

**SCHEDULE NO. 4**  
**INSTALLATION, TESTING, COMMISSIONING AND OTHER SERVICES**  
**FOR RUMURUTI SUBSTATION**

**Note:** All of the blank cells shall be filled with quoted price or "included". Any other alternation interpreted as "included". It means that relevant price has been included in other items.

1	2	3	4	5			6		
Item No	Description	Unit	Estimated Quantity	"Foreign Currency (FC1) = USD Foreign Currency (FC2) = EURO Local Currency (KSh) = KENYAN SHILLINGS"			Total Price		
				Installation,Testing,Commissioning and other Services			Installation and other Services		
				Unit Price			(Quantity x Unit Price)		
				FC1	FC2	Ksh	FC1	FC2	Ksh
EQUIPMENT AND MATERIAL									
1	132kV PRIMARY PLANT								
1.1	132kV Circuit Breaker (3 phase) 1600A, 31.5kA - single pole	No.	2						
1.2	132kV Circuit Breaker (3 phase) 1600A, 31.5kA	No.	1						
1.3	132kV Circuit Breaker (3 phase) 3150A, 31.5kA	No.	1						
1.4	Motorized disconnecter (3-phase) 132kV,1600A,31.5kA, without earthing switch with earth mat	No.	3						
1.5	Motorized disconnecter (3-phase) 132kV,3150A,31.5kA, without earthing switch with earth mat	No.	2						
1.6	Motorized disconnecter (3-phase) 132kV,1600A,31.5kA, with one (1) earthing switch, and earth mat	No.	7						
1.7	Motorized disconnecter (3-phase) 132kV,1600A,31.5kA, with two (2) earthing switches, and earth mat	No.	1						
1.8	Motorized earthing switch (3-phase) with earth mat	No.	2						
1.9	Surge arrester 132kV (1-phase) including surge counter and earth leakage meter	No.	9						
1.10	Post Insulator	No.	1						
1.11	Insulator string (suspension and strain types with hardware fitting)	No.	1						
1.12	132 kV Post type current transformer, for protection and metering, six cores (1-phase)	Lot	12						
1.13	132 kV Post type current transformer, for protection and metering, five cores (1-phase)	Lot	3						
1.14	132 kV Post type current transformer, for protection and measuring, three cores (1-phase)	No.	3						
1.15	132 kV Post type current transformer, for protection, two cores (1-phase)	No.	3						
1.16	132 kV Capacitive voltage transformer protection and metering three cores (1-phase)	No.	6						
1.17	132 kV Capacitive voltage transformer protection and measuring two cores (1-phase)	No.	3						
1.18	Conductor - Tubular	No.	1						

1.19	Conductor - Stranded	No.	1						
1.2	Connectors and clamps for tubular conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1						
1.21	Connectors and clamps for stranded conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1						
1.22	Busbars modification from single bus to double buses configuration with all required connections, demolition, modification, relocation and replacement works for the existing area	Lot	1						
1.23	Replacement of CT of existing 132kV bays (one line and one transformer feeder) to comply with the busbar protection.	Lot	1						
1.24	Demolition, Relocation and Re-installation of the complete equipment (Circuit Breaker, Disconnectors, current transformers, voltage transformers, Surge arrestors, conductors and accessories,...etc), support structures, gantry, etc of the existing 132kV Nanyuki OHL bay including the supply of necessary additional power supply cables, control cables, earthing conductors, fiber optic cables,...etc required to cover the extended distance and other accessories to make the system functional	Lot	1						
1.25	All required modification, replacement, relocation, disassembling, demolition and transportation works to make the system complete and functional	Lot	1						
	<b>TOTAL PRICE ITEM 1</b>								
2	<b>33kV PRIMARY PLANT</b>								
2.1	33kV Circuit Breaker (3 phase) 1600A, 31.5kA	No.	4						
2.2	Motorized disconnecter (3-phase), without earth switch, with earth mat	No.	5						
2.3	Motorized disconnecter (3-phase), complete with one integral motorised earth switch, and earth mat	No.	3						
2.4	Surge arrester (1-phase) including surge counter and earth leakage meter	No.	9						
2.5	Post insulator	Lot	1						
2.6	Insulator string (suspension and strain types with hardware fitting)	Lot	1						
2.7	Post type current transformer protection and metering, four cores (1-phase)	No.	12						
2.8	Post type current transformer, for protection, three cores (1-phase)	No.	3						
2.9	Voltage transformer Protection and metering, two cores (1-phase)	No.	12						
2.10	40.5kV, 5A 1phase cut off fuse	No.	3						
2.11	Conductor - Tubular	Lot	1						
2.12	Conductor - Stranded	Lot	1						
2.13	Connectors and clamps for tubular conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1						
