

## **Renfro Crescent (Pvt.) Ltd. - Flood Relief Effort**

Renfro Crescent (Pvt.) Ltd. is a joint venture between Renfro Corporation (USA), one of the largest socks manufacturers in the world, and Crescent (Pakistan). We manufacture and export high quality white and dyed socks to North America and Europe.

Excellence in Corporate Social Responsibility is one of the Company's core values. This is established through regular contributions towards various charities and causes such as the Shoukat Khanam Cancer Hospital and in 2005 earth quake, Renfro Crescent took the initiative and distributed socks and rations with help of group associates and friends in effort to relieve the suffering of the affected.

Pakistan has been hit by a natural disaster of enormous scale; floods have swept through our all provinces with devastating effects. 09 August 2010 press release of UN Office for the Coordination of Humanitarian Affairs estimated that the more than 13.8 million people have been affected; this is a higher figure than those who were affected by the 2005 South Asia tsunami (five million), the 2005 South Asia earthquake (three million), or the 2010 Haiti earthquake (three million). The estimate of homes destroyed or seriously damaged — 290,000 — is almost the same as those destroyed in Haiti. The damage ranges from 14 million becoming homeless to longer term damage such as crop losses or loss of earnings.

While every country has contingency plans in place, we simply don't yet have the resources in country to respond to an emergency of this scale. Needs are huge and still rising; the humanitarian effort needs to be scaled up accordingly, as fast as we can. The funding needed for humanitarian relief in the coming weeks and months will inevitably be hundreds of millions of dollars.

### **Renfro Crescent's Relief Effort in collaboration with Trade Partners, friends and families.**

Objective:

1. Dispense dry ration to at least 3000 families (approx. 15000 persons) in Sindh, Punjab and Khyber Pakhtunkhwa.
2. The biggest health threat to flood-affected children is diarrhoea. For displaced children living in camps and on motorway settlements, measles is yet another serious concern therefore; we will arrange and install to arrange water purification plants to supply clean drinking water.

We at Renfro Crescent have volunteered to arrange and personally dispense much needed relief to the affected. In our efforts we look towards our family, friends and trade partners to help us in our effort to bring some relief to the poor masses who desperately need our help. We encourage you to contribute either monetary or ration supplies or any assistance for this noble cause.

## Food Relief

Makro has committed to arrange ration packs from their locations nearest to the affected areas and

Content of one month ration for a family of five quoted by Makro is as follows:

S.NO	ITEM	QTY	Rate (PKR)	Value (PKR)
1	RICE	10 KG	34.50	345.00
2	FLOUR	10 KG	29.00	290.00
3	SUGAR	5 KG	84.00	420.00
4	TEA	1 KG	404.00	404.00
5	MILK	1 KG	420.00	420.00
6	DAAL CHANA	3 KG	75.00	225.00
7	BLACK CHANA	2 KG	70.00	140.00
8	COOKING OIL	5 LTR	126.00	630.00
9	SALT	2 PKT	15.00	30.00
10	DATES	1 KG	129.00	129.00
11	Match	1 Pkt	46.00	46.00
12	Mosquito lotion	1 Btl	56.00	56.00
13	Poly Bag	1 Pc	30.00	30.00
<b>TOTAL</b>				<b>3,165.00</b>

## Water Purification & Disinfection

Our trade partner CWG Water Technology Pakistan has offered following Reverse Osmosis & Filtration Plants at cost. Choice between simple filtration or RO equipment will depend on water quality in the area.

RCL will use its extensive technical expertise in the water processing and volunteer its employees to install, run the equipment and train local caretakers. Therefore cost in attached quotation for water purification equipment does not include labour and installation cost.

We are collecting and testing water samples from various sites where the plants can be placed.

Summary of the equipment is as follows; detailed quotation from CWG is attached

#	Equipment	Output	Cost
1	Reverse Osmosis Plant	300ltr/hour	350,000
2	Reverse Osmosis Plant	500ltr/hour	418,000
3	Filtration Plant	1500ltr/hour	295,000

\*where input water quality is better filtration plant with higher output will be used instead of RO Plant

## Logistics

Agility Logistics is providing logistical support free of cost for the relief operation.

## Management of relief work.

Mr. Tariq Shafi, CEO Renfro Crescent will oversee the relief work.

[tariqshafi@cesplus.com](mailto:tariqshafi@cesplus.com)

Following department heads along with other members of RCL Team have volunteered for the cause and will personally visit the affected areas and carry out the relief work.

Name	Email	Mobile no.
Ubaidullah Sheikh	<a href="mailto:UbaidullahSheikh@cesplus.com">UbaidullahSheikh@cesplus.com</a>	03333343983
Shoaib Bhombal	<a href="mailto:shoaibbhombal@cesplus.com">shoaibbhombal@cesplus.com</a>	03332158739
Anwar Jamal	<a href="mailto:anwarjamal@cesplus.com">anwarjamal@cesplus.com</a>	03223657886
Iqbal karim	<a href="mailto:iqbalkarim@cesplus.com">iqbalkarim@cesplus.com</a>	03008230818
Aadil Zaidi	<a href="mailto:aadilzaidi@cesplus.com">aadilzaidi@cesplus.com</a>	03332158740
Shahid Sultan	<a href="mailto:shahidsultan@cesplus.com">shahidsultan@cesplus.com</a>	03343658123
Sohail Gogal	<a href="mailto:sohailgogal@cesplus.com">sohailgogal@cesplus.com</a>	03333832390

## Agility Logistics:

### **Naeem A. Malik**

Executive Director

Agility Logistics, Karachi, Pakistan.

Tel: +92.21.4387403

IP.Tel: +89212004

Mobile:+92.300.8254884

Fax: +92.21.4383763-4

[www.agilitylogistics.com](http://www.agilitylogistics.com)

## CWG Water Technology

Mr. Afdhash Chaudary

Head Office

Wahdat Road, Multan Chungi, Lahore-Pakistan

Tel: 92-42-5435325-27 Fax: 92-42-5435328

Mobile: 03224677908

e-mail: [info@cwg.com.pk](mailto:info@cwg.com.pk) <http://www.cwg.com.pk>

## Monetary Contribution

Contributions can be made to following bank account

Account title Renfro Crescent (Pvt.) Limited

Account no. 56690-9

Bank National Bank of Pakistan

Branch Main Branch, I.I. Chundrigar Road, Karachi-74000



For Foreign Remittance wiring instruction are as follows:

Standard Chartered Bank Ltd. New York,  
Swift Code: SCBLUS33 to Faysal Bank Limited. Karachi  
A/C # 3582-059673-001 for onward Credit to Account No. 110-2101351-001 of M/s. Renfro Crescent  
(Pvt) Limited, at Faysal Bank Limited Main Branch Karachi Pakistan.

#### **Contribution in kind**

We count on any support and assistance that you may arrange that would allow us to deliver relief as early and efficiently as possible.

We look forward to your generous support so we may deliver relief to maximum possible victims affected by the floods. We will keep you posted on the progress and will update you on the relief activities carried out and detailed statement of the utilization of donations.

Best regards,

Renfro Crescent Team



# Drinking Water RO Plant

***Capacity: 300 Lits. Per Hour***

*Submitted By:*  
***CWG Water Technology Pakistan***



**Subject: Proposal For Drinking Water Reverse Osmosis Plant with Reconditioned Pumps**

Dear Sir,

In reference to your request for drinking water plant, kindly find below our best offer for the system.

**Price of Drinking Water RO System**

**Rs. 350,000 .00**

Type: BWRO300, Capacity: 300 lits./hr  
Complete with accessories as mentioned  
Delivered at Site, excluding taxes.

