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Performance and Evaluation of Seawage Treatment Plant

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***Abstract* - In India due to increase in urbanization & population increased demand of water & its creating stress on the civic authorities to providing basic requirement of safe drinking water, sanitation the available treatment unit are not satisfying the demand of treatment .so the untreated domestic water is causing problem of pollution of surface water source & land in which it was discharged, so its imp to study on plant & increase in performance our team decided to study of performance & evaluation of sewage treatment plant in pune. As for reference we take visit to Dr Naidu sewage treatment plant having capacity of 160 MLD .will be worked out during the entire project the selected parameters are PH, TSS, TDS, COD & BOD, Turbidity, we treated sample will be collected on daily & treat it and the result are taken on the result we decided to some treatment which are discussed the paper below in it.**

Key Words:* *Plant performance, Biological Oxigen Dimand, Chemical Oxigen Demanmd, Total Dissolved solids, Dissolved Oxigen, Oil & Grease.

STUDY AREA-

In pune, Maharashtra ,India the pune sewage system has dismal. In a recent pune municipal corporation (PMC) in National green tribunal(NGT) for failing to control water pollution mula mutha river. The treated sewage is let off into the Mula-Mutha River. There is an intermediate pumping station at Kasba Peth and Tofakhana of 115 MLD capacities from where sewage is pumped into the sewage treatment plant at Dr. Naidu Hospital.

1.INTRODUCTION -

The pune city with 18’31’’N Latitude & 73’51’’E Longitude is situated on the western magazine of the Deccan plateau at the confluence of mula-mutha River. Pune is second largest city of Maharashtra State & lies on the leewords side of the western ghats, at the ht of about 560 meters above mean sea level & The mean daily minimum & maximum temp for the summer season.ie may are 23 degree c &38 degree c respectively & The same for the coldest months of the December are 22 degree c &30 degree c respectively. The annual rainfall is about 70 cm .A large population of dependant on mula-mutha river, water flow down to pune city & there rivers finally discharge into Ujni dam

As my team studied on Dr Naidu sewage treatment plant having capacity 115 MLD running Design for 230 MLD there is having two pumping stations that one is Kasba having inlet 160 MLD & other is Tophkhana inlet capacity is 90 MLD Designed actual get 45 MLD The performance of the plant is discussed below

1.1 Historical background on wastewater treatment

The existence of wastewater and the need for wastewater treatment is not a new problem. The production of excreta and urine is a natural part of human life, and has a history as long as mankind. water body constitute a great hazard for the environment and a health risk for human and animal life. The environmental risk is mainly due to overloading of physical and chemical components associated with human activity into an aquifer, while the health risk is mainly the result of pathogenic contamination. The problem of the contamination of water bodies through wastewater discharges was understood back in the time of the Romans. The first sewer in Rome was built about 400 Blunder the name Cloacae Maxima, a system mainly for transportation of drainage water. During the late 19th and the early 20th century, there was an awakening in the development of centralized wastewater treatment systems. Through the20th century, there was an increasing public concern for environmental issues, leading to aider focus on wastewater disposal practices. More advanced treatment techniques were developed Treatment processes designed for different types of industrial wastewater has also been developed to a large extent.

3) METHODOLOGY-

Methodology is based on the collection of sample from the Naidu sewage treatment plant located in pune. The treated sewage sample would be collected from 1 february2017 to 20 February 2017 and have be checked in the laboratory per day. The main parameter to be analyzed are biological oxygen demand(BOD),Chemical oxygen demand(COD), Total suspended solid (TSS), pH value, Dissolved oxygen (DO), Oil and Grease (O&G), Mixed liquor suspended solid. The efficiency of BOD,TSS,COD, should be find out and expected outcome of treatment plant.

The sewage treatment plant is based on the extended aeration method of sewage treatment. The method of treatment consists basically of four operations.

