ACTION PLAN FOR INDUSTRIAL CLUSTER IN CRITICALLY POLLUTED AREA

Monitoring, Sampling, Analysis of Stack, Ambient Air Quality, Surface Water, Ground Water, Waste Water

औरंगाबाद Aurangabad

Maharashtra Pollution Control Board

Kalptaru Point, Sion East, Mumbai - 400022
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By undertaking this project and completing in schedule time, we consider ourselves very lucky since we have helped the mankind by giving the data on pollution load and further action by the Board, to bring down the pollution level.

We also thank our associates for working on this project for making the write up, making graphs and feeding the data on computer.

This acknowledgement will be incomplete if we do not thank our laboratory analysts and others who made this project a success by timely analysing the samples.
We also thank our sampling team members for conducting the sampling in this vast area.

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

India has experienced rapid industrial growth in last few years. Maharashtra is one of the most industrialized states in the country. The state has identified industrial sectors like auto, engineering, chemical, electronics and textile as focus sectors. Industrial processes and activities consume materials and resources for manufacturing products generating emissions, effluents and solid wastes. Rise in growth in industrial activities is leading to manifold impacts to the environment. This environmental pollution is a wide reaching problem and if not controlled to certain tolerable levels, it is likely to influence the human health too. Long term exposure to the polluted air and water causes chronic health problems. Hence, 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.

The extent of pollution varies with the size of the industry, the nature of the industry, the type of products used and produced etc. 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. 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. 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. For the study, Central Pollution Control Board (CPCB) has selected a total of 88 industrial areas or clusters in consultation with the Ministry of Environment & Forests Government of India. Out of these, 5 critically polluted industrial clusters namely Tarapur, Dombivali, Navi Mumbai, Aurangabad and Chandrapur, are identified and 3 severely polluted industrial clusters namely Pimpri-chinchwad, Nashik and Chembur from Maharashtra are added into this list.

Aurangabad city is located in the northern part of the state of Maharashtra, in the western region of India. It is 375 km from Mumbai. The city is surrounded by hills. Aurangabad is famous for the World Heritage Sites Ajanta and Ellora. Named after Aurangzeb, the last of the great Mughal Emperors, Aurangabad acquired plenty of monuments and a rich culture as its heritage from the middle ages. Aurangabad is also famous for its silk and cotton textiles. The Shendra, Chikalthana and Waluj MIDC Industrial Areas are prominent industrial zones on the outskirts of the city, with various major multinational groups having set up manufacturing or processing plant in and around the city. Many firms have their manufacturing bases in Aurangabad in the sectors of automotive and auto components, pharmaceuticals and breweries, consumer durables, plastic processing, aluminum processing, agriculture and biotech. Among Pharmaceutical there is Recombinant Insulin Manufacturing plant of Wockhardt (Wockhardt Biotech Park) in Aurangabad, which is Largest Biopharmaceutical plant in India.

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 and Nashik** as per standard methods.

- At each of the 5 CPAs and 3 SPAs, 24 hourly ambient air quality monitoring to be carried out.
- Representative samples for surface water quality, waste water quality and Ground Water quality to be collected from prominent surface and Ground Water bodies located in and around 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 CPAs and 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 and Ground Water Quality for Aurangabad:

- The sampling was carried out in 12 days at various locations i.e. from 22nd June to 29th June, 2017 for 4 MIDC namely: Chikalthana, Waluj, Shendra and Paithan Road.
- **MIDC Chikalthana**: It comprises of a total of 8 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 3 Waste Water Samples and 6 Ground Water Samples were collected and analyzed.
- **MIDC Waluj**: It includes of a total of 8 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 3 Waste Water Samples and 5 Ground Water Samples were collected and analyzed.
- **MIDC Shendra**: It comprises of a total of 8 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 4 Waste Water Samples and 5 Ground Water Samples were collected and analyzed.
- **MIDC Paithan Road**: It includes of a total of 8 Stack Monitoring Samples, 3 Ambient Air Quality Monitoring Samples, 5 Waste Water Samples and 5 Ground Water Samples were collected and analyzed.

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 (PM_{10})

4) Particulate Matter ($PM_{2.5}$)

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 was analyzed 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 and Ground 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 so as to arrive at the CEPI. This will further help the authorities to monitor the areas in order to improve the current 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 various types of parameters is presented under following annexure:

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

4. 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.
- ND specifies that even though the sample was analysed for the parameter, it was not detected.
- 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. The limits are represented on the graphical representation.

Sr.	Name of Industry/ Location	Stack Identity/ Location detail	MIDC	Table No.
1.	Jolly Board Ltd. United Spirits Ltd.	Stack No. 1	Chikalthana	Table No. I
2.	Wochhardt Ltd (R &D)	Stack No. 1	Chikalthana	Table No. I
3.	Harman Finochem Ltd.	Stack No. 1	Chikalthana	Table No. I
4.	Harman Finochem Ltd.	RPS 3	Chikalthana	Table No. I
5.	Radiant Indus Chem Pvt. Ltd.	Stack No. 1	Chikalthana	Table No. I

Sr.	Name of Industry/ Location	Stack Identity/ Location detail	MIDC	Table No.
6.	United Spirits	Stack No. 1	Chikalthana	Table No. I
7.	Lupin Limited	Stack No. 1	Chikalthana	Table No. I
8.	NHK Automotive Components India Pvt. Ltd.	Electric Heating	Chikalthana	Table No. II
9.	Carlsberg India Pvt Ltd.	Stack No. 1	Waluj	Table No. II
10.	Balkrishna Industries (BKT) Ltd.	Stack No. 2	Waluj	Table No. II
11.	Mylan Laboratories Ltd.	Stack No. 5	Waluj	Table No. II
12.	IPCA Laboratories	Stack No. 1	Waluj	Table No. III
13.	IPCA Laboratories	Stack No. 1	Waluj	Table No. III
14.	FDC Ltd.	Stack No. 2	Waluj	Table No. III
15.	Cosmo Films	Stack No. 1	Waluj	Table No. III
16.	Endo Europian	Stack No. 2	Waluj	Table No. IV
17.	Amri India Pvt Ltd.	Stack No. 1	Waluj	Table No. IV
18.	Ajanta Pharma Ltd.	Stack No. 1	Waluj	Table No. IV
19.	Wockhardt Ltd.	Stack No. 1	Shendra	Table No. V
20.	Radico NV Distilleries Maharashtra Ltd.	Stack No. 1	Shendra	Table No. V
21.	Metalyst Forgings Limited	Short Blasting	Shendra	Table No. V
22.	Glenmark Pharmaceuticals Lab.	Stack No. 1	Shendra	Table No. V
23.	Cosmos Films	Stack No. 1	Shendra	Table No. VI
24.	Radiant Indus Chem Pvt. Ltd.	Stack No. 1	Shendra	Table No. VI
25.	Premium Transmission	Stack No. 1	Shendra	Table No. VI
26.	Cosmo Films Ltd.	Stack No. 1	Shendra	Table No. VI

Sr.	Name of Industry/ Location	Stack Identity/ Location detail	MIDC	Table No.
27.	Glenmark Pharmaceuticals Ltd.	PSI	Shendra	Table No. VI
28.	Jailaxmi Casting & Alloys Pvt Ltd.	Stack No. 1	Paithan Road	Table No. VII
29.	Frigorifico Allana Pvt Ltd	MDC Stad	Paithan Road	Table No. VII
30.	Aurangabad Electricals Ltd.	Stack No. 1	Paithan Road	Table No. VII
31.	Ajanta Pharma Ltd.	Stack No. 1	Paithan Road	Table No. VII
32.	Galaxy laboratories Pvt Ltd.	Stack No. 1	Paithan Road	Table No. VIII
33.	OMR Bagla Automotive System India Ltd.	Stack No. 1	Paithan Road	Table No. VIII
34.	Marathwada Chemicals	Stack No. 1	Paithan Road	Table No. VIII
35.	BG Fastening	Stack No. 3	Paithan Road	Table No. VIII

Table No. I:

Name of Industry		**Jolly Board Ltd.**	**Wochhardt Ltd.**	**Harman Finochem Limited**	**Harman Finochem Limited**
Date of Sampling		**23.05.18**	**23.05.18**	**23.05.18**	**23.05.18**
Parameters	**Units**	**Results**			
Particulate Matter	mg/Nm^3	18	25	28	-
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	17.4	5.81	13.06	-
	kg/day	9.42	0.18	1.45	-
Std. Limit	**kg/day**		**90**		**400**

Table No. II:

Name of Industry		**Radient Indus Chem Pvt Ltd.**	**United Spirits**	**Lupin Limited**	**NHK Auto Motive**
Date of Sampling		**23.05.18**	**23.05.18**	**23.05.18**	**23.05.18**
Parameters Units		**Results**			
Particulate Matter	mg/Nm^3	29	17	22	-
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	11.2	23.3	9.79	-
	kg/day	2.89	8.9	1.38	-
Std. Limit	**kg/day**		**90**		**400**

Table No. III

Name of Industry		**Carlsberg India Pvt Ltd.**	**BKT**	**Mylan Lab Ltd.**	**FDC Ltd.**
Date of Sampling		**17.05.18**	**17.05.18**	**18.05.18**	**17.05.18**
Parameters	**Units**	**RESULTS**			
Particulate Matter	mg/Nm^3	20	0	22	15
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	BDL	0	BDL	BDL
	kg/day	BDL	0	BDL	BDL
Std. Limit	**kg/day**		**90**		**400**

Table No. IV

Name of Industry		**Cosmo Films**	**Endo Europian**	**Amri India Pvt Ltd.**	**Ajanta Pharma Ltd.**
Date of Sampling		**18.05.18**	**18.05.18**	**18.05.18**	**18.05.18**
Parameters Units		**RESULTS**			
Particulate Matter	mg/Nm^3	22	28	-	-
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	20	6.53	-	-
	kg/day	3.41	0.6	-	-
Std. Limit	**kg/day**		**90**		**400**

Table No. V

Name of Industry		**Wockhardt Ltd.**	**Radico NV Distilleries Maharashtra Ltd.**	**Metalyst Forgings Limited**	**Glenmark Pharmaceuticals Ltd.**
Date of Sampling		**29.05.18**	**29.05.18**	**29.05.18**	**29.05.18**
Parameters Units		**RESULTS**			
Particulate Matter	mg/Nm^3	32	36	28	26
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	9.05	18.1	8.72	5.81
	kg/day	2.05	73.7	3.03	1.33
Std. Limit	**kg/day**		**90**		**400**

Table No. VI:

Name of Industry		**Cosmos Films Ltd.**	**Radient Indus Chem Pvt Ltd.**	**Premium Transmission Ltd.**	**Glenmark Pharmaceuticals Ltd.**
Date of Sampling		**29.05.18**	**29.05.18**	**29.05.18**	**29.05.18**
Parameters Units		**RESULTS**			
Particulate Matter	mg/Nm^3	32	26	-	-
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	11.6	9.23	-	-
	kg/day	1.66	0.82	-	-
Std. Limit	**kg/day**		**90**		**400**

Table No. VII

Name of Industry		**Jailaxmi Casting & Alloys Pvt Ltd.**	**Frigorifico Allana Pvt Ltd.**	**Aurangabad Electrical**	**Ajanta Pharma Ltd.**
Date of Sampling		**19.05.18**	**19.05.18**	**19.05.18**	**19.05.18**
Parameters Units		**RESULTS**			
Particulate Matter	mg/Nm^3	26	22	18	16
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	11.2	5.92	8.88	14.5
	kg/day	17.7	3	45.5	0.45
Std. Limit	**kg/day**		**90**		**400**

Table No. VIII

Name of Industry		**Galaxy laboratories Pvt Ltd.**	**OMR Bagla Automotive System India Ltd.**	**Marathwada Chemical**	**BG Fastening**
Date of Sampling		**20.05.18**	**20.05.18**	**20.05.18**	**20.05.18**
Parameters Units		**RESULTS**			
Particulate Matter	mg/Nm^3	13	29	21	-
Std. Limit	**mg/Nm^3**	**150**	**100**	**150**	**150**
Sulphur Dioxide (SO_2)	mg/Nm^3	19.2	15	11.6	-
	kg/day	2.3	3.52	0.84	-
Std. Limit	**kg/day**		**90**		**400**

Table No. IX

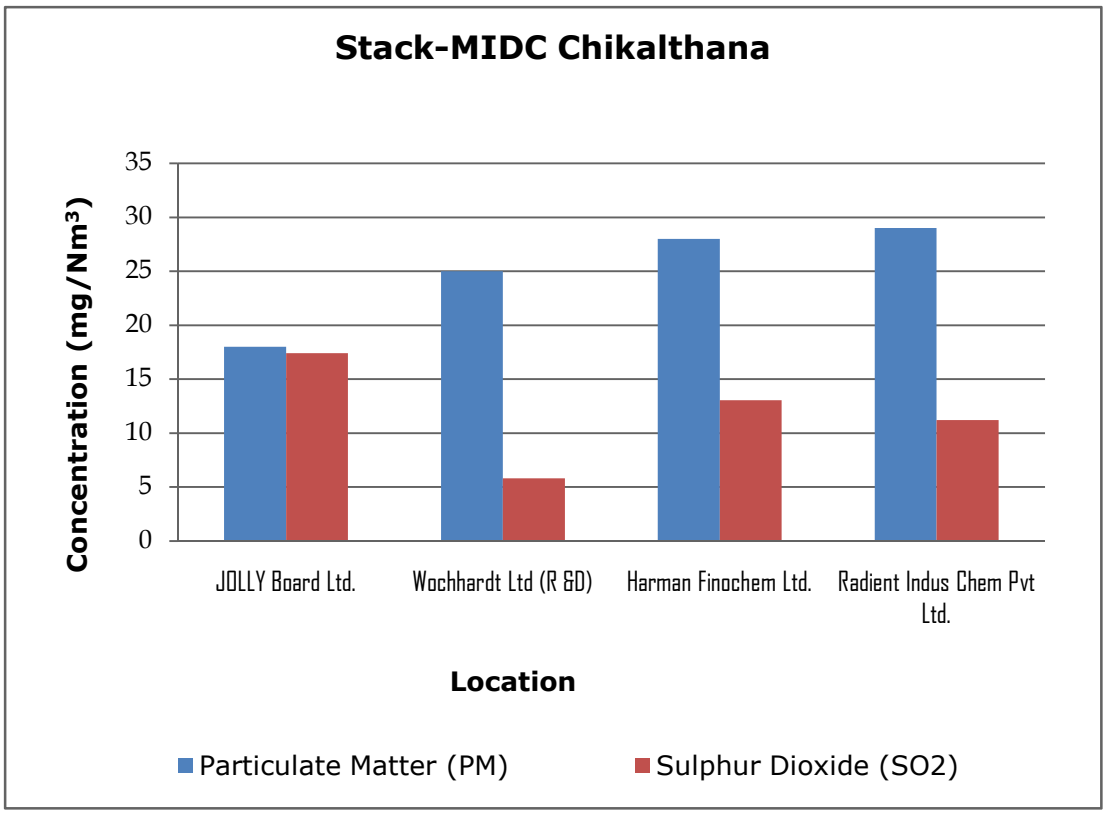
VOCs Results of Aurangabad					
		Chikalthana		**Shendra**	
Name of Industry		**Harman Finochem Limited**	**NHK Auto Motive**	**Premium Transmission Ltd.**	**Glenmark Pharmaceuticals Ltd.**
Date of Sampling		**23.05.18**	**24.05.18**	**29.05.18**	**29.05.18**
Parameter	**Unit**	**RESULTS**			
MIBK	mg/Nm^3	ND	ND	ND	ND
Benzene	mg/Nm^3	ND	ND	ND	ND
Toluene	mg/Nm^3	ND	ND	ND	ND
Xylene	mg/Nm^3	ND	ND	ND	ND
Ethyl Benzene	mg/Nm^3	ND	ND	ND	ND
Ethyl Acetate	mg/Nm^3	ND	ND	ND	ND

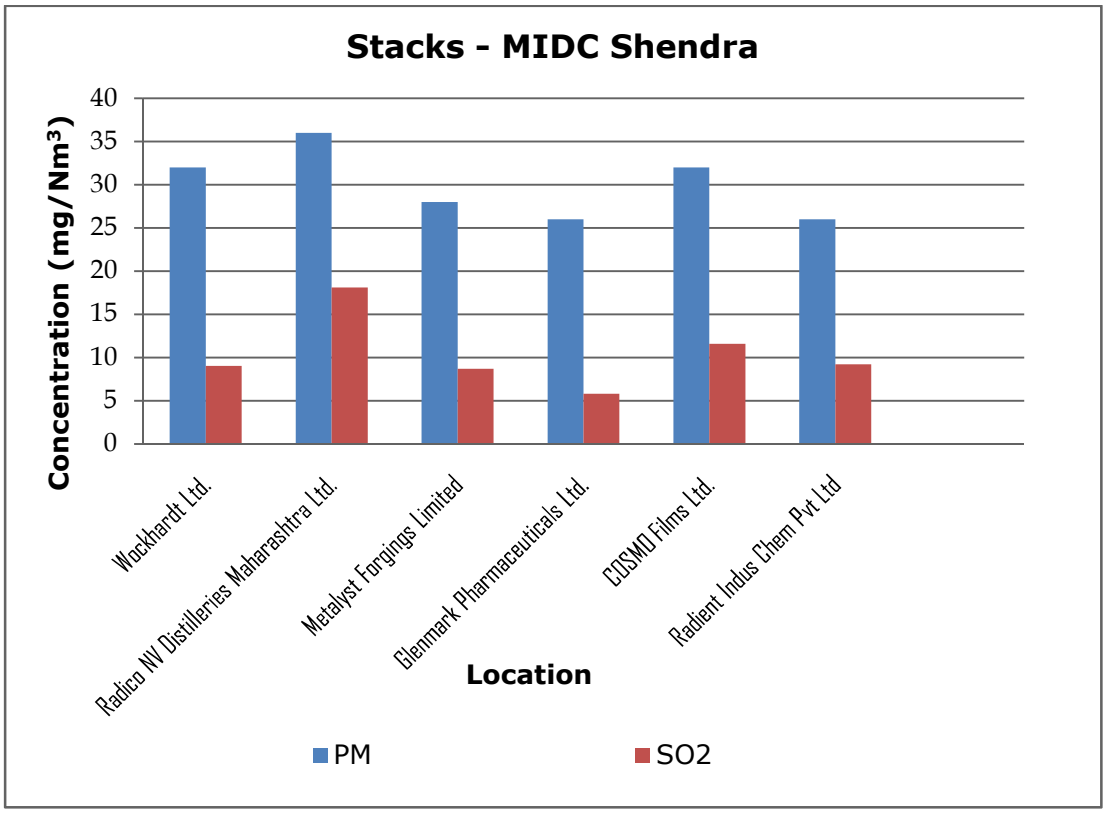
Table No. X

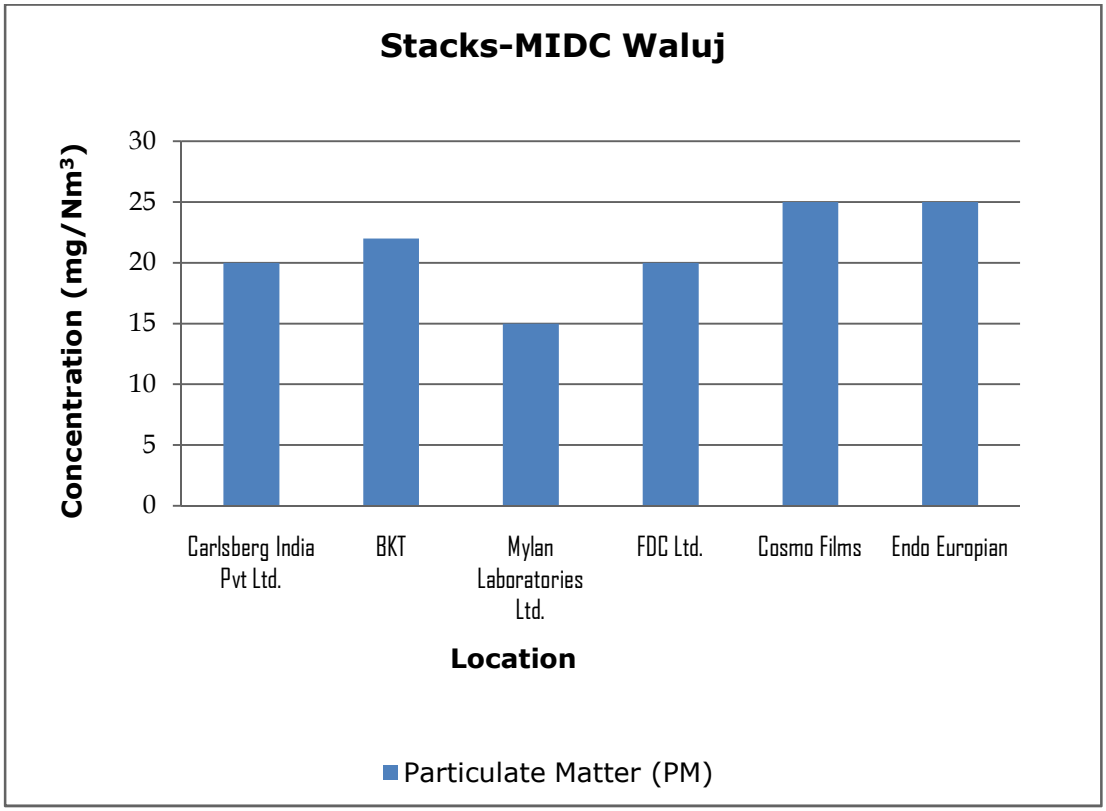
		Waluj		Paithan Road
Name of Industry		**Amri India Pvt Ltd.**	**Ajanta Pharma Ltd.**	**BG Fastening, Citegaon**
Date of Sampling		**18.05.18**	**18.05.18**	**20.05.18**
Parameter	**Unit**	**RESULTS**		
MIBK	mg/Nm^3	ND	ND	ND
Benzene	mg/Nm^3	ND	ND	ND
Toluene	mg/Nm^3	ND	ND	ND
Xylene	mg/Nm^3	ND	ND	ND
Ethyl Benzene	mg/Nm^3	ND	ND	ND
Ethyl Acetate	mg/Nm^3	ND	ND	ND

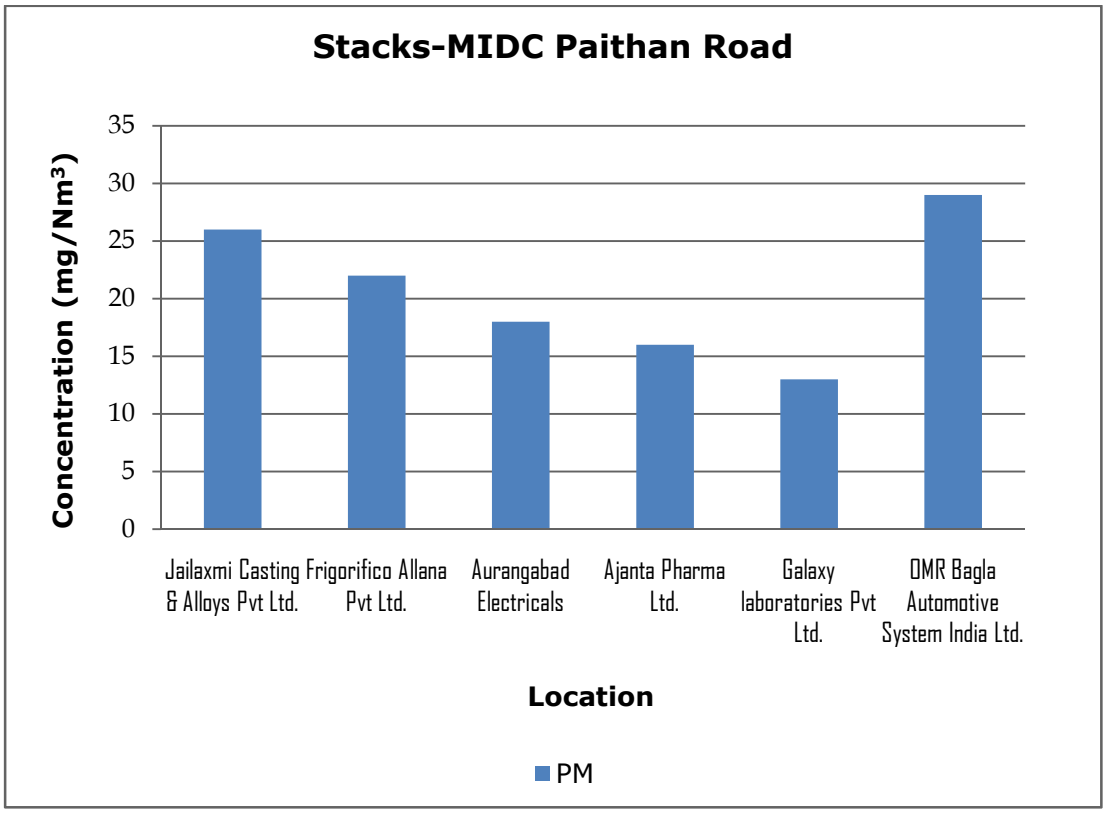
Graphs: Stack Emission Monitoring:

Please Note: *As per the results, parameters like Flouride, Poly Aromatic Hydrocarbon, Hydrogen sulphide, acid mist, ammonia, Hydrogen Chloride, Benzene, Toluene, Xylene and Volatile Organic Carbons (VOCs) are found either Below detection limit or not detected, hence not included in the graphs below.*




Stacks - MIDC Shendra
Concentration (mg/Nm³)
40
35
30
25
20
15
10
5
0
Wockhardt Ltd.
Radico NV Distilleries Maharashtra Ltd.
Metalyst Forgings Limited
Glenmark Pharmaceuticals Ltd.
COSMO Films Ltd.
Radient Indus Chem Pvt Ltd
Location
PM
SO2


Stacks-MIDC Waluj
Concentration (mg/Nm³)
30
25
20
15
10
5
0
Carlsberg India Pvt Ltd.
BKT
Mylan Laboratories Ltd.
FDC Ltd.
Cosmo Films
Endo Europian
Location
Particulate Matter (PM)



3.2 Ambient Air Quality:

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

Sr.	Name of Location	MIDC	Included in
1.	Harman Finochem Limited	Chikhalthana	Table No. I
2.	Wochhardt Ltd (R &D)	Chikhalthana	Table No. I
3.	MPCB Office	Chikhalthana	Table No. I
4.	JK Ansell Pvt Ltd.	Waluj	Table No. II
5.	Mylan Laboratories Ltd.	Waluj	Table No. II
6.	Cosmo Films	Waluj	Table No. II
7.	Wockhardt Ltd.	Shendra	Table III
8.	NRB Bearing	Shendra	Table III
9.	Liegher	Shendra	Table III

Sr.	Name of Location	MIDC	Included in
10.	Jailaxmi Casting & Alloys Pvt Ltd.	Paithan Road	Table IV
11.	Aurangabad Electricals	Paithan Road	Table IV
12.	Frigorifico Allana Pvt Ltd.	Paithan Road	Table IV

Table No. I

Name of Industry				Harman Finochem Limited	Wochhardt Ltd (R &D)	MPCB Office
Sr.	**Parameters**	**Units**	**Std. Limit**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	6.56	6.75	6.71
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	7.9	5.4	7.34
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	167	190	220
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	41	46	55
5.	Ozone (O_3)	$\mu g/m^3$	**180**	BDL	BDL	BDL
6.	Lead (Pb)	$\mu g/m^3$	**1**	BDL	BDL	BDL
7.	Carbon Monoxide (CO)	mg/m^3	**04**	3.74	2.46	1.49
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	BDL	BDL	BDL
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	BDL	BDL	BDL
10.	Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	**1**	BDL	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	BDL	BDL	BDL
12.	Nickel (Ni)	ng/m^3	**20**	BDL	BDL	BDL

Table No. II

Name of Industry				**JK Ansell Pvt Ltd.**	**Mylan Labs Ltd.**	**Cosmo Films**
Sr.	**Parameters**	**Units**	**Std. Limit**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	6.93	6.61	6.72
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	7.9	7.45	7.12
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	89	329	152
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	18	82	37.8
5.	Ozone (O_3)	$\mu g/m^3$	**180**	BDL	BDL	BDL
6.	Lead (Pb)	$\mu g/m^3$	**1**	BDL	BDL	BDL
7.	Carbon Monoxide (CO)	mg/m^3	**04**	2.6	2.94	2.46
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	BDL	BDL	BDL
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	BDL	BDL	BDL
10.	Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	**1**	BDL	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	BDL	BDL	BDL
12.	Nickel (Ni)	ng/m^3	**20**	BDL	BDL	BDL

