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

CHANDRAPUR

Pre-Monsoon (April 2024 to June 2024)

MAHARASHTRA

LiFE Lifestyle for Environment

Maharashtra Pollution Control Board

महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Index

ABBREVIATIONS

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
CCMC	Chandrapur City Municipal Corporation
CEMS	Continuous Emission Monitoring System
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CPA	Critically Polluted Area
CPCB	Central Pollution Control Board
EPA	Environmental Protection Act, 1986
GDP	Gross Domestic Product
MIDC	Maharashtra Industrial Development Corporation
MPCB	Maharashtra Pollution Control Board
NAAQS	National Ambient Air Quality Standard
NWMP	National Water Quality Monitoring Program
SPA	Severely Polluted Area
VOCs	Volatile Organic Compounds
WHO	World Health Organisation
ZLD	Zero Liquid Discharge

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 pre monsoon monitoring was carried out during the period of April 2024 to June 2024 to verify the Ambient Air Quality, Surface water and Groundwater.

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 at the locations Except PM_{10} parameter. In the surface water of Chandrapur CEPI region, mainly the concentration of Fluoride, Total Phosphate, Iron, Manganese etc. have exceeded in some all the samples collected. In ground water also, the concentration of Fluoride, Iron, Zinc etc. is high in some of the samples collected.

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 62.84 of June 2024. Based on the study results of April 2024 to June 2024 the CEPI score as per the revised CEPI 2016, the CEPI index of Pre-Monsoon - Ambient Air is 26.5, Surface Water is 55.00, and Ground Water is 56.50. The overall CEPI score for Chandrapur area for the Pre-monsoon 24 is 62.84.

The analysis of the aggregated CEPI score shows that the pollution in Chandrapur industrial clusters has reduced in the last three years. Approximately 17.7 % decrease in CEPI score is observed from 76.41 (CPCB CEPI score) in 2018 to 62.84 in June 2024.

2. Introduction

The industrial sector remains a pivotal force in driving a nation's economic growth, significantly contributing to increased production, fixed investment, exports, employment, and capacity utilization. Industries serve as engines of economic development, bolstering government revenue, international trade, social services, and job creation. The growth rate of the industrial sector directly impacts the overall economic growth of a country. Consequently, industries are essential for achieving economic goals and prosperity. According to the World GDP Ranking 2024, India stands as the fifth-largest economy globally. Several Sustainable Development Goals (SDGs) focus on growth, including Decent Work and Economic Growth (Goal 8) and Industry, Innovation, and Infrastructure (Goal 9).

Despite these economic benefits, industrial activities have a profound negative impact on the environment, affecting water, air and soil quality. Industries discharging untreated wastewater have contaminated drinking water with hazardous substances, posing severe risks to human, animal, and aquatic life. Air pollution from industrial emissions is linked to a range of respiratory and cardiovascular diseases, particularly affecting children and leading to increased rates of infant mortality and chronic health issues in adulthood. According to the World Health Organization (WHO), environmental pollution is responsible for approximately 9 million premature deaths annually. Over 90% of the global population is exposed to air pollution levels exceeding WHO guidelines, posing serious health risks. Furthermore, around 2 billion people use drinking water contaminated with feces, leading to infectious diseases such as cholera and dysentery.

The impact on flora and fauna is equally alarming. Industrial pollution has led to habitat destruction, loss of biodiversity, and the disruption of ecosystems. Toxic pollutants can cause genetic mutations, reproductive failures, and behavioral changes in wildlife, endangering entire species. Plants exposed to polluted air and water can experience stunted growth, reduced photosynthesis, and increased susceptibility to diseases, which ultimately affects food security and ecosystem stability.

To mitigate these adverse effects, robust environmental policies are essential. These policies set forth rules for industries and individuals, enforced by government agencies. Key aspects include monitoring pollution levels, imposing fines or penalties on violators, and conducting environmental impact assessments for proposed projects. Conservation measures are crucial for protecting biodiversity, and policies must be regularly updated to address emerging challenges. A comprehensive approach, including robust regulatory frameworks, international collaboration, advanced monitoring technologies, and a commitment to sustainable practices from industries and governments, is vital for safeguarding our natural resources and promoting sustainability.

Simultaneously, the Comprehensive Environmental Pollution Index (CEPI) has emerged as a beacon of assessment and action in India's environmental landscape. Introduced as a standardized methodology for evaluating and addressing pollution in industrial clusters across the nation, the CEPI represents a significant step towards achieving the delicate balance between economic growth and environmental sustainability. Developed through collaborative efforts between environmental scientists, regulatory authorities, and community stakeholders, the CEPI serves as a vital instrument for identifying, prioritizing, and mitigating pollution in industrial areas. By systematically monitoring, sampling, and

analyzing pollution parameters such as ambient air quality, surface water quality, and groundwater quality, the CEPI empowers policymakers and regulators to make informed decisions and allocate resources effectively.

In Maharashtra, where industrial activities drive economic growth and employment opportunities, the importance of the CEPI cannot be overstated. Through strategic monitoring, sampling, and analysis efforts, the CEPI aims to provide a comprehensive assessment of pollution levels and their impacts on environmental health in critically, severely, and other polluted industrial areas across the state.

Moreover, the application of the CEPI extends beyond mere assessment, serving as a catalyst for targeted interventions and regulatory enforcement in polluted industrial areas. By identifying pollution hotspots and vulnerable communities, the CEPI enables authorities to implement remedial measures, enforce pollution control norms, and monitor progress towards environmental sustainability.

In the following sections, we delve into the methodology, findings, and implications of both the CEPI assessment and the Monitoring, Sampling, and Analysis for Ambient Air Quality, Surface Water Quality, and Groundwater Quality in Polluted Industrial Areas of MIDC Chandrapur, MIDC Tadali, MIDC Ballarpur, and MIDC Ghugus in Chandrapur, Maharashtra. 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 index captures the various dimensions of environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI), which is a rational number to characterize the environmental quality at a given location following the algorithm of source, pathway and receptor have been developed. The CEPI reports serve as a roadmap for targeted interventions, regulatory enforcement, and community engagement aimed at mitigating pollution and safeguarding public health in the area. Despite the persistent challenges, ongoing initiatives guided by the CEPI action plan reports offer hope for addressing environmental concerns and fostering sustainable development in Chandrapur.

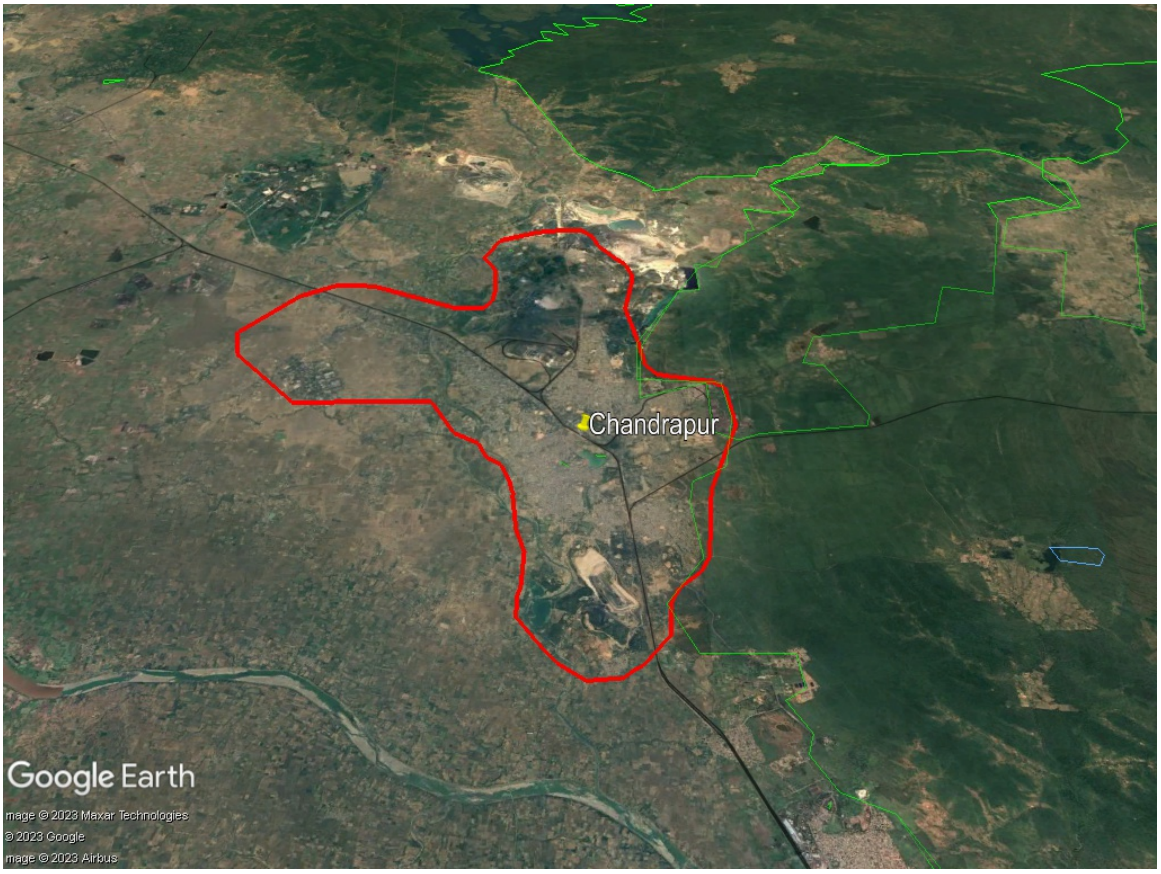


Fig. Chandrapur region CEPI monitoring zone

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	• MIDC Tadali-04 • MIDC Chandrapur-04 • MIDC Ghugus -04 • MIDC Ballarpur -04	**16**	PM_{10}, $PM_{2.5}$, SO_2, NO_2, NH_3, O_3, C_6H_6, CO, BaP, Pb, Ni, As
Volatile Organic Compounds (VOCs)	• MIDC Tadali-02 • MIDC Chandrapur-02 • MIDC Ghugus -02 • MIDC 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, Naphthalene, 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, 1,1,2-Trichloroethane, Tetrachloroethylene, 1,3,5-Trimethylbenzene, N-Butylbenzene, 1,2,3-

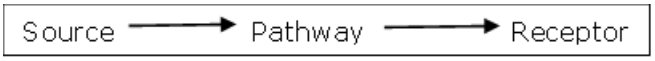
Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
			Trichlorobenzene, Hexachlorobutadiene, 1,2,4-Trichlorobenzene, 2,2-Dichloropropane, Dibromo methane, Toluene, O-Xylene, Bromoform, 1,1,2,2-Tetrachloroethane, 4-Chlorotoluene, 1,1-Dichloroethylene, Trans-1,2-Dichloroethylene, 1,1-Dichloroethane, CIS-1,2-Dichloroethylene, Bromochloromethane, 1,1,1-Trichloroethane
Water Quality Monitoring	**Surface water** • MIDC Tadali-03 • MIDC Chandrapur-03 • MIDC Ghugus -03 • MIDC 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 • MIDC Tadali-03 • MIDC Chandrapur-03 • MIDC Ghugus -03 • MIDC 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 h each
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	03	1 Shift of 24 h
3.	Sulphur Dioxide (SO_2)	03	6 Shifts of 4 h each
4.	Nitrogen Dioxide (NO_2)	03	6 Shifts of 4 h each
5.	Ammonia (NH_3)	03	6 Shifts of 4 h each
6.	Ozone (O_3)	03	24 Shifts of 1 h each
7.	Benzene (C_6H_6)	03	1 Shifts of 24 h
8.	Carbon Monoxide (CO)	03	24 Shifts of 1 h each
9.	Benzo (a) Pyrene (BaP) – particulate phase only	03	3 Shifts of 8 h each
10.	Lead (Pb)	03	3 Shifts of 8 h each
11.	Arsenic (As)	03	3 Shifts of 8 h each
12.	Nickel (Ni)	03	3 Shifts of 8 h each
B	**Volatile Organic Compounds (VOCs)**		
	As mentioned in Table 3.1	03	3 Shifts of 24 h 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.*

1. **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 PM_{10} exceeds at one location.

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	26.06.2024	28.06.2024	30.06.2024
2.	NAMP Growth Centre	20°59'15.8"N	79°11'08.7"E	26.06.2024	28.06.2024	30.06.2024
3.	Near Chaman Metalic Boundary Wall	19° 00'50.9"N	79°11'05.0"E	26.06.2024	28.06.2024	30.06.2024
4.	MIDC WTP Building	20°01'04.3"N	79°11'34.9"E	26.06.2024	28.06.2024	30.06.2024

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	26.06.2024	28.06.2024	30.06.2024
2.	NAMP Growth Centre	20°59'15.8"N	79°11'08.7"E	26.06.2024	28.06.2024	30.06.2024

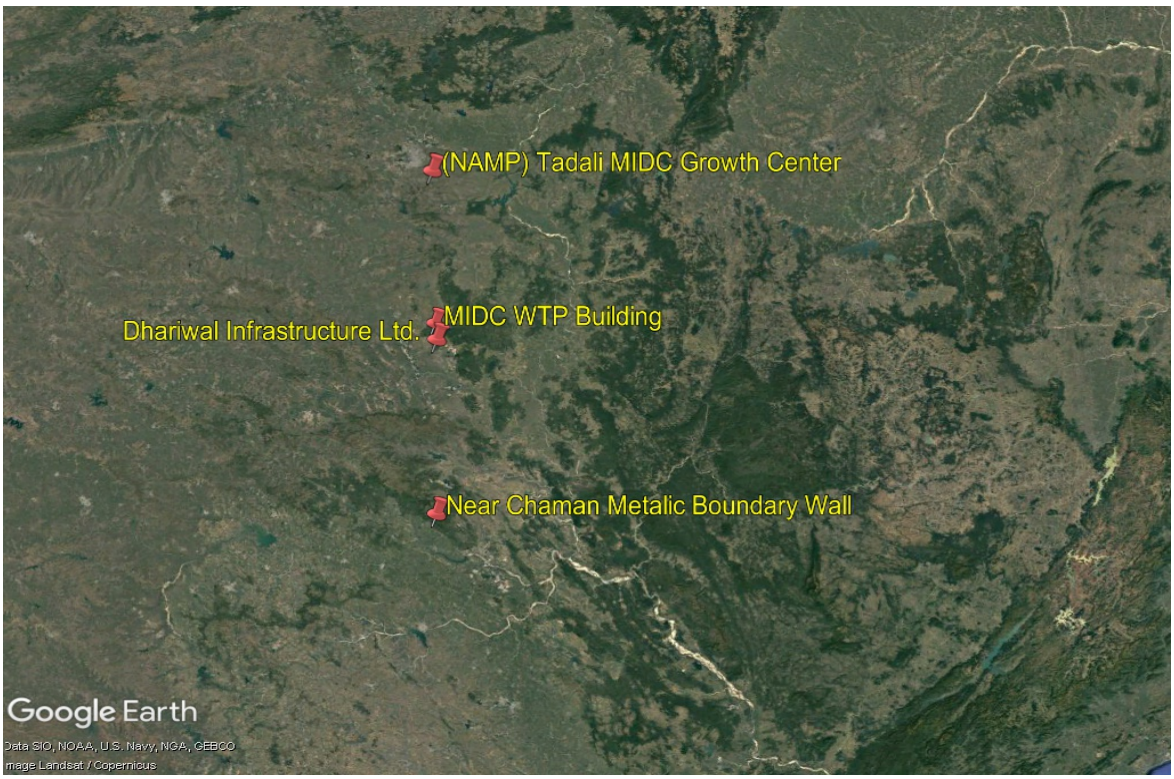


Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Tadali

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 Metalic Boundary Wall	MIDC WTP Building
Sulphur Dioxide (SO_2)	µg/m³	15.8	31.6	12.5	17
Nitrogen Dioxide (NO_2)	µg/m³	7.7	BLQ	6.97	BLQ
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	71	128	48	45
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	15	25	12	9
Ozone (O_3)	µg/m³	31.2	32.15	22.7	21.1
Lead (Pb)	µg/m³	0.3	0.07	0.04	0.03
Carbon Monoxide (CO) (1 h)	mg/m³	0.9	1.40	1.21	1.00
Carbon Monoxide (CO) (8 h)	mg/m³	1.4	1.74	1.26	1.07
Ammonia (NH_3)	µg/m³	48.4	77	62.3	78.3
Benzene (C_6H_6)	µg/m³	1.9	1.76	1.98	1.72
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m³	0.5	0.56	0.60	0.61
Nickel (Ni)	ng/m³	4.5	4.34	4.35	3.96

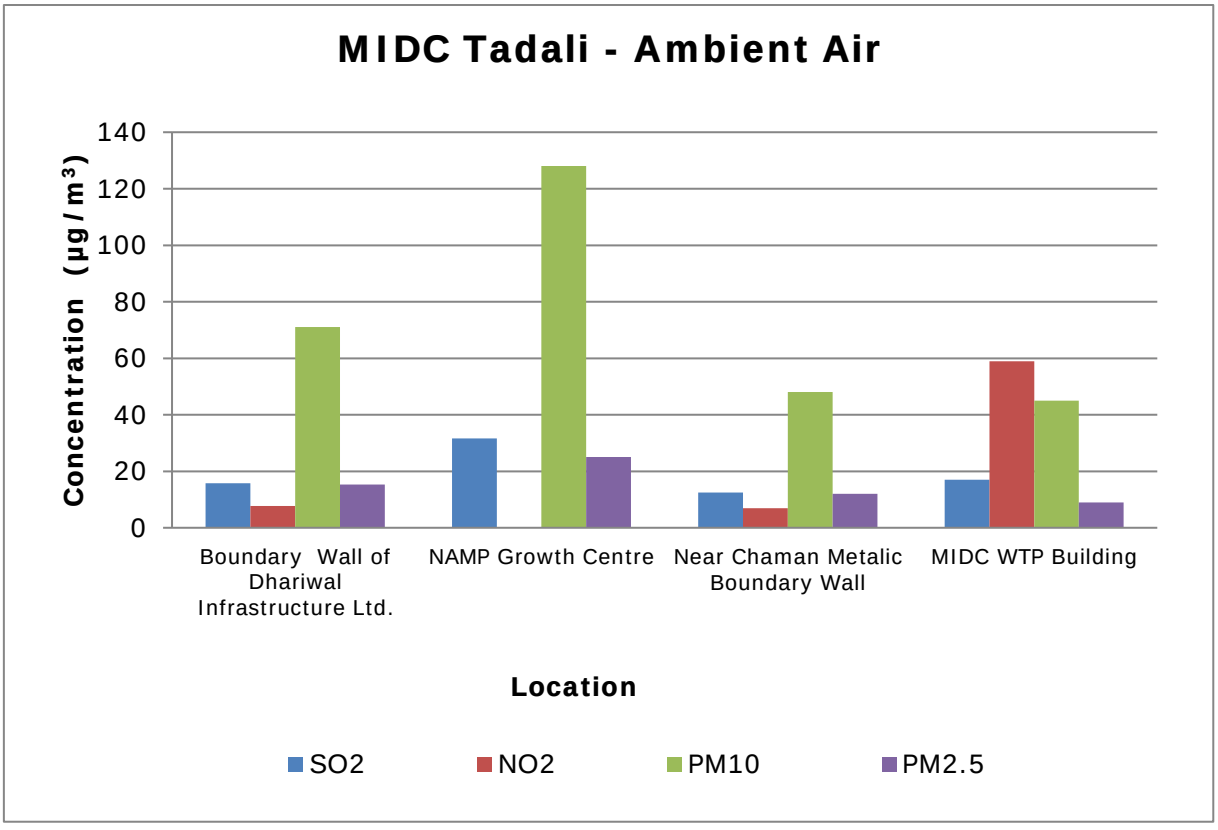
Table 5.4 MIDC Tadali - Volatile Organic Compounds (VOCs) in Ambient Air Results

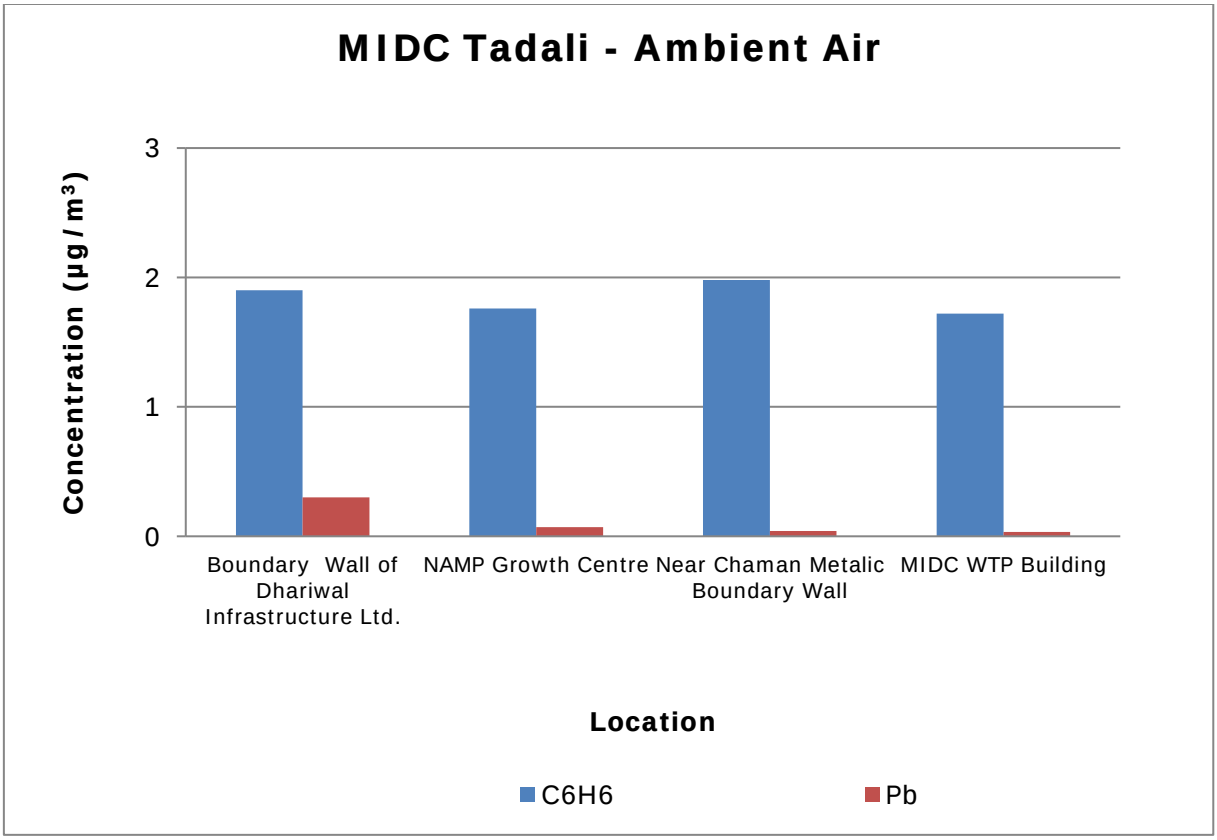
Parameters	Unit	Results	
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre
Dichloromethane	µg/m³	8.2	4.82
Chloroform	µg/m³	0.6	BLQ
Carbon Tetrachloride	µg/m³	BLQ	BLQ
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dichlorobenzene	µg/m³	BLQ	BLQ

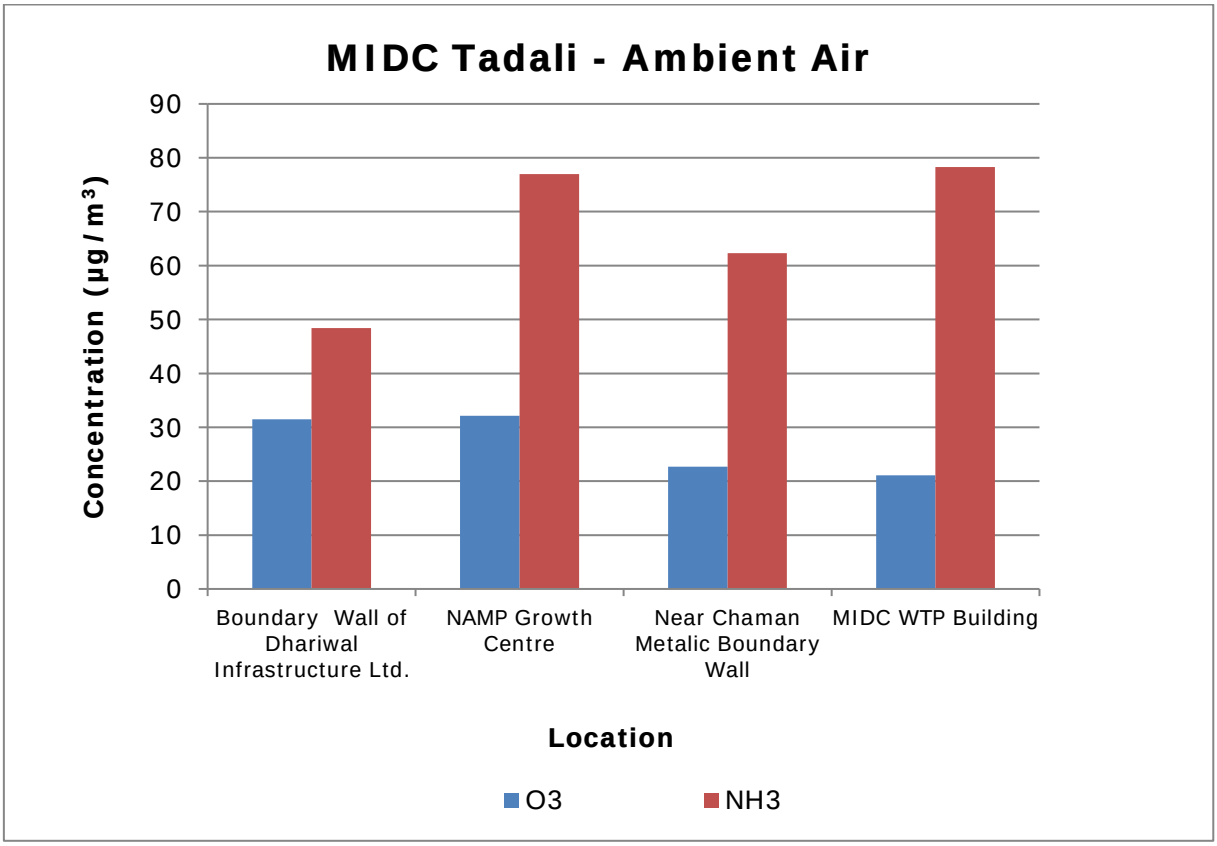
Parameters	Unit	Results	
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propylbenzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m³	BLQ	BLQ
Ethylbenzene	µg/m³	BLQ	BLQ
1,1-Dichloropropylene	µg/m³	BLQ	BLQ
1,2-Dichloroethane	µg/m³	0.7	BLQ
1,2-Dichloropropane	µg/m³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m³	BLQ	BLQ
Tetrachloroethylene	µg/m³	BLQ	BLQ
1,3,5-Trimethylbenzene	µg/m³	BLQ	BLQ
N-Butylbenzene	µg/m³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m³	BLQ	BLQ
Hexachlorobutadiene	µg/m³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m³	BLQ	BLQ
2,2-Dichloropropane	µg/m³	BLQ	BLQ

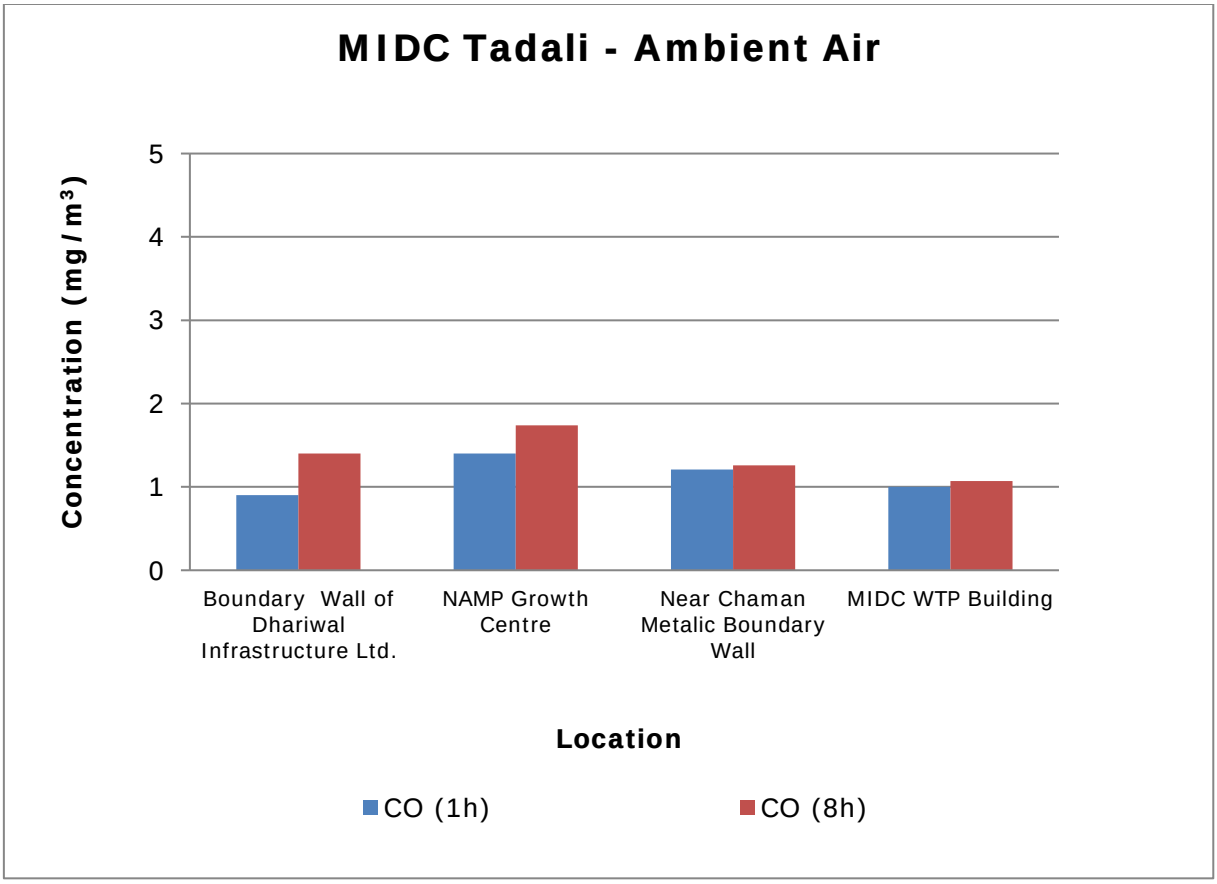
Parameters	Unit	Results	
		Boundary Wall of Dhariwal Infrastructure Ltd.	NAMP Growth Centre
Dibromomethane	µg/m³	BLQ	BLQ
Toluene	µg/m³	5.6	4.415
O-Xylene	µg/m³	BLQ	BLQ
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
1,1-Dichloroethane	µg/m³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
Bromochloromethane	µg/m³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

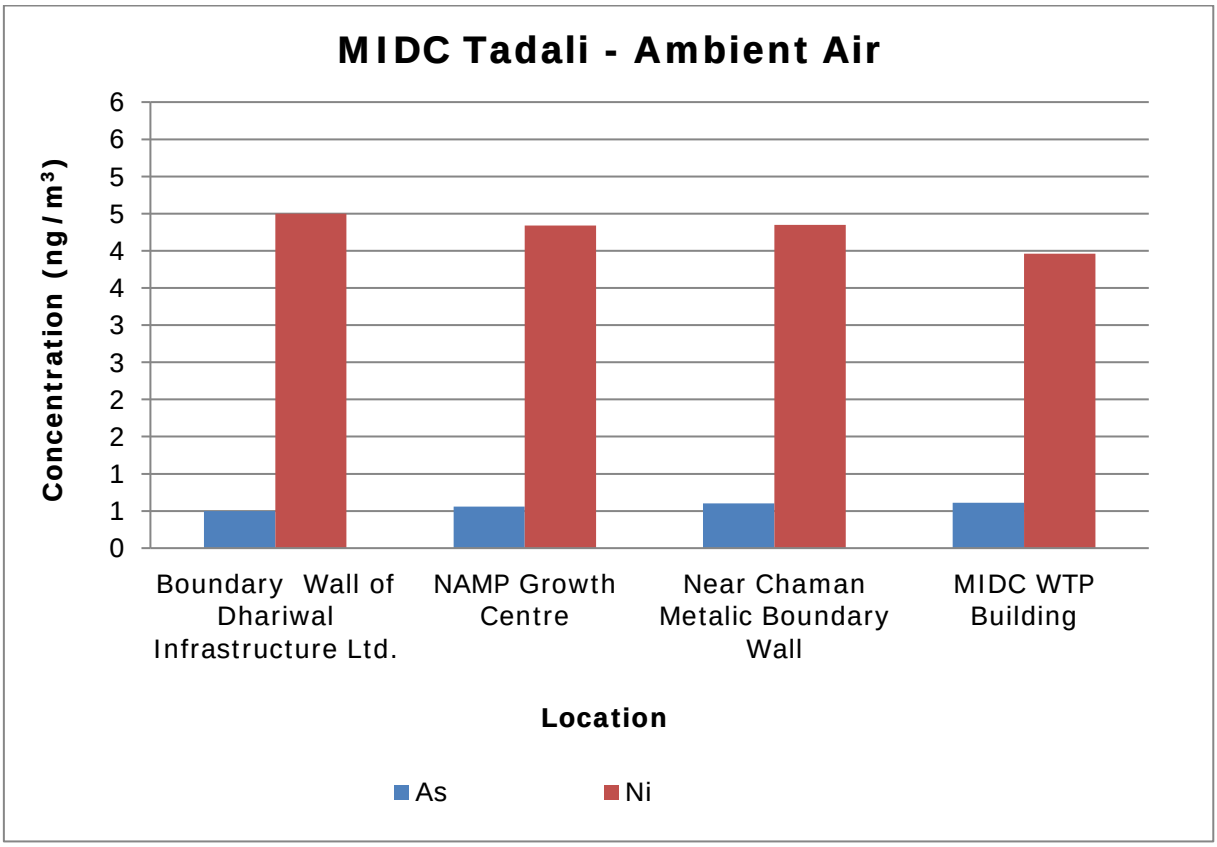
Graphs - Ambient Air Quality Monitoring of Tadali




MIDC Tadali - Ambient Air
Concentration (µg/m³)
3
2
1
0
Boundary Wall of Dhariwal Infrastructure Ltd.
NAMP Growth Centre
Near Chaman Metalic Boundary Wall
MIDC WTP Building
Location
C6H6
Pb


MIDC Tadali - Ambient Air
Concentration (µg/m³)
90
80
70
60
50
40
30
20
10
0
Boundary Wall of Dhariwal Infrastructure Ltd.
NAMP Growth Centre
Near Chaman Metalic Boundary Wall
MIDC WTP Building
Location
O3
NH3


MIDC Tadali - Ambient Air
Concentration (mg/m³)
5
4
3
2
1
0
Boundary Wall of Dhariwal Infrastructure Ltd.
NAMP Growth Centre
Near Chaman Metalic Boundary Wall
MIDC WTP Building
Location
CO (1h)
CO (8h)


MIDC Tadali - Ambient Air
Concentration (ng/m³)
6
6
5
5
4
4
3
3
2
2
1
1
0
Boundary Wall of Dhariwal Infrastructure Ltd.
NAMP Growth Centre
Near Chaman Metalic Boundary Wall
MIDC WTP Building
Location
As
Ni

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 PM_{10} exceeds at one location.

