

Monitoring, Sampling and Analysis for Ambient Air Quality, Surface Water Quality and Ground Water Quality in Critically/Severely/Other Polluted Industrial Areas of Maharashtra

CHANDRAPUR

Post Monsoon (December 2022 to February 2023)



Maharashtra Pollution Control Board

Kalptaru Point, Sion East, Mumbai – 400 022

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ABBREVIATIONS

CPCB	Central Pollution Control Board
MPCB	Maharashtra Pollution Control Board
CEPI	Comprehensive Environmental Pollution Index
EPA	Environmental Protection Act, 1986
APHA	American Public Health Association
ASTM	American Society for Testing and Materials
BIS	Bureau of Indian Standards
BLQ	Below the Limit of Quantification
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CEMS	Continuous Emission Monitoring System
CETP	Common Effluent Treatment Plant
VOCs	Volatile Organic Compounds
MIDC	Maharashtra Industrial Development Corporation
NWMP	National Water Quality Monitoring Program
NAAQS	National Ambient Air Quality Standard
ZLD	Zero Liquid Discharge
CCMC	Chandrapur City Municipal Corporation
CPA	Critically Polluted Area
SPA	Severely Polluted Area

1. Executive Summary

The Chandrapur CEPI area including MIDC Chandrapur, MIDC Tadali, MIDC Ballarpur, and MIDC Ghugus was monitored for Ambient Air Quality, Ground and Surface Waters quality and CEPI Score was calculated based on the Latest directions 120 of Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016 of Central Pollution Control Board (CPCB). Maharashtra Pollution Control Board (MPCB) has carried out monitoring at CPCB location with the additional location of samplings for ambient air, surface and ground Water in consideration with the previous CEPI monitoring and covering the entire CEPI Impact Zone. The post monsoon monitoring was carried out during the period of December 2022 to February 2023 to verify the Ambient Air Quality, Surface water and Ground water.

The Ambient Air Quality stations were identified considering the upwind and cross wind direction in the CEPI impact area. The concentration of all 12 Parameters is well within the limit prescribed by NAAQS except the parameters PM10 and Carbon Monoxide (8) exceed some of the locations. In the surface water of Chandrapur CEPI region, mainly the concentration of Total Kjeldahl Nitrogen (TKN) have exceeded in all the samples collected. The main reason for the increase in TKN is due to the presence of sewage and manure discharges in the water body. In ground water also, the concentration of Total Kjeldahl Nitrogen (TKN) is high in all the samples collected and the concentration of Total phosphate is high in some of the water samples collected. Phosphates and nitrates from farm fertilizers may penetrate into the ground water.

The CEPI score is the combination of A (Source), B (Pathway), C (Impact on Human Health) and D (Additional High Risk Element) factors. Maharashtra Pollution Control Board has worked on controlling and mitigating the air and water pollution with installation of CAAQMS, CETPs, online VOC analysers etc.

Maharashtra Pollution Control Board has taken various initiatives in reducing the CPCB CEPI Score of 76.41 of 2018 to 65.76 of March 2023. Based on the study results of December 2022 to February 2023 the CEPI score as per the revised CEPI 2016, the CEPI index of Post-Monsoon - Ambient Air is 38.13, Surface Water is 59.25, and Ground Water is 41.88. The overall CEPI score for Chandrapur area for the Post-monsoon 2023 is 65.76.

The analysis of the aggregated CEPI score shows that the pollution in Chandrapur industrial clusters has reduced in last three years. Approximately 13% decrease in CEPI score is observed from 76.41 (CPCB CEPI score) in 2018 to 65.76 in March 2023.

2. Introduction

Over the past few decades, environmental deterioration has become a "common concern" for humanity. The distinctive nature of the current environmental issues is that human activity contributes to them more than natural events. Economic expansion and mindless consumption are beginning to have negative impacts on Mother Nature. It's been studied and reported that the majority of industries (77% approximately) contribute to water pollution, 15% to air pollution, and the remaining 8% to both air and water pollution. Additionally, the most polluting businesses are those that depend on natural resources and are expanding quickly.

These human activities have an adverse effect on the environment by polluting the water we drink, the air we breathe, and the soil in which plants grow. Untreated wastewater from industries has affected the potability and hygiene of drinking water due to the presence of hazardous impurities in it, causing detrimental health effects to human, animal and aquatic life. Exposure to air pollutants is closely related to pulmonary diseases, wheezing, asthma, respiratory disease, cardiovascular diseases etc. Moreover, air pollution seems to have various malign health effects in early human life, such as respiratory, cardiovascular, mental, and perinatal disorders, leading to infant mortality or chronic disease in adult age. Therefore, it is crucial to identify and investigate the major sources of pollution to implement mitigation strategies for substantial environmental and health co-benefits.

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. CEPI bridges the perceptive gap between experts, public, and government departments by simplifying the complexity of environmental issues. It aims at categorizing critically polluted industrial areas based on scientific criteria, so as to ascertain various dimensions of pollution. This is a combined framework used to evaluate the impacts caused by industrial clusters on the nearby environment, as a numerical value.

The present CEPI study includes MIDC Chandrapur, MIDC Tadali, MIDC Ballarpur, and MIDC Ghugus which are industrial areas under Chandrapur. Chandrapur district is known for its super thermal power station, and its vast reserves of coal in Wardha Valley Coalfield. Chandrapur also has large reservoirs of limestone which is a raw material for cement manufacturing in the district. Chandrapur city is in the top 10 cleanest cities in India and 2 in Maharashtra after Navi Mumbai by the Minister of housing and urban affairs rank cities based on the cleanliness index.

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. The index captures the various dimensions of the 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.

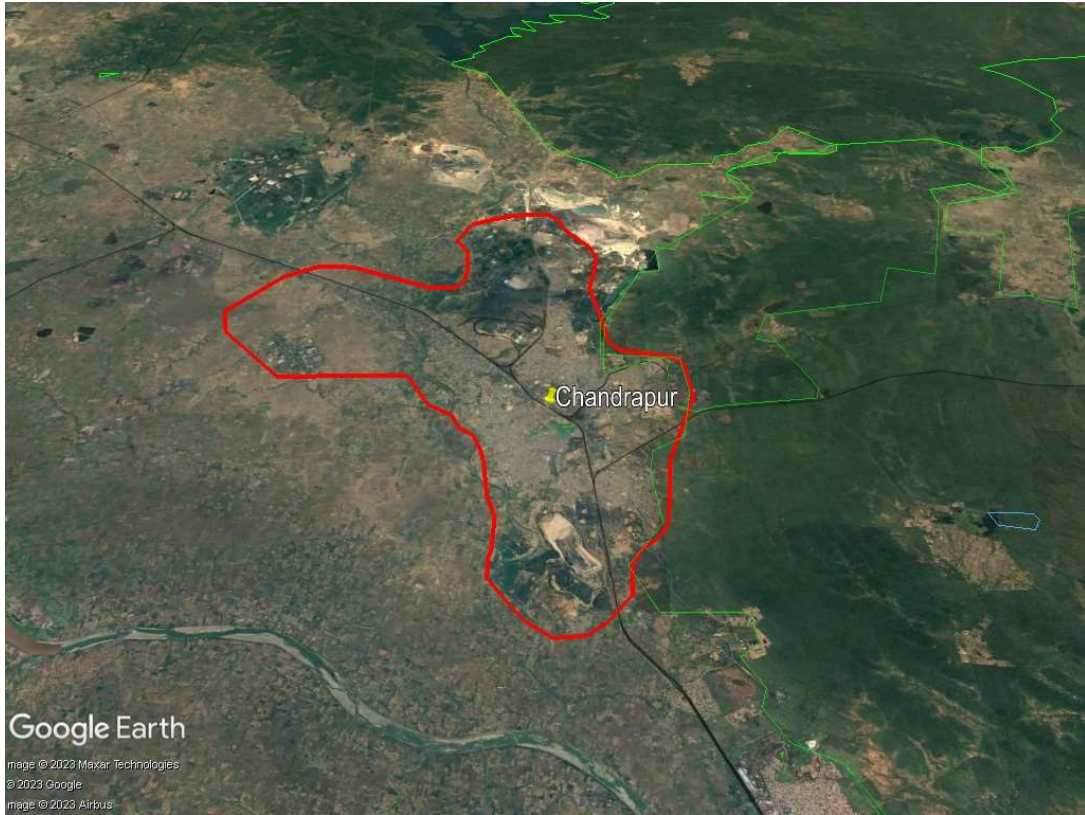


Fig. Chandrapur region CEPI monitoring zone

3. Scope of Work

The major scope of work includes:

- I. The scope of the present study is to perform three (3) rounds of "Monitoring, Sampling and Analysis for Ambient Air Quality, VOCs in Ambient Air, Surface Water Quality & Ground Water Quality in selected Pollution Industrial Areas (PIAs) of Chandrapur, Maharashtra" with a gap of one or two days. The analysis of the collected samples was carried out by the standard methods (CPCB, BIS, APHA, USEPA).
- II. To Collect health-related data in the CEPI region.
- III. To calculate the Comprehensive Environmental Pollution Index (CEPI) Score as per Revised CEPI-2016 issued by Central Pollution Control Board (CPCB).

The sampling details and frequency of sampling in Ambient Air, VOCs, Surface Water and Ground Water are given in Table 3.1 and Table 3.2 respectively.

Table 3.1 Sampling Details of Chandrapur

Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
Ambient Air Quality	<ul style="list-style-type: none"> • Tadali-04 • MIDC Chandrapur-04 • MIDC Ghugus -04 • Ballarpur -04 	16	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , NH ₃ , O ₃ , C ₆ H ₆ , CO, BAP, Pb, Ni, As
Volatile Organic Compounds (VOCs)	<ul style="list-style-type: none"> • Tadali-02 • MIDC Chandrapur-02 • MIDC Ghugus -02 • Ballarpur -02 	08	Dichloromethane, Chloroform, Carbon Tetrachloride, Trichloroethylene, Bromodichloromethane, 1,3-Dichloropropane, 1,4-Dichlorobenzene, 1,3-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dibromo-3-Chloropropane, Napthalene, Bromobenzene, 1,2,4-Trimethylbenzene, 2-Chlorotoluene, Tert-Butylbenzene, SEC-Butylbenzene, P-Isopropyl toluene, M-Xylene, P-Xylene, Styrene, Cumene 1,2,3-Trichloropropane, N-Propyl benzene, Dibromochloromethane, 1,2-Dibromoethane, Chlorobenzene, 1,1,1,2-Tetrachloroethane, Ethylbenzene, 1,1-Dichloropropylene, 1,2-Dichloroethane, 1,2-Dichloropropane, Trans-1,3-Dichloropropene, CIS 1,3-Dichloropropene,

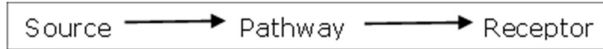
Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
			1,1,2-Trichloroethane, Tetrachloroethylene, 1,3,5-Trimethylbenzene, N-Butylbenzene, 1,2,3-Trichlorobenzene, Hexachlorobutadiene, 1,2,4-Trichlorobenzene, 2,2-Dichloropropane, Dibromomethane, Toluene, O-Xylene, Bromoform, 1,1,2,2-Tetrachloroethane, 4-Chlorotoluene, 1,1-Dichloroethylene, Trans-1,2-Dichloroethylene, 1,1-Dichloroethane, CIS-1,2-Dichloroethylene, Bromochloromethane, 1,1,1-Trichloroethane
Water Quality Monitoring	Surface water <ul style="list-style-type: none"> • Tadali-03 • MIDC Chandrapur-03 • MIDC Ghugus-03 • Ballarpur -03 	12	(i) Simple Parameters Sanitary Survey, General Appearance, Colour, Smell, Transparency and Ecological (ii) Regular Monitoring Parameters pH, O & G, Suspended Solids, DO, COD, BOD, TDS, Electrical Conductivity, Total Dissolved Solids, Nitrite-Nitrogen, Nitrate-Nitrogen, (NO ₂ +NO ₃) total nitrogen, Free Ammonia, Total Residual Chlorine, Cyanide, Fluoride, Chloride, Sulphate, Sulphides, Total Hardness, Dissolved Phosphates, SAR, Total Coliforms, Faecal Coliform (iii) Special Parameters Total Phosphorous, TKN, Total Ammonia (NH ₄ +NH ₃)-Nitrogen, Phenols, Surface Active Agents, Anionic detergents, Organo-Chlorine Pesticides, PAH, PCB and PCT, Zinc, Nickel, Copper, Hexa-valent Chromium, Chromium (Total), Arsenic (Total), Lead, Cadmium, Mercury, Manganese, Iron, Vanadium, Selenium, Boron (iv) Bio-assay (zebra Fish) Test – For specified samples only.
	Groundwater <ul style="list-style-type: none"> • Tadali-03 • MIDC Chandrapur-03 • MIDC Ghugus-03 • Ballarpur -03 	12	

Table 3.2 Frequency of Sampling

	Parameter	Round of Sampling	Frequency in Each Round
A	Ambient Air Quality Monitoring		
1.	Particulate Matter (size less than 10 µm) or PM ₁₀	03	3 Shifts of 8 hrs each
2.	Particulate Matter (size less than 2.5 µm) or PM _{2.5}	03	1 Shift of 24 hrs
3.	Sulphur Dioxide (SO ₂)	03	6 Shifts of 4 hrs each
4.	Nitrogen Dioxide (NO ₂)	03	6 Shifts of 4 hrs each
5.	Ammonia (NH ₃)	03	6 Shifts of 4 hrs each
6.	Ozone (O ₃)	03	24 Shifts of 1 hr each
7.	Benzene (C ₆ H ₆)	03	1 Shifts of 24 hrs
8.	Carbon Monoxide (CO)	03	24 Shifts of 1 hr each
9.	Benzo (a) Pyrene (BaP) – particulate phase only	03	3 Shifts of 8 hrs each
10.	Lead (Pb)	03	3 Shifts of 8 hrs each
11.	Arsenic (As)	03	3 Shifts of 8 hrs each
12.	Nickel (Ni)	03	3 Shifts of 8 hrs each
B	Volatile Organic Compounds (VOCs)		
	As mentioned in Table 3.1	03	3 Shifts of 24 hrs each
C	Ground Water		
	As mentioned in Table 3.1	03	01 sample at each round
D	Surface Water		
	As mentioned in Table 3.1	03	01 sample at each round

4. Methodology

The present report is based on the revised Comprehensive Environmental Pollution Index (CEPI) version 2016. The index captures the various dimensions of the environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI) is a rational number, which is used to characterize the environmental quality at a given location. It is three-step process based on the algorithm:



Ambient air stations, Surface water locations and Ground water locations were decided by the respective regional officers. The sampling was done in 3 rounds with an interval of one or two days at each location. 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 CPCB/ EPA/ APHA/ IS/ ASTM standard methods for the samples.

AIR ENVIRONMENT

5. Air Environment

For studying the Air Environment of Chandrapur area, monitoring stations were identified considering the upwind and cross wind direction and all 12 parameters as per the notification of National Ambient Air Quality Standards (NAAQS) were carried out.

**Kindly note: Volatile Organic Compounds (VOCs) concentration is not detected in most of the Air samples collected; hence it is not shown in the graphs.*

- Tadali:** In Tadali four locations have been monitored of checking the AAQ. All 12 parameters monitored as per NAAQS are observed well within the limits in all four locations except two locations found above standard for the parameter Particulate Matter PM10 and one location for the parameter Carbon Monoxide (8 h).

Table 5.1 MIDC Tadali - Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Boundary Wall of Dhariwal Infrastructure Ltd.	20°01'01.3" N	79°11'57.9"E	10.01.2023	12.01.2023	14.01.2023
2.	NAMP Growth Centre	20°59'15.8"N	79°11'08.7"E	10.01.2023	12.01.2023	14.01.2023
3.	Near Chaman Metallic Boundary Wall	19° 00'50.9"N	79°11'05.0"E	10.01.2023	12.01.2023	14.01.2023
4.	MIDC WTP Building	20° 01' 04.3" N	79° 11' 34.9" E	10.01.2023	12.01.2023	14.01.2023

Table 5.2 MIDC Tadali - Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Boundary Wall of Dhariwal Infrastructure Ltd.	20° 01'01.3" N	79°11'57.9"E	10.01.2023	12.01.2023	14.01.2023
2.	NAMP Growth Centre	20°59'15.8"N	79°11'08.7"E	10.01.2023	12.01.2023	14.01.2023



Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Tadali



Fig. Geographical Locations of VOCs Monitoring MIDC Tadali

Table 5.3 MIDC Tadali – Results of Ambient Air Quality Monitoring

Parameters	Unit	Results			
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre	Near Chaman Metallic Boundary Wall	MIDC WTP Building
Sulphur Dioxide (SO ₂)	µg/m ³	67.4	39.7	65.7	72.8
Nitrogen Dioxide (NO ₂)	µg/m ³	27.2	20.9	20.8	20.8
Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	108	94	86	107
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	25	24	20	27
Ozone (O ₃)	µg/m ³	34.6	26.4	76.1	29.7
Lead (Pb)	µg/m ³	0.031	0.097	BLQ	0.058
Carbon Monoxide (CO) (1 h)	mg/m ³	1.35	1.59	1.32	1.47
Carbon Monoxide (CO) (8 h)	mg/m ³	1.65	2.12	1.74	1.83
Ammonia (NH ₃)	µg/m ³	25.4	37.8	35.3	37.1
Benzene (C ₆ H ₆)	µg/m ³	2.34	2.87	2.02	2.75
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m ³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m ³	0.333	0.871	0.519	0.507
Nickel (Ni)	ng/m ³	3.97	6.17	9.36	3.32

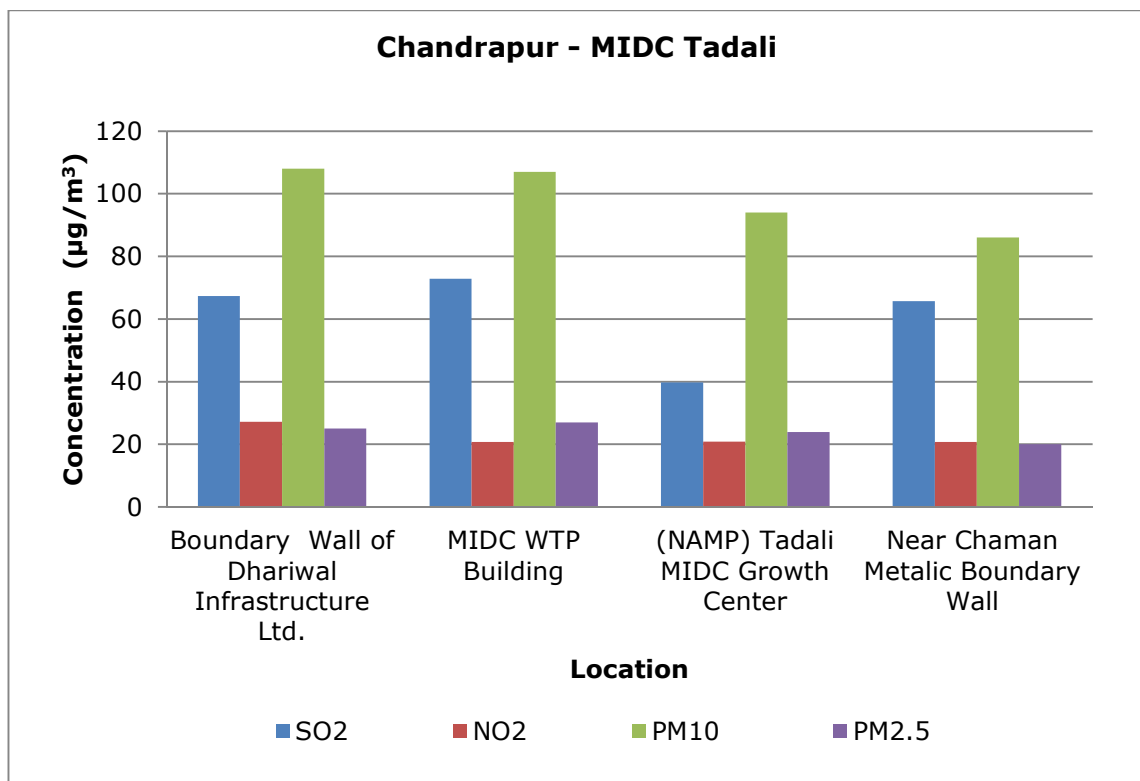
Table 5.4 MIDC Tadali - Volatile Organic Compounds (VOCs) in Ambient Air Results

Parameters	Unit	Results	
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre
Dichloromethane	µg/m ³	BLQ	BLQ
Chloroform	µg/m ³	BLQ	BLQ
Carbon Tetrachloride	µg/m ³	BLQ	BLQ
Trichloroethylene	µg/m ³	BLQ	BLQ
Bromodichloromethane	µg/m ³	BLQ	BLQ
1,3-Dichloropropane	µg/m ³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m ³	1.54	2.91
1,3-Dichlorobenzene	µg/m ³	1.93	2.04
1,2-Dichlorobenzene	µg/m ³	BLQ	4.18

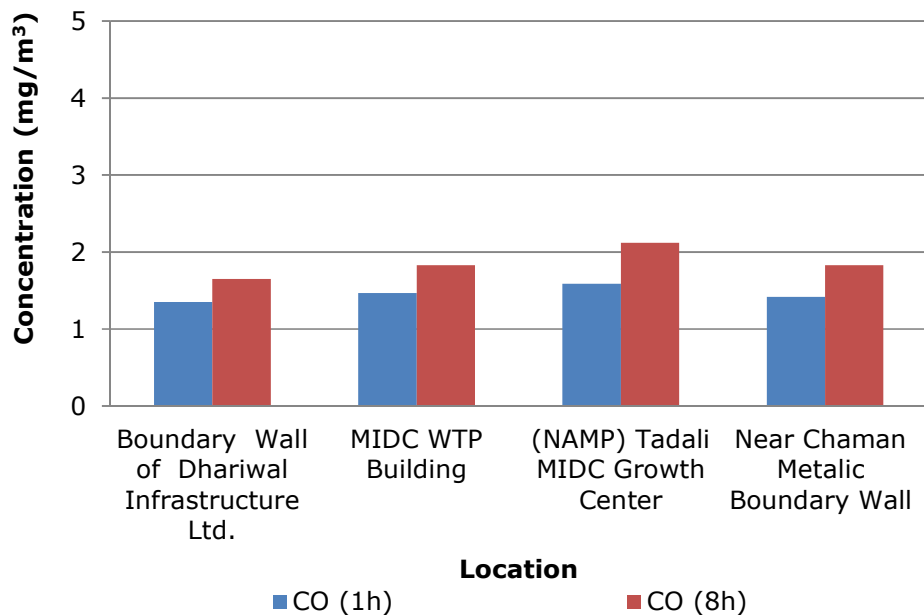
Parameters	Unit	Results	
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre
1,2-Dibromo-3-Chloropropane	µg/m ³	BLQ	BLQ
Napthalene	µg/m ³	5.04	3.95
Bromobenzene	µg/m ³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m ³	BLQ	BLQ
2-Chlorotoluene	µg/m ³	BLQ	BLQ
Tert-Butylbenzene	µg/m ³	BLQ	BLQ
SEC-Butylbenzene	µg/m ³	BLQ	BLQ
P-Isopropyltoluene	µg/m ³	1.51	0.775
M-Xylene	µg/m ³	BLQ	BLQ
P-Xylene	µg/m ³	BLQ	2.97
Styrene	µg/m ³	2.01	3.44
Cumene	µg/m ³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m ³	BLQ	BLQ
N-Propylbenzene	µg/m ³	BLQ	0.88
Dibromochloromethane	µg/m ³	BLQ	BLQ
1,2-Dibromoethane	µg/m ³	BLQ	BLQ
Chlorobenzene	µg/m ³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
Ethylbenzene	µg/m ³	BLQ	BLQ
1,1-Dichloropropylene	µg/m ³	BLQ	BLQ
1,2-Dichloroethane	µg/m ³	BLQ	BLQ
1,2-Dichloropropane	µg/m ³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m ³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m ³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m ³	BLQ	BLQ
Tetrachloroethylene	µg/m ³	0.9	BLQ
1,3,5-Trimethylbenzene	µg/m ³	BLQ	BLQ
N-Butylbenzene	µg/m ³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m ³	6.56	5.21
Hexachlorobutadiene	µg/m ³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m ³	BLQ	4.89
2,2-Dichloropropane	µg/m ³	BLQ	BLQ

Parameters	Unit	Results	
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre
Dibromomethane	µg/m ³	BLQ	BLQ
Toluene	µg/m ³	1.15	0.54
O-Xylene	µg/m ³	BLQ	BLQ
Bromoform	µg/m ³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m ³	0.88	BLQ
4-Chlorotoluene	µg/m ³	BLQ	BLQ
1,1-Dichloroethylene	µg/m ³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
1,1-Dichloroethane	µg/m ³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
Bromochloromethane	µg/m ³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m ³	BLQ	BLQ

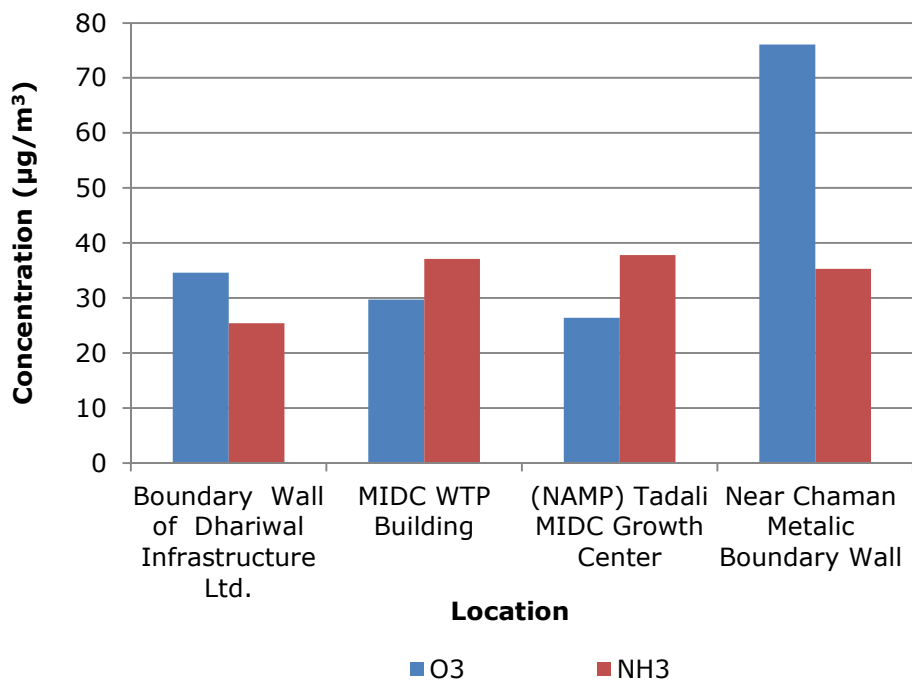
Graphs - Ambient Air Quality Monitoring of Tadali



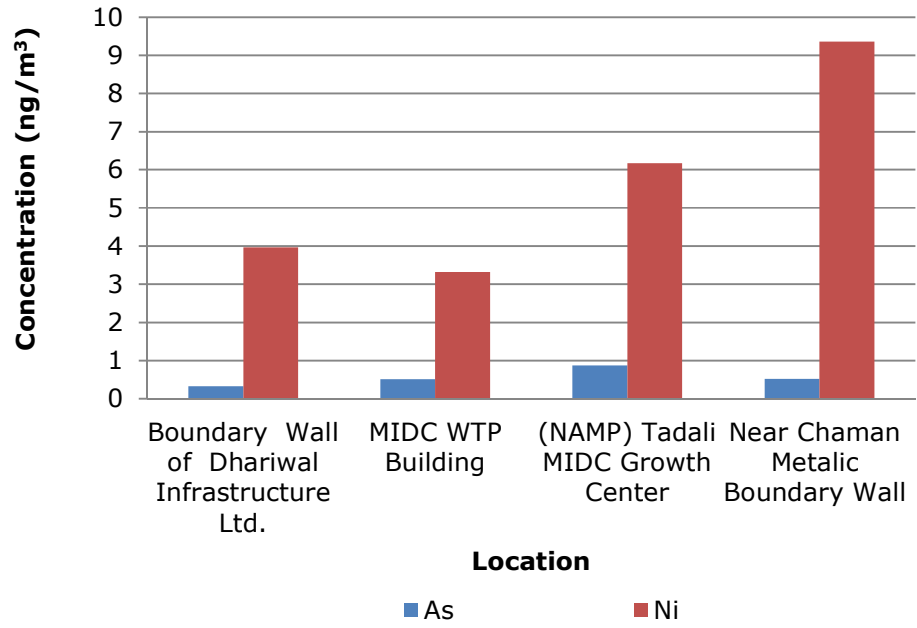
Chandrapur - MIDC Tadali



Chandrapur - MIDC Tadali



Chandrapur - MIDC Tadali



2. MIDC Chandrapur: In MIDC Chandrapur, at all 4 locations monitored for 12 parameters are well within the limit prescribed as per the NAAQS except one location found above standard limit for the parameter Carbon Monoxide (8 h).

