

**COMPREHENSIVE STUDY OF POLLUTED RIVER
STRETCHES OF BHIMA RIVER
FOR
MAHARASHTRA POLLUTION CONTROL BOARD.**



**Maharashtra Pollution
Control Board**



Prepared By



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INTRODUCTION

The **Bhīma River** is a major river in South India. It flows southeast for 861 kilometres through Maharashtra, Karnataka, and Telangana before entering the Krishna River. After the first sixty-five kilometres in a narrow valley through rugged terrain, the banks open up and form a fertile agricultural area which is densely populated.

With plenty of water supply but poor sewage collection and treatment management, has polluted all the tributaries of Bhima like Indrayani, Pawana, Mula, Mutha and Mula-Mutha.

In order to study pollution of Bhima river it is essential to study its tributaries from pollution point of view.

In order to study pollution in various tributaries and also Bhima river Maharashtra Pollution Control Board (MPCB) appointed M/s. Klean Environmental Consultants (P) Ltd. Vide their letter Ref. No. MPCB/ROP/141125FTO267 dated nil. Terms of reference suggested by Maharashtra Pollution Control Board vide their above letter, MPCB/JD(WPC)/B-1934 dated 20th April 2015 and subsequent meeting in MPCB office at Sion on 23rd April 2015 were to study polluted river stretches and prepare report as per Central Pollution Control Board's guidelines. The polluted river stretches specified are as follows,

- a. Indrayani River from origin to its confluence with Bhima at Tulapur (near Pune).
- b. Pawana River from origin to its confluence with Mula at Sangvi gaon near Pune,
- c. River stretch of Bhima river-Vithhalwadi to Takli on Bhima river (including tributaries of Bhima-Mula and Mutha) down stream of Pune city.

There are more than two Vithalwadis in the study area. The Vithalwadis referred by CPCB is not on Bhima river but on Mutha river. To minimise confusion about Vithalwadi, this study will cover both the Vithalwadis by further sub-dividing last stretch into following sectors,

1. Vithhalwadi on **Mutha** river (covered under Mutha river)
2. **Mula-Mutha** river and its confluence with Bhima at Sangameshwar (near Pargaon)
3. Origin of **Bhima** river and its journey up to Sangameshwar (including another **Vithhalwadi**, Takli-Bhima etc.) near Pargaon where it meets Mula-Mutha river.

BHIMA RIVER STUDY AREA

The Bhima River originates at Bhimashankar near Karjat on the western side of the Western Ghats at an altitude of 945 m above sea level. Bhima River flows in the southeast direction for 745 kilo meters covering the states of Maharashtra, Karnataka and Telangana. In Maharashtra Bhima River drains an area of 48,853 km² and has a length of 451 km. It joins Krishna on the Karnataka – Andhra Pradesh border near Kudlu in Raichur District. The major tributaries of Bhima river around Pune are Kundali, Ghod, Bhama, Indrayani, Mula, Mutha and Pawana.

Based on sampling on various locations, it was found that the river stretches of Bhima river and its tributaries are polluted. These includes Indrayani, Pawana, Mula, Mula-Mutha and Bhima at confluence with Mula-Mutha.

With fertile land, availability of water and power Bhīma and its major tributaries like Indrayani, Pawana, Mula, Mula-Mutha are polluted due to various reasons some of which are as follows,

1. Populated cities like Hill stations at Lonavla, Khandala, Talegaon.
2. Holy cities of Dehu and Alandi where devotee visit all over the year and during biannual yatras Lakhs of devotees assemble overloading a meagre sanitation system designed for few thousand people. In addition, flowers, garlands and garbage pollutes the river Pawana.
3. Industrial and populated towns of Pune, Pimpri Chinchwad pollute Pawana, Mula and Mutha rivers. These cities have experienced sudden growth which is reflected in its inadequate infrastructure. Though there is sufficient water supply, in the absence of proper sewage collection and treatment, untreated sewage finds its way into nearby nallas which discharge into these rivers.
4. IT Parks at Talavade, Hinjewadi and Automobile hubs at Chakan, Talegaon, attracts large population from all over India. Chakan has number of Industrial units which attract large population.
5. Being fertile land river water is extensively used for irrigation uncontrolled. Since large quantities of chemical fertilizers are used it is reflected in eutrophication of river on down stream of Pune cities.

The Study of polluted stretches of Bhima:

Bhima and its tributaries flow from West to South-East and as all the tributaries drain into Bhima river sequentially, the cumulative pollution load can be gauged downstream. Hence this study of polluted stretches of Bhima, is detailed study of its tributaries.

The report is presented in five chapters as prescribed by CPCB covering following river stretches,

1. **Indrayani** river originating at Kurvande, near Lonavla and meeting Bhima at Tulapur.
2. **Pawana** river originating in Pawana Lake near Lonavla and meeting Mula at Sangvi near Pune.
3. **Mula** river originating from Mulshi dam and meeting Mutha in Pune city.
4. **Mutha** river originating in Khadakwasla dam and meeting Mula in Pune, (including Vithhalwadi)
5. **Mula-Mutha** meeting **Bhīma** at Rohu (near Pargaon) and
6. **Bhima** river from its origin up to Pargaon. (including Takli)

LOCATION OF CITIES AND TOWNS ON THE IDENTIFIED POLLUTED STRETCHES

1. INDRAYANI RIVER



Indrayani river at Moshi (D/S)



Indrayani River at Alandi

1. INDRAYANI RIVER

Indrayani river originating at Kurvande, near Lonavla and meets Bhima river at Tulapur. The prominent towns along the Indrayani river from origin to its confluence with Bhima at Tulapur are as follows,

a. KAMSHET,

Kamshet is a hill station 18km from Lonavla, located at about 600m above sea level. Luscious green cover, placid lakes and undulating hilly terrains make it a perfect holiday destination. Kamshet straddles the ancient trade route between the Konkan region and Pune. A major Hydro-Electric station in on Indrayani river at Valvan.

b. INDURI: Town near Talegaon and having a marine training school and Cadbury factory.

c. TALEGAON DABHADE:

Talegaon Dabhade is a historic city, a town with a municipal council, in Mawal Taluka , Pune district , in the Indian state of Maharashtra. This town is 120 km from Mumbai and 35 km from Pune. As per 2011 India census, Talegaon Dabhade had a population of 75,854.

Talegaon Dabhade is home to many multinational companies, agro-based units. It is also home to thriving poultry belt, largest in Asia in terms of broiler birds per square mile. Maharashtra Industrial Development Corporation (MIDC) Industrial Estate at Talegaon has many factories including M/s. Larsen Toubro, General Motors etc.

d. CHAKAN:

Chakan is an upcoming industrial town which houses many multinational companies. As of date there are ... large and medium industries in this area. This is a new MIDC provided with sufficient water supply, roads and other infrastructure which attracts many multinational companies. Out of 176 prominent companies located in Chakan MIDC, names include Philips, TetraPak, Schindler Elevators, Mahindra Automobile, Hyundai, Atlas Copco etc.

e. DEHU (POPN.5340)

Dehu is a place of Sant Tukaram - well known saint in Maharashtra. He lived here and taught people how to pray to god. He and Sant Dnyaneshwar were the popular saints and both worshiped Lord Vitthal. The 'Palakhi' in the month of 'Ashadh' from Dehu is one of the main attractions of Dehu when Lakhs of warkaris assemble. These assemblies create pollution due to sewage and garbage.

f. DEHU ROAD (POPN. 48,961)

Dehu Road is a cantonment town in Pune district and lies 27 km northwest of Pune Station along the NH4- Old Pune-Mumbai Highway which connects it to Pune city proper. Dehu Road lies at an altitude of over 600 metres, between two south-eastwardly flowing tributaries of the Bhima river ,

the Indrayani river to the north and the Pawana river to the south. Due to the elevation, the climate is pleasant. Dehu Road is a cantonment town, offices of Central Government departments, especially Military and Defence, are located here.

g. TALAWADE MIDC TECHNOLOGY PARK.

Talawade Technology Park was one of the first Technology park developed by MIDC. Major multinational IT parks includes M/s. Syntel, M/s. Fujitsu etc. located in this park.

h. ALANDI (POPULATION 28,576)

Alandi is located on the banks of the Indrayani River, 25 km north of **Pune**. **Alandi** is a city and a municipal council in Pune district. The town is popular as a place of pilgrimage for being the resting place (Samadhi) of the 13th century Marathi saint, Sant Dnyaneshwar.

In the Jeshtha month (June- July), a procession carries symbolic sandals of Dnyaneshwar on a Palkhi from Alandi to reach Pandharpur on Ashadhi Ekadashi . The procession is joined by tens of thousands of devotees for the 150 km journey on foot.

The biggest festival in Alandi is held every year on *Kartika Vadya Ekadashi*(eleventh day of the dark fortnight of Hindu month of Kartik). The festival falls close to the day Dnyaneshwar entered Samadhi. This festival or yatra is attended by hundreds of thousands of Dnyaneshwar devotees and has a great economic significance to the local population. The Indrayani River is a Perennial River and bathing in the river has special significance for pilgrims to Alandi. However, the river is heavily polluted because of sewage discharge by different towns along its course and garbage. The river Indrayani has high amount of Faecal coliform in the water.

Indrayani river is heavily polluted because there is no proper sewage collection and treatment provided for these thousands of people who assemble twice a year and for the local residents. In addition, lot of garbage is thrown in the river polluting it further. In addition, Indrayani river receives sewage discharge from towns located upstream. The river Indrayani has high amount of Faecal coliform in the water.

i. Tulapur

Indrayani meets Bhima at Tulapur which is about 40 Kilometres north east of Pune and is situated at the confluence of the Indrayani river with Bhima River. Tulapur is a historic place because of Samadhi of Chatrapati Sambhaji Maharaj.

2. PAWANA RIVER



Pawana river at Chinchwad



Pawana at Pimpri-Chinchwad

2. PAWANA RIVER

Pawana river originating in Pawana Lake near Lonavla and meets Mula river at Sangvi near Pune. The river flows a total distance of 60 kilometres to meet Mula river in Pune. On its journey **Pawana River** crosses the most populous and industrious cities of Pimpri-Chinchwad and Pune. The river is reported to be severely polluted due to untreated/treated sewage and garbage from these cities and their suburbs. Accumulation of silt and discharge of untreated waste are the major factors of pollution of the river, and has made the river water unusable.

The prominent towns along the Pawana river stretch are as follows,

a. Pimpri Chinchwad (Population 17,29,000 as of 2011,)

Pimpri-Chinchwad, is a suburb in the Pune Metropolitan Area. It consists of the twin towns of Pimpri and Chinchwad which are governed by a common municipal body (the Pimpri-Chinchwad Municipal Corporation or PCMC). It is located to the North-West of Pune and is well connected to the centre of Pune city via the Old Pune-Mumbai Highway . Pimpri-Chinchwad is formed of the formerly independent localities of Chinchwad. Pimpri , Nigdi , Akurdi, Kalewadi and Bhosari.

Pimpri – Chinchwad MIDC

Pimpri-Chinchwad MIDC happens to be one of the biggest Industrial region formed in the year 1954. It has rapid growth in terms of Industry and major automobile industries like Kinetic Engineering, Tata Motors, Mahindra and Mahindra etc. are located here. Also included are many engineering Multinationals like Sandvik Asia, Alfa Laval, Atlas Copco, Thyasson group, K.S. B. Pumps etc. Apart from Automobile there are number of consultancy firms, providing hiring services, technology parks etc.

b. Thergaon

Tetragon is located within the Pimpri-Chinchwad municipal corporation. Pudumjee Pulp and Paper Mills runs a large paper mill which imports pulp and makes paper.

c. Pimple gurav

Pimpale Gurav (also called Pimple Gurav) is a neighbourhood in the metropolitan city of Pune. It is located in the northwest area of the city, roughly between Dapodi and Navi Sangvi. Pimple Gurav is an upcoming residential area in PCMC

d. **Sangvi:** Pawana meets Mula in this quiet suburb of Pimpri- Chinchwad.

3. MULA RIVER



Mula river entering Pune City



Mula river at Holkar bridge

3. MULA RIVER

The **Mula** river is dammed near the Western Ghats at the Mulshi Dam that forms the Mulshi Lake. Further downstream, in Pune city, it merges with the Pawana River on the left bank and Mutha River on the right bank to form the Mula-Mutha river, which later meets the Bhima River.

The river forms the boundary between the limits of the Pimpri-Chinchwad Municipal Corporation and the Pune Municipal Corporation along the Old Pune–Mumbai Highway .

In 2010, areas surrounding the river experienced flash floods due to high levels of pollution and garbage dumped into the river. Due to high levels of pollution, including 125 MLD of untreated sewage being discharged into the river by the Pune Municipal Corporation , the Maharashtra Pollution Control Board has classified the water quality to be of *Class-IV*.

From its origin at Mulshi dam to its confluence with Mutha river, Mula travels a distance of about 52 km. Out of this about 40 km passes through hilly area with nearby towns of Paud, Nande, Chande etc. having population less than 10,000. It enters Pune city behind Balewadi sports stadium and there after passes through populated areas of Pune city like Pimple Saudagar, Baner gaon, Sangvi (where Pawana meets Mula), Bopodi, Khadki, Vishrant wadi, Wakadewadi and behind RTO office Mula river meets Mutha river.

Mula is considered to be the lifeline of the Pune city. The water of Mula River is used for drinking, bathing, industrial and irrigation purposes. The increasing urban and industrial activity influences the water quality of Mula River. Mula and Mutha rivers covers almost whole city. Hence it receives disposal of solid wastes, domestic waste, hospitals and industrial effluents and some amount of agricultural runoff.

Pune City : (Population as of 2011 is 31,154,31 people)

Pune is the ninth-most populous city in India and the second largest in the state of Maharashtra after the state capital Mumbai. Pune is also the 71st largest city in the world, by population. Pune is now listed in the Smart City plan of Union Government.

Pune's various attractions include Vithhalwadi Mandir. Balewadi stadium which is an international standard sports complex where youth commonwealth games were held recently. Wakad and Pimple Nilakh are upcoming residential and commercial suburb of Pune. Pashan and Vishrantwadi has army research centres. Bombay Engineering Group is a major army station. Mula meets with Mutha at Sangamwadi.

4. MUTHA RIVER



Mutha under Sangam bridge



Mutha River at Omkareshwar

4. MUTHA RIVER

The **Mutha River** originates in the Western Ghats and flows eastward for about 21 kilo meters when it merges with the Mula River in the city of Pune. Mutha river has been dammed twice, first at the Panshet Dam (on the Ambi River), used as a source of drinking water for Pune city and irrigation. The water released here is dammed again at Khadakwasla and is an important source of drinking water for Pune. One more dam has been built later on the Mutha river at Temghar. After merging with the Mula River in Pune, it flows on as the Mula-Mutha River to join the Bhima River at Sangameshwar.

Mutha travels through the old populous city of Pune. The important part of Pune on the bank of Mutha river are Karve nagar where women's education was started by Dr. D. K. Karve and has established a women's university (SNDT). Deccan Gymkhana a quiet residential area, Congress House, and then under Sangam bridge Mutha meets Mula. After its confluence it proceeds further as Mula-Mutha river. All along its journey in Pune city it receives raw sewage and garbage and is one of the most polluted river.

Pune takes about 1000 MLD water for drinking from Mutha river through closed pipes and discharges about 750 MLD of its sewage into Mula river.

5. MULA - MUTHA RIVER



Bund Garden



Mula Mutha at Loni Kalbhor

5. MULA - MUTHA RIVER

Mula and Mutha rivers after meeting under Sangam bridge proceed further through the Pune city. The prominent places in Pune along the Mula- Mutha river stretch are,

- Bund Garden, built by Phiroze Jamshedji Jeejeebhoy, one of the longest serving members of the Bombay Stock Exchange, it served as a source of irrigation water for the under-privileged. Offering something for everyone, Bund Garden is a favourite haunt for those looking for a quiet, scenic place close to Mother Nature that helps one relax, rejuvenate and get re-energized. Koregaon Park is an area located south of the Mula-Mutha River in Pune, this area is often viewed as one of prestigious addresses in Pune. The area was primarily a residential area with lush greenery, but of late has been growing into a commercial marketplace.

- Mundhwa is an old industrial area with a Foundry and handmade paper mill.
- Ghorpadi, and, Kharadi are the upcoming residential towns.
- Manjari is a small village 4 km from Pune. **Vasantdada Sugar Institute (VSI)** formerly known as Deccan Sugar Institute is located here. Established in the year 1975 by the sugarcane grower members of cooperative sugar factories in the State of Maharashtra, it is the only organisation of its kind in the world. The Institute performs, under one umbrella, all scientific technical and educational functions relevant to the sugar industry. The Institute strives for an all-round progress of the sugar industry and to achieve this objective, it operates through three main channels viz., Academic, Extension and Research & Development.

- Loni Kalbhor is a village very close to Pune and on Pune-Sholapur road. The fertilizer factory (Rama Krishi Rasayan) is located here along with an electronics component factory.
- **Theur** : This is an historic place where one of the Ashta Vinayak temple is located. A sugar mill and distillery are located in this town which is reportedly closed.
- **Sangameshwar** (Confluence with Bhima): Mula Mutha meets Bhima at this location.

6. BHIMA RIVER



Bhima river under Kedgaon – Ranjangaon bridge



Bhima at Koregaon

6. BHIMA RIVER

Journey of Bhima River from Bhimashankar to Sangameshwar.

The Bhima River originates near **Bhimashankar Temple** in the Bhimashankar hills in Khed Taluka on the western side of the Western Ghats, known as Sahyadri, in Pune District (19°04'03"N 073°33'00"E.). Bhima flows southeast for a long journey of 861 kilometres (535 mi), with many smaller rivers joining it as tributaries.

It flows through Bhimashankar Wildlife Sanctuary where it enters Khed Taluka and is soon joined by its tributary, the Aria River from the right (west) which flows into the Chas Kaman Reservoir. The Chas Kaman Reservoir is impounded by the Chas Kaman Dam, the most upstream dam on the Bhima River proper.

Some 5 km along the river below the bridge on the Bhima at **Chas**, the Kumandala River enters from the right. From there it is 8 km along the river to the railroad bridge at the town of **Rajgurunagar (Population: 25,146 (2011))** on the left bank. In 18 km further along the river, the Bhima River enters from the right just above the village of Pimpalgaon on the left bank. From there to Siddhe gavhan along the river is 10 km.

After leaving Khed Taluka, the Bhima forms the boundary between Haveli Taluka on the right (south) and Shirur Taluka on the left (north). From the Bhima's intersection to the Indrayani River, which also enters from the right, is 14 km along the river. At the confluence is the town of **Tulapur** on the right bank in Haveli Taluka.

The Bhima River, the Indrayani River and the Mula-Mutha River are the major tributaries of the Bhima that drain western Pune. After the Indrayani, in about 4 km downstream the Dhomal River enters from the right, at the village of **Wadhu Budruk**. Shortly thereafter (3.5 km) the Bhima passes under the SH 60 bridge at the town of **Koregaon Bhima** (Popn. 9000). From Koregaon going east, downstream 16 km, is the confluence with the Vel River from the left (north) and the village of **Vittalwadi**. The Vel River also arises in Ambegaon Taluka, east of the Bhima, and flows through Khed Taluka and into Shirur Taluka before flowing into the Bhima. With Vittalwadi on the left, the right side of the river leaves Haveli Taluka and enters Daund Taluka.

From Vittalwadi the Bhima meanders northwest and 14 km after the Vel River enters from the left, the Kamania River enters from the left at the village of Parodi. After the Kamania River enters, the river meanders back southeast for 23 km to the confluence with the Mula-Mutha River from the right at the village of **Ranjangaon Sandas**. From This point onwards it is known as Bhima river.

INDUSTRIAL POLLUTION

In the study zone there are about 7000 industries comprising Large, Medium and Small scale units. Most of the industries are located in the Maharashtra Industrial Development Corporation(MIDC) estates which follow Maharashtra Pollution Control Board's (MPCB) treatment and disposal standards. Except some old established industries which were allowed to treat and discharge treated effluent in the river all other industries treat the effluent (both Sewage and Industrial waste) for reuse in the process or for gardening within their premises (Zero Liquid Discharge). This practice was conforming River Regulation Zone (RRZ) policy which seeks to minimize river pollution and hence no industry is allowed to send treated/untreated waste outside it's premises. To meet ZLD standards, treatment plants are provided in each individual unit. This ensures that there is no effluent reaches nearest water course/ river except by accident.

Even for those industries which were earlier allowed to treat and discharge treated effluent into river, MPCB has asked them to treat their effluent for reuse purpose and excess effluent to be used for gardening. This is being implemented progressively and hence shortly no industrial effluent will find its way to the river.

Second, there are no MIDC's Chemical zones in the study area hence no bulk drug or any other major chemical factory is present, except Hindustan Antibiotics Ltd. at Pimpri, which is a sick unit.

Hence industries are grouped as follows,

1. Industries in MIDC area and not discharging treated effluent out of their premises. The MIDC's includes,
 - Chakan
 - Talegaon
 - Talawade
 - Pimpri Chinchwad Bhosari
 - Hinjewadi
2. Industries located in private land and not discharging out of their unit, and
3. Units allowed to treat and discharge into river earlier but now told to treat and use on their own land for disposal.

Since no industry is discharging effluent to the river (except few permitted units) this report details only Large and Medium industries and their Sewage and Effluent quantities as an illustration for their ZLD efforts.

The industry statistics at a glance is as follows,

Industry Statistics

Sr. NO.	Particulars	SRO Pune - I	SRO Pune - II	SRO Pimpri Chinchwad	Total
a)	RED category				
	Large	103	291	54	448
	Medium	63	51	5	119
	Small	575	531	124	1230
	Total Red	741	873	183	1797
b)	Orange category				
	Large	75	315	114	504
	Medium	60	66	8	134
	Small	550	388	169	1107
	Total Orange	685	769	291	1745
c)	Green category				
	Large	14	159	10	183
	Medium	36	109	8	153
	Small	998	1092	965	3055
	Total Green	1048	1360	983	3391
	Total no.of Industries				6933
1	Total effluent quantity generated through industries (MLD)	275	24.1	148.689	447.789
	Total effluent quantity treated by industries in (MLD)	275	24.1	148.689	447.789
a)	Industries complied with consent / authorisation conditions	2474	3002	1361	6837
b)	Industries having valid consent / authorisation	2412	3002	1112	6526
c)	Industries not having consent / authorisation	62	17	249	328
d)	No.of Non-polluting industries	1048	1360	983	3391
e)	No.of industries discharging effluent into the river	Nil	Nil	1	1
	Effluent quantity discharged into the river (in MLD)	Nil	Nil	5.5	5.5
f)	Industries discharging effluent into the sea/Creek	Nil	Nil	Nil	0
	Effluent quantity discharged into the sea/creek (in MLD)	Nil	Nil	Nil	0
g)	No.of industries having membership of CETP	65	4	Nil	69
	Treatment capacity of CETP (in MLD)	1.0 (0.6 operating)	Talegaon 4.0 (0.5 Operating)	Nil	--

INDUSTRIAL SITUATION IN STUDY ZONE.

From Lonavla up to Pune, due to availability of water supply and power, number of industries are present. Maharashtra Industrial Development Corporation (MIDC) has established these Industrial estates which has Large (investment more than 75 crore), Medium (Less than 75 crore) and small scale factories. Also included are Information Technology Parks which are developed recently and attracts thousands of technocrats. Details of such industries are listed in the report area wise.

Major MIDC estates are as follows,

1. Talegaon: Engineering units like M/s. Larsen and Toubro Ltd.

2. Chakan:

Engineering, Food processing, Automobile etc. Chakan is now home to a Special Economic Zone (SEZ) promoted by the Maharashtra Industrial Development Corporation (MIDC). It has since evolved into a major automobile hub. It hosts automobile production plants for the Volkswagen Group, Daimler-Benz, Mahindra & Mahindra, Jaguar Land Rover, Bajaj Auto, General Electric etc. Over 750 large and small industries, including a number of automobile component manufacturers are based in the area.

3. Talavade: IT parks of M/s. Syntel, M/s. Fujitsu etc.

4. Pimpri-Chinchwad- Bhosari: Pimpri-Chinchwad Industrial area (including Bhosari) is considered as the biggest industrial centre in Asia. These Industrial areas are known to house companies like Bajaj Auto, BEL Optronics Devices Ltd, TATA Motors (formerly TELCO), Kinetic Engineering, Force Motors (formerly Bajaj Tempo) and DaimlerChrysler. It is home to India's premier antibiotics research institute Hindustan Antibiotics Limited (HAL).

5. Hinjewadi:

Hinjewadi is located off the NH 4 bypass to the west of Pune. It is the location of Rajiv Gandhi InfoTech Park with many software companies like Infosys, Wipro, Cognizant etc which attracts 2-3 lakh employees.

6. Non MIDC areas:

There are many industries which are Large or Medium industries and not located in MIDC area. These are listed separately and includes heavy industries such as Forbes-Marshall, ThyssenKrupp, Alfa Laval & Sandvik Asia etc. Recently number of IT parks are also developed in this area.

7. Units (7 nos.) allowed to treat and discharge into river earlier but now told to treat and use on their own land for disposal

Large and medium industries

Details of Large and Medium Industries in this zone and volume of waste water generated from each industrial unit are as follows,

List of Large and Medium Industries

Chakan MIDC							
Sr.	Industry	Address	Industry Type	Effluent Qty in CMD		ETP/STP details	Disposal of treated effluent
				Sewage	Ind.		
1	Badve Engineering Limited (Chakan)	Plot. No. A-23/1, Phase - 2, MIDC Indl. Area, Chakan, Tal - Khed, Dist - Pune.	R36 Industry or process Involving metal surface treatment or process	50	125	ASP followed by PSF&ACF.	56000 sq.m. On land for Gardening
2	Bajaj Auto Ltd.	Plot No. A-1 MIDC Chakan. Mahalunge Tal-Khed	R4 Automobiles Manufacturing (integrated facilities)	20	7	ASP followed by PSF&ACF.	Gardening
3	BentelerAutomotive India Pvt. Ltd.	Plot No. A-3, Phase II, MIDC Chakan, Chakan Talegaon Road, Khalumbre, Tal:- Khed, Dist:- Pune	R36Industry or process involvingmetal surface treatment or process	19	0.5	ASP followed by PSF&ACF.	Gardening
4	Bridgestone India Private Limited	Plot No. A-43, MIDC Chakan,Phase-II, Tal:- Khed	O72 Tyres and tubes vulcanization/hot retreading	215	379	ASP followed by PSF&ACF.	Gardening
5	Corning Technologies India. private Ltd.	Plot no.D-237,Chakan Industrial area, Phase-II,Village-Warale, Tal-Khed, Dist- Pune	R42 Manufacturing of Glass	17.8	Nil	ASP followed by PSF&ACF.	Gardening.
6	Endurance Systems (India) Pvt.Ltd.	B-20, ChakanIndl. Area, Village-Nighoje,Tal - Khed,Pune	R36 Industry or process involvingmetal surface treatment or process	45	40	ASP followed by PSF&ACF.	Gardening.
7	Endurance Technologies India Pvt.Ltd..	B-22, MDC Chakan,Vill-Nighoje, Tal- Khed, Dist-Pune.	R36 Industry of Process Involving metal surface treatment or process	Nil	Nil	Nil	Nil
8	Endurance Technologies Ltd.	B-1/2.,B1/3, Chakan MIDC Industrial Area, Village- Nighoje, Tal-Khed, Dist Pune	R36 Industry or process involvingmetal surface treatment or process	108	200	ASP followed by PSF&ACF.	Recycle to maximum extent & remaining Gardening
9	Federal Mogul PTSB India Private Limited	Plot No. A-23, MIDC Chakan Phase-II, Khalumbre, Tal:- Khed, Dist:- Pune	R04 Automobiles Manufacturing (integrated facilities)	30	200	ASP followed by PSF&ACF.	Gardening.
10	Forbes Marshall Pvt. Ltd.	Plot No. B-85, MIDC Chakan,Phase-II, Village Savardi, Tal:- Khed	R27 Heavy engineering includingship building (With investment)	100	Nil	ASP followed by PSF&ACF.	Gardening.
11	Foton Motors Manufacturing India Pvt Ltd	Plot No. F-5, MIDC Chakan Phase-II, Ta- Khed, Dist-Pune	R04 Automobiles Manufacturing (integrated facilities)				
12	GE India Industrial	Plot No. A-78/1, MIDC	R27 Heavy		Nil	Nil	Gardening

	Private Limited	Chakan Phase- II, Tal:- Khed, Dist:- Pune	engineering including ship building (With investment)	114			
13	Gestamp Automotive India Pvt. Ltd.	E-1, MIDC Chakan (Phase-III), Village-Nigije Mahalunge, Kharabwadi, Tal- Khed, Dist- Pune	R27 Heavy engineering including ship building (With investment)	12	Nil	ASP followed by PSF&ACF.	Gardening.
14	Hyundai Construction Equipement (I) Pvt Dist:-Pune	Plot no. A-2, MIDC Chakan (phase-II), Tal:- Khed,	R27 Heavy engineering including ship building (With investment)	47	7.5	ASP followed by PSF&ACF.	Gardening.
15	Jbm Ma Automotive Pvt.Ltd.	C - 1 (Part) MIDC Chakan Talegaon Road Tal - Kked Dist – Pune	R27 Heavy engineering including ship building (With investment)	40	Nil	ASP followed by PSF&ACF.	Gardening.
16	Keihin Fie Pvt. Ltd.	Plot No. B-3, Mahalunge, MIDC Chakan, Tal. Khed	R36 Industry or process involving metal surface treatment or process	82	75	Primary, secondary and tertiary treatment.	Reused and remaining gardening.
17	Mahindra Heavy Engine (formerly now as Mahindra)	Plot No. A-1/1, Chakan Industrial Area, Phase IV,	R04 Automobiles Manufacturing (integrated facilities)	371	1110	2 no .of STP having capacity 200 CMD each provided up to tertiary. ETP having capacity 1500 m ³ /d with Primary, Secondary Tertiary, RO & MEE.	60% Recycle & remaining in use for HRTS area 6.5 acrs
18	Mahindra Vehicle Manufacturers Ltd.	Plot No. A-1, Chakan Industrial Area, Phase IV, Tal:- Khed	R04 Automobiles Manufacturing (integrated facilities)	371	1210	ASP followed by PSF&ACF.	Gardening.
19	Mercedes-Benz India Private Limited	Plot No. E-3, MIDC Chakan, Phase-III, Kuruli and Nighoje, Tal:- Khed, Dist:-	R04 Automobiles Manufacturing (integrated facilities)	181	211	ASP followed by PSF&ACF.	100% recycle for paint process & gardening.
20	Redco Hotels Pvt .Ltd.	P-7, Phase-1, MIDC Chakan, Tal-Khed, Dist- Pune.	R29 Hotels (3 Star & above) and Hotels having 100 rooms and above	88.2	21.6	Primary treatment and then to STP	60% recycle and remaining discharged into municipal sewerage.

