

CONTRACT NO : RFP172/2024  
CONSTRUCTION OF PHASE 1 ROOIWAL WWTW

## **PART 3: ELECTRICAL AND MECHANICAL EAST WORKS BOQ**

**CITY OF TSHWANE**  
**CONTRACT NO : RFP172/2024**  
**CONSTRUCTION OF PHASE 1 ROOIWAL WWTW EAST WORKS**  
**ELECTRICAL AND MECHANICAL FINAL SUMMARY**

ITEM	DESCRIPTION	AMOUNT
1	PRELIMINARY AND GENERAL	
2	ELECTRICAL WORKS	
3	MECHANICAL WORKS	
	SUBTOTAL	
	ADD CONTINGENCY 10% This sum will be under the sole control of the Engineer and may be deducted in part or full.	
	EPWP TRAINING Allow for EPWP Training	R1 000 000,00
	SUBTOTAL Excl VAT	
	ADD VAT (15%)	
TOTAL CARRIED TO FORM OF OFFER		

**CITY OF TSHWANE**  
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**CONSTRUCTION OF PHASE 1 ROOIWAL WWTW**  
**ELECTRICAL AND MECHANICAL SECTION: P&GS**

ITEM	DESCRIPTION	UNIT	QTY	RATES	AMOUNT
1	The supply, installation, testing, commissioning and a 52 week defects liability period in accordance with this bill of material, Local Supply Authority's by-laws & regulations, National Building Regulations, detailed electrical specification, SANS 10142-1: 2003 (Code of Practice), Occupational Health and Safety Act, General Conditions of Contract and drawings listed in the detailed specification. <b>Schedule No 1 Preliminary and General Fixed charge items</b>				
1,1	Site establishment Allow for site establishment, and for storage of plant, materials and equipment including protection thereof.	Item	1		
1,2	Site disestablishment Allow for the demolishing and removal of the site camp upon completion of the contract.	Item	1		
1,3	Commissioning and testing Supply all test equipment and labour for testing and commissioning of the final installation.	Item	1		
1,4	Guarantee Allow for a guarantee period of 12 months against defect in equipment, material and workmanship, but wear and tear and normal maintenance excluded.	Item	1		
1,5	Additional fixed charge items Any additional item(s) that the tenderer may wish to detail and price.	Item	1		
1,6	AS BUILT DRAWINGS The marking - up of "As Built" drawings during the contract to ensure that accurate "As Built" drawings are submitted to the Engineer at the end of the contract.	Sum	1		
1,7	Training of Staff	Sum	1		
1,71	Contractor to allow for CIDB Built Programme	Prov Sum	1	5%	
1,8	OPERATING & MAINTENANCE MANUALS Compilation of an O & M manual	Sum	1		
1,90	.14 Provisional sum for salary of CLO and travel assistance of Project Steering Committee Members appointed by Employer	Prov Sum	1	300 000,00	300 000,00
1,10	Profit and attendance on item 1.10	%		300 000,00	
<b>TOTAL CARRIED FORWARD</b>					

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**ELECTRICAL AND MECHANICAL SECTION: P&GS**

ITEM	DESCRIPTION	UNIT	QTY	RATES	AMOUNT
<b>BROUGHT FORWARD</b>					
1,11	Occupational Health and Safety:				
1.11.1	General safety obligations				
1.11.1	Mandatory Signage / Road signs	Sum			
1.11.2	Safety Poster including Acts & Regulations	Sum			
1.11.3	Safety office / shed or container	Month			
1.11.4	Allowance for toilets (Gender specific)	Each			
1.11.5	Lay down & storage areas	Sum			
1.11.6	Employee eating area	Sum			
1.11.7	Hand washing & sanitizing stations	Sum			
1,12	Safety Planning				
1.12.1	Safety file and Risk Assessment	Sum			
1.12.2	Health and safety plan	Sum			
1.12.6	Medical assessment of employees (Entrance & Exit) &	Sum			
1.12.7	Fall Protection Plan	Sum			
1.12.8	Traffic Management Plan	Sum			
1.13	Safety Personnel				
1.13.2	Construction safety officer (Full time)	Month			
1,14	OHS Training				
1.14.1	Safety Representative Training	Each			
1.14.2	First Aid Training	Each			
1.14.3	Construction vehicle operators	Each			
1.14.4	Working at Heights training	Each			
1.14.5	Fire fighting training	Each			
1.15	Personal Protective Equipment (PPE)				
1.15.1	Work overalls - Reflective Conti suits (Min 2 pairs each)	Each			
1.15.2	Safety Shoes	Each			
1.15.3	Gum Boots	Each			
1.15.4	Hardhats	Each			
1.15.5	Reflective vests	Each			
1.15.6	Ear Plugs (100's)	Box			
1.15.7	Ear Muffs	Each			
1.15.8	Full body Safety Harness (Double lanyard)	Each			
<b>TOTAL CARRIED FORWARD</b>					