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	26.06.2024	28.06.2024	30.06.2024
2.	Multi Organics, Chandrapur MIDC	19°58'51.5''N	79°13'55.4''E	26.06.2024	28.06.2024	30.06.2024
3.	Opposite Super Hygienic CBMW Site	19°58'19.2''N	79°14'21.4''E	26.06.2024	28.06.2024	30.06.2024
4.	Near HPCL, MIDC Chandrapur	19°59'12.7''N	79°15'36.3''E	26.06.2024	28.06.2024	30.06.2024

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	28.06.2024	30.06.2024	28.06.2024
2.	Opposite Super Hygienic CBMW Site	19°58'19.2''N	79°14'21.4''E	28.06.2024	30.06.2024	28.06.2024

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/m³	18.7	BLQ	19.4	37.1
Nitrogen Dioxide (NO_2)	µg/m³	22	BLQ	40	BLQ
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	102	38	80	33
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	28	9	22	8
Ozone (O_3)	µg/m³	58.3	71.8	30.1	39.2
Lead (Pb)	µg/m³	BLQ	0.024	0.045	BLQ
Carbon Monoxide (CO) (1 h)	mg/m³	1.05	1.45	1.12	1.13
Carbon Monoxide (CO) (8 h)	mg/m³	1.46	1.26	1.40	1.34
Ammonia (NH_3)	µg/m³	60.5	43.4	42.0	61
Benzene (C_6H_6)	µg/m³	1.85	1.75	1.52	1.78
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m³	0.69	0.66	0.36	0.66
Nickel (Ni)	ng/m³	3.96	5.19	3.09	BLQ

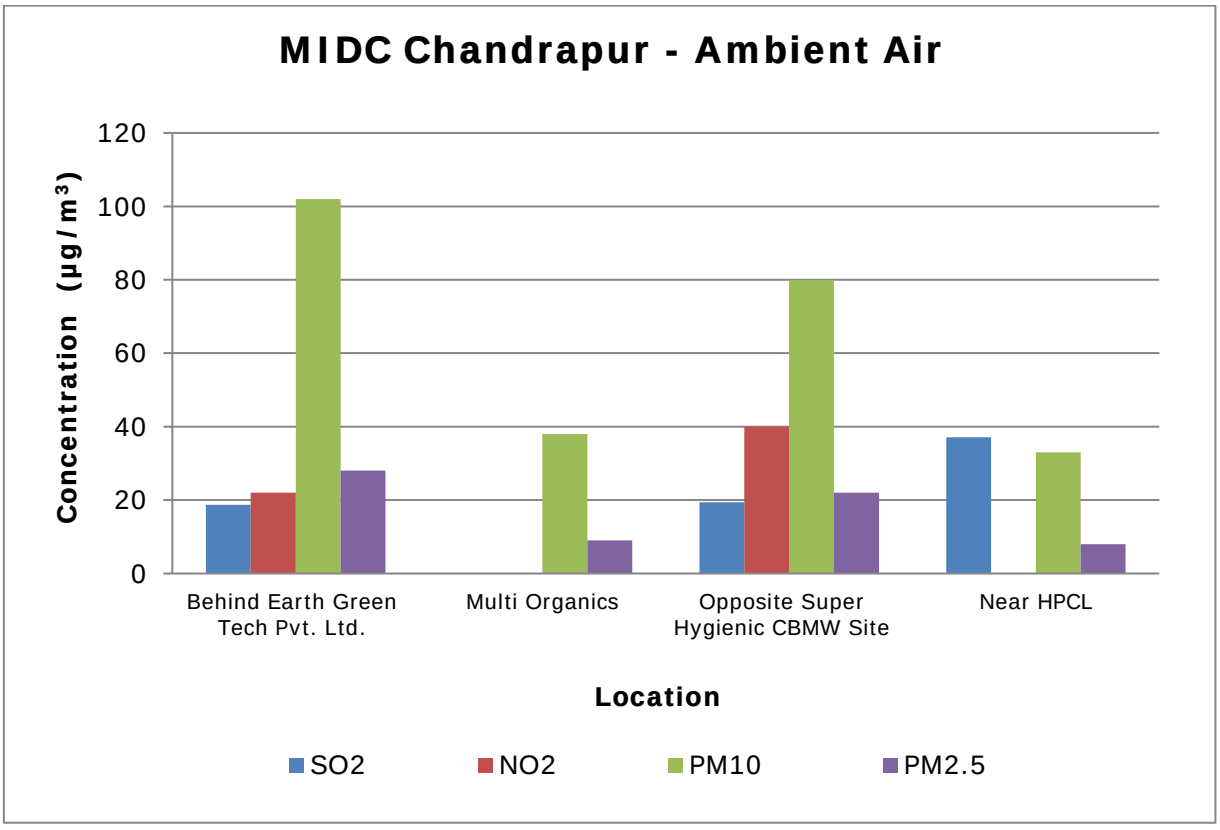
Table 5.8 MIDC Chandrapur - Volatile Organic Compounds (VOCs) in Ambient Air Results

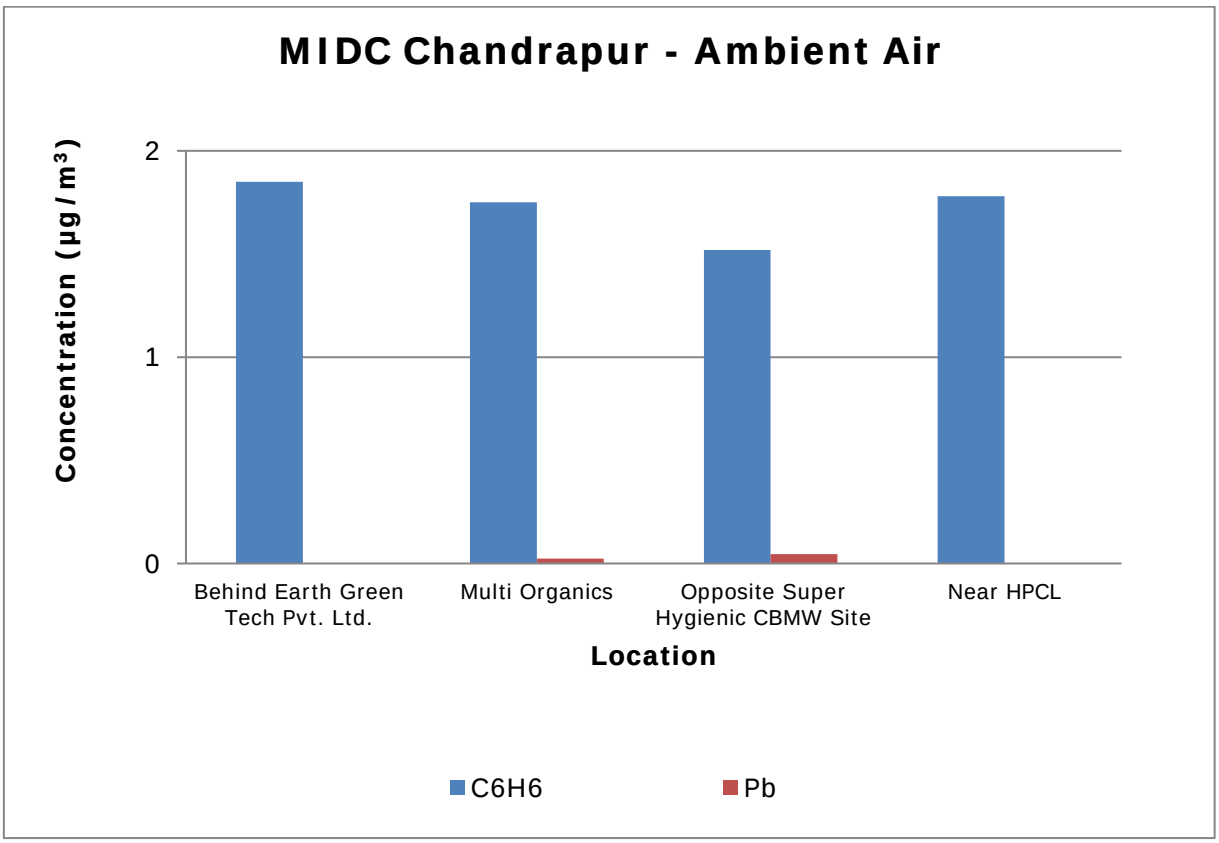
Parameters	Unit	Results	
		Multi Organics	Opposite Super Hygienic CBMW Site
Dichloromethane	µg/m³	5.76	0.90
Chloroform	µg/m³	BLQ	0.7
Carbon Tetrachloride	µg/m³	BLQ	0.863
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ

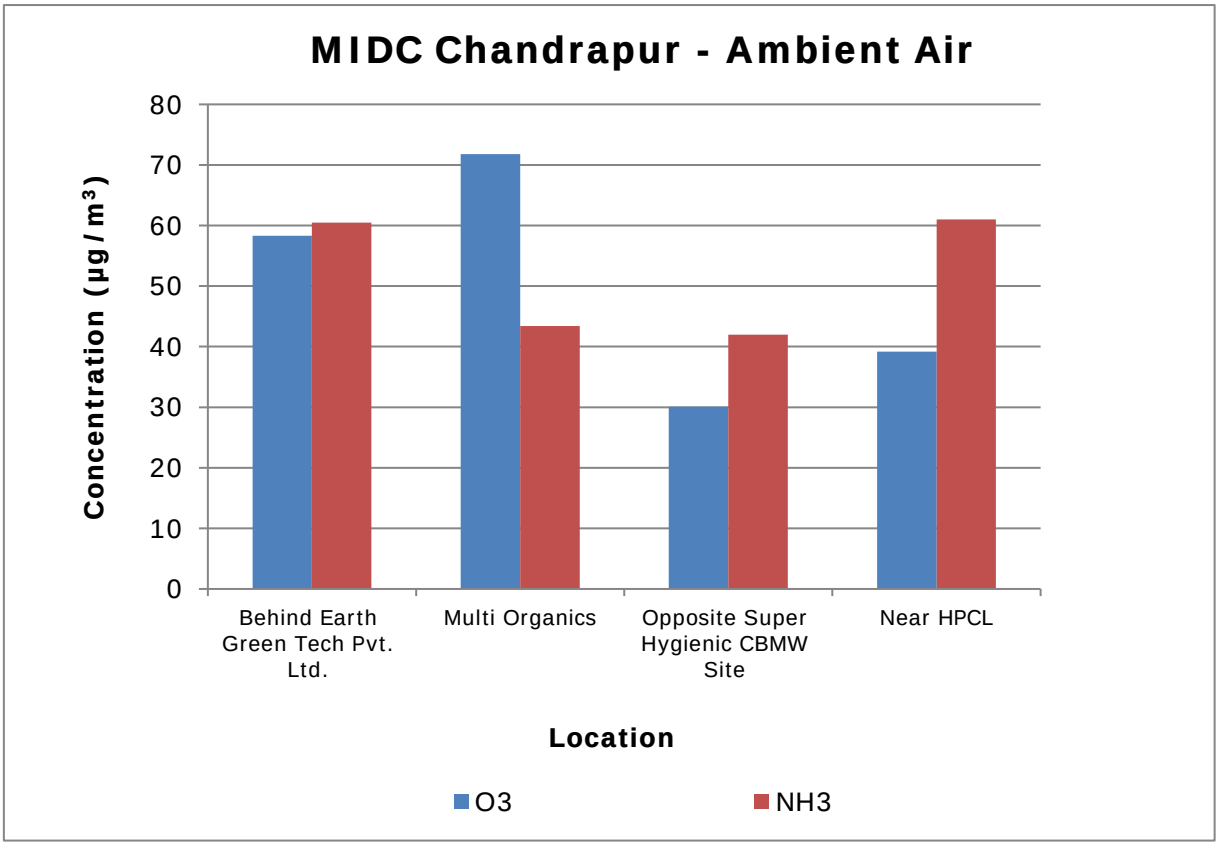
Parameters	Unit	Results	
		Multi Organics	Opposite Super Hygienic CBMW Site
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propylbenzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m³	BLQ	BLQ
Ethylbenzene	µg/m³	BLQ	BLQ
1,1-Dichloropropylene	µg/m³	BLQ	BLQ
1,2-Dichloroethane	µg/m³	BLQ	0.52
1,2-Dichloropropane	µg/m³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m³	BLQ	BLQ
Tetrachloroethylene	µg/m³	BLQ	BLQ
1,3,5-Trimethylbenzene	µg/m³	BLQ	BLQ
N-Butylbenzene	µg/m³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m³	BLQ	BLQ
Hexachlorobutadiene	µg/m³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m³	BLQ	BLQ
2,2-Dichloropropane	µg/m³	BLQ	BLQ
Dibromomethane	µg/m³	BLQ	BLQ

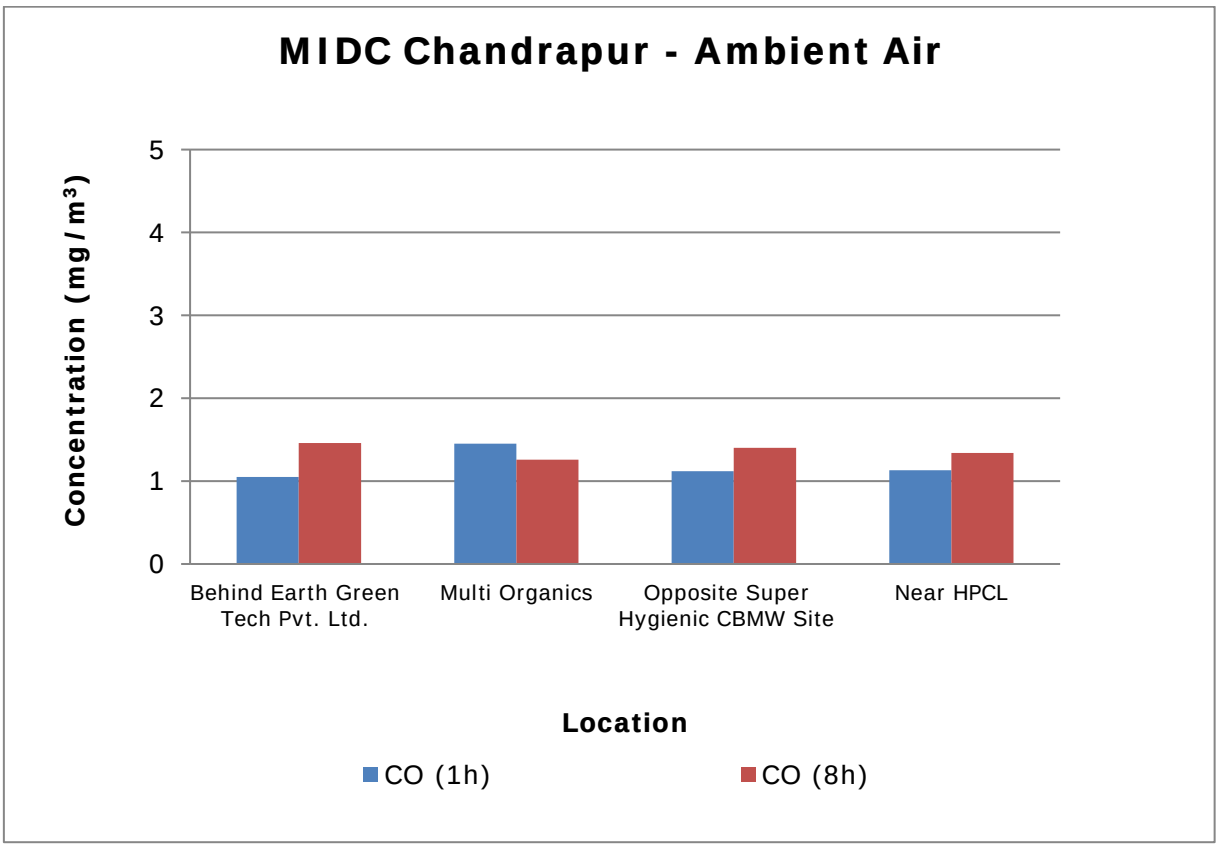
Parameters	Unit	Results	
		Multi Organics	Opposite Super Hygienic CBMW Site
Toluene	µg/m³	2.56	2.72
O-Xylene	µg/m³	BLQ	BLQ
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
1,1-Dichloroethane	µg/m³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
Bromochloromethane	µg/m³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

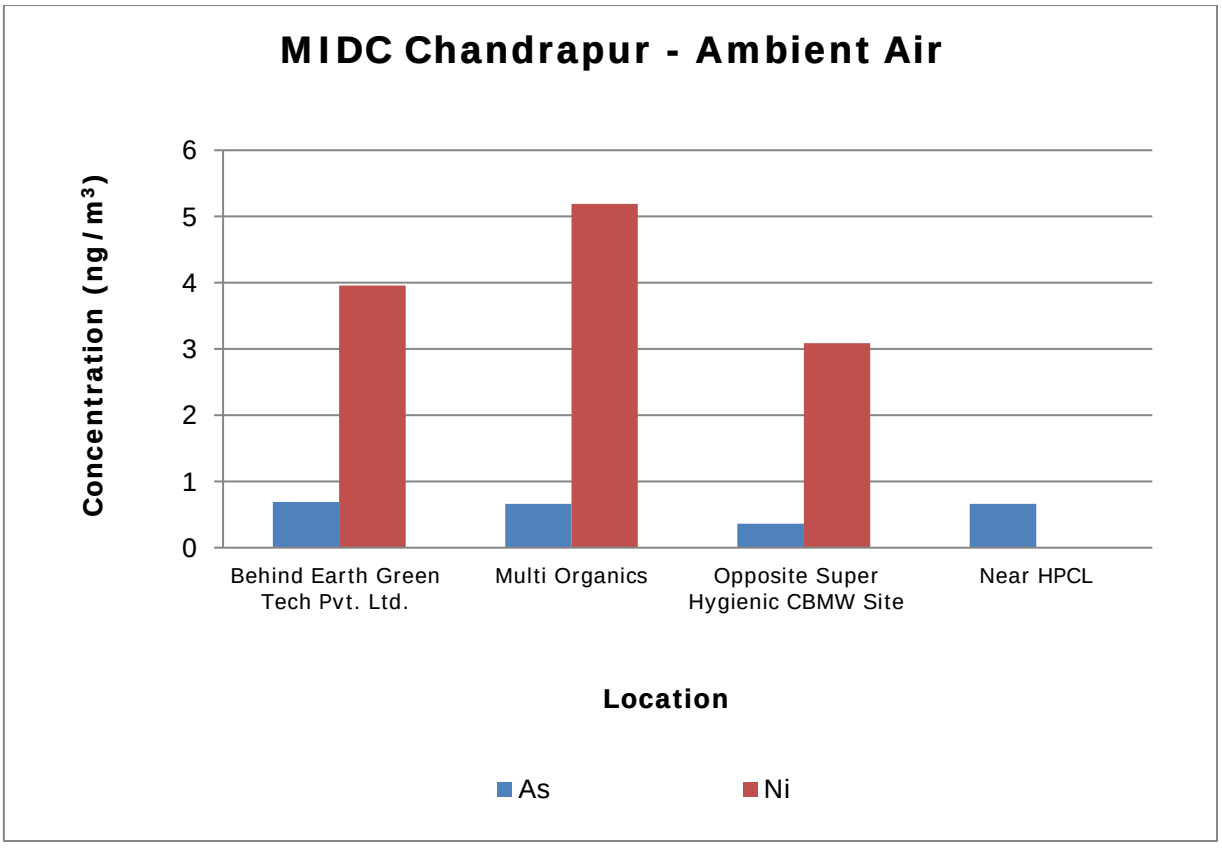
Graphs - Ambient Air Quality Monitoring of MIDC Chandrapur




MIDC Chandrapur - Ambient Air
Concentration (µg/m³)
2
1
0
Behind Earth Green Tech Pvt. Ltd.
Multi Organics
Opposite Super Hygienic CBMW Site
Near HPCL
Location
C6H6
Pb


MIDC Chandrapur - Ambient Air
Concentration (µg/m³)
80
70
60
50
40
30
20
10
0
Behind Earth Green Tech Pvt. Ltd.
Multi Organics
Opposite Super Hygienic CBMW Site
Near HPCL
Location
O3
NH3


MIDC Chandrapur - Ambient Air
Concentration (mg/m³)
5
4
3
2
1
0
Behind Earth Green Tech Pvt. Ltd.
Multi Organics
Opposite Super Hygienic CBMW Site
Near HPCL
Location
CO (1h)
CO (8h)


MIDC Chandrapur - Ambient Air
Concentration (ng/m³)
6
5
4
3
2
1
0
Behind Earth Green Tech Pvt. Ltd.
Multi Organics
Opposite Super Hygienic CBMW Site
Near HPCL
Location
As
Ni

3. **MIDC Ghugus:** In MIDC Ghugus also all 4 locations monitored for 12 parameters are well within the limit prescribed as per the NAAQS.

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	26.06.2024	28.06.2024	30.06.2024
2.	WTP Water Supply Tank, Ghugus	19°56'26.8''N	79°07'13.0''E	26.06.2024	28.06.2024	30.06.2024
3.	(NAMP) Near Gram Panchayat Ghugus	19°56'22.8''N	79°06'50.9''E	26.06.2024	28.06.2024	30.06.2024
4.	Guest House of ACC Cement	19°55'41.4''N	79°06'45.3''E	26.06.2024	28.06.2024	30.06.2024

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	26.06.2024	28.06.2024	30.06.2024
2.	Guest House of ACC Cement	19°55'41.4''N	79°06'45.3''E	26.06.2024	28.06.2024	30.06.2024

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/m³	32.5	10.9	18.7	15.6
Nitrogen Dioxide (NO_2)	µg/m³	58.9	BLQ	23.02	BLQ
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	24	34	54	43
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	8	9	20	14
Ozone (O_3)	µg/m³	BLQ	53.1	42.9	25.9
Lead (Pb)	µg/m³	0.0	0.03	0.05	BLQ
Carbon Monoxide (CO) (1 h)	mg/m³	0.9	0.89	0.92	0.91
Carbon Monoxide (CO) (8 h)	mg/m³	1.1	0.91	1.50	1.13
Ammonia (NH_3)	µg/m³	52.8	51.9	32.0	45.63
Benzene (C_6H_6)	µg/m³	1.9	1.96	1.21	1.62
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m³	0.6	0.57	0.67	0.87
Nickel (Ni)	ng/m³	BLQ	3.57	BLQ	BLQ

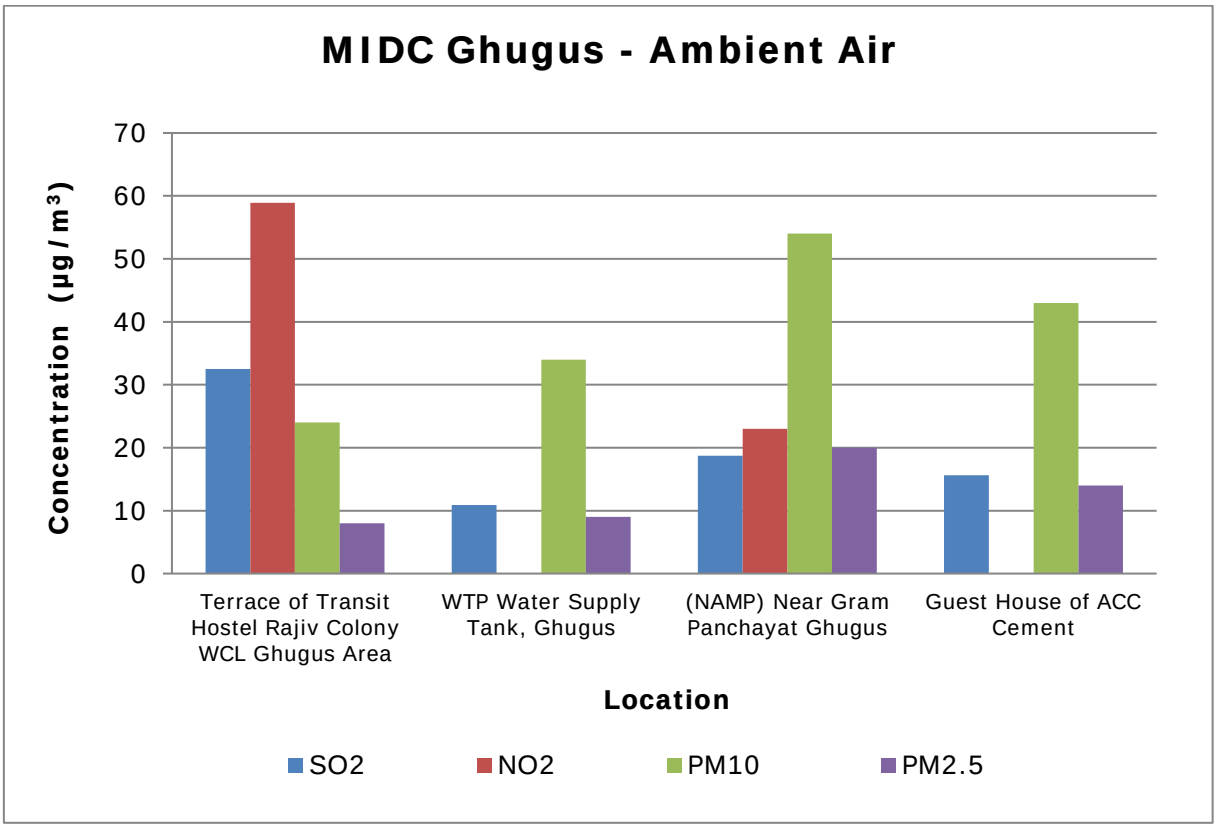
Table 5.12 MIDC Ghugus - Volatile Organic Compounds (VOCs) in Ambient Air Results

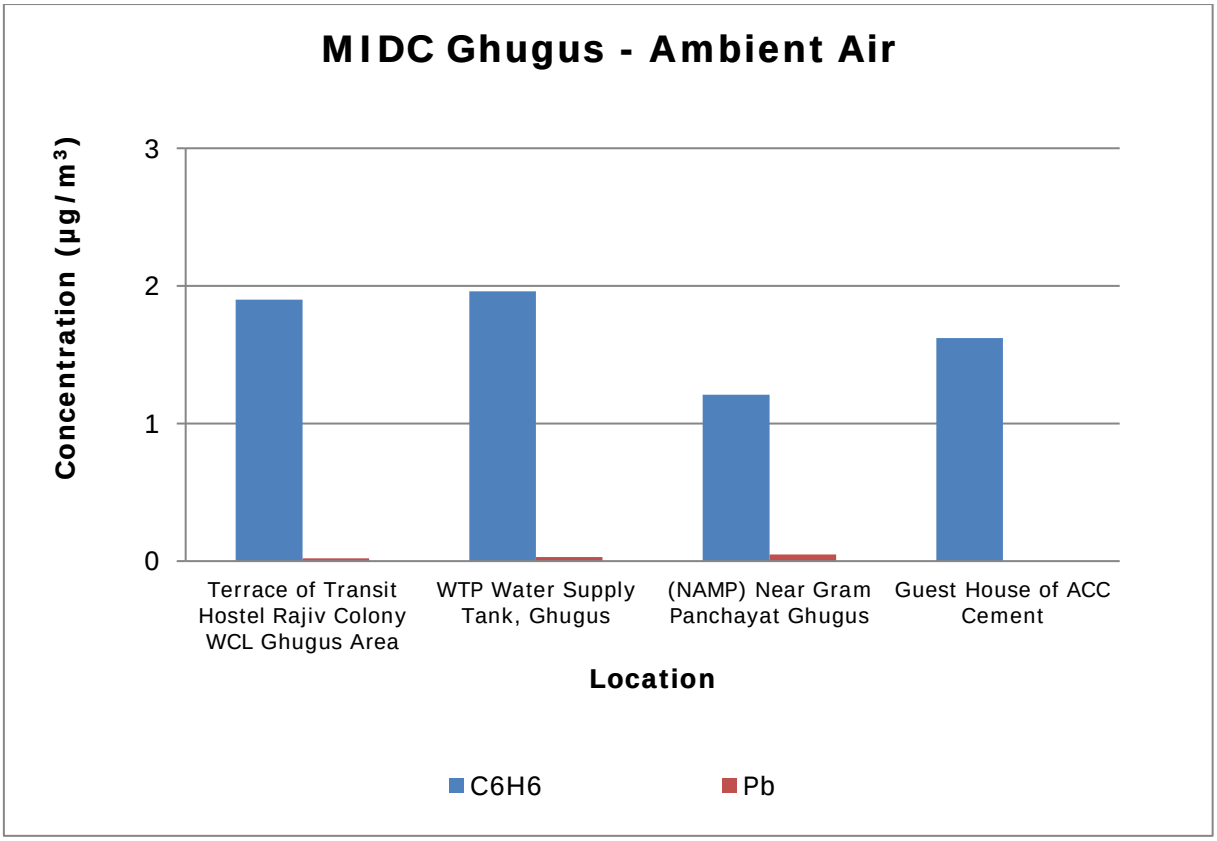
Parameters	Unit	Results	
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	Guest House of ACC Cement
Dichloromethane	µg/m³	4.4	4.53
Chloroform	µg/m³	0.7	BLQ
Carbon Tetrachloride	µg/m³	0.5	BLQ
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dichlorobenzene	µg/m³	BLQ	BLQ

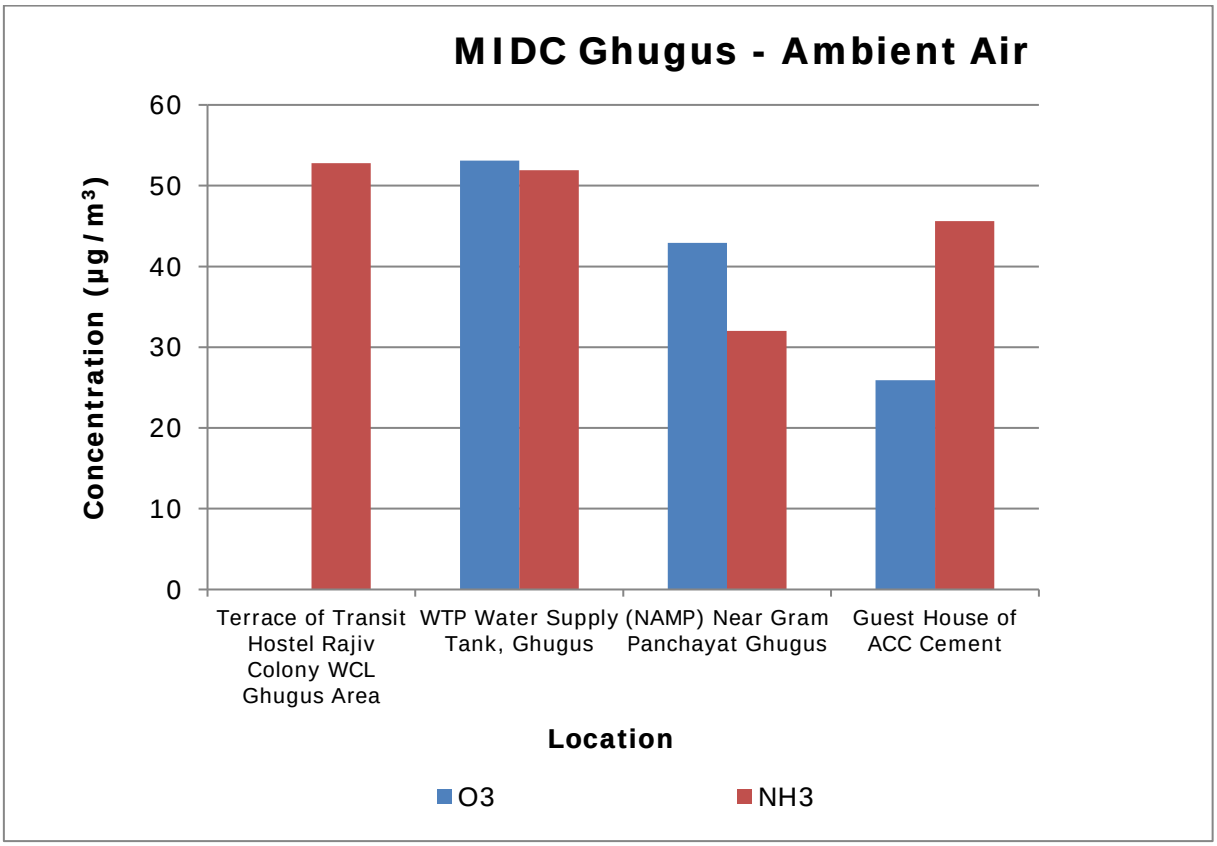
Parameters	Unit	Results	
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	Guest House of ACC Cement
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propylbenzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m³	BLQ	BLQ
Ethylbenzene	µg/m³	BLQ	BLQ
1,1-Dichloropropylene	µg/m³	BLQ	BLQ
1,2-Dichloroethane	µg/m³	BLQ	BLQ
1,2-Dichloropropane	µg/m³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m³	BLQ	BLQ
Tetrachloroethylene	µg/m³	BLQ	BLQ
1,3,5-Trimethylbenzene	µg/m³	BLQ	BLQ
N-Butylbenzene	µg/m³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m³	BLQ	BLQ
Hexachlorobutadiene	µg/m³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m³	BLQ	BLQ
2,2-Dichloropropane	µg/m³	BLQ	BLQ

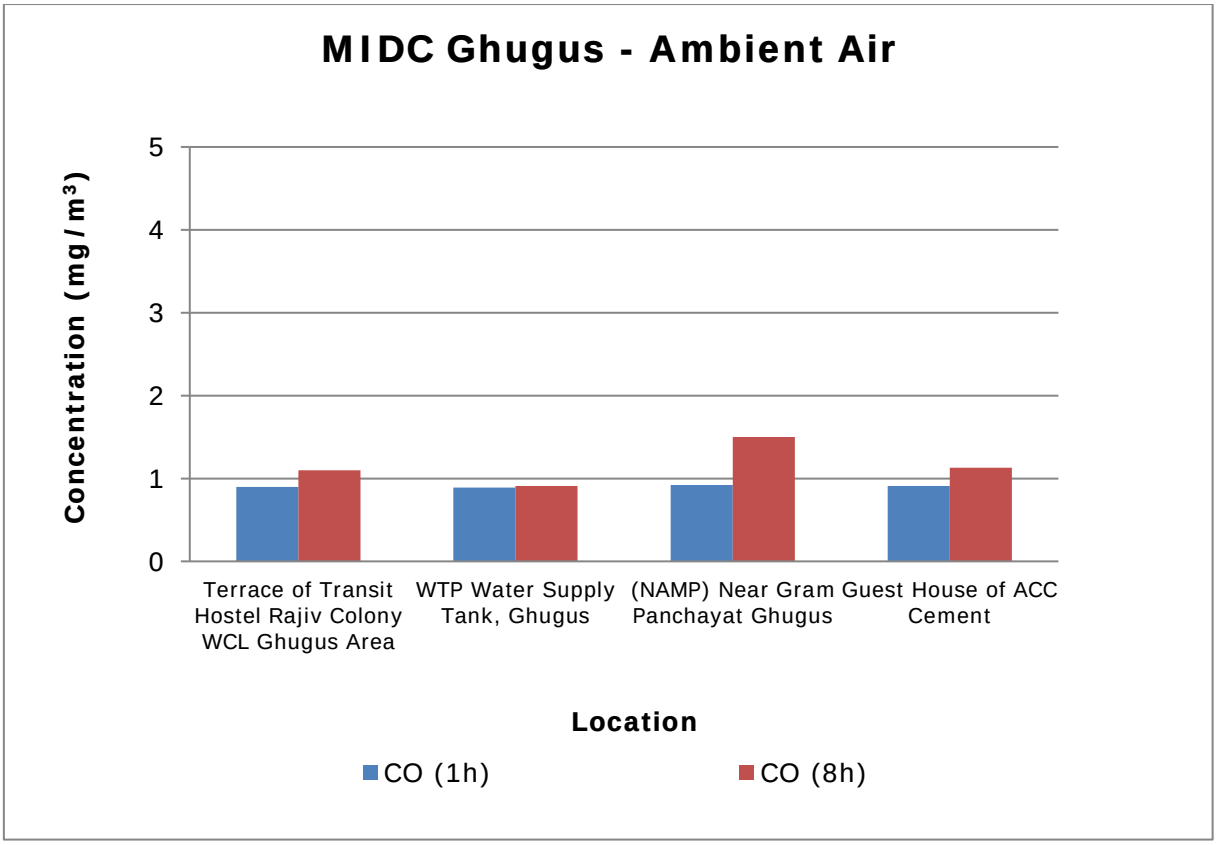
Parameters	Unit	Results	
		Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area	Guest House of ACC Cement
Dibromomethane	µg/m³	BLQ	BLQ
Toluene	µg/m³	2.7	3.63
O-Xylene	µg/m³	BLQ	BLQ
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
1,1-Dichloroethane	µg/m³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
Bromochloromethane	µg/m³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

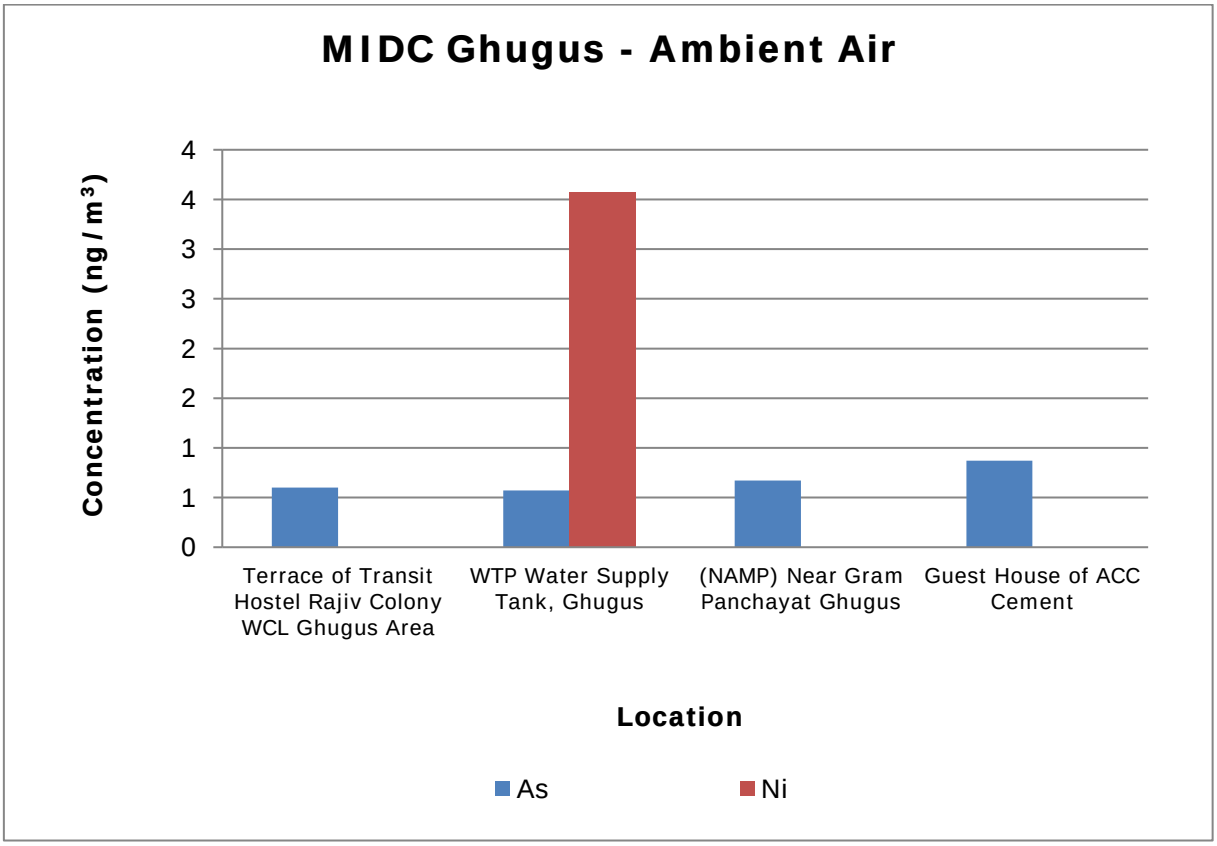
Graphs - Ambient Air Quality Monitoring of MIDC Ghugus




MIDC Ghugus - Ambient Air
Concentration (µg/m³)
3
2
1
0
Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area
WTP Water Supply Tank, Ghugus
(NAMP) Near Gram Panchayat Ghugus
Guest House of ACC Cement
Location
C6H6
Pb


MIDC Ghugus - Ambient Air
Concentration (µg/m³)
60
50
40
30
20
10
0
Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area
WTP Water Supply Tank, Ghugus
(NAMP) Near Gram Panchayat Ghugus
Guest House of ACC Cement
Location
O3
NH3


MIDC Ghugus - Ambient Air
Concentration (mg/m³)
5
4
3
2
1
0
Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area
WTP Water Supply Tank, Ghugus
(NAMP) Near Gram Panchayat Ghugus
Guest House of ACC Cement
Location
CO (1h)
CO (8h)


MIDC Ghugus - Ambient Air
Concentration (ng/m³)
4
4
3
3
2
2
1
1
0
Terrace of Transit Hostel Rajiv Colony WCL Ghugus Area
WTP Water Supply Tank, Ghugus
(NAMP) Near Gram Panchayat Ghugus
Guest House of ACC Cement
Location
As
Ni

4. **MIDC Ballarpur:** In MIDC Ballarpur also all 4 locations monitored for 12 parameters are well within the limit prescribed as per the NAAQS.