Table No. III

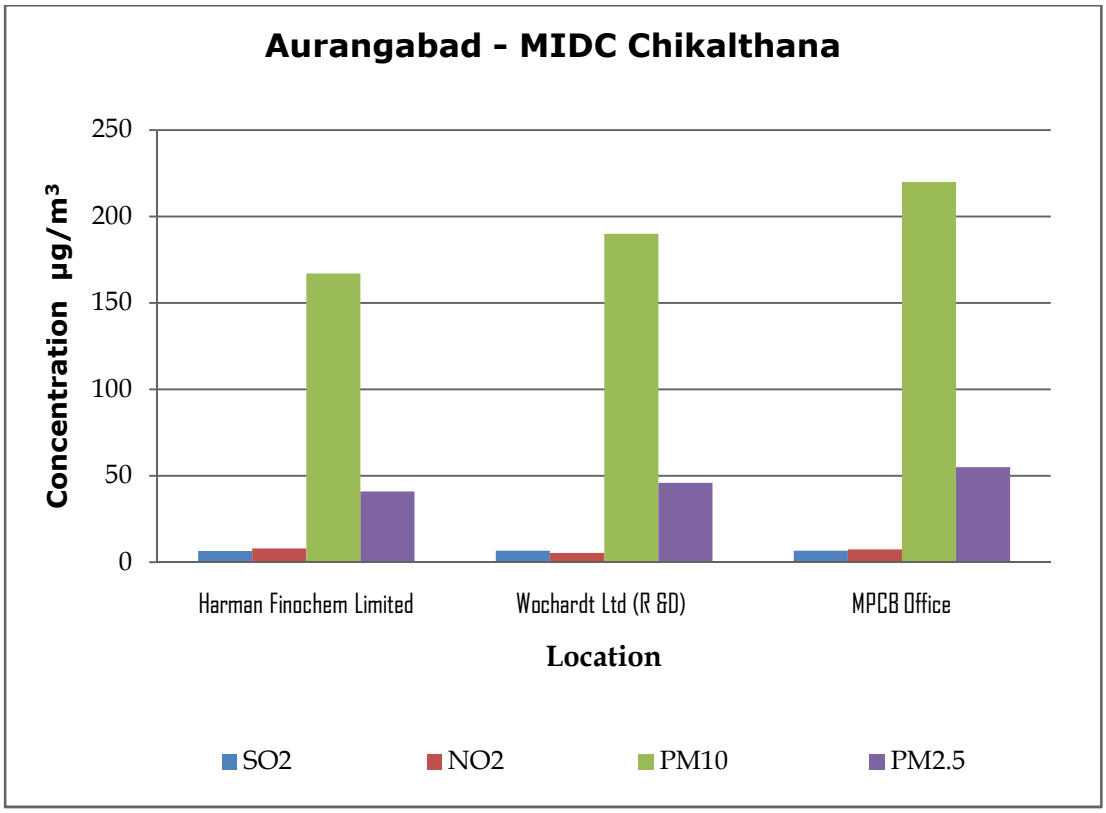
Name of Industry				Wockhardt Ltd.	NRB Bearing	Liegher
Sr.	**Parameters**	**Units**	**Std. Limit**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	6.72	7.00	6.50
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	7.56	7.6	7.34
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	348	75	359
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	54	18	87
5.	Ozone (O_3)	$\mu g/m^3$	**180**	BDL	BDL	BDL
6.	Lead (Pb)	$\mu g/m^3$	**1**	BDL	BDL	BDL
7.	Carbon Monoxide (CO)	mg/m^3	**04**	1.65	1.36	4.09
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	BDL	BDL	BDL
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	BDL	BDL	BDL
10.	Benzo (a) Pyrene (BaP) – particulate phase only,	ng/m^3	**1**	BDL	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	BDL	BDL	BDL
12.	Nickel (Ni)	ng/m^3	**20**	BDL	BDL	BDL

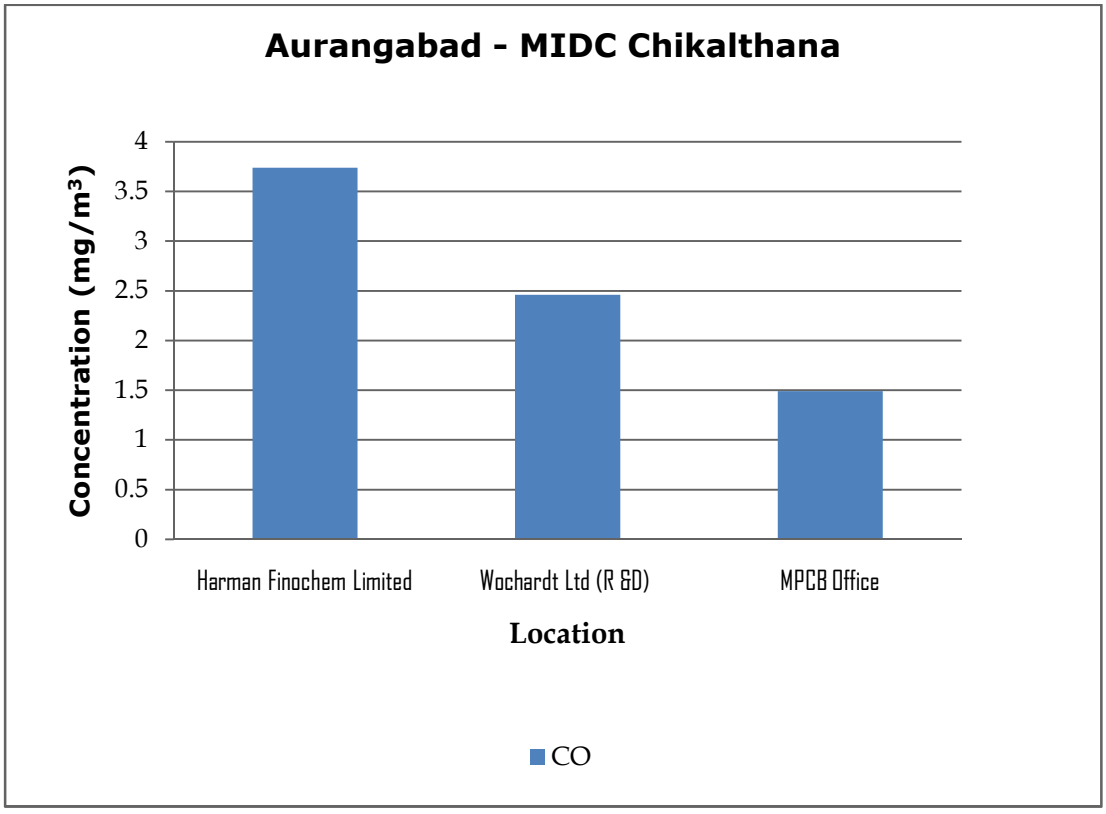
Table No. IV

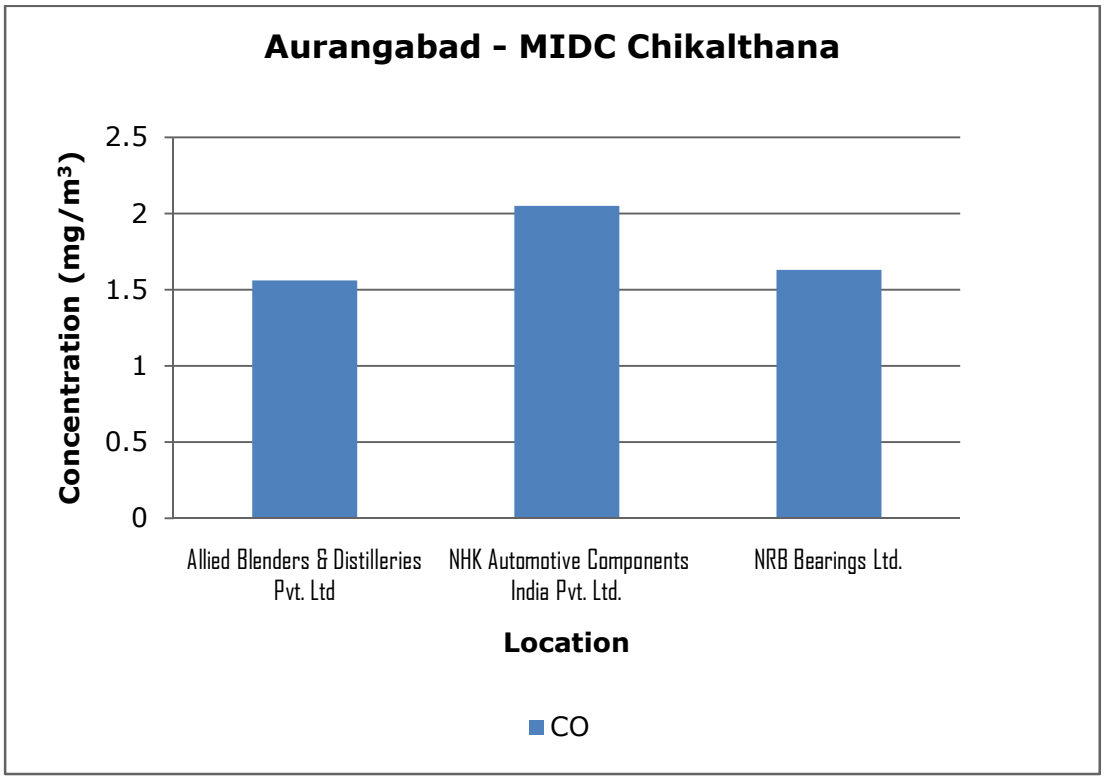
Name of Industry				**Jailaxmi Casting & Alloys Pvt Ltd.**	**Aurangabad Electricals**	**Frigorifico Allana Pvt Ltd.**
Sr.	**Parameters**	**Units**	**Std. Limit**	**Results**		
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	**80**	6.5	6.12	6.61
2.	Nitrogen Dioxide (NO_2)	$\mu g/m^3$	**80**	6.93	6.56	5.11
3.	Particulate Matter (size less than 10 µm) or PM_{10}	$\mu g/m^3$	**100**	231	265	103
4.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	$\mu g/m^3$	**60**	57	66	25
5.	Ozone (O_3)	$\mu g/m^3$	**180**	BDL	BDL	BDL
6.	Lead (Pb)	$\mu g/m^3$	**1**	BDL	BDL	BDL
7.	Carbon Monoxide (CO)	mg/m^3	**04**	2.2	2.37	2.45
8.	Ammonia (NH_3)	$\mu g/m^3$	**400**	BDL	BDL	BDL
9.	Benzene (C_6H_6)	$\mu g/m^3$	**5**	BDL	BDL	BDL
10.	Benzo (a) Pyrene (BaP) – particulate phase only,	ng/m^3	**1**	BDL	BDL	BDL
11.	Arsenic (As)	ng/m^3	**6**	BDL	BDL	BDL
12.	Nickel (Ni)	ng/m^3	**20**	BDL	BDL	BDL

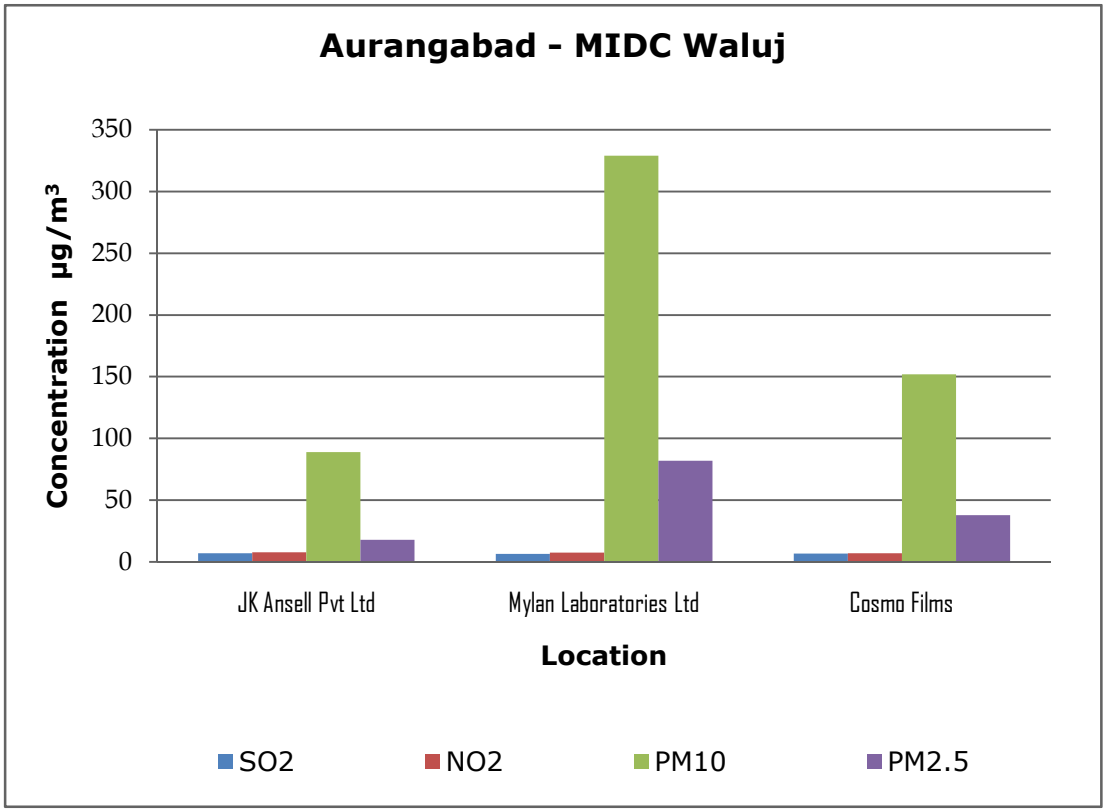
Graphs: Ambient Air Quality of Aurangabad

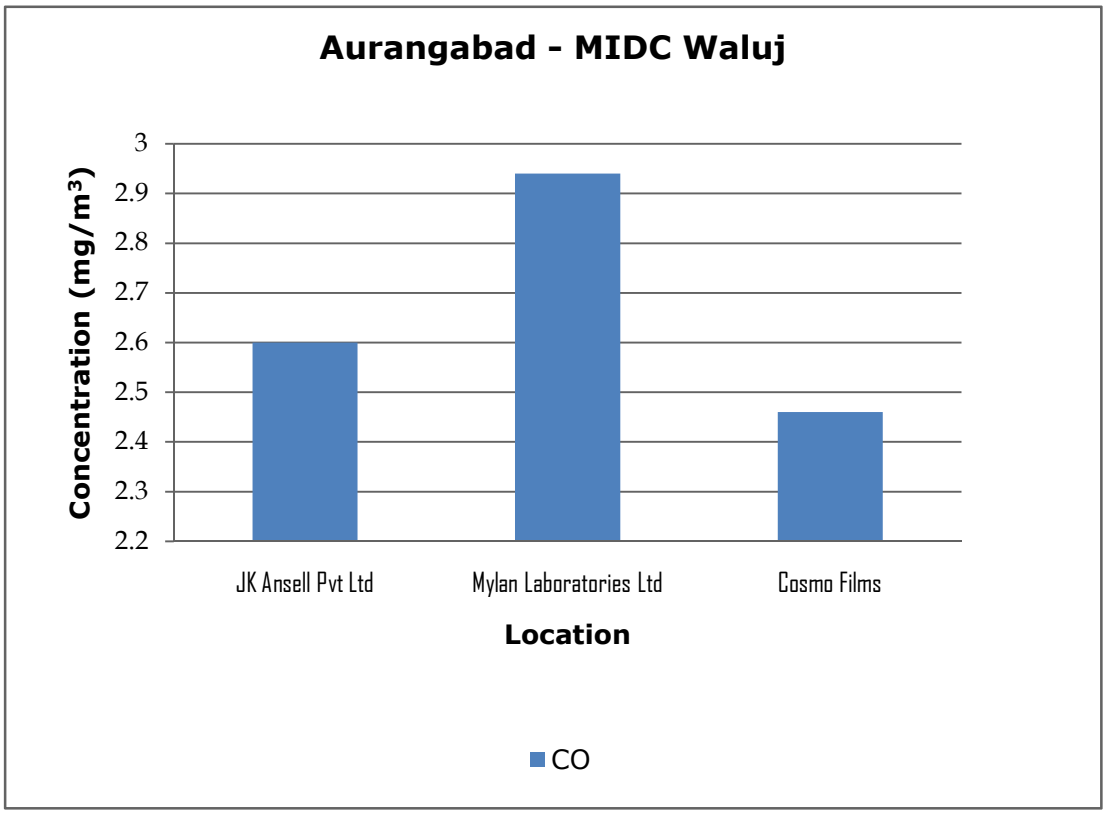
Please Note: *As per the results, parameters like Pb, C_6H_6, NH_4, Bap, As, Ni and Volatile Organic Carbons (VOCs) are found either Below detection limit or not detected, hence not included in the graphs below*

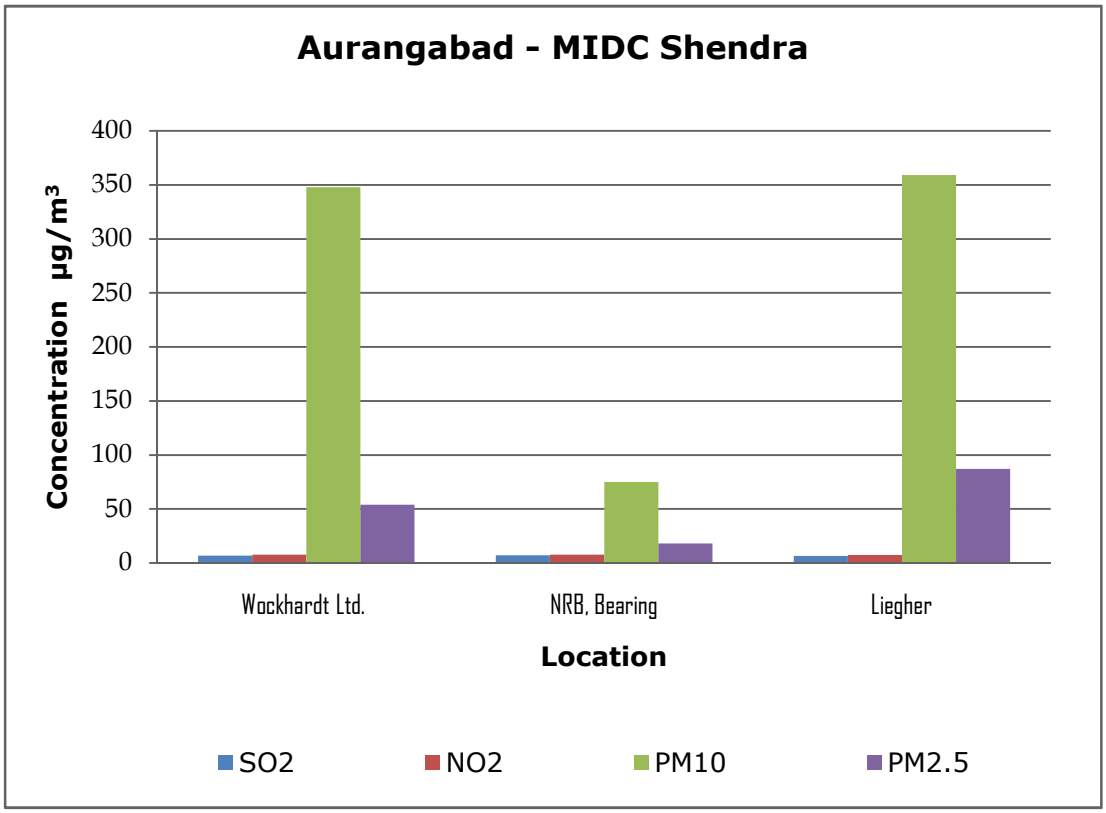


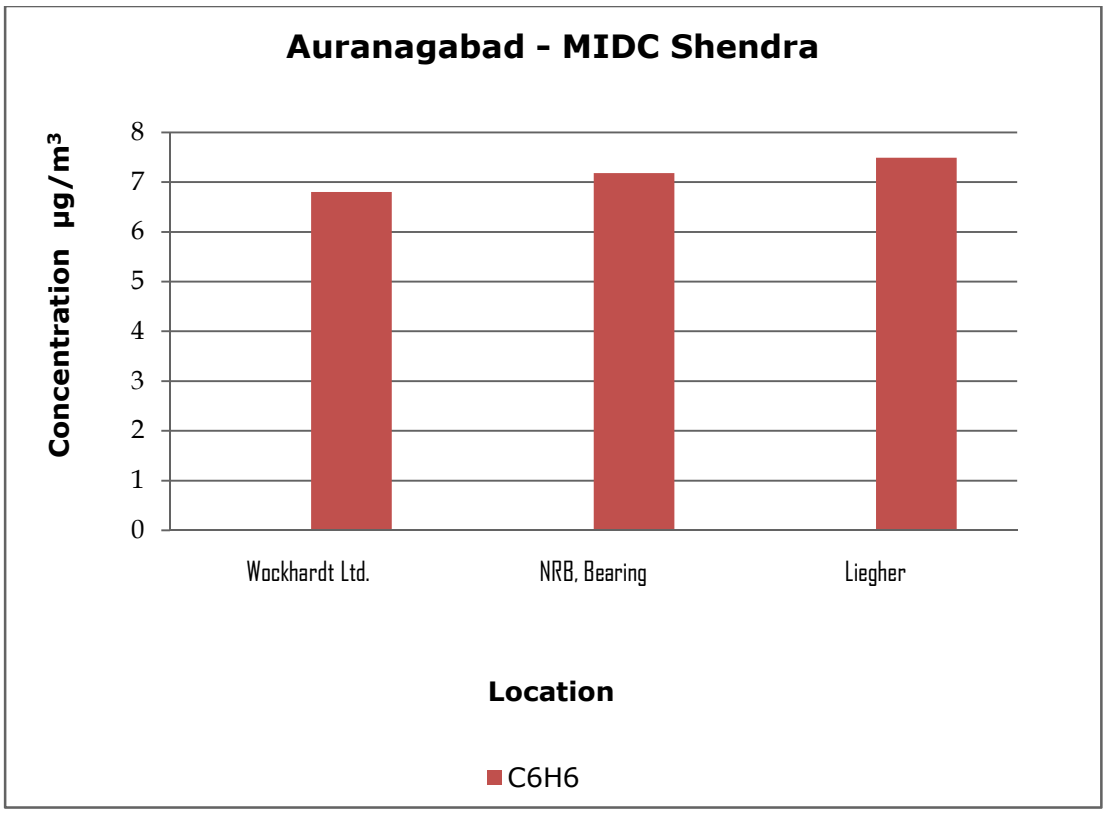


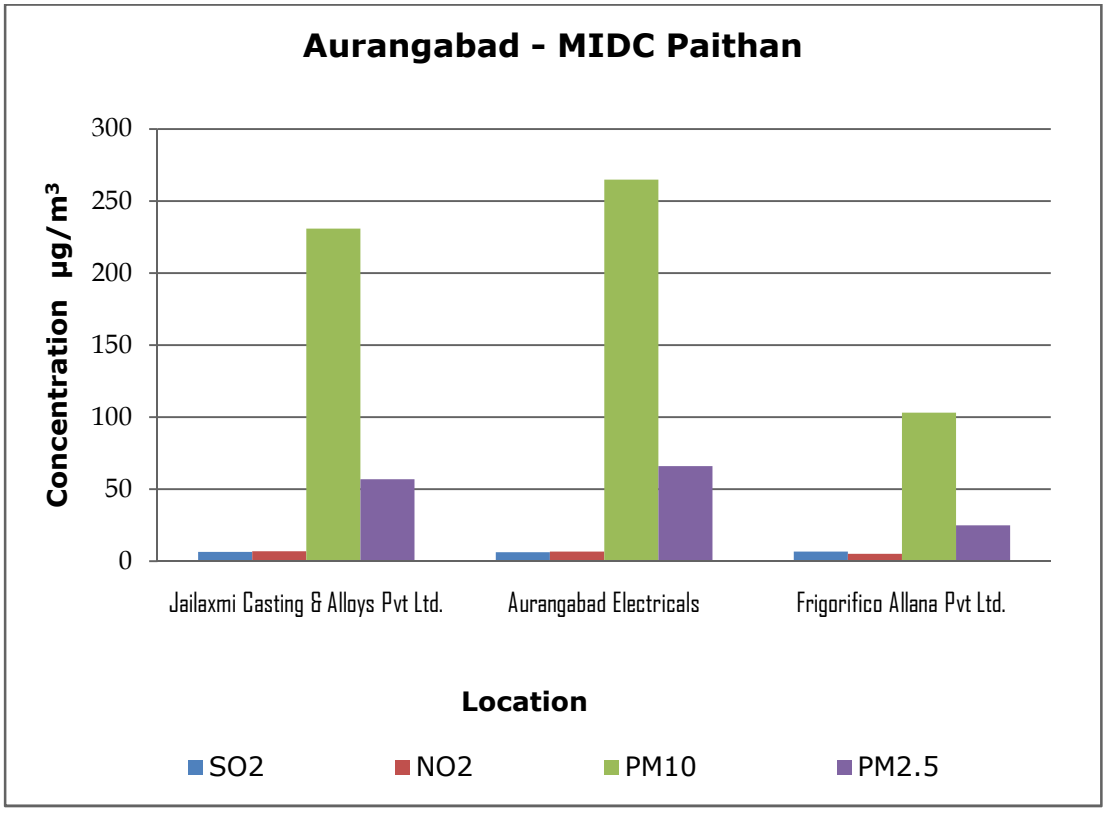

Aurangabad - MIDC Chikalthana
Concentration (mg/m³)
2.5
2
1.5
1
0.5
0
Allied Blenders & Distilleries Pvt. Ltd
NHK Automotive Components India Pvt. Ltd.
NRB Bearings Ltd.
Location
CO

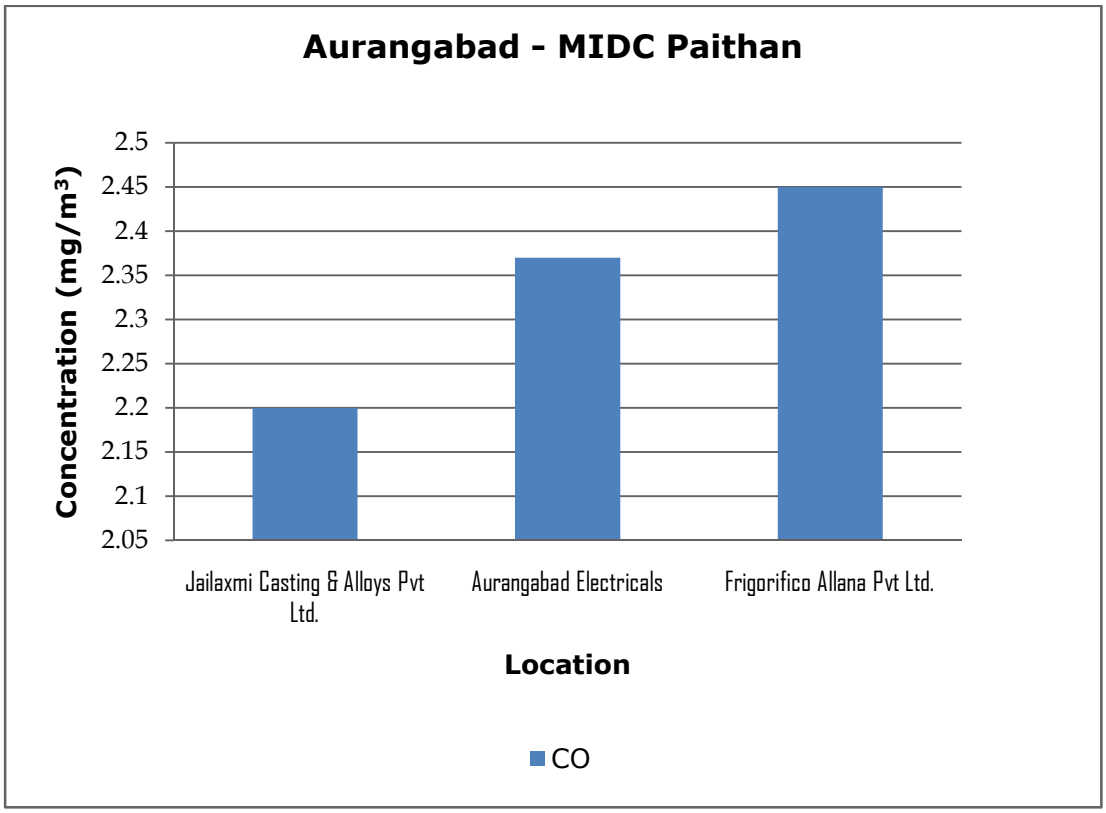

Aurangabad - MIDC Waluj
Concentration µg/m³
350
300
250
200
150
100
50
0
JK Ansell Pvt Ltd
Mylan Laboratories Ltd
Cosmo Films
Location
SO2
NO2
PM10
PM2.5


Aurangabad - MIDC Waluj
Concentration (mg/m³)
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
JK Ansell Pvt Ltd
Mylan Laboratories Ltd
Cosmo Films
Location
CO


Aurangabad - MIDC Shendra
Concentration µg/m³
400
350
300
250
200
150
100
50
0
Wockhardt Ltd.
NRB, Bearing
Liegher
Location
SO2
NO2
PM10
PM2.5


Auranagabad - MIDC Shendra
Concentration µg/m³
8
7
6
5
4
3
2
1
0
Wockhardt Ltd.
NRB, Bearing
Liegher
Location
C6H6


Aurangabad - MIDC Paithan
Concentration µg/m³
300
250
200
150
100
50
0
Jailaxmi Casting & Alloys Pvt Ltd.
Aurangabad Electricals
Frigorifico Allana Pvt Ltd.
Location
SO2
NO2
PM10
PM2.5



3.3 Surface Water/Waste water Analysis Results:

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

Sr.	Name of Location	MIDC	Included in
1.	Wochhardt Ltd (R &D)	Chikhalthana	Table No. I
2.	ABD Pvt Ltd	Chikhalthana	Table No. I
3.	Lupin Limited	Chikhalthana	Table No. I
4.	Carlsberg India Pvt Ltd	Waluj	Table II
5.	Mylan Laboratories Ltd.	Waluj	Table II
6.	JK Ansell Pvt Ltd.	Waluj	Table II
7.	Wockhardt Ltd.	Shendra	Table No. III

Sr.	Name of Location	MIDC	Included in
8.	Perkins India Pvt Ltd.	Shendra	Table No. III
9.	Skoda Auto India Pvt. Limited	Shendra	Table No. III
10.	Radiant Industries	Shendra	Table No. III
11.	Frigorifico Allana Pvt Ltd.	Paithan Road	Table No. IV
12.	Nall Near Kanchanwadi	Paithan Road	Table No. IV
13.	Nalla Near Nath Group	Paithan Road	Table No. IV
14.	M/s. Jhaveri Flexo India Ltd.	Paithan Road	Table No. IV
15.	OMR Bagla Automotive System India Ltd.	Paithan Road	Table No. IV

Table No. I

Name of Industry				**Wochhardt Ltd (R &D)**	**ABD Pvt Ltd**	**Lupin Limited**
Location				ETP Outlet	ETP Outlet	ETP Outlet
Date of Sampling				**22.05.18**	**22.05.18**	**22.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
1.	Sanitary Survey	-		-	-	-
2.	General Appearance	-		-	-	-
3.	Colour	Hazen		3	5	5
4.	Smell	-		Disagreeable	Disagreeable	Disagreeable
5.	pH	-	**5.5 -9.0**	7.17	6.29	6.87
6.	Oil & Grease	mg/L	**10.0**	BDL	1.2	BDL
7.	Suspended Solids	mg/L	**100.0**	20	29	42
8.	Dissolved Oxygen (%Saturation)	%		0	0	49

