



REPUBLIC OF ZAMBIA

PROVINCIAL ADMINISTRATION- EASTERN PROVINCE

ZAMBIA INTEGRATED FOREST LANDSCAPE PROJECT (ZIFLP)

Specifications for the Supply, delivery and Installations of Solar water pumps for the Farmer-led irrigation schemes in twenty-one sites in Eastern Province

CONSULTANT

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BILL 1: PRELIMINARY AND GENERAL ITEMS**1.1 PRELIMINARY ITEMS**

NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
1.1.1	Mobilization of required materials, equipment's, tools, machines and skilled and unskilled labour and demobilization of equipment after completion. All the provided materials should be of approved quality by supervisor Engineer (Certificate of Origin and Quality should be provided).	1	set		
1.1.2	Movements between sites	645	Km		

1.2 GENERAL ITEMS

1.2.1	Cement grouting and concrete platform ground well head (1m)	46	m ³		
1.2.2	Construction of a cover as per drawing.	46	LS		
1.2.3	Metallic Enclosure for housing the controls, well-ventilated and lockable	46	pc		
<u>DC accessories and earth protection</u>					
1.2.4	Supply and install Solar DC Fuses with all necessary accessories.	46	pc		
1.2.5	Supply and Install PV surge protector.	46	pc		
1.2.6	Supply and Install lightning arrestor with copper strips of not less than 25mm x 4mm	46	pc		
1.2.7	Supply and Install 5/8 100% copper earth rod.	46	pc		
1.2.8	Supply and Install 10mm ² Copper earth cable (10m per borehole)	460	M		
1.2.9	Supply and Install 4 mm ² 3-cores PVC/SWA 99% copper armored cable from controller to well head (10M PER BOREHOLE OF UNDERGROUND CABLE)	460	M		
<u>Power supply cables</u>					
1.2.1 0	Appropriately sized cable joint kit to splice the motor lead to the submersible cable.	46	pc		
1.2.1 1	Testing and Commissioning of the solar system. The work includes training of the local TSB staff on the operation and maintenance of the solar system	46	No.		

BILL 1: PRELIMINARY AND GENERAL ITEMS TOTAL CARRIED TO MAIN SUMMARY (Page 43)

BILL 2: KAMLAZA FLIS SOLAR PUMP WORK

NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E (ZK)	AMOUNT (ZK)
2.1 KAMLAZA BOREHOLE 1 (BH1) WORKS					
2.1.1	<u>Main components</u>				
2.1.1.1	Supply and Install a complete submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 36m ³ /day (8 hours) at 130m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
2.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
2.1.2	<u>Power supply cables</u>				
2.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
2.1.2.2	Appropriately sized cable joint to splice the motor lead to the submersible cable	1	pc		
2.1.3	<u>Sensors</u>				
2.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
2.1.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	250	M		
2.1.4	<u>Pipes and piping accessories</u>				
2.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	Rolls		
2.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
2.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
2.1.5	<u>Module support structure</u>				
2.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

2.1.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
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KAMLAZA BH1 WORKS TOTAL CARRIED TO BILL 2 SUMMARY

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2.2 KAMLAZA BOREHOLE 2 (BH2) WORKS

NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
2.2.1	<u>Main components</u>				
2.2.1 .1	Supply and Install a complete submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 18.4m³/day (8 hours) at 70m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
2.2.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
2.2.2	<u>Power supply cables</u>				
2.2.2 .1	Supply and Install 4 mm² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	70	M		
2.2.3	<u>Sensors</u>				
2.2.3 .4	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
2.2.3 .5	Supply and Install 1.5 mm² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	150	M		
2.2.4	<u>Pipes and piping accessories</u>				
2.2.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	pc		
2.2.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
2.2.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	70	m		

2.2.5	<u>Module support structure</u>				
2.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
2.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KAMLAZA BH2 WORKS TOTAL CARRIED TO BILL 2 SUMMARY					

2.3 BILL 2 KAMLAZA BH WORKS SUMMARY

2.3.1	KAMLAZA BH1 WORKS TOTAL				
2.3.2	KAMLAZA BH2 WORKS TOTAL				
BILL 2: KAMLAZA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY					
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BILL 3: ZINGALUME FLIS SOLAR PUMP WORK

3.1 ZINGALUME BOREHOLE 1 (BH1) WORKS

3.1.1	<u>Main components</u>				
3.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 13.6m ³ /day (8 hours per day of pumping) at 70m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
3.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
3.1.2	<u>Power supply cables</u>				
3.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
3.1.3	<u>Sensors</u>				
3.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		

3.1.3 .2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	70	M		
3.1.4	<u>Pipes and piping accessories</u>				
3.1.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		
3.1.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
3.1.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
3.1.5	<u>Module support structure</u>				
3.1.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
3.1.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
ZINGALUME BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

3.2 ZINGALUME BOREHOLE 2 (BH2) WORKS

NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
3.2.1	<u>Main components</u>				
3.2.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 18.4m ³ /day (8 hours per day of pumping) at 70m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		-
3.2.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
3.2.2	<u>Power supply cables</u>				
3.2.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	70	M		
3.2.3	<u>Sensors</u>				
3.2.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		

3.2.3 .2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	60	M		
3.2.4	<u>Pipes and piping accessories</u>				
3.2.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		
3.2.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
3.2.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
3.2.5	<u>Module support structure</u>				
3.2.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
3.2.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
ZINGALUME BH2 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