2.14	Connectors and clamps for stranded conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1						
2.15	One circuit of 33kV for interconnection between 132kV switchgear (TR-2) and 33kV Switchyard Transformer feeder including requirement	Lot	1						
2.16	All required modification, replacement, relocation, disassembling, demolition and transportation works to make the system complete and functional	Lot	1						
	<b>TOTAL PRICE ITEM 2</b>								
3	<b>POWER TRANSFORMER (P.TR.)</b>								

3.1	Power transformer three phase units HV132/LV33kV, 18-23MVA including HV/LV/Neutral Bushing CT's, OLTC, RTCC, Control Cabinet and all accessories as required acc. to Tech. Spec. and TDS	No.	1						
3.2	Fire Protection System Installation	Lot	1						
<b>TOTAL PRICE ITEM 3</b>									
<b>4 AUXILIARY TRANSFORMER</b>									
4.1	Auxiliary transformer three phase units HV33/LV0.415kV, 315KVA including all accessories as required	No.	2						
4.2	40.5kV, 9A 1-phase cut off fuse	No.	6						
4.3	All required modification, replacement, relocation, disassembling and transportation works related to replacement of existing auxiliary transformer and hand over to KETRACO at designated Employer's warehouse.	Lot	1						
<b>TOTAL PRICE ITEM 4</b>									
<b>5 132kV PROTECTION SYSTEMS</b>									
5.1	<b>132kV OHL Protection System including:</b>								
5.1.1	Main 1 21L Protection(with all required functions as per PS LD)	No.	2						
5.1.2	Main 2 87L Protection(with all required functions as per PS LD)	No.	2						
5.1.3	Auto-Reclose Protection Relay(with all required functions and Voltage Selection Logic as per PS LD)	No.	2						
5.1.4	All other relays or functions such as over voltage; under voltage; trip relay; trip/circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1						
5.1.5	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	4						
5.2	<b>Transformer 132kV Side Protection System including:</b>								
5.2.1	Main 87T+87NT Protection(with all required functions as per PS LD)	No.	1						
5.2.2	Backup 50/51, 50N/51N Protection(with all required functions as per PS LD)	No.	1						
5.2.3	All other relays or functions such as over voltage; under voltage; trip relay; trip/circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1						
5.2.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1						
5.3	<b>Completion and Modification of 132kV Low Impedance Type Busbar Protection System</b>								
5.3.1	132kV Low Impedance type Busbar Protection Relay with Check zone ACC. To PS LD drawing and considering future extention	No.	2						
5.3.2	Panels including all accessories, e.g. trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	No.	2						
5.3.3	Decommission existing busbar panels and associated accessories and hand over to Employer at a designated location in Kenya	lot	1						
5.3.4	Low impedance busbar protection system including panels, relays, auxiliary relays, and all accessories for double bus scheme extension/modification scope with compete retesting, recommissioning and all other modifications	Lot	1						
5.4	<b>132kV Coupler Protection System including:</b>								
5.4.1	Over Current 50/51(N) (with all required functions as per PS LD)	No.	1						
5.4.2	Bay Control Unit integrated with synchro-check function (with all required functions as per PS LD)	No.	1						

5.4.3	All other relays or functions such as over voltage; under voltage; trip relay; trip/circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1						
5.4.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1						
5.5	<b>Miscellaneous modification works as necessary to make a complete functional 132kV protection system</b>	Lot	1						
	<b>TOTAL PRICE ITEM 5</b>								
6	<b>33kV PROTECTION SYSTEMS</b>								
6.1	<b>Transformer 33kV Side Protection System including:</b>								
6.1.1	50/51, 50N/51N Protection with all required functions as per PSLD)	No.	1						
6.1.2	Earth Fault 50N/51N (SBEF) Protection (with all required functions as per PSLD)	No.	1						
6.1.3	All other relays or functions such as over voltage; under voltage; trip; trip/circuit supervision; pole discordance; synchro check; fuse failure; close; lockout; short zone; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	Lot	1						
6.1.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1						
6.2	<b>Power Transformer Automatic Voltage Regulation System including:</b>								
6.2.1	Automatic Voltage Regulator Relay (AVR)	No.	1						