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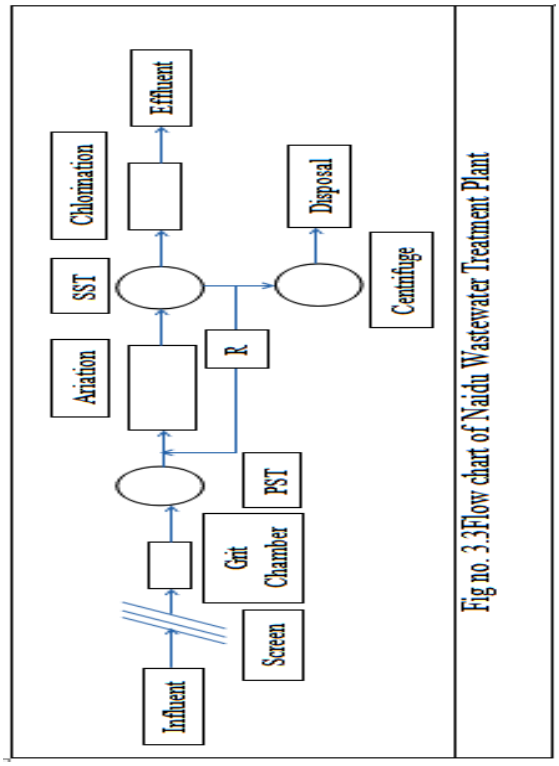
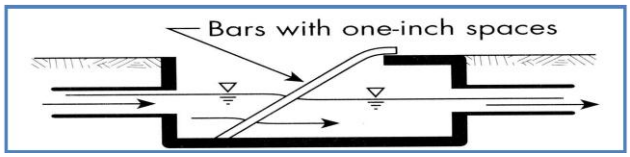
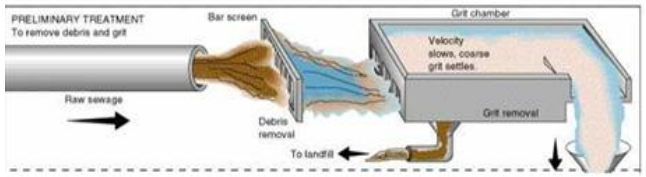


Fig no. 3.3Flow chart of Naidu Wastewater Treatment Plant

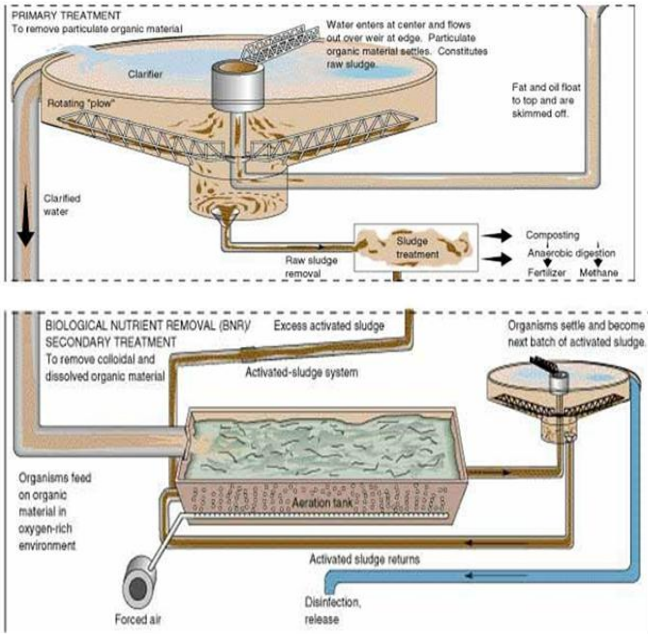
1) Screening and Grit Removal: The first part of entry on sewage in the plant.