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**ELECTRICAL AND MECHANICAL SECTION: P&GS**

ITEM	DESCRIPTION	UNIT	QTY	RATES	AMOUNT
<b>BROUGHT FORWARD</b>					
1.15.9	Life Lines	Each			
1.15.10	Dust / Cloth Masks (100s)	Box			
1.15.11	Eye protection (Safety Glasses)	Each			
1.15.12	Hand Protection (Gloves) 100pcs	Bulk			
1.15.13	Barricade Netting (1 x 50m)	Sum			
1.15.14	Edge protection material & equipment	Sum			
1.15.15	Fire Extinguishers (9kg)	Each			
1.15.16	First Aid box (GR3 kit). Including refill kits required.	Each			
1.15.17	Spill kit (120litre)	Each			
1.15.18	Lock out items (locks, tags,safes, etc..)	Sum			
1.15.19	Emergency air siren	Each			
1.15.20	Rescue equipment	Sum			
<b>TOTAL CARRIED FORWARD TO FINAL SUMMARY PAGE</b>					

CITY OF TSHWANE

CONTRACT NO : RFP172/2024

ELECTRICAL & ELECTRONICS SECTION

SCHEDULE	DESCRIPTION	TOTAL	TOTAL
		LABOUR	MATERIAL
Schedule 1:	East Works Electrical		
Total Labour and Material (including P & G's)			
<u>Provisional sums</u>			
	Lightning Protection System	R 35 000,00	R 35 000,00
	MV Equipment & Switchgear Repair & Upgrade	R 125 000,00	R 125 000,00
	Refurbishment of 16 X Highmast Light Structures & Kiosks	R 320 000,00	R 320 000,00
TOTAL CARRIED FORWARD TO FINAL SUMMARY PAGE			

**CITY OF TSHWANE**  
**CONTRACT NO :RFP172/2024**

**ELECTRICAL SECTION: EAST WORKS**

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				UNIT LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
<b>3</b>	<b>Schedule No 3 EAST WORKS</b>						
3,1	300A, 30kA three pole circuit breaker and cradle to be installed into existing mini substation.	No	1				
3,2	Manufacture, supply, off loading and installation of the Inlet Works IP66 Stainless Steel MCC including commissioning as detailed in the specifications and drawings.	No	1				
3,3	Manufacture, supply, off loading and installation of the Inlet Works IP66 Stainless Steel MCC including commissioning as detailed in the specifications and drawings to cater for 2 x Mechanical Screens, 2 x Conyeros, PLC, Local DB& 2x Compressors )	No	1				
3,4	Refurbish and rewire of the existing MCC including commissioning as detailed in the specifications and drawings.	No	1				
3,3	LV CABLE PVC/SWA/PVC copper conductor cables strapped to cable ladders. (trenches, sleeves and cable terminations measured elsewhere):						
a	95mm2 x 4 core (MCC / DB supply)	m	200				
b	70mm2 Kwena earthing conductor	m	200				
c	16mm2 x 4 core ( panel)	m	20				
d	6mm2 x 4 core (compressor cable)	m	20				
e	6mm2 x 4 core (welding socket)	m	10				
f	1.5mm2 x 3 core (emergency stop cable)	m	30				
3,4	LV CABLE TERMINATION: PVC/SWA/PVC Exe corrosion guard cable glands (IP68) complete including conductor & earth termination, lugs, tapes, drilling etc						
a	95mm2 x 4 core (MCC / DB supply)	No	2				
b	70mm2 Kwena earthing conductor	No	2				
c	16mm2 x 4 core (control panel)	No	2				
d	6mm2 x 4 core (compressor cable)	No	6				
e	1.5mm2 x 3 core (emergency stop cable)	No	4				
<b>TOTAL CARRIED FORWARD</b>							

