

**TAMILNADU WATER SUPPLY AND DRAINAGE BOARD  
EASTERN REGION, 37, M C ROAD, EASWARI NAGAR  
THANJAVUR-613 004**



## **BILL OF QUANTITY**

NAME OF THE WORK : Designing, providing, constructing, erection and commissioning, startup and performance run followed by 5 years of O&M of 4.16 mld capacity Sewage Treatment Plant (STP) with Activated Sludge Process or modified Activated Sludge process at Ariyalur Municipality of Ariyalur District in Tamil Nadu on DBOT Basis.

**LAST DATE OF SUBMISSION; UP TO 3.00PM on 07.07. 2010**

## **ACTIVITY SCHEDULE**

### **General**

The price schedule given here is broadly for the following works:

- Civil Works
- Electrical & Mechanical Works
- Performance Trial Run (6 months )
- Operation, maintenance & monitoring Works. (5 Years)

Each item in the price Schedule of Activities shall be individually priced in ink and the same shall be added up to the Bid Cost. No column in the price Schedule shall be left blank. The price quoted by the Bidder must allow for all works as per the detailed specifications and for all contractual obligations whether separately specified or not.

The rates and prices in the price Schedule shall, except in cases separately provided for, be deemed to cover all the contractual obligations under this contract.

### **2 Civil Works**

The Civil works shall include all the works indicated in the Scope of Work and Technical Specifications given in Volume I & II. Any additional item if required from process point of view and for better performance of the plant shall be considered while quoting offer.

All items under Civil works are inclusive of all excavation in any type of strata at required depth, including dewatering of Sub-soil Water for Concreting and other works, refilling the sides of excavation after construction of structure, disposing of surplus soil etc. complete as detailed in Volume I & II and as directed by the Engineer in Charge.

All items of Piping works for STP shall be inclusive of excavation in any type of strata, including supply, laying, jointing and testing of all pipelines, specials, valves, all types of labour, construction of sewer appurtenances and valve chambers, pipe support pedestals complete in all respects as detailed in Volume I & II and as directed by Engineer-in-charge.

### **3 Electrical, Mechanical and Instrumentation works**

The scope of work under the contract shall include all the work indicated in the Scope of Work and bid document given in Volume I & II.

### **4 Performance Run, Operation, Maintenance & Monitoring Works**

The scope of work under the contract shall include all the work as specified in the Scope of Work and bid document given in Volume I & II.

In the initial years, the sewage flow into the STP is likely to be less than the design flow. Hence the performance of STP in terms of chemical and power consumption can not be assessed for the design capacity, In such case , at the end of trial run period the employer shall assess the power consumption and chemical consumption for the designed capacity on the basis of guaranteed power and chemical consumption /mld given by the bidder. If there is any variation between the actual consumption and the guaranteed consumption, the difference in cost of power and chemical consumption shall be calculated for a period of 5 years and a recovery shall be effected for the amount from the final bill for capital works.

## 5 Cost Break Up

As the bid is a lump sum price, the bidder shall give break up for various units for the total cost quoted in Schedule A (see Table 1 below) to facilitate the unit wise payments. Cost of an individual unit shall be worked out on the basis of the stipulated percentage and agreed cost of the work. The percent value stipulated for the unit is for completion of the entire work related to the unit as per detailed specifications and requirements mentioned in the bid document and overall requirement for successful commissioning and operation of the plant in accordance with applicable requirements. In case any addition or deletion in these unit items takes place after designs are approved for the unit, the actual cost for the purpose of payment will be worked out on the basis of quantities as per the approved drawings and prevailing schedule of rates in being adopted by the employer. If the work of a unit is deleted by the employer from the scope of contract before approval of the detailed drawings, the cost of such deleted unit will be decided on the basis of the stipulated percentages in Table.1 to be furnished by the bidder.

It shall be explicitly noted by the bidders that the tables given below shall be referred only for facilitating the payments to the contractor and shall not be any way referred to, for defining and restricting the scope of work under the contract.