**Terms & Conditions:**

- Payment Terms** : 70% advance, 20% against delivery and 10% after commissioning.  
**GST** : above price is excluding GST which will be paid by client as per Govt. rules.  
**Delivery** : 3 - 4 weeks, after confirm PO and advance.  
**Inclusions** : following is the scope of work of CWG
- Design, manufacturing etc. of the subject system using brand new components as mentioned in technical details.
  - Supply of system at site.
  - Installation & commissioning of the system.
  - Training of allocated person for operation & maintenance of system

**Warranty** : System is warranted for six months in workmanship & materials as per standard terms & conditions of CWG Water Technology Pakistan.

We hope that our proposal will be considered attractive fulfilling your requirement. However, if you feel the need of any further clarification or information, please feel free to contact us.

With true regards,

**CWG Water Technology Pakistan**

**Germany**

Besselstrasse 21 68219 Mannheim, Germany  
Internet: <http://www.cwgqmbh.de>  
e-mail: [info@cwqgmbh.de](mailto:info@cwqgmbh.de)

**Head Office**

Wahdat Road, Multan Chungi, Lahore-Pakistan  
Tel: 92-42-5435325-27 Fax: 92-42-5435328  
e-mail: [info@cwq.com.pk](mailto:info@cwq.com.pk) <http://www.cwg.com.pk>

**Branch Office**

1-B, Plot # 1-C, Street # 2, Badar Commercial  
Phase 5, Ext. Karachi Tel: 92-21-5245385  
Fax: 92-21-5245386 E-[info@cwq.com.pk](mailto:info@cwq.com.pk)



## TECHNICAL DETAILS AND BILL OF QUANTITIES

### Design Basis:

Product Flow Rate, Max.		: 300 lits./hr
Raw Water Flow Rate		: 1 m <sup>3</sup> /hr
Raw Water TDS		: 3000 max.
Raw Water Specifications	:	
	Total Colony Count	: 855cfu/ml
	Total Coliforms	: 13 cfu/100 ml
	Fecal E. Coli	: 10 cfu/100 ml
	Fecal Enterococci	: 10 cfu/100 ml
Product Water Specifications	:	
	Total Colony Count	: <500 cfu/ml
	Total Coliforms	: 0 cfu/100 ml
	Fecal E. Coli	: Nil
	Fecal Enterococci	: Nil

### Technical Specifications:

Model of Drinking Water RO System	: CWG BWRO300
Product Flow Rate at approx. 3000 ppm TDS	: 300 lits./hr
Raw Water Pressure required, bar approx.	: 2 - 3
Operating Hours	: 24
Current, V/Hz	: 220/50
Pipe Connections, inches	: 3/4"

### *The system includes the following bill of quantity:*

1. **Multimedia Filtration Unit**, which includes;
  - o Fiberglass Vessel, Q1354, make: Clack USA/ Eq 01 Unit
  - o Filtration Media, Anthracite, make: Clack USA 01 Filling
  - o Filtration Media, Birm, make: Clack USA 01 Filling
  - o Multiport Valve, Top Mounted 01 Unit
  - o Necessary Piping & fittings etc. 01 Lot
  
2. **Activated carbon filtration Unit**, which includes;
  - o Fiberglass Vessel, Q1354, make: Clack USA/ Eq 01 Unit
  - o Filtration Media, Activated Carbon, make: CWG Germany 01 Filling
  - o Multiport Valve, Top Mounted 01 Unit
  - o Necessary Piping & fittings etc. 01 Lot



3. **Jumbo 5- $\mu$ , 20" Prefilter Cartridge Unit**, which includes;
- o Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - o 100% PPF cartridge, 20", 5-microns, made: CWG Germany 01 Unit

4. **Reverse Osmosis Block:**

CWG's Reverse Osmosis Plant type BWRO 500 assembled and tested by CWG Water Technology Pakistan.

Quantity : One  
 Model : BWRO 300  
 Manufacturer : CWG Pakistan

**Performance Specification:**

Product Water Flow Rate : 300 lit/hr  
 Raw Water Flow Rate : 1000 lit/hr  
 Feed Water TDS basis : 3000 ppm  
 Product water quality : as per WHO guidelines for drinking water  
 Recovery : 35 %  
 Design Temperature : 25 °C

**System Specification:**

Membrane Type : Filmtec (DOW) USA/ Hydranautics, USA  
 Size of Element : 4"x40"  
 Number of Pressure Vessels : 02  
 Number of Elements : 02  
 High Pressure Pump : Grundfos (Reconditioned)  
 Power Consumption : 1. 5 KW  
 Electrical : 400V / 50HZ

**Feed Water Specifications:**

Feed (incoming) : TDS approx. 3000 ppm  
 Feed Water Pressure : 2 - 3bars  
 Feed Water Analysis : as specified  
 Temperature Range : 25 – 35 °C design temperature  
 Feed water Chlorine level : 0 ppm  
 Feed Water Turbidity : less than 1 NTU  
 Feed Water SDI : 3 max.  
 Capacity basis : 24 hrs/day

**The Reverse Osmosis Block consists of the following features**

- Sampling permeate port, make: CWG Germany 01 unit
- Panel mounted regulating valves, make: Kitz, Japan/Korea 02 unit
- Raw Water Pump with motor, make; Grundfos Denmark 01 unit
- High Pressure Feed pump with motor, make: Grundfos Denmark 01 unit
- Membrane Element of Filmtec(BW-30-4040)(DOW), USA 03 unit
- Membrane Element Housings of FRP corrosion proof 03 unit
- Mild Steel Skid and Frame with corrosion proof painting 01 unit
- Front Plate for Instruments made of Plastic, if required 01 unit





- Float level Switch for permeate tank and raw water tank 01 unit
- High Pressure Piping of Stainless Steel 01 unit
- Low Pressure Piping of PVC (Sch#80), make: Australia 01 unit
- **Electronic Controls**
  - TDS online meter
  - Permeate storage full
  - Permeate storage empty
  - Indicator Lights
- **Instruments**
  - Pressure gauges, make: WIKA/Bourdon Europe 04 unit
  - Online TDS meter, make: CREATE 01 unit
  - Flow Meter (Rotameters), Blue & White USA 02 unit
  - Electrical control panel with 01 unit
    - Auto/Manual Operation Switch
    - ON/OFF Control System for High Pressure Pump
  - Float Switch For Permeate storage Tank 01 unit
- 5. **Chemical Dosing Station, which includes;**
  - Dosing pump with accessories, make: LMI USA 02 Unit
  - 75 lits. Chemical tank, made of Polyethylene 02 Unit
  - Antiscalant chemical, Osmodos AS, Make: CWG Germany 01 Fill
  - Biocide Chemical, Envirolex, Eurostel Germany 01 Fill
- 6. **Raw Water and Permeate Storage Tank, which includes;**
  - Polyethylene tank, capacity: 600 lits., make: Polycon 02 Unit
  - Float level switch & necessary piping & supports 01 Lot
- 7. **1- $\mu$ , 20" Prefilter Cartridge Unit, which includes;**
  - Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - 100% PPF cartridge, 20", 1-microns, made: CWG Germany 01 Unit
- 8. **Post Carbon Filer, which includes;**
  - Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - CTO with carbon block, made: USA/Germany 01 Unit