6.2.2	Panels with all accessories and auxiliaries, lighting, heating, socket, push buttons, wiring, terminals, test facilities, discrepancy and all other switches, labels, unit measurement indicating lamps, position indicators, alarm annunciators, temperature indicators, test block/plug, Labels, etc. and with the following equipment.	No.	1						
6.3	<b>33kV Coupler Protection System Including:</b>								
6.3.1	Overcurrent 50/51 And Earth Fault 50N/51N Protection(with all required functions as per PSLD)	No.	1						
6.3.2	Bay Control Unit integrated with synchro-check function (with all required functions as per PSLD)	No.	1						
6.3.2	All other relays or functions such as over voltage; under voltage; trip relay; trip/circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1						
6.3.3	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1						
6.4	<b>Completion and Modification 33kV Low Impedance Type Busbar Protection System</b>								
6.4.1	33kV Low Impedance type Busbar Protection Relay ACC. To PSLD drawing and considering future extention	No.	2						
6.4.2	Decommission existing busbar high impedance protection panels and associated accessories and hand over to Employer at a designated Warehouse location in Kenya	Lot	2						
6.4.3	Low impedance busbar protection system including panels, relays, auxiliary relays, and all accessories for double bus scheme extension/modification scope with compete retesting, recommissioning and all other modifications	Lot	1						
6.5	<b>33kV Feeder Protection System Including:</b>								
6.5.1	Main 1 21L Protection(with all required functions as per PSLD)	No.	2						
6.5.2	Bay control and protection unit with intergrated auto-reclose function(with all required functions as per PSLD)	No.	2						
6.5.3	All other relays or functions such as lockout; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	No.	2						

6.5.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	2						
6.6	Miscellaneous modification works as necessary to make a complete functional 33kV protection system	Lot	1						
	<b>TOTAL PRICE ITEM 6</b>								
<b>7</b>	<b>132/33kV SUBSTATION CONTROL SYSTEM</b>								
7.1	Substation automation system including:	Lot	1						
7.2	All software and license, Modifications in HMI	Lot	1						
7.3	Bay Control and Protection Units (BCU/BCPU)(with all required functions as per PS LD)	No.	3						
7.4	Bay Control Panels	No.	3						
7.5	Auxiliary and Common Services Bay Control Unit	Lot	1						
7.6	Auxiliary and Common Services Panel including all accessories	Lot	1						
7.7	Bay level LAN (Switches, Star-Coupler, Fibre Optic Cables etc.)	Lot	1						
7.8	Completion of Human Machine Interface Systems and Computers	No.	2						
7.9	Any other material for full functionality of the Substation Control System	Lot.	1						
	<b>TOTAL PRICE ITEM 7</b>								
<b>8</b>	<b>CONTROL AND PROTECTION SYSTEM IN EXISTING REMOTE SUBSTATIONS</b>								
8.1	Modification works in remote substations in case of compatibility (already considered at Kabarnet)	Lot	0						
	<b>TOTAL PRICE ITEM 8</b>								
<b>9</b>	<b>TELECOMMUNICATION &amp; NCC/RCC/NSCC</b>								
9.1	Required equipment for modification works at existing Rumuruti 132/33kV substation Telecommunication and Teleprotection Signalling System		1						
9.1.1	Required equipment for modification works at existing Telecommunication SDH System in 132/33kV Substation	Lot	1						
9.1.2	Required equipment for modification works at existing Teleprotection Signalling Equipment Interface Board for Distance & Differential protection relay in 132/33kV Substation	Lot	1						
9.2	New Firewall system with all necessary Licenses	Lot	1						
9.3	Required equipment for incorporating new and modified substation equipment into the SCADA/EMS System at the NCC/RCC/NSCC	Lot	1						
9.4	Required equipment for modifications to NCC/RCC/NSCC mimic board (if any)	Lot	1						
9.5	All necessary licences, hardware, software and configuration needed for the existing network management system (NMS) to create the STM-1 link that forms part of the Optic network from Rumuruti 132/33kV Substation and other Substation to the NCC/RCC/NSCC	Lot	1						
9.6	Required equipment for modification works at existing PABX in Lessos RCC including all necessary Licenses, Network switches and any other facilities for communication with NCC,RCC and NSCC	Lot	1						
9.7	Required equipment and accessories for interconnection between the OPGW and fibre optic cable in communication room	Lot	1						
9.7.1	Optical Distribution panel for Main Communication room	No	2						
9.7.2	Optical Distribution Unit (OCDF) 48 cores fiber for Main Communication room	Set	5						