**TABLE – 1: Activity Schedule**

SI. No	Unit and Stage of Construction	% of finalized cost
I	<b>Process and Hydraulic Design and Detailed Engineering</b>	
a)	Submission and acceptance of detailed designs, drawings and estimates.	
b)	Hydraulic process design and layout of the plant.	
c)	Structural design and construction drawing for primary units.	
d)	Structural design and construction drawing for secondary units.	
e)	Structural design and construction drawing for sludge handling, treatment arrangements unit and auxiliary units.	
II.	Submission and acceptance of detailed Environmental Assessment Report.	
III.	Construction of the following I components of the plant	
1	Receiving Chamber	
	Civil	
2	Screen Chamber	
A	Civil	
B	Mechanical including	
	Screens	

3	Grit Chamber and Parshall Flume	
A	Civil	
B	Mechanical including	
	Grit Mechanism with all associated accessories	
4	Distribution Box and Bypass arrangement	
	Civil	
5	Primary and Secondary Treatment units( Each unit to be specified by the bidder for civil , Mechanical & electrical works	
6	Chlorination Tank / Chlorination House	
A	Civil	
B	Mechanical including	
	Chlorinator with all accessories	
7	Sludge Sump and Pump House	
A	Civil	
B	Mechanical including	
	Sludge Sump Blowers and Air Grid	
	Centrifuge Feed Pumps	
8	Centrifuge House	
A	Civil	
B	Mechanical including	
	Dewatering Polymer Dosing System	
	Centrifuge	
9	Administrative Building including Furniture and Laboratory Equipments	
	Civil	
10	Internal Roads, Pathways, Pavements, Storm water	
	Civil	
11	Site Clearance, Disposal/ Plot Development – Landscaping etc.	
	Civil	
12	Electrical Works including ( Bidder to specify various units)	
13	Others if any	

### 1- Chemicals

The bidder should list the chemical consumption & the approximate (+/-10%) delivered rate of the chemicals at the project site to be used by them for the STP.

This information is to be used for evaluating the bids.

Chemical / Utilities	Units	Delivered Rate in Rs. / Unit	Daily Consumption	Total cost for design capacity	Total cost per mld
Gas Chlorine	Kg/day/mld				
Dewatering Polyelectrolyte	Kg/day/mld				

Cost of chemical for design capacity =

Cost of chemical per mld =

## 2-Electric Load List

1 S No	2 Drive For	3 Total Nos	4 Nos Operat ing	5 Nos Stand by	6 Operat ing Hours / day	7 Drive Rat ing KW	8 Operat ing Power kWh/ day	9 Guaran -teed Consum -ed Power KWh/day	10 Guaran -teed Consumed Power per mld KWh/day
1.	Screening								
2.	De- gritting								
3.	Aeration								
4.	Sludge Pumping								
5.	Sludge Treatment								
6									
7									
8									
9	Others etc								

### For sewage Treatment

Total connected Power, kW \_\_\_\_\_

Total operating power, kw \_\_\_\_\_

Total Consumed Power KWh/day /3.90 mld

Total Consumed Power KWh/day /mld \_\_\_\_\_

Note: (i) Since the flow of sewage will be minimum in the initial period, the bidder is requested to furnish the power consumption per mld

(ii) If an arithmetical error is found in Power consumption calculation, the same will be corrected in accordance with ITB Clause 27.

The contractor shall submit the running bills to the engineer in charge at the rate of one (1) RA bill per month.

Being a lump sum contract, the payments through RA Bills will be made to the contractor on the basis of stage wise break-up of payment. The stage wise payment of different units is specified in Table 2.0 and Table 3.0. A part of work will become eligible for payment as per the percentage to be furnished by the bidder in Table 2 only on completion of particular stage of work. Intermediate payments on prorated basis or as per actual measurements shall not be made