***The system is preassembled & ready for connections.  
Technical Changes are reserved to optimize the performance.***

***All Sales are subject to CWG standard terms & conditions.  
CWG's Sales Tax Certificate No. 03-02-2900-017-64***



## **Terms & Condition**

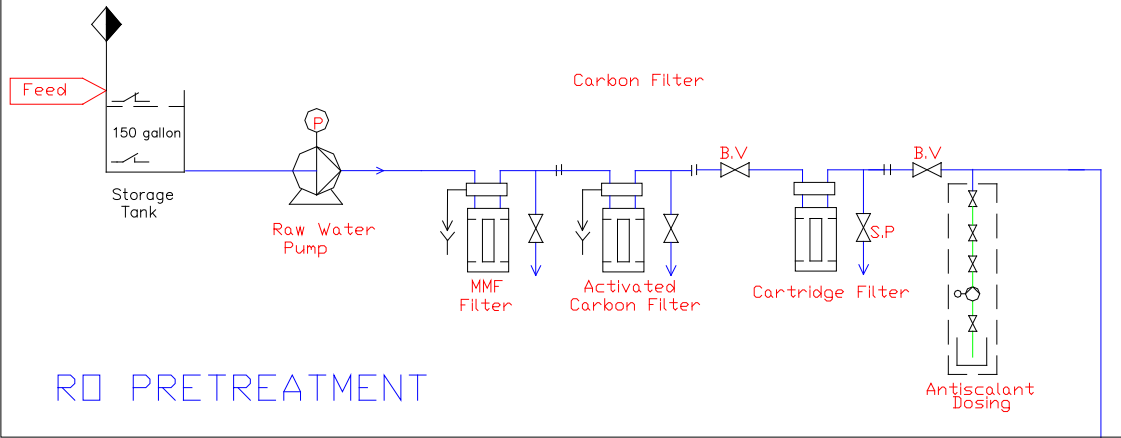
### **Responsibilities of CWG:**

- Providing the plant Hardware (friendly to use) as indicated in Submitted Technical Details.
- The Supervision of Installation & Commissioning of the Plant.
- After sales technical backup services free of cost for four months (one visit per month) excluding of replacement consumables.
- Training of assigned persons.
- First fill of chemicals for RO system at start up of system.

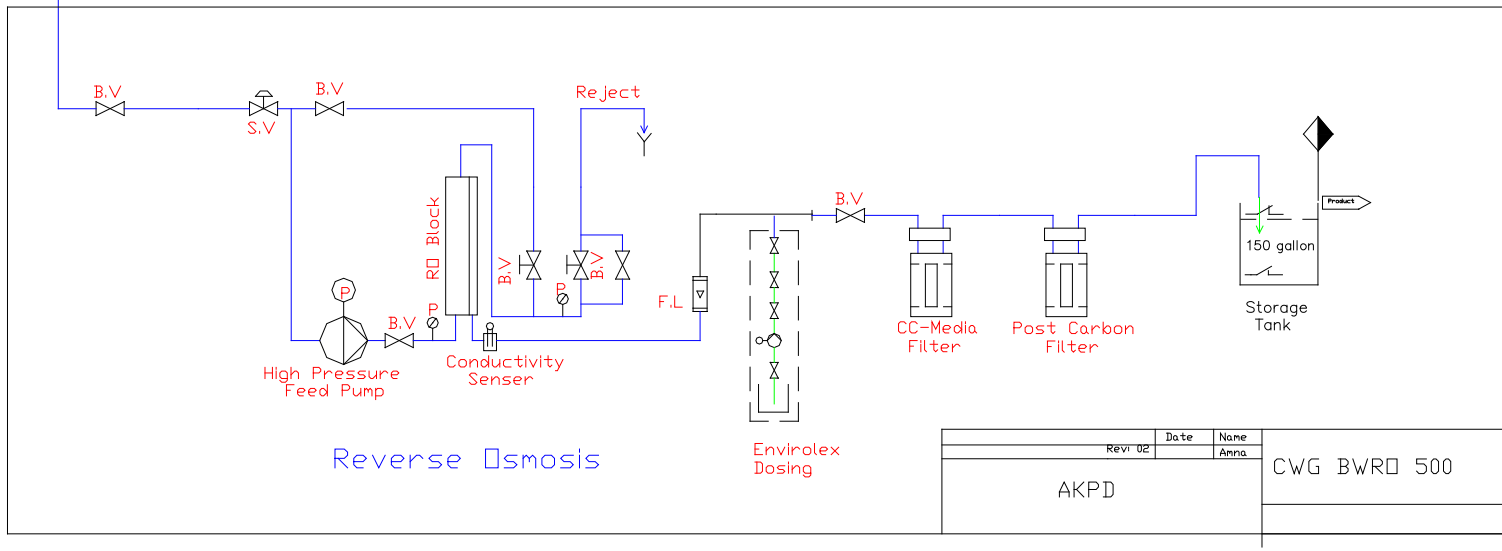
### **Responsibilities of Client:** Client will be responsible for the followings:

- Building works
- Hydraulic and Electric connections
- Civil works relating to R.C.C foundation, Drain lines.
- Disposal of drain to sewer
- Power supply at 220V, 3-phase, 50Hz
- Any required item or service not specified or included in our offer.

PROCESS INSTRUMENT FLOW DIAGRAM



BP: Blending Point  
 BV: Ball Valve  
 SP: Sampling Port  
 FL: Flowmeter  
 ◆ Battery Limit



Revi	Date	Name
02		Anna
AKPD		
CWG BWRD 500		

## OPERATIONAL COST OF REVERSE OSMOSIS PLANT

Drinking Water 300 liter/hr

<b>1 THE POWER COST:</b>	
The permeate Capacity	0.35 m <sup>3</sup> /hr
The Power Consumption in one hour	2 kwh
The Power Consumption per m <sup>3</sup> of permeate	5.714285714 kw/m <sup>3</sup>
The Unit Price of Power per KW	8 Rs./hr
<b>The Power Cost per m<sup>3</sup> of Permeate</b>	<b>45.71428571 Rs./m<sup>3</sup></b>
<b>2 THE H2SO4 COST:</b>	
The H2SO4 dosage rate	0 mg/l
The Raw Water Flow Rate	1 m <sup>3</sup> /hr
The H2SO4 Consumption per hour	0 gms/hr
The Unit Price of H2SO4	20 Rs./Kg
The Cost of Envi per hour	0 Rs./hr
<b>The H2SO4 Cost per m<sup>3</sup> of permeate</b>	<b>0 Rs./m<sup>3</sup></b>
<b>3 The Biocide Cost:</b>	
The Biocide dosage Rate (once a day)	10 mg/l
The Biocide Consumption per day	10 gms/day
The Unit Price of Biocide	60 Rs./Kg.
The Cost of Biocide per day	0.6 Rs./day
The Permeate Production per day	8.4 m <sup>3</sup> /day
<b>The Biocide Cost per m<sup>3</sup> of permeate</b>	<b>0.071428571 Rs./m<sup>3</sup></b>
<b>4 The Antiscalant (OsmoDos AS) Cost:</b>	
The Antiscalant dosage rate	6 mg/l
The Antiscalant consumption per hour	6 gms/hr
The Unit Price of Antiscalant	450 Rs./kg
The Cost of Antiscalant per Hour	2.7 Rs./hr
<b>The Antiscalant Cost per m<sup>3</sup> of permeate</b>	<b>7.714285714 Rs./m<sup>3</sup></b>
<b>5 The Cost of PP Cartridges:</b>	
The total number of cartridges	4 pcs.
The unit price of cartridge(Average)	675 Rs./pc.
The total replacement cost	2700 Rs.
The approx. life of cartridges	1 months
The permeate production in 1 months	252 m <sup>3</sup>
<b>The Cost of Cartridge per m<sup>3</sup> of permeate</b>	<b>10.71428571 Rs./m<sup>3</sup></b>
<b>6 The Chemical Cleaning Cost:</b>	
The Cost of Chemicals for Cleaning of Membranes	15000 Rs./job
The frequency of the cleaning	4 times/year
The annual cleaning cost	60000 Rs./year
The permeate production per year	3024 m <sup>3</sup> /year
<b>The cleaning Cost per m<sup>3</sup> of permeate</b>	<b>19.84126984 Rs./m<sup>3</sup></b>
<b>7 The membranes Replacement Cost:</b>	
The number of membranes	2 pcs.
The approx. unit price of membrane	25000 Rs./pc.
The total replacement cost of membranes	50000 Rs.
The average life of membranes	3 years
The permeate production in 5 years	9072 m <sup>3</sup>
<b>The membrane Cost per m<sup>3</sup> of permeate</b>	<b>5.511463845 Rs./m<sup>3</sup></b>
<b>8 THE CAUSTIC (NaOH) COST:</b>	
The NaOH dosage rate	0 mg/l
The NaOH Consumption per hour	0 gms/hr
The Unit Price of NaOH	45 Rs./Kg
The Cost of NaOH per hour	0 Rs./hr
<b>The NaOH Cost per m<sup>3</sup> of permeate</b>	<b>0 Rs./m<sup>3</sup></b>
<b>THE OPERATIONAL COST OF ONE M3 OF RO PERMEATE</b>	<b>89.567 Rs./m<sup>3</sup></b>
<b>THE OPERATIONAL COST OF ONE Liter OF RO PERMEATE</b>	<b>0.090 Rs./Liter</b>

