ACTION PLAN FOR INDUSTRIAL CLUSTER IN CRITICALLY POLLUTED AREA

Monitoring, sampling, analysis of Stack, Ambient Air Quality, Surface Water, Ground Water, Waste Water

चंद्रपूर Chandrapur

Maharashtra Pollution Control Board

Kalptaru Point, Sion East, Mumbai - 400022

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Abbreviations:

APHA	American Public Health Association
BDL	Below Detection Limit
BOD	Biochemical Oxygen Demand
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
COD	Chemical Oxygen Demand
CPA	Critically Polluted Areas
SPA	Severely Polluted Areas
DO	Dissolved Oxygen
ETP	Effluent Treatment Plant
MIBK	Methyl Isobutyl Ketone
MPCB	Maharashtra Pollution Control Board
NAAQS	National Ambient Air Quality Standards
NO_x	Oxides of Nitrogen
BDL	Not Detected
PAH	Poly Aromatic Hydrocarbons
PCB	Poly Chlorinated Biphenyls
PCT	Poly Chlorinated Terphenyls
PM_{10}	Particulate Matter (size less than 10 µm)
$PM_{2.5}$	Particulate Matter (size less than 2.5 µm)
SO_2	Sulphur Dioxide
STAP	Short Term Action Plan
WHO	World Health Organization

1. Introduction:

Rapid modernization and industrialization worldwide has not only uprooted to the economic development, but has increased pollution of land, air and water. This has also destroyed our habitat and environment too. Pollutants discharged from the industries have widespread implications and one of the unpleasant effects on water bodies and air. Long term exposure to the polluted air and water causes chronic health problems, making the issue industrial pollution into severe one. So, scientists are exploring the quantum of pollution load as well as to device certain strategies and technologies so that our sustainable development would not be jeopardized otherwise our long-cherished dream of establishing eco-socialism on this watery planet could not come true.

In view of this, Central Pollution Control Board (CPCB) has evolved the concept of Comprehensive Environmental Pollution Index (CEPI) during 2009-10 as a tool for comprehensive environmental assessment of prominent industrial clusters and formulation of remedial Action Plans for the identified critically polluted areas. Later-on proposals were received from the SPCBs, State Governments, and Industrial Associations and concerned Stake-holders for revisiting the criteria of assessment under CEPI concept. After careful examination and consideration of the suggestions of concerned stake-holders, it was decided to prepare the revised concept of CEPI by eliminating the subjective factors but retaining the factors which can be measured precisely. Hence, revised concept came into existence, which is termed as Revised CEPI Version 2016.

The present report is also based on the revised CEPI version 2016. The results of the application of the Comprehensive Environmental Pollution Index (CEPI) to selected industrial clusters or areas are presented in this report. The main objective of the study is to identify polluted industrial clusters or areas in order to take concerted action and to centrally monitor them at the national level to improve the current status of their environmental components such as air and water quality data, ecological damage, and visual environmental conditions. A total of 88 industrial areas or clusters have been selected by the Central Pollution Control Board (CPCB) in consultation with the Ministry of Environment & Forests Government of India for the study.The index captures the various dimensions of environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI), which is a rational number to characterize the environmental quality at a given location following the algorithm of source, pathway and receptor have been developed.

About 6000 small, medium and large-scale industries are located at Chandrapur district. Chandrapur has large deposits of coal and lime stone. The mammoth coal mines around the city also contribute to the heavy industrialization of the city. Western Coalfields Limited (WCL), a subsidiary of Coal India, has many mines here. Chandrapur Super Thermal Power Station by Maharashtra State Power Generation Company Limited is its biggest pit head thermal power station. The city houses various cement factories in its vicinity. They are Manikgarh Cement, a division of Century Textile and Industries, part of the BK Birla group of companies, UltraTech Cement (formerly L&T Cement), a division of Grasim Industries, part of the Aditya Birla Group; Chandrapur Cement Works, a division of Associated Cement Companies, part of Holcim Group; and Maratha Cement Works, part of Ambuja Cements Limited. The district also boasts of having Ballarpur Industries Limited, the largest manufacturer and exporter of paper in India. Other major industries include a Chandrapur ferro alloy plant (formerly Maharashtra Elektrosmelt Ltd), a ferro-manganese plant, and a silico-manganese plant of Steel Authority of India Limited. Chandrapur's ferro alloy plant is the largest manganese-based ferro alloy producer in the country.

2. Scope of Work

The Scope of Work consisted of the following:

Monitoring, Sampling, Analysis for Stack, Ambient Air Quality, Surface Water, Waste Water, and Ground Water Quality for identified five Critically Polluted areas (CPAs) in Maharashtra i.e. **Chandrapur, Dombivli, Aurangabad, Navi Mumbai,**and**Tarapur**and 3 Severely Polluted areas (SPAs) in Maharashtra i.e. **Chembur, Pimpri-Chinchwad andNashik**as per standard methods.

- At each of the 5 CPAsand 3 SPAs, 24 hourly ambient air quality monitoring to be carried out.
- Representative samples for surface water quality, waste water quality andGround Water quality to be collected from prominent surface andGround Water bodies located in andaround the clusters/areas.
- Submission of complete monitoring, sampling and analysis reports including the summary of the parameters exceeding the prescribed standards/norms for all the 5 CPAsand 3 SPAs.
- Submission of 3 copies of final report with photographs at prominent locations and the CD (soft copy) on completion of the project for every critically polluted and severely polluted area separately.

Monitoring, Sampling, Analysis for Stack, Ambient Air Quality, Surface Water, Waste Water andGround Water Quality for Chandrapur:

- The sampling was carried out in 4 days i.e. on 1st, 2nd, 6th, and7th June2017 for MIDC Tadali, MIDC Ghuggus, MIDC Chandrapur and MIDC Ballarpur.
- In MIDC Tadali, a total of 6 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 5 Waste Water Samples, 4 Ground Water Samples and 2 VOC Samples were collected and analyzed.
- In MIDC Ghuggus, a total of 6 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 6 Waste Water Samples, 3 Ground Water Samples and 2 VOC Samples were collected and analyzed.
- In MIDC Chandrapur, a total of 4 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 5 Waste Water Samples, 3 Ground Water Samples and 2 VOC Samples were collected and analyzed.
- In MIDC Ballarpur, a total of 6 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 6 Waste Water Samples, 3 Ground Water Samples and 2 VOC Samples were collected and analyzed.
- Health data of last 05 years (2011-2016) was collected from the hospitals nearby industrial clusters under study.

2.1 Stack Emission Parameters

The Stack Emissions were analyzed with the following parameters:

1. Acid Mist
2. Ammonia
3. Carbon Monoxide
4. Chlorine
5. Fluoride(gaseous)
6. Fluoride (particulate)
7. Hydrogen Chloride
8. Hydrogen Sulphide
9. Oxides of Nitrogen
10. Oxygen
11. Polyaromatic Hydrocarbons (Particulate)
12. Suspended Particulate Matter
13. Sulphur Dioxide
14. Benzene
15. Toluene
16. Xylene
17. Volatile Organic Compounds (VOCs)

2.2 Ambient Air Quality Parameters

The Ambient Air Quality was analyzed with the following parameters:

1. Sulphur Dioxide (SO_2)
2. Nitrogen Dioxide (NO_2)
3. Particulate Matter (PM10)
4. Particulate Matter (PM2.5)
5. Ozone (O_3)
6. Lead (Pb)
7. Carbon Monoxide (CO)

8. Ammonia (NH_3)
9. Benzene (C_6H_6)
10. Benzo (a) Pyrene (BaP) (Particulate Phase Only)
11. Arsenic (As)
12. Nickel (Ni)

2.3 Water/Waste Water Parameters

The Water/Waste Water wasanalyzed with the following parameters:

a. Prominent Surface Water bodies such as outfalls of CETPs, ETPs, treated effluent drainage, river, canal, ponds, lakes and other such water supply resources flowing through the area or flowing adjoining the CPA.

b. Ground Water Quality data of prominent Ground Water resources such as observation wells of Central Ground Water Board, drinking water wells, hand pumps, bore wells, hand pumps, bore wells and other such water supply resources located in the industrial cluster/area under consideration or in the peripheral areas.

Basic water quality parameters for surface water andGround Water both are as follows:

i. Simple Parameters:

1. Sanitary Survey
2. General Appearance
3. Colour
4. Smell
5. Transparency
6. Ecological (Presence of animals like fish, insects) (Applicable to only surface water)

ii. Regular Monitoring Parameters:

7. pH
8. Oil & Grease
9. Suspended Solids
10. Dissolved Oxygen (% saturation) (Not applicable for ground waters)
11. Chemical Oxygen Demand
12. Biochemical Oxygen Demand

13. Electrical Conductivity
14. Nitrite-Nitrogen
15. Nitrate-Nitrogen
16. (NO_2 + NO_3)-Nitrogen
17. Free Ammonia
18. Total Residual Chlorine
19. Cyanide
20. Fluoride
21. Sulphide
22. Dissolved Phosphate
23. Sodium Absorption Ratio (SAR)
24. Total Coliforms (MPN/100 ml)
25. Faecal Coliforms (MPN/100 ml)

iii. Special Parameters:

26. Total Phosphorous
27. Total Kjeldahl Nitrogen(TKN)
28. Total Ammonia (NH_4 +NH_3)-Nitrogen
29. Phenols
30. Surface Active Agents
31. Organo Chlorine Pesticides
32. Polynuclear aromatic hydrocarbons (PAH)
33. Polychlorinated Biphenyls (PCB)and Polychlorinated Terphenyls (PCT)
34. Zinc
35. Nickel
36. Copper
37. Hexavalent Chromium
38. Chromium (Total)
39. Arsenic (Total)

40. Lead
41. Cadmium
42. Mercury
43. Manganese
44. Iron
45. Vanadium
46. Selenium
47. Boron

iv. Bioassay (Zebra Fish) Test: For specified samples only.

2.4 Methodology followed in Sampling and Analysis

Industries, places and locations that have been chosen for the sampling are representative of the city/area. Sampling has been done at the potential polluted areas to arrive at the CEPI. This will further help the authorities to monitor the areas to improve the status of their environmental components such as air and water quality data, ecological damage and visual environmental conditions. Methodology for sampling, preservation and analysis have been done according to the references incorporated. Methodology of several types of parameters is presented under following annexure:

1. Stack Emission Sampling and Analysis Methodology – **Annexure I**
2. Ambient Air Sampling and Analysis Methodology **- Annexure II**
3. Water/Wastewater Sampling and Analysis Methodology - **Annexure III**

3. Result of Analysis:

Results of Analysis are tabulated below for Stack Emission Monitoring, Ambient Air Quality Monitoring, Waste Water Analysis and Water Analysis. These are followed by their respective graphical representation.

***Kindly note:**

- NA specifies the sample is not analysed for the specific parameter.
- BDL specifies that the result obtained is below detection limit.

Please Note: Industrial clusters observed with below detection limit parameters are NOT included into the graphs

3.1 Stack Emission:

Stack Emission Monitoring Results are compared against The Environment (Protection) Rules, 1986 General Emission Standard - Part D.

Sr.	Name of Industries	Stack Identity	MIDC	Table No.
1.	Gopani Iron & Power (India) Pvt. Ltd.	100 TPD Kiln 1 & 2-ESP Outlet	Tadali	**I**
2.	Gopani Iron & Power (India) Pvt. Ltd.	100 TPD Kiln 3 & 4 -ESP Outlet	Tadali	**I**
3.	Gopani Iron & Power (India) Pvt. Ltd.	DES-1 100 TPD - Bag Filter	Tadali	**II**
4.	Gopani Iron & Power (India) Pvt. Ltd.	SMS (Furnace) 3 & 4	Tadali	**II**
5.	Grace Industries Ltd.	WHRBs Kiln 3&4	Tadali	**III**
6.	Dhariwal Infrastructure Ltd.	Unit -2, 300MW Power Plant	Tadali	**III**
7.	ACC Cement Ltd.	Boiler Stack 25 MW	Ghuggus	**IV**
8.	ACC Cement Ltd.	Boiler Stack 15 MW	Ghuggus	**IV**
9.	ACC Cement Ltd.	Kiln RABH -ESP Outlet	Ghuggus	**V**
10.	Lloyds Metal& Energy Ltd.	500TPD Kiln	Ghuggus	**V**
11.	Lloyds Metal& Energy Ltd.	WHRBS 30MW Power Plant	Ghuggus	**VI**
12.	Lloyds Metal& Energy Ltd.	DES-7 of 500TPD Kiln	Ghuggus	**VI**
13.	Superb Hygienic Ltd.	Incinerator	Chandrapur	**VII**
14.	Sourav Oil & Mill	Boiler	Chandrapur	**VII**
15.	Maharashtra Carbon	Heater with Bag Filter	Chandrapur	**VIII**
16.	Vinar Ispat Ltd.	Reheating Furnace	Chandrapur	**VIII**

Sr.	Name of Industries	Stack Identity	MIDC	Table No.
17.	BILT Graphic PPL	Recovery Stack Boiler No. 3	Ballarpur	**IX**
18.	BILT Graphic PPL	Coal Fired Boiler No. 8	Ballarpur	**IX**
19.	BILT Graphic PPL	Coal Fired Boiler No. 9	Ballarpur	**X**
20.	BILT Graphic PPL	Lime Kiln II-ESP Outlet	Ballarpur	**X**
21.	Bamni Proteins	Boiler Stack-Dust Collector	Ballarpur	**XI**
22.	Bamni Proteins	HTF-Recuperator	Ballarpur	**XI**
23.	Gopani Iron & Power (India) Pvt. Ltd.	100 TPD Kiln 3 & 4 -ESP Outlet	Tadali	**XII**
24.	Gopani Iron & Power (India) Pvt. Ltd.	SMS (Furnace) 3 & 4	Tadali	**XII**
25.	ACC Cement Ltd.	Boiler Stack 25 MW	Ghuggus	**XIII**
26.	Lloyds Metal& Energy Ltd.	500TPD Kiln	Ghuggus	**XIII**
27.	Superb Hygienic Ltd.	Incinerator	Chandrapur	**XIV**
28.	Sourav Oil & Mill	Boiler	Chandrapur	**XIV**
29.	BILT Graphic PPL	Lime Kiln II-ESP Outlet	Ballarpur	**XV**
30.	Bamni Proteins	HTF-Recuperator	Ballarpur	**XV**

***The VOC result of stack emission is provided in Table No. XII, XIII, XIV & XV**

Table No. I

Name of Industries			**Gopani Iron & Power (India) Pvt. Ltd.** **(100 TPD Kiln 1 & 2-ESP Outlet)**	**Gopani Iron & Power (India) Pvt. Ltd.** **(100 TPD Kiln 3 & 4-ESP Outlet)**
Date of Sampling			**01.06.17**	**01.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	39	36
	Std. Limit	**mg/Nm^3**	**100**	**100**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	463	507
		kg/day	921	839
	Std. Limit	**mg/Nm^3**	**200**	**200**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	21.8	24.0
	Std. Limit	**mg/Nm^3**	**150**	**150**
4.	Carbon Monoxide (CO)	mg/Nm^3	88.3	75.8

Table No. II

Name of Industries			**Gopani Iron & Power (India) Pvt. Ltd.** **(DES-1 100 TPD - Bag Filter)**	**Gopani Iron & Power (India) Pvt. Ltd.** **(SMS Furnace 3 & 4)**
Date of Sampling			**01.06.17**	**01.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	49	BDL
	Std. Limit	**mg/Nm^3**	**100**	**100**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	BDL	BDL
		kg/day	BDL	BDL
	Std. Limit	**mg/Nm^3**	**200**	**200**

Name of Industries			**Gopani Iron & Power (India) Pvt. Ltd.** **(DES-1 100 TPD - Bag Filter)**	**Gopani Iron & Power (India) Pvt. Ltd.** **(SMS Furnace 3 & 4)**
Date of Sampling			**01.06.17**	**01.06.17**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	BDL	BDL
	Std. Limit	**mg/Nm^3**	**150**	**150**
4.	Carbon Monoxide (CO)	mg/Nm^3	NA	NA

Table No. III

Name of Industries			**Grace Industries Ltd.** **(WHRBs Kiln 3 & 4)**	**Dhariwal Infrastructure Ltd.** **(Unit -2, 300 MW Power Plant)**
Date of Sampling			**02.06.17**	**02.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	70	49
	Std. Limit	**mg/Nm^3**	**100**	**50**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	786	1270
		kg/day	3632	38534
	Std. Limit	**mg/Nm^3**	**200**	**200**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	50	168
	Std. Limit	**mg/Nm^3**	**150**	**150**
4.	Carbon Monoxide (CO)	mg/Nm^3	125	7.32

Table No.IV

Name of Industries			**ACC Cement Ltd (Boiler Stack 25 MW)**	**ACC Cement Ltd (Boiler Stack 15 MW)**
Date of Sampling			**01.06.17**	**01.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	22	21
	Std. Limit	**mg/Nm^3**	**50**	**50**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	696	556
		kg/day	2364	1256
	Std. Limit	**mg/Nm^3**	**100**	**100**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	70	105
	Std. Limit	**mg/Nm^3**	**200**	**200**
4.	Carbon Monoxide (CO)	mg/Nm^3	20.5	30.5

Table No. V

Name of Industries			**ACC Cement Ltd (Kiln RABH -ESP Outlet)**	**Lloyds Metal & Energy Ltd. (500 TPD Kiln)**
Date of Sampling			**01.06.17**	**02.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	30	41
	Std. Limit	**mg/Nm^3**	**50**	**50**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	95	253
		kg/day	1339	443
	Std. Limit	**mg/Nm^3**	**100**	**200**

Name of Industries			**ACC Cement Ltd (Kiln RABH -ESP Outlet)**	**Lloyds Metal & Energy Ltd. (500 TPD Kiln)**
Date of Sampling			**01.06.17**	**02.06.17**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	106	59.5
	Std. Limit	**mg/Nm^3**	**200**	**150**
4.	Carbon Monoxide (CO)	mg/Nm^3	193	53

Table No. VI

Name of Industries			**Lloyds Metal & Energy Ltd. (WHRBS 30MW Power Plant)**	**Lloyds Metal & Energy Ltd. (DES-7 of 500TPD Kiln)**
Date of Sampling			**02.06.17**	**02.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	21	35
	Std. Limit	**mg/Nm^3**	**50**	**50**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	554	BDL
		kg/day	4875	BDL
	Std. Limit	**mg/Nm^3**	**200**	**200**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	53.1	41.4
	Std. Limit	**mg/Nm^3**	**150**	**150**
4.	Carbon Monoxide (CO)	mg/Nm^3	0.80	NA

Table No. VII

Name of Industries			**Superb Hygienic Ltd. (Incinerator)**	**Sourav Oil & Mill (Boiler)**
Date of Sampling			**06.06.17**	**06.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	32	18
	Std. Limit	**mg/Nm^3**	**150**	**150**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	26.9	337
		kg/day	2.0	6.2
	Std. Limit	**mg/Nm^3**	**100**	**100**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	26	27.7
	Std. Limit	**mg/Nm^3**	**50**	**50**
4.	Carbon Monoxide (CO)	mg/Nm^3	12.0	4.83

Table No. VIII

Name of Industries			**Maharashtra Carbon (Heater with Bag Filter)**	**Vinar Ispat Ltd. (Reheating Furnace)**
Date of Sampling			**06.06.17**	**06.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	55	65
	Std. Limit	**mg/Nm^3**	**150**	**150**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	110	280
		kg/day	5.6	390
	Std. Limit	**mg/Nm^3**	**100**	**100**

Name of Industries			**Maharashtra Carbon** **(Heater with Bag Filter)**	**Vinar Ispat Ltd.** **(Reheating Furnace)**
Date of Sampling			**06.06.17**	**06.06.17**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	27.7	38.3
	Std. Limit	**mg/Nm^3**	**50**	**50**
4.	Carbon Monoxide (CO)	mg/Nm^3	66.0	42.0

Table No. IX

Name of Industries			**BILT Graphic PPL** **(Recovery Stack Boiler No. 3)**	**BILT Graphic PPL** **(Coal Fired Boiler No. 8)**
Date of Sampling			**06.06.17**	**06.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	BDL	50
	Std. Limit	**mg/Nm^3**	**150**	**150**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	55.9	285
		kg/day	741	1495
	Std. Limit	**mg/Nm^3**	**100**	**100**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	83	90.4
	Std. Limit	**mg/Nm^3**	**50**	**50**
4.	Carbon Monoxide (CO)	mg/Nm^3	29.2	21.7

Table No. X

Name of Industries			**BILT Graphic PPL (Coal Fired Boiler No. 9)**	**BILT Graphic PPL (Lime Kiln II-ESP Outlet)**
Date of Sampling			**06.06.17**	**06.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	56	BDL
	Std. Limit	**mg/Nm^3**	**150**	**150**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	574	22.4
		kg/day	6440	58.0
	Std. Limit	**mg/Nm^3**	**100**	**100**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	108	31.2
	Std. Limit	**mg/Nm^3**	**50**	**50**
4.	Carbon Monoxide (CO)	mg/Nm^3	23.6	13

Table No. XI

Name of Industries			**Bamni Proteins (Boiler Stack-Dust Collector)**	**Bamni Proteins (HTF-Recuperator)**
Date of Sampling			**07.06.17**	**07.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	Particulate Matter(as PM)	mg/Nm^3	48	28
	Std. Limit	**mg/Nm^3**	**100**	**100**
2.	Sulphur Dioxide(as SO_2)	mg/Nm^3	75.5	55.9
		kg/day	16.9	9.6
	Std. Limit	**mg/Nm^3**	**200**	**200**

Name of Industries			**Bamni Proteins** **(Boiler Stack-Dust Collector)**	**Bamni Proteins** **(HTF-Recuperator)**
Date of Sampling			**07.06.17**	**07.06.17**
3.	Nitrogen Dioxide (NO_2)	mg/Nm^3	22.8	37.4
	Std. Limit	**mg/Nm^3**	**50**	**50**
4.	Carbon Monoxide (CO)	mg/Nm^3	9.88	7.43

Table No. XII

Name of Industries			**Gopani Iron & Power (India) Pvt. Ltd.** **(100 TPD Kiln 3 & 4 -ESP Outlet)**	**Gopani Iron & Power (India) Pvt. Ltd.** **(SMS Furnace 3 & 4)**
Date of Sampling			**01.06.17**	**01.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	VOC			
I.	Methyl Isobutyl Ketone	mg/Nm^3	ND	ND
II.	Benzene	mg/Nm^3	0.497	0.289
III.	Toulene	mg/Nm^3	0.257	0.427
IV.	Xylene	mg/Nm^3	0.176	0.197
V.	Ethyl Benzene	mg/Nm^3	ND	ND
VI.	Ethyl Acetate	mg/Nm^3	ND	ND

Table No. XIII

Name of Industries			**ACC Cement Ltd. (Boiler Stack 25 MW)**	**Lloyds Metal & Energy Ltd. (500 TPD Kiln)**
Date of Sampling			**01.06.17**	**02.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	VOC			
I.	Methyl Isobutyl Ketone	mg/Nm^3	ND	ND
II.	Benzene	mg/Nm^3	0.192	0.120
III.	Toulene	mg/Nm^3	0.265	0.145
IV.	Xylene	mg/Nm^3	ND	ND
V.	Ethyl Benzene	mg/Nm^3	ND	ND
VI.	Ethyl Acetate	mg/Nm^3	ND	ND

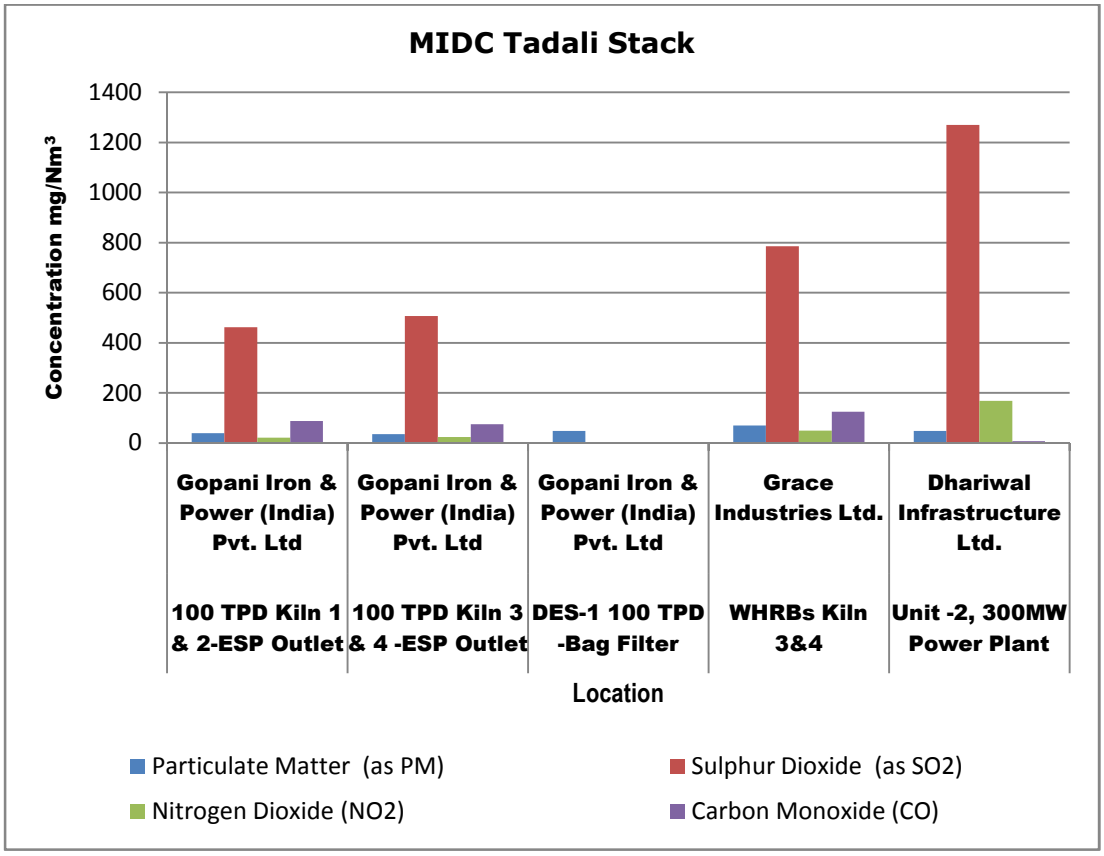
Table No. XIV

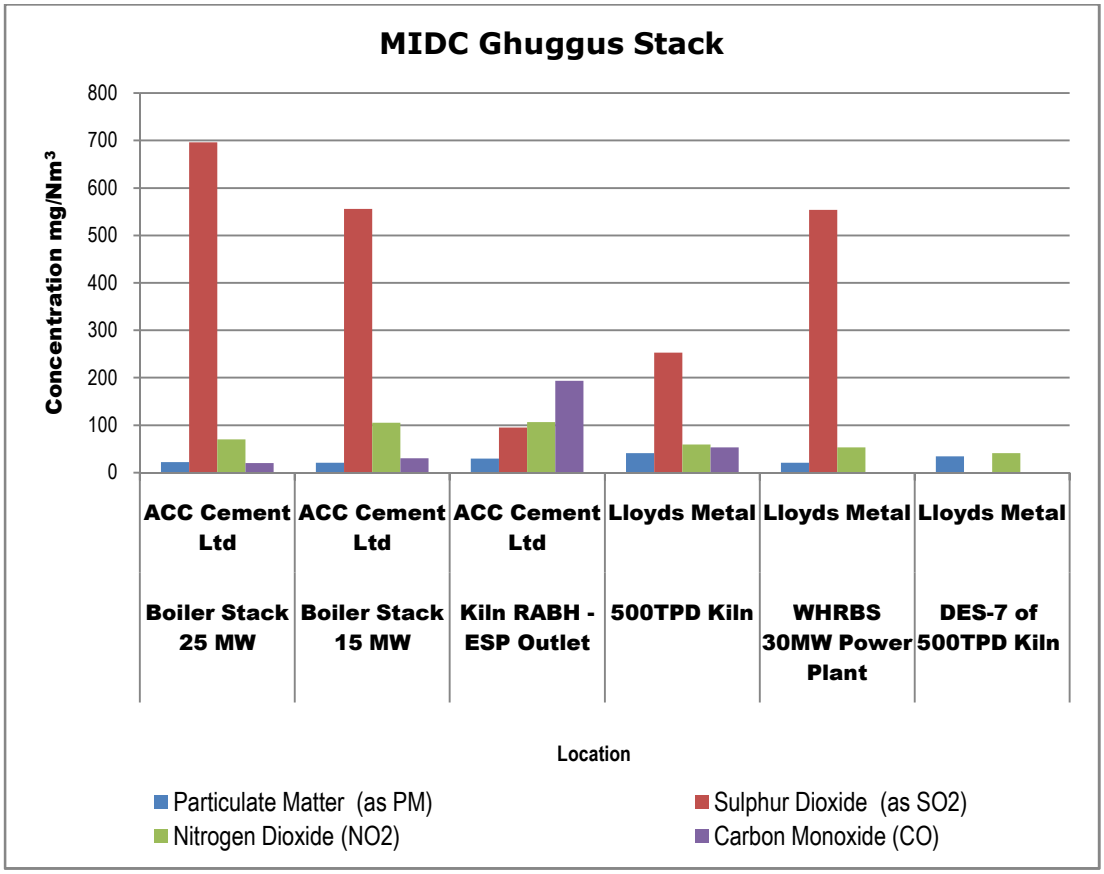
Name of Industries			**Superb Hygienic Ltd. (Incinerator)**	**Sourav Oil & Mill (Boiler)**
Date of Sampling			**06.06.17**	**06.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	VOC			
I.	Methyl Isobutyl Ketone	mg/Nm^3	ND	ND
II.	Benzene	mg/Nm^3	1.87	0.496
III.	Toulene	mg/Nm^3	0.282	0.998
IV.	Xylene	mg/Nm^3	ND	ND
V.	Ethyl Benzene	mg/Nm^3	ND	ND
VI.	Ethyl Acetate	mg/Nm^3	0.474	ND

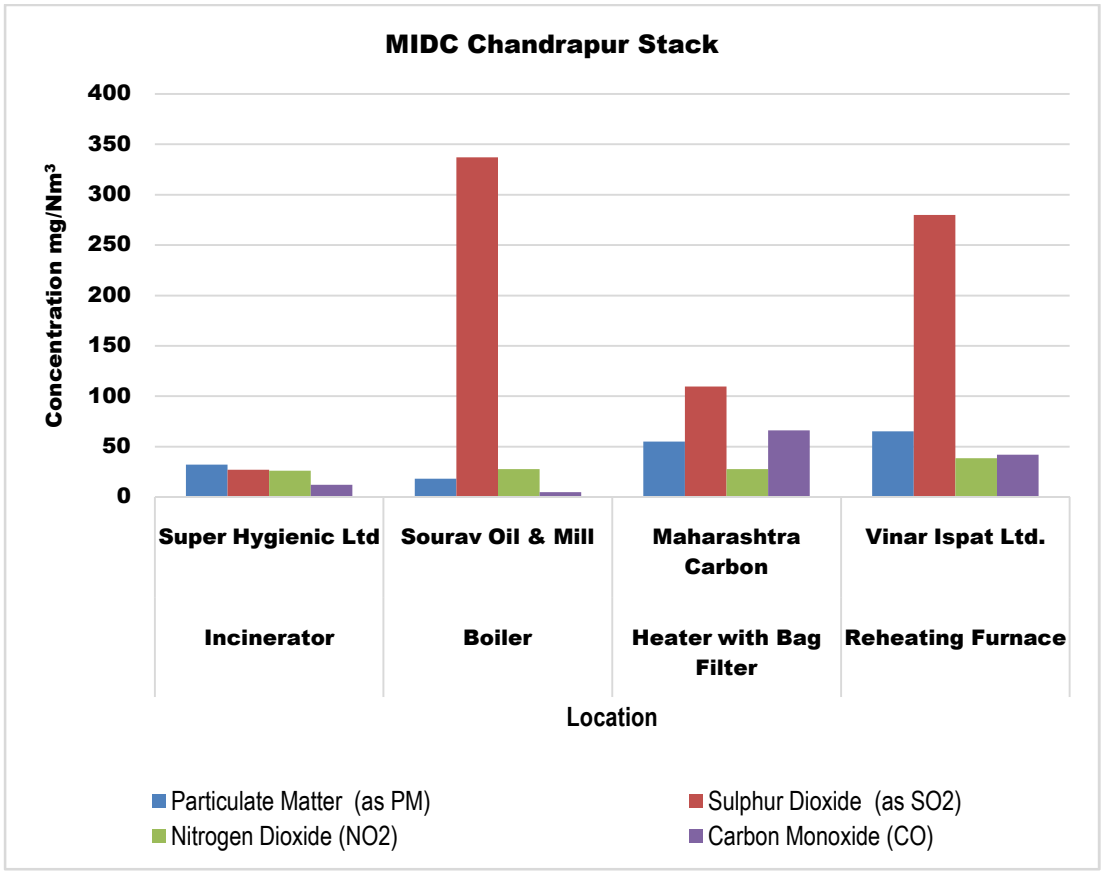
Table No. XV

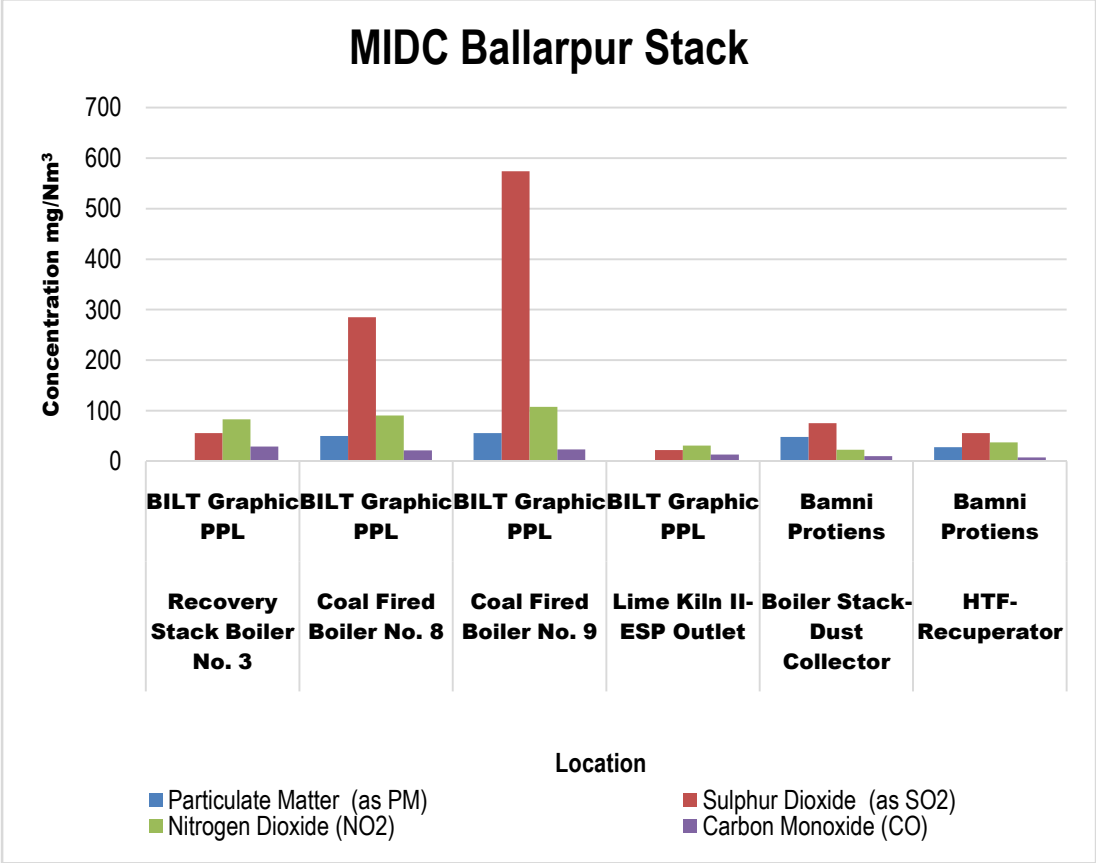
Name of Industries			**BILT Graphic PPL (Lime Kiln II-ESP Outlet)**	**Bamni Proteins (HTF-Recuperator)**
Date of Sampling			**06.06.17**	**07.06.17**
Sr.	**Parameter**	**Unit**	**Results**	
1.	VOC			
I.	Methyl Isobutyl Ketone	mg/Nm^3	ND	ND
II.	Benzene	mg/Nm^3	0.5	0.345
III.	Toulene	mg/Nm^3	0.490	0.627
IV.	Xylene	mg/Nm^3	ND	ND
V.	Ethyl Benzene	mg/Nm^3	ND	ND
VI.	Ethyl Acetate	mg/Nm^3	0.497	ND

Graphs: Stack Monitoring for Chandrapur MIDC:




MIDC Ghuggus Stack
Concentration mg/Nm³
800
700
600
500
400
300
200
100
0
ACC Cement Ltd
Boiler Stack 25 MW
ACC Cement Ltd
Boiler Stack 15 MW
ACC Cement Ltd
Kiln RABH - ESP Outlet
Lloyds Metal
500TPD Kiln
Lloyds Metal
WHRBS 30MW Power Plant
Lloyds Metal
DES-7 of 500TPD Kiln
Location
Particulate Matter (as PM)
Sulphur Dioxide (as SO2)
Nitrogen Dioxide (NO2)
Carbon Monoxide (CO)


MIDC Chandrapur Stack
Concentration mg/Nm³
400
350
300
250
200
150
100
50
0
Super Hygienic Ltd
Incinerator
Sourav Oil & Mill
Boiler
Maharashtra Carbon
Heater with Bag Filter
Vinar Ispat Ltd.
Reheating Furnace
Location
Particulate Matter (as PM)
Sulphur Dioxide (as SO2)
Nitrogen Dioxide (NO2)
Carbon Monoxide (CO)



3.2 Ambient AirQuality:

In order to arrive at conclusions, the Ambient Air Quality Monitoring Results are compared against National Ambient Air Quality Standards, 2009 (**Annexure IV**).