Name of Industry				**Wochhardt Ltd (R &D)**	**ABD Pvt Ltd**	**Lupin Limited**
Location				ETP Outlet	ETP Outlet	ETP Outlet
Date of Sampling				**22.05.18**	**22.05.18**	**22.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
9.	Chemical Oxygen Demand	mg/L	**250.0**	160	1240	120
10.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	56	435	43
11.	Electrical Conductivity (at 25^{o}C)	µmho/ cm		2380	992	1036
12.	Nitrite Nitrogen (as N)	mg/L		BDL	BDL	3.45
13.	Nitrate Nitrogen (as N)	mg/L	**5.0**	16.1	11.4	46.1
14.	(NO_2 + NO_3)-Nitrogen	mg/L	**10.0**	16.1	11.4	49.5
15.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.23	BDL	BDL
16.	Total Residual Chlorine	mg/L	**1.0**	BDL	BDL	BDL
17.	Cyanide (as CN)	mg/L	**0.2**	BDL	BDL	BDL
18.	Fluoride (as F)	mg/L	**2.0**	0.35	0.79	0.55
19.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL	BDL
20.	Dissolved Phosphate (as P)	mg/L	**5.0**	1	BDL	BDL
21.	Sodium Absorption Ratio			BDL	BDL	BDL

Name of Industry				**Wochhardt Ltd (R &D)**	**ABD Pvt Ltd**	**Lupin Limited**
Location				ETP Outlet	ETP Outlet	ETP Outlet
Date of Sampling				**22.05.18**	**22.05.18**	**22.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
22.	Total Coliforms	MPN index/ 100 mL	**100.0**	22	220	17
23.	Faecal Coliforms	MPN index/ 100 mL	**1000.0**	7.8	26	6.8
24.	Total Phosphorous (as P)	mg/L	**1.0**	1.9	BDL	BDL
25.	Total Kjeldahl Nitrogen (as N)	mg/L	**100.0**	125	1.4	12.4
26.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	18.4	0.45	6.6
27.	Phenol (as C_6H_5OH)	mg/L	**3.0**	BDL	BDL	BDL
28.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	BDL	BDL
29.	Organo Chlorine Pesticides		**0.1**			
30.	Alachlor	µg/L	**2.0**	BDL	BDL	BDL
I.	Atrazine	µg/L	**0.2**	BDL	BDL	BDL
II.	Aldrin	µg/L	**0.1**	BDL	BDL	BDL
III.	Dieldrin	µg/L	**2.0**	BDL	BDL	BDL
IV.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
V.	Beta HCH	µg/L	**2.0**	BDL	BDL	BDL
VI.	Butachlor	µg/L	**3.0**	BDL	BDL	BDL

Name of Industry				**Wochhardt Ltd (R &D)**	**ABD Pvt Ltd**	**Lupin Limited**
Location				ETP Outlet	ETP Outlet	ETP Outlet
Date of Sampling				**22.05.18**	**22.05.18**	**22.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
VII.	Chlorpyrifos	µg/L		BDL	BDL	BDL
VIII.	Delta HCH	µg/L	**0.2**	BDL	BDL	BDL
IX.	p,p DDT	µg/L	**0.05**	BDL	BDL	BDL
X.	o,p DDT	µg/L	**100.0**	BDL	BDL	BDL
XI.	p,p DDE	µg/L	**250.0**	BDL	BDL	BDL
XII.	o,p DDE	µg/L	**30.0**	BDL	BDL	BDL
XIII.	p,p DDD	µg/L		BDL	BDL	BDL
XIV.	o,p DDD	µg/L		BDL	BDL	BDL
XV.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL	BDL
XVI.	Beta Endosulfan	µg/L		BDL	BDL	BDL
XVII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL	BDL
XVIII.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL	BDL
XIX.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	**0.2**	BDL	BDL	BDL
31.	Polychlorinated Biphenyls (PCB)	µg/L	**2.0**	BDL	BDL	BDL
32.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL	BDL
33.	Nickel (as Ni)	mg/L	**3.0**	BDL	0.154	0.07
34.	Copper (as Cu)	mg/L		BDL	BDL	BDL

Name of Industry				**Wochhardt Ltd (R &D)**	**ABD Pvt Ltd**	**Lupin Limited**
Location				ETP Outlet	ETP Outlet	ETP Outlet
Date of Sampling				**22.05.18**	**22.05.18**	**22.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
35.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL	BDL
36.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL	0.04
37.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL	BDL
38.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL	BDL
39.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL	0.022
40.	Mercury (as Hg)	mg/L	**0.01**	BDL	BDL	BDL
41.	Manganese (as Mn)	mg/L	**2.0**	BDL	0.036	0.02
42.	Iron (as Fe)	mg/L	**3.0**	BDL	0.07	0.08
43.	Vanadium (as V)	mg/L	**0.2**	BDL	0.031	BDL
44.	Selenium (as Se)	mg/L	**0.05**	BDL	BDL	BDL
45.	Boron (as B)	mg/L		0.079	BDL	BDL
46.	Bioassay Test on fish	% survival		0	0	0

Table No. II

Name of Industry				**Carlsberg India Pvt Ltd.**	**Mylan Laboratories Ltd.**	**JK Ansell Pvt Ltd.**
Location				ETP Outlet	STP Outlet	ETP Outlet
Dateof Sampling				**17.05.18**	**17.05.18**	**17.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
1.	Sanitary Survey	-		-	-	-
2.	General Appearance	-		-	-	-
3.	Colour	Hazen		2	1	3
4.	Smell	-		Disagreeable	Disagreeable	Disagreeable
5.	pH	-	**5.5 -9.0**	8.1	7.67	7.82
6.	Oil & Grease	mg/L	**10.0**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**100.0**	62	32	52
8.	Dissolved Oxygen (%Saturation)	%		9	30	0
9.	Chemical Oxygen Demand	mg/L	**250.0**	90	130	170
10.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	31.7	46	60
11.	Electrical Conductivity (at 25^{o}C)	µmho/ cm		2440	2500	1800
12.	Nitrite Nitrogen (as N)	mg/L		2.66	0.5	BDL
13.	Nitrate Nitrogen (as N)	mg/L	**5.0**	25.4	59.2	23.8
14.	(NO_2 + NO_3)-Nitrogen	mg/L	**10.0**	22.7	58.7	23.8

Name of Industry				**Carlsberg India Pvt Ltd.**	**Mylan Laboratories Ltd.**	**JK Ansell Pvt Ltd.**
Location				ETP Outlet	STP Outlet	ETP Outlet
Dateof Sampling				**17.05.18**	**17.05.18**	**17.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
15.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.77	BDL	0.34
16.	Total Residual Chlorine	mg/L	**1.0**	BDL	BDL	BDL
17.	Cyanide (as CN)	mg/L	**0.2**	BDL	BDL	BDL
18.	Fluoride (as F)	mg/L	**2.0**	1.8	0.5	BDL
19.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL	BDL
20.	Dissolved Phosphate (as P)	mg/L	**5.0**	1.12	0.86	BDL
21.	Sodium Absorption Ratio			0.32	BDL	BDL
22.	Total Coliforms	MPN index/ 100 mL	**100.0**	Absent	27	14
23.	Faecal Coliforms	MPN index/ 100 mL	**1000.0**	BDL	BDL	BDL
24.	Total Phosphorous (as P)	mg/L	**1.0**	2.68	1.1	0.1
25.	Total Kjeldahl Nitrogen (as N)	mg/L	**100.0**	39	7.01	23.1
26.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	9.04	BDL	7.3
27.	Phenol (as C_6H_5OH)	mg/L	**3.0**	BDL	BDL	BDL
28.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	BDL	BDL

Name of Industry				**Carlsberg India Pvt Ltd.**	**Mylan Laboratories Ltd.**	**JK Ansell Pvt Ltd.**
Location				ETP Outlet	STP Outlet	ETP Outlet
Dateof Sampling				**17.05.18**	**17.05.18**	**17.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
29.	Organo Chlorine Pesticides		**0.1**			
I.	Alachlor	µg/L	**2.0**	BDL	BDL	BDL
II.	Atrazine	µg/L	**0.2**	BDL	BDL	BDL
III.	Aldrin	µg/L	**0.1**	BDL	BDL	BDL
IV.	Dieldrin	µg/L	**2.0**	BDL	BDL	BDL
V.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
VI.	Beta HCH	µg/L	**2.0**	BDL	BDL	BDL
VII.	Butachlor	µg/L	**3.0**	BDL	BDL	BDL
VIII.	Chlorpyrifos	µg/L		BDL	BDL	BDL
IX.	Delta HCH	µg/L	**0.2**	BDL	BDL	BDL
X.	p,p DDT	µg/L	**0.05**	BDL	BDL	BDL
XI.	o,p DDT	µg/L	**100.0**	BDL	BDL	BDL
XII.	p,p DDE	µg/L	**250.0**	BDL	BDL	BDL
XIII.	o,p DDE	µg/L	**30.0**	BDL	BDL	BDL
XIV.	p,p DDD	µg/L		BDL	BDL	BDL
XV.	o,p DDD	µg/L		BDL	BDL	BDL
XVI.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL	BDL
XVII.	Beta Endosulfan	µg/L		BDL	BDL	BDL

Name of Industry				**Carlsberg India Pvt Ltd.**	**Mylan Laboratories Ltd.**	**JK Ansell Pvt Ltd.**
Location				ETP Outlet	STP Outlet	ETP Outlet
Dateof Sampling				**17.05.18**	**17.05.18**	**17.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
XVIII.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL	BDL
XIX.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL	BDL
XX.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	**0.2**	BDL	BDL	BDL
XXI.	Polychlorinated Biphenyls (PCB)	µg/L	**2.0**	BDL	BDL	BDL
30.	Zinc (Zn)	mg/L	**5.0**	BDL	0.112	0.385
31.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL	BDL
32.	Copper (as Cu)	mg/L		BDL	BDL	BDL
33.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL	BDL
34.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL	BDL
35.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL	BDL
36.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL	BDL
37.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL	BDL
38.	Mercury (as Hg)	mg/L	**0.01**	BDL	BDL	BDL
39.	Manganese (as Mn)	mg/L	**2.0**	0.048	BDL	BDL
40.	Iron (as Fe)	mg/L	**3.0**	0.199	0.153	BDL

Name of Industry				**Carlsberg India Pvt Ltd.**	**Mylan Laboratories Ltd.**	**JK Ansell Pvt Ltd.**
Location				ETP Outlet	STP Outlet	ETP Outlet
Dateof Sampling				**17.05.18**	**17.05.18**	**17.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
41.	Vanadium (as V)	mg/L	**0.2**	BDL	BDL	BDL
42.	Selenium (as Se)	mg/L	**0.05**	BDL	BDL	BDL
43.	Boron (as B)	mg/L		BDL	BDL	BDL
44.	Bioassay Test on fish	% survival		100	0	100

Table No. III

Name of Industry				**Wockhardt Ltd.**	**Perkins India Pvt Ltd.**	**Skoda Auto India Pvt. Limited**
Location				Nalla Water	ETP Outlet	ETP Outlet
Date of Sampling				**24.05.18**	**24.05.18**	**24.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
1.	Sanitary Survey	-		-	-	-
2.	General Appearance	-		-	-	-
3.	Colour	Hazen		2	1	1
4.	Smell	-		Disagreeable	Disagreeable	Disagreeable
5.	pH	-	**5.5 -9.0**	7.56	7.11	7.34
6.	Oil & Grease	mg/L	**10.0**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**100.0**	22	9	7

Name of Industry				**Wockhardt Ltd.**	**Perkins India Pvt Ltd.**	**Skoda Auto India Pvt. Limited**
Location				Nalla Water	ETP Outlet	ETP Outlet
Date of Sampling				**24.05.18**	**24.05.18**	**24.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
8.	Dissolved Oxygen (%Saturation)	%		53	34	60
9.	Chemical Oxygen Demand	mg/L	**250.0**	40	30	20
10.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	14	11	7.2
11.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm		840	750	506
12.	Nitrite Nitrogen (as N)	mg/L		0.11	0.17	<0.01
13.	Nitrate Nitrogen (as N)	mg/L	**5.0**	38.01	3.97	3.12
14.	(NO_2 + NO_3)-Nitrogen	mg/L	**10.0**	37.9	3.8	3.12
15.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	BDL	BDL	BDL
16.	Total Residual Chlorine	mg/L	**1.0**	BDL	BDL	BDL
17.	Cyanide (as CN)	mg/L	**0.2**	BDL	BDL	BDL
18.	Fluoride (as F)	mg/L	**2.0**	0.4	0.52	0.28
19.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL	BDL
20.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.21	0.98	BDL

Name of Industry				**Wockhardt Ltd.**	**Perkins India Pvt Ltd.**	**Skoda Auto India Pvt. Limited**
Location				Nalla Water	ETP Outlet	ETP Outlet
Date of Sampling				**24.05.18**	**24.05.18**	**24.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
21.	Sodium Absorption Ratio			2.70	BDL	BDL
22.	Total Coliforms	MPN index/ 100 mL	**100.0**	Absent	27	39
23.	Faecal Coliforms	MPN index/ 100 mL	**1000.0**	BDL	14	14
24.	Total Phosphorous (as P)	mg/L	**1.0**	1	1.42	BDL
25.	Total Kjeldahl Nitrogen (as N)	mg/L	**100.0**	1.45	0.5	0.45
26.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.25	0.45	0.2
27.	Phenol (as C_6H_5OH)	mg/L	**3.0**	BDL	BDL	BDL
28.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	BDL	BDL
29.	Organo Chlorine Pesticides		**0.1**			
i.	Alachlor	µg/L	**2.0**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**0.2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.1**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**2.0**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL

Name of Industry				**Wockhardt Ltd.**	**Perkins India Pvt Ltd.**	**Skoda Auto India Pvt. Limited**
Location				Nalla Water	ETP Outlet	ETP Outlet
Date of Sampling				**24.05.18**	**24.05.18**	**24.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
vi.	Beta HCH	µg/L	**2.0**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**3.0**	BDL	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.2**	BDL	BDL	BDL
x	p,p DDT	µg/L	**0.05**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**100.0**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**250.0**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**30.0**	BDL	BDL	BDL
xiv.	p,p DDD	µg/L		BDL	BDL	BDL
xv.	o,p DDD	µg/L		BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L		BDL	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL	BDL
30.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	**0.2**	BDL	BDL	BDL
31.	Polychlorinated Biphenyls (PCB)	µg/L	**2.0**	BDL	BDL	BDL

Name of Industry				**Wockhardt Ltd.**	**Perkins India Pvt Ltd.**	**Skoda Auto India Pvt. Limited**
Location				Nalla Water	ETP Outlet	ETP Outlet
Date of Sampling				**24.05.18**	**24.05.18**	**24.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
32.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL	BDL
33.	Nickel (as Ni)	mg/L	**3.0**	BDL	0.013	0.012
34.	Copper (as Cu)	mg/L		BDL	BDL	BDL
35.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL	BDL
36.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL	0.023
37.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL	BDL
38.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL	BDL
39.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL	BDL
40.	Mercury (as Hg)	mg/L	**0.01**	BDL	BDL	BDL
41.	Manganese (as Mn)	mg/L	**2.0**	BDL	BDL	BDL
42.	Iron (as Fe)	mg/L	**3.0**	BDL	BDL	BDL
43.	Vanadium (as V)	mg/L	**0.2**	BDL	BDL	BDL
44.	Selenium (as Se)	mg/L	**0.05**	BDL	BDL	BDL
45.	Boron (as B)	mg/L		BDL	0.74	BDL
46.	Bioassay Test on fish	% survival		0	0	50

Table No. IV

Name of Industry				**Frigorifico Allana Pvt Ltd.**	**Nall Near Kanchanwadi,**	**Nalla Near Nath Group**
Location				ETP Outlet	Nalla Water	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
1.	Sanitary Survey	-		-	-	-
2.	General Appearance	-		-	-	-
3.	Colour	Hazen		1	5	5
4.	Smell	-		Disagreeable	Disagreeable	Disagreeable
5.	pH	-	**5.5 -9.0**	7.53	7.53	7.63
6.	Oil & Grease	mg/L	**10.0**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**100.0**	10	52	92
8.	Dissolved Oxygen (%Saturation)	%		28	0	0
9.	Chemical Oxygen Demand	mg/L	**250.0**	30	220	320
10.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	10.5	77	113
11.	Electrical Conductivity (at 25^{o}C)	µmho/ cm		1950	1710	1730
12.	Nitrite Nitrogen (as N)	mg/L		4.1	BDL	BDL
13.	Nitrate Nitrogen (as N)	mg/L	**5.0**	47.6	30.2	30.5
14.	$(NO_2 + NO_3)$-Nitrogen	mg/L	**10.0**	43.5	30.2	30.5

Name of Industry				**Frigorifico Allana Pvt Ltd.**	**Nall Near Kanchanwadi,**	**Nalla Near Nath Group**
Location				ETP Outlet	Nalla Water	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
15.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	0.11	BDL	0.36
16.	Total Residual Chlorine	mg/L	**1.0**	BDL	BDL	BDL
17.	Cyanide (as CN)	mg/L	**0.2**	BDL	BDL	BDL
18.	Fluoride (as F)	mg/L	**2.0**	0.45	0.5	BDL
19.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL	BDL
20.	Dissolved Phosphate (as P)	mg/L	**5.0**	0.2	0.98	1.1
21.	Sodium Absorption Ratio			BDL	BDL	BDL
22.	Total Coliforms	MPN index/ 100 mL	**100.0**	Absent	33	170
23.	Faecal Coliforms	MPN index/ 100 mL	**1000.0**	BDL	9.3	20
24.	Total Phosphorous (as P)	mg/L	**1.0**	0.51	1.68	1.93
25.	Total Kjeldahl Nitrogen (as N)	mg/L	**100.0**	5.54	48.5	43.3
26.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	4.26	1.7	10.2
27.	Phenol (as C_6H_5OH)	mg/L	**3.0**	BDL	BDL	BDL
28.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	BDL	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd.**	**Nall Near Kanchan wadi,**	**Nalla Near Nath Group**
Location				ETP Outlet	Nalla Water	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
29.	Organo Chlorine Pesticides		**0.1**			
i.	Alachlor	µg/L	**2.0**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**0.2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.1**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**2.0**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
vi.	Beta HCH	µg/L	**2.0**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**3.0**	BDL	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.2**	BDL	BDL	BDL
x	p,p DDT	µg/L	**0.05**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**100.0**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**250.0**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**30.0**	BDL	BDL	BDL
xiv.	p,p DDD	µg/L		BDL	BDL	BDL
xv.	o,p DDD	µg/L		BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L		BDL	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd.**	**Nall Near Kanchan wadi,**	**Nalla Near Nath Group**
Location				ETP Outlet	Nalla Water	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
xix.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL	BDL
30.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	**0.2**	BDL	0.00011	BDL
31.	Polychlorinated Biphenyls (PCB)	µg/L	**2.0**	BDL	BDL	BDL
32.	Zinc (Zn)	mg/L	**5.0**	0.117	0.118	0.141
33.	Nickel (as Ni)	mg/L	**3.0**	BDL	BDL	BDL
34.	Copper (as Cu)	mg/L		0.049	0.048	0.058
35.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL	BDL
36.	Total Chromium (as Cr)	mg/L	**2.0**	BDL	BDL	BDL
37.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL	BDL
38.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL	BDL
39.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL	BDL
40.	Mercury (as Hg)	mg/L	**0.01**	BDL	BDL	BDL
41.	Manganese (as Mn)	mg/L	**2.0**	0.257	0.27	0.242
42.	Iron (as Fe)	mg/L	**3.0**	4.23	4.27	5.28
43.	Vanadium (as V)	mg/L	**0.2**	0.046	0.045	0.054
44.	Selenium (as Se)	mg/L	**0.05**	BDL	0.006	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd.**	**Nall Near Kanchanwadi,**	**Nalla Near Nath Group**
Location				ETP Outlet	Nalla Water	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
45.	Boron (as B)	mg/L		BDL	BDL	BDL
46.	Bioassay Test on fish	% survival		50	0	0

Table No. V

Name of Industry				**Jhaveri Flexo India Ltd.**	**OMR Bagla Automotive System India Ltd**
Location				ETP Outlet	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Sanitary Survey	-		-	-
2.	General Appearance	-		-	-
3.	Colour	Hazen		1	5
4.	Smell	-		Disagreeable	Disagreeable
5.	pH	-	**5.5 -9.0**	7.41	7.19
6.	Oil & Grease	mg/L	**10.0**	BDL	BDL
7.	Suspended Solids	mg/L	**100.0**	6	39
8.	Dissolved Oxygen (%Saturation)	%		65	0
9.	Chemical Oxygen Demand	mg/L	**250.0**	720	360

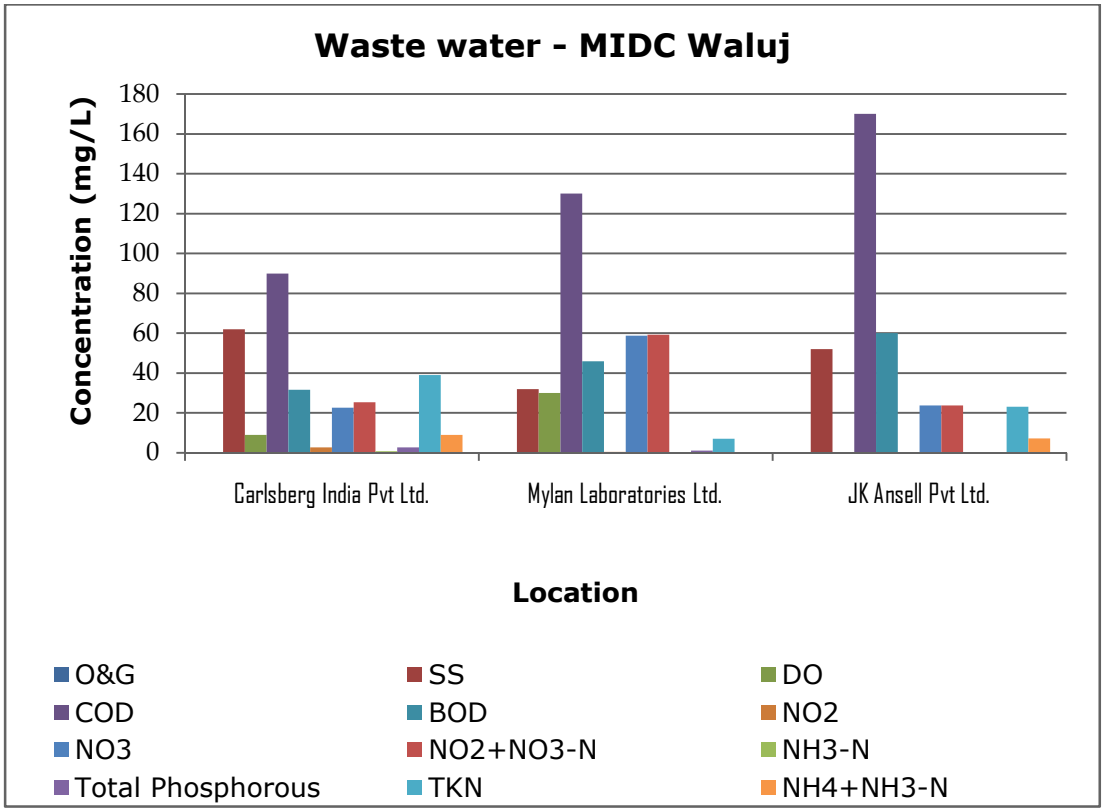
Name of Industry				**Jhaveri Flexo India Ltd.**	**OMR Bagla Automotive System India Ltd**
Location				ETP Outlet	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
10.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**30.0**	255	127
11.	Electrical Conductivity (at 25^{o}C)	µmho/ cm		509	5940
12.	Nitrite Nitrogen (as N)	mg/L		0.06	BDL
13.	Nitrate Nitrogen (as N)	mg/L	**5.0**	2.29	21.2
14.	(NO_2 + NO_3)-Nitrogen	mg/L	**10.0**	2.23	21.2
15.	Free Ammonia (as NH_3-N)	mg/L	**5.0**	BDL	0.13
16.	Total Residual Chlorine	mg/L	**1.0**	BDL	BDL
17.	Cyanide (as CN)	mg/L	**0.2**	BDL	BDL
18.	Fluoride (as F)	mg/L	**2.0**	0.36	BDL
19.	Sulphide (as S^{2-})	mg/L	**2.0**	BDL	BDL
20.	Dissolved Phosphate (as P)	mg/L	**5.0**	BDL	BDL
21.	Sodium Absorption Ratio			BDL	BDL
22.	Total Coliforms	MPN index/ 100 mL	**100.0**	47	Absent

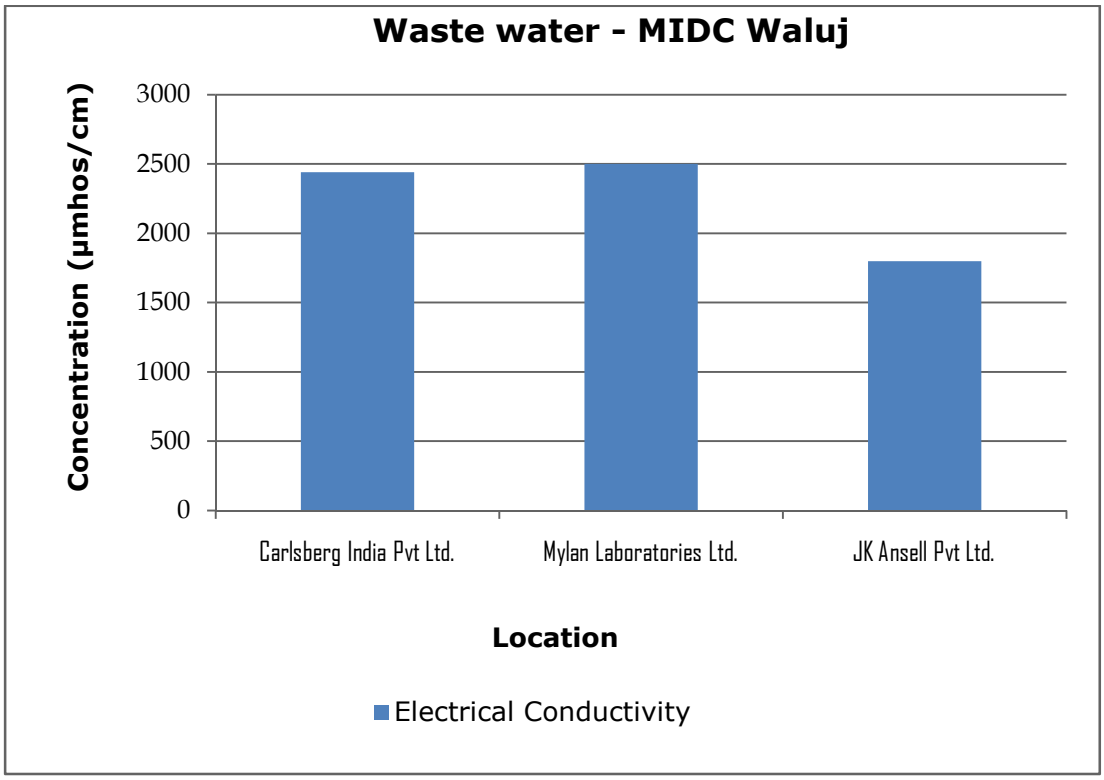
Name of Industry				**Jhaveri Flexo India Ltd.**	**OMR Bagla Automotive System India Ltd**
Location				ETP Outlet	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
23.	Faecal Coliforms	MPN index/ 100 mL	**1000.0**	14	BDL
24.	Total Phosphorous (as P)	mg/L	**1.0**	BDL	BDL
25.	Total Kjeldahl Nitrogen (as N)	mg/L	**100.0**	0.89	36.8
26.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**5.0**	0.24	10.6
27.	Phenol (as C_6H_5OH)	mg/L	**3.0**	BDL	BDL
28.	Surface Active Agents (as MBAS)	mg/L	**3.0**	BDL	BDL
29.	Organo Chlorine Pesticides		**0.1**		
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.	Butachlor	µg/L	**3.0**	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL
ix.	Delta HCH	µg/L	**0.2**	BDL	BDL

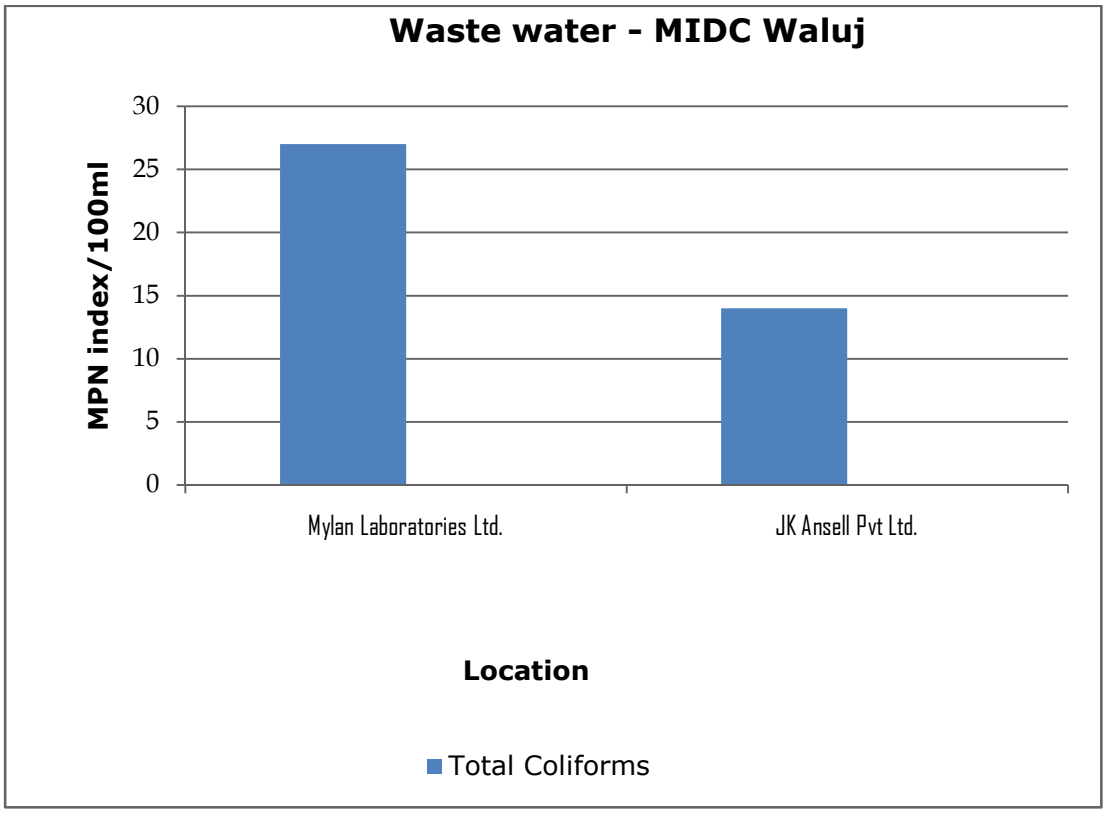
Name of Industry				**Jhaveri Flexo India Ltd.**	**OMR Bagla Automotive System India Ltd**
Location				ETP Outlet	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
x	p,p DDT	µg/L	**0.05**	BDL	BDL
xi.	o,p DDT	µg/L	**100.0**	BDL	BDL
xii.	p,p DDE	µg/L	**250.0**	BDL	BDL
xiii.	o,p DDE	µg/L	**30.0**	BDL	BDL
xiv.	p,p DDD	µg/L		BDL	BDL
xv.	o,p DDD	µg/L		BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**10.0**	BDL	BDL
xvii.	Beta Endosulfan	µg/L		BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**5.0**	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**1.0**	BDL	BDL
30.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	**0.2**	BDL	BDL
31.	Polychlorinated Biphenyls (PCB)	µg/L	**2.0**	BDL	BDL
32.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL
33.	Nickel (as Ni)	mg/L	**3.0**	0.01	0.01
34.	Copper (as Cu)	mg/L		BDL	BDL
35.	Hexavalent Chromium (as Cr^{6+})	mg/L	**0.1**	BDL	BDL