9.7.3	Digital Distribution Unit (ODF) for 48 cores fiber	Set	1						
9.7.4	Tail Optical Fiber	Lot	1						
9.7.5	48 cores Optical Cable	Lot	1						
9.7.6	2M Coaxial Cable	Lot	1						
9.7.7	PVC Pipe suitable for the distance between entry gantry and communication room	Lot	1						
9.7.8	Optical Cable plane	Lot	1						
9.7.9	Steel Tube from junction box to entry of cable channel	Lot	1						
9.7.10	OPGW Splice Closures joint box with all accessories	Set	1						
9.8	EPABX system for communication between guard house and individual Staff housings including:	Lot	1						
9.8.1	Exchange	Lot	1						
9.8.2	Telephone Equipment	No.	1						
9.8.3	Junction Boxes	Lot	1						
9.8.4	Cabling	Lot	1						
9.8.5	Power supply with backup battery	Lot	1						
9.9	VHF System included a station set and at least 4 portable handsets and batteries and battery chargers, suitable antenna with all accessories (RG, Helix cabling, AC & DC cabling, indication lamp), supported tower with suitable height	Lot	1						

9.10	Any other material for full functionality of the Telecommunication System	Lot.	1						
	<b>TOTAL PRICE ITEM 9</b>								
<b>10</b>	<b>LV CABLES AND ACCESSORIES</b>								
10.1	Auxiliary power and control cabling including single and three phase power cables, control cables required for control; protection; metering and alarms, CTs and CVTs cable circuits, DC supply cables.	Lot	1						
10.2	Substation internal fibre optic cabling, coaxial cables.	Lot	1						
10.3	Cabling installation including, cable trays, ladders, supports & fixing calmps, accessories, glands, lugs, terminals, rails, labels, cable shoes, fire proof sealing of ducts/conduits/openings etc.	Lot	1						
	<b>TOTAL PRICE ITEM 10</b>								
<b>11</b>	<b>EARTHING &amp; LIGHTNING PROTECTION</b>								
11.1	Earthing system (including main earth grid, earth mat, rizer, bonding, connector, clamp, fitting, earth rod and well, inspection earth pits etc. as required)	Lot	1						
11.2	Lightning protection system (including shield wire, air termination rod, down conductor, equipotential bonding, disconnecting link, etc. as required)	Lot	1						
11.3	Earth mat for the existing DS(E) and ES	Lot	1						
	<b>TOTAL PRICE ITEM 11</b>								
<b>12</b>	<b>SUPPORT STRUCTURES</b>								
12.1	Steel supports for 132kV equipment and accessories (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1						
12.2	Steel supports for 33kV equipment and accessories (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1						
12.3	Gantries and other structures within the Substation (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1						
12.4	Structures for interconnecting 132kV and 33kV switchyards (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1						
	<b>TOTAL PRICE ITEM 12</b>								
<b>13</b>	<b>"CIVIL WORKS</b> <b>Note:</b> All required material and works shall be included in the quoted price in this section."								
13.1	Site survey	Lot	1						
13.2	Site clearance including removal of shrubs, bushes, vegetation, buildings, foundations as necessary	Lot	1						
13.3	Earth works including excavation, backfilling and excavation in rock up to a depth of 2m	Lot	1						
13.4	Soil Investigation (Geotechnical and geo-electrical) (Boreholes and trial pits)	Lot	1						
13.5	Temporary works	Lot	1						
13.6	Grading and landscaping on completion	Lot	1						
13.7	Surfacing with gravel	Lot	1						
13.8	Extension and Integration of Drainage system (including: excavation, backfill, channel slopping, lean concrete, reinforcement, formwork, concrete placement, concrete curing, grating plates, filter aggregates and others)	Lot	1						
13.9	Sewage system (including Polyethylene Pipes, PVC Vent Pipes, Toilet, Septic Tanks with sufficient size, Floor drain, Valves, etc.)								
13.9.1	Underground Polyethylene Septic Tank for control building and Guard house, 6m^3	No.	1						
13.9.2	Underground Polyethylene Septic Tank for Technical staff Housing and Security staff Housing, 6m^3 and Regional office	No.	3						
13.9.3	Polyethylene Pipes, PVC Vent Pipes, Toilet, Floor drain, Valves, etc.	No.	1						

13.10	Complete water supply system (potable water and fire water) including borehole, 30000-liter and 10000-liter pressed steel water tank including foundations and structures (tanks quantity and capacity shall be adequate to serve requirements of control building, staff housings, guard house etc. with automatic level controls), pumps, pipes, valves, control panel, electric motors, indicative gauges/meters, etc.								
