

PUNJAB AAB-E-PAK AUTHORITY

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No	Description	Qty	Unit Rate (Rs.)	Amount (Rs.)
1	Rehabilitation of Reverse Osmosis 1000 LPH	36		
2	Rehabilitation of Ultra Filtration 2000 LPH	41		
3	Installation of Reverse Osmosis 1000 LPH	4		
4	Installation of Reverse Osmosis 2000 LPH	1		
5	Installation of Ultra Filtration 2000 LPH	7		
6	New Bore Holes	18		
7	Washing of Bore Holes	27		
8	Rehabilitation of Civil Work	42		
9	Water Analysis Reports	89		
Total: -				
6 Months O&M for 89 Plants excluding PRA & electricity charges				
Grand Total				

**REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED
IN LAHORE**

BILL OF QUANTITIES

Bill No. 1: Rehabilitation of Reverse Osmosis 1000 LPH

Sr. No.	MRS Ref. #	Description	Unit	Qty.	Unit Rate (PKR)	Amount (PKR)
1	N.S	Rehabilitation of Plant Skid frame and Finishing, complete in all respect, inclusive of Carriage to Site and Labor for Installation Frame: Stainless Steel	Per Plant	20.00		
2	N.S	Membranes recovery (minimum 50%) with chemicals cleaning, including labour & testing, Complete in all respects, inclusive of Carriage to Site and Labor for Installation	Per Plant	24.00		
3	N.S	Supply Installation & Commissioning of Membrane Housing, Complete in all respect Material: FRP Certification: NSF	Per Plant	3.00		
4	N.S	Supply Installation and commissioning of RO Plant membrane (4x40), complete in all respect. Origin: Europe / USA / German or Equivalent Certification: NSF Stable salt rejection: Minimum - 99% Capacity: 1000 LPH For Permeate water Capable for TDS: Upto 5000 mg/l Recovery: Should be More than 50% Ambient Temperature: Upto 45 degree celsius Life of RO Membrane: Minimum 03 years Pressure Vessels: As per required Pressure Rating: Upto 17 Barg	Per Membrane	48.00		
5	N.S	Supply Installation and commissioning of RO Feed Pump capacity of 2000 LPH, for 1000 LPH RO Plant, complete in all respect Discharge: 2000 LPH Minimum Operation Head: 04 Barg Maximum. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Vertical / Horizontal Low Pressure Pump Impeller Type: SS 304 Operating Head: Up to 06 Barg Pump Efficiency: >60% Motor Starter: Star Delta	No.	10.00		
6	N.S	Supply, Installation and commissioning of RO High Pressure Pump Capacity of 2000 LPH, for 1000 LPH RO Plant, complete in all respect Discharge: 2000 LPH Operating Head: Upto 06 Barg Pump Type: Vertical / Horizontal High Pressure Pump Origin: Europe / USA / German or Equivalent Impeller material: S.S. 304 Pump Efficiency: >60% Motor Starter: Star Delta Motor Temperature Class: 45 degree Celsius Make: Grundfous / KSB / Wilo or Equivalent	p/job	7.00		
7	N.S	Rehabilitation of RO Feed water pump 2000 LPH, for 1000 LPH RO Plant, complete in all respect	p/job	18.00		
8	N.S	Rehabilitation of RO High Pressure pump 2000 LPH, for 1000 LPH RO Plant, complete in all respect	p/job	16.00		