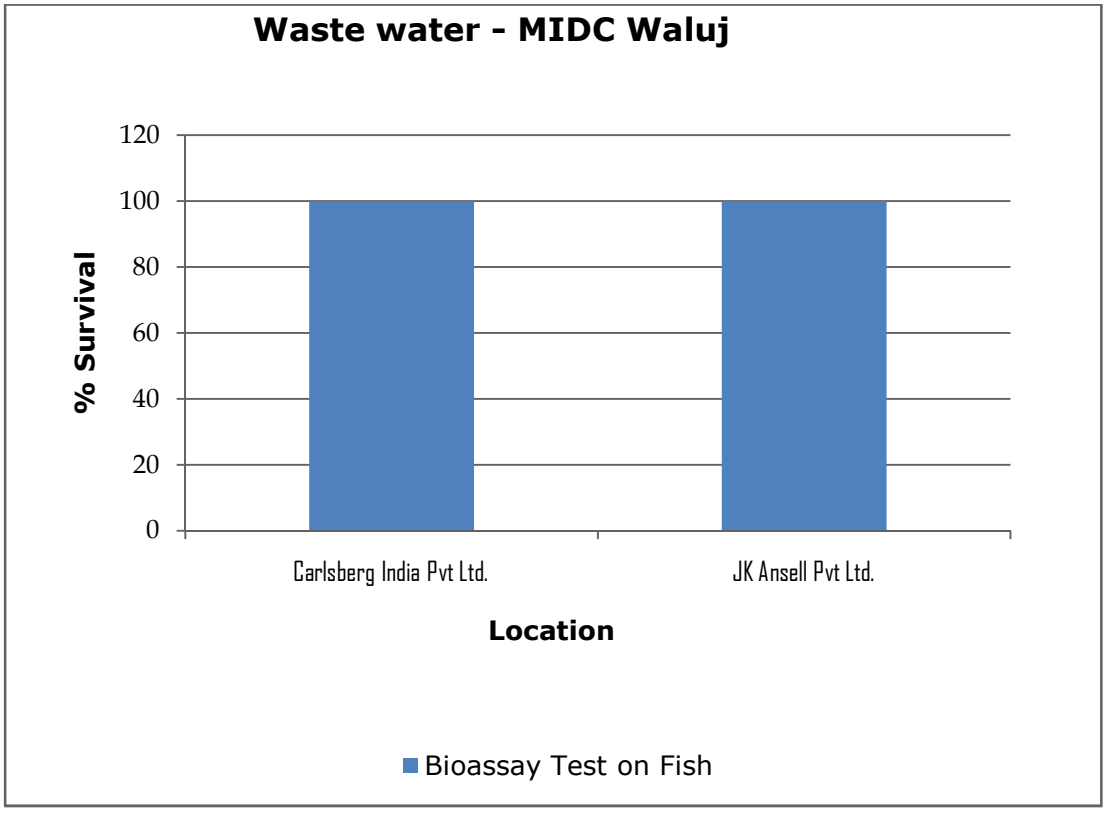
Name of Industry				**Jhaveri Flexo India Ltd.**	**OMR Bagla Automotive System India Ltd**
Location				ETP Outlet	Nalla Water
Date of Sampling				**19.05.18**	**21.05.18**
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
36.	Total Chromium (as Cr)	mg/L	**2.0**	0.03	0.03
37.	Total Arsenic (as As)	mg/L	**0.2**	BDL	BDL
38.	Lead (as Pb)	mg/L	**0.1**	BDL	BDL
39.	Cadmium (as Cd)	mg/L	**2.0**	BDL	BDL
40.	Mercury (as Hg)	mg/L	**0.01**	BDL	BDL
41.	Manganese (as Mn)	mg/L	**2.0**	BDL	BDL
42.	Iron (as Fe)	mg/L	**3.0**	0.13	0.47
43.	Vanadium (as V)	mg/L	**0.2**	0.01	0.03
44.	Selenium (as Se)	mg/L	**0.05**	BDL	BDL
45.	Boron (as B)	mg/L		BDL	0.81
46.	Bioassay Test on fish	% survival		0	

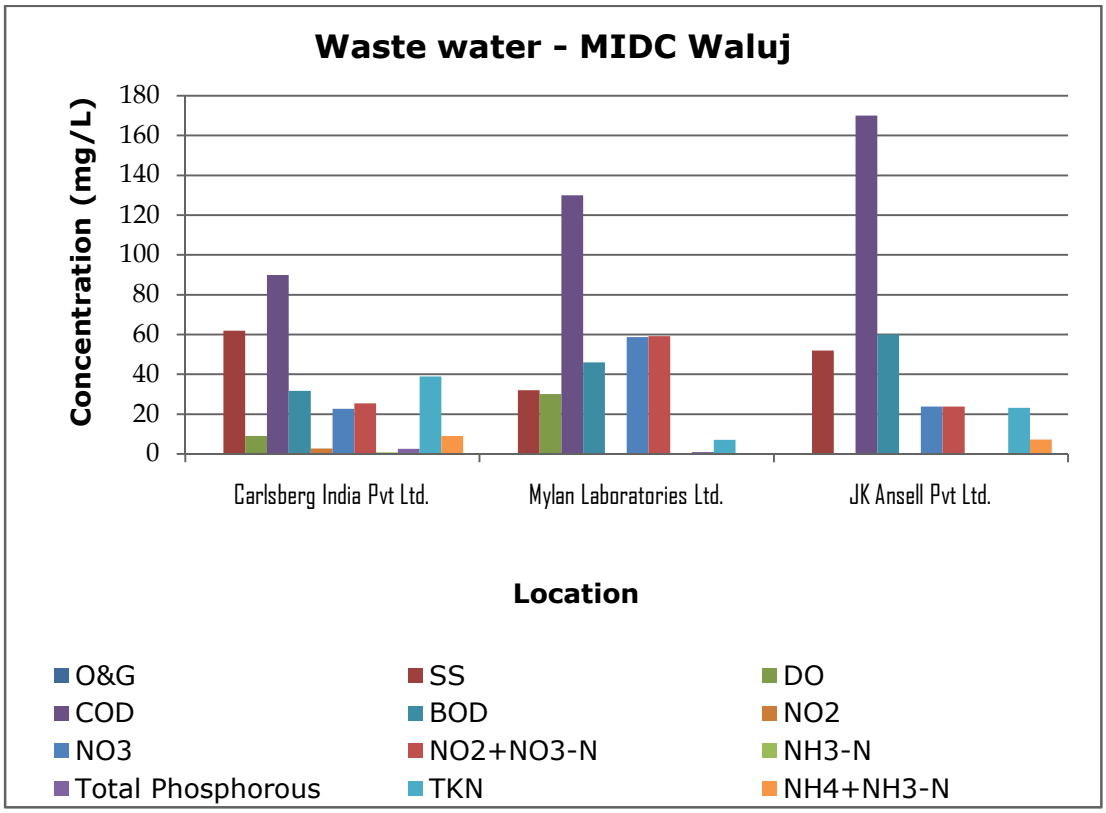
Graphs: Surface/ Waste Water Analysis:

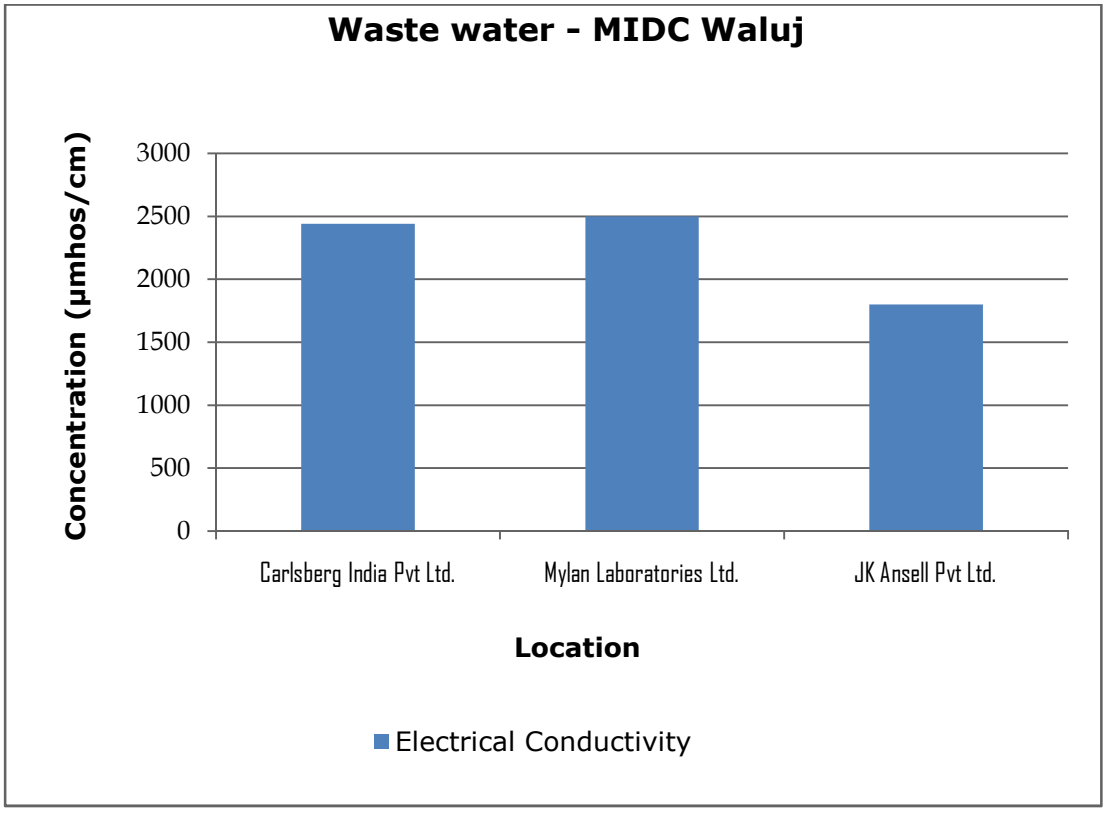


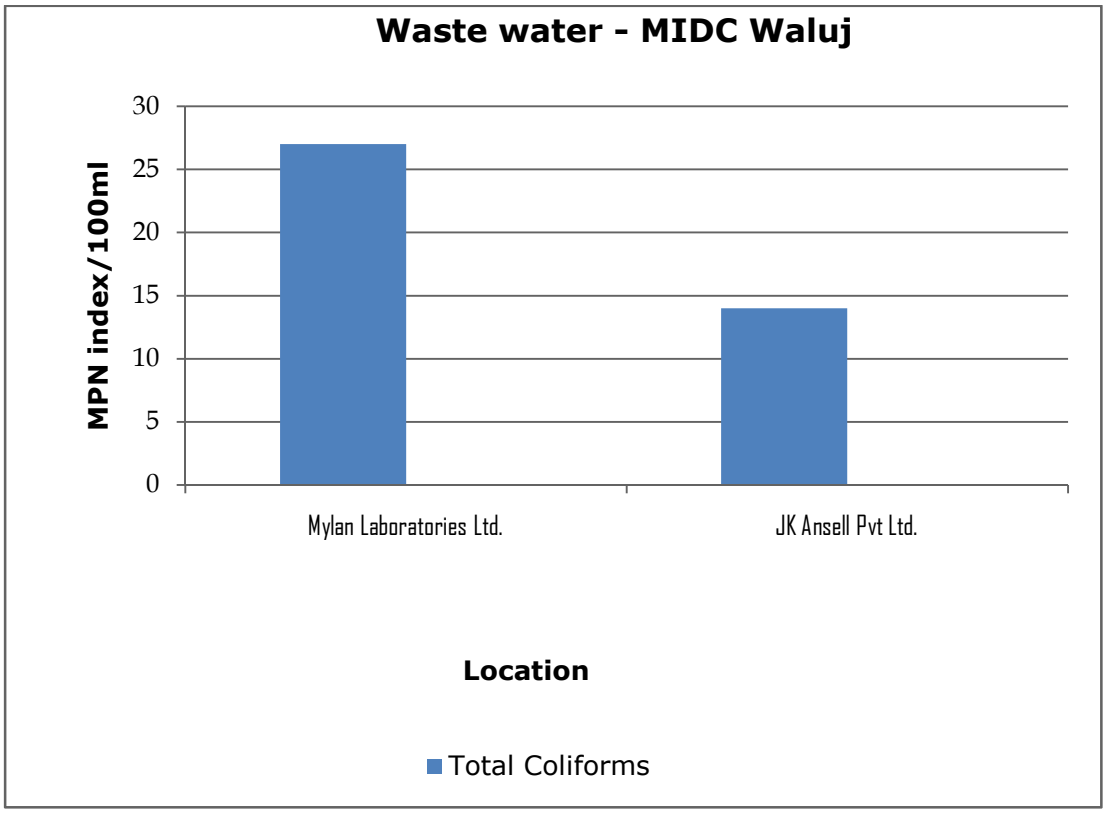


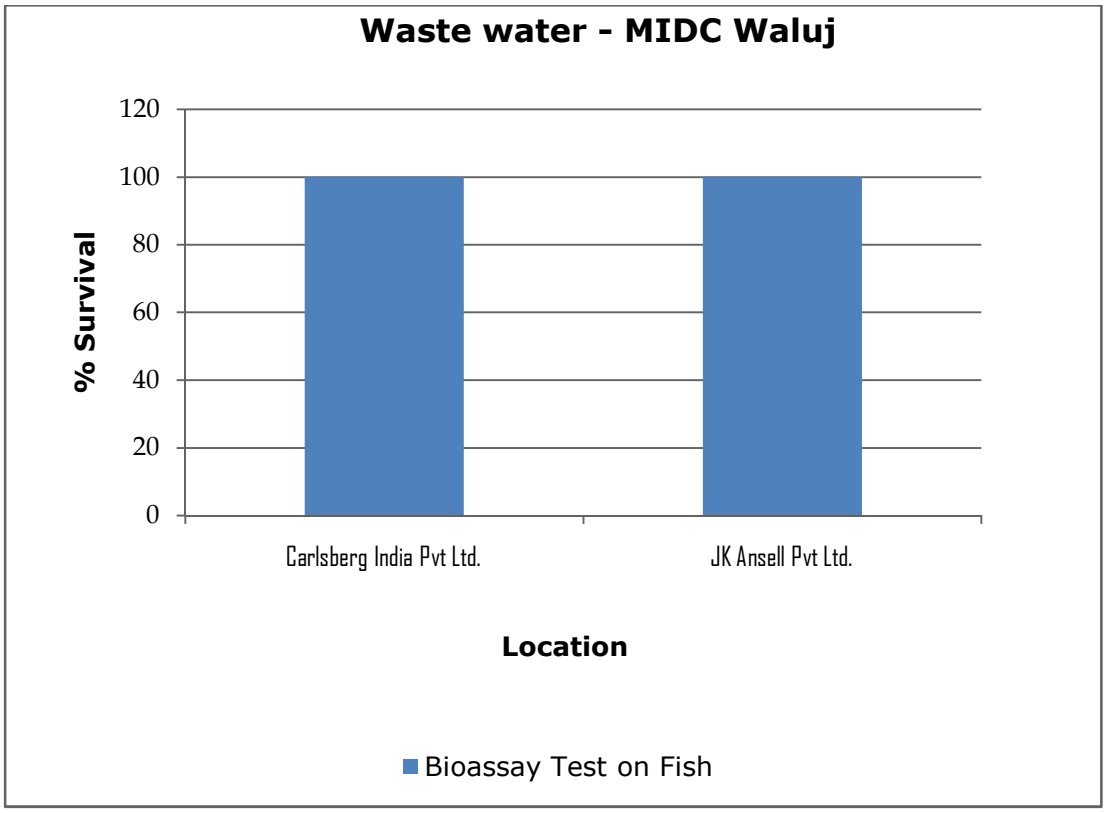

Waste water - MIDC Waluj
MPN index/100ml
30
25
20
15
10
5
0
Mylan Laboratories Ltd.
JK Ansell Pvt Ltd.
Location
Total Coliforms

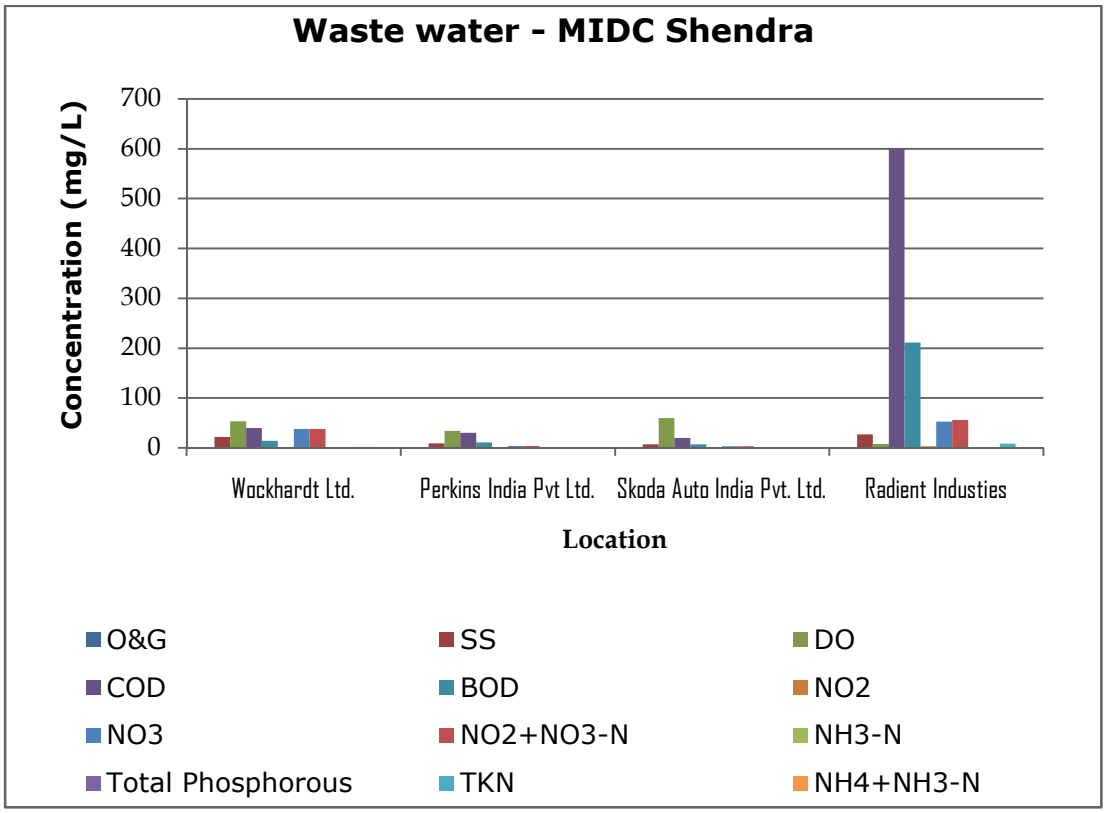

Waste water - MIDC Waluj
% Survival
120
100
80
60
40
20
0
Carlsberg India Pvt Ltd.
JK Ansell Pvt Ltd.
Location
Bioassay Test on Fish

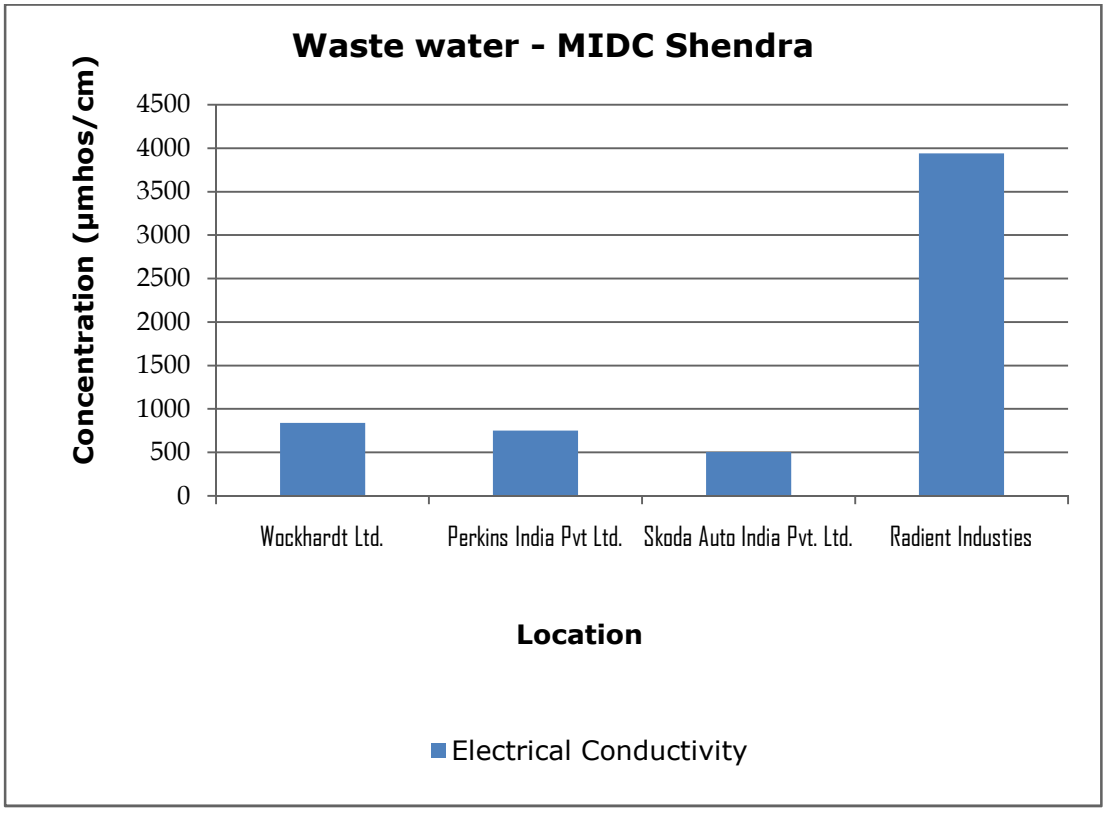

Waste water - MIDC Waluj
Concentration (mg/L)
180
160
140
120
100
80
60
40
20
0
Carlsberg India Pvt Ltd.
Mylan Laboratories Ltd.
JK Ansell Pvt Ltd.
Location
O&G
SS
DO
COD
BOD
NO2
NO3
NO2+NO3-N
NH3-N
Total Phosphorous
TKN
NH4+NH3-N

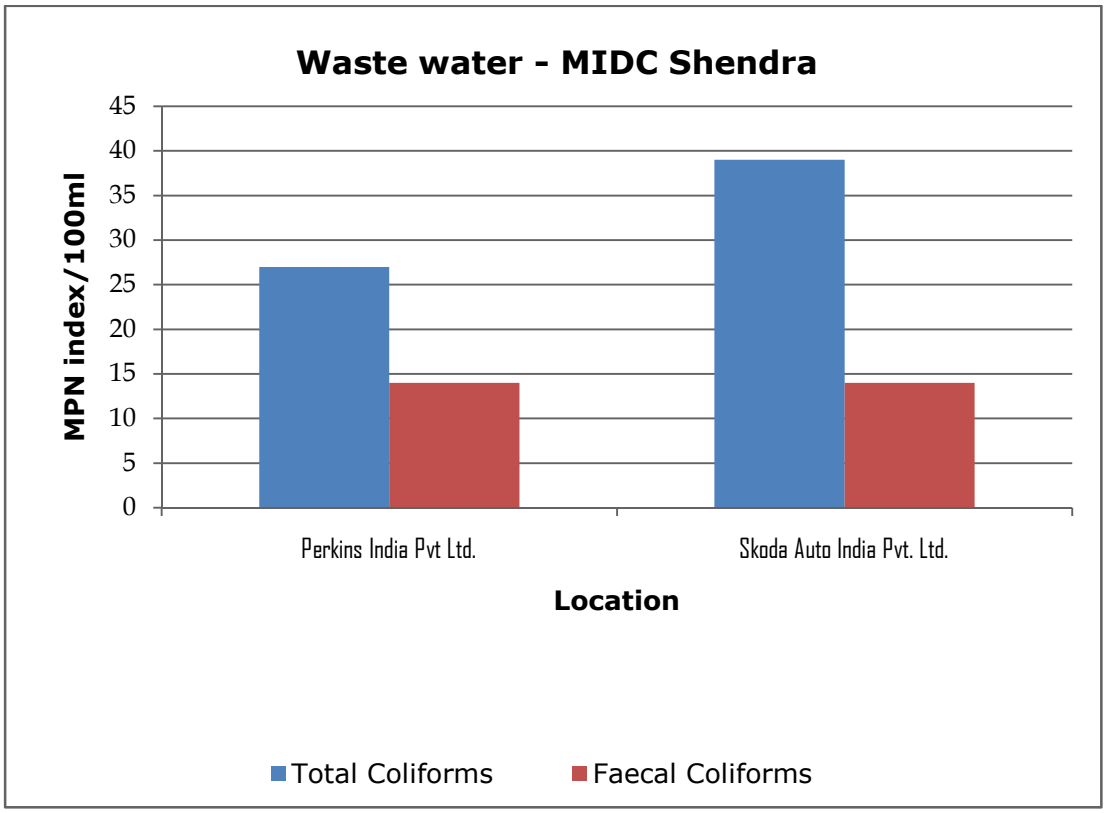

Waste water - MIDC Waluj
Concentration (µmhos/cm)
3000
2500
2000
1500
1000
500
0
Carlsberg India Pvt Ltd.
Mylan Laboratories Ltd.
JK Ansell Pvt Ltd.
Location
Electrical Conductivity

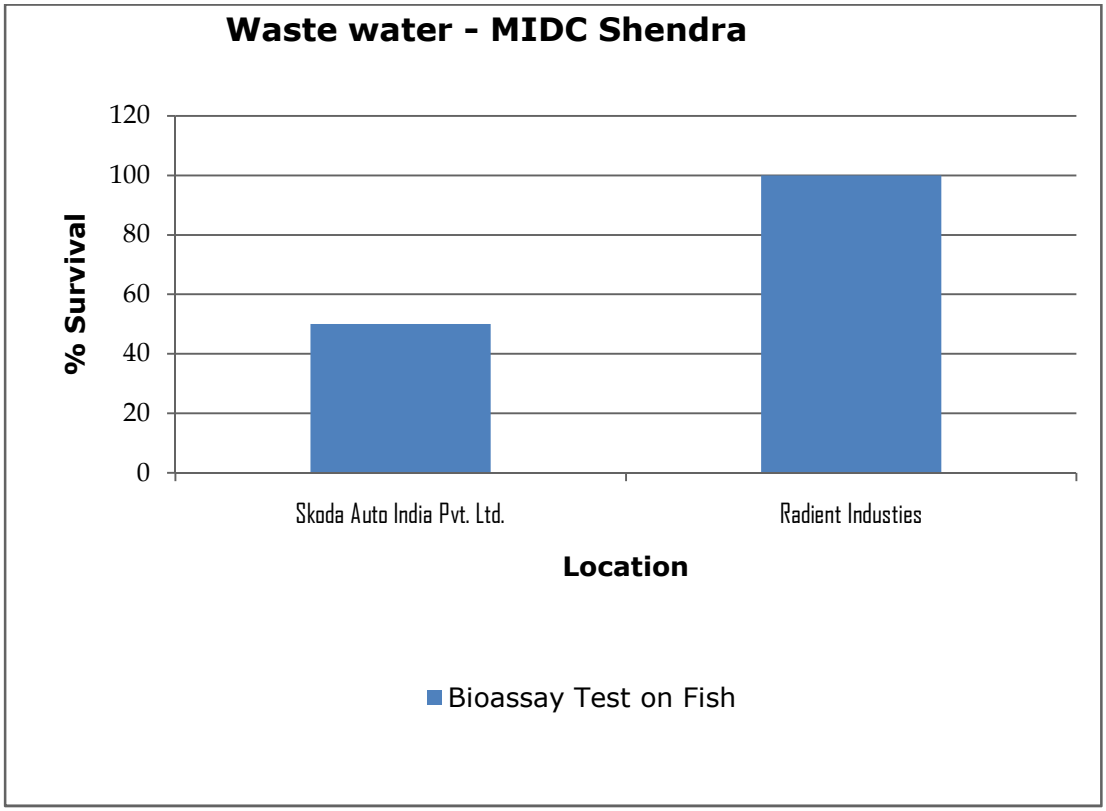

Waste water - MIDC Waluj
MPN index/100ml
30
25
20
15
10
5
0
Mylan Laboratories Ltd.
JK Ansell Pvt Ltd.
Location
Total Coliforms

