BILL OF QUANTITIES FOR NGOANO SAND DAM CONSTRUCTION AND LIVELIHOOD RESTORATION PROJECT

TULIMANI WARD, MBOONI SUB-COUNTY, MAKUENI COUNTY

FY2025-2026

NB: Rates and prices inserted by Contractor in the BoQ shall include value of the work described under the item and shall cover all over heads charges, profits, and applicable taxes. Contract to be paid as per actual works done.

	BILL 1: Preliminaries				
ITEM	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**RATE**	**AMOUNT**
				(KShs.)	(KShs.)
1.1	Fabricate erect and maintain public sign post using 1.5mm metal sheet, min.1500mm above ground level, and anchored 600mm deep in mass concrete and well supported with 50x25mm RHS frame to detail as provided in the drawing and as instructed by the project manager.	Item	1		
Bill 1 Total carried to Summary					
	BILL 2: PIPELINES				
	CLASS D: DEMOLITION AND SITE CLEARANCE				
	The rate quoted is for site clearance and demolition along construction wayleave. Rate shall be deemed to include removal of the material, natural and artificial articles, objects and obstructions which are above the original surface and carting away to tips, identified by the contractor in liaison with the Local Authority				
2.1	*General clearence*				
2.1.1	Site clear and excavate to pipe invert level 600 mm n.e 1m below existing ground level and backfill/ reinstate to original ground level after testing pipeline, all to the approval of the engineer	m	2,300		
2.1.2	Allow for setting out of the entire pipeline and installations	Item	1.00		
2.2.	CLASS I: PIPEWORK - PIPES				
	The rate quoted is for supply and transport to site storage, transport from site storage, excavate, lay and joint pipes complete with all jointing materials and butt fusing. The rate is deemed to include excavation, bed lining, installation and backfilling of the pipe trenches. keep trenches and ther excavations free of water.				
2.2.2	OD75mm PN20 HDPE PE100 ISO4427 butt fused	m	300		
2.2.3	OD75mm PN16 HDPE PE100 ISO4427 butt fused	m	100		
2.2.4	OD63mm PN10 HDPE PE100 ISO4427	m	600		
2.2.5	OD50mm PN10 HDPE PE100 ISO4427	m	1,300		
2.2.6	2.5" GI Class B inclusive of connectors and adopters	m	24		
2.2.8	CLASS J: PIPEWORK - FITTINGS AND VALVES				
	The rate quoted is for provision and fixing inclusive of all allied materials				
2.3.1	Reducers & connectors				
2.3.1.1	Allow for assorted HDPE Elbows, adopters as shall be needed for the above pipeline instalations	item			
2.3.2	Junctions and branches				
	Supply and install GI/HDPE tees and reducers as instructed complete with all the necessary accessories for airvalves, washouts, and distribution				
2.3.2.1	1.5"x1.5" tee HDPE	nr	3		
2.3.2.2	2.5"X2.5" tee GI	nr	2		
2.3.2.3	2.5"X2" reducer set, GI	nr	3		
2.3.3	Airvalves and non-return valves				
	Supply and install anti-shock/ anti-surge Metallic Air Valves approved with threaded or flanged base , c/w isolating valve, including tees and reducers for connecting Airvalve				
2.3.3.1	DN40 ARV	nr	2		