21	Sany Heavy Industries India Pvt. Ltd.	Plot No. E-4, Phase-III, MIDC, Chakan,Pune	R27 Heavy engineering includingship building (With investment)	29	0	ASP followed by PSF&ACF	Gardening
22	Schindler India Private Limited	Plot No. D-234, (L-23), MIDC Chakan,Phase-II, Tal:- Khed, Dist:- Pune	R36 Industry or process involvingmetal surface treatment or process	56	37	ASP followed by PSF&ACF	Gardening
23	Sigma Electric Manufacturing Corporation Pvt.Ltd.(Formerly known as Semco Electric Pvt. Ltd.	Plot No. A-2, MIDC Chakan, Tal- Khed, Dist- Pune	R36 Industry or process involvingmetal surface treatment or pro	100.9	97.7	ASP followed by PSF&ACF	85 CMD recycled and remaining 12.7 CMD for gardening.
24	Tetra Pak India Pvt. Ltd.	Plot. No. B-53, MIDC, Chakan,Phase - 2, Village- Vasuli,Tal - Khed	R36 Industry or process involvingmetal surface treatment or pro	40	259	Anaerobic, ASP followed by PSF&ACF	Gardening
25	Volkswagen India Pvt. Ltd.	Plot no. E-1, MIDC Indl, Area, Chakan,(Phase-III) Village- Noghoje, Mahalunge,Kharabwadi,	R04 Automobiles Manufacturing (integrated facilities)	300	800	ASP followed by PSF&ACF	Recycle and gardening.
26	Pudumjee Group of Companies. Pudumjee Pulp & Paper mills Ltd, &Pudumjee Industry Ltd.	Thergaon, Tal- Chinchwad, Dist- Pune		390	12050	ASP followed by PSF&ACF	8330 recycling , 3750 discharged to Pawana river
27	Badve Autocomps Pvt. Ltd.	A-3, MIDC Mahalunge,Chakan,Tal. Khed, Dist- Pune	R36 Industry or process involvingmetal surface treatment or process	44	34	Primary, secondary and/or tertiary treatment.	Reuse and gardening.
28	Endurance Magneti Marelli Shock Absorbers India Pvt.Ltd.	Plot No. B-23, MIDC Chakan,Vill-Nighoje,Tal- Khed, Dist- Pune.	R36 Industry or process involvingmetal surface treatment or process	30	30	Primary / secondary &/ or tertiary treatment.	Gardening
29	GE India Industrial Pvt. Ltd. (GE Wind Energy)	Plot no. B-17/1, Chakan MIDC Phase I, Tal-Khed, Dist-Pune	R66 Power Generation Plants [Except Wind, Solar and MiniHydel	114	88	ASP followed by PSF&ACF	Recycling and gardening
30	Huntsman International (I) Pvt. Ltd.	Plot. No. D - 113, MIDC Chakan,Phase - 2, Village- Bhambuli,Tal -	R06 Ceramics, Refractories	5.0	Nil	ASP followed by PSF&ACF	Soaked into soak pit and overflow used for gardening.
31	Lumax Industries Ltd.	608 ChakanTalegaon Road, Mahalunge,MIDC Chakan,Tal:- khed,	R36 Industry or process involvingmetal surface treatment or process				

32	Lustrous Industries	Plot No. A-26, MIDC Chakan, Tal:- Khed, Dist:- Pune	R36 Industry or process involving metal surface treatment or process				
33	Minda Industries Ltd	Plot No. B-6, MIDC Industrial area, Chakan, Pune-	R36 Industry or process involving metal surface treatment or process	32	9	ASP followed by PSF&ACF	Gardening
34	Minda Valeo Security System Pvt. Ltd.	Plot No. B-21, MIDC Chakan, Tal. Khed, Dist- Pune-410501	R36 Industry or process involving metal surface treatment or process	4.8	Nil	ASP followed by PSF&ACF	Gardening
35	Plastic Omnium Varroc Pvt. Ltd.	Plot. No. B-14/A, MIDC, Chakan, Tal - Khed,	R36 Industry or process involving metal surface treatment or process	9	7.5	ASP followed by PSF&ACF	Gardening
36	S.M. Auto Engineering Pvt. Ltd.	Plot No. B-1/6, MIDC Chakan, Talegaon Chakan Road, Mahalunge, Chakan, Tal:	R36 Industry or process involving metal surface treatment or process	39.70	22	ASP followed by PSF&ACF	Recycle and Gardening
37	Sansera Engineering (P) LTD.	B 18 Chakan MIDC Industrial Area	R27 Heavy engineering including ship building (With investment o	26	1	ASP followed by PSF&ACF	Recycle and Gardening
38	Semco Electric Pvt Ltd.	B 27, MIDC, Chakan Tal- Khed, Pune	R04 Automobiles Manufacturing (integrated facilities)	50	72	Primary / secondary &/ or tertiary treatment.	Recycle and Gardening
39	SHV Energy Pvt. Ltd.	Plot No. D-233/2, Phase-II, MIDC Chakan, Tal- Khed, Dist- Pune.	R59 Petrochemicals (Manufacture of and not merely use of as raw	3	Nil	Primary / secondary &/ or tertiary treatment	Soak effluent into soak pit and use overflow for gardening

Hinjewadi MIDC

Sr. no	Industry	Address	Industry Type	Effluent Qty in CMD		ETP/STP details	Disposal of treated effluent
				Domestic	Industrial		
1	Cognizant Technology Solutions India Pvt. Ltd.	Plot No. 16, Rajiv Gandhi Infotech Park, Phase-III (SEZ), MIDC Hinjawadi, Tal:- Mulshi	O39 IT / Infrastructure	300	Nil	Primary/Secondary and/or tertiary treatment.	Gardening
2	Emcure Pharmaceuticals Ltd	Plot No. P-2, International Biotech Park, Phase-II, MIDC Hinjewadi, Tal. Mulshi, Dist. Pune	R60 Pharmaceuticals (excluding formulation).	41	174	Primary/Secondary and/or tertiary treatment.	Gardening
3	Infosys Ltd.,	Plot No. 24, Rajiv Gandhi Infotech Park, Hinjawadi, Phase-II, Taluka Mulshi, Pune – 411057	O39 IT / Infrastructure	1888	96	ASP followed by PSF&ACF	60% recycled and remaining used for gardening.
4	SciGenBiopharma Pvt.Ltd.	Plot No.18, International Biotech Park, Phase - II, M.I.D.C. Hinjewadi, Tal- Mulshi, Dist - Pune	R60 Pharmaceuticals (excluding formulation).	15	227	ASP followed by PSF&ACF	108 CMD recycled and remaining for gardening.
5	Tech Mahindra Limited	Plot no 1, Phase III, Rajiv Gandhi Infotech Park, Hinjewadi, Pune - 411057, Phone : +91 20 66018100	O39 IT / Infrastructure				
6	Wipro Ltd	Plot No. 31, Rajiv Gandni Infotech Park, MIDC Phase-II, Hinjewadi, Pune	O39 IT / Infrastructure	235	Nil	MBBR based STP	60% recycle and excess discharge into municipal sewer.
7	3D PLM Software Solutions Ltd.	Plot no. 15/B, Pune infotech park MIDC Hinjawadi. Tal - Mulshi, Dist- Pune.	O39 IT / Infrastructure				
8	Acoris Research Ltd.	International Bio-Tech Park, Phase-2, Hinjewadi, Tal- Mulsi. Dist- Pune	R60 Pharmaceuticals (excluding formulation).				
9	Advinus Therapeutics Pvt Ltd	4th to 8th floor, Plot No. 9, Quantum Tower, Rajiv Gandhi Infotech Park, Tak:- Mulshi, Dist:- Pune.	R60 Pharmaceuticals (excluding formulation).	8	10	Primary/Secondary and /or Tertiary treatment	8 CMD recycle and 2 CMD used for gardening

10	Cognizant Technology Solutions India Pvt. Ltd.	Plot No. 26 & 27 , Rajiv Gandhi Infotech Park, MIDC, Hinjewadi, Pune - 411057	O39 IT / Infrastructure	100	Nil	ASP followed by PSF&ACF	Common STP by MIDC
11	Emerson Design Engineering Center,	Plot No. 23, Rajiv Gandhi Infotech Park, Phase-II, Hinjewadi, Village- mann, Tal- Mulshi, Dist- Pune.	O39 IT / Infrastructure	50	Nil	ASP followed by PSF&ACF	80% recycled, reused and remaining to municipal sewer.
12	Gennova Biopharmaceuticals Ltd.	1st and 2nd floor, (1/2 part, LHS), IBPL, Chrysalis Enclave, Building No.2, Plot No. 2A, MIDC Hinjewadi, Phase-II, Tal. MULshi, Dist. Pune	R60 Pharmaceuticals (excluding formulation).	6	13	ASP followed by PSF&ACF	Other (Facility provider)
13	Global Training & Development Center of Patni Computer	Plot. No. 14, Rajiv Gandhi Infotech Park, Hinjewadi, Phase-III, SEZ, Mulshi, Man,	O39 IT / Infrastructure	294	Nil	ASP followed by PSF&ACF	80% recycled, reused and remaining to municipal sewer.
14	International Biotech Park	Plot no. 2 A (Phase - II) Tal.- Mulshi Hinjewadi	R60 Pharmaceuticals (excluding formulation).	20.4	45	Primary/Secondary and /or Tertiary treatment	Gardening
15	Lupin Ltd	1st & 2nd Floor, Genesis Square Bldg. Phase-II, International Biotech Park,	R60 Pharmaceuticals (excluding formulation).	10	22	ASP followed by PSF&ACF	Facility provided by IBPL
16	Omni Acitice Health Technology Pvt. Ltd.	38/39 IBP phase -II hinjewadi Tal- Mulshi. Dist- Pune.	R60 Pharmaceuticals (excluding formulation).	4	57	Primary, secondary, tertiary treatment comprising 1 st followed by 2 nd RO	Recycle in cooling and gardening
17	Panchsil Tech Park Pvt. Ltd.	Plot No. 15 A, Rajiv Gandhi Info Tech Park Phase -I, Indl. area, Hinjewadi Pune	IT & ITES Activity	55	Nil	ASP followed by PSF&ACF	Overflow of septic tank and soak pit connected to MIDC drain finally goes to CSTP Hinjewadi

18	Persistent Systems Pvt. Ltd.	Plot No. 39, Ph-1, MIDC Hinjawadi, tal:- Mulshi, Dist:- Pune	O39 IT / Infrastructure	108	Nil	Nil	Discharged into MIDC sewerage line for treatment at common STP provided by MIDC Hinjewadi
19	Pune Embassy Projects Pvt. Ltd	Plot No. 3 A, Rajiv Gandhi Infotech Park, Ph-II, MIDC Hinjawadi, Dist. Pune	O39 IT / Infrastructure	1280	Nil	ASP followed by PSF&ACF	80% recycled and remaining used for gardening.
20	Quadron Business Park Ltd.,DLFAkruti Info Parks (Pune) Ltd.	Plot No. 28, MIDC Hinjawadi, Tal:- Mulshi, Dist:- Pune	O39 IT / Infrastructure	700	Nil	ASP	80% recycled and remaining discharged to municipal sewer.
21	Tata consultancy services Ltd.	Sahyadri Park, Phase - 1, Plot.No. 2,3, RGIP, Phase III, Hinjewadi, Pune.	O39 IT / Infrastructure				
22	Venkateshwara Hatcheries Pvt.Ltd. (VentriBio.Vaccine Div)	Plot No.20, Rajiv Gandhi ITBT Park, Hinjewadi, Vill.Mann, Tal - Mulshi, Dist - Pune	R60 Pharmaceuticals (excluding formulation).	8	43	Primary/Secondary and /or Tertiary treatment	Gardening
23	Infosys Ltd.,	Plot No. 1, Rajiv Gandhi Infotech Park, Hinjawadi, TalukaMulshi,Pune – 411057	O39 IT / Infrastructure	192	Nil	ASP followed by PSF&ACF	60% shall be reused & recycled and remaining shall be discharged in municipal sewer.

TALEGAON MIDC -							
Sr no	Industry	Address	Industry Typ.	Effluent Qty. in CMD		ETP/STP details	Disposal of treated effluent
				Domestic	Industrial		
1	General Motors India Pvt.Ltd.	A-16,MIDC Talegaon Industrial Area,Near Floriculture Park,Talegaon-NavalakhUmbreVillroad, Tal - Maval	R04 Automobiles Manufacturing (integrated facilities)	257	900	Primary treatment system	Discharge into sewer collection sump and pumping station provided by MIDC leading to terminal CETP Talegaon.
2	INA Bearings India Pvt. Ltd.	Plot No. A-3, MIDC Talegaon, Village NavalakhUmbre, Tal:- Maval, Dist:- Pune	R04 Automobiles Manufacturing (integrated facilities)	66.5	4	ASP followed by PSF&ACF	Metal bearing effluent 100% recycle. On land for gardening.
3	J.C.B. India Limited.	Plot No. A & B, Talegaon Floriculture &Indl. Park, Vill-Ambi, Tal-Maval	R27 Heavy engineering including ship building(With investment o	250	12	ASP followed by PSF&ACF	Gardening
4	Larson & Toubro Ltd.	Plot No.A-5,A-7,A-10,A-11 MIDC Talegaon,NavlakhUmbre Tal-Maval,Dist- Pune	R36Industry metal surface & painting activity	50	Nil	ASP followed by PSF&ACF	Gardening
5	Husco Hydraulics Pvt Ltd.	Plot No. A-4, MIDC Talegaon, Tal:- Maval, Dist: Pune	R27 Heavy engineering includingship building(With	10	0.5	Primary/Secondary and /or Tertiary treatment	Gardening
6	Ognibene India Pvt Ltd.	Plot No.A-13, MIDC Talegaon, Tal-Maval.	R04 Automobiles Manufacturing (integrated facilities)	3	1.5	Primary/Secondary and /or Tertiary treatment	Gardening
7	Shrinivas Engineering Auto Components Pvt. Ltd.	Plot No. A-24, MIDC Talegaon,Phase-IV, Tal - Maval, Pune.	R35 Foundry operations	45 m3	Nil	ASP	Gardening
8	Toyota Kirloskar Motor Pvt.Ltd.	Plot No.A-17/1,Talegaon Industrial Area,Tal - Maval, Dist - Pune	R36 Industry or process involving metal surface treatment	5 m3	Nil	ASP	Gardening
9	Victor Reinz India Pvt. Ltd.	Plot No. A-20, Talegaon Ind. Area, Village-Navlakhumbre, Tal-Maval, Dist- Pune	R27 Heavy engineering includingship building(With				

NON MIDC AREA

Sr. no	Industry	Address	Industry Type	Effluent Qty in CMD		ETP/STP details	Disposal of treated effluent
				Domestic	Industrial		
1	Behr India Pvt.Ltd.	Gat No.626/1,626/2,622/1/0, 29,Milestone ,Pune-Nashik Road,Vill-kuruli,Tal-	R36 Industry or process involving metal surface treatment or pro	23	Nil	ASP followed by PSF&ACF	Recycle &Gardenin g
2	Bharat Forge Ltd	Gat. no. 635, Kuruli Tal.-Khed	O31 Forging of ferrous and non-ferrous metal (using oil or gas	32	15	ASP followed by PSF&ACF	Gardening
3	Bhimashankar Sakhar Karkhana Ltd.	A/P Dattatraya Nagar ,Pargaon,Tal - Ambegaon,D	R74 Sugar(excluding Khandsari)	44	Sugar :- 261.5 Co-Gen:- 50.0	ASP followed by PSF&ACF	Irrigation
4	Brintons Carpet Asia(P)Ltd.	G.No.414,415,416,Vi ll- Urawade,Tal- Mulshi.	R84 Yarn and textile processing involving any effluent/ emission-generating process, bleaching, dyeing, printing and scouring	54	152	ASP followed by PSF&ACF	152 CMD recycled and reused and remaining shall be disposed to Irrigation on 12 acres of own land.
5	DGP Hinoday Industries Ltd. (Mahindra Hinoday Industries Ltd.)	(Automotive Casting Group Unit- II)Gat No.318,Urse,TqMavali,Dist- Pune.	R04 Automobiles Manufacturing (integrated facilities)	124	Nil	ASP	Gardening.
6	Endurance Technologies Pvt. Ltd..	Gat No.416, Takwe Budruk, Vadgaonmaival, Tal-Maval	R04 Automobiles Manufacturing (integrated facilities)	60	140	Primary/Secondary and /or Tertiary treatment	Gardening
7	FinolexCables Ltd.(Urse Cable Div)	Gat No. 346, 375, 376, 374 Village– Urse, Tal. Maval, Dist. Pune	G67 Polythene & plastic processed products manufacturing	23	Nil	ASP	Gardening
8	Gabrial India Ltd.	29 th , MailStone, Pune Nashik Road High way, Vill-Kuruli, Tal .- Khed, Dist.- Pune	R36Industry or process involving metal surface treatment or pro	53	28	ASP followed by PSF&ACF	Segregate metal bearing effluent and reused back in process and remaining on land for gardening.
9	GKNDriveline (India) Ltd.	Gat no.16,18(Part), 22, 23, 24, 744,745, Village Lonikand,	R27 Heavyengineering includingship building (With	14.5	0.35	Primary/Secondary and /or Tertiary	Gardening

		Tal:- Haveli	investment)			treatment	
10	Hindustan Coca Cola Beverages Pvt. Ltd.	1105, 7, 8, 33, Pirangut, Tal:- Mulshi, Dist:- Pune	R19 Fermentation industry including manufacture of yeast, beer,	70	440	ASP followed by PSF&ACF	100 CMD recycle in process and remaining 340 used on land for gardening.
11	Hindustan Electricity Generation Company Pvt.Ltd.	SurveyNo.613-631,634-637,644,645,650-652,799-818,836of Navlakhumb re & Survey No.11,12,23,25,81 of Village Badhalwadi, Tal - Maval	R66 PowerGeneration Plants [Except Wind, Solar and Mini Hydel	28.80	495	ASP followed by PSF&ACF	Gardening
12	Jaya HindIndustries Ltd.(Foundry Expansion Project)	Gat No. 350and Others, Urse, Tal- Maval	R27 Heavyengineering including ship building (With investment)				
13	Loreal India Pvt. Ltd.	Gat No. 426,600/1, 600/2,601/1, Mahalunge- Ingle, Chakan- Talegaon Road, Chakan,Tal: Khed, Dist:-	O45Manufacturing of toothpowder, toothpaste, talcum powder and other cosmetic items	38	242	ASP followed by PSF&ACF	50 CMD reclaimed & reused for flushing, vessel washing and remaining for gardening
14	LupinLimited (Biotech Unit)	Gat No. 1156, Pirangut, Ghotawade, Tal:- Mulshi, DIst:- Pune	R60Pharmaceutic als (excluding formulation).	10.25	35.3	ASP followed by PSF&ACF	Recycle
15	LupinLtd.(Research Park).	46/47,VillageNande, Tal- Mulshi,Dist- Pune.	R60 Pharmaceuticals (excluding formulation).	75	111	ASP followed by PSF&ACF	Gardening
16	Mahindra Forging Ltd.	Gat No:-856 to 860,Chakan- Ambethan Road, Tal- Khed,Dist- Pune.	R21 Ferrous and Non ferrous metal extraction involving different furnaces through melting, refining, reprocessing , casting and alloy making	156	17	ASP followed by PSF&ACF	Gardening
17	Mahindra Hinoday Industries Ltd.	Gat No.309,318 & Others, Urse, Tal:-	R35 Foundry operations	124 m3	Nil	ASP	Gardening
18	Matrix The Innovation Center (Division of Praj Industries Ltd	Gat No. 402,403,109 8, At- Urawade, Tal- Mulshi, Dist- Pune	O50 Pharmaceutical formulation and for R&D purpose / Category not define	10.5	8.0	ASP followed by PSF&ACF	Reused and gardening
19	Mondelez India	Gat No. 532 & 533,	R47 Milk				

	Foods Ltd.(Formerly known Cadbury India Ltd.)	Induri, TalegaonDabhade	processing and dairy products (integrated project)				
20	Mothersonutomotive Technologies Engineering.	Gat No 150, Village Ambethan. Tal Khed, Dist Pune.	R36 Industry or process involving metal surface treatment or	14.24	4.10	ASP followed by PSF&ACF	Recycled to max extent in paint booth and excess on land of 2.33 acres for gardening.
21	Resort &Health Farm Writer Lifestyle Pvt.Ltd.	Village Shillim&Chawsar, Tal:- Maval, Dist:- Pune	R29 Hotels (3 Star & above) and Hotels having 100 rooms and				
22	KalyaniForge Ltd	Gat No. 611to 614, 684, 685, KoregaonBhima, Tal- Shirur, Dist- Pune.	R21 Ferrous and Non ferrous metal extraction involving different furnaces through melting, refining, reprocessing , casting and alloy making	68	28	ASP followed by PSF&ACF	On land for gardening and recycle
23	Magneti MarelliMotherson Auto system Ltd.	Gat No. 148-150, Village Ambethan, Tal:- Khed, Dist:- Pune	R36 Industry or process involving metal surface treatment or	Nil	Nil	Nil	Nil
24	Rieter India Pvt.Ltd.	Vadu Road,KoregaonBhima, Tal: Shirur, Dist:Pune.	R36Industry or process involving metal surface treatment or pro	12	0.3	ASP followed by PSF&ACF	On land for gardening
25	Seco Tools India Pvt. Ltd.	Gat No. 581,582, Pune Nagar Road, Koregaon Bhima, Tal - Shirur	R36Industry or process involving metal surface treatment or pro	34.40	5.84	ASP followed by PSF&ACF	On land for gardening and recycle
26	SemcoElectricPvt.Ltd	Unit-1, GatNo.154/155, Mahalunge, Chakan-TalegaonRoad,Chakan, Tal-Khed,	R36 Industry or process involving metal surface treatment or pro	27.5	20	Primary/Secondary and /or Tertiary treatment	Recycle and Gardening
27	Spicer India Limited	29,Miestone, Pune-Nashik Rd, Vill-Kuruli, Tal-Khed	R36 Industry or process involving metal surface treatment or	62	19	Primary/Secondary and /or Tertiary treatment	Gardening
28	Suzlon Generators Ltd.	Gat no.339/3/1, A/P-Mahalunge, Tal-Khed, Dist- Pune	R36 Industry or process involving metal surface treatment or	18.5	Nil	ASP	Gardening
29	TATA Blue scope Steel Ltd.	S. No, 247 & 250, Hinjewadi, Tal-Mulshi, Dist-Pune.	R36 Industry or process involving metal surface treatment or	55	2	ASP followed by PSF&ACF	Max reuse , recycle and remaining on land for Gardening
30	Tata Autocomp Systems Ltd.	S.No. 280 and 281, Village- Mann,Tal-	R27 Heavy engineering	28	1.5	ASP followed	Recycle and

	(Interior and Plastic Division)	Mulshi,Dist- Pune	including ship building (With investment			by PSF&ACF	Gardening
31	Tata Autocomp Systems Ltd. Interiors and Plastics Division	S. No. 235 &245, Village Hinjawadi, Tal- Mulshi	G67 Polythene & plastic processed products manufacturi	54	45	Primary/Secondary and /or Tertiary treatment	Recycle and Gardening
32	VarrocLighting systems (I) Pvt. Ltd.	Sr.no. 279, Village-Mann,Tal-Mulshi,Dist- Pune	R04 Automobiles Manufacturing (integrated facilities)	14	16	ASP followed by PSF&ACF	Recycle and Gardening
33	Virgo Engineers	RaisoniPark,277, 278 Hinjawadi Phase II, Maan Tal-Mulashi,Dist- Pune	R36 Industry or process involving metal surface treatment or	35	1.5	Primary/Secondary and /or Tertiary treatment	Recycle and Gardening
34	Vishay Components India Pvt. Ltd.	A/P.-Lonikalbhor Tal.-Haveli	R36Industry or process involving metal surface treatment or	235	18.37	ASP followed by PSF&ACF	Max. recycle and remaining on land for Gardening
35	Western India Inns and Resorts Ltd.	Survey No. 3/A/1, Opp. RayewoodPARl, INS ShivajiRaod, Vill.- Lonavala, Tal. Mawal, Pune	R29 Hotels (3 Star & above) and Hotels having 100 rooms and above	52	20	Primary/Secondary and /or Tertiary treatment	80% Recycle and Gardening
36	Yeshwant SahakariSakharKarkhana Ltd	Chintamaninagar, Theur, Tal:- Haveli, Dist:- Pune.	R15 Distillary /				
37	Yeshwant SahakariSakharKarkhana Ltd. (Sugar	Chintamaninagar, Theur, Tal:- Haveli, Dist:- Pune.	R15 Distillary / R74 Sugar (excluding Khandsari) /				
38	Matrix The Innovation Center (division of Praj Industries Ltd.	Gat No. 402,403,1098, at Uravade, Tal-Mulshi, Dist – Pune	O50 Pharmaceutical Formulation and for R&D purpose / Category not define.	10.5	8.0	ASP followed by PSF&ACF	Max. recycle and remaining on land for Gardening
39	Ascent Hotel P Ltd. Hyatt Regency (5 Star Hotel)	32/1, A & B, Weikfield IT Park, Wadgaonsheri, Pune-nagar road, Tal-Haveli, Pune-411004		189	7.4	Primary/Secondary and /or Tertiary treatment	60% shall be reused and recycled and remaining shall be discharged in municipal sewer.
40	Taj Blue Diamond Hotel “Vivanta”	Plot no 11, Koregaon Road, Pune		110	5	Primary/Secondary and /or Tertiary treatment	60% treated effluent shall be recycled/re used and remaining shall be used for

							gardening.
41	M.T.D.C. & Co, Ltd "Magarpatta City Township"	S. No 115, 116, 126-130, 138-148, 149(P), 254,288(P), Hadapsar, Pune		4342	0	ASP followed by PSF&ACF	60% secondary and gardening.
42	AakarFoundry Pvt. Ltd.	S. No.341/2, SomatanePhata, TalegaonDabhade, Tal:- Maval,	R21 Ferrousand Non ferrous metal extraction involving different	4	0	Septic tank and soak pit ASP	on land for Gardening
43	Bobst IndiaPvt. Ltd.	Plot. No. 82,128-132, Village-KasarAmboli,Post -Ambadvet,Tal - Mulshi, Dist - Pune.	PowderCoating	11	1.8	ASP followed by PSF&ACF	on land for Gardening
44	Chemetall Rai India Ltd	Gat No 569,Village KoregaonBhima, Tal- Shirur (Ghodnedi), Dist-Pune.	R05 BasicChemicals and electro chemicals and its derivatives in	12	23	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
45	Cummins India Ltd	G.No.311/1B,A/p-KasarAmboli,Tal-Mulshi.	R36Industryor process involving metal surface treatment or process	20	5	ASP followed by PSF&ACF	Gardening
46	Electromech Material Handling Systems (India) Pvt. Ltd.	Gat no 316Plot no 1A,1B Industrial Area, At /P KasarAmboli,TalMulshi,Dist	R27 Heavyengineering includingship building (With investment	23	0	ASP	Gardening
47	GangaPapers India Ltd.	Gat No.241to 244, vill. Bobedohal, Borgaon, Tal- Mval, Dist - Pune	R61 Pulpand Paper (Paper manufacturing with or without	20	232	ASP followed by PSF&ACF	and on land for Irrigation
48	High Explosive Factory	SurvyNo.175, Khadaki, Tal- Haveli, Dist - Pune	R41Manufacturing of Explosives, detonators, fuses including	350	3500	ASP followed by PSF&ACF	Gardening
49	Hindustan Petroleum Corporation Limited (Lonierminal Tank Farm	A/pLonikalbhor,Tal:- Haveli, Dist:- Pune	R59Petrochemicals (Manufacture e of and not merely use of as raw	0.2 m3 (Mumbai to pune pipeline) 4.0 m3(Pune Solapur pipeline)	Nil	Soaked in soak pit	Gardening
50	Hindustan Petroleum Corporation Ltd.	ChakanTalegaon Road, Village Mahalunge, Tal-Khed	R44Manufacturing of Lubricating oils, greases orpetroleum	3	10	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
51	HotelHoliday Inn	Sr.No.9/9/1,Mumnai Bangalo Highway, Nr. ChatrapatiShivaji Stadium, Mahalunge villag,Pune-	R29 Hotels(3 Star & above) and Hotels having 100 rooms and above	141	Nil	ASP	100% recycled for secondary purpose
52	HUF IndiaPvt. Ltd.	Gat. No. 304(P), Village-	R36Industry or process involving	10	0	Septic tank and soak	Gardening

		Nanekarwadi, Tal - Khed, Dist - Pune.	metal surface treatment or			pit provided	
53	Kider India Pvt. Ltd.	Old Gat. No.851/2, New Gat. No.584/2, Koregaon Bhima, Tal - Shirur, Dist -	R36 Industry or process involving metal surface treatment or	7	25	ASP followed by PSF&ACF	Gardening
54	Kores (India) Ltd.	Gat no-149, Mahalunge, Chakan Foundry Division, Tal- Khed	R35 Industry or process involving foundry operations	25	Nil	Septic tank and soak pit provided	Gardening
55	Lumax Industries Ltd.	608 Mahalunge, Chakan- Talegaon road, Chakan	R36 Industry or process involving metal surface treatment or				
56	Mahindra Conveyor Systems Pvt. Ltd.	Gat. No. 316 to 319, Village- Ambadvet, Tal - Mulshi, Dist - Pune.	R27 Heavy engineering including ship building (With investment)	19.6	Nil	ASP	Gardening
57	Mahindra Holiday And Resorts India Ltd.	Gat No. 375, 380, 382-395, 401 & 402, A/p Tungi Village, Tal:- Maval, Dist:-	R29 Hotels (3 Star & above) and Hotels having 100 rooms and above	180	Nil	ASP	80% recycled and remaining discharged to municipal sewer.
60	Mahle Filter Systems (India) Limited	Gat No.410/411, Mouje Urawade, Tal. Mulshi, Dist. Pune	R36 Industry or process involving metal surface treatment or	25.70	5.0	ASP followed by PSF&ACF	Gardening
61	Maxtech Sintered Products Pvt. Ltd.	Gat No. 127, A/p- Mangrul, Tal- Maval, Dist- Pune	R36 Industry or process involving metal surface treatment or				
62	Mubea Suspension (I) Ltd.	S. No. 1072, Pirangut, Tal:- Mulshi, Dist:- Pune	R36 Industry or process involving metal surface treatment or	15	30	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
63	Nord Drive System Pvt. Ltd.	282/2/283/2, Plot no..15, Village.- Mann, Tal.- Mulshi	R04 Automobiles Manufacturing (integrated facilities)	2	0.5	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
64	Ordance Factory	Dehu Road, Tal- Haveli, Pune	R41 Manufacturing of Explosives, detonators, fuses including	1100 m3	Nil	ASP	Gardening
65	Oriental Rubber Industries Ltd.	Gat No.519/2, Koregaon Bhima,	R79 Synthetic rubber excluding	28	0.15	Primary/Secondary and /or Tertiary treatment	Recycle and on land for Gardening
66	Racold Thermo Ltd.	Gat No.264/374/376, Kharabwadi, Tal:- Rajgurunagar Khed, Dist:-	R36 Industry or process involving metal surface treatment or	15	79.90	ASP followed by PSF&ACF	Gardening
67	Rama Krishi Rasayan.	Loni-Kalbhori, Gat No-43, Tal- Haveli.	R20 Fertilizer (Basic) (excluding formulation)	7	103.5	ASP followed by PSF&ACF	Gardening

68	Rinder India Pvt. Ltd.	Gat. No.148, Mahalunga (i), Chakan, Talegoan Road, tal. Khed, Dist.	R36Industry or process involving metal surface treatment or	20	Nil	ASP	Gardening
69	S.M. Auto engineering Pvt. Ltd.	Gat No. 299,Nanekarwadi ,Chakan, Tal. Khed, Dist-Pune	R36Industry or process involving metal surface treatment or	35	0.9	ASP followed by PSF&ACF	Recycle upto max extent and dispose on land for gardening
70	Shri santTukaram S.S.K.Ltd.	Kasarsai sr.no.17,25,26,,27 ,Darumbre sr.no.146,147,148,149,151,152,/1Ka sarsai-Darumbre, Tal,- Mulashi,dist- Pune	R74 Sugar (excludingKhandsari)	40	350	Primary/Secondary and /or Tertiary treatment	Gardening
71	SMEberspaecher ExhaustPvt Ltd	310B,Nanekarwadi, Chakan, Tal - Khed, Dist-Pune.	R36Industry or process involving metal surface treatment or	16.08	1.80	ASP followed by PSF&ACF	Gardening
72	TataJohnson Control Automotive Ltd.	Plot No. 1,S.No235/245, Hinjewadi, Tal.- Mulshi	R04Automobiles Manufacturing (integrated facilities)	50	Nil	ASP	Gardening
73	Tata MotorsLtd .(Maval Foundry).	P.OBebdohol,S. No.59-62, Off Mumbai- Pune Highway,Tal-Maval,Dist-	R35Industry or process involving foundry operations	80	Nil	ASP	Gardening
74	TekElectromechanicals Pvt. Ltd.	KesnandRahu Road, Kesnand, Wagholi	R36Industry or process involving metal surface treatment or				
75	TheSupreme Industries Ltd.	Gat No. 453to 458, At/Post - Kanhe, Tal. Maval, Dist. Pune	G67Polythene & plastic processed products manufacturing	18	3	ASP followed by PSF&ACF	Gardening
76	TUV India Pvt Ltd	S.No.42,Hissa No.3/1 & 3/2, Village- Sus, Tal- Mulshi, Dist- Pune.	R05 BasicChemicals and electro chemicals and its derivatives				
77	VarrocLighting systems (I) Pvt. Ltd.	Sr.no. 279,Village-Mann,Tal-Mulshi,Dist- Pune	R04Automobiles Manufacturing (integrated facilities)	14	16		Recycle and on land of 3.71 acres for Gardening
78	VarrocPolymers Pvt. Ltd. (VPPL-I)	Gat No. 390,Takve (Bk), Tal. Maval, Dist:- Pune-412106	R36Industry or process involving metal surface treatment or	25	4.5	Primary/Secondary and /or Tertiary treatment	Recycle upto max extent and dispose on land for gardening
79	Venky(India) Ltd. (Food Devision)	Village-Baur, Tal-Maval, Dist-	R71Slughter house	50	600	Primary/Secondary and /or Tertiary	Recycle upto max extent and dispose on

						treatment	land for gardening
80	VisteonAutomotive Systems India Pvt. Ltd.	S.No.283/2,Plot no.II, Raison Industrial Park, Village- Man, Tal.- Mulshi	R36 Industry or process involving metal surface treatment or	13.80	3.25	ASP followed by PSF&ACF	Gardening
81	WesternIndia Inns and Resorts Ltd.	Survey No.3/A/1, Opp. RayewoodParl, INS ShivajiRaod, Vill.- Lonavala, Tal. Mawal, Pune	R29 Hotels(3 Star & above) and Hotels having 100 rooms and above	52	20	Primary/Secondary and /or Tertiary treatment	80 % recycle and reuse and remaining utilized on land for gardening
82	The Westin hotel-Classic Citi Investment Pvt. Ltd. (Five star)	Sr. No. 36/3-B, Koregaon Park Annex, Near ABC Farm , Ghorpadi, Tal- Haveli, Pune-001.		351	37.5	Primary/Secondary and /or Tertiary treatment	100% Recycled and reused .