Sr.	Location	Location detail	MIDC	Table No.
1.	MIDC Water Treatment Plant	Near WTP	Tadali	**I**
2.	Grace Industries Ltd.	Terrace	Tadali	**I**
3.	Dhariwal Infrastructure Ltd.	Main Gate	Tadali	**I**
4.	Lloyds Colony	Mathardevi Village	Ghuggus	**II**
5.	Transit Hostel Rajiv Colony WCL	Terrace	Ghuggus	**II**
6.	Lloyds Metal	New CAAQMS Station	Ghuggus	**II**
7.	Green Tech	Main Gate	Chandrapur	**III**
8.	MIDC Office	Premises	Chandrapur	**III**

Sr.	Location	Location detail	MIDC	Table No.
9.	HPCL	Main Gate	Chandrapur	**III**
10.	Ram Mandir	Near Mangal Karyalaya	Ballarpur	**IV**
11.	BILT Colony	Near Guest House	Ballarpur	**IV**
12.	WCL	OCM Office	Ballarpur	**IV**

Table No. I

Location				**MIDC Water Treatment Plant**	**Grace Industries Ltd.**	**Dhariwal Infrastructure Ltd.**
Date of Sampling				**01.06.17**	**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit (NAAQS 2009)**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	7.4	8.5	6.1
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	10.8	108	10
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	114	109	137
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	37	45	53
5.	Ozone (O_3)	$\mu g/m^3$	**180**	17.16	13.43	14.14
6.	Lead (Pb)	$\mu g/m^3$	**1**	0.026	0.029	0.023
7.	Carbon Monoxide (CO)	mg/m^3	**4**	0.55	0.54	0.54
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	20.5	BDL	22.2

Location				MIDC Water Treatment Plant	Grace Industries Ltd.	Dhariwal Infrastructure Ltd.
Date of Sampling				01.06.17	01.06.17	01.06.17
Sr.	**Parameters**	**Unit**	**Std. Limit (NAAQS 2009)**	**Results**		
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	3.73	1.66	4.28
10.	Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	**1**	0.57	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	2.05	2.6	2.2
12.	Nickel (Ni)	ng/m^3	**20**	12.2	16.9	9.1

Table No. II

Location				Lloyds Colony	Transit Hostel Rajiv Colony WCL	Lloyds Metal
Date of Sampling				01.06.17	01.06.17	01.06.17
Sr.	**Parameters**	**Unit**	**Std. Limit (NAAQS 2009)**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	9.9	12.2	13.6
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	12.1	17	18.3
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	123	95	180

Location				**Lloyds Colony**	**Transit Hostel Rajiv Colony WCL**	**Lloyds Metal**
Date of Sampling				**01.06.17**	**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit (NAAQS 2009)**	**Results**		
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	48	39	59
5.	Ozone (O_3)	$\mu g/m^3$	**180**	13.32	14.92	14.86
6.	Lead (Pb)	$\mu g/m^3$	**1**	0.053	0.040	0.033
7.	Carbon Monoxide (CO)	mg/m^3	**4**	0.69	0.76	0.99
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	BDL	23.9	22.6
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	2.68	3.08	8.04
10.	Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	**1**	BDL	0.76	BDL
11.	Arsenic (As)	ng/m^3	**6**	2.1	1.7	1.7
12.	Nickel (Ni)	ng/m^3	**20**	20.7	6.4	15.7

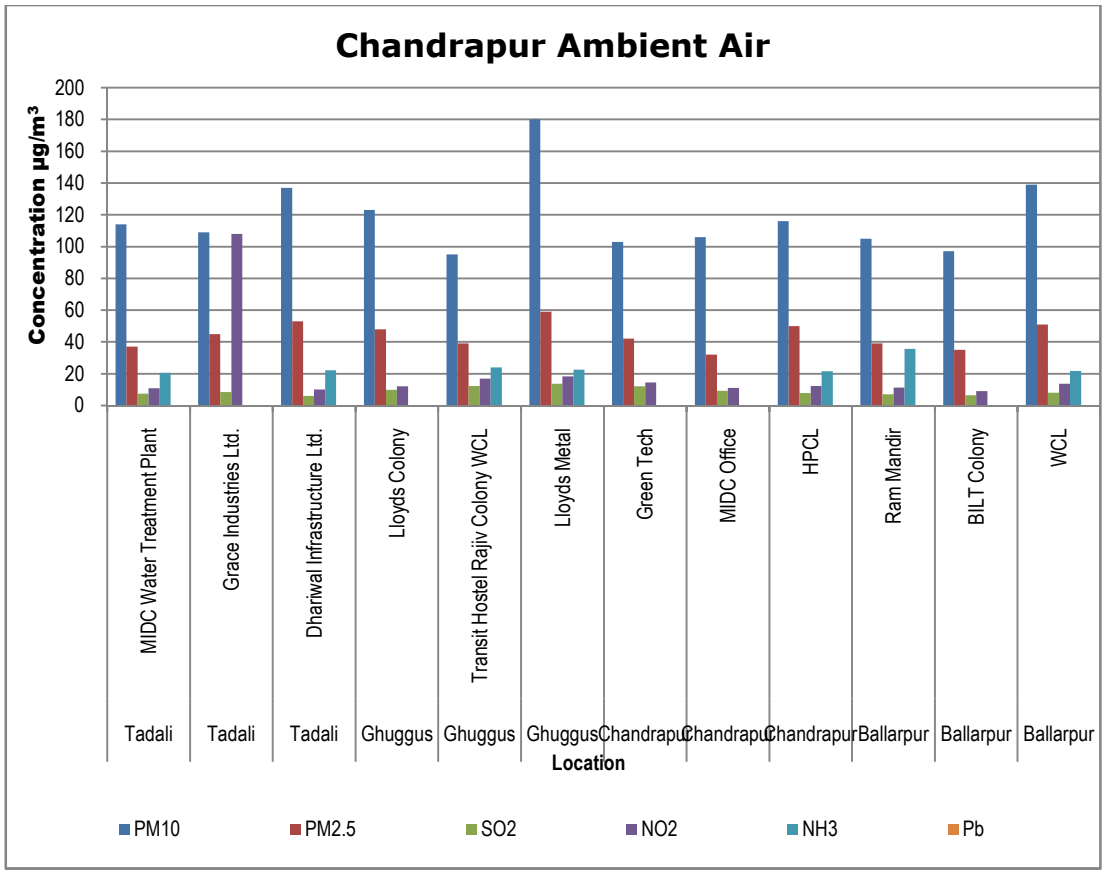
Table No. III

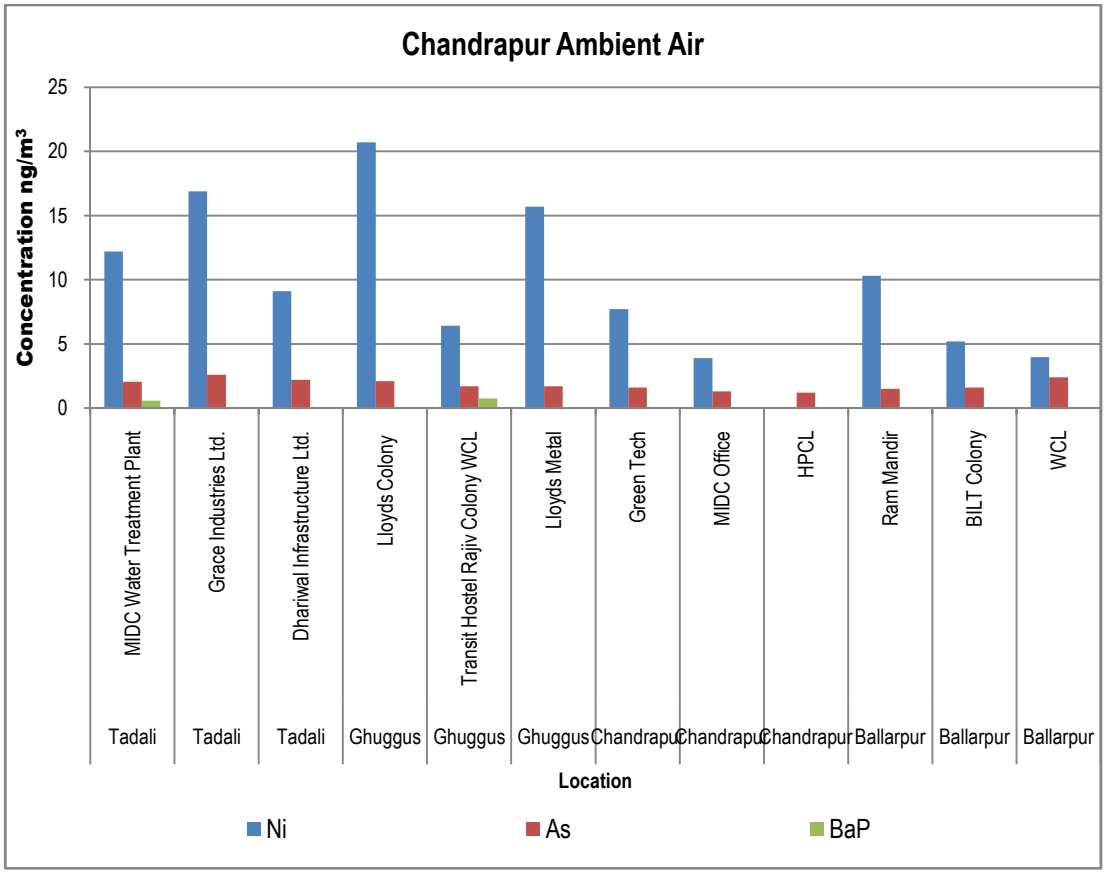
Location				**Green Tech**	**MIDC Office**	**HPCL**
Date of Sampling				**06.06.17**	**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit (NAAQS 2009)**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	12.1	9.3	7.9
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	14.6	11	12.3
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	103	106	116
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	42	32	50
5.	Ozone (O_3)	$\mu g/m^3$	**180**	15.16	12.5	15.75
6.	Lead (Pb)	$\mu g/m^3$	**1**	BDL	BDL	BDL
7.	Carbon Monoxide (CO)	mg/m^3	**4**	0.88	1.04	1.11
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	BDL	BDL	21.5
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	BDL	9.26	3.94
10.	Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	**1**	BDL	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	1.6	1.3	1.2
12.	Nickel (Ni)	ng/m^3	**20**	7.7	3.9	BDL

Table No. IV

Location				**Ram Mandir**	**BILT Colony**	**WCL**
Date of Sampling				**06.06.17**	**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit (NAAQS 2009)**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	7.1	6.4	8
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	11.2	9	13.7
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	105	97	139
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	39	35	51
5.	Ozone (O_3)	$\mu g/m^3$	**180**	14.07	12.25	15.27
6.	Lead (Pb)	$\mu g/m^3$	**1**	0.03	BDL	0.026
7.	Carbon Monoxide (CO)	mg/m^3	**4**	0.99	1.16	1.25
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	35.7	BDL	21.7
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	3.56	2.4	5.2
10.	Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	**1**	BDL	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	1.5	1.6	2.4
12.	Nickel (Ni)	ng/m^3	**20**	10.3	5.2	3.96

Graphs: Ambient Air Quality Monitoring for Chandrapur:





3.3 Water/ Waste WaterQuality:

Water Analysis Results are compared against CPCB document on criteria for Comprehensive Environmental Assessment of Industrial Clusters-Water Quality Parameters Requirement and Classification (Annexure VI), CPCB Water Quality Criteria (Annexure V) and Drinking Water Specification, IS 10500:2012 (Annexure IV), Wastewater Analysis Results are compared with General Standards for Discharge of Environmental Pollutants Part A: Effluents, The Environment (Protection) Rules, 1986, Schedule VI.

Sr.	Location	MIDC	Table No.
1.	GIPL Nallah	Tadali	**I**
2.	Tadali Village Lake	Tadali	**I**
3.	Gopani Iron & Power (I) Pvt. Ltd., Colony	Tadali	**I**
4.	Nallah Adjacent to Grace Industries	Tadali	**II**
5.	Raw Water of MIDC WTP (Tank)	Tadali	**II**
6.	Wardha river near WTP of WCL Ghugus opencast mine	Ghuggus	**III**
7.	Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus opencast mine	Ghuggus	**III**
8.	WCL Ghugus opencast mine discharge	Ghuggus	**III**
9.	Wardha River Behind ACC Plant (Mungoli Coal Mine Road)	Ghuggus	**IV**
10.	Nallah at Usgaon, Shengaon Road (Behind Gupta Energy Power Ltd)	Ghuggus	**IV**
11.	Nallah water domestic effluent of ACC LTD., Colony& Ghugusvillage	Ghuggus	**IV**
12.	Nallha Opposite Manidhari Industries, Plot No. c-2	Chandrapur	**V**
13.	Gagangiri Village Bridge	Chandrapur	
14.	BILT RCC Pipe Outlet	Chandrapur	**V**
15.	ETP Outlet of Multiorganics Pvt. Ltd	Chandrapur	**V**
16.	ETP Outlet of Super Hygienic (BMW disposal Unit)	Chandrapur	**VI**
17.	ETP Outlet of HPCL	Chandrapur	**VI**
18.	Bhagirathi Nallah Bridge, Gondpipri Road, Near Bamni Protiesn	Ballarpur	**VIII**
19.	Wardha River	Ballarpur	**VIII**

Sr.	Location	MIDC	Table No.
20.	Nallah Near MSW Municipal Corporation	Ballarpur	**IX**
21.	Ballarpur Open Cast Mine Discharge	Ballarpur	**IX**
22.	Nallah of Municipal Council Ballarpur, Besides HP Petrol Pump	Ballarpur	**IX**

Table No. I

Location				**GIPL Nallah**	**Tadali Village Lake**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		<1	<1
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**5.5 -9.0**	7.7	8.0
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	29	36
6.	Dissolved Oxygen (% Saturation)	%		60.2	93.8
7.	Chemical Oxygen Demand	mg/L	**250.0**	52	40
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	14	10
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		4097	482
10.	Nitrite Nitrogen (as NO_2)	mg/L		0.081	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	0.617	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	0.698	BDL

Location				**GIPL Nallah**	**Tadali Village Lake**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.361	BDL
14.	Total Residual Chlorine	mg/L	**1.0**	0.121	BDL
15.	Cyanide (as CN)	mg/L	**0.2**	ND	ND
16.	Fluoride(as F)	mg/L	**2.0**	1.15	0.574
17.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.06	BDL
19.	Sodium Absorption Ratio	mg/L		9.29	1.16
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	2200	340
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	1100	140
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.154	0.099
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	4.37	0.952
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	1.77	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL

Location				**GIPL Nallah**	**Tadali Village Lake**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL

Location				**GIPL Nallah**	**Tadali Village Lake**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
34.	Total Chromium (as Cr)	mg/L	**2.0**	0.023	0.024
35.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	ND	ND
39.	Manganese(as Mn)	mg/L	**2.0**	0.021	0.17
40.	Iron (as Fe)	mg/L	**3.0**	0.313	1.28
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	BDL
43.	Boron (as B)	mg/L		0.426	0.154
44.	Bioassay Test on fish	% survival		100%	100%

Table No. II

Location				**Gopani Iron & Power (I) Pvt. Ltd., Colony**	**Nallah Adjacent to Grace Industries**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		BDL	BDL
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**5.5 -9.0**	8.2	7.4
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	BDL	22

Location				**Gopani Iron & Power (I) Pvt. Ltd., Colony**	**Nallah Adjacent to Grace Industries**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
6.	Dissolved Oxygen (% Saturation)	%		72.9	97.1
7.	Chemical Oxygen Demand	mg/L	**250.0**	16	36
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	4.2	9.3
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		649	2607
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	ND
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	BDL	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	BDL	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**1.0**	0.089	0.274
15.	Cyanide (as CN)	mg/L	**0.2**	ND	ND
16.	Fluoride (as F)	mg/L	**2.0**	0.335	0.710
17.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.147	0.10
19.	Sodium Absorption Ratio	mg/L		1.36	6.13
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	1100	1100

Location				**Gopani Iron & Power (I) Pvt. Ltd., Colony**	**Nallah Adjacent to Grace Industries**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	260	260
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.168	0.187
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	1.34	1.4
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.205	0.20
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	0.007
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	BDL
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL

Location				**Gopani Iron & Power (I) Pvt. Ltd., Colony**	**Nallah Adjacent to Grace Industries**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	BDL	0.73
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	0.026	0.022
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	ND
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	ND	0.0004
39.	Manganese(as Mn)	mg/L	**2.0**	BDL	0.185
40.	Iron (as Fe)	mg/L	**3.0**	0.23	1
41.	Vanadium(as V)	mg/L	**0.2**	0.016	BDL

Location				**Gopani Iron & Power (I) Pvt. Ltd., Colony**	**Nallah Adjacent to Grace Industries**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
42.	Selenium (as Se)	mg/L	**0.05**	ND	BDL
43.	Boron (as B)	mg/L		BDL	0.337
44.	Bioassay Test on fish	% survival		100%	100%

Table No. III

Location				**Raw Water of MIDC WTP (Tank)**	**Wardha river near WTP of WCL Ghugus opencast mine**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		1	2
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**5.5 -9.0**	8.0	8.4
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	16	10
6.	Dissolved Oxygen (% Saturation)	%		89.3	80.7
7.	Chemical Oxygen Demand	mg/L	**250.0**	12	36
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	2.9	9.3
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		602	547

Location				**Raw Water of MIDC WTP (Tank)**	**Wardha river near WTP of WCL Ghugus opencast mine**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	BDL	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	BDL	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	ND	BDL
14.	Total Residual Chlorine	mg/L	**1.0**	0.284	0.386
15.	Cyanide (as CN)	mg/L	**0.2**	ND	ND
16.	Fluoride (as F)	mg/L	**2.0**	0.284	0.386
17.	Sulphide (as S^{2-})	mg/L	**2.0**	ND	BDL
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.0888	0.051
19.	Sodium Absorption Ratio	mg/L		1.41	1.58
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	2800	20
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	320	BDL
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.165	0.103
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	0.952	1.51
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	BDL	BDL

Location				**Raw Water of MIDC WTP (Tank)**	**Wardha river near WTP of WCL Ghugus opencast mine**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL

Location				**Raw Water of MIDC WTP (Tank)**	**Wardha river near WTP of WCL Ghugus opencast mine**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	0.38	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	ND	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	0.023	0.03
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	ND
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	ND	ND
39.	Manganese(as Mn)	mg/L	**2.0**	0.03	0.055
40.	Iron (as Fe)	mg/L	**3.0**	0.5	0.713
41.	Vanadium(as V)	mg/L	**0.2**	0.017	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	BDL
43.	Boron (as B)	mg/L		0.178	BDL
44.	Bioassay Test on fish	% survival		100%	100%

Table No. IV

Location				**Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus opencast mine**	**WCL Ghugus opencast mine discharge**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		2	<1
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**5.5 -9.0**	8.1	2.7
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	29	61
6.	Dissolved Oxygen (% Saturation)	%		76.9	34.5
7.	Chemical Oxygen Demand	mg/L	**250.0**	36	16
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	9.6	4.2
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		694	5140
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	ND
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	BDL	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	BDL	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	BDL	0.10
14.	Total Residual Chlorine	mg/L	**1.0**	0.305	0.221

Location				**Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus opencast mine**	**WCL Ghugus opencast mine discharge**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
15.	Cyanide (as CN)	mg/L	**0.2**	ND	ND
16.	Fluoride (as F)	mg/L	**2.0**	0.335	0.710
17.	Sulphide (as S^{2-})	mg/L	**2.0**	0.143	0.223
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.112	0.034
19.	Sodium Absorption Ratio	mg/L		1.89	1.22
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	1100	20
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	68	20
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.179	0.055
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	0.560	24.8
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	BDL	22.0
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	0.002
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL

Location				**Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus opencast mine**	**WCL Ghugus opencast mine discharge**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	1.44
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	0.934

Location				**Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus opencast mine**	**WCL Ghugus opencast mine discharge**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	0.441
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	0.020	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	0.028	0.024
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	0.0004	0.0005
39.	Manganese(as Mn)	mg/L	**2.0**	0.188	9.57
40.	Iron (as Fe)	mg/L	**3.0**	2.63	22.2
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	ND
43.	Boron (as B)	mg/L		BDL	0.385
44.	Bioassay Test on fish	% survival		100%	0%

Table No. V

Location				**Wardha River Behind ACC Plant (Mungoli Coal Mine Road)**	**Nallah at Usgaon, Shengaon Road (Behind Gupta Energy Power Ltd)**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		<1	<1
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**5.5 -9.0**	8.1	7.7
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	9	9
6.	Dissolved Oxygen (% Saturation)	%		90.5	48.6
7.	Chemical Oxygen Demand	mg/L	**250.0**	24	48
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	6.1	13
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		567	5168
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	ND
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	BDL	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	BDL	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**1.0**	0.247	0.221
15.	Cyanide (as CN)	mg/L	**0.2**	ND	ND

Location				**Wardha River Behind ACC Plant (Mungoli Coal Mine Road)**	**Nallah at Usgaon, Shengaon Road (Behind Gupta Energy Power Ltd)**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
16.	Fluoride (as F)	mg/L	**2.0**	0.335	1.11
17.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.056	0.090
19.	Sodium Absorption Ratio	mg/L		1.66	3.94
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	700	1100
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	92	68
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.101	0.157
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	0.896	1.34
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.120	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL

Location				**Wardha River Behind ACC Plant (Mungoli Coal Mine Road)**	**Nallah at Usgaon, Shengaon Road (Behind Gupta Energy Power Ltd)**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL

Location				**Wardha River Behind ACC Plant (Mungoli Coal Mine Road)**	**Nallah at Usgaon, Shengaon Road (Behind Gupta Energy Power Ltd)**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
34.	Total Chromium (as Cr)	mg/L	**2.0**	0.022	BDL
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	ND
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	ND	ND
39.	Manganese(as Mn)	mg/L	**2.0**	0.01	0.227
40.	Iron (as Fe)	mg/L	**3.0**	0.467	0.486
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	ND	ND
43.	Boron (as B)	mg/L		BDL	0.438
44.	Bioassay Test on fish	% survival		100%	100%

Table No. VI

Location				**Nallah water domestic effluent of ACC LTD., Colony & Ghugus village**	**Nallha Opposite Manidhari Industries, Plot No. c-2**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		50	150
2.	Smell	-		Disagreeable	Disagreeable
3.	pH	-	**5.5 -9.0**	7.5	7.4
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	59	48
6.	Dissolved Oxygen (% Saturation)	%		0.0	95
7.	Chemical Oxygen Demand	mg/L	**250.0**	128	324
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	39	103
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		841	5101
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	BDL	4.39
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	BDL	4.40
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.10	0.994
14.	Total Residual Chlorine	mg/L	**1.0**	0.247	ND
15.	Cyanide (as CN)	mg/L	**0.2**	ND	BDL
16.	Fluoride (as F)	mg/L	**2.0**	0.386	1.27

Location				**Nallah water domestic effluent of ACC LTD., Colony & Ghugus village**	**Nallha Opposite Manidhari Industries, Plot No. c-2**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
17.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	0.08
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.81	0.388
19.	Sodium Absorption Ratio	mg/L		1.31	7.41
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	$16x10^4$	3500
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	1400	470
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.912	0.579
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	9.2	10.6
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	8.28	8.62
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	0.063
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	0.269	11.7
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL

Location				**Nallah water domestic effluent of ACC LTD., Colony & Ghugus village**	**Nallha Opposite Manidhari Industries, Plot No. c-2**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	0.032

Location				**Nallah water domestic effluent of ACC LTD., Colony & Ghugus village**	**Nallha Opposite Manidhari Industries, Plot No. c-2**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
34.	Total Chromium (as Cr)	mg/L	**2.0**	0.029	BDL
35.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	0.0005	0.0002
39.	Manganese(as Mn)	mg/L	**2.0**	0.177	0.035
40.	Iron (as Fe)	mg/L	**3.0**	3.34	BDL
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	ND	ND
43.	Boron (as B)	mg/L		BDL	0.30
44.	Bioassay Test on fish	% survival		0%	80%

Table No. VII

Location				**Gagangiri Village Bridge**	**BILT RCC Pipe Outlet**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		20	20
2.	Smell	-		Disagreeable	Disagreeable
3.	pH	-	**5.5 -9.0**	7.6	7.1
4.	Oil & Grease	mg/L	**10.0**	ND	ND

Location				**Gagangiri Village Bridge**	**BILT RCC Pipe Outlet**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
5.	Suspended Solids	mg/L	**100.0**	42	24
6.	Dissolved Oxygen (% Saturation)	%		41.2	30.8
7.	Chemical Oxygen Demand	mg/L	**250.0**	52	116
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	14	33
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		1424	3702
10.	Nitrite Nitrogen (as NO_2)	mg/L		0.1076	0.05
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	3.42	2.55
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	3.53	2.60
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	1.19	BDL
14.	Total Residual Chlorine	mg/L	**1.0**	0.089	0.079
15.	Cyanide (as CN)	mg/L	**0.2**	ND	ND
16.	Fluoride (as F)	mg/L	**2.0**	0.568	0.50
17.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	0.400
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.235	0.319
19.	Sodium Absorption Ratio	mg/L		3.92	5.83
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	2800	28000

Location				**Gagangiri Village Bridge**	**BILT RCC Pipe Outlet**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	1100	1100
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.355	0.450
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	5.04	0.784
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.840	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL

Location				**Gagangiri Village Bridge**	**BILT RCC Pipe Outlet**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	0.0005	0.0005
39.	Manganese(as Mn)	mg/L	**2.0**	BDL	0.189
40.	Iron (as Fe)	mg/L	**3.0**	0.131	BDL
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	ND	ND
43.	Boron (as B)	mg/L		0.438	0.243

Location				**Gagangiri Village Bridge**	**BILT RCC Pipe Outlet**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
44.	Bioassay Test on fish	% survival		80%	100%

Table No. VIII

Location				**ETP Outlet of Multiorganics Pvt. Ltd**	**ETP Outlet of Super Hygienic (BMW disposal Unit)**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		150	20
2.	Smell	-		Disagreeable	Disagreeable
3.	pH	-	**5.5 -9.0**	8.1	5.9
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	13	121
6.	Dissolved Oxygen (% Saturation)	%		69.3	0
7.	Chemical Oxygen Demand	mg/L	**250.0**	116	316
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	33	100
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		6271	2901
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	0.19

Location				**ETP Outlet of Multiorganics Pvt. Ltd**	**ETP Outlet of Super Hygienic (BMW disposal Unit)**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	18.3	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	18.3	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.184	0.12
14.	Total Residual Chlorine	mg/L	**1.0**	BDL	0.053
15.	Cyanide (as CN)	mg/L	**0.2**	ND	BDL
16.	Fluoride (as F)	mg/L	**2.0**	1.34	1.38
17.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	0.08
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	1.09	0.161
19.	Sodium Absorption Ratio	mg/L		43.6	2.7
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	5.4 $X10^4$	4900
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	3.5 X 10^4	3300
22.	Total Phosphorous (as P)	mg/L	**1.0**	1.29	0.230
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	1.0	52.1
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.20	48.8
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	0.005	0.116

Location				**ETP Outlet of Multiorganics Pvt. Ltd**	**ETP Outlet of Super Hygienic (BMW disposal Unit)**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	0.45	BDL
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL

Location				**ETP Outlet of Multiorganics Pvt. Ltd**	**ETP Outlet of Super Hygienic (BMW disposal Unit)**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	1.24	2.15
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	5.61
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	0.582
32.	Copper (as Cu)	mg/L		BDL	0.056
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	0.097
35.	Total Arsenic (as As)	mg/L	**0.2**	BDL	0.01
36.	Lead (as Pb)	mg/L	**0.1**	BDL	0.363
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	0.016
38.	Mercury (as Hg)	mg/L	**0.01**	BDL	BDL
39.	Manganese(as Mn)	mg/L	**2.0**	BDL	0.791
40.	Iron (as Fe)	mg/L	**3.0**	0.131	10.9
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	ND
43.	Boron (as B)	mg/L		0.254	0.198
44.	Bioassay Test on fish	% survival		0%	100%

Table No. IX

Location				**ETP Outlet of HPCL**	**Bhagirathi Nallah Bridge, Gondpipri Road, Near Bamni Protiesn**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		2	20
2.	Smell	-		Agreeable	Disagreeable
3.	pH	-	**5.5 -9.0**	8.1	6.7
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	BDL	80
6.	Dissolved Oxygen (% Saturation)	%		81.0	0
7.	Chemical Oxygen Demand	mg/L	**250.0**	32	284
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	9.4	84
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		1989	12182
10.	Nitrite Nitrogen (as NO_2)	mg/L		ND	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	BDL	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	BDL	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**1.0**	BDL	0.063
15.	Cyanide (as CN)	mg/L	**0.2**	ND	BDL

Location				**ETP Outlet of HPCL**	**Bhagirathi Nallah Bridge, Gondpipri Road, Near Bamni Protiesn**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
16.	Fluoride (as F)	mg/L	**2.0**	1.17	0.097
17.	Sulphide (as S^{2-})	mg/L	**2.0**	0.08	0.160
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	BDL	0.381
19.	Sodium Absorption Ratio	mg/L		13.2	0.567
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	2300	260
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	1300	170
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.099	0.58
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	5.38	58.6
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	3.85	40.0
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	BDL
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL

Location				**ETP Outlet of HPCL**	**Bhagirathi Nallah Bridge, Gondpipri Road, Near Bamni Protiesn**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	0.039