3.3 ZINGALUME BOREHOLE 3 (BH3) WORKS

3.3. Main components

1

3.3.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 18.4m ³ /day (8 hours per day of pumping) at 70m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
3.3.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
3.3.2	<u>Power supply cables</u>				
3.3.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	70	M		
3.3.3	<u>Sensors</u>				
3.3.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		

3.3.3 .2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	60	M		
3.3.4	<u>Pipes and piping accessories</u>				
3.3.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		
3.3.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
3.3.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
3.3.5	<u>Module support structure</u>				
3.3.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
3.3.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
ZINGALUME BH2 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

3.4 BILL 3: ZINGALUME BH WORKS SUMMARY

3.4.1	ZINGALUME BH1 WORKS TOTAL				
3.4.2	ZINGALUME BH2 WORKS TOTAL				
3.4.3	ZINGALUME BH3 WORKS TOTAL				
BILL 3: ZINGALUME SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 4: KAMANGA FLIS SOLAR PUMP WORK

4.1 KAMANGA BOREHOLE 1 (BH1) WORKS					
4.1.1	<u>Main components</u>				
4.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
4.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
4.1.2	<u>Power supply cables</u>				
4.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
4.1.3	<u>Sensors</u>				
4.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
4.1.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for Floats witch	55	M		
4.1.4	<u>Pipes and piping accessories</u>				
4.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
4.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
4.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
4.1.5	<u>Module support structure</u>				
4.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		

4.1.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
KAMANGA BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					
4.2 KAMANGA BOREHOLE 2 (BH2) WORKS					
4.2. 1	<u>Main components</u>				
4.2.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m³/day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
4.2.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
4.2. 2	<u>Power supply cables</u>				
4.2.2 .1	Supply and Install 4 mm² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	70	M		
4.2. 3	<u>Sensors</u>				
4.2.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
4.2.3 .2	Supply and Install 1.5 mm² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M		
4.2. 4	<u>Pipes and piping accessories</u>				
4.2.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		
4.2.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
4.2.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
4.2. 5	<u>Module support structure</u>				
4.2.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

4.2.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KAMANGA BH2 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					
4.3 KAMANGA BOREHOLE 3 (BH3) WORKS					
NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
4.3. 1	<u>Main components</u>				
4.4.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		-
4.4.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		-
4.3. 2	<u>Power supply cables</u>				
4.3.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M		-
4.3. 3	<u>Sensors</u>				
4.3. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		-
4.3.3 .2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M		-
4.3. 4	<u>Pipes and piping accessories</u>				
4.3.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		-
4.3.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		-
4.3.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		-
4.3. 5	<u>Module support structure</u>				
4.3.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		-

4.3. 5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		-
KAMANGA BH3 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

4.4 BILL 4: KAMANGA BH WORKS SUMMARY

4.4.1	KAMANGA BH1 WORKS TOTAL				
4.4.2	KAMANGA BH2 WORKS TOTAL				
4.4.3	KAMANGA BH3 WORKS TOTAL				
KAMANGA BILL 4 WORKS TOTAL CARRIED MAIN SUMMARY (Page 43)					

BILL 5: CHISWA FLIS SOLAR PUMP WORK

5.1 CHISWA BOREHOLE 1 (BH1) WORKS					
5.1. 1	<u>Main components</u>				
5.1.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 25.6m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
5.1.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
5.1. 2	<u>Power supply cables</u>				
5.1.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M		
5.1. 3	<u>Sensors</u>				
5.1.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
5.1.3 .2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
5.1. 4	<u>Pipes and piping accessories</u>				
5.1.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
5.1.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump	1	set		

	cable, well head accessories including elbows, adaptors etc.				
5.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
5.1.5	<u>Module support structure</u>				
5.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
5.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
CHISWA BH1 WORKS TOTAL CARRIED TO BILL 5 SUMMARY					

5.2 CHISWA BOREHOLE 2 (BH2) WORKS

NO.	ITEM DESCRIPTION	QTY	UNIT	RATE	AMOUNT
5.2.1	<u>Main components</u>				
5.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
5.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
5.2.2	<u>Power supply cables</u>				
5.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	70	M		
5.2.3	<u>Sensors</u>				
5.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
5.2.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M		
5.2.4	<u>Pipes and piping accessories</u>				
5.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		

5.2.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
5.2.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
5.2.5	<u>Module support structure</u>				
5.2.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
5.2.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
CHISWA BH2 WORKS TOTAL CARRIED TO BILL 5 SUMMARY					

5.4 BILL 5: CHISWA BH WORKS SUMMARY

5.4.1	CHISWA BH1 WORKS TOTAL				
5.4.2	CHISWA BH2 WORKS TOTAL				
BILL 5: CHISWA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY					

BILL 6: JERUSALEM FLIS SOLAR PUMP WORK

6.1 JERUSALEM BOREHOLE 1 (BH1) WORKS

6.1.1	<u>Main components</u>				
6.1.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 32m³/day (8 hours per day of pumping) at 130m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
6.1.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
6.1.2	<u>Power supply cables</u>				
6.1.2 .1	Supply and Install 4 mm² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
6.1.3	<u>Sensors</u>				

6.1.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
6.1.3 .2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	150	M		
6.1.4	<u>Pipes and piping accessories</u>				
6.1.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
6.1.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
6.1.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
6.1.5	<u>Module support structure</u>				
6.1.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
6.1.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
JERUSALEM BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					
6.2 JERUSALEM BOREHOLE 2 (BH2) WORKS					
NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
6.2.1	<u>Main components</u>				
6.2.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 32 m³/day (8 hours per day of pumping) at 130m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
6.2.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
6.2.2	<u>Power supply cables</u>				
6.2.2 .1	Supply and Install 4 mm² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		