Table 5.5 MIDC Chandrapur – Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Behind Earth Green Tech Pvt. Ltd., MIDC Chandrapur	19°58'46.8" N	79°13'53.6" E	16.01.2023	18.01.2023	20.01.2023
2.	Multi Organics, Chandrapur MIDC	19°58'51.5"N	79°13'55.4" E	16.01.2023	18.01.2023	20.01.2023
3.	Opposite Super Hygienic CBMW Site	19°58'19.2" N	79°14'21.4" E	16.01.2023	18.01.2023	20.01.2023
4.	Near HPCL, MIDC Chandrapur	19°59'12.7" N	79°15'36.3" E	16.01.2023	18.01.2023	20.01.2023

Table 5.6 MIDC Chandrapur - Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Multi Organics, Chandrapur MIDC	19°58'51.5" N	79°13'55.4" E	16.01.2023	18.01.2023	20.01.2023
2.	Opposite Super Hygienic CBMW Site	19°58'19.2" N	79°14'21.4" E	16.01.2023	18.01.2023	20.01.2023



Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Chandrapur



Fig. Geographical Locations of VOCs Monitoring MIDC Chandrapur

Table 5.7 MIDC Chandrapur – Results of Ambient Air Quality Monitoring

Parameters	Unit	Results			
		Behind Earth Green Tech Pvt. Ltd.	Multi Organics	Opposite Super Hygienic CBMW Site	Near HPCL
Sulphur Dioxide (SO ₂)	µg/m ³	BLQ	BLQ	BLQ	44
Nitrogen Dioxide (NO ₂)	µg/m ³	14.8	13.7	45.7	15.8
Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	64	80	65	73
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	19	22	20	20
Ozone (O ₃)	µg/m ³	52	BLQ	BLQ	22.6
Lead (Pb)	µg/m ³	BLQ	BLQ	0.044	BLQ
Carbon Monoxide (CO) (1 h)	mg/m ³	1.81	1.88	1.45	1.67
Carbon Monoxide (CO) (8 h)	mg/m ³	1.98	2.23	1.78	1.96
Ammonia (NH ₃)	µg/m ³	77.7	115	99.7	115
Benzene (C ₆ H ₆)	µg/m ³	2.65	3.39	3.43	3.22
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m ³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m ³	0.403	BLQ	0.937	BLQ
Nickel (Ni)	ng/m ³	BLQ	BLQ	BLQ	3.32

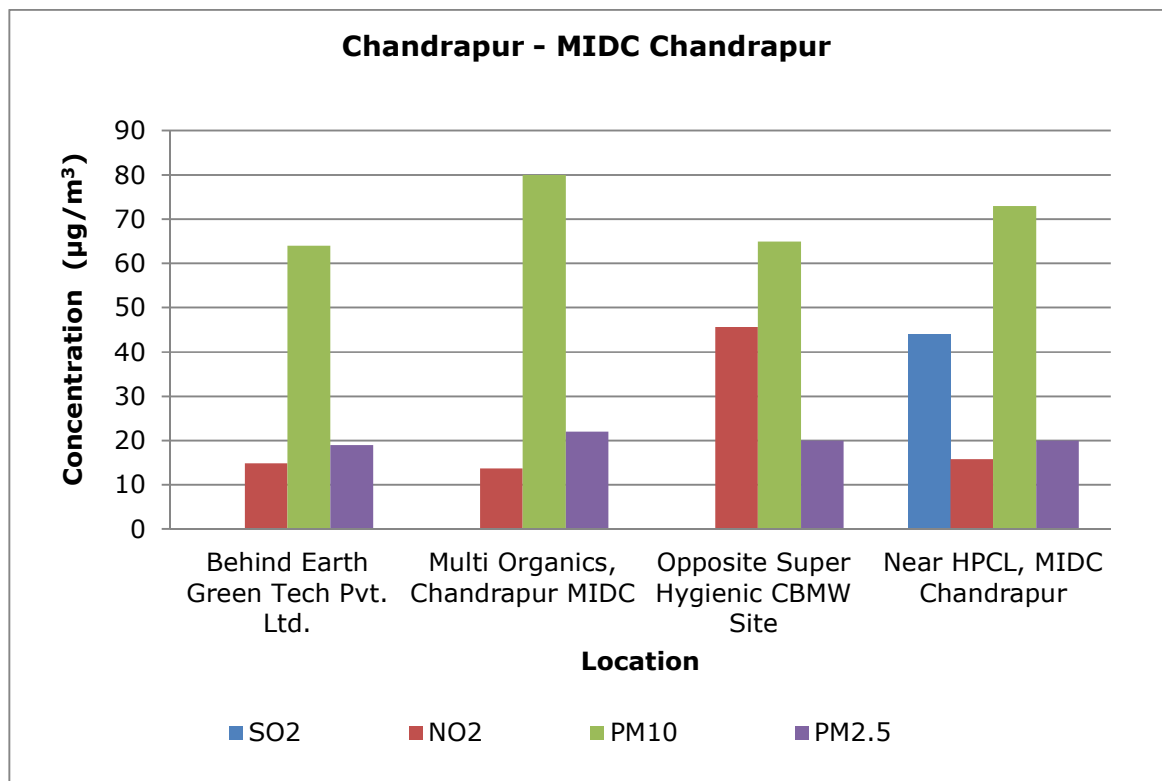
Table 5.8 MIDC Chandrapur - Volatile Organic Compounds (VOCs) in Ambient Air Results

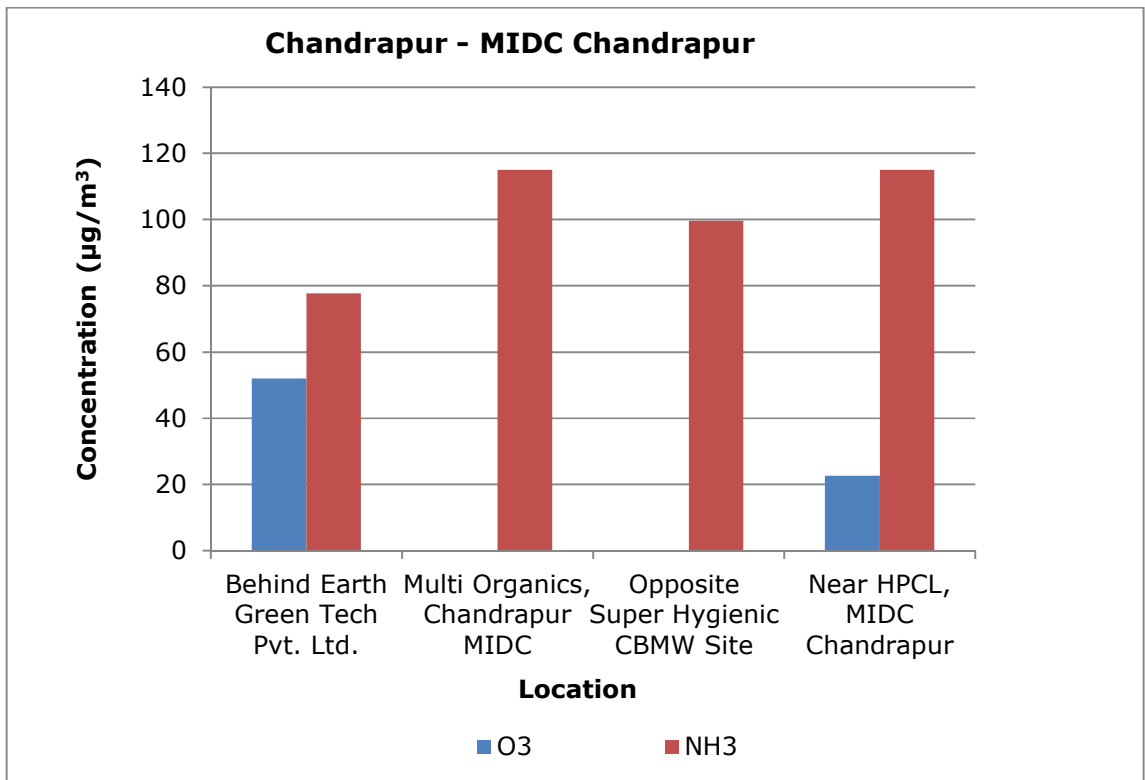
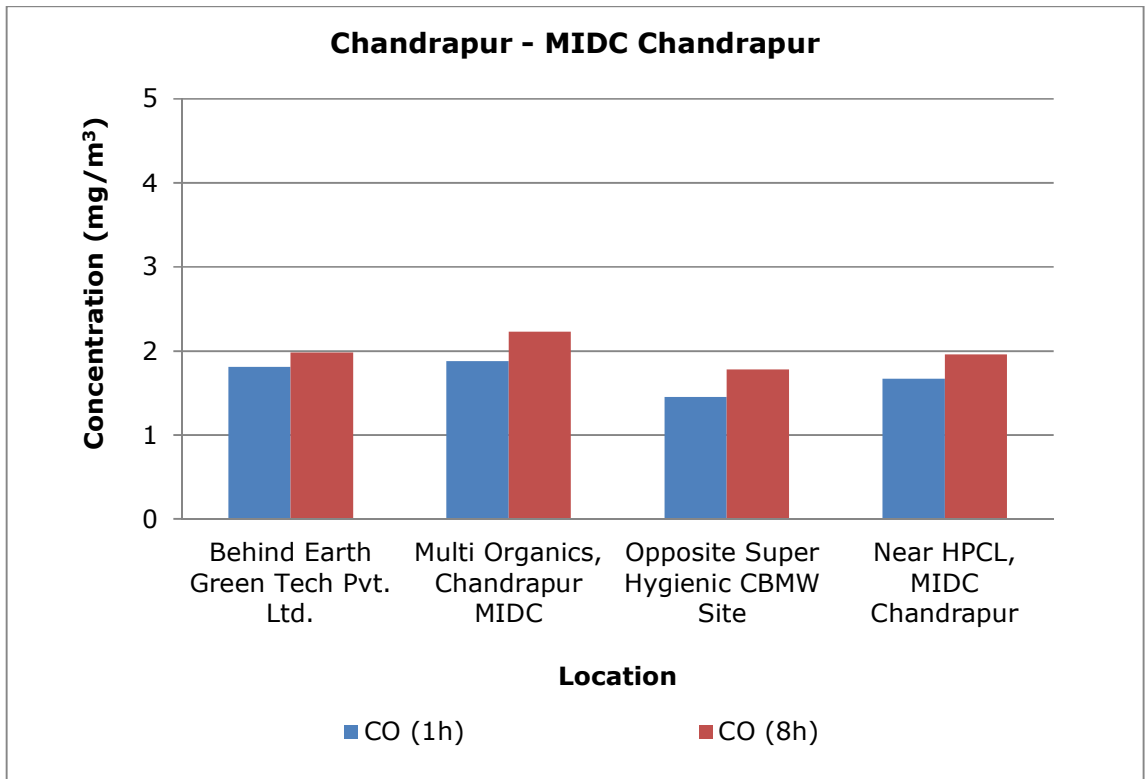
Parameters	Unit	Results	
		Multi Organics	Opposite Super Hygienic CBMW Site
Dichloromethane	µg/m ³	BLQ	BLQ
Chloroform	µg/m ³	BLQ	BLQ
Carbon Tetrachloride	µg/m ³	BLQ	BLQ
Trichloroethylene	µg/m ³	BLQ	BLQ
Bromodichloromethane	µg/m ³	BLQ	BLQ
1,3-Dichloropropane	µg/m ³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m ³	1.73	BLQ
1,3-Dichlorobenzene	µg/m ³	2.06	1.57
1,2-Dichlorobenzene	µg/m ³	1.81	BLQ

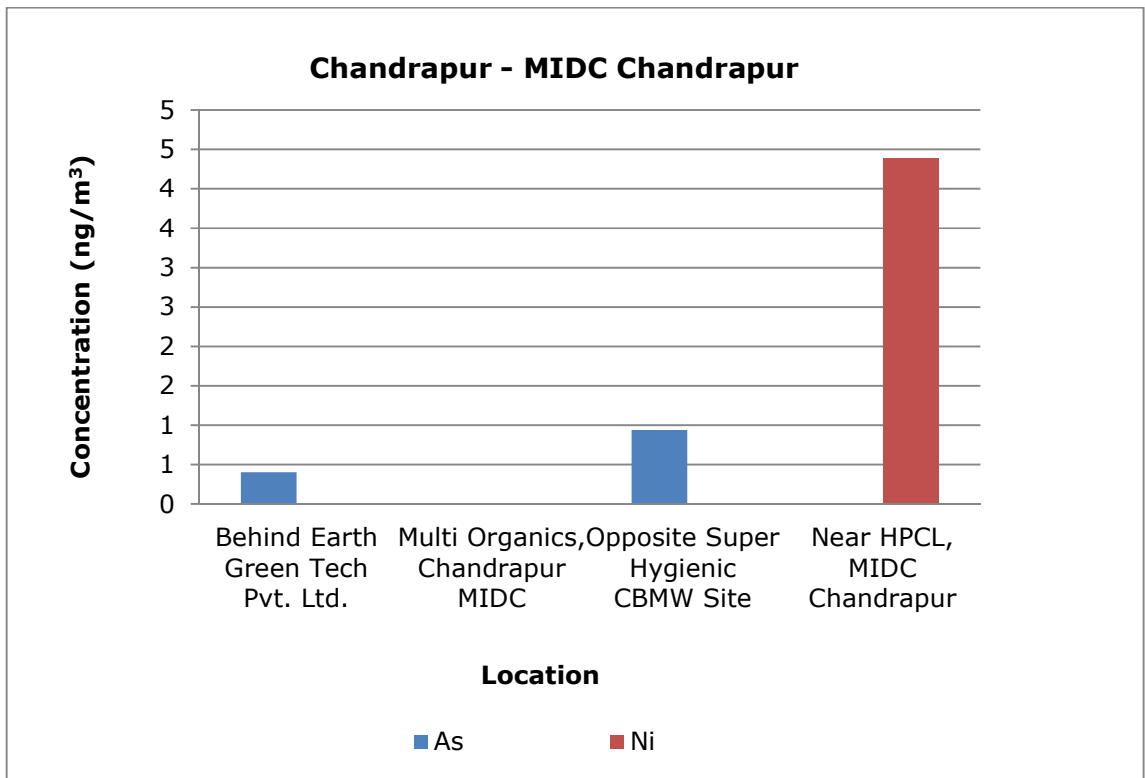
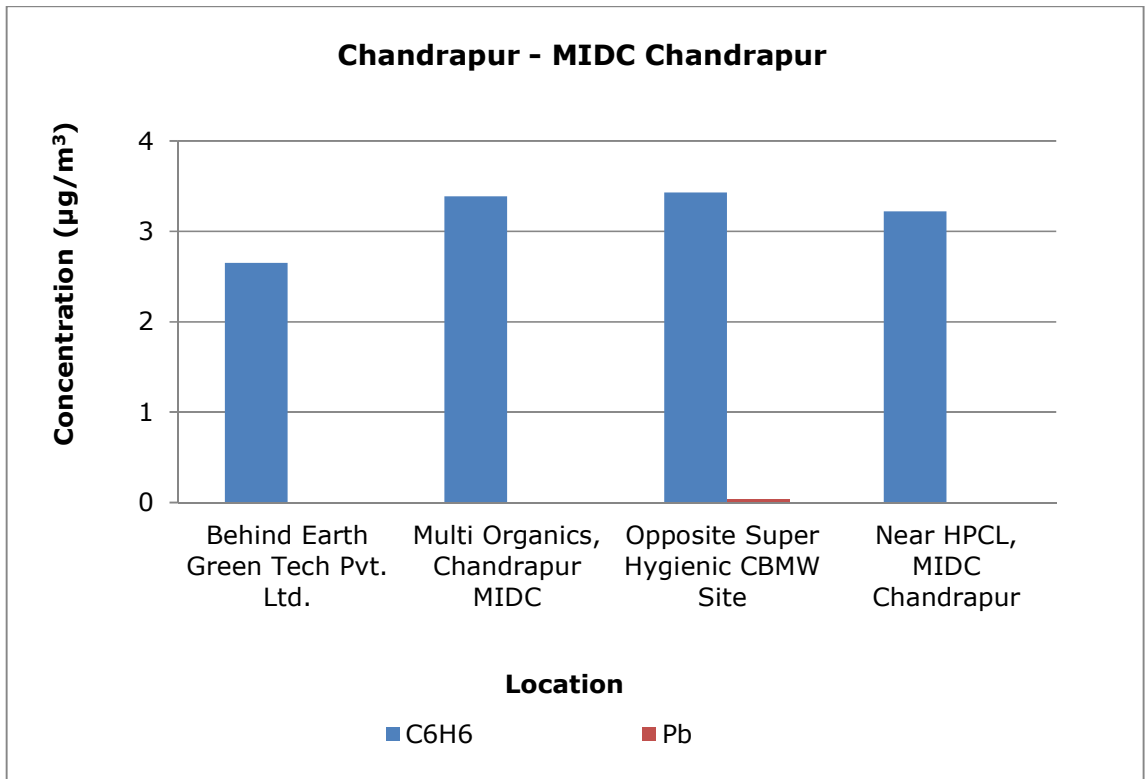
Parameters	Unit	Results	
		Multi Organics	Opposite Super Hygienic CBMW Site
1,2-Dibromo-3-Chloropropane	µg/m ³	BLQ	BLQ
Napthalene	µg/m ³	2.23	2.28
Bromobenzene	µg/m ³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m ³	BLQ	BLQ
2-Chlorotoluene	µg/m ³	BLQ	0.54
Tert-Butylbenzene	µg/m ³	BLQ	BLQ
SEC-Butylbenzene	µg/m ³	BLQ	BLQ
P-Isopropyltoluene	µg/m ³	1.56	1.66
M-Xylene	µg/m ³	0.69	BLQ
P-Xylene	µg/m ³	BLQ	BLQ
Styrene	µg/m ³	BLQ	0.99
Cumene	µg/m ³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m ³	BLQ	BLQ
N-Propylbenzene	µg/m ³	BLQ	BLQ
Dibromochloromethane	µg/m ³	BLQ	BLQ
1,2-Dibromoethane	µg/m ³	BLQ	BLQ
Chlorobenzene	µg/m ³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
Ethylbenzene	µg/m ³	BLQ	BLQ
1,1-Dichloropropylene	µg/m ³	BLQ	BLQ
1,2-Dichloroethane	µg/m ³	BLQ	BLQ
1,2-Dichloropropane	µg/m ³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m ³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m ³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m ³	BLQ	BLQ
Tetrachloroethylene	µg/m ³	0.86	1.02
1,3,5-Trimethylbenzene	µg/m ³	BLQ	BLQ
N-Butylbenzene	µg/m ³	2.58	0.74
1,2,3-Trichlorobenzene	µg/m ³	BLQ	BLQ
Hexachlorobutadiene	µg/m ³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m ³	BLQ	BLQ
2,2-Dichloropropane	µg/m ³	BLQ	BLQ

Parameters	Unit	Results	
		Multi Organics	Opposite Super Hygienic CBMW Site
Dibromomethane	µg/m ³	BLQ	BLQ
Toluene	µg/m ³	1.67	1.72
O-Xylene	µg/m ³	BLQ	BLQ
Bromoform	µg/m ³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
4-Chlorotoluene	µg/m ³	BLQ	BLQ
1,1-Dichloroethylene	µg/m ³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
1,1-Dichloroethane	µg/m ³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
Bromochloromethane	µg/m ³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m ³	BLQ	BLQ

Graphs - Ambient Air Quality Monitoring of MIDC Chandrapur







3. MIDC Ghugus: In MIDC Ghugus also all 4 locations monitored for 12 parameters are well within the limit prescribed as per the NAAQS except one location found above standard limit for the parameter Carbon Monoxide (8 h).

Table 5.9 MIDC Ghugus – Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	19°05'06.22"N	79°66'12.8" E	16.01.2023	18.01.2023	20.01.2023
2.	WTP Water Supply Tank, Ghugus	19°56'26.8"N	79°07'13.0" E	16.01.2023	18.01.2023	20.01.2023
3.	(NAMP) Near Gram Panchayat Ghugus	19°56'22.8"N	79°06'50.9" E	16.01.2023	18.01.2023	20.01.2023
4.	Guest House of ACC Cement	19°55'41.4"N	79°06'45.3" E	16.01.2023	18.01.2023	20.01.2023

Table 5.10 MIDC Ghugus - Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	19°05'06.22" N	79°66'12.8" E	16.01.2023	18.01.2023	20.01.2023
2.	Guest House of ACC Cement	19°55'41.4" N	79°06'45.3" E	16.01.2023	18.01.2023	20.01.2023



Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Ghugus



Fig. Geographical Locations of VOCs MIDC Ghugus

Table 5.11 MIDC Ghugus – Results of Ambient Air Quality Monitoring

Parameters	Unit	Results			
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	WTP Water Supply Tank, Ghugus	(NAMP) Near Gram Panchayat Ghugus	Guest House of ACC Cement
Sulphur Dioxide (SO ₂)	µg/m ³	8.03	11.7	7.96	6.91
Nitrogen Dioxide (NO ₂)	µg/m ³	12.1	9.41	10.4	15.7
Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	66	64	63	55
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	18	18	18	16
Ozone (O ₃)	µg/m ³	BLQ	BLQ	BLQ	167
Lead (Pb)	µg/m ³	0.027	0.024	0.022	BLQ
Carbon Monoxide (CO) (1 h)	mg/m ³	1.68	1.65	1.72	1.45
Carbon Monoxide (CO) (8 h)	mg/m ³	2.0	1.78	2.07	1.59
Ammonia (NH ₃)	µg/m ³	104	124	154	82.2
Benzene (C ₆ H ₆)	µg/m ³	3.47	3.01	2.97	3.33
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m ³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m ³	0.455	BLQ	BLQ	0.693
Nickel (Ni)	ng/m ³	3.1	BLQ	8.06	BLQ

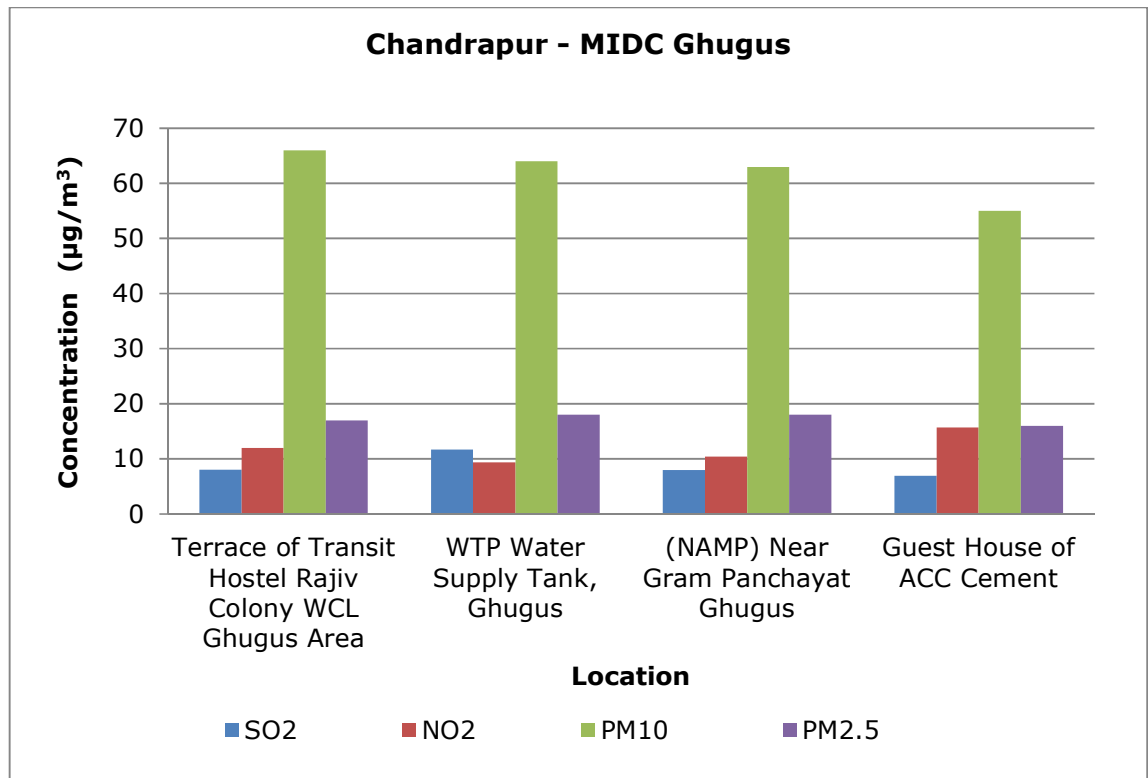
Table 5.12 MIDC Ghugus - Volatile Organic Compounds (VOCs) in Ambient Air Results

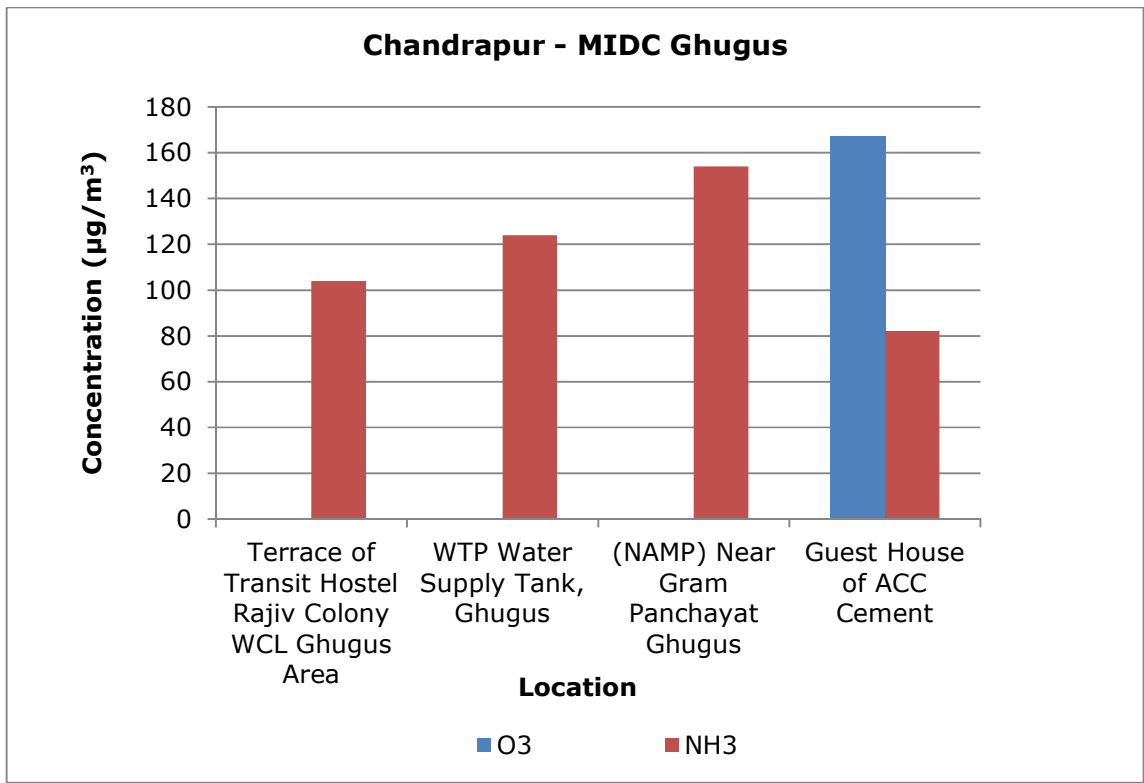
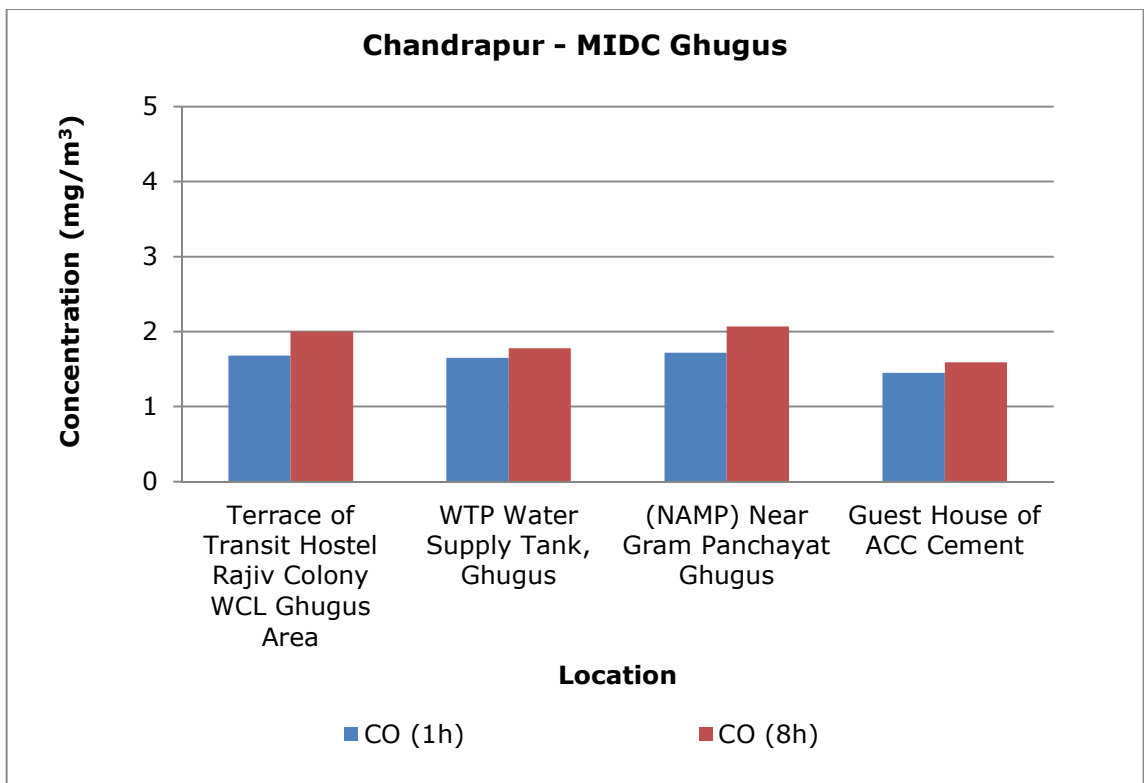
Parameters	Unit	Results	
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	Guest House of ACC Cement
Dichloromethane	µg/m ³	BLQ	BLQ
Chloroform	µg/m ³	BLQ	BLQ
Carbon Tetrachloride	µg/m ³	BLQ	BLQ
Trichloroethylene	µg/m ³	BLQ	BLQ
Bromodichloromethane	µg/m ³	BLQ	BLQ
1,3-Dichloropropane	µg/m ³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m ³	1.46	1.19
1,3-Dichlorobenzene	µg/m ³	1.11	1.24

Parameters	Unit	Results	
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	Guest House of ACC Cement
1,2-Dichlorobenzene	µg/m ³	1.25	1.11
1,2-Dibromo-3-Chloropropane	µg/m ³	BLQ	BLQ
Napthalene	µg/m ³	3.92	3.88
Bromobenzene	µg/m ³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m ³	BLQ	BLQ
2-Chlorotoluene	µg/m ³	BLQ	BLQ
Tert-Butylbenzene	µg/m ³	BLQ	BLQ
SEC-Butylbenzene	µg/m ³	BLQ	BLQ
P-Isopropyltoluene	µg/m ³	0.64	1.41
M-Xylene	µg/m ³	BLQ	BLQ
P-Xylene	µg/m ³	BLQ	BLQ
Styrene	µg/m ³	0.63	1.17
Cumene	µg/m ³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m ³	BLQ	BLQ
N-Propylbenzene	µg/m ³	BLQ	BLQ
Dibromochloromethane	µg/m ³	BLQ	BLQ
1,2-Dibromoethane	µg/m ³	BLQ	BLQ
Chlorobenzene	µg/m ³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
Ethylbenzene	µg/m ³	BLQ	BLQ
1,1-Dichloropropylene	µg/m ³	BLQ	BLQ
1,2-Dichloroethane	µg/m ³	BLQ	BLQ
1,2-Dichloropropane	µg/m ³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m ³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m ³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m ³	BLQ	BLQ
Tetrachloroethylene	µg/m ³	0.97	1.19
1,3,5-Trimethylbenzene	µg/m ³	BLQ	BLQ
N-Butylbenzene	µg/m ³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m ³	BLQ	BLQ
Hexachlorobutadiene	µg/m ³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m ³	1.48	BLQ

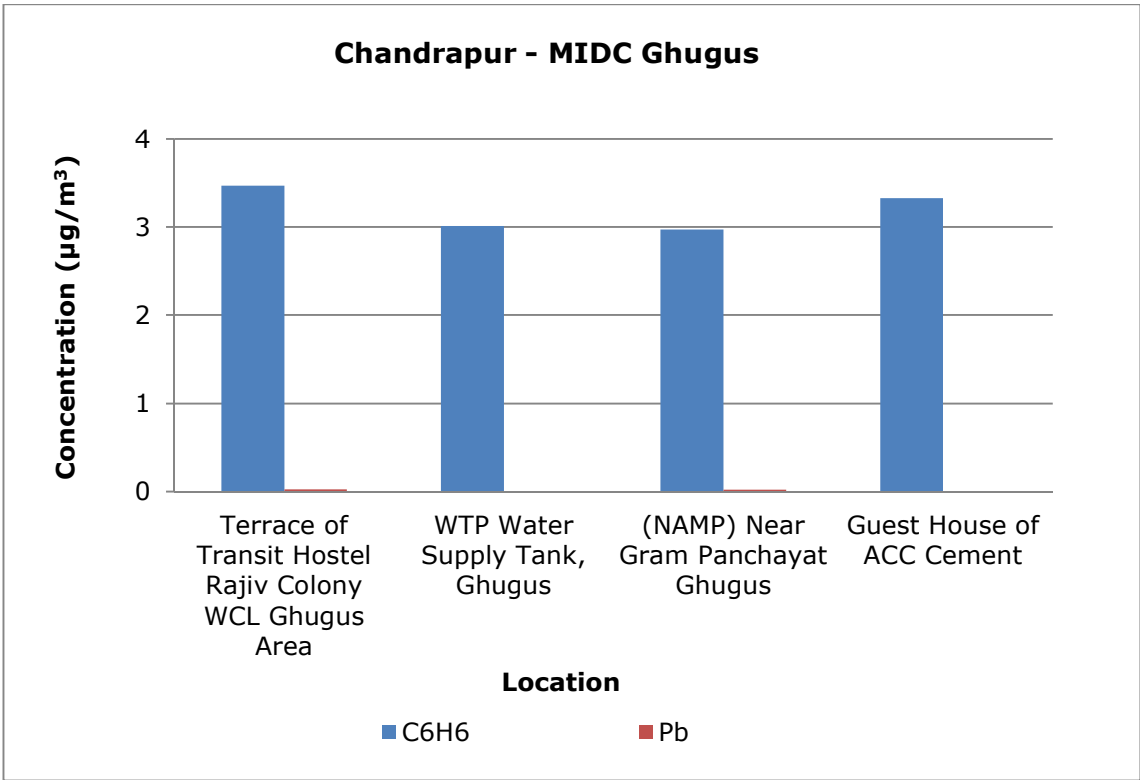
Parameters	Unit	Results	
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	Guest House of ACC Cement
2,2-Dichloropropane	µg/m ³	BLQ	BLQ
Dibromomethane	µg/m ³	BLQ	BLQ
Toluene	µg/m ³	1.59	2.20
O-Xylene	µg/m ³	BLQ	0.64
Bromoform	µg/m ³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
4-Chlorotoluene	µg/m ³	BLQ	BLQ
1,1-Dichloroethylene	µg/m ³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
1,1-Dichloroethane	µg/m ³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
Bromochloromethane	µg/m ³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m ³	BLQ	BLQ

Graphs - Ambient Air Quality Monitoring of MIDC Ghugus

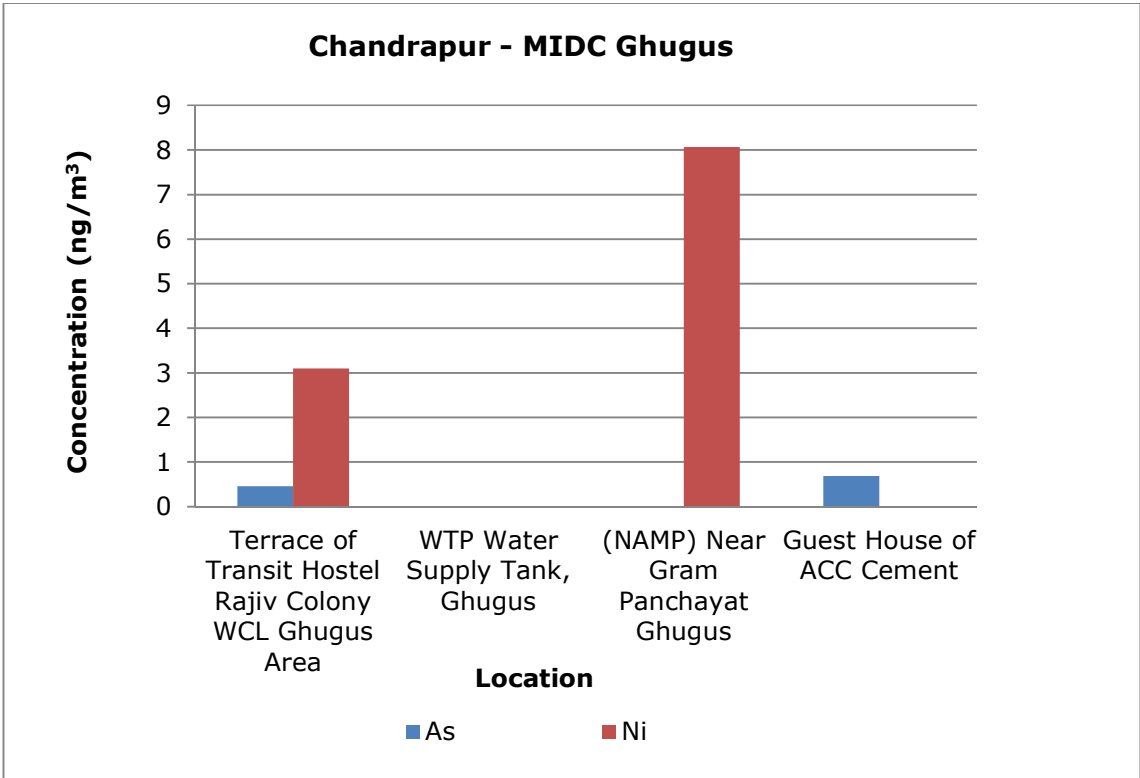




Chandrapur - MIDC Ghugus



Chandrapur - MIDC Ghugus



- 4. MIDC Ballarpur:** In MIDC Ballarpur only the concentration of PM₁₀ and Carbon Monoxide at one location has exceeded as per the NAAQS. Remaining all parameters is observed well within the limits.

