

REPUBLIC OF KENYA



GOVERNMENT OF MAKUENI COUNTY



DEPARTMENT OF WATER, SANITATION & IRRIGATION
P.O BOX 78 – 90300, MAKUENI

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BILL OF QUANTITIES FOR KWA NZOONGO EARTH DAM DEVELOPMENT AND LIVELIHOOD ENHANCEMENT PROJECT IVINGONI/ NZAMBANI WARD					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
BILL 1	PRELIMINARY AND GENERAL ITEMS				
1.1	Maintain Contractor's camps, facilities, plants, personnel, etc, include mobilization to site, provision of security, provision of personal protective equipment and demobilization on completion of contract	Item	1		
1.2	Supply and erect publicity sign board on 1.5m x 1.2m metal sheet approximately secured on a 40 mm x 3mm thick steel frame at least 2m above the ground level and leveled as directed	No	1		
1.4	Undertake a hydrological survey of the flows, catchment, etc for the proposed construction of Kwa Nzongo earth pan and provide a certified report	Item	1		
1.8	Allow a provisional sum of Kenya Shillings Forty Thousand for setting out by the client's representative	Sum	1	40,000.00	40,000.00
1.9	Allow for contractor's attendance (Profit and other overheads) for item 1.5, 1.6, 1.7 and 1.8 above	%		40,000.00	
	TOTAL FOR PRELIMINARIES				
BILL 2	EARTH WORKS				
2.1	Reservoir Excavation				
2.1.1	Clear site of bushes , shrubs and trees, with mean girth of n.e 300 mm, and burn the arising / dispose of as directed.	SM	14,500		

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.1	Excavate in normal material depths from original levels and heap suitable excavated soils from the reservoir for embarkment construction and cart away sand, silt and other spoil for disposal as directed by the Project Manager.	CM	9,847		
2.2	Embankment				
2.21	Excavate core trench 3 m width to firm ground as shall be directed	CM	738		
2.22	Lay approved soils in 300mm layers, wet compact to 95% MMD AASHTO using sheep foot roller compactor (minimum 7 passes) for fill the core trench as directed by the resident engineer	CM	738		
2.23	Lay soils in 300mm layers, wet compact to 95% MMD AASHTO using sheep foot roller compactor or dozer min D7 to creat embankment fill. Raise the embankment and training wall to elevation 823.0 MASL, crest width of 5 m, and 108 m long, construct the embankment with slope of 1:2.5 both upstream and 1:2 downstream as detailed in the provided drawings or as directed by the resident engineer	CM	2540		
2.3	Check Dam				
2.31	Excavate core trench 3 m width to firm ground	CM	210		
2.32	Lay soils in 300mm layers, wet compact to 95% MMD AASHTO using sheep foot roller compactor (minimum 7 passes)for core trench fill as directed by the resident engineer	CM	210		
2.33	Lay approved soils in 300mm layers, wet compact to 95% MMD AASHTO using sheep foot roller compactor or dozer (minimum 7 passes), to create check dam embankment and training wall to crest width of 3 m, construct the embankment with slope of 1:2 both upstream and downstream as detailed in the provided drawings or as directed by the resident engineer	CM	1500		
2.4	Spillway Channel				



ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.41	Excavate and trim spillway channel 10 m width; maintain 2 m free board and maintain slopes of 1:1 as directed by the Project Supervisor.	CM	240		
2.42	Construct a 300 mm width by 0.5 m depth by 12 m length concrete sill class 20/20 reinforced with BRC A142 across the spillway as directed by the project manager	Item	2		
2.43	Provide and pack 200-300mm approved hardcore to bed and to slanting sides of the spilway channel for a length of 20 m of spillway channels on 1:2 c/s mortar	SM	360		
2.5	Extra Over Excavation in Any Position for:-				
2.51	Excavating in rock Class "A"	m ³	5		
2.52	Excavating in rock Class "B"	m ³	10		
2.53	Excavating in rock Class "C"	m ³	10		
	TOTAL FOR EARTHWORKS				
BILL 3	WATER WITHDRAWAL SYSTEM				
3.1	Drawoff pipe System				
3.101	Fabricate ,supply and install intake tower, 2.50 m high, 350 mm by 350 mm. The tower shall be made of iron angle sections, 40x40x3mm. Weld high grade mesh wire to make a cage round the angle bars. Weld 75 mm long angle pieces across the four stands in the lower end of the tower to facilitate proper anchorage in concrete. Include cost for perforation of 90 mm diam HDPE pipe PN12.5, centrally place in the graded ballast filled cage. Connect this pipe with the horizontal water withdrawal pipe across dam wall as per the provided drawing and directed.	No	1		
3.102	Supply Trench, lay and butfuse/ electroweld 90mm HDPE pipe PN12.5, as the water withdrawal pipe. Install the pipe in 200mm, 15/20 mass concrete sorround with water proof all section in dam embankment,	m	70		
	Supply the following plain end pipe fittings for fusing in to the drawoff pipe.				
3.103	DN90 plain ended 90° elbow	Nr	1		