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	19º52'17.0''N	79º20'38.8''E	26.06.2024	28.06.2024	30.06.2024
2.	Estate Office, BILT Colony, Ballarpur	19º52'07.9''N	79º20'22.8''E	26.06.2024	28.06.2024	30.06.2024
3.	(NAMP) Nagar Parishad Ballarpur	19º51'03.3''N	79º21'04.3''E	26.06.2024	28.06.2024	30.06.2024
4.	WCL Office, Ballarpur on Sasti Road	19º50'23.2''N	79º20'49.0''E	26.06.2024	28.06.2024	30.06.2024

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	19º52'07.9''N	79º20'22.8''E	26.06.2024	28.06.2024	30.06.2024
2.	(NAMP) Nagar Parishad Ballarpur	19º52'08.2''N	79º20'17.8''E	26.06.2024	28.06.2024	30.06.2024

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/m³	20.1	11.1	18.9	24
Nitrogen Dioxide (NO_2)	µg/m³	31.05	BLQ	29.7	BLQ
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	65	36	49	68
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	17	10	9	16
Ozone (O_3)	µg/m³	BLQ	BLQ	21	56
Lead (Pb)	µg/m³	0.034	0.02	0.07	BLQ
Carbon Monoxide (CO) (1 h)	mg/m³	0.93	0.9	1.0	0.9
Carbon Monoxide (CO) (8 h)	mg/m³	1.4	1.4	1.5	1.44
Ammonia (NH_3)	µg/m³	61.4	51	63	41.1
Benzene (C_6H_6)	µg/m³	1.75	1.9	1.7	1.91
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m³	0.63	0.44	0	0.61
Nickel (Ni)	ng/m³	5	6	5	3.74

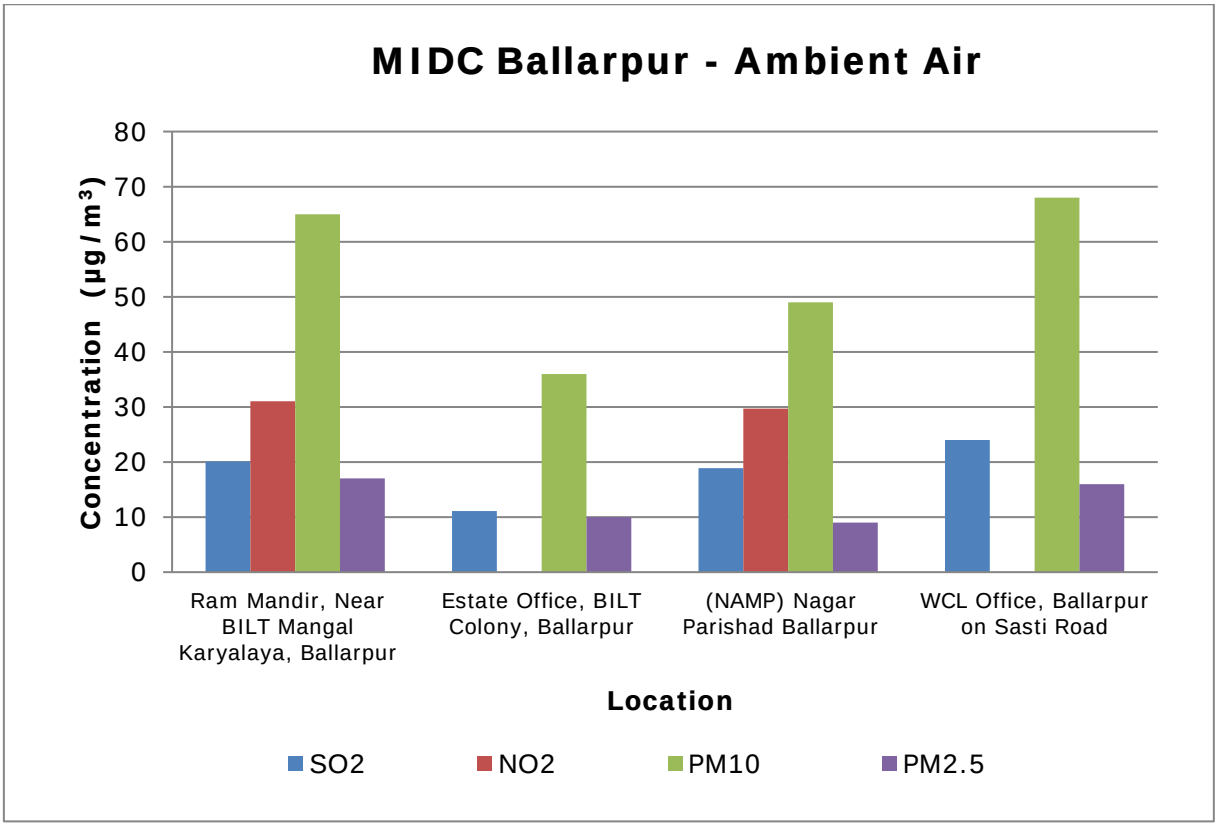
Table 5.16 MIDC Ballarpur - Volatile Organic Compounds (VOCs) in Ambient Air Results

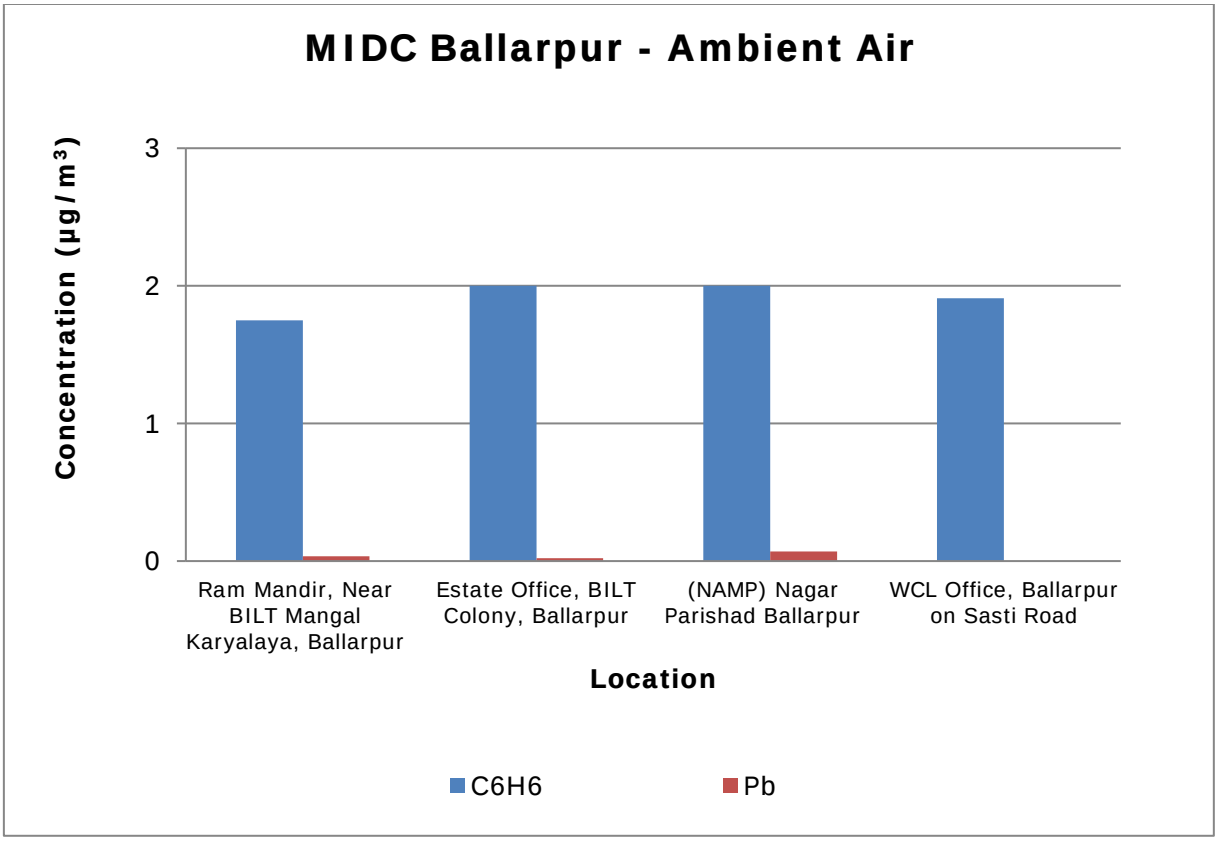
Parameters	Unit	Results	
		Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur
Dichloromethane	µg/m³	2.85	5.07
Chloroform	µg/m³	0.66	3.29
Carbon Tetrachloride	µg/m³	0.69	BLQ
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dichlorobenzene	µg/m³	BLQ	BLQ

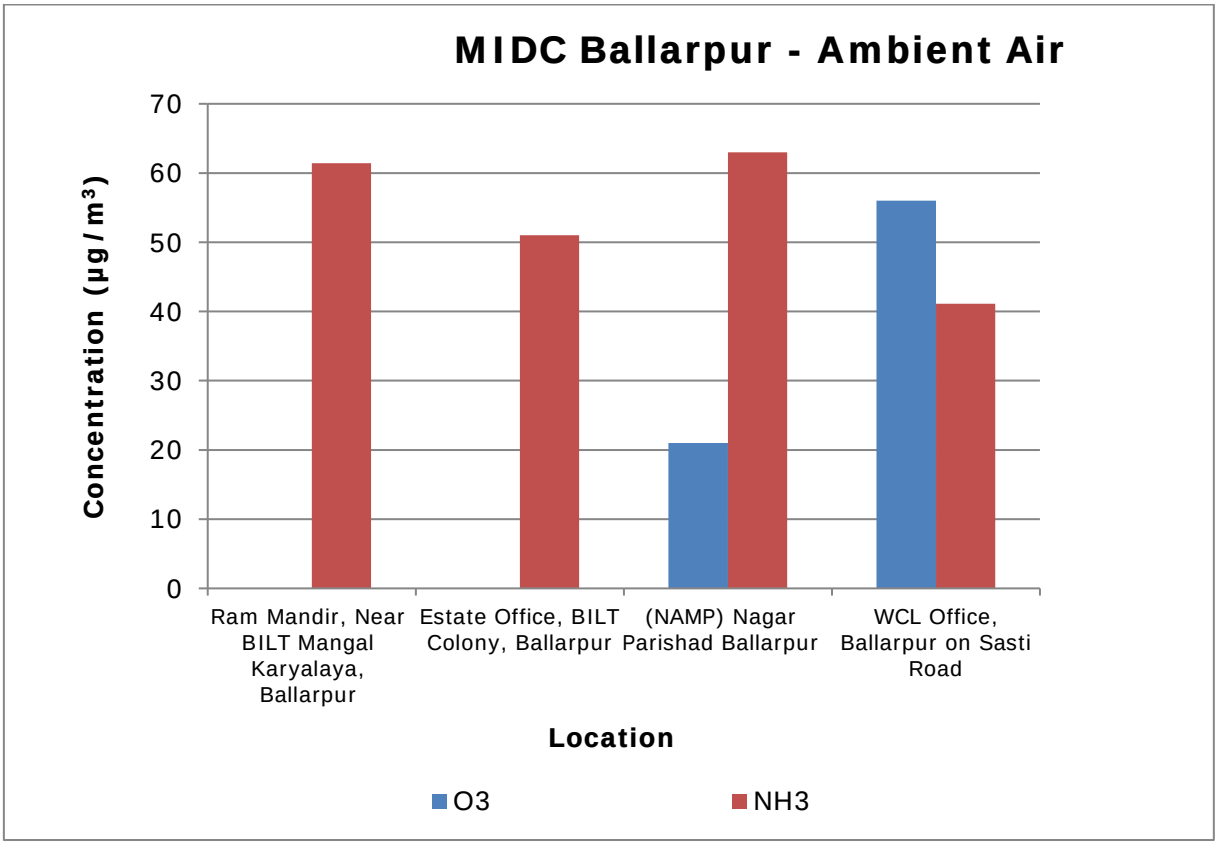
Parameters	Unit	Results	
		Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propylbenzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m³	BLQ	BLQ
Ethylbenzene	µg/m³	BLQ	BLQ
1,1-Dichloropropylene	µg/m³	BLQ	BLQ
1,2-Dichloroethane	µg/m³	0.61	1.70
1,2-Dichloropropane	µg/m³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m³	BLQ	BLQ
Tetrachloroethylene	µg/m³	BLQ	BLQ
1,3,5-Trimethylbenzene	µg/m³	BLQ	BLQ
N-Butylbenzene	µg/m³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m³	BLQ	BLQ
Hexachlorobutadiene	µg/m³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m³	BLQ	BLQ
2,2-Dichloropropane	µg/m³	BLQ	BLQ

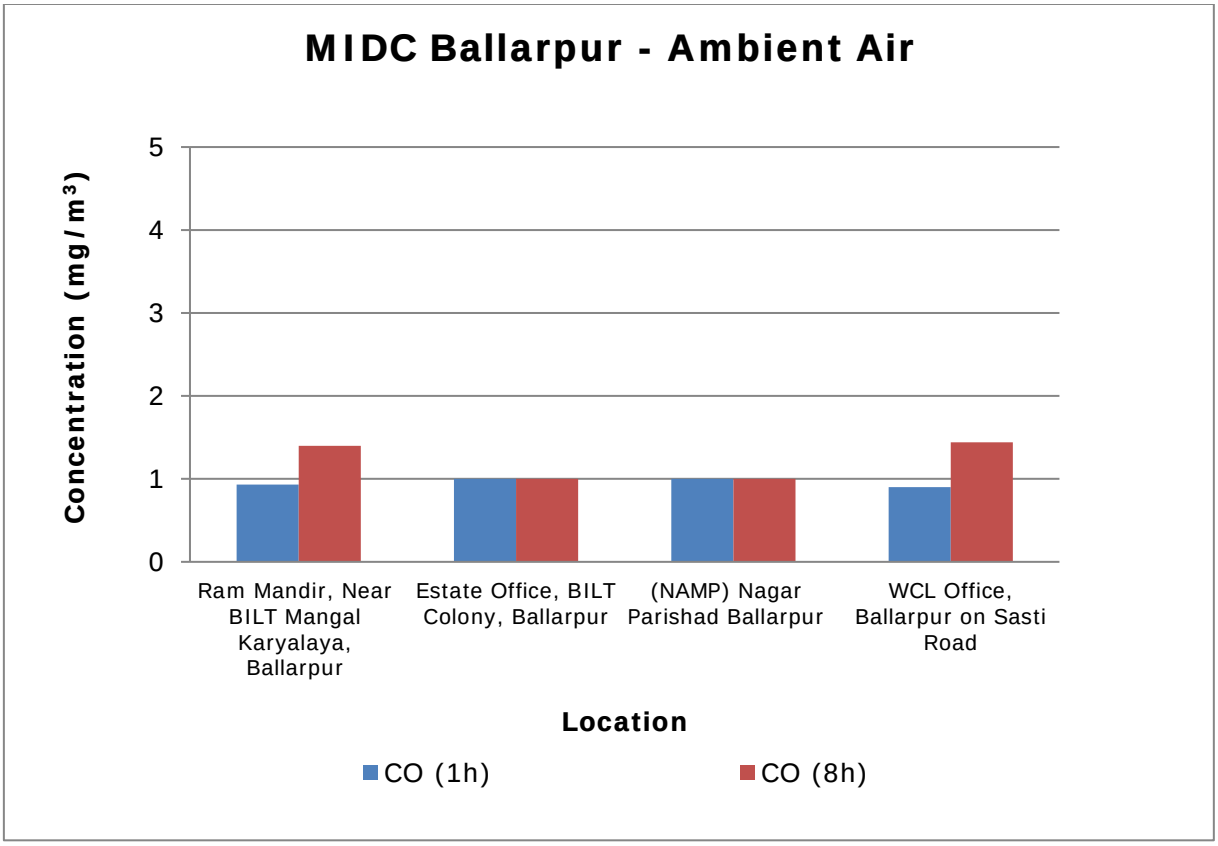
Parameters	Unit	Results	
		Estate Office, BILT Colony, Ballarpur	(NAMP) Nagar Parishad Ballarpur
Dibromomethane	µg/m³	BLQ	BLQ
Toluene	µg/m³	2.02	2.28
O-Xylene	µg/m³	BLQ	BLQ
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
1,1-Dichloroethane	µg/m³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
Bromochloromethane	µg/m³	BLQ	1.43
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

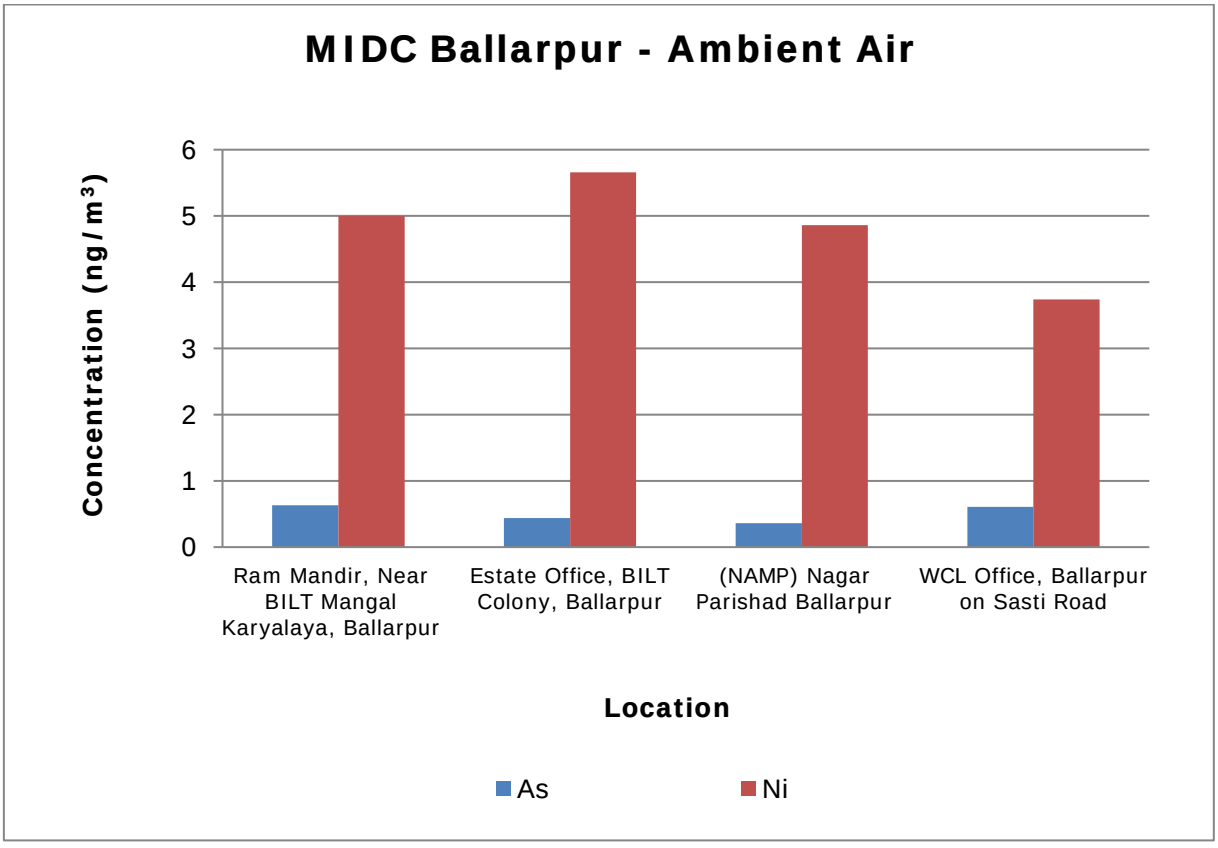
Graphs - Ambient Air Quality Monitoring of MIDC Ballarpur




MIDC Ballarpur - Ambient Air
Concentration (µg/m³)
3
2
1
0
Ram Mandir, Near BILT Mangal Karyalaya, Ballarpur
Estate Office, BILT Colony, Ballarpur
(NAMP) Nagar Parishad Ballarpur
WCL Office, Ballarpur on Sasti Road
Location
C6H6
Pb


MIDC Ballarpur - Ambient Air
Concentration (µg/m³)
70
60
50
40
30
20
10
0
Ram Mandir, Near BILT Mangal Karyalaya, Ballarpur
Estate Office, BILT Colony, Ballarpur
(NAMP) Nagar Parishad Ballarpur
WCL Office, Ballarpur on Sasti Road
Location
O3
NH3


MIDC Ballarpur - Ambient Air
Concentration (mg/m³)
5
4
3
2
1
0
Ram Mandir, Near BILT Mangal Karyalaya, Ballarpur
Estate Office, BILT Colony, Ballarpur
(NAMP) Nagar Parishad Ballarpur
WCL Office, Ballarpur on Sasti Road
Location
CO (1h)
CO (8h)


MIDC Ballarpur - Ambient Air
Concentration (ng/m³)
6
5
4
3
2
1
0
Ram Mandir, Near BILT Mangal Karyalaya, Ballarpur
Estate Office, BILT Colony, Ballarpur
(NAMP) Nagar Parishad Ballarpur
WCL Office, Ballarpur on Sasti Road
Location
As
Ni

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 four surface water samples are collected.

- All three water samples collected are acceptable in sanitary survey, colour, smell and transparency.
- Suspended solids, pH and BOD also well within the limits at all four samples collected.
- 100% survival was achieved in Fish Bioassay in all three samples out of four samples.
- Metals like Zinc, Nickel, Copper, Hexavalent Chromium (Cr^{6+}), Total Chromium, Total Arsenic, Lead, Cadmium, etc. are observed either below limit of quantification or below their standard limits.
- Iron observed above their standard limits.
- Parameters like Free Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- The concentration of Fluoride, Total Phosphate and Total Dissolve Solid exceeded prescribed 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 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	20º01’48.0’’N	79º11’21.8’’E	27.06.2024	29.06.2024	30.06.2024
2.	Nallah adjacent to Grace Industries	20º00’28.1’’N	79º 11’11.1’’E	27.06.2024	29.06.2024	30.06.2024
3.	Raw Water of MIDC WTP	20º00’26.6”N	79º11’11.3”E	27.06.2024	29.06.2024	30.06.2024
4.	Morva Village Lake	20º00’49.0”N	79º13’35.7”E	27.06.2024	29.06.2024	30.06.2024

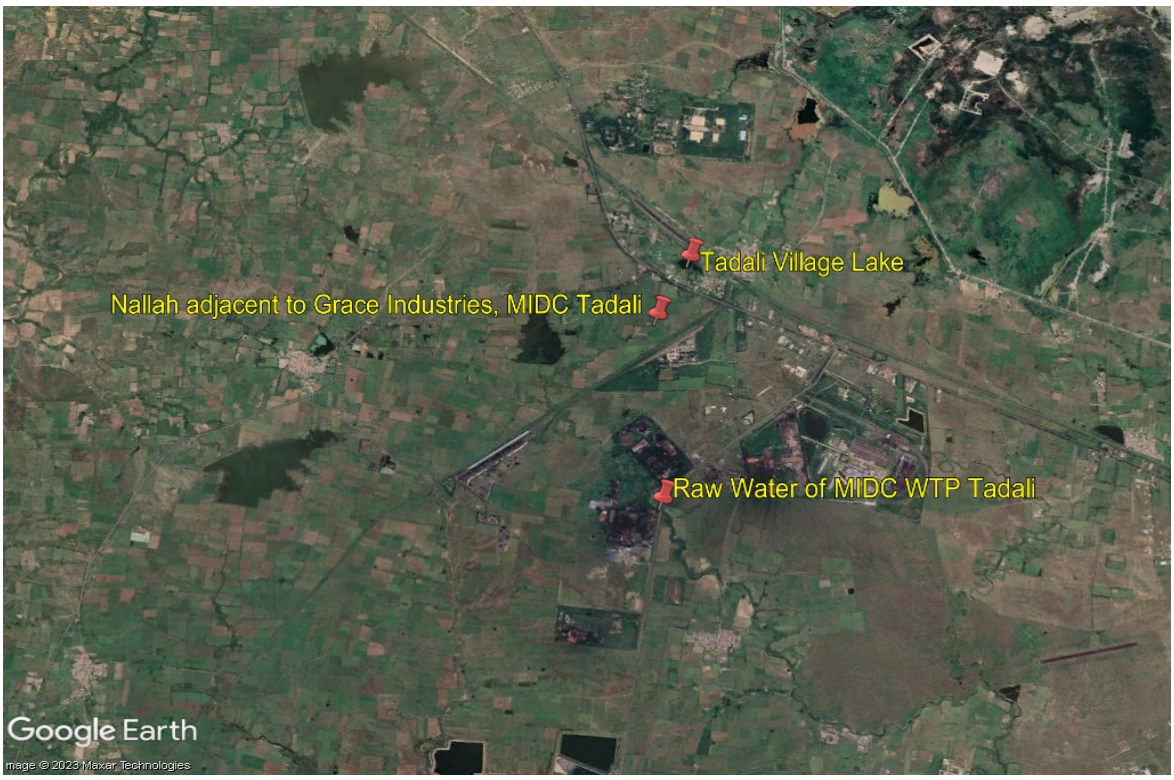


Fig. Geographical Locations of Surface Water Sampling MIDC Tadali

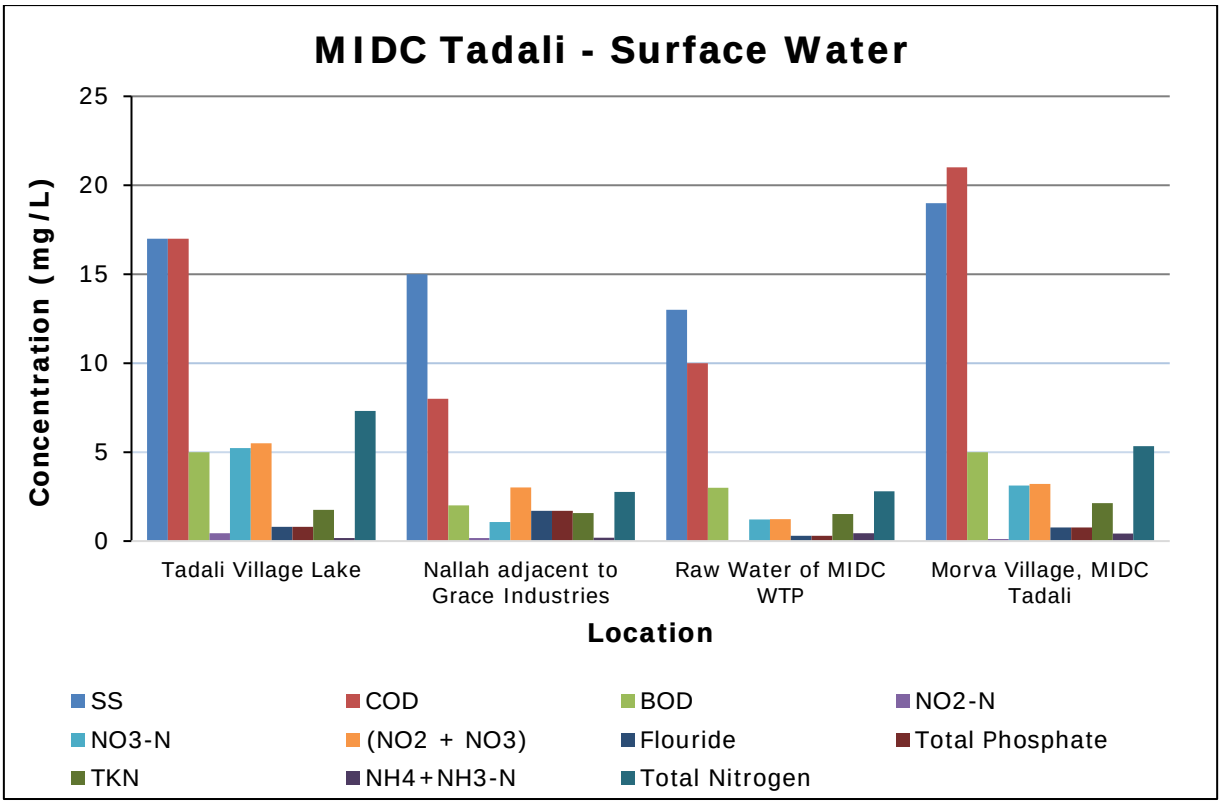
Table 6.2 MIDC Tadali – Results of Surface Water

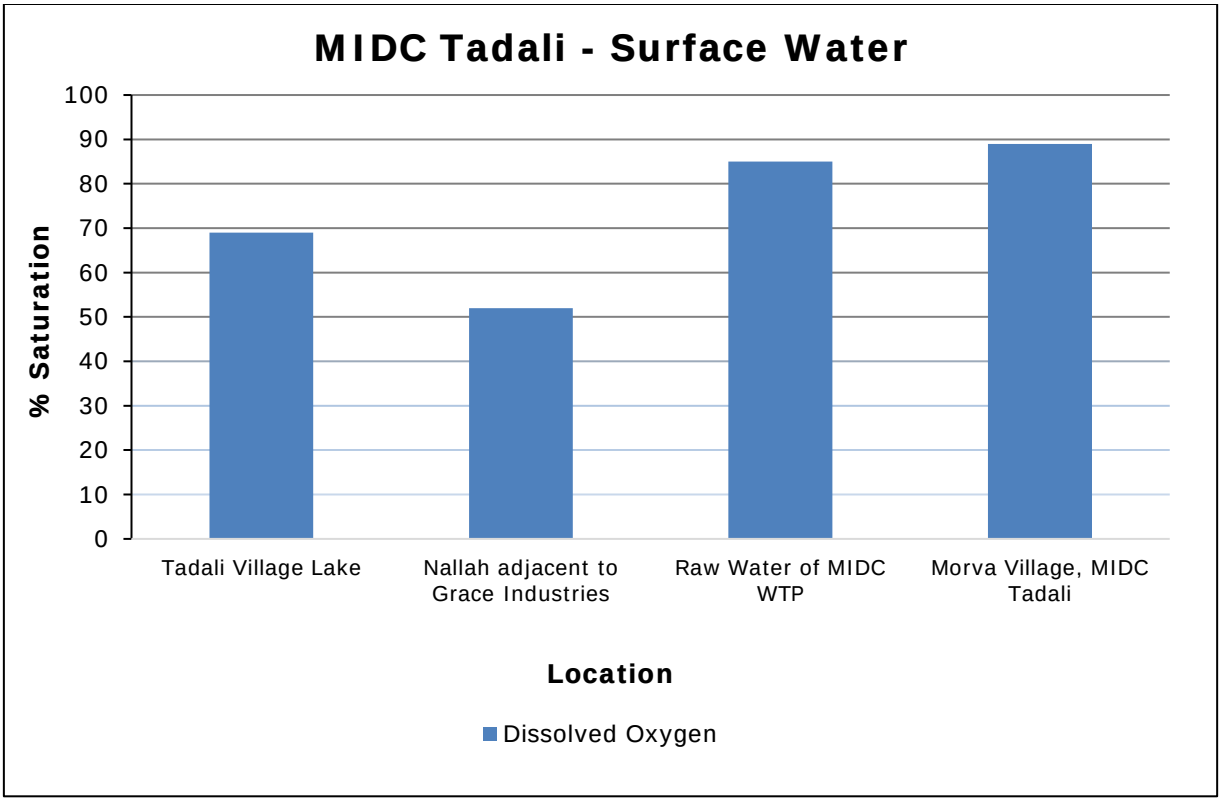
Parameters	Unit	Results			
		Tadali Village Lake	Nallah adjacent to Grace Industries	Raw Water of MIDC WTP	Morva Village
Sanitary Survey	-	Reasonably Clean Neighbourhood	Reasonably Clean Neighbourhood	Very Clean Neighbourhood and Catchment	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	No Floating Matter	Floating Matter Evident
Transparency	m	0.2	0.2	0.2	0.3
Temperature	^{o}C	29	28	29	30
Colour	Hazen	2	1	1	11
Odour	-				
pH	-	7.63	7.88	8.10	7.44
Oil & Grease	mg/L	BLQ	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	17	15	13	19
Total Dissolved Solids	mg/L	439	2559	233	378
Dissolved Oxygen (% Saturation)	%	69	52	85	89
Chemical Oxygen Demand	mg/L	17	8	10	21