6.2.3	Sensors				
6.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
6.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	150	M		
6.2.4	Pipes and piping accessories				
6.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
6.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
6.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
6.2.5	Module support structure				
6.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
6.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
JERUSALEM BH2 WORKS TOTAL CARRIED TO BILL 6 SUMMARY					

6.3 JERUSALEM ADDITIONAL WORKS

6.3.1	Allow for Traffic control (detour) and provide appropriate signage	1	LS		
6.3.2	Excavation works to enable crossing of water pipes across the road as instructed by the supervising Engineer.	3	m ³		
6.3.3	Supply and install 150mm diameter G.I pipe	12	m		
6.3.4	Encasing of a G.I pipe in C30 concrete	1.5	m ³		
6.3.5	Backfilling the excavated works with approved materials in layers of 150mm and compacted to 98 MDD-AASHITO.	2	m ³		
6.3.6	supply and installation of game wire according to design to secure solar modules and the boreholes	1	No.		
JERUSALEM ADDITIONAL WORKS CARRIED TO BILL 6 SUMMARY					

6.4 BILL 6: JERUSALEM BH WORKS SUMMARY

6.4.1	JERUSALEM BH1 WORKS TOTAL				
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6.4.2	JERUSALEM BH2 WORKS TOTAL	
6.4.3	ADDITIONALWORKS TOTAL	
BILL 6: JERUSALEM SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY		
(Page 43)		

BILL 7: KAPONGOLO FLIS SOLAR PUMP WORK					
7.1 KAPONGOLO BOREHOLE 1 (BH1) WORKS					
7.1.1	<u>Main components</u>				
7.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 30m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
7.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, as per pump power requirements to meet the water demand	1	lump sum		
7.1.2	<u>Power supply cables</u>				
7.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M		
7.1.3	<u>Sensors</u>				
7.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
7.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
7.1.4	<u>Pipes and piping accessories</u>				
7.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
7.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
7.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	55	m		
7.1.5	<u>Module support structure</u>				
7.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
7.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate	1	lump sum		

	foundation, made of corrosion resistant steel, raised foundation resistant to erosion during flooding or run off.				
KAPONGOLO BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					
7.2 KAPONGOLO BOREHOLE 2 (BH2) WORKS					
7.2.1	<u>Main components</u>				
7.2.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 30 m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
7.2.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, as per pump power requirements to meet the water demand	1	L		
7.2.2	<u>Power supply cables</u>				
7.2.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
7.2.3	<u>Sensors</u>				
7.2.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
7.2.3 .2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
7.2.4	<u>Pipes and piping accessories</u>				
7.2.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
7.2.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
7.2.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
7.2.5	<u>Module support structure</u>				
7.2.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

7.2.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KAPONGOLO BH2 WORKS TOTAL CARRIED TO BILL 7 SUMMARY					

7.3 BILL 7: KAPONGOLO BH WORKS SUMMARY

7.3.1	KAPONGOLO BH1 WORKS TOTAL				
7.3.2	KAPONGOLO BH2 WORKS TOTAL				
BILL 7: KAPONGOLO SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 8: MKHANYA FLIS SOLAR PUMP WORK

8.1 MKHANYA BOREHOLE 1 (BH1) WORKS

8.1. Main components

1

8.1.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 39m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
8.1.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
8.1. 2	<u>Power supply cables</u>				
8.1.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
8.1. 3	<u>Sensors</u>				
8.1.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
8.1.3 .2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
8.1. 4	<u>Pipes and piping accessories</u>				
8.1.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
8.1.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		

8.1.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
8.1.5	<u>Module support structure</u>				
8.1.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
8.1.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
MKHANYA BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

8.2 MKHANYA BOREHOLE 2 (BH2) WORKS

8.2.1	<u>Main components</u>				
8.2.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 30 m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
8.2.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
8.2.2	<u>Power supply cables</u>				
8.2.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
8.2.3	<u>Sensors</u>				
8.2.3 .1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
8.2.3 .2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
8.2.4	<u>Pipes and piping accessories</u>				
8.2.4 .1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		

8.2.4 .2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
8.2.4 .3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
8.2.5	<u>Module support structure</u>				
8.2.5 .1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
8.2.5 .2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
MKHANYA BH2 WORKS TOTAL CARRIED TO BILL 8 SUMMARY					

8.3 BILL 8: MKHANYA BH WORKS SUMMARY

8.3.1	MKHANYA BH1 WORKS TOTAL				
8.3.2	MKHANYA BH2 WORKS TOTAL				
BILL 8: MKHANYA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 9: NSAIKA FLIS SOLAR PUMP WORK

9.1 NSAIKA BOREHOLE 1 (BH1) WORKS					
9.1.1	<u>Main components</u>				
9.1.1 .1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
9.1.1 .2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
9.1.2	<u>Power supply cables</u>				
9.1.2 .1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		

9.1.3	Sensors				
9.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
9.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
9.1.4	Pipes and piping accessories				
9.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
9.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
9.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
9.1.5	Module support structure				
9.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
9.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
NSAIKA BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

9.2 NSAIKA BOREHOLE 2 (BH2) WORKS

NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
9.2.1	Main components				
9.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6 m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
9.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
9.2.2	Power supply cables				
9.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		

9.2.3	Sensors				
9.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
9.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
9.2.4	Pipes and piping accessories				
9.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
9.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
9.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
9.2.5	Module support structure				
9.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
9.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
NSAIKA BH2 WORKS TOTAL CARRIED TO BILL 9 SUMMARY					