Table 5.13 MIDC Ballarpur – Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Ram Mandir, Near BILT Mangal Karyalaya, Ballarpur	19°52'17.0" N	79° 20'38.8" E	10.01.2023	12.01.2023	14.01.2023
2.	Estate Office, BILT Colony, Ballarpur	19°52'07.9" N	79°20'22.8" E	10.01.2023	12.01.2023	14.01.2023
3.	(NAMP) Nagar Parishad Ballarpur	19°52'08.2" N	79°20'17.8" E	10.01.2023	12.01.2023	14.01.2023
4.	WCL Office, Ballarpur on Sasti Road	19°50'23.2" N	79°20'49.0" E	10.01.2023	12.01.2023	14.01.2023

Table 5.14 MIDC Ballarpur - Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Estate Office, BILT Colony, Ballarpur	19°52'07.9" N	79°20'22.8" E	10.01.2023	12.01.2023	14.01.2023
2.	(NAMP) Nagar Parishad Ballarpur	19°52'08.2" N	79°20'17.8" E	10.01.2023	12.01.2023	14.01.2023



Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Ballarpur



Fig. Geographical Locations of VOCs Monitoring MIDC Ballarpur

Table 5.15 MIDC Ballarpur – Details of Sampling Location of Ambient Air Quality Monitoring

Parameters	Unit	Results			
		Ram Mandir, Near BILT Mangal Karyalaya, Ballarpur	Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur	WCL Office, Ballarpur on Sasti Road
Sulphur Dioxide (SO ₂)	µg/m ³	4.94	49.9	50.9	54.0
Nitrogen Dioxide (NO ₂)	µg/m ³	26.8	19.0	42.7	43.7
Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	94	116	97	102
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	21	30	25	24
Ozone (O ₃)	µg/m ³	BLQ	BLQ	BLQ	BLQ
Lead (Pb)	µg/m ³	0.043	0.064	BLQ	0.052
Carbon Monoxide (CO) (1 h)	mg/m ³	1.32	1.53	1.56	1.34
Carbon Monoxide (CO) (8 h)	mg/m ³	1.73	1.82	2.03	1.70
Ammonia (NH ₃)	µg/m ³	30.8	23.0	23.1	26.5
Benzene (C ₆ H ₆)	µg/m ³	2.82	2.94	3.56	3.20
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m ³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m ³	0.668	1.01	0.92	0.57
Nickel (Ni)	ng/m ³	7.26	9.34	3.08	6.73

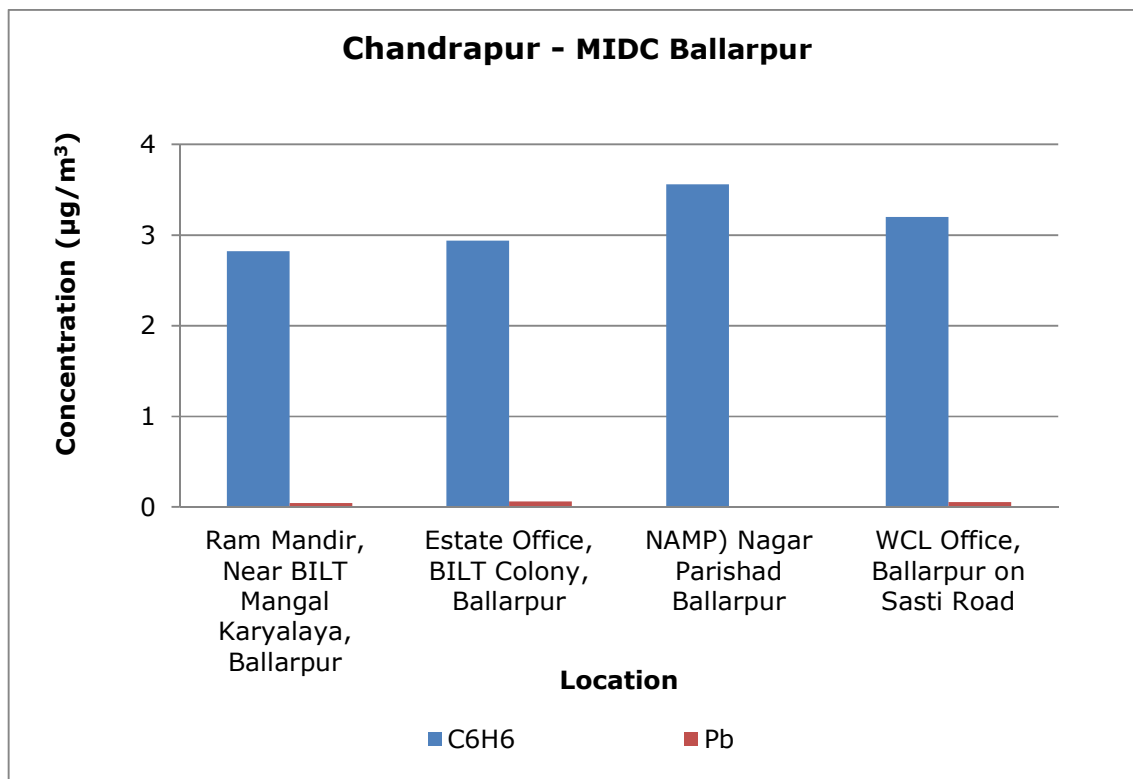
Table 5.16 MIDC Ballarpur - Volatile Organic Compounds (VOCs) in Ambient Air Results

Parameters	Unit	Results	
		Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur
Dichloromethane	µg/m ³	BLQ	BLQ
Chloroform	µg/m ³	BLQ	BLQ
Carbon Tetrachloride	µg/m ³	BLQ	BLQ
Trichloroethylene	µg/m ³	BLQ	BLQ
Bromodichloromethane	µg/m ³	BLQ	BLQ
1,3-Dichloropropane	µg/m ³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m ³	0.59	2.59
1,3-Dichlorobenzene	µg/m ³	2.74	1.91

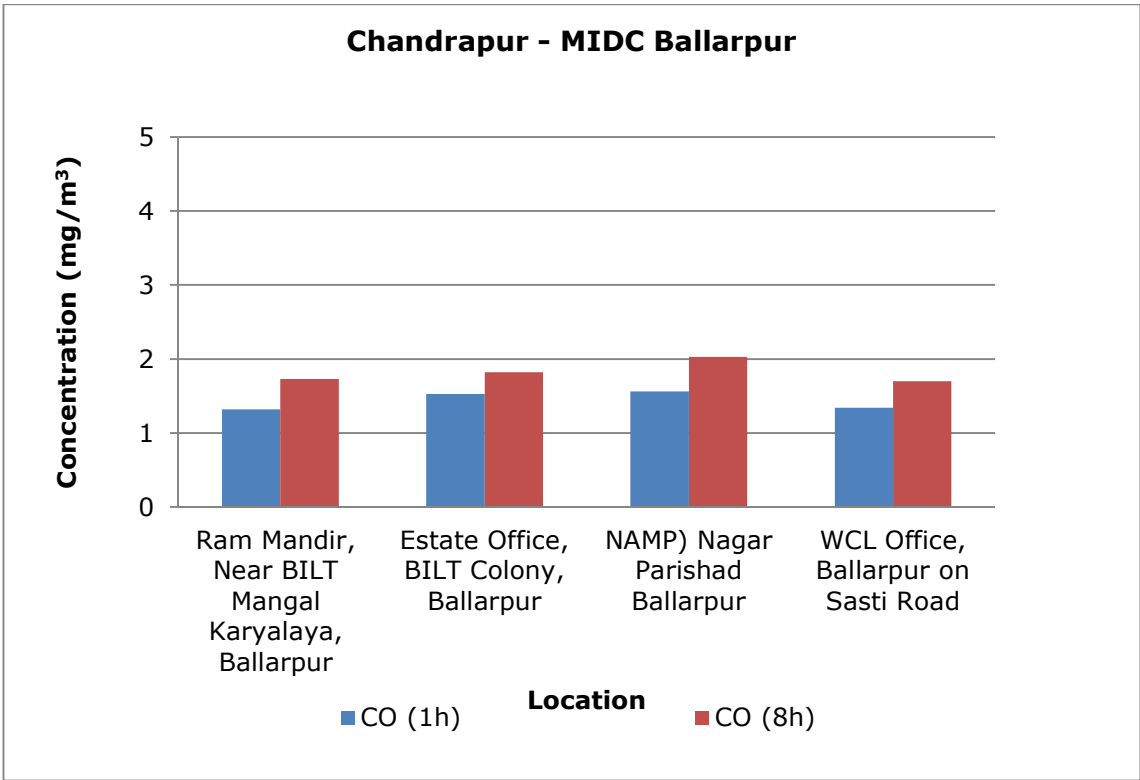
Parameters	Unit	Results	
		Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur
1,2-Dichlorobenzene	µg/m ³	1.26	1.8
1,2-Dibromo-3-Chloropropane	µg/m ³	BLQ	BLQ
Napthalene	µg/m ³	4.19	3.93
Bromobenzene	µg/m ³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m ³	BLQ	BLQ
2-Chlorotoluene	µg/m ³	BLQ	BLQ
Tert-Butylbenzene	µg/m ³	BLQ	BLQ
SEC-Butylbenzene	µg/m ³	BLQ	BLQ
P-Isopropyltoluene	µg/m ³	0.80	0.94
M-Xylene	µg/m ³	BLQ	BLQ
P-Xylene	µg/m ³	BLQ	BLQ
Styrene	µg/m ³	1.93	BLQ
Cumene	µg/m ³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m ³	BLQ	BLQ
N-Propylbenzene	µg/m ³	BLQ	BLQ
Dibromochloromethane	µg/m ³	BLQ	BLQ
1,2-Dibromoethane	µg/m ³	BLQ	BLQ
Chlorobenzene	µg/m ³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
Ethylbenzene	µg/m ³	BLQ	BLQ
1,1-Dichloropropylene	µg/m ³	BLQ	BLQ
1,2-Dichloroethane	µg/m ³	BLQ	BLQ
1,2-Dichloropropane	µg/m ³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m ³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m ³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m ³	BLQ	BLQ
Tetrachloroethylene	µg/m ³	BLQ	0.46
1,3,5-Trimethylbenzene	µg/m ³	BLQ	BLQ
N-Butylbenzene	µg/m ³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m ³	3.58	4.29
Hexachlorobutadiene	µg/m ³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m ³	4.12	3.96

Parameters	Unit	Results	
		Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur
2,2-Dichloropropane	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
Dibromomethane	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
Toluene	$\mu\text{g}/\text{m}^3$	0.98	0.64
O-Xylene	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
Bromoform	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
1,1,2,2-Tetrachloroethane	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
4-Chlorotoluene	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
1,1-Dichloroethylene	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
Trans-1,2-Dichloroethylene	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
1,1-Dichloroethane	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
CIS-1,2-Dichloroethylene	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
Bromochloromethane	$\mu\text{g}/\text{m}^3$	BLQ	BLQ
1,1,1-Trichloroethane	$\mu\text{g}/\text{m}^3$	BLQ	BLQ

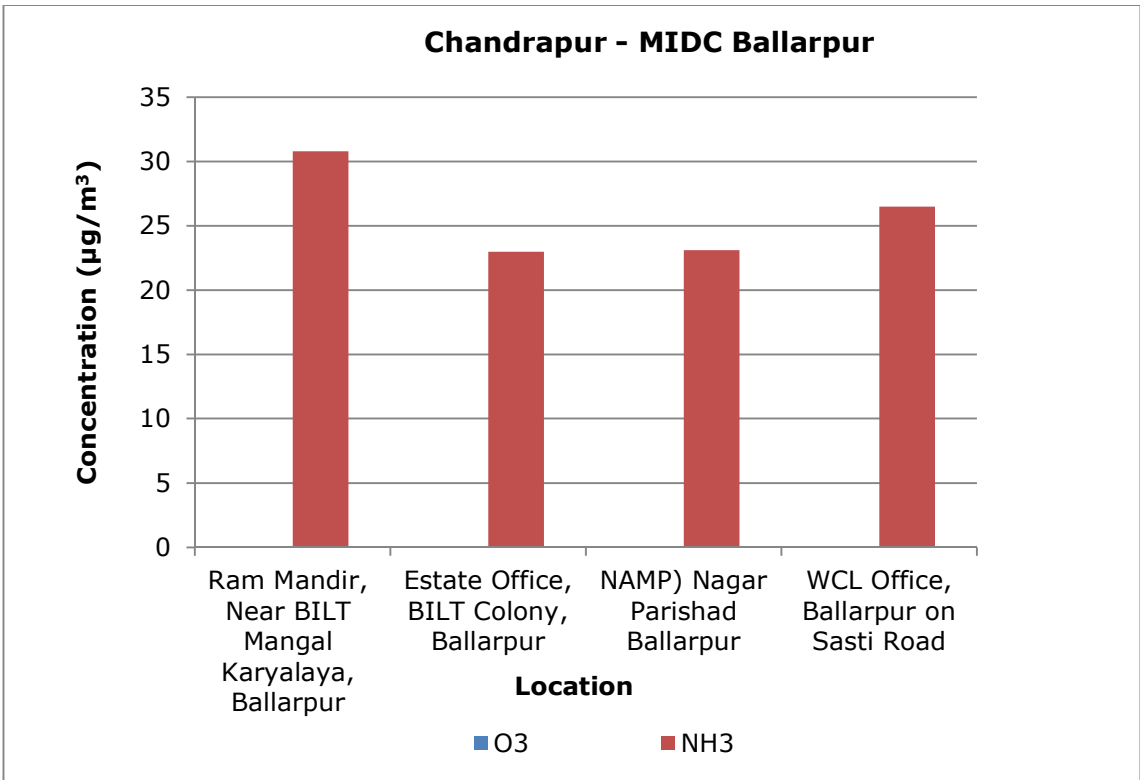
Graphs - Ambient Air Quality Monitoring of MIDC Ballarpur

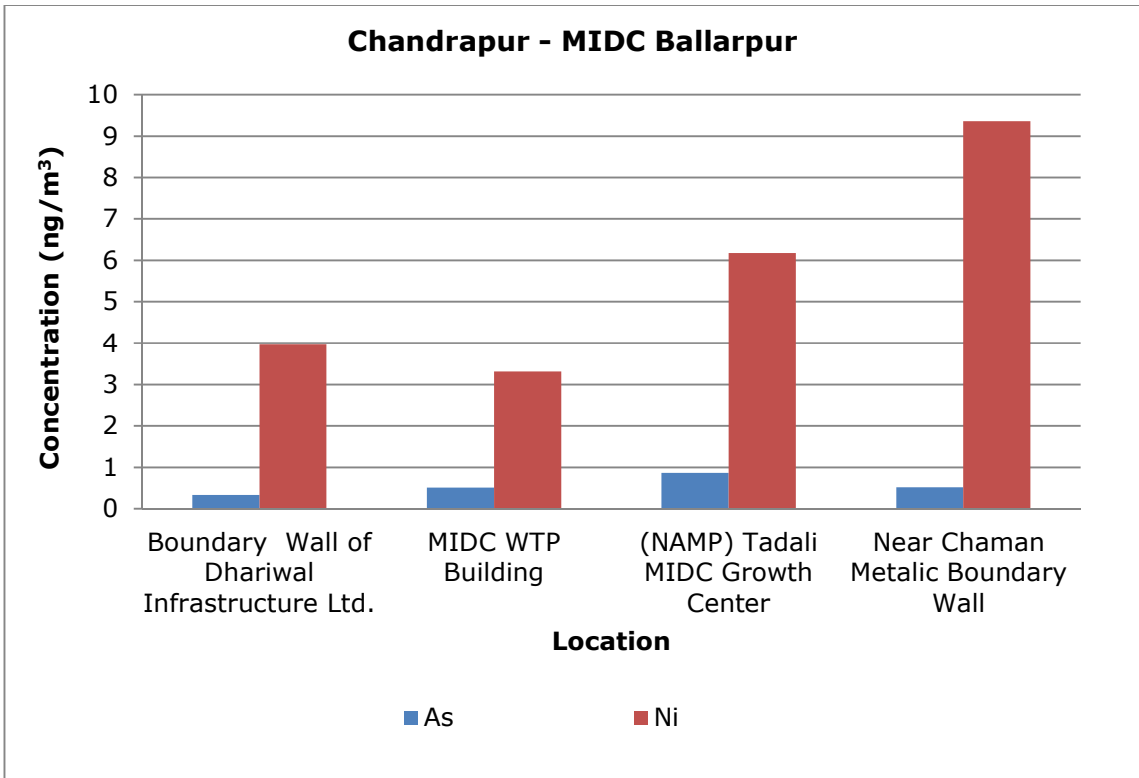
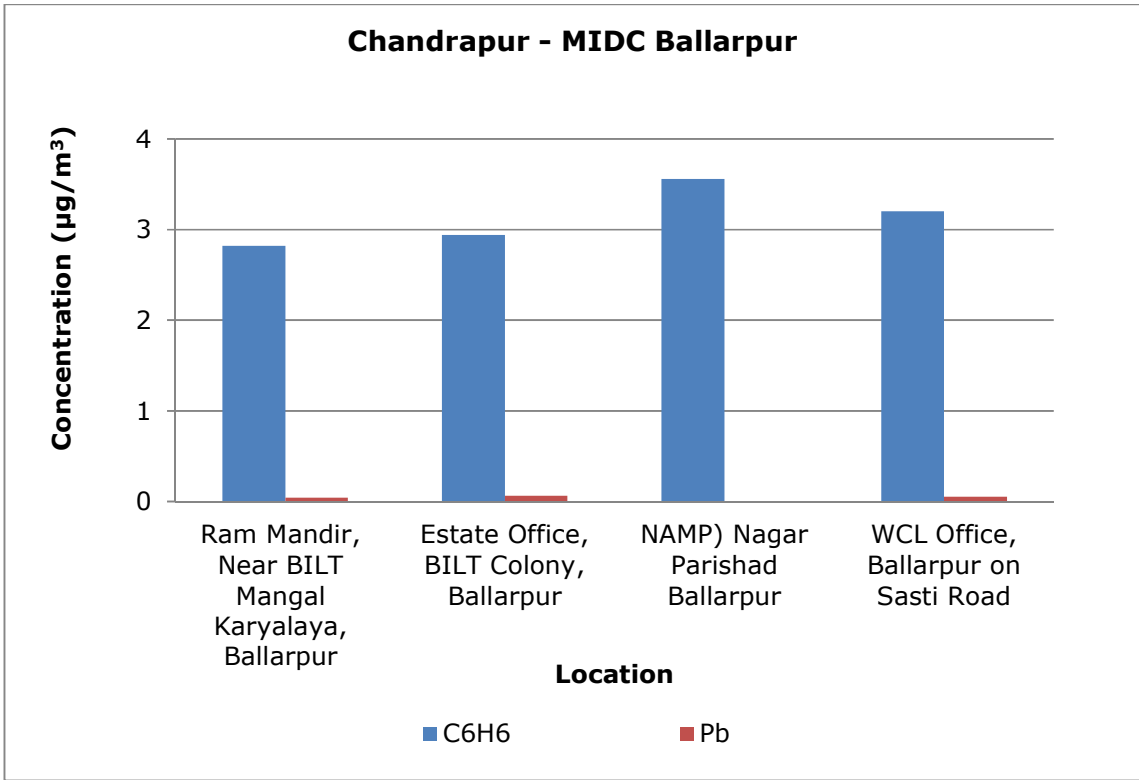


Chandrapur - MIDC Ballarpur



Chandrapur - MIDC Ballarpur





WATER ENVIRONMENT

6. Water Environment

For studying the water Environment of Chandrapur area, surface water was collected from Nallah, Lake and River. A total of 17 samples were collected from MIDC Chandrapur, MIDC Tadali, MIDC Ballarpur and MIDC Ghugus.

1. MIDC Tadali: from MIDC Tadali also three surface water samples are collected.

- All three water samples collected are acceptable in general appearance, colour, smell and transparency.
- Suspended solids also well within the limits at all three samples collected.
- pH and BOD are found above the standard limit.
- 100% survival was not achieved in Fish Bioassay of all three samples.
- Metals like Zinc, Nickel, Copper, Hexavalent Chromium (Cr⁶⁺), Total Chromium, Total Arsinic etc. are observed either below limit of quantification or below their standard limits.
- Iron observed above their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Kjeldahl Nitrogen exceeded in all three samples collected from MIDC Tadali.
- The concentration of Total Phosphate exceeded and Fluoride at Nallah adjacent to Grace Industries.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all three samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all three samples collected.

Table 6.1 MIDC Tadali – Details of Sampling Location of Surface Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Tadali Village Lake	20°01'48.0"N	79°11'21.8"E	11.01.2023	13.01.2023	15.01.2023
2.	Nallah adjacent to Grace Industries	20°00'28.1"N	79°11'11.1"E	11.01.2023	13.01.2023	15.01.2023
3.	Raw Water of MIDC WTP	20°00'26.6"N	79°11'11.3"E	11.01.2023	13.01.2023	15.01.2023

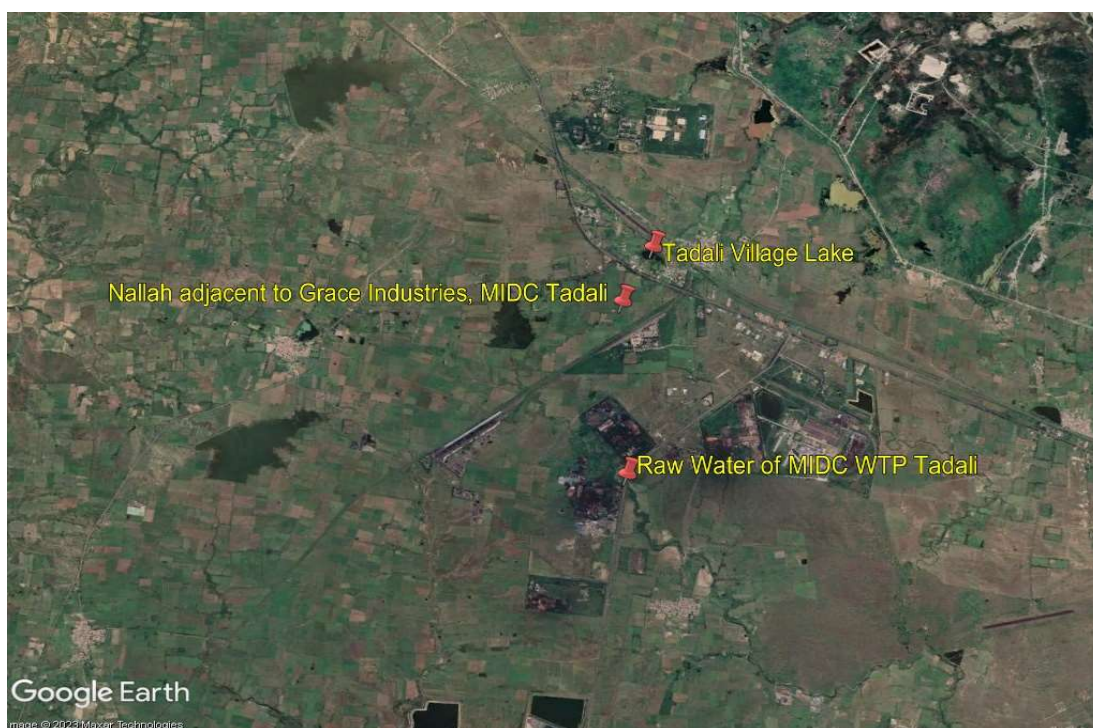


Fig. Geographical Locations of Surface Water Sampling MIDC Tadali

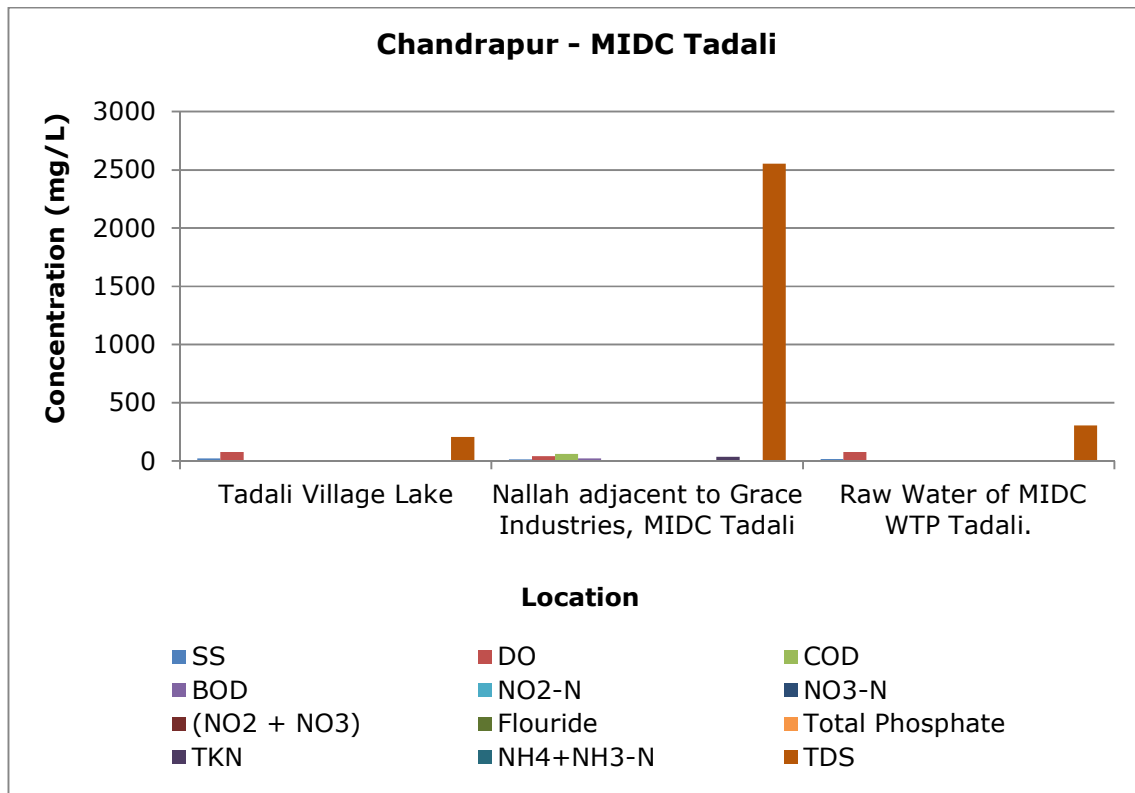
Table 6.2 MIDC Tadali – Results of Surface Water