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BILL OF QUANTITIES

Bill No. 1: Rehabilitation of Reverse Osmosis 1000 LPH

Sr. No.	MRS Ref. #	Description	Unit	Qty.	Unit Rate (PKR)	Amount (PKR)
9	N.S	Supply Installation & commissioning of submersible pump 3HP including supporting clamp, pump coupling, cable clip, delivery pipe, cable complete in all respect. Discharge: 2000 LPH Minimum Operation Head: Up to 130 m. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Submersible Pump Impeller Type: SS 304 Discharge: As per the capacity of Plant (2000 LPH) Pump Efficiency: >60% Motor Starter: Star Delta	p/job	5.00		
10	N.S	Supply Installation and Testing of Cartridge Filter complete in all respect Size: 20 Inches / As per Flow Porosity: 1-5 micron Material: High pressure Plastic Melt Blown PE	p/job	36.00		
11	N.S	Supply Installation and Testing of Online TDS meter complete with all respects	p/job	36.00		
12	N.S	Supply Installation and Testing of Pressure Switches complete with all respects	p/job	36.00		
13	N.S	Supply Installation and testing of Rota meter complete in all respect Origin: Europe / USA / German / Pakistan or Equivalent Type: Rota Meter / Flow Type Material: Acrylic	p/job	14.00		
14	N.S	Supply Installation and Testing of pressure gauges, complete in all respect	p/job	40.00		
15	N.S	Supply Installation and testing of Analogue Water meter, complete in all respect	p/job	20.00		
16	N.S	Rehabilitation of analogue water meter including callibration, complete in all respect	p/job	12.00		
17	N.S	Supply Installation and Testing of Solinoid valve complete in all respect	p/job	22.00		
18	N.S	Rehabilitation of Solinoid valve complete in all respect	p/job	17.00		
19	N.S	Supply Installation & Commissioning of 3way Automatic Multiport Valve, top & bottom distributors, complete in all respect	p/job	12.00		
20	N.S	Rehabilitation of 3way Automatic Multiport Valve, top & bottom distributors, complete in all respect	p/job	20.00		
21	N.S	Supply, installation and Testing of Chemical Dosing Pump / Liquid Dosing Pump with working pressure 5 - 7 Bar Imported, along with 80 liter capacity tank complete in all respect Origin: Europe / USA / German or Equivalent Pressure: 5 -7 bar Tank Size: Maximum 80 liter Chemical Anti Sclanet: Food Grade	p/job	36.00		
22	N.S	Supply and installation of Water Storage Tank, Capacity 2000 Liters, Material PE, Food Grade, 3 to 5 mm wall thickness, weight minimum 32 kg, complete in all respects Capacity : 2000 Litre minimum Material: Plastic food grade	p/job	3.00		

**REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED
IN LAHORE**

BILL OF QUANTITIES

Bill No. 1: Rehabilitation of Reverse Osmosis 1000 LPH

Sr. No.	MRS Ref. #	Description	Unit	Qty.	Unit Rate (PKR)	Amount (PKR)
23	N.S	Chemical Cleaning & repair of Water Storage tank, complete in all respects at site	p/job	69.00		
24	N.S	Supply and installation of electric float switch for Water Storage Tank, complete in all respect No: 02	No.	36.00		
25	N.S	Replacement of Activated Carbon media supply, installation and commissioning complete in all respect NSF Certified, Iodine No 850-1000 Material: Coconut Shell Origin: Sri Lanka / Thailand or Equivalent Size of Media: 1.2 - 1.6 mm Surface Area: 900 m ² / g Bulk Density: 440 - 540 kg / m ³ Hardness No: 80 Ash Contents: 5 % Height of Gravel: 200 mm Media Bed Height: > 800 mm	kg	1080.00		
26	N.S	Replacement of Silica sand media supply, installation and commissioning complete in all respect Material: Quartz Silica Sand Size of Media: 0.85 - 2 mm Cleaning Process: Automatic, through PLC / Time Controller MPV	kg	3456.00		
27	N.S	Replacement of Natural Gravels media supply, installation and commissioning complete in all respect Material: Gravel Media	kg	3456.00		
28	N.S	Supply installation and commissioning of UV lamp rod with quartz complete in all respect Origin: Europe / USA / German or Equivalent	Per Plant	36.00		
29	N.S	Supply Installation & Commissioning of Manual Valve 3Way complete in all respect	p/job	22.00		
30	N.S	Rehabilitation of Pipe and fittings, complete plant fitting in all respect	Per Plant	20.00		
31	N.S	Supply installation & testing of Plastic water Taps with fusion joint, complete in all respect	p/job	108.00		
32	N.S	Rehabilitation of Plant Control Panel / RO Controller complete in all respect	p/job	36.00		
Grand Total for 36 Plants (A)						
Per Unit Cost (B = A / 36)						

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No. 2: Rehabilitation of Ultra Filtration 2000 LPH

Sr. No.	MRS Ref. #	Description	Unit	Qty.	Unit Rate (PKR)	Amount (PKR)
1	N.S	Rehabilitation of Plant Skid frame and Finishing, complete in all respect, inclusive of Carriage to Site and Labor for Installation Frame: Frame stainless steel	Per Plant	27		
2	N.S	Membranes recovery (minimum 50%) with chemicals cleaning, including labour & testing, Complete in all respects, inclusive of Carriage to Site and Labor for Installation	Per Plant	25		
3	N.S	Supply, Installation & Commissioning of UF membrane/s Material of vessel: uPVC Removal Size: 0.02 Micron Manufacturer Type: Mutibore (seven bore) Manufacturer: GE Power (IMT) / INGE or Equivalent Filter vessel: uPVC Thickness: 5mm Membrane material: PES (Polystyrene) Country Made: Europe / USA / Germany or Equivalent. Membrane Working pressure: 5 Bar Max Membrane Life: 5 years Bacterail Removal Efficiency of UF membrane: 99.9999% log 6 Viruses Removal efficiency of the UF membrane: 99.99% log 4 Auto Back wash Working pressure: 0-2 Bar Working temprature: Max 40 degree Celsius	Per Plant	14		
4	N.S	Supply Installation and commissioning of UF Feed Pump capacity of 4000 LPH, for 2000 LPH UF Plant, complete in all respect Operating Pressure: 2m3/h at minimum 10 m head, efficiency > 60% Sand Filter: Sand Filter with automatic Backwash Active Carbon Filter: Active Carbon Filter with automatic backwash	No.	8		
5	N.S	Rehabilitation of UF Feed water pump 4000 LPH, for 2000 LPH UF Plant, complete in all respect	p/job	20		
6	N.S	Supply Installation & commissioning of submersible pump 3HP including supporting clamp, pump coupling, cable clip, delivery pipe, cable complete in all respect. Discharge: 2000 LPH Minimum Operation Head: Up to 130 m. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Submersible Pump Impeller Type: SS 304 Pump Efficiency: >60% Motor Starter: Star Delta	p/job	7		
7	N.S	Supply and installation of safety filter strainer	p/job	41		
8	N.S	Supply Installation and Testing of Online TDS meter complete with all respects	p/job	41		
9	N.S	Supply Installation and Testing of Pressure Switches complete with all respects	p/job	41		