13.10.1	Water borehole equipped with solar powered pumps	Lot	1						
13.10.2	Water Pump for Control building and Guard house, 6 m³/hr	No.	1						
13.10.3	Water Pump for Technical staff Housings and Security staff Housings, 6 m³/hr	No.	2						
13.10.4	pressed steel water tank (30,000 lit.) with automatic control system including foundations	Lot	1						
13.10.5	Elevated pressed steel water tank (10,000 lit.) with automatic control system including foundations and structures for control building, guard house, staff housings, and Regional Office.	No.	3						
13.10.5	Water system plumbing and accessories to circulate water from borehole to 30,000-liter reservoir and 10,000-liter elevated water tanks	No.	1						
13.11	Completion and integration of Substation chain link security fence shifting, removal and installation works including security for watch and ward during construction phase, as per bid drawings to match the existing.	Lot	1						
13.12	Switchyard chain link fence to match the existing as required and as specified in part 2-A Employer's requirement	Lot	1						
13.13	Required extension/modification of Substation gates and access control system	Lot	1						
13.14	Cable trenches / ducts (including: excavation, backfill, channel slopping, lean concrete, reinforcement, formwork, concrete placement, concrete curing, grating plates, Cover Slab and others)	Lot	1						
13.15	Extension/modification Substation Road and fence Lighting System, With all related equipment including Lighting fixture and terminal boxes, Steel lighting poles with related terminals, fuses, fixtures, lamps and etc. , cables and related accessories, distribution boards and etc.	Lot	1						
13.16	Foundation of 132kV equipment/support structures (including: excavation, backfill, reinforced concrete, lean concrete, formatting, grout, reinforcement, galvanized anchor bolt and others). This includes foundation of Nanyuki which shall be demolition and re-installed	Lot	1						
13.17	Foundation of 33kV equipment/support structures (including: excavation, backfill, reinforced concrete, lean concrete, formatting, grout, reinforcement, galvanized anchor bolt and others)	Lot	1						
13.18	Foundation of gantries and other structures within substation (including: excavation, backfill, reinforced concrete, lean concrete, formatting, grout, reinforcement, galvanized anchor bolt and others)	Lot	1						
13.19	Foundation for Structures for interconnecting 132kV and 33kV switchyards	Lot	1						
13.20	Miscellaneous foundation to complete the requirements of work	Lot	1						
13.21	Main Transformer foundation, Plinth and oil drain pits(including: excavation, backfill, reinforced concrete, lean concrete, formatting, grout, reinforcement, metal works and fittings and others)	Set	1						
13.22	Auxiliary Transformer foundation, Plinth and oil drain pits (including: excavation, backfill, reinforced concrete, lean concrete, formatting, grout, reinforcement, metal works and fittings and others)	Set	2						
13.23	Firewalls for Power Transformers (including: excavation, backfill, reinforced concrete, lean concrete, formatting, grout, reinforcement, metal works and fittings and others) (Not required)	Lot	0						
13.24	Storage Warehouse including building services (e.g. Lighting, Small Power System (including Lighting Panels, Conduits, Lighting Fixtures and etc.), HVAC (fans, heaters, etc.), Fire Detection, hand held and trolley-mounted fire extinguishers and etc.)								
13.24.1	Construction of Storage Warehouse (including Excavation, concrete works, backfilling, and etc.) and Building services such as Lighting, Small Power System (including Lighting Panels, Conduits, Lighting Fixtures and etc.), Water Supply and Sewage System, access control, etc.	m²	1440						
13.24.2	Complete Electric Overhead Travelling (EOT) Crane minimum five (5) tonnes	Lot	1						

13.24.3	Wind-driven Cyclone Ventilator for Storage Warehouse, one per slope per span	No.	20						
13.24.4	Dry-Powder Fire extinguishers, 12 Kg for Storage (as required acc. to bid documents)	No.	4						
13.24.5	CO2 Fire extinguishers, 6 Kg for Storage (as required acc. to bid documents)	No.	4						
13.24.6	All Other Mechanical/ Electrical/ Plumbing Installations (including Shower, Faucet, Basin, Sink, Eye Wash, Ceramic Floor Mounted Toilet, Pipes, Valves, etc.)	Lot	1						
13.25	Diesel generator house Civil works (including Excavation, concrete works, backfilling, and etc.) together with building services (e.g. Lighting, Small Power System, Fire Detection and hand-held fire extinguishers)	No.	1						
13.25.1	Construction of Diesel generator house (including Excavation, concrete works, backfilling, and etc.) and Building services (e.g. Lighting, Small Power System, Fire Detection and hand-held fire extinguishers) <b>Note:</b> As per contractor's detail design and proposed package, the building size shall be considered accordingly without any surcharge	m^2	24						
13.25.2	Dry-Powder Fire extinguishers, 12 Kg for Storage (as required acc. to bid documents)	No.	1						
13.25.3	Dry-Powder Fire extinguishers, 12 Kg for Storage (as required acc. to bid documents)	No.	1						
13.26	Fire water pump house Civil works (including Excavation, concrete works, backfilling, and etc.) together with building services (e.g. Lighting, Small Power System, HVAC (fans, etc.), Fire Detection hand held and trolley-mounted fire extinguishers and etc.) and borehole with underground reservoir (with adequate capacity to Client/Consultant Approval) of adequate capacity with automatic level control to serve requirements of substation yard and buildings, yard hydrant system, NFPA-listed and jockey pumps, and other required equipment/works to make a complete and functional system								
13.26.1	Construction of Fire water pump house (including Excavation, concrete works, backfilling, and etc.) and Building services (e.g. Lighting, Small Power System, HVAC (fans, etc.), Fire Detection hand held and trolley-mounted fire extinguishers and etc.) <b>Note:</b> As per contractor's detail design and proposed package, the building size shall be considered accordingly without any surcharge.	m^2	40						
13.26.2	Fire water supply reservoir (2 reservoirs, with total capacity of 230 m3) with automatic level control	Lot	1						
13.26.3	Hydrant system for yard	Set	1						
13.26.4	Fire pump package (NFPA-listed and jockey pumps, etc.)	Set	1						
13.26.5	Other required equipment/works to make a complete and functional firefighting system	Lot	1						
13.27	Extension/modification of substation control building including control, protection and telecommunication systems Civil works (including Excavation, concrete works, backfilling, and etc.) together with building services such as Lighting, Small Power System (including Lighting Panels, Conduits, Lighting Fixtures and etc.), Water Supply and Sewage System, HVAC, Water Solar Heating, Fire Detection and fire extinguishers (handheld and trolley-mounted), fire blankets, access control, etc.								