Location				**ETP Outlet of HPCL**	**Bhagirathi Nallah Bridge, Gondpipri Road, Near Bamni Protiesn**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
34.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	BDL
36.	Lead (as Pb)	mg/L	**0.1**	0.10	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	ND	0.0005
39.	Manganese(as Mn)	mg/L	**2.0**	0.093	0.123
40.	Iron (as Fe)	mg/L	**3.0**	0.373	0.256
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	ND
43.	Boron (as B)	mg/L		0.127	0.18
44.	Bioassay Test on fish	% survival		0%	100%

Table No. X

Location				**Wardha River, Rajura Bridge**	**Nallah Near MSW Municipal Corporation, Near Railway Line**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		2	20
2.	Smell	-		Agreeable	Disagreeable

Location				**Wardha River, Rajura Bridge**	**Nallah Near MSW Municipal Corporation, Near Railway Line**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
3.	pH	-	**5.5 -9.0**	8.1	7.3
4.	Oil & Grease	mg/L	**10.0**	ND	ND
5.	Suspended Solids	mg/L	**100.0**	13	27
6.	Dissolved Oxygen (% Saturation)	%		89.3	17.3
7.	Chemical Oxygen Demand	mg/L	**250.0**	48	92
8.	Biochemical Oxygen Demand (3 days,27°C)	mg/L	**30.0**	13	26
9.	Electrical Conductivity (at 25°C)	µmho/cm		875	3499
10.	Nitrite Nitrogen (as NO_2)	mg/L		BDL	0.066
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	0.55	7.50
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	0.575	7.57
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.210	0.543
14.	Total Residual Chlorine	mg/L	**1.0**	BDL	0.074
15.	Cyanide (as CN)	mg/L	**0.2**	ND	BDL
16.	Fluoride (as F)	mg/L	**2.0**	0.50	0.50
17.	Sulphide (as S^{2-})	mg/L	**2.0**	ND	0.08

Location				**Wardha River, Rajura Bridge**	**Nallah Near MSW Municipal Corporation, Near Railway Line**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.062	0.319
19.	Sodium Absorption Ratio	mg/L		2.61	4.47
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	1400	2200
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	390	1100
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.103	0.491
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	1.06	2.41
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.271	0.677
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	0.0104
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL

Location				**Wardha River, Rajura Bridge**	**Nallah Near MSW Municipal Corporation, Near Railway Line**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL

Location				**Wardha River, Rajura Bridge**	**Nallah Near MSW Municipal Corporation, Near Railway Line**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	ND	0.0004
39.	Manganese(as Mn)	mg/L	**2.0**	0.042	0.156
40.	Iron (as Fe)	mg/L	**3.0**	0.264	0.085
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	ND
43.	Boron (as B)	mg/L		0.216	0.231
44.	Bioassay Test on fish	% survival		0%	0%

Table No. XI

Location				**Ballarpur Open Cast Mine Discharge**	**Nallah of Municipal Council Ballarpur, Besides HP Petrol Pump**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen		<1	50
2.	Smell	-		Agreeable	Disagreeable
3.	pH	-	**5.5 -9.0**	7.6	7.3
4.	Oil & Grease	mg/L	**10.0**	ND	ND

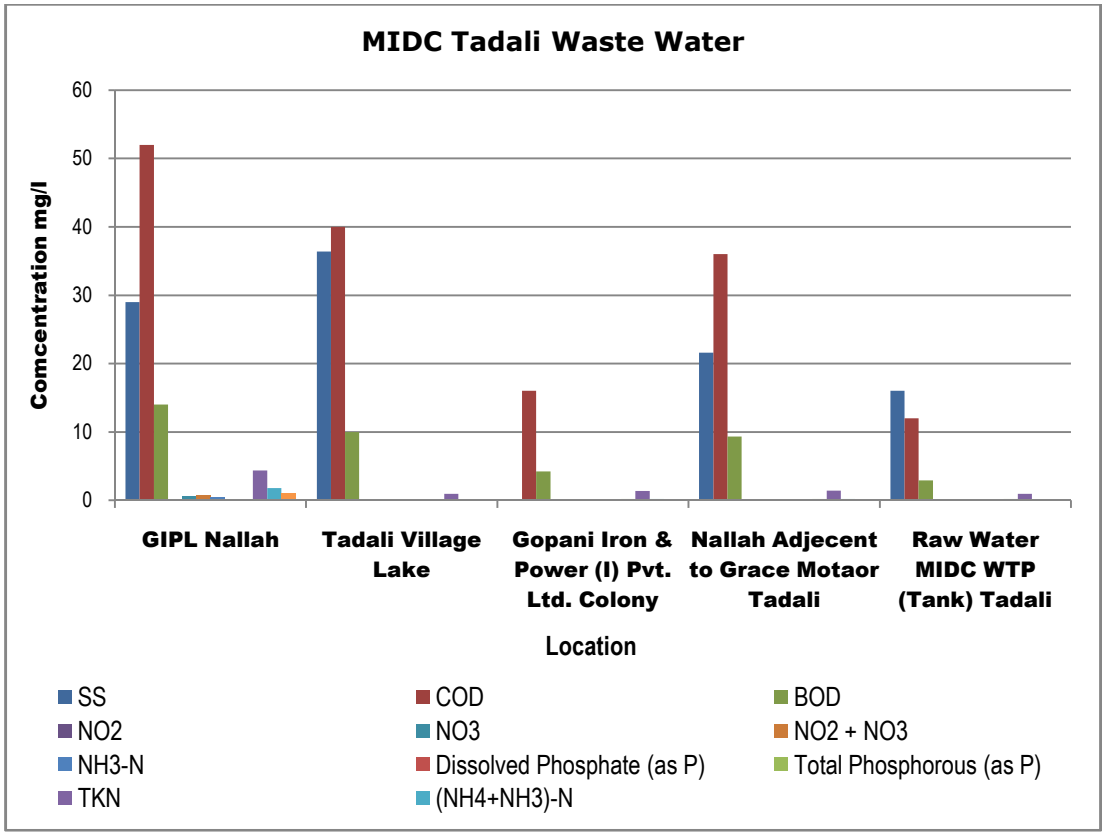
Location				**Ballarpur Open Cast Mine Discharge**	**Nallah of Municipal Council Ballarpur, Besides HP Petrol Pump**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
5.	Suspended Solids	mg/L	**100.0**	6	83
6.	Dissolved Oxygen (% Saturation)	%		91	0.0
7.	Chemical Oxygen Demand	mg/L	**250.0**	20	240
8.	Biochemical Oxygen Demand (3 days,27°C)	mg/L	**30.0**	4.3	77
9.	Electrical Conductivity (at 25°C)	µmho/cm		1662	1136
10.	Nitrite Nitrogen (as NO_2)	mg/L		0.254	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L	**10.0**	0.76	1.84
12.	(NO_2 + NO_3)-Nitrogen	mg/L	**5.0**	1.02	1.87
13.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.699	0.367
14.	Total Residual Chlorine	mg/L	**1.0**	ND	0.542
15.	Cyanide (as CN)	mg/L	**0.2**	ND	BDL
16.	Fluoride (as F)	mg/L	**2.0**	0.591	0.57
17.	Sulphide (as S^{2-})	mg/L	**2.0**	ND	0.240
18.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.040	1.40
19.	Sodium Absorption Ratio	mg/L		1.18	3.48

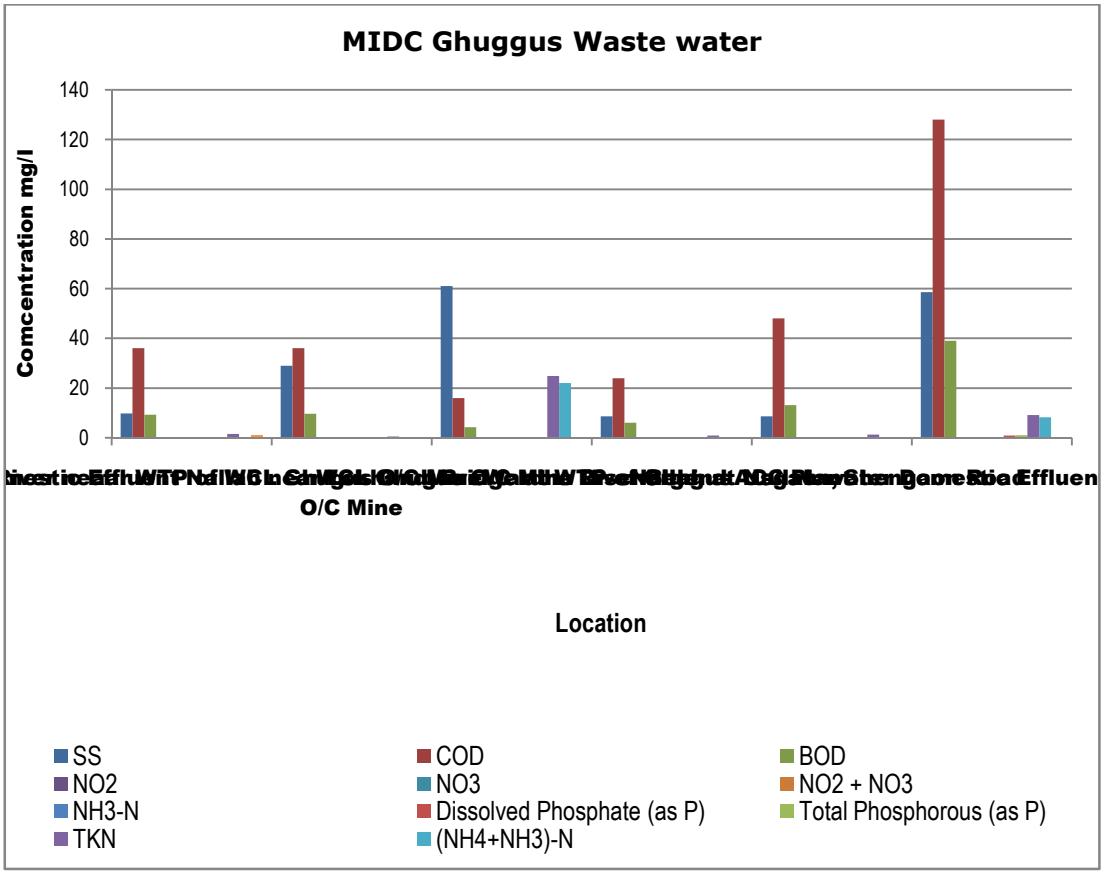
Location				**Ballarpur Open Cast Mine Discharge**	**Nallah of Municipal Council Ballarpur, Besides HP Petrol Pump**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
20.	Total Coliforms	MPN Index/ 100 ml	**100.0**	790	2800
21.	Faecal Coliforms	MPN Index/ 100 ml	**1000.0**	490	1400
22.	Total Phosphorous (as P)	mg/L	**1.0**	0.055	1.64
23.	Total Kjeldahl Nitrogen (as TKN)	mg/L	**100.0**	3.20	21.8
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	2.73	16.0
25.	Phenols (as C_6H_5OH)	mg/L	**3.0**	ND	0.014
26.	Surface Active Agents (as MBAS)	mg/L	**3.0**	ND	13.1
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**2.0**	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL
VII.	Delta HCH	µg/L	**0.2**	BDL	BDL
VIII.	Butachlor	µg/L		BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL

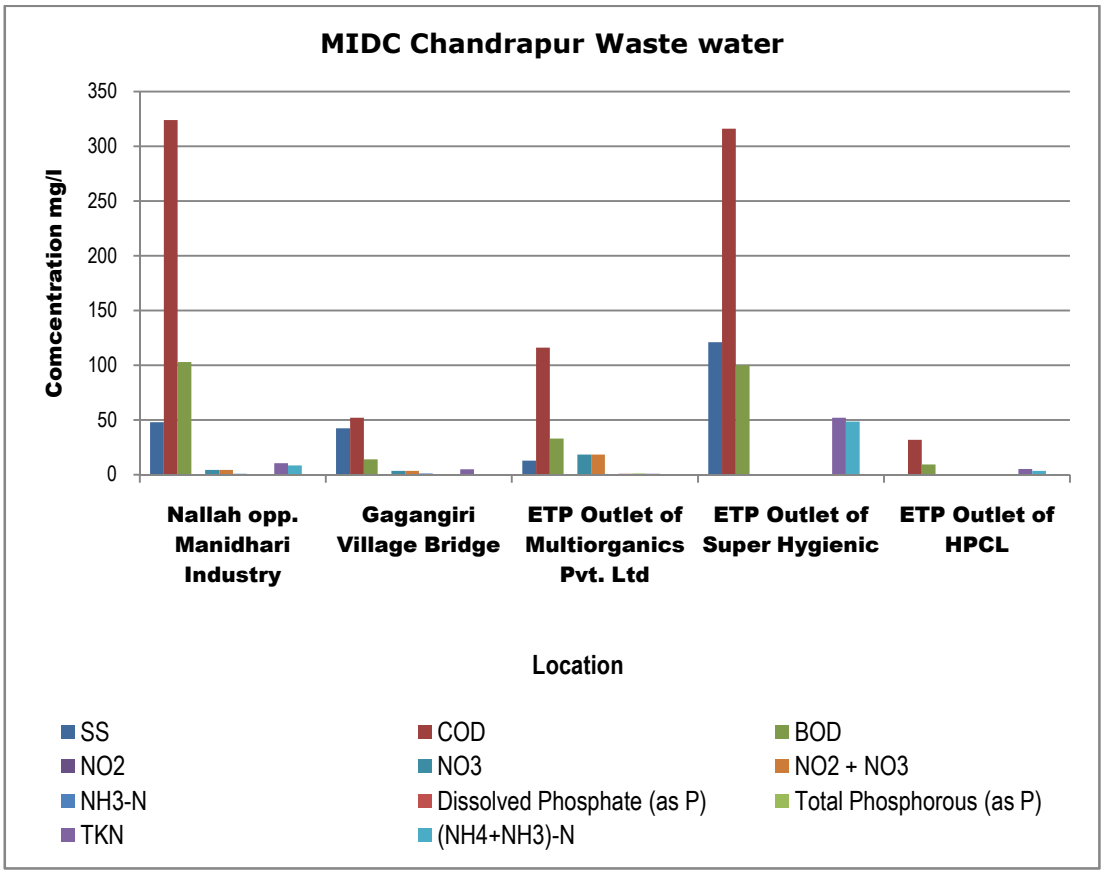
Location				**Ballarpur Open Cast Mine Discharge**	**Nallah of Municipal Council Ballarpur, Besides HP Petrol Pump**
Date of Sampling				**06.07.17**	**06.07.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
X.	o,p DDT	µg/L	**100.0**	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
VIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**0.2**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**2.0**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**5.0**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	ND	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.2**	ND	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL

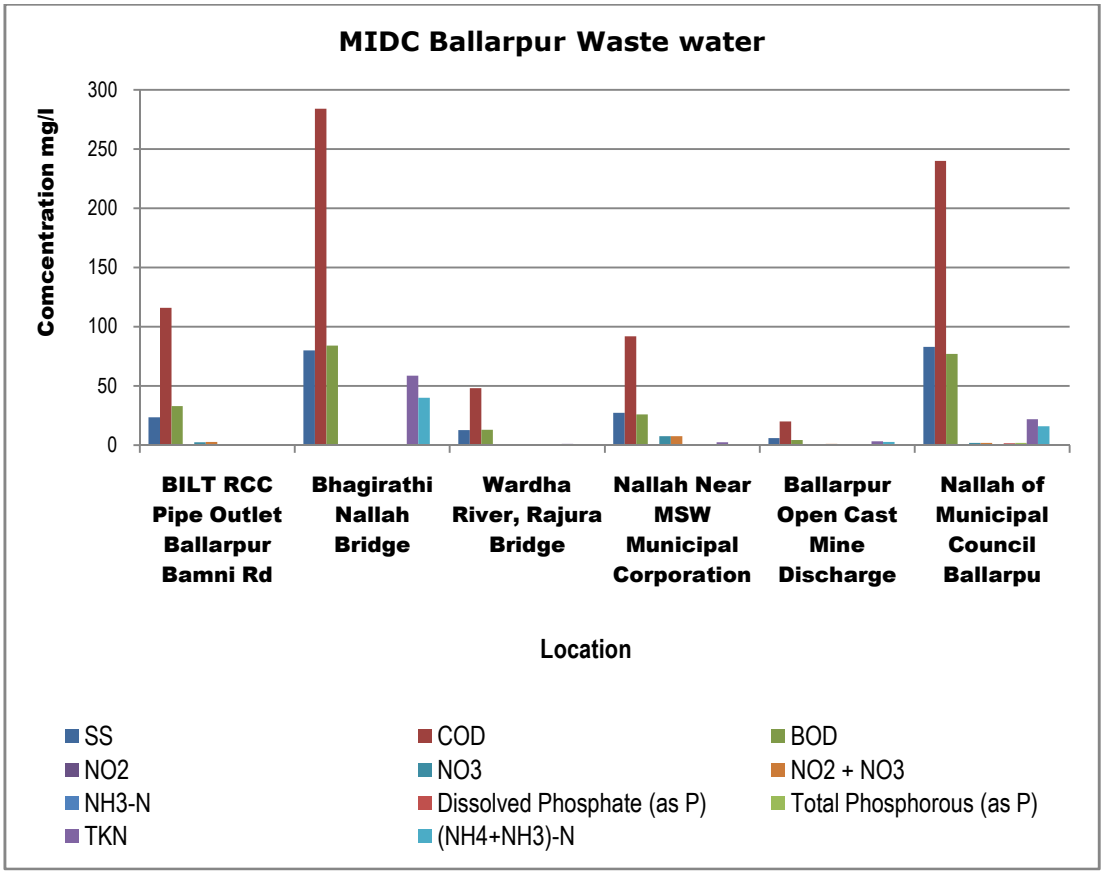
Location				Ballarpur Open Cast Mine Discharge	Nallah of Municipal Council Ballarpur, Besides HP Petrol Pump
Date of Sampling				06.07.17	06.07.17
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
38.	Mercury (as Hg)	mg/L	**0.01**	ND	0.0005
39.	Manganese(as Mn)	mg/L	**2.0**	0.282	0.123
40.	Iron (as Fe)	mg/L	**3.0**	0.08	0.256
41.	Vanadium(as V)	mg/L	**0.2**	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	ND	ND
43.	Boron (as B)	mg/L		0.257	0.18
44.	Bioassay Test on fish	% survival		0%	100%

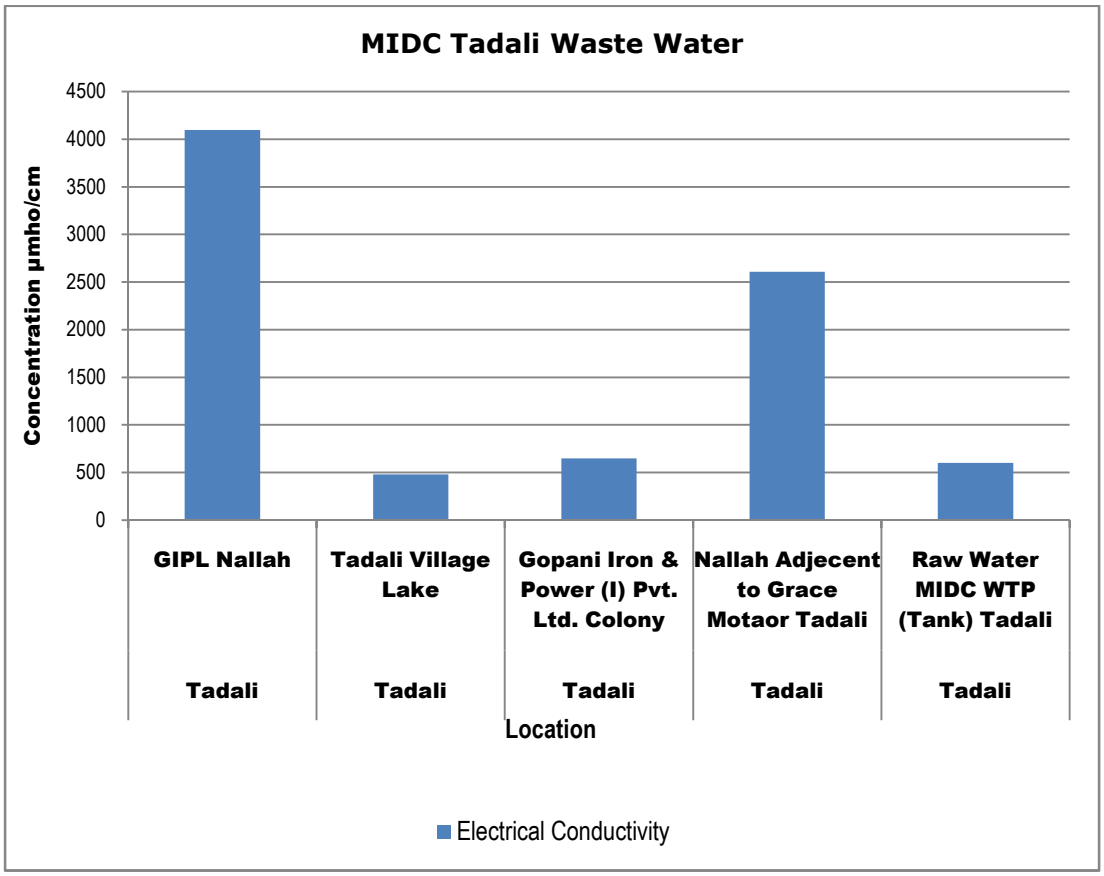
Graphs: Water/Waste Water Quality Monitoring for Chandrapur:

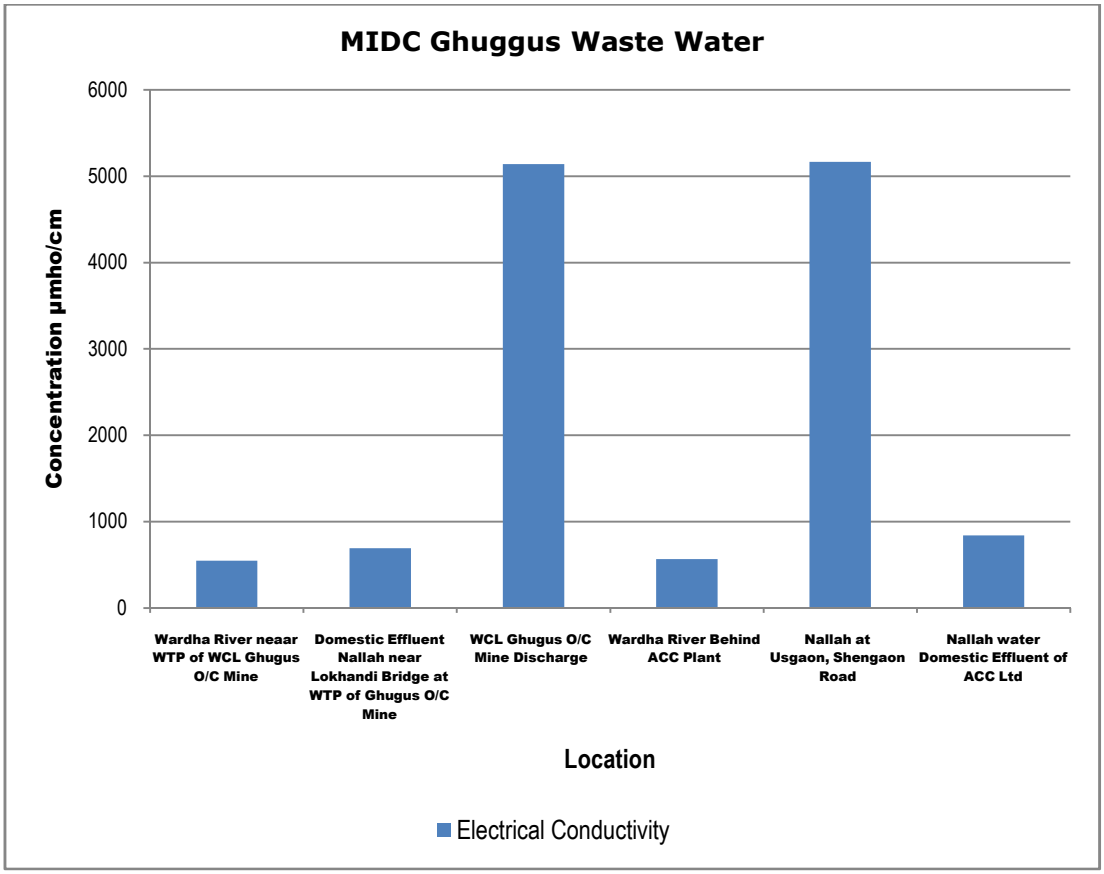


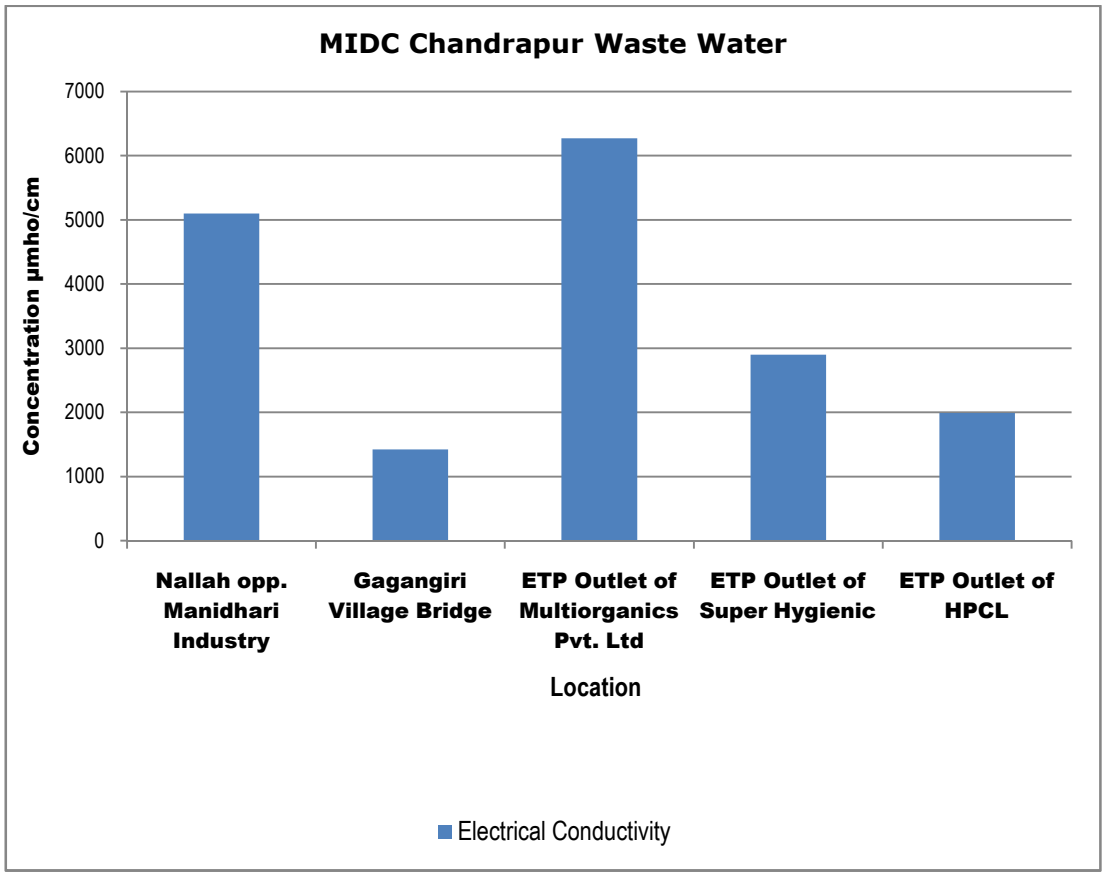

MIDC Ghuggus Waste water
Comcentration mg/l
140
120
100
80
60
40
20
0
O/C Mine
Location
SS
COD
BOD
NO2
NO3
NO2 + NO3
NH3-N
Dissolved Phosphate (as P)
Total Phosphorous (as P)
TKN
(NH4+NH3)-N

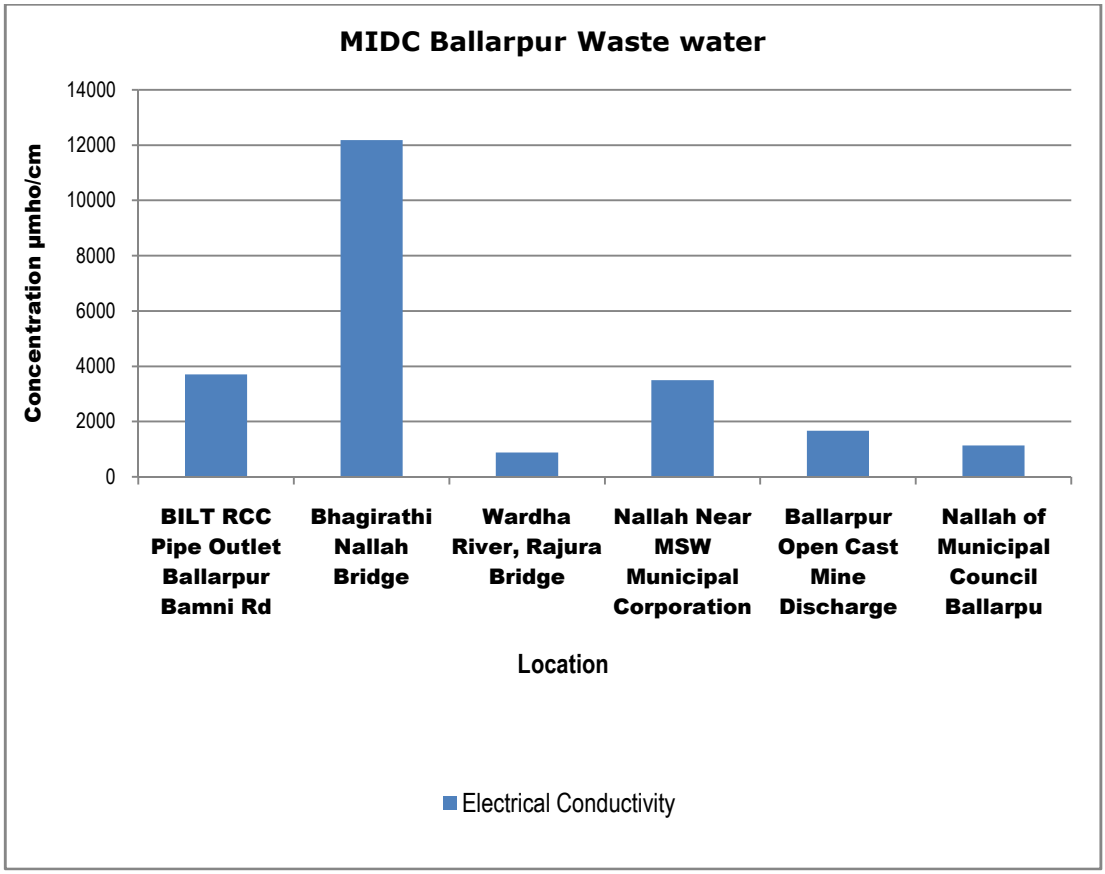

MIDC Chandrapur Waste water
Comcentration mg/l
350
300
250
200
150
100
50
0
Nallah opp. Manidhari Industry
Gagangiri Village Bridge
ETP Outlet of Multiorganics Pvt. Ltd
ETP Outlet of Super Hygienic
ETP Outlet of HPCL
Location
SS
COD
BOD
NO2
NO3
NO2 + NO3
NH3-N
Dissolved Phosphate (as P)
Total Phosphorous (as P)
TKN
(NH4+NH3)-N

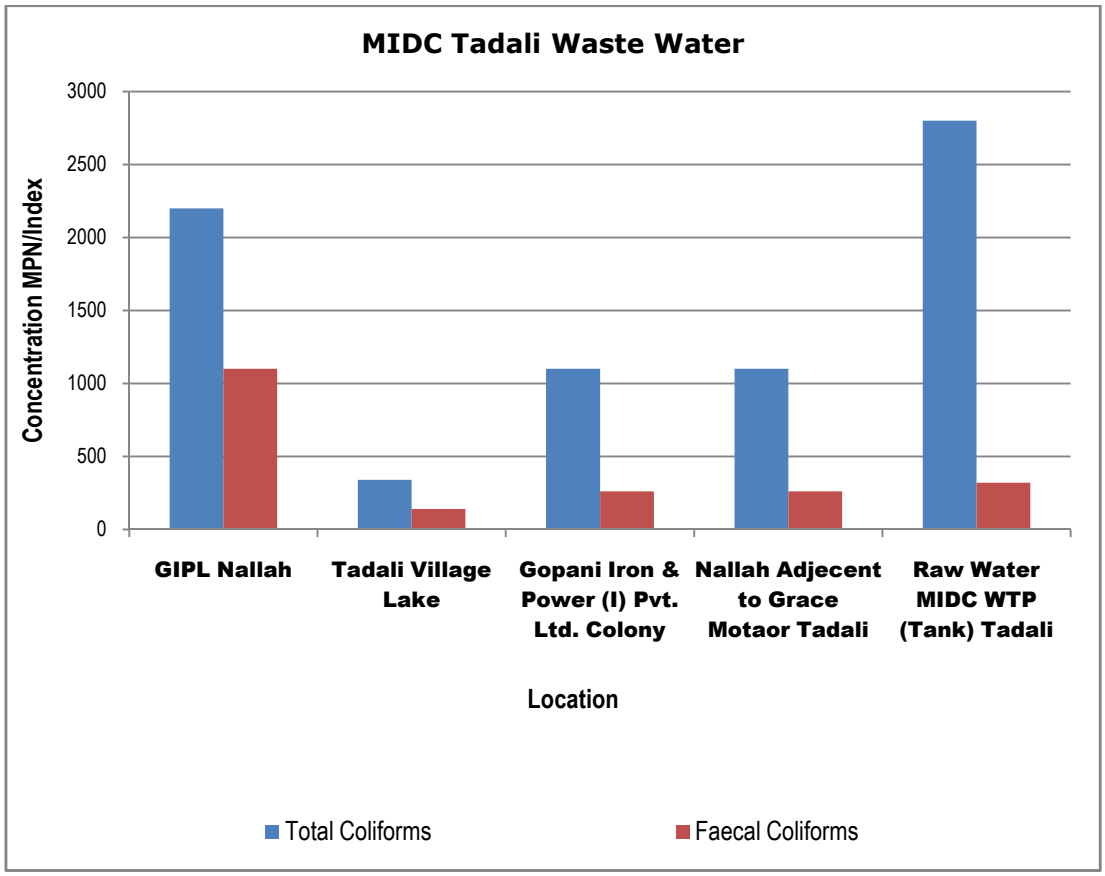

MIDC Ballarpur Waste water
Comcentration mg/l
300
250
200
150
100
50
0
BILT RCC Pipe Outlet Ballarpur Bamni Rd
Bhagirathi Nallah Bridge
Wardha River, Rajura Bridge
Nallah Near MSW Municipal Corporation
Ballarpur Open Cast Mine Discharge
Nallah of Municipal Council Ballarpu
Location
SS
COD
BOD
NO2
NO3
NO2 + NO3
NH3-N
Dissolved Phosphate (as P)
Total Phosphorous (as P)
TKN
(NH4+NH3)-N