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No. 2: Rehabilitation of Ultra Filtration 2000 LPH

10	N.S	Supply Installation and testing of Rota meter complete in all respect Origin: Europe / USA / German / Pakistan or Equivalnet Type: Rota Meter / Flow Type Material: Acrylic	p/job	20		
11	N.S	Supply Installation and Testing of pressure gauges, complete in all respect	p/job	45		
12	N.S	Supply Installation and testing of Analogue Water meter, complete in all respect	p/job	12		
13	N.S	Rehabilitation of Analogue Water meter including callibration, complete in all respect	p/job	29		
14	N.S	Supply Installation and Testing of Solinoid valve complete in all respect	p/job	15		
15	N.S	Rehabilitation of Solinoid valve complete in all respect	p/job	25		
16	N.S	Supply Installation & Commissioning of 3way Automatic Multiport Valve, top & bottom distributors, complete in all respect	p/job	15		
17	N.S	Rehabilitation of 3way Automatic Multiport Valve, top & bottom distributors, complete in all respect	p/job	20		
18	N.S	Supply, installation and Testing of Chlorine Dosing Pump with working pressure 5 - 7 Bar imported, along with 80 liter capacity tank with all repects.complete in all respect Origin: Europe / USA / German or Equivalent Pressure: 5 -7 bar Tank Size: Maximum 80 liter Material: PVDF	p/job	22		
19	N.S	Supply and installation of Water Storage Tank, Capacity 2000 Liters, Material PE, Food Grade, 3 to 5 mm wall thickness, weight minimum 32 kg, complete in all respects Capacity : 2000 Litre minimum Material: Plastic food grade	p/job	5		
20	N.S	Chemical Cleaning & repair of Water Storage tank, complete in all respects at site	p/job	28		
21	N.S	Supply and installation of electric float switch for Water Storage Tank, complete in all respect No: 02	No.	25		
22	N.S	Replacement of Activated Carbon media supply, installation and commissioning complete in all respect NSF Certified, Iodine No 850-1000 Material: Coconut Shell Origin: Sri Lanka / Thailand or Equivalent Size of Media: 1.2 - 1.6 mm Surface Area: 900 m ² / g Bulk Density: 440 - 540 kg / m ³ Hardness No: 80 Ash Contents: 5 % Height of Gravel: 200 mm Media Bed Height: > 800 mm	kg	1230		

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No. 2: Rehabilitation of Ultra Filtration 2000 LPH

23	N.S	Replacement of Silica sand media supply, installation and commissioning complete in all respect Material: Quartz Silica Sand Size of Media: 0.85 - 2 mm Cleaning Process: Automatic, through PLC / Time Controller MPV	kg	3936		
24	N.S	Replacement of Natural Gravels media supply, installation and commissioning complete in all respect Material: Gravel Media	kg	3936		
25	N.S	Replacement of Granular Feric Hydroxide use for drinking water treatment with oxidation capacity of As3 to As5, commissioning complete in all respect Operating Pressure: 1.5 - 3 Bar Media: Grannular Ferric Hydroxide Origin: Europe / USA / German or Equivalent (NSF Certified) Cleaning Process: Automatic, through PLC / Time Controller MPV	kg	2624		
26	N.S	Supply Installation & Commissioning of Manual Valve 3Way complete in all respect	p/job	15		
27	N.S	Rehabilitation of Pipe and fittings, complete plant fitting in all respect	Per Plant	24.6		
28	N.S	Supply installation & testing of Plastic water Taps with fusion joint, complete in all respect	p/job	123		
29	N.S	Rehabilitation of Plant control panel with PLC & HMI complete in all respect	Per Plant	18		
Grand Total for 41 Plants (A)						
Per Unit Cost (B = A / 41)						