PIMPRI-CHINCHWAD MIDC

Sr. no	Industry Name	Address	Type	Effluent Qty in CMD		ETP/STP details	Disposal of treated effluent
				Domestic	Industrial		
1	Alfa Laval (I) Ltd.	S-No.2221(b), Pune-Mumbai Road. Dapodi.	R-27 Heavy Engineering.	50	53	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
2	Atlas Copco (I) Ltd	Mumbai Pune Road, Dapodi	R-27 Heavy Engineering.	35	0.2	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
3	Bajaj Auto Ltd.	Servey no. 51A, 82,67,86 Mumbai Pune Road, Akurdi.	R-4 Automobiles Manufacturing (Integrated Facilities)	546	574	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
4	Finolex cables Ltd.	26/27, Mumbai Pune Road,Pimpri , Pune.	R-27 Heavy Engineering.	35.2	Nil	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
5	Force Motors Ltd	Mumbai-Pune Road, Akurdi	R-4 Automobiles manufacturing (Integrated Facilities)	720	200	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
6	GKN sinter Metals Ltd.	146 Mumbai-Pune Road, Pimpri	R-27 Heavy Engineering.	48	0	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
7	Hindustan Antibiotics Ltd.	Mumbai Pune Highway, Pimpri	Pharmaceuticals (Excluding Formulation)	1200	1000	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
8	PMT Machines Limited	P.O.Box.No.1102, Pimpri, P.F.	R-27 Heavy Engineering.	40	30	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
9	Premier Ltd.	Mumbai-Pune Road, Chinchwad, Pune	R-4 Automobiles manufacturing (Integrated Facilities)	110	6.3	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
10	Pudumjee Pulp & Paper Mills Ltd.	Thergaon, chinchwad	R-61 Pulp and Paper (Paper Manufacturing with or without pulping)	390	12050	Primary/Secondary and /or Tertiary treatment	Treated domestic Reused and on land for Gardening. 8300 m ³ /d treated industrial shall be reused and 3750 m ³ /d

							sent to Pawana river.
11	Sandvik Asia Ltd.	S.No.459 to 469, Mumbai –Pune Road, Dapodi, Pune-12	R-27 Heavy Engineering.	180	70	Primary/Secondary and /or Tertiary treatment	90 % Reused and on land for Gardening and balance to nalla.
12	SKF India Ltd.	S.No.159 to 162, 169, 186, Chinchawad	R-27 Heavy Engineering.	250	120	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
13	Tata Motors ltd.	Pimpri.	R-4 Automobiles manufacturing (Integrated Facilities)	3810	6047	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
14	Tata Motors Ltd. (Passenger Car Unit)	Sector no. 15 & 15A, PCNTDA, Chikhali, Tal.Haveli.	R-4 Automobiles manufacturing (Integrated Facilities)	720	3120	Primary/Secondary and /or Tertiary treatment	Recycle to maximum extent used and on land for Gardening
15	Tata Motors Ltd.	Chinchwad	R-4 Automobiles manufacturing (Integrated Facilities)	175	380	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
16	Thyssen Krupp Industries India Pvt. Ltd.	s.No.202/1,206/4,207/2, Pimpri, Pune-18	R-27 Heavy Engineering.	105	1	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
17	M/s. Sayaji Hotels Limited	Mumbai Bangalore bypass highway	R-29 Hotels and restaurants	124	Nil	Primary/Secondary and /or Tertiary treatment	Reused to maximum extent and on land for Gardening
18	Jayhind Industries Ltd.	S.no.61/2, Mumbai Pune, Rd, Akurdi, dist-pune	R-27 Heavy Engineering.				
19	Indian card clothing Co .Ltd.	Mumbai-Pune Rd. Pimpri.	R-27 Heavy Engineering.	30	12	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
20	Dai Lchi Karkaria Ltd.	Mumbai Pune road, Kasarwadi, Pune – 34	R-56 Organic chemicals Manufacturing	18	250	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
21	Edifice Recreational clubs Pvt. Ltd.	Recreational centre, sector 18, PCNTDA, Chikhali, Tal. Haveli, Dist. Pune	R-29 Hotels (3 star and above)				
22	KSB pumps Ltd (IPD)	Mumbai-Pune Rd. Pimpri, Pune.	R-27 Heavy Engineering.	50	1	Primary/Secondary and /or	Reused and on land for

						Tertiary treatment	Gardening
23	Premium Transmission Limited	Mumbai-Pune Road, Chinchwad, Pune	R-27 Heavy Engineering.	45	0.7	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
24	Greaves Ltd. (Diesel engine Unit)	Mumbai-Pune Road, Chinchwad, Pune	R-27 Heavy Engineering.	100	5	Primary/Secondary and /or Tertiary treatment	Recycle to maximum extent & on land for Gardening
25	Pudumjee Industries Ltd.(Pudumjee Agro Industries)	Thergaon, Chinchwad, Pune	R-61 Pulp –Paper (Paper Manufacturing with or without pulping)				
26	Mather and Platt Pumps Ltd.	Mumbai-Pune Road, Chinchwad, Pune-19	R-27 Heavy Engineering.				
27	Eaton Fluid Power Limited	S.No.-145, Off Mumbai-Pune road, Pimpri, Pune-18	R-27 Heavy Engineering.	30	15	Primary/Secondary and /or Tertiary treatment	Reused and on land for Gardening
28	Elpro Internationals ltd.	Sr.No.170,175,176,180 ,to 185. Chinchwad	R-27 Heavy Engineering.	1.2	0.5		land for Gardening

**Units allowed to treat and discharge into river earlier but now told to
treat and use on their own land for disposal.**

Sr. No.	Name of Industry	Water supply(KLD)		Sewage Generation(KLD)		Treatment
		Domestic	Industrial	Domestic	Industrial	
1	M/s. Tata Motors Ltd. Pimpri Works, Pune	4500	8500	3810	6015	All Industries give primary, secondary and tertiary treatment for both domestic and industrial sewage, use it for gardening and remaining discharged into river. Treated sewage discharged into river is within Limits of discharge.
2	M/s. Tata Motors Ltd. Passenger car unit, Sector 15 Chikali, Tal Havelli Dist. - Pune	1300	4900	720	4230	
3	M/s. Padmajee Pulp & Paper Mills Ltd. Thergaon, Chinchwad Pune	250	5800	200	5500	
4	M/s. Rama Krushi Rasayan Loni Kalbhor unit no 43 Tal – Havelli Pune	18.3	376.7	7	130	
	Total	6068.30	19576.70	4737	15875	
5	M/s. Ordinance factory Dehu road, Pune	1500	1300	1100	550	Earlier committee has given permission to discharge primary treated sewage. Amendment has done to reuse the treated sewage for gardening.
6	M/s. High Explosive factory Khadki, Pune	378	3784	350	3500	
7	M/s. Ammunition factory Khadki, Pune	670	1668.75	603	1501.25	
	Total	2548	6752.75	2053	5551.25	

Sr. No.	Area	Domestic sewage m ³	Industrial effluent m ³
1	Total of all industries	27082.27	39039.46
2	Units allowed to discharge earlier	4737	15875
3	Ordinance factories	2053	5551.25
	*Total m³	33872.27	60465.71
	*This does not includes small scale units.		

POLLUTION LOAD FROM THOSE INDUSTRIES.

Influent and effluent Quality of waste water from each industrial unit in terms of BOD, COD, Conductivity, Heavy metals, Toxic Chemicals, Pesticides etc.

As there are no chemical zones in the study area, most of the major industries are engineering, automobile or similar nature and pesticides, heavy metals or similar parameters are absent in the effluent.

A typical raw effluent analysis for few industries reads as follows,

Sr. No.	Parameter	Sandvik Asia		Schindler		John Deere	
		Domestic	Industrial	Domestic	Industrial	Domestic	Industrial
	Flow m ³ /day	120	70	60	40	---	120
1	pH	6.5 to 7.5	6 to 8	6.5 to 7.5	6-9	-----	7.5
2	Oil and Grease		BDL	20	10	-----	120
3	Suspended solids	200-250	300-350	150	800	-----	1600
4	Total dissolved solids	350	2000	----	2000	-----	1928
5	27°C 3 day's BOD	250-300	100-120	700	60-80	-----	733
6	COD	400-600	300-400	300	150-200	-----	1475
7	Sulphates	----		----	40	-----	
8	Chlorides	----		----	100-140	-----	
9	Phosphate	-----	-----	-----	-----	-----	2.5

Note : All values except pH expressed as mg/l.

Treatment technology adopted and process.

Industries in study area are asked to treat their effluents and either use in their process or use in the gardens. Hence depending upon strength of the effluent, treated effluent quality is same and in some cases it is followed by Reverse Osmosis to minimise Total dissolved solids which helps industry reuse water for process. In order to meet reuse standards industry has used all available treatment methodologies. These includes following,

1. Physico-Chemical treatment to reduce Oil, Heavy metals, Suspended solids etc.
2. Anaerobic treatment to treat effluents of high organic strength. This includes,
 - Upflow Anaerobic Sludge Blanket Reactor (UASB)
 - Anaerobic digester with media.
3. Activated sludge process with its various variants like,
 - Extended Aeration system,
 - Sequential Batch Reactor, (SBR)
 - Moving bed Bio Reactors (MBBR)
 - Membrane Bio Reactors (MBR)

4. Tertiary Treatment to include,
 - Pressure sand filter
 - Activated Carbon Filter
 - Disinfection system with NaOCl, UV. Ozone etc.
5. Reverse osmosis system (RO) to reduce dissolved solids
6. Multi Effect Evaporation system using both Thermal and Membrane system.

So virtually all the available processes are used by the industry to achieve their target of Zero Liquid Discharge. Some of the flow sheets are attached to the report.

Since treated effluent is to be reused in the industries process or to be used in the premises for gardening treated effluent standards are to be maintained better than that specified by MPCB. In some cases, where ever TDS exceeded 2100 mg/l limits, Industry has provided Reverse Osmosis system to reduce TDS to less than 100 mg/l.

Parameters of treated effluent for the industries are as follows,

Sr. No.	Parameter	Value
1	pH	6.5 to 7.0
2	Oil and Grease	BDL
3	Suspended solids	< 10
4	Total dissolved solids	< 2100
5	27°C 3 day's BOD	< 10
6	COD	< 50
7	Sulphates	< 600
8	Chlorides	< 1000

Note : All values except pH expressed as mg/l.

Treatment steps to treat effluents are as follows,

STEP I – Pre treatment

1. Screening of the effluent,
2. Oil and Grease removal system
3. Physico-chemical process to remove emulsion, Suspended solids, heavy metals etc by coagulation and settling in optimum pH. This step reduces BOD and COD substantially.
4. Pre treated effluent has only parameters left for treatment are BOD and COD.

STEP II – Biological Treatment to reduce BOD, COD etc.

5. Mixing pre-treated effluent with domestic sewage for reduction of BOD and COD in an Activated Sludge process to achieve minimum 90% efficiency.
6. Disinfection of treated effluent by UV or similar method.

STEP III – Tertiary Treatment

7. Tertiary treatment comprising passing the effluent through Pressure filter and Activated Carbon filter to minimise suspended solids and COD etc. so as to make effluent suitable for Reverse Osmosis feed.

STEP IV– Reverse Osmosis (RO)

8. If treated effluent has TDS more than 2100 mg/l then Reverse Osmosis is used to reduce it to 100 mg/l standards for use in the process or 1000 mg/l, if it is to be used in gardening.

STEP V – Multi Effect Evaporation (MEE)

9. In an exceptional case, if RO rejects are to be disposed off then MEE process is used. With this process MEE rejects are evaporated. Condensed water is put back to treatment plant and dry salts are sent to the Hazardous waste disposal site.

Case I: Flow sheet for above **Zero Liquid discharge** is attached to ensure that no effluent (raw or treated) leaves the factory.

Case II: For food industry Pre-Treatment included Anaerobic digestion or similar process. Then other steps are similar to above flow sheet. (Flow sheet attached)

Case III: For a plant handling strong acids like HF, HCL, HNO₃ etc. after neutralization, sludge settling and dewatering all the effluent was subjected to Multi Effect Evaporation. (Flow sheet attached)

Utilisation of waste water.

Since industries in this belt are consuming low volume of water (10-500 m³/day) their treatment to meet reuse standards and reuse is possible within their campus. There are very few industries using higher water quantity (more than 1000 m³/day) which were permitted to treat and discharge their effluents in the river. However even these industries are now directed to reuse treated effluent or apply on their own land for gardening. All other industries have total effluent (Domestic plus Industrial) 500 m³/day or less and they utilize the same in following manners.

Treated waste water is used for following purposes after exhaustive treatment.

1. If Total dissolved solids are less than 100 mg/l then if other parameters conform to Raw water quality, then treated effluent can be mixed with raw water tank.
2. If Total dissolved solids are high but less than 1500 mg/l then treated water can be used for gardening.
3. If Total dissolved solids are less than 500 mg/l in a properly treated water it can be used as Cooling Tower Make up water as well as for HVAC system and boiler with a pre-treatment, if required.

Since most of the industries are following Zero Liquid disposal system as explained above, river pollution due to industrial effluents is minimal which may be due to accident etc.

We are attaching process flow diagram for treatment of following industries which practice ZLD.

1. M/s. Sandvik Asia Ltd.
2. M/s. Pudumjee Pulp & paper Ltd.
3. M/s. Century Inka.
4. Shri Sant Tukaram Sahakari Sakhar Karkhana Ltd.
5. M/s. Tetra Pak (I)

DOMESTIC POLLUTION

Since Bhima basin is a fertile region it is populated from Lonavla to Pargaon (study area). There are numerous small towns with a population of less than 1000 people to big municipal corporations of Pimpri Chinchwad and Pune with a total population of 6 million people. As there is plenty of water available, these cities generate sewage and in the absence of proper collection and treatment, domestic effluent is discharged into the river treated/partially treated/untreated leading to river pollution. In the major cities of Pune and Pimpri Chinchwad only 60-70% of the collected sewage is treated whereas in remaining towns sewage is discharged to river without any treatment. This is indicated by the sample analysis at various locations in all the rivers. This also indicates that to make river clean, it is necessary to properly collect, treat and dispose of Domestic sewage.

In the polluted stretches of Indrayani, Pawana, Mula, Mutha, Mula-Mutha and Bhima there are two major cities of Pune and Pimpri Chinchwad having total population of 60,00,000 people. All other cities are having a population of less than 50,000 people. Apart from Pune and Pimpri-Chinchwad other cities to have sewage collection and treatment are Lonavla (3.69 MLD as against 16 MLD sewage generated) and Kirkee town (9.2 MLD). Other populated cities like Alandi, Dehu, Pune cantonment, Kirkee cantonment etc. have not provided any treatment. Similarly, all the small towns and villages have not provided any collection and treatment system and in its absence leads to river pollution.

1.0 Identification of major outfall points & their locations.

Following are the location of major outfalls.

Sr. No	Location	Discharge MLD	Treatment plant capacity
1	Lonavla	12.3	3.69
2	Talegaon	7	0
3	Dehu	0.28	0
4	Dehu cantonment board	8.2	0
5	Chikhali		0
6	Alandi	2.4	0
7	Junnar	2	0
8	Shirur	4.2	0
9	Pimpri-Chinchwad Municipal Corporation	255	207
	Kiwale		
	Walvhekar wadi		
	Gokhale park		
	Thergaon		
	Gawade colony		
	Link road		
	Bhat nagar		
	Nashik phata		
	Sandvik		
	Sangvi gaon		
	De-lux nalla		
10	Pune Municipal corporation	744	612
	Hinjewadi		
	Bopodi		

	Balewadi		
	Pashan		
	Baner		
	Malwadi – Warje		
	Vadgaon (B)		
	Vadgaon (D)		
	Manik		
	Vithhalwadi		
	Erandwana		
	Kothrud		
	Nagzari		
	Ambil odha		
	Tanaji wadi		
	Bhairoba		
	Mundhwa-1		
	Mundhwa-2		
	Wadgaon (S)		
	Nagar Road		
	Mental Hospital		
	Kalas		
11	Khadki cantonment Board	6	9.2
	Range hill nalla		
	Nalla near K.N. Bajaj Udyan		
	Pachwad nalla		
	Sapras nalla		
	Nalla near Hindu smashan bhumi		
	Rajiv Gandhi vasahat		
	Khadki bazaar nalla		
	Gawaliwada nalla		
	MIDC areas		
	Talegaon	1.6	4
	Chakan	4.8	4.8
	Talawade	1.6	1.6
	Bhosari (Pimpri-Chinchwad)	80	80
	Hinjewadi	2.5	0.8

2.0 Raw sewage quality following various nallas.

Corporation/Municipality	Name of Nullah	pH	DO	BOD	COD	SS	SO4	Cl	NO3	Hardness	
Pune Municipal Corporation	Tanajiwadi	8.19	1.52	45.7	132	36	25.27	-	0.192	140	
	Ambilodha	8.21	2.11	21.6	60	45	26.76	44	0.281	104	
	Yerawada	8.2	2.35	20.4	60	28	26.19	66	0.281	110	
	Mhatre Pool	8.03	0.0	48.9	140	28	35.11	60	0.508	100	
	Vithhalwadi	8.07	3.32	16.7	48	55	19.78	66	0.216	156	
	Varje Malwadi	8.16	2.62	13.9	40	32	18.98	88	0.181	158	
	Bhairoba	8.14	1.06	57.5	164	85	37.85	84	0.298	150	
Pimpri Chinchwad Municipal Corporation	Kiwale	7.89	4.28	8.5	28	16	63.13	90	0.862	296	
	Valhekar	7.77	2.78	37.5	108	22	30.99	84	0.926	146	
	Gokhale Park	7.64	0.0	43.5	124	25	72.05	105	0.728	148	
	Thergaon	7.62	0.66	56	160	24	69.53	90	1.28	180	
	Garware colony	7.74	3.2	18.5	52	17	35.11	76	0.668	140	
	Link Road	7.7	3.1	16.3	48	18	64.73	90	0.572	180	
	Garware Nalla	7.68	3.98	13.8	40	16	75.71	84	0.602	210	
	Nullah	7.7	3.26	16.7	48	24	146.38	110	0.772	200	
	Bhairoba	7.65	0.79	52.8	148	16	73.19	112	1.42	244	
						4					
	Nashik Phata	7.48	3.35	15.5	44	27	13.95	64	0.446	140	
	Sandvik	7.21	1.86	48.3	140	40	29.73	96	1.28	152	
Sangvi gaon	7.57	1.24	41.9	120	23	53.52	84	1.12	160		
Talegaon	Katvi	7.56	2.5	29.5	128	16	108.64	45.99	0.11	--	
Dehu Cantonment	Shelarwadi	7.75	0.0	35	100	22	41.17	65.98	0.194	--	
	Kiwale	7.55	0.0	75	208	20	28.02	125.96	0.149	--	
	Kinhe	7.77	0.0	60	172	26	58.55	117.96	0.268	--	
Pune Cantonment	Morwade	7.63	4.79	4.2	12	30	16.24	50	0.102	90	
	Manik	6.64	0.0	25.3	72	44	19.78	45	0.158	130	
	Bhairoba	6.75	0.0	36.2	104	68	50.04	72	0.279	164	
Kirkee Cantonment	Civil area	7.13	0.0	23.7	68	11	44.6	7	0.337	344	
	Amm. factory					6					
	STP civil area	6.94	0.0	22.9	64	82	35.34	47.5	0.229	124	
	G. E. Office	6.91	0.0	46.5	132	96	27.67	62.5	0.332	204	
	Bajaj Park	7.2	0.0	20.9	60	34	56.72	52.5	0.253	236	
	C.B. office	7.67	3.97	9.8	28	24	148.67	0.393	340	64	
	Saiprus	7.37	0.87	14.2	40	30	28.25	32.5	0.192	116	
	Hindu crematorium	7	0.0	67	204	10	38.31	156	0.356	240	
						6					
	Rajiv Gandhi colony	6.88	0.0	186	568	76	37.85	168	0.65	260	
Gadi adda	7.36	0.0	55.8	168	11	92.06	112	0.296	264		
					4						
Gawli wada	7.26	0.0	127	388	26	44.37	145	1.164	234		
					6						

2. Quality and quantity of municipal waste water discharging in a water body

Details of Water consumption and sewage generation along with population

Sr. No.	Name of City/Town	Population	Water supplied (MLD)	Sewage generated (MLD)	STP capacity (MLD)	Quantity of Sewage untreated (MLD)
Mahanagar Palikas						
a.	Pimpri Chinchwad	20,00,000	360	255	207	48
b.	Pune	40,00,000	1050	744	497	247
Cities						
a.	Lonavla	49865	21.8	16	3.69	12.31
b.	Talegaon	56025	9	6.72	0	6.72
c.	Alandi	40,000	4	2.4	0	2.4
d.	Junnar	24741	2.2	1.76	0	1.76
e.	Shirur	40,000	5	4	0	4
	Total		42.0	26.88	3.69	25.19
Cantonments						
a.	Dehu					
	Civilian residence	46921	9	8.2	0	0
	Army	14000	1.9	1.5	0	0
b.	Khadki					
	Civilian residence	77473	11.3	6	6	0
	Army	16026	2.94	1.6	0	1.6
c.	Pune Cantonment					
	Civilian residence	79865	12.8	8	0	8
	Army	70000	10	9.5	0	9.5
	Total for Cantonment		47.94	34.8	6	28.8
Villages on the bank of river (total 163)						
a.	Haveli(35 villages)	170070	6.80	4.7	0	4.7
c.	Indapur (19 villages)	24897	0.995	0.697	0	0.697
d.	Shirur (11 villages)	26753	1.07	0.74	0	0.74
e.	Mawal (63 villages)	131259	5.25	3.67	0	3.67
f.	Khed (35 villages)	142783	5.71	3.99	0	3.99
	Total for 163 villages	468991	19.825	13.797	0	13.797
	Grand Total		1519.76	1074.477	713.69	360.787

Above table shows that in Bhima basin study area total water supply for Domestic purpose is **1519.76** million liters per day (MLD) and **1074.477 MLD** sewage is generated. Out of this sewage about **713.69 MLD** sewage is treated by providing Primary, Secondary and in some cases Tertiary treatment and then used for gardening to the maximum extent and remaining treated water is discharged into the river. With this analysis it is seen that **360.787MLD (33.57%)** sewage is still discharged into the river untreated.

Of the **360.787MLD** untreated waste water discharged into the Bhima river or its tributaries 247MLD is from Pune city (68.46 %) 48 MLD from Pimpri Chinchwad area (16.24%), 25.19 MLD from 5 Municipalities, 28.9 MLD from various Cantonment boards (5.33%), 13.79 MLD from various villages on the bank of rivers (3.12%) and 1.7 MLD from Hinjewadi Industrial estate (0.31%).

MIDC has constructed a 4 MLD capacity Common Effluent Treatment Plant (CETP) at Talegaon. At present this plant receives 1 MLD of Industrial waste and Domestic sewage which is treated and used in High Rate Transparency System (HRTS). In addition, various industries in Talegaon MIDC have constructed their own Industrial as well as Domestic waste water treatment plants. Treated water is used in the campus of the factory for gardening.

Hinjewadi MIDC is developed for Information and Technology (IT) industry. Here in Phase no. 1 Domestic sewage generation is 2.5 MLD which is treated in MIDC's treatment plant having capacity of 0.8 MLD. The capacity of this plant is being increased to 4MLD which will be complete shortly.

Various industries in MIDC's in Chakan, Pimpri-Chinchwad, Bhosari etc. have constructed their own treatment plants for Industrial as well as domestic sewage. After treatment treated water is used for gardening within the campus of each industry.

Various industries which are located outside MIDC area have constructed their own industrial effluent and Sewage treatment plants and treated water is used within the campus of the industry for gardening. For some major industries, Maharashtra Pollution Control Board (MPCB) has given permission to treat the effluent as per specified standards and then discharge the treated effluent into the nearest water course. For some industries permission to discharge such treated effluent is withdrawn and modified to use such treated effluent for gardening in their own premises. MPCB regularly follows up with these industries regularly.

MPCB regularly monitors the quality of river water by analysing the samples where treated effluent is discharged as per consent. Details of such monitoring stations are detailed.

Sr No	STP Location	Date	Treated water Quality							
			pH	BOD	COD	SS	O&G	TDS	Sulphate	Chlorides
Pimpri Chinchwad Municipal Cooperation										
1	Sangvi (15 MLD)	15/3/2010	8.1	26.5	76	11	BDL	398	40.58	329.9
		20/2/2010	7.4	18	64	30	BDL	420	29.97	115
		12/1/2010	8.02	21.5	68	12	BDL	184	1.368	62.5
2	Kasarwadi Phase 1 (40 MLD)	15/3/2010	8	26	80	52	BDL	258	41.95	56
		20/2/2010	7.5	19	64	33	BDL	380	34.76	95
		12/1/2010	7.38	17.2	56	14	BDL	552	51.75	57.5
3	Kasarwadi Phase 2 (40 MLD)	15/3/2010	7.9	6	20	52	BDL	402	43.31	125
		20/2/2010	7.5	9	28	8	BDL	410	68.62	105
		12/1/2010	6.97	6	20	12	BDL	147	38.53	125
4	Chikali 1 (16MLD)	15/3/2010	8.2	6	16	9	BDL	212	37.38	40
		20/2/2010	8	8.8	28	12	BDL	340	37.38	80
		12/1/2010	8.2	6.2	24	15	BDL	267	15.61	65
5	Chikali 2 (16MLD)	15/3/2010	8	25	104	22	BDL	318	73.18	30
		20/2/2010	7.5	219	480	14	BDL	386	24.39	110
		12/1/2010	7.84	19.4	64	8	BDL	148	7.295	57.5
6	Pimple Nilakh (20MLD)	15/3/2010	8	18	60	15	BDL	442	51.75	100
		20/2/2010	8.6	30	128	24	BDL	710	43.66	174.9
		12/1/2010	7.71	11.4	40	7	BDL	302	21.43	87.5
7	Chinchwad Phase 1 (30MLD)	15/3/2010	8.4	15	48	33	BDL	304	48.79	65
		20/2/2010	7.6	10	36	1	BDL	510	17.55	135

		12/1/2010	7.86	17.6	54	11	BDL	663	4.901	65
8	Chinchwad Phase 2 (30MLD)	15/3/2010	8.5	6	24	10	BDL	-	31.69	80
		20/2/2010	8	7	24	7	BDL	640	27.81	179.9
		12/1/2010	7.87	6	24	5	BDL	187	1.368	70
Pune Municipal Cooperation										
1	Yeravda (50 MLD)	27/10/2009	8.11	13.2	32	26	BDL	-	-	-
		24/11/2009	8.8	5.1	20	6	BDL	-	-	-
		24/2/2010	8.06	12	40	37	BDL	-	-	-
2	Bhairoba Nala (130 MLD)	27/10/2009	7.53	13.5	40	24	BDL	-	-	-
		24/11/2009	8.11	8.5	28	4	BDL	-	-	-
		19/3/2010	8.2	13	44	10	BDL	-	-	-
3	Bopodi (18 MLD)	27/10/2009	7.95	8.4	24	25	BDL	-	-	-
		24/11/2009	8.4	5.1	20	4	BDL	-	-	-
		19/3/2010	7.4	15	44	12	BDL	-	-	-
4	Mundhwa (45 MLD)	27/10/2009	8.22	7.2	24	40	BDL	-	-	-
		24/11/2009	8.22	8.3	24	6	BDL	-	-	-
		19/3/2010	8.1	12	40	8	BDL	-	-	-
5	Vitthalwadi (32 MLD)	30/11/2009	8.04	37.8	84	15	2	-	-	-
		24/2/2010	7.84	16	56	30	BDL	-	-	-
		19/3/2010	8.7	22	60	8	BDL	-	-	-
6	Tanajiwadi (17 MLD)	22/12/2009	7.16	6.4	25	30	BDL	-	-	-
		15/1/2010	7.39	8.6	20	9	BDL	-	-	-
		19/3/2010	6.6	15	48	34	BDL	-	-	-
7	Dr. Naidu (90 MLD)	27/10/2009	7.5	9.6	27	42	BDL	-	-	-
		24/11/2009	7.48	4.2	12	8	BDL	-	-	-
		15/1/2010	7.36	8.2	28	23	BDL	-	-	-

Apart from these major cities there are about 23 small towns having total population of 57,722 people generating sewage flow of 28,133.m³/day. Since these are scattered villages, it is necessary to treat sewage locally by providing septic tank followed by a soak pit. Alternately sewage should be collected and pumped to fields for farming

iii Identification of extent of pollution control needed in view of critical flow conditions and comparing with desired quality criteria,

Pollution control systems will be required in all aspects starting from sewage collection, treatment and disposal. The details are as follows,

Sewage collection: This is the first step and based on water supply figures even Pune and Pimpri Chinchwad towns are not collecting all their sewage. Annexure ... details the steps to collect sewage from various nallas from Pune city.