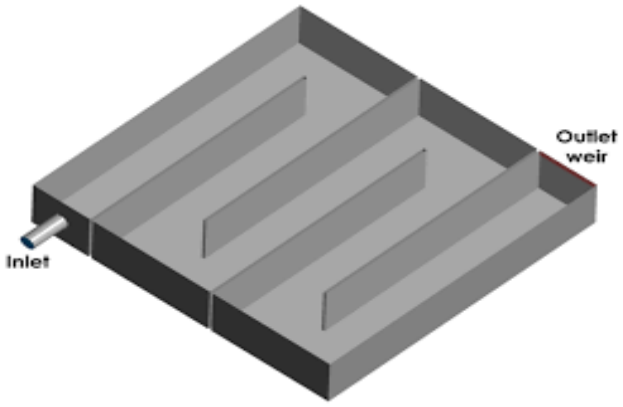


2) Aeration: Decomposition of sewage by aerobic bacteria and other organisms into carbon dioxide and water and other minor constituents.

3) Settling: The treated sewage passes to the settling chamber or clarifier. Here heavy activated sludge mass settles to the bottom while the clear water liquid flows over a vertical plate or weir into a discharge line. Performance Evaluation of Activated Sludge process.



4) Chlorination: The treated liquid (the effluent) from settling chamber is chlorinated to kill disease carrying (pathogenic) bacteria and treated effluent passes into the chlorine, usually for 30 minutes and pass out of the tank through the final plant discharge.



3.1 Generation of source of sewage-

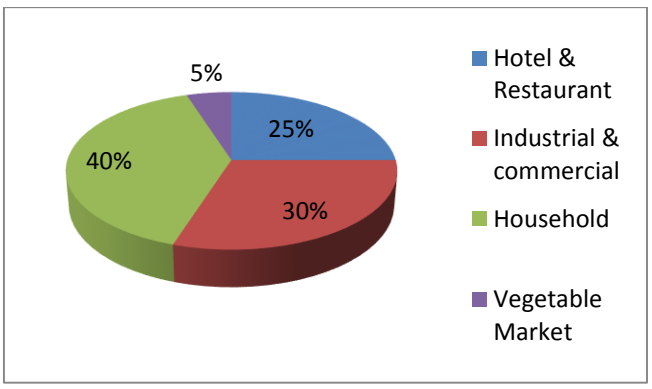


Fig3.1 shows. Generation of source of sewage

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To achieve the main objectives of this thesis the following overall research methodology is adopted as shown in figure 2. Overall of methodology. To Evaluation of pollution parameters of wastewater and check whether the treatment units are working with designed efficiency or not, within this view, the experimental work has been designed and is presented here with.

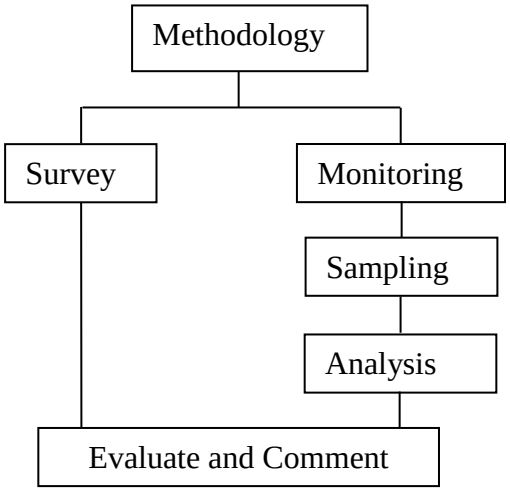

Figure 3.2. Overall of methodology

3.3.2Hydraulic Design of Plant

Naidu wastewater treatment plant is working process is Conventional Activated Sludge Process. This plant sewage is receiving from Kasba Pumping station and Tophkghana Station.

