

**BHEL : BAP:RANIPET**  
**CIVIL PROJECTS & SERVICES**

(Reference drawing No : 1 -SW-220-00226 (Rev-03) progressive print dt:09.02.09)

**Part I:** Engineering Consultancy services for **PIPAVAV 700MW** Desalination-Civil works.

Sl No.	Description	Unit (nos.)	Amount
01	Structural steel construction with color coated metal sheeting as roof for RO Building with Equipment foundation, trenches and facilities to fix 5 T capacity EOT crane and other facilities. The approximate size 42 m x 30 m x 7 m clear height.	1 No	
02	Structural steel construction with color coated metal sheeting of covered area with flooring, trenches & foundations for filters, pumps and other equipments (8 numbers of vertical filters-3.5 m dia, 4.50 meters height, 55 ton each and 2 nos. of pumps, with associated trenches and 2 Nos. of blowers etc.). The approximate size of the building will be 42 m x 18 m x 7 m clear ht.	1 set	
03	Acid resistant tiled platform of size 22 x 10 m for pump foundation and finished floor with side parapet for bulk storage tanks of Acid (25 M <sup>3</sup> ), Alkali and Ferric chloride (10 M <sup>3</sup> ) outside the RO building <b>open to sky</b> (entire area to be covered with acid resistant tiles), pedestal height for tanks are at +3.00m elevation. Foundation for unloading pumps (6 Nos.).	1 No	
04	RCC Back wash water tank of size 15 m x 11 m x 4 m height top covered with inside protection coating., (600 Cu.m. usable volume above ground), (suitable for sea water storage )	1 No	
05	RCC twin compartment neutralizing pit of size 10m x 5m x 2.5m height. 50 Cu.m. each usable volume, below ground (Acid / Alkali resistant tiles lined) and foundation for pumps	1 No	
06	RCC chemical storage room of size 5 x 5.5 x 4 m (adjacent to RO building with chemical resistant tiles).	1 No	
07	RCC LTMCC room (Adjacent to RO Building) –Switch gear room of size 23.5 m x 6.5 m x 4 m height. (First floor)	1 No	
08	RCC PLC room (Adjacent to RO Building - to be air conditioned) of size 6 m x 11.5m x 4 m height. (First floor)	1 No	
09	RCC cable spreader room with trench of size 30m x 6.5m x 3 m (Below LTMCC & PLC)	1 No	
10	RCC office room (Adjacent to RO Building) of size 8 m x 4 m x 5m height.	1 No	

11	RCC laboratory of size 6 m x 4.5 m x 3 m height. (Adjacent to RO Building) with working table and shelves top lined with acid resistant tiles.(room to be air conditioned)	1 No	
12	RCC dosing system area of 17.5m x 10.5 m x 5 m has to be lined with acid resistant tiles, trenches & Foundation etc., (Adjacent to the filter shed).	1 No	
13	RCC degassed water storage tank 60 Cu.m. of size 6m x 7.5m x 2 m height having base at 5m elevation, foundation for 6 Nos of blowers & 3 degasser each dia 2m, 5 M.T weight.. at 7 m elevation will have to be made Above the tank.	1 No	
14	RCC membrane store of size 5 x 5.5m x 4m ht.	1 No	
15	RCC CDT, AMT & CC System Room of size 16m x 5.5m x 4m with trenches, floor & side wall protection with acid/ alkali resistant tiles.	1 No	
16	RCC building of size 30.5 x 8 x 5 m to have Chemical cleaning system, MB Blower area, BWRO Feed pump etc	1 No	
17	Road crossing culverts – 6 Nos. (each 2m x 2m: Length~10m)  External trenches 1.5m x 1m ; 250 metres	1 Lot	
18	Estimation for Lighting, Ventilation, Air- conditioning and other utilities as per tender requirements.	1 Lot	

**Note:**

1. Consultant has to incorporate the technical specification requirements in the drawings.
2. Consultant has to incorporate all the changes / corrections indicated by the customer approved consultant till the final approval and distribution.
3. Consultant has to follow all the relevant BIS codes for designing the buildings and tanks.
4. Consultant shall have to issue the working drawings, which is understandable by the construction site personnel.
5. Preliminary BOQ shall have to be furnished for above facility for tendering purpose.
6. For the approval of Design & Drawings from customer / customer consultant, the designer may have to visit their office for direct interaction / across the table approval etc. Expenses towards journey, boarding & lodging are to be borne by the consultant.
7. Customer site is at Pipavav village, Tal: Rajula, dist: Amreli, state: Gujarat  
Customer consultant office–
8. All drawings can be sent as soft copy to BHEL, which is to be submitted for customer approval.
9. Final approved drawings should be sent for distribution in hard copy by the consultant (8 Copies).

