



**KENYA ELECTRICITY GENERATING COMPANY LIMITED**

**KGN-GDD-070-2019  
TENDER FOR CONNECTION OF MAKEUP WELLS OW-53B, OW-53C AND  
OW-53D TO OLKARIA IAU POWER PLANT AT GEOTHERMAL  
DEVELOPMENT DIVISION**

**30<sup>th</sup> May 2019**

**CLARIFICATION NO.4**

In accordance with the **TENDER FOR CONNECTION OF MAKEUP WELLS OW-53B, OW-53C AND OW-53D TO OLKARIA IAU POWER PLANT AT GEOTHERMAL DEVELOPMENT DIVISION**, KenGen hereby issues clarification No. 4

No.	Requirement as per the relevant Clause in the Bid documents	Declinations/Deviations/Clarifications	Employer/Engineer Comment
I.	"A bidder willing to enter into a Joint Venture (JV) agreement must include all the necessary documents validating such an agreement and experience not limited to the following;"	If consortium agreement is accepted for this project	A consortium is acceptable so long as the lead partner is a local.

**ACKNOWLEDGEMENT OF CLARIFICATION NO. 4**

We, the undersigned hereby certify that the clarification is an integral part of the document and the alterations set out in the addendum has been incorporated in the tender proposal.

**Signed** \_\_\_\_\_

**Tenderer** \_\_\_\_\_

**BILLS OF QUANTITY****PRELIMINARY PC SUMS**

<b>ITEM:</b>	<b>DESCRIPTION:</b>	<b>Unit</b>	<b>Rate</b>	<b>TOTAL (KES)</b>
1	Provide PC sum for mechanical and plumbing	sum	3,500,000	
	Profit for item 1 above	%		
2	Provide PC sum for Electrical works	sum	2,500,000	
	Profit for item 2 above	%		
3	Provide PC sum for Fire suppression and protection works	sum	6,000,000	
	Profit for item 3 above	%		
4	Provide PC sum for ICT works	sum	1,200,000	
	Profit for item 4 above	%		
5	Provide PC sum for Air Conditioning works	sum	7,000,000	
	Profit for item 5 above	%		
	<b>Total Amount carried to Form of Tender</b>			

BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS		BILL NO. 1			
ITEM	DESCRIPTION	QTY	UNIT	RATE (KES)	TOTAL (KES)
<b>GROUND FLOOR</b>					
<b>1</b>	<b>ELEMENT No.1 : SUBSTRUCTURE:</b>				
1.0	Demolish the existing masonry structure (50m x 10m) and cart away arising debris.	1	sum		
1.1	Clear site including grubbing up all bushes and remove vegetable top soil (upto depth 150mm) and remove all debris from site	1600	m <sup>2</sup>		
1.2	Excavate for strip foundation trenches 800mm wide commencing at oversite level and not exceeding 1500mm and carting away to spoil as directed by the site supervisor . Rate to allow for holding of excavated sides from collapse.	302.2	m <sup>3</sup>		
1.3	Excavate for column pad footings size 1,000x1,000mm commencing at oversite level and not exceeding 1200mm and carting away to spoil as directed by the site engineer	72	m <sup>3</sup>		
1.4	Return, fill and ram selected excavated materials around foundations in 150mm deep layers	99.96	m <sup>3</sup>		
1.5	Supply, fill and ram hardcore as fill in 3- layers of 300mm thick each below the floor slab and a 75mm thick compacted marram blinding	440	m <sup>2</sup>		
	<b>Supply vibrated plain concrete class 15/20 with crushed aggregates as described:</b>				
1.6	In blinding 50mm thick to strip and column bases.	16	m <sup>3</sup>		
	<b>Supply vibrated plain concrete class 25/20 with crushed aggregate as described:</b>				
1.7	In strip foundation 200 mm thick	25.6	m <sup>3</sup>		
1.8	In column footing and columns	20.58	m <sup>3</sup>		