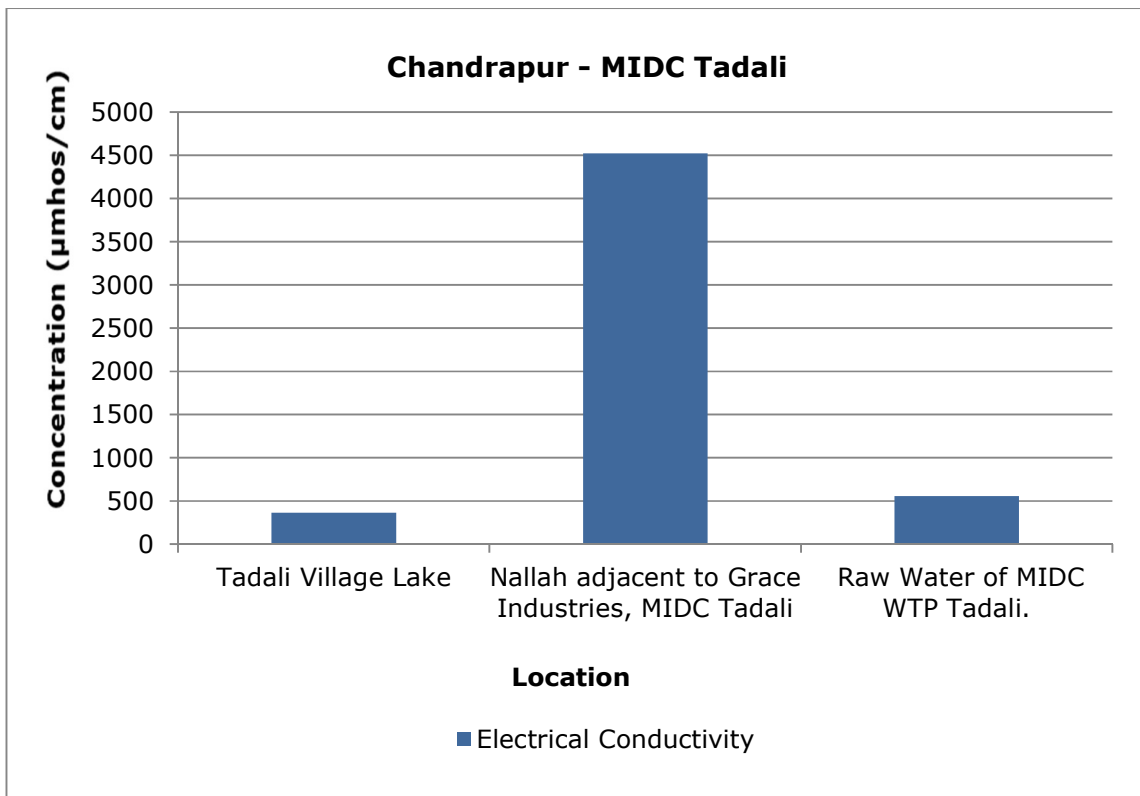
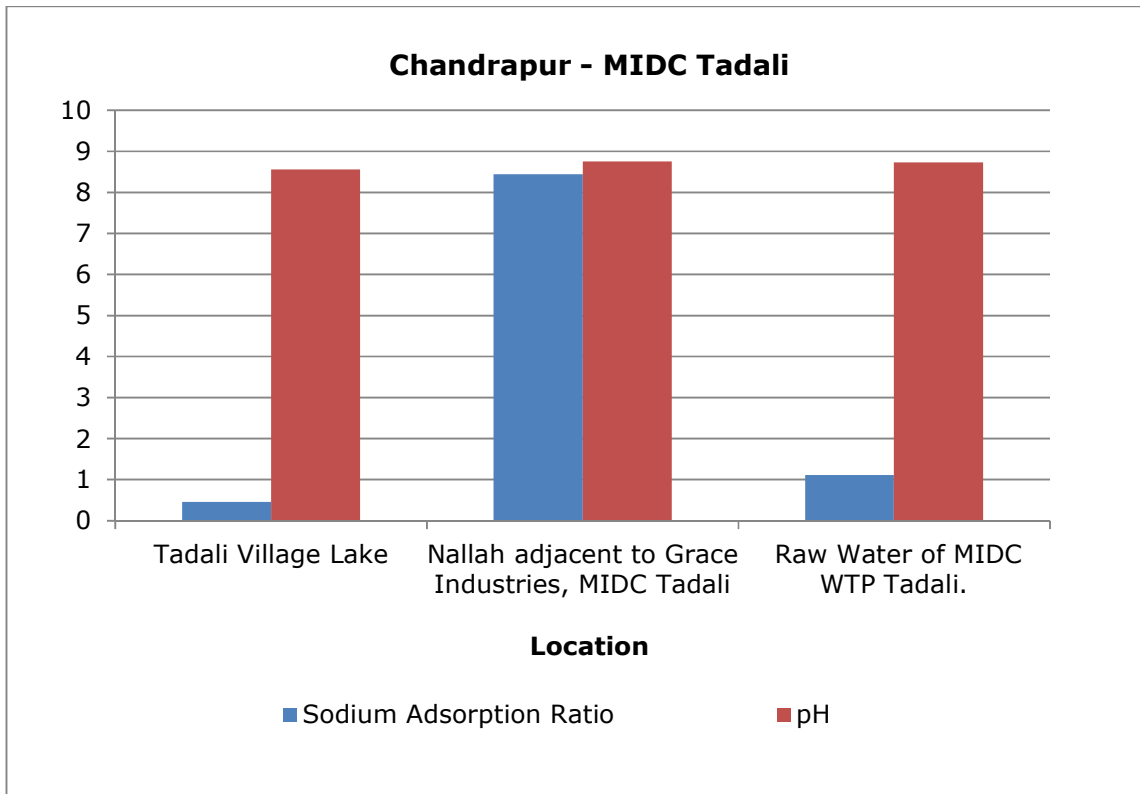
Parameters	Unit	Results		
		Tadali Village Lake	Nallah adjacent to Grace Industries	Raw Water of MIDC WTP
Sanitary Survey	-	Reasonably Clean Neighbourhood	Reasonably Clean Neighbourhood	Very Clean Neighbourhood and Catchment
General Appearance	-	Floating Matter Evident	Floating Matter Evident	No Floating Matter
Transparency	m	0.2	0.3	0.5
Temperature	°C	22	19	22
Colour	Hazen	2	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.56	8.75	8.73
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	21	15	17
Total Dissolved Solids	mg/L	205	2533	305
Dissolved Oxygen (% Saturation)	%	75	43	75
Chemical Oxygen Demand	mg/L	9	62	BLQ
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	21	BLQ

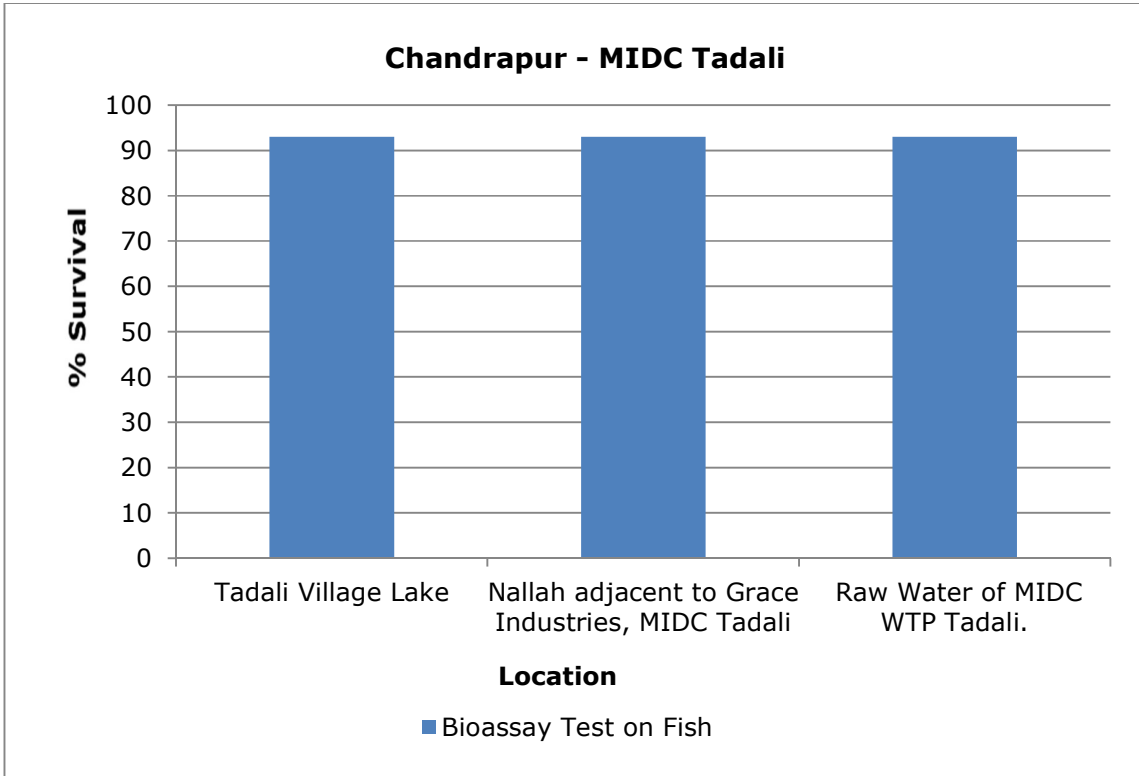
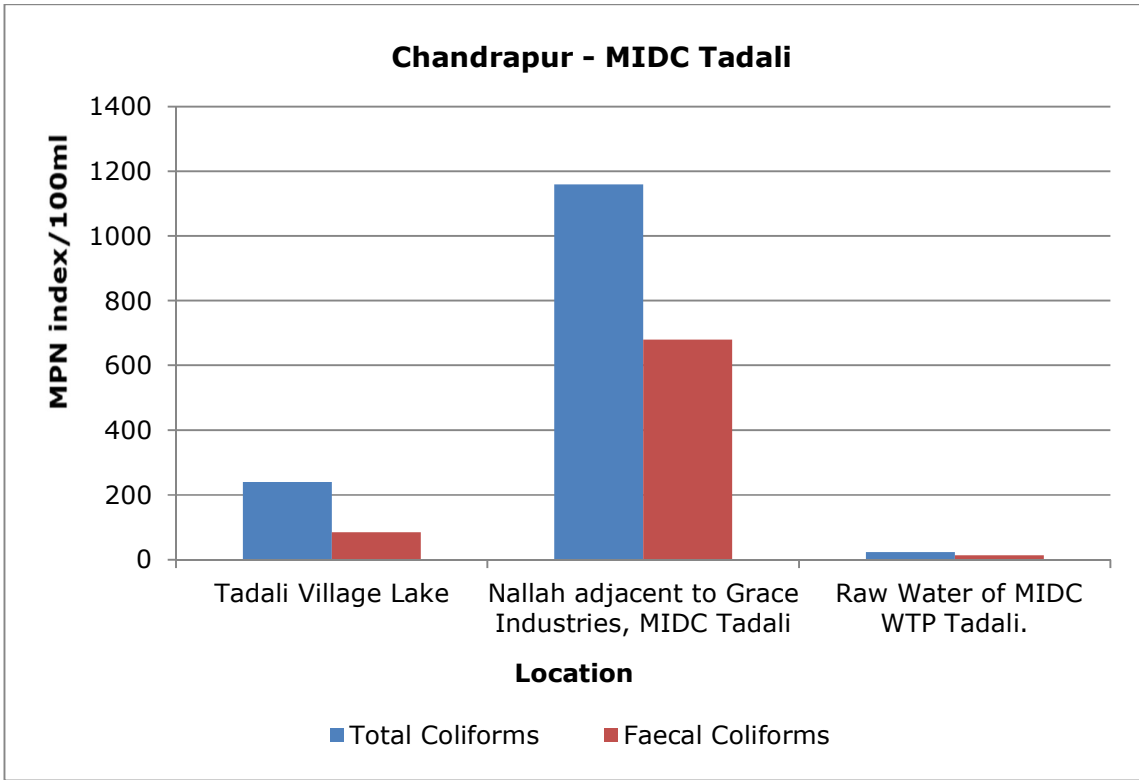
Parameters	Unit	Results		
		Tadali Village Lake	Nallah adjacent to Grace Industries	Raw Water of MIDC WTP
Electrical Conductivity (at 25°C)	µmhos/cm	364	4523	557
Nitrite Nitrogen	mg/L	BLQ	0.16	BLQ
Nitrate Nitrogen	mg/L	BLQ	7.0	1.74
(NO ₂ + NO ₃)-Nitrogen	mg/L	BLQ	7.1	1.74
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	0.06	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.4	1.6	0.6
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	0.21	BLQ
Sodium Adsorption Ratio	-	0.46	8.44	1.11
Total Coliforms	MPN Index/ 100 ml	240	1160	23
Faecal Coliforms	MPN Index/ 100 ml	85	680	13
Total Phosphate (as P)	mg/L	BLQ	0.54	BLQ
Total Kjeldahl Nitrogen (as N)	mg/L	3.35	33.8	5.24
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.54	0.37	0.27
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.052	0.097
Nickel (as Ni)	mg/L	BLQ	0.011	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	0.006	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.089	0.055	0.028
Iron (as Fe)	mg/L	0.321	0.313	0.244
Vanadium (as V)	mg/L	BLQ	0.043	0.042

Parameters	Unit	Results		
		Tadali Village Lake	Nallah adjacent to Grace Industries	Raw Water of MIDC WTP
Selenium (as Se)	mg/L	0.007	0.017	0.008
Boron (as B)	mg/L	BLQ	0.236	0.243
Total Nitrogen	mg/L	4	40.9	6.97
Bioassay Test on fish	% survival	93	93	93

Graphs - Surface Water Quality of MIDC Tadali







2. MIDC Chandrapur: Three surface water samples are collected from MIDC Chandrapur region.

- All three water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, Electrical conductivity, suspended solids and COD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay except in Nallah Near Gagangiri Village.
- Metals like Zinc, Hexavalent Chromium (Cr⁶⁺), Total Chromium, Total Arsenic, Cadmium etc. are observed either below the limit of quantification or below their standard limits.
- Metals like Iron, Nickel, Copper, Lead, etc. are observed above their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Kjeldahl Nitrogen, Total Phosphate and Iron exceeded in all three samples collected from MIDC Chandrapur.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all three samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all three samples collected.

Table 6.3 MIDC Chandrapur – Details of Sampling Location of Surface Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Nallah Opposite Manidhari Industry	19°58'46.5"N	79°13'57.7"E	17.01.2023	19.01.2023	21.01.2023
2.	Nallah Near Gagangiri Village	19°58'03.5"N	79°14'50.5"E	17.01.2023	19.01.2023	21.01.2023
3.	Nallah at Dhanora Bridge	19° 57' 37.1"N	79°15'40.5"E	17.01.2023	19.01.2023	21.01.2023

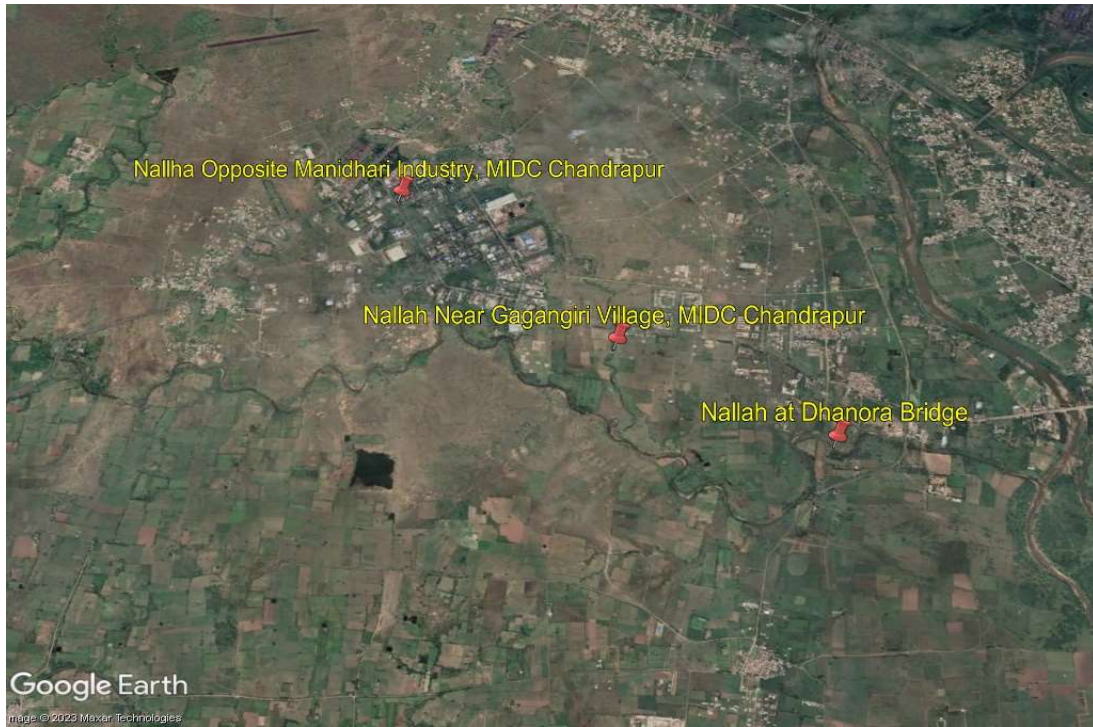


Fig. Geographical Locations of Surface Water Sampling MIDC Chandrapur

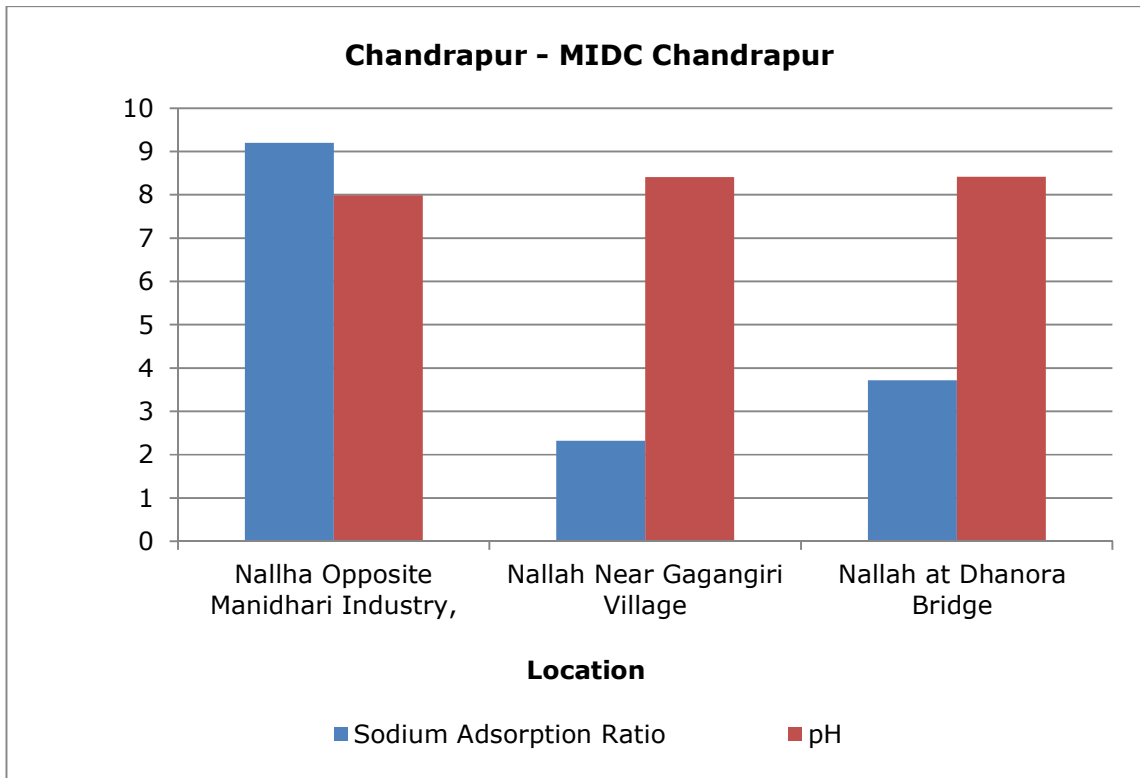
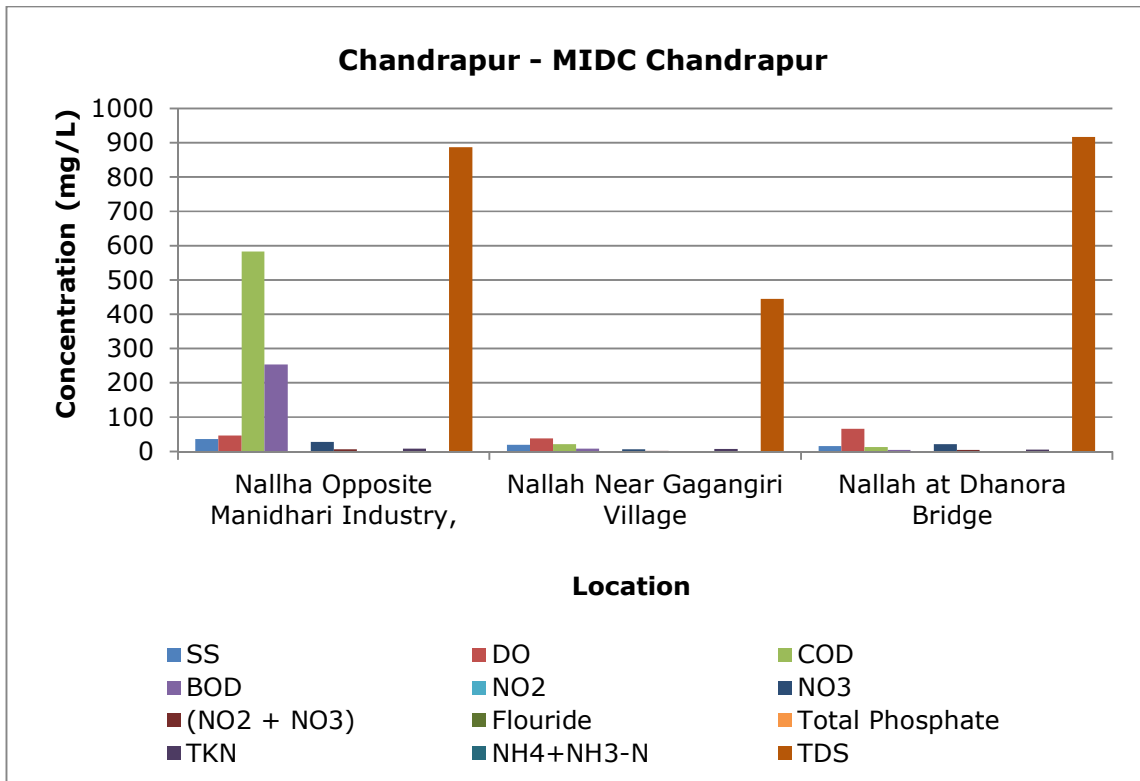
Table 6.4 MIDC Chandrapur – Results of Surface Water

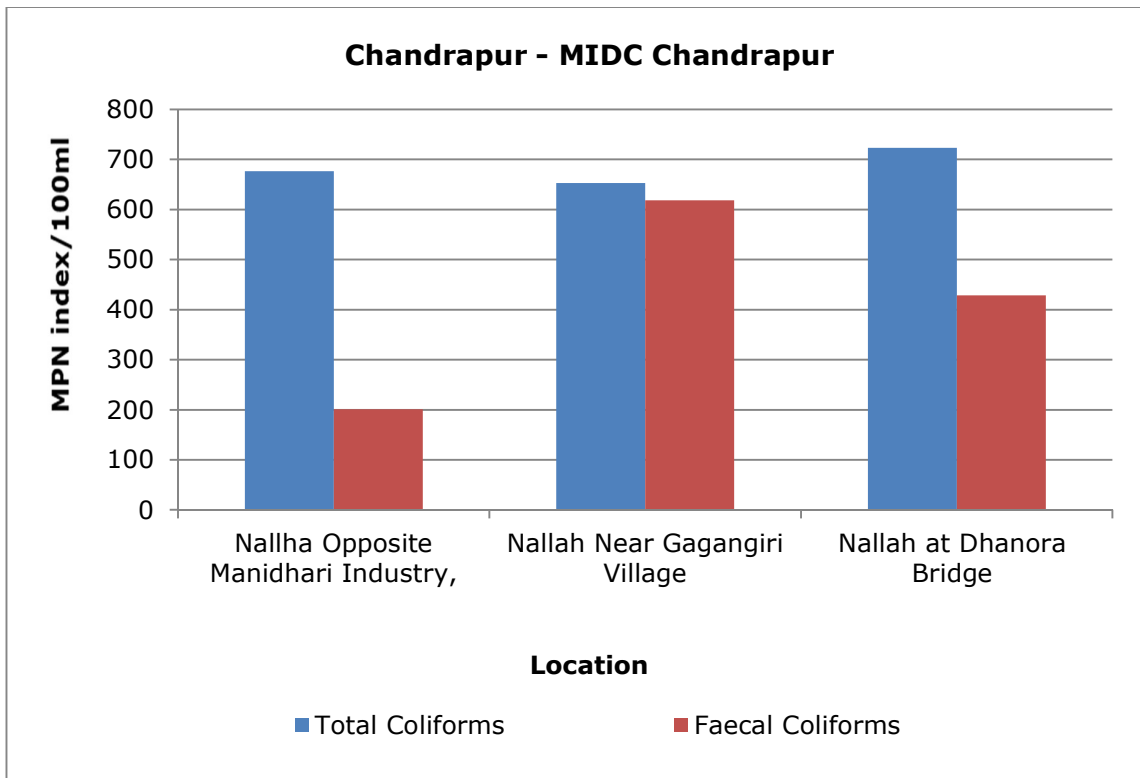
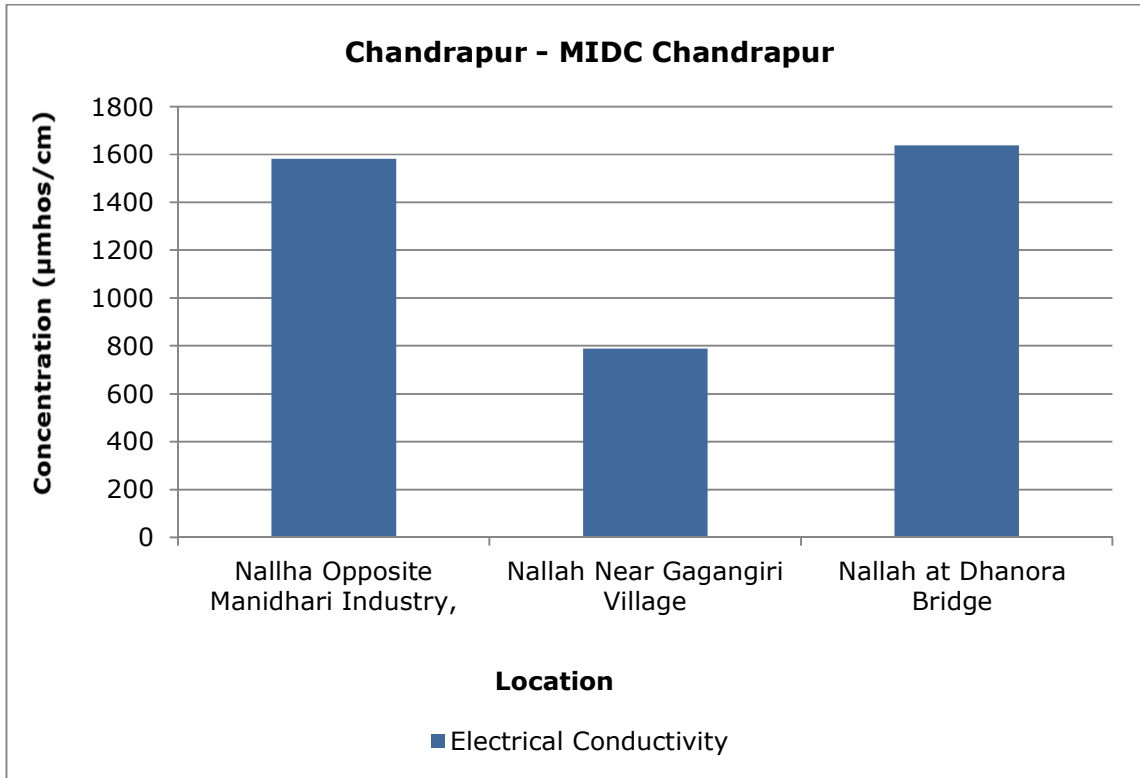
Parameters	Unit	Results		
		Nallah Opposite Manidhari Industry	Nallah Near Gagangiri Village	Nallah at Dhanora Bridge
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.2	0.2	0.3
Temperature	°C	23	21	23
Colour	Hazen	3	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.99	8.41	8.42
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	36	20	16
Total Dissolved Solids	mg/L	887	445	917
Dissolved Oxygen (% Saturation)	%	47	38	66
Chemical Oxygen Demand	mg/L	584	21	13
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	254	8	5
Electrical Conductivity (at 25°C)	µmhos/cm	1583	789	1638
Nitrite Nitrogen	mg/L	0.27	0.39	BLQ

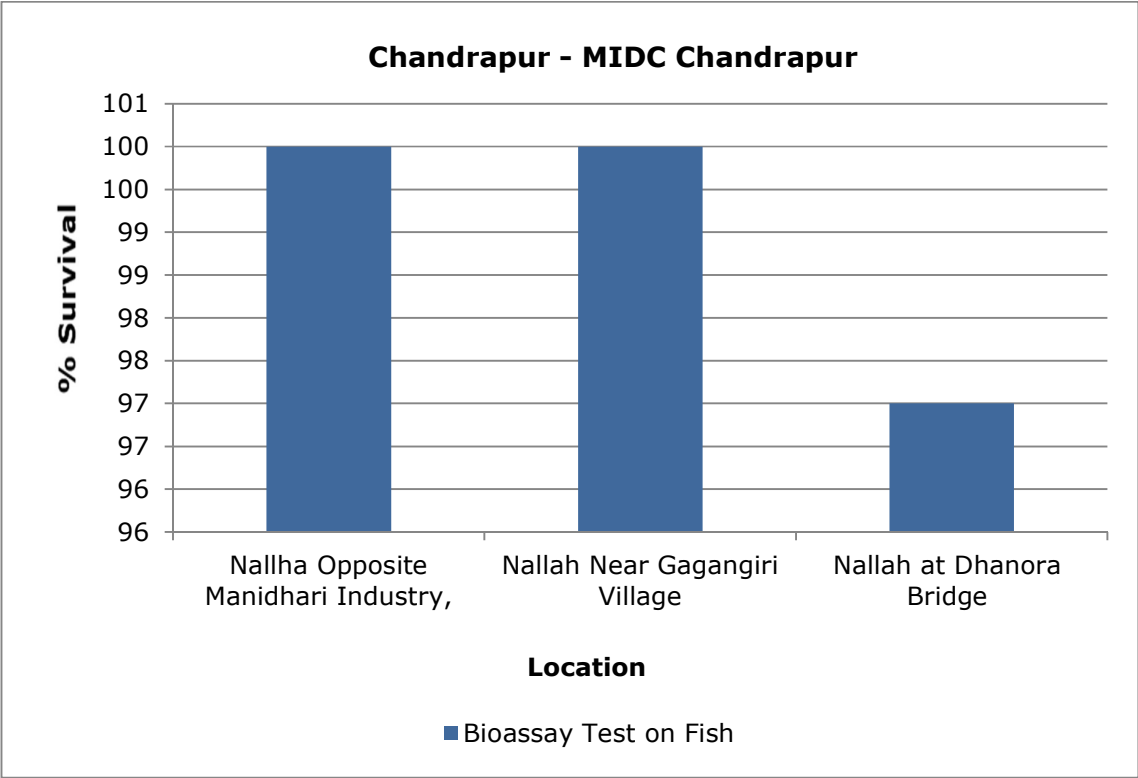
Parameters	Unit	Results		
		Nallah Opposite Manidhari Industry	Nallah Near Gagangiri Village	Nallah at Dhanora Bridge
Nitrate Nitrogen	mg/L	6.3	1.38	4.8
(NO ₂ + NO ₃)-Nitrogen	mg/L	6.3	1.76	4.8
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.3	0.7	1.2
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.61	0.39	0.48
Sodium Adsorption Ratio	-	9.20	2.32	3.72
Total Coliforms	MPN Index/ 100 ml	676	653	723
Faecal Coliforms	MPN Index/ 100 ml	201	618	429
Total Phosphate (as P)	mg/L	1.5	0.62	1.02
Total Kjeldahl Nitrogen (as N)	mg/L	8.02	6.91	5.61
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.45	1.01	0.43
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.071	0.119	0.065
Nickel (as Ni)	mg/L	0.05	0.011	0.012
Copper (as Cu)	mg/L	0.103	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.03	BLQ	BLQ
Total Arsenic (as As)	mg/L	0.008	0.007	BLQ
Lead (as Pb)	mg/L	0.061	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.354	0.261	0.088
Iron (as Fe)	mg/L	1.664	1.337	0.533
Vanadium (as V)	mg/L	0.071	0.019	BLQ
Selenium (as Se)	mg/L	BLQ	BLQ	0.013
Boron (as B)	mg/L	0.166	0.147	0.22

Parameters	Unit	Results		
		Nallah Opposite Manidhari Industry	Nallah Near Gagangiri Village	Nallah at Dhanora Bridge
Total Nitrogen	mg/L	14.4	8.68	10.4
Bioassay Test on fish	% survival	93	100	97

Graphs - Surface Water Quality of MIDC Chandrapur







3. MIDC Ghugus: Five Surface water samples are collected from MIDC Ghugus.

- All five water samples collected are acceptable in general appearance, colour and smell.
- pH, Electrical conductivity, suspended solids and COD are also well within the limits at all five samples collected.
- 100% survival was achieved in Fish Bioassay test in one out of five samples collected.
- Metals like Zinc, Arsenic, Nickel, Copper, Hexavalent Chromium (Cr⁶⁺) etc. are observed either below the limit of quantification or below their standard limits.
- Metals like Iron, Manganese etc. are observed above their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Kjeldahl Nitrogen exceeded in two samples out of five Surface water samples collected.
- Total Phosphate exceeded in all five Surface water samples collected.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all five samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all five samples collected.