BROUGHT FORWARD						
3,5	CABLE EXCAVATION:					
a	Pickable material	m <sup>3</sup>	50			
b	Soft Rock	m <sup>3</sup>	20			
c	Hard Rock	m <sup>3</sup>	20			
d	Backfilling & Compaction	m <sup>3</sup>	90			
3,6	CABLE ROUTE MARKERS: The supply and installation of concrete cable route markers	No	10			
3,7	CABLE LADDER AND TRAY: OL55 duplex coating (exterior polyester) 3CR12 cable ladder including all accessories mounted to concrete slabs / walls.					
a	100mm cable ladder	m	20			
b	100mm 90o bends	No	4			
c	100mm duplex coating (exteria polyester) 3CR12 cable tray.	m	20			
3,8	LOCAL EMERGENCY STOP STATIONS:					
a	Surface mounted IP65 emergency stop push buttons.	No	2			
b	Stainless Steel support stands for the above item.	No	2			
3,9	Surface mounted 35A, 5 pin 3 phase welding socket including male plug. (to be mounted brick wall)	No	1			
	LIGHTING AND SMALL POWER					
3,1	GALVANISED CONDUIT:					
a	Surface mounted 20mm galvanised conduit including couplings, galvanised saddles and all accessories.	m	60			
c	Surface mounted round galvanised 20mm conduit boxes including galvanised cover plate.	No	7			
3,11	PHOTO CELL:					
a	Royce Thompson photo cell including conduit box.	No	1			
3,12	WIRING PVC insulated copper conductors drawn into galvanised conduit:					
a	1.5mm2	m	150			
b	2.5mm2	m	200			
3,13	EARTH WIRING BCEW drawn into galvanised conduit:					
a	2.5mm2	m	350			
3,14	LUMINAIRES To be mounted to suspended ceilings and to brick walls:					
a	2 x 36W IP65 vapour proof LED luminaire complete Driver.	No	4			
b	2 x 36W IP65 vapour proof LED Emergency Maintained luminaire complete Driver.	No	2			
3,15	LIGHT SWITCHES Industrial surface mounted 16A single lever two way switch.	No	2			
TOTAL CARRIED FORWARD TO SUMMARY						



**Mechanical Bill of Quantities**  
**East Water Treatment Works**  
**Rooiwal Water Treatment Plant**  
**Contract No: RFP172/2024**

Item	Description	Unit	Quantity	Rate	Total
<b>1,00</b>	<b>Inlet flow meter</b>				
<b>1,01</b>	Remove existing, Supply and install open channel flow preferably Krohne Optiflux or equivalently and Suitably better complete with mounting brackets, cabling, new power supplies and integrated data logging capabilities	ea	2		
<b>2,00</b>	<b>Inlet overflow system</b>				
<b>2,01</b>	comprehensive refurbishment of the inlet works overflow mechanical system including replacement of major minor components, corrosion protection and advanced coating, labour and commissioning	sum	1		
<b>3,00</b>	<b>Inlet sluice gates</b>				
<b>3,01</b>	Remove existing Sluice Gates and upgrade GR316L Stainless steel Sluices	ea	2		
<b>3,02</b>	Retrofit gate operating mechanism to hydraulic complete with hydraulic powerpacks, hoses, cylinders and control panelling to support	ea	1		
<b>3,03</b>	Comprehensive repair on all the gate side and bottom seals	ea	3		
<b>3,04</b>	Corrosion treatment of all the framing and supports	sum	1		
<b>TOTAL CARRIED FORWARD</b>					