In Terms of Monthly Expenditure		
RO Plant Capacity	300	liters per hour
RO Plant Daily Operation Hours	8	hours
Daily Production	2400	liters per day
Total Monthly Production	72000	liters per month
Per Liter Cost	0.090	Rs. / Liter
<b>Total Monthly Expenditure</b>	<b>6,449</b>	<b>Rupees per month</b>



# Drinking Water RO Plant

***Capacity: 500 Lits. Per Hour***

*Submitted By:*  
***CWG Water Technology Pakistan***



**Subject: Proposal For Drinking Water Reverse Osmosis Plant with Reconditioned Pumps**

Dear Sir,

In reference to your request for drinking water plant, kindly find below our best offer for the system.

**Price of Drinking Water RO System**

**Rs. 418,000 .00**

Type: BWRO500, Capacity: 500 lits./hr  
Complete with accessories as mentioned  
Delivered at Site, excluding taxes.

**Terms & Conditions:**

**Payment Terms**

:70% advance, 20% against delivery and 10% after commissioning.

**GST**

: above price is excluding GST which will be paid by client as per Govt. rules.

**Delivery**

: 3 - 4 weeks, after confirm PO and advance.

**Inclusions**

: following is the scope of work of CWG

- Design, manufacturing etc. of the subject system using brand new components as mentioned in technical details.
- Supply of system at site.
- Installation & commissioning of the system.
- Training of allocated person for operation & maintenance of system

**Warranty**

: System is warranted for six months in workmanship & materials as per standard terms & conditions of CWG Water Technology Pakistan.

We hope that our proposal will be considered attractive fulfilling your requirement. However, if you feel the need of any further clarification or information, please feel free to contact us.

With true regards,

**CWG Water Technology Pakistan**

**Germany**

Besselstrasse 21 68219 Mannheim, Germany  
Internet: <http://www.cwgqmbh.de>  
e-mail: [info@cwqgmbh.de](mailto:info@cwqgmbh.de)

**Head Office**

Wahdat Road, Multan Chungi, Lahore-Pakistan  
Tel: 92-42-5435325-27 Fax: 92-42-5435328  
e-mail: [info@cwq.com.pk](mailto:info@cwq.com.pk) <http://www.cwg.com.pk>

**Branch Office**

1-B, Plot # 1-C, Street # 2, Badar Commercial  
Phase 5, Ext. Karachi Tel: 92-21-5245385  
Fax: 92-21-5245386 E-[info@cwq.com.pk](mailto:info@cwq.com.pk)



## TECHNICAL DETAILS AND BILL OF QUANTITIES

### Design Basis:

Product Flow Rate, Max.	: 500 lits./hr
Raw Water Flow Rate	: 1.3 m3/hr
Raw Water TDS	: 3000 max.

Raw Water Specifications	:	
	Total Colony Count	: 855cfu/ml
	Total Coliforms	: 13 cfu/100 ml
	Fecal E. Coli	: 10 cfu/100 ml
	Fecal Enterococci	: 10 cfu/100 ml

Product Water Specifications	:	
	Total Colony Count	: <500 cfu/ml
	Total Coliforms	: 0 cfu/100 ml
	Fecal E. Coli	: Nil
	Fecal Enterococci	: Nil

### Technical Specifications:

Model of Drinking Water RO System	: CWG BWRO300
Product Flow Rate at approx. 3000 ppm TDS	: 500 lits./hr
Raw Water Pressure required, bar approx.	: 2 - 3
Operating Hours	: 24
Current, V/Hz	: 220/50
Pipe Connections, inches	: 3/4"

### *The system includes the following bill of quantity:*

1. **Multimedia Filtration Unit**, which includes;
  - o Fiberglass Vessel, Q1354, make: Clack USA/ Eq 01 Unit
  - o Filtration Media, Anthracite, make: Clack USA 01 Filling
  - o Filtration Media, Birm, make: Clack USA 01 Filling
  - o Multiport Valve, Top Mounted 01 Unit
  - o Necessary Piping & fittings etc. 01 Lot
  
2. **Activated carbon filtration Unit**, which includes;
  - o Fiberglass Vessel, Q1354, make: Clack USA/ Eq 01 Unit
  - o Filtration Media, Activated Carbon, make: CWG Germany 01 Filling
  - o Multiport Valve, Top Mounted 01 Unit
  - o Necessary Piping & fittings etc. 01 Lot



3. **Jumbo 5- $\mu$ , 20" Prefilter Cartridge Unit**, which includes;
- o Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - o 100% PPF cartridge, 20", 5-microns, made: CWG Germany 01 Unit

4. **Reverse Osmosis Block:**

CWG's Reverse Osmosis Plant type BWRO 500 assembled and tested by CWG Water Technology Pakistan.

Quantity : One  
 Model : BWRO 500  
 Manufacturer : CWG Pakistan

**Performance Specification:**

Product Water Flow Rate : 500 lit/hr  
 Raw Water Flow Rate : 1300 lit/hr  
 Feed Water TDS basis : 3000 ppm  
 Product water quality : as per WHO guidelines for drinking water  
 Recovery : 35 %  
 Design Temperature : 25 °C

**System Specification:**

Membrane Type : Filmtec (DOW) USA/ Hydranautics, USA  
 Size of Element : 4"x40"  
 Number of Pressure Vessels : 03  
 Number of Elements : 03  
 High Pressure Pump : Grundfos (Reconditioned)  
 Power Consumption : 1. 5 KW  
 Electrical : 400V / 50HZ

**Feed Water Specifications:**

Feed (incoming) : TDS approx. 3000 ppm  
 Feed Water Pressure : 2 - 3bars  
 Feed Water Analysis : as specified  
 Temperature Range : 25 – 35 °C design temperature  
 Feed water Chlorine level : 0 ppm  
 Feed Water Turbidity : less than 1 NTU  
 Feed Water SDI : 3 max.  
 Capacity basis : 24 hrs/day