1.9	In floor slab 150mm thick and other areas as directed by the engineer	109.6	m <sup>3</sup>		
	<b>High Yield steel reinforcement bars, characteristic strength not less than 425N/mm<sup>2</sup>, to BS 4466:1969, cut, bent, and fixed including all necessary binding wire and spacer bars:</b>				
1.10	D12mm diameter bars in strip footing	985.3	Kg		
1.11	Y8 mm diameter bars in strip footing as links	645.2	Kg		
1.12	Y10mm diameter bars in column footing	550	Kg		
1.13	Y12mm diameter bars in column starter bars	265.2	Kg		
1.14	Y16mm diameter bars in column starter bars	333.25	Kg		
1.15	Y8mm diameter bars as links in column	200.30	Kg		
	<b>Foundation Walling</b>				
1.16	Construct machine shaped natural stone wall in foundation, 225mm thickness bedded and jointed with cement sand mortar of 1:4 proportion (1 cement: 4 clean coarse sand) up to a height of 1200mm. Face of wall should be in plumb. Corner stone should be good stones dressed to correct angles and laid as headers and stretchers. Bond stones shall be provided 100cm c/c vertically and horizontally. Wall should be laid in courses of 40cm height. All the gaps between stones shall be filled with cement mortar and wall should be kept moist for a period of at least 10 days and should be protected from sun.	250	m <sup>2</sup>		
	<b>Sub-total carried forward to next page</b>				<b>0.00</b>
<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS</b>		<b>BILL NO.</b>			
		1			
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE (KES)</b>	<b>TOTAL (KES)</b>
	<b>Hardcore</b>				

1.17	300mm thick bed of quarry stones or equivalent material, well compacted and blinded with fine aggregate to receive concrete	199.6	m <sup>3</sup>		
	<b>Supply and fix 25mm thick sawn formwork in softwood as described.</b>				
1.18	150mm high to edges of concrete floor slab.	298	m		
	<b>Damp proof course</b>				
1.19	200mm wide hessian based bituminous damp proof course to BS 743 type SA under walls lapped 150mm at joints laid on cement levelling screed	320	m		
1.20	1000g polythene sheeting on top of murrum blinding including 100mm laps	666.4	m <sup>2</sup>		
1.21	A142 mesh to ground floor slab including 100mm laps	666.4	m <sup>2</sup>		
	<b>Total carried forward to summary page</b>				
<b>2</b>	<b>ELEMENT No.2 : WALLS</b>				
	<b>Supply and erection of machine cut natural stone external wall.</b>				
2.1	200mm thick machine cut natural stones external wall reinforced in hoop iron at every alternate course with v 20 swg x 25mm wide and embeded to RC columns	2500	m <sup>2</sup>		
	<b>Total carried forward to summary page</b>				
<b>3</b>	<b>ELEMENT No.3: REINFORCED CONCRETE</b>				
	<b>Cast in-situ vibrated reinforced concrete mix 1:2:4 Crushed aggregate as described:</b>				
3.1	Beam irrespective of size	36	m <sup>3</sup>		
3.2	Columns at ground floor and 1st floor	4	m <sup>3</sup>		
	<b>Staircase</b>				
3.3	1st and 2nd flight	1.95	m <sup>3</sup>		

3.4	150mm Thick landing <b>Slab</b>	1.75	m <sup>3</sup>		
3.5	175mm Thick suspended floor slab and roof slab <b>Supply and fix sawn formwork in softwood as described.</b>	180.8	m <sup>3</sup>		
3.6	Sides and soffits of beams	540	sm		
<b>Sub-total carried forward to next page</b>					
<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS</b>		<b>BILL NO.</b> 1			
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE (KES)</b>	<b>TOTAL (KES)</b>
3.7	Sides of columns 200-300mm	280	sm		
3.8	Soffits of suspended floor slab	972.3	sm		
3.9	Soffits of landing	44.44	sm		
3.10	Sloping soffits of staircase	560	sm		
3.11	Edges of staircase strings 225-300mm high including cutting to profile of treads and risers	22.16	Lm		
3.12	Edges of risers 150-225mm high	32	Lm		
3.13	Edges of suspended floor slab 150-225mm high	167.8	Lm		
3.14	Edges of landing 75-150mm high	8.9	Lm		
3.15	Allow for scaffolding & props  <b>High Yield steel reinforcement bars, characteristic strength not less than 425N/mm<sup>2</sup>, to BS 4466:1969, and Mild Yeild steel of characteristic strength 250N/mm<sup>2</sup> cut, bent, and fixed including all necessary binding wire and spacer bars:</b>	1	Sum		

	<b>Beam 500 x 200mm</b>				
3.16	Y16mm diameter bars in beam	710.90	Kg		
3.17	Y12mm diameter bars in beam	1,120.30	Kg		
3.18	Y8mm diameter bars as stirrups to beam	980.25	Kg		
	<b>Columns 300x 300mm</b>				
3.19	Y16 mm diameter bars in columns	446.2	Kg		
3.2	Y12mm diameter bars in columns	420	Kg		
3.21	Y8mm diameter bars as stirrups to columns	950	Kg		
	<b>Staircase</b>				
3.22	Y12mm diameter bars in staircase	201	Kg		
3.23	Y10mm diameter bars in staircase	163.47	Kg		
	<b>175mm thick Slab (1st floor and roof slab)</b>				
3.24	Y10mm diameter bars in slab	12,074.29	Kg		
3.25	Y12mm diameter bars in slab	8,384.83	Kg		
	<b>Total carried forward to summary page</b>				
<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS</b>		<b>BILL NO.</b>			
		1			
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE (KES)</b>	<b>TOTAL (KES)</b>
4	<b>ELEMENT No.4: DOORS AND WINDOWS</b> <b>DOORS</b>				