Table 6.5 MIDC Ghugus – Details of Sampling Location of Surface Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Wardha river Near WCL WTP Ghugus OCM	19° 57' 25.8"N	79° 06' 11.4"E	17.01.2023	19.01.2023	21.01.2023
2.	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	19° 57' 23.3"N	79° 06' 14.5"E	17.01.2023	19.01.2023	21.01.2023
3.	(NWMP) Wardha River behind ACC plant	19° 54' 16.7"N	79° 06' 54.9"E	17.01.2023	19.01.2023	21.01.2023
4.	Nallah at Usgaon, Shengaon road	19° 55' 18.5"N	79° 07' 57.5"E	17.01.2023	19.01.2023	21.01.2023
5.	Nallah Water down site of ACC Colony.	19° 55' 42.3"N	79° 06' 54.7"E	17.01.2023	19.01.2023	21.01.2023



Fig. Geographical Locations of Surface Water Sampling MIDC Ghugus

Table 6.6 MIDC Ghugus – Results of Surface Water

Parameters	Unit	Results		
		Wardha river Near WCL WTP Ghugus OCM	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	(NWMP) Wardha River behind ACC plant
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.9	0.8	0.7
Temperature	°C	22	20	26
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.67	8.44	8.55
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	17	30	28
Total Dissolved Solids	mg/L	271	484	343
Dissolved Oxygen (% Saturation)	%	71	69	81
Chemical Oxygen Demand	mg/L	16	144	48
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	5	41	11
Electrical Conductivity (at 25°C)	µmhos/cm	483	863	611

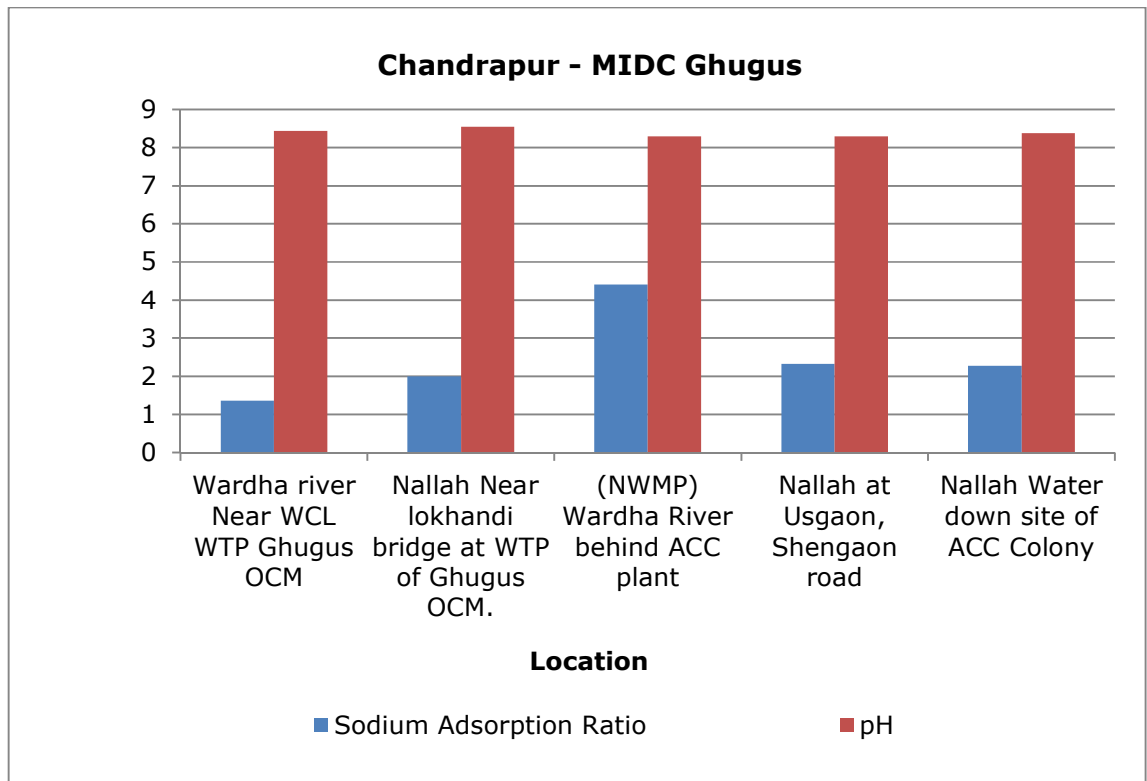
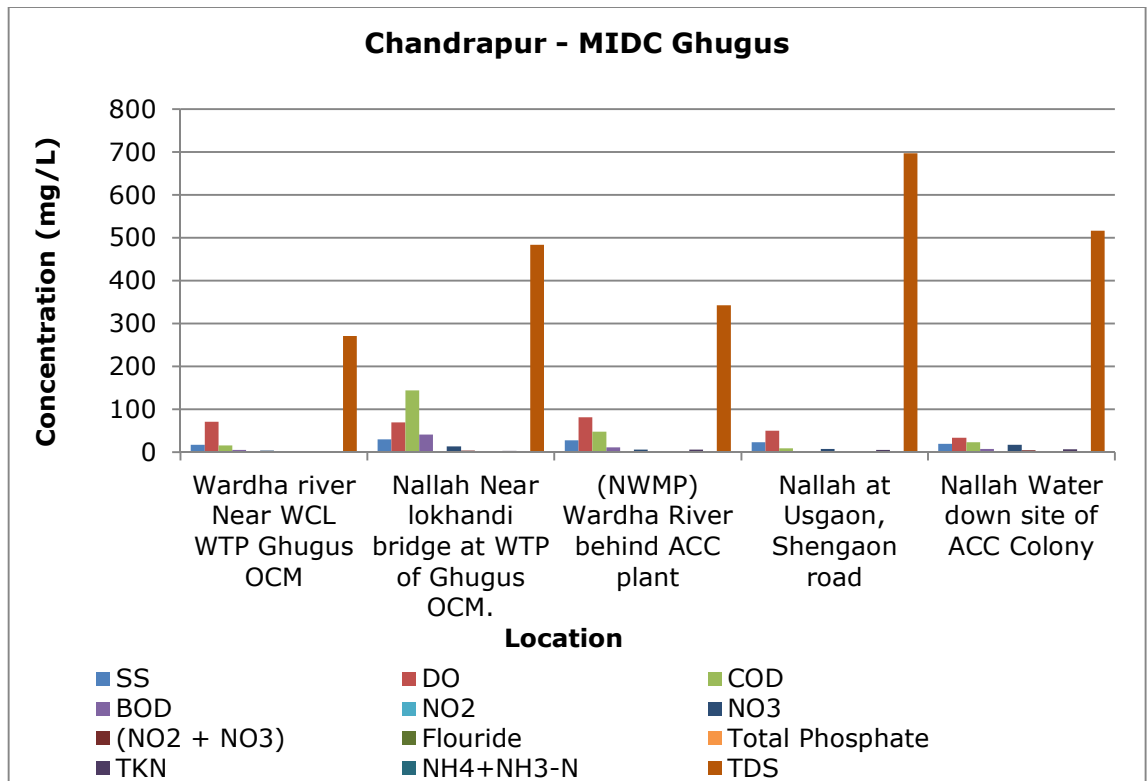
Parameters	Unit	Results		
		Wardha river Near WCL WTP Ghugus OCM	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	(NWMP) Wardha River behind ACC plant
Nitrite Nitrogen	mg/L	BLQ	0.4	BLQ
Nitrate Nitrogen	mg/L	BLQ	3.0	2.29
(NO ₂ + NO ₃)-Nitrogen	mg/L	BLQ	3.5	2.29
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	0.06	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.4	0.8	0.6
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.12	0.195	0.22
Sodium Adsorption Ratio	-	1.36	2.0	4.41
Total Coliforms	MPN Index/ 100 ml	453	128	149
Faecal Coliforms	MPN Index/ 100 ml	281	6.15	22
Total Phosphate (as P)	mg/L	0.36	0.47	0.38
Total Kjeldahl Nitrogen (as N)	mg/L	1.69	2.99	5.79
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.48	0.46	1.32
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.079	0.056
Nickel (as Ni)	mg/L	0.013	0.013	0.011
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.177	0.23	0.107
Iron (as Fe)	mg/L	0.589	1.81	0.551

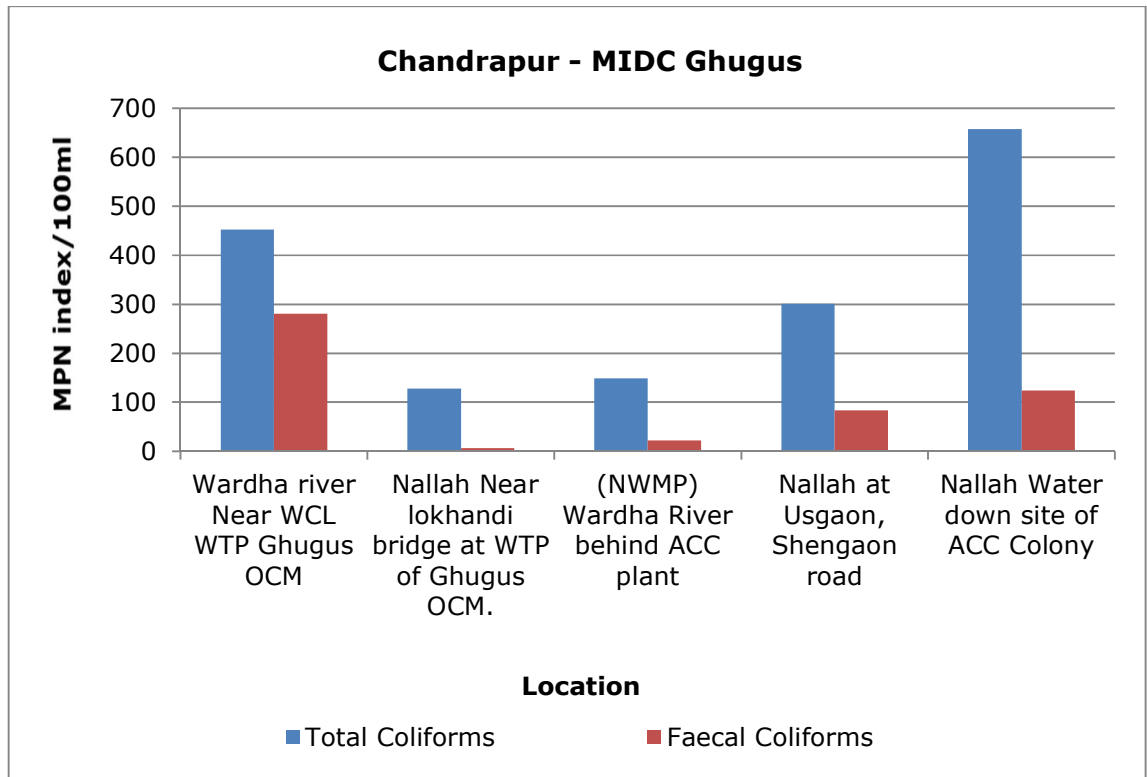
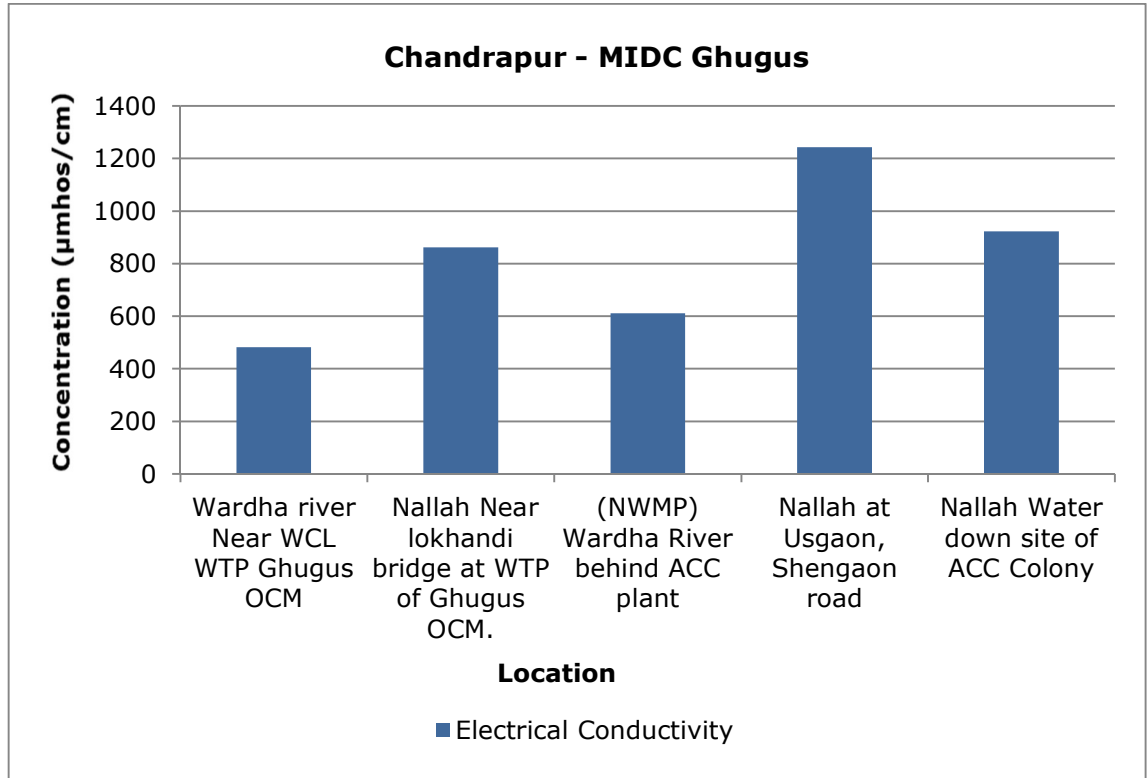
Parameters	Unit	Results		
		Wardha river Near WCL WTP Ghugus OCM	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	(NWMP) Wardha River behind ACC plant
Vanadium (as V)	mg/L	0.0235	0.016	0.036
Selenium (as Se)	mg/L	BLQ	0.009	BLQ
Boron (as B)	mg/L	0.104	BLQ	BLQ
Total Nitrogen	mg/L	2.59	6.45	7.14
Bioassay Test on fish	% survival	87	100	97

Parameters	Unit	Result	
		Nallah at Usgaon, Shenggaon road	Nallah Water down site of ACC Colony
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.5	0.2
Temperature	°C	22	23
Colour	Hazen	2	1
Odour	-	Agreeable	Agreeable
pH	-	8.30	8.38
Oil & Grease	mg/L	BLQ	BLQ
Total Suspended Solids	mg/L	23	19
Total Dissolved Solids	mg/L	697	517
Dissolved Oxygen (% Saturation)	%	50	33
Chemical Oxygen Demand	mg/L	9	23
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	7
Electrical Conductivity (at 25°C)	µmhos/cm	1244	923
Nitrite Nitrogen	mg/L	0.06	0.42
Nitrate Nitrogen	mg/L	1.61	3.8
(NO ₂ + NO ₃)-Nitrogen	mg/L	1.63	4.2
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ
Fluoride (as F)	mg/L	1.1	1.3
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.33	0.18

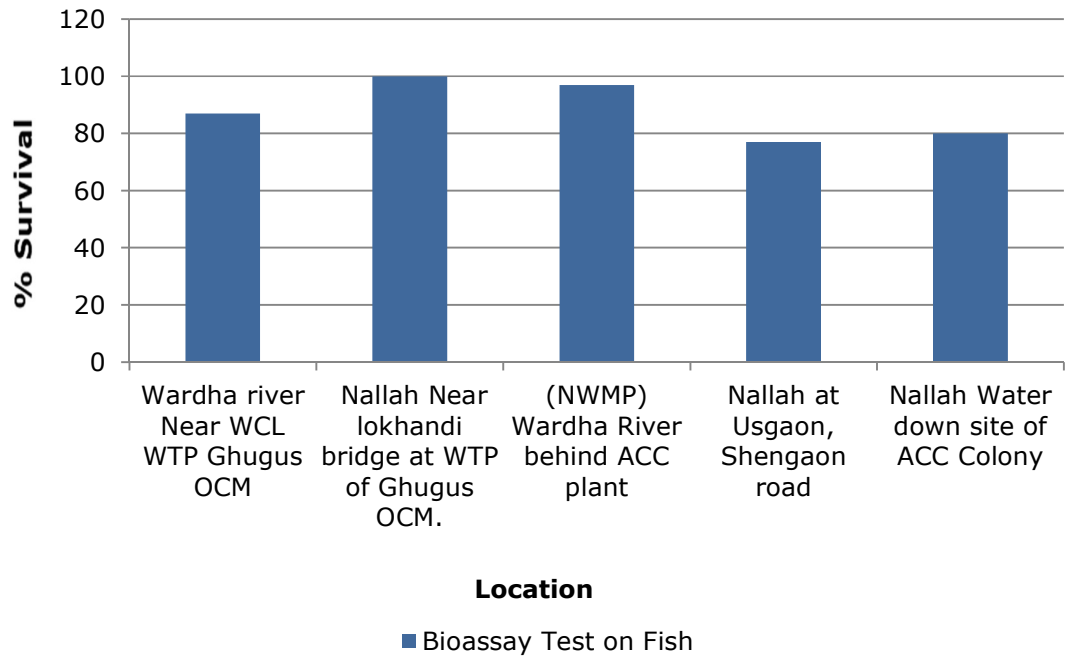
Parameters	Unit	Result	
		Nallah at Usgaon, Shengaoon road	Nallah Water down site of ACC Colony
Sodium Adsorption Ratio	-	2.32	2.28
Total Coliforms	MPN Index/ 100 ml	301	658
Faecal Coliforms	MPN Index/ 100 ml	83	124
Total Phosphate (as P)	mg/L	0.75	0.43
Total Kjeldahl Nitrogen (as N)	mg/L	5.04	6.73
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.60	0.38
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.059
Nickel (as Ni)	mg/L	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ
Manganese (as Mn)	mg/L	0.086	0.202
Iron (as Fe)	mg/L	0.696	0.599
Vanadium (as V)	mg/L	0.038	0.013
Selenium (as Se)	mg/L	0.01	0.01
Boron (as B)	mg/L	0.252	0.15
Total Nitrogen	mg/L	6.71	11.0
Bioassay Test on fish	% survival	77	80

Graphs - Surface Water Quality of MIDC Ghugus





Chandrapur - MIDC Ghugus



4. MIDC Ballarpur: Six Surface water samples are collected from MIDC Ballarpur.

- All six water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, Electrical conductivity and COD are also well within the limits at all six samples collected.
- Metals like Zinc, Copper, Iron, Hexavalent Chromium (Cr⁶⁺), Total Chromium, Total Arsenic, etc. are observed either below the limit of quantification or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds also meet the criteria as prescribed by CPCB.
- Total Kjeldahl Nitrogen exceeded in all six Surface water samples collected.
- The concentration of Total Phosphate exceeded at Nalla Near MSW Municipal Corporation Near Railway Line.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all six samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all six samples collected.

Table 6.7 MIDC Ballarpur – Details of Sampling Location of Surface Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Nallah Near Petrol Pump at Ballarpur Bamni Road	19° 50' 41.4"N	79° 21' 29.1"E	11.01.2023	13.01.2023	15.01.2023
2.	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	19° 51' 11.8"N	79° 20' 45.8"E	11.01.2023	13.01.2023	15.01.2023
3.	Wardha River upstream at Ballarpur	19° 51' 10.5"N	79° 20' 20.3"E	11.01.2023	13.01.2023	15.01.2023
4.	(NWMP) Wardha River downstream, Near Rajura Bridge	19° 48' 52.8"N	79° 22' 39.2"E	11.01.2023	13.01.2023	15.01.2023
5.	Nallah Near MSW Municipal Corporation, Near Railway line	19° 50' 23.5"N	79° 21' 23.9"E	11.01.2023	13.01.2023	15.01.2023
6.	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump	19° 51' 26.5"N	79° 20' 45.1"E	11.01.2023	13.01.2023	15.01.2023



Fig. Geographical Locations of Surface Water Sampling MIDC Ballarpur

Table 6.8 MIDC Ballarpur – Results of Surface Water

Parameters	Unit	Results		
		Nallah Near Petrol Pump at Ballarpur Bamni Road	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	Wardha River upstream at Ballarpur
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.2	0.2	0.8
Temperature	°C	31	21	21
Colour	Hazen	3	2	2
Odour	-	Not Agreeable	Agreeable	Agreeable
pH	-	7.92	7.84	8.60
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	21	23	19
Total Dissolved Solids	mg/L	1778	1984	306
Dissolved Oxygen (% Saturation)	%	48	36	71

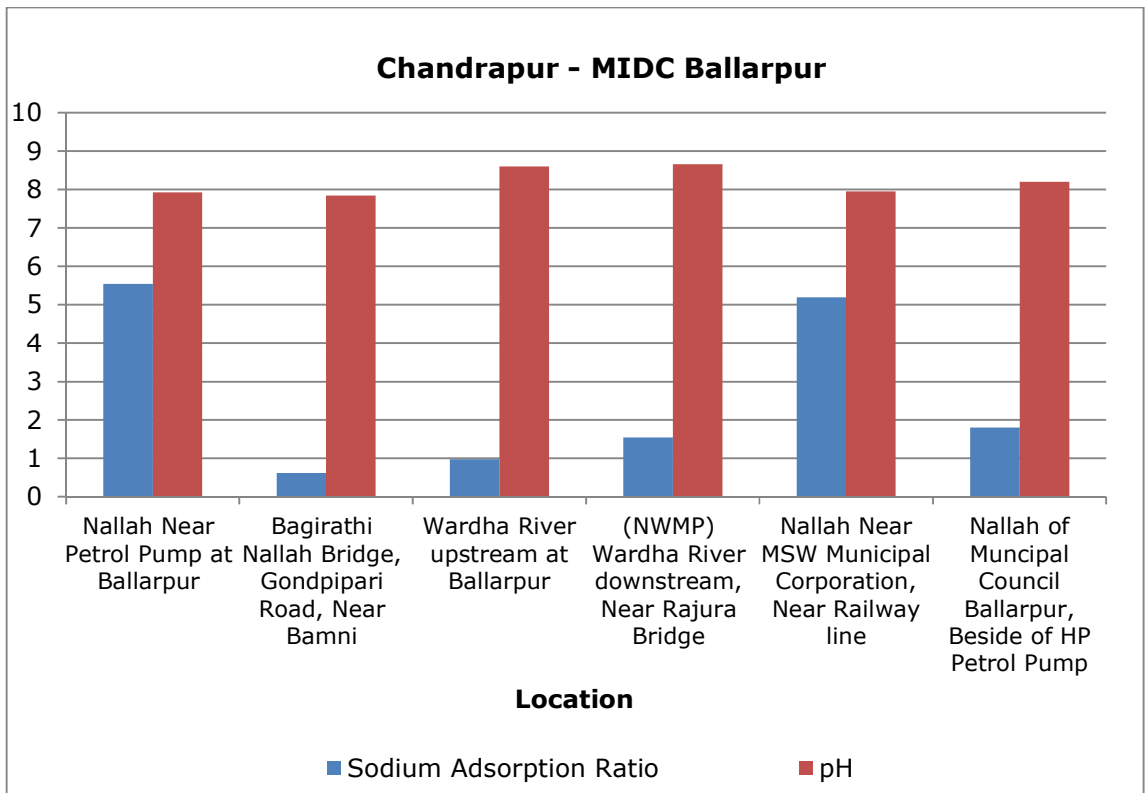
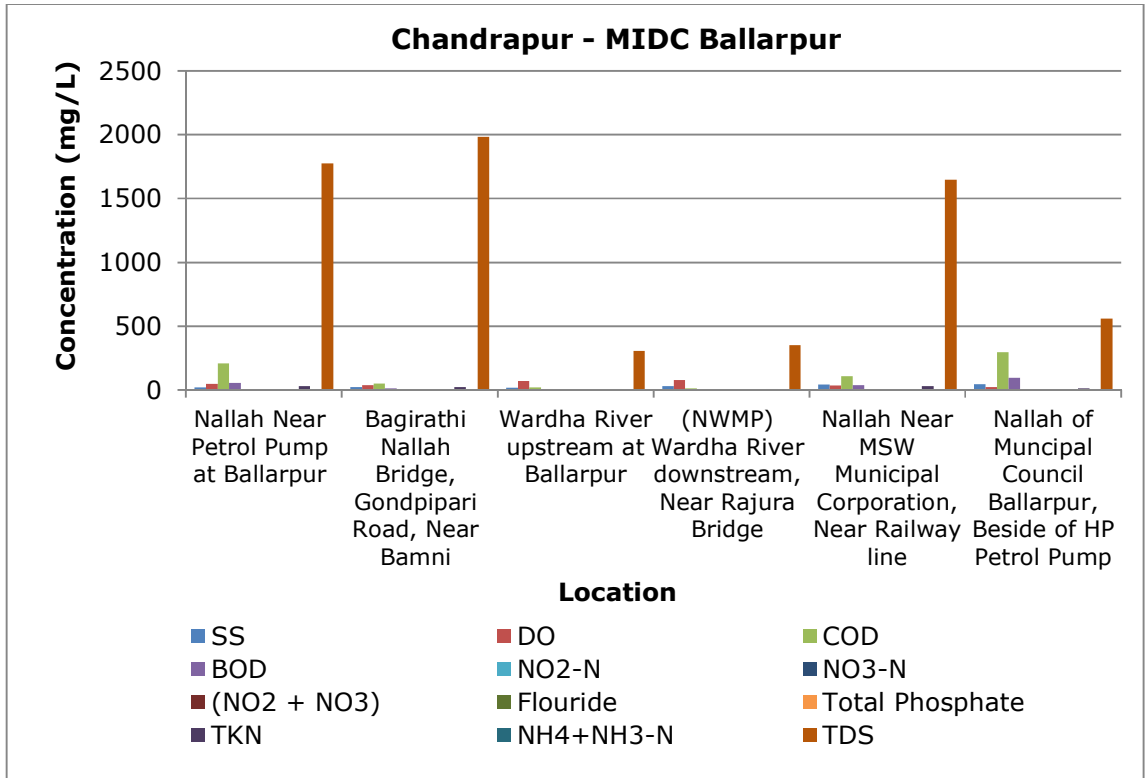
Parameters	Unit	Results		
		Nallah Near Petrol Pump at Ballarpur Bamni Road	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	Wardha River upstream at Ballarpur
Chemical Oxygen Demand	mg/L	208	51	21
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	57	13.3	7
Electrical Conductivity (at 25°C)	µmhos/cm	3173	3540	544
Nitrite Nitrogen	mg/L	0.06	0.04	0.04
Nitrate Nitrogen	mg/L	8.18	6.8	3.63
(NO ₂ + NO ₃)-Nitrogen	mg/L	8.2	6.80	3.67
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	0.06	0.06	0.08
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.5	1.9	0.6
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.17	0.8	BLQ
Sodium Adsorption Ratio	-	5.54	0.62	0.98
Total Coliforms	MPN Index/ 100 ml	220	693	150
Faecal Coliforms	MPN Index/ 100 ml	94	132	113
Total Phosphate (as P)	mg/L	0.28	1.75	0.11
Total Kjeldahl Nitrogen (as N)	mg/L	29.8	22.6	8.22
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.56	0.42	0.40
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.0705	0.068	0.076
Nickel (as Ni)	mg/L	0.011	0.013	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	0.002	0.003	BLQ