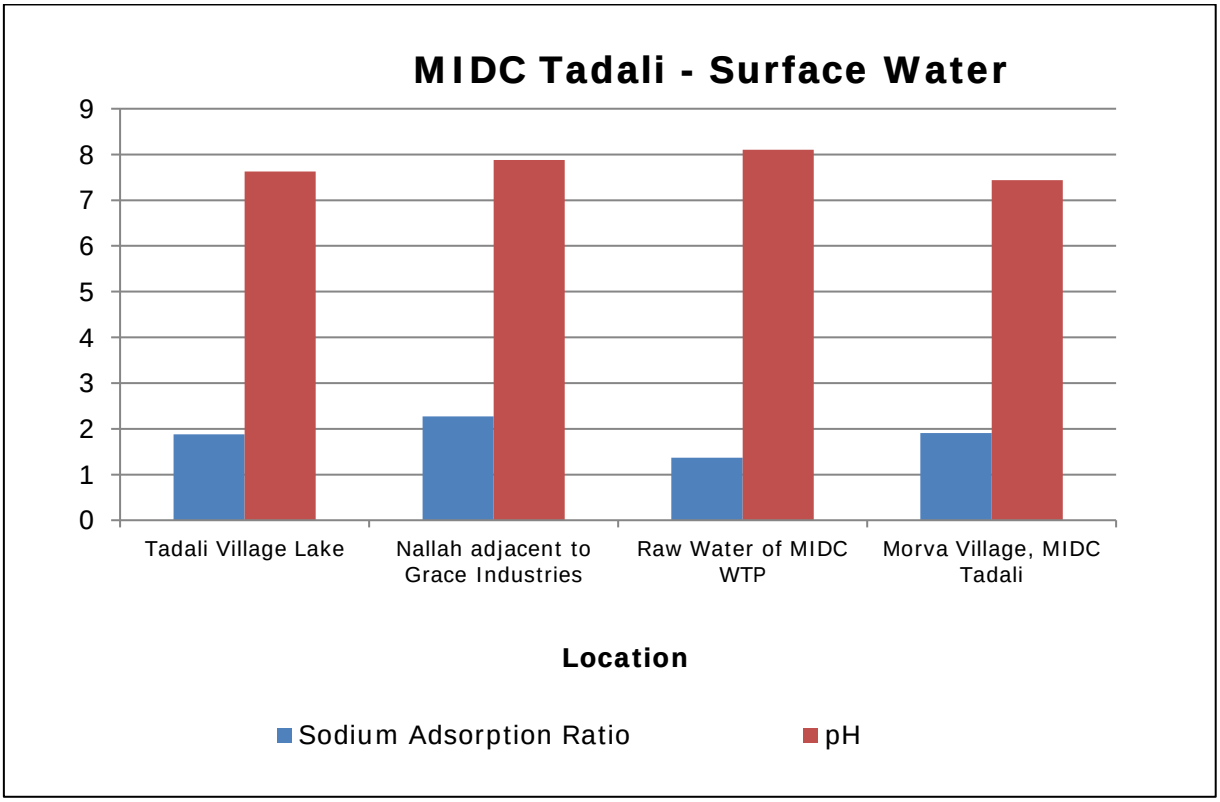
Parameters	Unit	Results			
		Tadali Village Lake	Nallah adjacent to Grace Industries	Raw Water of MIDC WTP	Morva Village
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	5	2	3	5
Electrical Conductivity (at 25°C)	µmhos/cm	783	4560	357	672
Nitrite Nitrogen	mg/L	0.45	0.18	0.03	0.11
Nitrate Nitrogen	mg/L	5.23	1.07	1.22	3.13
$(NO_2 + NO_3)$-Nitrogen	mg/L	5.50	3.01	1.24	3.21
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.8	1.7	0.3	0.77
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.28	BLQ	BLQ	0.14
Sodium Adsorption Ratio	-	1.88	2.27	1.37	1.91
Total Coliforms	MPN Index/ 100 ml	1600	1247	198	757
Faecal Coliforms	MPN Index/ 100 ml	182	42	26	812
Total Phosphate (as P)	mg/L	0.38	0.7	0.29	0.22
Total Kjeldahl Nitrogen (as N)	mg/L	1.76	1.57	1.53	2.13
Total Ammonia $(NH_4 + NH_3)$-Nitrogen	mg/L	0.18	0.19	0.44	0.42
Total Nitrogen	mg/L	7.31	2.76	2.8	5.34
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.051	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	0.014	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ	BLQ

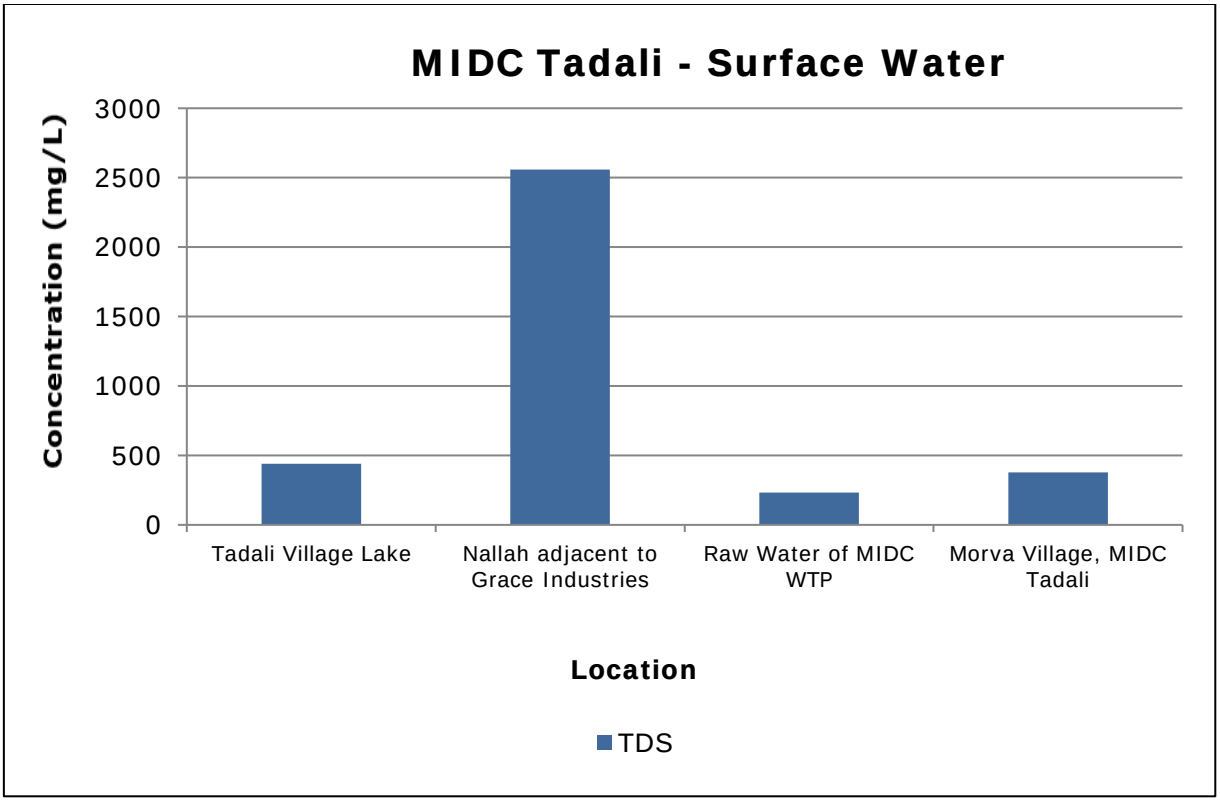
Parameters	Unit	Results			
		Tadali Village Lake	Nallah adjacent to Grace Industries	Raw Water of MIDC WTP	Morva Village
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.167	0.135	0.042	0.074
Iron (as Fe)	mg/L	0.327	0.616	0.57	0.798
Vanadium (as V)	mg/L	0.012	0.019	0.026	0.014
Selenium (as Se)	mg/L	BLQ	0.006	0.015	BLQ
Boron (as B)	mg/L	BLQ	0.422	0.315	0.1745
Bioassay Test on fish	% survival	100	93	100	100

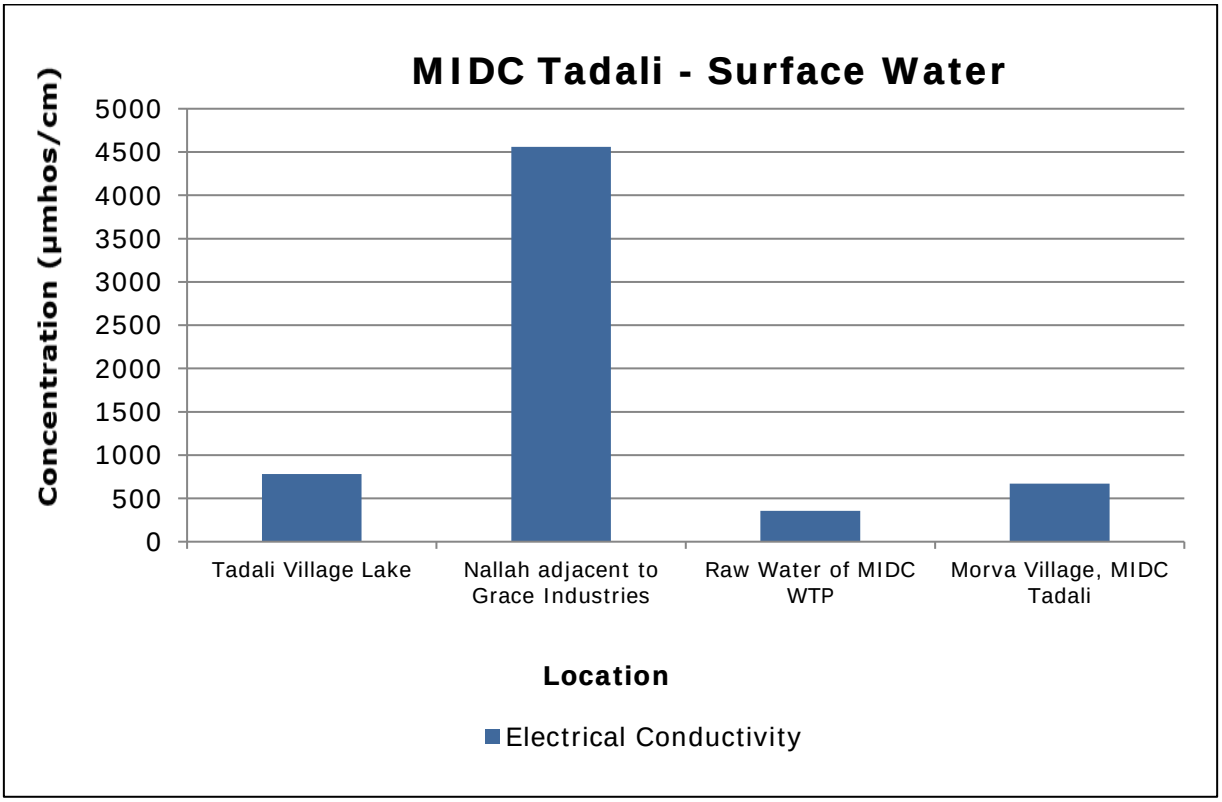
Graphs - Surface Water Quality of MIDC Tadali

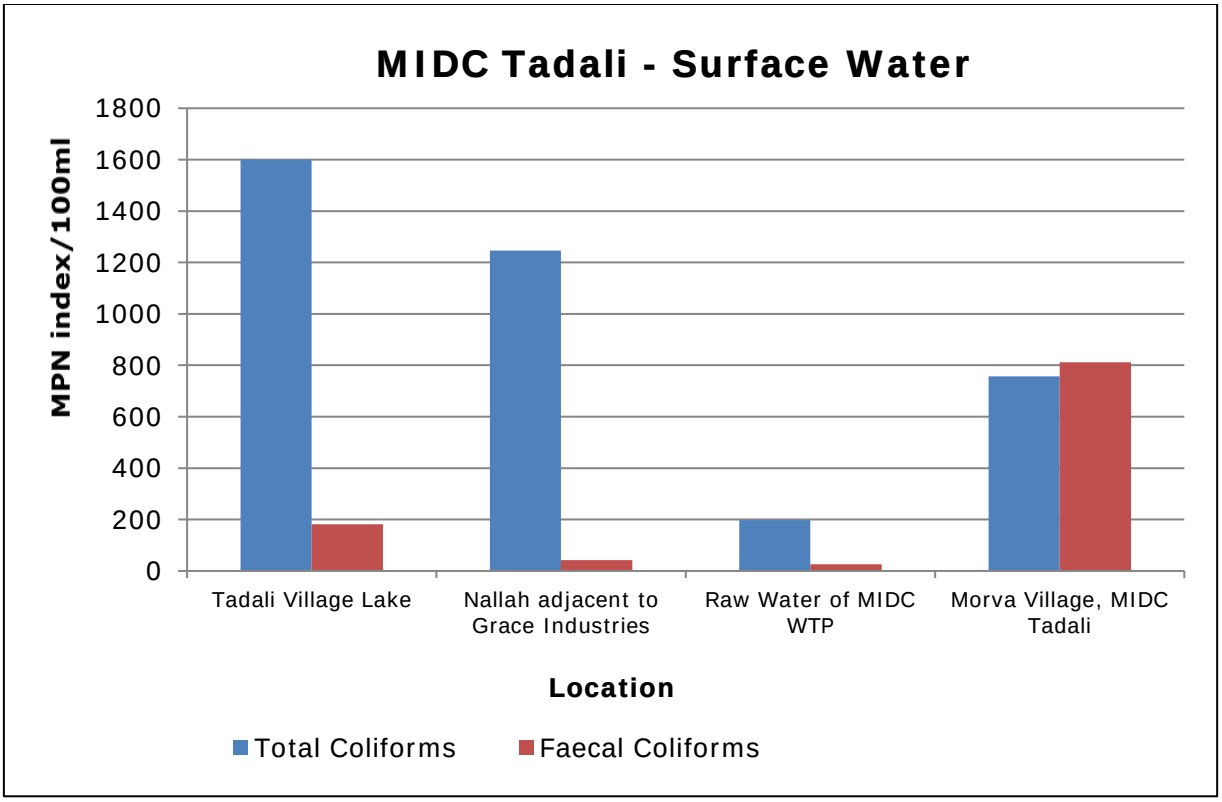


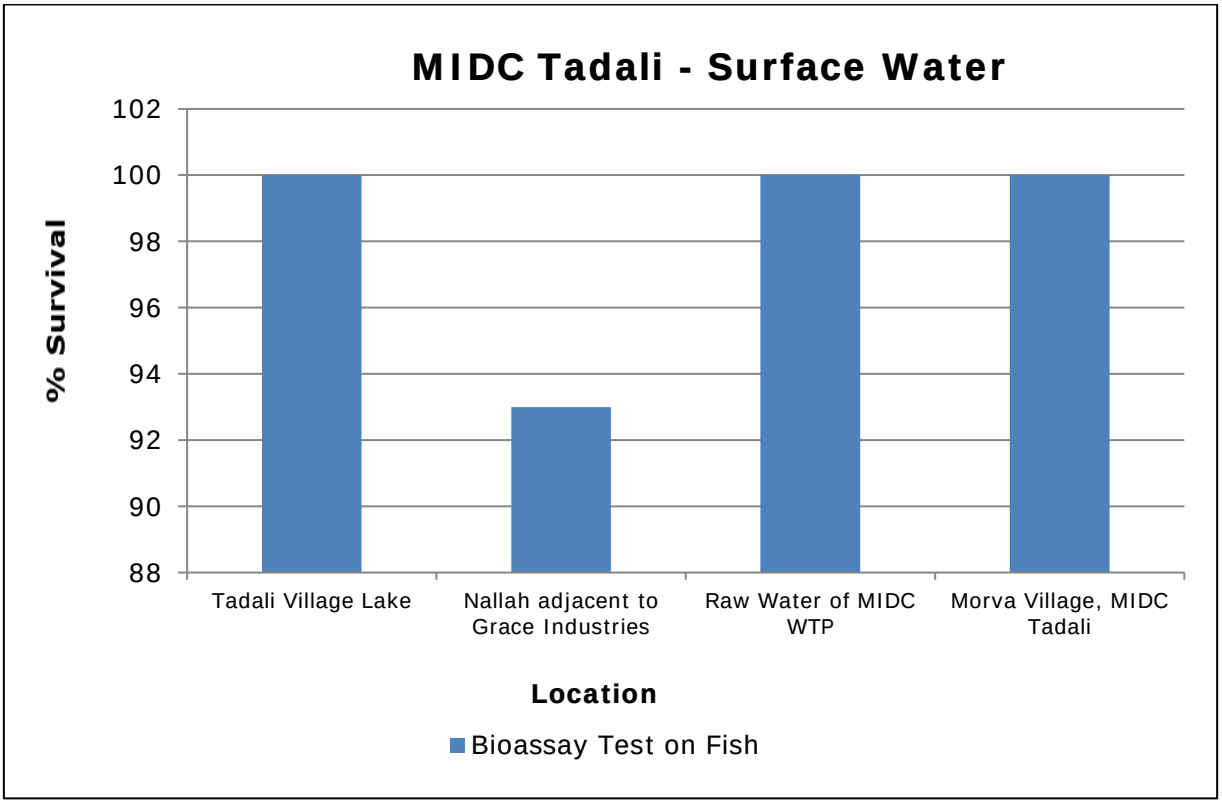

MIDC Tadali - Surface Water
% Saturation
100
90
80
70
60
50
40
30
20
10
0
Tadali Village Lake
Nallah adjacent to Grace Industries
Raw Water of MIDC WTP
Morva Village, MIDC Tadali
Location
Dissolved Oxygen


MIDC Tadali - Surface Water
9
8
7
6
5
4
3
2
1
0
Tadali Village Lake
Nallah adjacent to Grace Industries
Raw Water of MIDC WTP
Morva Village, MIDC Tadali
Location
Sodium Adsorption Ratio
pH


MIDC Tadali - Surface Water
Concentration (mg/L)
3000
2500
2000
1500
1000
500
0
Tadali Village Lake
Nallah adjacent to Grace Industries
Raw Water of MIDC WTP
Morva Village, MIDC Tadali
Location
TDS


MIDC Tadali - Surface Water
Concentration (µmhos/cm)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Tadali Village Lake
Nallah adjacent to Grace Industries
Raw Water of MIDC WTP
Morva Village, MIDC Tadali
Location
Electrical Conductivity


MIDC Tadali - Surface Water
MPN index/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
Tadali Village Lake
Nallah adjacent to Grace Industries
Raw Water of MIDC WTP
Morva Village, MIDC Tadali
Location
Total Coliforms
Faecal Coliforms


MIDC Tadali - Surface Water
% Survival
102
100
98
96
94
92
90
88
Tadali Village Lake
Nallah adjacent to Grace Industries
Raw Water of MIDC WTP
Morva Village, MIDC Tadali
Location
Bioassay Test on Fish

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

- All three water samples collected are acceptable in sanitary survey, colour, smell and transparency.
- pH, Electrical conductivity, suspended solids and BOD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay in two samples.
- Metals like Hexavalent Chromium (Cr^{6+}), Total Chromium, Total Arsenic, Cadmium, Copper, Lead, 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.
- Zink, Nickel, Manganese and Iron exceeded prescribed 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 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	27.06.2024	29.06.2024	30.06.2024
2.	Nallah Near Gagangiri Village	19°58'03.5''N	79°14'50.5''E	27.06.2024	29.06.2024	30.06.2024
3.	Nallah at Dhanora Bridge	19°57'37.1''N	79°15'40.5''E	27.06.2024	29.06.2024	30.06.2024

Fig. Geographical Locations of Surface Water Sampling MIDC Chandrapur

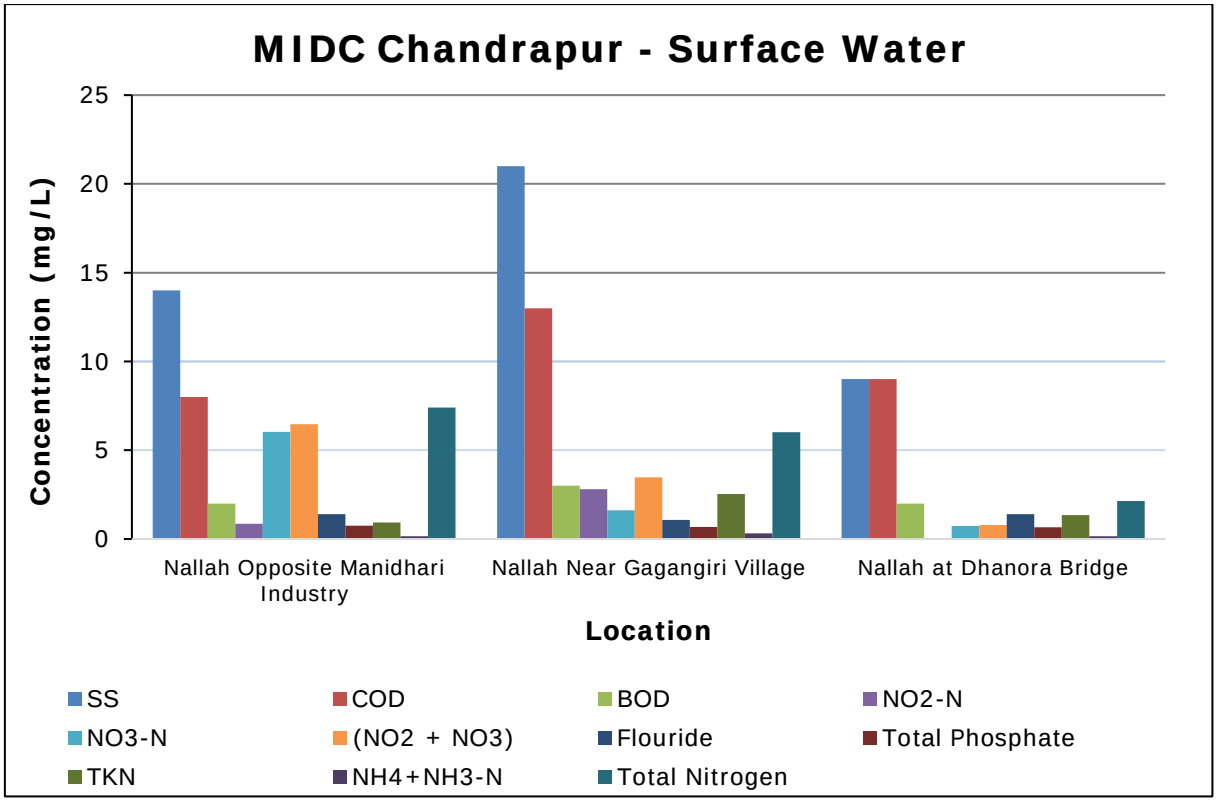
Table 6.4 MIDC Chandrapur – Results of Surface Water

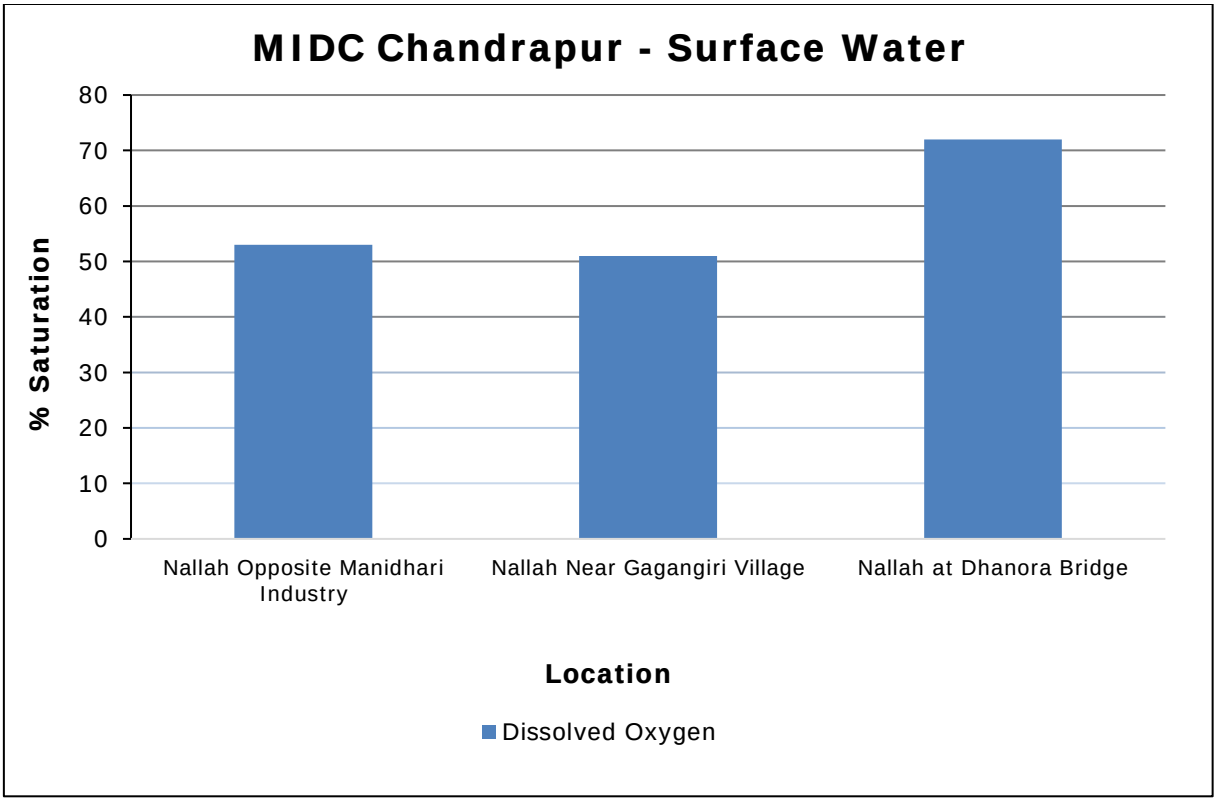
Parameters	Unit	Results		
		Nallah Opposite Manidhari Industry	Nallah Near Gagangiri Village	Nallah at Dhanora Bridge
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.1	0.1	0.2
Temperature	^{o}C	26	27	26
Colour	Hazen	1	3	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.87	7.81	7.99
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	14	21	9
Total Dissolved Solids	mg/L	678	495	632
Dissolved Oxygen (% Saturation)	%	53	51	72
Chemical Oxygen Demand	mg/L	8	13	9
Biochemical Oxygen Demand (3 days, 27^{o}C)	mg/L	2	3	2
Electrical Conductivity (at 25^{o}C)	µmhos/cm	1207	881	1125
Nitrite Nitrogen	mg/L	0.86	2.8	0.048

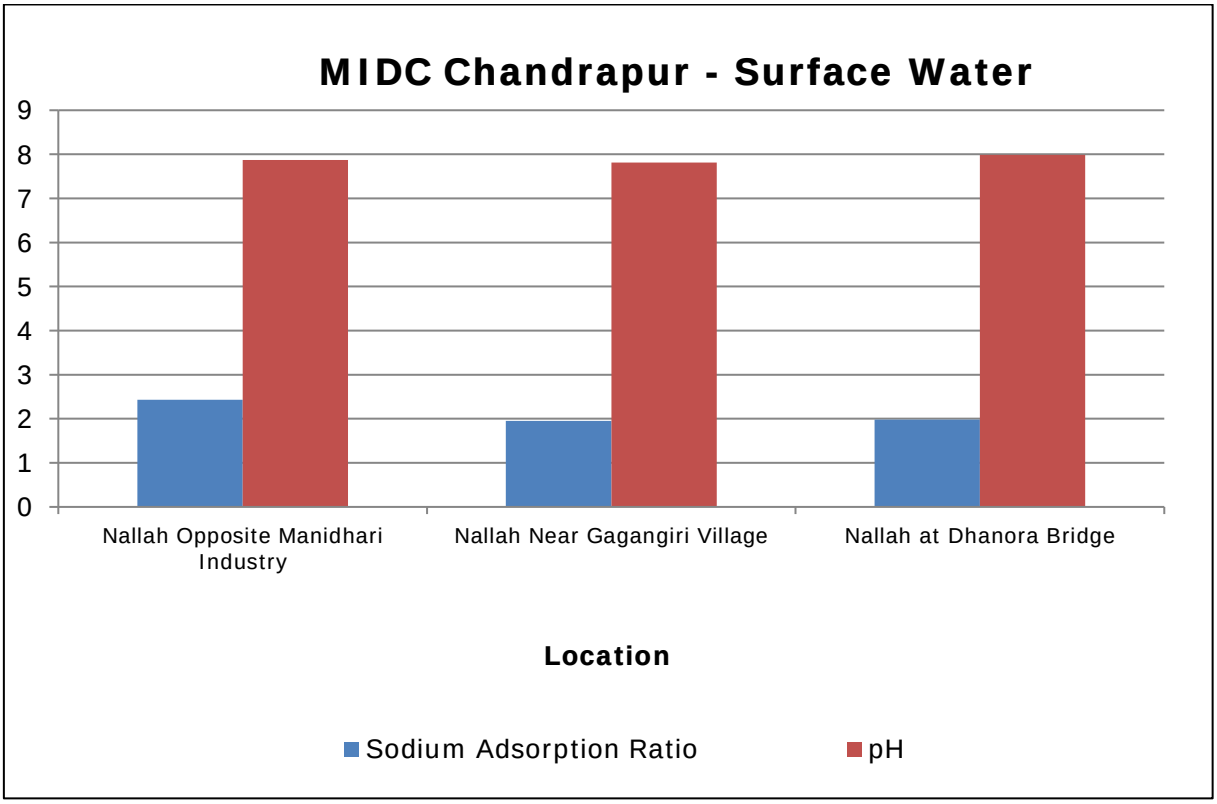
Parameters	Unit	Results		
		Nallah Opposite Manidhari Industry	Nallah Near Gagangiri Village	Nallah at Dhanora Bridge
Nitrate Nitrogen	mg/L	6.03	1.62	0.74
(NO_2+ NO_3)-Nitrogen	mg/L	6.47	3.47	0.79
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.4	1.07	1.4
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.31	0.29	0.67
Sodium Adsorption Ratio	-	2.43	1.95	1.98
Total Coliforms	MPN Index/ 100 ml	653	856	619
Faecal Coliforms	MPN Index/ 100 ml	32	203	58.6
Total Phosphate (as P)	mg/L	0.75	0.67	0.66
Total Kjeldahl Nitrogen (as N)	mg/L	0.93	2.54	1.34
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.15	0.32	0.16
Total Nitrogen	mg/L	7.4	6.01	2.14
Phenols (as C_6H_5OH)	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	0.20	0.39	BLQ)
Nickel (as Ni)	mg/L	0.23	0.30	0.01
Copper (as Cu)	mg/L	0.37	0.28	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.285	0.26	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	0.55	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.65	7.02	0.043
Iron (as Fe)	mg/L	2.01	1.9	0.667
Vanadium (as V)	mg/L	0.196	0.106	0.023
Selenium (as Se)	mg/L	0.009	0.006	BLQ

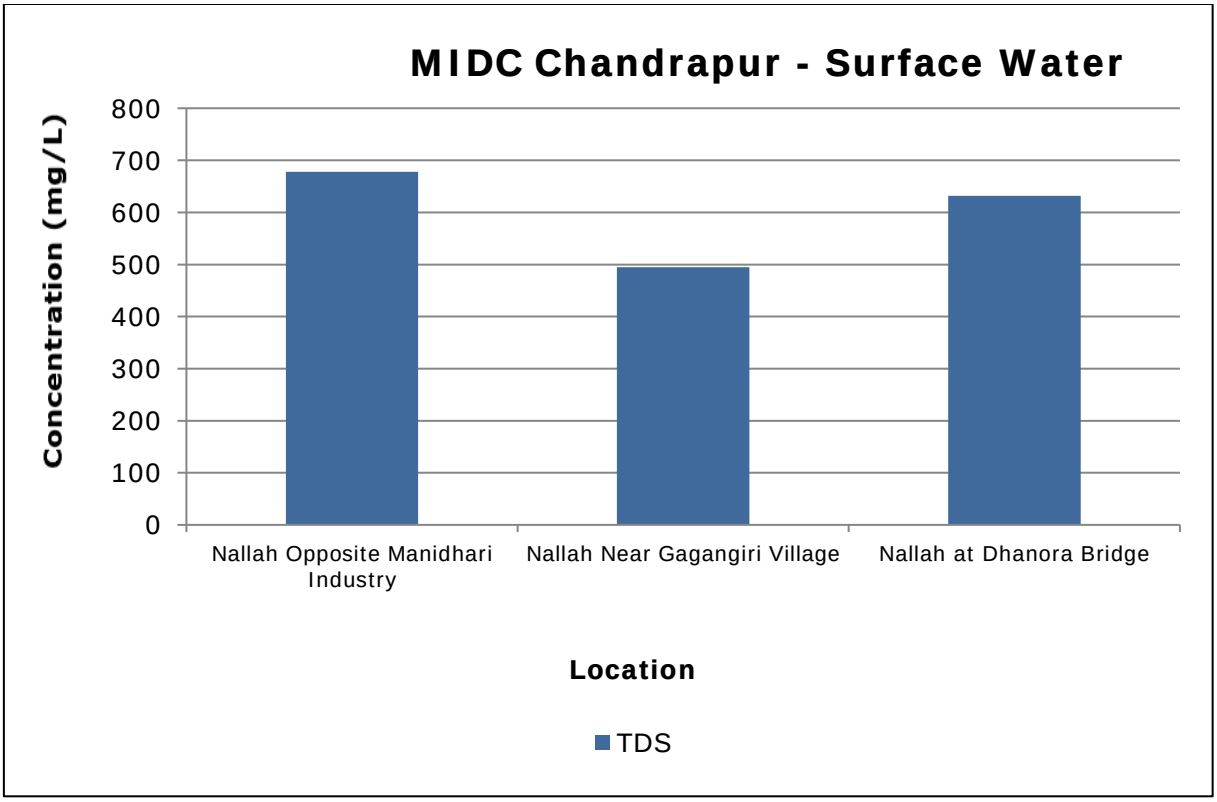
Parameters	Unit	Results		
		Nallah Opposite Manidhari Industry	Nallah Near Gagangiri Village	Nallah at Dhanora Bridge
Boron (as B)	mg/L	0.15	BLQ	0.21
Bioassay Test on fish	% survival	100	93	100