Similar situation is in other towns like Pimpri Chinchwad, Alandi, Talegaon etc. And for other towns/cities sewage need be properly collected for treatment.

Sewage Treatment Plants : In the cities where sewage treatment is provided still, 30-40% of the collected sewage is released to the river untreated. This need be addressed on priority basis. This quantity prima facia collectively is more than 300 MLD.

Quality of treated sewage : At present Sewage Treatment plants are designed for River discharge standards i.e. BOD 30 mg/l and suspended solids 100 mg/l. Due to absence of dilution effect this standard is no more valid and should be enhanced to BOD 10 mg/l and suspended solids 30 mg/l. This can be achieved by adding Tertiary treatment comprising a coagulation/settling unit and a sand filtration system (similar to Water treatment plant). The cost of this addition will compensate with improved quality of river water. It may be possible to supply this treated sewage to industries, thereby reducing their fresh water consumption. Providing Sewage Treatment Plants

Name of City	Water supply MLD	Sewage Generation MLD	Sewage Treatment MLD	Additional treatment capacity MLD	Type of Treatment
Pimpri-Chinchwad	360	291	224	67	ASP
Pune	1050	744	567	177	ASP
Lonavla	21.8	16	3.69	12.31	ASP
Alandi	4	3	0	3.0	ASP
Talegaon Dabhade	9	6.7	0	6.7	ASP
Total	1444.8	1060.7	794.69	266.01	
Pune cant. Civil area	12.8	8	0	8	ASP
Pune cantonment(military)	10	9.5	0	9.5	ASP
Dehu Civil area	9	8.2	0	8.2	ASP
Dehu Road Cantonment	1.9	1.5	0	1.5	ASP
Kirkee (Civil)	11.6	6	9.2	----	----
Kirkee (Military)	2.14	1.7	0	1.7	ASP
Total	47.44	34.9	9.2	28.9	

For the villages provide bund to the nalla and pump sewage to nearby fields or provide septic tanks followed by soak pit to group of residents.

iv Utilisation of waste water and Volume of waste water used for Agriculture.

Based on available data, total waste water generated is 25 MLD from 3 cities and about 28 MLD from all villages combined i.e. 53 MLD. After treatment this can be easily used for agricultural purpose since it has no Industrial contamination.

INDRAYANI RIVER WATER QUALITY

Indrayani river is polluted from Dehu onwards due to various reasons. First there is sewage treatment plant in this stretch and raw sewage enters river. Second during Bi-annual yatras Lakhs of yatras assemble in Alandi where adequate sanitation facilities are not provided resulting into water pollution. Third factor is garbage in the form of flowers, garlands, plastic etc. which is thrown in the river.

Maharashtra Pollution Control Board has provided number of monitoring stations on this river. Based on the sample analysis at this stations water quality at salient points is as follows,

RIVER WATER QUALITY

Introduction:

Central Pollution Control Board has specified quality standards for the use of river or similar waters as detailed in ANNEXURE -I. Based on these standards river stretches are classified. Maharashtra Pollution Control Board has classified Bhima river and its tributaries as follows,

1. Classification of rivers in Bhima basin

Sr. No.	River	A-I	A-II	A-III	A-IV
	Best usage	Unfiltered public water supply after approved disinfection	Public water supply with approved treatment equal to coagulation, sedimentation & disinfection	Not fit for human consumption fish & wildlife propagation	Fit for agriculture, industrial cooling & process water
1	Bhima	Origin to Chaskaman dam	Chaskaman dam to Mula-Mutha confluence at Pargaon	-----	-----
2	Vel	Origin to confluence with Bhima	----	----	----
3	Indrayani	Origin to Lonavla dam	Lonavla dam to confluence with Bhima		
4	Pawana	Origin to Pawana dam	Pawana dam to Ravet bund	-----	Ravet bund to confluence with Mula
5	Mula	Origin to Mulshi dam	Mulshi dam to waked bund	----	Waked bund to confluence with Mutha
6	Mutha	Origin to Khadakwasla dam	Khadakwasla dam to Vithhalwadi bund	-----	Vithhalwadi bund to confluence with Bhima at Pargaon
7	Bhima	-----	Pargaon(after confluence with Mula-Mutha) to Ujani lake	-----	-----

Sr. No.	River	Sampling Location	Station Code
1	Indrayani	Indrayani river at D/s of Alandi gaon, Pune	2197
2		Indrayani river at D/s of Moshi village	2668
3		Indrayani river at U/s of Moshi Village	2669
4	Pawana	Pawana river at Sangavi	2196
5		Pawana river at Kasarwadi	2690
6		Pawana river at Dapodi bridge at Pawana-Mula sangam	2691
7		Pawana river at Ravet weir	2692
8		Pawana river at Chinchwad gaon	2693
9		Pawana river at Pimpri gaon	2694
10	Mula	Mula river at Aundh bridge, Aundh gaon	2193
11		Mula river at Harrison bridge near Mula-Pawana Sangam	2194
12	Mutha	Mutha river at Khadakwasla Dam	2680
13		Mutha river near veer Savarkar Bhavan	2678
14		Mutha river at Deccan bridge ,Pune	2679
15		Mutha river at Sangam bridge near Ganapati ghat	2191
16		Mutha river at U/s. of Vithalwadi near Shankar Mandir	1189
17	Mula-Mutha	Mula-Mutha river at D/s of Bund garden	1190
18		Mula-Mutha river at Mundhwa bridge	2192
19		Mula-Mutha river at D/s of Theur	2677
20	Bhima river	Bhima river at Koregaon, near Koregaon bridge, Pune	2655
21		Bhima river at Takali	28
22		Bhima river after confluence with Mula-Mutha at Paragon near Vasant Bandhara	1191

While preparing this report, analysis of river waters at various sampling stations were considered.

In the study area following sampling stations are provided by MPCB.

Based on the analysis reports of the water samples, site visits and photographs it is quite clear that all the rivers after some distance from their origin are clean and qualify for Class A-I standard and there after they fall in Class IV standard making them unfit for drinking purpose even after treatment. Reasons for this pollution are attributed to unchecked dumping of garbage and raw sewage from most populated cities of Pimpri-Chinchwad and Pune as well as other cities like Alandi, Lonavla, Talegaon etc.

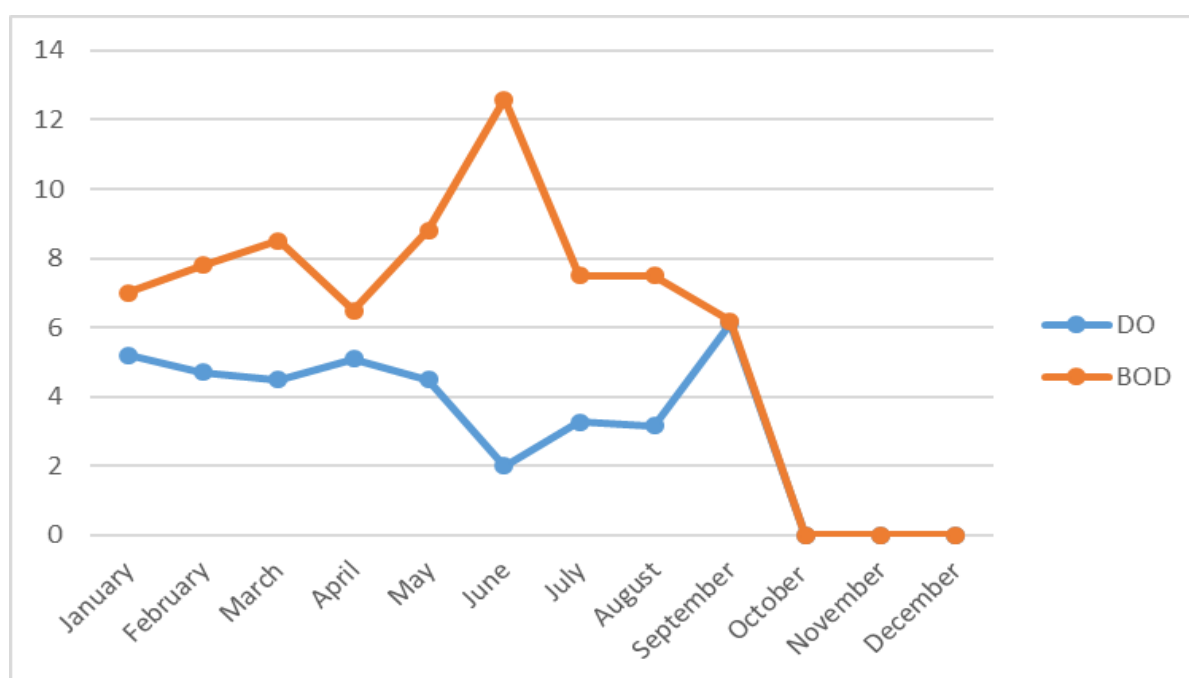
Analysis of river water and its quality in the study area from various sampling points, river wise is as follows,

INDRAYANI RIVER

No. 2197: Indrayani river at D/s of Alandi gaon, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.78	5.2	7	20	8.2	85
February	7.72	4.7	7.8	24	2.5	350
March	7.8	4.5	8.5	24	3.5	275
April	8.67	5.1	6.5	20	2.1	225
May	8.01	4.5	8.8	28	0.8	425
June	8.41	2	12.6	36	3.4	275
July	8.12	3.27	7.5	32	1.4	170
August	8.27	3.16	7.5	24	1.6	150
September	7.91	6.12	6.2	20	1.4	350
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Indrayani river at D/s. of Alandi gaon, Pune

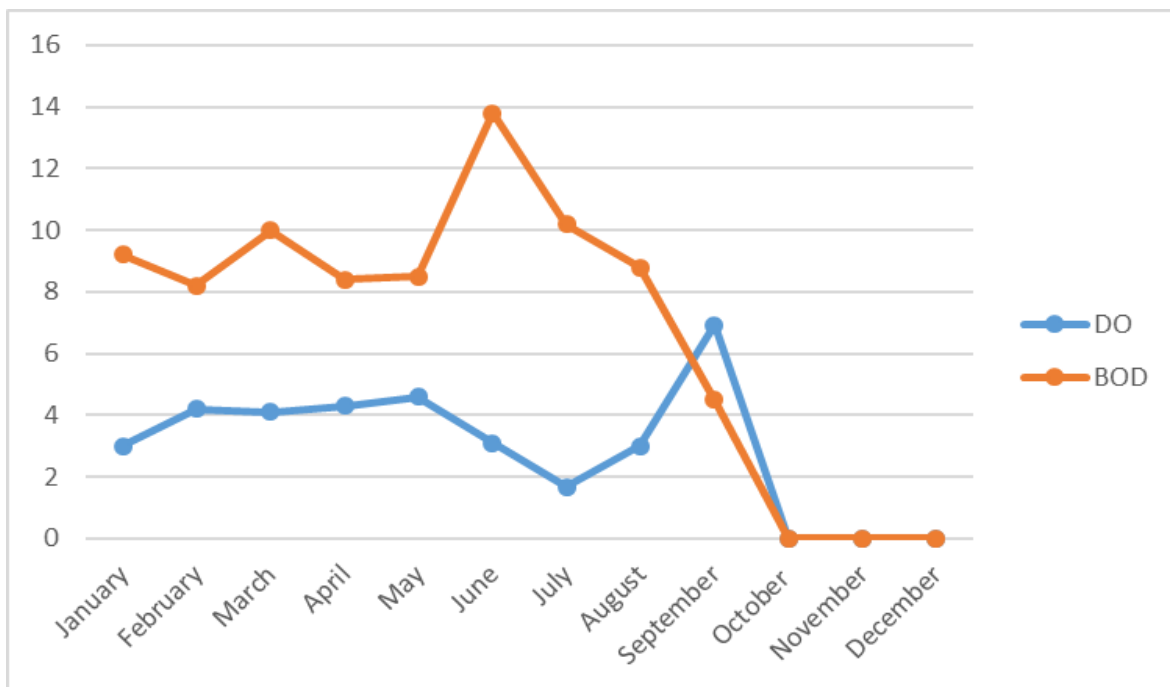


Indrayani river water Dissolved Oxygen (D.O.) at Alandi is between 2 to 6 mg/l and BOD 6.2 to 12.6 mg/l respectively. Faecal organism 85 to 350 per 100 ml. With this water can be properly treated and then used for drinking. Water treatment plant must have proper disinfection system. In addition, sewage coming from Moshi nalla need be prevented from entering Indrayani river, which will further improve river water quality.

Station No. 2668 : Indrayani river at D/s of Moshi Village

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.62	3	9.2	28	8.4	95
February	8.47	4.2	8.2	24	3.8	350
March	8.2	4.1	10	32	3.7	350
April	8.6	4.3	8.4	28	2.9	140
May	8.03	4.6	8.5	28	1.4	350
June	8.47	3.11	13.8	40	3.8	250
July	8.15	1.68	10.2	40	7.8	120
August	8.29	3.01	8.8	28	1.6	175
September	7.83	6.92	4.5	16	2.2	350
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Indrayani river at D/s of Moshi gaon, Pune

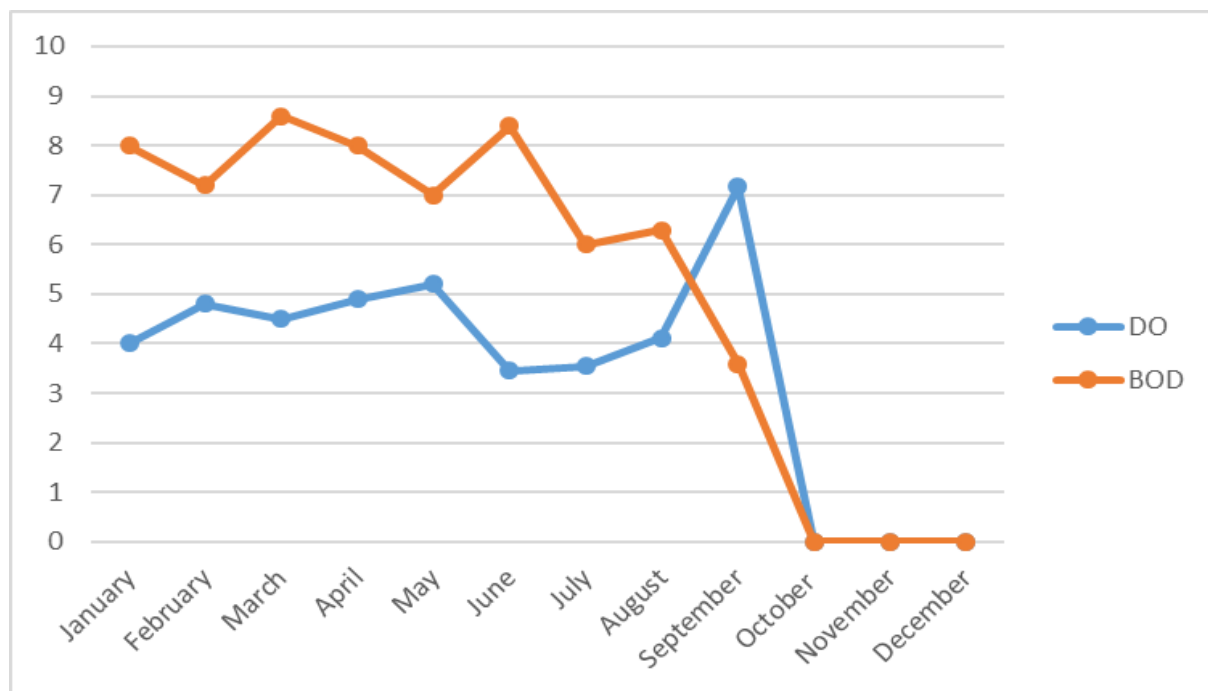


Dissolved Oxygen (D.O.) at downstream of Moshi nalla is between 1.68 to 6.92 mg/l and BOD 4.5 to 13.8 mg/l respectively with Faecal organism 95 to 350 per 100 ml. With this water can be properly treated and then used for drinking. Water treatment plant must have proper disinfection system

Station No. 2669 : Indrayani river at U/s of Moshi Village , Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.54	4	8	24	3.4	40
February	8.31	4.8	7.2	16	2.8	200
March	8.1	4.5	8.6	24	2.6	250
April	8.69	4.9	8	24	0.9	110
May	7.95	5.2	7	24	1.2	225
June	8.45	3.46	8.4	24	4.2	170
July	8.09	3.54	6	24	8.2	70
August	8.42	4.12	6.3	20	2	95
September	7.66	7.16	3.6	12	2.3	250
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Indrayani river at U/s of Moshi village



Indrayani river water at Moshi (Upstream) indicates Dissolved Oxygen (D.O.) between 3.46 to 7.16 mg/l and BOD 3.6 to 8.6 mg/l respectively. Faecal organism was 40 to 250 per 100 ml. With this water can be properly treated and then used for drinking. Water treatment plant must have proper disinfection system.

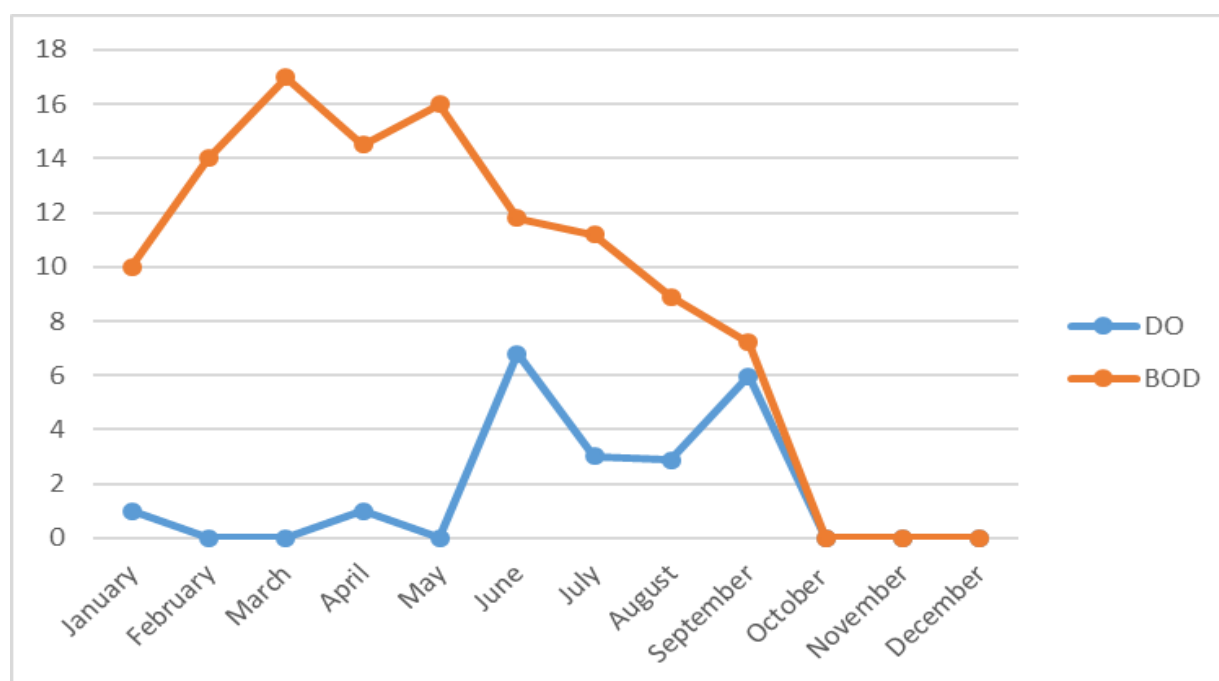
PAWANA RIVER

Pawana river is reported to be severely polluted, causing the civic activists to blame the governing body for not taking appropriate steps to limit the degradation. Accumulation of silt and discharge of untreated waste are the major factors of pollution of the river, and has made the river water unusable. The sampling stations clearly show this condition.

Station No. 2196 : Pawana river at Sanghavi gaon, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	7.98	1	10	36	8.5	70
February	8.12	BDL	14	40	1	275
March	8.3	BDL	17	48	3.6	275
April	8.31	1	14.5	40	1	120
May	7.7	BDL	16	52	6.2	250
June	8.18	6.81	11.8	36	0.3	195
July	7.74	3.02	11.2	36	2.4	350
August	8.38	2.88	8.9	28	1.3	350
September	7.1	5.98	7.2	24	3	350
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Pawana river at Sangvi gaon, Pune (confluence with Mula)

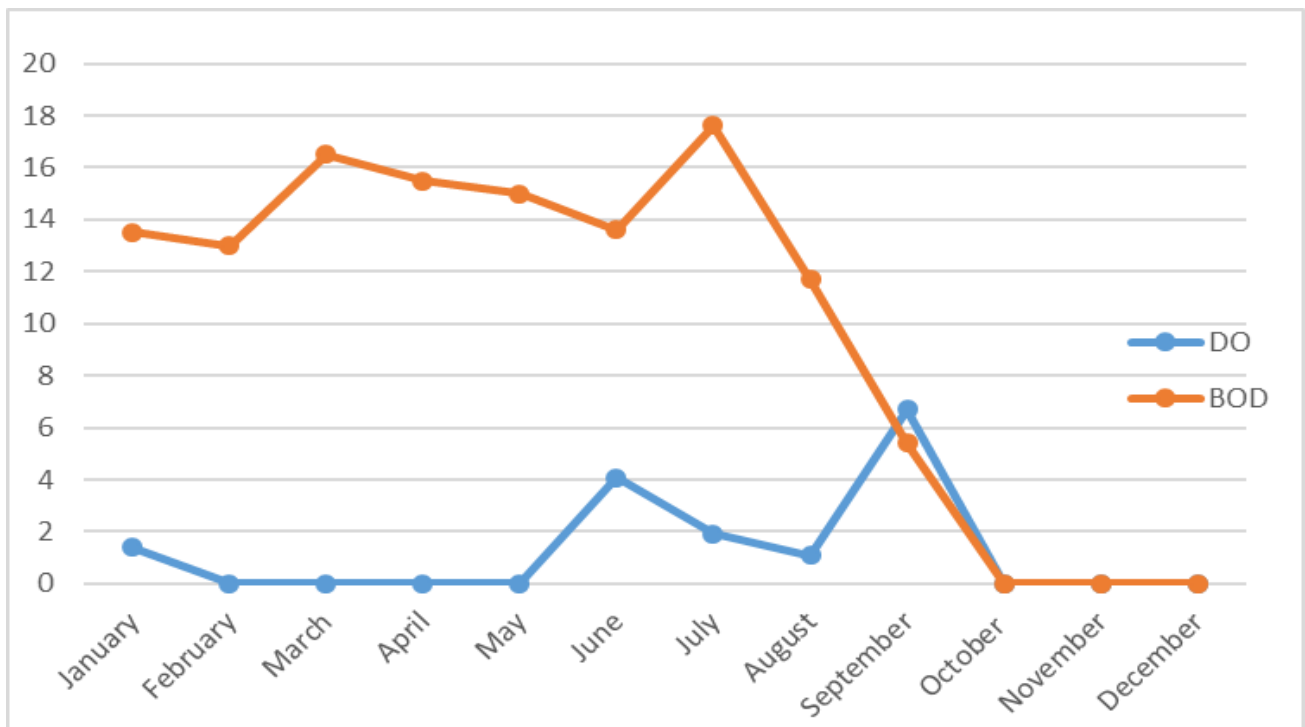


Pawana river at Sangvi gaon has Dissolved Oxygen is BDL to 6.10 mg/l and BOD is about 7.2 to 17.0 mg/l with Faecal coliform organisms 70 to 350 per 100 ml. With these high readings this water is unfit for drinking even after treatment.

Station No. 2690 : Pawana river at Kasarwadi, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.13	1.4	13.5	32	7.6	120
February	8.21	BDL	13	36	7.2	350
March	8.4	BDL	16.5	44	3.4	350
April	8.46	BDL	15.5	44	101	110
May	7.73	BDL	15	48	4.8	350
June	8.46	4.08	13.6	40	0.3	350
July	7.96	1.92	17.6	40	2.4	350
August	8.45	1.08	11.7	36	3.2	350
September	7.18	6.69	5.4	16	2.5	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Pawana river at Kasarwadi Pune

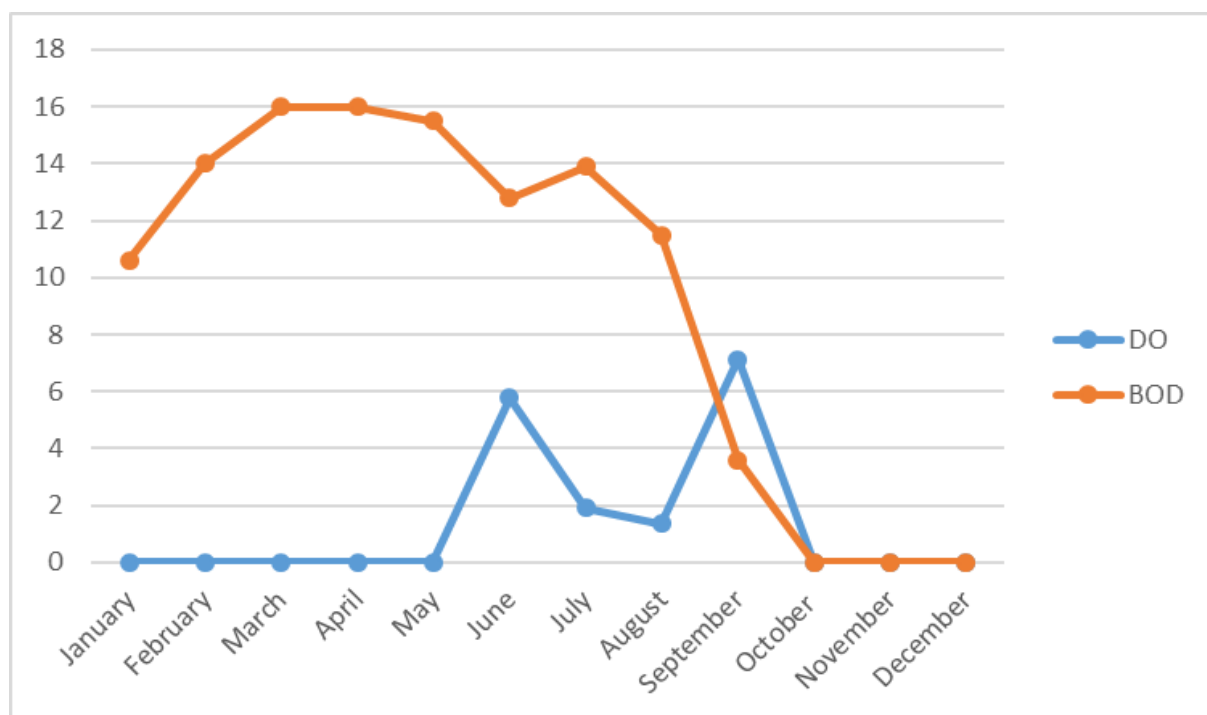


At Kasarwadi Dissolved Oxygen is BDL to 6.69 mg/l and BOD is about 5.4 to 17.6 mg/l with Faecal coliform organisms 120 to 350 per 100 ml. With these high readings this water is unfit for drinking even after treatment.

Station No. 2691 : Pawana river at Dapodi Bridge at Pawana-Mulla Sangam Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.18	BDL	10.6	32	6.8	115
February	8.11	BDL	14	44	1.2	350
March	8	BDL	16	44	3.3	275
April	8.41	BDL	16	48	1.9	120
May	7.58	BDL	15.5	48	7.2	275
June	8.35	5.78	12.8	36	0.3	275
July	7.89	1.91	13.9	44	2.6	425
August	8.42	1.36	11.5	36	2.7	350
September	7.14	7.12	3.6	16	2.6	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Pawana river at Dapodi bridge at Pawana-Mula sangam, Pune

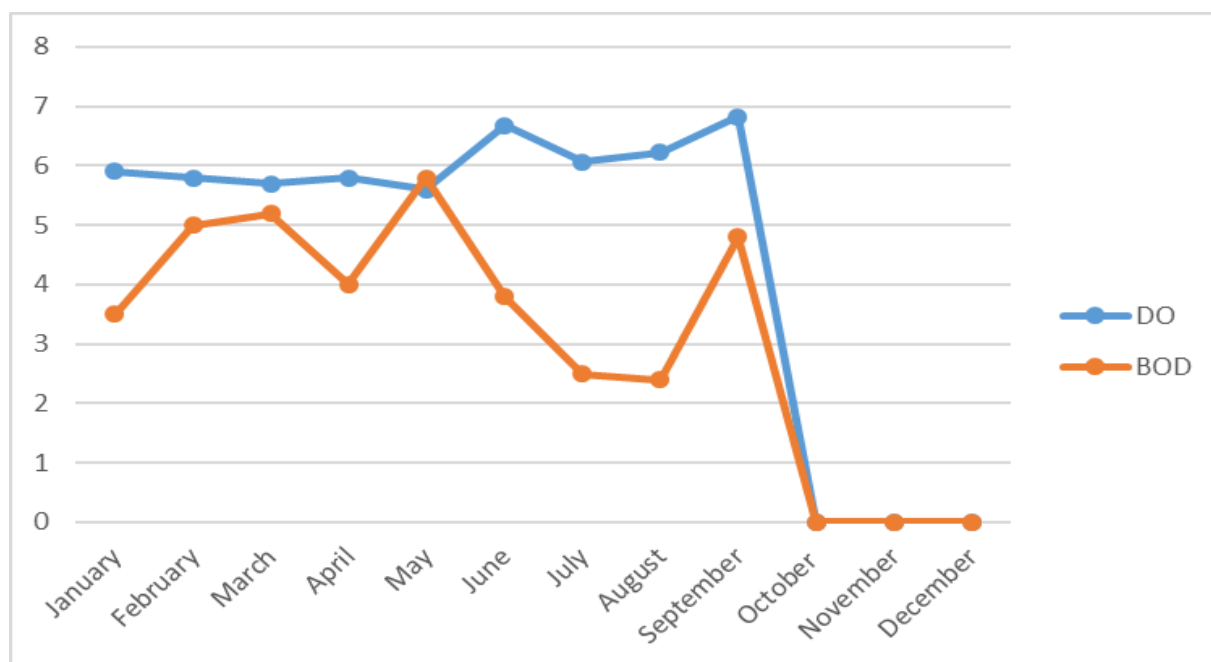


At Dapodi Bridge at Pawana-Mulla Sangam Dissolved Oxygen is BDL to 5.78 mg/l and BOD is about 3.6 to 16 mg/l with Faecal coliform organisms 115 to 425 per 100 ml. With these high readings this water is unfit for drinking even after treatment.