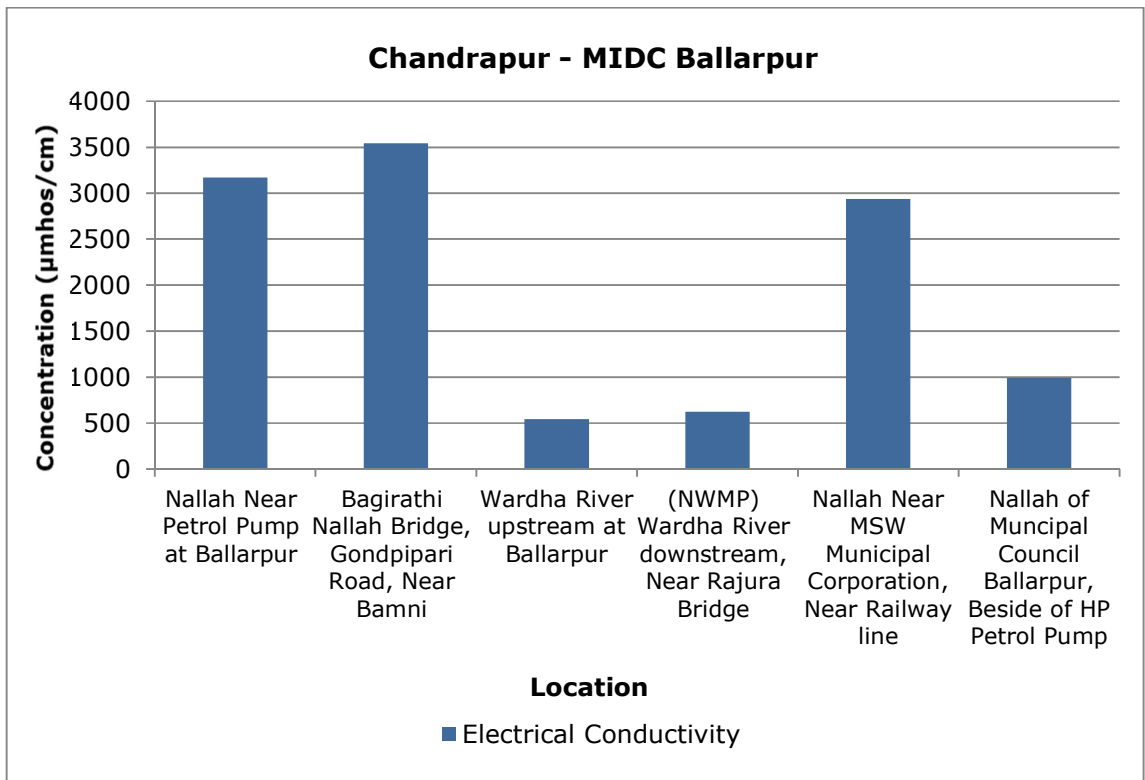
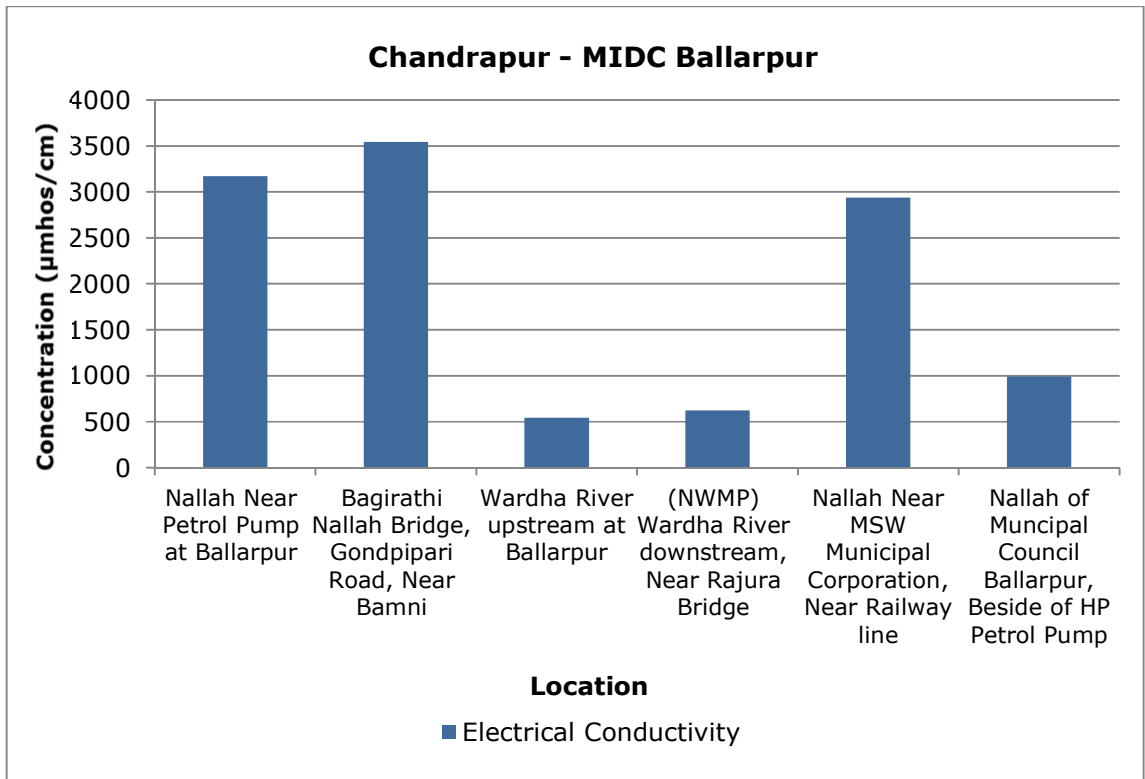
Parameters	Unit	Results		
		Nallah Near Petrol Pump at Ballarpur Bamni Road	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	Wardha River upstream at Ballarpur
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.373	0.10	0.07
Iron (as Fe)	mg/L	0.361	0.68	0.386
Vanadium (as V)	mg/L	0.03	BLQ	0.032
Selenium (as Se)	mg/L	0.016	0.016	0.007
Boron (as B)	mg/L	BLQ	BLQ	BLQ
Total Nitrogen	mg/L	38.0	29.4	9.99
Bioassay Test on fish	% survival	93	100	87

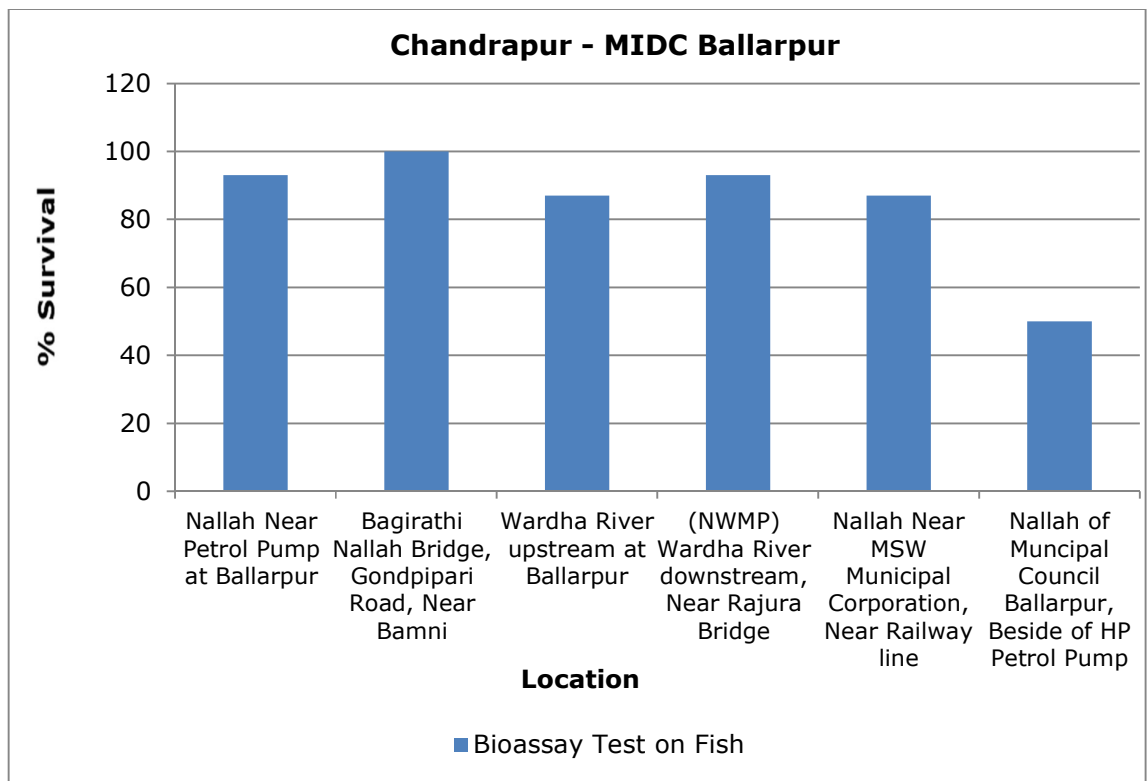
Parameters	Unit	Results		
		(NWMP) Wardha River downstream, Near Rajura Bridge	Nallah Near MSW Municipal Corporation, Near Railway line	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.9	0.3	0.3
Temperature	°C	22	28	22
Colour	Hazen	2	6	6
Odour	-	Agreeable	Not Agreeable	Not Agreeable
pH	-	8.66	7.95	8.20
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	30	41	44
Total Dissolved Solids	mg/L	351	1646	557
Dissolved Oxygen (% Saturation)	%	77	35	22
Chemical Oxygen Demand	mg/L	13	107	297
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	4	37	96
Electrical Conductivity (at 25°C)	µmhos/cm	626	2937	993
Nitrite Nitrogen	mg/L	0.03	0.02	0.02
Nitrate Nitrogen	mg/L	1.85	7.5	3.85
(NO ₂ + NO ₃)-Nitrogen	mg/L	1.88	7.5	3.9
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ

Parameters	Unit	Results		
		(NWMP) Wardha River downstream, Near Rajura Bridge	Nallah Near MSW Municipal Corporation, Near Railway line	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump
Total Residual Chlorine	mg/L	0.065	0.06	0.06
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.7	1.8	1.2
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.14	0.52	0.17
Sodium Adsorption Ratio	-	1.55	5.19	1.8
Total Coliforms	MPN Index/ 100 ml	643	1110	723
Faecal Coliforms	MPN Index/ 100 ml	611	152	66
Total Phosphate (as P)	mg/L	0.23	1.20	0.50
Total Kjeldahl Nitrogen (as N)	mg/L	9.66	29.3	13.1
Total Ammonia (NH ₄ +NH ₃)- Nitrogen	mg/L	0.68	2.35	2.1
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.111	0.070	0.136
Nickel (as Ni)	mg/L	0.035	0.012	0.025
Copper (as Cu)	mg/L	0.023	BLQ	0.034
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	0.017
Cadmium (as Cd)	mg/L	BLQ	BLQ	0.002
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.202	0.341	0.177
Iron (as Fe)	mg/L	4.20	0.495	2.42
Vanadium (as V)	mg/L	0.050	0.030	0.023
Selenium (as Se)	mg/L	BLQ	0.013	0.018
Boron (as B)	mg/L	0.279	0.111	0.105
Total Nitrogen	mg/L	11.6	36.8	17
Bioassay Test on fish	% survival	93	87	50

Graphs - Surface water Quality of MIDC Ballarpur







LAND ENVIRONMENT

7. Land Environment

For studying the land Environment of Chandrapur area, ground water was collected from Bore well, Dug well, and Hand Pump. A total of 12 samples were collected from MIDC Chandrapur, MIDC Tadali, MIDC Ballarpur and MIDC Ghugus.

1. MIDC Tadali: From MIDC Tadali also three ground water samples are collected.

- All three water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids and COD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay at Yerur Village.
- Metals like Zinc, Arsenic, Nickel, Copper, Iron, Hexavalent Chromium (Cr⁶⁺) etc. are observed either below the limit of quantification or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Kjeldahl Nitrogen and Total Phosphate exceeded at all three samples collected.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all three samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all three samples collected.

Table 7.1 MIDC Tadali – Details of Sampling Location of Ground Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Yerur village (Bore well water)	19°59'46.1"N	79°11'28.7"E	11.01.2023	13.01.2023	15.01.2023
2.	Near Tadali Lake Janata School (Dug well water)	20°01'48.4"N	79°11'22.1"E	11.01.2023	13.01.2023	15.01.2023
3.	Yerur Village (Dug well Water)	19°59'46.9"N	79°11'28.0"E	11.01.2023	13.01.2023	15.01.2023



Fig. Geographical Locations of Ground Water Sampling MIDC Tadali

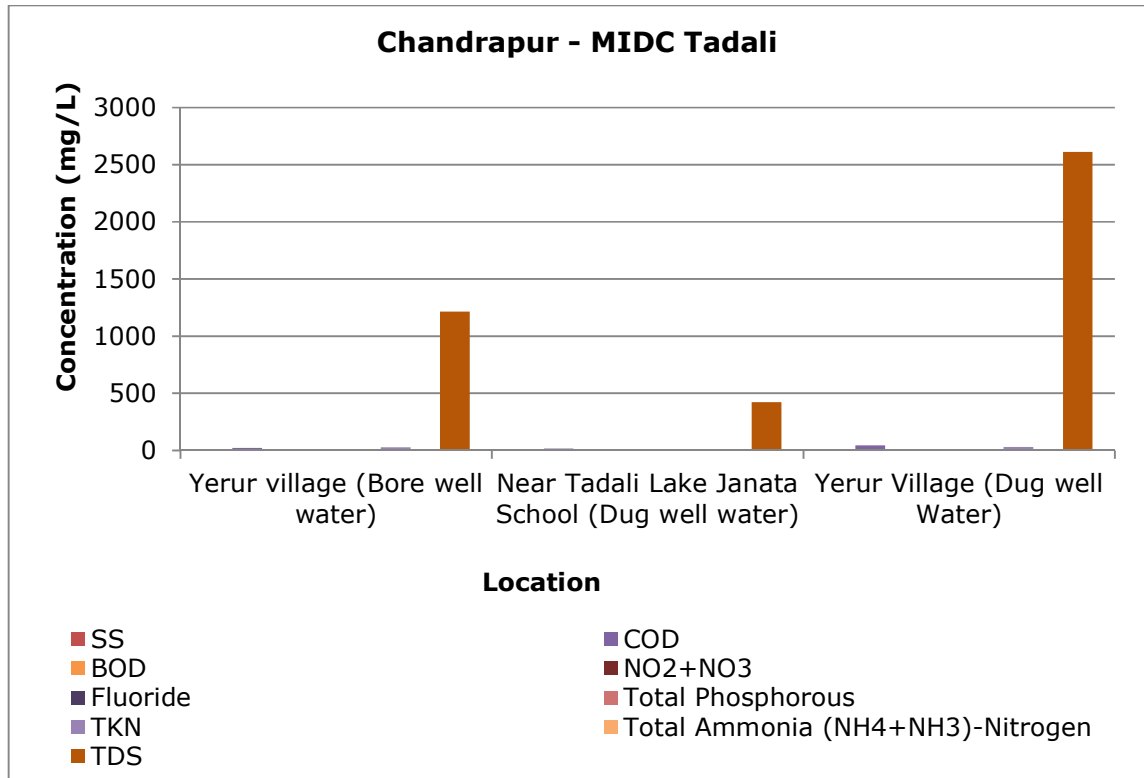
Table 7.2 MIDC Tadali – Details of Sampling Location of Ground Water

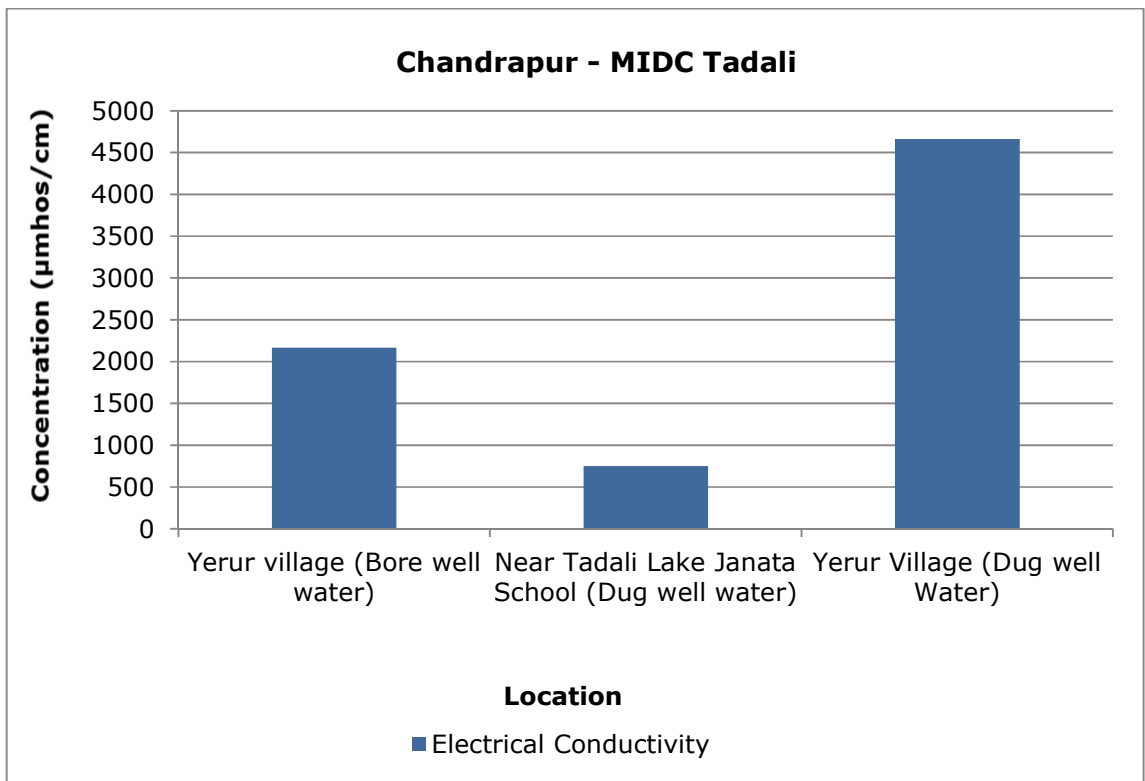
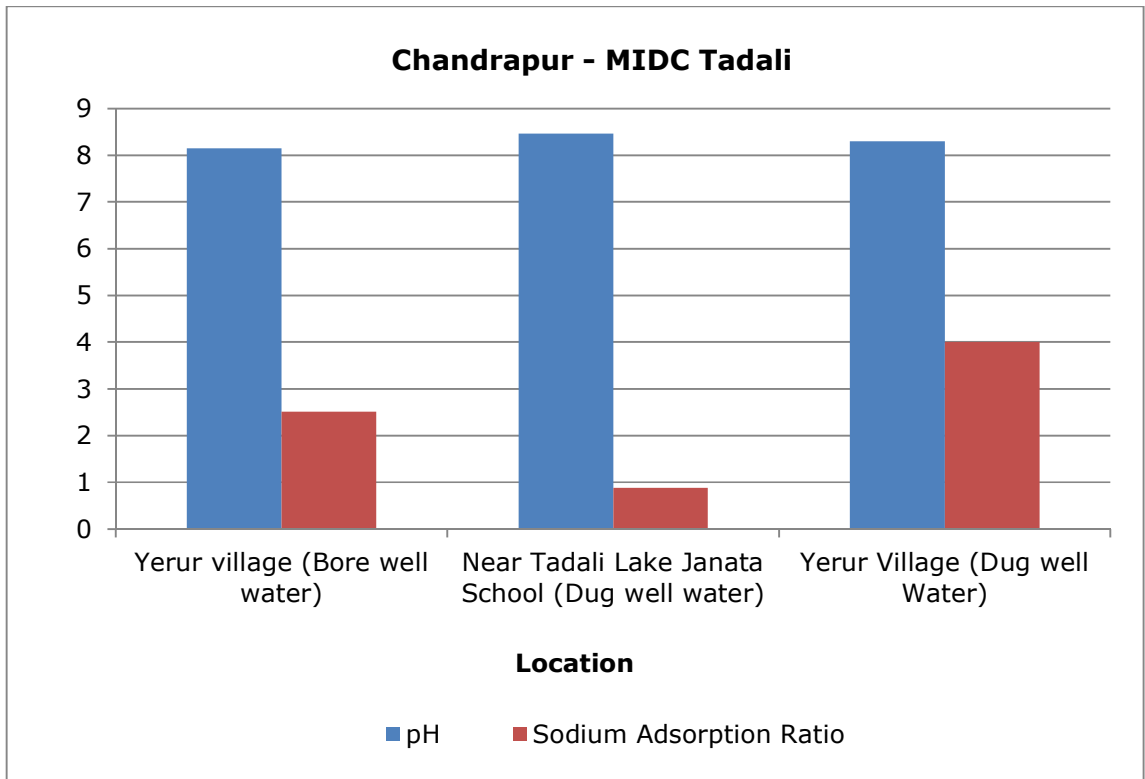
Parameters	Unit	Results		
		Yerur village (Bore well water)	Near Tadali Lake Janata School (Dug well water)	Yerur Village (Dug well Water)
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean neighbourhood	Generally Clean neighbourhood
General Appearance	-	No Floating Matter Evident	No floating matter	No floating matter
Transparency	m	Not Applicable	1	0.5
Temperature	°C	27	24	25
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.15	8.46	8.30
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	8	8	9
Total Dissolved Solids	mg/L	1217	423	2613
Chemical Oxygen Demand	mg/L	22	17	46
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	7	5	11
Electrical Conductivity (at 25°C)	µmhos/cm	2167	753	4663
Nitrite Nitrogen	mg/L	0.11	BLQ	0.02
Nitrate Nitrogen	mg/L	8.58	1.11	9

Parameters	Unit	Results		
		Yerur village (Bore well water)	Near Tadali Lake Janata School (Dug well water)	Yerur Village (Dug well Water)
(NO ₂ + NO ₃)-Nitrogen	mg/L	8.69	1.105	9
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.1	0.7	1.5
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.2	0.21	0.91
Sodium Adsorption Ratio	-	2.51	0.88	4.0
Total Coliforms	MPN Index/ 100 ml	160	1071	450
Faecal Coliforms	MPN Index/ 100 ml	126	164	230
Total Phosphate (as P)	mg/L	0.44	0.51	1.55
Total Kjeldahl Nitrogen (as N)	mg/L	26.2	6.7	32.5
Total Ammonia (NH ₄ +NH ₃)- Nitrogen	mg/L	0.56	0.29	0.89
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.222	BLQ	BLQ
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	0.003	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.024	BLQ	BLQ
Iron (as Fe)	mg/L	0.164	0.11	0.085
Vanadium (as V)	mg/L	0.01	0.013	0.014
Selenium (as Se)	mg/L	0.020	0.009	0.034
Boron (as B)	mg/L	0.567	BLQ	0.935
Total Nitrogen	mg/L	34.9	7.78	41

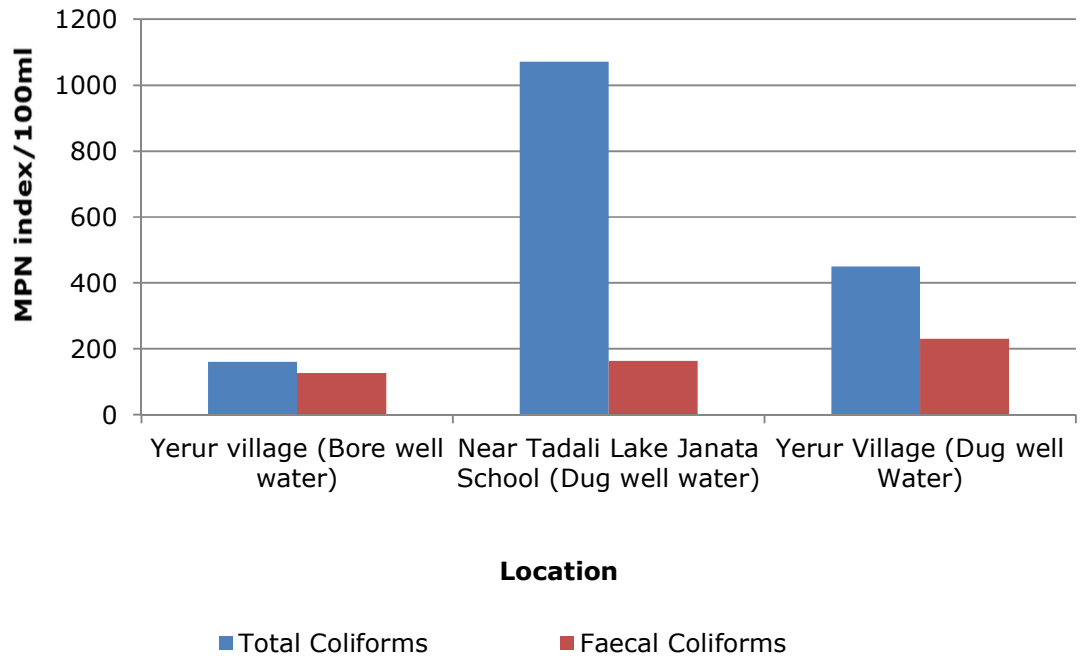
Parameters	Unit	Results		
		Yerur village (Bore well water)	Near Tadali Lake Janata School (Dug well water)	Yerur Village (Dug well Water)
Bioassay Test on fish	% survival	100	93	93

Graphs - Ground Water Quality of MIDC Tadali

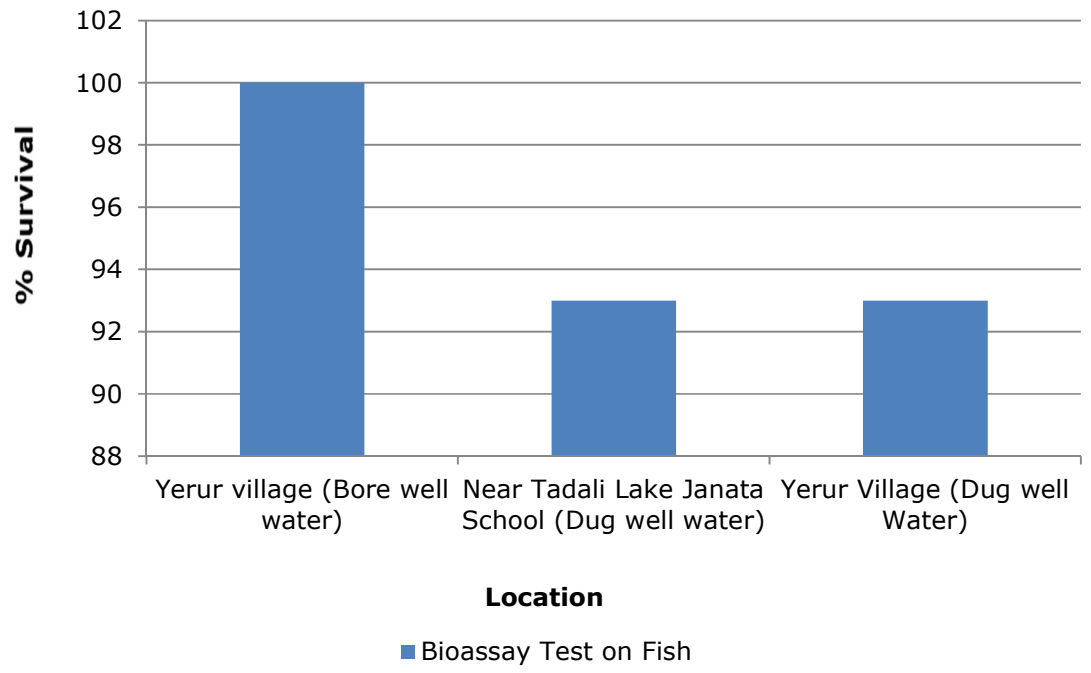




Chandrapur - MIDC Tadali



Chandrapur - MIDC Tadali



2. MIDC Chandrapur: Three ground water samples are collected from MIDC Chandrapur region.

- All three water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids, Electrical conductivity, BOD, and COD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay in all three locations.
- Metals like Arsenic, Nickel, Copper, Iron, Hexavalent Chromium (Cr⁶⁺) etc. are observed either below detection limit or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds also meet the criteria as prescribed by CPCB.
- Total Phosphate concentration found above the in all three locations.
- Total Kjeldahl Nitrogen and Fluoride exceeds in two locations out of three location.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all three samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all three samples collected.

Table 7.3 MIDC Chandrapur – Details of Sampling Location of Ground Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Gangiri Village (Dug well Water)	19° 58' 07.8"N	79°14' 53.8"E	23.06.2021	25.06.2021	27.06.2021
2.	Mahada Colony (Hand Pump water)	19° 58' 13.4"N	79°15'02.7"E	23.06.2021	25.06.2021	27.06.2021
3.	Near Datala Grampanchayat (Hand Pump water)	19° 58' 8.8"N	79° 15'40.6"E	23.06.2021	25.06.2021	27.06.2021



Fig. Geographical Locations of Ground Water Sampling MIDC Chandrapur

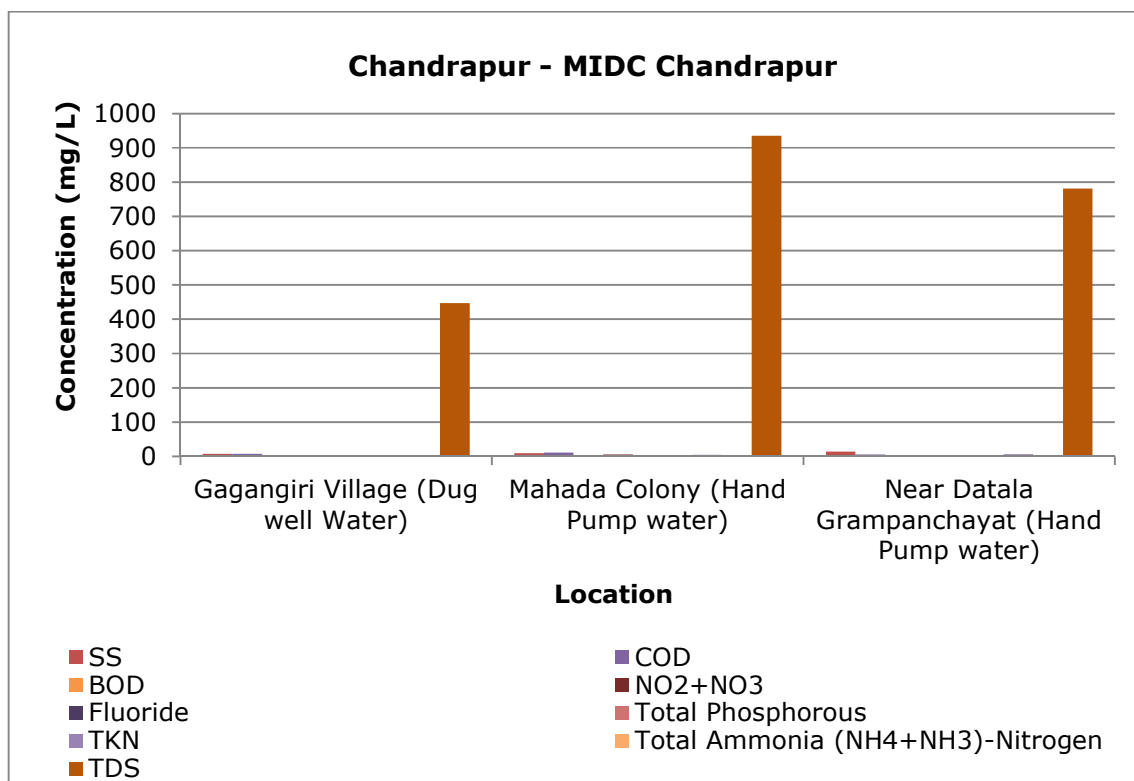
Table 7.4 MIDC Chandrapur – Details of Sampling Location of Ground Water

Parameters	Unit	Results		
		Gagangiri Village (Dug well Water)	Mahada Colony (Hand Pump water)	Near Datara Grampanchayat (Hand Pump water)
Sanitary Survey	-	Very Clean Neighbourhood and catchment	Generally Clean neighbourhood	Generally Clean neighbourhood
General Appearance	-	No floating matter	No floating matter	No floating matter
Transparency	m	0.7	Not Applicable	Not Applicable
Temperature	°C	26	25	27
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.29	8.81	8.3
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	7	10	14
Total Dissolved Solids	mg/L	447	935	781
Chemical Oxygen Demand	mg/L	7	12	6
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	4	2
Electrical Conductivity (at 25°C)	µmhos/cm	796	1667	1393
Nitrite Nitrogen	mg/L	BLQ	0.03	0.02