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No 3 : Installation of Reverse Osmosis 1000 LPH

RO 1000 LPH Plant

Sr. No	Description	Qty	Unit Rate (Rs)	Amount (Rs)
1	<p>Supply, transport, erection, installation, testing & commissioning of 1,000 L/H Reverse Osmosis (RO) Plant for TDS removal along with all other contaminants, including carriage, loading/unloading charges inclusive of all taxes conforming to Mentioned in Technical specifications of filtration plants. Control PLC GSM/GPRS/ SCADA enabled. The unit should be composed of Raw and Product water tanks (1000 Liter capacity for each) Feed and High Pressure Pump, pressure gauges, variable area flow meter for raw water and for product water totalizer/ water meter, pressure safety switch and valves, Multiport valves, safety filter strainers/cartridges filter, sand filter, carbon filters. System should be fully automatic. Provision of UV system, Anti secalent system with Anti scalent PVDF based dosing Pumps and chemical tank. The complete plant should be able to operate/backwash automatically through Automatic Multiport Valve operated by PLC with same feed pump based system. All type of piping and instrumentation shall be considered as part of filtration plant complete in all respect. The plant should be supplied to provide the treated water as per the WHO limits (strict compliance). The specifications along with equipment and accessories properly mounted in the frame/skid are given below:</p>	1		
2	Raw Water Feed Pump			
	<p>Discharge: 2000 LPH Minimum Operation Head: 04 Barg Maximum. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Vertical / Horizontal Low Pressure Pump Impeller Type: SS 304 Discharge: As per the capacity of Plant (2000 LPH) Operating Head: Up to 06 Barg Pump Efficiency: >60% Motor Starter: Star Delta</p>			
3	Submersible Pump			
	<p>Discharge: 2000 LPH Minimum Operation Head: Up to 130 m. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Submersible Pump Impeller Type: SS 304 Discharge: As per the capacity of Plant (2000 LPH) Pump Efficiency: >60% Motor Starter: Star Delta</p>			
4	Pre-Filtration			
4 (a)	Sand Filter			
	<p>Material: FRP Origin: Europe / USA / German or Equivalent Filtration Rate: 6 - 15 m/hr Vessel Certification: NSF Operating Pressure Max: Up to 06 Barg</p>			
4 (b)	Filter Media Sand			

	Material: Quartz Silica Sand Origin: Europe / USA / German or Equivalent Size of Media: 0.6 - 0.8 mm Cleaning Process: Automatic, through PLC / Time Controller MPV
4 (c)	Activated Carbon Filter
	Material: FRP Origin: Europe / USA / German or Equivalent Media & Vessel Certification: NSF Filtration Rate: 5 - 15 m/hr Operating Pressure Max: Up to 06 Barg
4 (d)	Filter Media Carbon
	Material: Coconut Shell Origin: Sri Lanka / Thailand or Equivalent Size of Media: 1.2 - 1.6 mm Surface Area: 900 m ² / g Bulk Density: 440 - 540 kg / m ³ Hardness No: 80 Ash Contents: 5 % Height of Gravel: 200 mm Media Bed Height: > 800 mm
4 (e)	Cartridge Filter
	Size: 20 Inches / As per Flow Porosity: 1-5 micron Material: High pressure Plastic Melt Blown PE
5	RO Skid
	Frame: Stainless Steel
6	High Pressure Pump multistage
	Discharge: 2000 LPH Operating Head: Upto 06 Barg Pump Type: Vertical High Pressure Pump Origin: Europe / USA / German or Equivalent Impeller material: S.S. 304 Pump Efficiency: >60% Motor Starter: Star Delta Motor Temperature Class: 45 degree Celsius Make: Lewara / Grundfous / KSB / CNP / Wilo or Equivalent
7	RO Housing
	Material: FRP Certification: NSF
8	RO Membrane
	Origin: Europe / USA / German or Equivalent (Assembly of Parts may be Pakistan) No. of Stages: Up to 2 No. of Membranes: Up to 4 Certification: NSF Stable salt rejection: Minimum - 99% Capacity: 1000 LPH For Permeate water Capable for TDS: Upto 5000 mg/l Recovery: Should be More than 50% Ambient Temperature: Upto 45 degree celsius Life of RO Membrane: Minimum 03 years Pressure Vessels: As per required Pressure Rating: Upto 17 Barg
9	Automatic PLC Panel

