

Mukaa.

BILL OF QUANTITIES FOR THE REHABILITATION OF KWA KAKUI EARTH DAM

MUKAA WARD - KILOME SUB COUNTY, MAKUENI COUNTY

Funding: FLOCA

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.

ITEM	DESCRIPTION	UNIT	QTY	RATE (KSH)	AMOUNT (KSH)
A	PRELIMINARY AND GENERAL ITEMS				
A1	Maintain Contractor's camps, facilities, plants, etc., include mobilization to site, insurance and demobilization on completion of contract	Item	1		
A2	Allow for a project signboard to be installed at a convenient site to be maintained throughout the project period, as directed by the Project Manager.	No	1		
A3	Allow a provisional sum of One Hundred thousand shillings for setting out all works by the client's representative as directed by the Engineer	L/Sum	1	100000	100,000.00
	TOTAL FOR PRELIMINARIES				100,000.00
B	EARTH WORKS & ALLIED PROTECTION				
B1	Site Clearance and Soil Stripping:				
	Clear the site of trees, bushes, stumps and top soil including soil stripping for setting out to a depth of 200mm and cart away to spoil as directed by the site Project Manager.	SM	1000		
B2	Main Reservoir Expansion				
	Excavate in normal material depths for expansion of the dam reservoir and cart away silt and other spoil and damp as directed by the Engineer. Use approved excavated soil in raising the embankment and compact in 300mm layers, wet compacted to 95% MDD AASHTO using sheepfoot rollwe compactor (minimum 7 passes per layer), all as directed by the supervising engineer.	CM	7,200		
B3	Dam Embankment				

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B3.1	Cut a core trench bottom width 3m and an average depth of 2m for a length of 100 m at the Downstream of the embankment, and dispose the material as directed by the project manager	CM	600		
B3.2	Avail soil from approved borrow site, Lay soils in 300mm layers, wet compact to 95% MDD AASHTO using sheep foot roller compactor (minimum 7 passes per layer), and raise fill the core trench as directed by the Engineer.	CM	1000		
B4	Toe drain				
B4.1	Excavate a 1m wide and 1.5m deep trench, dispose spoil, and keep trench free of waters for gabions installation as directed by the Engineer	CM	105		
B4.2	Construct a toe drain using heavy gauge gabions made of 2.2mm thick wires, for a length of 70m, in two layers as directed by the Engineer	No.	70		
B4.3	Fill the above gabions with approved hardcore and set them in place as directed by the Engineer	CM	140		
B5	Cut-off Drains				
B5.1	Excavate 2no. Trenches on both sides of the reservoir, each 130m long, 2m wide and 1.5m deep, disposing spoil on the downstream of the trenches to create cut off drains as directed by the Engineer	CM	780		
	TOTAL FOR EARTHWORKS CARRIED TO SUMMARY				
C	SPILLWAY, SILT TRAP and CULVERTS				
C1	Silt Trap				
C1.1	Excavate in normal material for the silt trap (40m width across dam inlet channel, by 20 m length by 2m deep) as per the drawings and as per the Project Manager's instructions	CM	1600		
C1.2	Construct 300 mm by 1.5 m depth(or to firm ground) by 45 m length concrete sill class 20/20 reinforced with BRC A66 across the silt trap outlet as directed by the Engineer, complete with a 2m wide apron as per the drawings and Project Manager's instructions	Item	1		



C1.3	Stone pitch to create an energy dissipater 40m by 3m by minimum 300mm thick layer, at the silt trap outlet section as per drawings and the site Project Manager's instructions	SM	120		
	Total for silt trap				
C2	Spillway Channel				
C2.1	Shape the existing spillway channel 100 m long, 10 m bottom width; maintain a 1.5m free board and maintain channel side slopes of 1:1. Fill and Compact selected material on down stream's side to stabilize it as directed by the Project Manager.	CM	50		
C2.2	Construct 300 mm by 1.5 m depth(or to firm ground) by 18 m length concrete sills class 20/20 reinforced with BRC A66 across the spillway as directed by the project manager, complete with a 3m wide apron as per the drawings and Project Manager's instructions	Item	2		
C2.3	Construct minimum 300mm stone pitching to bed and to slanting sides for the entire spillway length of 100 meters jointed in 1:2 c/s waterproofed mortar and fully concrete blinded as per the Project Manager's instructions	SM	1400		
	Total for spillway channel				
C3	Culverts				
C3.1	Excavate for culverts in soft material as per drawings and specifications	CM	30.00		
C3.2	E.O for excavation in hard material	CM	10.00		
C3.3	Provide and lay MIN 200mm rockfill below culverts as specified	SM	40.00		
C3.4	Provide and lay concrete Class 25/20 culvert headwalls and wingwalls	CM	12.00		-
C3.5	Ditto item3.4.4 but concrete Class 15/20 to beds, surrounds and haunches	CM	15.00		
	Provide, lay and joint concrete pipe culverts:				-
C3.6	1200mm diameter(4-Cell) to Surround,Hwalls,Wwalls,Aprons & T-Beams	m	24.00		
C3.7	Provide and backfill approved material around new structures and compact in layers not exceeding 150mm to Project Manager's Approval.	m ³	67.00		