2.3.3.2	GI 2.5" non-return valve, flap	nr	1		
2.3.4	Sluice/Gate Valves				
	Supply and install GI sluice/gate valves/end plugs threaded or flanged as shall be instructed and approved for Washouts & Tees				
2.3.4.1	2.5" gate valve	nr	2		
2.3.4.2	2" gate valve	nr	1		
2.3.4.3	1.5" gate valve	nr	4		
2.3.4.4	2.5" end plug	nr	1		
2.3.5	Water meters				
	Supply and install approved GI threaded or flanged water meters inclusive of allied adoptors and jointing materials as instructed by the engineer				
2.3.5.1	2.5"	nr	1		
2.3.5.2	2"	nr	1		
2.3.5.3	1.5"	nr	4		
2.4	CLASS K: PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
	The rate quoted is for chambers, culverts, crossings and reinstatements and other ancilleries as specified.				
2.4.1	Air Valve/Washout/Sluice Valve Chambers				
2.4.1.1	Construct 900mm by 900mm masonry valve chamber. Depth not exceeding 1m, all in accordance with details shown on drawings and as per engineer's instructions. Include for provision and fixing of cast iron step irons and heavy duty rectangular mild steel frame with locking devices as per details on drawing	nr	4.00		
2.4.1.2	Construct 500mm by 500mm masonry valve chamber. Depth not exceeding 1m, all in accordance with details shown on drawings and as per engineer's instructions. Include for provision and fixing of cast iron step irons and heavy duty rectangular mild steel frame with locking devices as per details on drawing	nr	2.00		
2.4.2	Marker Posts				
	Construct concrete marker posts and install along the water supply pipeline, all in accordance with engineer's instructions and details shown on drawings. (Reinforced concrete 1:2:4(class 20/20, bars D12), as per details on drawing				
2.4.2.1	Pipeline marker post inscribed WL at 500m intervals	nr	5.00		
2.4.2.2	Air valve marker post Inscribed AV	nr	2.00		
2.4.2.3	Washout marker post inscribed WO	nr	1.00		
2.5	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
	Extras to excavation and backfilling in pipe trenches				
2.5.1	Excavation in rock Class A	$_{m}3$	1.00		
2.5.2	-Ditto- but rock Class B	$_{m}3$	1.00		
2.5.3	-Ditto- but rock Class C	$_{m}3$	0.50		
	Note:- Blasting is NOT permitted				
2.6	Class L; PIPEWORK - SUPPORTS AND PROTECTION, ANCILLIARIES TO LAYING AND EXCAVATION				
2.6.1	Construct concrete stools for fitting and thrust blocks and anchor blocks to all bends along the water supply pipeline, all in accordance with details shown on drawings Thrust blocks - RC, Volume 0.2 - 0.5m3	nr	2.00		
2.6.2	Concrete surround to pipe	m	24.00		
	Sub-total for the pipeline carried to summary				

	Bill 3: Communal water points				
	Water points				
3.1	Supply all necessary materials and Construct a 1.5m wide×1.5m high above ground tap stand complete with a 1" metered control chamber, water fetching bay & allied 1" PPR pipes for two taps per stand, connection to the tanks and branding as directed by the supervising engineer; for Nthaani, Ngoano (250m from tee), and Kalii kwa Makovo	No	3		
	Bill 3 total carried to summary				
	BILL 4: Plastic Tanks on Masonry Platforms				
	Plastic Tanks on platforms				
4.1	Supply, Deliver & Install 10,000L Double Laminated Plastic Water Tank at Kiosks , c/w GI Inlet, Outlet & Overflow Fixtures, 2'' dia. c/w constructing a 1m high above ground masonry platform with reinforced concrete slab. Include for water connection to the water points and kiosks and branding of the tanks. 1no above Nthaani Primary, 1no. at Ngoano wp, 1no. at Kalii kwa Makovo	No	3		
	Bill 4 Total carried to summary				
	BILL 5: Construction of Ngoano Sand Dam				
5.1	**Excavations**				
	Provide for the setting out of sand dam construction works	Item	1		
5.1.1	Excavate and dispose soils to a maximum of 0.5m from G.L over area of sand dam	CM	90		
5.1.2	Excavate a trench and apron upto 65m long by 1.5-3m wide and an average depth of 1-2m or to hard rock base foundation. Excavation to be certified by supervising engineer. All spoil to be disposed as directed by the site engineer.	CM	250		
5.1.3	E.O for rock surface	CM	10		
5.1.4	Provide for hacking of rock and existing concrete, clearing site of loose rocks and soil to create base for concrete slab and reinforcement lapping as shall be directed by the engineer	SM	65		
5.1.5	Allow for backfilling with hardcore to approved levels after Completion of the excavation worksorks.	m^3	20.00		
5.1.6	BLINDING -Provide materials, cement, sand and coarse aggregate and mix concrete,1:4:8,ratio to tank base in sections approved by the engineer	CM	4.00		
5.2	***Provided handle, cut, bend and fix the following reinforcement bars to BS 4449 & BS 4461 as in the drawing or as advised by the site engineer***				
5.2.1	12 mmØ,M.S twisted bars	KGs	1311		
5.2.2	10 mmØ,M.S twisted bars	KGs	1695		
5.2.3	Plain G.I binding wire,G24, 50Kg roll (For all reinforcement works)	Rolls	3		