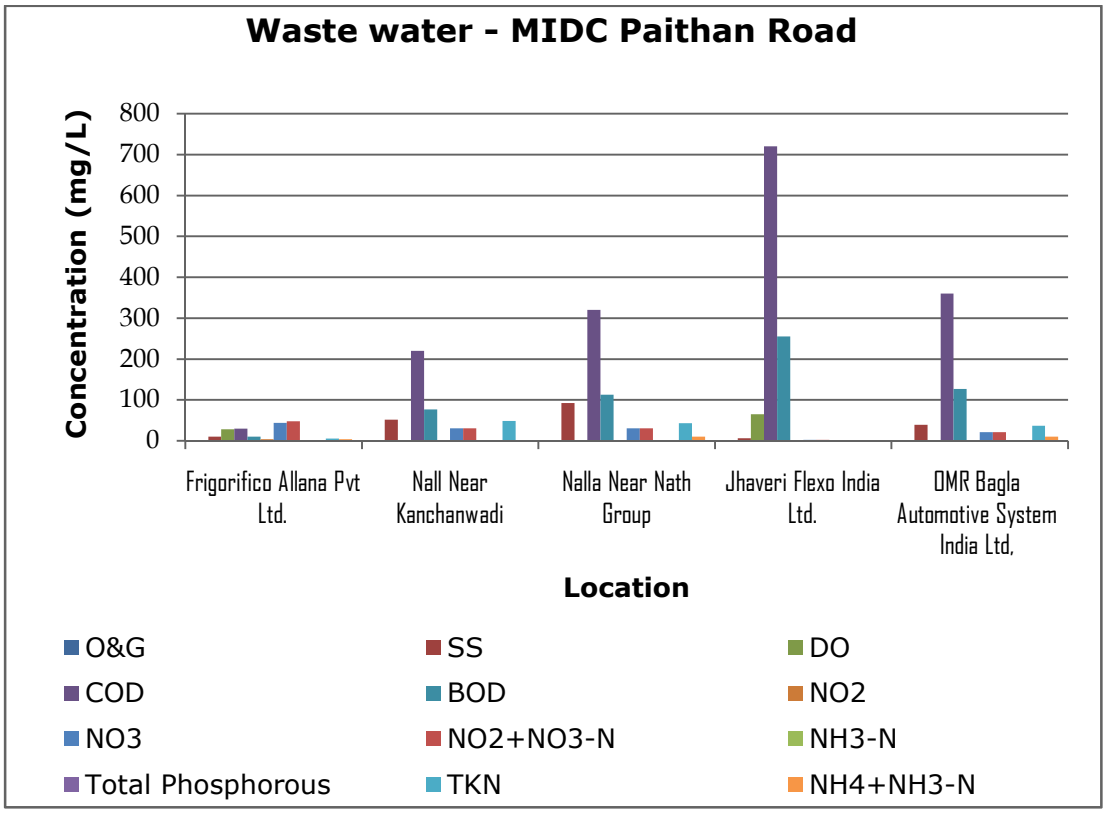

Waste water - MIDC Waluj
% Survival
120
100
80
60
40
20
0
Carlsberg India Pvt Ltd.
JK Ansell Pvt Ltd.
Location
Bioassay Test on Fish

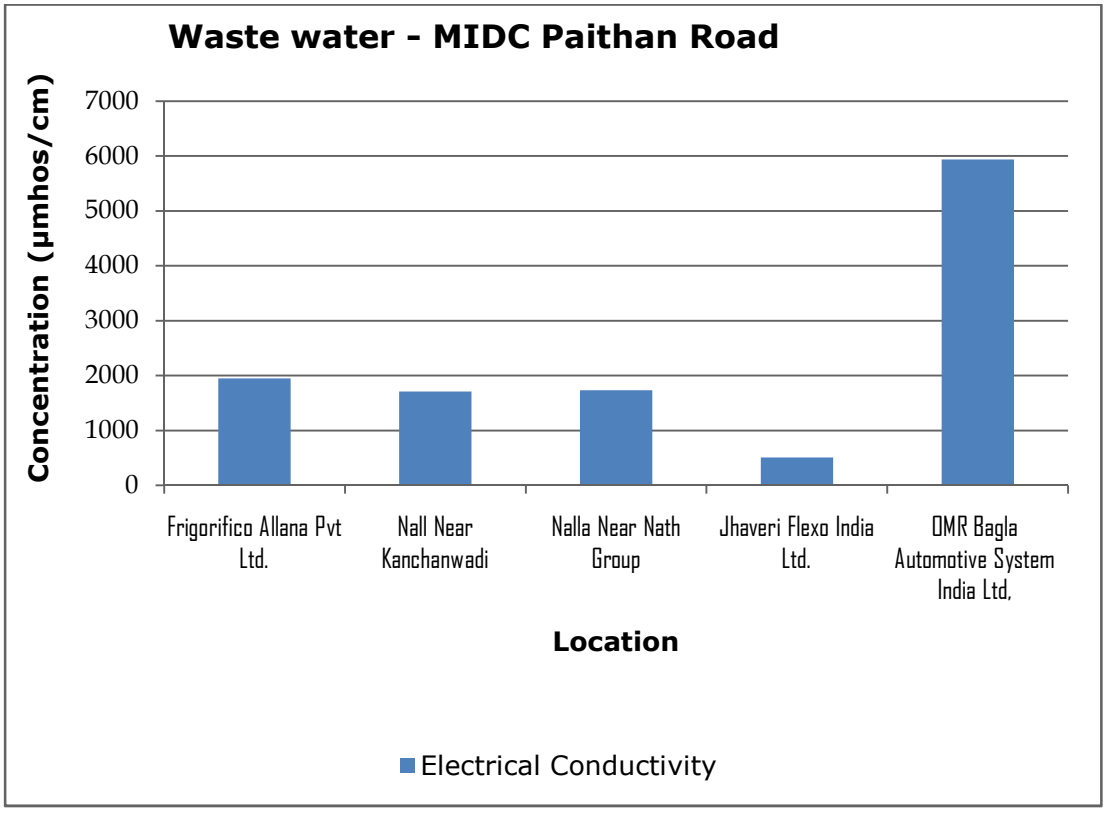

Waste water - MIDC Shendra
Concentration (mg/L)
700
600
500
400
300
200
100
0
Wockhardt Ltd.
Perkins India Pvt Ltd.
Skoda Auto India Pvt. Ltd.
Radient Industies
Location
O&G
SS
DO
COD
BOD
NO2
NO3
NO2+NO3-N
NH3-N
Total Phosphorous
TKN
NH4+NH3-N

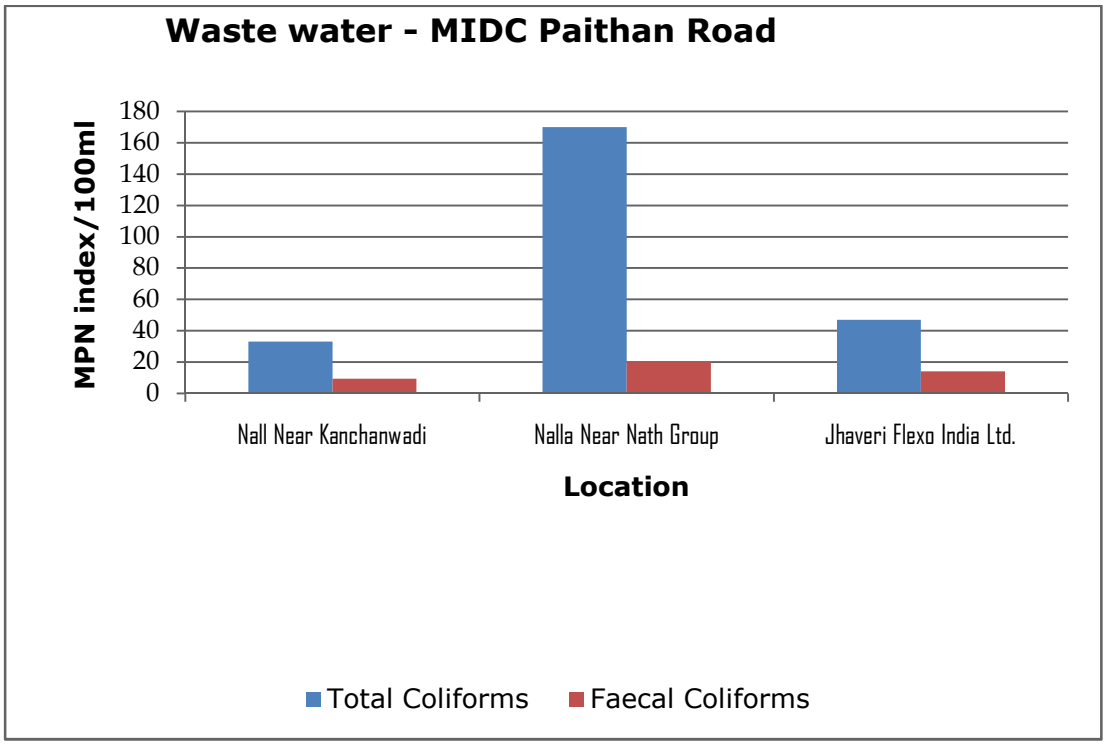

Waste water - MIDC Shendra
Concentration (µmhos/cm)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Wockhardt Ltd.
Perkins India Pvt Ltd.
Skoda Auto India Pvt. Ltd.
Radient Industies
Location
Electrical Conductivity

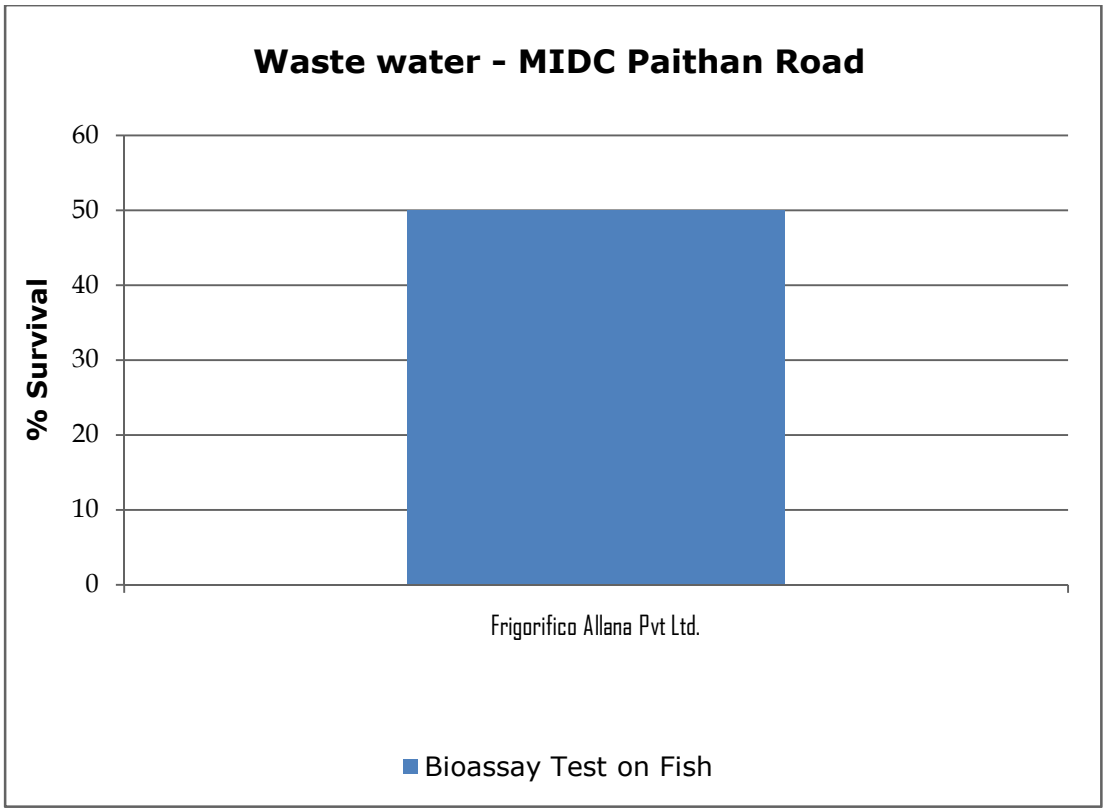

Waste water - MIDC Shendra
MPN index/100ml
45
40
35
30
25
20
15
10
5
0
Perkins India Pvt Ltd.
Skoda Auto India Pvt. Ltd.
Location
Total Coliforms
Faecal Coliforms


Waste water - MIDC Shendra
% Survival
120
100
80
60
40
20
0
Skoda Auto India Pvt. Ltd.
Radient Industies
Location
Bioassay Test on Fish


Waste water - MIDC Paithan Road
Concentration (mg/L)
800
700
600
500
400
300
200
100
0
Frigorifico Allana Pvt Ltd.
Nall Near Kanchanwadi
Nalla Near Nath Group
Jhaveri Flexo India Ltd.
OMR Bagla Automotive System India Ltd,
Location
O&G
SS
DO
COD
BOD
NO2
NO3
NO2+NO3-N
NH3-N
Total Phosphorous
TKN
NH4+NH3-N


Waste water - MIDC Paithan Road
Concentration (µmhos/cm)
7000
6000
5000
4000
3000
2000
1000
0
Frigorifico Allana Pvt Ltd.
Nall Near Kanchanwadi
Nalla Near Nath Group
Jhaveri Flexo India Ltd.
OMR Bagla Automotive System India Ltd,
Location
Electrical Conductivity


Waste water - MIDC Paithan Road
MPN index/100ml
180
160
140
120
100
80
60
40
20
0
Nall Near Kanchanwadi
Nalla Near Nath Group
Jhaveri Flexo India Ltd.
Location
Total Coliforms
Faecal Coliforms


Waste water - MIDC Paithan Road
% Survival
60
50
40
30
20
10
0
Frigorifico Allana Pvt Ltd.
Bioassay Test on Fish

3.4 Ground Water Analysis

Sr.	Name of Industry	MIDC	Included in
1.	CTR Mfg Industries Ltd	Chikalthana	Table No. I
2.	Vivekananad School	Chikalthana	Table No. I
3.	Salim Ali Sarovar	Chikalthana	Table No. I
4.	Harsool Talav	Chikalthana	Table No. II
5.	Hotel Welcome Rama International	Chikalthana	Table No. II
6.	CIPET	Chikalthana	Table No. II
7.	Badve Engineering	Waluj	Table No. III
8.	Good Year	Waluj	Table No. III
9.	Girija Society	Waluj	Table No. III
10.	Pareshwadi Talav	Waluj	Table No. IV
11.	Jackwell at Bramgavan	Waluj	Table No. IV
12.	Nasir Shikandar	Waluj	Table No. IV
13.	Shendra Village	Shendra	Table No. V
14.	Kumbhephal	Shendra	Table No. V
15.	Radico NV Distillary	Shendra	Table No. V
16.	Lake Near Radico	Shendra	Table No. VI
17.	Zalta Phata STP	Shendra	Table No. VI
18.	Frigorifico Allana Pvt Ltd	Paithan Road	Table No. VII
19.	Varroc Polymers Pvt Ltd	Paithan Road	Table No. VII
20.	Near Sky Biotech Well water	Paithan Road	Table No. VII
21.	Talav Near Faroola Gaon	Paithan Road	Table No. VIII
22.	Near Dhoot Transmission, Chitegaon	Paithan Road	Table No. VIII

Table No. I

Name of Industry				**CTR Mfg Industries Ltd**	**Vivekanand School**	**Salim Ali Sarovar**
Location				Bore Well	Bore Well	Surface water
Date of Sampling				**22.05.18**	**23.05.18**	**23.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
1.	Sanitary Survey	-	**Very Clean neighborhood and catchment**	-	-	-
2.	General Appearance	-	**No floating matter**	-	-	-
3.	Colour	Hazen	**5**	1	1	2
4.	Smell	-	**Agreeable**	Agreeable	Agreeable	Agreeable
5.	pH	-	**6.5-8.5**	6.35	7.09	7.71
6.	Oil & Grease	mg/L	**100**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**500**	BDL	BDL	BDL
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	24	15	104
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	9	5.57	37
10.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm	**750**	2180	1526	1325
11.	Nitrite Nitrogen (as N)	mg/L		0.04	0.15	0.77

Name of Industry				**CTR Mfg Industries Ltd**	**Vivekanand School**	**Salim Ali Sarovar**
Location				Bore Well	Bore Well	Surface water
Date of Sampling				**22.05.18**	**23.05.18**	**23.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	42	42.4	8.62
13.	$(NO_2 + NO_3)$-Nitrogen	mg/L	**45**	42	42.5	9.39
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL	BDL
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	0.8	0.83	0.35
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL	BDL
20.	Sodium Absorption Ratio			BDL	BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	280	Absent	47
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	32	BDL	17
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	0.7	1.45	4.36

Name of Industry				**CTR Mfg Industries Ltd**	**Vivekanand School**	**Salim Ali Sarovar**
Location				Bore Well	Bore Well	Surface water
Date of Sampling				**22.05.18**	**23.05.18**	**23.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	0.24	BDL	1.45
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL	BDL
28.	Organo Chlorine Pesticides	µg/L	**0.05**			
i.	Alachlor	µg/L	**20**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.03**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL	BDL

Name of Industry				**CTR Mfg Industries Ltd**	**Vivekanand School**	**Salim Ali Sarovar**
Location				Bore Well	Bore Well	Surface water
Date of Sampling				**22.05.18**	**23.05.18**	**23.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
xiv.	p,p DDD	µg/L	**1**	BDL	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL	BDL
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	BDL	0.034
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL	BDL

Name of Industry				**CTR Mfg Industries Ltd**	**Vivekanand School**	**Salim Ali Sarovar**
Location				Bore Well	Bore Well	Surface water
Date of Sampling				**22.05.18**	**23.05.18**	**23.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	0.06	BDL	0.05
41.	Iron (as Fe)	mg/L	**0.3**	BDL	BDL	BDL
42.	Vanadium (as V)	mg/L		BDL	BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL	BDL
45.	Bioassay Test on fish	% survival		100	0	50

Table No. II

Name of Industry				**Harsool Talav**	**Hotel Welcome Rama International**	**CIPET**
Location				Bore Well	Well	Bore Well
Date of Sampling				**23.05.18**	**25.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
1.	Sanitary Survey	-	**Very Clean neighborhood and catchment**			

Name of Industry				**Harsool Talav**	**Hotel Welcome Rama International**	**CIPET**
Location				Bore Well	Well	Bore Well
Date of Sampling				**23.05.18**	**25.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
2.	General Appearance	-	**No floating matter**			
3.	Colour	Hazen	**5**	1	1	1
4.	Smell	-	**Agreeable**	Agreeable	Agreeable	Agreeable
5.	pH	-	**6.5-8.5**	7.1	6.79	6.83
6.	Oil & Grease	mg/L	**100**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**500**	BDL	BDL	BDL
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	BDL	8	12
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	BDL	3.8	4
10.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm	**750**	820	1012	1125
11.	Nitrite Nitrogen (as N)	mg/L		0.01	0.02	0.01
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	37.8	40.8	41
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	37.8	40.8	41
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL	BDL

Name of Industry				**Harsool Talav**	**Hotel Welcome Rama International**	**CIPET**
Location				Bore Well	Well	Bore Well
Date of Sampling				**23.05.18**	**25.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	0.61	BDL	0.4
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL	BDL
20.	Sodium Absorption Ratio			BDL	BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	32	32	39
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	6.8	14	9.3
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	0.11	0.8	1.23
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	0.18	BDL	0.3
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL	BDL

Name of Industry				**Harsool Talav**	**Hotel Welcome Rama International**	**CIPET**
Location				Bore Well	Well	Bore Well
Date of Sampling				**23.05.18**	**25.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
28.	Organo Chlorine Pesticides	µg/L	**0.05**			
i.	Alachlor	µg/L	**20**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.03**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL	BDL

Name of Industry				**Harsool Talav**	**Hotel Welcome Rama International**	**CIPET**
Location				Bore Well	Well	Bore Well
Date of Sampling				**23.05.18**	**25.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL	BDL
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	BDL	BDL
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	BDL	BDL	BDL

Name of Industry				**Harsool Talav**	**Hotel Welcome Rama International**	**CIPET**
Location				Bore Well	Well	Bore Well
Date of Sampling				**23.05.18**	**25.05.18**	**25.05.18**
Sr.	**Parameters**	**Unit**	**Std.**	**Results**		
41.	Iron (as Fe)	mg/L	**0.3**	BDL	0.063	BDL
42.	Vanadium (as V)	mg/L		BDL	BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL	BDL
45.	Bioassay Test on fish	% survival		50	100	0

Table No. III

Name of Industry				**Badve Engineering**	**Girija Society**	**Pareshwadi Talav**
Location				Ground Water	Ground Water	Ground Water
Date of Sampling				17.05.18	17.05.18	18.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
1.	Sanitary Survey		**Very Clean neighborhood and catchment**	-	-	-
2.	General Appearance	Hazen	**No floating matter**	-	-	-
3.	Colour		**5**	1	1	1
4.	Smell	m	**Agreeable**	Agreeable	Agreeable	Agreeable

Name of Industry				**Badve Engineering**	**Girija Society**	**Pareshwadi Talav**
Location				Ground Water	Ground Water	Ground Water
Date of Sampling				17.05.18	17.05.18	18.05.18
5.	pH		**6.5-8.5**	7.09	7.07	7.56
6.	Oil & Grease	mg/L	**100**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**500**	6	BDL	53
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	11	BDL	38
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	3.8	BDL	13.3
10.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm	**750**	2490	1370	1460
11.	Nitrite Nitrogen (as N)	mg/L		1.31	2.91	0.42
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	35	27	15.5
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	36.3	29.9	15.9
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	<0.1	<0.1	<0.1
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	1.22	0.2	0.6
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL	BDL

Name of Industry				**Badve Engineering**	**Girija Society**	**Pareshwadi Talav**
Location				Ground Water	Ground Water	Ground Water
Date of Sampling				17.05.18	17.05.18	18.05.18
20.	Sodium Absorption Ratio			BDL	BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	47	Absent	Absent
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	6.8	BDL	BDL
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	0.33	8.25	3.28
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	BDL	5.04	BDL
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL	BDL
28.	Organo Chlorine Pesticides		**0.05**			
i.	Alachlor	µg/L	**20**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.03**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL	BDL

Name of Industry				**Badve Engineering**	**Girija Society**	**Pareshwadi Talav**
Location				Ground Water	Ground Water	Ground Water
Date of Sampling				17.05.18	17.05.18	18.05.18
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	0.12	0.122	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL	BDL

Name of Industry				**Badve Engineering**	**Girija Society**	**Pareshwadi Talav**
Location				Ground Water	Ground Water	Ground Water
Date of Sampling				17.05.18	17.05.18	18.05.18
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	BDL	BDL
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	BDL	BDL	BDL
41.	Iron (as Fe)	mg/L	**0.3**	BDL	0.087	BDL
42.	Vanadium (as V)	mg/L		BDL	BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL	BDL
45.	Bioassay Test on fish	% survival		100	100	100

Table No. IV

Name of Industry				**Jackwell at Bramgavan**	**Nasir Shikandar**
Location				Ground Water	Borewell Water
Date of Sampling				18.05.18	18.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Sanitary Survey		**Very Clean neighborhood and catchment**	-	-
2.	General Appearance	Hazen	**No floating matter**	-	-
3.	Colour		**5**	1	1
4.	Smell	m	**Agreeable**	Agreeable	Agreeable
5.	pH		**6.5-8.5**	6.89	7.17
6.	Oil & Grease	mg/L	**100**	BDL	BDL
7.	Suspended Solids	mg/L	**500**	BDL	6
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	36	24
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	13	8.45
10.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm	**750**	2380	2550
11.	Nitrite Nitrogen (as N)	mg/L		BDL	0.17
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	39.4	42.5
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	39.4	42.7
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL

Name of Industry				**Jackwell at Bramgavan**	**Nasir Shikandar**
Location				Ground Water	Borewell Water
Date of Sampling				18.05.18	18.05.18
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	0.14	0.51
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL
20.	Sodium Absorption Ratio			BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	Absent	22
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	BDL	4.5
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	4.07	0.22
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	BDL	BDL
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL
28.	Organo Chlorine Pesticides		**0.05**		
i.	Alachlor	µg/L	**20**	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL

Name of Industry				**Jackwell at Bramgavan**	**Nasir Shikandar**
Location				Ground Water	Borewell Water
Date of Sampling				18.05.18	18.05.18
iii.	Aldrin	µg/L	**0.03**	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL

Name of Industry				**Jackwell at Bramgavan**	**Nasir Shikandar**
Location				Ground Water	Borewell Water
Date of Sampling				18.05.18	18.05.18
31.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	0.1
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	BDL	BDL
41.	Iron (as Fe)	mg/L	**0.3**	BDL	0.072
42.	Vanadium (as V)	mg/L		BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL
45.	Bioassay Test on fish	% survival		100	100

Table No. V

Name of Industry				**Shendra Village**	**Kumbhephal Well Water**	**Radico NV Distillary**
Location				Ground Water	Well Water	Ground Water
Date of Sampling				23.05.18	23.05.18	24.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
1.-	Sanitary Survey		**Very Clean neighborhood and catchment**	-	-	-
2.	General Appearance	Hazen	**No floating matter**	-	-	-
3.	Colour		**5**	1	1	1
4.	Smell	m	**Agreeable**	Agreeable	Agreeable	Agreeable
5.	pH		**6.5-8.5**	7.2	6.63	6.83
6.	Oil & Grease	mg/L	**100**	BDL	BDL	BDL
7.	Suspended Solids	mg/L	**500**	BDL	BDL	BDL
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	5	18	44
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	2	6.3	16
10.	Electrical Conductivity(at 25 ^{o}C)	µmho/ cm	**750**	1451	2380	1498
11.	Nitrite Nitrogen (as N)	mg/L		0.14	0.16	3.95
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	42	43.5	13.2

Name of Industry				**Shendra Village**	**Kumbhephal Well Water**	**Radico NV Distillary**
Location				Ground Water	Well Water	Ground Water
Date of Sampling				23.05.18	23.05.18	24.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	42.1	43.7	17.1
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL	BDL
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	1.18	1	0.56
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL	BDL
20.	Sodium Absorption Ratio			BDL	BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	Absent	Absent	33
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	BDL	BDL	14
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	7.28	1.23	4.31
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	0.1	0.28	3.5
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL	BDL

Name of Industry				**Shendra Village**	**Kumbhephal Well Water**	**Radico NV Distillary**
Location				Ground Water	Well Water	Ground Water
Date of Sampling				23.05.18	23.05.18	24.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL	BDL
28.	Organo Chlorine Pesticides		**0.05**			
i.	Alachlor	µg/L	**20**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.03**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL	BDL

Name of Industry				**Shendra Village**	**Kumbhephal Well Water**	**Radico NV Distillary**
Location				Ground Water	Well Water	Ground Water
Date of Sampling				23.05.18	23.05.18	24.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL	BDL
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	BDL	BDL
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	BDL	0.102	0.38
41.	Iron (as Fe)	mg/L	**0.3**	BDL	BDL	BDL

Name of Industry				**Shendra Village**	**Kumbhephal Well Water**	**Radico NV Distillary**
Location				Ground Water	Well Water	Ground Water
Date of Sampling				23.05.18	23.05.18	24.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
42.	Vanadium (as V)	mg/L		BDL	BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL	BDL
44.	Boron (as B)	mg/L		0.145	BDL	BDL
45.	Bioassay Test on fish	% survival		100	100	100

Table No. VI

Name of Industry				**Lake Near Radico**	**Zalta Phata STP**
Location				Surface Water	Borewell Water
Date of Sampling				24.05.18	25.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Sanitary Survey		**Very Clean neighborhood and catchment**	-	-
2.	General Appearance	Hazen	**No floating matter**	-	-
3.	Colour		**5**	4	1
4.	Smell	m	**Agreeable**	Disgreeable	Agreeable
5.	pH		**6.5-8.5**	7.4	6.99
6.	Oil & Grease	mg/L	**100**	BDL	BDL
7.	Suspended Solids	mg/L	**500**	22	<5

Name of Industry				**Lake Near Radico**	**Zalta Phata STP**
Location				Surface Water	Borewell Water
Date of Sampling				24.05.18	25.05.18
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	560	13
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	198	4.7
10.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm	**750**	7400	2140
11.	Nitrite Nitrogen (as N)	mg/L		BDL	0.28
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	90.7	41.3
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	90.7	41.6
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	0.3	BDL
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	45	1.36
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		0.2	BDL
20.	Sodium Absorption Ratio			BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	17	14
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	9.3	4.5

Name of Industry				**Lake Near Radico**	**Zalta Phata STP**
Location				Surface Water	Borewell Water
Date of Sampling				24.05.18	25.05.18
23.	Total Phosphorous (as P)	mg/L	**0.5**	0.78	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	68.4	0.56
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	15.2	0.2
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL
28.	Organo Chlorine Pesticides		**0.05**		
i.	Alachlor	µg/L	**20**	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL
iii.	Aldrin	µg/L	**0.03**	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL

Name of Industry				**Lake Near Radico**	**Zalta Phata STP**
Location				Surface Water	Borewell Water
Date of Sampling				24.05.18	25.05.18
xiii.	o,p DDE	µg/L	**1**	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	BDL
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL

Name of Industry				**Lake Near Radico**	**Zalta Phata STP**
Location				Surface Water	Borewell Water
Date of Sampling				24.05.18	25.05.18
40.	Manganese (as Mn)	mg/L	**0.1**	0.166	BDL
41.	Iron (as Fe)	mg/L	**0.3**	0.679	<0.06
42.	Vanadium (as V)	mg/L		BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL
45.	Bioassay Test on fish	% survival		50	0