9.3 BILL 9: NSAIKA BH WORKS SUMMARY

9.3.1	NSAIKA BH1 WORKS TOTAL				
9.3.2	NSAIKA BH2 WORKS TOTAL				
BILL 9: NSAIKA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 10: MAWANDA FLIS SOLAR PUMP WORK

10.1 MAWANDA BOREHOLE 1 (BH1) WORKS

10.1.1	Main components				
10.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 24.6m ³ /day (8 hours per day of pumping) at 70m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		

10.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
10.1.2	<u>Power supply cables</u>				
10.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
10.1.3	<u>Sensors</u>				
10.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
10.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	50	M		
10.1.4	<u>Pipes and piping accessories</u>				
10.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
10.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
10.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
10.1.5	<u>Module support structure</u>				
10.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
10.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
MAWANDA BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

10.2 MAWANDA BOREHOLE 2 (BH2) WORKS

10.2.1	<u>Main components</u>				
10.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 24.6 m ³ /day (8 hours per day of pumping) at 110m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		

10.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
10.2.2	<u>Power supply cables</u>				
10.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
10.2.3	<u>Sensors</u>				
10.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
10.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	60	M		
10.2.4	<u>Pipes and piping accessories</u>				
10.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
10.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
10.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
10.2.5	<u>Module support structure</u>				
10.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
10.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
MAWANDA BH2 WORKS TOTAL CARRIED TO BILL 10 SUMMARY					

10.3 BILL 10: MAWANDA BH WORKS SUMMARY

10.3.1	MAWANDA BH1 WORKS TOTAL				
10.3.2	MAWANDA BH2 WORKS TOTAL				
BILL 10: MAWANDA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 11: KALINDAWALO FLIS SOLAR PUMP WORK

11.1 KALINDAWALO BOREHOLE 1 (BH1) WORKS

11.1	<u>Main components</u>				
.1					
11.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6m ³ /day (8 hours per day of pumping) at 60 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
11.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
11.1	<u>Power supply cables</u>				
.2					
11.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
11.1	<u>Sensors</u>				
.3					
11.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
11.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	55	M		
11.1	<u>Pipes and piping accessories</u>				
.4					
11.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
11.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
11.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
11.1	<u>Module support structure</u>				
.5					
11.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
11.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KALINDAWALO BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					
<u>11.2 KALINDAWALO BOREHOLE 2 (BH2) WORKS</u>					
NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT

11.2	<u>Main components</u>				
.1					
11.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6 m ³ /day (8 hours per day of pumping) at 60m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
11.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
11.2	<u>Power supply cables</u>				
.2					
11.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
11.2	<u>Sensors</u>				
.3					
11.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
11.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	60	M		
11.2	<u>Pipes and piping accessories</u>				
.4					
11.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
11.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
11.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
11.2	<u>Module support structure</u>				
.5					
11.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
11.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KALINDAWALO BH2 WORKS TOTAL CARRIED TO BILL 11 SUMMARY					

11.3 BILL 11: KALINDAWALO BH WORKS SUMMARY

11.3.1	KALINDAWALO BH1 WORKS TOTAL				
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11.3. 2	KALINDAWALO BH2 WORKS TOTAL	
BILL 11: KALINDAWALO SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)		

BILL 12: NYAMPHANDE FLIS SOLAR PUMP WORK

12.1 NYAMPHANDE BOREHOLE 1 (BH1) WORKS					
12.1 .1	<u>Main components</u>				
12.1. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6m ³ /day (8 hours per day of pumping) at 120 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
12.1. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
12.1 .2	<u>Power supply cables</u>				
12.1. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
12.1 .3	<u>Sensors</u>				
12.1. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
12.1. 3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	230	M		
12.1 .4	<u>Pipes and piping accessories</u>				
12.1. 4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
12.1. 4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
12.1. 4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
12.1 .5	<u>Module support structure</u>				
12.1. 5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
12.1. 5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate	1	LS		

	foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.				
NYAMPHANDE BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

12.2 NYAMPHANDE BOREHOLE 2 (BH2) WORKS

NO.	ITEM DESCRIPTION	QTY	UNIT	RAT E	AMOUNT
12.2 .1	<u>Main components</u>				
12.2. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6 m ³ /day (8 hours per day of pumping) at 120m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
12.2. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
12.2 .2	<u>Power supply cables</u>				
12.2. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	50	M		
12.2 .3	<u>Sensors</u>				
12.2. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
12.2. 3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	130	M		
12.2 .4	<u>Pipes and piping accessories</u>				
12.2. 4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
12.2. 4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
12.2. 4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
12.2 .5	<u>Module support structure</u>				
12.2. 5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

12.2. 5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
NYAMPHANDE BH2 WORKS TOTAL CARRIED TO BILL 12 SUMMARY					

12.3 BILL 12: NYAMPHANDE BH WORKS SUMMARY

12.3. 1	NYAMPHANDE BH1 WORKS TOTAL				
12.3. 2	NYAMPHANDE BH2 WORKS TOTAL				
NYAMPHANDE WORKS TOTAL CARRIED TO BILL 12 SUMMARY (Page 43)					

BILL 13: SINDA VILLAGE FLIS SOLAR PUMP WORK

13.1 SINDA VILLAGE BOREHOLE 1 (BH1) WORKS					
13.1 .1	<u>Main components</u>				
13.1. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m³/day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
13.1. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, as per pump power requirements to meet the water demand	1	LS		
13.1 .2	<u>Power supply cables</u>				
13.1. 2.1	Supply and Install 4 mm² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
13.1 .3	<u>Sensors</u>				
13.1. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
13.1. 3.2	Supply and Install 1.5 mm² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
13.1 .4	<u>Pipes and piping accessories</u>				