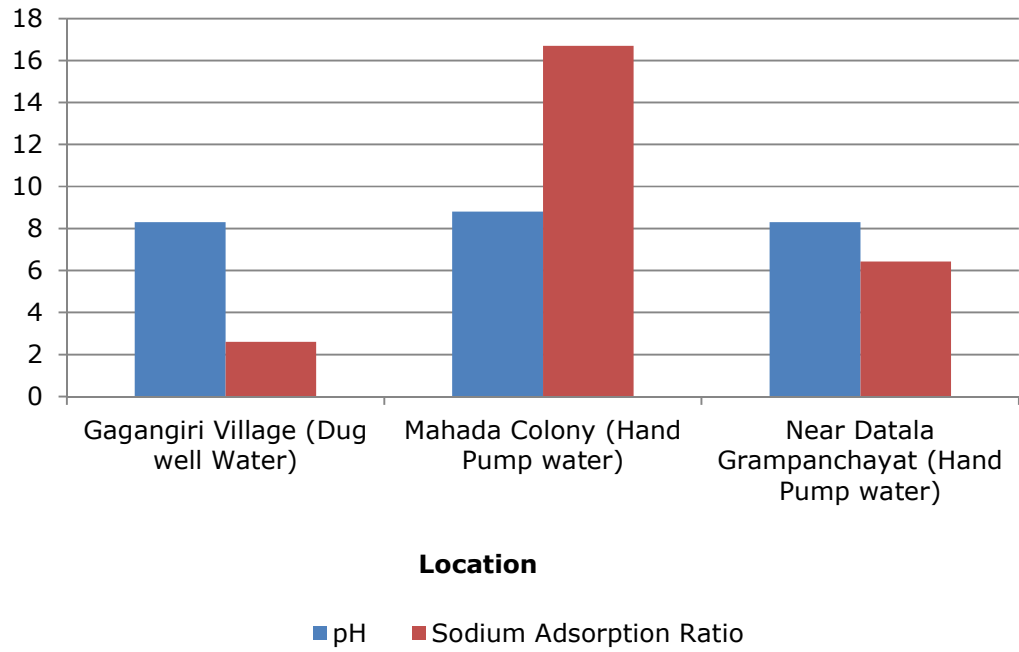
Parameters	Unit	Results		
		Gangangiri Village (Dug well Water)	Mahada Colony (Hand Pump water)	Near Datala Grampanchayat (Hand Pump water)
Nitrate Nitrogen	mg/L	1.94	5.5	3.9
(NO ₂ + NO ₃)-Nitrogen	mg/L	1.94	5.53	3.9
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	0.15
Total Residual Chlorine	mg/L	BLQ	0.06	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.7	1.2	1.1
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	0.16	0.74
Sodium Adsorption Ratio	-	2.59	16.7	6.44
Total Coliforms	MPN Index/ 100 ml	236	13	80
Faecal Coliforms	MPN Index/ 100 ml	60	6	114
Total Phosphate (as P)	mg/L	0.47	0.305	1
Total Kjeldahl Nitrogen (as N)	mg/L	2.25	4.67	6.18
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.36	0.51	0.37
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.267	0.301
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	BLQ	0.024	BLQ
Iron (as Fe)	mg/L			
Vanadium (as V)	mg/L	BLQ	0.019	BLQ
Selenium (as Se)	mg/L	BLQ	BLQ	BLQ
Boron (as B)	mg/L	0.114	0.395	0.375

Parameters	Unit	Results		
		Gagangiri Village (Dug well Water)	Mahada Colony (Hand Pump water)	Near Datala Grampanchayat (Hand Pump water)
Total Nitrogen	mg/L	4.19	10.2	10.1
Bioassay Test on fish	% survival	100	100	100

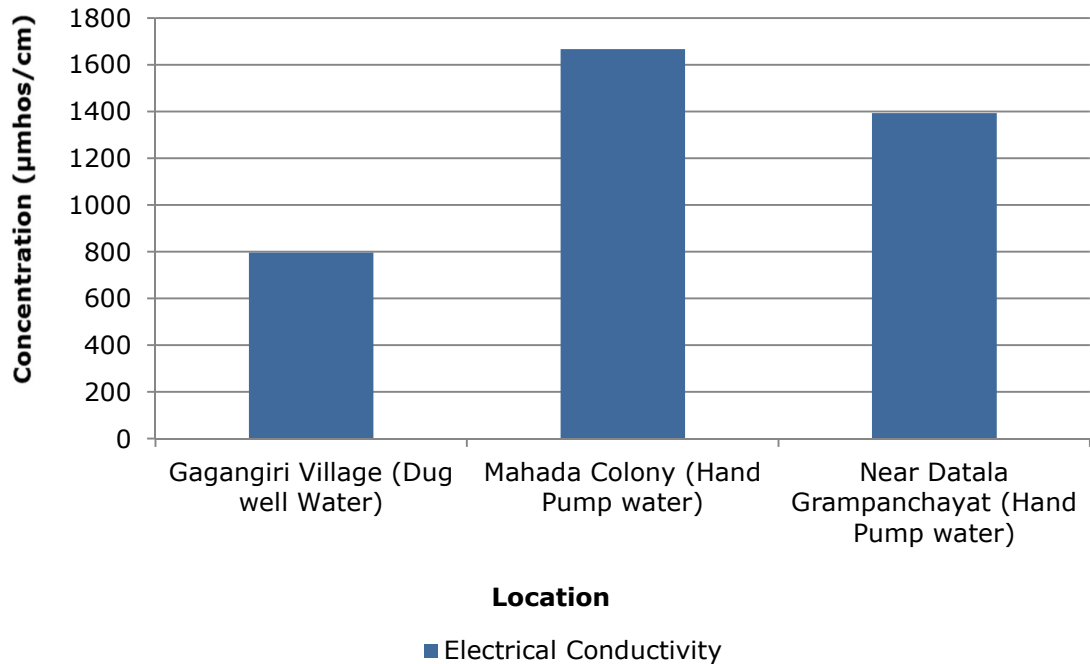
Graphs - Ground water Quality of MIDC Chandrapur

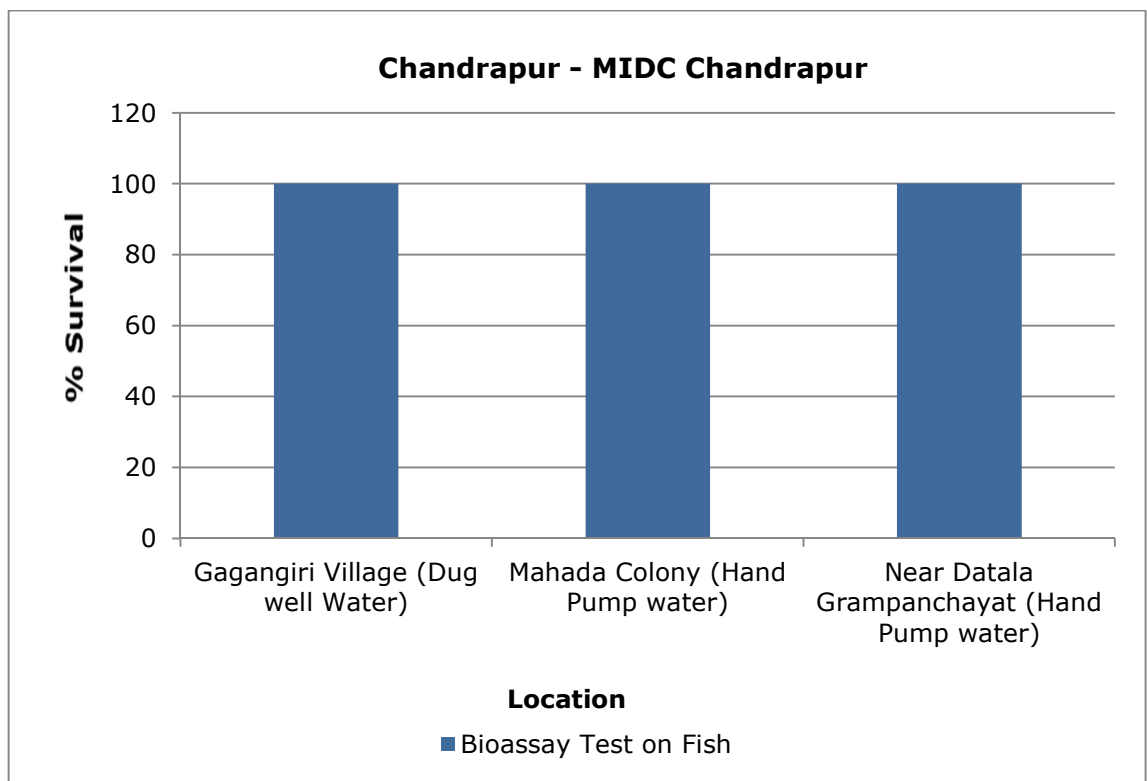
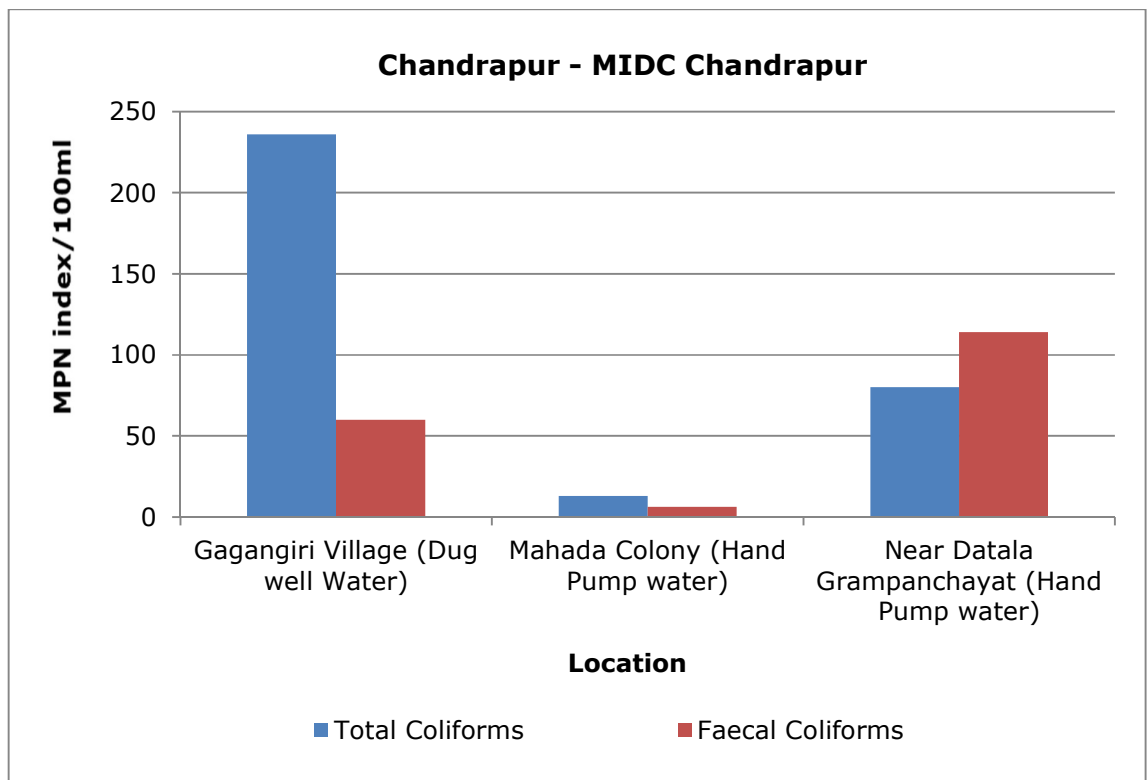


Chandrapur - MIDC Chandrapur



Chandrapur - MIDC Chandrapur





3. MIDC Ghugus: Three ground water samples are collected from MIDC Ghugus.

- All three water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids, Electrical conductivity and COD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay observed at all three samples collected.
- Metals like Zinc, Nickel, Copper, Hexavalent Chromium, Total Chromium etc. are observed either below the limit quantification or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Phosphate exceeded standard limit at all three samples collected.
- Total Kjeldahl Nitrogen exceeded standard limit at two locations out of three locations.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all three samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all three samples collected.

Table 7.5 MIDC Ghugus – Details of Sampling Location of Ground Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Tukdoji Nagar Ghugus Village (Hand Pump Water)	19°56' 20.6"N	79°07'11.3"E	17.01.2023	19.01.2023	21.01.2023
2.	Nakoda Village (Bore Well Water)	19° 54' 57.9"N	79°06'42.1"E	17.01.2023	19.01.2023	21.01.2023
3.	Usgaon Village (Dug Well Water)	19° 54' 45.3"N	79°07'36.4"E	17.01.2023	19.01.2023	21.01.2023



Fig. Geographical Locations of Ground Water Sampling MIDC Ghugus

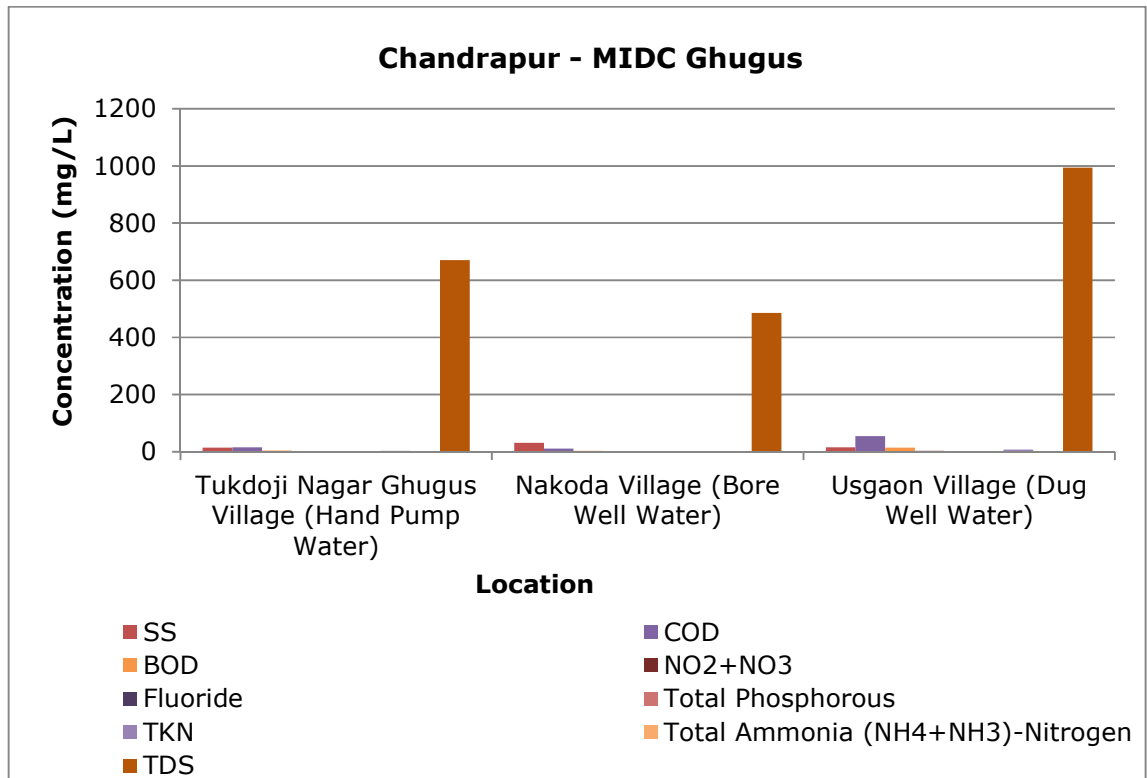
Table 7.6 MIDC Ghugus – Details of Sampling Location of Ground Water

Parameters	Unit	Results		
		Tukdoji Nagar Ghugus Village (Hand Pump Water)	Nakoda Village (Bore Well Water)	Usgaon Village (Dug Well Water)
Sanitary Survey	-	Generally Clean neighbourhood	Generally Clean neighbourhood	Generally Clean neighbourhood
General Appearance	-	No floating matter	No floating matter	No floating matter
Transparency	m	Not Applicable	Not Applicable	0.2
Temperature	°C	27	26	25
Colour	Hazen	1	2	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.85	8.04	7.82
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	14	31	15
Total Dissolved Solids	mg/L	671	486	994
Chemical Oxygen Demand	mg/L	16	11	55
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	5	3.5	14.5
Electrical Conductivity (at 25°C)	µmhos/cm	1200	866	1775
Nitrite Nitrogen	mg/L	0.16	BLQ	0.02
Nitrate Nitrogen	mg/L	2.11	2.49	3

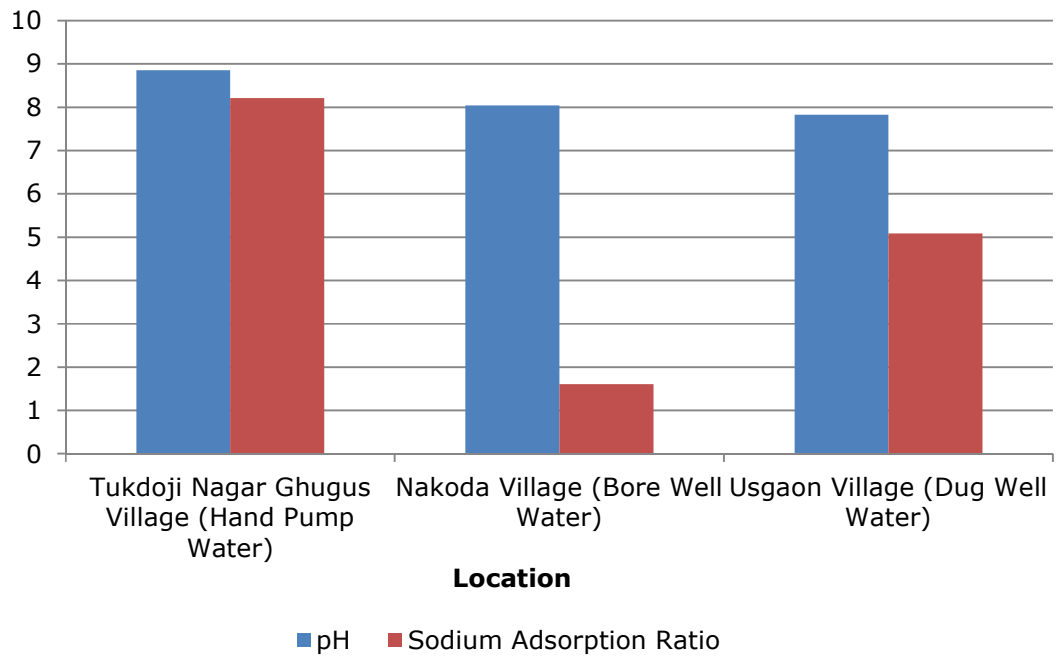
Parameters	Unit	Results		
		Tukdoji Nagar Ghugus Village (Hand Pump Water)	Nakoda Village (Bore Well Water)	Usgaon Village (Dug Well Water)
(NO ₂ + NO ₃)-Nitrogen	mg/L	2.21	2.49	3.3
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.0	0.8	1.3
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.26	0.2	0.6
Sodium Adsorption Ratio	-	8.21	1.60	5.09
Total Coliforms	MPN Index/ 100 ml	127	52	124
Faecal Coliforms	MPN Index/ 100 ml	20	15	26
Total Phosphate (as P)	mg/L	0.7	0.5	1.15
Total Kjeldahl Nitrogen (as N)	mg/L	3.55	1.49	8.21
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.44	0.40	0.45
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.6	1.21	0.066
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.032	0.191	BLQ
Iron (as Fe)	mg/L	0.896	7.42	0.2245
Vanadium (as V)	mg/L	BLQ	BLQ	0.018
Selenium (as Se)	mg/L	0.008	BLQ	0.008
Boron (as B)	mg/L	0.32	0.105	0.41
Total Nitrogen	mg/L	5.76	3.45	11.5

Parameters	Unit	Results		
		Tukdoji Nagar Ghugus Village (Hand Pump Water)	Nakoda Village (Bore Well Water)	Usgaon Village (Dug Well Water)
Bioassay Test on fish	% survival	100	100	100

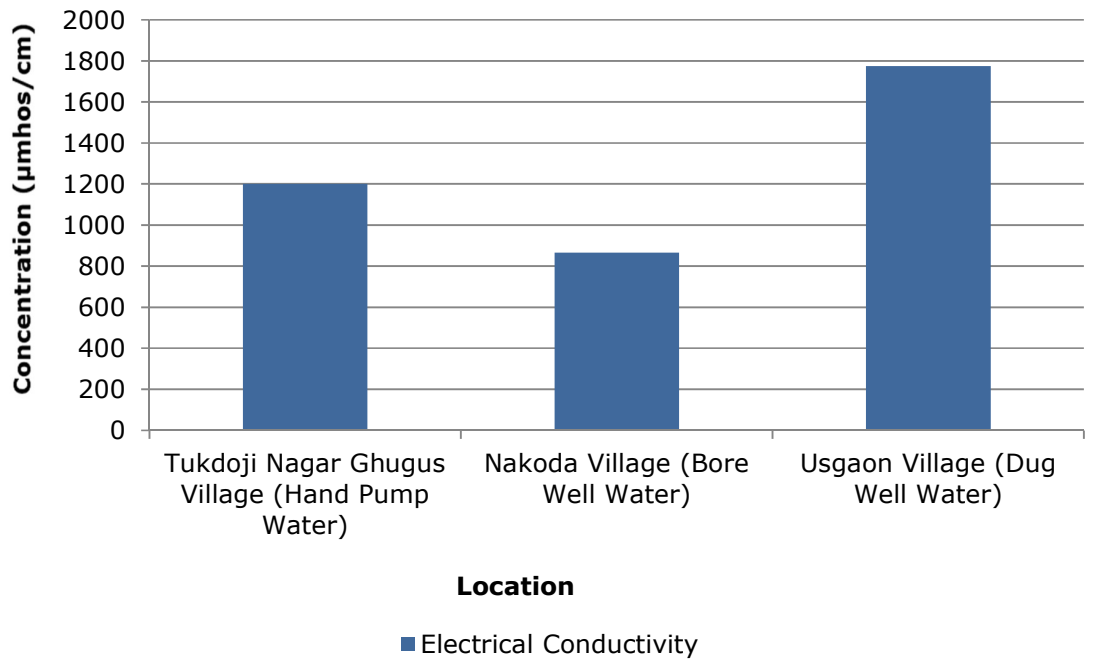
Graphs - Ground water Quality of MIDC Ghugus



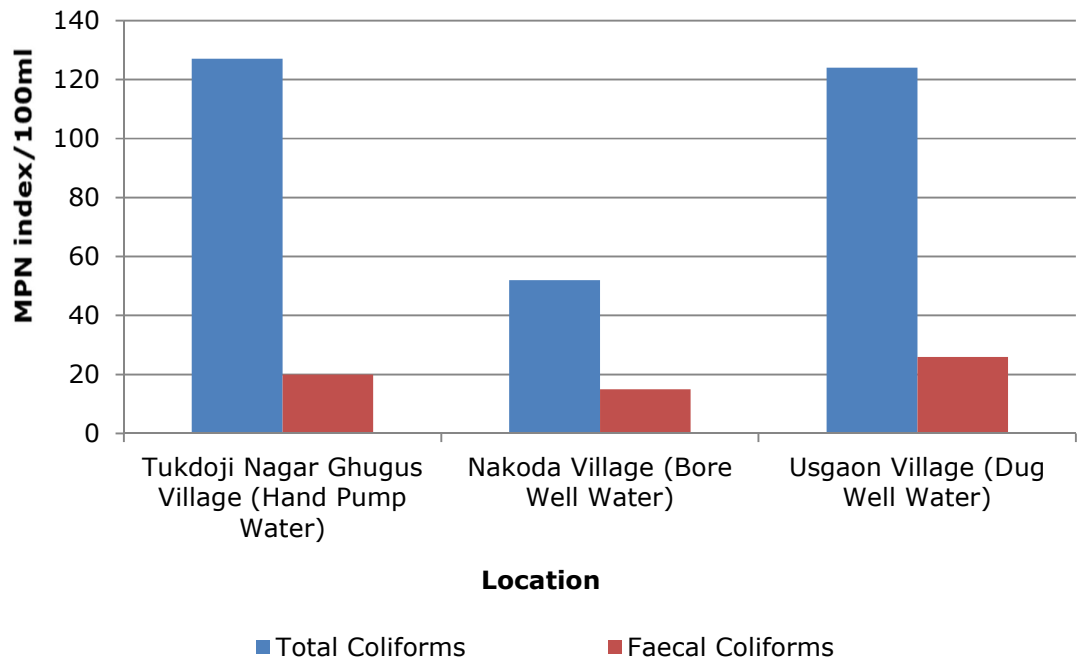
Chandrapur - MIDC Ghugus



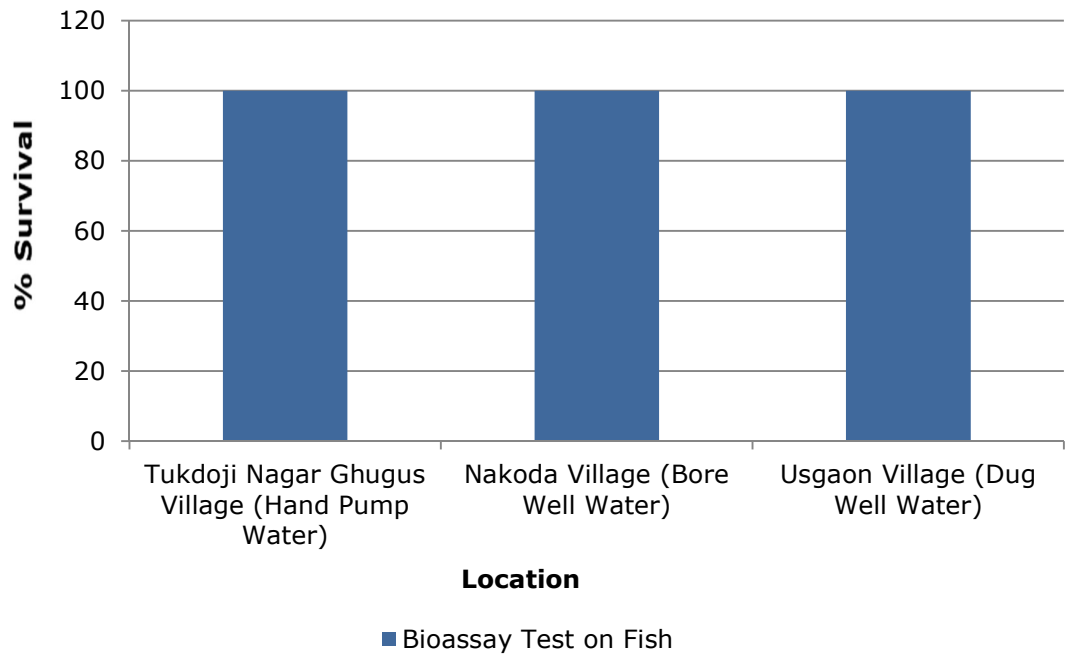
Chandrapur - MIDC Ghugus



Chandrapur - MIDC Ghugus



Chandrapur - MIDC Ghugus



4. MIDC Ballarpur: Three ground water samples are collected from MIDC Ballarpur.

- All three water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids, Electrical conductivity, BOD, and COD are also well within the limits at all three samples collected.
- 100% survival of Fish Bioassay was achieved in all three samples collected.
- Metals like Arsenic, Nickel, Copper, Iron, Hexavalent Chromium etc. are observed either below detection limit or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Fluoride, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Kjeldahl Nitrogen of all 3 samples has exceeded the limit.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all three samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all three samples collected.

Table 7.7 MIDC Ballarpur – Details of Sampling Location of Ground Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Gramin Rugnalaya (Bore Well Water)	19°51'11.6"N	79°20'58.0"E	11.01.2023	13.01.2023	15.01.2023
2.	Near Fire Station (Bore Well Water)	19°51'11.8"N	79°20'45.8"E	11.01.2023	13.01.2023	15.01.2023
3.	Visapur Village (Bore well Water)	19°53'13.7"N	79°19'49.7"E	11.01.2023	13.01.2023	15.01.2023



Fig. Geographical Locations of Ground Water Sampling MIDC Ballarpur

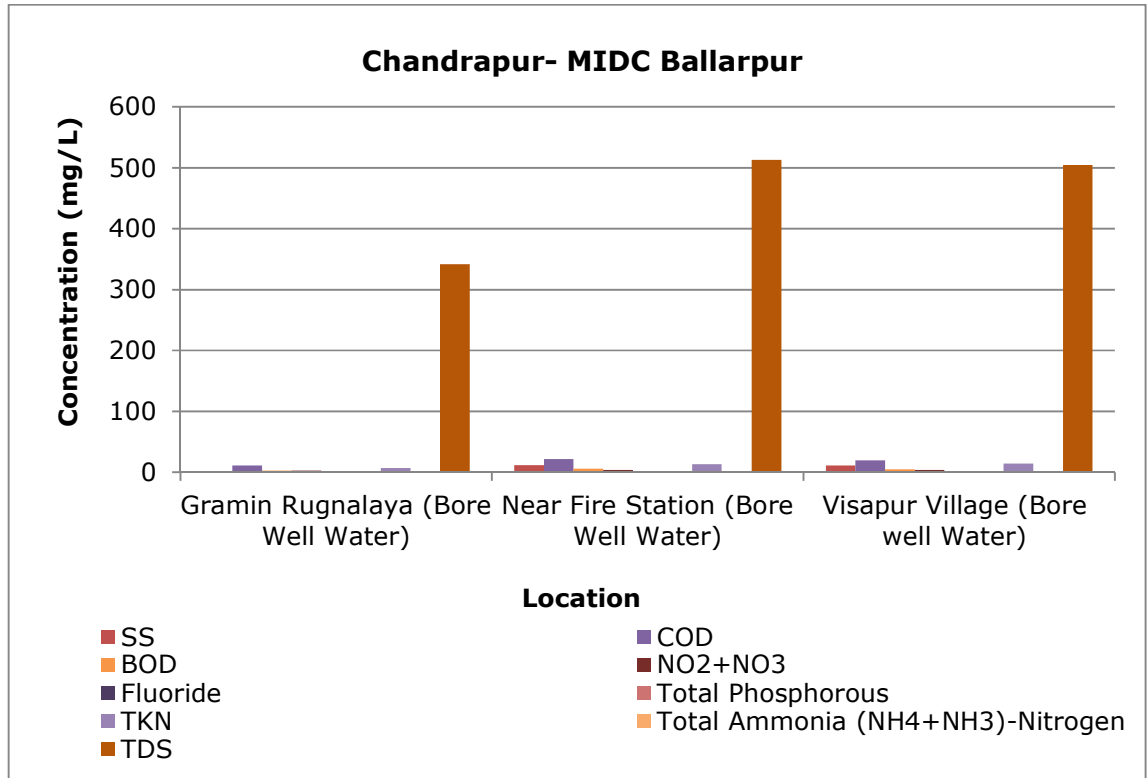
Table 7.8 MIDC Ballarpur – Details of Sampling Location of Ground Water

Parameters	Unit	Results		
		Gramin Rughnalaya (Bore Well Water)	Near Fire Station (Bore Well Water)	Visapur Village (Bore well Water)
Sanitary Survey	-	Generally Clean neighbourhood	Generally Clean neighbourhood	Generally Clean neighbourhood
General Appearance	-	No floating matter	No floating matter	No floating matter
Transparency	m	Not Applicable	Not Applicable	Not Applicable
Temperature	°C	24	28	27
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.96	7.95	8.08
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	BLQ	12	11
Total Dissolved Solids	mg/L	342	513	505
Chemical Oxygen Demand	mg/L	11	22	19.5
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	3	5.5	5
Electrical Conductivity (at 25°C)	µmhos/cm	610	913	899
Nitrite Nitrogen	mg/L	0.02	BLQ	BLQ
Nitrate Nitrogen	mg/L	3.1	4.0	4.3