Table No. VII

Name of Industry				**Frigorifico Allana Pvt Ltd**	**Varroc Polymers Pvt Ltd**	**Near Sky Biotech Well**
Location				Borewell Water	Borewell Water	Well Water
Date of Sampling				19.05.18	19.05.18	19.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
1.-	Sanitary Survey		**Very Clean neighborhood and catchment**	-	-	-
2.	General Appearance	Hazen	**No floating matter**	-	-	-
3.	Colour		**5**	1	1	1
4.	Smell	m	**Agreeable**	Agreeable	Agreeable	Agreeable
5.	pH		**6.5-8.5**	8.03	7.27	7.79
6.	Oil & Grease	mg/L	**100**	BDL	BDL	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd**	**Varroc Polymers Pvt Ltd**	**Near Sky Biotech Well**
Location				Borewell Water	Borewell Water	Well Water
Date of Sampling				19.05.18	19.05.18	19.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
7.	Suspended Solids	mg/L	**500**	6	BDL	BDL
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	19	37	7
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	6.69	13	3.7
10.	Electrical Conductivity(at 25 ^{o}C)	µmho/ cm	**750**	490	2740	907
11.	Nitrite Nitrogen (as N)	mg/L		BDL	BDL	0.04
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	1.57	29.2	12.78
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	1.57	29.2	12.8
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL	BDL
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	BDL	1.21	0.5
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL	BDL
20.	Sodium Absorption Ratio			BDL	BDL	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd**	**Varroc Polymers Pvt Ltd**	**Near Sky Biotech Well**
Location				Borewell Water	Borewell Water	Well Water
Date of Sampling				19.05.18	19.05.18	19.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
21.	Total Coliforms	MPN index/ 100 mL	**ND**	Absent	Absent	110
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	BDL	BDL	14
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	0.11	0.22	0.11
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	BDL	BDL	BDL
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL	BDL
28.	Organo Chlorine Pesticides		**0.05**			
i.	Alachlor	µg/L	**20**	BDL	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL	BDL
iii.	Aldrin	µg/L	**0.03**	BDL	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd**	**Varroc Polymers Pvt Ltd**	**Near Sky Biotech Well**
Location				Borewell Water	Borewell Water	Well Water
Date of Sampling				19.05.18	19.05.18	19.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
viii.	Chlorpyrifos	µg/L		BDL	BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL	BDL
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	BDL	0.332	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL	BDL

Name of Industry				**Frigorifico Allana Pvt Ltd**	**Varroc Polymers Pvt Ltd**	**Near Sky Biotech Well**
Location				Borewell Water	Borewell Water	Well Water
Date of Sampling				19.05.18	19.05.18	19.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**		
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	BDL	BDL	BDL
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	BDL	BDL	BDL
41.	Iron (as Fe)	mg/L	**0.3**	BDL	0.186	0.134
42.	Vanadium (as V)	mg/L		BDL	BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL	BDL
45.	Bioassay Test on fish	% survival		100	100	100

Table No. VIII

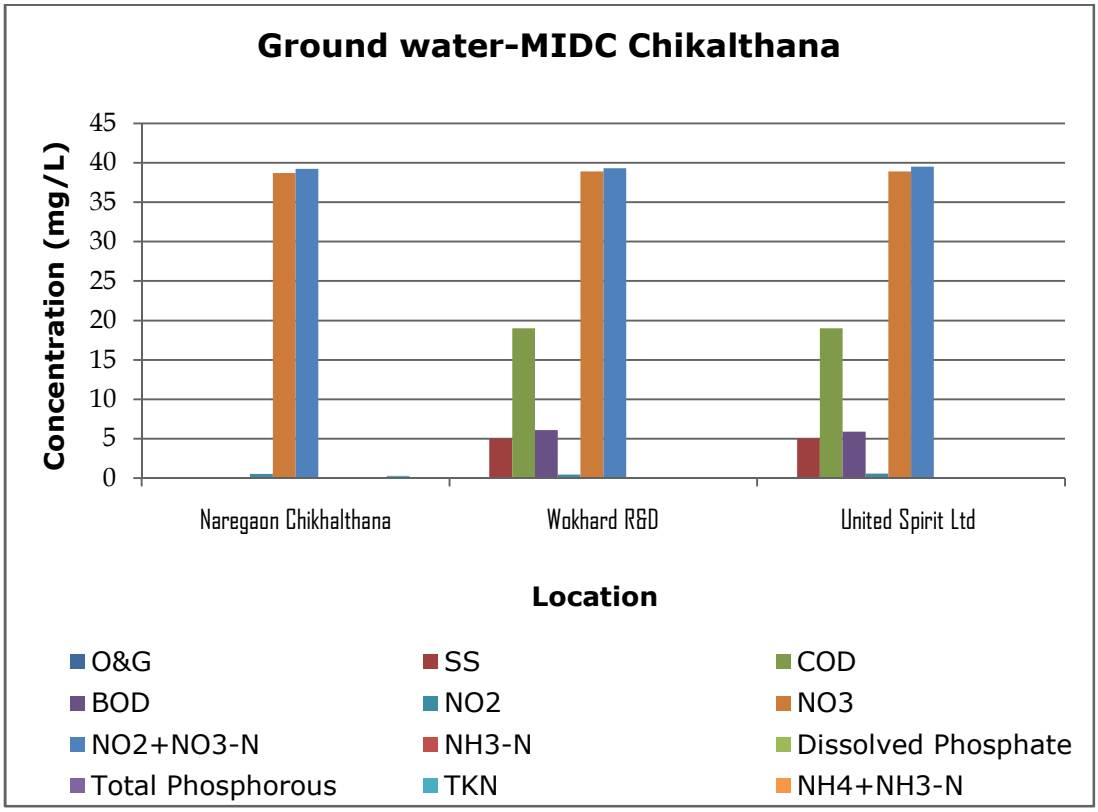
Name of Industry				**Talav Near Faroola Gaon**	**Near Dhoot Transmission**
Location				Well Water	Borewell Water
Date of Sampling				21.05.18	21.05.18
Sr.	**Parameters**	**Unit**	**Std. Limit**	**Results**	
1.	Sanitary Survey		**Very Clean neighborhood and catchment**	-	-
2.	General Appearance	Hazen	**No floating matter**	-	-
3.	Colour		**5**	1	1
4.	Smell	m	**Agreeable**	Agreeable	Agreeable
5.	pH		**6.5-8.5**	7.79	7.72
6.	Oil & Grease	mg/L	**100**	BDL	BDL
7.	Suspended Solids	mg/L	**500**	BDL	BDL
8.	Chemical Oxygen Demand	mg/L	**10 (WHO, 1993)**	32	20
9.	Biochemical Oxygen Demand (3 days,27^{o}C)	mg/L	**6 (WHO, 1993)**	11	6.34
10.	Electrical Conductivity (at 25 ^{o}C)	µmho/ cm	**750**	1110	1090
11.	Nitrite Nitrogen (as N)	mg/L		0.02	0.02
12.	Nitrate Nitrogen (as N)	mg/L	**1.0**	39.3	39
13.	(NO_2 + NO_3)-Nitrogen	mg/L	**45**	39.3	39
14.	Free Ammonia (as NH_3-N)	mg/L	**0.5**	BDL	BDL

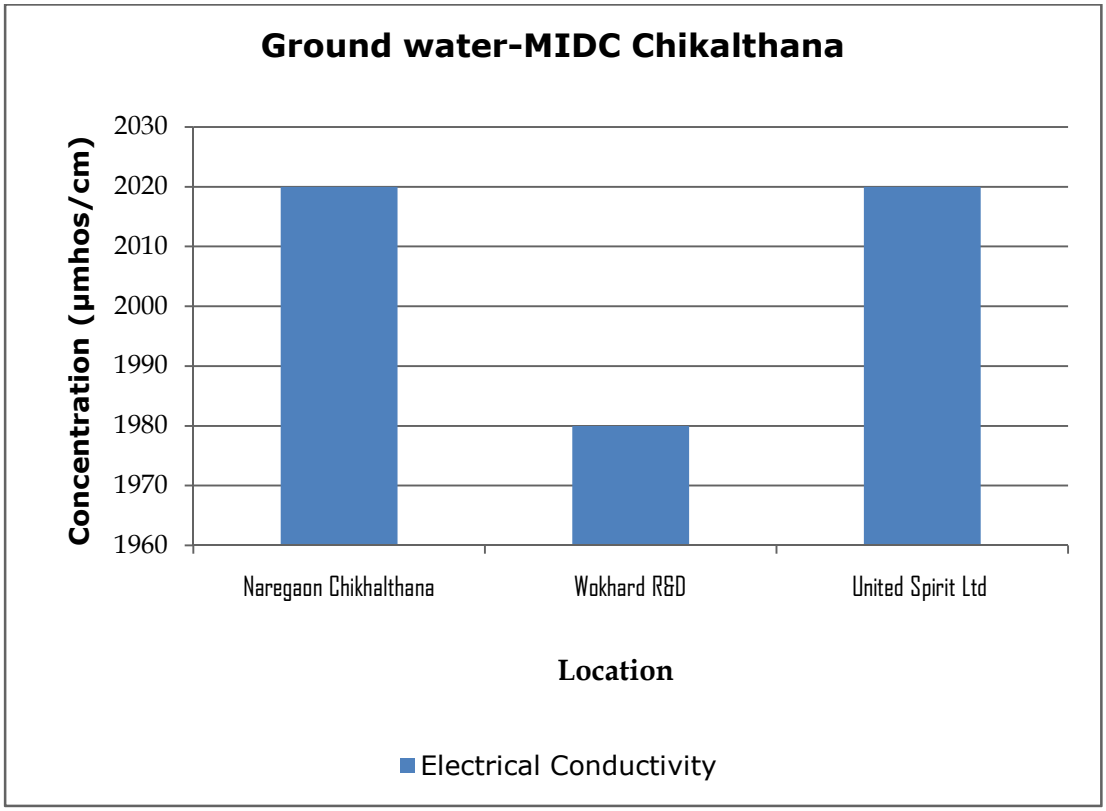
Name of Industry				**Talav Near Faroola Gaon**	**Near Dhoot Transmission**
Location				Well Water	Borewell Water
Date of Sampling				21.05.18	21.05.18
15.	Total Residual Chlorine	mg/L	**0.2**	BDL	BDL
16.	Cyanide (as CN)	mg/L	**1.5**	BDL	BDL
17.	Fluoride (as F)	mg/L	**1**	0.33	0.2
18.	Sulphide (as S^{2-})	mg/L	**0.05**	BDL	BDL
19.	Dissolved Phosphate (as P)	mg/L		BDL	BDL
20.	Sodium Absorption Ratio			BDL	BDL
21.	Total Coliforms	MPN index/ 100 mL	**ND**	47	34
22.	Faecal Coliforms	MPN index/ 100 mL	**ND**	17	6.8
23.	Total Phosphorous (as P)	mg/L	**0.5**	BDL	BDL
24.	Total Kjeldahl Nitrogen (as N)	mg/L	**0.001**	0.22	0.22
25.	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	**0.5**	BDL	BDL
26.	Phenol (as C_6H_5OH)	mg/L	**0.001**	BDL	BDL
27.	Surface Active Agents (as MBAS)	mg/L	**0.02**	BDL	BDL
28.	Organo Chlorine Pesticides		**0.05**		-
i.	Alachlor	µg/L	**20**	BDL	BDL
ii.	Atrazine	µg/L	**2**	BDL	BDL

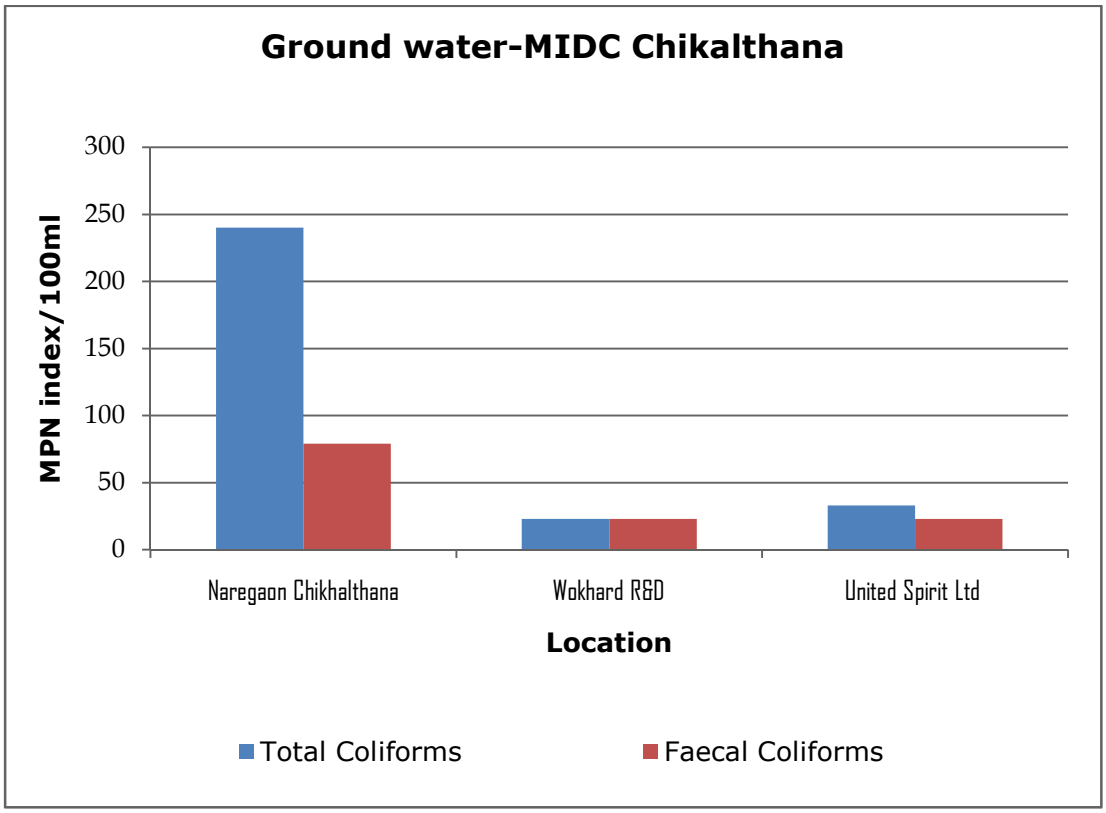
Name of Industry				**Talav Near Faroola Gaon**	**Near Dhoot Transmission**
Location				Well Water	Borewell Water
Date of Sampling				21.05.18	21.05.18
iii.	Aldrin	µg/L	**0.03**	BDL	BDL
iv.	Dieldrin	µg/L	**0.03**	BDL	BDL
v.	Alpha HCH	µg/L	**0.01**	BDL	BDL
vi.	Beta HCH	µg/L	**0.04**	BDL	BDL
vii.	Butachlor	µg/L	**125**	BDL	BDL
viii.	Chlorpyrifos	µg/L		BDL	BDL
ix.	Delta HCH	µg/L	**0.04**	BDL	BDL
x	p,p DDT	µg/L	**1**	BDL	BDL
xi.	o,p DDT	µg/L	**1**	BDL	BDL
xii.	p,p DDE	µg/L	**1**	BDL	BDL
xiii.	o,p DDE	µg/L	**1**	BDL	BDL
xiv.	p,p DDD	µg/L	**1**	BDL	BDL
xv.	o,p DDD	µg/L	**1**	BDL	BDL
xvi.	Alpha Endosulfan	µg/L	**0.4**	BDL	BDL
xvii.	Beta Endosulfan	µg/L	**0.4**	BDL	BDL
xviii.	Endosulfan Sulphate	µg/L	**0.4**	BDL	BDL
xix.	Y HCH (Lindane)	µg/L	**2.0**	BDL	BDL
29.	Polynuclear aromatic hydrocarbons (as PAH)	µg/L	**0.0001**	BDL	BDL

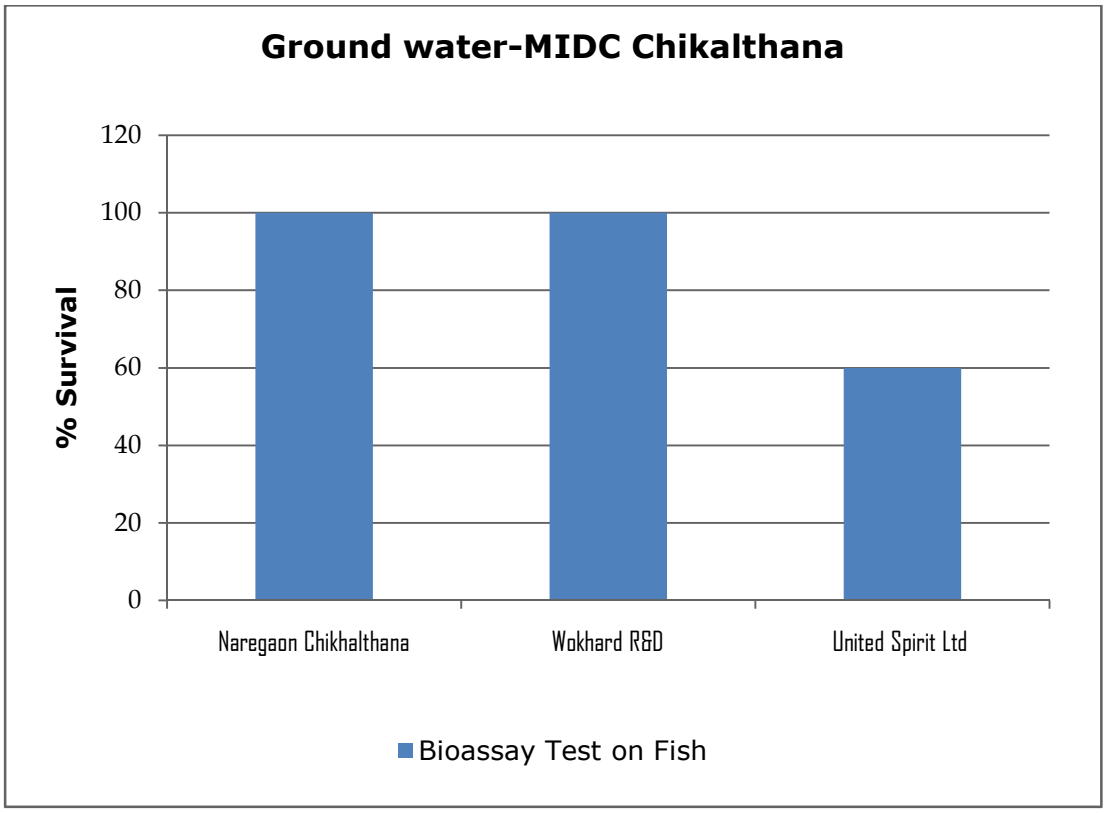
Name of Industry				**Talav Near Faroola Gaon**	**Near Dhoot Transmission**
Location				Well Water	Borewell Water
Date of Sampling				21.05.18	21.05.18
30.	Polychlorinated Biphenyls (PCB)	µg/L	**0.0005**	BDL	BDL
31.	Zinc (Zn)	mg/L	**5.0**	BDL	BDL
32.	Nickel (as Ni)	mg/L	**0.02**	BDL	BDL
33.	Copper (as Cu)	mg/L	**0.05**	BDL	BDL
34.	Hexavalent Chromium (as Cr^{6+})	mg/L	**1**	BDL	BDL
35.	Total Chromium (as Cr)	mg/L	**0.05**	0.084	BDL
36.	Total Arsenic (as As)	mg/L	**0.01**	BDL	BDL
37.	Lead (as Pb)	mg/L	**0.01**	BDL	BDL
38.	Cadmium (as Cd)	mg/L	**0.003**	BDL	BDL
39.	Mercury (as Hg)	mg/L	**0.001**	BDL	BDL
40.	Manganese (as Mn)	mg/L	**0.1**	BDL	BDL
41.	Iron (as Fe)	mg/L	**0.3**	BDL	BDL
42.	Vanadium (as V)	mg/L		BDL	BDL
43.	Selenium (as Se)	mg/L	**0.01**	BDL	BDL
44.	Boron (as B)	mg/L		BDL	BDL
45.	Bioassay Test on fish	% survival		0	100

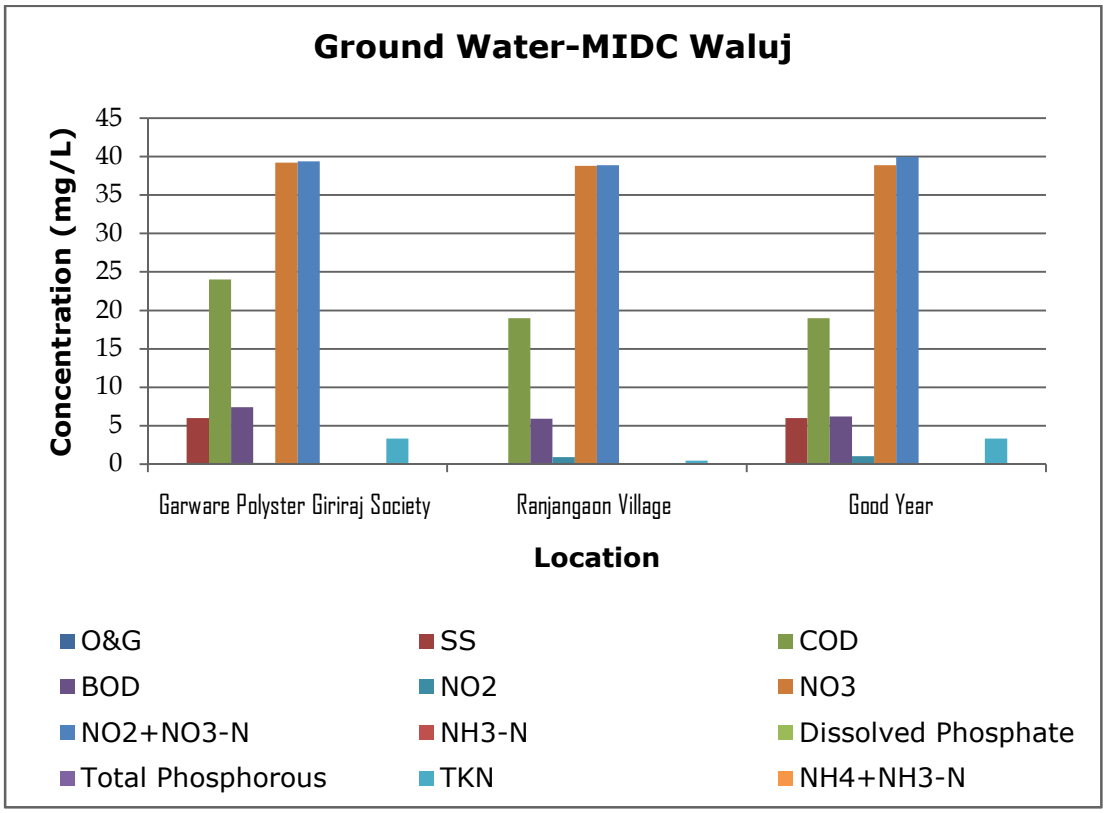
Graphs: Ground Water Analysis:

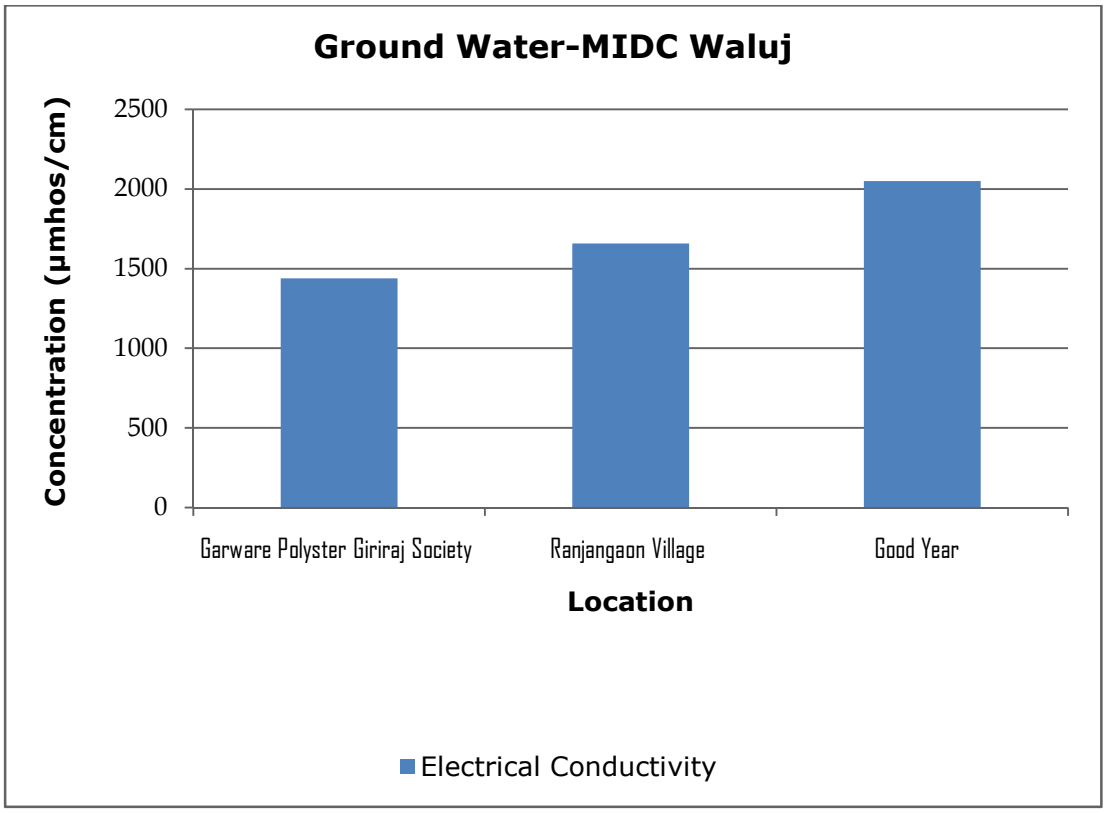


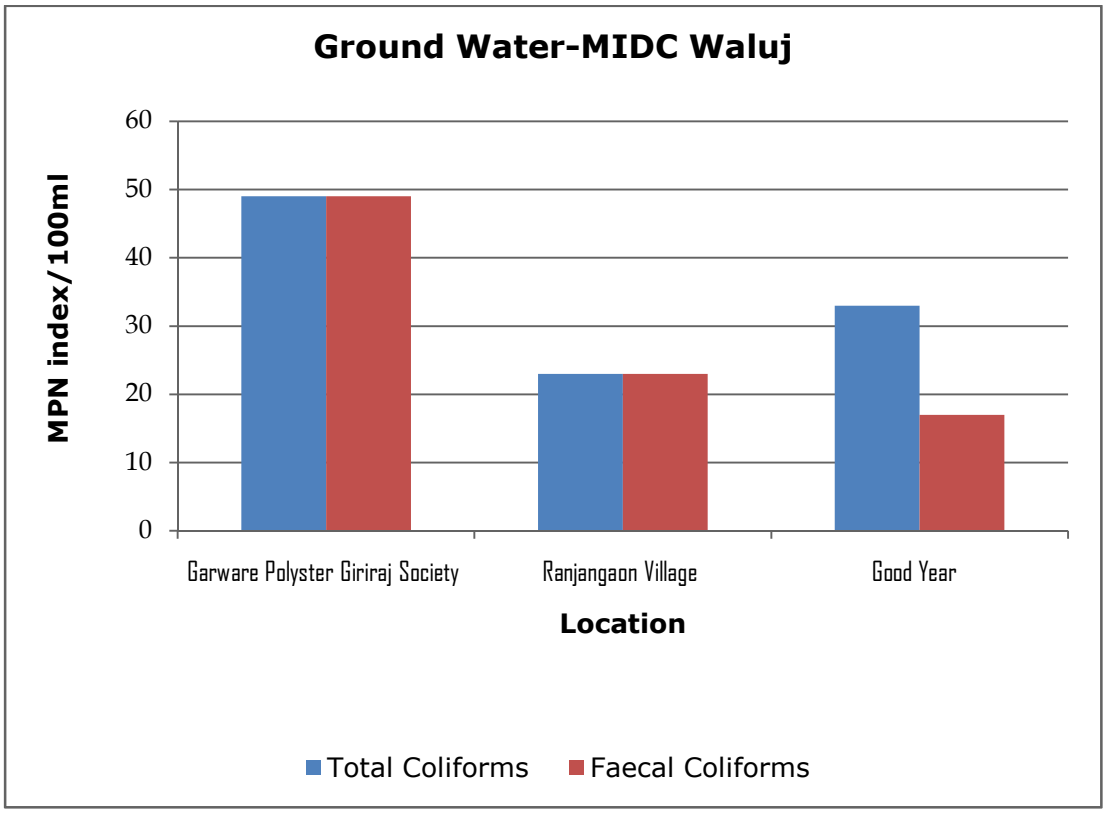


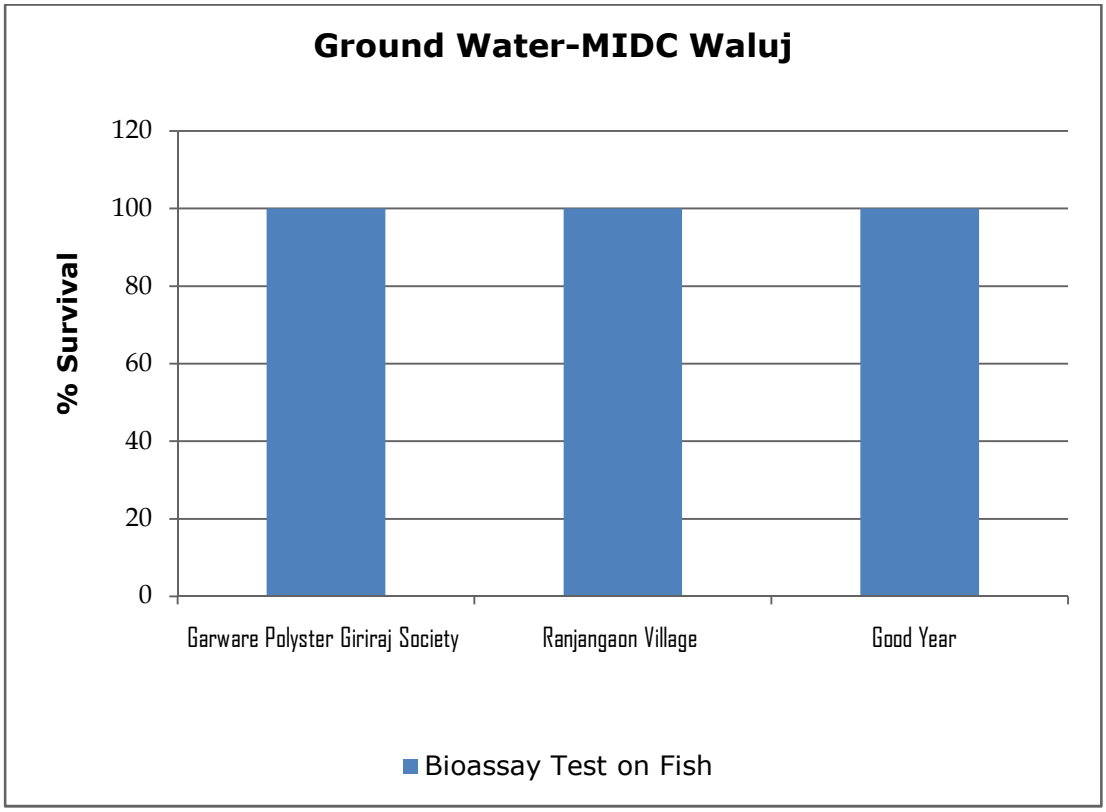

Ground water-MIDC Chikalthana
MPN index/100ml
300
250
200
150
100
50
0
Naregaon Chikhalthana
Wokhard R&D
United Spirit Ltd
Location
Total Coliforms
Faecal Coliforms