	Total for 1no 4-cell culvert				-
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	Total for spillway, silt trap, and culverts carried over to summary				
D	DRAW OFF, WATER TREATMENT, & SUPPLY				
D1	Floating Pontoon Draw-off system				
D1.1	Supply, deliver and install a Solar Submersible Multistage Centrifugal Pump and Motor Set (wet-end and motor) of Duty Point: - 10 m ³ /hour at a 30m head. The pump Efficiency at duty point should be at least 59%. The pump Impellers should be of Stainless Steel. Must Provide Copies of Pump Characteristic/ Performance Curves (Brochures). Selected pump type & size to be approved by the supervising engineer before installation.	No.		1	
D1.2	Supply, deliver and install a max 2.2KW 1PH control module AC/DC inverter designed for solar powering AC motors. Selected inverter type & size to be approved by the supervising engineer before installation.	No.		1	
D1.3	Supply, deliver and assemble a Floating Pontoon system, mount the pump and test as approved by the project manager.	No.		1	
D1.4	DC PV Disconnect switch 1000 VDC/200A	No.		1	
D1.5	Supply, deliver and install a 6mm ² 1 Core DC cable (black & red) as approved by the supervising engineer	M		80	
D1.6	Supply, deliver and install a 6mm ² 3Core PVC Flat submersible drop cable as approved by the supervising engineer	M		100	
D1.7	Supply, deliver and install high efficiency mono crystalline solar modules totalling 2800W using MC4 connectors. Combination & String arrangement to be approved by the supervising engineer before installation.	Watt		2800	
D1.8	Solar support structure (steel and as recommended by the project manager) placed above the water kiosk	Item		1	
D1.9	Supply, Deliver, Fit and Test 2inch standard 30m Cold Water Flex pipe conjoined to an offtake HDPE pipe	No.		1	
D1.10	Provide, install and test a HDPE 2.5" pipe PN10 complete with installation sundries	M		70	

D1.11	UPVC Conduit, HG, 1"Ø for overhead cabling	No.	5		
D1.12	Cable Glands, 25mml	No.	4		
D1.13	Cable Glands, 20mml	No.	2		
D1.14	Splicing Kit, Medium Packet	No.	2		
D1.15	Cable Ties, Large Packet, Manila	No.	2		
D1.16	Insulating Tapes, Large	No.	20		
D1.17	Copper Earth Rod, 5ft c/w Clamp	No.	1		
D1.18	Earth Lead Cable, 6mm ² , single	m	10		
	Total for Floating Pontoon				
D2	Water Treatment				
D.2.1	Construct a masonry intake/sedimentation tank size 5000mm x3000mm x 2300mm with 4No internal chambers and added with water proof cement c/w a G.1 inlet and outlet pipe 3 " as per the provided drawings and directed by the Engineer.	No	1		
D.2.2	Construct a 3000mm by 2500mm masonry house to hold sand filters and allied installations (pump controls) as per the provided drawings and directed by the Engineer	No	1		
D.2.3	Supply, deliver and install industrial water media standard pressure filters of rated flow 10cm/hr.; Dayliff CX600 with media or equivalent as directed and approved by the Engineer	No	2		
D.2.4	Supply, install and test a simple in-line point of use disinfection system that uses a compacted calcium hypochlorite chlorine cartridge that releases active chlorine sanitizer into water flow at max flow rate 16 m ³ /hr. Supply a Klorman inline unit or equivalent as approved by supervising engineer	No	1		
D.2.5	Supply, install and test a constant flow rate manually adjustable using control dial on front panel with two frequency ranges 1-20% and 0-100% for maximum flow rate. Include for 100L chemical tank c/w all accessories therein. Supply Kompact dosing pump AML or similar approved by the Engineer.	No.	1		
D.2.6	Supply, deliver and install a surface pump with discharge 10cm/hr. at 40m head as approved by the Engineer. Pump type and size to be approved by the supervising engineer before installation.	No	1		