Station No. 2692 : Pawana river at Ravet Weir, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.36	5.9	3.5	12	0.8	5
February	8.41	5.8	5	20	0.2	11
March	8	5.7	5.2	16	0.6	14
April	8.19	5.8	4	12	0.8	80
May	7.79	5.6	5.8	20	1	20
June	8.27	6.68	3.8	12	0.3	20
July	7.74	6.06	2.5	8	1.8	38
August	8.44	6.22	2.4	8	3.3	10
September	7.18	6.82	4.8	16	2.5	14
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Pawana river at Ravet Weir, Pune

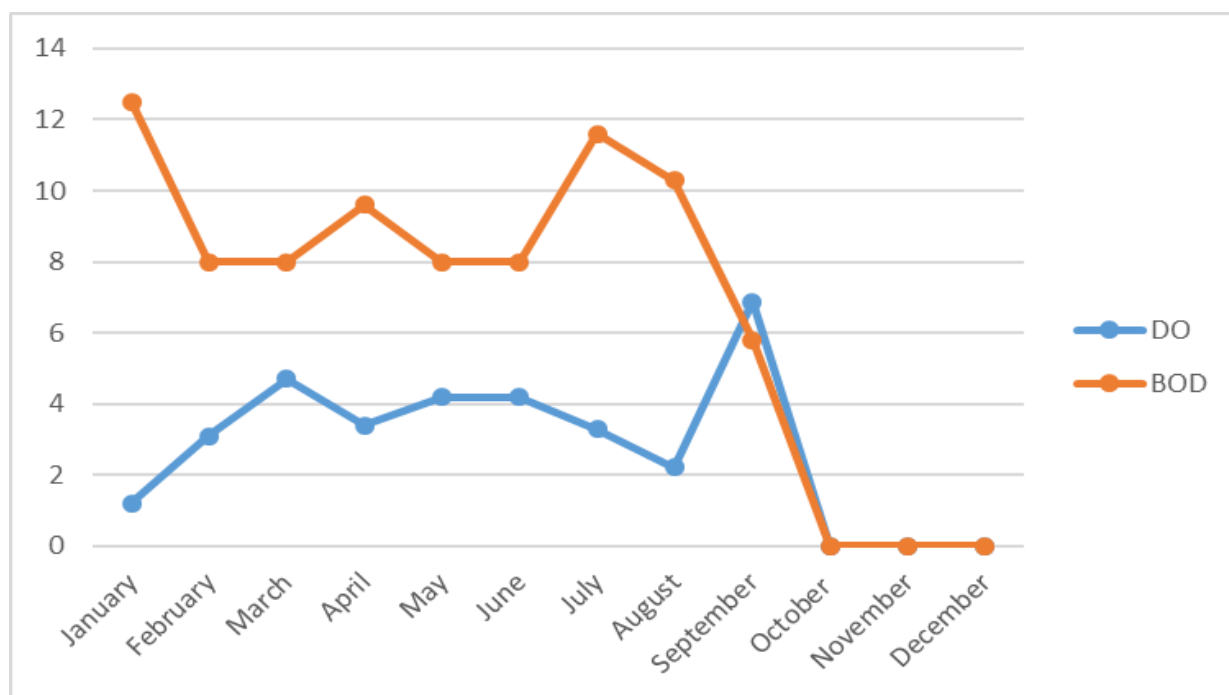


At Ravet bund, Dissolved Oxygen is 5.6 to 6.82 mg/l and BOD is about 2.4 to 5.8 mg/l with Faecal coliform organisms 5 to 80 per 100 ml. Hence this water can be used for drinking with proper treatment followed by disinfection system.

Station No. 2693 : Pawana river at Chinchwad gaon, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.19	1.2	12.5	32	2.1	85
February	8.14	3.1	8	24	7.2	275
March	8.1	4.7	8	28	3.3	250
April	7.92	3.4	9.6	28	2.9	95
May	7.63	4.2	8	28	4	250
June	7.63	4.2	8	28	4	250
July	7.71	3.29	11.6	36	1.6	200
August	8.47	2.22	10.3	32	1.6	170
September	7.15	6.88	5.8	20	2.3	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Pawana river at Chinchwad gaon, Pune

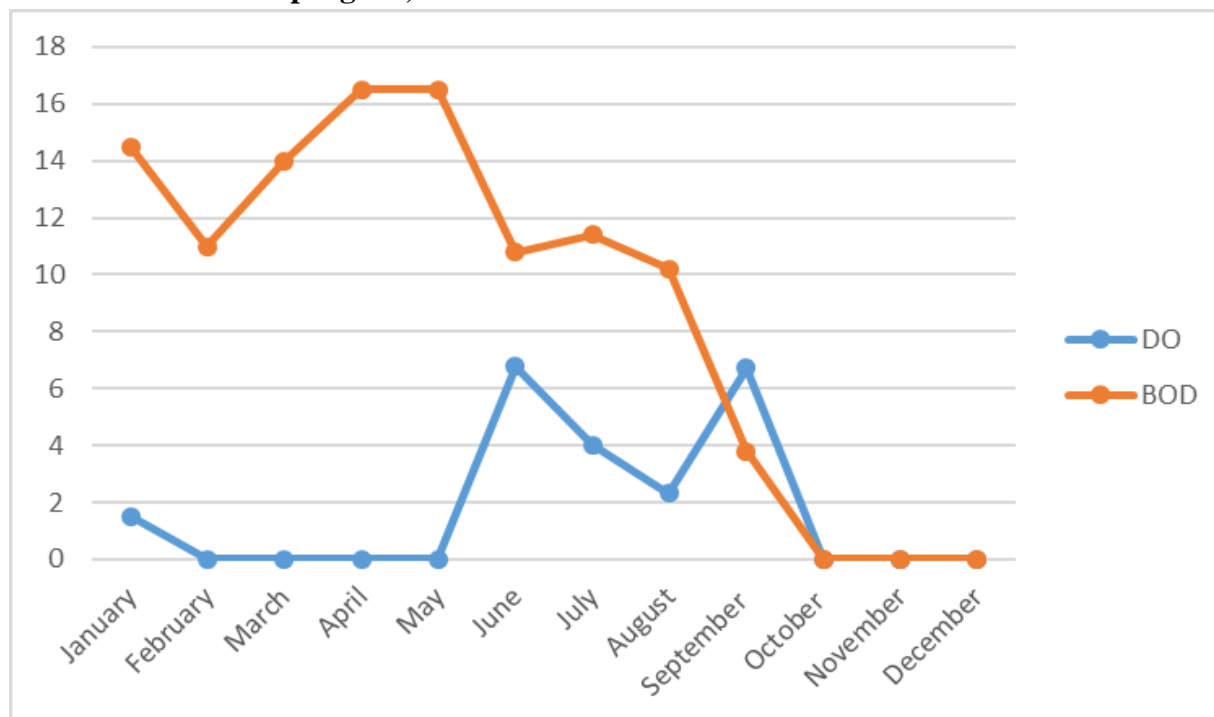


At Chinchwad Dissolved Oxygen is 1.2 to 6.88 mg/l and BOD is about 5.8 to 12.5 mg/l with Faecal coliform organisms 85 to 250 per 100 ml. With these high readings this water is unfit for drinking even after treatment.

Station No. 2694 : Pawana river at Pimpri gaon, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.23	1.5	14.5	36	7.8	95
February	8.09	BDL	11	28	7.2	250
March	8.2	BDL	14	40	3.2	275
April	8.43	BDL	16.5	52	1.4	110
May	8.43	BDL	16.5	52	1.4	110
June	8.57	6.78	10.8	32	0.4	350
July	8	4.03	11.4	36	3	350
August	8.42	2.33	10.2	32	4.1	350
September	7.21	6.72	3.8	20	1.5	350
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Pawana river at Pimpri gaon, Pune



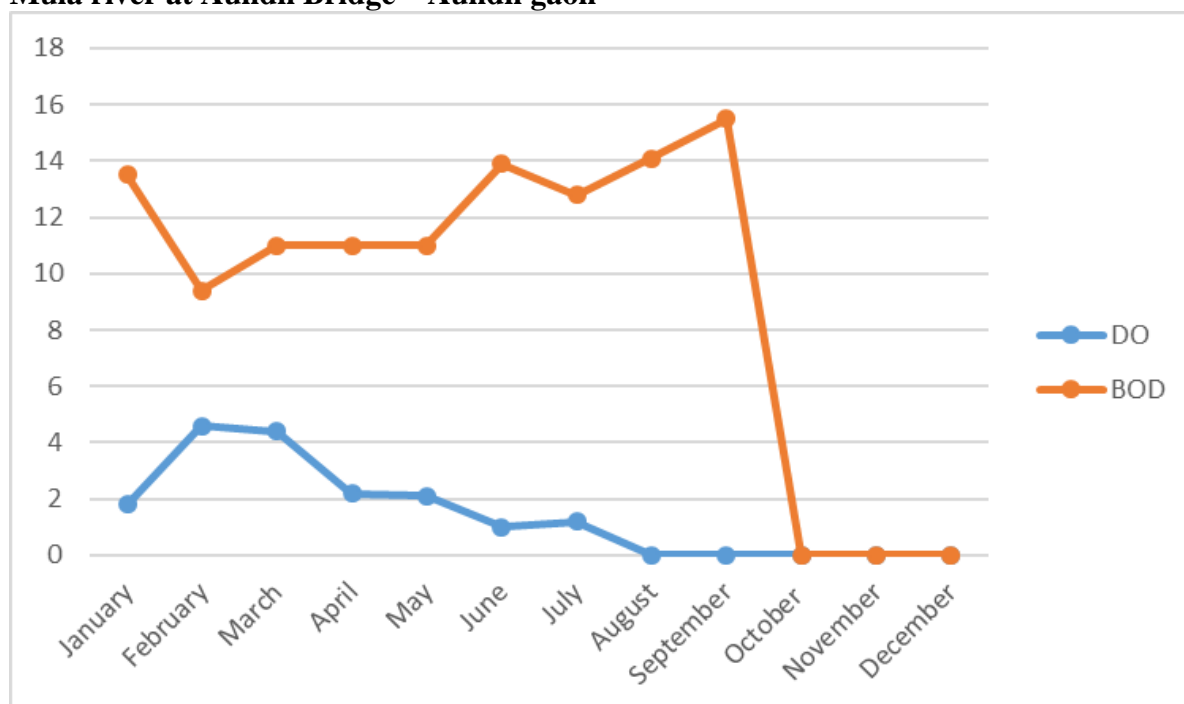
At Pimpri gaon Dissolved Oxygen is 1.5 to 6.78 mg/l and BOD is about 3.8 to 16.5 mg/l with Faecal coliform organisms 95 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

MULA RIVER

Station No. 2193: Mula river at Aundh Bridge – Aundh gaon

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.63	1.8	13.5	40	2.1	70
February	8.51	4.6	9.4	32	7.2	275
March	8.5	4.4	11	28	3.2	350
April	8.61	2.2	11	32	9	225
May	7.47	2.1	11	32	5.8	275
June	8.35	1.01	13.9	40	0.5	225
July	7.65	1.2	12.8	48	15	80
August	8.56	BDL	14.1	44	1.6	200
September	7.74	BDL	15.5	16	1.5	250
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mula river at Aundh Bridge – Aundh gaon

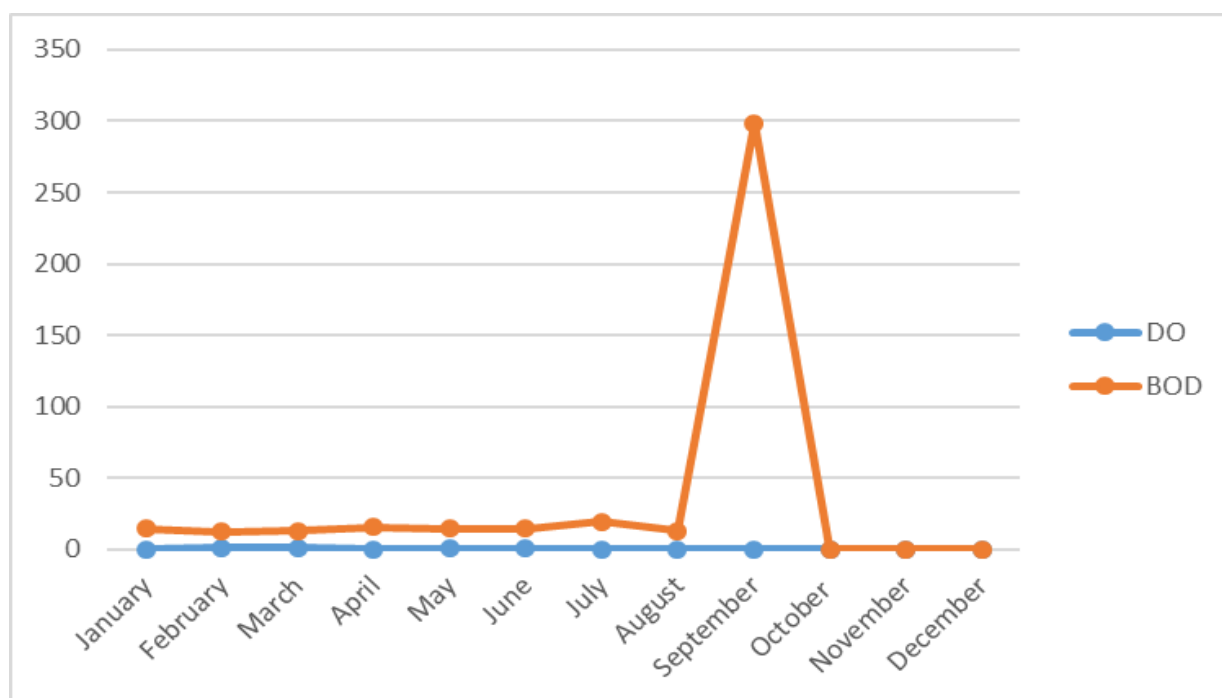


At Aundh Bridge, Aundh gaon Dissolved Oxygen in Mula river BDL to 4.6 mg/l and BOD is about 9.4 to 15.5 mg/l with Faecal coliform organisms 80 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Station No. 2194 : Mula river at Harrison Bridge near Mula-Pawana Sangam

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.22	BDL	14.6	32	1.7	55
February	8.19	1.2	12.5	36	2.8	250
March	8	1.3	13	36	2.9	425
April	8.47	BDL	15.5	48	7	350
May	7.83	0.8	14.6	44	3.2	275
June	8.17	0.72	14.8	44	BDL	275
July	7.52	BDL	19.6	60	5	275
August	8.32	BDL	12.8	40	1.4	350
September	7.72	BDL	298.6	12	0.8	350
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mula river at Harrison bridge near Mula-Pawana Sangam



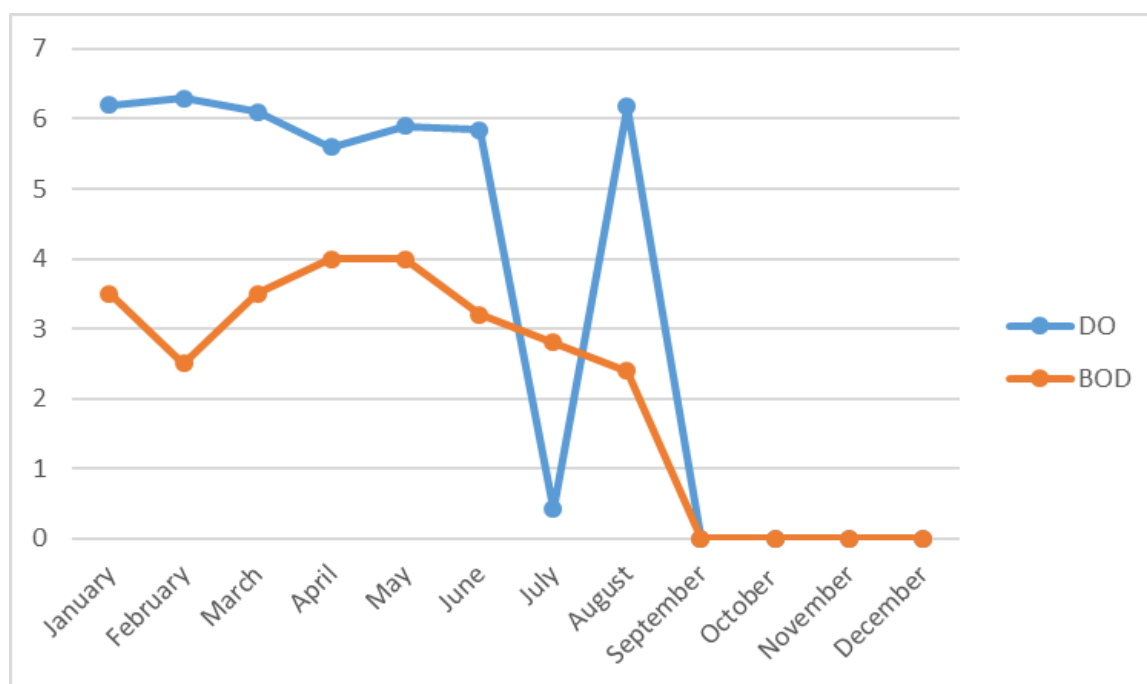
At Harrison Bridge Mula river shows Dissolved Oxygen as BDL to 1.3mg/l and BOD is 12.5 to 19.6 mg/l with Faecal coliform organisms 55 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Mutha River

Station No. 2680 : Mutha river at Khadakwasla Dam Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.75	6.2	3.5	8	0.4	13
February	7.9	6.3	2.5	8	3.1	13
March	7.9	6.1	3.5	2.2	1	6
April	7.56	5.6	4	12	0.6	7
May	7.8	5.9	4	12	1	9
June	8.29	5.84	3.2	8	1	12
July	3.13	0.42	2.8	8	1	8
August	8.66	6.18	2.4	8	1.6	9
September	NA	NA	NA	NA	NA	NA
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mutha river at Khadakwasla Dam Pune

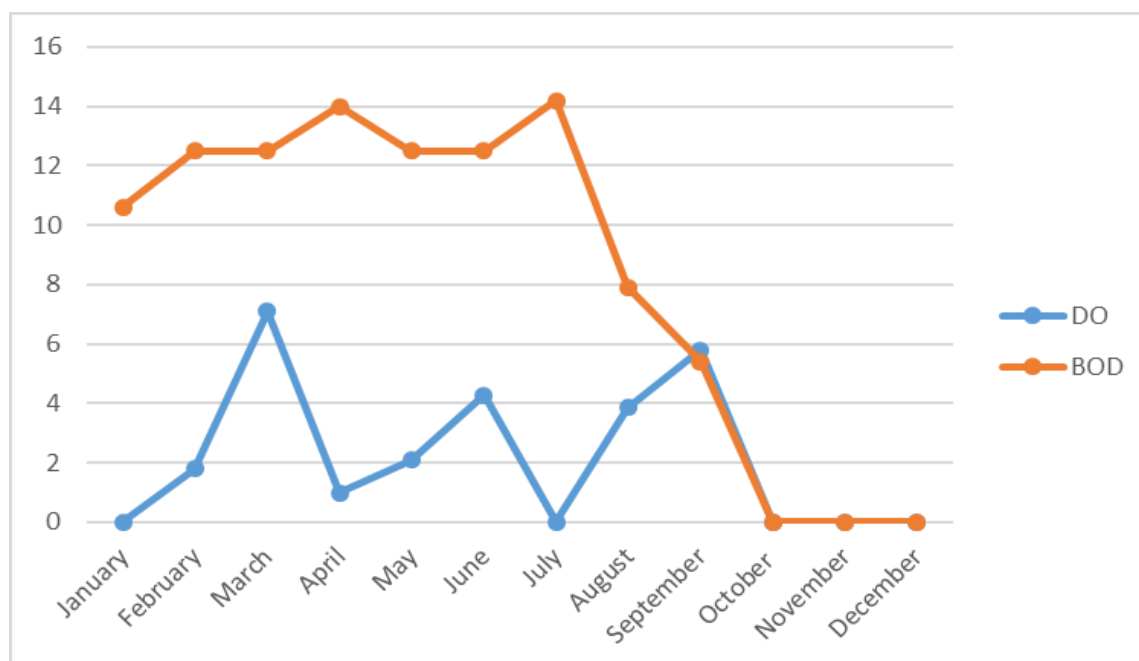


At Khadakwasla Dam Dissolved Oxygen is 0.42 to 6.3 mg/l and BOD is about 2.4 to 4.0 mg/l with Faecal coliform organisms 8 to 13 per 100 ml. With such high contamination this water is not fit for drinking even after treatment. This water is suitable as drinking water after proper treatment followed by disinfection.

Station No. 1189 : Mutha river at U/s. at Vithalwadi near Shankar Mandir

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.55	BDL	10.6	28	2.4	20
February	8.22	1.8	12.5	36	2.4	250
March	8.4	7.1	12.5	28	3.1	275
April	8.55	1	14	40	7	350
May	7.82	2.1	12.5	36	5.4	275
June	8.37	4.28	12.5	36	2.2	250
July	7.82	BDL	14.2	48	2.4	250
August	8.58	3.86	7.9	24	2.3	275
September	7.47	5.8	5.4	16	1.6	250
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mutha river at U/s of Vithalwadi near Shankar Mandir

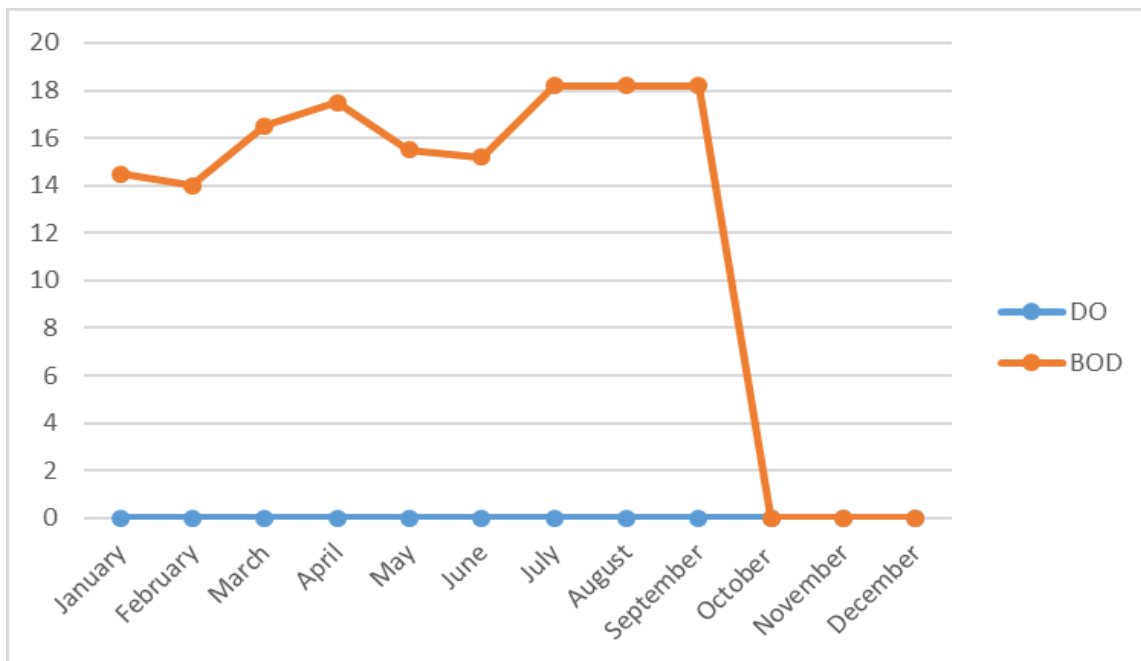


At Vithalwadi Dissolved Oxygen is BDL to 7.1 mg/l and BOD is about 5.4 to 14.5 mg/l with Faecal coliform organisms 20 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Station No. 2678 : Mutha river near Veer Savarkar Bhavan

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.5	BDL	14.5	36	1.7	150
February	7.95	BDL	14	44	6.6	350
March	7.42	BDL	16.5	40	3.4	350
April	8.24	BDL	17.5	56	4.5	225
May	7.65	BDL	15.5	48	8.2	350
June	8.35	BDL	15.2	44	2.8	275
July	7.79	BDL	18.2	56	3.8	350
August	8.5	BDL	18.2	56	4.2	350
September	7.35	BDL	18.2	16	2	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mutha River near Veer Savarkar Bhavan

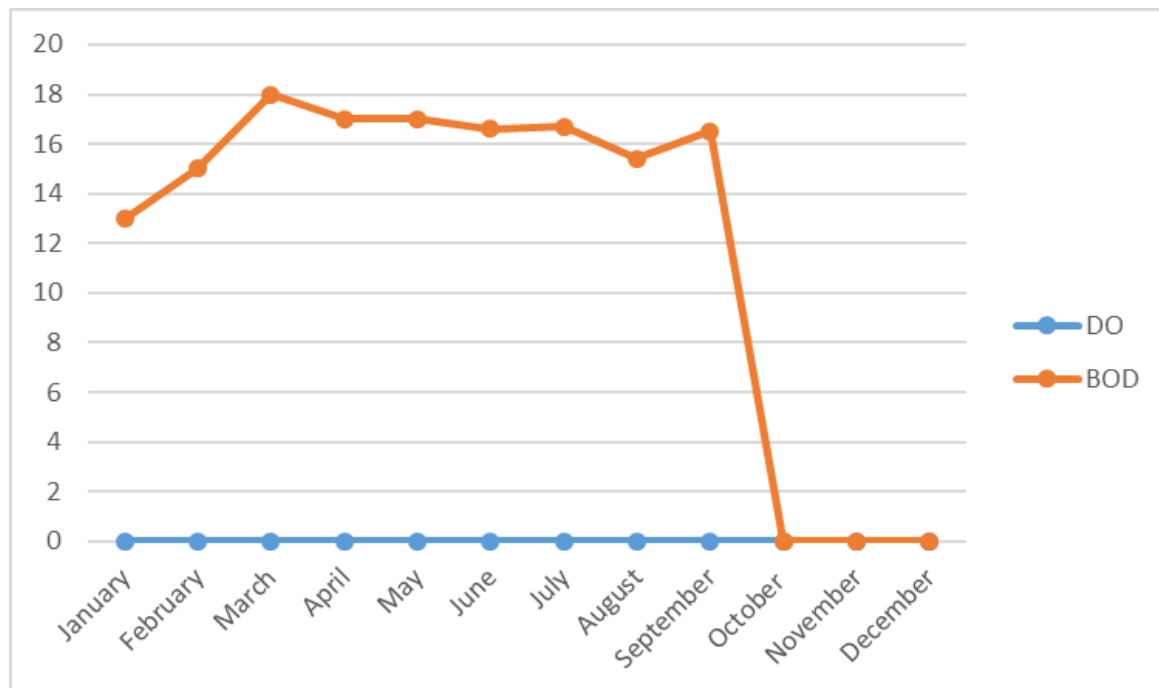


At Veer Savarkar Bhuvan Dissolved Oxygen is nil mg/l and BOD is about 14 to 18.2 mg/l with Faecal coliform organisms 150 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Station No. 2679 : Mutha river at Deccan Bridge, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.52	BDL	13	36	2.6	120
February	7.94	BDL	15	40	2.5	275
March	8	BDL	18	48	3.7	425
April	8.19	BDL	17	52	5	275
May	7.78	BDL	17	52	6.6	350
June	8.32	BDL	16.6	48	2.8	350
July	7.76	BDL	16.7	64	3.4	425
August	8.54	BDL	15.4	48	4.1	350
September	7.54	BDL	16.5	12	1.5	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mutha river at Deccan Bridge, Pune

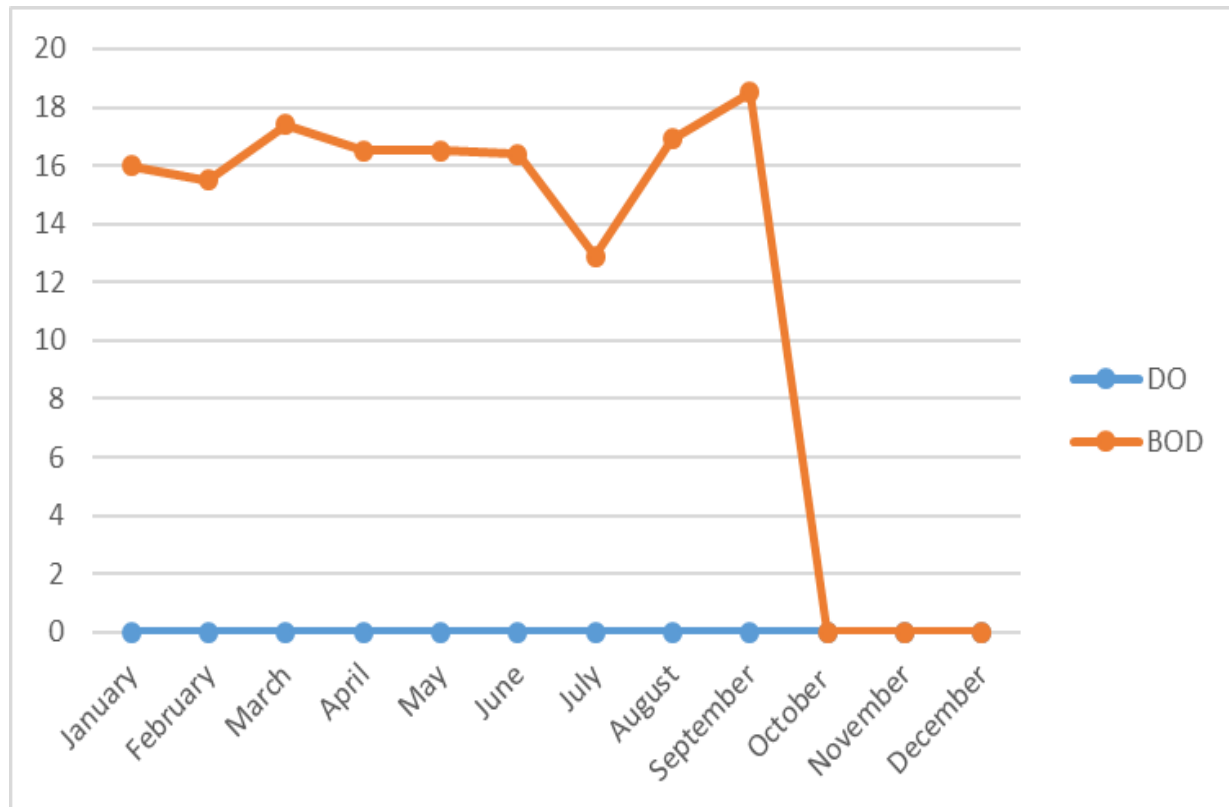


At Deccan Dissolved Oxygen in Mutha river is nil mg/l and BOD is about 13 to 17 mg/l with Faecal coliform organisms 120 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Station No. 2191 : Mutha river at Sangam Bridge Near Ganapati Ghat