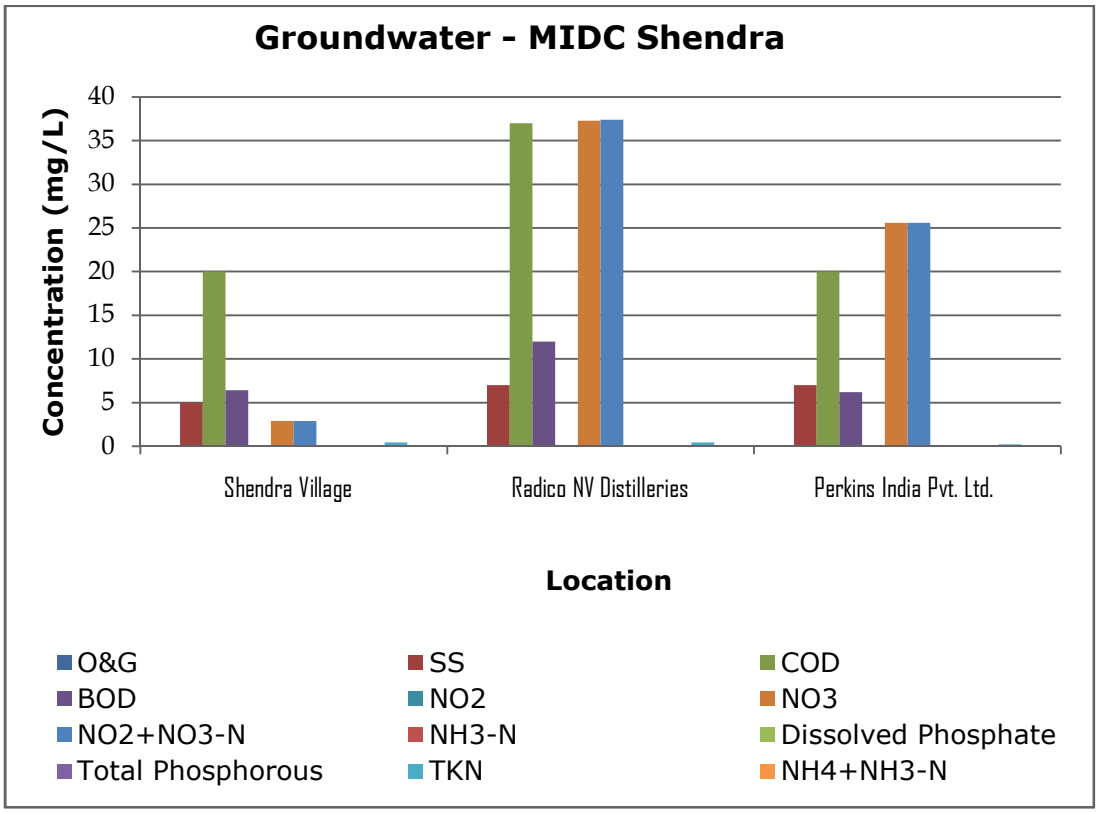

Ground water-MIDC Chikalthana
% Survival
120
100
80
60
40
20
0
Naregaon Chikhalthana
Wokhard R&D
United Spirit Ltd
Bioassay Test on Fish

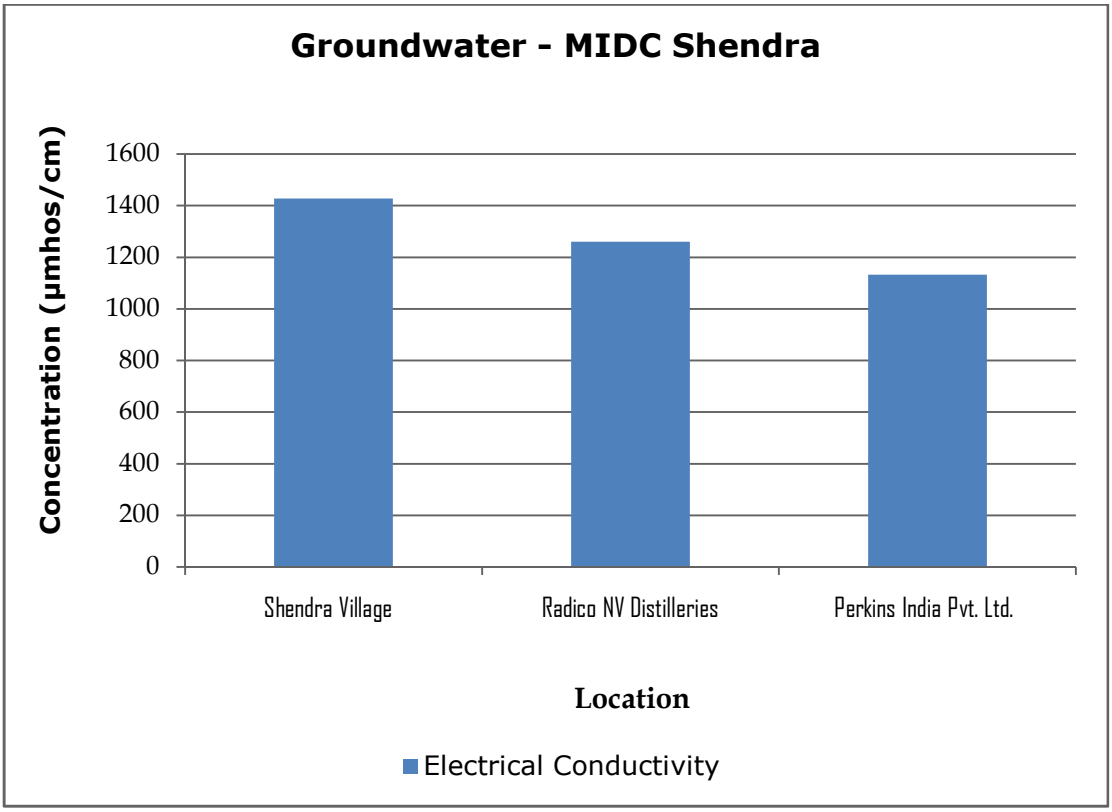

Ground Water-MIDC Waluj
Concentration (mg/L)
45
40
35
30
25
20
15
10
5
0
Garware Polyster Giriraj Society
Ranjangaon Village
Good Year
Location
O&G
SS
COD
BOD
NO2
NO3
NO2+NO3-N
NH3-N
Dissolved Phosphate
Total Phosphorous
TKN
NH4+NH3-N

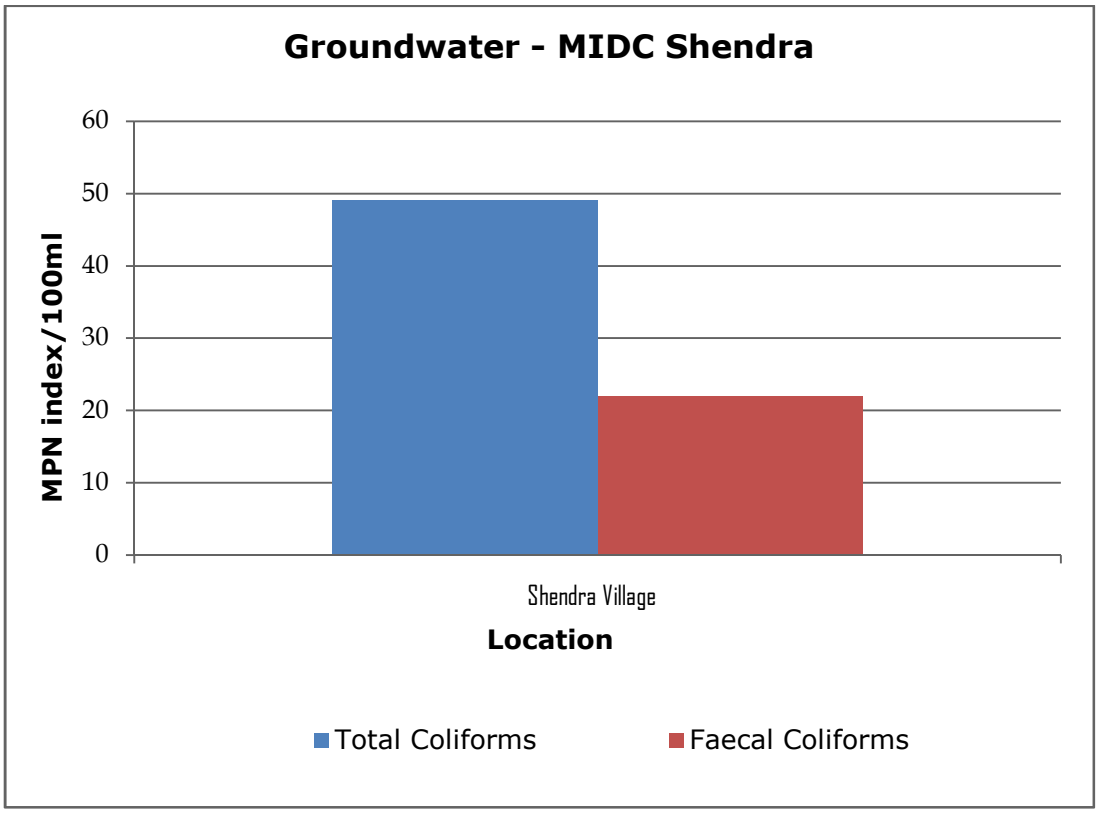

Ground Water-MIDC Waluj
Concentration (µmhos/cm)
2500
2000
1500
1000
500
0
Garware Polyster Giriraj Society
Ranjangaon Village
Good Year
Location
Electrical Conductivity

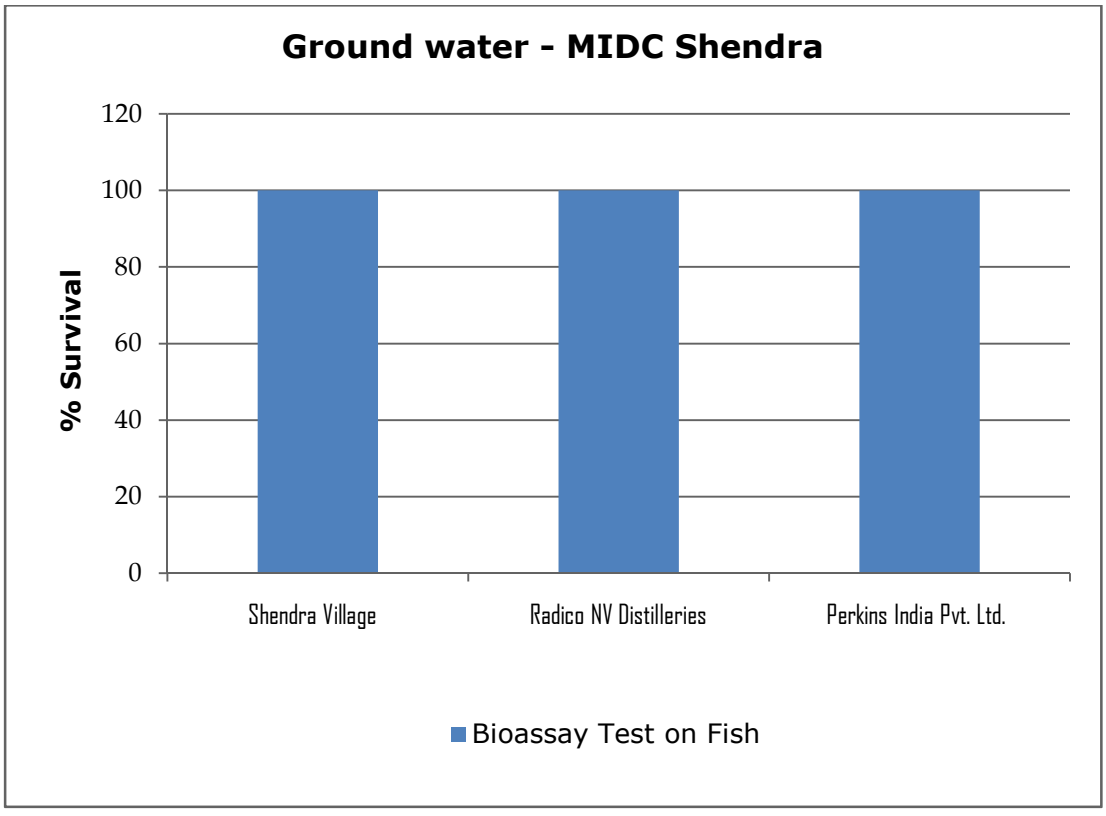

Ground Water-MIDC Waluj
MPN index/100ml
60
50
40
30
20
10
0
Garware Polyster Giriraj Society
Ranjangaon Village
Good Year
Location
Total Coliforms
Faecal Coliforms

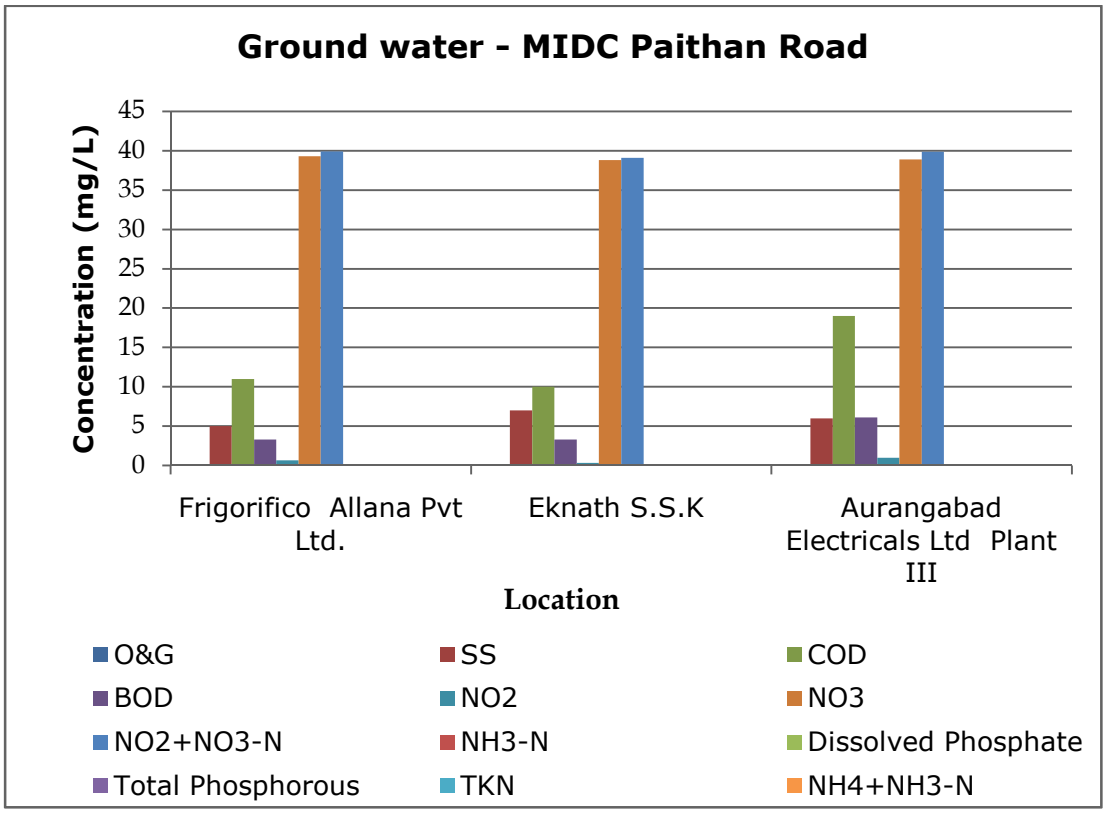

Ground Water-MIDC Waluj
% Survival
120
100
80
60
40
20
0
Garware Polyster Giriraj Society
Ranjangaon Village
Good Year
Bioassay Test on Fish

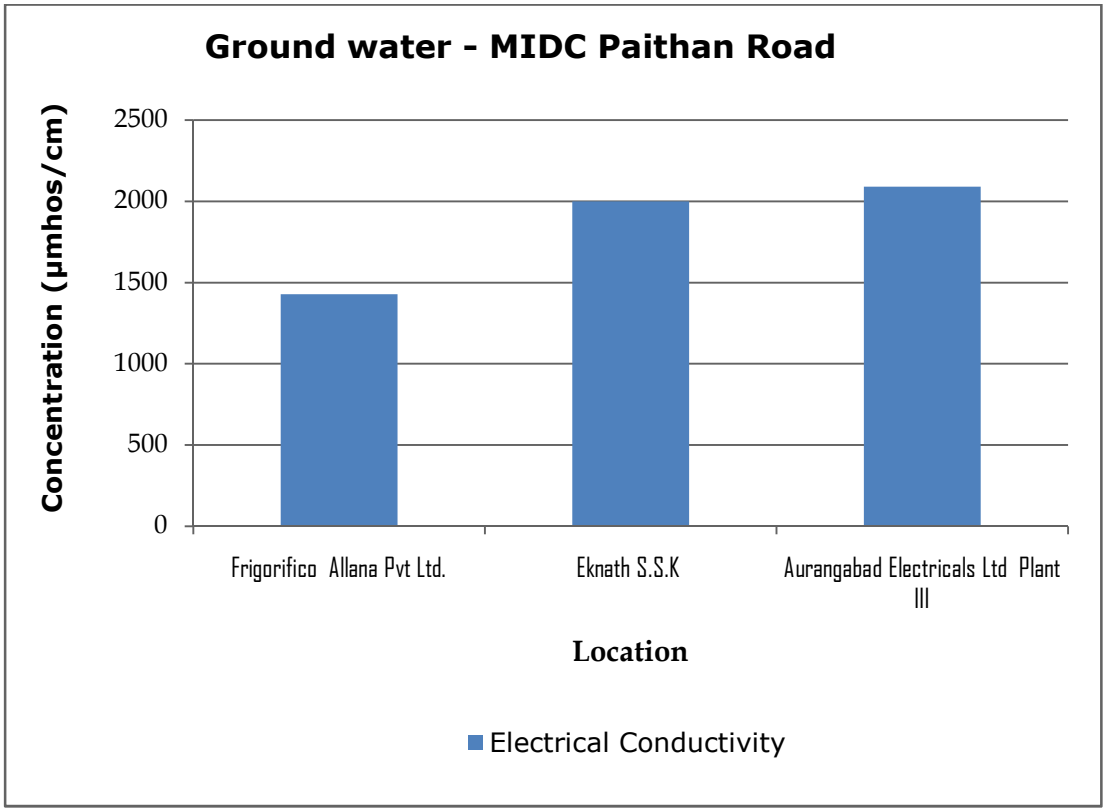

Groundwater - MIDC Shendra
Concentration (mg/L)
40
35
30
25
20
15
10
5
0
Shendra Village
Radico NV Distilleries
Perkins India Pvt. Ltd.
Location
O&G
SS
COD
BOD
NO2
NO3
NO2+NO3-N
NH3-N
Dissolved Phosphate
Total Phosphorous
TKN
NH4+NH3-N

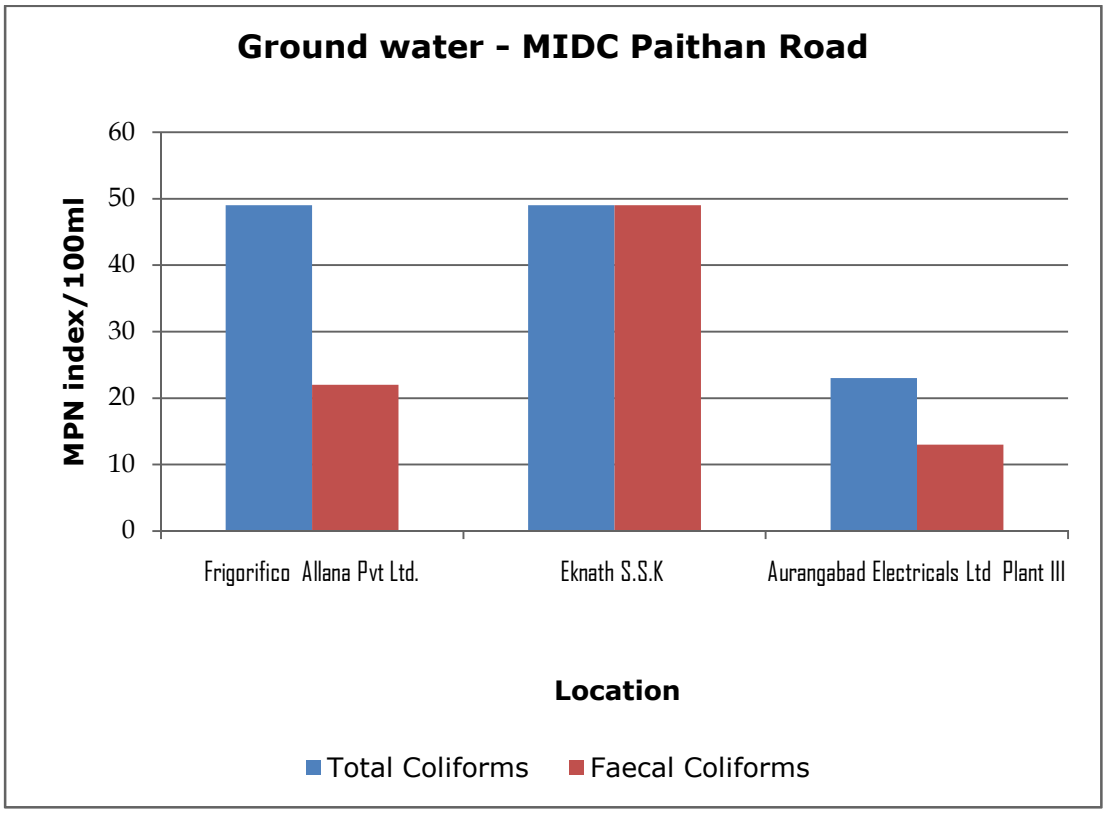

Groundwater - MIDC Shendra
Concentration (µmhos/cm)
1600
1400
1200
1000
800
600
400
200
0
Shendra Village
Radico NV Distilleries
Perkins India Pvt. Ltd.
Location
Electrical Conductivity

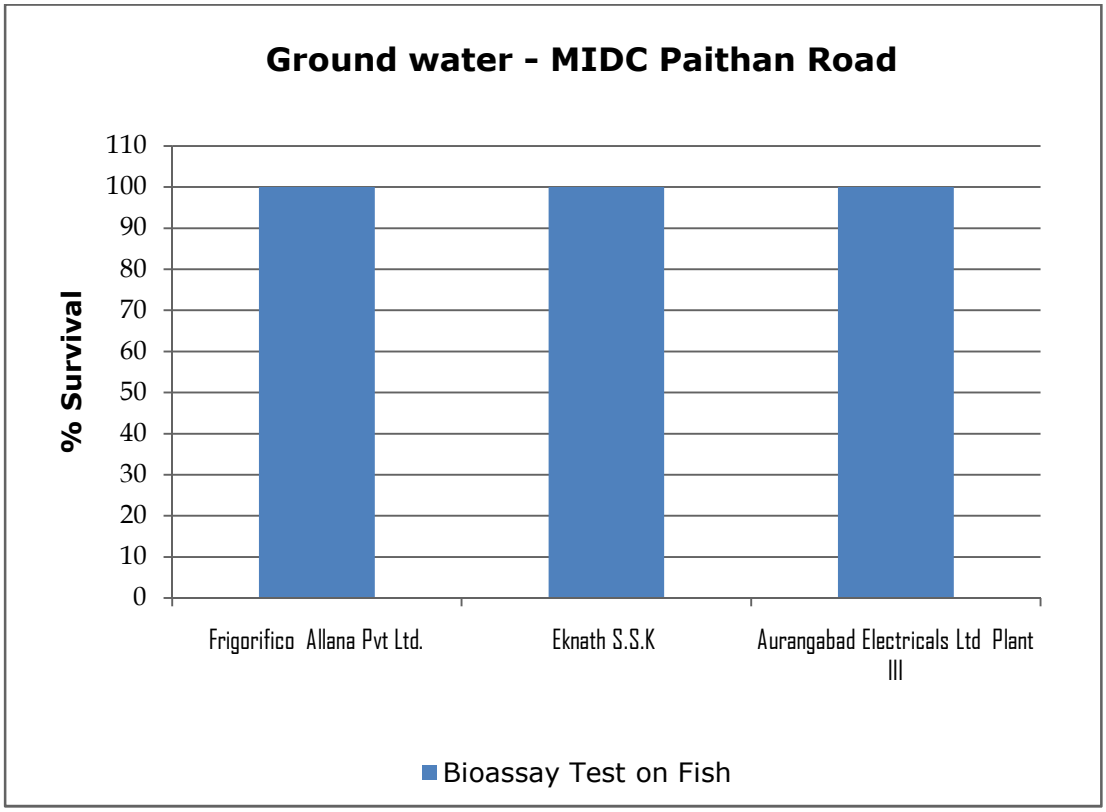

Groundwater - MIDC Shendra
MPN index/100ml
60
50
40
30
20
10
0
Shendra Village
Location
Total Coliforms
Faecal Coliforms


Ground water - MIDC Shendra
% Survival
120
100
80
60
40
20
0
Shendra Village
Radico NV Distilleries
Perkins India Pvt. Ltd.
Bioassay Test on Fish


Ground water - MIDC Paithan Road
Concentration (mg/L)
45
40
35
30
25
20
15
10
5
0
Frigorifico Allana Pvt Ltd.
Eknath S.S.K
Aurangabad Electricals Ltd Plant III
Location
O&G
SS
COD
BOD
NO2
NO3
NO2+NO3-N
NH3-N
Dissolved Phosphate
Total Phosphorous
TKN
NH4+NH3-N


Ground water - MIDC Paithan Road
Concentration (µmhos/cm)
2500
2000
1500
1000
500
0
Frigorifico Allana Pvt Ltd.
Eknath S.S.K
Aurangabad Electricals Ltd Plant III
Location
Electrical Conductivity


Ground water - MIDC Paithan Road
MPN index/100ml
60
50
40
30
20
10
0
Frigorifico Allana Pvt Ltd.
Eknath S.S.K
Aurangabad Electricals Ltd Plant III
Location
Total Coliforms
Faecal Coliforms


Ground water - MIDC Paithan Road
% Survival
110
100
90
80
70
60
50
40
30
20
10
0
Frigorifico Allana Pvt Ltd.
Eknath S.S.K
Aurangabad Electricals Ltd Plant III
Bioassay Test on Fish

4 Summary and Conclusions:

The results are summarized and concluded based on various standards mentioned in the previous chapter.

4.1 Stack Emission Monitoring:

Stack monitoring was done at four MIDC clusters having eight locations each. Volatile Organic Carbons (VOCs) are not detected in any of the collected sample. However, concentration of other parameters like particulate matter and sulphur dioxide is discussed below:

a) Chikalthana MIDC includes eight stacks at different industries. The status of stack parameters in these industrial clusters is discussed below:

1. **Particulate Matter:** At all the eight locations of MIDC Chikalthana, obtained values for particulate matter are below the standard limit of 150mg/Nm^3. It is observed in the range from 17 to 29mg/Nm^3.

2. **Sulphur Dioxide:** All industries in this MIDC displayed different concentrations depending on fuel and load. Sulphur dioxide is found in the range of 5.81 to 23.3mg/Nm^3.

b) Waluj MIDC also includes eight locations under study. The concentration of various parameters in these industrial clusters is observed as follows :

1. **Particulate Matter:** All obtained values for particulate matter are below the standard limit of 150mg/Nm^3. It is observed in the range of 15 to 31mg/Nm^3.

2. **Sulphur Dioxide:** Sulphur dioxide is found in the range of 6.53 to 20mg/Nm^3.

c) Shendra MIDC also includes eight locations under study. The status of stack parameters in these industrial clusters is discussed below:

1. **Particulate Matter:** All obtained values for particulate matter are below the standard limit of 150mg/Nm^3. It is observed in the range of 26 to 36mg/Nm^3.

2. **Sulphur Dioxide:** Sulphur dioxide is found in the range of 5.81 to 18.1mg/Nm^3.

d) Paithan MIDC also includes eight locations under study. The status of stack parameters in these industrial clusters is discussed below:

1. **Particulate Matter:** All obtained values for particulate matter are below the standard limit of 150mg/Nm^3. It is observed in the range of 13 to 29mg/Nm^3.

2. **Sulphur Dioxide:** Sulphur dioxide is found in the range of 5.92 to 19.2mg/Nm^3.

4.2 Ambient Air Quality:

Ambient Air Quality parameters are compared with NAAQ, 2009 by CPCB. All the four MIDCs covered with 3 locations each under study.

a) MIDC Chikalthana

MIDC Chikalthana is covered by studying 3 locations i.e. Harman Finochem Limited, Wochhardt Ltd (R &D) and MPCB Office.

1. **Sulphur dioxide:** Sulphur dioxide at all the three locations of MIDC Chikalthana is observed very low in concentration in the range of 6.56 to 6.75 µg/m^3.

2. **Nitrogen Dioxide:** similar to the sulphur dioxide, nitrogen dioxide is also observed in very low concentration i.e. in the range of 5.4 to 7.9 µg/m^3.

3. **Particulate Matter (PM10):** It is observed in the range from minimum of 167µg/$m^3$and maximum of 220µg/m^3 at Chikalthana MIDC.

4. **Particulate Matter (PM2.5):** Range between minimum of 41µg/m^3 at Harman Finochem Limited and maximum of 55µg/m^3at MPCB Office.

5. **Ozone (O_3):** Well within the limit and it is detected below detection limits <19.6µg/m^3 at all the locations.

6. **Lead (Pb):** It is also observed below detection limit at all locations.

7. **Carbon monoxide (CO):** It is also observed in very low concentrations and well below standard limit i.e. in the range of 1.49 to 3.74mg/m^3.