**The Reverse Osmosis Block consists of the following features**

- Sampling permeate port, make: CWG Germany 01 unit
- Panel mounted regulating valves, make: Kitz, Japan/Korea 02 unit
- Raw Water Pump with motor, make; Grundfos Denmark 01 unit
- High Pressure Feed pump with motor, make: Grundfos Denmark 01 unit
- Membrane Element of Filmtec(BW-30-4040)(DOW), USA 03 unit
- Membrane Element Housings of FRP corrosion proof 03 unit
- Mild Steel Skid and Frame with corrosion proof painting 01 unit
- Front Plate for Instruments made of Plastic, if required 01 unit





- Float level Switch for permeate tank and raw water tank 01 unit
- High Pressure Piping of Stainless Steel 01 unit
- Low Pressure Piping of PVC (Sch#80), make: Australia 01 unit
- **Electronic Controls**
  - TDS online meter
  - Permeate storage full
  - Permeate storage empty
  - Indicator Lights
- **Instruments**
  - Pressure gauges, make: WIKA/Bourdon Europe 04 unit
  - Online TDS meter, make: CREATE 01 unit
  - Flow Meter (Rotameters), Blue & White USA 02 unit
  - Electrical control panel with 01 unit
    - Auto/Manual Operation Switch
    - ON/OFF Control System for High Pressure Pump
  - Float Switch For Permeate storage Tank 01 unit
- 5. **Chemical Dosing Station, which includes;**
  - Dosing pump with accessories, make: LMI USA 02 Unit
  - 75 lits. Chemical tank, made of Polyethylene 02 Unit
  - Antiscalant chemical, Osmodos AS, Make: CWG Germany 01 Fill
  - Biocide Chemical, Envirolex, Eurostel Germany 01 Fill
- 6. **Raw Water and Permeate Storage Tank, which includes;**
  - Polyethylene tank, capacity: 600 lits., make: Polycon 02 Unit
  - Float level switch & necessary piping & supports 01 Lot
- 7. **1- $\mu$ , 20" Prefilter Cartridge Unit, which includes;**
  - Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - 100% PPF cartridge, 20", 1-microns, made: CWG Germany 01 Unit
- 8. **Post Carbon Filer, which includes;**
  - Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - CTO with carbon block, made: USA/Germany 01 Unit

***The system is preassembled & ready for connections.  
 Technical Changes are reserved to optimize the performance.***

***All Sales are subject to CWG standard terms & conditions.  
 CWG's Sales Tax Certificate No. 03-02-2900-017-64***



## **Terms & Condition**

### **Responsibilities of CWG:**

- Providing the plant Hardware (friendly to use) as indicated in Submitted Technical Details.
- The Supervision of Installation & Commissioning of the Plant.
- After sales technical backup services free of cost for four months (one visit per month) excluding of replacement consumables.
- Training of assigned persons.
- First fill of chemicals for RO system at start up of system.

### **Responsibilities of Client:** Client will be responsible for the followings:

- Building works
- Hydraulic and Electric connections
- Civil works relating to R.C.C foundation, Drain lines.
- Disposal of drain to sewer
- Power supply at 220V, 3-phase, 50Hz
- Any required item or service not specified or included in our offer.



## Computer Projection

### BASIC DESIGN

RO program licensed to:  
 Calculation created by: AS  
 Project name: AKPD-DRO-Multan  
 HP Pump flow: 1.3 m3/hr  
 Recommended pump press.: 8.5 bar  
 Feed pressure: 6.5 bar  
 Feedwater Temperature: 25.0 C(77F)  
 Feed water pH: 7.5  
 Chem dose, ppm (100%): 7.4 H2SO4  
 Acidified feed CO2: 8.66  
 Average flux rate: 21.1 l/m2hr

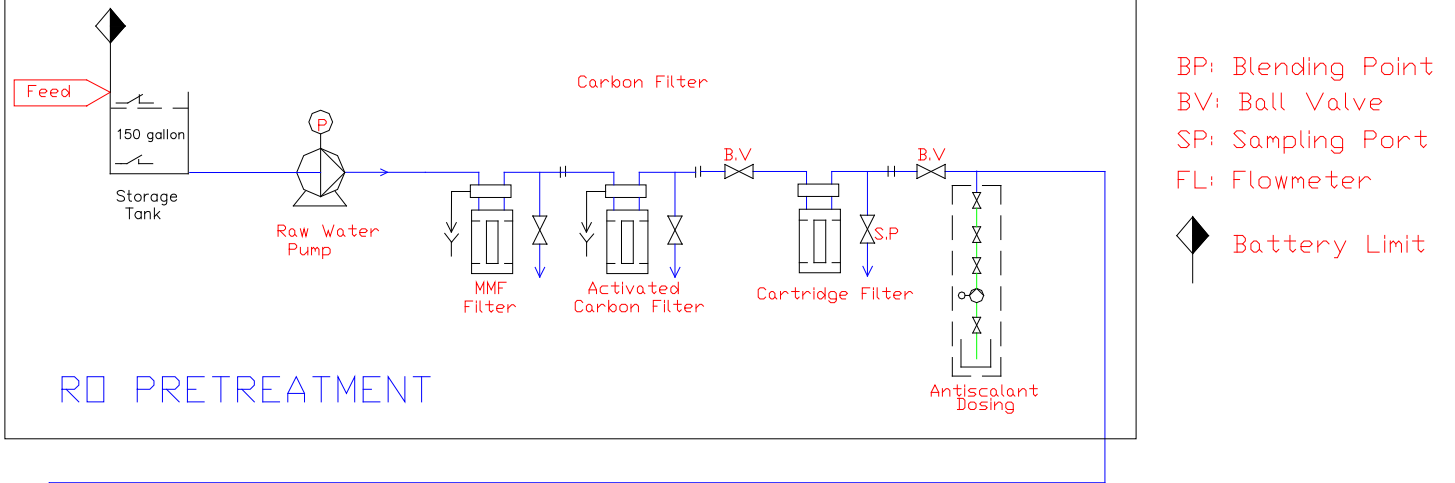
Permeate flow: 0.50 m3/hr  
 Raw water flow: 1.3 m3/hr  
 Permeate recovery: 40.0 %  
 Element age: 3.0 years  
 Flux decline % per year: 7.0  
 Salt passage increase, %/yr: 10.0  
 Feed type: Well Water

Stage	Perm. Flow m3/hr	Flow/Vessel		Flux l/m2-hr	Beta	Conc.&Throt. Pressures		Element Type	Elem. No.	Array
		Feed m3/hr	Conc m3/hr			bar	bar			
1-1	0.2	1.3	1.0	26.4	1.18	6.3	0.0	ESPA4-4040	1	1x1
1-2	0.2	1.0	0.9	20.7	1.17	6.0	0.0	ESPA4-4040	1	1x1
1-3	0.1	0.9	0.8	16.2	1.15	5.7	0.0	ESPA4-4040	1	1x1