Total average flow = 115 MLD
Peak factor = 2
Design flow = 230 MLD
Area of STP = 4.32 Ha
Hydraulic design unit are tabulated in Table No. 3.1

Table No. 3.1 Hydraulic Design Details of plant

Sr. No.	Description	Dimension	Nos.
1	Inlet Chamber	8.20 x 6.10 x 3.20 m	01
2	Screen Channel	1.60 x 6.00 x 1.00 m	04
3	Grit Chamber	1.24 x 1.24 x 0.94 m	02
4	PST	32.70 m Dia. X 3.50 m	04
5	Aeration Tank	40.33 x 26.30 x 5.00 m	04
6	SST	46.00 m Dia. X 2.50 m	04
7	Chlorine Contact Tank	40.00 x 20.00 x 0.32 m	01

3.3 Sewage treatment plant in pune-

Sr.no	Location of STP	Process	Capacity MLD
1	Vithalwadi	ASP	32MLD
2	Naidu(Existing)	ASP	90 MLD
3	Naidu	ASP	115 MLD
4	Bhairoba	ASP+AIR DIFF	130 MLD
5	Mundhwa	SBR	45 MLD
6	Kharadi	SBR	40 MLD
7	Tanjiwadi	Biotower+EAP	17 MLD
8	Bopodi	EAP	18 MLD
9	Baner	SBR	30 MLD
10	Kothrud	SBR	50 MLD
	TOTAL		567 MLD

4) DETAILED PERFORMANCE EVALUATION REPORT ON SEWAGE TREATMENT PLANTS MAHARASHTRA

Location –Near pune station sewage treatment plant ,
Dr. Naidu Hospital
Design flow-230MLD
Total average flow-115MLD
PeakFactor-2Workstartedon-March2007
Dateofcommissioning-March2010
Area of STP- 4.32 Ha

4.1 DESIGNED PARAMETERS OF THE PLANT

Sr. no.	Parameters	Inlet	Outlet
1	pH	7.0-8.0	7.0-8.0
2	Total Suspended solids	250-300mg/lit	<30.00mg/lit
3	BOD at 20dc	200-250mg/lit	<20.00mg/lit
4	Oil and Grease	30mg/lit	<10.00mg/lit

SEWAGE TREATMENT PLANT

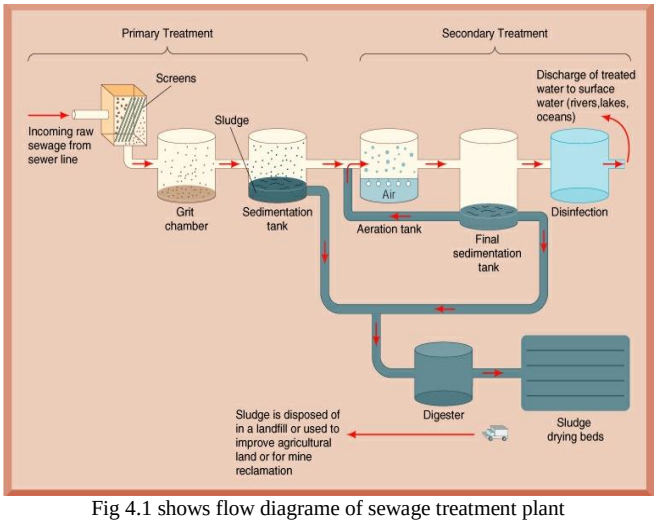

Fig 4.1 shows flow diagrame of sewage treatment plant

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Definition

Sewage treatment is the process of removing contaminants from wastewater, primarily from household sewage. It includes physical, chemical and biological processes to remove these contaminants and produce environmentally safe treated wastewater (or treated water)

Purpose

- To remove the contaminants from wastewater.
- To reduce the spread of communicable diseases caused by the pathogenic organisms in the sewage such as cholera, typhoid, diarrhea , intestinal worms etc.
- To prevent the pollution of ground water, surface water, marine. To make environment healthy.