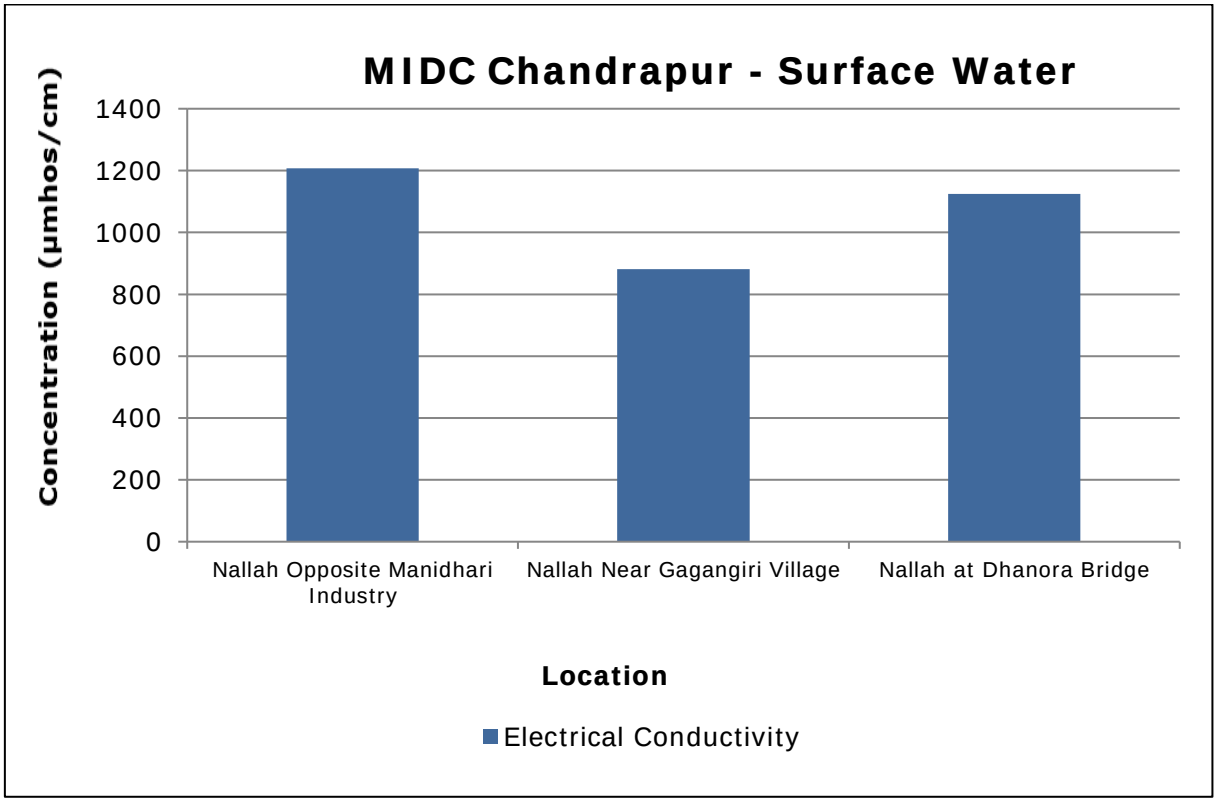
Graphs - Surface Water Quality of MIDC Chandrapur

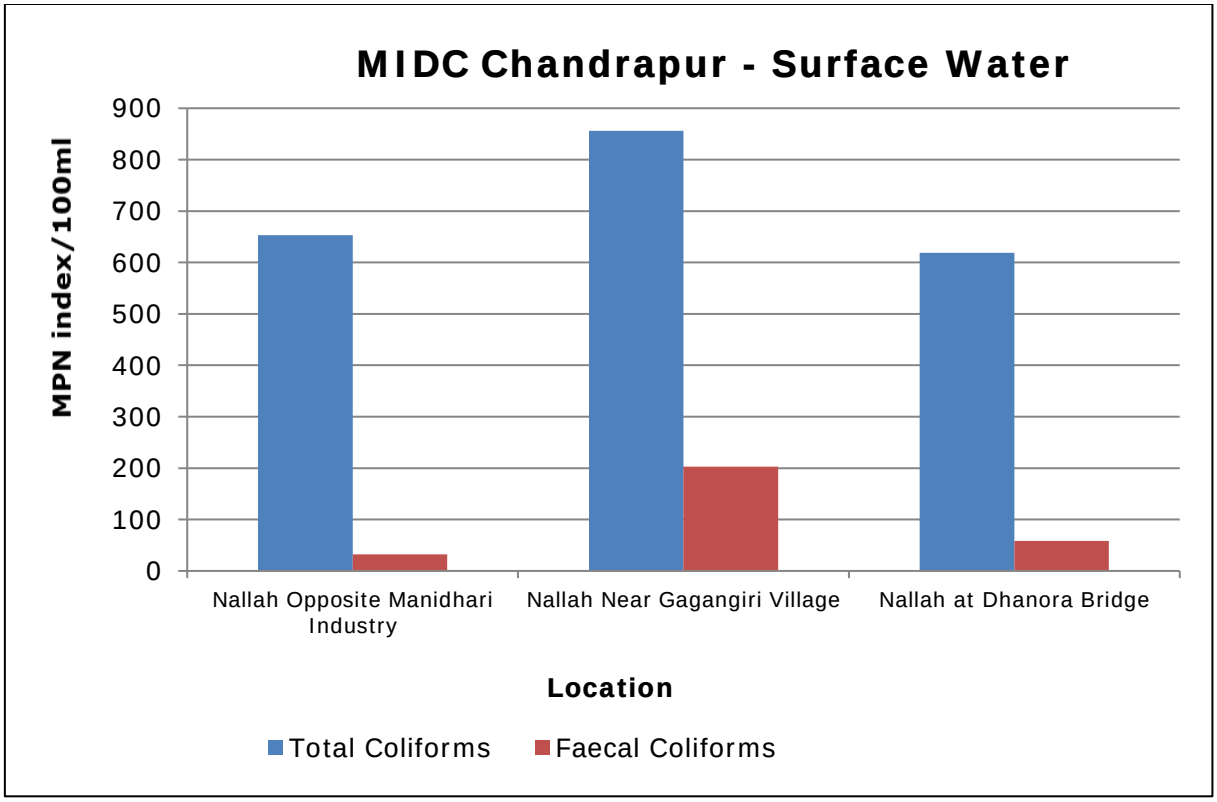


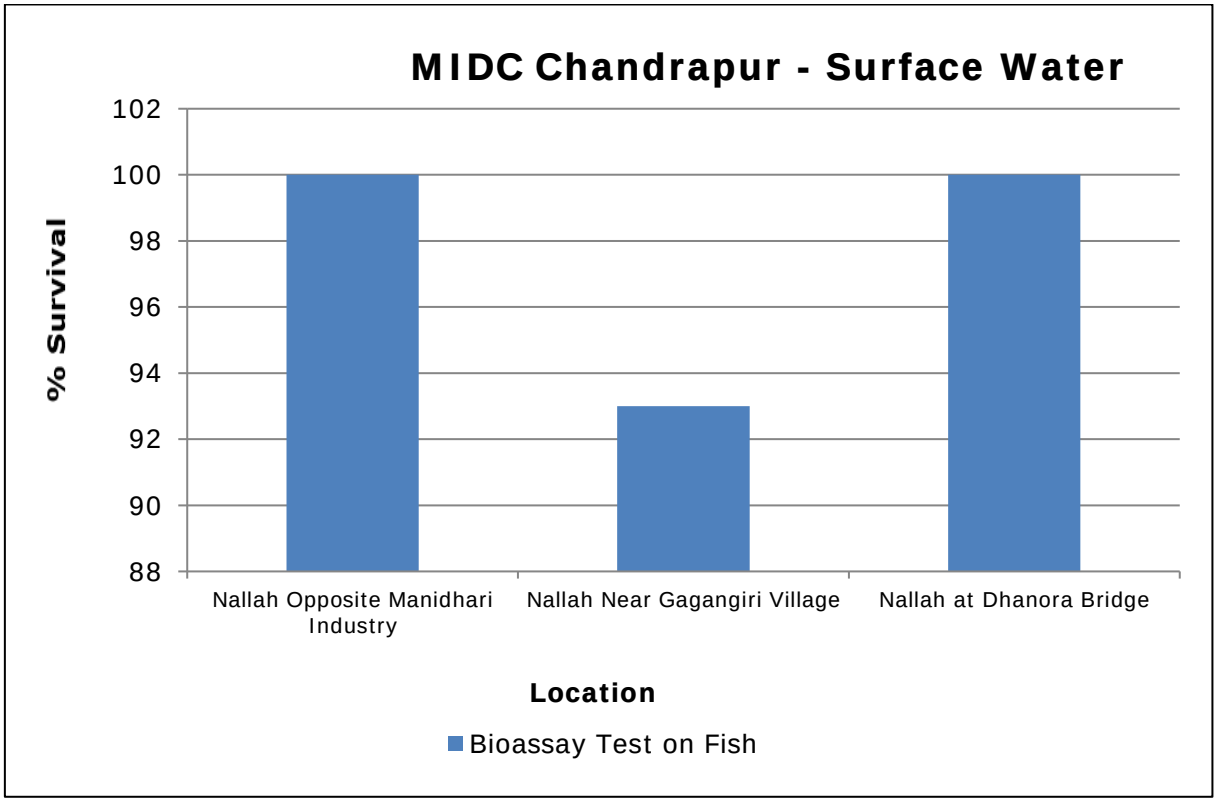

MIDC Chandrapur - Surface Water
% Saturation
80
70
60
50
40
30
20
10
0
Nallah Opposite Manidhari Industry
Nallah Near Gagangiri Village
Nallah at Dhanora Bridge
Location
Dissolved Oxygen


MIDC Chandrapur - Surface Water
9
8
7
6
5
4
3
2
1
0
Nallah Opposite Manidhari Industry
Nallah Near Gagangiri Village
Nallah at Dhanora Bridge
Location
Sodium Adsorption Ratio
pH


MIDC Chandrapur - Surface Water
Concentration (mg/L)
800
700
600
500
400
300
200
100
0
Nallah Opposite Manidhari Industry
Nallah Near Gagangiri Village
Nallah at Dhanora Bridge
Location
TDS


MIDC Chandrapur - Surface Water
Concentration (µmhos/cm)
1400
1200
1000
800
600
400
200
0
Nallah Opposite Manidhari Industry
Nallah Near Gagangiri Village
Nallah at Dhanora Bridge
Location
Electrical Conductivity


MIDC Chandrapur - Surface Water
MPN index/100ml
900
800
700
600
500
400
300
200
100
0
Nallah Opposite Manidhari Industry
Nallah Near Gagangiri Village
Nallah at Dhanora Bridge
Location
Total Coliforms
Faecal Coliforms


MIDC Chandrapur - Surface Water
% Survival
102
100
98
96
94
92
90
88
Nallah Opposite Manidhari Industry
Nallah Near Gagangiri Village
Nallah at Dhanora Bridge
Location
Bioassay Test on Fish

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

- All five water samples collected are acceptable in sanitary survey, colour and smell.
- pH, Electrical conductivity, suspended solids and BOD are also well within the limits at all five samples collected.
- 100% survival was achieved in Fish Bioassay test in three samples out of five samples collected.
- Metals like Arsenic, Hexavalent Chromium (Cr^{6+}) etc. are observed either below the limit of quantification or below their standard limits.
- Total Phosphate and Iron is observed above their standard limits at all locations.
- Fluoride is observed above their standard limits.
- Zinc, Nickel, Copper, Lead and Manganese exceeds the prescribed limit.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- 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	27.06.2024	29.06.2024	30.06.2024
2.	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	19°57'23.3''N	79°06'14.5''E	27.06.2024	29.06.2024	30.06.2024
3.	(NWMP) Wardha River behind ACC plant	19°54'16.7''N	79°06'54.9''E	27.06.2024	29.06.2024	30.06.2024
4.	Nallah at Usgaon, Shengaon road	19°55'18.5''N	79°07'57.5''E	27.06.2024	29.06.2024	30.06.2024
5.	Nallah Water down site of ACC Colony.	19°55'42.3''N	79°06'54.7''E	27.06.2024	29.06.2024	30.06.2024

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	Reasonably clean neighbourhood	Generally Clean Neighbourhood
General Appearance	-	No Floating Matter	Floating matter Evident	Floating Matter Evident
Transparency	m	0.4	0.1	0.4
Temperature	^{o}C	29	30	29
Colour	Hazen	2	1	2
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8	8.24	8.2
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	18	16	23
Total Dissolved Solids	mg/L	187	537	228
Dissolved Oxygen (% Saturation)	%	79	73	83
Chemical Oxygen Demand	mg/L	10	9	12
Biochemical Oxygen Demand (3 days, 27^{o}C)	mg/L	3	2	4

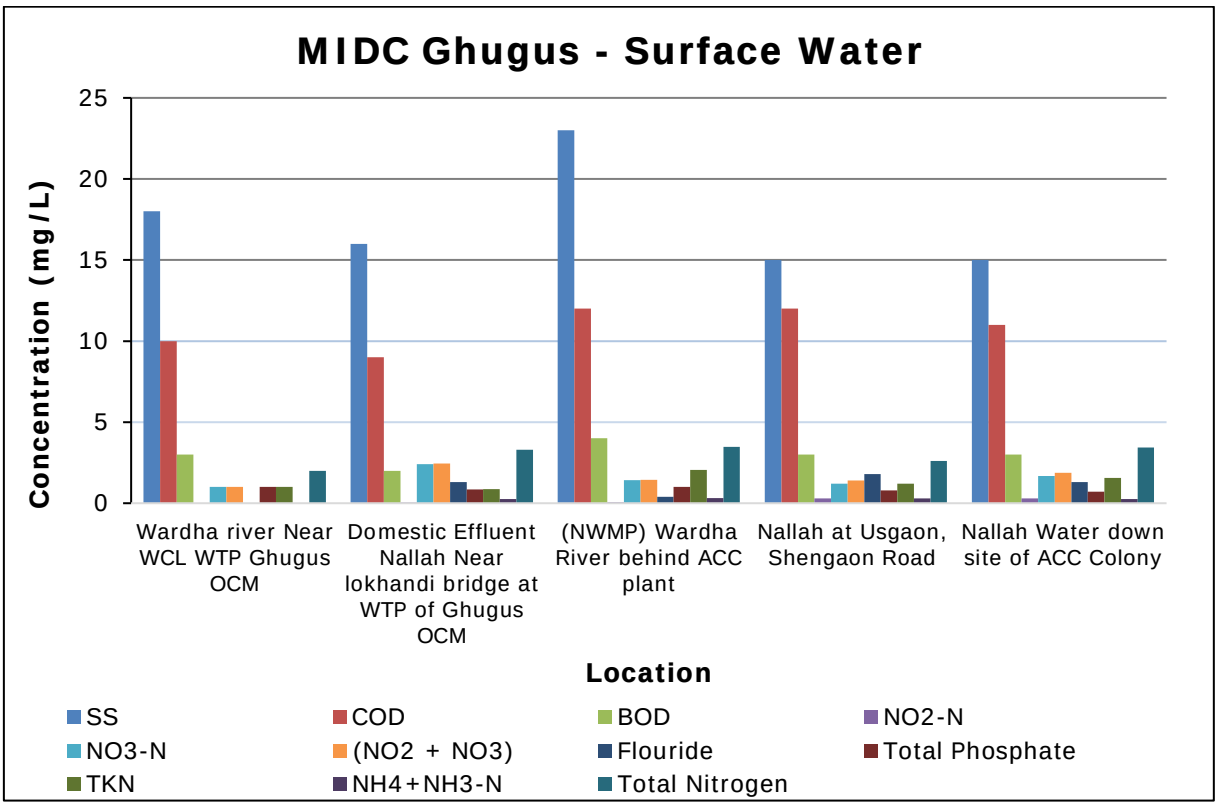
Parameters	Unit	Results		
		Wardha river Near WCL WTP Ghugus OCM	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	(NWMP) Wardha River behind ACC plant
Electrical Conductivity (at 25°C)	µmhos/cm	330	955	404
Nitrite Nitrogen	mg/L	0.04	0.041	0.056
Nitrate Nitrogen	mg/L	1.03	2.41	1.42
(NO_2+ NO_3)-Nitrogen	mg/L	1.05	2.44	1.45
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.27	1.3	0.4
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	1	2.25	1.20
Total Coliforms	MPN Index/ 100 ml	166	190	1123
Faecal Coliforms	MPN Index/ 100 ml	129	97	84
Total Phosphate (as P)	mg/L	0.6	0.84	1
Total Kjeldahl Nitrogen (as N)	mg/L	1.12	0.86	2.05
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.24	0.26	0.32
Total Nitrogen	mg/L	2.17	3.3	3.48
Phenols (as C_6H_5OH)	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	0.06	BLQ	2.4
Nickel (as Ni)	mg/L	BLQ	0.011	0.241
Copper (as Cu)	mg/L	BLQ	BLQ	3.219
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.179
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.009	BLQ	0.284
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ

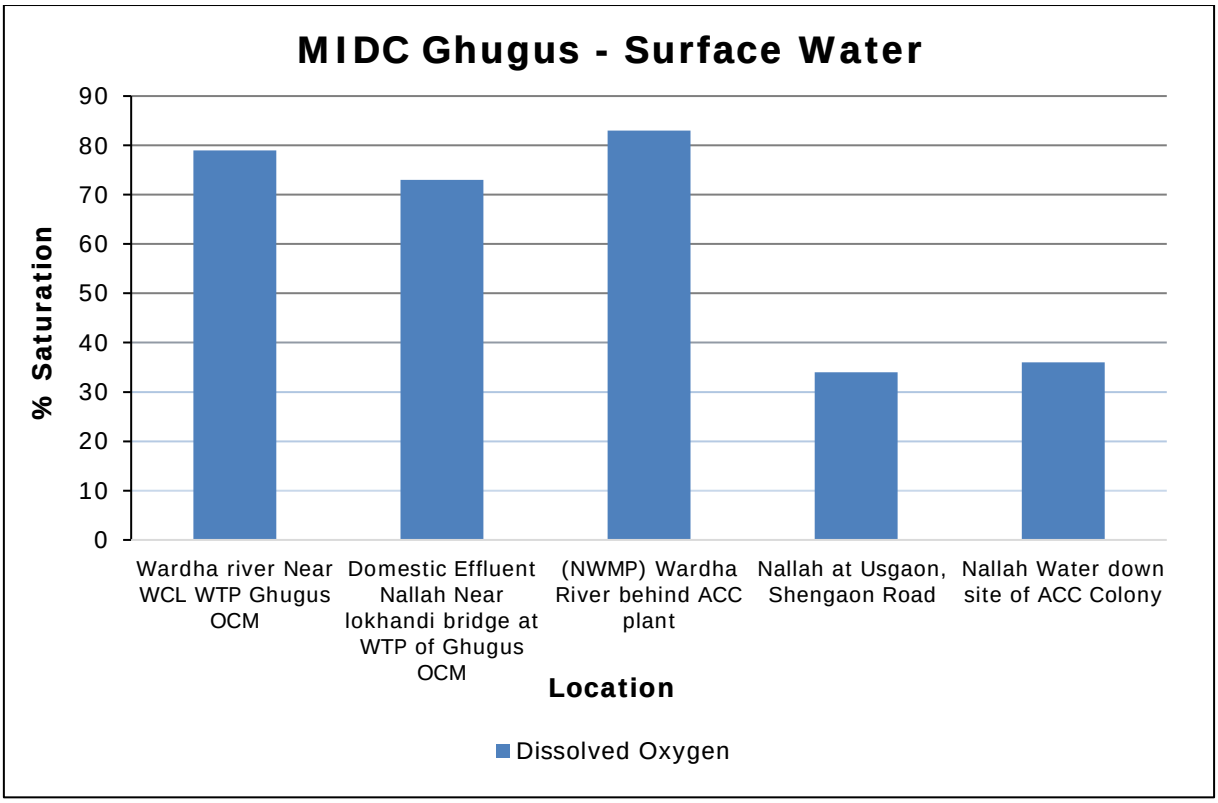
Parameters	Unit	Results		
		Wardha river Near WCL WTP Ghugus OCM	Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM	(NWMP) Wardha River behind ACC plant
Manganese (as Mn)	mg/L	0.11	0.057	1.93
Iron (as Fe)	mg/L	1.01	0.41	9.598
Vanadium (as V)	mg/L	0.03	0.0125	0.704
Selenium (as Se)	mg/L	BLQ	BLQ	BLQ
Boron (as B)	mg/L	0.11	0.25	0.30
Bioassay Test on fish	% survival	100	100	87

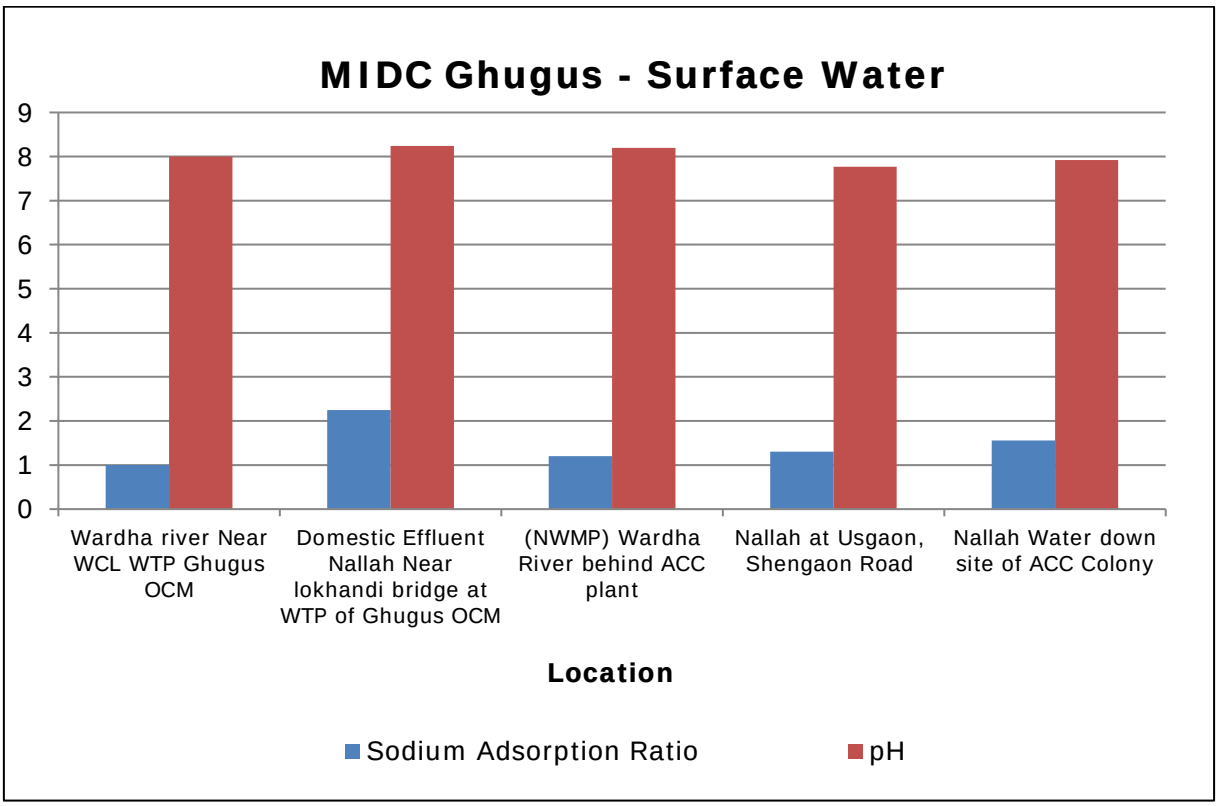
Parameters	Unit	Result	
		Nallah at Usgaon, Shengaon Road	Nallah Water down site of ACC Colony
Sanitary Survey	-	Reasonably clean Neighbourhood	Reasonably clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.1	0.1
Temperature	^{o}C	29.0	28
Colour	Hazen	1	2
Odour	-	Agreeable	Agreeable
pH	-	7.77	7.92
Oil & Grease	mg/L	BLQ	BLQ
Total Suspended Solids	mg/L	15	15
Total Dissolved Solids	mg/L	982	752
Dissolved Oxygen (% Saturation)	%	34	36
Chemical Oxygen Demand	mg/L	12.0	11
Biochemical Oxygen Demand (3 days, 27^{o}C)	mg/L	3	3
Electrical Conductivity (at 25^{o}C)	µmhos/cm	1739	1334
Nitrite Nitrogen	mg/L	0.3	0.30
Nitrate Nitrogen	mg/L	1.2	1.68
(NO_2+ NO_3)-Nitrogen	mg/L	1.4	1.88
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ
Fluoride (as F)	mg/L	1.8	1.3
Sulphide (as H_2S)	mg/L	BLQ	BLQ

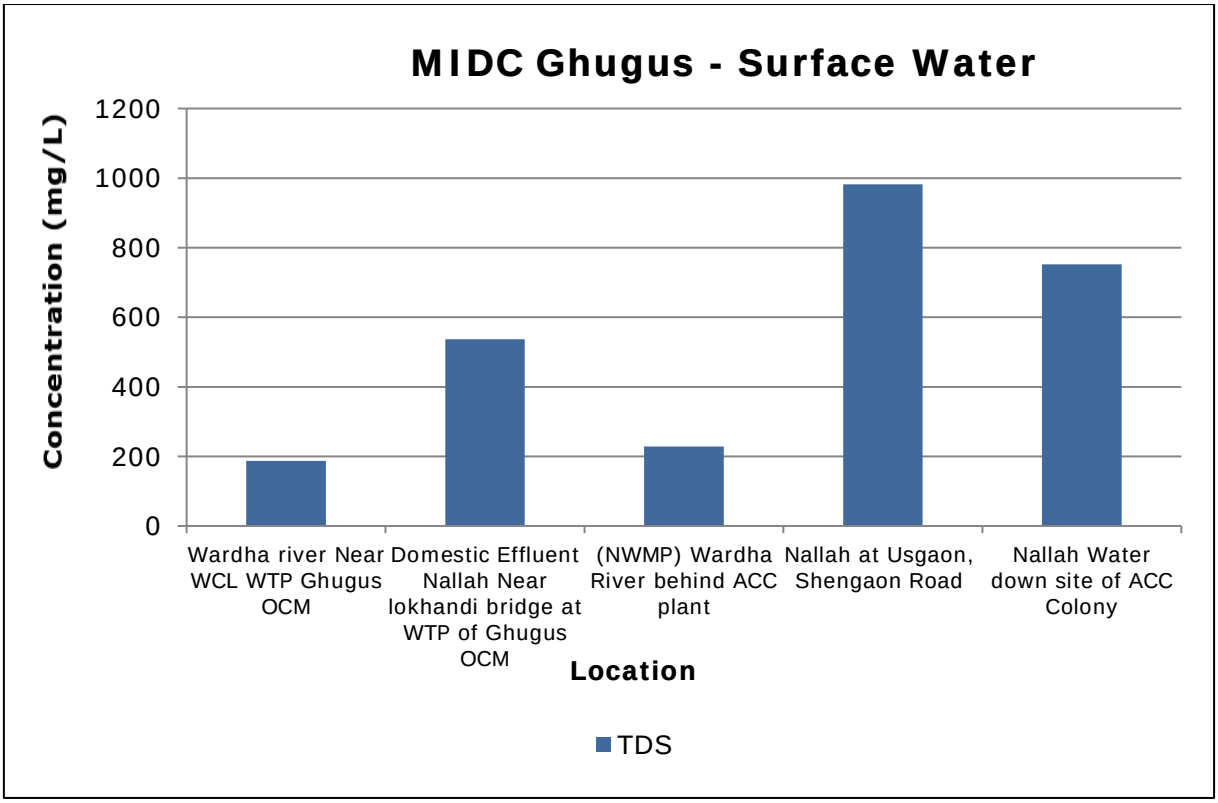
Parameters	Unit	Result	
		Nallah at Usgaon, Shengaon Road	Nallah Water down site of ACC Colony
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ
Sodium Adsorption Ratio	-	1.3	1.56
Total Coliforms	MPN Index/ 100 ml	144	1373
Faecal Coliforms	MPN Index/ 100 ml	21	567
Total Phosphate (as P)	mg/L	0.8	0.72
Total Kjeldahl Nitrogen (as N)	mg/L	1.2	1.57
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.3	0.26
Total Nitrogen	mg/L	2.6	3.44
Phenols (as C_6H_5OH)	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	3.5	1.504
Nickel (as Ni)	mg/L	0.2	0.199
Copper (as Cu)	mg/L	4.6	0.119
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.1	0.124
Total Arsenic (as As)	mg/L	BLQ	BLQ
Lead (as Pb)	mg/L	0.2	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ
Manganese (as Mn)	mg/L	1.6	1.733
Iron (as Fe)	mg/L	1.3	3.54
Vanadium (as V)	mg/L	0.3	0.194
Selenium (as Se)	mg/L	BLQ	0.012
Boron (as B)	mg/L	0.20	0.33
Bioassay Test on fish	% survival	93	100

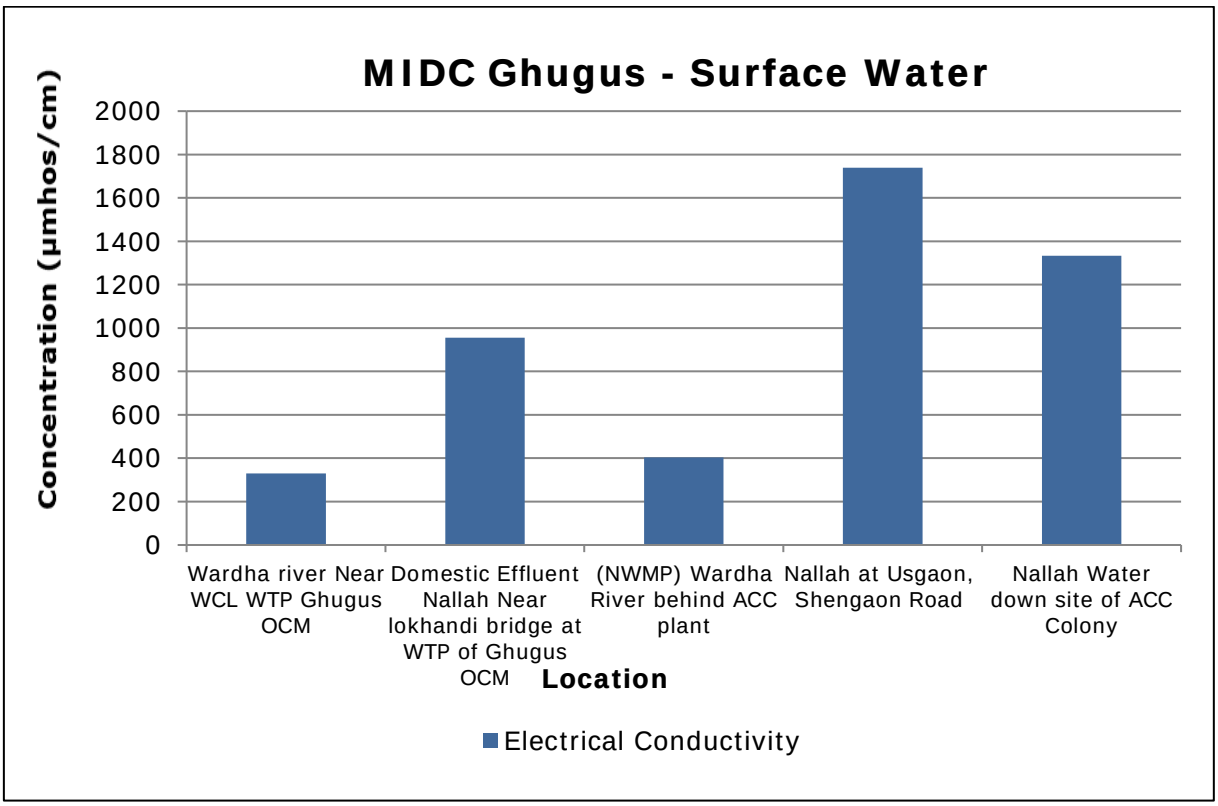
Graphs - Surface Water Quality of MIDC Ghugus

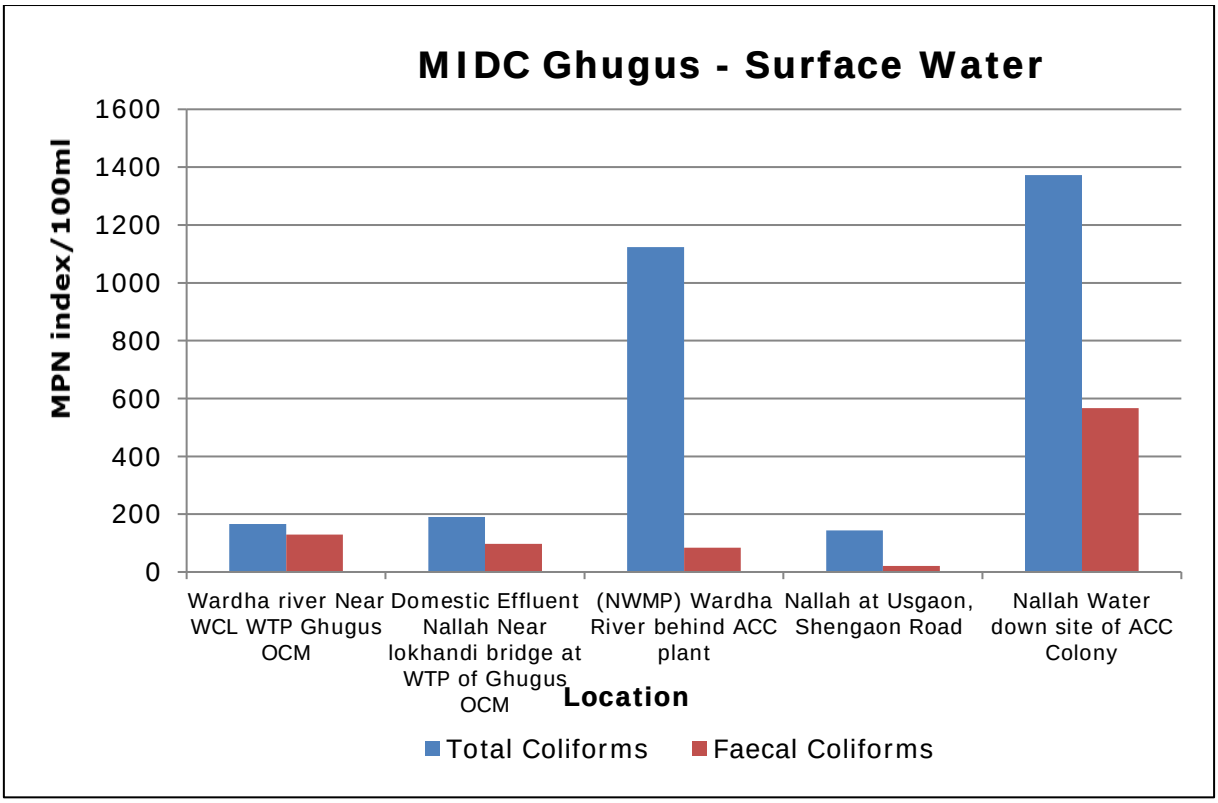


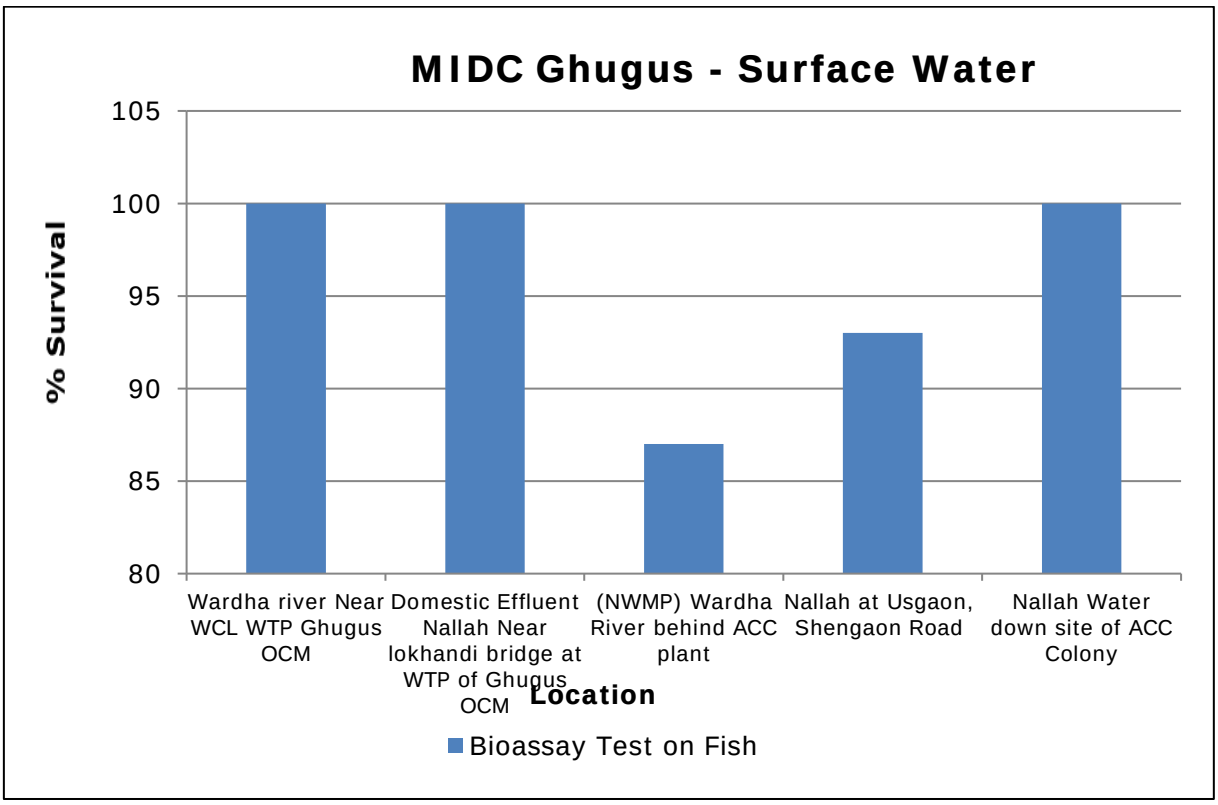



MIDC Ghugus - Surface Water
9
8
7
6
5
4
3
2
1
0
Wardha river Near WCL WTP Ghugus OCM
Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM
(NWMP) Wardha River behind ACC plant
Nallah at Usgaon, Shengaon Road
Nallah Water down site of ACC Colony
Location
Sodium Adsorption Ratio
pH