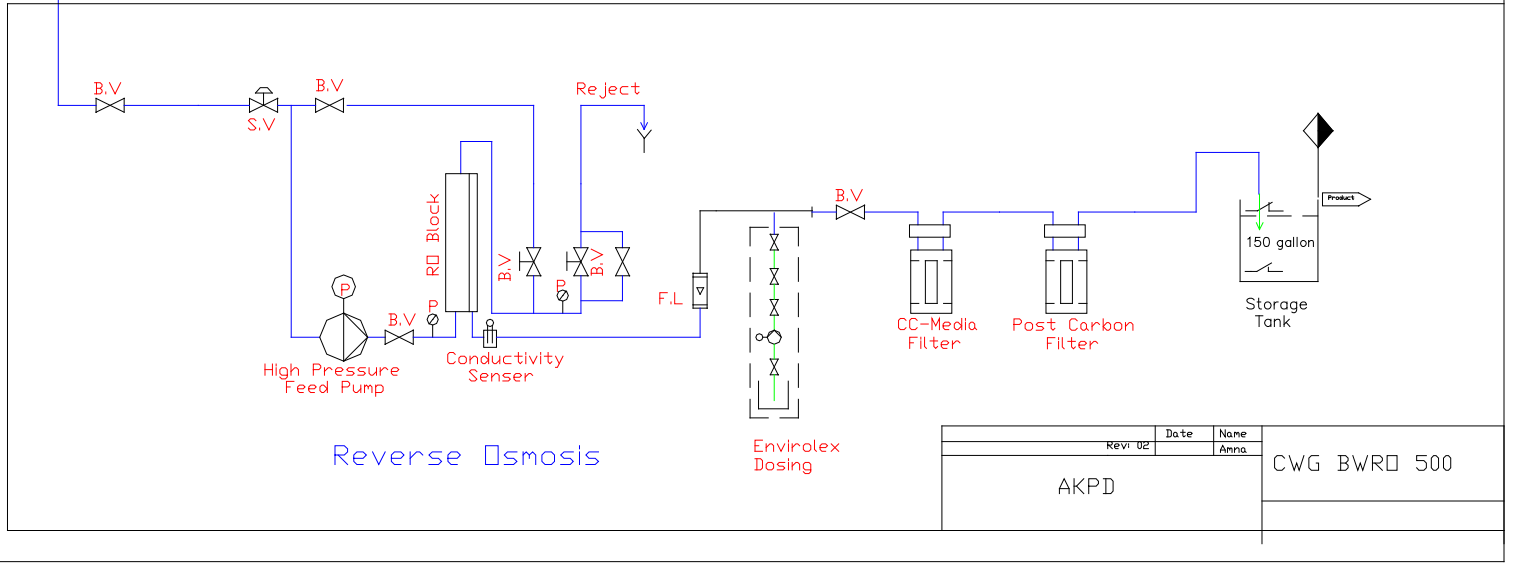
Ion	Raw water		Feed water		Permeate		Concentrate	
	mg/l	meq/l	mg/l	meq/l	mg/l	meq/l	mg/l	meq/l
Ca	78.0	3.9	78.0	3.9	1.065	0.1	129.3	6.4
Mg	86.0	7.1	86.0	7.1	1.175	0.1	142.6	11.7
Na	890.2	38.7	890.2	38.7	58.475	2.5	1444.7	62.8
K	7.0	0.2	7.0	0.2	0.566	0.0	11.3	0.3
NH4	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0
Ba	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.0
Sr	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.0
CO3	1.9	0.1	0.6	0.0	0.003	0.0	1.1	0.0
HCO3	201.0	3.3	194.3	3.2	39.239	0.6	297.7	4.9
SO4	278.0	5.8	285.3	5.9	4.839	0.1	472.2	9.8
Cl	1442.9	40.7	1442.9	40.7	69.572	2.0	2358.5	66.5
F	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0
NO3	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0
B	0.00		0.00		0.000		0.00	
SiO2	15.0		15.0		1.72		23.9	
TDS	3000.0		2999.3		176.7		4881.1	
pH	8.0		7.5		6.9		7.7	

	Raw water	Feed water	Concentrate
CaSO4 / Ksp * 100:	3%	3%	5%
SrSO4 / Ksp * 100:	0%	0%	0%
BaSO4 / Ksp * 100:	0%	0%	0%
SiO2 saturation:	11%	11%	17%
Langelier Saturation Index	0.56	0.04	0.60
Stiff & Davis Saturation Index	0.47	-0.05	0.40
Ionic strength	0.06	0.06	0.10
Osmotic pressure	2.1 bar	2.1 bar	3.4 bar

## PROCESS INSTRUMENT FLOW DIAGRAM



BP: Blending Point  
BV: Ball Valve  
SP: Sampling Port  
FL: Flowmeter  
◆ Battery Limit



Revi	02	Date	Name	
			Amna	
AKPD				CWG BWRD 500

### OPERATIONAL COST OF REVERSE OSMOSIS PLANT

Drinking Water 500 liter/hr

<b>1 THE POWER COST:</b>	
The permeate Capacity	0.5 m <sup>3</sup> /hr
The Power Consumption in one hour	2.2 kwh
The Power Consumption per m <sup>3</sup> of permeate	4.4 kw/m <sup>3</sup>
The Unit Price of Power per KW	8 Rs./hr
<b>The Power Cost per m<sup>3</sup> of Permeate</b>	<b>35.2 Rs./m<sup>3</sup></b>
<b>2 THE H<sub>2</sub>SO<sub>4</sub> COST:</b>	
The H <sub>2</sub> SO <sub>4</sub> dosage rate	0 mg/l
The Raw Water Flow Rate	1.3 m <sup>3</sup> /hr
The H <sub>2</sub> SO <sub>4</sub> Consumption per hour	0 gms/hr
The Unit Price of H <sub>2</sub> SO <sub>4</sub>	20 Rs./Kg
The Cost of Envi per hour	0 Rs./hr
<b>The H<sub>2</sub>SO<sub>4</sub> Cost per m<sup>3</sup> of permeate</b>	<b>0 Rs./m<sup>3</sup></b>
<b>3 The Biocide Cost:</b>	
The Biocide dosage Rate (once a day)	10 mg/l
The Biocide Consumption per day	13 gms/day
The Unit Price of Biocide	60 Rs./Kg.
The Cost of Biocide per day	0.78 Rs./day
The Permeate Production per day	12 m <sup>3</sup> /day
<b>The Biocide Cost per m<sup>3</sup> of permeate</b>	<b>0.065 Rs./m<sup>3</sup></b>
<b>4 The Antiscalant (OsmoDos AS) Cost:</b>	
The Antiscalant dosage rate	6 mg/l
The Antiscalant consumption per hour	7.8 gms/hr
The Unit Price of Antiscalant	450 Rs./kg
The Cost of Antiscalant per Hour	3.51 Rs./hr
<b>The Antiscalant Cost per m<sup>3</sup> of permeate</b>	<b>7.02 Rs./m<sup>3</sup></b>
<b>5 The Cost of PP Cartridges:</b>	
The total number of cartridges	4 pcs.
The unit price of cartridge(Average)	675 Rs./pc.
The total replacement cost	2700 Rs.
The approx. life of cartridges	1 months
The permeate production in 1 months	360 m <sup>3</sup>
<b>The Cost of Cartridge per m<sup>3</sup> of permeate</b>	<b>7.5 Rs./m<sup>3</sup></b>
<b>6 The Chemical Cleaning Cost:</b>	
The Cost of Chemicals for Cleaning of Membranes	15000 Rs./job
The frequency of the cleaning	4 times/year
The annual cleaning cost	60000 Rs./year
The permeate production per year	4320 m <sup>3</sup> /year
<b>The cleaning Cost per m<sup>3</sup> of permeate</b>	<b>13.8888889 Rs./m<sup>3</sup></b>
<b>7 The membranes Replacement Cost:</b>	
The number of membranes	3 pcs.
The approx. unit price of membrane	25000 Rs./pc.
The total replacement cost of membranes	75000 Rs.
The average life of membranes	3 years
The permeate production in 5 years	12960 m <sup>3</sup>
<b>The membrane Cost per m<sup>3</sup> of permeate</b>	<b>5.787037037 Rs./m<sup>3</sup></b>
<b>8 THE CAUSTIC (NaOH) COST:</b>	
The NaOH dosage rate	0 mg/l
The NaOH Consumption per hour	0 gms/hr
The Unit Price of NaOH	45 Rs./Kg
The Cost of NaOH per hour	0 Rs./hr
<b>The NaOH Cost per m<sup>3</sup> of permeate</b>	<b>0 Rs./m<sup>3</sup></b>
<b>THE OPERATIONAL COST OF ONE M3 OF RO PERMEATE</b>	<b>69.461 Rs./m<sup>3</sup></b>
<b>THE OPERATIONAL COST OF ONE Liter OF RO PERMEATE</b>	<b>0.069 Rs./Liter</b>