5.3	**Concrete work**				
5.3.1	Construct a sand dam wall, and apron drift using waterproofed boulder-concrete in 60:40 ratio of vibrated reinforced concrete class 20 (1:2:4) to impermeable boudlers of 200-400mm width. Use water proofing additive, 1kg per 50kg of cement. Cost includes curing sand dam for 21 days. Work as per the working drawing and the site engineer's instructions.	M^3	283		
5.3.2	Provide vibrated concrete mix1:2:4 and construct 100mm reinforced Apron slab over the boulder-concrete mix as in the provided drawing. Use water proofing additive, 1 kg per 50 kg cement	CM	14.00		
5.3.3	Provide and prepare marine-board smooth formwork. Include for propping strutting and striking off to dam upstream and downstream surfaces.	m^2	360		
5.4	**Miscelenious works**				
5.4.1	Supply and fix 300mm diameter, 1m length reinforced culverts as per the provided darwings	No.	30.00		
	Sub-total for bill 5 carried to summary				
6	**BILL 6 - 50,000L concrete sump conjoined to the sand dam**				
6.1	**Excavations**				
6.1.1	Strip top soil 200mm from g.l. over area of sump and remove all vegetable soil to temporary spoil heap.	CM	12.00		
6.1.2	Excavate from stripped level over the tank site to depth n.e. 3.5m deep and dispose soil as directed	CM	65.00		
6.1.3	Extra over excavation items above for excavating in rock (Rate to include making good)	CM	10.00		
6.1.4	Allow for backfilling to approved levels after Completion of the works.	CM	20.00		
6.1.5	Allow for keeping all sand dam and sump excavation free from general waters	Item	L/Sum		
6.1.6	Allow for planking and strutting of the pit	Item	1.00		
6.2	**Levelling and Blinding**				
6.2.1	HARDCORE - Provide, place and compact hardcore of approved quality to make up levels	CM	10.00		
6.2.2	BLINDING -Provide materials, cement, sand and coarse aggregate and mix concrete,1:4:8,ratio to tank base in sections approved by the engineer	CM	4.00		
6.3	**Concrete works**				
6.3.1	CONCRETE -provide vibratedd concrete mix 1:2:4 and construct concrete tank wallings and roof slab, including baffle walls as in the provided drawing. Use water proof cement (Pudlo) 1 kg per 50 kg cement	CM	20.00		
6.3.2	Reinforcement				
6.3.2.1	10 mmØ,M.S twisted bars	kg	900.00		
6.3.2.2	16 mmØ,M.S twisted bars	kg	45.00		
6.3.2.3	Plain G.I binding wire,G24, 50Kg roll (For all reinforcement works)	Rolls	2.00		
6.4	**FORM WORK**				
6.4.1	Provide and prepare marine-board smooth formwork. Include for propping strutting and striking off to sump walls, and slab	m^2	111		
6.5	**PLUMBING WORKS**				
	Supply, deliver and install the following items to form the inlet and breather components				
6.5.1	2" dia bend	No	3.00		
6.5.2	2" dia Elbow with mosquito gauze	No	6.00		
6.5.3	2" dia Barrel nipple	No	4.00		
6.5.4	2" dia Union socket	No	2.00		
6.5.5	3"class B GI slotted conduits in 1m lengths for installation of inlet galleries	m	24.00		
6.5.6	Boss white for G.I Pipes	Kg	0.50		
6.5.7	Solvent Cement	Kg	0.50		
6.5.8	Sealing thread	Pcs	4.00		
6.6	**Miscelenious works**				
6.6.1	Construct and fix a vertical ladder of length upto 3m fixed to wall and floor on the internal side, Use 2" GI class B pipes painted for added rust protection	No.	1.00		
6.6.2	Provide impermiable hardcore of max size 200mm X 200mm for use in constructing the sump intake gallery sieves tied as gabions	M^3	18		

