Preliminary Report on Collection, Treatment and Disposal system of Sewage for Bharuch Town

General

Bharuch is a district head quarter of Bharuch District of Gujarat State. It is located in southern part of Gujarat and about 180 Km away in south direction from Ahmedabad. The town has been situated on the bank of river Narmada. It is considered to be a historic town and happened to be an important port in olden days

The Bharuch Town is spread over 19.4 SQ.Km out of this **old town** is located on and around a hillock on the riverbank with an area of 6 square km.

It has been observed that due to good industrial infrastructural facilities and industrial investment and vicinity of the large industrial estates around Bharuch the population growth of town is relatively high.

In spite of the industrialization in the surrounding the town of Bharuch could not develop proportionately because of the developed cities like Vadodara, Surat and Ahmedabad with 70 to 180 km distance. The town developed of its own due to the residential housing demands after an earthquake in 1970 and drainage problems of old town and migration of the people from outside. The development was on the north, northwest and east side of the old town.

The infrastructure could not develop in proportion to the expansion of the town specially sewerage, storm water drainage and roads. The sewage

was collected in bins about 40 years back and then soak pits were built. Due to congestion the soak pits saturated and later septic tanks were included in new housing colonies in plain areas. Due to the black cotton soil these also saturated and local common drains discharging into the nearby natural nala (ravine) have developed. Thus, the town has no sewage system and the sewage is being indirectly thrown into the river.

The natural drains (nala / ravine along the river bank) passing through the town have also been filled up in the development process and now the problem of storm water drainage and sewage disposal is aggravating. There are possibilities of mosquito / flies in permanently wet nallas due to domestic sewage water. And during the rains the water is not being drained effectively due to choking or inadequate drain sections which floods the roads and sometimes houses locally.

With the above situation and conditions the Bharuch Municipality is trying to cope up the situation in as and where and piecemeal bases as per its resources, which are very scarce. And the demand to supply increases year to year.

With the above facts a brief report of the Bharuch Town development is prepared for taking up the infrastructure development with a futuristic approach.

Need For Drainage System

Bharuch does not have its drainage system as on today .In past several attempts were made for this project but it was failed primarily because of peculiarity of its topography. Because of its location on golden corridor of

Gujarat, an attractive location with good industrial infrastructural facilities for industrial investment and vicinity of one of the largest industrial estate of Asia the population growth is relatively high. At present in absence of any drainage system the untreated sewage find its way to river Narmada at various points through existing storm water drains.

The drainage system will lead to have plan development and will attract the employees and owners of surrounding industrial units for settling down in town like Bharuch and also it will reduce pollution load leading to river Narmada.

Topography & Proposed Drainage Collection System

Bharuch is having a typical topography i.e. steep slop in a distance of a few meters along with small stretches of plain roads. The walk through survey of Bharuch town was carried out so as to under stand its topography. Based on observation made during survey and as well as data obtained on reduced levels of few of the important locations following are the observation/comments.

1. For having effective Waste Water collection system the area of entire Bharuch town is required to be divided in following four zones.

(i) Eastern Part i.e. the area on eastern side of Ahmedabad – Mumbai railway line

(ii) Southern part i.e. old city area along the stretch of river Narmada

(iii) Northern Part i.e. area around proposed TP Scheme road

(iv) Western Part i.e. Area around Vejalpur ward i.e. on west side of Bharuch

2. The eastern part and southern is having gentle to steep slopes towards river Narmada .It will be easier and economical viable to have main trunk line for these area along bank of the river Narmada

3. There is a reasonable slope on either side of the proposed road of TP scheme of Zone III i.e. northern part. Hence trunk line will follow the route along alignment of proposed TP Scheme road.

4. Waste Water from western part will join in a trunk line of zone III at later stage.

5. The subsoil water is at the depth of 1.5 meter in a low lying area nearer to the river Narmada in zone II

The layout map showing four zones and route of proposed **trunk line** is attached here as **Annexure –A.**

The Sewage treatment plant has been proposed on Southern West o Bharuch Looking to the favorable falling natural gradient is available.

Depending upon the site condition both trunk lines can be terminated at single pumping station or separate pumping station and shall than be pumped to a convenient location available for establishing sewage treatment plant.