In Terms of Monthly Expenditure			
	RO Plant Capacity	500	liters per hour
	RO Plant Daily Operation Hours	8	hours
	Daily Production	4000	liters per day
	Total Monthly Production	120000	liters per month
	Per Liter Cost	0.069	Rs. / Liter
	<b>Total Monthly Expenditure</b>	<b>8,335</b>	<b>Rupees per month</b>



# Drinking Water Filtration System

***Capacity: 1500 Lits. Per Hour***

*Submitted By:*  
***CWG Water Technology Pakistan***



## Price of Drinking Water Filtration System

Rs. 295,000.00

Type: CWG FRF 3K, Capacity: 1500 lits./hr  
Complete with accessories as mentioned

### Terms & Conditions:

**Payment Terms** : 70% advance, & remaining 30 % at delivery.  
**GST** : above price is excluding GST which will be paid by client as per Govt. rules.

**Delivery** : 3 - 4weeks, after confirm PO and advance.

**Inclusions** : following is the scope of work of CWG

- Design, manufacturing etc. of the subject system using brand new components as mentioned in technical details.
- Supply of system at **Site** Installation & commissioning of the system.
- Training of allocated person for operation & maintenance of system
- One year after sales technical backup services

**Warranty** : System is warranted for **six months** in workmanship & materials as per standard terms & conditions of CWG Water Technology Pakistan.

We hope that our proposal will be considered attractive fulfilling your requirement. However, if you feel the need of any further clarification or information, please feel free to contact us.

With true regards,

**CWG Water Technology Pakistan**

### **Germany**

[Besselstrasse.21 68219 Mannheim, Germany](http://www.cwggmbh.de)  
Internet: <http://www.cwggmbh.de>  
e-mail: [info@cwggmbh.de](mailto:info@cwggmbh.de)

### **Head Office**

[Wahdat Road, Multan, Chungi, Lahore-Pakistan](http://www.cwg.com.pk)  
Tel: 92-42-5435325-27 Fax: 92-42-5435328  
e-mail: [info@cwg.com.pk](mailto:info@cwg.com.pk) <http://www.cwg.com.pk>

### **Branch Office**

[1-B, Plot # 1-C, Street # 2, Badar Commercial](http://www.cwg.com.pk)  
Phase 5, Ext. Karachi Tel: 92-21-5245385  
Fax: 92-21-5245386 E-[info@cwg.com.pk](mailto:info@cwg.com.pk)



## TECHNICAL DETAILS AND BILL OF QUANTITIES

### Design Basis:

Product Flow Rate, Max.	: 1500 lits./hr
Raw Water Flow Rate	: 1500 m <sup>3</sup> /hr
Raw Water TDS	: 550 max.

### **Raw Water Specifications**

Total Colony Count	: 855cfu/ml
Total Coliforms	: 300 C/100 ml
Fecal E. Coli	: 300 C/100 ml
Fecal Enterococci	: 300 C/100 ml

### **Product Water Specifications**

Total Colony Count	: <100 cfu/ml
Total Coliforms	: 0 cfu/100 ml
Fecal E. Coli	: Nil
Fecal Enterococci	: Nil
HCP	: < 50 cfu/ml

### Technical Specifications:

Model of Drinking Water filtration System	: CWG FRF 1.5K
Product Flow Rate	: 1500 lits./hr
Operating Hours	: 12
Current, V/Hz	: 220/50
Pipe Connections, inches	: 3/4"

### *The system includes the following bill of quantity:*

1. **Raw Water pump** 01 unit
  - o To pressurized the raw water upto 3 bars
  - o Horizontal multistage pump
  - o Make: Grundfos/Lowara ( Refurbished)
  - o Power Rating: 1.25 KW
  
2. **Anthracite Filtration Unit, which includes;**
  - Fiberglass Vessel, Q2166, make: Clack USA/ Eq 01 Unit
  - o Filtration Media, Anthracite, make: CWG Germany 01 Filling
  - o Multiport Valve, Top Mounted 01 Unit
  - o Necessary Piping & fittings etc. 01 Lot
  
3. **Activated carbon filtration Unit, which includes;**
  - o Fiberglass Vessel, Q2166, make: Clack USA/ Eq 01 Unit
  - o Filtration Media, Activated Carbon, make: CWG Germany 01 Filling
  - o Multiport Valve, Top Mounted 01 Unit
  - o Necessary Piping & fittings etc. 01 Lot





4. **Jumbo 5- $\mu$ , 20" Prefilter Cartridge Unit**, which includes;
- o Transparent Housing with connections, make: SEKO Italy 01 Unit
  - o 100% PPF cartridge, 20", 5-microns, made: CWG Germany 01 Unit
5. **UV Sterilization Unit:**  
 Ultra-violet Sterilization unit is designed to remove all the bacterial contamination present in raw water.
- |              |                           |
|--------------|---------------------------|
| Quantity     | : One                     |
| UV Lamp      | : Philips/ Firstlight-USA |
| UV lamp      | : 45 watt                 |
| Housing      | : SS-316 (Skid mounted)   |
| Manufacturer | : CWG Germany             |
6. **Envirolex Dosing Station Unit:**  
 Envirolex is a proven European technology to remove and to prevent from harmful bacterial growth. This unit is included to ensure that bacteria will not grow again in system lines and in storage vessels.
- |             |                  |
|-------------|------------------|
| Quantity    | : One            |
| Dosing Pump | : Etatron- Italy |
| Dosing Tank | : PE- &5 liters  |
7. **Post Absolute Cartridge Filter**, which includes;
- o Transparent Housing with connections, make: SEKO Italy 01 Unit
  - o 100% PE cartridge, 20", 0.2-microns, made: CWG Germany 01 Unit
8. **Post CTO Filter**, which includes;  
 to rectify the color, taste and smell of water
- o Transparent Housing with brass connections, make: SEKO Italy 01 Unit
  - o 100% PPF cartridge, 20", 5-microns, made: CWG Germany 01 Unit
- **Other Features of System**
    - All above mentioned equipment is mounted on corrosion proof mild steel skid.
    - Electrical control panel
    - Pressure Indicators
    - PVC piping & fittings, Sch# 80, make: Hydroseal- Australia
    - Raw water level switch.