13.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
13.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
13.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
13.1.5	<u>Module support structure</u>				
13.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
13.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
SINDA VILLAGE BH1 WORKS TOTAL CARRIED TO BILL 13 SUMMARY					

13.2 SINDA VILLAGE BOREHOLE 2 (BH2) WORKS

13.2.1	<u>Main components</u>				
13.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
13.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, as per pump power requirements to meet the water demand	1	LS		
13.2.2	<u>Power supply cables</u>				
13.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
13.2.3	<u>Sensors</u>				
13.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
13.2.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
13.2.4	<u>Pipes and piping accessories</u>				

13.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		
13.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
13.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
13.2.5	<u>Module support structure</u>				
13.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	3	LS		
13.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
SINDA VILLAGE BH2 WORKS TOTAL CARRIED TO BILL 13 SUMMARY					

13.3 SINDA VILLAGE BOREHOLE 3 (BH3) WORKS

13.3.1	<u>Main components</u>				
13.3.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 16.4m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
13.3.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
13.4	<u>Power supply cables</u>				
13.4.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
13.5.3	<u>Sensors</u>				
13.5.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
13.5.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
13.5.4	<u>Pipes and piping accessories</u>				
13.5.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	1	roll		

13.5.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
13.5.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
13.3.6	<u>Module support structure</u>				
13.3.6.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
13.3.6.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
SINDA VILLAGE BH3 WORKS TOTAL CARRIED TO BILL 13 SUMMARY					

13.4 BILL 13: SINDA VILLAGE BH WORKS SUMMARY

13.4.1	SINDA VILLAGE BH1 WORKS TOTAL				
13.4.2	SINDA VILLAGE BH2 WORKS TOTAL				
13.4.3	SINDA VILLAGE BH2 WORKS TOTAL				
BILL 13: SINDA VILLAGE SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 14: KATHUMBA FLIS SOLAR PUMP WORK

14.1 KATHUMBA BOREHOLE 1 (BH1) WORKS

14.1.1	<u>Main components</u>				
14.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 18.4m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
14.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to pump power requirements to meet the water demand	1	LS		
14.1.2	<u>Power supply cables</u>				
14.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
14.1.3	<u>Sensors</u>				

14.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
14.1.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	65	M		
14.1.4	<u>Pipes and piping accessories</u>				
14.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
14.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
14.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	50	m		
14.1.5	<u>Module support structure</u>				
14.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
14.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KATHUMBA BH1 WORKS TOTAL CARRIED TO BILL 14 SUMMARY					

14.2 KATHUMBA BOREHOLE 2 (BH2) WORKS

14.2.1	<u>Main components</u>				
14.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 18.4m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
14.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
14.2.2	<u>Power supply cables</u>				
14.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
14.2.3	<u>Sensors</u>				
14.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		

14.2.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
14.2.4	<u>Pipes and piping accessories</u>				
14.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
14.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
14.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
14.2.5	<u>Module support structure</u>				
14.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	3	LS		
14.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KATHUMBA BH2 WORKS TOTAL CARRIED TO BILL 14 SUMMARY					

14.3 KATHUMBA BOREHOLE 3 (BH3) WORKS

14.3.1	<u>Main components</u>				
14.3.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 18.4m ³ /day (8 hours per day of pumping) at 100m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
14.3.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
14.4	<u>Power supply cables</u>				
14.4.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
14.5.3	<u>Sensors</u>				

14.5.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
14.5.3.2	Supply and Install 1.5 mm ² 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
14.5.4	<u>Pipes and piping accessories</u>				
14.5.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
14.5.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
14.5.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
14.3.6	<u>Module support structure</u>				
14.3.6.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
14.3.6.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KATHUMBA BH3 WORKS TOTAL CARRIED TO BILL 14 SUMMARY					

14.4 BILL 14: KATHUMBA BH WORKS SUMMARY

14.4.1	KATHUMBA BH1 WORKS TOTAL				
14.4.2	KATHUMBA BH2 WORKS TOTAL				
14.4.3	KATHUMBA BH2 WORKS TOTAL				
BILL 14: KATHUMBA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 15: KAGORO FLIS SOLAR PUMP WORK

15.1 KAGORO BOREHOLE 1 (BH1) WORKS

15.1	<u>Main components</u>				
.1					
15.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 23m ³ /day (8 hours per day of pumping) at 130 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
15.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
15.1	<u>Power supply cables</u>				
.2					
15.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
15.1	<u>Sensors</u>				
.3					
15.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
15.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
15.1	<u>Pipes and piping accessories</u>				
.4					
15.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
15.1.4.2	Supply and Install well head cover e for 155mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
15.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
15.1	<u>Module support structure</u>				
.5					
15.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
15.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
KAGORO BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

15.2 KAGORO BOREHOLE 2 (BH2) WORKS

15.2	<u>Main components</u>				
.1					

15.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 23 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 155mm PVC casings	1	set		
15.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
15.2.2	<u>Power supply cables</u>				
15.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
15.2.3	<u>Sensors</u>				
15.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
15.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
15.2.4	<u>Pipes and piping accessories</u>				
15.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
15.2.4.2	Supply and Install well head cover e for 155mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
15.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
15.2.5	<u>Module support structure</u>				
15.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
15.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
KAGOLO BH2 WORKS TOTAL CARRIED TO BILL 15 SUMMARY					