8. **Nickel and Arsenic:** Being carcinogenic in nature high concentration of nickel and Arsenic may become fatal for all human beings. However, both the metals are observed below detection limit in the ambient air samples studied.

9. **Ammonia:** It is also observed below detection limit in the ambient air samples studied

10. **Benzene:** Benzene is categorized as a known carcinogen in CEPI guidelines. It is present in all the collected samples but below standard limit (BDL).

11. **Benzo(a)Pyrene:** All values are observed BDL at all the locations.

b) MIDC Waluj

MIDC Waluj includes 3 locations namely: JK Ansell Pvt Ltd., Mylan Laboratories Ltd. and Cosmo Films.

1. **Sulphur dioxide:** Sulphur dioxide at all the three locations of MIDC Waluj is observed very low in concentration i.e. in the range of 6.61 to 6.93µg/m^3 at all the locations.

2. **Nitrogen Dioxide:** similar to the sulphur dioxide, nitrogen dioxide is also observed in low concentration i.e. in the range of 7.12 to 7.9µg/m^3 at all the locations.

3. **Particulate Matter (PM10):** All the values of Particulate Matter are found below the standard limit of NAAQ Standards, 2009. It is ranged from minimum of 89µg/m^3 at JK Ansell Pvt. Ltd. and maximum of 329µg/m^3 at Mylan Laboratories Ltd.

4. **Particulate Matter (PM2.5):** Range between minimum of 18µg/m^3 at JK Ansell Pvt. Ltd. and maximum of 82µg/m^3 at Mylan Laboratories Ltd.

5. **Ozone (O_3):** Well within the limit and it is detected below detection limits <19.6µg/m^3 at all the locations.

6. **Lead (Pb):** It is observed below detection limit at all locations.

7. **Carbon monoxide (CO):** It is also observed in very low concentrations and well below standard limit i.e. in the range of 2.6 to 2.94mg/m^3.

8. **Nickel and Arsenic:** Being carcinogenic in nature high concentration of nickel and Arsenic may become fatal for all human beings. However, both the metals are observed below detection limit in the ambient air samples studied.

9. **Ammonia:** It is also observed below detection limit in the ambient air samples studied

10. **Benzene:** Benzene is categorized as a known carcinogen in CEPI guidelines. It is present in all the collected samples but below standard limit.

11. **Benzo(a)Pyrene:** All values are observed BDL at all the locations.

c) MIDC Shendra

MIDC Shendra includes 3 locations namely: Wockhardt Ltd., NRB Bearing and Liegher.

1. **Sulphur dioxide:** Sulphur dioxide at all the three locations of MIDC Shendra is observed very low in concentration i.e. from 66.5 to 7.0µg/m^3 in concentration.

2. **Nitrogen Dioxide:** similar to the sulphur dioxide, nitrogen dioxide is also observed in low concentration i.e. in the range of 7.34 to 7.6µg/m^3 at all the locations.

3. **Particulate Matter (PM10):** Particulate Matter is found above the standard limit of NAAQ Standards, 2009 at two locations out of three. It is ranged from minimum of 75µg/m^3 at NRB Bearing and maximum of 359µg/m^3 at Liegher

4. **Particulate Matter (PM2.5):** Range between minimum of 18µg/m^3 at NRB Bearing and maximum of 87µg/m^3 at Liegher.

5. **Ozone (O_3):** Well within the limit and it is detected below detection limits <19.6µg/m^3 at all the locations.

6. **Lead (Pb):** It is observed below detection limit all locations.

7. **Carbon monoxide (CO):** It is also observed in very low concentrations and well below standard limit i.e. in the range of 1.36 to 4.09mg/m^3.

8. **Nickel and Arsenic:** Being carcinogenic in nature high concentration of nickel and Arsenic may become fatal for all human beings. However, both the metals are observed below detection limit in the ambient air samples studied.

9. **Ammonia:** It is also observed below detection limit in the ambient air samples studied

10. **Benzene:** Benzene is categorized as a known carcinogen in CEPI guidelines. It is present in all the collected samples but below standard limit.

11. **Benzo(a)Pyrene :** All values are observed BDL at all the locations.

d) MIDC Paithan Road

MIDC Paithan Road includes 3 locations namely: Jailaxmi Casting & Alloys Pvt Ltd., Aurangabad Electricals and Frigorifico Allana Pvt Ltd.

1. **Sulphur dioxide:** Sulphur dioxide at all the three locations of MIDC Paithan is observed very low in concentration i.e. in the range of 6.12 to 6.61.

2. **Nitrogen Dioxide:** It ranges between minimum of 5.11µg/m^3 at Frigorifico Allana Pvt Ltd and maximum 6.93µg/m^3 at Jailaxmi Casting & Alloys Pvt Ltd. All the values are quiet below the standard limit of 80µg/m^3.

3. **Particulate Matter (PM10):** All the values of Particulate Matter are found above the standard limit of NAAQ Standards, 2009. It is ranged from minimum of 103µg/m^3 at Frigorifico Allana Pvt Ltd and maximum of 265µg/m^3 at Aurangabad Electricals.

4. **Particulate Matter (PM2.5):** Range between minimum of 25µg/m^3 at Aurangabad Electricals.and maximum of 66µg/m^3 at Aurangabad Electricals. All the values are below the standard limit.

5. **Ozone (O_3):** Well within the limit and it is detected below detection limits <19.6µg/m^3 at all the locations.

6. **Lead (Pb):** It is observed below detection limit at all locations.

7. **Carbon monoxide (CO):** It is also observed in very low concentrations and well below standard limit i.e. in the range of 2.2 to 2.45mg/m^3.

8. **Nickel and Arsenic:** Being carcinogenic in nature high concentration of nickel and Arsenic may become fatal for all human beings. However, both the metals are observed below detection limit in the ambient air samples studied.

9. **Ammonia:** It is also observed below detection limit in the ambient air samples studied

10. **Benzene:** Benzene is categorized as a known carcinogen in CEPI guidelines. It is present in all the collected samples but below standard limit.

11. **Benzo(a)Pyrene :** All values are observed BDL at all the locations.

4.3 Water and Waste Water Quality:

Waste water parameters are compared with general water standards by CPCB. All the ground water parameters are compared with ISO 10500:2012 standards. Parameters which are not included in ISO 10500:2012 are compared with WHO standards like BOD (6mg/L) and COD (10mg/L).

a) MIDC Chikalthana:

Waste Water:

Samples of outlet effluent from three different Industries were drawn from their Effluent Treatment Plants. The names of Industries are i) Wockhardt R&D (ii) ABD Pvt. Ltd. (iii) Lupin Ltd.

- Out of all 3 industries, except ABD Pvt. Ltd., COD and BOD at all the other locations are observed below standard limit 250 and 60mg/L respectively.

- Except Lupin Ltd., water samples of all other locations are found within the limit for nitrate concentration.

- Among all the heavy metals, little concentration of heavy metals like manganese, iron and vanadium is found in all the samples. However, the observed concentrations are very much below the standard permissible limits.

- Bioassay test on fish shows zero survival in the waste water samples of all the industries.

4.4 Ground water

Six samples of Ground water from CTR Mfg Industries Ltd., Vivekananad School, Salim Ali Sarovar, Harsool Talav, Hotel Welcome Rama International and CIPET were taken for analysis.

- Out of all the water samples, water samples of 4 industries are found to exceed the standard limit of COD parameter. However, water sample of CTR Mfg Industries Ltd. and Salim Ali Sarovar are observed to exceed the standard limit of BOD.

- All other parameters are found within the standard limits.

- Among heavy metals, iron is found to exceed the standard limit at all the locations.

- Water sample of CTR Mfg Industries Ltd. and Hotel Welcome Rama International show 100% fish survival in Bioassay test. Salim Ali Sarovar and Harsool Talav samples show 50% fish survival. Remaining two samples show zero fish survival.

b) MIDC Waluj:

Waste water

MIDC at Waluj has maximum number of industries in Aurangabad District. There are more than 10 industries in the area where the total effluent generation is about 11 MLD. Large and medium scale industries are provided with ETP having primary and secondary treatment. These industries are also provided with septic tanks or STP for domestic waste water. Most of the units are bulk drugs and electroplating generating carcinogenic wastes.

In this MIDC area, 3 ETP samples were collected and analyzed for general water parameters, metals, phenols, cyanides, surface active agents.

ETP Outlet sample were taken from1) Carlsberg India Pvt Ltd. 2) Mylan Laboratories Ltd. 3) JK Ansell Pvt Ltd

- COD of analyzed sampled is observed within the permissible limits in the range of 90-170mg/L and BOD is also observed within the standard limit in the range of 31.7 to 60mg/L.

- All heavy metals concentration is also observed below standard limits in all the waste water samples.

- All industrial water samples show 100% fish survival in Bioassay test except Mylan Laboratories which has zero fish survival.

Ground Water

Five water samples are taken from Badve Engineering, Girija Society, Pareshwadi Talav, Jackwell at Bramgavan and Nasir Shikandar for the analysis of ground water.

- Except Girija Society (BDL) COD of all the samples is observed above the permissible limit in the range of (11-38mg/L). BOD is also observed above the standard limit in 3 samples namely Pareshwadi Talav (13.3mg/L), Jackwell at Bramgavan (13.0mg/L) and Nasir Shikandar (8.45mg/L).

- All the heavy metals are observed within the standard limit at all the locations

- All the ground water samples show 100% fish survival in Bioassay test

c) MIDC Shendra:

Waste Water

In this, 4 ETP outlet samples were collected and analyzed for general water parameters.

Samples were taken from the industries namely Wockhardt Ltd., Perkins India Pvt Ltd, Skoda Auto India Pvt. Limited and Radiant Industries.

- Out of all the water samples, COD (600mg/L) and BOD (211mg/L) of Radiant Indus Chem Pvt. Ltd. is found to exceed the standard limit.

- Also, water sample of Radiant Indus Chem Pvt. Ltd. is found to exceed nitrate concentration.

- All the heavy metal parameters of industries under this MIDC are observed within the standard limits.

Ground water

Ground water analysis at MIDC Shendra comprised of water samples from 3 industries namely: Shendra Village, Radico Distilleries and Perkins India Pvt. Ltd.

- Except Shendra Village, COD and BOD of all other water samples are found to exceed the standard limit.

- Nitrate concentration is also observed beyond standard limits in all the water samples.

- All the heavy metal parameters of industries under this MIDC are observed within the standard limits.

- Out of all, three ground water samples show 100% fish survival in Bioassay test.

d) MIDC Paithan Road

Waste Water

From Paithan Road industrial area, waste water samples were collected from 5 industries namely: Frigorifico Allana Pvt Ltd., Nall Near Kanchanwadi, Nalla Near Nath Group, Jhaveri Flexo India Ltd. and OMR Bagla Automotive System India Ltd.

- Except Frigorifico Allana Pvt Ltd. (30mg/L) and Nall Near Kanchanwadi (220mg/L), COD of all other 3 samples are observed to exceed the standard limit in the range of 320-720mg/L.

- Except Frigorifico Allana Pvt Ltd. (10.5mg/L), water samples of remaining four locations are found to exceed the permissible limit of BOD. It is observed in the range of 77-255mg/L.

- Except Frigorifico Allana Pvt Ltd. (50%) all other industrial water samples show zero fish survival in Bioassay test.

Ground Water

At this MIDC, 5 water samples are collected from Frigorifico Allana Ltd., Varroc Polymers Pvt Ltd, Near Sky Biotech Well water, Talav Near Faroola Gaon and Near Dhoot Transmission.

- Except near Sky Biotech Well water, BOD and COD concentration in other samples are observed beyond permissible limits.

- Except Talav Near Faroola Gaon (0%), all other industrial water samples show 100% fish survival in Bioassay test.

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

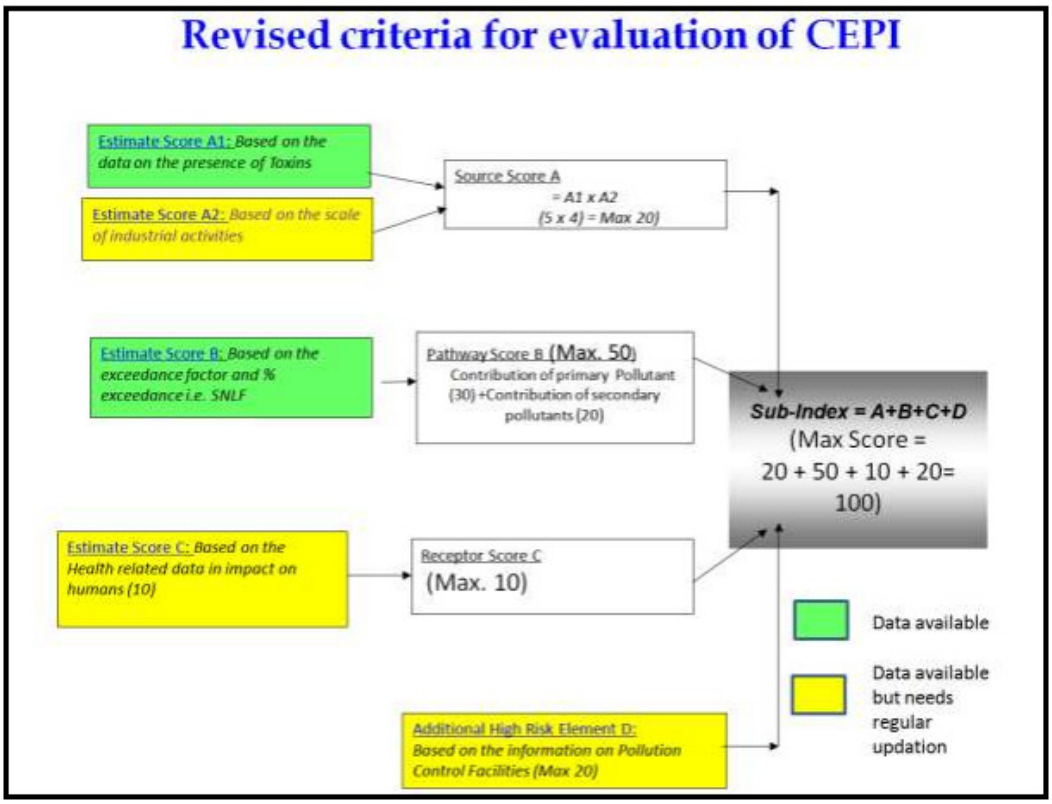
The outlines of the revised CEPI criteria are as follows:

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.

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.

5.1. Comparison of CEPI Scores:

The result shows that CEPI score of present report is 65.01. The present study is the compilation of pre monsoon season, which also affects the score value. This time CEPI is observed lower than the post-monsoon CEPI Score (79.92).

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

Air

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
CEPI score June 2018	2	4	8				18.25				0	10	**36.25**
CEPI score February 2018	3.5	4	14				50				0	10	**74**
CEPI score June 2017	2.5	4	10	-	-	-	0	-	-	-	0	10	**20**
CEPI score February 2017	1	5	5	6	3	3	12	3	1	5	8	10	**35**
CEPI score 2016	2	5	10	6	3	3	12	3	3	5	14	10	**46**
CEPI score 2013	6	5	30	6	3	3	12	3	3	5	14	10	**66**
CPCB Report 2009	5.75	5	28.75	6	3	3	12	3	3	5	14	10	**64.75**

Water

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
CEPI score June 2018	1.75	4	7				43.25				0	5	**55.25**
CEPI score February 2018	1.75	4	7				17				5	5	**34**
CEPI score June 2017	3.5	4	14	-	-	-	41.5	-	-	-	0	5	**60.5**
CEPI score February 2017	4	5	20	8	3	3	14	3	5	5	20	5	**59**
CEPI score 2016	1	5	10	8	3	3	14	3	5	5	20	5	**44**
CEPI score 2013	4	5	20	8	3	3	14	3	5	5	20	3	**57**
CPCB Report 2009	5.5	5	27.5	8	3	3	14	3	3	5	14	5	**60.5**

Land

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
CEPI score June 2018	1.75	4	7				44.25				0	5	**56.25**
CEPI score February 2018	1.75	4	7	-	-	-	50	-	-	-	5	5	**67**
CEPI score June 2017	3.5	4	14	-	-	-	26	-	-	-	0	5	**45**
CEPI score February 2017	2	5	10	6	3	3	12	3	3	5	14	5	**41**
CEPI score 2016	1	5	5	8	3	3	14	3	3	5	20	5	**44**

	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	CEPI
CEPI score 2013	4	5	20	6	3	3	12	3	5	5	20	3	**55**
CPCB Report 2009	5.5	5	27.5	7	3	3	13	3	3	5	14	5	**59.5**

Aggregated CEPI

	Air Index	Water Index	Land Index	CEPI
CEPI score June 2018	36.25	55.25	56.25	**65.01**
CEPI score February 2018	74	34	67	**79.92**
CEPI score June 2017	20	60.5	45	**64.05**
CEPI score February 2017	35	59	41	**64.88**
CEPI Score 2016	46	44	44	**56.45**
CEPI score 2013	66	57	57	**76.66**
CPCB Report 2009	64.75	60.5	59.5	**77.43**

6. Conclusions

The Present study has been done according to the revised CEPI Version 2016. It has been an attempt to check the characteristics and status of environment among the different industrial clusters of Aurangabad city. Revised CEPI version 2016 includes 2 major modifications in terms of evaluation of data: (1) It includes Contribution of primary as well as secondary pollutants under Factor B (Max Value 50) and (2) Exhaustive collection of health data of people residing in the vicinity of industrial clusters under study, Factor C (Max Value 10).This has changed the entire criteria of calculating CEPI as compared to the previous CEPI version and hence affected the overall CEPI score also. Being an industrial hub, the city was sampled among the industrial clusters fall into 4 different MIDCs.

The result shows that the concentration of pollutants in ground water is lowered down at the Industrial clusters as compared to past studies, as most of the results are observed below their standards with an exception of one or two parameters. However, Air sampling parameters like PM10 and PM2.5 of most of the samples are observed above the permissible limits of NAAQ standards 2009. Waste water parameters like BOD and COD are observed above their standards in most of the water samples.

The new CEPI index has ensured that the path is cleared for areas like Aurangabad to no longer be classified as critically polluted and to allow for an inflow of industrial activities. It is estimated that due to the moratorium, high investment were stalled in Aurangabad.

The overall present CEPI score (65.01) is lower than the past few years study. This reveals the fact that the environmental pollution in this city is substantially decreased over the period of times. But still the city comes under severely polluted category, according to CEPI. Hence, there is lot of scope to improve the environmental quality of the city, for which continuous efforts, strategies, planning and actions are required.

	A1	**A2**	**A**	**B**	**C**	**D**	**CEPI**
Air Index	2	4	8	18.25	0	10	36.25
Water Index	1.75	4	7	43.25	0	5	55.25
Land Index	1.75	4	7	44.25	0	5	56.25
						Aggregated CEPI	**65.01**

7. Efforts Taken For the Abatement of Pollution

The regional office of Maharashtra pollution control board has taken various initiatives in reducing the CEPI Score in past few years. Below mentioned are some of the efforts:

- All the large scale and medium scale industries have provided primary and secondary treatment facility for

- Treatment of the trade effluent generated. Board has persuaded large industries to adopt cleaner technologies. Following are the industries who have adopted cleaner technologies: Chrome recovery plant has been installed and operated by M/s. Metalman Industries. Metal recover plant has been provided by M/s. Endurance group of Companies and M/s. Durvoalve industry. RO system is being installed and operated by M/s. Orchid Chemicals, and M/s. Radico distillery. Multi effect evaporators are being used by M/s. Radico distillery and M/s. Pranav Agrotech distillery. Raamri, M/s Skol brewery and M/s. Foster (I) Ltd. have also provided RO system and are generating biogas from there UASB plant. M/s. Canpac industries have provided central fume extraction system and these fumes are treated by thermal oxidation system.

- Provision of tertiary treatment for industrial waste water at MIDC Waluj and provision of STP near Kham river for sale of treated water to the industries is envisaged as a project through Private Public Participation.

- Online monitoring system provided at CETP Waluj for pH and TOC It is planned to link it to MPCB and CPCB websites.

- Major industries like M/s. Orchid Chemicals and other large bulk drug industries have provided solvent recovery systems. This has lead to substantial reduction in the VOC emissions. The Board has made it mandatory for industries using coal / bagasse / biomass / briquettes as fuel to provide dust collectors and wet scrubbers to limit emissions.

- Vision 2020 is being formulated for Aurangabad city. Major concerns like sewage collection and treatment facility, municipal waste collection and treatment facility will be stressed upon. MPC Board along with the industrial associations and CETP association along with MIDC will work in co-ordination for efficient implementation of the action plan

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8. Photographs

MIDC Chikalthana

MIDC Waluj

MIDC Shendra

MIDC Paithan Road


TES


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10. 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 region

Annexure B

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the polluted industrial area (PIA) : Aurangabad
2. Name of measure health center / organization : AMC Hospital
3. Name and designation of the contact person :
4. Address : ~~Cidco N-8 Aurangabad~~ Roshan gate A'bad
5. Year of establishment :

Health status data received from hospital

Sr no.	Air Borne Diseases	No. of patients reported for the years					
		2018	2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthama	Nil	Nil	Nil	Nil	Nil	Nil
2.	Acute Respiratory Infection	Nil	Nil	Nil	Nil	Nil	Nil
3.	Bronchitis	Nil	Nil	Nil	Nil	Nil	Nil
4.	Cancer	Nil	Nil	Nil	Nil	Nil	Nil
	Water Borne diseases						
5.	Gastroenteritis	Nil	3	2	3	4	3
6.	Diarrhea	Nil	38	42	31	32	22
7.	Typhoid	Nil	3	2	2	3	2
8.	Renal diseases	Nil	Nil	Nil	Nil	Nil	Nil
9.	Cancer(Liver)	Nil	Nil	Nil	Nil	Nil	Nil

Incharge Medical Officer
Aurangabad Municipal Corporation, Aurangabad.

Signature of Hospital Head / Superintend

Annexure B

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the polluted industrial area (PIA) : Aurangabad
2. Name of measure health center / organization : Ghati Hospital
3. Name and designation of the contact person :
4. Address : Aurangabad
5. Year of establishment :

Health status data received from hospital

Sr no.	Air Borne Diseases	No. of patients reported for the years					
		2018	2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthama	325	679	708	579	400	185
2.	Acute Respiratory Infection	1952	3571	4167	3639	3373	4361
3.	Bronchitis	154	594	390	433	256	151
4.	Cancer		19	9	5	4	3
	Water Borne diseases						
5.	Gastroenteritis	122	465	397	516	157	276
6.	Diarrhea	187	355	317	357	337	539
7.	Renal diseases	116	6	7	5	6	1
8.	Cancer(Liver)		168	100	137	108	97

22.6.18

Signature of Hospital Head / Superintend

Medical Superintendent
Govt. Medical College, Hospita
Aurangabad.

Annexure B

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the polluted industrial area (PIA) : Aurangabad
2. Name of measure health center / organization : Manik Hospital
3. Name and designation of the contact person :
4. Address : Aurangabad
5. Year of establishment :

Health status data received from hospital

Sr no.	Air Borne Diseases	No. of patients reported for the years					
		2018	2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthama	3	Nil	Nil	4	Nil	Nil
2.	Acute Respiratory Infection	14	10	12	8	Nil	7
3.	Bronchitis	2	Nil	Nil	Nil	Nil	Nil
4.	Cancer	6	Nil	Nil	Nil	Nil	Nil
	Water Borne diseases						
5.	Gastroenteritis	14	10	14	8	Nil	Nil
6.	Diarrhea	10	8	Nil	4	10	Nil
7.	Renal diseases	3	Nil	Nil	Nil	Nil	Nil
8.	Cancer(Liver)	NIL.	Nil	Nil	Nil	Nil	Nil

Signature of Hospital Head / Superintend

Chief Executive Officer
Manik Hospital &
Research Center
Aurangabad

Annexure B

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the polluted industrial area (PIA) : Aurangabad
2. Name of measure health center / organization : MGM Hospital
3. Name and designation of the contact person :
4. Address : Aurangabad
5. Year of establishment :

Health status data received from hospital

Sr no.	Air Borne Diseases	No. of patients reported for the years					
		2018	2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthama	52	379	458	366	200	180
2.	Acute Respiratory Infection	338	476	325	220	192	187
3.	Bronchitis	46	194	75	133	98	136
4.	Cancer	4	11	2	Nil	Nil	Nil
	Water Borne diseases						
5.	Gastroenteritis	164	414	346	474	125	245
6.	Diarrhea	105	28	50	30	27	38
7.	Typhoid	75	4	2	5	2	1
8.	Renal diseases	—	Nil	Nil	Nil	Nil	Nil
9.	Cancer(Liver)	6	164	95	134	106	97

Signature of Hospital Head / Superintend

Dr H.V. Muchhar
DYMS

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the polluted industrial area (PIA) : Aurangabad
2. Name of measure health center / organization : United Ciigma Hospital
3. Name and designation of the contact person :
4. Address : Aurangabad
5. Year of establishment :

Health status data received from hospital

Sr no.	Air Borne Diseases	No. of patients reported for the years					
		2018	2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthama	320	300	250	213	200	5
2.	Acute Respiratory Infection	24	22	14	17	15	2
3.	Bronchitis	415	400	315	300	218	15
4.	Cancer	12	8	7	5	4	3
	Water Borne diseases						
5.	Gastroenteritis	42	38	35	31	28	10
6.	Diarrhea	14	9	5	7	3	1
7.	Renal diseases	09	6	7	5	6	1
8.	Cancer(Liver)	06	4	5	3	2	0

Signature of Hospital Head / Superintend

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the polluted industrial area (PIA) : Aurangabad
2. Name of measure health center / organization : United Ciigma Hospital
3. Name and designation of the contact person :
4. Address : Aurangabad
5. Year of establishment :

Health status data received from hospital

Sr no.	Air Borne Diseases	No. of patients reported for the years				
		2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthama	300	250	213	200	5
2.	Acute Respiratory Infection	22	14	17	15	2
3.	Bronchitis	400	315	300	218	15
4.	Cancer	8	7	5	4	3
	Water Borne diseases					
5.	Gastroenteritis	38	35	31	28	10
6.	Diarrhea	9	5	7	3	1
7.	Renal diseases	6	7	5	6	1
8.	Cancer(Liver)	4	5	3	2	0

Signature of Hospital Head / Superintend

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 0.02kg/day

Sr.	Parameters	Method References	Techniques	Detection Limit
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
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

Sr.	Parameters	Method References	Techniques	Detection Limit
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, 22nd Ed., 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, 22nd Ed., 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
14.	Nitrate-Nitrogen	APHA, 22nd Ed.,2012, 4500-NO_3, B-4-122	UV Spectrophotometer Screening Method	0.2 mg/L

Sr.	Parameters	Methods References	Techniques	Detection Limit
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	Iodometric Method	0.08 mg/L
21.	Dissolved Phosphate (P)	APHA, 22nd Ed., 2012, 4500 P, E, 4-155	Ascorbic Acid Method	0.03 mg/L
22.	Sodium Absorption Ratio	IS 11624 :1986, Reaffirmed 2006	By Calculation	0.3
23.	Total Phosphorous (P)	APHA, 22nd Ed., 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,22nd, 2012 , 4500 NH_3, F, 4 -115	Colorimetric Method	0.001 mg/L
26.	Phenols (C_6H_5OH)	APHA, 22nd Ed., 2012, 5530- B & C, 5-44 & 5-47	Chloroform Extraction Method	0.001 mg/L
27.	Surface Active Agents	APHA, 22nd Ed., 2012, 5540-B & C,5-50	Methylene Blue Extraction Method	0.1 mg/L

Sr.	Parameters	Methods References	Techniques	Detection Limit
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, 22nd Ed., 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
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

Sr.	Parameters	Methods References	Techniques	Detection Limit
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 (Zebra Fish) Test	IS 6582, 1971, Reaffirmed 1987	Static Technique	-

Annexure V: National Ambient Air Quality Standards, 2009

The Gazette of India
EXTRAORDINARY PART III-Section 4 PUBLISHED BY AUTHORITY
NEW DELHI, WEDNESDAY, NOBEMBER 18, 2009 No. B-29016/20/90/PCI-I

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 Suspend ed mailer of influent cooling water.
3.	Particle size of Suspended solids	Shall pass 850 micron IS Sieve			a. Floatable solids, Max 3 mm b. Settleabl e 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	--	--	--
31.	Sulphate (as SO_4), mg/L, Max.	1000	1000	1000	--
32.	Sulphide (as S), mg/L, Max.	2.0	--	--	5.0

Sr.	Parameter	Standards			
		Inland surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Areas**
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
18.	Iron (as Fe)	mg/L	Max 0.3	No relaxation
19.	Magnesium (as Mg)	mg/L	Max 30	Max100

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
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 (as Cd)	mg/L	Max 0.003	No relaxation
32.	Cyanide (as CN)	mg/L	Max 0.05	No relaxation
33.	Lead (as Pb)	mg/L	Max 0.01	No relaxation
34.	Mercury (as Hg)	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.	Polychlorinated biphenyls	mg/L	Max 0.0005	No relaxation
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			

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
a)	Bromoform	mg/L	Max 0.1	No relaxation
b)	Dibromochloro Methane	mg/L	Max 0.1	No relaxation
c)	Bromodichloro methane	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	Bq/L	Max 0.1	No relaxation
b)	Beta emitters	Bq/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
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

Sr.	Characteristic	Unit	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
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/L or more, and ➢ Biochemical Oxygen Demand 2 mg/L or 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/L or more, and ➢ Biochemical Oxygen Demand 3 mg/L or 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/L or more, and ➢ Biochemical Oxygen Demand 3 mg/L or less
Propagation of wildlife and fisheries	D	➢ pH between 6.5 and 8.5 ➢ Dissolved Oxygen 4 mg/L or more, and ➢ Free ammonia (as N) 1.2 mg/L or 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 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
(vii)	Fecal Coliform, MPN/ 100 ml	<20 per 100 ml	<200 per 100 ml	<2000 per 100 ml

Sr.	Parameters	Requirement for Waters of Class		
		A Excellent	B-Desirable	C-Acceptable
(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
(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

Sr.	Parameters	Requirement for Waters of Class		
		A- Excellent	B-Desirable	C-Acceptable
(xv)	Cadmium	<1.0µg/l	<2.5 µg/l	<5.0µg/l
(xvi)	Mercury	<0.2µg/l	<0.5µg/l	<1.0µg/l