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.43	BDL	16	40	4	140
February	7.99	BDL	15.5	48	3.6	275
March	8.4	BDL	17.4	48	3.2	350
April	8.14	BDL	16.5	52	4	225
May	7.56	BDL	16.5	52	8	350
June	8.78	BDL	16.4	48	2.8	356
July	7.74	BDL	12.9	52	5.6	425
August	8.4	BDL	16.9	52	3.6	350
September	7.51	BDL	18.5	20	1.6	350
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mutha river at Sangam Bridge Near Ganapati Ghat



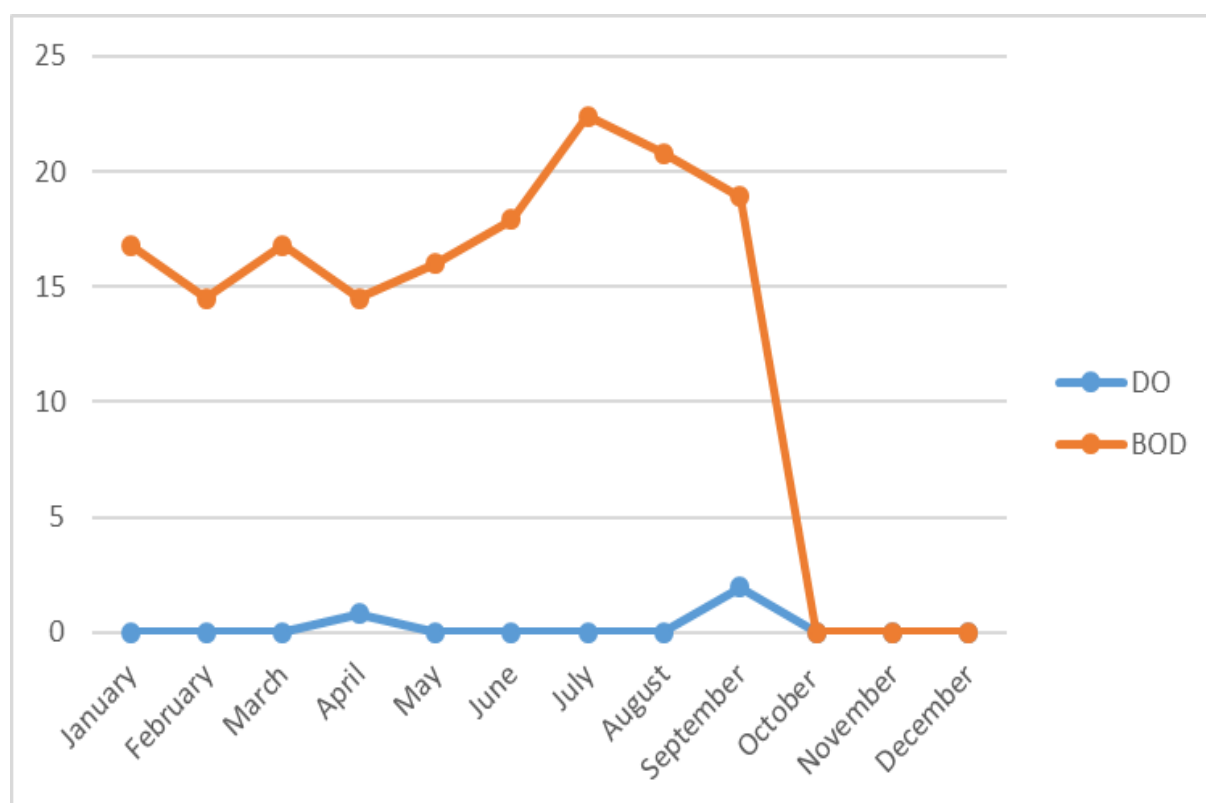
At Sangam, near Ganapati Temple, Dissolved Oxygen is nil mg/l and BOD is about 12.9 to 18.5 mg/l with Faecal coliform organisms 140 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

MULA MUTHA RIVER

Station No. 1190: Mula-Mutha river at D/s of Bund garden, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.34	BDL	16.8	44	3.9	175
February	7.42	BDL	14.5	48	2.7	425
March	7.9	BDL	16.8	48	4.8	425
April	8.19	0.8	14.5	44	5.5	275
May	7.51	BDL	16	48	5.2	550
June	8.27	BDL	17.9	52	2.6	275
July	7.64	BDL	22.4	68	7	350
August	8.29	BDL	20.8	64	2	425
September	7.4	1.98	18.9	12	1.7	425
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mula-Mutha river at D/s of Bund garden, Pune

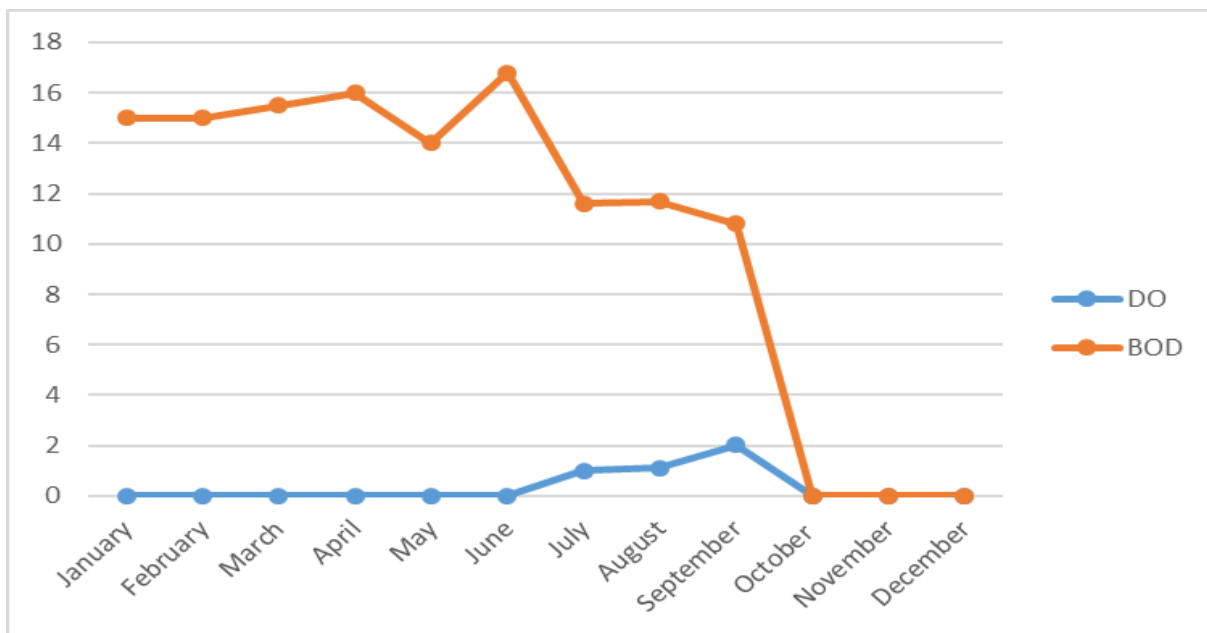


At Bund Garden Dissolved Oxygen is nil to 0.8 mg/l and BOD is about 14.5 to 22.4 mg/l with Faecal coliform organisms 175 to 550 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Station No. 2192 : Mula-Mutha River at Mundhwa Bridge

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.41	BDL	15	40	3.8	195
February	8.07	BDL	15	44	2.6	350
March	8	BDL	15.5	44	3.3	275
April	8.04	BDL	16	48	5	350
May	7.39	BDL	14	44	4.6	250
June	8.45	BDL	16.8	48	1.8	350
July	7.61	1.01	11.6	44	1.0	350
August	8.3	1.12	11.7	44	1.5	350
September	7.49	2.02	10.8	12	2.2	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mula-Mutha river at Mundhwa Bridge

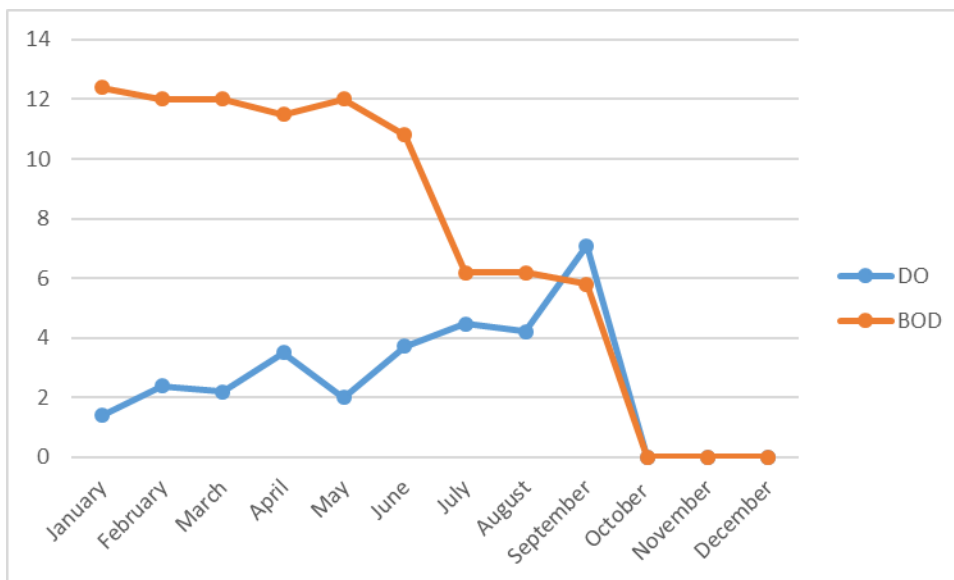


At Mundhwa Bridge Dissolved Oxygen is nil to 2.02 mg/l and BOD is about 10.8 to 16.8 mg/l with Faecal coliform organisms 195 to 350 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

Station No. 2677 : Mula-Mutha River at D/s of Theur, Pune

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.68	1.4	12.4	32	1.2	95
February	8.27	2.4	12	36	1.6	200
March	8.2	2.2	12	3	2.7	250
April	8.87	3.5	11.5	32	2.5	250
May	8.06	2	12	36	6.6	275
June	8.55	3.73	10.8	32	0.8	225
July	8.56	4.48	6.2	32	3.4	225
August	8.35	4.22	6.2	20	2.4	275
September	7.88	7.09	5.8	16	2.4	200
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Mula-Mutha river at D/s of Theur, Pune.



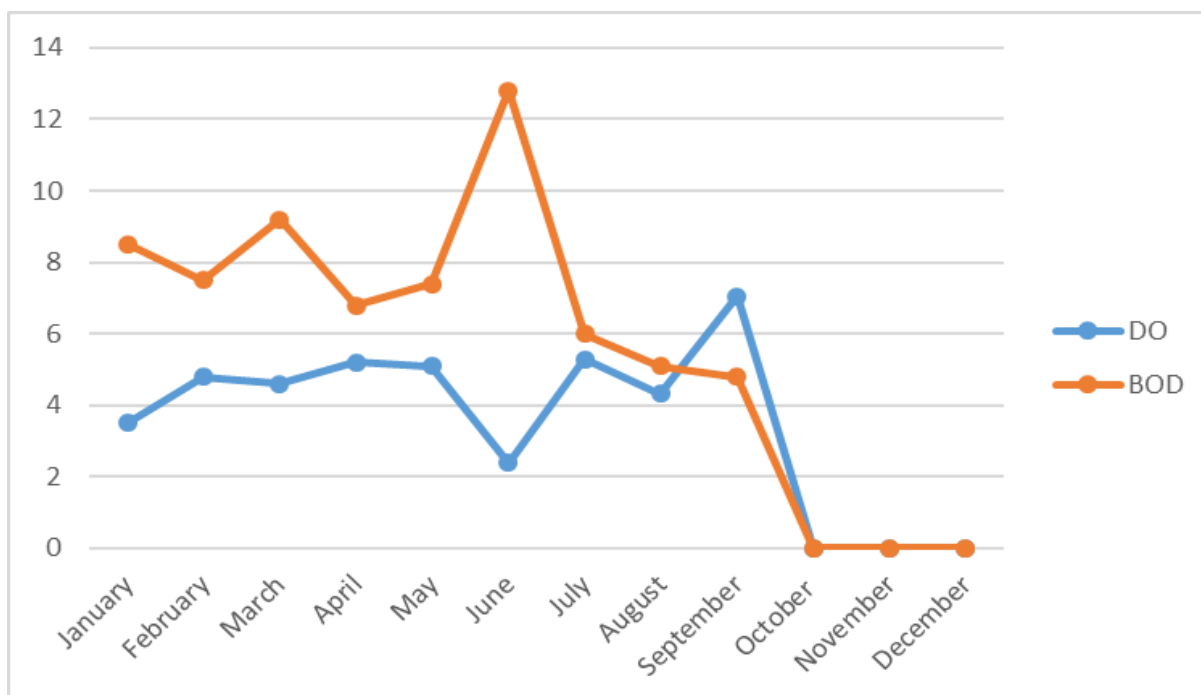
At Theur, Dissolved Oxygen in Mula-Mutha river is 1.4 to 7.09 mg/l and BOD is about 5.8 to 12.4 mg/l with Faecal coliform organisms 95 to 250 per 100 ml. With such high contamination this water is not fit for drinking even after treatment.

BHIMA RIVER

Station No. 2655 : Bhima river at Koregaon near Koregaon bridge

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.54	3.5	8.5	20	1.7	65
February	8.22	4.8	7.5	20	1.3	225
March	7.9	4.6	9.2	28	2.4	250
April	8.59	5.2	6.8	20	3.7	110
May	8.23	5.1	7.4	24	6.5	225
June	8.52	2.38	12.8	36	0.4	250
July	8.59	5.29	6	20	2.2	85
August	8.34	4.33	5.1	16	1.5	130
September	7.89	7.05	4.8	24	1.4	275
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Bhima river at Koregaon Bridge, Pune

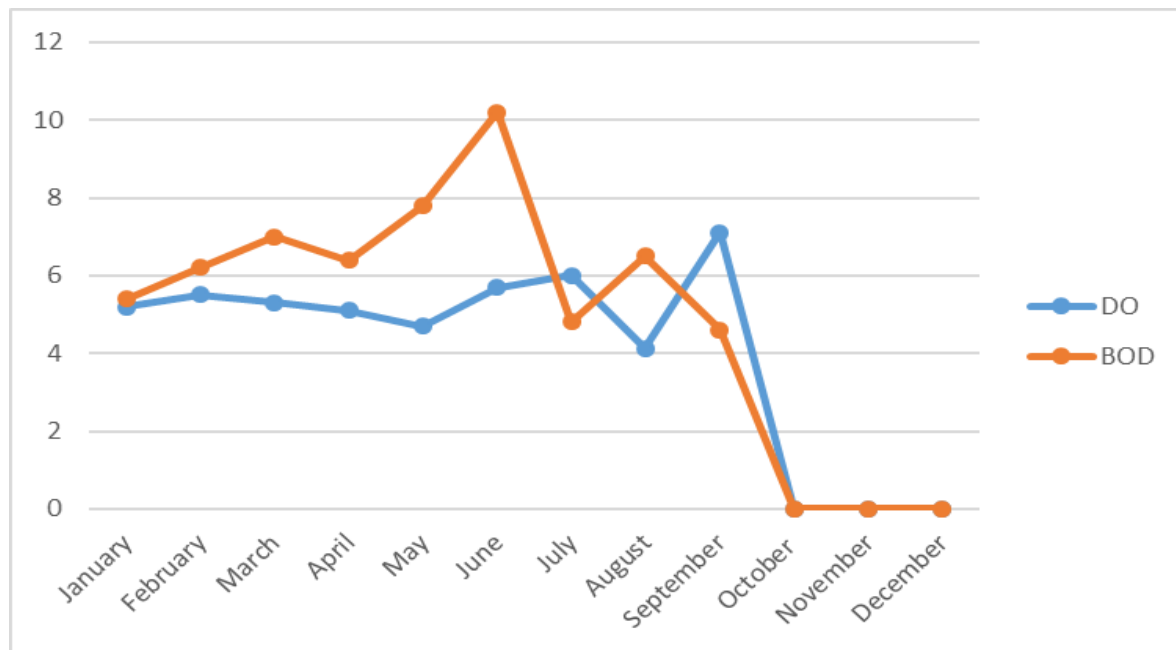


At Koregaon, Dissolved Oxygen of Bhima river is 3.5 to 7.05 mg/l and BOD is about 4.8 to 12.8 mg/l with Faecal coliform organisms 65 to 275 per 100 ml. This water can be used for drinking purpose with proper treatment followed by disinfection.

Station No. 28 : Bhima river at Takli

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.71	5.2	5.4	20	2.2	115
February	8.41	5.5	6.2	20	2.3	275
March	8.2	5.3	7	24	2.3	275
April	8.58	5.1	6.4	20	1.1	65
May	8.05	4.7	7.8	24	2.2	195
June	8.6	5.7	10.2	28	3.4	110
July	8.16	6.01	4.8	16	2	120
August	8.65	4.12	6.5	20	2.4	130
September	7.7	7.11	4.6	16	4	130
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Bhima river at Takli

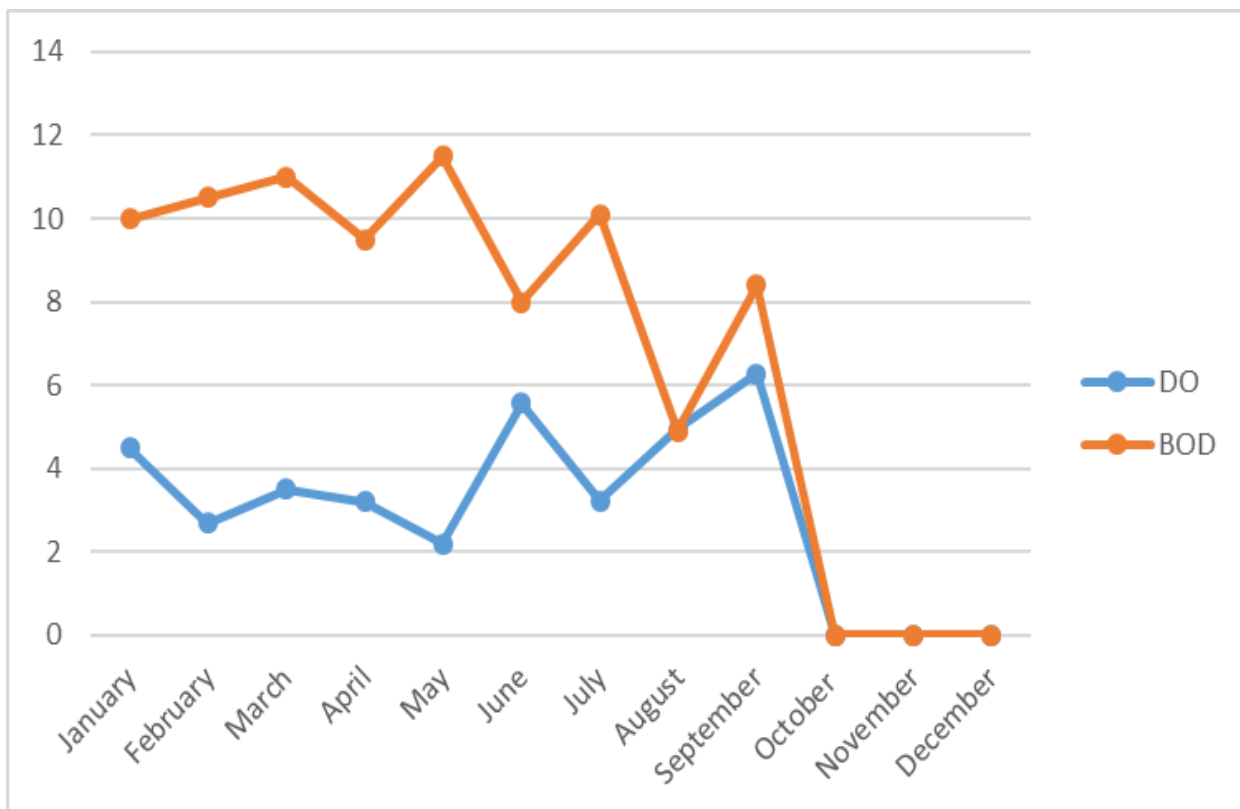


At Takli Dissolved Oxygen of Bhima river is nil mg/l and BOD is about 4.12 to 7.11 mg/l with Faecal coliform organisms 65 to 275 per 100 ml. This water can be used for drinking purpose with proper treatment followed by disinfection.

Station No. 1191 : Bhima river after confluence with Mula-Mutha at paragon near Vasant Bandhara

Month	pH	Dissolved Oxygen	B.O.D.	C.O.D.	Nitrates	Faecal Organisms
January	8.82	4.5	10	28	3.4	140
February	8.69	2.7	10.5	32	3.2	225
March	7.8	3.5	11	24	1.8	200
April	8.86	3.2	9.5	28	6.5	275
May	7.87	2.2	11.5	36	6.6	225
June	8.66	5.57	8	24	7.4	170
July	7.99	3.22	10.1	32	2	225
August	8.25	4.94	4.9	16	3.4	225
September	7.7	6.28	8.4	20	1.3	225
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA

Bhima river after confluence with Mula-Mutha at Paragon near Vasant Bandhara



At Vasant Bandhara, Dissolved Oxygen of Bhima river is 2.2 to 6.28 mg/l and BOD is about 4.9 to 11.5 mg/l with Faecal coliform organisms 140 to 275 per 100 ml. This water can be used for drinking purpose with proper treatment followed by disinfection.

Site selection for Sewage Treatment Plants and treatment methodology

a. Site selection for sewage treatment plants and treatment methodology.

Since there are more than six polluted river stretches, selection of sites, treatment methodology and probable treatment technology need be discussed separately.

A. Indrayani river : Treatment plants proposed and their details are as follows,

Sr. No.	City	Sewage generated MLD	Sewage treated MLD	Capacity of proposed treatment plant MLD
1	Lonavla	12.3	3.69	8.61
2	Talegaon	7	0	7
3	Dehu	0.28	0	0.28
4	Dehu cantonment board	8.2	8.2	8.2
5	Alandi	2.4	0	2.4

Thus five treatment plants are required. Their details will be as follows,

1. LONAVLA :

Capacity of the plant: Existing plant capacity is only 3.69 MLD and additional flow is 8.61 i.e. more than double capacity. For a hilly location such vast area at one place may not be available and hence two separate plants each of 5 MLD capacity need be constructed.

Location of plant will depend upon sewage collection network so as to collect sewage easily by gravity. Being hilly country this will be possible and raw sewage pumping station/s can be avoided.

Methodology: To save treatment plant area and ensure best quality output Activated Sludge process with either Moving Bed Bio Reactor (MBBR) or Sequential Batch Reactor system may be adopted. This should be followed by a Tertiary treatment which will produce BOD less than 15 mg/l and Suspended solids less than 10 mg/l.

2. Talegaon :

Capacity of the plant: At present there is no treatment plant. Proposed sewage treatment plant capacity is 7 MLD.

Location of plant will depend upon sewage collection network so as to collect sewage by gravity or else pump to one location.

Methodology: Since space will be available, to ensure more than 90% treatment efficiency, an Activated Sludge Process with Extended Aeration will be best alternative. This should be followed by a Tertiary treatment which will produce BOD less than 15 mg/l and Suspended solids less than 10 mg/l.

3. Dehu :

Capacity of the plant: At present there is no treatment plant. Proposed sewage treatment plant capacity is 0.28 MLD.

Location of plant will depend upon sewage collection network so as to collect sewage by gravity or else pump to one location.

Methodology: To ensure more than 90% treatment efficiency, an Activated Sludge Process with Extended Aeration will be best alternative. This should be followed by a Tertiary treatment which will produce BOD less than 15 mg/l and Suspended solids less than 10 mg/l.

4. Dehu Cantonment :

Capacity of the plant: At present there is no treatment plant. Proposed sewage treatment plant capacity is 8.2 MLD.

Location of plant will depend upon sewage collection network so as to collect sewage by gravity or else pump to one location.

Methodology: To ensure more than 90% treatment efficiency, an Activated Sludge Process with SBR process will be economical, space wise. This should be followed by a Tertiary treatment which will produce BOD less than 15 mg/l and Suspended solids less than 10 mg/l.

5. Alandi:

Capacity of the plant: At present there is no treatment plant. Proposed sewage treatment plant capacity is 2.4 MLD. However, there should be provision to treat additional sewage treatment during bi-annual yatras. For yatra purpose an Upflow Anaerobic Sludge Blanket (UASB) Reactor may be constructed on permanent basis. This will take care of occasional load from visiting Lakhs of yatris.

Location of plant will depend upon sewage collection network so as to collect sewage by gravity or else pump to one location..

Methodology: Treatment will be in two parts,

a. One will be to treat normal sewage flow of 2.4 MLD by an Activated Sludge Process with Extended Aeration followed by a Tertiary treatment which will produce BOD less than 15 mg/l and Suspended solids less than 10 mg/l.

b. Second will be a UASB reactor followed by SBR system to treat sewage followed by Tertiary Treatment Plant

B. Pawana river

Sr. No.	City	Sewage generated MLD	Sewage treated MLD	Capacity of proposed treatment plant MLD
1	Pimpri-Chinchwad Municipal Corporation	255	207	48

Capacity : Additional capacity will be 48 MLD.

Location : Preferably in the same campus by either modifying existing units or addition of new unit.

Methodology : Same as existing plant. However Tertiary need be provided to entire flow of 255 MLD. This may require refurbishing of existing aeration system.

C. Mula and Mutha rivers.

Sr. No.	City	Sewage generated MLD	Sewage treated MLD	Capacity of proposed treatment plant MLD
10	Pune Municipal corporation	744	612	132

Capacity : Additional capacity will be 132 MLD.

Location : To be shared proportionally with existing treatment plants by either modifying working units or addition of new unit.

Methodology : Same as existing plants. However Tertiary treatment need be provided to entire flow of 744 MLD. This may require refurbishing of existing aeration system.

D. Villages on the bank of river

Sr. No.	Name of City/Town	Population	Water supplied (MLD)	Sewage generated (MLD)	STP capacity (MLD)	Treatment to be provided
Villages on the bank of river (total 163)						
a.	Haveli(35 villages)	170070	6.80	4.7	0	4.7
c.	Indapur (19 villages)	24897	0.995	0.697	0	0.697
d.	Shirur (11 villages)	26753	1.07	0.74	0	0.74
e.	Mawal (63 villages)	131259	5.25	3.67	0	3.67
f.	Khed (35 villages)	142783	5.71	3.99	0	3.99
	Total for 163 villages	468991	19.825	13.797	0	13.797

For villages having population less than 5000 and no proper sewage collection system, it is necessary to provide group septic tanks followed by proper soak pits. If possible, after septic tank partially treated sewage should be pumped/sent by gravity to the fields. Alternately if sewage is flowing in a nallah, it should be barricaded and sewage pumped to the fields. This step will prevent flow of sewage to the rivers uninterrupted.

E. Identification of site for construction of STPs

Identifying the capacity of the treatment plant is simple however to find a proper place for such treatment plant is most difficult particularly in the urban areas. Another factor while selecting the STP site is treatment standards to be achieved.

Final goal is to make STP most economical and sustainable while achieving the desired standards.

Following is the check list to arrive at most probable site.

Criteria for the selection of the site for wastewater treatment

1. Proximity to an important river - as close as possible- treated water must be adequately diluted
2. Situated near the zones to be served - allows the economic regrouping of the water sewers in order to reduce the construction costs of the planned sewers
3. Access to the site by an existing road - as close as possible to avoid the construction costs of an access road
4. Presence of housing or protected forest - avoid zones to be protected
5. A river in close proximity to the site - avoid affecting a river
6. Site outside a flooding zone - avoid flooding that may affect water treatment
7. Zoning - respect existing municipal zoning
8. Land acquisition - economic impact
9. Control of odours, noise and lighting
 - respect of the standards for a biological reactor fluidized support (type of treatment chosen)
 - without odour since the treatment is effected inside
 - minimum noise since the treatment is effected inside
 - lighting along a residential street
 - minimal impact
10. Architecture
 - respect for the architectural surroundings
 - integrate and harmonize with the existing architecture
11. Construction of conduits, collectors and outlets
 - the shortest possible distance in order to reduce costs
12. Area of the site
 - area required for natural treatment for small towns.

- area required for biological reactor

13. Topography of the site

- must be relatively flat to facilitate construction

14. Type of soil - lends itself to the construction of a treatment plant at a reasonable cost.

15. Geotechnical stability of the site - soil must be stable

F. Probable scope for treatment technology to be adopted.

Treatment technology will depend upon the standards to be achieved in the Sewage Treatment Plant. Earlier there was presumption that river water provides dilution up to 20 volumes and hence the standards for treated sewage from STP were as follows,

5 day's 20°C BOD : 30 mg/l, and

Suspended solids : 100 mg/l.

However since there is no flow in the river for dilution any more due to various reasons, above standards are not sufficient to achieve BOD of 3 mg/l after dilution, which is a criterion for Water suitable for potable use after proper treatment and disinfection.

Raising the disposal standards has direct impact on capital cost as well as operational cost and hence a balance must be found to achieve this goal.

Since all the STP's are designed to achieve above standards, by modifying existing biological system it may be possible to improve these standards to

5 day's 20°C BOD : 20 mg/l, and

Suspended solids : 50 mg/l.

Further treated water should be subjected to Tertiary treatment plant which includes Disinfection, Physico-chemical treatment followed by gravity sand filters. With this modification treated effluent quality after Tertiary Treatment will be as follows,

5 day's 20°C BOD : 10 mg/l, and

Suspended solids : 10 mg/l

Sewage Treatment Plants in Pune city.

Sr. No.	Location	Capacity MLD
1	Erandavane	50
2	Bhairoba Nalla	130
3	Bopodi	18
4	Mundhwa	45
5	Vithhalwadi	32
6	Tanajiwadi	17
7	Dr. Naidu Hospital	90
8	Additional at Dr. Naidu Hospital	118*
	Total	500

Note : * under construction.