15.3 BILL 15: KAGOLO BH WORKS SUMMARY

15.3.1	KAGOLO BH1 WORKS TOTAL				
15.3.2	KAGOLO BH2 WORKS TOTAL				

BILL 15: KAGOLO SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY

(Page 43)

BILL 16: CHIPILINGU FLIS SOLAR PUMP WORK**16.1 CHIPILINGU BOREHOLE 1 (BH1) WORKS**

16.1	<u>Main components</u>				
.1					
16.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 23m ³ /day (8 hours per day of pumping) at 80 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
16.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
16.1	<u>Power supply cables</u>				
.2					
16.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
16.1	<u>Sensors</u>				
.3					
16.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
16.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	150	M		
16.1	<u>Pipes and piping accessories</u>				
.4					
16.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	3	roll		
16.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
16.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
16.1	<u>Module support structure</u>				
.5					
16.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
16.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		

CHIPILINGU BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY	
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16.2 CHIPILINGU BOREHOLE 2 (BH2) WORKS

16.2	<u>Main components</u>				
.1					
16.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 23 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
16.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
16.2	<u>Power supply cables</u>				
.2					
16.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
16.2	<u>Sensors</u>				
.3					
16.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
16.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	100	M		
16.2	<u>Pipes and piping accessories</u>				
.4					
16.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 160m complete with all necessary fittings and accessories	2	roll		
16.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
16.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
16.2	<u>Module support structure</u>				
.5					
16.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
16.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
CHIPILINGU BH2 WORKS TOTAL CARRIED TO BILL 16 SUMMARY					

16.3 BILL 16: CHIPILINGU BH WORKS SUMMARY

16.3. 1	CHIPILINGU BH1 WORKS TOTAL	
16.3. 2	CHIPILINGU BH2 WORKS TOTAL	
BILL 16: CHIPILINGU SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)		

BILL 17: RUKUZYE FLIS SOLAR PUMP WORK

17.1 RUKUZYE BOREHOLE 1 (BH1) WORKS

17.1 .1	<u>Main components</u>				
17.1. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 25m ³ /day (8 hours per day of pumping) at 80 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		-
17.1. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		-
17.1 .2	<u>Power supply cables</u>				
17.1. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		-
17.1 .3	<u>Sensors</u>				
17.1. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		-
17.1. 3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		-
17.1 .4	<u>Pipes and piping accessories</u>				
17.1. 4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		-
17.1. 4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		-
17.1. 4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
17.1 .5	<u>Module support structure</u>				
17.1. 5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

17.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 170*170*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
RUKUZYE BH1 WORKS TOTAL CARRIED TO BILL 17 SUMMARY					

17.2 RUKUZYE BOREHOLE 2 (BH2) WORKS

17.2	<u>Main components</u>				
.1					
17.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 25 m ³ /day (8 hours per day of pumping) at 90m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
17.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
17.2	<u>Power supply cables</u>				
.2					
17.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		
17.2	<u>Sensors</u>				
.3					
17.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
17.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M		
17.2	<u>Pipes and piping accessories</u>				
.4					
17.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
17.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
17.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
17.2	<u>Module support structure</u>				
.5					
17.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		-

17.2. 5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 170*170*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		-
RUKUZYE BH2 WORKS TOTAL CARRIED TO BILL 17 SUMMARY					

17.3 BILL 17: RUKUZYE BH WORKS SUMMARY

17.3. 1	RUKUZYE BH1 WORKS TOTAL				
17.3. 2	RUKUZYE BH2 WORKS TOTAL				
BILL 17: RUKUZYE SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 18: NYALUBANGA FLIS SOLAR PUMP WORK

18.1 NYALUBANGA BOREHOLE 1 (BH1) WORKS

18.1 .1	<u>Main components</u>				
18.1. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 23m ³ /day (8 hours per day of pumping) at 80 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		-
18.1. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		-
18.1 .2	<u>Power supply cables</u>				
18.1. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	65	M		-
18.1 .3	<u>Sensors</u>				
18.1. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
18.1. 3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
18.1 .4	<u>Pipes and piping accessories</u>				

18.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
18.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
18.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	65	m		
18.1.5	<u>Module support structure</u>				
18.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
18.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 180*180*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
NYALUBANGA BH1 WORKS TOTAL CARRIED TO BILL 18 SUMMARY					

18.2 NYALUBANGA BOREHOLE 2 (BH2) WORKS

18.2.1	<u>Main components</u>				
18.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 26 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
18.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
18.2.2	<u>Power supply cables</u>				
18.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
18.2.3	<u>Sensors</u>				
18.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		

18.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
18.2.4	<u>Pipes and piping accessories</u>				
18.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
18.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
18.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	55	m		
18.2.5	<u>Module support structure</u>				
18.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
18.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 180*180*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
NYALUBANGA BH2 WORKS TOTAL CARRIED TO BILL 18 SUMMARY					

18.3 BILL 18: NYALUBANGA BH WORKS SUMMARY

18.3.1	NYALUBANGA BH1 WORKS TOTAL				
18.3.2	NYALUBANGA BH2 WORKS TOTAL				
BILL 18: NYALUBANGA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 19: VUU FLIS SOLAR PUMP WORK