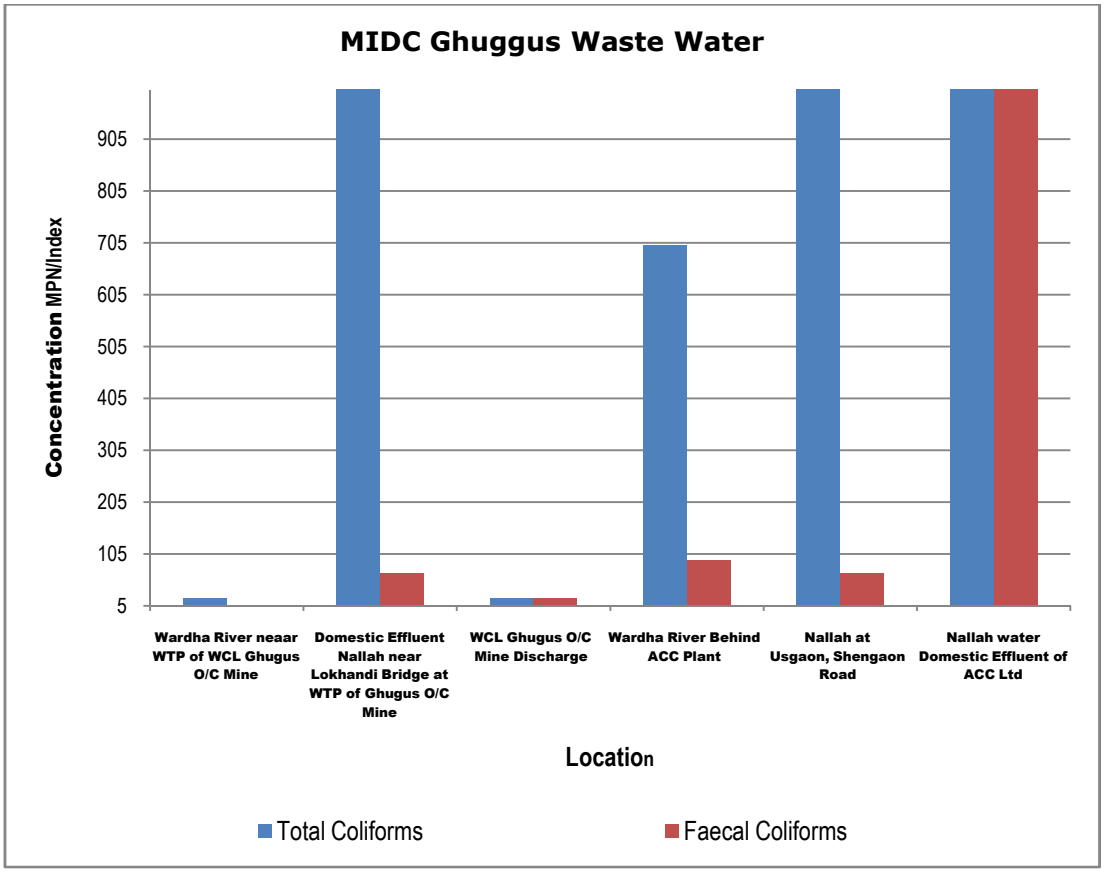

MIDC Tadali Waste Water
Concentration µmho/cm
4500
4000
3500
3000
2500
2000
1500
1000
500
0
GIPL Nallah
Tadali Village Lake
Gopani Iron & Power (I) Pvt. Ltd. Colony
Nallah Adjecent to Grace Motaor Tadali
Raw Water MIDC WTP (Tank) Tadali
Tadali
Tadali
Tadali
Tadali
Tadali
Location
Electrical Conductivity

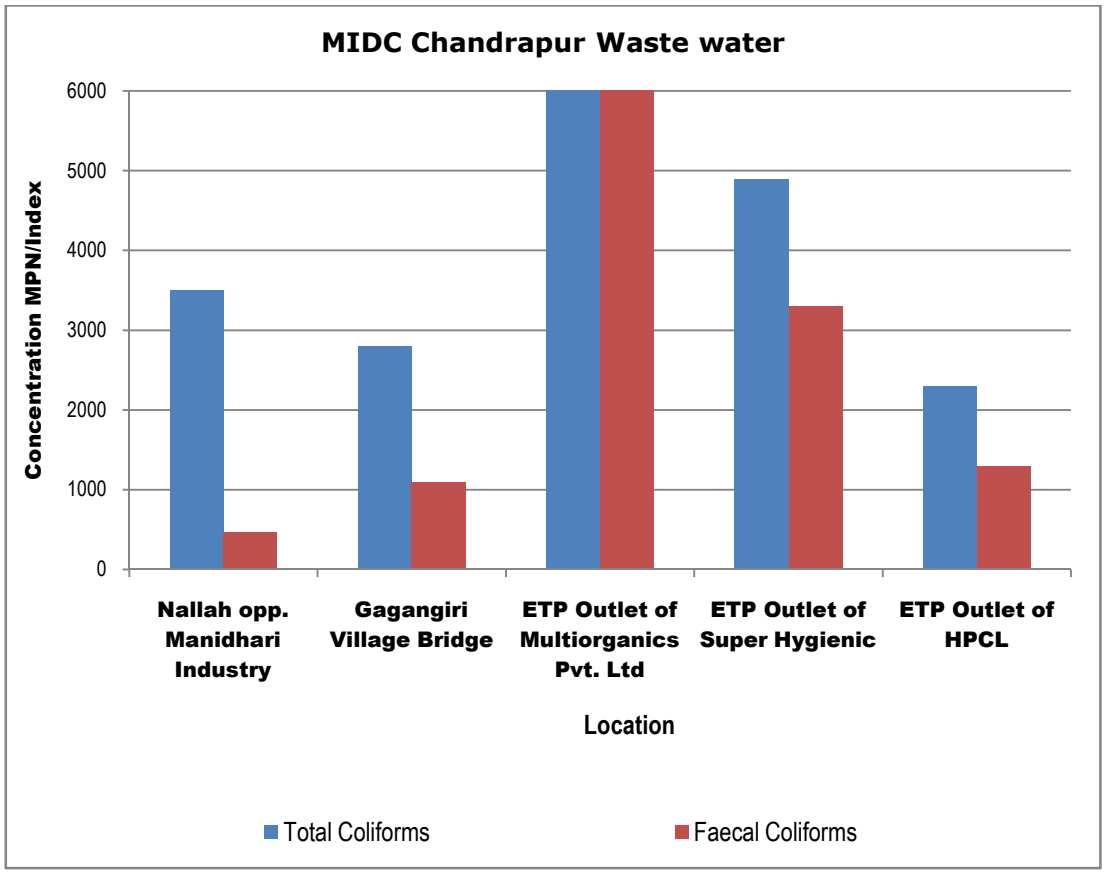

MIDC Ghuggus Waste Water
Concentration µmho/cm
6000
5000
4000
3000
2000
1000
0
Wardha River neaar WTP of WCL Ghugus O/C Mine
Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus O/C Mine
WCL Ghugus O/C Mine Discharge
Wardha River Behind ACC Plant
Nallah at Usgaon, Shengaon Road
Nallah water Domestic Effluent of ACC Ltd
Location
Electrical Conductivity

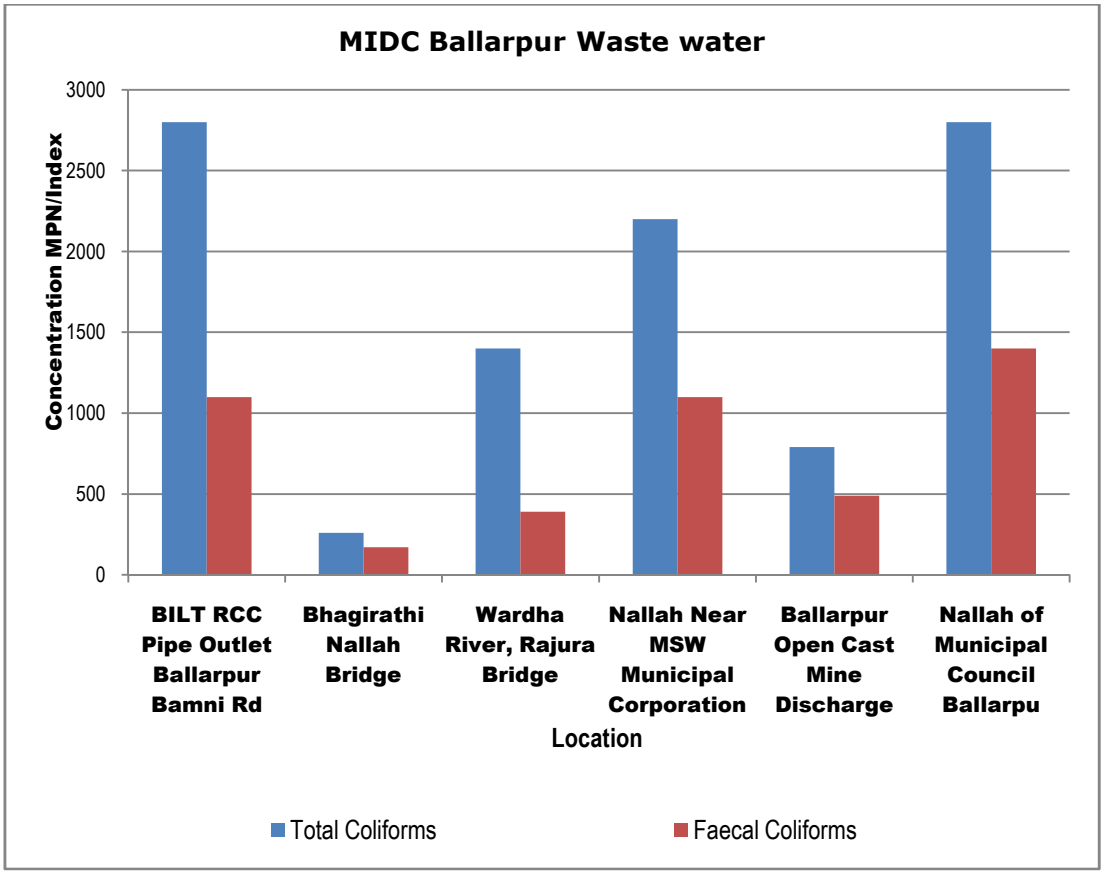

MIDC Chandrapur Waste Water
Concentration µmho/cm
7000
6000
5000
4000
3000
2000
1000
0
Nallah opp. Manidhari Industry
Gagangiri Village Bridge
ETP Outlet of Multiorganics Pvt. Ltd
ETP Outlet of Super Hygienic
ETP Outlet of HPCL
Location
Electrical Conductivity

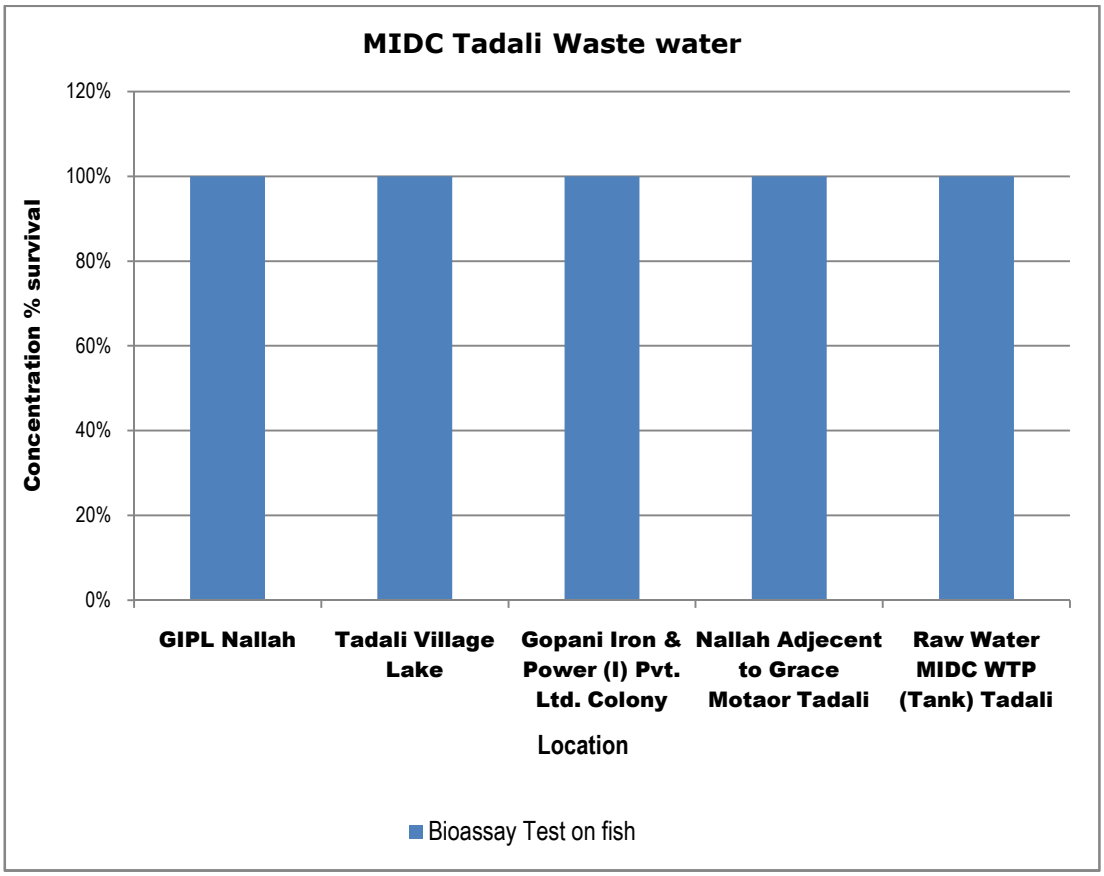

MIDC Ballarpur Waste water
Concentration µmho/cm
14000
12000
10000
8000
6000
4000
2000
0
BILT RCC Pipe Outlet Ballarpur Bamni Rd
Bhagirathi Nallah Bridge
Wardha River, Rajura Bridge
Nallah Near MSW Municipal Corporation
Ballarpur Open Cast Mine Discharge
Nallah of Municipal Council Ballarpu
Location
Electrical Conductivity

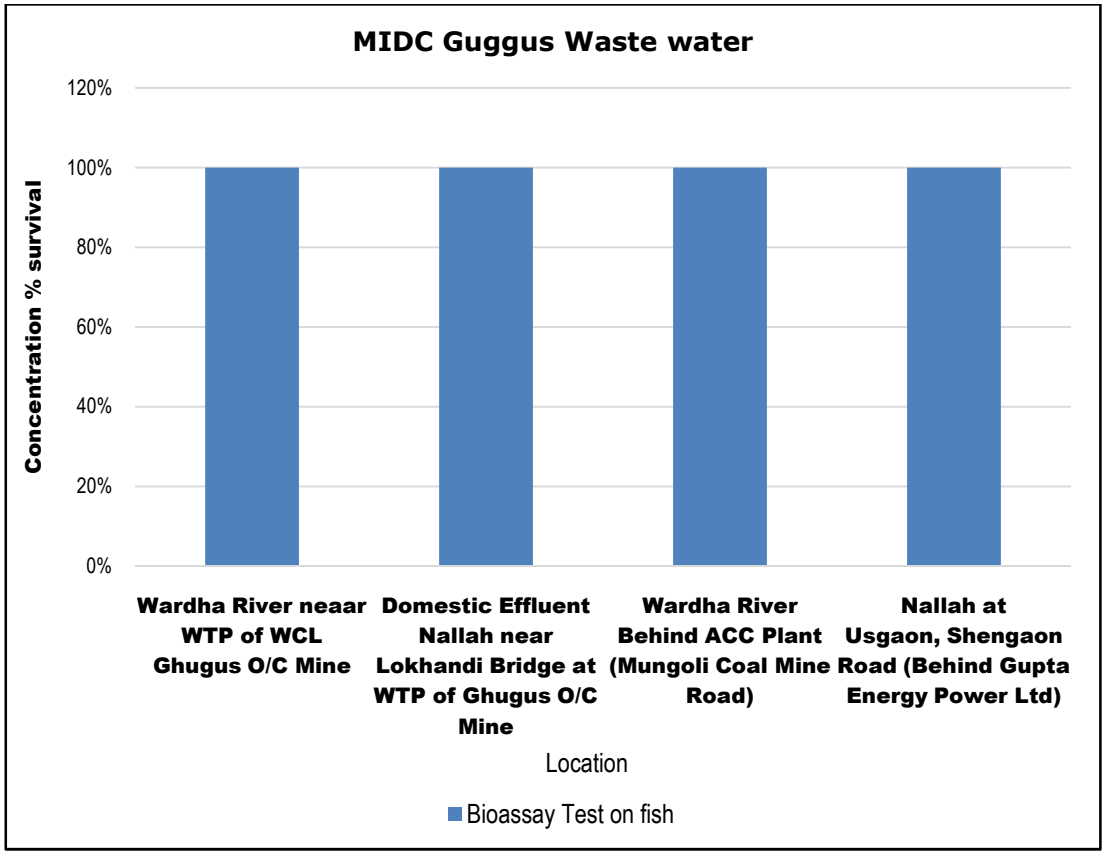

MIDC Tadali Waste Water
Concentration MPN/Index
3000
2500
2000
1500
1000
500
0
GIPL Nallah
Tadali Village Lake
Gopani Iron & Power (I) Pvt. Ltd. Colony
Nallah Adjecent to Grace Motaor Tadali
Raw Water MIDC WTP (Tank) Tadali
Location
Total Coliforms
Faecal Coliforms

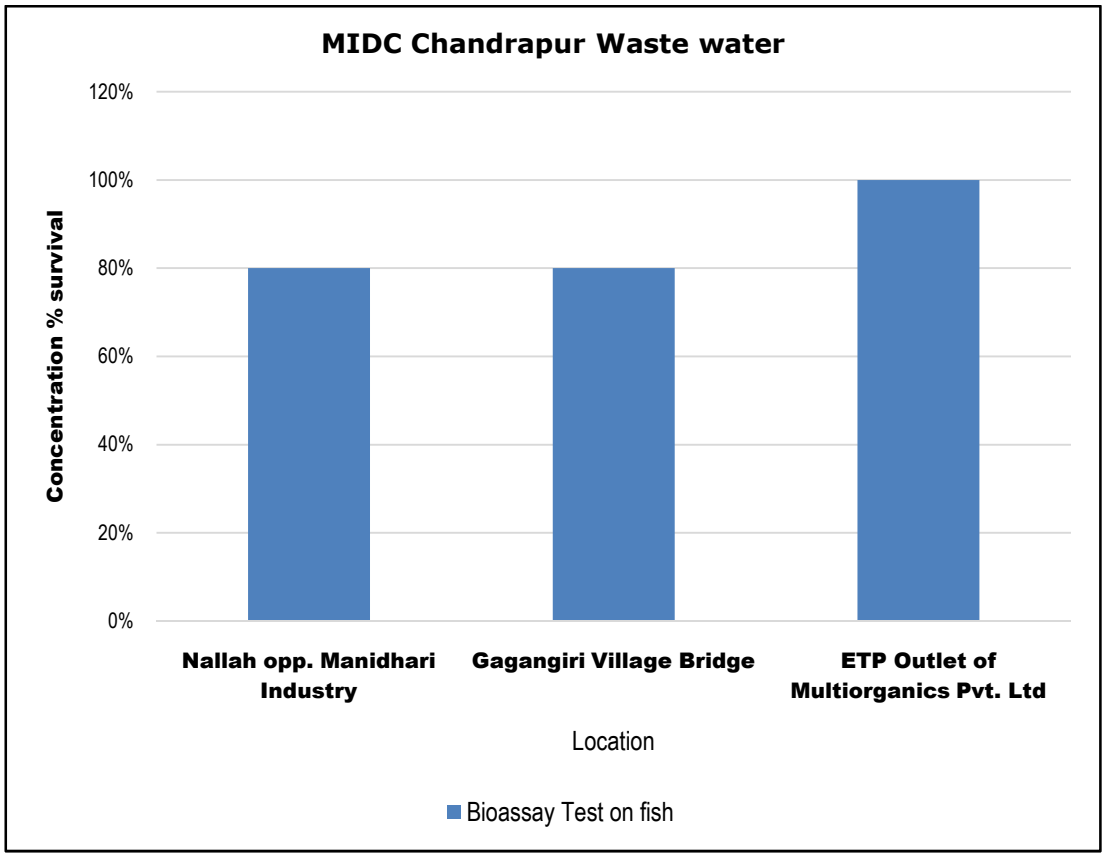

MIDC Ghuggus Waste Water
Concentration MPN/Index
905
805
705
605
505
405
305
205
105
5
Wardha River neaar WTP of WCL Ghugus O/C Mine
Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus O/C Mine
WCL Ghugus O/C Mine Discharge
Wardha River Behind ACC Plant
Nallah at Usgaon, Shengaon Road
Nallah water Domestic Effluent of ACC Ltd
Location
Total Coliforms
Faecal Coliforms

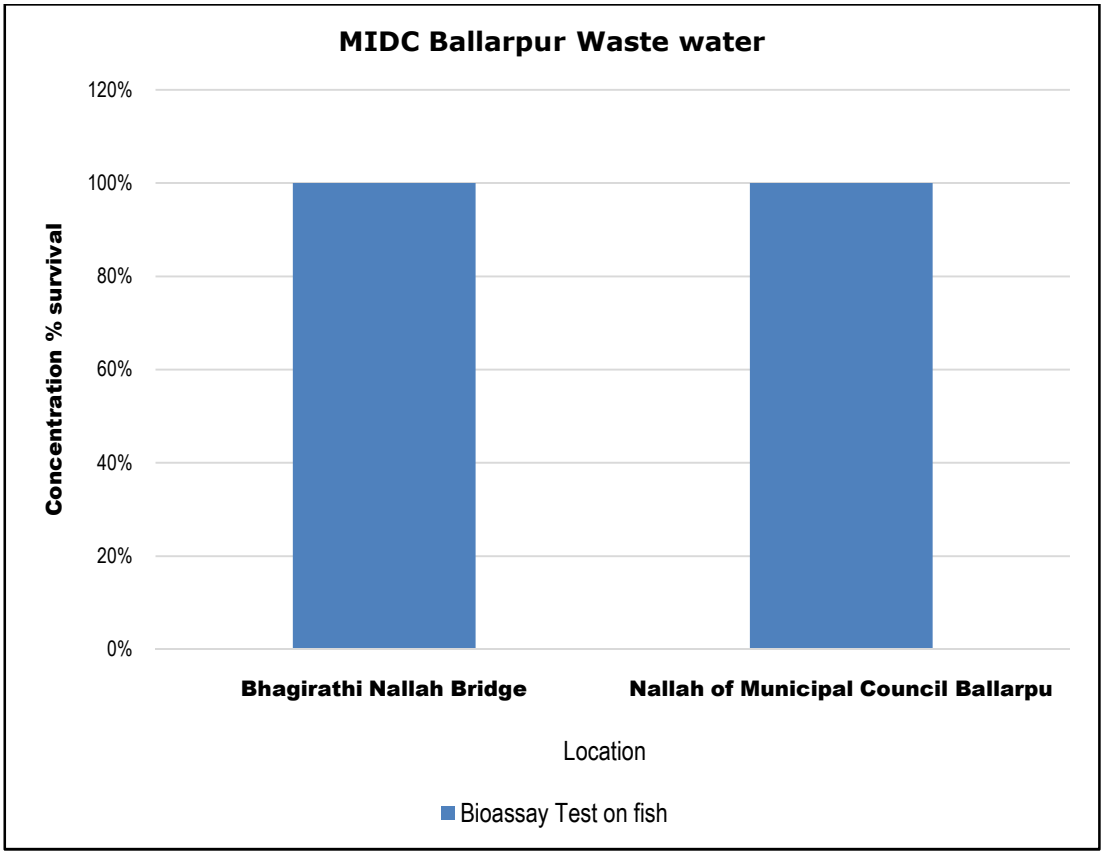

MIDC Chandrapur Waste water
Concentration MPN/Index
6000
5000
4000
3000
2000
1000
0
Nallah opp. Manidhari Industry
Gagangiri Village Bridge
ETP Outlet of Multiorganics Pvt. Ltd
ETP Outlet of Super Hygienic
ETP Outlet of HPCL
Location
Total Coliforms
Faecal Coliforms


MIDC Ballarpur Waste water
Concentration MPN/Index
3000
2500
2000
1500
1000
500
0
BILT RCC Pipe Outlet Ballarpur Bamni Rd
Bhagirathi Nallah Bridge
Wardha River, Rajura Bridge
Nallah Near MSW Municipal Corporation
Ballarpur Open Cast Mine Discharge
Nallah of Municipal Council Ballarpu
Location
Total Coliforms
Faecal Coliforms


MIDC Tadali Waste water
Concentration % survival
120%
100%
80%
60%
40%
20%
0%
GIPL Nallah
Tadali Village Lake
Gopani Iron & Power (I) Pvt. Ltd. Colony
Nallah Adjecent to Grace Motaor Tadali
Raw Water MIDC WTP (Tank) Tadali
Location
Bioassay Test on fish


MIDC Guggus Waste water
120%
100%
80%
60%
40%
20%
0%
Concentration % survival
Wardha River neaar WTP of WCL Ghugus O/C Mine
Domestic Effluent Nallah near Lokhandi Bridge at WTP of Ghugus O/C Mine
Wardha River Behind ACC Plant (Mungoli Coal Mine Road)
Nallah at Usgaon, Shengaon Road (Behind Gupta Energy Power Ltd)
Location
Bioassay Test on fish


MIDC Chandrapur Waste water
120%
100%
80%
60%
40%
20%
0%
Concentration % survival
Nallah opp. Manidhari Industry
Gagangiri Village Bridge
ETP Outlet of Multiorganics Pvt. Ltd
Location
Bioassay Test on fish



4 Ground WaterQuality:

Sr.	Location	MIDC	Table No.
1.	Dugwell of Tadali Village Near Primary School	Tadali	**I**
2.	Borewell of Yerur Village	Tadali	**I**
3.	Dugwell near Tadali Lake & Janata School	Tadali	**I**
4.	Dugwell of Yerur Village	Tadali	**I**
5.	Borewell water taken of Tukdoji Nagar Ghugus Village	Ghuggus	**II**
6.	Borewell Water taken from Nakoda Village	Ghuggus	**II**
7.	Dugwell water from Usgaon Village	Ghuggus	**II**
8.	Dugwell Water Gagangiri Village	Chandrapur	**III**
9.	Borewell Water from Mhada Colony	Chandrapur	**III**
10.	Borewell Water from Datala Gram Panchayat	Chandrapur	**III**
11.	Borewell water at Gramin Rugnalaya Ballarpur	Ballarpur	**IV**

Sr.	Location	MIDC	Table No.
12.	Borewell Water at Nagar Parishad Near New Fire Station Ballarpur	Ballarpur	**IV**
13.	Borewell Water at Visapur Vill	Ballarpur	**IV**

Table No. I

Location				**Dugwell of Tadali Village Near Primary School**	**Borewell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen	**5**	BDL	BDL
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**6.5-8.5**	7.4	7.6
4.	Oil & Grease	mg/L		ND	ND
5.	Suspended Solids	mg/L	**100**	BDL	BDL
6.	Dissolved Oxygen (%Saturation)	%		NA	NA
7.	Chemical Oxygen Demand	mg/L	**250**	8	8
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30**	2.1	2.2
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		1607	1307
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L		6.85	4.57

Location				**Dugwell of Tadali Village Near Primary School**	**Borewell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
12.	(NO_2 + NO_3)-Nitrogen	mg/L		6.85	4.57
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	0.168	BDL
15.	Cyanide (as CN)	mg/L	**0.05**	ND	ND
16.	Fluoride (as F)	mg/L	**1.0**	0.591	0.795
17.	Sulphide (asS^{2-})	mg/L	**1.0**	ND	BDL
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.078	0.110
19.	Sodium Absorption Ratio	mg/L		2.46	6.20
20.	Total Coliforms	MPN Index/ 100 ml		2.2	23
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	BDL	12
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.099	0.136
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.448	0.896
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	BDL	BDL

Location				**Dugwell of Tadali Village Near Primary School**	**Borewell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**0.05**	BDL	BDL
II.	Atrazine	µg/L	**20**	BDL	BDL
III.	Aldrin	µg/L	**2**	BDL	BDL
IV.	Dieldrin	µg/L	**0.03**	BDL	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL	BDL
VIII.	Butachlor	µg/L	**125**	BDL	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL	BDL
X.	o,p DDT	µg/L	**1.0**	BDL	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL	BDL
XII.	o,p DDE	µg/L	**1.0**	BDL	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL	BDL
XIV.	o,p DDD	µg/L	**1.0**	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL

Location				**Dugwell of Tadali Village Near Primary School**	**Borewell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
(VIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**5.0**	BDL	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	ND	ND
34.	Total Chromium (as Cr)	mg/L	**1**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.05**	ND	ND
36.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**0.01**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.003**	N.D.	N.D.
39.	Manganese (as Mn)	mg/L	**0.001**	0.035	BDL
40.	Iron (as Fe)	mg/L	**0.1**	BDL	BDL
41.	Vanadium (as V)	mg/L	**0.3**	BDL	BDL

Location				**Dugwell of Tadali Village Near Primary School**	**Borewell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
42.	Selenium (as Se)	mg/L		BDL	N.D.
43.	Boron (as B)	mg/L	**0.01**	0.213	0.299
44.	Bioassay Test on fish	% survival		100%	100%

Table No. II

Location				**Dugwell near Tadali Lake s& Janata School**	**Dugwell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen	**5**	BDL	BDL
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**6.5-8.5**	7.3	7.5
4.	Oil & Grease	mg/L		ND	ND
5.	Suspended Solids	mg/L	**100**	BDL	6
6.	Dissolved Oxygen (%Saturation)	%		NA	NA
7.	Chemical Oxygen Demand	mg/L	**250**	16	16
8.	Biochemical Oxygen Demand (3 days,27°C)	mg/L	**30**	4.1	4.1

Location				**Dugwell near Tadali Lake s& Janata School**	**Dugwell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
9.	Electrical Conductivity (at 25°C)	µmho/cm		929	1179
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL	0.053
11.	Nitrate Nitrogen (as NO_3)	mg/L		4.73	3.44
12.	(NO_2 + NO_3)-Nitrogen	mg/L		4.74	3.49
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	0.053	0.132
15.	Cyanide (as CN)	mg/L	**0.05**	ND	ND
16.	Fluoride (as F)	mg/L	**1.0**	0.574	0.915
17.	Sulphide (asS^{2-})	mg/L	**1.0**	ND	ND
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.056	0.066
19.	Sodium Absorption Ratio	mg/L		0.70	4.70
20.	Total Coliforms	MPN Index/ 100 ml		16	23
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	9.2	12

Location				**Dugwell near Tadali Lake s& Janata School**	**Dugwell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.066	0.077
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.784	0.504
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	0.157	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**0.05**	BDL	BDL
II.	Atrazine	µg/L	**20**	BDL	BDL
III.	Aldrin	µg/L	**2**	BDL	BDL
IV.	Dieldrin	µg/L	**0.03**	BDL	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL	BDL
VIII.	Butachlor	µg/L	**125**	BDL	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL	BDL
X.	o,p DDT	µg/L	**1.0**	BDL	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL	BDL
XII.	o,p DDE	µg/L	**1.0**	BDL	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL	BDL

Location				**Dugwell near Tadali Lake s& Janata School**	**Dugwell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
XIV.	o,p DDD	µg/L	**1.0**	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
XVIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	0.07	BDL
31.	Nickel (as Ni)	mg/L	**5.0**	BDL	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	ND	BDL
34.	Total Chromium (as Cr)	mg/L	**1**	0.02	0.021
35.	Total Arsenic (as As)	mg/L	**0.05**	ND	ND
36.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**0.01**	0.006	BDL
38.	Mercury (as Hg)	mg/L	**0.003**	ND	ND

Location				**Dugwell near Tadali Lake s& Janata School**	**Dugwell of Yerur Village**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
39.	Manganese (as Mn)	mg/L	**0.001**	0.076	0.038
40.	Iron (as Fe)	mg/L	**0.1**	0.116	0.24
41.	Vanadium (as V)	mg/L	**0.3**	BDL	BDL
42.	Selenium (as Se)	mg/L		ND	ND
43.	Boron (as B)	mg/L	**0.01**	0.263	0.343
44.	Bioassay Test on fish	% survival		100%	100%