D.2.7	Supply, deliver and install a 3Ph AC/DC solar pump controller for the Motor as approved by supervising engineer	No	1		
D.2.8	Supply and install high efficiency mono crystalline photovoltaic solar modules (Panels) capable of generating 5.5 KW minimum of solar power, properly arrayed for maximum insolation on steel tower. Combination & String arrangement to be approved by the supervising engineer before installation.	Watts	5500		

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D.2.9	Supply, Deliver, Install and Test DC PV Disconnect switch 1000 VDC/200A	No.	1		
D.2.10	UPVC Conduit, HG, 1"Ø for overhead cabling	No.	5		
D.2.11	Cable Glands, 25mmL	No.	4		
D.2.12	Cable Glands, 20mmL	No.	2		
D.2.14	Cable Ties, Large Packet, Manila	No.	2		
D.2.15	Insulating Tapes, Large	No.	20		
D.2.16	Copper Earth Rod, 5ft c/w Clamp	No.	1		
D.2.17	Earth Lead Cable, 4mm ² , single	m	10		
D.2.18	Supply, deliver and install a 2.5mm ² 4 Core armored cable as approved by the supervising engineer	m	60		
D.2.10	Supply and install Fabricated Steel Tower, (on properly casted concrete stands). Use square tubes, 3" x 3" x 4mm for solar Array System; minimum height - 5meters high.	Item	1		
D.2.11	Supply and install the required sundries, cables and accessories for installation of the sand filters pumping system and ensure proper functioning as approved by the engineer	Item	1		
	Total for water treatment				
D3	Clear water storage tanks				
D.3.1	Supply, Deliver & Install 4no. 10m ³ Double Laminated Plastic Water Tanks, c/w GI Inlet, Tank Connectors, Outlet & Overflow Fixtures, 2" dia.	Item	1		
D.3.2	Construct a 1.5m high masonry platform with reinforced concrete slab, ensure to accommodate the four tanks. Include for water connection to the water kiosk and branding of the tanks as approved by the supervising engineer.	Item	1		
	Total for clear water storage tanks				
D4	Cattle trough				
	Supply materials and provide personnel to construct a 5 X 1 m cattle trough with 2m wide stone pitching (as in the attached drawing)				
D4.1	Bush clearing and stripping the spoil up to 250 mm below G.L over cattle trough and stone pitching area and dispose soil as directed	CM	12		

D4.2	Excavate foundation from stripped level over the tank site to depth i.e. 0.6m deep and dispose soil as directed	CM	2		
D4.3	Mass concrete mix 1:4:8: in 50mm thick blinding along the strip footing	CM	0.5		
D4.4	Construct walling from 0.6 m deep up to 450 mm above ground level using 225mm thick dressed quarry stone walling. Mortar 1:3	SM	13		
D4.5	Provide, place and compact hardcore of approved quality up to 350mm level, 250mm below ground level	CM	2		
D4.6	MURRUM - Place approved marram for filling consolidated in layers to make up levels	CM	1		
D4.7	Anti-Termite Treatment for Foundation/to hardcore surface applied in accordance with manufacturer's instructions.	SM	5		
D4.8	Damp proof Membrane 1000 gauge black polythene sheet	SM	5		
D4.9	Provide and place fabric mesh reinforcement Type A, B.R.C mesh type A142	SM	5		
D4.10	Vibrated reinforced concrete Class 20/20 mm (1:2:4) 150 mm thick ground floor slab	SM	5		
D4.11	0.3% cement screed on floor surface	SM	5		
D4.12	PLASTER - 25mm thick 1:3 cement sand with water proof to exterior and interior face.	SM	15		
D4.13	Construct frame of natural building stones in mortar around the stone pitching area 250 mm height	SM	7		
D4.14	Construct stone pitching 250 mm depth slope 1:10, 2.5m all-round the cattle trough as per the drawing. Use boulders diameter 200-300 mm. Place boulders on 50 mm thick grouting mortar 1:3	SM	38		
D4.15	63 mm washout G.I Pipe with end cap and puddle flange	No	1		
D4.16	Construct a 1m*1m water regulation chamber with self-regulatory water float valve as instructed by the Engineer.	No	1		
	Total for water trough				
D5.A	Water Kiosk				