***The system is preassembled & ready for connections.  
 Technical Changes are reserved to optimize the performance.***

***All Sales are subject to CWG standard terms & conditions.  
 CWG's Sales Tax Certificate No. 03-02-2900-017-64***



## **Terms & Condition**

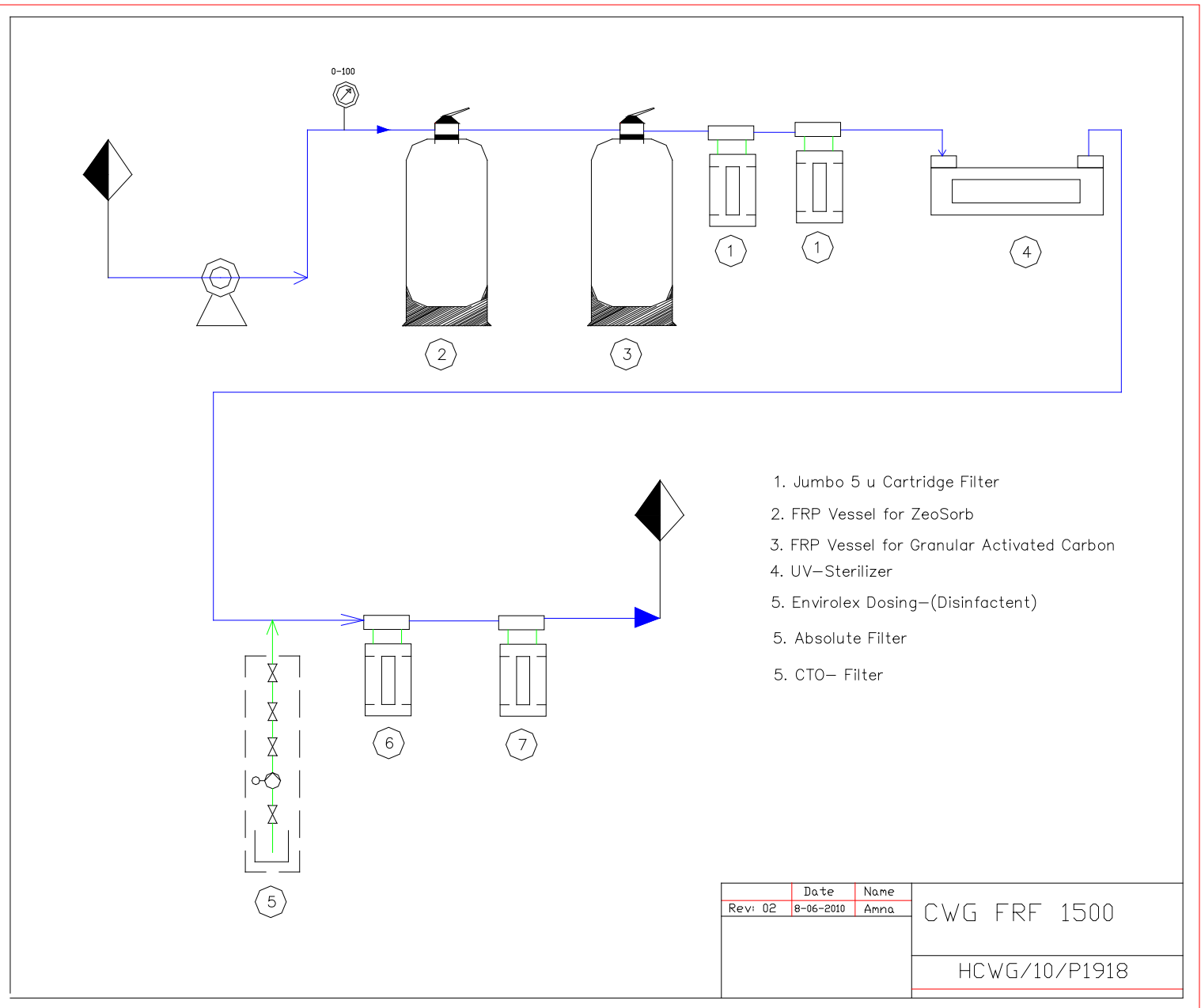
### **Responsibilities of CWG:**

- Providing the plant Hardware (friendly to use) as indicated in Submitted Technical Details.
- The Supervision of Installation & Commissioning of the Plant.
- After sales technical backup services free of cost for four months (one visit per month) excluding of replacement consumables.
- Training of assigned persons.
- First fill of chemicals for system at start up of system.

### **Responsibilities of Client:** Client will be responsible for the followings:

- Building works
- Hydraulic and Electric connections
- Raw & product water storages. (if needed)
- Civil works relating to R.C.C foundation, Drain lines.
- Disposal of drain to sewer
- Power supply at 220V, 3-phase, 50Hz
- Any required item or service not specified or included in our offer.

### Process Flow Diagram



### OPERATIONAL COST OF FILTRATION PLANT

CAPACITY: 1500 liters per hour

<b>1 THE POWER COST:</b>	
The Product Capacity	3 m3/hr
The Power Consumption in one hour	1.5 kwh
The Power Consumption per m3 of permeate	0.5 kw/m3
The Unit Price of Power per KW	9 Rs./hr
<b>The Power Cost per m3 of Permeate</b>	<b>4.5 Rs./m3</b>
<b>2 THE H2SO4 COST: not applicable in this case</b>	
The H2SO4 dosage rate	0 mg/l
The Raw Water Flow Rate	3 m3/hr
The H2SO4 Consumption per hour	0 gms/hr
The Unit Price of H2SO4	10 Rs./Kg
The Cost of Envi per hour	0 Rs./hr
<b>The H2SO4 Cost per m3 of permeate</b>	<b>0 Rs./m3</b>
<b>3 The Envirolex Cost:</b>	
The Envirolex dosage Rate (once a day)	25 mg/l
The Envirolex Consumption per day	75 gms/day
The Unit Price of Envirolex	85 Rs./Kg.
The Cost of Envirolex per day	4.875 Rs./day
The Permeate Production per day	36 m3/day
<b>The Envirolex Cost per m3 of permeate</b>	<b>0.135416667 Rs./m3</b>
<b>4 The Antiscalant (OsmoDos AS) Cost: not applicable in this case</b>	
The Antiscalant dosage rate	0 mg/l
The Antiscalant consumption per hour	0 gms/hr
The Unit Price of Antiscalant	450 Rs./kg
The Cost of Antiscalant per Hour	0 Rs./hr
<b>The Antiscalant Cost per m3 of permeate</b>	<b>0 Rs./m3</b>
<b>5 The Cost of Cartridges + CC Media + CTO:</b>	
The total number of cartridges	3 pcs.
The unit price of cartridge(Average)	4000 Rs./pc.
The total replacement cost	12000 Rs.
The approx. life of cartridges	1.5 months
The permeate production in 2 months	3240 m3
<b>The Cost of Cartridge per m3 of permeate</b>	<b>3.703703704 Rs./m3</b>
<b>6 The Chemical Cleaning Cost:</b>	
The Cost of Chemicals for Cleaning of Membranes	0 Rs./job
The frequency of the cleaning	3 times/year
The annual cleaning cost	0 Rs./year
The permeate production per year	25920 m3/year
<b>The cleaning Cost per m3 of permeate</b>	<b>0 Rs./m3</b>
<b>7 The membranes Replacement Cost:</b>	
The number of membranes	0 pcs.
The approx. unit price of membrane	22000 Rs./pc.
The total replacement cost of membranes	0 Rs.
The average life of membranes	5 years
The permeate production in 5 years	129600 m3
<b>The membrane Cost per m3 of permeate</b>	<b>0 Rs./m3</b>
<b>8 THE CAUSTIC (NaOH) COST:</b>	
The NaOH dosage rate	0 mg/l
The NaOH Consumption per hour	0 gms/hr
The Unit Price of NaOH	45 Rs./Kg
The Cost of NaOH per hour	0 Rs./hr
<b>The NaOH Cost per m3 of permeate</b>	<b>0 Rs./m3</b>
<b>THE OPERATIONAL COST OF ONE M3 OF Product</b>	<b>8.339 Rs./m3</b>
<b>THE OPERATIONAL COST OF ONE Liter OF Product</b>	<b>0.008 Rs./Liter</b>

In Terms of Monthly Expenditure			
	Plant Capacity	1500	liters per hour
	Plant Daily Operation Hours	8	hours
	Daily Production	12000	liters per day
	Total Monthly Production	360000	liters per month
	Per Liter Cost	0.008	Rs. / Liter
	<b>Total Monthly Expenditure</b>	<b>3,002</b>	<b>Rupees per month</b>