Table No. III

Location				**Borewell water taken of Tukdoji Nagar**	**Borewell Water taken from Nakoda**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen	**5**	BDL	8
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**6.5-8.5**	7.7	7.1
4.	Oil & Grease	mg/L		ND	ND
5.	Suspended Solids	mg/L	**100**	BDL	20
6.	Dissolved Oxygen (%Saturation)	%		NA	NA
7.	Chemical Oxygen Demand	mg/L	**250**	12	24

Location				**Borewell water taken of Tukdoji Nagar**	**Borewell Water taken from Nakoda**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
8.	Biochemical Oxygen Demand (3 days,27°C)	mg/L	**30**	2.8	6.1
9.	Electrical Conductivity (at 25°C)	µmho/cm		1773	682
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L		7.46	BDL
12.	(NO_2 + NO_3)-Nitrogen	mg/L		7.49	BDL
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL
15.	Cyanide (as CN)	mg/L	**0.05**	ND	ND
16.	Fluoride (as F)	mg/L	**1.0**	1.06	0.528
17.	Sulphide (asS^{2-})	mg/L	**1.0**	ND	ND
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.051	0.048
19.	Sodium Absorption Ratio	mg/L		15.3	1.78
20.	Total Coliforms	MPN Index/ 100 ml		BDL	BDL

Location				**Borewell water taken of Tukdoji Nagar**	**Borewell Water taken from Nakoda**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	BDL	BDL
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.059	0.059
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.616	0.784
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	BDL	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**0.05**	BDL	BDL
II.	Atrazine	µg/L	**20**	BDL	BDL
III.	Aldrin	µg/L	**2**	BDL	BDL
IV.	Dieldrin	µg/L	**0.03**	BDL	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL	BDL
VIII.	Butachlor	µg/L	**125**	BDL	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL	BDL
X.	o,p DDT	µg/L	**1.0**	BDL	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL	BDL

Location				**Borewell water taken of Tukdoji Nagar**	**Borewell Water taken from Nakoda**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
XII.	o,p DDE	µg/L	**1.0**	BDL	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL	BDL
XIV.	o,p DDD	µg/L	**1.0**	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
XVIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	0.45	0.52
31.	Nickel (as Ni)	mg/L	**5.0**	BDL	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	BDL	BDL
34.	Total Chromium (as Cr)	mg/L	**1**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.05**	ND	ND
36.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**0.01**	BDL	BDL

Location				**Borewell water taken of Tukdoji Nagar**	**Borewell Water taken from Nakoda**
Date of Sampling				**01.06.17**	**01.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
38.	Mercury (as Hg)	mg/L	**0.003**	ND	ND
39.	Manganese (as Mn)	mg/L	**0.001**	BDL	0.074
40.	Iron (as Fe)	mg/L	**0.1**	0.22	8.36
41.	Vanadium (as V)	mg/L	**0.3**	BDL	BDL
42.	Selenium (as Se)	mg/L		BDL	BDL
43.	Boron (as B)	mg/L	**0.01**	0.195	0.207
44.	Bioassay Test on fish	% survival		100%	100%

Table No. III

Location				**Dugwell water from Usgaon Village**	**DugWell Water Gagangiri Village**
Date of Sampling				**01.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen	**5**	BDL	BDL
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**6.5-8.5**	7.5	7.3
4.	Oil & Grease	mg/L		ND	ND
5.	Suspended Solids	mg/L	**100**	BDL	BDL

Location				**Dugwell water from Usgaon Village**	**DugWell Water Gagangiri Village**
Date of Sampling				**01.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
6.	Dissolved Oxygen (%Saturation)	%		NA	NA
7.	Chemical Oxygen Demand	mg/L	**250**	16	8
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30**	4.1	2.1
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		1678	1165
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L		9.20	3.03
12.	(NO_2 + NO_3)-Nitrogen	mg/L		9.22	3.08
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	0.079	ND
15.	Cyanide (as CN)	mg/L	**0.05**	ND	ND
16.	Fluoride (as F)	mg/L	**1.0**	0.483	0.466
17.	Sulphide (asS^{2-})	mg/L	**1.0**	ND	ND
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.043	BDL

Location				**Dugwell water from Usgaon Village**	**DugWell Water Gagangiri Village**
Date of Sampling				**01.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
19.	Sodium Absorption Ratio	mg/L		3.04	2.69
20.	Total Coliforms	MPN Index/ 100 ml		12	23
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	9.2	16
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.056	0.033
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.616	0.840
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	BDL	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**0.05**	BDL	BDL
II.	Atrazine	µg/L	**20**	BDL	BDL
III.	Aldrin	µg/L	**2**	BDL	BDL
IV.	Dieldrin	µg/L	**0.03**	BDL	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL	BDL

Location				**Dugwell water from Usgaon Village**	**DugWell Water Gagangiri Village**
Date of Sampling				**01.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
VIII.	Butachlor	µg/L	**125**	BDL	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL	BDL
X.	o,p DDT	µg/L	**1.0**	BDL	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL	BDL
XII.	o,p DDE	µg/L	**1.0**	BDL	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL	BDL
XIV.	o,p DDD	µg/L	**1.0**	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
XVIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**5.0**	0.011	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	ND	BDL
34.	Total Chromium (as Cr)	mg/L	**1**	0.052	BDL

Location				**Dugwell water from Usgaon Village**	**DugWell Water Gagangiri Village**
Date of Sampling				**01.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
35.	Total Arsenic (as As)	mg/L	**0.05**	ND	ND
36.	Lead (as Pb)	mg/L	**0.01**	0.22	0.11
37.	Cadmium (as Cd)	mg/L	**0.01**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.003**	ND	ND
39.	Manganese (as Mn)	mg/L	**0.001**	BDL	0.02
40.	Iron (as Fe)	mg/L	**0.1**	0.33	BDL
41.	Vanadium (as V)	mg/L	**0.3**	0.011	BDL
42.	Selenium (as Se)	mg/L		BDL	ND
43.	Boron (as B)	mg/L	**0.01**	BDL	0.107
44.	Bioassay Test on fish	% survival		100%	100%

Table No. IV

Location				**Borewell Water from Mhada Colony**	**Borewell Water from Datala Gram Panchayat**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen	**5**	BDL	BDL
2.	Smell	-		Agreeable	Agreeable

Location				**Borewell Water from Mhada Colony**	**Borewell Water from Datala Gram Panchayat**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
3.	pH	-	**6.5-8.5**	8	7.6
4.	Oil & Grease	mg/L		ND	ND
5.	Suspended Solids	mg/L	**100**	BDL	BDL
6.	Dissolved Oxygen (%Saturation)	%		NA	NA
7.	Chemical Oxygen Demand	mg/L	**250**	8	24
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30**	1.9	6.4
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		3711	1126
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL	ND
11.	Nitrate Nitrogen (as NO_3)	mg/L		BDL	6.63
12.	(NO_2 + NO_3)-Nitrogen	mg/L		BDL	6.63
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	ND	BDL
15.	Cyanide (as CN)	mg/L	**0.05**	ND	ND
16.	Fluoride (as F)	mg/L	**1.0**	1.92	0.903

Location				**Borewell Water from Mhada Colony**	**Borewell Water from Datala Gram Panchayat**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
17.	Sulphide (asS^{2-})	mg/L	**1.0**	ND	ND
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.034	0.067
19.	Sodium Absorption Ratio	mg/L		28.3	4.91
20.	Total Coliforms	MPN Index/ 100 ml		12	9.2
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	6.9	6.9
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.045	0.073
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.504	0.448
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	BDL	0.101
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND	ND
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**0.05**	BDL	BDL
II.	Atrazine	µg/L	**20**	BDL	BDL
III.	Aldrin	µg/L	**2**	BDL	BDL

Location				**Borewell Water from Mhada Colony**	**Borewell Water from Datala Gram Panchayat**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
IV.	Dieldrin	µg/L	**0.03**	BDL	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL	BDL
VIII.	Butachlor	µg/L	**125**	BDL	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL	BDL
X.	o,p DDT	µg/L	**1.0**	BDL	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL	BDL
XII.	o,p DDE	µg/L	**1.0**	BDL	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL	BDL
XIV.	o,p DDD	µg/L	**1.0**	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
XVIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL	BDL
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	BDL	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	BDL	BDL
31.	Nickel (as Ni)	mg/L	**5.0**	BDL	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL	BDL

Location				**Borewell Water from Mhada Colony**	**Borewell Water from Datala Gram Panchayat**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	ND	BDL
34.	Total Chromium (as Cr)	mg/L	**1**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.05**	ND	ND
36.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**0.01**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.003**	ND	ND
39.	Manganese (as Mn)	mg/L	**0.001**	BDL	BDL
40.	Iron (as Fe)	mg/L	**0.1**	0.13	0.1
41.	Vanadium (as V)	mg/L	**0.3**	BDL	BDL
42.	Selenium (as Se)	mg/L		ND	ND
43.	Boron (as B)	mg/L	**0.01**	0.305	0.284
44.	Bioassay Test on fish	% survival		100%	100%

Table No. V

Location				**Borewell water at Gramin Rugnalaya**	**Borewell Water at Nagar Parishad Near New Fire Station**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Colour	Hazen	**5**	BDL	BDL
2.	Smell	-		Agreeable	Agreeable
3.	pH	-	**6.5-8.5**	7.8	6.8
4.	Oil & Grease	mg/L		ND	ND
5.	Suspended Solids	mg/L	**100**	BDL	BDL
6.	Dissolved Oxygen (%Saturation)	%		NA	NA
7.	Chemical Oxygen Demand	mg/L	**250**	32	12
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30**	8.5	3.1
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		568	917
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L		2.30	6.57
12.	(NO_2 + NO_3)-Nitrogen	mg/L		2.30	6.57
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL

Location				**Borewell water at Gramin Rugnalaya**	**Borewell Water at Nagar Parishad Near New Fire Station**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
15.	Cyanide (as CN)	mg/L	**0.05**	ND	ND
16.	Fluoride (as F)	mg/L	**1.0**	0.375	0.278
17.	Sulphide (asS^{2-})	mg/L	**1.0**	ND	ND
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.077	0.099
19.	Sodium Absorption Ratio	mg/L		1.77	1.43
20.	Total Coliforms	MPN Index/ 100 ml		BDL	BDL
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	BDL	BDL
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.088	0.128
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.84	0.952
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	0.10	BDL
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND	ND

Location				Borewell water at Gramin Rugnalaya	Borewell Water at Nagar Parishad Near New Fire Station
Date of Sampling				06.06.17	06.06.17
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
27.	Organo Chlorine Pesticides				
I.	Alachlor	µg/L	**0.05**	BDL	BDL
II.	Atrazine	µg/L	**20**	BDL	BDL
III.	Aldrin	µg/L	**2**	BDL	BDL
IV.	Dieldrin	µg/L	**0.03**	BDL	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL	BDL
VIII.	Butachlor	µg/L	**125**	BDL	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL	BDL
X.	o,p DDT	µg/L	**1.0**	BDL	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL	BDL
XII.	o,p DDE	µg/L	**1.0**	BDL	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL	BDL
XIV.	o,p DDD	µg/L	**1.0**	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
XVIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL	BDL

Location				**Borewell water at Gramin Rugnalaya**	**Borewell Water at Nagar Parishad Near New Fire Station**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	ND	ND
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	BDL	0.20
31.	Nickel (as Ni)	mg/L	**5.0**	BDL	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	ND	BDL
34.	Total Chromium (as Cr)	mg/L	**1**	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.05**	ND	ND
36.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**0.01**	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.003**	ND	ND
39.	Manganese (as Mn)	mg/L	**0.001**	BDL	0.05
40.	Iron (as Fe)	mg/L	**0.1**	BDL	BDL
41.	Vanadium (as V)	mg/L	**0.3**	BDL	BDL

Location				**Borewell water at Gramin Rugnalaya**	**Borewell Water at Nagar Parishad Near New Fire Station**
Date of Sampling				**06.06.17**	**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
42.	Selenium (as Se)	mg/L		BDL	ND
43.	Boron (as B)	mg/L	**0.01**	0.101	0.104
44.	Bioassay Test on fish	% survival		100%	100%

Table No. VI

Location				**Borewell Water at Visapur Village**
Date of Sampling				**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**
1.	Colour	Hazen	**5**	BDL
2.	Smell	-		Agreeable
3.	pH	-	**6.5-8.5**	7.8
4.	Oil & Grease	mg/L		ND
5.	Suspended Solids	mg/L	**100**	BDL
6.	Dissolved Oxygen (%Saturation)	%		NA
7.	Chemical Oxygen Demand	mg/L	**250**	12
8.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30**	2.9
9.	Electrical Conductivity (at 25^{o}C)	µmho/cm		603

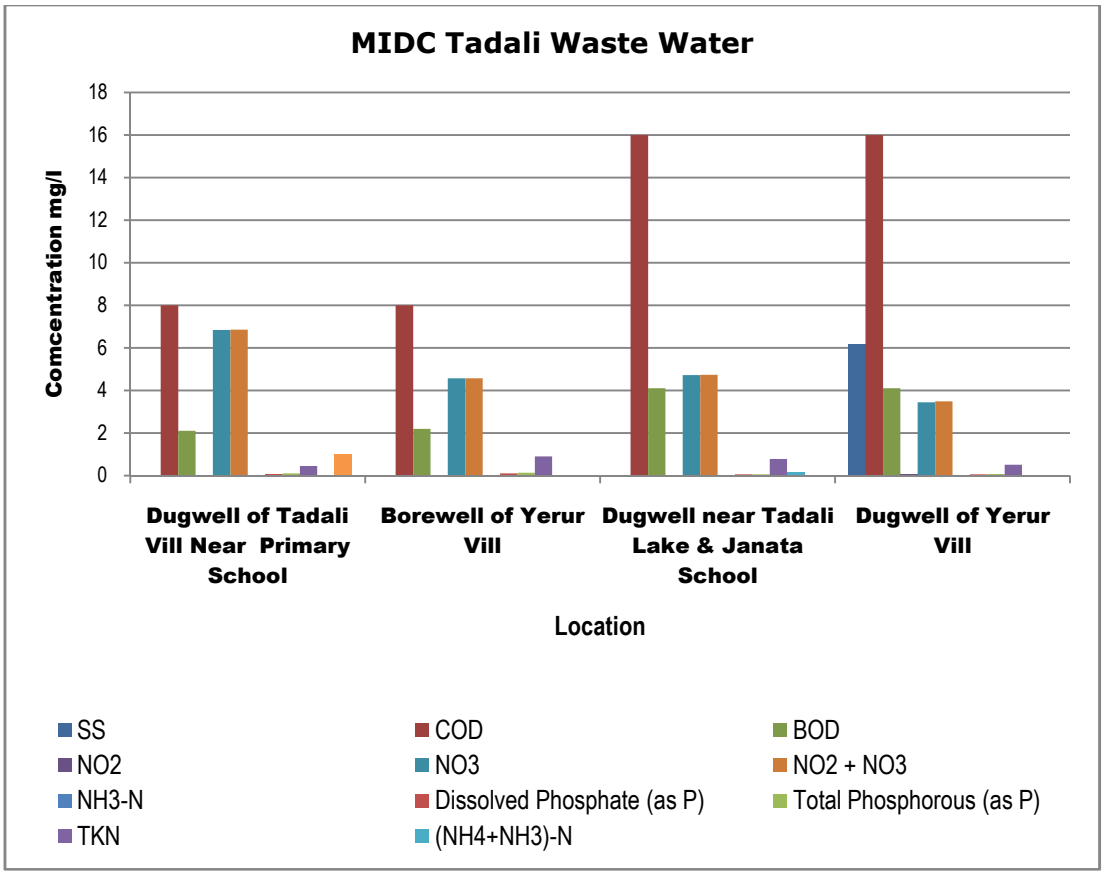
Location				**Borewell Water at Visapur Village**
Date of Sampling				**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**
10.	Nitrite Nitrogen (as NO_2)	mg/L	**45**	BDL
11.	Nitrate Nitrogen (as NO_3)	mg/L		4.22
12.	(NO_2 + NO_3)-Nitrogen	mg/L		4.23
13.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL
14.	Total Residual Chlorine	mg/L	**0.2**	BDL
15.	Cyanide (as CN)	mg/L	**0.05**	ND
16.	Fluoride (as F)	mg/L	**1.0**	0.205
17.	Sulphide (asS2-)	mg/L	**1.0**	ND
18.	Dissolved Phosphate (as P)	mg/L	**0.05**	0.112
19.	Sodium Absorption Ratio	mg/L		1.14
20.	Total Coliforms	MPN Index/ 100 ml		16
21.	Faecal Coliforms	MPN Index/ 100 ml	**BDL**	12
22.	Total Phosphorous (as P)	mg/L	**BDL**	0.139
23.	Total Kjeldahl Nitrogen	mg/L	**0.5**	0.504
24.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.001**	BDL

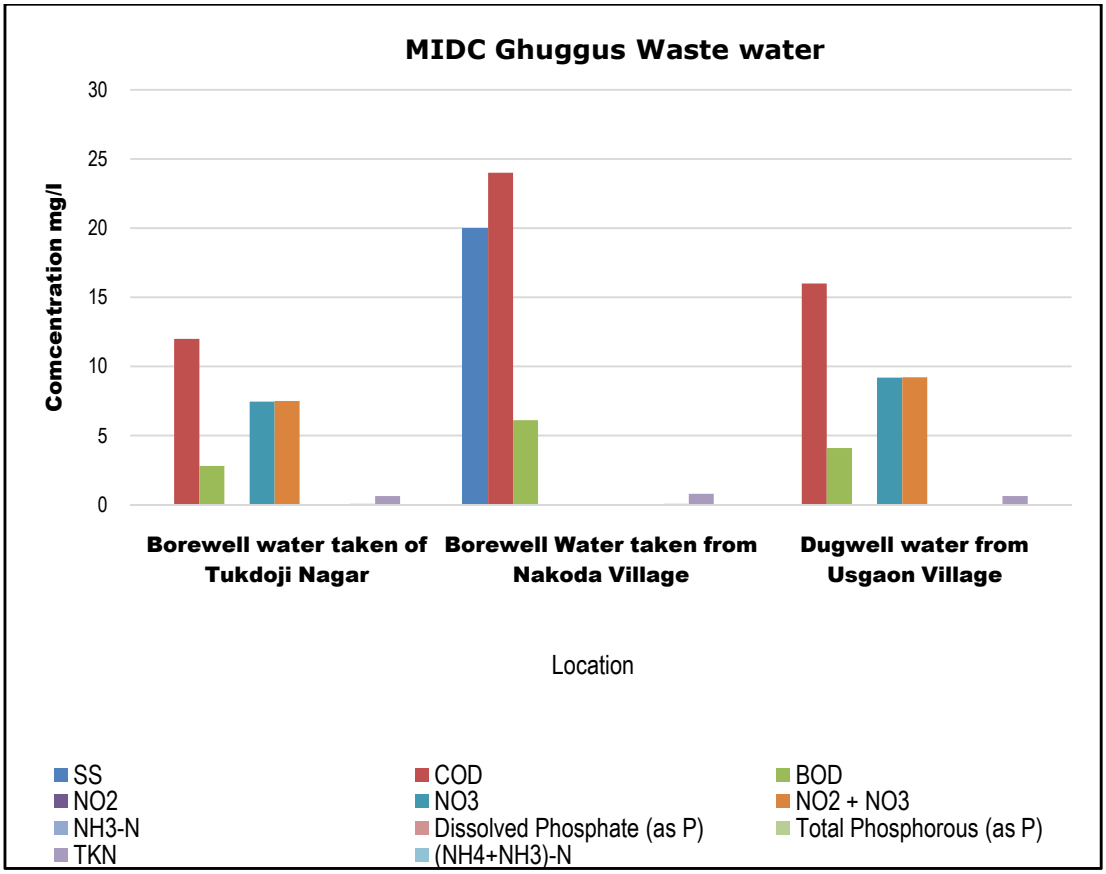
Location				**Borewell Water at Visapur Village**
Date of Sampling				**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**
25.	Phenols (as C_6H_5OH)	mg/L	**0.5**	ND
26.	Surface Active Agents (as MBAS)	mg/L	**0.001**	ND
27.	Organo Chlorine Pesticides			
I.	Alachlor	µg/L	**0.05**	BDL
II.	Atrazine	µg/L	**20**	BDL
III.	Aldrin	µg/L	**2**	BDL
IV.	Dieldrin	µg/L	**0.03**	BDL
V.	Alpha HCH	µg/L	**0.03**	BDL
VI.	Beta HCH	µg/L	**0.01**	BDL
VII.	Delta HCH	µg/L	**0.04**	BDL
VIII.	Butachlor	µg/L	**125**	BDL
IX.	p,p DDT	µg/L	**0.04**	BDL
X.	o,p DDT	µg/L	**1.0**	BDL
XI.	p,p DDE	µg/L	**1.0**	BDL
XII.	o,p DDE	µg/L	**1.0**	BDL
XIII.	p,p DDD	µg/L	**1.0**	BDL
XIV.	o,p DDD	µg/L	**1.0**	BDL
XV.	Alpha Endosulfan	µg/L	**1.0**	BDL
XVI.	Beta Endosulfan	µg/L	**0.4**	BDL
XVII.	Endosulfan Sulphate	µg/L	**0.4**	BDL
XVIII.	Y HCH (Lindane)	µg/L	**0.4**	BDL

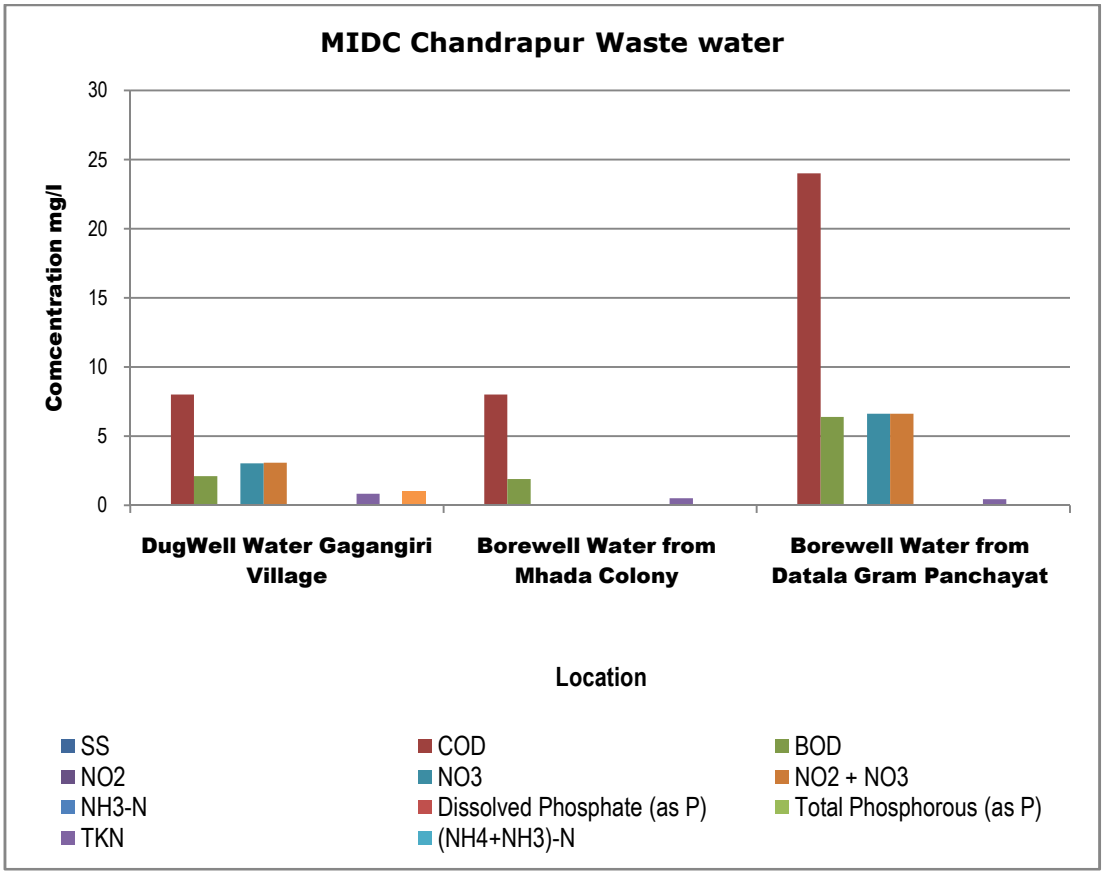
Location				**Borewell Water at Visapur Village**
Date of Sampling				**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**
28.	Polynuclear aromatic hydrocarbons (as PAH)	mg/L	**2.0**	BDL
29.	Polychlorinated Biphenyls (PCB)	mg/L	**0.0001**	BDL
30.	Zinc (as Zn)	mg/L	**0.0005**	BDL
31.	Nickel (as Ni)	mg/L	**5.0**	BDL
32.	Copper (as Cu)	mg/L	**0.02**	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.05**	BDL
34.	Total Chromium (as Cr)	mg/L	**1**	BDL
35.	Total Arsenic (as As)	mg/L	**0.05**	ND
36.	Lead (as Pb)	mg/L	**0.01**	BDL
37.	Cadmium (as Cd)	mg/L	**0.01**	BDL
38.	Mercury (as Hg)	mg/L	**0.003**	ND
39.	Manganese (as Mn)	mg/L	**0.001**	0.03
40.	Iron (as Fe)	mg/L	**0.1**	0.13
41.	Vanadium (as V)	mg/L	**0.3**	BDL
42.	Selenium (as Se)	mg/L		ND

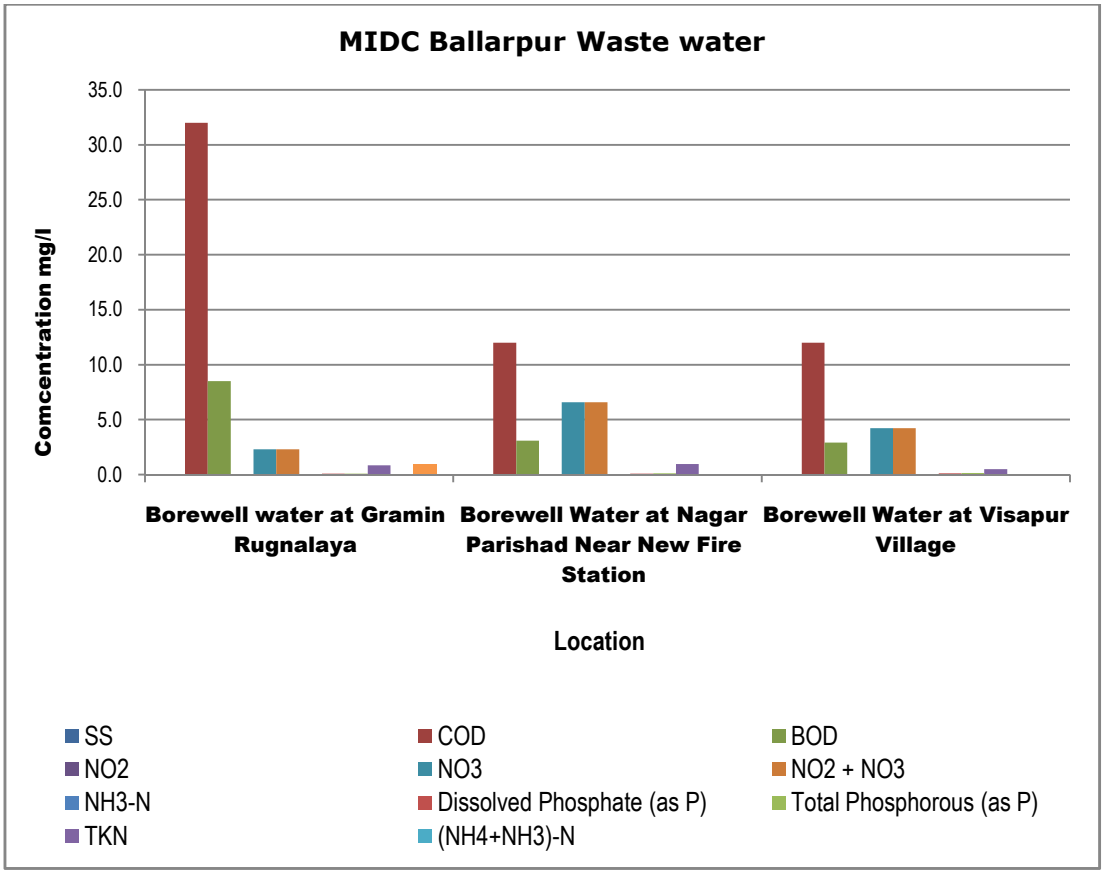
Location				**Borewell Water at Visapur Village**
Date of Sampling				**06.06.17**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**
43.	Boron (as B)	mg/L	**0.01**	0.104
44.	Bioassay Test on fish	% survival		100%

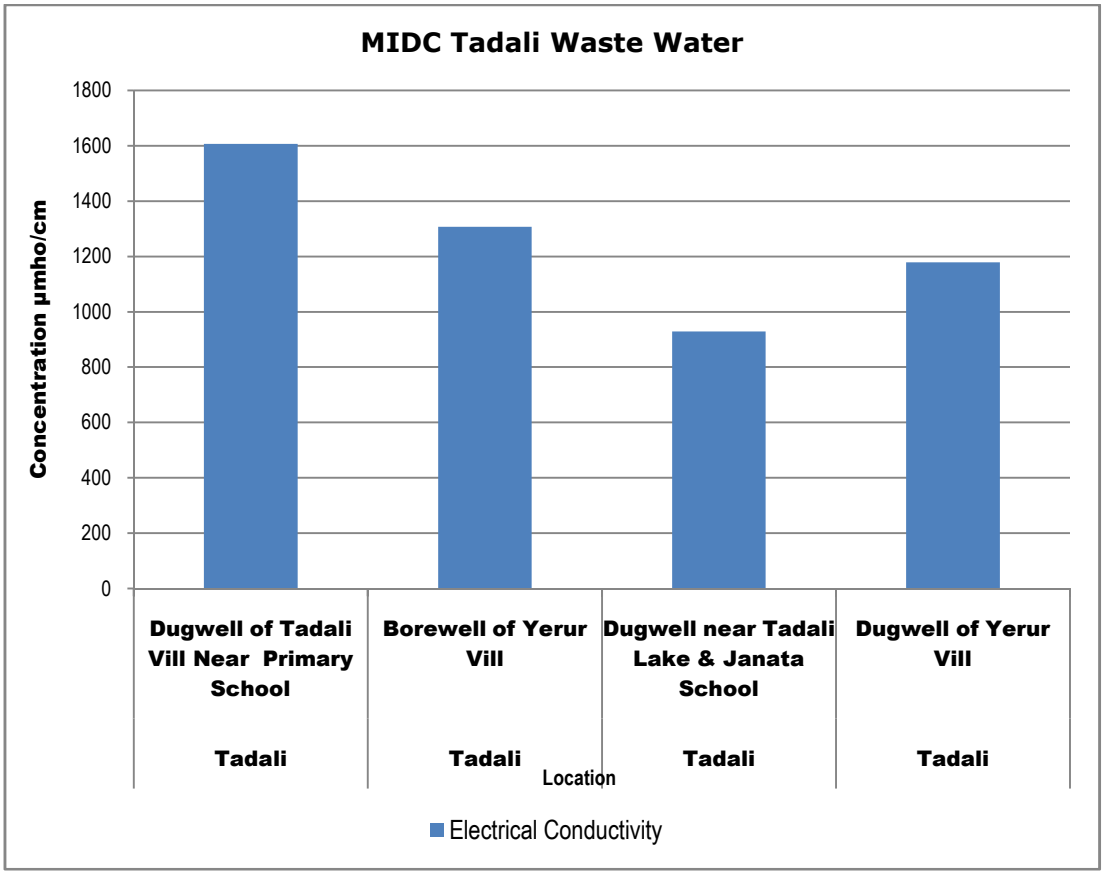
Graphs: Water/Waste Water Quality Monitoring for Chandrapur:

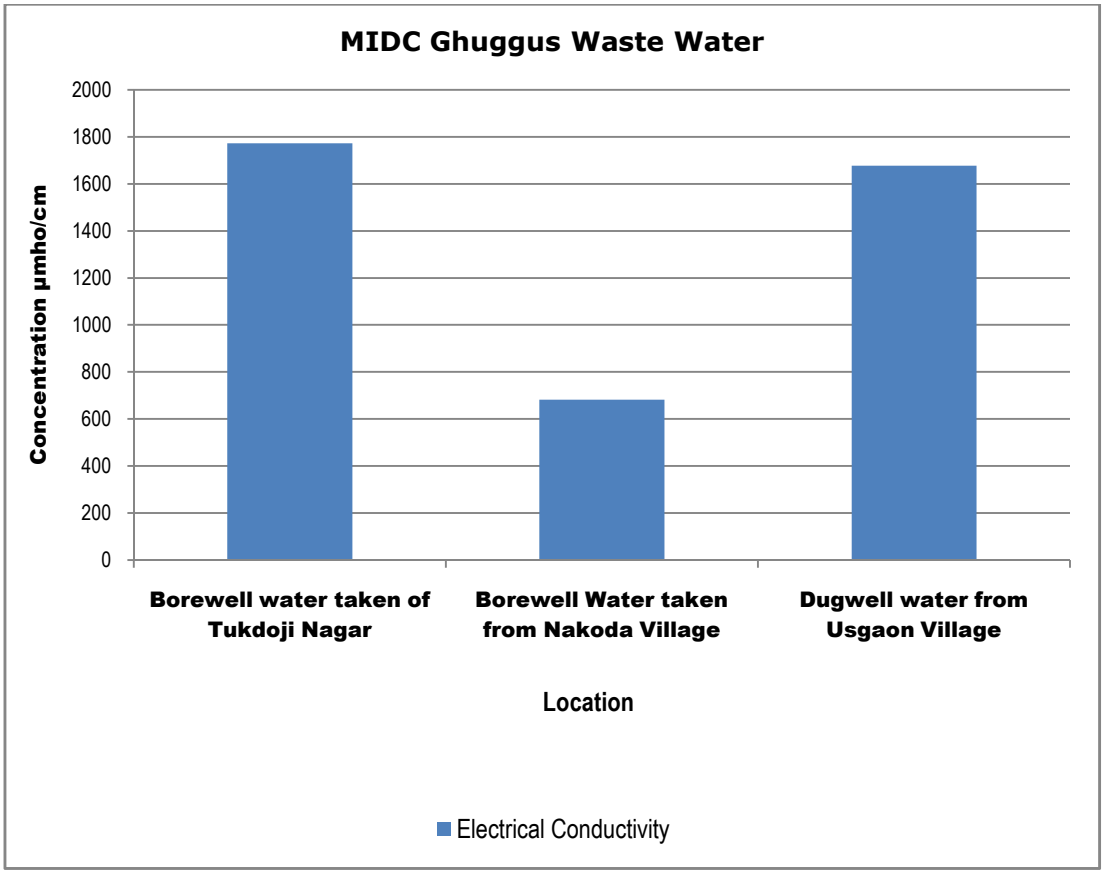


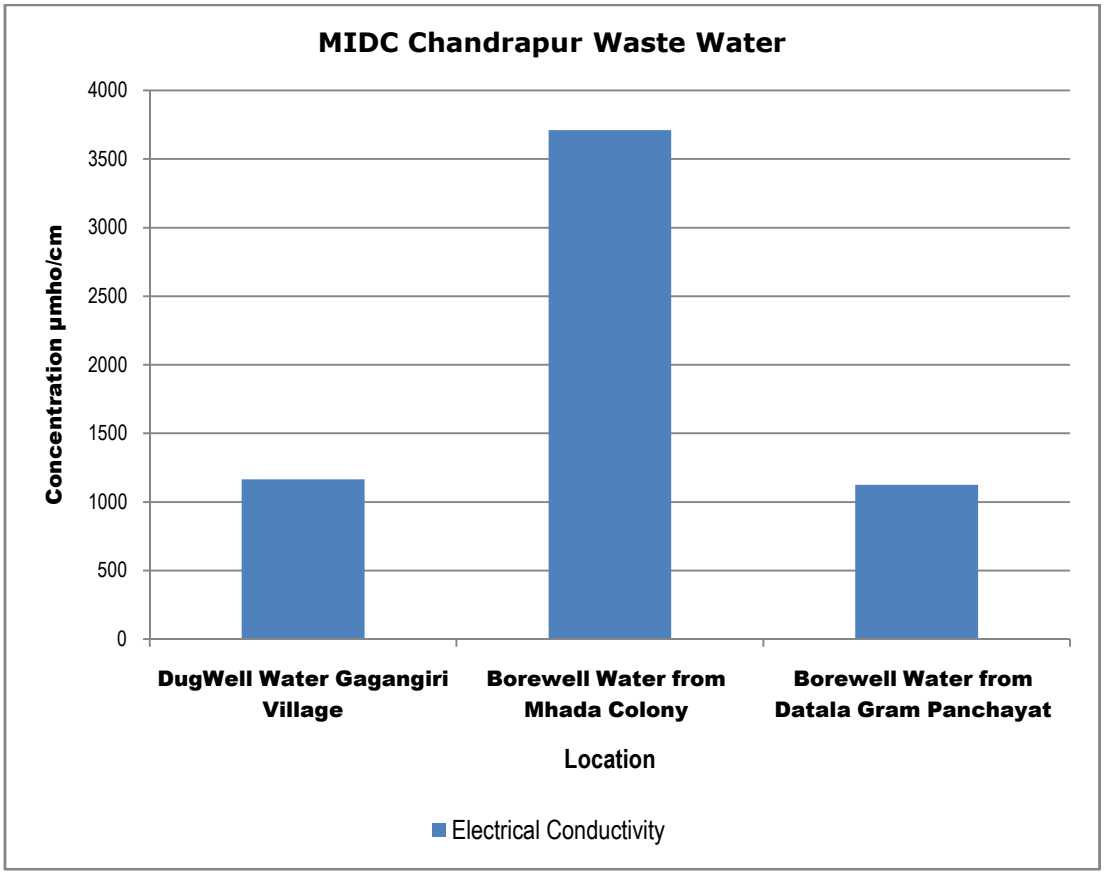

MIDC Ghuggus Waste water
Comcentration mg/l
30
25
20
15
10
5
0
Borewell water taken of Tukdoji Nagar
Borewell Water taken from Nakoda Village
Dugwell water from Usgaon Village
Location
SS
COD
BOD
NO2
NO3
NO2 + NO3
NH3-N
Dissolved Phosphate (as P)
Total Phosphorous (as P)
TKN
(NH4+NH3)-N

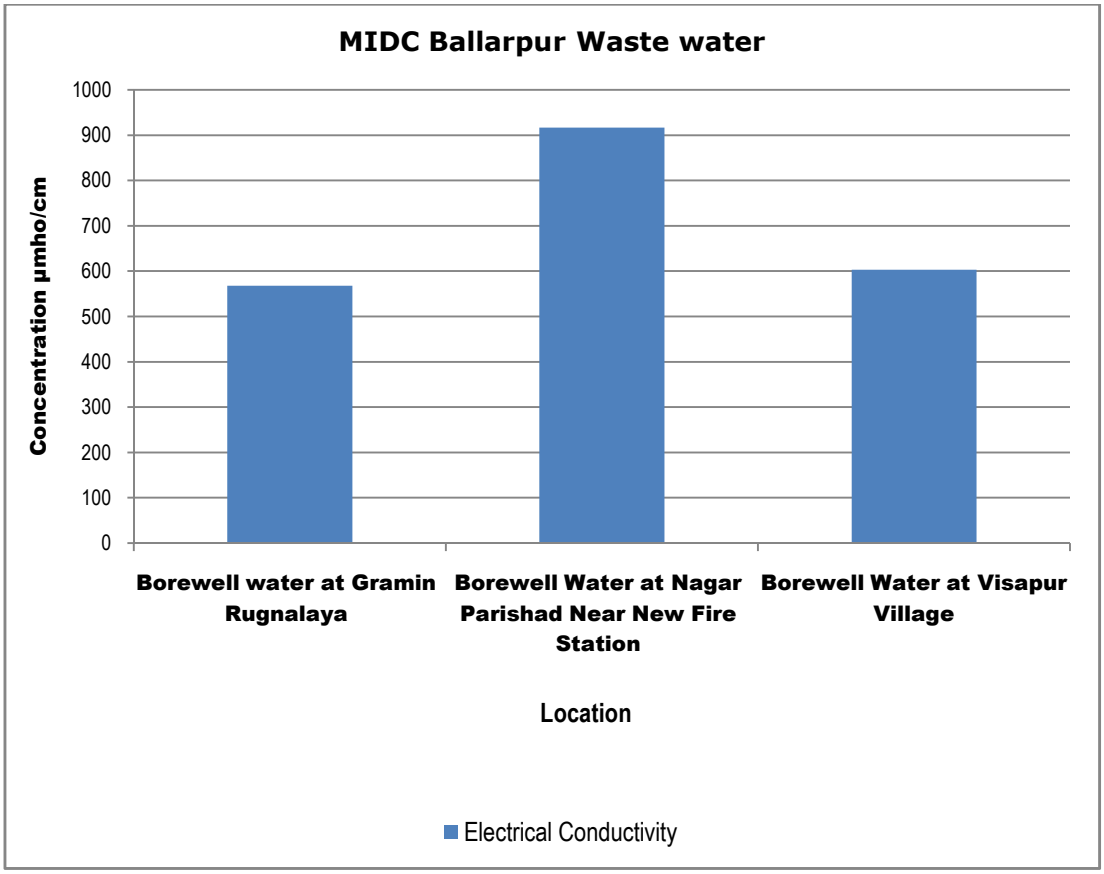

MIDC Chandrapur Waste water
Comcentration mg/l
30
25
20
15
10
5
0
DugWell Water Gagangiri Village
Borewell Water from Mhada Colony
Borewell Water from Datala Gram Panchayat
Location
SS
COD
BOD
NO2
NO3
NO2 + NO3
NH3-N
Dissolved Phosphate (as P)
Total Phosphorous (as P)
TKN
(NH4+NH3)-N

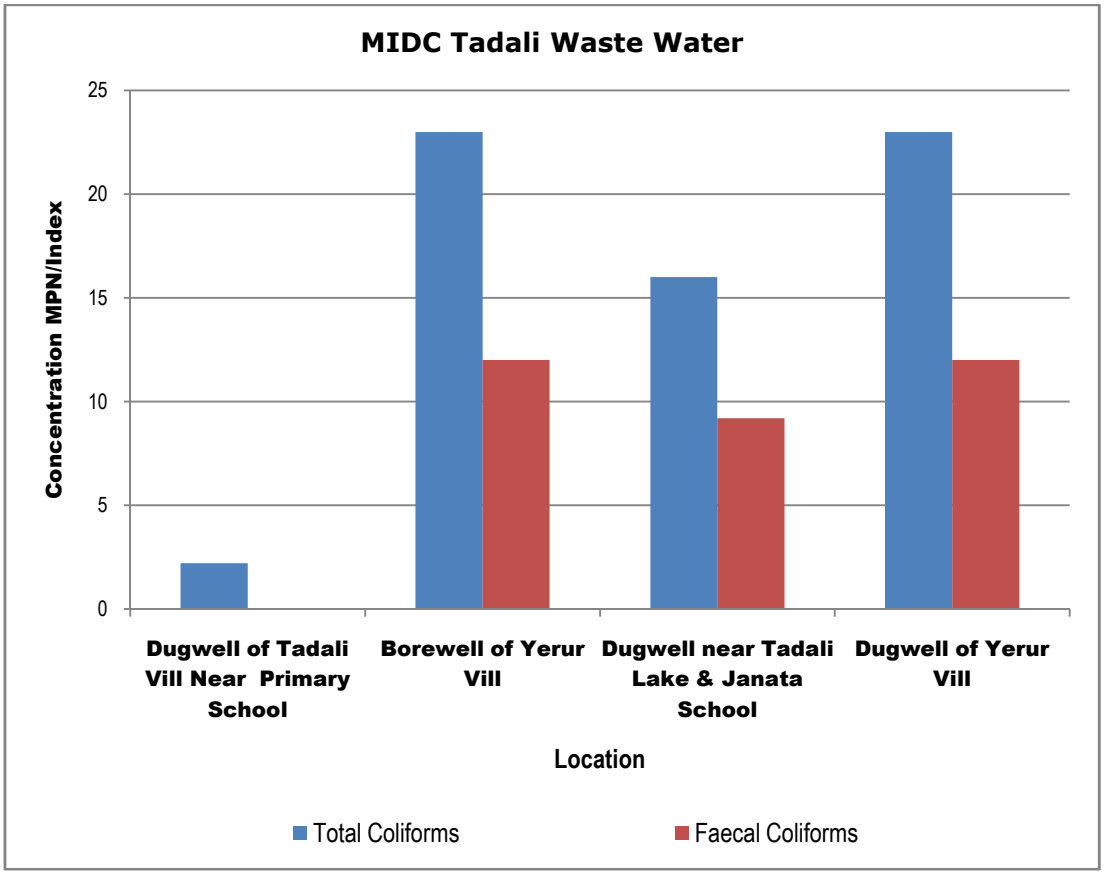

MIDC Ballarpur Waste water
Comcentration mg/l
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Borewell water at Gramin Rugnalaya
Borewell Water at Nagar Parishad Near New Fire Station
Borewell Water at Visapur Village
Location
SS
COD
BOD
NO2
NO3
NO2 + NO3
NH3-N
Dissolved Phosphate (as P)
Total Phosphorous (as P)
TKN
(NH4+NH3)-N

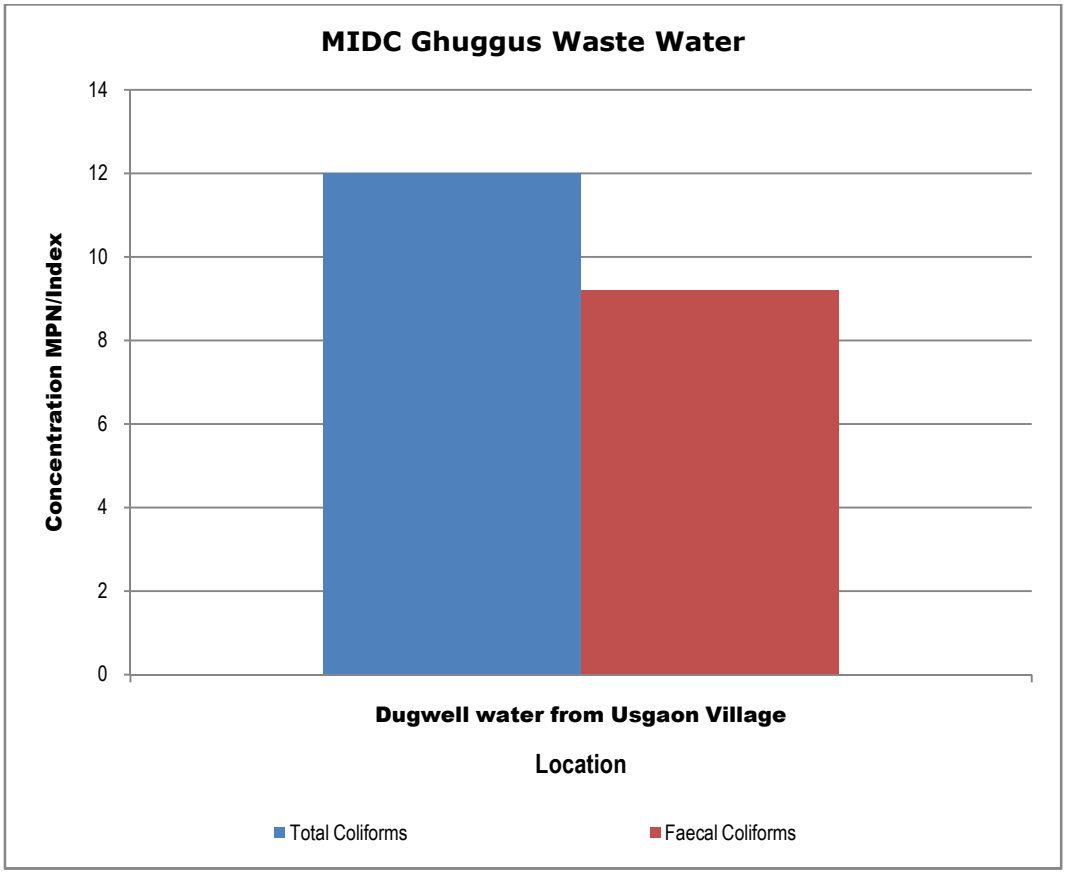

MIDC Tadali Waste Water
Concentration µmho/cm
1800
1600
1400
1200
1000
800
600
400
200
0
Dugwell of Tadali Vill Near Primary School
Tadali
Borewell of Yerur Vill
Tadali
Dugwell near Tadali Lake & Janata School
Tadali
Dugwell of Yerur Vill
Tadali
Location
Electrical Conductivity

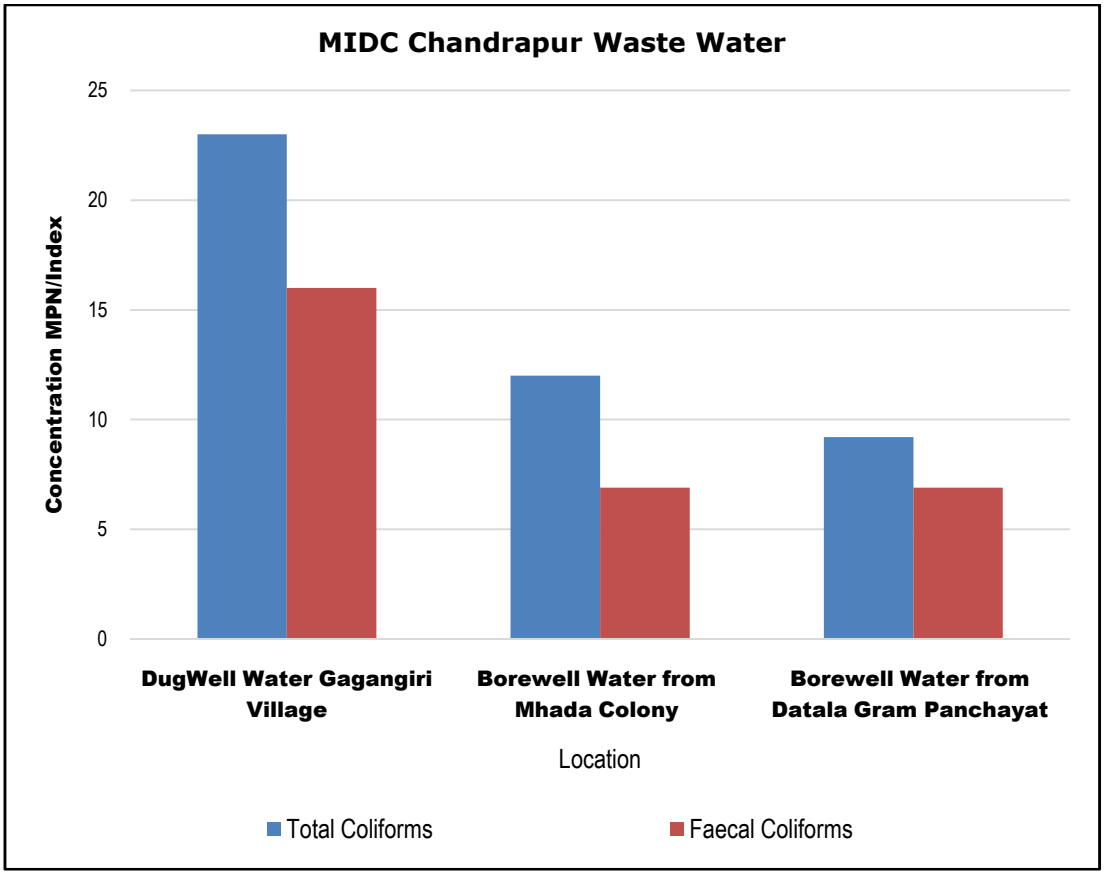

MIDC Ghuggus Waste Water
Concentration µmho/cm
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Borewell water taken of Tukdoji Nagar
Borewell Water taken from Nakoda Village
Dugwell water from Usgaon Village
Location
Electrical Conductivity

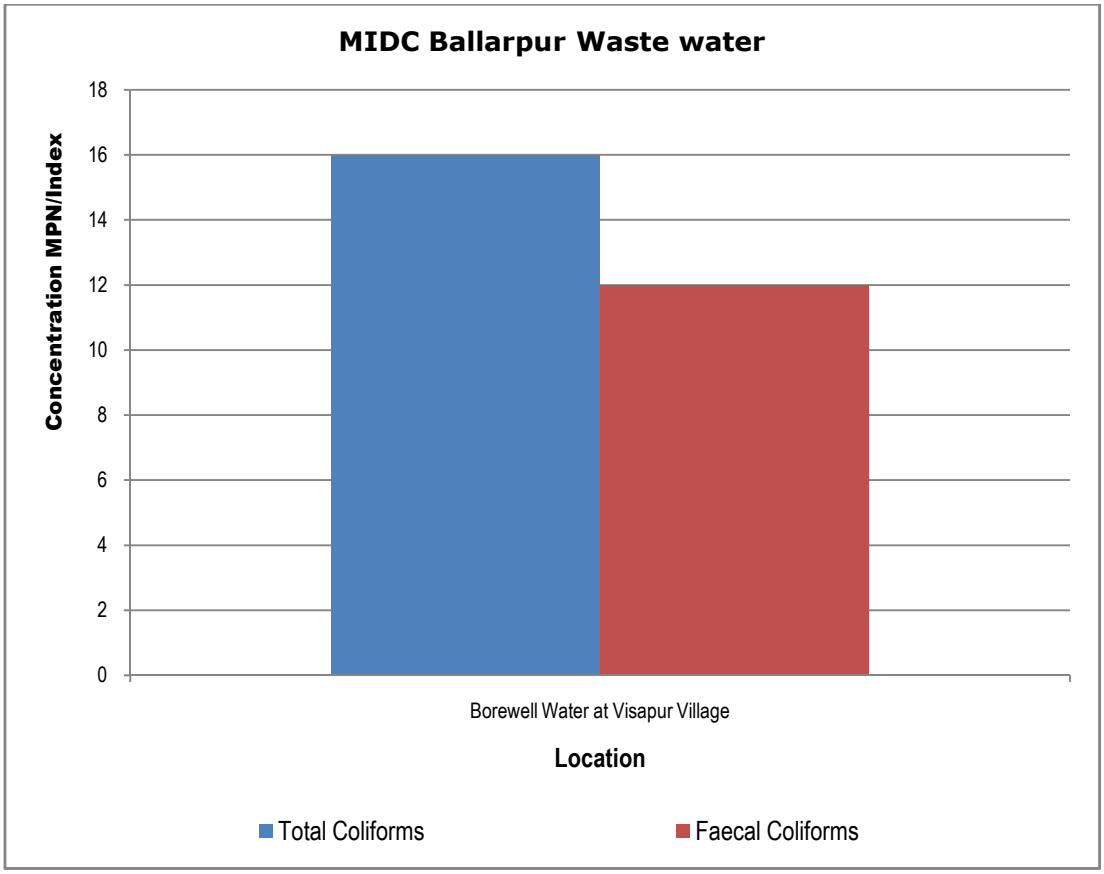

MIDC Chandrapur Waste Water
Concentration µmho/cm
4000
3500
3000
2500
2000
1500
1000
500
0
DugWell Water Gagangiri Village
Borewell Water from Mhada Colony
Borewell Water from Datala Gram Panchayat
Location
Electrical Conductivity

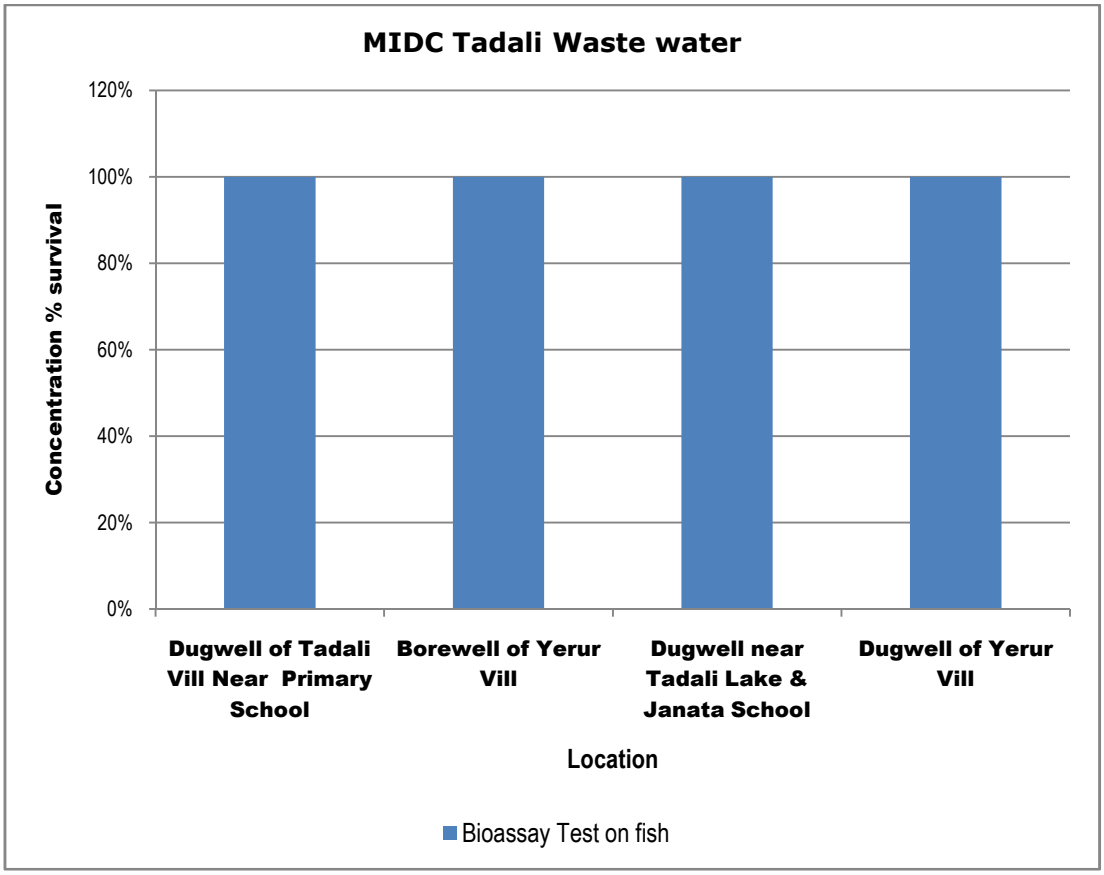

MIDC Ballarpur Waste water
Concentration µmho/cm
1000
900
800
700
600
500
400
300
200
100
0
Borewell water at Gramin Rugnalaya
Borewell Water at Nagar Parishad Near New Fire Station
Borewell Water at Visapur Village
Location
Electrical Conductivity

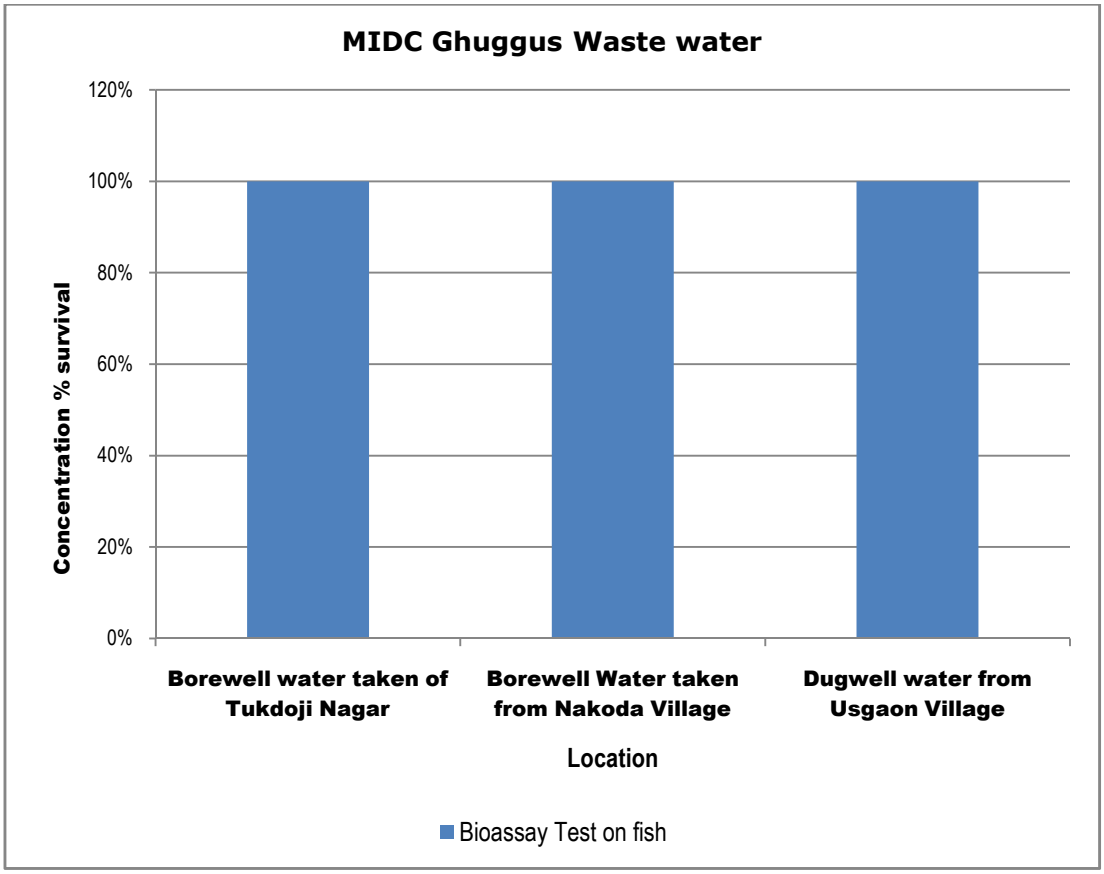

MIDC Tadali Waste Water
Concentration MPN/Index
25
20
15
10
5
0
Dugwell of Tadali Vill Near Primary School
Borewell of Yerur Vill
Dugwell near Tadali Lake & Janata School
Dugwell of Yerur Vill
Location
Total Coliforms
Faecal Coliforms

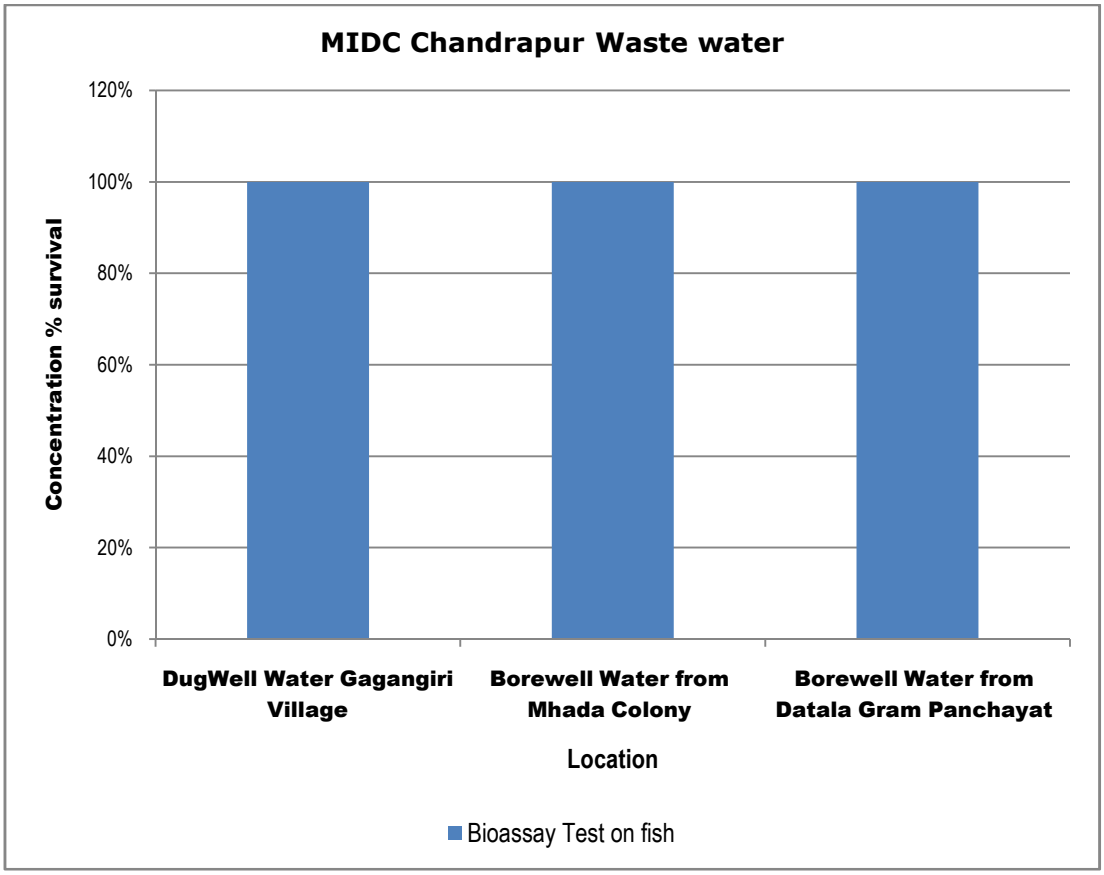

MIDC Ghuggus Waste Water
14
12
10
8
6
4
2
0
Concentration MPN/Index
Dugwell water from Usgaon Village
Location
Total Coliforms
Faecal Coliforms

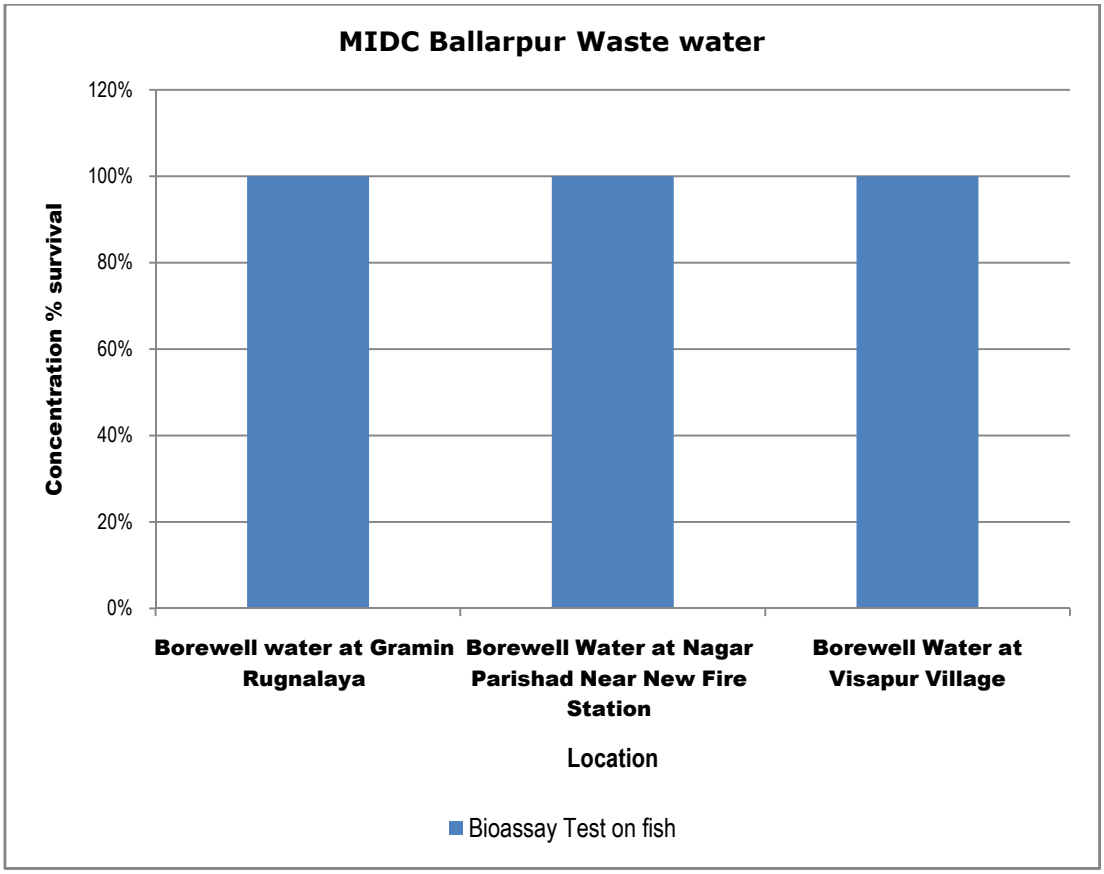

MIDC Chandrapur Waste Water
25
20
15
10
5
0
Concentration MPN/Index
DugWell Water Gagangiri Village
Borewell Water from Mhada Colony
Borewell Water from Datala Gram Panchayat
Location
Total Coliforms
Faecal Coliforms


MIDC Ballarpur Waste water
Concentration MPN/Index
18
16
14
12
10
8
6
4
2
0
Borewell Water at Visapur Village
Location
Total Coliforms
Faecal Coliforms


MIDC Tadali Waste water
Concentration % survival
120%
100%
80%
60%
40%
20%
0%
Dugwell of Tadali Vill Near Primary School
Borewell of Yerur Vill
Dugwell near Tadali Lake & Janata School
Dugwell of Yerur Vill
Location
Bioassay Test on fish


MIDC Ghuggus Waste water
120%
100%
80%
60%
40%
20%
0%
Concentration % survival
Borewell water taken of Tukdoji Nagar
Borewell Water taken from Nakoda Village
Dugwell water from Usgaon Village
Location
Bioassay Test on fish


MIDC Chandrapur Waste water
120%
100%
80%
60%
40%
20%
0%
Concentration % survival
DugWell Water Gagangiri Village
Borewell Water from Mhada Colony
Borewell Water from Datala Gram Panchayat
Location
Bioassay Test on fish



4. Summary of the results

Based on the study done, the results are summarised and concluded as follows:

4.1 Stack Emission Monitoring:

A) Tadali MIDC

At Tadali MIDC, sixstack samples were collected from different industries.