	Supply, deliver all necessary materials as below and Construct 2Mx2.5M kiosks each with a tank. The rates must include all connection costs from the main line or the tanks and Branding the kiosks at sites as advised by the engineer				
D5.1	FOUNDATION				
D5.1.1	Cut to spoil top soil i.e. 150mm below g.l. over Kiosks and fetching bay areas into a permanent heap	m ²		7	
D5.1.2	Cut to spoil a strip foundation trench i.e. 600mm below g.l.	m ³		1.2	
D5.1.3	300mm thick hardcore filling well-watered and compacted in layers of 150mm maximum thickness to make up levels	m ³		2.1	
D5.1.4	50mm thick quarry dust/Marram blinding to surfaces of hardcore	m ²		7	
D5.1.5	Chemical anti-termite treatment (as gladiator or equally approved) executed complete by an approved specialist under ten (10) year guarantee to surfaces of blinded hardcore	m ²		7	
D5.1.6	1000gauge polythene or any other equally approved Damp proof membrane laid under surface bed with 300mm side and end laps(measured net - allow for laps)	m ²		9	
D5.1.7	Natural stone walling, roughly chisel dressed on both sides and jointed in cement and sand (1:3) mortar 200mm foundation walling	LM		9	
D5.1.8	Mass concrete class 15 (1:4:8) in 50mm thick surface blinding under strip footings	m ³		0.35	
D5.1.9	Mesh fabric reinforcement A98 to B.S 4483 (measured net-allow for laps)	m ²		7	
D5.1.10	100mm thick 1:2:4 (C20/20) vibrated RC floor slab over Kiosks and fetching bay areas	m ²		7	
D5.1.11	25mm thick Cement sand screed (1:3) finished with steel float.	LM		5	
D5.2	WALLING				
D5.2.1	Hessian based bituminous felt DPC 225mm wide horizontally placed below masonry walling	LM		10	

D5.2.2	Dressed Natural stone / Block walling: 200mm thick, bedded and jointed with cement and sand mortar (1:3), reinforced with 20SWG hoop iron in alternate courses to external wall including gable ends	m ²	30		
D5.2.3	Vibrated reinforced concrete 1:2:4 (class 20 (20/20mm) in Ring beams	m ³	0.4		
D5.2.4	High yield square twisted steel reinforcement bars to BS 4461 including for cutting, bending to shape, tying, hooking and spacer blocks as described in:				
D5.2.5	8mm diameter ditto	KG	10		
D5.2.6	12mm diameter ditto	KG	50		
D5.2.7	Sawn formwork to Sides of ring beam	m ²	2.7		
D5.2.8	Horizontal key pointing in masonry joints in external wall surfaces	m ²	27		
D5.2.9	15mm thick Cement sand plaster to walls surfaces (1:3) finished to walls to receive paint internally	m ²	30		
D5.3	ROOFING:				
D5.3.1	Wrought Cypress Timber 4x2	LM	17		
D5.3.2	Wrought Cypress Timber 3" x 2"	LM	39		
D5.3.3	Wrought Cypress Timber 2" x 2"	LM	39		
D5.3.4	G30 2m Corrugated Iron Sheets.	m ²	4		
D5.3.5	Roofing Nails	Kg	1.5		
D5.3.6	Assorted Ordinary Wire Nails	Kg	5		
D5.3.7	2.1M x 1M Standard steel door complete with frame, hinges latch bolts and padlock.	No	1		
D5.3.8	1M X 1M Standard steel window complete with frame hinges and latch bolts.	No	1		
D5.4	FINISHES:				
D5.4.1	ROOF: 8" x 1" planed timber fascia board	LM	36		
D5.4.2	METAL SURFACES: Prepare and apply three coats plastic enamel paint to General metal surfaces (both sides).- (Red oxide primer glossy)	m ²	3.5		
D5.4.3	INTERNAL PLASTERED WALLS: Prepare and apply three coats plastic silk emulsion paint to Plastered wall surfaces internally	m ²	29		