19.1 VUU BOREHOLE 1 (BH1) WORKS

19.1.1	<u>Main components</u>				
19.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 23m³/day (8 hours per day of pumping) at 80 head. The motor should be brushless and have the	1	set		

	thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings				
19.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
19.1.2	<u>Power supply cables</u>				
19.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
19.1.3	<u>Sensors</u>				
19.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
19.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
19.1.4	<u>Pipes and piping accessories</u>				
19.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
19.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
19.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	55	m		
19.1.5	<u>Module support structure</u>				
19.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
19.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 190*190*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
VUU BH1 WORKS TOTAL CARRIED TO BILL 19 SUMMARY					

19.2 VUU BOREHOLE 2 (BH2) WORKS

19.2.1	<u>Main components</u>				
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19.2. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 27.6 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
19.2. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
19.2 .2	<u>Power supply cables</u>				
19.2. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
19.2 .3	<u>Sensors</u>				
19.2. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
19.2. 3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
19.2 .4	<u>Pipes and piping accessories</u>				
19.2. 4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
19.2. 4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
19.2. 4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	55	m		
19.2 .5	<u>Module support structure</u>				
19.2. 5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
19.2. 5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 190*190*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
VUU BH2 WORKS TOTAL CARRIED TO BILL 19 SUMMARY					

19.3 BILL 19: VUU BH WORKS SUMMARY

19.3. 1	VUU BH1 WORKS TOTAL				
19.3. 2	VUU BH2 WORKS TOTAL				

BILL 20: KATOPOLA FLIS SOLAR PUMP WORK

20.1 VUU BOREHOLE 1 (BH1) WORKS

20.1 .1	<u>Main components</u>				
20.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 25m ³ /day (8 hours per day of pumping) at 70 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
20.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	lump sum		
20.1 .2	<u>Power supply cables</u>				
20.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
20.1 .3	<u>Sensors</u>				
20.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
20.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	70	M		
20.1 .4	<u>Pipes and piping accessories</u>				
20.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
20.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
20.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	55	m		
20.1 .5	<u>Module support structure</u>				
20.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
20.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 200*200*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		

KATOPOLA BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY**20.2 KATOPOLA BOREHOLE 2 (BH2) WORKS**

20.2	<u>Main components</u>			
.1				
20.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 34 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set	
20.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L	
20.2	<u>Power supply cables</u>			
.2				
20.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M	
20.2	<u>Sensors</u>			
.3				
20.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc	
20.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M	
20.2	<u>Pipes and piping accessories</u>			
.4				
20.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll	
20.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set	
20.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m	
20.2	<u>Module support structure</u>			
.5				
20.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS	
20.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS	
KATOPOLA BH2 WORKS TOTAL CARRIED TO BILL 20 SUMMARY				

20.3 BILL 20: KATOPOLA BH WORKS SUMMARY

20.3. 1	KATOPOLA BH1 WORKS TOTAL	
20.3. 2	KATOPOLA BH2 WORKS TOTAL	
BILL 20: KATOPOLA SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)		

BILL 21: MBANDE FLIS SOLAR PUMP WORK

21.1 MBANDE BOREHOLE 1 (BH1) WORKS

21.1 .1	<u>Main components</u>				
21.1. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 28m ³ /day (8 hours per day of pumping) at 60 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
21.1. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
21.1 .2	<u>Power supply cables</u>				
21.1. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M		
21.1 .3	<u>Sensors</u>				
21.1. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
21.1. 3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
21.1 .4	<u>Pipes and piping accessories</u>				
21.1. 4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
21.1. 4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
21.1. 4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
21.1 .5	<u>Module support structure</u>				
21.1. 5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

21.1. 5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
MBANDE BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					
21.2 MBANDE BOREHOLE 2 (BH2) WORKS					
21.2 .1	<u>Main components</u>				
21.2. 1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 34 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
21.2. 1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
21.2 .2	<u>Power supply cables</u>				
21.2. 2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M		
21.2 .3	<u>Sensors</u>				
21.2. 3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
21.2. 3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M		
21.2 .4	<u>Pipes and piping accessories</u>				
21.2. 4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
21.2. 4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
21.2. 4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
21.2 .5	<u>Module support structure</u>				
21.2. 5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		

21.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
MBANDE BH2 WORKS TOTAL CARRIED TO BILL 21 SUMMARY					

21.3 BILL 21: MBANDE BH WORKS SUMMARY

21.3.1	MBANDE BH1 WORKS TOTAL				
21.3.2	MBANDE BH2 WORKS TOTAL				
BILL 21: MBANDE SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

BILL 22: ZOZWE FLIS SOLAR PUMP WORK

22.1 ZOZWE BOREHOLE 1 (BH1) WORKS

22.1.1	<u>Main components</u>				
22.1.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 28m ³ /day (8 hours per day of pumping) at 60 head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		
22.1.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	LS		
22.1.2					
22.1.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	55	M		
22.1.3	<u>Sensors</u>				
22.1.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
22.1.3.2	Supply and Install appropriate 2-core PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	80	M		
22.1.4	<u>Pipes and piping accessories</u>				
22.1.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		

22.1.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
22.1.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	55	m		
22.1.5	<u>Module support structure</u>				
22.1.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	lump sum		
22.1.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	lump sum		
ZOZWE BH1 WORKS TOTAL CARRIED TO BILL 3 SUMMARY					