1. **Particulate Matter**: At all locations monitored, particulate matter was within the limit.

2. **Sulphur Dioxide:** The concentration of sulfur dioxide varied between minimum of 463 mg/Nm^3 to 1270 mg/Nm^3. This however, will depend on the fuel used and load allotted in the consent. Maximum concentration was found at Dhariwal Infra.

3. **Nitrogen Dioxide**: Values range between 21.8 mg/Nm^3 to 168 mg/Nm^3.

4. **Carbon Monoxide**: At Grace Industries Highest range of 125 mg/Nm^3 was observed.

5. **Volatile Organic Compounds:** At Tadali MIDC, VOCs were monitored from two stacks of Gopani Iron & Power (India) Pvt. Ltd. Benzene, Toulene and xylene was only detected at both the stacks.

B) Chandrapur MIDC:

At Chandrapur MIDC, fourstack samples were collected from different industries.

1. **Particulate Matter**: At all locations monitored, particulate matter was within the limit.

2. **Sulphur Dioxide**: The concentration of SO_2 ranged in between 26.9 mg/Nm^3 to 337 mg/Nm^3.

3. **Nitrogen Dioxide:**Nitrogen dioxide was well within the limit at all six locations monitored.

4. **Carbon Monoxide:** Values varied between minimum of 4.83 mg/Nm^3 and maximum of 66 mg/Nm^3.

5. **Volatile Organic Compounds**: Two stacks of Chandrapur MIDC were monitored for VOC and Benzene and Toulene was detected from both the stack with Ethyl Acetate was also detected from Superb Hygienic Ltd.

C) Ghugus MIDC:

Six different industries were selected for stack monitoring at Ghugus MIDC.

1. **Particulate Matter**: At all locations monitored, particulate matter was within the limit.

2. **Sulphur Dioxide**: At the Stack of Lloyds Metal & Energy Ltd.DES-7 500 TPD Kiln, Sulphur dioxide was not detectable and the highest concentration of SO_2 was observed at ACC Cement Boiler Stack 15 MW with 556 mg/Nm^3.

3. **Nitrogen Dioxide:**Nitrogen dioxide was well within the limit at all six locations monitored.

4. **Carbon Monoxide:** Values varied between minimum of 0.80 mg/Nm^3 and maximum of 193 mg/Nm^3.

5. **Volatile Organic Compounds**: Two stacks of Ghuggus MIDC were monitored for VOC and only Benzene and Toulene have been detected.

D) Ballarpur MIDC:

Six different stacks of Ballarpur MIDC were monitored for the aforesaid parameters.

1. **Particulate Matter:** Concentration of Particulate matter was well within the range not exceeding at any one of the stacks.

2. **Sulphur Dioxide:** Out of six stacks monitored of Ballarpur, two stacks of Ballarpur Graphic PPL exceeded the standard limit with value of285mg/Nm^3 and 574 mg/$Nm^3$and remaining four stacks had sulfur dioxide values were well within the standard limits prescribed.

3. **Nitrogen Dioxide:** Emission level varied between 22.8 mg/Nm^3 and 108 mg/Nm^3.

4. **Carbon Monoxide:**Values varied between minimum of 7.43 mg/Nm^3 and maximum of 29.2 mg/Nm^3.

5. **Volatile Organic Compounds:** Two stacks of Chandrapur MIDC were monitored for VOC and Benzene and Toulene was detected from both the stack with Ethyl Acetate was also detected from BILT Graphic PPL.

4.2 Ambient Air Quality Monitoring:

A) MIDC Tadali: In this industrial cluster the following locations were monitored namely MIDC water treatment plant, Grace Industries Ltd. and Dhariwal Infrastructure Ltd. Each location was monitored for 12 parameters as per NAAQS.

1. **Sulphur Dioxide (SO_2):** Concentration of Sulphur dioxide in Tadali MIDC Area varied between lowest of 6.1 µg/m^3 to maximum of 8.5 µg/m^3. This area displaced a clear picture of Sulfur Dioxide concentration.

2. **Nitrogen Dioxide (NOx):** Concentration varied between 10 µg/m^3 and 10.8 µg/m^3 which is well below the standard laid down by CPCB.

3. **Particulate Matter (PM_{10})**: Particulate matter in this area has exceeded at all three locations monitored ranging from 109 µg/m^3 to 137 µg/m^3.

4. **Particulate Matter ($PM_{2.5}$):** Concentration of $PM_{2.5}$was well within the limits at all three regions monitored and thehighest value of 53 µg/$m^3$was at Dhariwal Infrastructure Ltd.

5. **Ozone (O_3)**: Ozone concentration was well within the limit in all three regions monitored.

6. **Lead (Pb):** Concentration of Lead was also below the limit varying between 0.023 and 0.029 µg/m^3.

7. **Carbon Monoxide (CO):** Concentration of Carbon Monoxide ranges between 0.54 mg/m^3 and 0.55 mg/m^3.

8. **Ammonia (NH_3):** Concentration of Ammonia was lower than the limit at all two locations monitored and at Grace Industry Ltd. It was below the detectable limit.

9. **Benzene (C_6H_6):** Sampling and analysis at all three locations show, Benzene value has not exceeded at any locations monitored and the values ranged from 1.66 µg/m^3 to 4.28 µg/m^3.

10. **Benzo (a) Pyrene (BaP):** BaP was detected only at MIDC water treatment plant location with 0.57 ng/m^3.

11. **Arsenic (As):** Concentration of Arsenic was well below the standard prescribed by CPCB.

12. **Nickel (Ni):**Concentration of Nickel also was well below the standard prescribed by CPCB.

B) MIDC Chandrapur: At Chandrapur MIDC, following locations were monitored namely Green tech, MIDC Office and Hindustan Petroleum. Following are the findings based on the analytical values:

1. **Sulphur Dioxide (SO_2):** Values ranged between minimum of 7.9 µg/m^3 at HPCL and 12.1µg/m^3at Green Tech.

2. **Nitrogen Dioxide (NOx):** The highest value of NO_2 was observed at Green tech with 14.6 µg/m^3 which was well within the limit as per NAAQS.

3. **Particulate Matter (PM_{10}):** PM_{10} values were ranging between 103 µg/m^3at Green Tech and 116 µg/m^3 at Hindustan Petroleum.

4. **Particulate Matter ($PM_{2.5}$):** $PM_{2.5}$ values were well within the limits as per NAAQS.

5. **Ozone (O_3):** Ozone concentration was well within the limit in all three regions monitored.

6. **Lead (Pb):** Value of Lead was well below the detectable limit in all three regions monitored.

7. **Carbon Monoxide (CO):** Two values of Carbon monoxide were as per the standard value or very near to the standard and ranged between 0.69 mg/$m^3$to 0.99 mg/m^3.

8. **Ammonia (NH_3):** Values are below detectable limit at two locations monitored and at HPCL it was 21.5µg/m^3.

9. **Benzene (C_6H_6)**: At MIDC office, value exceeded exhibiting 9.6µg/m^3 as against 5 µg/m^3 standard value.

10. **Benzo (a) Pyrene** (**BaP):** At all three locations, the concentration of BaP was below detectable limit.

11. **Arsenic (As):** Concentration in the ambient air at all the three locations of Chandrapur MIDC is within the stipulated limits.

12. **Nickel (Ni):** Concentration in the ambient air at all the three locations of Chandrapur MIDC is within the stipulated limits.

C) MIDC Ghugus: At MIDC Ghugus three locations of ambient air quality were monitored.

1. **Sulphur Dioxide (SO_2):** Values were well within the range, highest being 13.6 µg/m^3 at Lloyds Metal and lowest being at Lloyds Metal Colony i.e. 9.9 µg/m^3.

2. **Nitrogen Dioxide (NOx):** Values of Nitrogen dioxide ranged between 12.1 µg/m^3 and 18.3 µg/m^3at Lloyd Metal and at Lloyd Metal Colony respectively.

3. **Particulate Matter (PM_{10}):** With reference to the concentration of PM10 values, it seems Transit Hostel WCL and Tukdoji Nagar values are above 700µg/$m^3$where as at Lloyds Metal Colony concentration of PM 10 is 235µg/m^3

4. **Particulate Matter ($PM_{2.5}$):** At one place i.e. Tukdoji Nagar, value slightly exceeds the limit i.e. 101 µg/m^3.

5. **Ozone (O_3):** Concentration of Ozone ranged between 28.2µg/m^3 at Tukdoiji Nagar and 70.8µg/m^3 at Lloyd Metal Colony.

6. **Lead (Pb)**: Values are between below detectable level and 0.13 µg/m^3.

7. **Carbon Monoxide (CO):** Values at Transit Hostel and Tukdoji Nagar, exceeded the standard value.

8. **Ammonia (NH_3)**: Values are well within the range lowest being 6.3 µg/m^3 and highest being 25.6 µg/m^3.

9. **Benzene (C_6H_6)**. Values are either near to the standard value or have exceeded as seen clearly at Transit Hostel WLC.

10. **Benzo (a) Pyrene (BaP):** At Tukdoji Nagar, value is lower than the standard value. Two values are above the limit.

11. **Arsenic (As) and Nickel (As):** Values of both metals are below the standard values although one value of Arsenic exceeded Transit Hostel WCL.

D) MIDC Ballarpur: MIDC Ballarpur area was monitored at three following locations (i) Main Gate Bamni Proteins Ltd (ii) Ballarpur Paper Mill Guest house and (iii) Mangal Karyalaya near lime dumping.

1. **Sulphur Dioxide (SO_2)**: Values are below the standard values.

2. **Nitrogen Dioxide (NO_x)**: All the values are within limit.

3. **Particulate Matter (PM_{10}):** As generally observed PM10 values also exceed in the area, ranging between 96 µg/m^3 and 272 µg/m^3.

4. **Particulate Matter ($PM_{2.5}$):**At Ballarpur Paper Mill Guest house area, values of PM 2.5 exceeded (73µg/m^3). Whereas at other two places they were below the standards.

5. **Ozone (O_3):** At one location i.e., Ballarpur Paper Mill guest house, value is as low as 22.6µg/m^3 whereas at two places either it is near the limit or exceeded the limit.

6. **Lead (Pb):** Very low values are observed.

7. **Carbon Monoxide(CO):** Values are below the standard value ranging between 1.3 mg/$m^3$and 1.9 µg/m^3.

8. **Ammonia (NH_3)**: Values of ammonia are below the standard value ranging between 5.7µg/m^3 at Ballarpur Paper Mills Guest house and 21.0µg/m^3 at Bamni Proteins Ltd.

9. **Benzene(C_6H_6)**: Concentration of Benzene exceeds at one place i.e. near Mangal Karyalaya.

10. **Benzo (a) Pyrene (BaP):** At two locations BaP values exceeded the standard limit of ng/m^3.

11. **Arsenic(As)**: Values are below the standard values.

12. **Nickel (Ni)**:At Ballarpur Paper Mill guest house and Mangal Karyalaya, values are on the higher side ranging between 23.80 ng/m^3 and 33.90 ng/m^3.

If 4 MIDC areas in Chandrapur district are compared with NAAQS, 2009 the following conclusion can be drawn.

At Ghugus area they are the highest. There is a large variation in PM 2.5, but higher value PM10 is above limit at all the locations of Ghugus MIDC and Ballarpur. Other parameter which appears to be culprit are the Benzene, BaP with respect to other parameters. District appears to be clearer.

4.3 Waste Water Quality Monitoring:

(i) Shreesurya Dairy - MIDC Chandrapur (ii) Superhygenic (BMW) (iii) HPCL Bottling Plant MIDC Chandrapur (iv) Borewell Water at Gramin Rugnalaya - Ballarpur (v) Multiorganic Ltd Chandrapur.

- **Suspended solids:** At two industries namely Shreesurya Dairy and Super Hygenic (BMW) have exceeded the limits of 100 mg/L max.
- **pH:** pH Value in case of Shreesurya Daily has exceeded the value beyond the general standard.
- **Oil & Grease**: Oil and Grease in case of Shree Suraya Dairy is 23 mg/L which is beyond the standard discharge limit.
- **Total Residual Chlorine:** It is well below the standard discharge limit.
- **Total Ammonia**: Exceeds the limit of Super Hygenic, having the concentration of 30.3 mg/L.
- **Total Kjeldhal Nitrogen**: It is well within the limit.
- **Free Ammonia**: In case of Super Hygenic (BMW) the concentration is 7.11 mg/L as against 5.0 mg/L of standard discharge value.
- **Biochemical Oxygen Demand**: Exceeding at all places.
- **Chemical Oxygen Demand:** Exceeding the limit of 250 mg/L at all places expect HPCL Bottling Plant.
- **Mercury:** Concentration of Mercury is well below the limit at all places.
- **Lead:** Lead exceeds the value of 0.1 mg/L at Super Hygenic.
- **Cadmium Chromium Hexa and Total Chromium**: Values are below the prescribed limit.
- **Copper & Zinc:** Values of both metals are below the standard limit.
- **Nickel:** Concentration of Nickel is below the limit and ranges between 0.06 mg/L and 1.08 mg/L
- **Cyanide:** Values of Cyanide are either above or below the detection limit.
- **Fluoride**: Value of fluoride exceeds at Super Hygenic.
- **Dissolved Phosphorus**: Values are well below the standard limits.

- **Sulphide:** At all places sulfide is not detectable.
- **Manganese:** Well within the limits at all places.

Iron: At two places, namely Shreesuraya Dairy and HPCL Bottling Plant, concentration of Iron is within the range, however at Super Hygienic and at Bore well water at Gramin Rugnalaya the values have exceeded.Apart samples of ETP outlet effluent, surface water samples were also collected.

Each MIDC area has been segregated for collection of surface and bore well water samples. They are as follows:

A) Tadali MIDC:

1. **Colour**: Colour in the range 1 to 15 Hazen units, maximum being at Nalla near railway crossing and at well water near Primary School Tadali.
2. **pH**: Is in the range of 7 and 8.2. As per IS 10500-2012, it is acceptable.
3. **Suspended Solids**. Values range between less than 5 mg/L and maximum of 124 mg/L in case of Lake water, Tadali Village.
4. **COD**: Chemical oxygen demand varies between minimum of 13 mg/L in case of well water at Tadali village and maximum of 32 mg/L at Wardha river.
5. **BOD:** Values range between 3.9 mg/L at well water near Primary school, Tadali.
6. **Nitrates:** Within the acceptable standard of drinking water IS 10500:2012.
7. **Surface Active Agent:** Well below the acceptable value as per IS 10500:2012.
8. **Residual Chlorine:** It is below the detectable level (DL 0.1 mg/L)
9. **Sulphide**: Less than 0.08 mg/L
10. **Metals**: All metals like Zinc, Nickel, Copper, Hexavalent Chromium, Total Chromium, Lead, Cadmium, Mercury are below the prescribed limits.
11. **Cyanide and Phenol**: Are all within the prescribed limits.
12. **Pesticides:** All analysed pesticides concentration are below the standards.
13. **PAH & PCBs:** Also lie below the standard.

B) Chandrapur MIDC:

All analytical values are compared with General standards for discharge of Environment pollutants.

- **Suspended Solids**: Values range between, minimum of 19 mg/L at Nalla on Yeur road and maximum of 32mg/L at Nalla on backside of Gopani Iron.
- **pH**: pH Values lie between 6.5 at Nalla outside Grace Industry and maximum of 7.9 at Nalla near Madhuban Board mill.

- **Oil and Grease**: Values are at below detectable level BDL (1.0 mg/L).
- **Residual Chlorine**: Values are at BDL Level (0.1 mg/L).
- **Biochemical Oxygen Demand**: Varies between minimum of 19 mg/L at Nalla outside Grace Industry and maximum of 438 mg/L. Except two values of BOD, all are beyond the standard value.
- **Chemical Oxygen Demand:** Values are as high as 1320 mg/L at Nalla near Madhuban Board and 1152 mg/L at Dhanora Bridge River.
- **Metals:** Metals like Arsenic, Mercury, Lead, Cadmium, Hexavalent Chromium, Copper, and Zinc all within the acceptable range.Cyanide, Fluoride and Phenol are within the acceptable range.
- **Sulphide:** Values range between 0.08 mg/L at Nallah at Yeur village and 2.2 mg/L at Nallah at backside of Gopani Iron.
- **Iron:** Values range between 0.08 mg/L at Nalla on Yeur village road 1.641 at Nalla at Grace Industry.
- **PAH & PCB**: Below the standard limit.
- **Pesticides**: All pesticides analysed, individually below the general standards.

C) Ghugus MIDC

- **Suspended Solids**: Values range between minimum of 8 mg/L at River water near intake well WCL OCM and maximum of 54 mg/L at Nalla water.
- **pH**: Variation of pH range is within the narrow range between 7 and 8. At all places pH is within the acceptable range.
- **Oil and Grease:** Values are below the detectable level of 1.0 mg/L.
- **Total Residual Chlorine:** It is below 0.1 mg/L as against the acceptable standard of 0.1 mg/L.
- **Ammonical Nitrogen, Total Kjeldhal Nitrogen and Free Ammonia:** All Values are within the acceptable limits.
- **Chemical Oxygen Demand:** Values lie between minimum of 16 mg/L at River water near intake well WCL OCM and maximum of 168 mg/L at Nallah water
- **Biochemical Oxygen Demand**: Values are between 6.5 mg/L at Wardha River near AC Ltd, Coal Mines Road.
- **Metals**: All values of metals are within the acceptable range.
- **Cyanide and Fluoride**: Values of these two parameters are within the acceptable standards.
- **Phenol**: Meets the requirement of standard.

- **Dissolved Phosphate:** All the values of dissolved phosphate at all locations are within the acceptable standards.
- **PAH and PCB:** are within the acceptable range of standard values.
- **Pesticides**: analysed show their analytical values within the range.

D) Ballarpur MIDC

- **Suspended Solids**: Values range between minimum of 0.5 mg/L at Bore well water near Nagar Parishad and maximum of 482 mg/L at Bore well water, Visapur village. Thus, there is wide variation in the values.
- **pH**: At all the locations pH is in the range of 5.6 and 8 lowest value being observed at Bore well water at Visapur village Bore well while the maximum at Wardha river, Rajura bridge. This pH variation fits into the standard for discharge of Environment pollutants.
- **Oil and Grease**: All values are below the detection limit of 1.0 mg/L.
- **Total Residual Chlorine**: Values are below the detection limit of 0.1 mg/L.
- **Ammonical Nitrogen, Total Kjeldhal Nitrogen and free ammonia**: Values are within the acceptable concentrations.
- **Biochemical Oxygen Demand:** It exceeds at Nalla near MSW, Municipal Corporation. At other places, it is in acceptable range.
- **Chemical Oxygen Demand:** Values range between minimum of 12 mg/L at Bore well water near Nagar Parishad water supply and maximum of 236 mg/L at Nalla near MSW, Municipal Corporation.
- **Metals**: Metals like Arsenic, Mercury, Lead, Cadmium, Chromium hexavalent, Total Chromium, Copper, Zinc all within the acceptable range.
- **Cyanide, Fluoride and Phenol:** All are within the acceptable values.
- **Dissolved Phosphate**:Values are within the acceptable range.
- **Nitrate**: Values of Nitrates are below the standard discharge values.

5. CEPI Score

Comprehensive Environmental Pollution Index (CEPI) is intended to act as early warning tool which helps in categorization of industrial clusters/areas in terms of priority of needing attention.

CPCB had evolved certain methodology to calculate CEPI, in which a score has been fixed for different environmental components based on the level of pollution. The scoring system involves an algorithm that takes into account the basic selection criteria. This approach is based on the basic hazard assessment logic that can be summarized as below.

Hazard = pollutant source, pathways, and receptor

CPCB has calculated CEPI for the identified critically polluted industrial clusters. It is calculated separately for air, water, and land. The basic framework and scoring system of the CEPI – based on three factors namely pollutant, pathway, and receptor – has been described further under this section

To overcome the subjectivity, revised concept is proposed by eliminating the subjective factors as described in the previous section, but retaining the factors which can be measured precisely.

i. Revised concept is prepared by eliminating the debatable factors but retaining the factors which can be measured precisely.

ii. It is decided to develop the Comprehensive Environmental Pollution Index (CEPI) retaining the existing algorithm of Source, Pathway and Receptor.

iii. Health component was also retained in the revised concept in line with the suggestions of Secretary, MoEFCC during the meeting held in MoEF.

Outlines of revised CEPI 2016 criteria

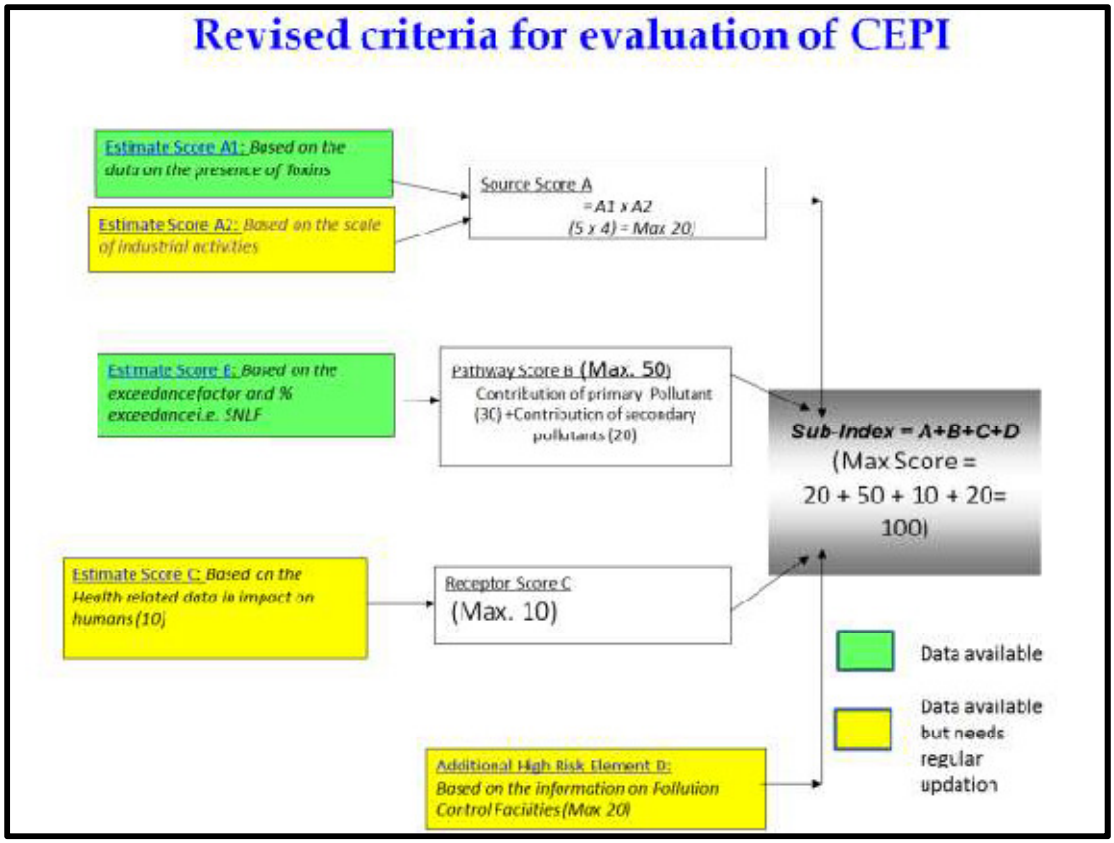
The outlines of the revised CEPI criteria are as follows:

1. It is proposed to develop the Comprehensive Environmental Pollution Index (CEPI) based on Sources of pollution, real time observed values of the pollutants in the ambient air, surface water and ground water in & around the industrial cluster and health related statistics.

2. For assessment of the environmental quality of the area i.e. CEPI score, the concept of SNLF i.e. a surrogate number which represents the level of exposure (a function of percentage sample exceedance & Exceedance Factor) shall be used.

3. Health component to be evaluated based on the health data available from major hospitals in the area was also retained in the revised concept.

4. The evaluation criterion of the revised CEPI version 2016 is described in the flowchart given below:



Here, health data collected for Receptor score C is included in **Annexure I**

Based on Sub-index Score (score of individual environmental component like air, water etc.):

- **Score more than 63:** A Critical Level of Pollution in the respective level of environmental component
- **Score between 51-63:** Severe to critical level of pollution with reference to respective environmental component

Cut-off Score

- **Score 50:** Severely Polluted Industrial Clusters/areas
- **Score 60:** Critically Polluted Industrial Clusters/areas

Based on Aggregated CEPI Score (score includes sub-index score of all individual environmental components together):

- **Aggregated CEPI score >70:** Critically polluted areas
- **Aggregated CEPI score between 60-70:** Severely polluted areas

Since the inception of the programme, MPCB has also formulated Action Plans to mitigate the environmental pollution problems for each of the 8 Critically Polluted Areas (CPAs) in Maharashtra. Based on available information, parameters selected and monitored in continuation with this, CEPI has been calculated and Short-Term Action Plan (STAP) as well as Long Term Action Plan (LTAP) was prepared in 2010.

Subsequently NAAQS 2009 came in force. List of parameters to be considered increased and expanded including more critical and hazardous pollutants like benzene, BaP, Metals, etc. existing in the environment. There was revision of standards (limiting values) as well. In this present report of 2016 prepared by MPCB, CEPI is calculated considering all these revised standards' limiting values, list of parameters and complete scope of monitoring.

The result shows that CEPI score of present report is 50.77. The present study is the compilation of pre-monsoon season, which also affects the score value. It should be noticed here that MPCB's efforts through the formulation of action plans decreased the overall concentration of pollutants in all aspects i.e. air, land and water in Chembur area in past three years. This has also resulted in decreased score of CEPI.

5.1 Comparison of CEPI scores:

Results show that present CEPI score (50.77) of Chandrapur considering all revised standards is lesser tan the CEPI Score of February 2017 (62.3) report.

Detailed results of Air, Water and Land are given below:

Air

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
Present Report CEPI Score June, 2017 (Revised CEPI 2016)	2.9	3.3	9.57	-	-	-	14.36	-	-	-	5	15	**43.93**
CEPI Score February, 2017	3	2	6	6	0	2	8	4	3.8	0	15.2	15	**44.2**
CEPI score, August, 2016													
CEPI score 2013	2	5	10	6	3	3	12	5	3	0	15	10	**47**
CPCB Report 2009	5.75	5	28.75	6	3	3	12	5	4	0	20	10	**70.75**

Water:

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
Present Report CEPI Score June, 2017 (Revised CEPI 2016)	3.7	4.8	17.76	-	-	-	10.85	-	-	-	0	10	**38.61**
CEPI Score February, 2017	3	4.8	14.4	1.6	0	3	4.6	5	5	2.3	27.3	10	**56.3**
CEPI score, August, 2016													
CEPI score 2013	1	5	5	6	0	3	9	5	1.5	4	11.5	3	**28.5**
CPCB Report 2009	3	5	15	8	1.5	3	12.5	5	4	5	25	15	**67.5**

Land:

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
Present Report CEPI Score June, 2017 (Revised CEPI 2016)	3.1	4.2	13.02	-	-	-	8.6	-	-	-	0	10	**31.62**
CEPI Score February, 2017	3	4.8	14.4	1.6	0	3	4.6	5	5	2.3	26.5	10	**57.5**
CEPI score, August, 2016													
CEPI score 2013	1	5	5	8	0	3	11	5	5	4	29	10	**55**
CPCB Report 2009	3	5	15	4	3	4.5	11.5	5	4	5	25	15	**66.5**

Aggregated CEPI:

	Air Index	Water Index	LandIndex	CEPI
Present Report CEPI Score June, 2017 (Revised CEPI 2016)	43.93	38.61	31.62	**50.77**
CEPI Score February, 2017	44.2	56.3	57.5	**62.3**
CEPI score, August, 2016				
CEPI score 2013	77	62	60	**85.56**
CPCB Report 2009	70.75	67.5	66.5	**83.88**

6. Conclusion

The status of pollution load in Chandrapur is improving year by year as per the CEPI study carried out. The score of post monsoon CEPI score of February 2017 was 62.3 which have again reduced to 50.77 in the Pre-monsoon CEPI study. The efforts taken by the Pollution Control Board officials is clearly visible in the score. The region has been moved from Critically Polluted Industrial Clusters/areas to Severely Polluted Industrial Clusters/areas

In the 22 stack emissions monitored, few of them had higher concentration of SO_2. All other parameters monitored were well within the standard provided to specific industries.

Twelve locations were monitored for ambient air concentration. Only PM_{10}level was exceeding in few locations as per NAAQS. This is due to the increase in the vehicles and vehicular emissions.

Out of the 22 waste water samples, few samples were detected with higher concentration of Total coliform and Faecal coliform. This will be complied as already the specified industry have been notified and asked to take necessary action.

13 Ground water samples were collected from different Dug well, well and Bore well in the region. In the ground water samples collected, Electrical Conductivity, Nitrogen, Total coliform and Faecal coliform was found in higher concentration.

Collective efforts of MPCB, administration and environmental organizations have finally paid off and pollution levels in Chandrapur are on the decline. Cumulative CEPI score which was initially 88.83 in 2009 has declined to 81.90 by 2013. In this report the CEPI score have even more reduced to 50.77.

	A1	A2	A	B	C	D	CEPI
Air Index	2.9	3.3	9.57	14.36	5	15	**43.93**
Water Index	3.7	4.8	17.76	10.85	0	10	**38.61**
Land Index	3.1	4.2	13.02	8.6	0	10	**31.62**
Aggregated CEPI							**50.77**

7. Efforts taken for the reduction in pollution:

The regional office of Maharashtra pollution control board has taken various initiatives in reducing the CEPI Score of 85.56 of 2013 to 79.07 of 2017. Below mentioned are some of the efforts:

- A monitoring committee was formed under the Chairman of District Collector for effective implementation of the Action Plan.

- M/s. BILT Graphics paper products Ltd., a pulp and paper mill has adopted new environmental friendly technology based on ECF i.e. Elemental Chlorine Free technology and Board has granted consent to establish Plant is under stabilization since May- 2013.

- The Thermal Power plant is the single largest contributor in the air pollution in Chandrapur. The MAHAGENCO, which operates this plant, has taken steps to control air emissions from this coal based power plant and the efficiency of the air pollution control equipment is rated to be good. There is need for improvement. In spite of the air pollution prevention and control measures in place, sporadic complaints of the air emissions are received by the Board.

- MPCB is operating three stations under National Air Monitoring Programe (NAMP) at Chandrapur and nearby industrial area. Automatic Continuous ambient air quality monitoring station is also operational at Chandrapur. Board has initiated steps to set up additional ambient air quality monitoring (AAQM) stations under NAMP and State air monitoring program (SAMP) particularly at the coal mine sites.