Sr.no.	Location	Area covered	Functioning since	Process	Sludge generated
1	Erandwane (Near Mhatre Bridge)	26.15 sq.km: Erandwana, Kothrud, Warje, Karvenagar, Paud Rd., Karve Rd	Dec 2004	Modified activated sludge process followed by aerobic digestion. Aeration with the help of diffusers and settling with the help of inclined tube settlers	
2	Bhairoba Nala (Koregaon Park)	82 sq.km: Kondhwa, Vanawadi, Kalyaninagar, Dhanori, Vimannagar, Kalas, Vishrantwadi, Ghorpadi	Jul 2003	Sludge process followed by aerobic digestion. The gas generated in the digester is useful for power generation and the treated water is presently used for irrigation	
3	Tanajiwad	8 sq.km: Model Colony, Shivajinagar, Janwadi, Gokhale Nagar, Ganeshkhind	Apr 2004	2 stage biological process is used, i.e. bio towers and aeration tank with diffused aeration system	
4	Bopodi (Near Harris Bridge)	15 sq.km: Aundh ITI, Aundhgaon, Sindh Colony, Bopodi, NCL, Raj Bhavan	Jun 2003	Extended aeration process. The sump well and pump house are constructed at Botanical Garden in Aundh, and a pipeline carries the sewage up to the STP	
5	Naidu Hospital	Sewage from Kasba pumping station		Activated sludge process followed by aerobic digestion	
6	Naidu Hospital extension				
7	Vitthalwad				

1. Water quality standards for Best Designated usages.

Category of fresh water	A-I	A-II	A-III	A-IV
Best usage	Unfiltered public water supply after approved disinfection	Public water supply with approved treatment equal to coagulation, sedimentation & disinfection	Not fit for human consumption fish & wildlife propagation	Fit for agriculture, industrial cooling & process water
Chemical qualities: Maximum allowable concentration				
1. Toxic Substances				
Arsenic(As)	0.3 mg/l	0.3 mg/l	1.0 mg/l	0.1 mg/l
Cadmium(Cd)	0.01 mg/l	0.01 mg/l	-	-
Chromium(Cr ⁺⁶)	0.05 mg/l	0.05 mg/l	0.05 mg/l	0.2 mg/l
Cyanide (CN)	0.05 mg/l	0.1 mg/l	0.05 mg/l	0.2 mg/l
Lead (Pb)	0.1 mg/l	0.1 mg/l	-	0.1 mg/l
Boron (B)	-	-	-	2.0 mg/l
Mercury (Hg)	0.001 mg/l	0.001 mg/l	0.001 mg/l	-
Gross alpha activity	3 PCI/l	10-9 uc/ml	3 PCI/l	3 PCI/l
Gross Beta activity	30 PCI/l	10-8 uc/m	30 PCI/l	30 PCI/l
2. Substances affecting health				
Fluoride (F)	1.5 mg/l	1.5 mg/l	-	1.0 mg/l
Nitrates (NO ₃)	45 mg/l	45 mg/l	-	-
3. Substances affecting the portability of water				
pH	6.5 to 8.5	6.0 to 8.5	6.5 to 9.0	6.5 to 9.0
TDS	-	TDS	TDS	-
Total Solids	1500 mg/l	1500 mg/l	-	-
Total Suspended solids	25 mg/l	-	-	-
Total Hardness (CaCO ₃)	50 mg/l	-	-	-
Total residual chlorine	-	-	-	-
Electrical conduct at 25 C	-	-	1000 X 10 ⁻⁶ mhos	3000 X 10 ⁻⁶ mhos
Free carbon di oxide	-	-	12 mg/l	-
Free Ammonical Nitrogen	-	-	12 mg/l	-
Oil & Grease	-	-	0.1 mg/l	-
Pesticides	-	-	0.02 mg/l	-
Biotic Index	-	-	6.0 mg/l	-
Total ammonical Nitrogen	1.5 mg/l	1.5 mg/l	-	50 mg/l
Chlorides (Cl)	600 mg/l	600 mg/l	-	600 mg/l
Sulphates	400 mg/l	400 mg/l	-	1000 mg/l
Copper (Cu)	1.5 mg/l	1.5 mg/l	-	-
Manganese (Mn)	0.5 mg/l	3.0 mg/l	-	-
Iron (Fe)	1.0 mg/l	5.0 mg/l	-	-
Sodium	-	-	-	-
Zinc (Zn)	15.0 mg/l	1.5 mg/l	5.0 mg/l	5.0 mg/l
Phenolic Compound	0.002 mg/l	0.002 mg/l	0.05 mg/l	-
Alkyl Benzene Sulphate	1.0 mg/l	1.0 mg/l	-	-
Mineral Oil	0.3 mg/l	0.3 mg/l	-	-
Ammonia	1.5 mg/l	1.5 mg/l	-	-
BOD (5 days 20°C)	2.0 mg/l (Monthly average of 100 samples)	5.0 mg/l (Monthly average of 100 samples)	10 mg/l	30 mg/l
COD	-	-	-	150 mg/l
DO	Not less than 5 mg/l (Monthly average of 100 samples)	4.0 mg/l	Not less than 3 mg/l	Not less than 2 mg/l
Bacteriological Standard	Coliform Bact 250	Not greater than 5000	-	-

2. Quality of treated water from Existing Sewage Treatment Plants.

Sr No	STP Location	Date	Treated water Quality							
			pH	BOD	COD	SS	O&G	TDS	Sulphate	Chlorides
Pimpri Chinchwad Municipal Cooperation										
1	Sanghavi(Capacity 15 MLD)	15/3/2010	8.1	26.5	76	11	BDL	398	40.58	329.9
		20/2/2010	7.4	18	64	30	BDL	420	29.97	115
		12/1/2010	8.02	21.5	68	12	BDL	184	1.368	62.5
2	Kasarwadi Phase 1 (Capacity 40 MLD)	15/3/2010	8	26	80	52	BDL	258	41.95	56
		20/2/2010	7.5	19	64	33	BDL	380	34.76	95
		12/1/2010	7.38	17.2	56	14	BDL	552	51.75	57.5
3	Kasarwadi Phase 2 (Capacity 40 MLD)	15/3/2010	7.9	6	20	52	BDL	402	43.31	125
		20/2/2010	7.5	9	28	8	BDL	410	68.62	105
		12/1/2010	6.97	6	20	12	BDL	147	38.53	125
4	Chikali 1 (Capacity 16MLD)	15/3/2010	8.2	6	16	9	BDL	212	37.38	40
		20/2/2010	8	8.8	28	12	BDL	340	37.38	80
		12/1/2010	8.2	6.2	24	15	BDL	267	15.61	65
5	Chikali 2 (Capacity 16MLD)	15/3/2010	8	25	104	22	BDL	318	73.18	30
		20/2/2010	7.5	219	480	14	BDL	386	24.39	110
		12/1/2010	7.84	19.4	64	8	BDL	148	7.295	57.5
6	Pimple Nilakh (Capacity 20MLD)	15/3/2010	8	18	60	15	BDL	442	51.75	100
		20/2/2010	8.6	30	128	24	BDL	710	43.66	174.9
		12/1/2010	7.71	11.4	40	7	BDL	302	21.43	87.5
7	Chinchwad Phase 1 (Capacity 30MLD)	15/3/2010	8.4	15	48	33	BDL	304	48.79	65
		20/2/2010	7.6	10	36	1	BDL	510	17.55	135
		12/1/2010	7.86	17.6	54	11	BDL	663	4.901	65
8	Chinchwad Phase 2 (Capacity 30MLD)	15/3/2010	8.5	6	24	10	BDL	-	31.69	80
		20/2/2010	8	7	24	7	BDL	640	27.81	179.9
		12/1/2010	7.87	6	24	5	BDL	187	1.368	70
Pune Municipal Cooperation										
1	Yeravda (Capacity 50 MLD)	27/10/2009	8.11	13.2	32	26	BDL	-	-	-
		24/11/2009	8.8	5.1	20	6	BDL	-	-	-
		24/2/2010	8.06	12	40	37	BDL	-	-	-
2	Bhairoba Nala (Capacity 130 MLD)	27/10/2009	7.53	13.5	40	24	BDL	-	-	-
		24/11/2009	8.11	8.5	28	4	BDL	-	-	-
		19/3/2010	8.2	13	44	10	BDL	-	-	-
3	Bopodi (Capacity 18 MLD)	27/10/2009	7.95	8.4	24	25	BDL	-	-	-
		24/11/2009	8.4	5.1	20	4	BDL	-	-	-
		19/3/2010	7.4	15	44	12	BDL	-	-	-
13	Mundhwa (45 MLD)	27/10/2009	8.22	7.2	24	40	BDL	-	-	-
		24/11/2009	8.22	8.3	24	6	BDL	-	-	-
		19/3/2010	8.1	12	40	8	BDL	-	-	-
14	Vitthalwadi	30/11/2009	8.04	37.8	84	15	2	-	-	-

	(Capacity 32 MLD)	24/2/2010	7.84	16	56	30	BDL	-	-	-
		19/3/2010	8.7	22	60	8	BDL	-	-	-
15	Tanajiwadi (Capacity 17 MLD)	22/12/2009	7.16	6.4	25	30	BDL	-	-	-
		15/1/2010	7.39	8.6	20	9	BDL	-	-	-
		19/3/2010	6.6	15	48	34	BDL	-	-	-
16	Dr. Naidu (Capacity 90 MLD)	27/10/2009	7.5	9.6	27	42	BDL	-	-	-
		24/11/2009	7.48	4.2	12	8	BDL	-	-	-
		15/1/2010	7.36	8.2	28	23	BDL	-	-	-

3. Raw sewage quality flowing from various nallas.

Corporation/Municipality	Name of Nullah	pH	DO	BOD	COD	SS	SO4	Cl	NO3	Hardness
Pune Municipal Corporation	Tanajiwadi	8.19	1.52	45.7	132	36	25.27	-	0.192	140
	Ambilodha	8.21	2.11	21.6	60	45	26.76	44	0.281	104
	Yerawada	8.2	2.35	20.4	60	28	26.19	66	0.281	110
	Mhatre Pool	8.03	0.0	48.9	140	28	35.11	60	0.508	100
	Vithhalwadi	8.07	3.32	16.7	48	55	19.78	66	0.216	156
	Varje Malwadi	8.16	2.62	13.9	40	32	18.98	88	0.181	158
	Bhairoba	8.14	1.06	57.5	164	85	37.85	84	0.298	150
Pimpri Chinchwad Municipal Corporation	Kiwale	7.89	4.28	8.5	28	16	63.13	90	0.862	296
	Valhekar	7.77	2.78	37.5	108	22	30.99	84	0.926	146
	Gokhale Park	7.64	0.0	43.5	124	25	72.05	105	0.728	148
	Thergaon	7.62	0.66	56	160	24	69.53	90	1.28	180
	Garware colony	7.74	3.2	18.5	52	17	35.11	76	0.668	140
	Link Road	7.7	3.1	16.3	48	18	64.73	90	0.572	180
	Garware Nalla	7.68	3.98	13.8	40	16	75.71	84	0.602	210
	Nullah	7.7	3.26	16.7	48	24	146.38	110	0.772	200
	Bhairoba	7.65	0.79	52.8	148	16 4	73.19	112	1.42	244
	Nashik Phata	7.48	3.35	15.5	44	27	13.95	64	0.446	140
	Sandvik	7.21	1.86	48.3	140	40	29.73	96	1.28	152
	Sangvi gaon	7.57	1.24	41.9	120	23	53.52	84	1.12	160
Talegaon	Katvi	7.56	2.5	29.5	128	16	108.64	45.99	0.11	--
Dehu Cantonment	Shelarwadi	7.75	0.0	35	100	22	41.17	65.98	0.194	--
	Kiwale	7.55	0.0	75	208	20	28.02	125.96	0.149	--
	Kinhe	7.77	0.0	60	172	26	58.55	117.96	0.268	--
Pune Cantonment	Morwade	7.63	4.79	4.2	12	30	16.24	50	0.102	90
	Manik	6.64	0.0	25.3	72	44	19.78	45	0.158	130
	Bhairoba	6.75	0.0	36.2	104	68	50.04	72	0.279	164
Kirkee Cantonment	Civil area	7.13	0.0	23.7	68	11	44.6	7	0.337	344
	Amm. factory					6				
	STP civil area	6.94	0.0	22.9	64	82	35.34	47.5	0.229	124
	G. E. Office	6.91	0.0	46.5	132	96	27.67	62.5	0.332	204
	Bajaj Park	7.2	0.0	20.9	60	34	56.72	52.5	0.253	236
	C.B. office	7.67	3.97	9.8	28	24	148.67	0.393	340	64
	Saiprus	7.37	0.87	14.2	40	30	28.25	32.5	0.192	116
	Hindu crematorium	7	0.0	67	204	10 6	38.31	156	0.356	240
	Rajiv Gandhi colony	6.88	0.0	186	568	76	37.85	168	0.65	260
Gadi adda	7.36	0.0	55.8	168	11 4	92.06	112	0.296	264	
Gawli wada	7.26	0.0	127	388	26 6	44.37	145	1.164	234	

4. VILLAGES SITUATED AT THE BANK OF RIVER IN PUNE DISTRICT

NO.	VILLAGE	POPULATION	WATER SUPPLY m ³ /day	WASTE WATER GENERATE m ³ /day	STP SCHME CAPACITY	REMARK (POLLUTED OR NOT POLLUTED)
HAWELI TALUKA(TOTAL 35 VILLAGE)						
TOTAL		170070	7370	5198.75	---	---
1	Kondve Dhawade	4675	187.0	130.0	---	---
2	Shivane	6661	266.4	186.5	---	---
3	Uttamagar	6473	258.9	181.2	---	---
4	New Kopare	2976	119.0	83.3	---	---
5	Khadakwasala	7056	282.2	197.5	---	---
6	Kirkitwadi	4334	173.3	121.3	---	---
7	Dhayari	18611	744.4	521.1	---	---
8	Nanded	5839	233.5	163.4	---	---
9	Narhe	3859	154.3	108.0	---	---
10	Aabegaon Bu.	5767	230.6	161.4	---	---
11	Aabegaon Khu.	1579	631.6	442.1	---	---
12	Keshwagar	14934	597.3	418.15	---	---
13	Manjari Bu.	24509	980.3	686.2	---	---
14	Manjari Khu.	3021	120.8	845.8	---	---
15	Kolwadi	4210	168.4	117.8	---	---
16	Theur	9228	369.1	258.3	---	---
17	Bivari	1050	42.0	29.4	---	---
18	Koregaon Mul	3608	144.3	101.0	---	---
19	Bhavarapur	1254	50.1	35.1	---	---
20	Ashtapur	3237	129.4	90.6	---	---
21	Hingangaon	1573	62.9	44.0	---	---
22	Khamgaon Tek	832	33.2	23.2	---	---
23	Dehu	10000	400.0	280.0	---	---
24	Nirgudi	711	28.4	19.9	---	---
25	Wadgaon Shinde	2668	106.7	74.7	---	---
26	Bhavadi	1476	59.0	41.3	---	---
27	Tulapur	2039	81.5	57.0	---	---
28	Fulgaon	1651	66.0	46.2	---	---
29	Wadhu Khu.	1309	52.3	36.6	---	---
30	Perane	5181	207.2	145.0	---	---
31	Dongergaon	2233	89.3	62.5	---	Polluted
32	Burkegaon	1870	74.8	52.3	---	---
33	Pimpri saandas	3031	121.2	84.8	---	---
34	Sangavi saandas	1255	50.2	35.1	---	---
35	Nhavi saandus	1360	54.4	38.0	---	---
TOTAL		170070	7370	5198.75	---	---
INDAPUR TALUKA						
TOTAL		24897	995.8	696.8	---	---
1	Bhavadi	900	36.0	25.2	---	Polluted
2	chandgaon	865	34.6	24.2	---	Polluted
3	Kaalthan no. 1	2062	82.4	57.7	---	Polluted
4	Agoti no. 1	1400	56.0	39.2	---	Polluted
5	Kaalthan no. 2	1200	48.0	33.6	---	Polluted
6	Gangawalan	650	26.0	18.2	---	Polluted
7	Hingangaon	1200	48.0	33.6	---	Polluted

8	Taratgaon	475	19.0	13.3	---	Polluted
9	Kandalgaon	2025	81.0	56.7	---	Polluted
10	Ajoti	400	16.0	11.2	---	Polluted
11	Pimpri khurd	2300	92.0	64.4	---	Polluted
12	Padsthal	1080	43.2	30.2	---	Polluted
13	takrarwadi	2000	80.0	56.0	---	Polluted
14	kumbhargaon	1545	61.8	43.2	---	Polluted
15	Dalaj no. 2	1420	56.8	39.7	---	Polluted
16	Dalaj no. 1	1220	48.8	34.1	---	Polluted
17	Dalaj no. 3	1000	40.0	28.0	---	Polluted
18	Dikasal	1580	63.2	44.2	---	Polluted
19	Kalewadi no. 1	1575	63.0	44.1	---	Polluted
TOTAL		24897	995.8	696.8	---	---
KHED TALUKA						
TOTAL		142783	5710.4	3996.8	---	---
1	Donde	3790	151.6	106.1	---	---
2	Wadgaon Patode	2262	90.4	63.3	---	---
3	Chandoli	2242	89.6	62.7	---	Polluted
4	Rajgurunagar	17636	705.4	493.8	---	Polluted
5	Shiroli	4250	170.0	119.0	---	Polluted
6	Kharpudi Khu.	1450	58.0	40.6	---	Polluted
7	Manjarewadi	1622	64.8	45.4	---	---
8	Kharpudi Bu.	4592	183.6	128.5	---	---
9	Nimgaon	2811	112.4	78.7	---	---
10	Dawadi	6237	249.4	174.6	---	---
11	Duandkarwadi	1063	42.5	29.7	---	Polluted
12	Shailpimpalgaon	5939	237.5	166.2	---	Polluted
13	Koyadi Chakan	3375	135.0	94.5	---	---
14	Siddheghavan	780	31.2	21.8	---	Polluted
15	Bahud	3960	158.4	110.8	---	Polluted
16	Aaskhed Khu	1150	46.0	32.2	---	---
17	Aaskhed Bu	900	36.0	25.2	---	---
18	Chandus	1980	79.2	55.4	---	---
19	Waki Khu	3000	120.0	84.0	---	---
20	Rohkal	1910	76.4	53.4	---	---
21	Chakan	21674	866.9	606.8	---	---
22	Shailgaon	922	36.8	25.8	---	---
23	Sangurdi	1350	54.0	37.8	---	---
24	Yelwadi	2427	97.0	67.9	---	Polluted
25	Khalumbre	1530	61.2	42.8	---	Polluted
26	Nighoje	3310	132.4	92.6	---	---
27	Moi	3000	120.0	84.0	---	---
28	Kuruli	8000	320.0	224.0	---	Polluted
29	Chimbali	3410	136.4	95.4	---	Polluted
30	Kelgaon	3669	146.7	102.7	---	---
31	Charholi Khu	5973	238.9	167.2	---	---
32	Dhanore	2569	102.7	71.9	---	---
33	Solu	5900	236.0	165.2	---	Polluted
34	Golegaon	2500	100.0	70.0	---	Polluted
35	Markal	5600	224.0	156.8	---	---
TOTAL		142783	5710.4	3996.8	---	---
SHIRUR TALUKA						
TOTAL		26753	1069.6	784.6	---	---
1	Koregaon bhima	3077	123.0	86.1	---	Polluted
2	Vittalwadi	1682	67.2	47.0	---	Polluted

3	Aalegaon paga	1772	70.8	49.6	---	Polluted
4	Nagargaon	1543	61.7	43.2	---	Polluted
5	Wadgaon rasai	4074	162.9	114.0	---	Polluted
6	Ganegaon dumala	2537	101.4	71.0	---	Polluted
7	Madvangan farata	2388	95.5	66.8	---	Polluted
8	Tandadi	1671	66.8	46.7	---	---
9	Jhamgaon	2498	99.9	69.9	---	---
10	Darekarwadi	1311	52.4	36.7	---	---
11	shikrapur	4200	168.0	117.6	---	---
TOTAL		26753	1069.6	784.6	---	---
MAVAL TALUKA						
TOTAL		131259	43130.7	30190.3	---	---
1	Kale	1360	54.4	38.0	---	---
2	Yedese	1450	58.0	40.6	---	---
3	Mahagaon	1640	65.6	45.9	---	---
4	Kadadhe	1250	50.0	35.0	---	---
5	Karunj	2164	86.5	60.5	---	---
6	Chikhalse Ahirwade	1972	78.8	55.2	---	---
7	Baur	2122	84.8	59.4	---	---
8	Aadhe	880	35.2	24.6	---	---
9	Ojharde	1161	46.4	32.5	---	---
10	Urse	3582	143.2	100.2	---	---
11	Parandwadi	1631	65.2	45.6	---	---
12	Somatane	4200	168.0	117.6	---	---
13	Shirgaon	3250	130.0	91.0	---	---
14	Gahunje	2292	91.6	64.1	---	---
15	Waru	856	34.2	23.9	---	---
16	Bramhnoli	648	25.9	18.1	---	---
17	Kothurne	1152	46.0	32.2	---	---
18	Chinchwadi (Kothurne)	1480	59.2	41.4	---	---
19	Shivali	1631	65.2	45.6	---	---
20	Yedghod	692	27.6	19.3	---	---
21	Dhaggavhan	465	18.6	13.0	---	---
22	Bhadwali	428	17.1	11.9	---	---
23	Thugaon	700	28.0	19.6	---	---
24	Aardav	400	16.0	11.2	---	---
25	Malvandi Dhore	900	36.0	25.2	---	---
26	Shivane	2719	108.7	76.1	---	---
27	Sadvali	825	33.0	23.1	---	---
28	Bebadohod	2155	86.2	60.3	---	---
29	Pimpalekhute	925	37.0	25.9	---	---
30	Chandkhed (Chandawadi)	600	24.0	16.8	---	---
31	Saate	3902	156.0	109.2	---	---
32	Done	971	38.8	27.1	---	---
33	Dhamane	1468	58.7	41.1	---	---
34	Godubmre	1310	52.4	36.6	---	---
35	Salumbre	1226	49.0	34.3	---	---
36	Darumbre	1505	60.2	42.1	---	---
37	Saangwade	1329	53.1	37.2	---	---
38	Takave Khu	1296	51.8	36.2	---	---
39	Khadkale Kamshet	15000	600.0	420.0	---	---
40	Taaje	948	37920	26544	---	---

41	Pimploli	964	38.5	26.9	---	---
42	Pathergaon	497	19.8	13.9	---	---
43	Naane	3500	140.0	98.0	---	---
44	Kanhe	5535	221.4	154.9	---	---
45	Naaygaon	1240	49.6	34.7	---	---
46	Saai	622	24.8	17.4	---	---
47	Nanoni	536	21.4	15.0	---	---
48	Paarwadi	410	16.4	11.4	---	---
49	Ghonshet	1952	78.0	54.6	---	---
50	Wadgaon	11364	454.5	318.1	---	---
51	Katavi	678	27.1	18.9	---	---
52	Rajpuri	920	36.8	25.7	---	---
53	Warade	3346	133.8	93.6	---	---
54	Shiv Shankar & Bhimashankar Colony	1600	64.0	44.8	---	---
55	Aambi	1215	48.6	34.0	---	---
56	Mangrul	842	33.6	23.5	---	---
57	Maadwadi	3748	149.9	104.9	---	---
58	Indori	9350	374.0	261.8	---	---
59	Mundhaware	393	15.7	11.0	---	---
60	Jambhule	2750	110.0	77.0	---	---
61	Aambale	1273	50.9	35.6	---	---
62	Warangwadi	1200	48.0	33.6	---	---
63	Waksai	2739	113.5	79.4	---	---
Total		131259	5250.36	3675	---	---
Grand Total		4,68,991 nos.	20394.6m³	15034.4m³	---	---

CRITERIA FOR PRIORITY**Criteria for Priority 1**

- Monitoring locations exceeding BOD concentration 30 mg/l has been considered as it is the standard of sewage treatment plant and in river it appears without dilution. (River locations having water quality exceeding discharge standards for BOD to fresh water sources)
- All monitoring locations exceeding BOD concentration 6 mg/l on all occasions.
- Monitoring locations exceeding 3 mg/l BOD are not meeting desired water quality criteria but does not affect to Dissolved Oxygen level in water bodies. If BOD exceeds 6mg/l in water body, the Dissolved Oxygen is reduced below desired levels.
- The raw water having BOD levels up to 5 mg/l does not form complex chemicals on chlorination for municipal water supplies. Hence the water bodies having BOD more than 6 mg/l are considered as polluted and identified for remedial action.

Criteria for Priority 2

- Monitoring locations having BOD between 20-30 mg/l.
- All monitoring locations exceeding BOD concentration 6 mg/l on all occasions.

Criteria for Priority 3

- Monitoring locations having BOD between 10-20 mg/l.
- All monitoring locations exceeding BOD concentration 6 mg/l on all occasions.

Criteria for Priority 4

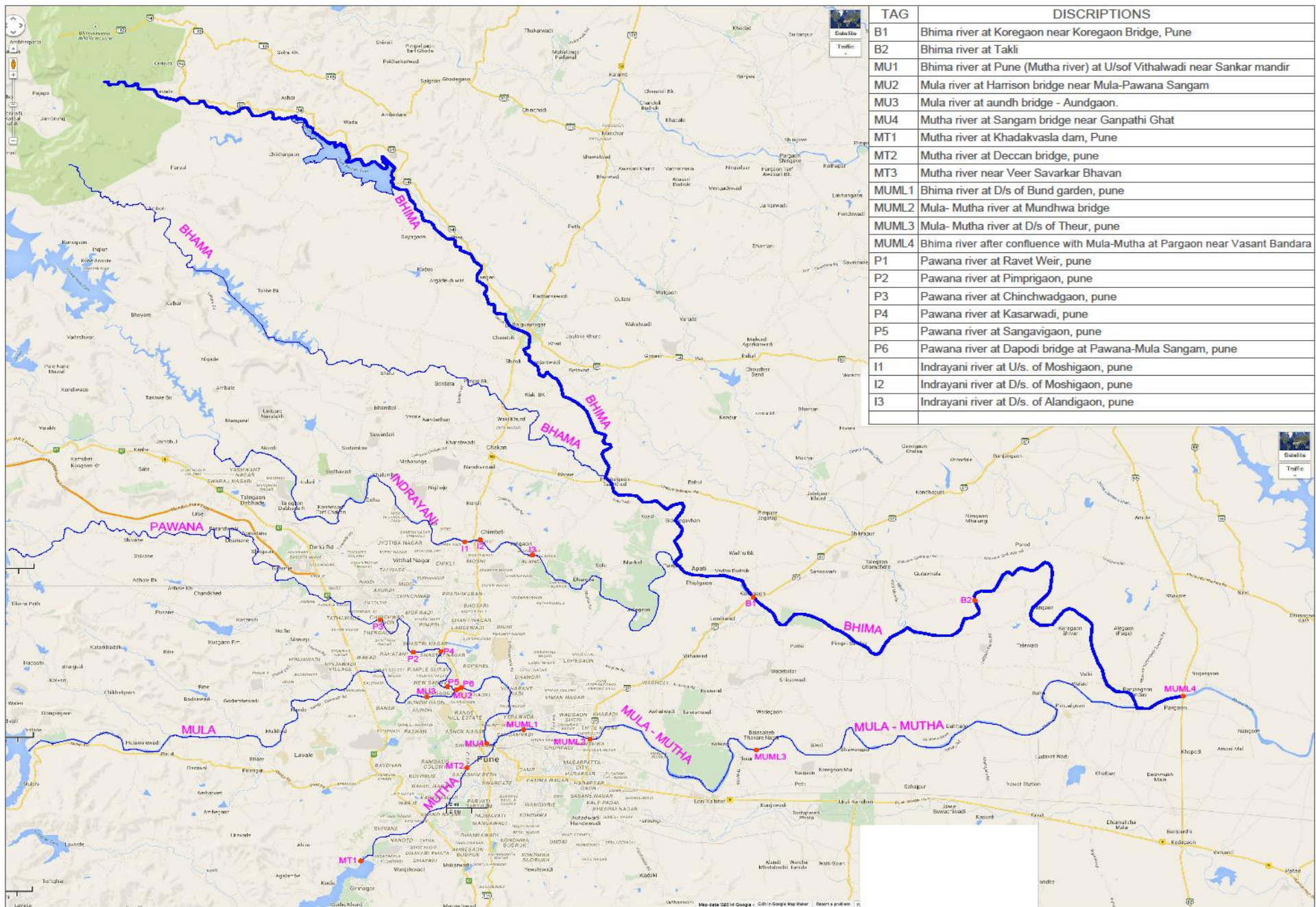
- Monitoring locations having BOD between 6-10 mg/l.

Criteria for Priority 5

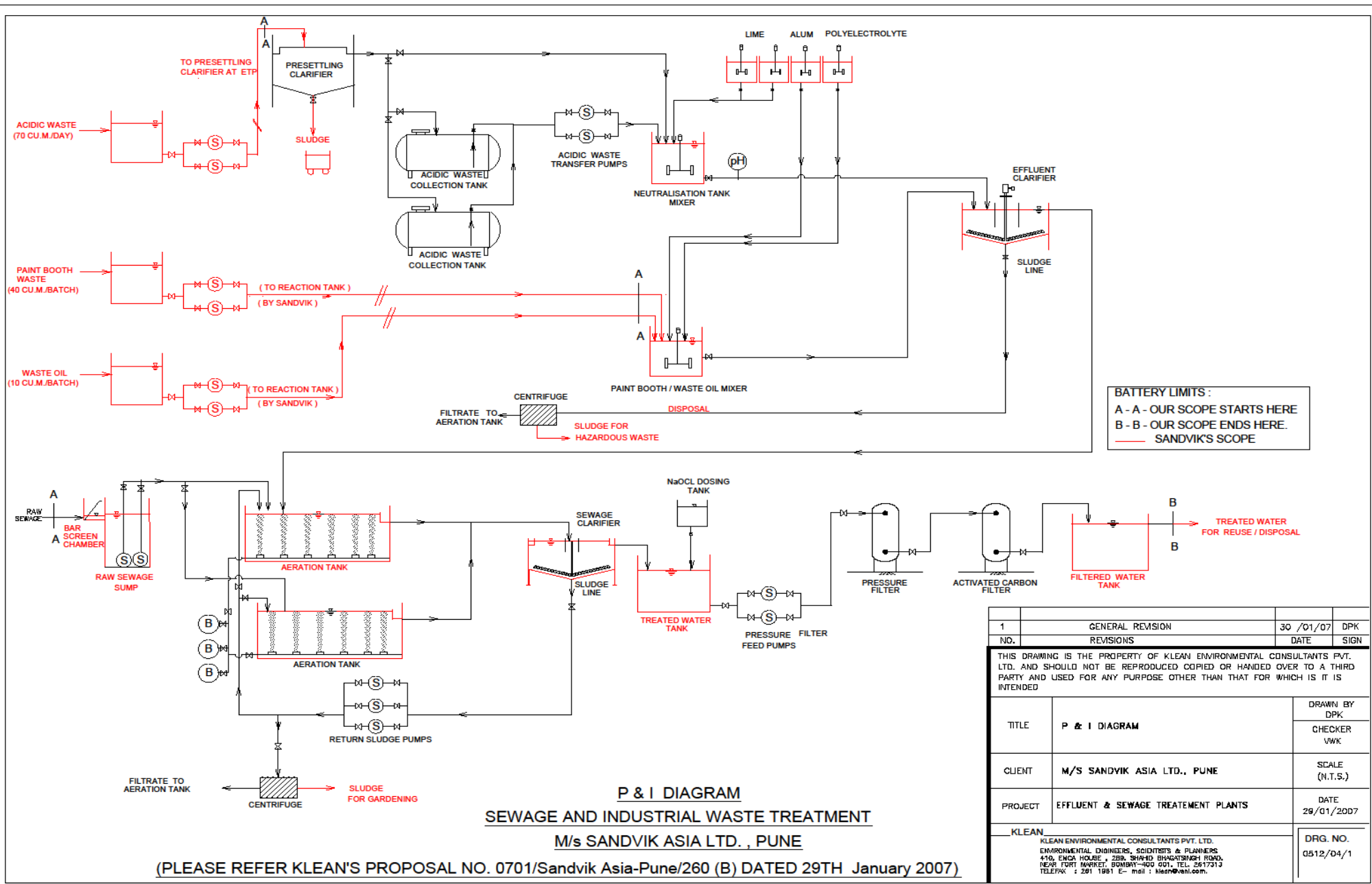
- Monitoring locations having BOD between 3-6 mg/l.
- The locations exceeding desired water quality of 3mg/l BOD.