6.6.3	Supply, lay, pack, and tie 2m*1m*1m high gauge gabion boxes (2.2mm min mesh wire size) at the excavated silt trap foundations above for bases and slopes as directed by the supervising engineer. Cost inclusive of aliminium gabion box ties.	M^3	10.00		
6.6.4	Standard Lockable reinforced concrete manhole cover (750mmx750mm) complete with frame and locking device and pinning lugs to concrete sorround and bedding frame in cement and sand mortar (1:4)	No	1.00		
	Bill 6 total carried to summary				
	Bill 7: Solar pumping systems				
	Supply,Deliver, install and test the below solar pumping installations;				
7.1	Supply,Deliver, install and test a Solar Powered Submersible Multistage Centrifugal Pump Set (Wetend c/w motor) of Duty Point: - 6,000L/hour at 160 meters. The pump Efficiency at duty point should be 50%. The pump Impellers should be of Stainless Steel. Dayliff DS5-44, 4.0kW or similar strictly approved by the Engineer. Provide Copies of Pump Characteristic/Performance Curves (Brochures). Install as directed by the Supervising Engineer	set	1		
7.2	Supply and Deliver a 5.5kW Solar Pump Control Module (Inverter) (Sunverter 3 or similar approved by the engineer) Incorporating: - • 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	No.	1		
A	Supply, Deliver and Install on the steel tower, Solar Array System of total output 8800 Watts, including high-efficiency tier 1 modules As 550W, or close and approved, 16 panels each with maximum string voltage VOC 850 VDC as approved using 6mm sq dc cable and MC4 terminated on both sides to be mounted on the structure	W	8800		
B	Supply, deliver and erect firmly on Concrete Anchors, Fabricated Steel Tower, use square tubes, 4" x 4" x 4mm, for solar Array System, minimum height 5 meters, solar controller box 1000mm by 500mm by 300mm well ventilated to be included and tower inclination angle 10-15 degrees. To be installed as directed by the supervising Engineer	Lot	1		
C	Supply and install DC enclosure complete with inline 1100VDC fused isolator	NO	1		
D	Supply install and test 6 mm sq PV Cable Single Core1000VDC Tinnd Copper ; Insulation: XLPO ; Insulation Color: Red and black to string solar panels as directed by supervising engineer	M	40		
E	Supply and lay Armored Cable, 4.0mm^2 X 4 core	M	30		
F	Allow for system earthing, lightening arrestor and balance of system	Lot	1		
L	Allow for installation sundries as Hg flex conduit, cable ties, MC4 Connectors, cable lugs cable clips and all necessary assortment	Lot	1		
7.3	Adaptor Set, 1.5"Ø, stainless steel C/W 1.5"x2.5" reducer set, 2no. 2.5" elbows, and 3m 2.5" class B riser pipe	No.	1		
7.4	UPVC Conduit, HG, 1"Ø, 6m	No.	20		

7.5	Splicing Kit, Medium Packet	No.	1		
7.6	Supply & install a submersible cable, Double Insulated, round/flat, 4.0mm2 X 4core	m	40		
7.7	I/O switch	No.	1		
7.8	Dry-run sensor	No	1		
7.9	Sensor Cable, Twin, Double Insulated, 0.75mm^2	m	70		
7.10	Supply materials and fabricate a steel pump stand as per drawings and site instructions	No	1		
	Bill 7 total carried to summary				
	BILL 8 - Solar site fencing and CCTV				
8.1	Supply and install 2.1 m high x 14 gauge chainlink complete with 14 Gauge x 4 strand galvanised plain wired fencing and 2 stands barbed wire at cranked section (430mm) complete with complete with 100 x 125 mm cranked precast concrete posts anchored 600mm deep and at 2.5m centres mortised in mass concrete sorround. Anchor the chainlink with 200x150mm mass concrete class ratio 1:3:6. Inlcude stainer posts at corners and after every 30m	LM	80		
8.2	Construct 3m wide 2.1 m height double leaf opening steel gates clad in high grade mesh wire, anchored on reinforced concrete columns using 4 No. Y10 Rebars each column c/w padlocks	No.	1		
8.3	Supply and install a 4G/5G Solar CCTV Camera with 2/3no. Cameras with 360 degree swirl, a SIM card, night vision, motion detection, and multi-user remote access, c/w a 5m high pole, solar panel, and include for concrete footing	Item	1		
8.4	Supply and install a double sided solar floodlight, 100W LED c/w solar panels on the 5m pole and include for concrete footing	Item	1		
	Bill 8 total carried to Summary				
	BILL 9: Juncao fodder establishment				
	Irrigation works for the 1 acre juncao farm at Ngoano				
1.0	**Construction of Sub Main pipeline**				
1.1.0	Supply and install HDPE 2" HDPE pipe OD63mm PN10 PE100 cost including trenching and backfilling in 600mm deep trench, and connectors. From rising main to juncao farm tank	m	200		
1.1.1	Site clear and excavate to pipe invert level of 600mm n.e 1m below the existing ground leve on normal soil and backfill/ reinstate to original ground level after testing O/D 40 mm (11/4") HDPE pipeline	LM	70		
1.1.2	Supply, deliver, install and test O/D 40 mm (11/4") HDPE pipes PN10, KS ISO 4427:2007 PE100 Smooth Virgin Material. To be laid in the trench mentioned in 3.1.2 above	LM	70		
1.2	Sub Mains Pipeline fittings				
	Provide, lay, joint and test HDPE fittings as follows: -				
1.2.1	40 mm End Plug	No.	1		
1.3	Field Hydrants Installation - items to cover two hydrants				
	Provide, lay, joint and test HDPE fittings as follows: -				