MIDC Ghugus - Surface Water
Concentration (mg/L)
1200
1000
800
600
400
200
0
Wardha river Near WCL WTP Ghugus OCM
Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM
(NWMP) Wardha River behind ACC plant
Nallah at Usgaon, Shengaon Road
Nallah Water down site of ACC Colony
Location
TDS


MIDC Ghugus - Surface Water
Concentration (µmhos/cm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Wardha river Near WCL WTP Ghugus OCM
Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM
(NWMP) Wardha River behind ACC plant
Nallah at Usgaon, Shengaon Road
Nallah Water down site of ACC Colony
Location
Electrical Conductivity


MIDC Ghugus - Surface Water
MPN index/100ml
1600
1400
1200
1000
800
600
400
200
0
Wardha river Near WCL WTP Ghugus OCM
Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM
(NWMP) Wardha River behind ACC plant
Nallah at Usgaon, Shengaon Road
Nallah Water down site of ACC Colony
Location
Total Coliforms
Faecal Coliforms


MIDC Ghugus - Surface Water
105
100
95
90
85
80
% Survival
Wardha river Near WCL WTP Ghugus OCM
Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM
(NWMP) Wardha River behind ACC plant
Nallah at Usgaon, Shengaon Road
Nallah Water down site of ACC Colony
Location
Bioassay Test on Fish

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

- All six water samples collected are acceptable in sanitary survey, colour, smell and transparency.
- pH, Electrical conductivity and Suspended Solids are also well within the limits at all six samples collected.
- 100% survival was achieved in Fish Bioassay test in five samples out of six samples collected.
- Metals like Hexavalent Chromium (Cr^{6+}), 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.
- Zinc, Copper, Total Chromium exceeded in 1 water sample out of 6 samples collected.
- The concentration of Iron and Total Phosphate exceeded in all 6 samples collected.
- Fluoride exceeds in 1 sample surface water collected.
- 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	19º50’41.4’’N	79º21’29.1’’E	27.06.2024	29.06.2024	30.06.2024
2.	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	19º51’11.8’’N	79º20’45.8’’E	27.06.2024	29.06.2024	30.06.2024
3.	Wardha River upstream at Ballarpur	19º51’10.5’’N	79º20’20.3’’E	27.06.2024	29.06.2024	30.06.2024
4.	(NWMP) Wardha River downstream, Near Rajura Bridge	19º48’52.8’’N	79º22’39.2’’E	27.06.2024	29.06.2024	30.06.2024
5.	Nallah Near MSW Municipal Corporation, Near Railway line	19º50’23.5’’N	79º21’23.9’’E	27.06.2024	29.06.2024	30.06.2024

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
6.	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump	19°51'26.5''N	79°20'45.1''E	27.06.2024	29.06.2024	30.06.2024

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	0.4
Temperature	°C	31	25	23
Colour	Hazen	3	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.39	7.55	7

Parameters	Unit	Results		
		Nallah Near Petrol Pump at Ballarpur Bamni Road	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	Wardha River upstream at Ballarpur
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	10	14	13
Total Dissolved Solids	mg/L	1091	544	397
Dissolved Oxygen (% Saturation)	%	68	62	60
Chemical Oxygen Demand	mg/L	22	10	10
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	6	2	3
Electrical Conductivity (at 25°C)	µmhos/cm	1942	968	707
Nitrite Nitrogen	mg/L	0.03	0.03	0
Nitrate Nitrogen	mg/L	6.54	3.20	2
$(NO_2 + NO_3)$-Nitrogen	mg/L	6.55	3.21	2
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	1.97	0.97	1
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	2.19	1.92	2
Total Coliforms	MPN Index/ 100 ml	1260	606	1110
Faecal Coliforms	MPN Index/ 100 ml	104	82	190
Total Phosphate (as P)	mg/L	0.93	1.00	1
Total Kjeldahl Nitrogen (as N)	mg/L	1.68	1.38	1.4
Total Ammonia $(NH_4 + NH_3)$-Nitrogen	mg/L	0.13	0.21	0.24
Total Nitrogen	mg/L	8.24	4.61	4
Phenols (as C_6H_5OH)	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	0.052
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ

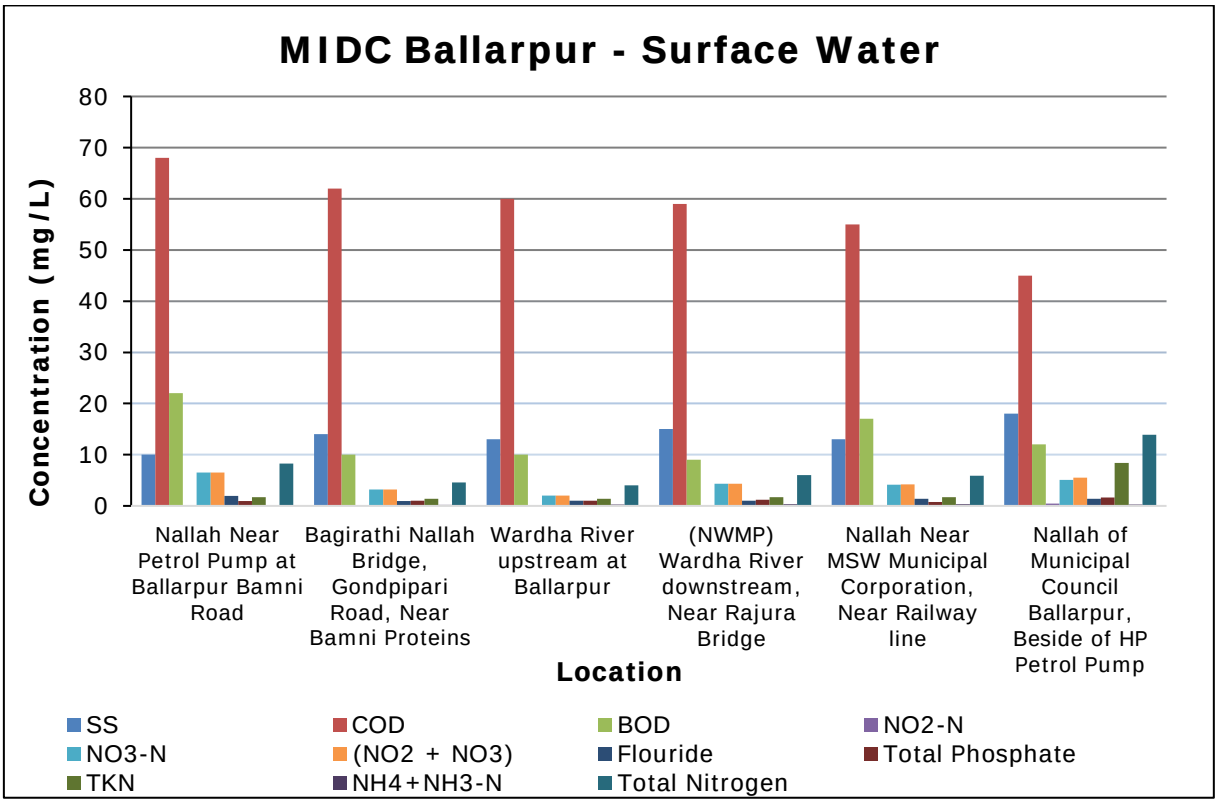
Parameters	Unit	Results		
		Nallah Near Petrol Pump at Ballarpur Bamni Road	Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins	Wardha River upstream at Ballarpur
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.01	BLQ	0.009
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.16	0.07	0.07
Iron (as Fe)	mg/L	0.07	0.45	0.68
Vanadium (as V)	mg/L	0.02	0.01	0.02
Selenium (as Se)	mg/L	BLQ	0.01	BLQ
Boron (as B)	mg/L	0.12	0.26	BLQ
Bioassay Test on fish	% survival	100	100	87

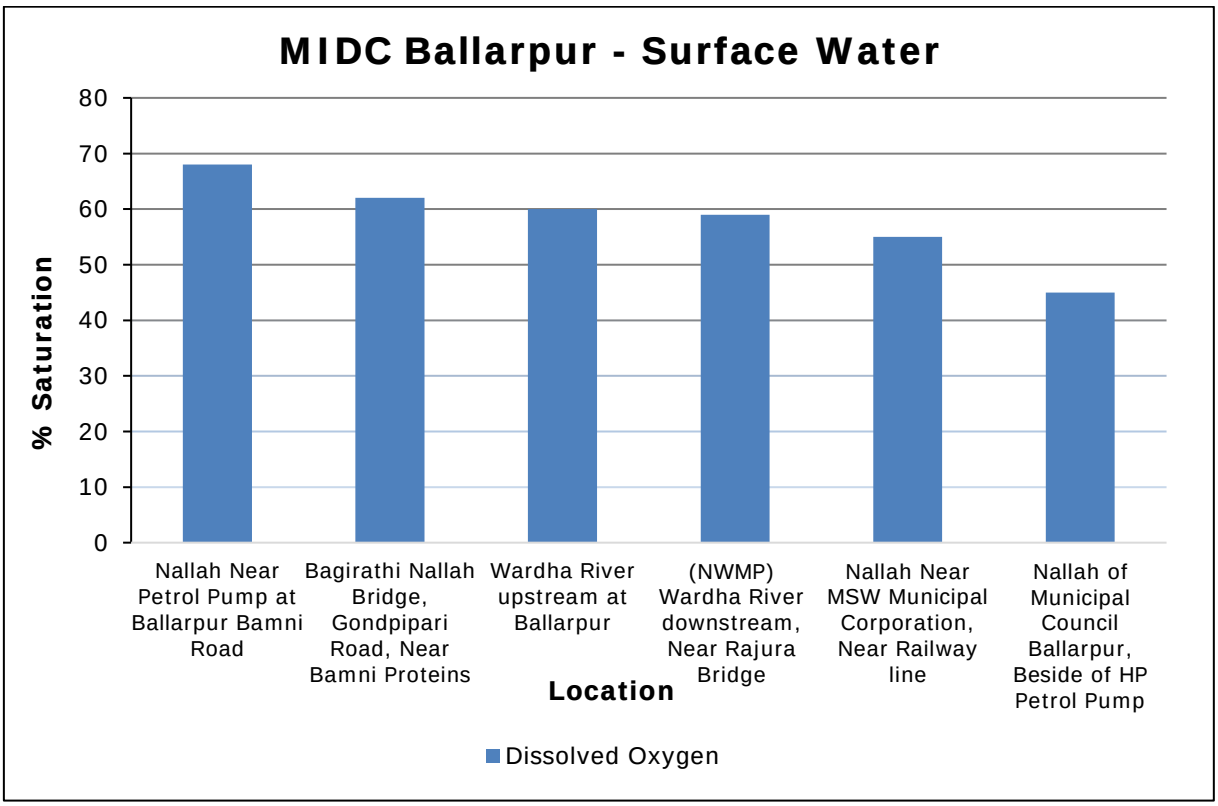
Parameters	Unit	Results		
		(NWMP) Wardha River downstream, Near Rajura Bridge	Nallah Near MSW Municipal Corporation, Near Railway line	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.5	0.2	0.2
Temperature	^oC	25.0	29	23
Colour	Hazen	4.0	1	7
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.7	7.08	7.39
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	15	13	18
Total Dissolved Solids	mg/L	476	1107	588
Dissolved Oxygen (% Saturation)	%	59	55	45
Chemical Oxygen Demand	mg/L	9	17	12
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	2	4	3
Electrical Conductivity (at 25^oC)	µmhos/cm	847	1971	1046

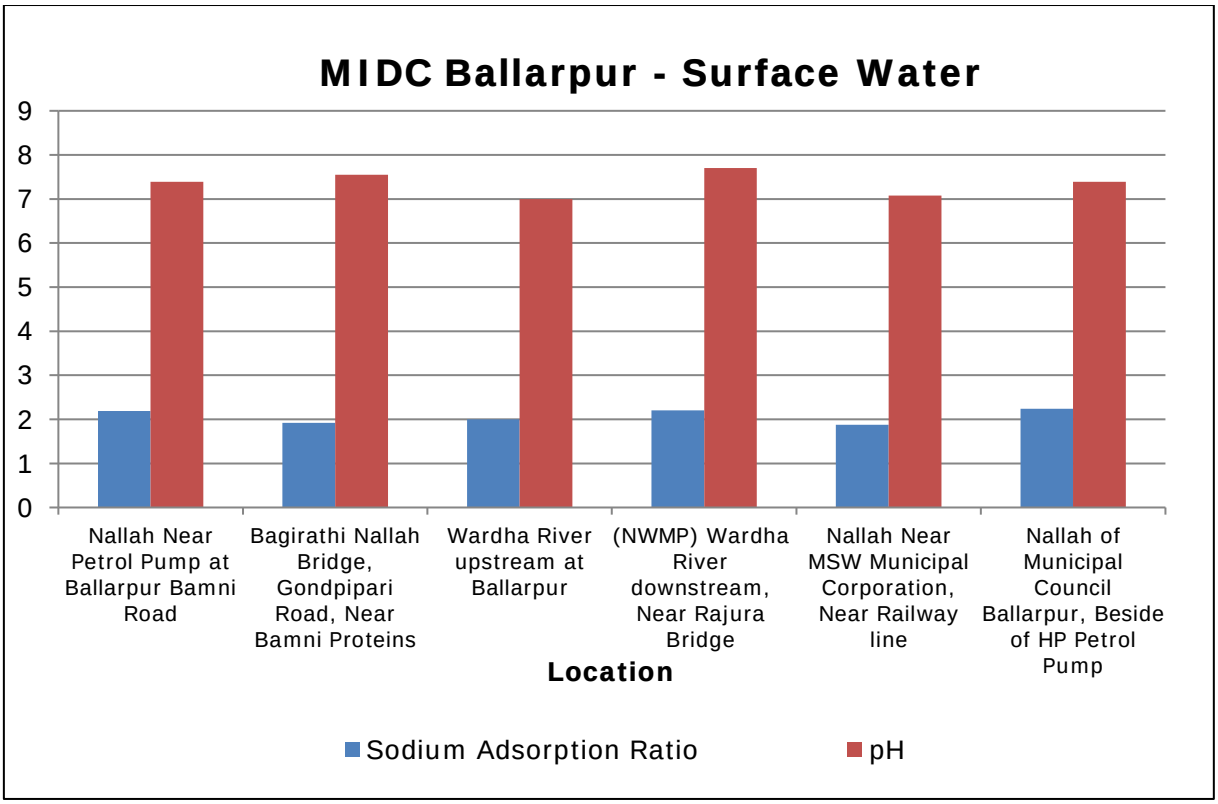
Parameters	Unit	Results		
		(NWMP) Wardha River downstream, Near Rajura Bridge	Nallah Near MSW Municipal Corporation, Near Railway line	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump
Nitrite Nitrogen	mg/L	0.1	0.05	0.45
Nitrate Nitrogen	mg/L	4.3	4.17	5.1
(NO_2+ NO_3)-Nitrogen	mg/L	4.3	4.19	5.51
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	1.4	1.4
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	2.2	1.88	2.24
Total Coliforms	MPN Index/ 100 ml	1074	1070	1600
Faecal Coliforms	MPN Index/ 100 ml	539	920	670
Total Phosphate (as P)	mg/L	1.2	0.78	1.61
Total Kjeldahl Nitrogen (as N)	mg/L	1.7	1.68	8.41
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.3	0.325	0.28
Total Nitrogen	mg/L	6.0	5.87	13.89
Phenols (as C_6H_5OH)	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	2.22
Nickel (as Ni)	mg/L	0.0	BLQ	0.114
Copper (as Cu)	mg/L	BLQ	BLQ	8.86
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.21
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.0	0.029	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.1	0.145	0.170
Iron (as Fe)	mg/L	0.9	0.73	0.901

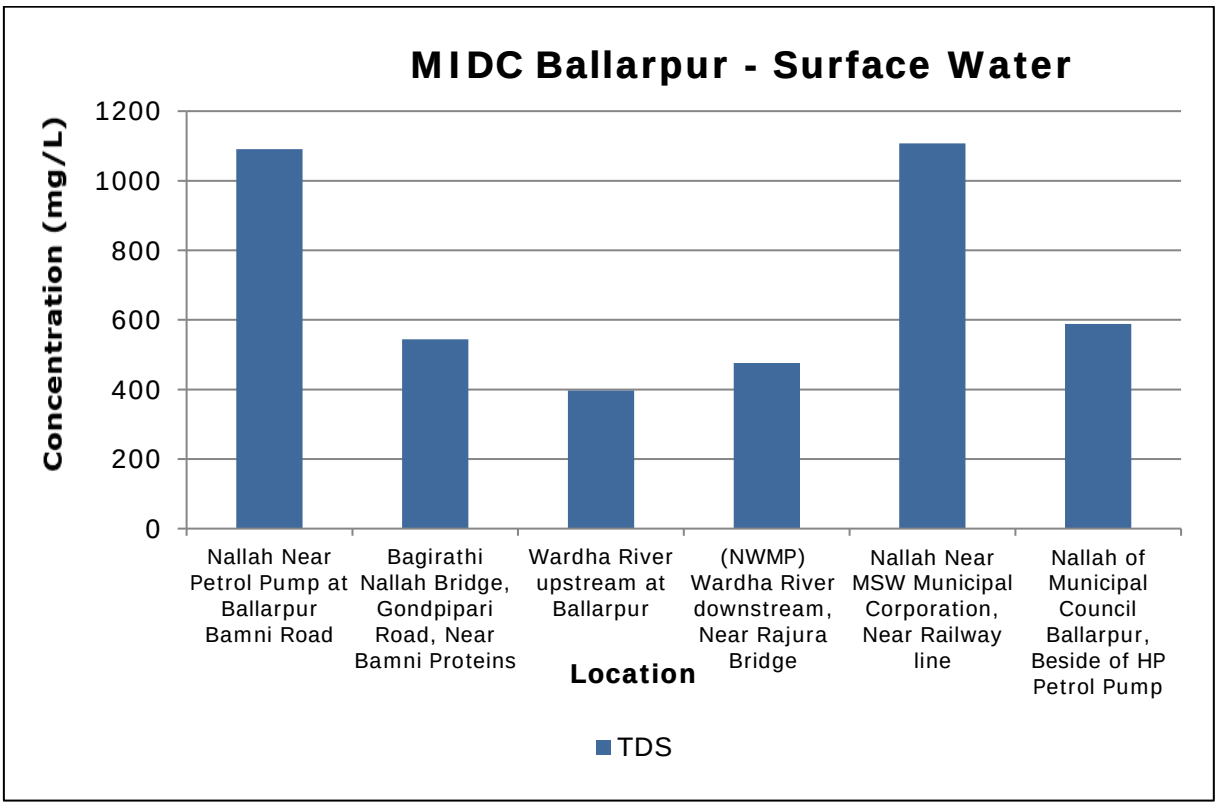
Parameters	Unit	Results		
		(NWMP) Wardha River downstream, Near Rajura Bridge	Nallah Near MSW Municipal Corporation, Near Railway line	Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump
Vanadium (as V)	mg/L	0.0	0.027	0.033
Selenium (as Se)	mg/L	BLQ	0.006	0.008
Boron (as B)	mg/L	0.1	0.109	0.288
Bioassay Test on fish	% survival	100.0	100	100

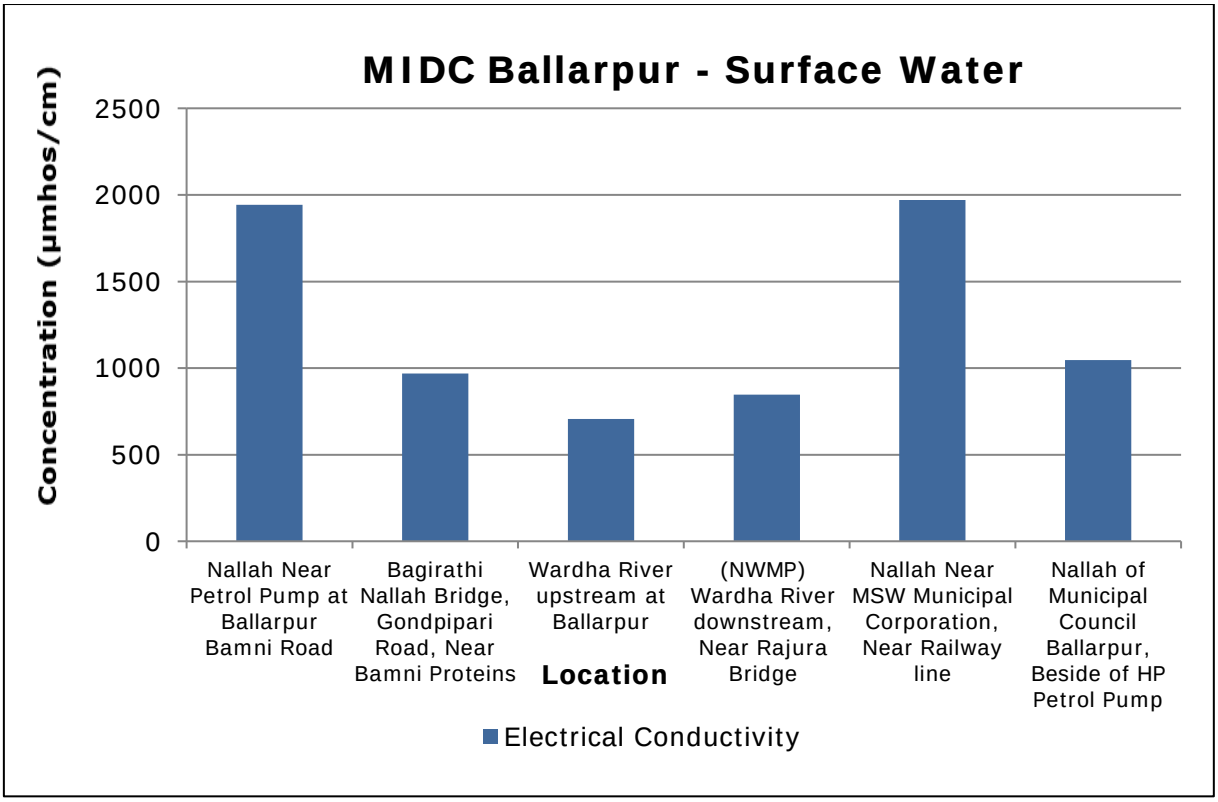
Graphs - Surface water Quality of MIDC Ballarpur

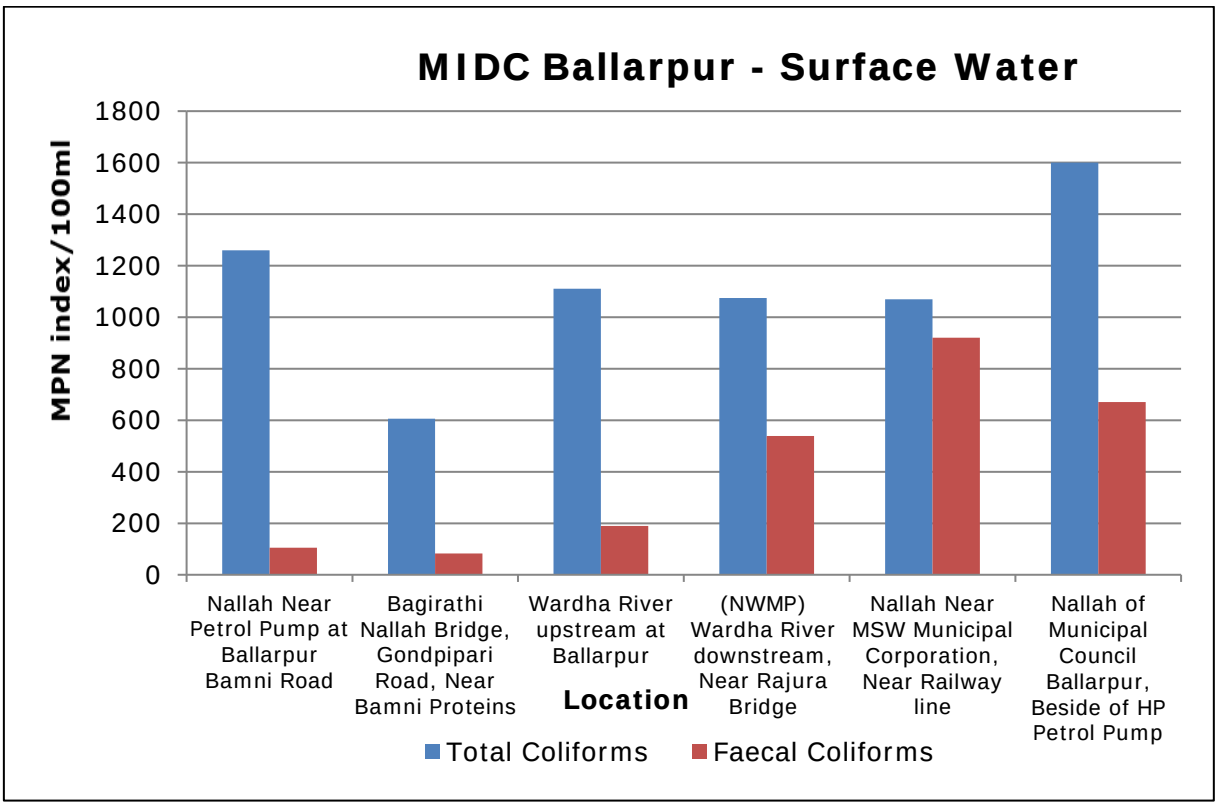


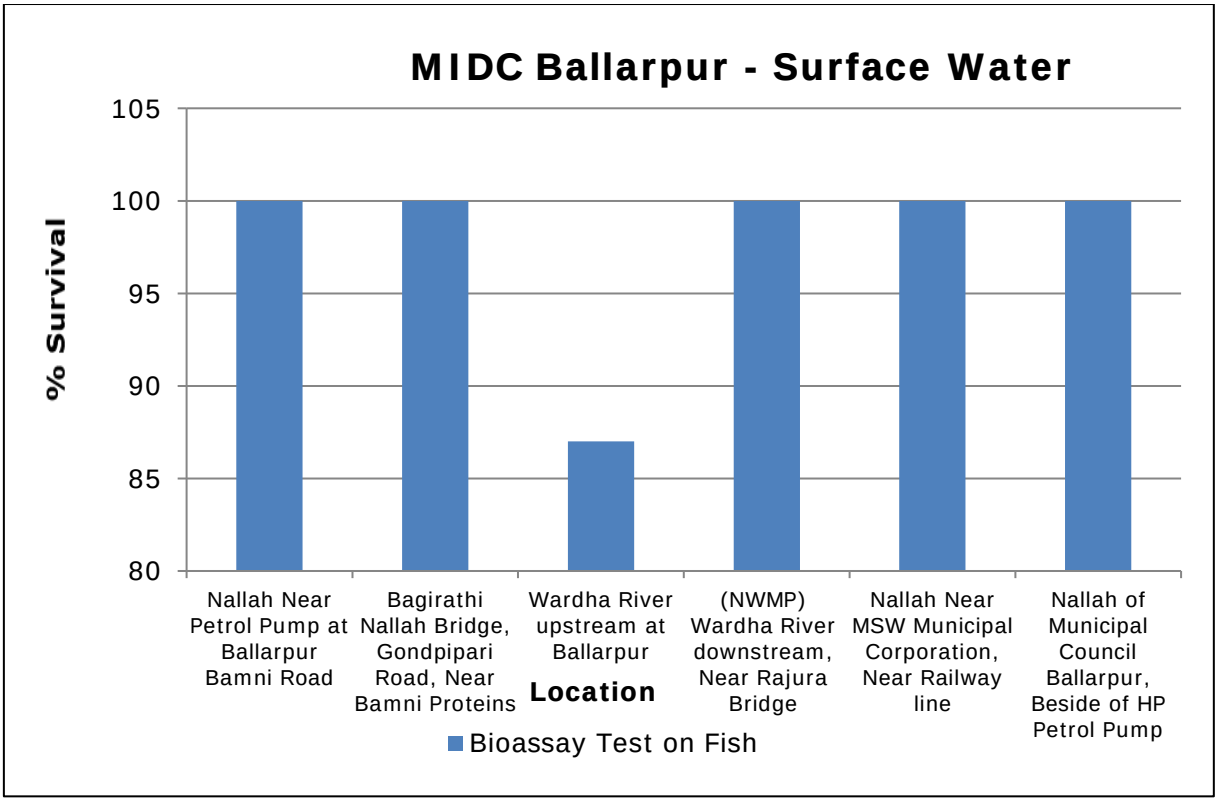

MIDC Ballarpur - Surface Water
% Saturation
80
70
60
50
40
30
20
10
0
Nallah Near Petrol Pump at Ballarpur Bamni Road
Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins
Wardha River upstream at Ballarpur
(NWMP) Wardha River downstream, Near Rajura Bridge
Nallah Near MSW Municipal Corporation, Near Railway line
Nallah of Municipal Council Ballarpur, Beside of HP Petrol Pump
Location
Dissolved Oxygen


MIDC Ballarpur - Surface Water
9
8
7
6
5
4
3
2
1
0
Nallah Near Petrol Pump at Ballarpur Bamni Road
Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins
Wardha River upstream at Ballarpur
(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
Location
Sodium Adsorption Ratio
pH


MIDC Ballarpur - Surface Water
Concentration (mg/L)
1200
1000
800
600
400
200
0
Nallah Near Petrol Pump at Ballarpur Bamni Road
Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins
Wardha River upstream at Ballarpur
(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
Location
TDS


MIDC Ballarpur - Surface Water
Concentration (µmhos/cm)
2500
2000
1500
1000
500
0
Nallah Near Petrol Pump at Ballarpur Bamni Road
Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins
Wardha River upstream at Ballarpur
(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
Location
Electrical Conductivity


MIDC Ballarpur - Surface Water
MPN index/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
Nallah Near Petrol Pump at Ballarpur Bamni Road
Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins
Wardha River upstream at Ballarpur
(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
Location
Total Coliforms
Faecal Coliforms


MIDC Ballarpur - Surface Water
% Survival
105
100
95
90
85
80
Nallah Near Petrol Pump at Ballarpur Bamni Road
Bagirathi Nallah Bridge, Gondpipari Road, Near Bamni Proteins
Wardha River upstream at Ballarpur
(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
Location
Bioassay Test on Fish

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 BOD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay in all tree samples collected.
- Metals like Zinc, Nickel, Copper, Hexavalent Chromium (Cr^{6+}), 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.
- Fluoride exceeds in two samples.
- Total Phosphate exceeds in all three samples collected.
- Zinc, Nickel, Copper, etc. exceeds in one sample out of 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	27.06.2024	29.06.2024	30.06.2024
2.	Near Tadali Lake Janata School (Dug well water)	20°01'48.4''N	79°11'22.1''E	27.06.2024	29.06.2024	30.06.2024
3.	Yerur Village (Dug well Water)	19°59'46.9''N	79°11'28.0''E	27.06.2024	29.06.2024	30.06.2024