13.27.1	Demolition of control building wall	m^3	10						
13.27.2	Construction of Extension/modification of substation control building (including Excavation, concrete works, backfilling, and etc.) and Building services such as Lighting, Small Power System (including Lighting Panels, Conduits, Lighting Fixtures and etc.), Water Supply and Sewage System, access control, etc.	m^2	50						
13.27.3	Complete Split Unit, 9000 BTU/hr for Communication Room, Meeting Room, Office, Operator & Scada Room	No.	4						
13.27.4	Complete Split Unit, 12000 BTU/hr for AC/DC Room	No.	2						
13.27.5	Complete Split Unit-24000 BTU/hr for Relay Room	No.	2						
13.27.6	Exhaust Fan, 270 m3/hr for Toilets	No.	2						
13.27.7	Hood-450 CFM for Kitchen	No.	1						
13.27.8	Exhaust Fan, 2900 m3/hr for Battery Room (suitable for hazardous area)	No.	2						
13.27.9	Dry-Powder Fire extinguishers, 12 Kg for Store, AC/DC room, Archive Room, Communication Room, Meeting Room, Office, Operator & Scada Room, Relay Room, and Corridor (as required acc. to bid documents)	No.	9						



13.27.10	CO2 Fire extinguishers, 6 Kg for Store, AC/DC room, Archive Room, Communication Room, Meeting Room, Office, Operator & Scada Room, Relay Room, and Corridor (as required acc. to bid documents)	No.	9						
13.27.11	Solar Water Heater with backup electric heating element	Lot	1						
13.27.12	All Other Mechanical/ Electrical/ Plumbing Installations (including Shower with Faucet, Basin Faucet, Basin, Sink, Eye Wash, Pipes, Valves, etc.)	Lot	1						
13.28	Fire Detection and Alarm System (for Transformers and Buildings)	Lot	1						
13.29	Substation internal access road to bituminous standards complete with drainage facilities and culverts as necessary suitable for heavy machine's traffic, as per bid drawings (including road leveling, lean concrete, prefabricated concrete kerb, base and sub-base, asphalt width 8&6&4&3 meters width and others)	Lot	1						
13.30	Rehabilitation and spot improvement of any damaged sections of existing external access road to Murram all-weather standard and subject to Client's approval <b>Note:</b> The access road length shall be included in the quoted price as required, and no surcharge is accepted.	Lot	1						
13.31	Retaining wall should be constructed when there is a considerable level difference in the site.	Lot	1						
13.32	Battery room shall include automatic full redundant double fans and ventilating louver against the fan, eyewash and wide-windows shall be avoided to prevent batteries exposure to sun shine (Modification and Blocking or removal of windows, improvement of ventilation in the existing battery room)	Lot	1						
13.33	Five meter wide murram road construction surrounding the outer side of the switchyard fence including excavation, backfilling, compaction to minimum 95% MDD acceptable to the Employer	m	270						
13.34	All required demolition, modification, replacement, relocation and transportation works to make the system complete and functional (including Demolition of reinforced concrete of equipment foundation and removal of fence)	Lot	1						
<b>TOTAL PRICE ITEM 13</b>									
<b>14</b>	<b>AUXILIARY SUPPLY</b>								
<b>14.1</b>	<b>LVAC system</b>								
14.1.1	AC Main and distribution panels, AC distribution outdoor cubicles, fuse box for oil treatment socket with all required equipment and accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	Lot	1						
14.1.2	Oil treatment panel and accessories (including heavy duty outlet socket, fuses, glands, etc.)	No.	1						
14.1.3	Any other material for full functionality of the LVAC System	Lot.	1						
<b>14.2</b>	<b>LVDC system</b>								
14.2.1	Modification, wiring and integration of 110Vdc Main and distribution panels, fuse boxes, with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	Lot	1						
14.2.2	Modification, wiring and integration of 48Vdc distribution panel, fuse boxes, with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	Lot	1						
14.3	Any other material for full functionality of the LVDC System	Lot.	1						
14.4	415V ac Uninterruptible Power Supply including isolating by-pass transformers, inverters, static switch, manual bypass switch, panels & distribution boards	Set	2						
14.5	Diesel Generator 315kVA including generator control and protection panel and all peripheral equipment, reservoir(s), (foundations, structure), and accessories.	No.	1						
<b>TOTAL PRICE ITEM 14</b>									
<b>15</b>	<b>TARIFF METERING</b>								
15.1	Tariff metering System for 132kV OHL, complete with wiring, accessories and etc. including:								