1.3.1	Supply, deliver, cut, install and test O/D 40 mm (11/4") HDPE pipes PN10, KS ISO 4427:2007 PE100 Smooth Virgin Material.	LM	16		
1.3.2	40 mm x 11/4" Saddle clamp	No.	2		
1.3.3	40 mm 90° Equal Tee	No.	6		
1.3.4	40 mm Ball cork valve	No.	8		
1.3.5	40 mm 90° Elbow	No.	8		
1.3.6	40 mm x 11/4" 90° Male Elbow	No.	8		
1.3.7	40 mm x 11/4" Male Adaptor	No.	10		
2.0	**Laterals Installation**				
2.1	Supply, deliver, install and test O/D 40 mm (11/4") HDPE pipes PN10, KS ISO 4427:2007 PE100 Smooth Virgin Material. To be laid in the trench mentioned in 3.1.2 above	LM	140		
2.2	Provide, lay, joint and test HDPE fittings as follows: -				
2.2.1	40 mm End Plug	No.	4		
2.2.2	40 mm Straight Coupling	No.	1		
2.2.3	16mm x 0.6m long PVC Rigid tubing complete with suitable connectors to the laterals	LM	113		
2.2.4	16mm Take- off fitting	No.	188		
3.0	**Drip installation**				
3.1	Supply install and test 16mm pressure compensated flat tape PE drip line with flow rate of 1liter/ hour and working pressure range of 1.6 bar with a wall thickness of 1.0mm and emmitter spacing of 200mm. 94 beds x 2 rows per bed x 35m per bed	R-M	6,580		
3.2	Supply, install and test 16mm PE drip line End cap	No.	188		
3.3	**Tank on platform**				
	Supply, deliver and install a 5000L double laminated tank complete with 1.5" GI inlet and 1.25" GI outlet,and 1.5" GDPE overflow fixtures on a 2.3m high above ground steel platform	No.	1		
3,4	**Fertiliser**				
3.4	Supply and spreas manure and fertilizer, Basal application -DAP as instructed by the agriculture officer	Bags	4		
	Bill 9 total carried to summary				
	Bill 10 -Supply of coffee and macadamia seedlings				
Item	**Description**	**Unit**	**Qty**	**Rate (Ksh)**	**Amount (Kshs)**
10.1	Supply and deliver potted quality Coffee seedlings of SL28 variety (of size between 600mm- 750mm height from the stem base and of 20mm stem diameter) from a certified source as will be instructed	No.	1800		
10.2	Supply and deliver potted quality grafted Macadamia seedlings of Murang'a 20 variety (of size between 600mm- 750mm height from the stem base and of 20mm stem diameter) from a certified source as will be instructed	No.	1,000		
	Bill 10 total carried to summary				
	GRAND SUMMARY				
BILL	**BILL DESCRIPTION**				**AMOUNT (Kshs)**
1	Preliminaries				
2	BILL 2: PIPELINES				
3	Bill 3: Communal water points				
4	BILL 4: Plastic Tanks on Masonry Platforms				
5	BILL 5: Construction of Ngoano Sand Dam				
6	BILL 6 - 50,000L concrete sump conjoined to the sand dam				
7	Bill 7: Solar pumping systems				
8	BILL 8 - Solar site fencing and CCTV				
9	BILL 9: Juncao fodder establishment				
10	Bill 10 -Supply of coffee and macadamia seedlings				
	SUB-TOTAL				
	Allow Ksh. 70,000 for contingencies				70,000.00
	SUB-TOTAL A				
	Add 0.03% to sub-total A for PPRA capacity building levy				
	Add 16% VAT to sub-total A for VAT				
	GRAND TOTAL CARRIED TO FORM OF TENDER				