	Origin: Europe / USA / German or Equivalent Programming: Fully automatic with breaker, timer and relays complete in all respects HMI display: For PLC - 10" minimum size with touch screen (Fully automatic control of plant) SCADA enable		
10	Anti Scalent + Injection System		
	Origin: Europe / USA / German or Equivalent Pressure: 5 -7 bar Tank Size: Maximum 80 liter Chemical Anti Sclanet: Food Grade Material: PVDF		
11	UV Light with SS casing		
	Origin: Europe / USA / German or Equivalent Material of Casing: SS 304 / 316 Operating Pressure: 04 Barg Ambient Temperature: Upto 45 degree celsius		
12	Raw & Product water tank (1000 L) Each		
	Material: PE Food Grade		
13	Level Meter / Float Valve / Switch Electronic		
	No: 02 Origin: Europe / USA / German or Equivallent		
14	Water Flow Meter		
	No: 02 Origin: Europe / USA / German or Equivallent Type: Rota Meter / Flow Type Material: Acrylic		
15	Pressure Gauges		
16	Online TDS meter		
17	All fittings of PVC Sch.80		
18	Pressure Regulation Switch		
19	Auto on/off Switch for Pump		
20	Automatic Back Wash system for Membrane		
21	Including any item required for Filtration Plant if required		
Total			

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No 4 : Installation of Reverse Osmosis 2000 LPH

RO 2000 LPH Plant

Sr No	Description	Qty	Unit Rate (Rs)	Amount (Rs)
1	<p>Supply, transport, erection, installation, testing & commissioning of 2,000 L/H Reverse Osmosis (RO) Plant for TDS removal along with all other contaminants, including carriage, loading/unloading charges inclusive of all taxes conforming to Mentioned in Technical specifications of filtration plants. Control PLC GSM/GPRS/ SCADA enabled. The unit should be composed of Raw and Product water tanks (2000Liter capacity for each) Feed and High Pressure Pump, pressure gauges, variable area flow meter for raw water and for product water totalizer/ water meter, pressure safety switch and valves, Multiport valves, safety filter strainers/cartridges filter, sand filter, carbon filters. System should be fully automatic. Provision of UV system, Anti secalent system with Anti secalent PVDF based dosing Pumps and chemical tank. The complete plant should be able to operate/backwash automatically through Automatic Multiport Valve operated by PLC with same feed pump based system. All type of piping and instrumentation shall be considered as part of filtration plant complete in all respect. The plant should be supplied to provide the treated water as per the WHO limits (strict compliance).</p> <p>The specifications along with equipment and accessories properly mounted in the frame/skid are given below:</p>	1		
2	Raw Water Feed Pump			
	<p>Discharge: 4000 LPH Minimum Operation Head: 04 Barg Maximum. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Vertical / Horizontal Low Pressure Pump Impeller Type: SS 304 Discharge: As per the capacity of Plant (4000 LPH) Operating Head: Up to 06 Barg Pump Efficiency: >60% Motor Starter: Star Delta</p>			
3	Submersible Pump			
	<p>Discharge: 4000 LPH Minimum Operation Head: Up to 130 m. Origin: Europe / USA / German / Pakistan or Equivalent Pump Type: Submersible Pump Impeller Type: SS 304 Discharge: As per the capacity of Plant (4000 LPH) Pump Efficiency: >60% Motor Starter: Star Delta</p>			
4	Pre-Filtration			
4 (a)	Sand Filter			

	Material: FRP Origin: Europe / USA / German or Equivalent Filtration Rate: 6 - 15 m/hr Vessel Certification: NSF Operating Pressure Max: Up to 06 Barg
4 (b)	Filter Media Sand
	Material: Quartz Silica Sand Origin: Europe / USA / German or Equivalent Size of Media: 0.6 - 0.8 mm Cleaning Process: Automatic, through PLC / Time Controller MPV
4 (c)	Activated Carbon Filter
	Material: FRP Origin: Europe / USA / German or Equivalent Media & Vessel Certification: NSF Filtration Rate: 5 - 15 m/hr Operating Pressure Max: Up to 06 Barg
4 (d)	Filter Media Carbon
	Material: Coconut Shell Origin: Sri Lanka / Thailand or Equivalent Size of Media: 1.2 - 1.6 mm Surface Area: 900 m ² / g Bulk Density: 440 - 540 kg / m ³ Hardness No: 80 Ash Contents: 5 % Height of Gravel: 200 mm Media Bed Height: > 800 mm
4 (e)	Cartridge Filter
	Size: 20 Inches / As per Flow Porosity: 1-5 micron Material: High pressure Plastic Melt Blown PE
5	RO Skid
	Frame: Stainless Steel
6	High Pressure Pump multistage
	Discharge: 4000 LPH Operating Head: Upto 06 Barg Pump Type: Vertical High Pressure Pump Origin: Europe / USA / German or Equivalent Impeller material: S.S. 304 Pump Efficiency: >60% Motor Starter: Star Delta Motor Temperature Class: 45 degree Celsius Make: Lewara / Grundfous / KSB / CNP / Vilo or Equivalent
7	RO Housing
	Material: FRP Certification: NSF
8	RO Membrane