15.1.1	Main Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	2						
15.1.2	Check Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	2						
15.2	Tariff metering System for Power Transformer, complete with wiring, accessories etc. and including:								

15.2.1	Main Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	1						
15.3	Tariff metering System for 33kV , complete with wiring, accessories and etc. including:								
15.3.1	Main Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	2						
15.4	Metering data collection and communication system, complete with fibre optic cabling, accessories, Each kind of energy meters software and communication ports. All media and accessories in order to transferring Energy meter measuring values to remote center according to both KETRACO and KPLC required specification.	Lot	1						
15.5	Metering panel with all accessories and auxiliaries, lighting, heating, socket, wiring, terminals, test facilities, and all other switches, labels, test block/plug , Labels, etc.	Lot	1						
15.6	All other related relays, racks, Voltage/Current test block, cubicles, terminals, As needed to complete the metering system.	Lot	1						
	<b>TOTAL PRICE ITEM 15</b>								
<b>16</b>	<b>MISCELLANEOUS</b>								
16.1	Required Bay Marshalling Kiosk	Lot	1						
16.2	Completion of CCTV System, with all related equipment for indoor and outdoor including Cameras of required type and specifications with Poles, Recorder and storage and monitor, Switch, Cabling, Boxes, Fixings and brackets and etc.	Lot	1						
16.3	Padlocks / Keys (for panels, outdoor equipments, doors, etc.)	Lot	1						
16.4	Equipment/Bay labels, safety warning plates, road signages, room name plates, etc.	Lot	1						
16.5	Overhead crane for storage warehouse	Lot	1						
16.6	Any other items not included above but required to complete the project successfully. (Tenderer shall specify and include breakdown of price in his proposal)	Lot	1						
	<b>TOTAL PRICE ITEM 16</b>								
<b>17</b>	<b>MOBILIZATION, SITE TRANSPORT, SITE OFFICE AND PERMANENT LIVING ACCOMMODATION</b>								
	Provision as per Employer's Requirements, Clause 27 and 28 of Part 2-A of Employer's Requirements								
17.1	Vehicles as per part 2-A, Clause 28								
17.1.1	Vehicle Type 1 as per part 2-A, Clause 28								
17.1.2	Operation, maintenance, regular upkeep of the vehicles including spares, consumables and services of driver/mechanic experienced in desert driving, insurance etc. for the entire duration of the contract as per part 2-A, Clause 28	months	36						
17.2	Temporary Works, Site Office, Site Storage and Living Accomodation as per Clause 27 and 29 of Part 2-A								
17.2.1	Mobilization including all required equipment, machineries, devices, tools and facilities as specified in Clause 2.6 of section III of Part1 and Clause 27 and 28 of Part 2-A	Lot	1						
17.2.2	Site Office fully equipped/furnished as specified in the Employer's Requirements and with fully furnished kitchenettes, Storage Facilities as per Clause 27 of Part 2-A	months	24						
17.2.3	Site power supply from local power network, etc.	Lot	1						
17.2.4	Site temporary fencing with barbed wire	Lot	1						
17.2.5	Project sign boards	Lot	1						
17.2.6	Roads, sidewalks and parking	Lot	1						
17.2.7	Road, fence and area lighting system with all ralated equipment including Lighting fixture and terminal boxes, Steel lighting poles with related terminals, cables, fuses, fixtures, lamps, related accessories and AC distribution outdoor cubicles	Lot	1						
17.2.8	Storage facilities	Lot	1						
17.2.9	First aid facilities	Lot	1						
17.2.10	Ambulance facilities	Lot	1						
17.2.11	Drainage System	Lot	1						
17.2.12	Sewage system	Lot	1						
17.2.13	Water Supply System	Lot	1						
17.2.14	Site Toilets	Lot	1						
17.2.15	Watch and ward and access control to site during construction	Lot	1						
17.3	Staff Housings for Permanent Living of Technical and Security Personnel as per Clause 27 of Part 2-A								

17.3.1	Technical staff Housing Civil works (including Excavation, concrete works, backfilling, and etc.) together with building services e.g. Lighting, Small Power System, Water Supply and Sewage System, HVAC (DX split units, fans, etc.), Water Solar Heating, Fire Detection and hand held fire extinguishers, fire blankets, fully furnished	Units	4						
17.3.1.1	Construction of Technical staff Housing (including Excavation, concrete works, backfilling, and etc.) and Building services such as Lighting, Small Power System, Water Supply and Sewage System, access control, etc.	m²	420						