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**Part II:** Engineering Consultancy services for **Pragati** Desalination-Civil works.

Ref: RO-DM plant lay out Drawing: (1 -BW-220-00222, Rev-00 )

Sl No.	Description	Unit (nos.)	Amount
01	RCC RO-DM building with equipment foundation and trenches, provision to fix two number of 1 T mono rail with hoist, acid resistant tiling for selected area, two storied office buildings for lab facilities, air conditioned PLC room, office room,LTMCC, chemical storage room etc as per tender requirements are to be considered. The approximate size of the building is 46 m x 40 m x 6 m clear height (excluding plinth protection dimension) including two storied building area of 40m x 8m with a clear height of 4m each floor) on either side as per our layout drawing. <b><u>Refer to Note no.9 given at the end.</u></b>	1No	
02	FDN platform open to sky accommodate four nos. of bulk chemical storage tanks. (two tanks of 28 ton each and two tanks of 3 tons each), two pedestals for each tank. The approximate size of the platform is 14m x 8m and the complete area to be lined with acid resistant tiles.	1 no.	
03	RCC waste water sump below ground with top cover, to store RO plant waste water. Top cover to accommodate two vertical pumps. The approximate size of the sump shall be 10m x 7m x 3.0m. 200 Cu.m capacity.	1 No	
04	RCC UF permeate water storage tank, twin compartment above ground (top covered) with a nett storage capacity of each150Cu.m.approximate size is 12 mx9 mx3 m	1 No	
05	Pump house with shade to accommodate 6 nos. of acid and alkali unloading / transfer/recirculation pumps with foundation. The approximate size of the building will be around 8m x 4m x 4m.	1No	
06	RCC degassed water storage tank, above ground level-top covered. The approximate size of the tank will be 10m x 4m x 2.5m ht. (two compartments of 50 Cu.m. each).	1No	
07	RCC Neutralizing pit with provision to fix standard accessories like agitators, vertical pumps etc. below ground– open tank. The approximate size of the tank shall be 10m x 5m x 2.5m depth (twin compartment each of 90 Cu.m. net capacity). Entire area of the pit is to be covered with acid resistant tiles.	1No	

SI No.	Description	Unit (nos.)	Amount
08	RCC foundation to place two MS tanks each of 700 cu.m. nett storage capacity, with epoxy coat to handle ultra permeate water. Dia of the MS tank will be around 10.5m and the total load on each foundation will be around 800 tons.	1No	
09	RCC foundation to place two DM water storage tanks each of 600 Cu.m. nett storage capacity with epoxy coating to handle DM water. Dia of DM water storage tank will be around 10.5m and the total load on each foundation will be around 700 tons.	2 No.	
10	RCC Brine sump below ground with top cover, to store RO reject. Top cover to accommodate two vertical pumps. The approximate size of the sump shall be 6m x 5m x 2.0m. 50 Cu.m capacity.  Top cover accommodate Toilet with approximate size of 4mx3m	1 No	
11	RCC foundation for all the equipment indicated inside the RO DM building in our Equipment Layout drawing.	1Lot for all equipment shown in side the RO-DM building	
12	Chemical store room to accommodate three No's of FRP tanks of 10 Cu.m each capacity, size 9mx5mx4m	1 No.	
13	RCC Chemical store room on top of waste water sump. The sizes of the building will be around 7mx5mx5 with shelves on the side wall	1 No.	
14	External cable / pipe trenches and drain channels with RCC cover slab.	1Lot	

**Note:**

1. All of the technical specification requirements specified in the Tender document of PPCL should be considered for the design.
2. All the general requirements such as approach roads, street lighting, etc are to be covered in the civil design.
3. Two compound epoxy coating suitable for brackish water for inside surface of all the tanks coming in contact with brackish water.
4. Necessary level gauges, GRP nozzles, etc., for tanks.
5. Consultant has to incorporate all the changes / corrections indicated by the customer approved consultant till the final approval and distribution.
6. Consultant has to follow all the relevant BIS codes for designing the buildings and tanks.
7. Preliminary BOQ shall have to be furnished for above facility for tendering purpose.
8. For the approval of Design & Drawings from customer / customer consultant, the designer may have to visit their office for direct interaction / across the table approval etc. Expenses towards journey, boarding & lodging are to be borne by the consultant.
9. Customer site is at Pipavav village, Tal: Rajula, dist: Amreli, state: Gujarat  
Customer consultant office–

10. All drawings can be sent as soft copy to BHEL, which is to be submitted for customer approval.
11. Final approved drawings should be sent for distribution in hard copy by the consultant (8 Copies).
12. Adjacent to the UF & RO & DM Plant building, two RCC buildings are proposed on either side. These buildings will be of two storeyed.