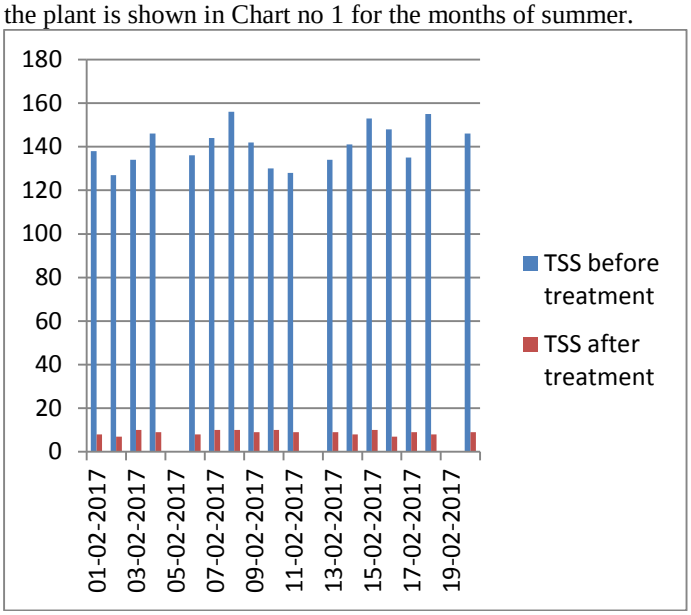
Sr .No	1	2	3	4	5	6	7
Decant	Raw sewage						
Parameter	Flow	Temp	DO	pH	BOD	COD	TSS
Unit	MLD	Dc	mg/lit	-	mg/lit	mg/lit	mg/lit
Designed	115				<250	<300	**<300**
1Feb-17	93.854	27.2	Nil	7.27	120	260	138
2Feb-17	95.646	27.5	Nil	7.3	-	220	127
3Feb-17	96.349	28.0	Nil	7.28	100	280	134
4Feb-17	96.592	28.6	Nil	7.17	135	300	146
6Feb-17	90.481	28.1	Nil	7.23	120	260	136
7 Feb-17	93.861	28.6	Nil	7.18	140	300	144
8 Feb-17	84.046	28.4	Nil	7.15	110	240	156
9 Feb-17	70.990	27.3	Nil	7.28	-	280	142
10 Feb-17	80.587	27.7	Nil	7.19	140	320	130
11 Feb-17	83.789	27.9	Nil	7.11	120	280	128
13 Feb-17	40.427	28.2	Nil	7.32	125	260	134
14 Feb-17	61.793	28.6	Nil	7.22	120	220	141
15 Feb-17	83.822	28.4	Nil	7.11	135	300	153
16 Feb-17	85.696	28.1	Nil	7.09	-	240	148
17 Feb-17	88.839	27.9	Nil	7.23	120	280	135
18 Feb-17	82.928	28.0	Nil	7.12	110	260	155
20 Feb-17	83.219	27.5	Nil	7.18	100	220	146

4.3 Results of Analysis of grab samples before and after different stages of treatment

4.3.1operation And Maintance Before Treatment

RESULT AND ANALYSIS

Chart -8.1:Variation in TSS for treated and raw sewage of the plant is shown in Chart no 1 for the months of summer.



The variation in TSS for treated and raw sewage of the plant is shown in Chart no. 2 for the months of winter season.