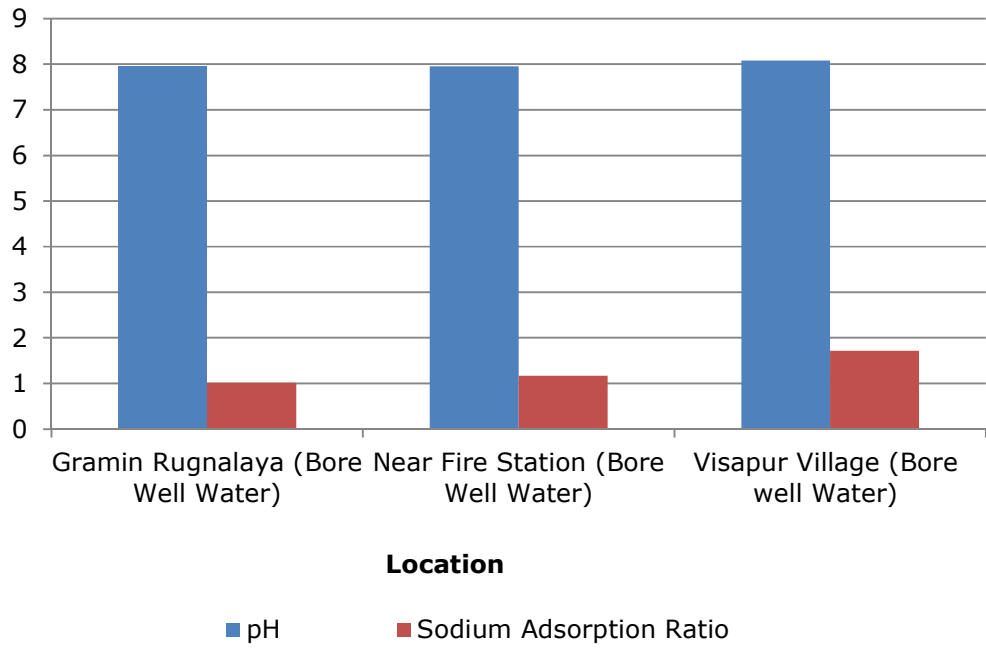
Parameters	Unit	Results		
		Gramin Rughalaya (Bore Well Water)	Near Fire Station (Bore Well Water)	Visapur Village (Bore well Water)
(NO ₂ + NO ₃)-Nitrogen	mg/L	3.10	4.0	4.3
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.6	0.8	0.8
Sulphide (as H ₂ S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	0.26	0.21
Sodium Adsorption Ratio	-	1.01	1.17	1.72
Total Coliforms	MPN Index/ 100 ml	723	913	865
Faecal Coliforms	MPN Index/ 100 ml	151	98	472
Total Phosphate (as P)	mg/L	BLQ	0.68	0.68
Total Kjeldahl Nitrogen (as N)	mg/L	7.11	13.7	14.6
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.29	0.3	0.37
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	BLQ	BLQ	0.012
Copper (as Cu)	mg/L	0.037	0.04	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	BLQ	BLQ	BLQ
Iron (as Fe)	mg/L	0.166	0.135	0.092
Vanadium (as V)	mg/L	BLQ	BLQ	BLQ
Selenium (as Se)	mg/L	0.018	0.022	0.011
Boron (as B)	mg/L	BLQ	0.102	0.108
Total Nitrogen	mg/L	10	18	18.9

Parameters	Unit	Results		
		Gramin Rugnalaya (Bore Well Water)	Near Fire Station (Bore Well Water)	Visapur Village (Bore well Water)
Bioassay Test on fish	% survival	100	100	100

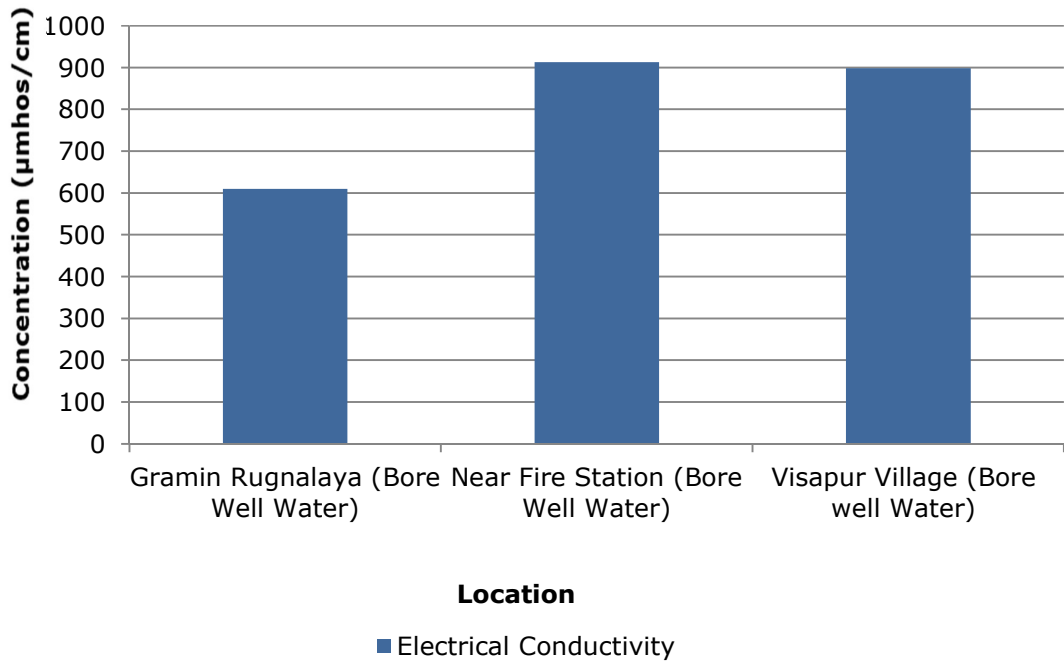
Graphs - Ground water Quality of MIDC Ballarpur

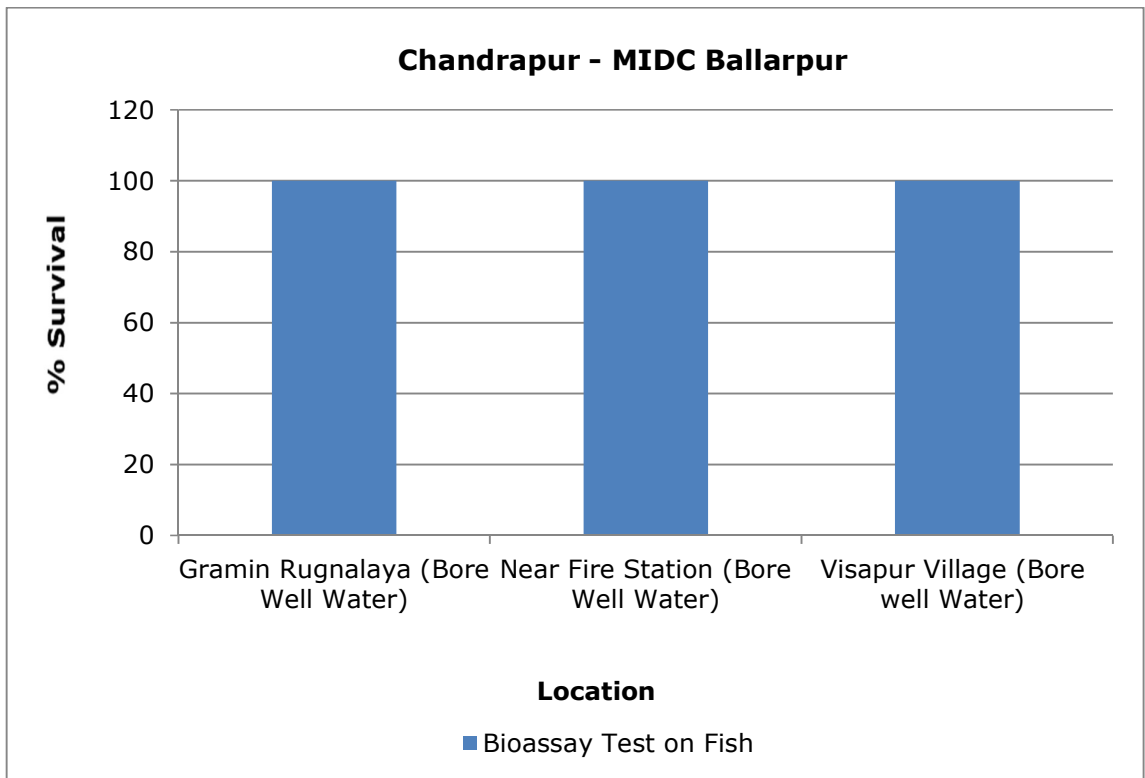
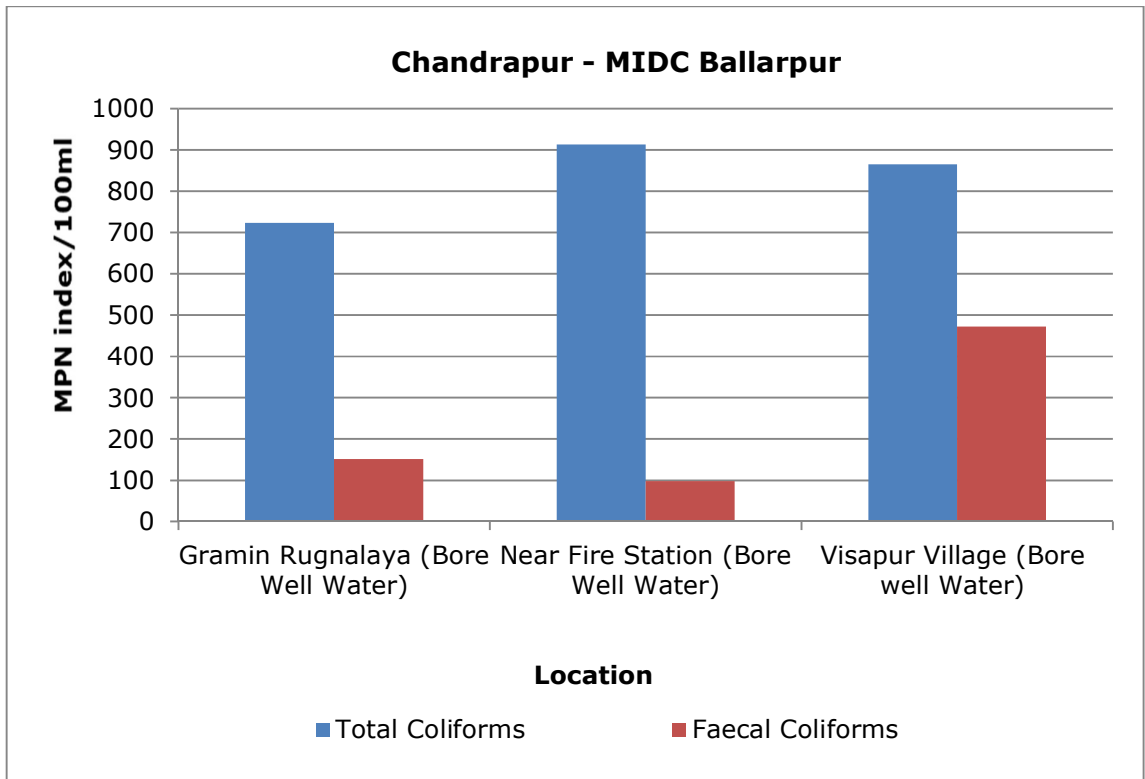


Chandrapur- MIDC Ballarpur



Chandrapur- MIDC Ballarpur





8. Health Related Data

C: Receptor

Component C (Impact on Human Health)	
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.

Annexure – I Health Related Data enclosed.

9. 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. The CEPI score have been calculated based on CPCB Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016. The scoring system involves an algorithm that considers the basic selection criteria. It is proposed to develop the 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.

Table 8.1 CEPI score of the Post monsoon season (2022-23)

	A1	A2	A	B	C	D	CEPI
Air Index	2.75	2.5	6.875	11.25	10	10	38.13
Water Index	2.5	2.5	6.25	33	10	10	59.25
Land Index	1.75	2.5	4.375	17.5	10	10	41.88
Aggregated CEPI							65.76

Water Index is highest with 59.25. The reason for increase in Water index is due to the exceedance of concentration of Biochemical Oxygen Demand (BOD) which has exceeded at eight samples out of 17 samples collected. The Land EPI is 41.88 and the concentration of and Air EPI is 38.13 and the concentration of Total Kjeldahl Nitrogen (TKN) and Total Phosphate is high.

Table 8.2 Comparison of CEPI Scores

	Air Index	Water Index	Land Index	CEPI
CEPI score March 2023	38.1	59.3	41.9	65.76
CEPI score June 2021	22	57.3	59	64.2
CEPI Score March 2021	54.3	43.5	42.3	62.7
CEPI score March 2020	65	22	21	66.6
CEPI score June 2019	37.07	51.1	54.4	54.56
CEPI score March 2019	44.5	48.9	47.1	57.28
CEPI score June 2018	41.32	40.58	44.36	51.88
CEPI score March 2018	46.8	49.2	56.9	61.69
CPCB CEPI score March 2018	75	23.75	23.75	76.41

The result shows that CEPI score of the present report is 65.76. The present study is the compilation of post monsoon season, which also affects the score value. This time CEPI is observed lower than the CPCB CEPI score March 2018 which was 76.41.

CEPI score calculation:

Chandrapur

Ambient Air Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
PM10	B	2	Moderate	
PM2.5	B	0.5		
SO ₂	A	0.25		
		2.75	2.5	6.875

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)		
PM ₁₀	83.38	100	0.83	4	16	0.21	M	11.25	
PM _{2.5}	21.69	60	0.36	0	16	0.00	L	0	
SO ₂	30.25	80	0.38	0	16	0.00	L	0	
B score = (B1+B2+B3)								B	11.25

C	10	>10 %
D	10	A-A-IA

Air CEPI Score	(A+B+C+D)	38.13
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Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
BOD	B	2	Moderate	
TSS	A	0.25		
TA(NH ₄ +NH ₃) N	A	0.25		
		2.5	2.5	6.25

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)		
BOD	33.55	8	4.19	8	17	1.97	C	30	
TSS	24.71	100	0.25	0	17	0.00	L	0	
TA(NH ₄ +NH ₃) N	0.75	1.5	0.50	2	17	0.06	M	3	
B score = (B1+B2+B3)								B	33

C	10	>10%
D	10	A-IA-A

Water CEPI Score	(A+B+C+D)	59.25
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Ground Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
F	A	1	Moderate	
BOD	B	0.5		
TSS	A	0.25		
		1.75	2.5	4.375

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)		
F	0.97	1	0.97	5	12	0.40	M	14.25	
BOD	5.63	8	0.70	2	12	0.12	M	3.25	
TSS	11.58	100	0.12	0	12	0.00	L	0	
B score = (B1+B2+B3)								B	17.5

C	10	>10%
D	10	A-IA-A

Land CEPI Score	(A+B+C+D)	41.88
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Water CEPI Score (im) 59.25
Land CEPI Score (i2) 41.88
Air CEPI Score (i3) 38.13

Aggregated CEPI Score = im + {(100-im)*i2/100}*i3/100}
 where, im = maximum sub index; and i2 and i3 are sub indices for other media

CEPI Score = 65.76

10. Conclusion

Ambient Air Quality

- The AAQ stations were identified in the CEPI impact area to cover both upwind and cross wind directions and AAQ survey was conducted.
- All 12 parameters are well within the limits as per NAAQS except the parameters PM₁₀ and Carbon Monoxide (8 h)
- In the CEPI score calculated for Air Environment by CPCB in March 2018 also PM₁₀, PM_{2.5} and Benzene have exceeded which may also be due to the vehicular emissions.

Surface Water Quality

- Higher concentration of Total Kjeldahl Nitrogen and Total phosphates was observed in the surface water samples collected which may be due to domestic wastewater, sewerage, other localized activities.
- All the industries in Chandrapur region are either reusing the treated trade effluent as sewage in their process or gardening or are disposed into Sea.

Ground Water Quality

- Ground water samples were collected from different Dug well, well and Bore well in the region.
- Higher concentration of TKN and Total phosphates was observed in the ground water samples collected.
- Mainly through agricultural processes the ground water contamination is happening.
- In the CEPI score calculated for Land Environment by CPCB in March 2018 also there is no critical pollutant exceeding in any water sample collected.

CEPI Score

- The CEPI Score post monsoon season is 65.76.
- When CEPI Score of June 2021 and March 2023 is compared, a decrease in the Land Index and an increase in the Water Index & the Air index are found to get increased in March 2023.
- Collective efforts of MPCB, administration and environmental organizations have finally paid off and pollution levels in Chandrapur are on the decline.
- An effort taken to reduce the pollution level is represented in factor D in CEPI Calculation, which also affects the overall CEPI score.
- The present study is the compilation of post monsoon season, which results in dilution of environmental samples resulting in lower pollution load, hence also affects the total score.

11. Efforts taken by MPCB to Control and Reduce Environmental Pollution Index

- Drive against open burning of bio-mass, crop residue, garbage, leaves, etc. Awareness programme/campaign conducted regularly during World Environment Day.
- **Waste collection and segregation centres:**
 - ✓ **Domestic Solid Waste:** CCMC has provided waste collection and segregation facility at source for residential areas.
 - ✓ **Industrial Non-Hazardous Waste:** Recyclable waste is sent to authorized waste recycler and other waste collected by corporation.
 - ✓ **Hazardous waste:** Industrial hazardous waste is sent to common hazardous treatment and disposal facility by industries.
- **Installation of CEMS installed for Air and Water in Large and Medium scale RED category industries:** All large and medium scale 10 nos. of red category industries of CEPI Area have installed CEMS for air monitoring.
- Arrangement of scientific collection and treatment of sewage generated: CCMC has constructed sewer line of 141 km in Chandrapur city for collection of entire sewage generated in Chandrapur city. Remaining work of 36 km is under progress.
- Installation of CAAQMS station: CAAQMS is installed at 02 locations namely at Udyog Bhavan and at MIDC Chandrapur.
- Establishment of monitoring stations under National Water Quality Monitoring Programme (NWMP): There are 5 NWMP stations in critically polluted area of Chandrapur namely at Wardha River upstream of AAC Ghuggus, Wardha river downstream of ACC Ghuggus, Wardha river at Rajura bridge, upstream of Erai river and downstream of Erai river.
- Steps are taken for industrial area/other units to recycle 100% treated effluent to achieve zero liquid discharge (ZLD): M/s Multi Organics Pvt.Ltd. has provided ZLD system for recycling of entire treated effluent into the process.
- Steps taken to reduce dust emission: All the industries in Chandrapur CEPI area has installed adequate air pollution control systems for dust suppression inside the plant periphery. WCL mines have installed water sprinklers and mist type fogging systems for dust suppression in mine areas.
- Tree plantation in last one year (2021-2022): 20000 approximately.
- Other initiatives taken to control and reduce pollution in air, surface water and groundwater in last one year (2021-2022):
 - a) Regular cleaning of roads, traffic diversion and signals shall be installed by corporation.
 - b) Road sweeping machine provided.
 - c) Tree plantation drive in nearby MIDC areas.
 - d) Continuous Ambient Air Monitoring Mobile Van provided for monitoring of air quality in around Chandrapur industrial areas.
 - e) Cleaning and deepening of Ramala Lake & Erai River.
 - f) Installation of display boards at prominent locations for creating awareness regarding air pollution in the city.



Continuous Ambient Air Quality Monitoring Station

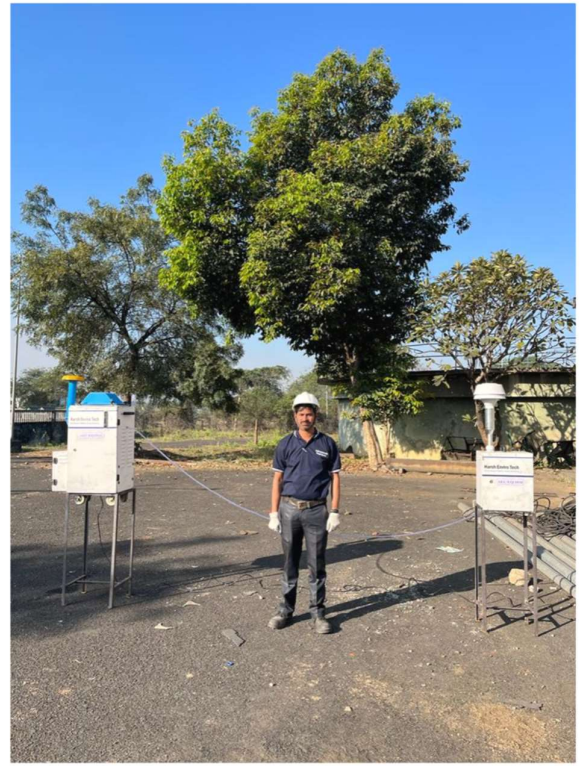


Ambient Air Quality Monitoring Van

12. Photographs



MIDC Tadali-Ambient Air Sampling at Near Chaman Metallic Boundary Wall



MIDC Tadali-Ambient Air Sampling at MIDC WTP Building



X6CM+VMF, Wandhari, Maharashtra 442406, India

Latitude	Longitude
19.9716947°	79.23424557°

Local 09:55:25 AM	Altitude 11.2 meters
GMT 04:25:25 AM	Monday, 16.01.2023



Urjanagar gate, X6JJ+MFM, Chandrapur, Maharashtra 442406, India

Latitude	Longitude
19.9811453°	79.23183466°

Local 09:37:11 AM	Altitude 11.21 meters
GMT 04:07:11 AM	Monday, 16.01.2023

MIDC Chandrapur - Ambient Air Sampling at Opposite Super Hygienic CBMW Site



X424+88H, WCL Colony, Ghugus, Maharashtra
442505, India

Latitude	Longitude
19.9505622°	79.10661282°
Local 09:12:12 AM	Altitude 11.27 meters
GMT 03:42:12 AM	Monday, 16.01.2023

Note : Captured by GPS Map Camera Lite

MIDC Chandrapur - Ambient Air Sampling at Multi Organics



Chandrapur Road, Chandrapur, Ghugus, 442505,
MH, India

Latitude	Longitude
19.9408° N	79.1202° E
Local 09:50:07	Altitude 204.7 meters
GMT 04:20:07	Monday, 01/16/2023

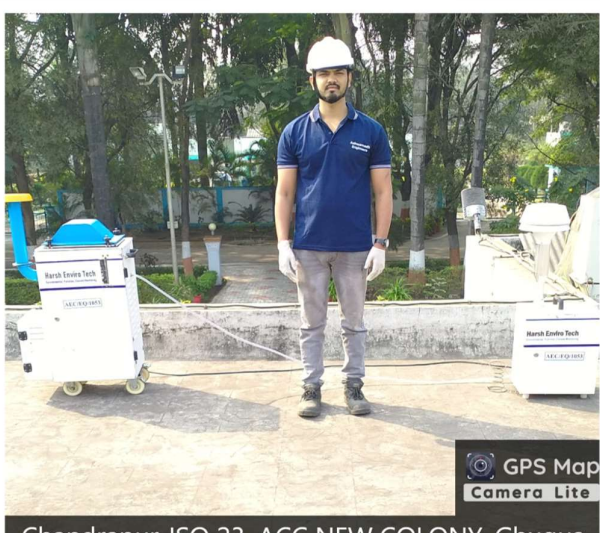
MIDC Ghugus - Ambient Air Sampling at Terrace of Transit Hostel Rajiv Colony WCL



W4Q7+RMR, Ghugus Basti, Ghugus, Maharashtra
442505, India

Latitude	Longitude
19.93974326°	79.1141747°
Local 10:18:26 AM	Altitude 11.25 meters
GMT 04:48:26 AM	Monday, 16.01.2023

MIDC Ghugus - Ambient Air Sampling at WTP Water Supply Tank



Chandrapur JSQ 23, ACC NEW COLONY, Ghugus,
Maharashtra 442503, India

Latitude	Longitude
19.92812403°	79.11266494°
Local 10:41:03 AM	Altitude 11.24 meters
GMT 05:11:03 AM	Monday, 16.01.2023

Note : Captured by GPS Map Camera Lite

MIDC Ghugus - Ambient Air Sampling at (NAMP) Near Gram Panchayat



MIDC Ghugus - Ambient Air Sampling at Guest House of ACC Cement



MIDC Ballarpur - Ambient Air Sampling at WCL Office, Ballarpur on Sasti Road

MIDC Ballarpur - Ambient Air Sampling at Estate Office, BILT Colony



MIDC Tadali – Surface Water Sampling at Tadali Village Lake



MIDC Tadali – Surface Water Sampling at Nallah adjacent to Grace Industries



MIDC Tadali – Surface Water Sampling at Raw Water of MIDC WTP



MIDC Chadrapur – Surface Water Sampling at Nallah Opposite Mandhari Industry



GPS Map
Camera Lite

X68X+VC2, Khutala, Maharashtra 442406, India

Latitude 19.96762193° Longitude 79.24746402°

Local 10:46:16 AM

Altitude 11.19 meters

GMT 05:16:16 AM

Date Thu, 19 Jan 2023

MIDC Chadrapur – Surface Water Sampling at Nallah Near Gagangiri Village



GPS Map
Camera Lite

Dewada - Datala Rd, Chandrapur, Maharashtra 442406, India

Latitude 19.96032792° Longitude 79.26134794°

Local 09:43:54 AM

Altitude 11.34 meters

GMT 04:13:54 AM

Date Tue, 17 Jan 2023

MIDC Chadrapur – Surface Water Sampling at Nallah at Dhanora Bridge



GPS Map
Camera Lite

Wani Road, WCL Colony, Ghugus, X443+4Q6, Chandur, Maharashtra 442505, India

Latitude 19.957146666666667° Longitude 79.1032783333334°

Local 09:47:13 AM

Altitude 11.28 meters

GMT 04:17:13 AM

Date Thu, 19 Jan 2023

MIDC Ghugus – Surface Water Sampling at Wardha river Near WCL WTP Ghugus OCM



GPS Map
Camera Lite

Wani Road, WCL Colony, Ghugus, X443+4Q6, Chandur, Maharashtra 442505, India

Latitude 19.956543333333333° Longitude 79.103923333333°

Local 09:36:15 AM

Altitude 11.28 meters

GMT 04:06:15 AM

Date Thu, 19 Jan 2023

MIDC Ghugus – Surface Water Sampling at Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM



Unnamed Road, Mungoli, Maharashtra 442505, India
 Latitude 19.904421666666668° Longitude 79.1156766666666°
 Local 10:38:05 AM Altitude 11.22 meters
 GMT 05:08:05 AM Date Thu, 19 Jan 2023

MIDC Ghugus – Surface Water Sampling at (NWMP) Wardha River behind ACC plant



MIDC Ballarpur – Surface Water Sampling at Nallah Near Petrol Pump at Ballarpur Bamni Road



MIDC Ballarpur – Surface Water Sampling at Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins



MIDC Ballarpur – Surface Water Sampling at Wardha River upstream



MIDC Tadali – Ground Water Sampling at Yerur village (Bore well water)



MIDC Tadali – Ground Water Sampling at Near Tadali Lake Janata School (Dug well water)



MIDC Tadali – Ground Water Sampling at Yerur Village (Dug well Water)



MIDC Chandrapur – Ground Water Sampling at Gagangiri Village (Dug well Water)



MIDC Chandrapur – Ground Water Sampling at Mahada Colony (Hand Pump water)



MIDC Chandrapur – Ground Water Sampling at Near Datala Grampanchayat (Hand Pump water)



MIDC Ghugus – Ground Water Sampling at Tukdoji Nagar Ghugus Village (Hand Pump Water)



MIDC Ghugus – Ground Water Sampling at Nakoda Village (Bore Well Water)



W47G+4RF, Usgaon, Maharashtra 442505, India
 Latitude 19.912733333333332° Longitude 79.1269266666666°
 Local 10:50:07 AM Altitude 11.22 meters
 GMT 05:20:07 AM Date Thu, 19 Jan 2023

MIDC Ghugus – Ground Water Sampling at Usgaon Village (Dug Well Water)



MIDC Ballarpur – Ground Water Sampling at Gramin Rugnalaya (Bore Well Water)



MIDC Ballarpur – Ground Water Sampling at Near Fire Station (Bore Well Water)



MIDC Ballarpur – Ground Water Sampling at Visapur Village (Bore well Water)

Annexure – I Health Related Data

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

Name of the Polluted Industrial Area (PIA)	CHANDRAPUR
Name of the major health center/ organization	BILT Hospital
Name and designation of the Contact person	
Address	Ballarpur, Tal. Ballarpur, Dist. Chandrapur

S No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	1	2
2.	Acute Respiratory Infection	55	63
3.	Bronchitis	8	6
4.	Cancer	Nil	Nil
WATERBORNE DISEASES			
1.	Gastroenteritis	26	30
2.	Diarrhea	45	60
3.	Renal diseases	Nil	Nil
4.	Cancer	Nil	Nil

Date: 11/1/2023


Signature
Dr. Rupali R. Yadav
MBBS (Mum.), MD (Anatomy)
R. No. 2001020497
AFIH (Industrial Health)
Lady Medical Officer
BGPPL Hospital, Ballarpur

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

Name of the Polluted Industrial Area (PIA)	CHANDRAPUR
Name of the major health center/ organization	CHL Multi-Specialty Hospital & Research Center
Name and designation of the Contact person	Dr. Rohan V. Ainchwar.
Address	Opposite Adarsh Petrol Pump, Sarkar Nagar, Mul Road, Chandrapur, Tal. Dist. Chandrapur

S No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	124	122
2.	Acute Respiratory Infection	1080	1070
3.	Bronchitis	150	130
4.	Cancer	30	20
WATERBORNE DISEASES			
1.	Gastroenteritis	90	80
2.	Diarrhea	95	82
3.	Renal diseases	40	30
4.	Cancer	20	15

Date: 24/01/2023

Rohan V. Ainchwar
Signature



HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

Name of the Polluted Industrial Area (PIA)	CHANDRAPUR
Name of the major health center/ organization	Government Medical College
Name and designation of the Contact person	
Address	Ramnagar, T. B. Hospital Premises, In front of Dr. Ambedkar College, Tal. Dist. Chandrapur-442401

S No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	521	236
2.	Acute Respiratory Infection	5371	1255
3.	Bronchitis	534	202
4.	Cancer	133	79
WATERBORNE DISEASES			
1.	Gastroenteritis	1500	1041
2.	Diarrhea	573	421
3.	Renal diseases	5567	3354
4.	Cancer (double entry)	133	79

Date:

Signature

H. S. Kulkarni

Medical Superintendent
Govt. Medical College & Hospital
Chandrapur.

D. Palaskar
25/11/23

अधिसूचना
राजकीय वैद्यकीय महाविद्यालय व रुग्णालय
चंद्रपूर

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

Name of the Polluted Industrial Area (PIA)	CHANDRAPUR
Name of the major health center/ organization	Rural Hospital Ballarpur
Name and designation of the Contact person	
Address	Ballarpur, Tal. Ballarpur, Dist. Chandrapur

S No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	35	32
2.	Acute Respiratory Infection	44	40
3.	Bronchitis	23	19
4.	Cancer	0	0
WATERBORNE DISEASES			
1.	Gastroenteritis	147	219
2.	Diarrhea	41	30
3.	Renal diseases	0	0
4.	Cancer	0	0

Date: 16/1/2023

Signature
Medical Officer
Rural Hospital, Ballarpur

HEALTH STATISTICS

Required for comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

Name Of the Polluted Industrial Area (PIA)	CHANDRAPUR
Name of the Major health Center / Organization	Rajiv Ratan Hospital
Name and Designation of the contact Person	Dr. D. C. Anand (AMO)
Address	WCL, Wani Area , Po.Ghugus Tal . Dist Chandrapur

S.No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	25	20
2.	Acute Respiratory Infection	63	72
3.	Bronchitis	980	755
4.	Cancer	0	0
WATERBORNE DISEASES			
1.	Gastroenteritis	45	32
2.	Diarrhea	80	154
3.	Renal Diseases	16	14
4.	Cancer	0	0

Date :

राजीव रतन केंद्रीय चिकित्सालय, घुगुस
 Rajiv Ratan Central Hospital, Ghugus
 डॉक्टर / डॉ. Dr. D. C. Anand
 दिनांक : 03
 Date : 22/01/23

Signature


 क्षेत्रीय चिकित्सा अधिकारी
 Area Medical Officer
 राजीव रतन केंद्रीय चिकित्सालय, घुगुस
 Rajiv Ratan Central Hospital, Ghugus