- The generation of mine discharge, excavation of top soil during the mining activities is an example of degradation of natural resources. It is necessary to initiate serious attempts to conserve these natural resources while the exploitation of minerals on a sustainable basis. Generation of fly ash from the power station is also a similar example. There are incidences of air and water pollution due to improper handling of fly ash. Maximum utilization of the fly ash in brick making, construction and cement industry is considered as priority. The efforts of the Board to generate awareness about the fly ash utilization by various stake holders have yielded positive results. However, there is a more potential to utilise fly ash for the reclamation of the coal mines and also use it as a micronutrient supplement for crops.

8. References

1) Criteria for Comprehensive Environmental Assessment of Industrial Clusters, December 2009, CPCB, EIAS/4/2009-10

2) Comprehensive Environmental Assessment of Industrial Clusters, December 2009, CPCB, EIAS/5/2009-10

3) Action Plan for Industrial Cluster: Chandrapur, November 2010, MPCB

4) Action Plan for Industrial Cluster: Dombivali, November 2010, MPCB

5) Action Plan for Industrial Cluster: Aurangabad, November 2010, MPCB

6) Action Plan for Industrial Cluster: Navi Mumbai, November 2010, MPCB

7) Action Plan for Industrial Cluster: Navi Mumbai, November 2010, MPCB

8) Standard Methods for the Examination of Water and Waste Water, American Public Health Association, 22nd Edition, 2012.

9) IS 3025 (various parts)

10) www.mpcb.gov.in

11) www.cpcb.gov.in

9. Annexure

Annexure I: Health related data in impact on humans

C: Receptor

Component C (Impact on Human Health) 10	
Main - 10	
% increase in cases	**Marks**
<5%	**0**
5-10%	**5**
>10%	**10**

- % increase is evaluated based on the total no. of cases recorded during two consecutive years.
- For Air Environment, total no. of cases related to Asthma, Bronchitis, Cancer, Acute respiratory infections etc. are to be considered.
- For surface water/ ground water Environment, cases related to Gastroenteritis, Diarrhoea, renal (kidney)malfunction, cancer etc are to be considered.
- For the above evaluation, the previous 5 years records of 3-5 major hospitals of the area shall be considered.

Attached below health data collected for the Chandrapur region

		Diseases caused by Air pollution					Diseases caused by Water pollution				
Name of Hospital	**Year**	**Asthma**	**Bronchitis**	**Pulmonary cancer**	**Mesothelioma (lung cancer)**	**Acute respiratory infections**	**Gastroenteritis**	**Typhoid**	**Diarrhea**	**Liver damage and even cancer** (due to presence of chlorinated solvents in the polluted water)	**Kidney damage** (because of various harmful chemicals present in the polluted water)
Government Medical College Chandrapur	**2012**										
	2013										
	2014										
	2015	685	89	0	0	5620	2715	49	769	0	0
	2016	1542	224	0	10	17188	5353	832	2279	0	0
	2017	466	242	0	5	3055	1096	10	360	0	0
Government Hospital, Ballarpur	**2012**	0	0	0	0	319	548	312	130	0	0
	2013	0	0	0	0	357	481	264	161	0	0
	2014	0	0	1	0	402	333	229	87	0	1
	2015	0	0	1	1	336	439	195	128	1	0
	2016	0	0	0	0	261	873	263	205	1	1
	2017	21	6	0	0	141	75	106	24	0	0
Chandrapur Healthcare Limited (CHL) Multispeciality Hospital & Research Centre	**2012**										
	2013										
	2014	30	35	0	0	100	40	30	25	0	0
	2015	35	20	0	0	120	30	20	20	0	0
	2016	25	30	0	0	110	20	15	15	0	0
	2017	20	35	0	0	140	25	20	20	0	0

		Diseases caused by Air pollution					Diseases caused by Water pollution				
Name of Hospital	**Year**	**Asthma**	**Bronchitis**	**Pulmonary cancer**	**Mesothelioma (lung cancer)**	**Acute respiratory infections**	**Gastroenteritis**	**Typhoid**	**Diarrhea**	**Liver damage and even cancer** (due to presence of chlorinated solvents in the polluted water)	**Kidney damage** (because of various harmful chemicals present in the polluted water)
Rajiv Ratan Hospital	**2012**	50	25	Nil	Nil	200	200	150	200	Nil	Nil
	2013	55	30	Nil	Nil	230	242	160	210	Nil	Nil
	2014	40	20	Nil	Nil	96	110	130	200	Nil	Nil
	2015	42	28	Nil	Nil	100	100	80	150	Nil	Nil
	2016	34	36	Nil	Nil	110	120	100	120	Nil	Nil
	2017	20	30	Nil	1	84	190	95	98	Nil	Nil
Bilt Hospital	**2012**										
	2013										
	2014										
	2015	5	105	Nil	Nil	4600	1350	12	1560	Nil	Nil
	2016	5	146	Nil	Nil	5200	1270	14	1340	Nil	Nil
	2017	5	57	Nil	Nil	1960	340	4	770	Nil	Nil

Annexure II: Stack Emission Sampling and Analysis Methodology

Sr.	Parameters	Method References	Techniques	Detection Limit
1.	Acid Mist (as Sulphuric Acid)	US EPA Method no.m-8	Barium thorine titration Method	0.6 mg/Nm^3
2.	Ammonia	IS 11255 (Part 6):1999, Reaffirmed 2003	Titration/Nessler Reagent / Spectrophotometric Method	1 mg/Nm^3
3.	Carbon Monoxide	USEPA Method 10B	GC-FID Method	0.2 mg/Nm^3
4.	Chlorine	US EPA Method 26 for sampling	Titrimetric	0.001 mg/Nm^3
5.	Fluoride (Gaseous)	US EPA Method 13 A	SPADNS Zirconium Lake Spectrophotometric Method	0.025 mg/Nm^3
6.	Fluoride (Particulate)	US EPA Method 13 A	SPADNS Zirconium Lake Spectrophotometric Method	0.005 mg/Nm^3
7.	Hydrogen Chloride	US EPA Method 26 for sampling	Titrimetric	0.25 mg/Nm^3
8.	Hydrogen Sulphide	IS 11255 (Part 4):1985	Titrimetric	1 mg/Nm^3
9.	Oxides of Nitrogen	IS 11255 (Part 7): 2005	PDSA Colorimetric Method	10 mg/Nm^3
10.	Oxygen	IS 13270 : 1992	ORSAT Apparatus	1 %
11.	Poly Aromatic Hydrocarbons (Particulate)	IS 5182 (Part 12) : 2004, Reaffirmed 2009 CPCB Guidelines, May 2011, Page No.39	GC-FID Method	0.25 mg/Nm^3
12.	Suspended Particulate Matter	IS 11255 (Part 1):1985, Reaffirmed 2003	Gravimetric Method	10 mg/Nm^3
13.	Sulphur Dioxide	IS 11255 (Part 2): 1985, Reaffirmed 2003	Titrimetric IPA thorine Method	5.0mg/Nm^3

Sr.	Parameters	Method References	Techniques	Detection Limit
				0.02kg/day
14.	BTX (Benzene, Toluene, Xylene)	NIOSH (NMAM) 1501	Adsorption and Desorption followed by GC-FID analysis	0.001 mg/Nm^3
15.	VOC (Volatile Organic Compounds)	NIOSH (NMAM) 1501 for sampling	Adsorption and Desorption followed by GC-FID or GC/MS analysis	-
i	Methyl Isobutyl Ketone	-	-	0.001 mg/Nm^3
ii	Benzene	-	-	0.001 mg/Nm^3
iii	Toluene	-	-	0.001 mg/Nm^3
iv	Xylene	-	-	0.001 mg/Nm^3
v	Ethyl Benzene	-	-	0.001 mg/Nm^3
vi	Ethyl Acetate	-	-	0.001 mg/Nm^3

Annexure III: Ambient Air Sampling and Analysis Methodology

Sr.	Parameters	Method References	Techniques	Detection Limit
1.	Sulphur Dioxide (SO_2)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No.1	Improved West & Gaeke Method	4 µg/m^3
2.	Nitrogen Dioxide (NO_2)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No.7	Modified Jacob & Hochheiser Method	3 µg/m^3
3.	Particulate Matter (size less than 10 µm) or PM_{10}	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No.11	Gravimetric Method	2 µg/m^3
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No. 15	Gravimetric Method	0.4 µg/m^3
5.	Ozone (O_3)	APHA, Method No. 820, Page no. 836	Chemical Method	19.6 µg/m^3
6.	Lead (Pb)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No. 47	AAS Method	0.02 µg/m^3
7.	Carbon Monoxide (CO)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume II, May 2011, Page No. 16	Non Dispersive Infra Red (BDLIR) spectroscopy	0.05 mg/m^3
8.	Ammonia (NH_3)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No. 35	Indophenol Blue Method	4.0µg/m^3
9.	Benzene (C_6H_6)	IS 5182 (Part 11):2006	Adsorption and Desorption followed by GC-FID analysis	1.0 µg/m^3
10.	Benzo (a) Pyrene (BaP) – particulate phase only,	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No. 39	Solvent extraction followed by GC-FID analysis	0.2 ng/m^3

Sr.	Parameters	Method References	Techniques	Detection Limit
11.	Arsenic (As)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No. 47	AAS Method	0.3ng/m^3
12.	Nickel (Ni)	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, May 2011, Page No. 47	AAS Method	3.0ng/m^3

Annexure IV: Water/Wastewater Sampling and Analysis Methodology

Sr.	Parameters	Methods References	Techniques	Detection Limit
1.	Sampling Procedure for Chemical Parameters	IS 3025 (Part 1): 1987, Reaffirmed 1998, Amds.1& APHA, 22nd Ed., 2012, 1060 B, 1-39	-	-
2.	Sampling Procedure for Microbiological Parameters	APHA, 22nd Ed., 2012,1060 B, 1-39, 9040, 9-17, and 9060B, 9-35	-	-
3.	Temperature	APHA, 22nd Ed., 2012, 2550-B, 2-69	By Thermometer	-
4.	Colour	APHA, 22ndEd., 2012, 2120-B, 2-26	Visible Comparison Method	1 Hazen Unit
5.	Odour	IS 3025 (Part 5): 1983, Reaffirmed 2006	Qualitative Method	-
6.	pH	APHA, 22nd Ed., 2012, 4500-H^+- B, 4-92	By pH Meter	1
7.	Oil & Grease	APHA, 22nd Ed., 2012, 5520-B, 5-40	Liquid -liquid Partition-Gravimetric Method	1.0 mg/L
8.	Suspended Solids	IS 3025 (Part 17): 1984, Reaffirmed 2006,Amds.1	Filtration /Gravimetric Method	5.0 mg/L
9.	Dissolved Oxygen	IS 3025 (Part 38): 1989, Reaffirmed 2009	Iodometric Method-Azide modification	0.05 mg/L
10.	Chemical Oxygen Demand	APHA,22ndEd., 2012, 5220-B, 5-17	Open Reflux Method	5.0 mg/L
11.	Biochemical Oxygen Demand	IS 3025 (Part 44): 1993,Reaffirmed 2009,Amds.1	Iodometric Method	5.0 mg/L
12.	Electrical Conductivity	APHA, 22nd Ed., 2012, 2510- B, 2-54	By Conductivity Meter	0.1 µmho/cm
13.	Nitrite-Nitrogen	APHA, 22nd Ed., 2012, 4500-NO_2-B, 4-120	Colorimetric Method	0.006 mg/L

Sr.	Parameters	Methods References	Techniques	Detection Limit
14.	Nitrate-Nitrogen	APHA,22nd Ed., 2012,4500-NO_3,B-4-122	UV Spectrophotometer Screening Method	0.2 mg/L
15.	(NO_2 + NO_3)-Nitrogen	APHA, 22nd Ed., 2012, 4500-NO_2-B, 4-120 APHA,22nd Ed.,2012,4500-NO_3,B-4-122	Colorimetric Method V Spectrophotometer Screening Method	0.2 mg/L
16.	Free Ammonia	APHA, 22nd Ed., 2012, 4500 NH_3, F, 4 -115	Colorimetric Method	0.006 mg/L
17.	Total Residual Chlorine	IS 3025 (Part 26):1986, Reaffirmed 2009, Ed. 2.1(2004-02)	Iodometric Method	0.1 mg/L
18.	Cyanide (CN)	APHA, 22nd Ed., 2012,4500-CN, C & E, 4-41 & 4-43	Colorimetric Method	0.001 mg/L
19.	Fluoride (F)	APHA, 22nd Ed., 2012, 4500-F, D, 4-87	SPADNS Method	0.05 mg/L
20.	Sulphide (S^{2-})	APHA, 22nd Ed., 2012, 4500 –S^2, C-4-175, F-4-178	IodometricMethod	0.08 mg/L
21.	Dissolved Phosphate (P)	APHA,22ndEd., 2012, 4500 P,E, 4-155	Ascorbic Acid Method	0.03 mg/L
22.	Sodium Absorption Ratio	IS11624 :1986, Reaffirmed 2006	By Calculation	0.3
23.	Total Phosphorous (P)	APHA,22ndEd., 2012, 4500 P,E, 4-155	Ascorbic Acid Method	0.03 mg/L
24.	Total Kjeldahl Nitrogen	APHA, 22nd Ed., 2012, 4500 NH_3, B & C, 4 -110, 4-112	Titrimetric Method	0.1 mg/L
25.	Total Ammonia (NH_4 +NH_3)-Nitrogen	APHA,22dEd., 2012, 4500 NH_3, F, 4 -115	Colorimetric Method	0.001 mg/L
26.	Phenols (C_6H_5OH)	APHA,22ndEd., 2012,5530- B & C, 5-44 & 5-47	Chloroform Extraction Method	0.001 mg/L

Sr.	Parameters	Methods References	Techniques	Detection Limit
27.	Surface Active Agents	APHA,22ndEd., 2012,5540-B & C,5-50	Methylene Blue Extraction Method	0.1 mg/L
28.	Organo Chlorine Pesticides	APHA, 22nd Ed., 2012,6410B,6-74	GC MS-MS Method	0.01 µg/L
29.	Polynuclear aromatic hydrocarbons (PAH)	APHA, 22nd Ed., 2012,6410B,6-74	GC MS-MS Method	0.01 µg/L
30.	Polychlorinated Biphenyls (PCB)	APHA, 22nd Ed., 2012,6410B,6-74	GC MS-MS Method	0.01 µg/L
31.	Zinc (Zn)	IS 3025(Part 2): 2004	ICP Method	0.1 mg/L
32.	Nickel (Ni)	IS 3025(Part 2): 2004	ICP Method	0.05 mg/L
33.	Copper (Cu)	IS 3025(Part 2): 2004	ICP Method	0.03 mg/L
34.	Hexavalent Chromium (Cr^{6+})	APHA, 22ndEd., 2012,3500-Cr,B,3-69	Colorimetric Method	0.02 mg/L
35.	Total Chromium (Cr)	IS 3025(Part 2): 2004	ICP Method	0.02 mg/L
36.	Total Arsenic (As)	IS 3025(Part 2): 2004	ICP Method	0.005 mg/L
37.	Lead (Pb)	IS 3025(Part 2): 2004	ICP Method	0.008 mg/L
38.	Cadmium (Cd)	IS 3025(Part 2): 2004	ICP Method	0.002 mg/L
39.	Mercury (Hg)	IS 3025(Part 2): 2004	ICP Method	0.0008 mg/L
40.	Manganese (Mn)	IS 3025(Part 2): 2004	ICP Method	0.02 mg/L
41.	Iron (Fe)	IS 3025(Part 2): 2004	ICP Method	0.06 mg/L
42.	Vanadium (V)	IS 3025(Part 2): 2004	ICP Method	0.05 mg/L

Sr.	Parameters	Methods References	Techniques	Detection Limit
43.	Selenium (Se)	IS 3025(Part 2): 2004	ICP Method	0.005 mg/L
44.	Boron (B)	IS 3025(Part 2): 2004	ICP Method	0.1 mg/L
45.	Total Coliforms	APHA, 22nd Ed., 2012,9221-B, 9-66	Multiple tube fermentation technique (MPN/100ml)	1.1 MPN/100ml
46.	Faecal Coliforms	APHA, 22nd Ed., 2012,9221-E, 9-74	Multiple tube fermentation technique (MPN/100ml)	1.1 MPN/100ml
47.	Bioassay Test (Zebra Fish)	IS 6582, 1971, Reaffirmed 1987	Static Technique	-

Annexure V: National Ambient Air Quality Standards, 2009

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National Ambient Air Quality Standards: Central Pollution Control Board

In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevntion and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in suppression of the Notification No(s). S.O.384(E), dated 11th April, 1994 and S.O.935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards **with immediate effect**, namely:

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas (Notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2) µg/m³	Annual *	50	20	– Improved West and Gaeke – Ultraviolet fluorescence
		24 hours **	80	80	
2	Nitrogen Dioxide (NO_2) µg/m³	Annual *	40	30	– Modified Jacob & Hochheiser (Na-Arsenite) – Chemilminescence
		24 hours **	80	80	
3	Particulate Matter (size less than 10 µm) or PM_{10} µg/m³	Annual *	60	60	– Gravimetric – TOEM – Beta attenuation
		24 hours **	100	100	
4	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$ µg/m³	Annual *	40	40	– Gravimetric – TOEM – Beta attenuation
		24 hours **	60	60	
5	Ozone (O_3) µg/m³	8 hours **	100	100	– UV photometric – Chemiluminescence – Chemical Method
		1 hour **	180	180	
6	Lead (Pb) µg/m³	Annual *	0.50	0.50	– AAS/ICP method after sampling on EPM 2000 or equivalent filter paper – EDXRF using Teflon filter
		24 hours **	1.0	1.0	
7	Carbon Monoxide (CO) mg/m³	8 hours **	02	02	– Non Dispersive Infra Red (NDIR) spectroscopy
		1 hour **	04	04	
8	Ammonia (NH_3) µg/m³	Annual *	100	100	– Chemiluminescence – Indophenol blue method
		24 hours **	400	400	
9	Benzene (C_6H_6) µg/m³	Annual *	05	05	– Gas Chromatography based continuous analyzer – Adsorption and Desorption followed by GC analysis
10	Benzo (a) Pyrene (BaP) – particulate phase only, ng/m³	Annual *	01	01	– Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As) ng/m³	Annual *	06	06	– AAS/ICP method after sampling on EPM 2000 or equivalent filter paper.
12	Nickel (Ni) ng/m³	Annual *	20	20	– AAS/ICP method after sampling on EPM 2000 or equivalent filter paper.

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2 % of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman, Central Pollution Control Board [ADVT-III/4/184/09/Exty.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India. Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October,1998.

µg/m³: micro-gram/m³ i.e. 10^{-6}gm/m³ ng/m³ : nano-gram/m³ i.e. 10^{-9}gm/m³

Annexure VI: General Standards for Discharge of Environmental Pollutants, Part A: Effluents (The Environment (Protection) Rules, 1986, Schedule VI)

Sr.	Parameter	Standards			
		Inland surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Areas**
1.	Colour and Odour	See Note 1	--	See Note I	See Note 1
2.	Suspended solids, mg/L, Max.	100	600	200	a. For process waste water - 100 b. For cooling water effluent- 10 percent above total Suspended mailer of influent cooling water.
3.	Particle size of Suspended solids	Shall pass 850 micron IS Sieve			a. Floatable solids, Max 3 mm b. Settleable solids Max 850 microns
4.	Dissolved solids (Inorganic), mg/L, Max.	2100	2100	2100	--
5.	pH value	5.5 -9.0	5.5 -9.0	5.5 -9.0	5.5-9.0

Sr.	Parameter	Standards			
		Inland surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Areas**
6.	Temperature °C, Max	Shall not exceed 40 in any section of the stream within 15 mts. Downstream from the effluent outlet	45 at the point of discharge	--	45 at the point of discharge
7.	Oil and Grease, mg/L, Max	10	20	10	20
8.,	Total Residual chlorine, mg/L, Max	1.0	--	--	1.0
9.	Ammonical Nitrogen (as N), mg/L, Max	50	50	--	50
10.	Total Kjeldahl Nitrogen (as N), mg/L, Max.	100	--	--	100
11.	Free Ammonia (as NH_3), mg/L, Max	5.0	--	--	5.0
12.	Biochemical oxygen demand (5 days, at 20° c) mg/L, Max	30	350	100	100
13.	Chemical oxygen demand, mg/L, Max	250	--	--	250
14.	Arsenic (as As), mg/l, Max	0.2	0.2	0.2	0.2
15.	Mercury (as Hg). Mg/L, Max	0.01	0.01	--	0.01
16.	Lead (as Pb), mg/L, Max	0.1	1.0	-	1.0
17.	Cadmium (as Cd), mg/L,	2.0	1.0	--	2.0

Sr.	Parameter	Standards			
		Inland surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Areas**
18.	Hexavalent Chromium (as Cr^{+6}) mg/L, Max	.1	2.0	--	1.0
19.	Total Chromium (as Cr), mg/L, Max	2.0	2.0	--	2.0
20.	Copper (as Cu), mg/L, Max.	3.0	3.0	--	3.0
21.	Zinc (as Zn), mg/L, Max.	5.0	15	0--	15
22	Selenium (as Se), mg/l, Max.	0.05	0.05	--	0.05
23	Nickel (as Ni), mg/l, Max.	3.0	3.0	--	5.0
24	Boron (as B), mg/l, Max.	2.0	2.0	2.0	--
25.	Percent Sodium, Max.	--	60	60	--
26.	Residual Sodium carbonate, mg/l, Max.	--	--	5.0	--
27.	Cyanide (as Cn), mg/L, Max.	0.2	2.0	0.2	0.2
28.	Chloride (as Cl), mg/L, Max.	1000	1000	600	--
29.	Fluoride (as F), mg/IL, Max.	2.0	15	--	15
30.	Dissolved Phosphate (as P), mg/L, Max.	5.0	--	--	--

Sr.	Parameter	Standards			
		Inland surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Areas**
31.	Sulphate (as SO_4), mg/L, Max.	1000	1000	1000	--
32.	Sulphide (as S), mg/L, Max.	2.0	--	--	5.0
33.	Pesticides	Absent	Absent	Absent	Absent
34.	Phenolic Compounds (as C_6H_5OH), mg/L, Max.	1.0	5.0	--	5.0
35.	Radioactive materials:				
	a. Alpha emitters MC/ml., Max.	10^{-7}	10^{-7}	10^{-8}	10^{-7}
	b. Beta emitters µc/ml., Max	10^{-6}	10^{-6}	10^{-7}	10^{-6}

Annexure VII: Drinking Water Specification-IS 10500:2012

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
Table 1	**Organoleptic and Physical Parameters**			
1.	Colour	Hazen units	Max 5	Max 15
2.	Odour	-	Agreeable	Agreeable
3.	pH value	-	6.5-8.5	No relaxation
4.	Taste	-	Agreeable	Agreeable
5.	Turbidity	NTU	Max 1	Max 5
6.	Total dissolved solids	mg/L	Max 500	Max 2000
Table 2	**General parameters concerning substances undesirable in excessive amounts**			
7.	Aluminium (as Al)	mg/L	Max 0.03	Max 0.2
8.	Ammonia (as total ammonia- N)	mg/L	Max 0.5	No relaxation
9.	Anionic detergents (as MBAS)	mg/L	Max 0.2	Max 1.0
10.	Barium (as Ba)	mg/L	Max 0.7	No relaxation
11.	Boron (as B)	mg/L	Max 0.5	Max 1.0
12.	Calcium (as Ca)	mg/L	Max 75	Max 200
13.	Chloramines (as $C1_2$)	mg/L	Max 4.0	No relaxation
14.	Chlorides (as Cl)	mg/L	Max 250	Max 1000
15.	Copper (as Cu)	mg/L	Max 0.05	Max 1.5
16.	Fluoride (as F)	mg/L	Max 1.0	Max 1.5
17.	Free residual chlorine	mg/L	Min 0.2	Min 1

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
18.	Iron (as Fe)	mg/L	Max 0.3	No relaxation
19.	Magnesium (as Mg)	mg/L	Max 30	Max100
20.	Manganese (as Mn)	mg/L	Max 0.1	Max 0.3
21.	Mineral Oil	mg/L	Max 0.5	No relaxation
22.	Nitrate (as NO_3)	mg/L	Max 45	No relaxation
23.	Phenolic compounds (as C_6H_5OH)	mg/L	Max 0.001	Max 0.002
24.	Selenium (as Se)	mg/L	Max 0.01	No relaxation
25.	Silver (as Ag)	mg/L	Max 0.1	No relaxation
26.	Sulphate (as SO_4)	mg/L	Max 200	Max 400
27.	Sulphide (as H_2S)	mg/L	Max 0.05	No relaxation
28.	Total Alkalinity as calcium carbonate	mg/L	Max 200	Max600
29.	Total hardness (as $CaCO_3$)	mg/L	Max 200	Max 600
30.	Zinc (as Zn)	mg/L	Max 5	Max15
Table 3	**Parameters Concerning Toxic Substances**			
31.	Cadmium (asCd)	mg/L	Max 0.003	No relaxation
32.	Cyanide (asCN)	mg/L	Max 0.05	No relaxation
33.	Lead (as Pb)	mg/L	Max 0.01	No relaxation
34.	Mercury (asHg)	mg/L	Max 0.001	No relaxation
35.	Molybdenum (as Mo)	mg/L	Max 0.07	No relaxation
36.	Nickel (as Ni)	mg/L	Max 0.02	No relaxation
37.	Pesticides	mg/L	See Table 5	No relaxation
38.	Polychlorinatedbiphenyls	mg/L	Max 0.0005	No relaxation

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
39.	Poly nuclear aromatic Hydrocarbons (as PAH)	mg/L	Max 0.0001	No relaxation
40.	Total Arsenic(as As)	mg/L	Max 0.01	Max0.05
41.	Total Chromium (as Cr)	mg/L	Max 0.05	No relaxation
42.	Trihalomethanes			
a)	Bromoform	mg/L	Max 0.1	No relaxation
b)	DibromochloroMethane	mg/L	Max 0.1	No relaxation
c)	Bromodichloromethane	mg/L	Max 0.06	No relaxation
d)	Chloroform	mg/L	Max 0.2	No relaxation
Table 4	**Parameters Concerning Radioactive Substances**			
43.	Radioactive Materials			
a)	Alpha emitters	mg/L	Max 0.1	No relaxation
b)	Beta emitters	mg/L	Max 1.0	No relaxation
Table 5	**Pesticide Residues Limits and Test Method**			
i)	Alachor	µg/L	20	No relaxation
ii)	Atrazine	µg/L	2	No relaxation
iii)	Aldrin/ Dieldrin	µg/L	0.03	No relaxation
iv)	Alpha HCH	µg/L	0.01	No relaxation
v)	Beta HCH	µg/L	0.04	No relaxation
vi)	Butachlor	µg/L	125	No relaxation
vii)	Chlorpyriphos	µg/L	30	No relaxation
viii)	Delta HCH	µg/L	0.04	No relaxation
ix)	2,4- Dichlorophenoxyacetic acid	µg/L	30	No relaxation

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
x)	DDT (o,p&p,p — Isomers of DDT, DDE and DDD)	µg/L	1	No relaxation
xi)	Endosulfan (α,β& sulphate)	µg/L	0.4	No relaxation
xii)	Ethion	µg/L	3	No relaxation
xiii)	Gamma - HCH (Lindane)	µg/L	2	No relaxation
xiv)	Isoproturon	µg/L	9	No relaxation
xv)	Malathion	µg/L	190	No relaxation
xvi)	Methyl parathion	µg/L	0.3	No relaxation
xvii)	Monocrotophos	µg/L	1	No relaxation
xviii)	Phorate	µg/L	2	No relaxation
Table 6	**Bacteriological Quality of Drinking Water**			
44.	E.coli or thermotolerant coliform bacteria	/100	Not detectable	-
45.	Total coliform bacteria	/100 mL	Not detectable	-
	Virological Requirements			
46.	MS2 phage	/1 L	Absent	-
	Biological Requirements			
47.	Cryptosporidium	/10 L	Absent	-
48.	Giardia	/10 L	Absent	-
49.	Microscopic organisms such as algae,zooplanktons,flagellates,parasites and toxin producing organisms		Free from microscopic organisms	-

Annexure VIII: CPCB Water Quality Criteria:

Designated best use	Quality Class	Primary Water Quality Criteria
Drinking water source without conventional treatment but with chlorination	A	➢ Total coliform organisms (MPN*/100 ml) shall be 50 or less ➢ pH between 6.5 and 8.5 ➢ Dissolved Oxygen 6 mg/Lor more, and ➢ Biochemical Oxygen Demand 2 mg/Lor less
Outdoor bathing (organized)	B	➢ Total coliform organisms (MPN/100 ml) shall be 500 or less ➢ pH between 6.5 and 8.5 ➢ Dissolved Oxygen 5 mg/Lor more, and ➢ Biochemical Oxygen Demand 3 mg/Lor less
Drinking water source with conventional treatment	C	➢ Total coliform organisms (MPN/100ml) shall be 5000 or less ➢ pH between 6 and 9 ➢ Dissolved Oxygen 4 mg/Lor more, and ➢ Biochemical Oxygen Demand 3 mg/Lor less
Propagation of wildlife and fisheries	D	➢ pH between 6.5 and 8.5 ➢ Dissolved Oxygen 4 mg/Lor more, and ➢ Free ammonia (as N) 1.2 mg/Lor less
Irrigation, industrial cooling, and controlled disposal	E	➢ pH between 6.0 and 8.5 ➢ Electrical Conductivity less than 2250 micro mhos/cm, ➢ Sodium Absorption Ratio less than 26, ➢ and Boron less than 2 mg/l.
	Below E	➢ Not Meeting A, B, C, D & E Criteria

Annexure IX: Water Quality Parameters Requirements and Classification

Water quality parameters are classified into three categories, given in Table (i), (ii) and (iii) (Source: CPCB, 2002, "Water Quality Criteria and Goals", Monitoring of Indian National aquatic Resources Series: MINARS/17/2001-2002).

Table: Basic Water Quality Requirement and Classification (Surface Water + Ground Water)

i) Simple Parameters:

Sr.	Parameters	Requirement for Waters of Class		
		A-Excellent	**B-Desirable**	**C-Acceptable**
(i)	Sanitary Survey	Very Clean neighborhood and catchment	Reasonably clean neighborhood	Generally clean neighborhood
(ii)	General Appearance	No floating matter	No floating matter	No floating matter
(iii)	Colour	Absolutely Colourless	Almost colourless, very light shade if any	No colour of anthropogenic origin
(iv)	Smell	Odourless	Almost odourless	No unpleasant odour
(v)	Transparency	>1.0 depth	>0.5 to 0.1m depth	>0.2 to 0.5 m depth
(vi)	Ecological* (Presence of Animals)	Fish & Insects	Fish & Insects	Fish & Insects

* Applicable to only surface water

ii) Regular Monitoring Parameters:

Sr.	Parameters	Requirement for Waters of Class		
		A Excellent	**B-Desirable**	**C-Acceptable**
(i)	pH	7.0 to 8.5	6.5 to 9.0	6.5 to 9.0
(ii)	DO (% Saturation)	90-110	80-120	60-140
(iii)	BOD, mg/l	Below 2	Below 5	Below 8
(iv)	EC, µmhos/cm	<1000	<2250	<4000
(v)	(NO_2+NO_3)-Nitrogen, mg/l	<5	<10	<15
(vi)	Suspended solid, mg/l	<25	<50	<100

Sr.	Parameters	Requirement for Waters of Class		
		A Excellent	B-Desirable	C-Acceptable
(vii)	Fecal Coliform, MPN/ 100 ml	<20 per 100 ml	<200 per 100 ml	<2000 per 100 ml
(viii)	Bio-assay (Zebra Fish)	No death in 5 days	No death in 3 days	No death in 2 days

Note:

1. Dissolved Oxygen (DO) not applicable for Ground Waters.
2. Dissolved Oxygen in eutrophicated waters should include measurement for diurnal variation.
3. Suspended solid limit is applicable only during non-monsoon period.
4. Faecal Coliform values should meet for 90% times.
5. Static Bio-Assay method may be adopted.

iii) Specific Parameters: (Only in case of need/apprehensions)

Sr.	Parameters	Requirement for Waters of Class		
		A- Excellent	B-Desirable	C-Acceptable
(i)	Total Phosphorous	<0.1 mg/l	< 0.2 mg/l	< 0.3 mg/l
(ii)	T.K.N	< 1.0 mg/l	<2.0 mg/l	<3.0 mg/l
(iii)	Total Ammonia (NH4 + NH3)-Nitrogen	< 0.5 mg/l	< 1.0 mg/l	< 1.5 mg/l
(iv)	Phenols	< 2µg/l	< 5µg/l	<10 µg/l
(v)	Surface Active Agents	<20 µg/l	<100µg/l	< 200µg/l
(vi)	Organo Chlorine Pesticides	< 0.05µg/l	< 0.1µg/l	< 0.2µg/l
(vii)	PAH	< 0.05µg/l	<0.1 µg/l	<0.2 µg/l
(viii)	PCB and PCT	< 0.01µg/l	< 0.01µg/l	< 0.02µg/l
(ix)	Zinc	< 100µg/l	< 200µg/l	<300 µg/l
(x)	Nickel	< 50µg/l	< 100µg/l	< 200µg/l
(xi)	Copper	< 20µg/l	< 50µg/l	<100µg/l

Sr.	Parameters	Requirement for Waters of Class		
		A- Excellent	B-Desirable	C-Acceptable
(xii)	Chromium (Total)	< 20µg/l	< 50µg/l	< 100µg/l
(xiii)	Arsenic (Total)	< 20µg/l	<50 µg/l	<100 µg/l
(xiv)	Lead	< 20µg/l	< 50µg/l	< 100µg/l
(xv)	Cadmium	< 1.0µg/l	<2.5 µg/l	< 5.0µg/l
(xvi)	Mercury	< 0.2µg/l	< 0.5µg/l	< 1.0µg/l