Chart-8.2: The variation of inflow of sewage treatment plant in MLD

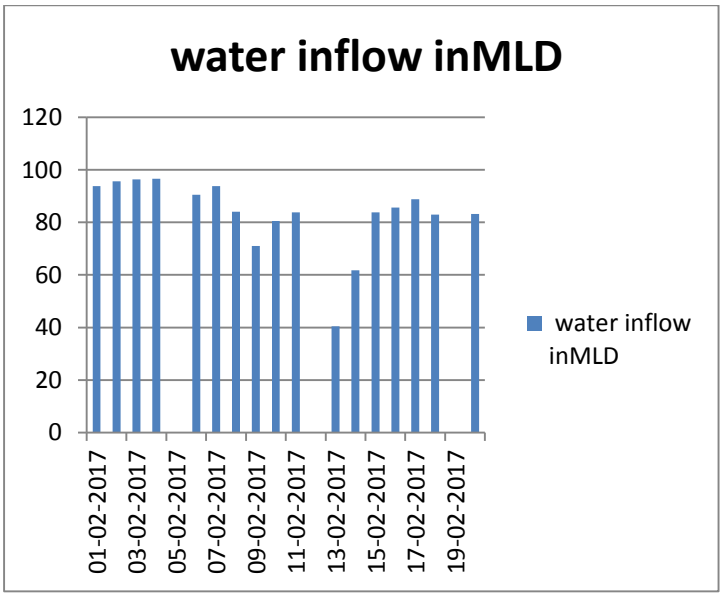


Chart 8.2: Inflow variation for the summer season.

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4.3.2 OPERATION AND MAINTANCE AFTER TREATED WATER

Sr.No	1	2	3	4	5	6	7	8	9
Decant		Treated sewage /outlet							Aeration
Parameter	Flow	Tem	DO	pH	BOD	COD	TSS	O&G	MLSS
Unit	MLD	Dc	mg/lit	-	ng/lit	mg/lit	mg/lit	Mg/li	Mg/lit
Designed	115	-	-	6.5-9	<20	<30	<30	Nil	
1Feb-2017	93.854	27.2	2.0	7.50	8	20	8	Nil	2481
2 Feb-2017	95.646	27.5	2.0	7.55	-	10	7	Nil	2568
3 Feb-2017	95.349	28.0	1.8	7.47	7	15	10	Nil	2611
4 Feb-2017	96.592	28.6	1.9	7.52	9	20	9	Nil	2675
6 Feb-2017	90.481	28.1	2.0	7.44	8	20	8	Nil	2710
7 Feb-2017	93.861	28.6	1.9	7.46	10	15	10	Nil	2812
8 Feb-2017	84.046	28.4	1.8	7.48	7	15	10	Nil	2712
9 Feb-2017	70.990	27.3	1.9	7.54	-	20	9	Nil	2479
10 Feb-2017	80.587	27.7	2.0	7.58	9	20	10	Nil	2519
11 Feb-2017	83.789	27.9	2.1	7.53	8	15	9	Nil	2582
13 Feb-2017	40.427	28.2	1.8	7.61	8	20	9	Nil	2612
14 Feb-2017	61.793	28.6	1.9	7.56	8	10	8	Nil	2570
15 Feb-2017	83.822	28.4	1.7	7.48	9	20	10	Nil	2497
16 Feb-2017	85.696	28.1	1.9	7.54	-	10	7	Nil	2521
17 Feb-2017	99.839	27.9	2.0	7.45	10	15	9	Nil	2608
18 Feb-2017	82.928	28.0	1.7	7.56	7	10	8	Nil	2583
20 Feb-2017	83.219	27.5	1.8	7.43	6	10	9	Nil	2741

Remarks:

a) The plant is presently being run by the consultant who have installed the unit in the same premises where
b) 115 MLD capacity plant in operation. .
c) A laboratory is established to analyze the controlling parameters found operational.
d) The STP was found operational during Inspection.
e) During inspection extra water storage tank should be empty.
f) Extreme foaming seen in the final outlet of the plant.
g) Chlorination plant was in operational during inspection.
h) Bypassing of the treated wastewater seen in the final outlet channel
i) All the analyzed parameter were found well within the norms.
j) Overall efficiency of plant is good.
k) Treated water do not use for any purpose except that gardening only.

5) CONCLUSION-

Operation & Maintenance of STPs depend on three factors:

- Uninterrupted energy supply
- Skilled manpower
- Regular checking machinery.

In case of natural treatment technology, energy requirement is quite low whereas. Conventional Treatment technologies need considerably high demand of energy. Natural treatment technology STPs requires few personals to operate the system whereas advanced & conventional treatment technology based STPs require large number of skilled professionals Maintenance is required with due diligence in all the treatment technologies but the most important aspect is collect and deliver the sewage to Sewage Treatment Plant.

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