17.3.1.2	Complete Split Unit, 9000 BTU/hr for Bedrooms	No.	8						
17.3.1.3	Complete Split Unit, 12000 BTU/hr for Living and Dining Rooms	No.	8						
17.3.1.4	Exhaust Fan, 270 m³/hr for Toilets	No.	4						
17.3.1.5	Hood-450 CFM for Kitchen	No.	4						
17.3.1.6	Dry-Powder Fire extinguishers, 12 Kg for Bedrooms, Living and Dining Room	No.	12						
17.3.1.7	CO2 Fire extinguishers, 6 Kg for Bedrooms, Living and Dining Room	No.	12						
17.3.1.8	Solar Water Heater with backup electric heating element	Lot	1						
17.3.1.9	All Other Mechanical/ Electrical/ Plumbing Installations (including Shower, Faucet, Basin, Sink, Eye Wash, Ceramic Floor Mounted Toilet, Pipes, Valves, etc.)	Lot	1						
17.3.1.10	Other furniture and devices and facilities as in Clause 27.2 (TV, wi-fi, IP phone, refrigerator, freezer, oven, hood, cookers, etc.)	Lot	1						
17.3.2	Security staff Housing Civil work (including Excavation, concrete works, backfilling, and etc.) together with building services e.g. Lighting, Small Power System, Water Supply and Sewage System, HVAC (DX split units, fans, etc.), Water Solar Heating, Fire Detection and hand held fire extinguishers, fire blankets, fully furnished	Units	4						
17.3.2.1	Construction of Security staff Housing (including Excavation, concrete works, backfilling, and etc.) and Building services such as Lighting, Small Power System, Water Supply and Sewage System, access control, etc.	m²	115						
17.3.2.2	Complete Split Unit, 18000 BTU/hr for Staff Rooms	No.	4						
17.3.2.3	Exhaust Fan, 270 m³/hr for Toilets	No.	4						
17.3.2.4	Hood-450 CFM for Kitchen	No.	4						
17.3.2.5	Dry-Powder Fire extinguishers, 12 Kg for Staff Rooms	No.	4						
17.3.2.6	CO2 Fire extinguishers, 6 Kg for Staff Rooms	No.	4						
17.3.2.7	Solar Water Heater with backup electric heating element	Lot	1						
17.3.2.8	All Other Mechanical/ Electrical/ Plumbing Installations (including Shower, Faucet, Basin, Sink, Eye Wash, Ceramic Floor Mounted Toilet, Pipes, Valves, etc.)	Lot	1						
17.3.2.9	Other furniture and devices and facilities as in Clause 27.1 and 27.2 (refrigerator, freezer, oven, hood, IP phone, etc.)	Lot	1						
17.3.3	Boundary fence for the staff housings with a perimeter of 445m as per the standard stated on 2A-Employer's requirement	m	445						
17.3.4	Decorative gate for person entry at the staff housings	No.	1						
17.3.5	Regional Office								
17.3.5.1	Regional Office Civil work (including Excavation, concrete works, backfilling, and etc.) together with building services e.g. Lighting, Small Power System, Water Supply and Sewage System, HVAC (DX split units, fans, etc.), Water Solar Heating, Fire Detection and hand held fire extinguishers, fire blankets, fully furnished	Lot	1						
17.3.5.2	Kitchen cabinets on the ground as well as overhead, kitchen work top, cabinets in the offices, and all office furniture as well as appropriate shelving in the store to be fully provided with the approval of Employer/Employers representatives	Lot	1						
17.3.6	Staff Houses, Regional office, Guard Houses costs								
17.3.6.1	Main Gate and Guardhouse, External access road with standard culvert on the Nyahururu – Rumuruti Road to KENYA standards, Internal concrete road, Street lighting, Water supply system, Parking lot for 10 for the office, 1 Parking space for each housing unit, Fencing as shown, Drainage system, Sewage system – Septic tanks and soak pits for each buildings and houses, Grading and land scaping of the entire office and staff housing area, Power supply for indoor and outdoor lighting and use	Lot	1						
17.4	Site Internet connection and facilities	Lot	1						
17.5	TV and Cable TV network	Lot	1						
17.6	50 Mbps symmetric internet bandwidth in the control room building and in the regional office separately for scalable and future-proof connectivity to support basic IT Functions (Email, ERP access, VoIP, Patch Management) and Video Surveillance Streaming and Remote Support Capabilities. Design should allow easy upgrades of bandwidth and hardware as needs evolve.	Lot	1						

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<p>TOTAL PRICE SCHEDULE 4 RUMURUTI SUBSTATION</p> <p><b>Note:</b> Contractor shall include and consider all activities which are necessary to complete the project works (including construction, erection, installation, mobilization, site transportation and accomodation, modification, replacement, relocation, tests, pre-commissioning, commissioning, training, internship and etc. as required)</p>								
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