4.1	Supply 2000X2100mm precoated high grade 2hr fire rated heavy duty double door with panic locks and handles (Cisa or any other approved equivalent) on a 150x75mm alluminium frames	5	Nr		
4.2	<b>WINDOWS</b> Supply pre-factory made aluminium casement windows size not exceeding 2000 x 1500 mm high, widow type W1, sliding type with handle. Rate to include glazing in 5.5 mm thick glass and fixing of the window framing. rate to include air tight rubber seals for proper air conditioning. all doors shall be fitted with provisions for both manual and automatic biometric locking and access control.include all hardware and software	33	Nr		
4.4	ditto but 1500 x 1200 mm high, window type W2, windows to WC/ stairwell	5	Nr		
4.5	Prepare Surface and install EPDM membrane on roof slab and gutterbeams. Rate to include all associated works	472.3	sm		
<b>Total carried forward to summary page</b>					
5	<b>ELEMENT No.5: FINISHINGS</b>  <b>Plinth area finishes</b>				
5.1	12mm thick cement and sand (1:3) wood float render to plinth area	140	sm		
5.2	Prepare and apply 3 coat of epoxy floor paint in approved colour to render area	140	sm		
<b>Sub-total carried forward to next page</b>					
<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS</b>			<b>BILL NO.</b>  1		
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE (KES)</b>	<b>TOTAL (KES)</b>

**Floor & Staircase Finishings**

5.3 25mm thick cement screed mix 1:3 finished: smooth steel trowel finish to the floor 388.74 sm

**Tiles: 600 x 600 x 6mm thick coloured non-slip granito tiles jointed and pointed with matching cement and sand (1:3) mortar as described**

5.4 On floor & staircase 400 m<sup>2</sup>

5.5 6 x 150mm high tile skirting 63.12 m<sup>2</sup>

**Wall Finishings**

5.6 Apply 20mm thick plastering in two coats of cement sand mortar on walls , both inside and outside. Walls should be cured at least for one week after 24 hours of plastering 3,240 m<sup>2</sup>

**Decorative Gypsum**

5.7 Supply and install Decorated Gypsum ceiling with recessed lighting provisions. Rate to include design and installation of these ceilings and all associated decorative accessories. The gypsum shall be supported in light gauge steel sections 75mmx 50mm U channels in square formation of not more than 600mmx600mm. Fastening in gypsum screws. Rate to include gypsum lime plaster in steel float for smooth painting. 880 m<sup>2</sup>

**Tiles laid on cement and sand (1:4) backing: fixing with approved tile adhesive: jointed and pointed in proprietary grout in approved patterns**

5.80 600mm x 200mm x 6mm thick polished porcelain wall tiles including matching border/mosaic tiles and edge strips to WC to height of 1.5m 214 m<sup>2</sup>

**Painting**

5.90 Supply and apply two coats of universal undercoat to plastered surfaces. 3240 m<sup>2</sup>

5.10	Supply and apply three coats of silk vinyl paint on all undercoated ares	3240	m <sup>2</sup>		
	<b>False/raised Floor</b>				
5.11	Supply and fix raised Floor consisting of a gridded metal framework or substructure of fixed height supports (called "pedestals") that shall provide support for removable (liftable) floor panels, which shall be or 600x600 mm. The height of the legs/pedestals shall allow for passage of services beneath, and shall not be less than 300mm tall. The panels shall be of steel-clad particleboard or a steel panel with a cementitious internal core. Panels shall be covered with carpet tiles,	160	m <sup>2</sup>		
5.12	Supply and fix Fire retardant 400 x 400 mm false floor tiles of approved colour and strength	160	m <sup>2</sup>		
5.13	Supply and fix 5mm thick floor carpet to control room	160	m <sup>2</sup>		
<b>Total carried forward to summary page</b>					
<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS</b>		<b>BILL NO.</b>			
		1			
ITEM	DESCRIPTION	QTY	UNIT	RATE (KES)	TOTAL (KES)
6	<b>ELEMENT No.6 : FINISHING WORKS</b>				
6.1	Supply of stainless steel hand rail & Balustrade Modular system of . The system comprises handrail of 50mm & 3mm thick and 3 horizontal steel pipe of 25mm & 1.5mm thick diameter of equal spacing with balustrades of stainless pipe of 38mm & 3mm thick @ 1200mm C/C bolted/ welded to good finish and fixed/ grouted in concrete. each peace shall be 8m long. see 3D impression	Nr	5		
	<b>Painting</b>				
6.2	Prepare and apply one coat of universal undercoat	5	m <sup>2</sup>		