<b>BROUGHT FORWARD</b>					
<b>4,00</b>	<b>Mechanical screen</b>				
<b>4,01</b>	Refurbishment of the drive system for the coarse material removal which includes the replacement of the drive motor and gearbox	ea	2		
<b>4,02</b>	Removal and replacement of Mechanical Screens with stainless steel or equivalently better for high throughput and reduced clogging	ea	2		
<b>TOTAL CARRIED FORWARD</b>					
<b>BROUGHT FORWARD</b>					
<b>5,00</b>	<b>Horizontal screw conveyor</b>				
<b>5,01</b>	Decommission and Remove existing Horizontal screw conveyor	ea	1		
<b>5,02</b>	Supply and Install a new screw conveyor as per specification and drawings. New screw conveyor works include replacement of motor and drive as well control panels to support	ea	1		
	Decommission and remove existing incline conveyor into the coarse screen bins				
<b>5,03</b>	Decommission and remove existing inclined screw conveyor	ea	1		
<b>5,04</b>	Supply and install a new inclined screw conveyor as per specification and Drawings including the supply of accompanying bins	ea	1		
<b>6,00</b>	<b>Outlet sluice gates</b>				
<b>6,01</b>	Remove existing Sluice Gates and upgrade to GR316 Stainless steel Sluices	ea	3		
<b>6,02</b>	Retrofit gate operating mechanism to hydraulic complete with hydraulic powerpacks, hoses, cylinders and control panelling to support	ea	1		
<b>6,03</b>	Comprehensive repair on all the gate side and bottom seals	ea	3		
<b>TOTAL CARRIED FORWARD</b>					

BROUGHT FORWARD					
6,04	Corrosion treatment of all the framing and supports	sum	1		
7,00	<b>Degritter 1</b>				
7,01	Replace the existing degritter channelling valves as per specification including sections of the piping that are corroded	ea	13		
8,00	<b>Degritter 2</b>				
8,01	Replace the existing degritter channelling valves as per specification	ea	13		
8,02	<b>Grit Slurry pumps</b>				
8,03	Remove Existing Grit Slurry Pumps and replace with equivalent Gorman Rupp T3A71s-BFM Submersible Grit Slurry Pump.New Installation must include variable speed drive,new control panelling,new hoses and must include remote monitoring and control.The slurry grit pumps will take grit slurry to the grit classifiers	ea	2		
8,04	Supply and Installation of New Grit Classifier inclusive of Piping ,fittings,Conveyor and Skip Bins for each vortex Chamber	ea	2		
9,00	<b>Primary settling tank division box</b>				
9,01	Major Service on the Inlet Sluice which includes repairing of the bottom and side sealing ,corrosion treatment on the components of the gate	ea	1		
9,02	Major Service on the Inlet Sluice which includes repairing of the bottom and side sealing ,corrosion treatment on the components of the gate	ea	4		
10,00	<b>Primary Settling Tanks</b>				
10,01	Replace all the primary sludge valves and actuators	ea	8		
11,00	<b>Bio Filters</b>				
11,01	Major service and refurbishment of the biofilter distribution piping and rotating arms including replacement of damaged parts	ea	4		
TOTAL CARRIED FORWARD					

<b>BROUGHT FORWARD</b>					
11,02	Complete replacement of the centre support unit and center bearing for the biofilter Arm	ea	4		
11,02	Comprehensive service of the motor and gearbox for the biofilter arm	ea	4		
12,00	<b>Humus Tanks</b>				
12,01	Repair and refurbish the sluice gates at the division box including replacement of seals,wheels,guide tracks ,rust removal ,coating and a full testing and commissioning	ea	15		
12,02	Major Service on the Outlet valves at the Humus Tanks	ea	24		
12,03	Provision for replacement of the outlet valves of any outlet valve beyond economical repair	ea	6		
13,00	<b>Humus/Primary Sludge Pumpstation</b>				
13,01	Decommission,removal and replacement of three Gorman Rupp sludge Pumps Model T6A3S-BFM(Two Duty,One Standby) as per specification with all associated hardware which includes new control panel with variable speed driving and provision for remote monitoring and operation.The sludge pumps will take primary sludge from the primary settling tanks to the anaerobic digestors	ea	3		
13,02	Supply and instal of a continuos duty leakage drainage pumps including piping and fittings	ea	1		
13,03	Supply and install a heavy duty submessible sludge pump for emergency usage only including the float switches and high sludge/water alarm system and automatic activation during emergency scenarios.	ea	1		
13,04	Refurbishment of existing pipework and fittings for humus pump station	sum	1		
<b>TOTAL CARRIED FORWARD</b>					