**Table-2: PAYMENT SCHEDULE FOR CIVIL WORKS**

S. No.	Unit and Stage of Construction	% of Cost of Unit
I	<b>Process and Hydraulic Design and Detailed Engineering</b>	
a)	Submission and acceptance of detailed designs, drawings and estimates.	
b)	Hydraulic process design and layout of the plant.	
c)	Structural design and construction drawing for primary units.	
d)	Structural design and construction drawing for secondary units.	
e)	Structural design and construction drawing for sludge handling, treatment arrangements unit and auxiliary units.	
II.	Submission and acceptance of detailed Environmental Assessment Report.	
III.	Construction of the following I components of the plant	
<b>1</b>	<b>Receiving Chamber</b>	
	Approval of Design and Drawings	
	Excavation	
	Entire Completion of Civil Works	
	Successful Hydraulic Testing and Commissioning	
	Consistent Performance of the Plant	
<b>2</b>	<b>Screen Chamber</b>	
	Approval of Design and Drawings	
	Excavation	
	Concreting of Raft	
	Concreting of Walls (1/2 height)	
	Concreting of Walls (full height)	
	Entire Completion of Civil Works	
	Successful Hydraulic Testing and Commissioning	
	Consistent Performance of the Plant	
<b>3</b>	<b>Grit Chamber and Parshall Flume</b>	
	Approval of Design and Drawings	
	Excavation	
	Concreting of Raft	
	Concreting of Walls (1/2 height)	
	Concreting of Walls (full height)	

	Entire Completion of Civil Works	
	Successful Hydraulic Testing and Commissioning	
	Consistent Performance of the Plant	
<b>4</b>	<b>Distribution Box and Bypass arrangement</b>	
<b>5</b>	<b>Primary &amp; Secondary Treatment units</b>	
	Approval of Design and Drawings	
	Excavation	
	Concreting of Foundation	
	Concreting of Walls (1/2 height)	
	Concreting of Walls (full height)	
	Entire Completion of Civil Works	
	Successful Hydraulic Testing and Commissioning	
	Consistent Performance of the Plant	
<b>6</b>	<b>Chlorination Tank</b>	
	Approval of Design and Drawings	
	Excavation	
	Concreting of Foundation	
	Concreting of Walls (1/2 height)	
	Concreting of Walls (full height)	
	Entire Completion of Civil Works	
	Successful Hydraulic Testing and Commissioning	
	Consistent Performance of the Plant	
<b>7</b>	<b>Sludge Sump and Pump House</b>	
	Approval of Design and Drawings	
	Excavation	
	Concreting of Foundation	
	Concreting of Walls (1/2 height)	
	Concreting of Walls (full height)	
	Entire Completion of Civil Works	
	Successful Hydraulic Testing and Commissioning	
	Consistent Performance of the Plant	
<b>8</b>	<b>Centrifuge House</b>	
	Approval of Design and Drawings	
	Excavation	
	RCC Framed Structure	
	Entire Completion of Civil Works	
<b>9</b>	<b>Administrative Building including Furniture and Laboratory Equipments</b>	
	Approval of Design and Drawings	
	Excavation	
	RCC Framed Structure	
	BBM and Plastering	
	Entire Completion of Civil Works	
<b>10</b>	<b>Internal Roads, Pathways, Pavements, Storm water drainage</b>	
	Approval of Design and Drawings	
	Preparation of Road Structure	
	Laying of Storm Water drains	
	Construction of Pavements	
	Entire Completion of Works	
<b>11</b>	<b>Misc. Civil works like Fencing/, Entry Gate,</b>	

	Approval of Design and Drawings	
	Entire Completion of Works	
12	<b>Site Clearance, Disposal/ Plot Development – Landscaping etc.</b>	
	Approval of Design and Drawings	
	Entire Completion of Works	
13	<b>Electrical Works including ( Bidder to specify various units)</b>	
14.	Others if any	

**TABLE-3**

**Trial run and Performance Period  
Summary of Fixed and Variable  
payments**

**ABSTRACT**

SI No.	Trial run and Performance period	O & M Cost in Rs.		
		Fixed (A)	Variable (B)	Total (A +B )

1. Performance Trial run 6 months

**(A). FIXED COST**

SI No.	Trial run and Performance period	Man Power (in Rs.)	Total Cost (in Rs.)
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Furnish category wise  
breakup

1. Performance Trial run 6 months

**(B). VARIABLE COST**

SI No.	Trial run and Performance period	Chemicals and other Consumables cost in Rs.		
		Unit cost	Estimates flow MLD	Total Cost

1. Performance Trial run 6 months 0.75 mld

Note : During the trial run of 6 months, the variable cost and fixed cost shall be paid by the employer.