22.2 ZOZWE BOREHOLE 2 (BH2) WORKS

22.2.1	<u>Main components</u>				
22.2.1.1	Supply and Install submersible solar pump, with stainless steel impeller and inbuilt dry run protection, to supply 34 m ³ /day (8 hours per day of pumping) at 80m head. The motor should be brushless and have the thrust bearing system. Ensure that pump selected will fit into the borehole with 125mm PVC casings	1	set		-
22.2.1.2	Supply and Install Solar Panel, monocrystalline PV Solar Modules, according to the pump power requirements to meet the water demand	1	L		
22.2.2	<u>Power supply cables</u>				
22.2.2.1	Supply and Install 4 mm ² 3-cores PVC SUBMERSIBLE 99% copper cable from well head to pump. (POWER CABLE)	60	M		
22.2.3	<u>Sensors</u>				
22.2.3.1	Supply and Install float switch for automation to the tank which must be compatible with the supplied controller	1	pc		
22.2.3.2	Supply and Install appropriate 2-cores PVC/SWA 99% copper armoured cable from control panel to the tank for FLOATSWITCH	90	M		

22.2	<u>Pipes and piping accessories</u>				
.4					
22.2.4.1	Supply and Install 50mm HDPE poly pipe class 9 x 100m complete with all necessary fittings and accessories	2	roll		
22.2.4.2	Supply and Install well head cover e for 125mm PVC casing c/w with opening for pipe connection and pump cable, well head accessories including elbows, adaptors etc.	1	set		
22.2.4.3	Appropriately sized nylon rope to support the submersible pump in the borehole	60	m		
22.2	<u>Module support structure</u>				
.5					
22.2.5.1	Allow for civil works of reinforced C25 concrete and foundation bolts, the whole foundation must be raised to a level such that steel column won't be in contact with storm water	1	LS		
22.2.5.2	Supply and erect a panel support structure with a 15° tilt and lower end to be minimum 3m above ground level to support the quantity of panels above. All joints to be bolt and nuts with spot welding. The design should account for self-weight, panel weight and also wind forces. Construction should be done with correctly sized members, adequate cross braces, drilled plates with minimum specifications of 160*160*8mm, adequate foundation, made of corrosion resistant steel, raised foundation that is resistant to erosion during flooding or run off.	1	LS		
ZOZWE BH2 WORKS TOTAL CARRIED TO BILL 22 SUMMARY					
22.3 BILL 22: ZOZWE BH WORKS SUMMARY					
SNO.	DETAILS				AMOUNT
22.3.1	ZOZWE BH1 WORKS TOTAL				
22.3.2	ZOZWE BH2 WORKS TOTAL				
BILL 22: ZOZWE SOLAR PUMP WORK TOTAL CARRIED TO MAIN SUMMARY (Page 43)					

MAIN SUMMARY

SNO.	DETAILS	AMOUNT (ZK)
01	BILL 1:PRELIMINARY AND GENERAL ITEMS TOTAL	
02	BILL 2: KAMLAZA SOLAR PUMP WORK TOTAL	
03	BILL 3: ZINGALUME SOLAR PUMP WORK TOTAL	
04	BILL 4: KAMANGA SOLAR PUMP WORK TOTAL	
05	BILL 5: CHISWA SOLAR PUMP WORK TOTAL	
06	BILL 6: JERUSALEM SOLAR PUMP WORK TOTAL	
07	BILL 7: KAPONGOLO SOLAR PUMP WORK TOTAL	
08	BILL 8: MKHANYA SOLAR PUMP WORK TOTAL	
09	BILL 9: NSAIKA SOLAR PUMP WORK TOTAL	
10	BILL 10: MAWANDA SOLAR PUMP WORK TOTAL	
11	BILL 11: KALINDAWALO SOLAR PUMP WORK TOTAL	
12	BILL 12: NYAMPHANDE VILLAGE SOLAR PUMP WORK TOTAL	
13	BILL 13: SINDA VILLAGE SOLAR PUMP WORK TOTAL	
14	BILL 14: KATHUMBA SOLAR PUMP WORK TOTAL	
15	BILL 15: KAGOLO SOLAR PUMP WORK TOTAL	
16	BILL 16: CHIPILINGU SOLAR PUMP WORK TOTAL	
17	BILL 17: RUKUZYE SOLAR PUMP WORK TOTAL	
18	BILL 18: NYALUBANGA SOLAR PUMP WORK TOTAL	
19	BILL 19: VUU SOLAR PUMP WORK TOTAL	
20	BILL 20: KATOPOLA SOLAR PUMP WORK TOTAL	
21	BILL 21: MBANDE SOLAR PUMP WORK TOTAL	
22	BILL 22: ZOZWE SOLAR PUMP WORK TOTAL	
TOTAL		
ADD VALUE ADDED TAX @ 16%		
TOTAL SUM		

APPROXIMATE DISTANCES OF FLIS SITES FROM CENTRAL BUSINESS DISTRICTS

SNo.	FLIS Site	District	Distance CBD (Km)
01	Kamlaza site	Kasenengwa	25
02	Zingalume site	Chadiza	15
03	Kamanga site	Chadiza	30
04	Chiswa site	Chipata	50
05	Jerusalem site	Chipata	35
06	Kapongolo site	Lumezi	20
07	Mkhanya site	Mambwe	20
08	Nsaika site	Nyimba	15
09	Mawanda site	Lusangazi	40
10	Kalindawalo site	Petauke	20
11	Nyamphande site	Lusangazi	10 (from Petauke)
12	Sinda Village site	Sinda	15
13	Kathumba site	Sinda	20
14	Kagoro site	Katete	15
15	Chipiringu site	Katete	25
16	Rukuzye site	Chipangali	10
17	Nyalubanga site	Chasefu	20 (from Lundazi)
18	Vuu site	Lundazi	25
19	Katopola site	Lundazi	30
20	Mbande site	Vuu	20
21	Zozwe site	Vuu	25