In one building, the ground floor will be used as a Cable spread room for RO DM Plant PLC and LTMCC and for Lab room. The first floor of the same building will house all the facilities in the scope of BAP, such as PLC room, LTMCC room and office.

In the second building, Ground floor will have a separate Chemical storage room (8m x 6m), dosing equipments and pump room. First floor is completely earmarked for the use of PPCL as per the tender spec.

**PPCL tender requirements is reproduced below.**

**The first floor of the building to house AC equipment, toilet block and 150 sqm space (excluding corridor/walkway) to accommodate Water Analysis Lab, Resin store room, Office, Oil Analysis room; Pollution control Lab, Instrument Labs, resin testing room etc. This area is to be air-conditioned. This building requires partitioning to house various rooms and such requirements to be decided / finalized during detailed engg.**

**BHEL:BAP:RANIPET**

**CIVIL PROJECTS & SERVICES**

**Part III:** Engineering Consultancy services for North Chennai #1 & 2 Desalination -Civil works.

Ref. drawing: **Plant Equipment Layout** (Dwg no: 1-BW-220-00241, Rev:01)

Sl No.	Description	Unit (nos.)	Amount
01	Structural steel construction with colour coated metal sheeting as roof for RO Building with Equipment foundation, trenches and facilities to fix Monorail of 2 T capacity and other facilities. (3 RO Skids, 3 UF skids, 3 sets of SAC, SBA & MB of each 1.5 m dia, 10 MT each vessel.). The approximate size 40 m x 24 m x 6 m clear height. For SAC, SBA & MB area (24 m x 10 m) clear ht will be 7 metres.	1 set	
02	Structural steel construction with colour coated metal sheeting as roof for building to house Filters with accessories (6 numbers of PSFs-3.0 m dia, 3.7 metres S.L., 30 ton each and 3 nos. of backwash pumps, with associated trenches. The approximate size of the building will be 24 m x 17 m x 7 m clear ht.	1 set	
03	RCC above ground, top covered Filtered water cum Back wash water tank of size 15 m x 12 m x ~3 m ht Twin compartment each 200 cu.m net storage capacity.	1 No	
04	RCC above ground, top covered UF Break tank of size 9 m x 9 m x ~3 m ht Twin compartment each 100 cu.m net storage capacity.	1 No	
05	RCC pump house to accommodate 11 nos. of horizontal pumps, with associated trenches, foundations, supports, etc of size 10 m x 9 m x 4 m clear ht (in between UF break tanks and Permeate water tank)	1 No	
06	RCC above ground, top covered Permeate water storage tank of size 12 m x 9 m x ~3 m ht Twin compartment each 150 cu.m nett storage capacity. The roof should support 3 Nos of degasser and blowers of each 3 MT weight.	1 No	
07	RCC chemical storage room. (Adjacent to RO Building) with Chemical resistant tiles of size 6 m x 6 m x 5 m ht.	1No	
08	RCC LTMCC room (Adjacent to RO Building) –Switch gear room of size 23 m x 6 m x 4 m height. (First floor)	1No	
09	RCC PLC room (Adjacent to RO Building - to be air conditioned) of size 6 m x 6m x 4 m height. (First floor)	1No	

SI No.	Description	Unit (nos.)	Amount
10	RCC cable spreader room with trench of size 30m x 6m x 3 m(Below LTMCC & PLC)	1No	
11	RCC office room (Adjacent to RO Building) of 6 m x 5 m x 4 m height.	1No	
12	RCC laboratory (Adjacent to RO Building) with conventional tiled working table and shelves. ( to be air-conditioned ) of size 6 m x 5 m x 4 m height.	1 No	
13	RCC dosing system room of 17m x 10 m x 5 m has to be lined with acid resistant tiles, trenches & Foundation etc., (Adjacent to the filter shed).	1 No	
14	RCC CDT, AMT & CC System Room with trenches, floor & side wall protection with acid/ alkali resistant tiles of size 30m x 6m x 5m	1 No	
15	External trenches 1.5m x 1m ; 250 Metres	1 Lot	
16	Estimation for Lighting, Ventilation, Air- conditioning and other utilities as per tender requirements.	1 Lot	

**Note:**

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