**OPERATION AND MAINTENANCE COST SUMMARY OF FIXED  
AND VARIABLE PAYMENTS**

ABSTRACT

Sl. No.	O&M Period	O&M Cost (In Rs.)		
		Fixed (A)	Variable (B)	Total (A+B)
1	1 <sup>st</sup> year			
2	2 <sup>nd</sup> year			
3	3 <sup>rd</sup> year			
4	4th year			
5	5th year			
	<b>Grand Total</b>			

**(A) Fixed Cost**

Sl. No.	O&M Period	*Manpower (In Rs.)	Maintenance works including Civil, Mechanical	Maintenance of Office etc. (In Rs.)	All repairs including spares & Replacement Oil & Grease	Total Cost (In Rs.)
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
1	1 <sup>st</sup> year					
2	2 <sup>nd</sup> year					
3	3 <sup>rd</sup> year					
4	4th year					
5	5th year					

\* Furnish category wise break up.

**(B) Variable Costs**

Sl.	O&M Period	Chemicals and other consumables cost (In Rs.)		
		Unit Cost Rs./Per MLD	Estimated Flow (MLD)	Annual Cost Rs. Lakhs /Year $5 = (3*4*365)/10^5$
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
1	1st year		1.50	
2	2nd year		2.00	
3	3rd year		2.60	
4	4th year		3.25	
5	5th year		4.16	

## A. PRICE SCHEDULE FOR CONSTRUCTION

Sl. No.	Description of Activity (with brief specification and reference to Book of specification)	Rate	
		In figures (in Rs.)	In words
I	<b>Capital cost:</b>		
a.	Submission and acceptance of detailed designs, drawings and estimates.		
b.	Hydraulic process design and layout of the plant.		
c.	Structural design and construction drawing for primary units.		
d.	Structural design and construction drawing for secondary units.		
e.	Structural design and construction drawing for sludge handling, treatment arrangements unit and auxillary units.		
II	Submission and acceptance of detailed Environmental Assessment Report.		
III	Construction of the following components of the plant		
1.	Receiving Chamber		
2..	Screening units		
3.	De-gritting units		
4.	Distribution box & Bye-pass arrangement		
5.	Primary and Secondary Units		
6	Chlorination Tank		
7.	Sludge Sum p and Pump house		
8.	Centrifuge House		
9.	Administrative Building including Furniture and Laboratory Equipments		
10.	Internal Roads, Pathways, Pavements, Storm water drainage		

11.	Misc. Civil works like Fencing/, Entry Gate,		
12.	Site Clearance, Disposal/ Plot Development – Landscaping etc.		
13.	Electrical Works including ( Bidder to specify various units)		
14.	Others if any		

**B. PRICE SCHEDULE FOR PERFORMANCE  
TRIAL FOR 6 MONTHS**

**Trial run and Performance Period  
Summary of Fixed and Variable  
payments**

**ABSTRACT**

SI No.	Trial run and Performance period	O & M Cost in Rs.		
		Fixed (A)	Variable (B)	Total (A +B )
1.	Performance Trial run 6 months			

## C. PRICE SCHEDULE FOR O&amp;M

Sl. No.	Description of activity (with brief specification and ref. to Book of specification)	Rate		Amount (in Rs.)
		In Words	In figures (in Rs.)	
1	O&M cost for operation and maintenance of the plant for five years			
	Fixed cost (Man power, maintenance of all Civil Structures and entire plant House Keeping, all repairs including spares & Replacement, Oil & Grease Cost)			
	i) First year			
	ii) Second year			
	iii) Third Year			
	iv) Fourth Year			
	v) Fifth year			
2	Variable cost (excluding TNEB power charges, Diesel cost and Chlorine Dosage costs) covering consumables, chemical and cost for safe disposal grit / sludge transportation to site.			
	i) First year			
	ii) Second year			
	iii) Third Year			
	iv) Fourth Year			
	v) Fifth year			
	Total Bid price (in figures)			
	(in words)			

- (1) Item for which no rate or price has been entered in will not be paid for by the employer when executed and shall be deemed covered by the other rates and prices in the Activity Schedule (refer: ITB Clause 13.2 and GCC Clause 43.3).
- (2) Unit rates and prices shall be quoted by the bidder in Indian rupee [ITB Clause 14.1].
- (3) Where there is a discrepancy between the rate in figures and words, the rates in words will govern. [ITB Clause 27.1]

CONTRACTOR

CHIEF ENGINEER