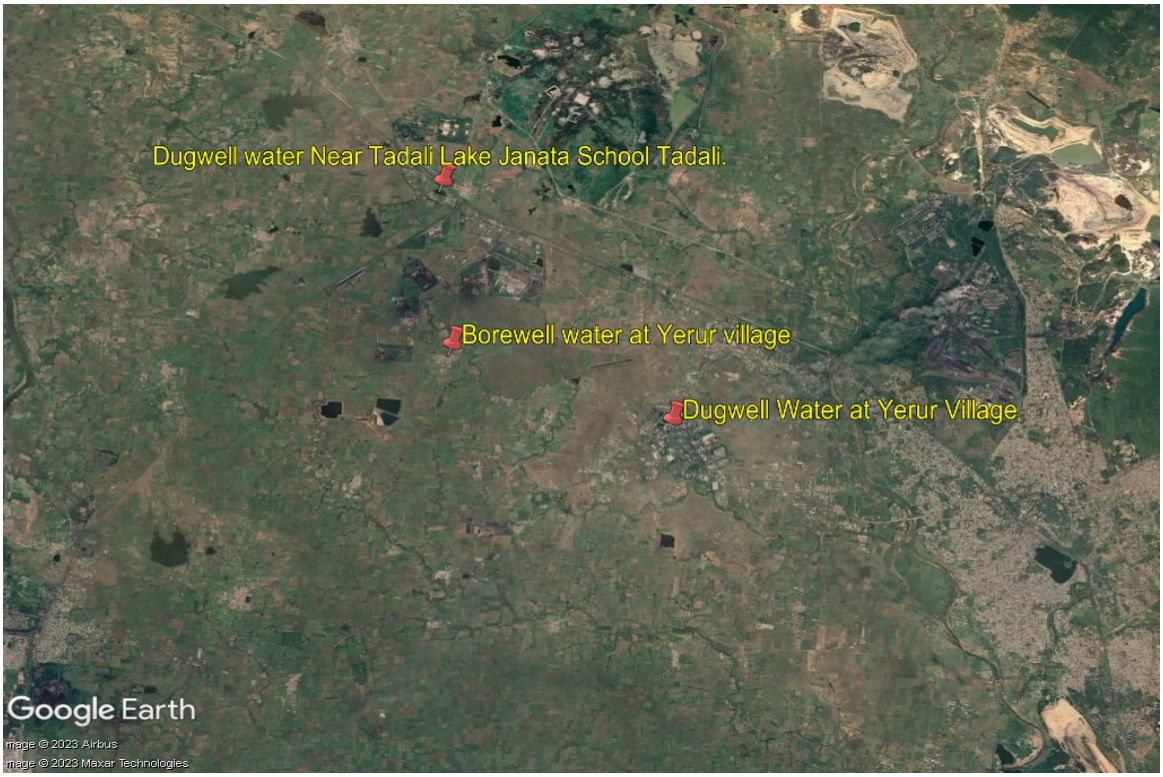


Fig. Geographical Locations of Ground Water Sampling MIDC Tadali

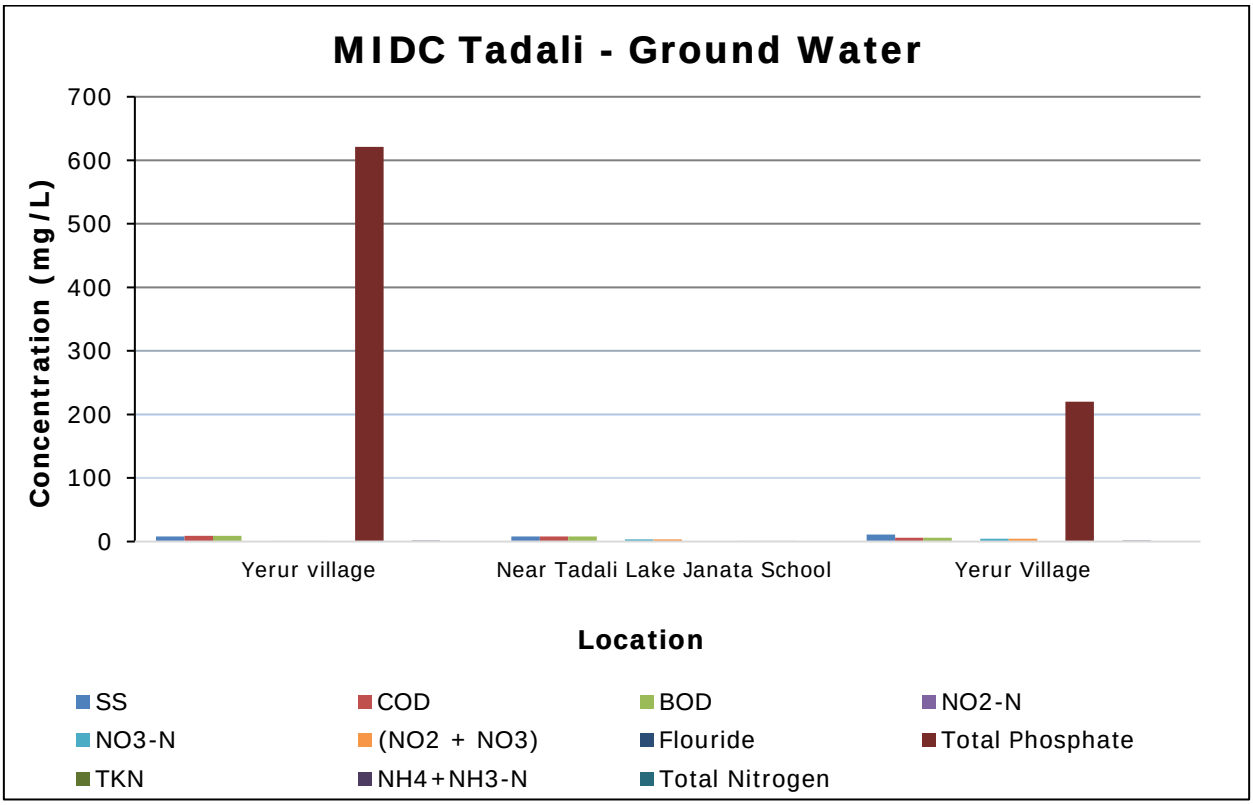
Table 7.2 MIDC Tadali – Details of Sampling Location of Ground Water

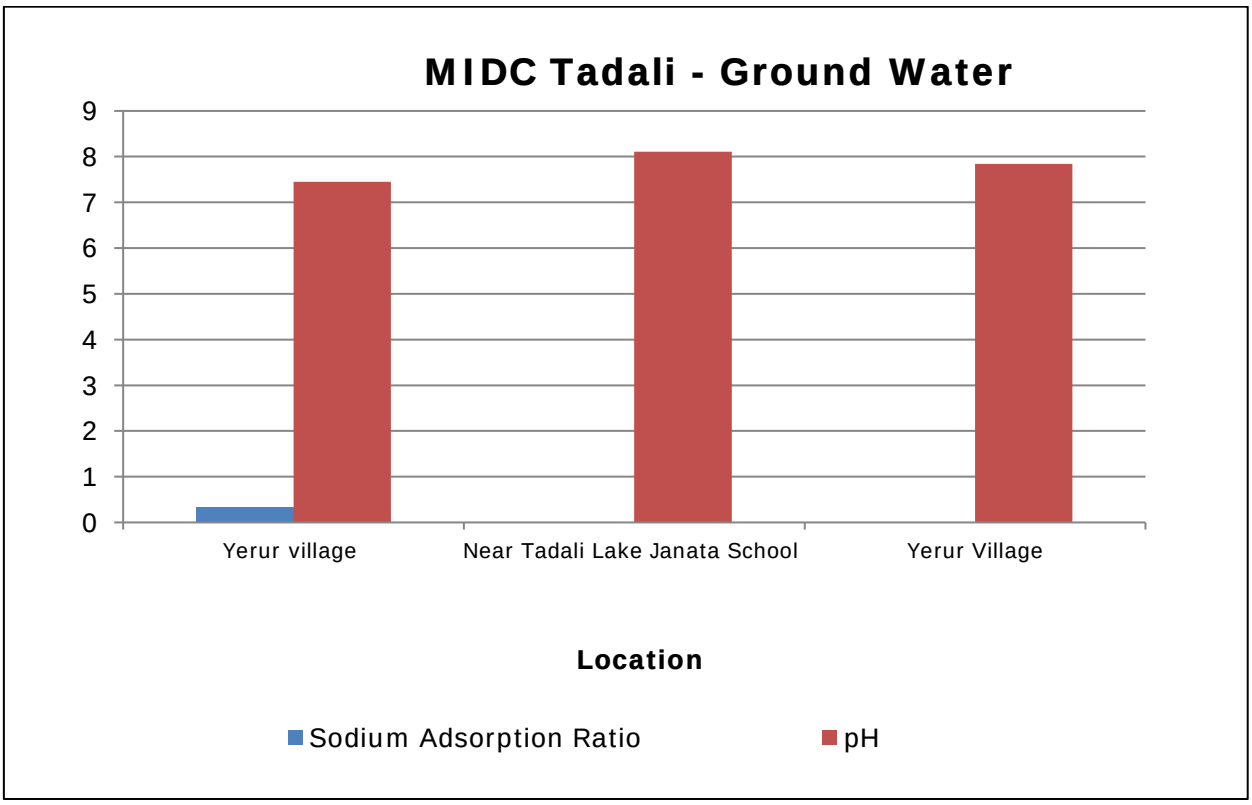
Parameters	Unit	Results		
		Yerur village (Bore well water)	Near Tadali Lake Janata School (Dug well water)	Yerur Village (Dug well Water)
Sanitary Survey	-	Generally Clean Neighbourhood	Generally Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	No floating matter	No floating matter	No floating matter
Transparency	m	Not Applicable	0.2	0.3
Temperature	^{o}C	30	28	28
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.45	8.11	7.84
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	8	8	11
Total Dissolved Solids	mg/L	1295	627	2231
Chemical Oxygen Demand	mg/L	9	8	6
Biochemical Oxygen Demand (3 days, $27^{o}C$)	mg/L	2	2	2
Electrical Conductivity (at $25^{o}C$)	µmhos/cm	2323	1116	3970
Nitrite Nitrogen	mg/L	BLQ	BLQ	0.05
Nitrate Nitrogen	mg/L	0.84	3.5	4.61

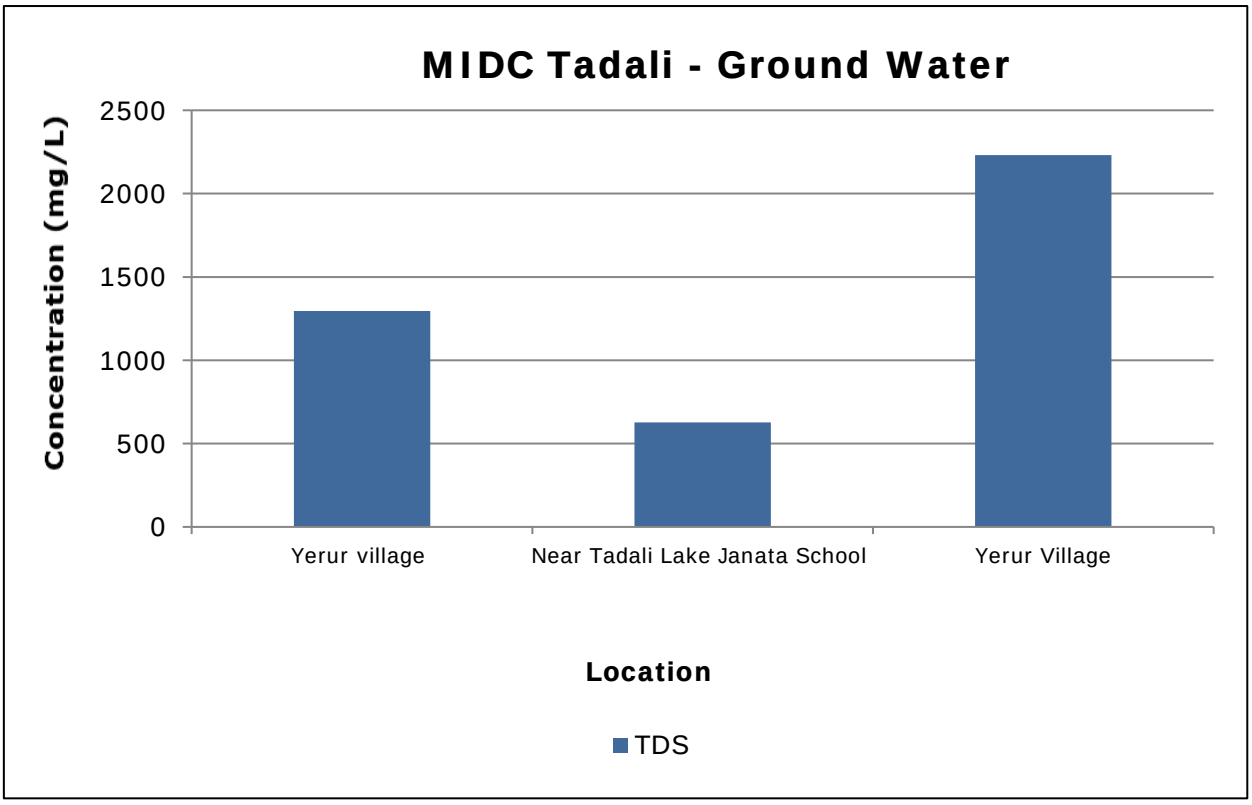
Parameters	Unit	Results		
		Yerur village (Bore well water)	Near Tadali Lake Janata School (Dug well water)	Yerur Village (Dug well Water)
(NO_2+ NO_3)-Nitrogen	mg/L	0.84	3.5	4.63
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.8	1.2	2.9
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.33	BLQ	BLQ
Sodium Adsorption Ratio	-	1.66	1.61	1.36
Total Coliforms	MPN Index/ 100 ml	1600	<1.8	920
Faecal Coliforms	MPN Index/ 100 ml	621	<1.8	220
Total Phosphate (as P)	mg/L	0.68	1.02	0.33
Total Kjeldahl Nitrogen (as N)	mg/L	1.23	1.01	1.50
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.13	0.12	0.14
Total Nitrogen	mg/L	2.07	4.51	6.14
Phenols (as C_6H_5OH)	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	0.000089	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.051	BLQ	0.073
Nickel (as Ni)	mg/L	0.013	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	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	0.071	BLQ	BLQ
Iron (as Fe)	mg/L	0.24	0.127	BLQ
Vanadium (as V)	mg/L	0.019	0.012	0.011
Selenium (as Se)	mg/L	0.008	BLQ	0.013
Boron (as B)	mg/L	0.658	0.641	0.795

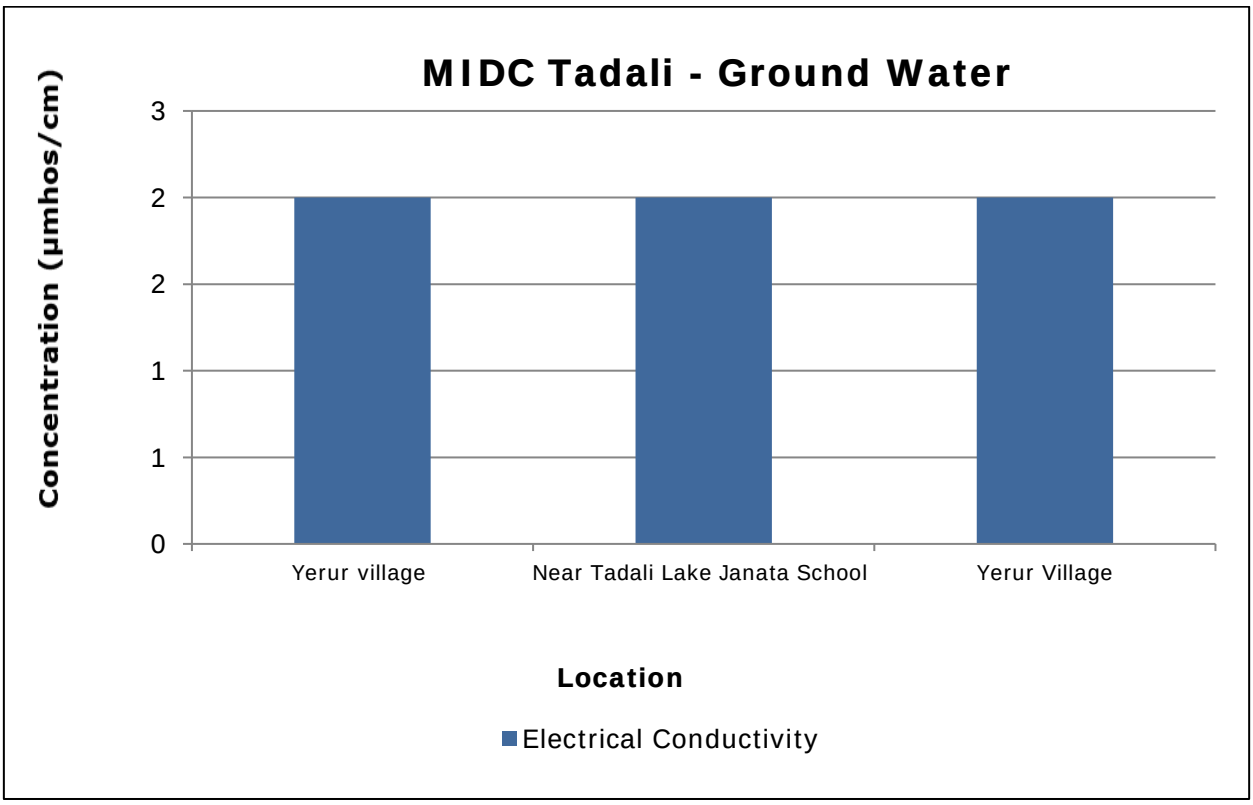
Parameters	Unit	Results		
		Yerur village (Bore well water)	Near Tadali Lake Janata School (Dug well water)	Yerur Village (Dug well Water)
Bioassay Test on fish	% survival	100	100	100

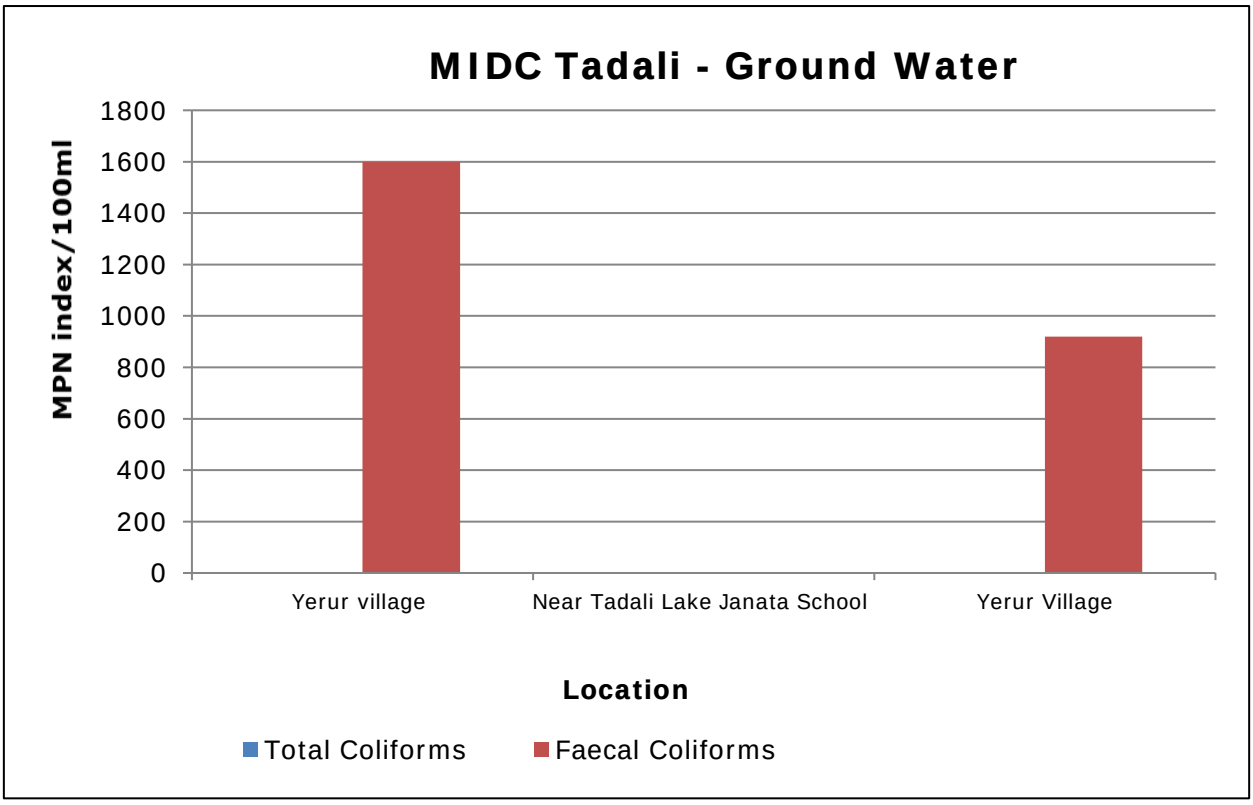
Graphs - Ground Water Quality of MIDC Tadali

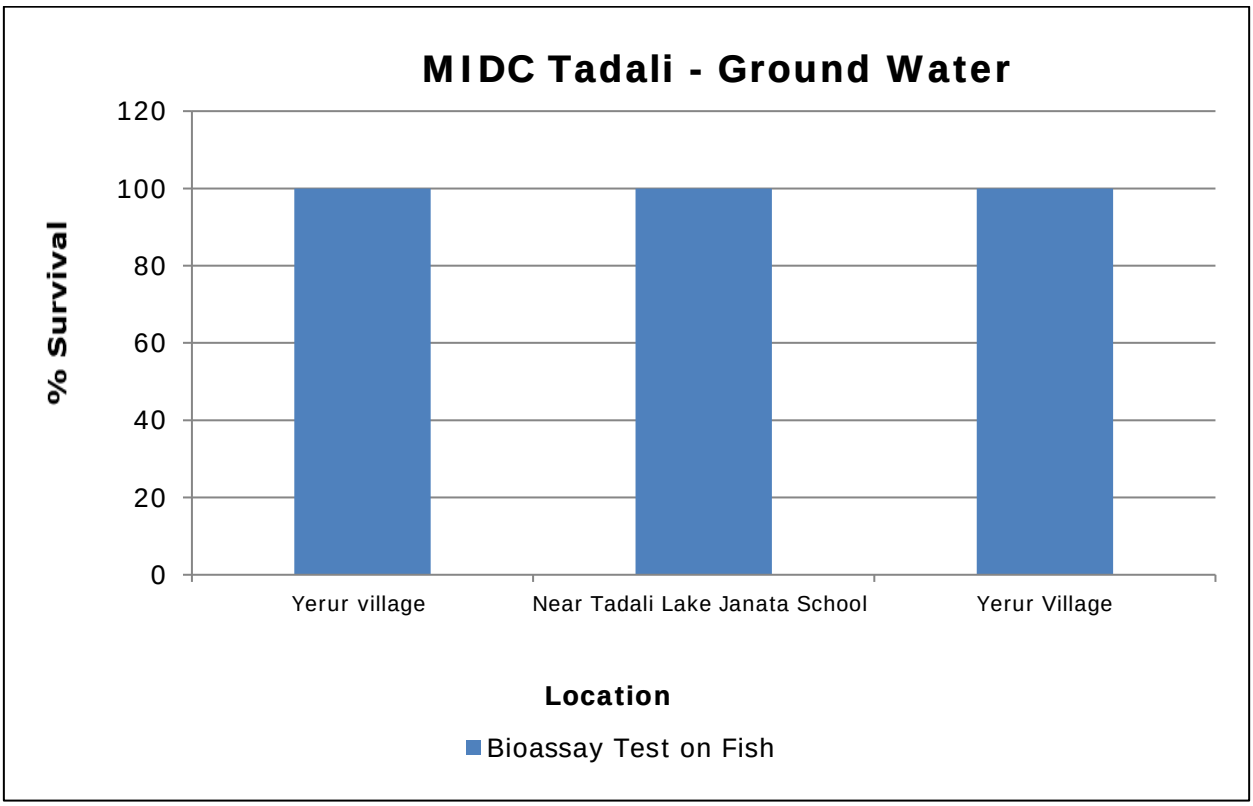



MIDC Tadali - Ground Water
9
8
7
6
5
4
3
2
1
0
Yerur village
Near Tadali Lake Janata School
Yerur Village
Location
Sodium Adsorption Ratio
pH


MIDC Tadali - Ground Water
Concentration (mg/L)
2500
2000
1500
1000
500
0
Yerur village
Near Tadali Lake Janata School
Yerur Village
Location
TDS


MIDC Tadali - Ground Water
Concentration (µmhos/cm)
3
2
2
1
1
0
Yerur village
Near Tadali Lake Janata School
Yerur Village
Location
Electrical Conductivity


MIDC Tadali - Ground Water
MPN index/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
Yerur village
Near Tadali Lake Janata School
Yerur Village
Location
Total Coliforms
Faecal Coliforms


MIDC Tadali - Ground Water
120
100
80
60
40
20
0
% Survival
Yerur village
Near Tadali Lake Janata School
Yerur Village
Location
Bioassay Test on Fish

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 samples collected.
- Metals like Arsenic, Nickel, Iron, Hexavalent Chromium (Cr^{6+}) etc. are observed either below detection limit or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Phosphate, Total Ammonical Nitrogen and Phenolic compounds also meet the criteria as prescribed by CPCB.
- Iron and Total Phosphate exceeds in all 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 7.3 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.	Gagangiri Village (Dug well Water)	19º58'07.8''N	79º14'53.8''E	27.06.2024	29.06.2024	30.06.2024
2.	Mahada Colony (Hand Pump water)	19º58'13.4''N	79º15'02.7''E	27.06.2024	29.06.2024	30.06.2024
3.	Near Datala Grampanchayat (Hand Pump water)	19º58'8.8''N	79º5'40.6''E	27.06.2024	29.06.2024	30.06.2024

Fig. Geographical Locations of Ground Water Sampling MIDC Chandrapur

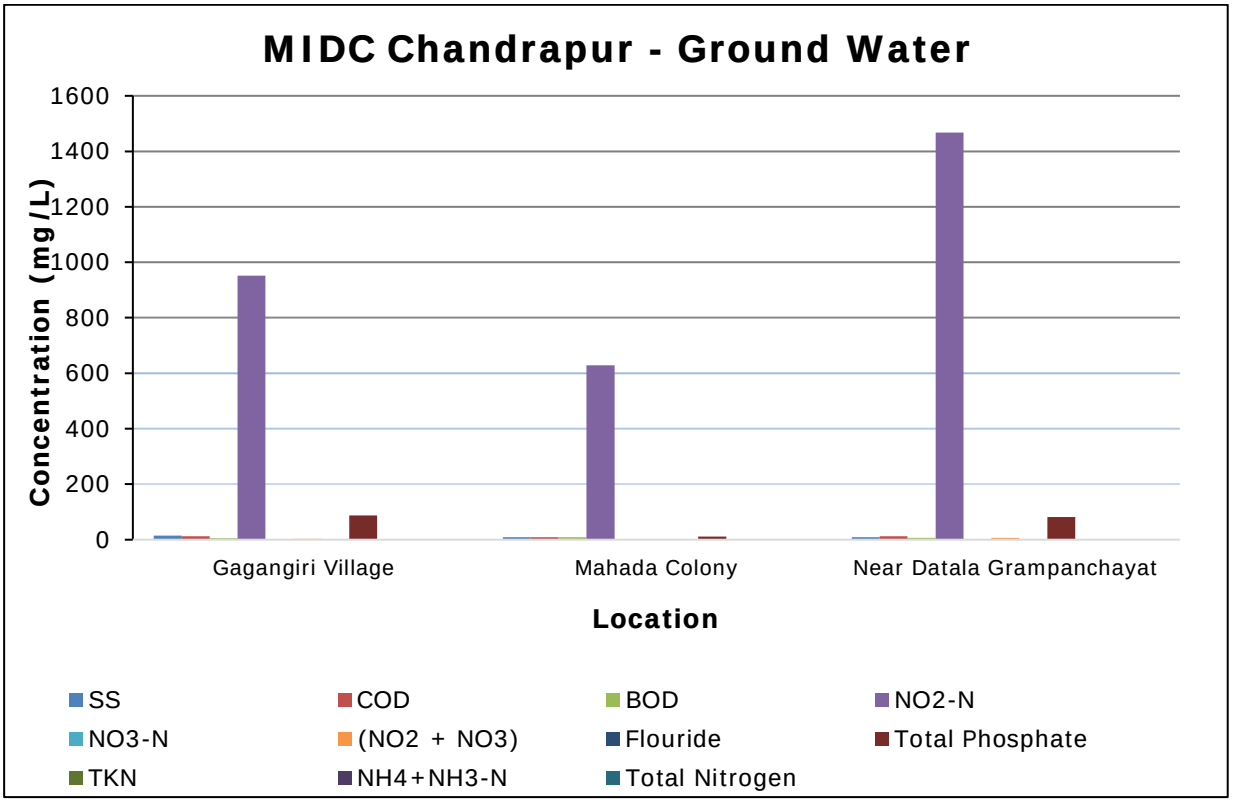
Table 7.4 MIDC Chandrapur – Details of Sampling Location of Ground Water

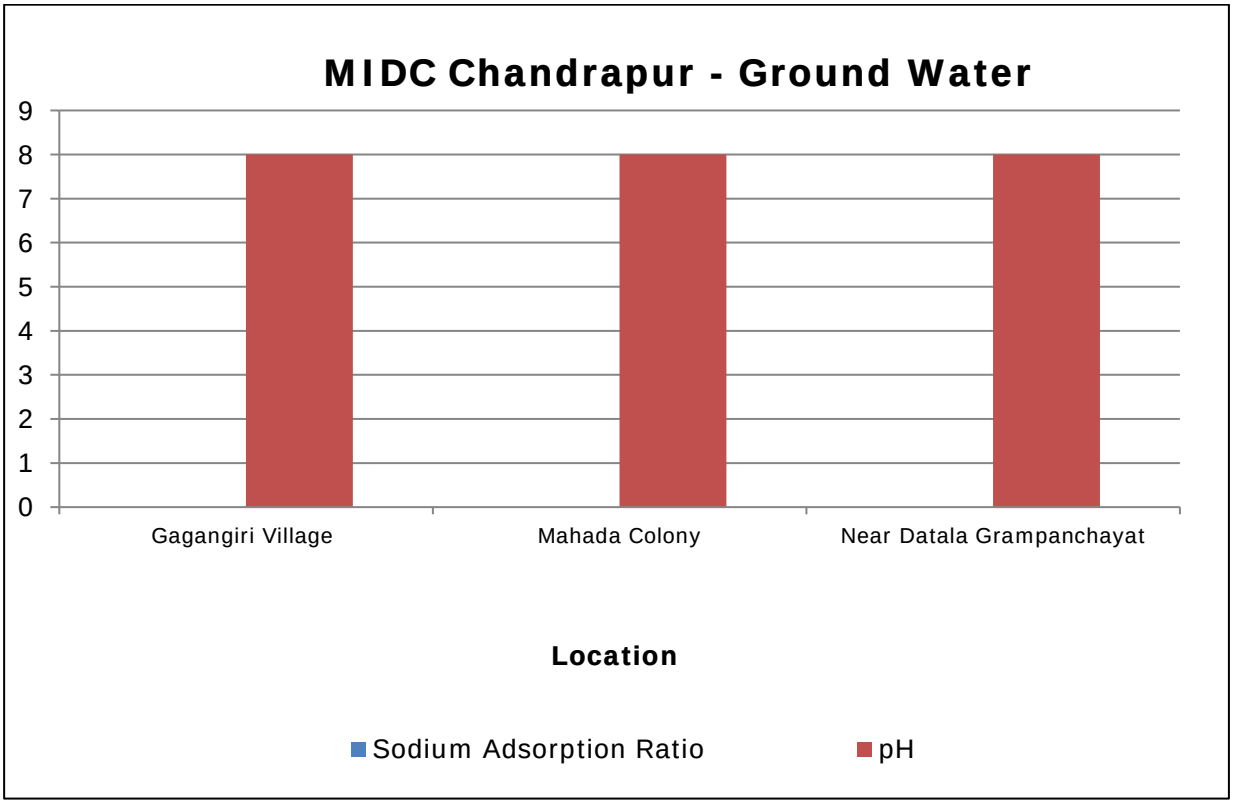
Parameters	Unit	Results		
		Gagangiri Village (Dug well Water)	Mahada Colony (Hand Pump water)	Near Datala Grampanchayat (Hand Pump water)
Sanitary Survey	-	Very Clean Neighbourhood and catchment	Very Clean neighbourhood and catchment	Very Clean neighbourhood and catchment
General Appearance	-	No floating matter	Not Applicable	Not Applicable
Transparency	m	0.2	Not Applicable	Not Applicable
Temperature	^{o}C	26	29	28
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.06	8.29	7.83
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	15	9	9
Total Dissolved Solids	mg/L	535	354	825
Chemical Oxygen Demand	mg/L	6	9	7
Biochemical Oxygen Demand (3 days, $27^{o}C$)	mg/L	2	2	2
Electrical Conductivity (at $25^{o}C$)	µmhos/cm	952	629	1468
Nitrite Nitrogen	mg/L	0.06	0.02	0.09

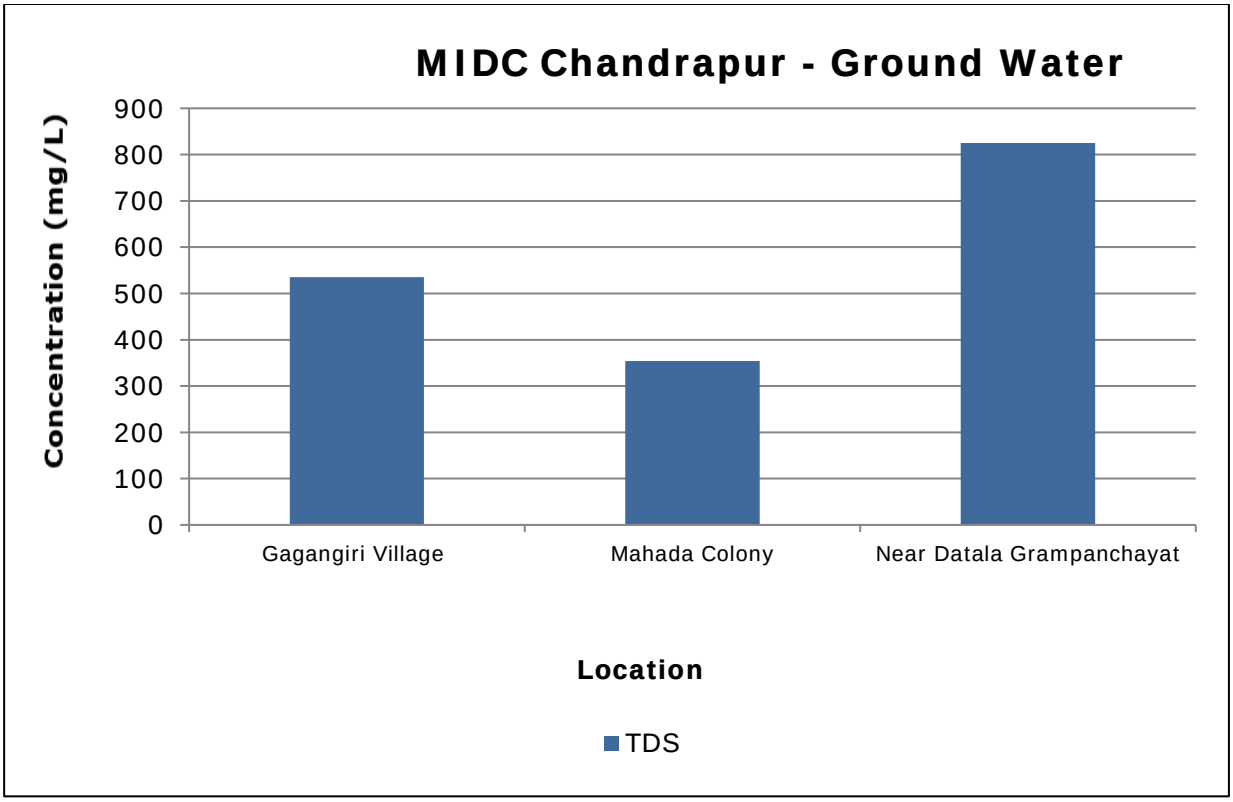
Parameters	Unit	Results		
		Gagangiri Village (Dug well Water)	Mahada Colony (Hand Pump water)	Near Datala Grampanchayat (Hand Pump water)
Nitrate Nitrogen	mg/L	3.40	0.69	6.67
(NO_2+ NO_3)-Nitrogen	mg/L	3.44	0.69	6.70
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.17	0.60	1.43
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	1.8	1.7	2.9
Total Coliforms	MPN Index/ 100 ml	370	19	192
Faecal Coliforms	MPN Index/ 100 ml	88	11	82
Total Phosphate (as P)	mg/L	0.48	0.58	0.64
Total Kjeldahl Nitrogen (as N)	mg/L	1.31	0.90	1.19
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.23	0.14	0.21
Total Nitrogen	mg/L	8.77	1.60	7.90
Phenols (as C_6H_5OH)	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	0.01	0.01	0.04
Copper (as Cu)	mg/L	BLQ	0.03	0.02
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	0.001	BLQ	BLQ
Manganese (as Mn)	mg/L	0.03	0.14	0.24
Iron (as Fe)	mg/L	0.75	0.49	0.32
Vanadium (as V)	mg/L	0.03	BLQ	0.02
Selenium (as Se)	mg/L	BLQ	BLQ	BLQ