Classification of rivers based on its analysis.

Category	Designated water usage
A-I	Unfiltered public water supply after approved disinfection
A-II	Public water supply with approved treatment equal to coagulation, sedimentation & disinfection
A-III	Not fit for human consumption fish & wildlife propagation
A-IV	Fit for agriculture, industrial cooling & process water



Plan Showing sampling points

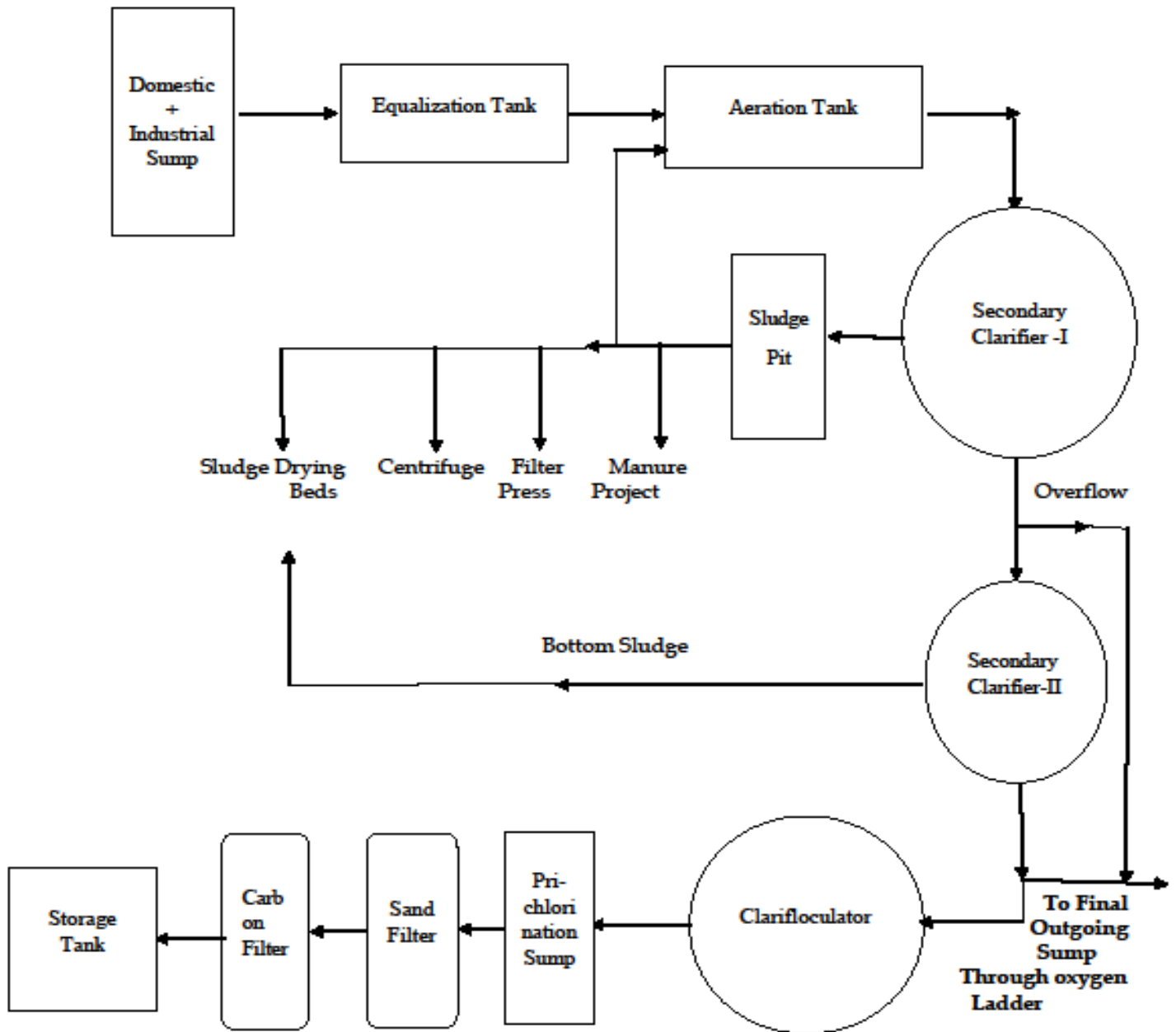


P & I DIAGRAM
SEWAGE AND INDUSTRIAL WASTE TREATMENT
M/s SANDVIK ASIA LTD., PUNE

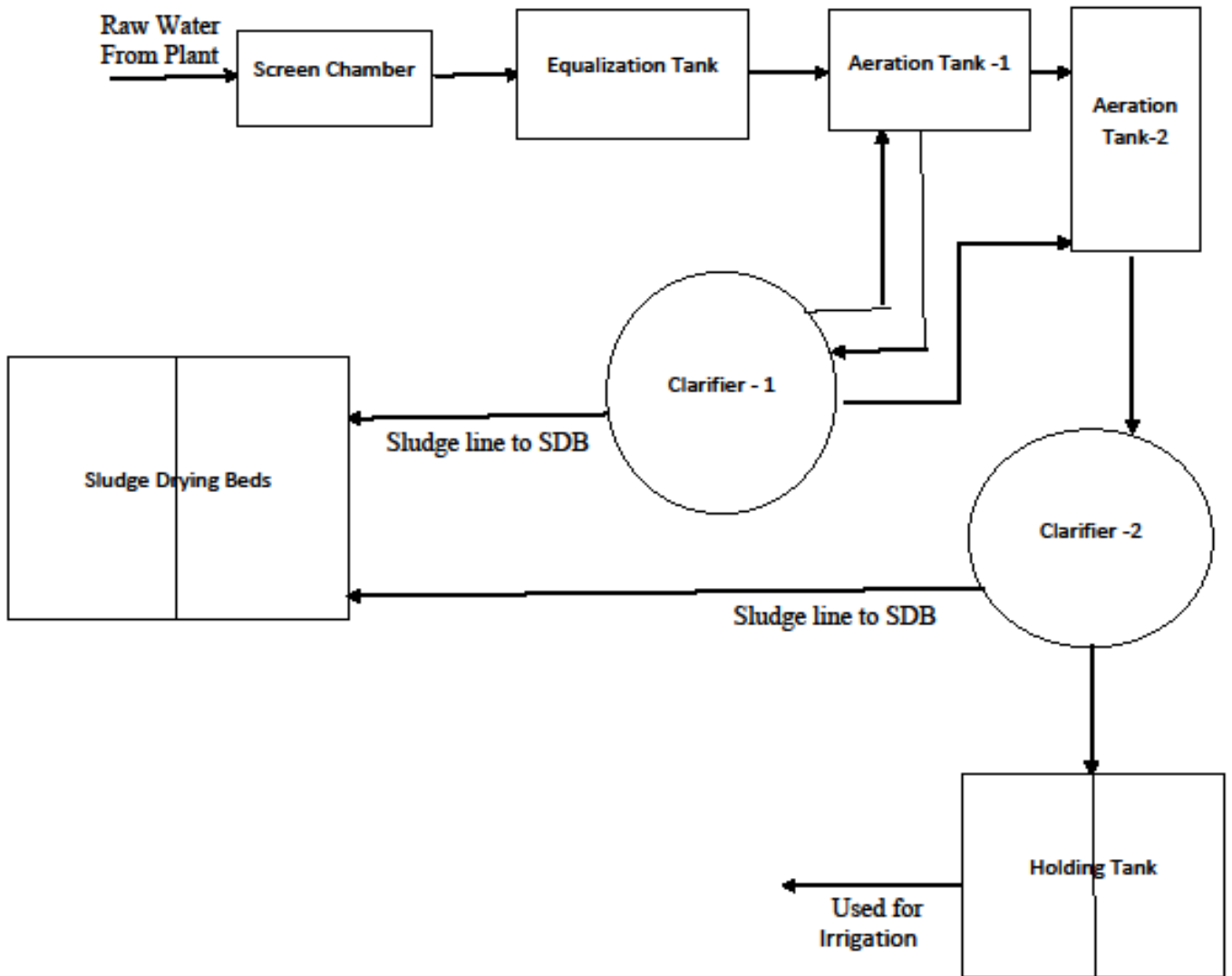
(PLEASE REFER KLEAN'S PROPOSAL NO. 0701/Sandvik Asia-Pune/260 (B) DATED 29TH January 2007)

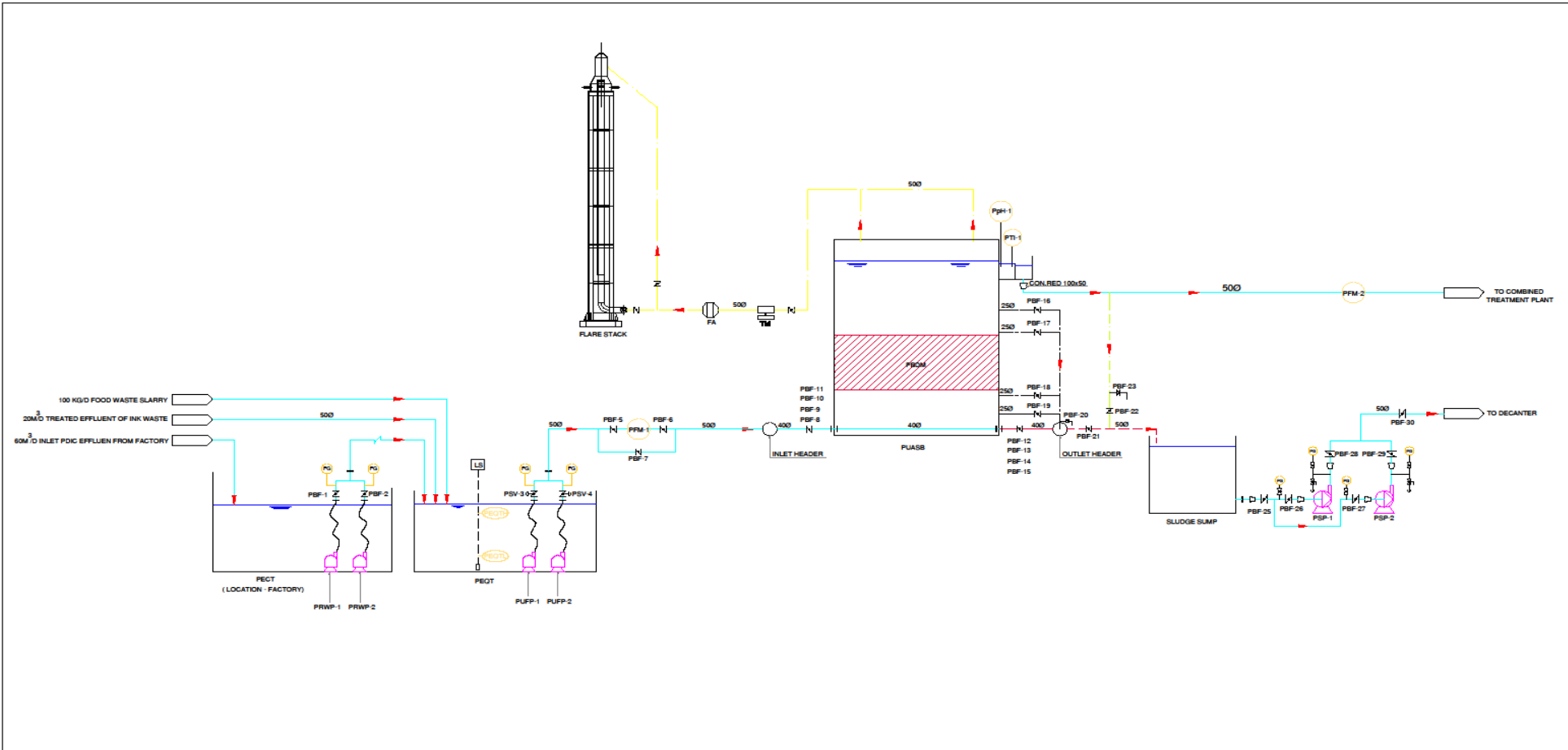
M/s. Sandvik Asia Ltd.

EFFLUENT TREATMENT PLANT



ETP FLOW SHEET





MECHANICAL UNITS				
SR.NO	TAG.	UNITS	NOS.	DUTY
1	PRWP	RAW WASTE PUMPS	2	3M ³ HR @ 20MWC
2	PUPF	UASB FEED PUMPS	2	6M ³ HR @ 13MWC
3	FSP	SLUDGE PUMPS	2	2M ³ HR @ 20MWC
4	PBDM	BIO-DIGESTER MODULES	SET	3MM THICK
5	PBF	BIOGAS FLARE	SET	MS, EPOXY
6	PpH	pH SENSOR	1	DIGITAL DISPLY
7	PTI	TEMPERATURE INDICATOR	1	DIGITAL DISPLY
8	PFM	FLOW METER	1	ELETROMAGNETIC

CIVIL UNITS				
SR.NO	TAG.	UNITS	NOS.	SIZE
1	PECT	EFFLUENT COLLECTION TANK	1	20M ³
2	PEOT	EQUALIZATION TANK	1	12M ³
3	FUASB	UASB REACTOR	1	109M ³

LEGENDS	
	CENTRIFUGAL PUMP
	SUBMERSIBLE PUMP
	DOING PUMP
	CONCENTRIC REDUCER
	BUTTERFLY VALVE
	BALL VALVE
	NEEDLE VALVE
	PRESSURE GAUGE
	pH INDICATER
	FLOW METER
	LEVEL SWITCH
	ACTUATOR

	EFFLUENT LINE
	GAS LINE
	SLUDGE LINE
	SAMPLING LINE
	RECYCAL LINE

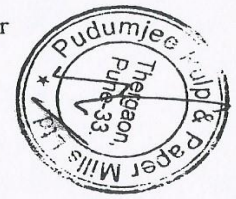
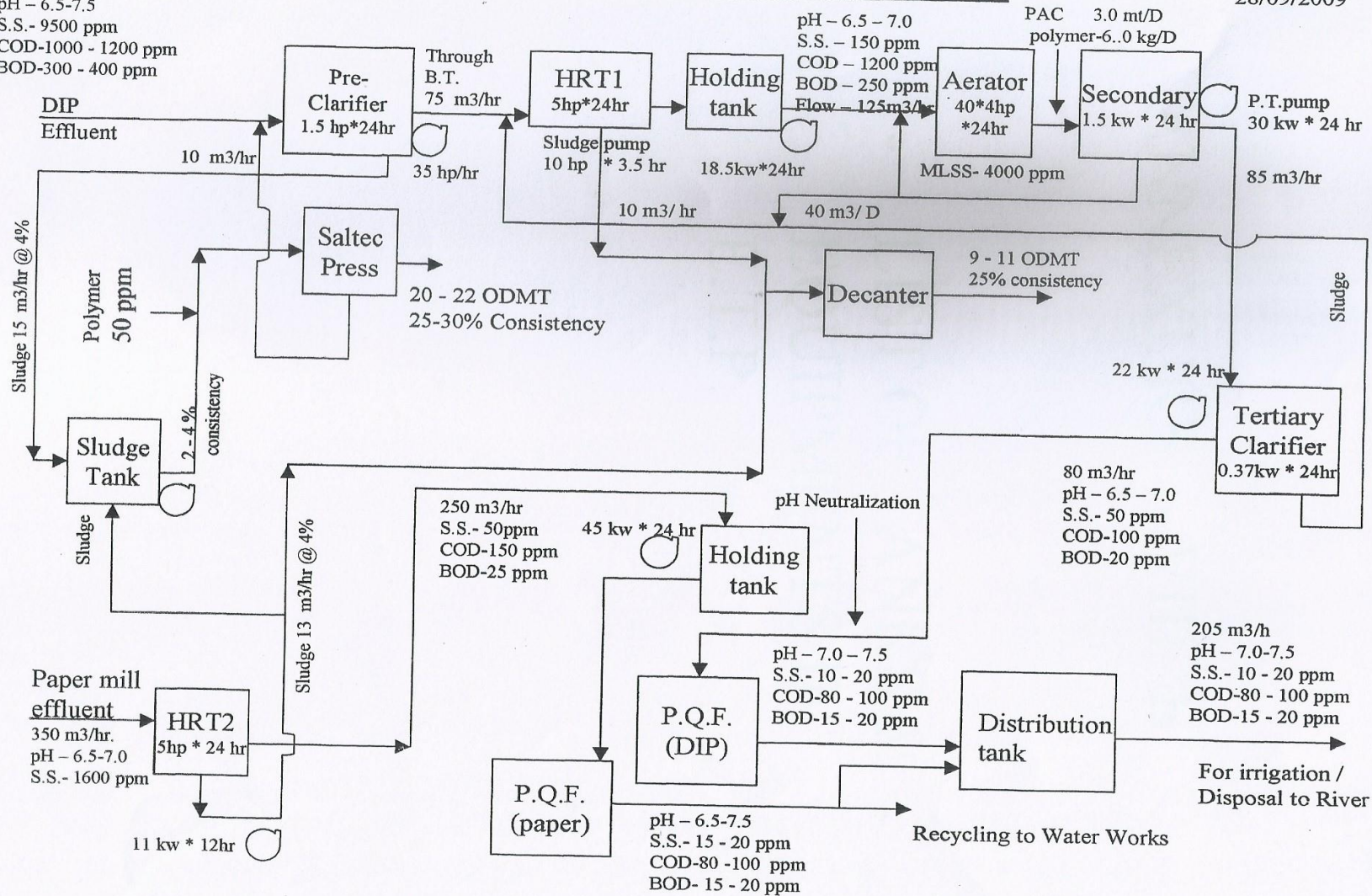
2	05-09-2012	REVISED PROCESS AND INSTRUMENTATION DIAGRAM	D.M.S	V.W.K	
1	25-10-2011	AS PER ENCL OF 14/5.	D.M.S	V.W.K	
Rev	Date	Description	Drawn	Checked	Approved
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KLEAN ENVIRONMENTAL CONSULTANTS PVT. LTD.					
17, Mahaveer nag, Bhagoff Kir Marg, Malin, Mumbai-400 018. Tel:-24453665, Fax:-24452493, E-mail: kleanenv@gmail.com					
TITLE PROCESS AND INSTRUMENTATION DIAGRAM					
CLIENT M/S TETRA PAK INDIA LTD., CHAKAN MIDC PHASE II TAL. KHED, PUNE					
PROJECT 60M ³ /D PDIC EFFLUENT TREATMENT PLANT					
SCALE	NTS	DATE 07-07-11	JOB NO. 120	DATE	NAME
DWG. NO.	SHEET ND.		Drawn	XXX	D.M.S
KLEAN/PDIC/120/02	1 OF 1		Check	XXX	V.W.K
			Appr.	XXX	XXX
					2

M/s. Tetra Pak India Ltd.

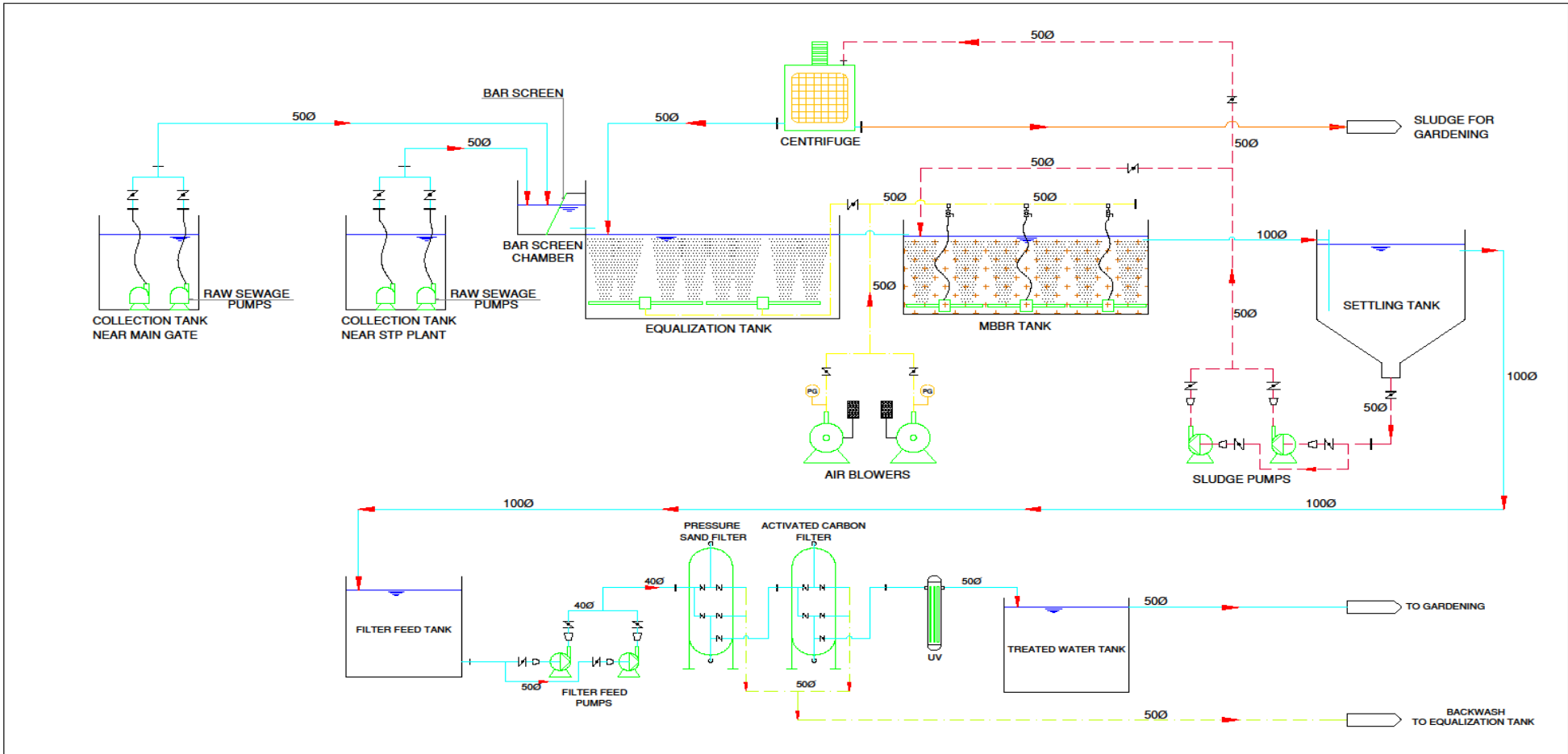
PPM & PIL EFFLUENT TREATMENT PLAN I

28/09/2009

80 m3/hr
pH - 6.5-7.5
S.S.- 9500 ppm
COD-1000 - 1200 ppm
BOD-300 - 400 ppm



M/s. Pudumjee Pulp & paper



EQUIPMENT LIST			
SR.NO	DISCRIPTION	NOS.	CAPACITY
1	BAR SCREEN	1	500 x 500
2	RAW SEWAGE PUMPS	4	6M ³ /HR @ 10MWC
3	BLOWERS	2	80M ³ /HR @ 0.4KG/CM ²
4	RETURN SLUDGE PUMPS	2	2M ³ /HR @ 10MWC
5	FILTER FEED PUMPS	2	8M ³ /HR @ 15MWC
6	PRESSURE SAND FILTER	1	8M ³ /HR
7	ACTIVATED CARBON FILTER	1	8M ³ /HR
8	UV SYSTEM	1	8M ³ /HR
9	CENTRIFUGE	1	300 DIA

LEGENDS	
	CENTRIFUGAL PUMP
	SUBMERCIBLE PUMP
	DOSING PUMP
	CONCENTRIC REDUCER
	BUTTERFLY VALVE
	BALL VALVE
	NEEDLE VALVE
	FLOW METER

	EFFLUENT LINE
	AIR LINE
	SLUDGE LINE
	CHEMICAL LINE
	BACKWASH WATER LINE

Rev	Date	Description	DWS	VMC	Approved
1	14-12-13	Revised layout			

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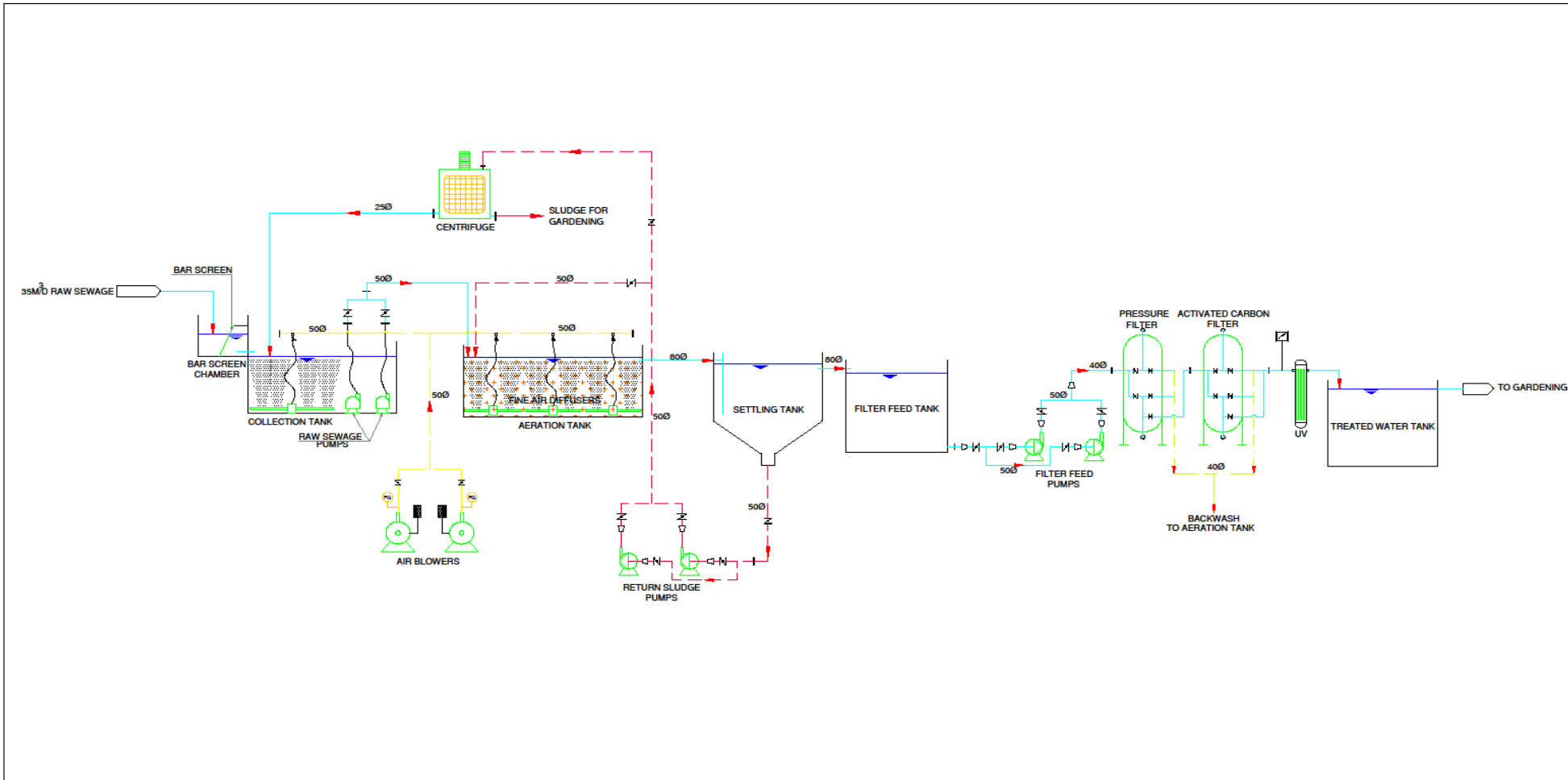
KLEAN ENVIRONMENTAL CONSULTANTS Pvt. Ltd.
 12, Shivajinagar, Ground Floor, Malhe, Mumbai-400 018.
 Tel:-24403885, Fax:-24402483, E-mail: kleanenv@gmail.com

TITLE: PROCESS FLOW DIAGRAM
 CLIENT: M/S. COGNIZANT PVT.LTD.
 PROJECT: 150M³/D SEWAGE TREATMENT PLANT

SCALE	DATE	JOB NO.	DATE	NAME	REV.
1:100	10-12-13	569			

DWG. NO.	SHEET NO.	Drawn	Check	Appr.
KLEAN/569/02	1 OF 1	XXX	XXX	XXX

M/s. Cognizant India Pvt. Ltd.



EQUIPMENT LIST			
SR.NO	DISCRIPTION	NOS.	CAPACITY
1	BAR SCREEN	1	800 x 800
2	RAW SEWAGE PUMPS	2	³ 2M ³ /HR @ 10MWC
3	BLOWERS	2	³ 50M ³ /HR @ 0.4KG/CM ²
4	RETURN SLUDGE PUMPS	2	³ 1M ³ /HR @ 10MWC
5	FILTER FEED PUMPS	2	³ 4M ³ /HR @ 35MWC
6	PRESSURE SAND FILTER	1	³ 2M ³ /HR
7	ACTIVATED CARBON FILTER	1	³ 2M ³ /HR
8	UV SYSTEM	1	³ 2M ³ /HR
9	CENTRIFUGE	1	300 DIA

LEGENDS	
	CENTRIFUGAL PUMP
	SUBMERCIBLE PUMP
	DOSING PUMP
	CONCENTRIC REDUCER
	BUTTERFLY VALVE
	BALL VALVE
	NEEDLE VALVE
	FLOW METER

	EFFLUENT LINE
	AIR LINE
	SLUDGE LINE
	CHEMICAL LINE
	BACKWASH WATER LINE

Sl. No.	Date	Description	D.W.S.	V.W.X	Approved
0	-	-	-	-	-
<p>This drawing is a property of KLEAN ENVIRONMENTAL CONSULTANTS PVT. Ltd. Unauthorized disclosure to any third party or duplication is not permitted.</p> <p align="center">KLEAN ENVIRONMENTAL CONSULTANTS PVT. Ltd</p> <p align="center">17, Mahaveer Road, Bhagaji KOP, Marg, Wakoli, Mumbai-400 018. Tel:- 24463990, Fax:- 24402493, E-mail: kleanenv@gmail.com</p>					
TITLE: PROCESS FLOW DIAGRAM					
CLIENT: M/S GKN SINTER METALS PVT LTD, AHMEDNAGAR					
PROJECT: 35M ³ /D SEWAGE TREATMENT PLANT					
SCALE: NTS	DATE: 26-07-13	JOB NO. 15	DATE	NAME	REV.
DWG. NO. KLEAN/PROCESS/02	SHEET NO. 1 OF 1	Drawn: XXK	Check: XXK	Appr: XXK	0

M/s. GKN Sinter Metals Pvt Ltd.