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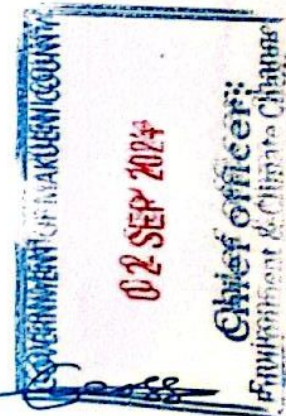
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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.104	DN90 plain ended end cap	Nr	1		
3.105	DN90 flanged stab and flanges	Nr	1		
3.106	DN90 sluice valve PN16	Nr	1		
3.107	DN90 flanged adaptor	Nr	1		
3.108	DN90x1" saddle clamps	Nr	2		
3.109	DN90 end plug	Nr	1		
3.11	Supply materials / quarry stones and construct a masonry valve chamber, 1.2 m x 1.2 m, n.e1 m deep. The chamber shall be fitted with a G16, lockable steel manhole cover in a G16 angle line frame work with locking devices and keys	No	1		
3.2	Communal Watering Points				
3.201	Provide materials and construct communal water point as per the provided drawing	No	1		
3.202	Provide materials and construct 5x1m cattle trough as per the provided drawing	No	1		
3.3	Scour Pipe				
3.301	Supply Trench, lay and butfuse/ electroweld 160mm HDPE pipe PN12.5, as the water withdrawal pipe. Install the pipe in 250mm, 15/20 mass concrete sorround with water proof all section in dam embankment,	m	48		
3.302	Supply the following plain end pipe fittings for fusing in to the drawoff pipe.				
3.303	DN160 flanged stab and flanges	Nr	1		
3.304	DN160 sluice valve PN16	Nr	1		
3.305	Supply materials / quarry stones and construct a masonry valve chamber, 1.2 m x 1.2 m, n.e1 m deep. The chamber shall be fitted with a G16, lockable steel manhole cover in a G16 angle line frame work with locking devices and keys	No	1		
	TOTAL BILL 3 CARRIED TO SUMMARY PAGE				
BILL 4	PERIMETER FENCING - PAN AREA AND DEMO FARM				



ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4.1	Supply and install 1.8 m high x 14 gauge approved chainlink complete with 14 Gauge x 4 strand galvanised plain wire fencing with 100 x 100 mm cranked precast concrete posts at 3 m centres, struted at 30m interval and mortised in mass concrete sorround. Include 2 strands of G14 galvanized approved barbed wire	LM	810		
4.2	Fabricate a standard 4 m double opening shutter lockable Steel gate openable from the outside all painted with Bermuda blue paint as directed by the Project Manager.	No	2		
4.3	Construct 2NO Reinforced masonry columns 300mm by 300mm reinforced with 4 D12 main bars, R6 links at 200 mm centres and concrete mix of 1:2:3 ratio, plastered and painted as directed by the Project Manager.	NO	4		
4.4	Fabricate and fix a standard 2 m lockable Steel gate openable from the outside all painted with Bermuda blue paint as directed by the Project Manager.	No	1		
TOTAL FOR PERIMETER FENCING					
BILL 5 ESTABLISHMENT OF DEMMO FARM					
<i>Supply and deliver the following</i>					
5.2	Vertical bags- Large Kitchen Garden Sacks	No.	70.00		
5.3	Conical garden dam-liner polythene sheet	No.	70.00		
5.4	Purchase and supply of Kales seeds (Hybrid)	grams	50.00		
5.5	Purchase and supply spinach seeds (Local)	grams	50.00		
5.6	Purchase and supply amarathas (Managu) seeds (Local)	grams	50.00		
5.7	Purchase and supply black night shade (Mchicha) (Local)	grams	25		
5.8	Purchase and supply Coriander (Daniah) seeds (Local)	grams	50		
5.9	Purchase of fungicides	litres	4		
5.10	Purchase of insectides	litres	5		
5.12	Watering can	No.	2		
5.13	Jua kali, heavy gauge, big wheels, Wheel barrow	No.	1		
5.14	Juakali Rake	No.	2		
5.15	Spade	No.	2		
5.16	Knapsack Sprayer, Jackto or equivalent approved, 20 litres	No.	1		
5.17	Potting Bags (6*9) (200 parkets with 100 pieces each)	No.	200		



ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
5.18	Shade net, 55 % permeability, 2x100m	No.	1		
5.19	Jembes	No.	2		
5.20	Assorted Seeds, Mukau, neem tree, lucerna as shall be instructed	Pcs	10		
5.22	Purchase and supply of pasture seeds, Cenchrus ciliaris, Eragrostis superba (Ndata Kivumbu and Mbeetwa) as shall be instructed	Kgs	300		
5.23	Galla Goats, mature, as shall be instructed	No.	6		
5.25	Purchase and supply of acaricides	Litres	2		
5.26	Complete Drip Kit as shall be instructed	acrea	0.25		
5.48	Cold water master meter 40mm Ø c/w fittings	No.	1		
5.50	Supply, trench, install test and cover install 32mm HDPE pipe PN10 as shall be directed	m	300		
5.51	5,000 litres double layer PVC water tank on 1m high masonry platfoarm, and plumbing works as shall be instructed	No.	1		
	Amount for Bill 5 carried for Collection				
BILL 6	SOLAR PUMPING SYSTEM				
6.01	Supply, Deliver, Install and Test PV Solar panels mono; with high peak voltage; specifically designed for heavy duty including pumping MC4 connections. Preferably 200wx16No. or equivalent approved. Provide brochures for approval by supervising engineer before supply. Appropriately set up for maximum insolation on steel tower	W	3,200		
6.02	Supply install, test and commission 4mm PV Cable Single Core 1000VDC Tinnd Copper ; Insulation: XLPO ; Insulation Color: Red and black	M	80		
6.03	Supply and Deliver a Solar Powered Submersible Multistage Pump Set of Duty Point: - 2.5m ³ /hr at a Total Head of 60 meters (DS2-23 1.1KW 3PH or equivalent approved). The pump Efficiency at duty point should be atleast 38%. Must Provide Copies of Pump Characteristic/Performance Curves (Brochures). Install as directed by the Supervising Engineer	Set	1		



ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
6.04	Supply a three phase 1.1kW motor, Pendrollo or equivalent approved compatible to item above as directed and approved by the Supervising Engineer	No	1		
6.05	Supply & install Fabricated Steel Tower to hold solar arrays above as shall be directed. Minimum height - 5meters high. Provide protective box, surface-metal-clad (to house the inverter & change over switch)	item			
6.06	Provide for the installation, testing and commissioning of the pump set and accessories; after fitting with well probe	Item			
6.07	Supply, Deliver & Install an AC/DC Solar inverter Incorporating: - Hybrid Capability with the option of DC solar power, generator or main grid power inputs, patented MPPT fast response, good stability and up to 99% efficiency, rated power 3.7KW, Detachable Control Interface, Settable Min/Max Frequency & open Circuit Voltage, Display of operating Parameters, including frequency, voltage, amperage, input power & pump speed; Display of Historical Data, including Energy generation, maximum power & operating times; Protection against over/under voltage, over current, system overload and module over temperature; Fault detection with error code display; Display of dry run sensors and automatic controls (SV3/037T) or equivalent as approved by the Supervising Engineer	No.	1		
6.08	Well probe	No	1		
6.09	Sensor Cable, Twin, Double Insulated, 0.75mm ²	M	70		
6.10	PV disconnect switch 16Amps;	No	1		
6.11	Submersible Cable 1.5mm 4core	m	70		
6.12	Armored Copper Cable, 2.5mm ² X 4 core	M	20		
6.13	Armored Copper Cable, 1.5mm ² X 2 core	M	20		
6.14	UPVC Conduit, HG, 1"Ø	No.	2		
6.15	Airline Pipes 3/4" Class D	No.	1		
6.16	Wiring, mc4 connectors, Eathing plus lightening arrestor	Item			
	TOTAL FOR DEMMO FARM ESTABLISHMENT				



ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	MAIN SUMMARY				
BILL 1	PRELIMINARY AND GENERAL ITEMS				
BILL 2	EARTH-WORKS				
BILL 3	DRAW OFF, WATERING POINTS AND SCOUR				
BILL 4	PERIMETER FENCING				
BILL 5	ESTABLISHMENT OF DEMMO FARM				
BILL 6	SOLAR PUMPING SYSTEM				
	SUB TOTAL 1				
	Add Kshs. 144,827.47 for Contingencies to be expended as whole or as part.				144,827.47
	SUB TOTAL 2				
	Add 16% VAT				
	GRAND TOTAL CARRIED TO FORM OF TENDER				


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