6.30	<p>Prepare surface and paint one undercoat and two coats of emulsion paint on external walls. Rate to include weather resistant paint of approved colour.</p> <p><b>Provide and fix 50 micron powder coated aluminium work for ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, paneling and dash fasteners to be paid for separately) :</b></p>	800	m <sup>2</sup>
6.4	for fixed portion of partition	400	kg
6.5	Other areas	350	kg
6.6	5.5mm thick glazed (to approved pattern) float glass pannels for glazing	370	m <sup>2</sup>
6.7	<p>Providing and fixing double action hydraulic floor spring of approved brand and manufacture conforming to IS : 6315, having brand logo embossed on the body / plate with double spring mechanism and door weight upto 125 kg, for doors, including cost of cutting floors, embedding in floors as required and making good the same matching to the existing floor finishing and cover plates with brass pivot and single piece M.S. sheet outer box with slide plate etc. complete as per the direction of Engineer-in-charge. with stainless steel cover plate minimum 1.25mm thick.</p>	20	Nr
6.8	<p>Procure and install scrollable office curtains on all windows. (see architectural drawings for window sizes)</p> <p><b>Total carried forward to summary page</b></p>	1	Item

**SEPTIC TANK**

<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS - SEPTIC TANK</b>					
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE (KES)</b>	<b>TOTAL (KES)</b>
<b>1</b>	<b>ELEMENT No.1 : SEPTIC TANK AND DRAINAGE WORKS</b>				
1.1	Excavate for septic tank, manholes, inspection chambers and pit and soak away pit as per the drawings	30	m <sup>3</sup>		
1.2	Spread excavated materials as directed by the site supervisor	15	m <sup>3</sup>		
	Supply vibrated plain concrete class 15/20 with crushed aggregates as described:				
1.3	In blinding 50mm thick.	0.7	m <sup>3</sup>		
	Supply vibrated plain concrete class 20/20 with crushed aggregate as described:				
1.4	<b>150mm thick in strip foundation and bottom slab to septic tank and inspection chambers</b>	3.2	m <sup>3</sup>		
	<b>Total carried forward to summary page</b>				
<b>2</b>	<b>Supply Cement sand blocks prepared in the 1:3 ratio</b>				
2.1	200mm thick machine cut natural stones external wall reinforced in hoop iron at every alternate course	56	m <sup>2</sup>		
	<b>Total carried forward to summary page</b>				
<b>3</b>	<b>Hardcore to soak away pit</b>				
3.1	<b>200mm thick quarry stones</b>	3	m <sup>3</sup>		

4.00	Unwrot formwork to soffits of septic tank, soak away pit				
4.1	25mm thick including all props	11	m <sup>2</sup>		
4.2	150mm high to edges of the slabs	21.5	m		
	Total carried forward to summary page				
5	Cast in-situ vibrated reinforced concrete mix 1:2:4 Crushed aggregate as described:				
5.1	Slabs to septic tank and soak away pit	5	m <sup>3</sup>		
	<b>Total carried forward to summary page</b>				<b>0.00</b>
	<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS - SEPTIC TANK</b>				
ITEM	DESCRIPTION	QTY	UNIT	RATE (KES)	TOTAL (KES)
6.00					
	<b>High yield steel reinforcement bars, characteristic strength not less than 425N/mm<sup>2</sup>, to BS 4466:1969, and Mild Yeild steel of characteristic strength 250N/mm<sup>2</sup> cut, bent, and fixed including all necessary binding wire and spacer bars:</b>				
6.1	<b>Y12mm diameter bars to septic tank slab</b>	65	Kg		