BROUGHT FORWARD					
14,00	Return Activated Sludge Pumpstation				
14,01	Replacement of Return Activated sludge Gorman Rupp VS6A60-BFM self priming pumps for each biodigester.Each pump to come with new control panel ,variable speed drive and provision for remote operation and monitoring capabilities.The sludge pumps will return activated sludge back to the anaerobic digesters(humus tanks)	ea	3		
14,02	Replacement of damaged,corroded sections of RAS Piping and fittings from Pump to Biodigester	ea	8		
14,03	Supply and installation of flow and level indication for each biodigester for precise monitoring and regulation of humus(sludge) level	ea	8		
14,04	Design,supply and installation of biogas collection system including the gas domes,gas holders and piping for collecting methane and associated gases from anaerobic digestions.Installed system must include removal of moisture,hydrogen sulfides(desulfurization) and other impurities to ensure that the gas is suitablefor intended usage	ea	1		
15,00	Digested Humus Pumpstation				
15,01	Decommission,removal and replacement of three Gorman Rupp sludge Pumps Model T6A3S-BFM(Two Duty,One Standby) as per specification with all associated hardware which includes new control panel with variable speed driving and provision for remote monitoring and operation.The sludge pumps will take sludge to the sludge dams	ea	3		
15,02	Supply and Install piping and fittings to accompany the new pumps	ea	1		
15,03	Supply and install a heavy duty submersible sludge pump for emergency usage only including the float switches and high sludge/water alarm system and automatic activation during emergency scenarios.	ea	1		
TOTAL CARRIED FORWARD					

<b>BROUGHT FORWARD</b>					
<b>16,00</b>	<b>SST-Waste Activated Sludge Pump Station</b>				
<b>16,01</b>	Decommission,removal and replacement of three Gorman Rupp sludge Pumps Model T6A3S-BFM(Two Duty,One Standby) as per specification with all associated hardware which includes new control panel with variable speed driving and provision for remote monitoring and operation.The sludge pumps redirect sludge from secondary settling tanks to sludge dams and recycle back to inlet works	ea	3		
<b>16,02</b>	Supply and Install piping and fittings to accompany the new pumps	ea	1		
<b>16,03</b>	Supply and install a heavy duty submersible sludge pump for emergency usage only including the float switches and high sludge/water alarm system and automatic activation during emergency scenarios.	ea	1		
<b>16,04</b>	Major Service on all the SST-Desludging valves	ea	24		
<b>16,05</b>	Provision for replacement of non-functional SST-Desludging valves	ea	1		
<b>15,00</b>	<b>Power Station Effluent water supply pumps</b>				
<b>15,01</b>	Decommissioning for storage of existings power station pump including the safe disconnection and removal of all powers supplies to allow for construction of a proper and compliant new pump station	ea	1		
<b>15,02</b>	Servicing and repair of the three pumpss including thte replacement of missing parts.	ea	3		
<b>15,03</b>	Supply and installation a pump control panel to accompany the pumps including variable drives and provision for remote montioring and control	ea	1		
<b>15,04</b>	Installation of new pijpng and fittings appropriate for then new pumps station setup	ea	1		
<b>16,00</b>	<b>Farmers effluent pumps</b>				
<b>16,01</b>	Decommissioning and removal of existing farmers effluent pumps to pave way for the construction of a compliant pump house	ea	1		
<b>16,02</b>	Supply and installation of new farmers Gorman Rupp VS6A60-bfm effluent pumps complete with control panel,variable speed drive and associated hardware for full commissioning	ea	3		
<b>16,03</b>	Supply and installation of associated piping for the new pumps into the new pumpstation	ea	3		
	<b>Total Carried Forward to Summary</b>				