Design Data

The total area of Bharuch town is about 19.4 square kilometers As per the census records of year 2003 the population of Bharuch is about 1,84,000 .It is learn that water supply scheme is also being designed The water supply of 40 MLD has been envisaged for the year 2034.Considering the growth rate of 2% per year of population it is expected that population to be served by Waste Water Collection system will be around 2,77,00,000 .The water requirement at that stage will be 40 MLD (considering rate of supply of 140 lpd.) The expected rate of generation of Waste Water will be about 80 % of water supply i.e. about 32 MLD It is also being envisaged that there will be contribution of sewage from the area adjoining to Bharuch Nagarpalika which are fast growing and may tend to have disposal of sewage in the same collection system.. Hence the designed flow has been considered around @ 25 % higher i.e. 40 MLD.

The Plant

The sewage treatment plant will be consisting of a mechanical cleaned bar rack screen chambers, grit removal chambers, and facultative aerated lagoon. The line diagram of proposed treatment plant is annexed as **Annexure–B**.

As the design flow is likely to be achieved in yr.2034 the sewage treatment plant is designed as two parallel plants. The sewage will treated so as to meet the standards prescribed for its use for irrigation purpose

The exact cost can only possible through detailed engineering survey and study of topography as well as population density for each of the ward, existing town planning scheme and sub soil water data, Trial pit data etc.

However preliminary estimates have been made by following assumptions.

1. The main trunk lines will be of 900 mm dia. NP-2 class.
2. Main collection system will be from NP-2 class pipes from 150mm dia to 600mm dia.
3. It has been assumed that due to Natural falling ground levels towards South west of town no pumping will be required in sewage collection network.
4. Low lying areas like Char rasta, Fata talov, Dandia Bazar, Furja area needs special attention while designing since the Storm water from major area of Bharuch and its surrounding flows thro these areas. As well as High water Table in the area.
5. The proposed sewage treatment plat will be located in southern west of Bharuch Town.

Project Cost Estimation Sheet

Sr. No	Particulars	Estimated Cost
1.	Preliminary Survey & Design	Rs. 20,00,000.00
2.	Land Cost 100 acres.	Rs.1,35,00,000.00
3.	Sewage treatment plant 40 MLD capacity. Incl. Electrical installations.	Rs.5,00,00,000.00
4.	Recycled water Distribution net work	Rs. 50,00,000.00
5.	Sewage collection system	
	(a) main Trunk lines 900mm dia- each – total 20 Kms.	Rs.6,00,00,000.00
	(b)Main &Sub main sewer lines appro. 60000 Mts incl. its Appurtenances	Rs.8,00,00,000.00
	(c)Individual house Connections 45000 Nos.	Rs.6,25,00,000.00
	(d)Protection work to the Trunk line on River side.	Rs.1,50,00,000.00
	Total	Rs.28,80,00,000.00
	Add 15% for Contingency & EPT Charges	Rs. 5,20,00,000.00
	Total Estimated cost	Rs.34,00,00,000.00

Cost Comparison

However comparing our estimates with the data on cost of a few of the drainage scheme which works out between Rs 60 lacs to Rs 70 lacs per MLD of sewage .which includes laying of sewer lines, constructions of manhole, intermediate pumping stations at shallow depth, main pumping station and its rising main, pumping machineries and electrification , cost of sewage treatment plant etc Hence considering average rate at of Rs 70 lacs per MLD the total estimated cost of our drainage system should be Rs. 2800 lacs. But Because of the typical topography of the town, nature of soil (black cotton soil), need for special protective treatment to Trunk line as well as for its foundation along the river stretch , higher level of sub soil water at selected location ,cost of land acquisition for sewage treatment plant and the present price rise of cement and steel, the estimated cost may remain higher by about 20-25% i.e. Rs. 3400 lacs ,which seems reasonable at present.

Operating & Maintenance cost

The recurring expenditure of operation and maintenance of drainage system (inclusive maintenance of sewage treatment plant) will be @ 7 % of the estimated cost i.e. Rs. 240 lacs. It includes cost towards electricity, manpower, repairing/replacement of parts of machineries etc,

The treated sewage will be supplied for irrigation purpose to the potential users .The study is under progress to ascertain the total of

quantum of land which can be irrigated with the help of 40 MLD. Of treated sewage .However it is expected that at least @ 20 to 25 % maintenance cost can be recovered through supply of treated sewage at the prevailing rate of supply of irrigation Department of Government Of Gujarat. Bharuch Nagarpalika will have to recover the maintenance cost by evolving/ providing suitable tariff structure. The possibility will have to be explored for the industrial use of water so as to fetch higher revenue.