6.2	Y10mm diameter bars to septic tank and soak-away pits	37.5	Kg		
7	<b>Finishings</b> Cement and sand (1:3)				
7.1	<b>25mm thick cement screed mix 1:3 finished to wooden float finish to the floor of the inspection chambers and gulley traps</b>	3	m <sup>2</sup>		
7.2	Ditto but to septic tank with water proofing cement to applied to manufacturer's instructions	6.5	m <sup>2</sup>		
7.3	13mm thick 1:4 lime/gypsum plaster to internal walls of the inspection chambers and gulley traps and finishing of the top surfaces of soak away pit, placenta pit and all the lcs and GTs to smooth trowel finish	21	m <sup>2</sup>		
7.4	Ditto but to walls of the septic tank in water proof cement	23	m <sup>2</sup>		
	<b>Total carried forward to summary page</b>				
8	<b>Inspection Chamber covers</b>				
8.1	600x450mm standard cast iron covers to Inspection chambers	7	Nr		
	Total carried forward to summary page				
	Total cost of septic tank				

## BOUNDARY FENCE AND PARKING WORKS

BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS - BOUNDARY FENCE					
ITEM	DESCRIPTION	QTY	UNIT	RATE (KES)	TOTAL (KES)
<b>1</b>	<b>ELEMENT No.1 : SUBSTRUCTURE:</b>				
1.1	Clear site including grubbing up all bushes and remove vegetable top soil and remove all debris from site	2800	m <sup>2</sup>		
1.2	Excavate for strip foundation trenches 600mm wide commencing at oversite level and not exceeding 600mm and carting away to spoil as directed by the site supervisor	120	m <sup>3</sup>		
1.3	Supply and install pre coated - 4inch diameter ,4mm thick and 3000mm tall hot deep galvanized pipes welded to -Y- shape and slotted to accept sta\rainer wire.	67	Pcs		
1.4	Supply and install strainer wire tightly round the installed posts  <b>Supply vibrated plain concrete class 15/20 with crushed aggregates as described:</b>	1200	LM		
1.5	In blinding 50mm thick.  <b>Supply vibrated plain concrete class 20/20 with crushed aggregate as described:</b>	15	m <sup>3</sup>		



1.6	in dwarf wall	65	m <sup>3</sup>		
	<b>High Yield steel reinforcement bars, characteristic strength not less than 425N/mm<sup>2</sup>, to BS 4466:1969, cut, bent, and fixed including all necessary binding wire and spacer bars:</b>				
1.7	Class A 140 BRC on dwarf wall	100.8	Kg		
1.8	Supply and install 4mm thick galvanized chainlink, 3000mm high. Fastened onto the strainers above. Install above the chainlink, 4.5mm coiled razor wire to engineers approval. Rate to include protection from harsh enviromental conditions around the geothermal areas.	250.00	Lm		
	<b>Ground/parking works</b>				
1.9	Procure, transpost and install motorized rolling Galzanized steel gate of approved design, with remote operation capabilities. All accessories shall be able to withstand effects of H <sub>2</sub> S and the harsh Geothermal environment.	1	Nr		
1.1	Procure, haul , spread and compact borrowed hardcore material to 95% MDD. The employer will not provide a quarry.	680.35	m <sup>3</sup>		
1.11	Procure, haul , spread and compact granular quarry dust to a thickness of 50mm	1600	m <sup>2</sup>		
1.12	Lay, joint and backfill approved road kerbs on the parking space	300	Lm		
1.13	Cast class 25/25 Concrete for drainages	45	m <sup>3</sup>		
1.14	Lay class A142 BRC on the drains	250	m <sup>2</sup>		
1.15	Procure and lay 80mm thick heavy duty precast concrete paving blocks laid to approved pattern.	1600	m <sup>2</sup>		

1.16	Fill in red soil, mixed with approved manure and plant in approved grass to establishment. Depth shall be 250mm	300	m <sup>2</sup>		
1.17	Supply and install 20 cubic metre Galvanized steel raised water tank on a galvanized steel water tower (9m tall) as per manufacturers design and installation guidelines.	1	item		
1.18	Supply and install 20 KVA UPS (Uninterruptible Power Supply) system for essential electrical loads within the buiding.	2	item		
<b>Total carried forward to next page</b>					
	Total carried forward to summary page				
	TOTAL COST FOR BOUNDRY WALL				

<b>BILL OF QUANTITIES - CONSTRUCTION OF REMOTE CONTROL CENTER FOR WELLHEAD GEOTHERMAL POWER PLANTS - SUMMARY PAGE</b>		<b>BILL NO.</b>	
		<b>GRAND SUMMARY</b>	
<b>ITEM:</b>	<b>DESCRIPTION:</b>		<b>TOTAL (KES)</b>
1	PRELIMINARY & PC SUMS		
3	MAIN BUILDING		
4	SEPTIC TANK/ DRAINAGE WORK		
5	BOUNDRY FENCE and PARKING		
	Add 5% Contingency		
	Add 16% V.A.T		

	<b>Total Amount of the construction</b>		
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