	Origin: Europe / USA / German or Equivalent (Assembly of Parts may be Pakistan) No. of Stages: Up to 4 No. of Membranes: Up to 8 Certification: NSF Stable salt rejection: Minimum - 99% Capacity: 2000 LPH For Permeate water Capable for TDS: Upto 5000 mg/l Recovery: Should be More than 50% Ambient Temperature: Upto 45 degree celsius Life of RO Membrane: Minimum 03 years Pressure Vessels: As per required Pressure Rating: Upto 17 Barg		
9	Automatic PLC Panel		
	Origin: Europe / USA / German or Equivalent Programming: Fully automatic with breaker, timer and relays complete in all respects HMI display: For PLC - 10" minimum size with touch screen (Fully automatic control of plant) SCADA enable		
10	Anti Scalent + Injection System		
	Origin: Europe / USA / German or Equivalent Pressure: 5 -7 bar Tank Size: Maximum 80 liter Chemical Anti Sclanet: Food Grade Material: PVDF		
11	UV Light with SS casing		
	Origin: Europe / USA / German or Equivalent Material of Casing: SS 304 / 316 Operating Pressure: 04 Barg Ambient Temperature: Upto 45 degree celsius		
12	Raw & Product water tank (2000 L) Each		
	Material: PE Food Grade		
13	Level Meter / Float Valve / Switch Electronic		
	No: 02 Origin: Europe / USA / German or Equivalent		
14	Water Flow Meter		
	No: 02 Origin: Europe / USA / German or Equivalent Type: Rota Meter / Flow Type Material: Acrylic		
15	Pressure Gauges		
16	Online TDS meter		
17	All fittings of PVC Sch.80		
18	Pressure Regulation Switch		
19	Auto on/off Switch for Pump		
20	Automatic Back Wash system for Membrane		
21	Including any item required for Filtration Plant if required		
Total			

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No 5 : Installation of Ultra Filtration 2000 LPH

Specification of UF 2000 LPH Plants

Sr No	Description	Specifications	Qty	Unit Rate (Rs)	Amount (Rs)
	Supply, Install, Testing and Commissioning of water Ultra filtration plant, capable of removing Turbidity, Arsenic, Bacteria & Viruses, having capacity of 2000 litres/ hour and fully automated (Auto filtration, flush and backwash process) complete in all respects. Pressure Gauges, Flow Meters and Level Sensors, Multiport and Solenoid Valves, Stainles Steel 304 Frame, All Pipe work including feed water pipe line connection to the delivery pipeline and necessary gate and flow regulating valves, water taps including pipework & uPVC pipe to drain off the spent/ waste water.		1		
1	Pre Filtration				
	Pressure Sand filtration				
	Constant flow valve for filtration backwash	3way automatic valve with automatic back wash system			
	Sand effective size	0.85 - 2 mm			
	Vessel Material	Material FRP, Make Pentair / Frotec / G Fiber or Equivalent NSF certified company			
	Vessel diameter / height	size 16" x 65" / Size 24" x 72"			
2	Activated Carbon filtration				
	Carbon Media	Iodine No 850-1000 Material: Coconut Shell Origin: Sri Lanka / Thailand or Equivalent Size of Media: 1.2 - 1.6 mm Surface Area: 900 m ² / g Bulk Density: 440 - 540 kg / m ³ Hardness No: 80 Ash Contents: 5 % Height of Gravel: 200 mm Media Bed Height: > 800 mm			
	Vessel Material	Material FRP, Make Pentair / Frotec / G Fiber or Equivalent NSF certified company			
	Vessel diameter / height	size 16" x 65" / Size 24" x 72"			
3	Arsenic Removal Filter				
	Arsenic Media	Grannular Ferric Hydroxide oxidation capacity of As ₃ to As ₅ , Operating Pressure: 1.5 - 3 Bar Origin: Europe / USA / German or Equivalent (NSF Certified) Cleaning Process: Automatic, through PLC / Time Controller MPV			
	Vessel Material	Material FRP, Make Pentair / Frotec / G Fiber or Equivalent NSF certified company			
	Vessel diameter / height	size 16" x 65" / Size 24" x 72"			
4	UF Unit				
	Mounting / Frame	Frame stainless steel SS 304			
	Pre treatment objectives turbidity	< 1 NTU			
5	Well pump or / with feed pump	Stainless Steel, NEMA Insulation Class F and Pump Efficiency > 50%			
6	UF Membrane				