D5.4.4	EXTERNAL WALLS: Prepare and apply three coats permaplast external wall paint to Rendered sides of beam and walls externally and allow for branding of the kiosk as directed by the supervising engineer	m ²	7		
D5.5	PLUMBING:				
D5.5.1	2" diameter GI pipe class B, 3m long c/w elbow and couplers	No.	1		
D5.5.2	2" by 3/4" reducing socket	No.	1		
D5.5.3	Water meter 3/4" dia. Kent	No.	1		
D5.5.4	3/4" diameter assorted length G.I nipples	No	5		
D5.5.5	3/4" diameter GI Pipe class B	No.	1		
D5.5.6	3/4" diameter Gate valve-Peglar type	No.	3		
D5.5.7	3/4" diameter valve sockets	No	2		
D5.5.8	3/4" diameter GI union.	No.	4		
D5.5.9	3/4" diameter GI Elbow	No	4		
	Pipe joining material:				
D5.5.10	Boss white for G.I Pipes	Kg	0.5		
D5.5.11	Solvent Cement	Kg	0.5		
D5.5.12	Coolant	Lts	1		
D5.5.13	Sealing thread	Pcs	2		
	Total for 1no. Kiosk				
	Total for draw off, treatment, and supply carried over to Summary				
E	PERIMETER FENCING				
	<i>Procure, deliver and install the following items for perimeter fencing (700m) as approved by the Project Manager.</i>				
E1	100x100 x 3000mm long precast concrete fencing posts with 600mm long crank and reinforced with 4 number 8mm diameter deformed steel bars, 6mm diameter mild steel stirrups at 200mm centres. The concrete shall be class 20 (1:2:4 mix), finished fair faced and have 9 number holes for attaching binding wire. (Posts erected in 3000mm centers)	pcs	235		
E2	Ditto struts for corner end and straining posts including hole for one number bolt to neatly support the main posts.	pcs	50		



E3	12mm diameter by 400mm long mild steel bolt complete with nut and 2 washers.	No	50		
E4	25kg*12 ^{1/2} *gauge galvanized steel barbed wire (600m roll) or other equal and approved tied to existing precast concrete posts (M/S) as with and including galvanized steel binding wire to attain 4 strands.	Rolls	5		
E5	2400mm high gauge 12 ^{1/2} galvanized steel chain-link steel mesh stretched and tightly tied to existing barbed wire (m/s) with and including galvanized steel binding wire. The bottom side to have 200mm depth of benching into the mass concrete (MS) and top side end to be properly tied up (18 meters long rolls)	Rolls	40		
E6	Binding wire	KG	25		
E7	Mass concrete class 15 (1:3:6 mix) benching to concrete posts well vibrated.	CM	23		
E8	Ditto mass concrete to chain-link bottom side hunching as shall be directed on site	CM	20		
	Sub-Total for fencing only				
E9	Entrance Gate				
E9.1	Mild Steel				



	Comprising 50 x 50 x 4mm thick hollow section top, bottom and intermediate rails and stiles; ends capped; 25 x 25 x 4mm thick hollow section vertical bars with capped ends welded top, bottom and intermediate rails at 150mm center; one and a half pairs per leaf of purpose- made hinges welded to gate leaf and gate post (m/s) 2No. purpose made slide bolts complete with padlock hasp welded to gate; all welding ground to smooth finish:				
E9.1.1	Gate overall size 4000mm wide x 2400mm high; all constructed as per Project Manager's instructions complete with all locking and hanging accessories	NO		1	
E9.2	Excavation				
	Excavate in hard soil/ marram 300mmx300mmx500mm deep thick holes	CM		6	
E9.3	Concrete				
E9.3.1	Concrete class 20/20 (1:2:4) to Column bases (1.2x1.2x0.3)	CM		0.864	
E9.3.2	Concrete class 20/20 (1:2:4) to Columns (0.4*0.4*3m high)	CM		0.96	
E9.4	High Tensile Steel Reinforcement to B.S. 8110				
E9.4.1	D12mm Bars to Column bases	KG		35	
E9.4.2	D12mm Bars to columns	KG		21	
E9.4.3	D8mm Bars to columns rings	KG		13	
E9.4.4	Paintings				
	Prepare, prime and paint two undercoats and two gloss finishing coat of oil paint on general surfaces of metalwork to steel gates	SM		24	
	Sub-Total for 1 gate				
	Total for 2 gates				
	TOTAL FOR FENCING AND GATES CARRIED TO SUMMARY				
BILL NO.	MAIN SUMMARY				
A	PRELIMINARY AND GENERAL ITEMS				
B	EARTH WORKS & ALLIED PROTECTION				
C	SPILLWAY, SILT TRAP and CULVERTS				



D	DRAW OFF, WATER TREATMENT, & SUPPLY				
E	PERIMETER FENCING				
	SUB TOTAL				
	Allow 2% for Contingencies to be expended as instructed by the Project Manager				
	GRAND TOTAL CARRIED TO THE FORM OF TENDER				

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