	Membrane Type	Material of vessel: uPVC Removal Size: 0.02 Micron Manufacturer Type: Mutibore (seven bore) Manufacturer: GE Power (IMT) / INGE or Equivalent Filter vessel: uPVC Thickness: 5mm Membrane material: PES (Polystyrene) Country Made: Europe / USA / Germany or Equivalent. Membrane Working pressure: 5 Bar Max Membrane Life: 5 years Bacterail Removal Efficiency of UF membrane: 99.9999% log 6 Viruses Removal efficiency of the UF membrane: 99.99% log 4 Auto Back wash Working pressure: 0-2 Bar Working temprature: Max 40 degree Celsius		
	Trans membrane Pressure (TMP)	<10 bar		
	Piping for Units	All fittings of UPVC Sch.80		
7	Dosing Pump	Operational / rinsing		
	Dosing Pump working pressure	5 - 7 bar		
	Chemical Used	Anti Scalant Food Grade		
	Pre Treatment	Disinfection by UV radiation		
	Bacteria	Below Detection level		
8	Control System	Automatic PLC Panel / Micro processor based embedded system		
		Programming fully automatic with breaker, timer and relays complete in all respects		
		Visual Display Unit with Membrane Keypad / HMI with Touch interface		
		Fully automatic control of plant		
		SCADA enable		
9	Raw water tank	Raw water tank		
		Capacity 2000 Litre minimum		
		Material Plastic food grade		
		Float Switch		
10	Clean Water Storage Tank	Product water tank		
		Material Plastic food grade		
		Capacity 2000 Litre minimum		
		Float Switch		
11	Waste disposal	Discharge in the sanitary sewerage system		
			Total	

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No 6: Installation of New Bore Holes

Sr. No	MRS	Description of items	Unit	Qty	Rate	Total Amount (Rs)
SCHEDULE ITEMS BASED ON MRS, 2nd BI-ANNUAL PERIOD (1st Jun, 2024 TO 30th Dec, 2024) Lahore						
1	23-2-b	Boring for tubewell in all types of soil except shingle, gravel & rock, from a depth of 0 to 100 ft (up to 30) below ground level, including sinking and withdrawing of casing pipe, complete:- 6"(150mm)	M	30.00		
1	23-2-b	Boring for tubewell in all types of soil except shingle, gravel & rock, from a depth of 100 ft to 200 ft (30 m to 60m) below ground level, including sinking and withdrawing of casing pipe, complete:- 6"(150mm)	M	30.00		
3	6-5-f	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): Ratio 1: 2: 4	Cu.m	0.50		
4	6-6-a ii b(i)	(a)(ii)Reinforced cement concrete in retaining/Shear walls laid in situ or precasted in position,or pre stressed members cast insitu(Formwork on both sides) , complete in all respects: Type C (nominal mix 1:2:4) Upto 9" thick (Avg)	Cu.m	1.50		
5	23-15-iii	Providing and installing P.V.C. Bail/End plug, in tubewell bore hole:- (4" dia). (100 mm)	Each	1.00		
6	23-11-b	Providing and installing, P.V.C. strainer B.S.S. Class 'B' in tubewell bore hole, including sockets and solvents, etc. complete . 4" dia (100mm).	per M	10.00		
7	23-17-b	Providing and installing P.V.C. blind pipe, B.S.S. Class `B', in tubewell bore hole, including sockets and solvents and jointing with strainer, etc. complete (4" dia)	M	55.00		

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE

BILL OF QUANTITIES

Bill No 6: Installation of New Bore Holes

Sr. No	MRS	Description of items	Unit	Qty	Rate	Total Amount (Rs)
SCHEDULE ITEMS BASED ON MRS, 2nd BI-ANNUAL PERIOD (1st Jun, 2024 TO 30th Dec, 2024) Lahore						
8	N.S	Providing, fixing, jointing and testing Polypropylene Random Copolymer (PPRC) PN20 pressure pipe for cold and hot water as per DIN 8077-8078, PN 20 for pipes and DIN 16962, PN 25 for fittings (polyfusion welded joints) inside building including fittings and specials (sockets, tees, elbows, bends, crosses, reducers, adaptor, plugs and union etc.) supported on walls or suspended from roof slab or run in chases including pipe hangers, supports, cutting and making good the chases and holes, complete in all respects.				
			M	10.00		
9	N.S	Supply & installation of 1/2" i/d thick M.S Cap for 6" housing pipe joint by means of welding & hinges with lock & locking arrangements.				
			Each	1.00		
10	N.S	Taking of water samples (2 bottles each) at the end of the pumping test. Full chemical and bacteriological analysis, of water samples according to WHO.				
			Each	1.00		
UNIT COST:						

**REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS
INSTALLED BY PHED IN LAHORE**

BILL OF QUANTITIES

Bill No 7: Washing of Bore Holes

Sr, No	Description	Unit	Quantity	Unit Rate (RS)	Amount (RS)
1	Rehabilitation, Cleaning & Washing existing bore holes by using air compresseor or any other equipment	No.	1		
				Unit Cost	

REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS INSTALLED BY PHED IN LAHORE						
BILL OF QUANTITIES						
Civil Room 12*12						
Bill No 8: Rehabilitation of Civil Works						
SCHEDULE ITEMS BASED ON MRS, 2nd BI-ANNUAL PERIOD (1st Jun, 2024 TO 30th Dec, 2024) Lahore						
Sr. No.	MRS	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
					(In Rupees)	
1	7/5(i)	Pacca brick work in ground floor:- cement, sand mortar:-Ratio 1:5	30.0	cft		
2	11/9(b)	Cement plaster 1 : 4 upto 20 ft. height	30.0	Sft.		
3	6/5(f)	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):	30.0	Sft.		
4	4/19(a)	Dismantling of plain cement concrete (1:4:8)	40.0	cft		
5	1/1	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor. Upto 200 km	200	km		
6	NS	Repair and Maintenance of panelled doors and windows in all aspects	1	P/job		
7	11/23(b)(ii)	Distemping on new surface. Three Coats	1089	%Sq.ft.		
8	10/46(A)(i)	Providing and laying superb quality Porcelain glazed tiles of Master brand, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2"thick (1:2) cement plaster i/c the cost of and sealer for finishing the joints, cutting grinding complete in all respect as approved and directed by the Engineer Incharge.	50	P Sft.		
CIVIL ROOM					Total :-	

**REHABILITATION & O&M OF DYSFUNCTIONAL WATER FILTRATION PLANTS
INSTALLED BY PHED IN LAHORE**

BILL OF QUANTITIES

Bill No 9: Water Analysis Reports

Sr, No	Description	Unit	Quantity	Unit Rate (RS)	Amount (RS)
1	Water Quality Testing, Micro Biological Testing, Physical and Chemical Parameters, Arsenic etc as per parameters recommended by engineer incharge	No.	1		
				Unit Cost	

06 Months O&M for RO (1000 LPH, 2000 LPH) & UF (2000 LPH) PLANTS

BILL NO 1 - Cost of O&M of 01 Plant for 06 Months

Sr. No.		Description	Reverse Osmosis - 2000 LPH			
			Unit	Qty.	Unit Cost (Rs.)	Total Price (Rs.)
1	Non-MRS	Jumbo Filter PPF Micro 20" Prosity 1-5 Micron Material High Pressure Plastic Melt Blown PE	No	5		
2		Plant Operator, 1 Nos.	Man Months	2		
3		Water Testing (From ISO Approved Lab)	Quarterly	2		
4		Antiscalent Chemical (DOSING) Dosing Rate: 5 Ppm	Kg	14.4		
5		Chemicals for Cleaning (CIP), Disinfection, Tank Cleaning, Site Disinfection and other cleaning material etc Acidic/Alkaline	Per Job	1		
TOTAL COST					(A)	

BILL NO 2 - Cost of O&M of 01 Plant for 06 Months

Sr. No.		Description	Reverse Osmosis - 1000 LPH			
			Unit	Qty.	Unit Cost (Rs.)	Total Price (Rs.)
1	Non-MRS	Jumbo Filter PPF Micro 20" Prosity 1-5 Micron Material High Pressure Plastic Melt Blown PE	No	5		
2		Plant Operator, 1 Nos.	Man Months	2		
3		Water Testing (From ISO Approved Lab)	Quarterly	2		
4		Antiscalent Chemical (DOSING) Dosing Rate: 5 Ppm	Kg	7.2		
5		Chemicals for Cleaning (CIP), Disinfection, Tank Cleaning, Site Disinfection and other cleaning material etc Acidic/Alkaline	Per Job	1		
TOTAL COST					(B)	

BILL NO 3 - Cost of O&M of 01 Plant for 06 Months

Sr. No.		Description	UF Plant - 2000 LPH			
			Unit	Qty.	Unit Cost (Rs.)	Total Price (Rs.)
1	Non MRS	Plant Operator, 1 Nos.	Man Months	2		
2		Water Testing (From ISO Approved Lab)	Quarterly	2		
3		Antiscalent Chemical (DOSING) Dosing Rate: 5 Ppm	Kg	14.4		
4		Chemicals for Cleaning (CIP), Disinfection, Tank Cleaning, Site Disinfection and other cleaning material etc Acidic/Alkaline	No.	1		
TOTAL COST					(C)	

O&M for 89 Plants for 06 Months			Unit	Qty.	Unit Cost (Rs.)	Total Price (Rs.)
1		A - 06 Months O&M for RO Plants - 1000 LPH	No.	40		
2		B - 06 Months O&M for RO Plants - 2000 LPH	No.	1		
3		C - 06 Months O&M for UF Plants - 2000 LPH	No.	48		

06 MONTHS O&M WITHOUT ELECTRICITY

GRAND TOTAL