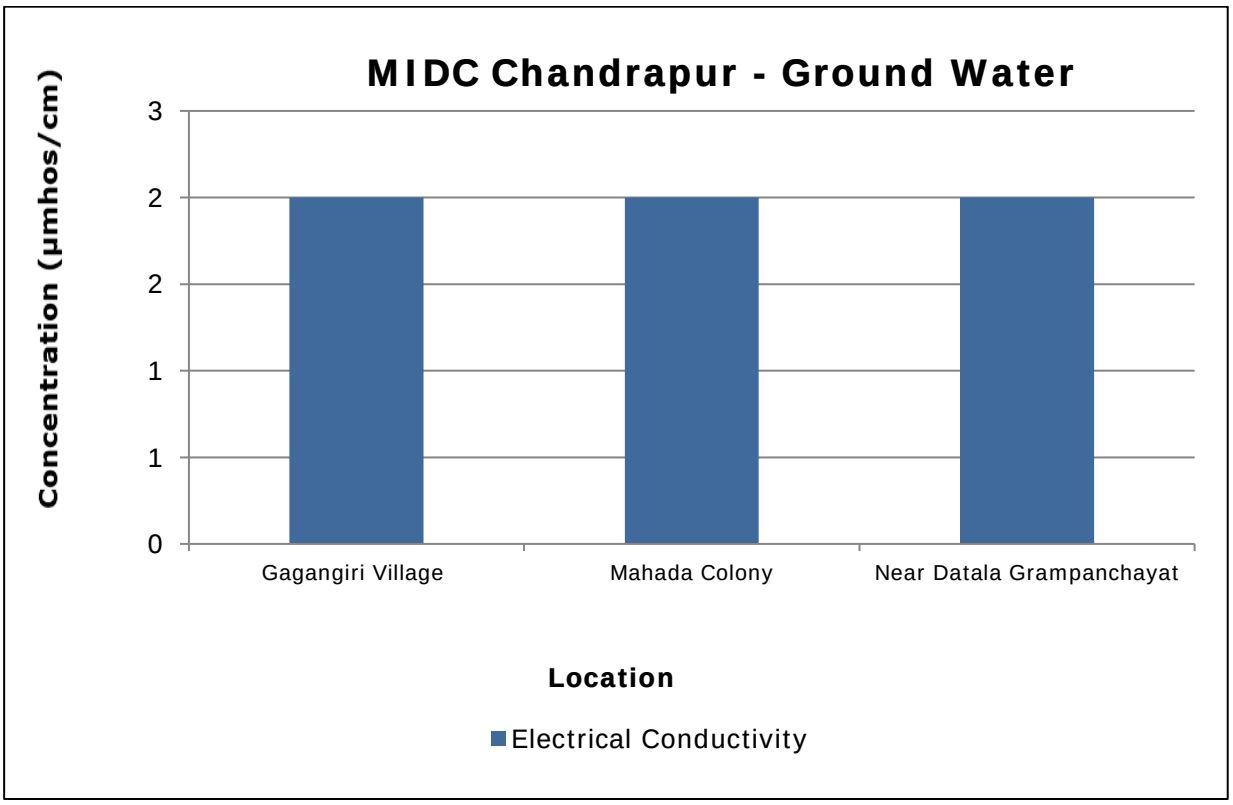
Parameters	Unit	Results		
		Gagangiri Village (Dug well Water)	Mahada Colony (Hand Pump water)	Near Datala Grampanchayat (Hand Pump water)
Boron (as B)	mg/L	0.29	0.22	0.32
Bioassay Test on fish	% survival	100	100	100

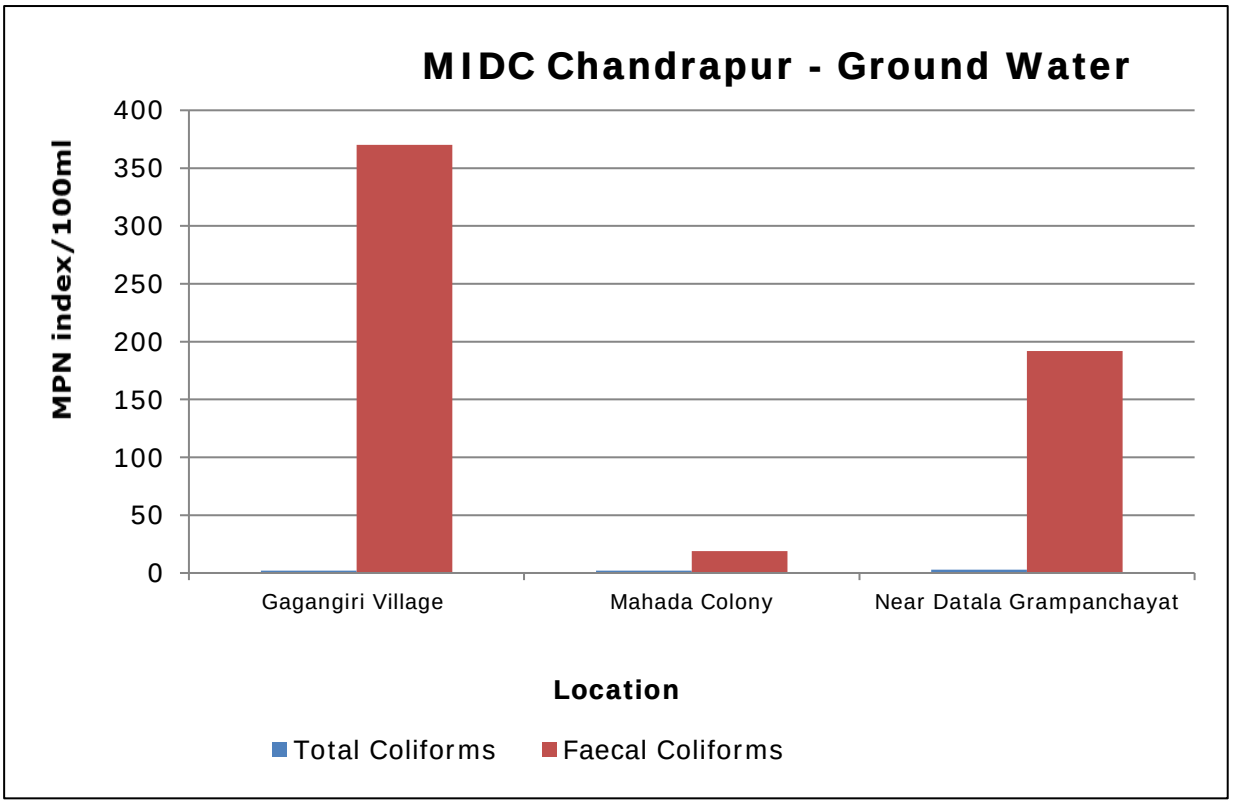
Graphs - Ground water Quality of MIDC Chandrapur

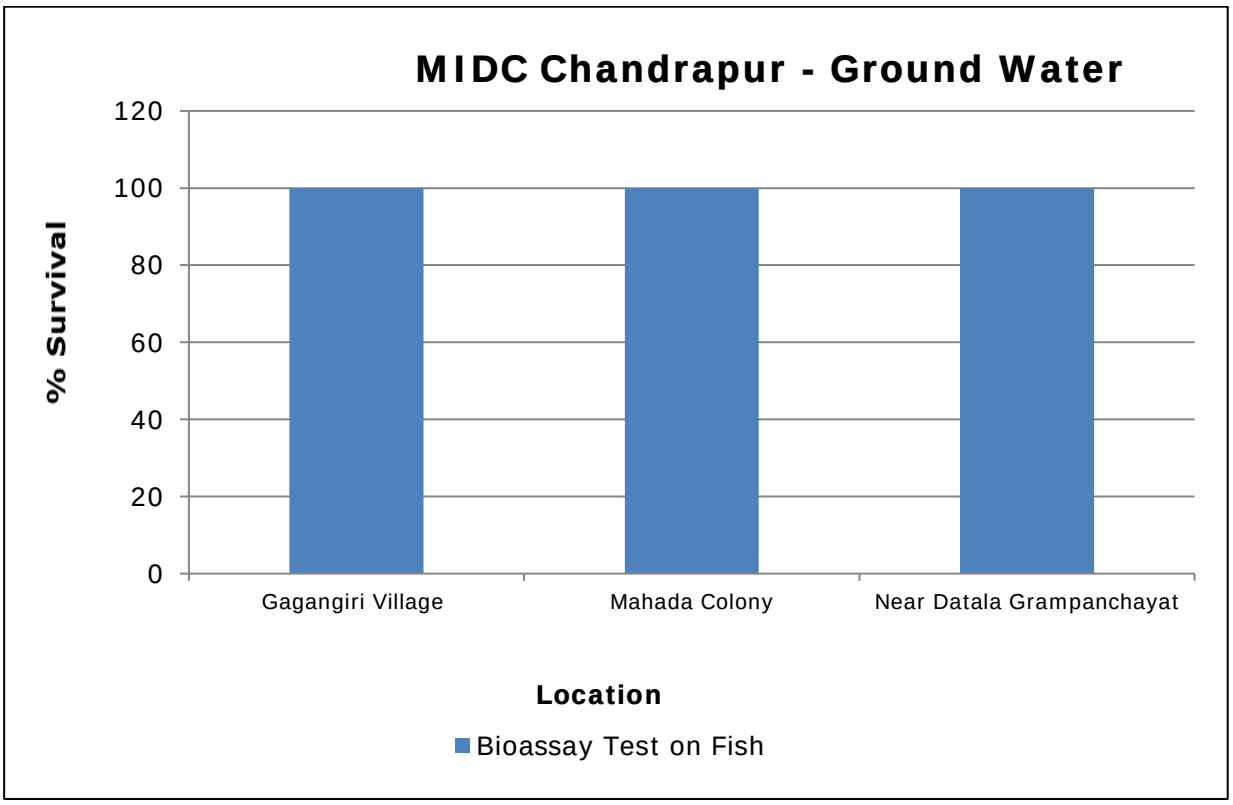



MIDC Chandrapur - Ground Water
9
8
7
6
5
4
3
2
1
0
Gagangiri Village
Mahada Colony
Near Datala Grampanchayat
Location
Sodium Adsorption Ratio
pH


MIDC Chandrapur - Ground Water
Concentration (mg/L)
900
800
700
600
500
400
300
200
100
0
Gagangiri Village
Mahada Colony
Near Datala Grampanchayat
Location
TDS


MIDC Chandrapur - Ground Water
Concentration (µmhos/cm)
3
2
2
1
1
0
Gagangiri Village
Mahada Colony
Near Datala Grampanchayat
Location
Electrical Conductivity


MIDC Chandrapur - Ground Water
MPN index/100ml
400
350
300
250
200
150
100
50
0
Gagangiri Village
Mahada Colony
Near Datala Grampanchayat
Location
Total Coliforms
Faecal Coliforms


MIDC Chandrapur - Ground Water
% Survival
120
100
80
60
40
20
0
Gagangiri Village
Mahada Colony
Near Datala Grampanchayat
Location
Bioassay Test on Fish

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

- All three water samples collected are acceptable in general appearance, colour and smell.
- pH, suspended solids, Electrical conductivity and BOD 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 Copper, Hexavalent Chromium, Selenium, 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.
- Fluoride and Total Phosphate exceeded standard limit in one sample out of three samples collected.
- Metals like Zinc, Nickel, Total Chromium and Iron exceeded standard limit in all 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 7.5 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	27.06.2024	29.06.2024	30.06.2024
2.	Nakoda Village (Bore Well Water)	19° 54'57.9''N	79°06'42.1''E	27.06.2024	29.06.2024	30.06.2024
3.	Usgaon Village (Dug Well Water)	19°54'45.3'N	79°07'36.4''E	27.06.2024	29.06.2024	30.06.2024

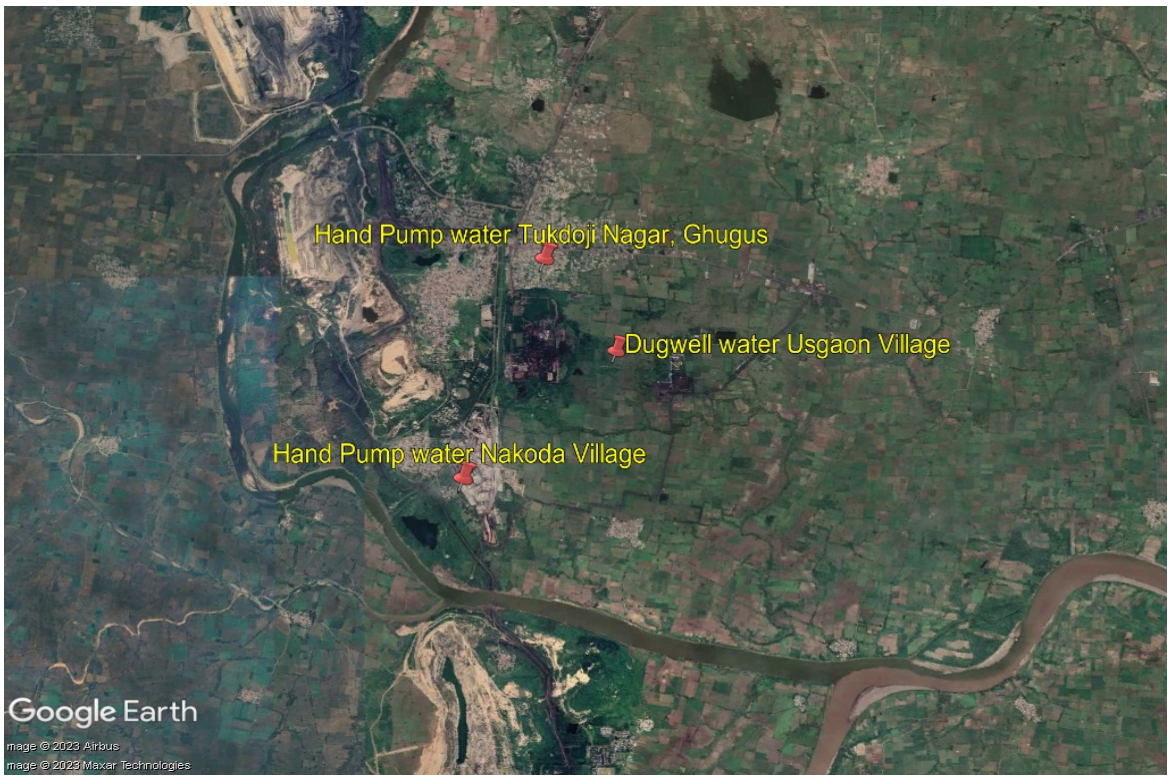


Fig. Geographical Locations of Ground Water Sampling MIDC Ghugus

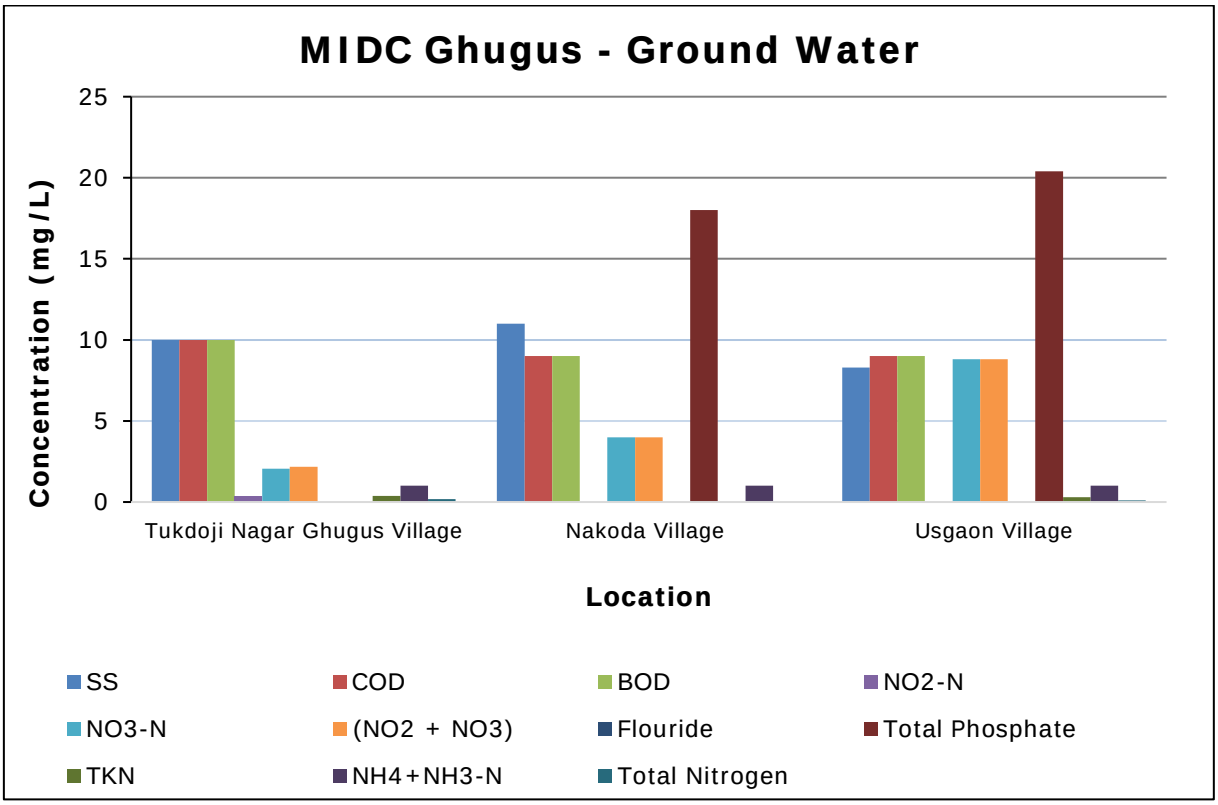
Table 7.6 MIDC Ghugus – Details of Sampling Location of Ground Water

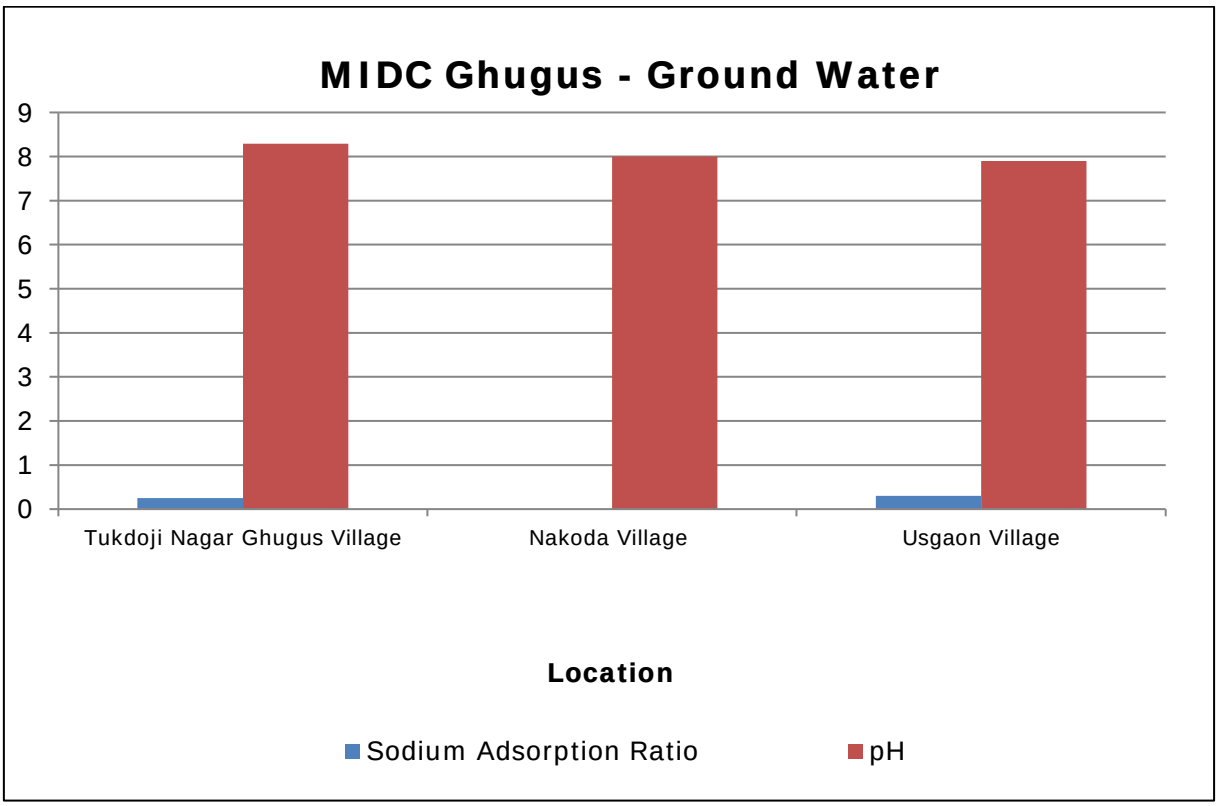
Parameters	Unit	Results		
		Tukdoji Nagar Ghugus Village (Hand Pump Water)	Nakoda Village (Bore Well Water)	Usgaon Village (Dug Well Water)
Sanitary Survey	-	Generally Clean Neighbourhood	Reasonably Clean Neighbourhood	Generally Clean Neighbourhood
General Appearance	-	Not Applicable	Not Applicable	No floating matter
Transparency	m	Not Applicable	Not Applicable	0.3
Temperature	^{o}C	30	30	28
Colour	Hazen	1	1	1.3
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	8.29	8	7.9
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	10	11	8.3
Total Dissolved Solids	mg/L	831	485	941
Chemical Oxygen Demand	mg/L	10	9	9.0
Biochemical Oxygen Demand (3 days, $27^{o}C$)	mg/L	3	2	2.5
Electrical Conductivity (at $25^{o}C$)	µmhos/cm	1480	862	1677.0
Nitrite Nitrogen	mg/L	0.35	BLQ	0.0

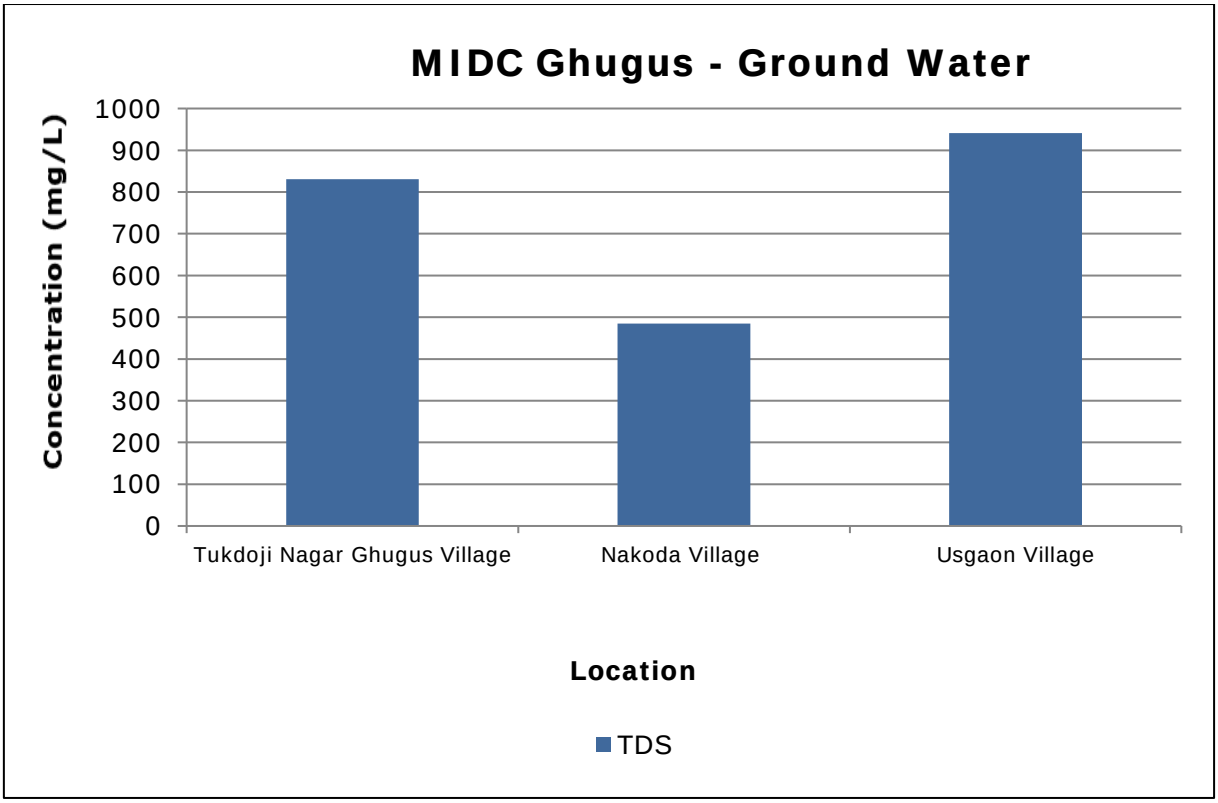
Parameters	Unit	Results		
		Tukdoji Nagar Ghugus Village (Hand Pump Water)	Nakoda Village (Bore Well Water)	Usgaon Village (Dug Well Water)
Nitrate Nitrogen	mg/L	2.05	4	8.8
(NO_2+ NO_3)-Nitrogen	mg/L	2.17	4	8.8
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.27	0.80	1.7
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.25	0.27	0.3
Sodium Adsorption Ratio	-	2.72	3	2.0
Total Coliforms	MPN Index/ 100 ml	7.80	136	635
Faecal Coliforms	MPN Index/ 100 ml	<1.8	18	20.4
Total Phosphate (as P)	mg/L	0.37	0.26	0.3
Total Kjeldahl Nitrogen (as N)	mg/L	1.01	0.93	1.0
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.18	0.23	0.1
Total Nitrogen	mg/L	3.18	4.88	9.9
Phenols (as C_6H_5OH)	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	12.08	2.98	0.5
Nickel (as Ni)	mg/L	0.19	0.15	0.2
Copper (as Cu)	mg/L	0.38	0.49	0.1
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.16	0.14	0.2
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.37	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.37	1.11	0.11
Iron (as Fe)	mg/L	2.44	16.09	0.68
Vanadium (as V)	mg/L	0.04	0.02	0.32
Selenium (as Se)	mg/L	BLQ	BLQ	0.006

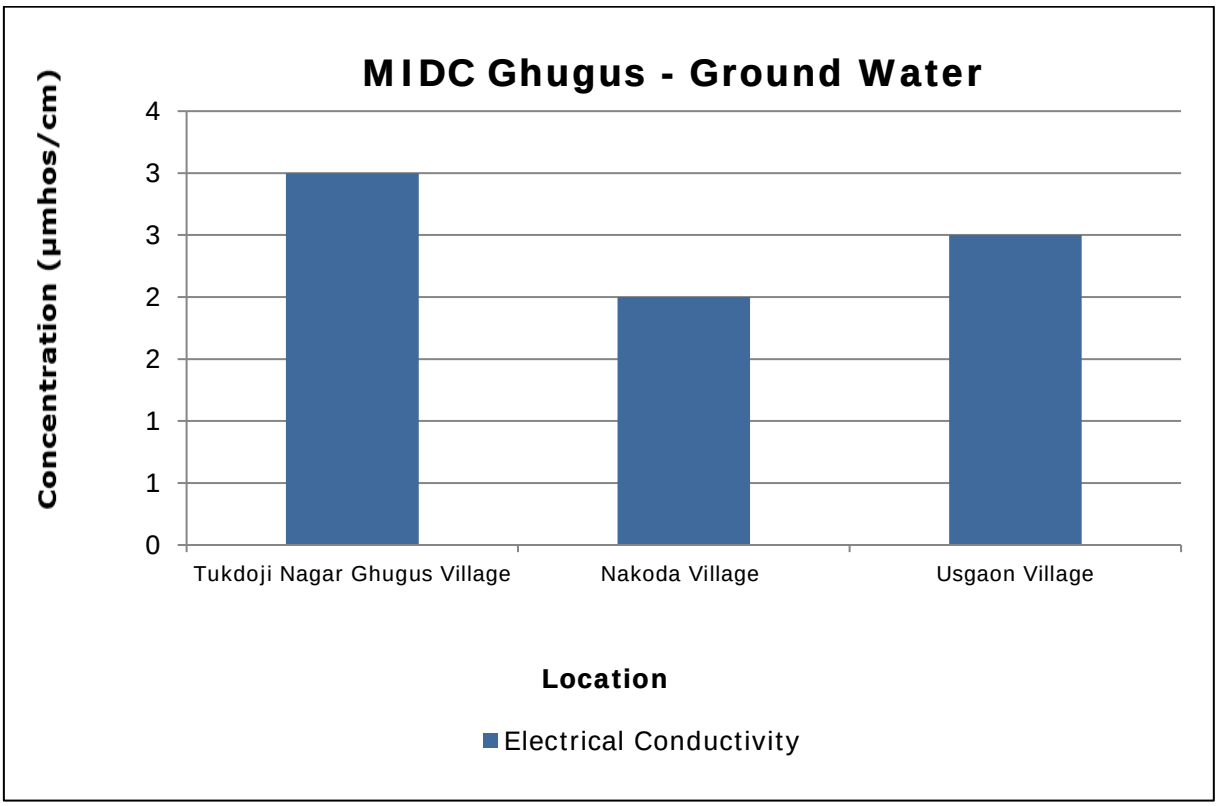
Parameters	Unit	Results		
		Tukdoji Nagar Ghugus Village (Hand Pump Water)	Nakoda Village (Bore Well Water)	Usgaon Village (Dug Well Water)
Boron (as B)	mg/L	0.27	0.36	0.34
Bioassay Test on fish	% survival	100	100	100.0

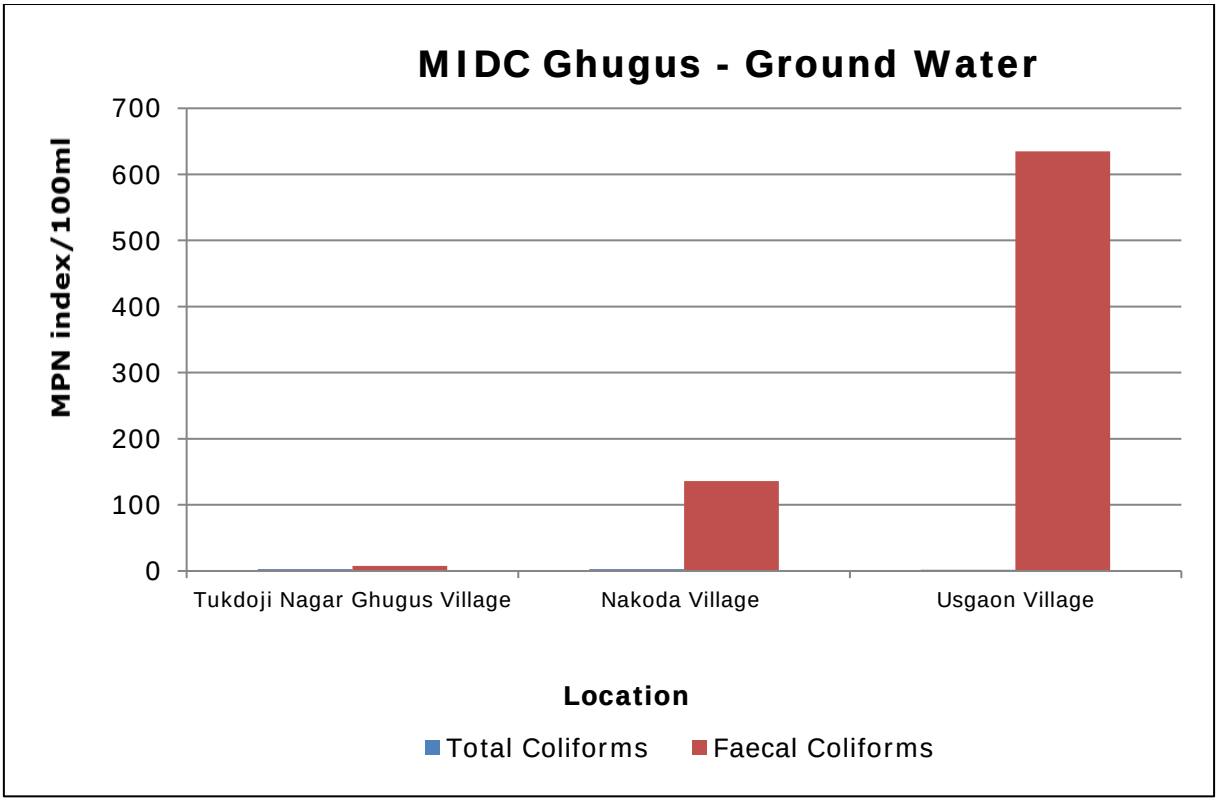
Graphs - Ground water Quality of MIDC Ghugus

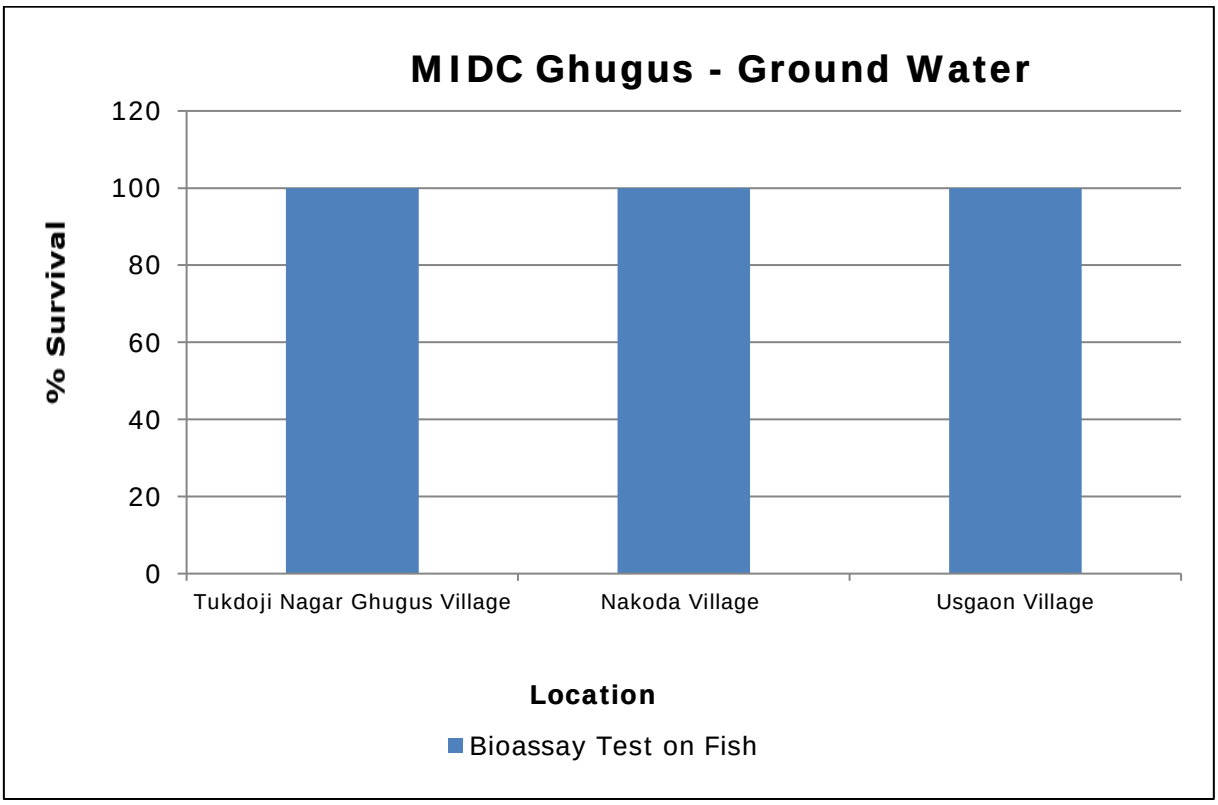



MIDC Ghugus - Ground Water
9
8
7
6
5
4
3
2
1
0
Tukdoji Nagar Ghugus Village
Nakoda Village
Usgaon Village
Location
Sodium Adsorption Ratio
pH


MIDC Ghugus - Ground Water
Concentration (mg/L)
1000
900
800
700
600
500
400
300
200
100
0
Tukdoji Nagar Ghugus Village
Nakoda Village
Usgaon Village
Location
TDS


MIDC Ghugus - Ground Water
Concentration (µmhos/cm)
4
3
3
2
2
1
1
0
Tukdoji Nagar Ghugus Village
Nakoda Village
Usgaon Village
Location
Electrical Conductivity


MIDC Ghugus - Ground Water
MPN index/100ml
700
600
500
400
300
200
100
0
Tukdoji Nagar Ghugus Village
Nakoda Village
Usgaon Village
Location
Total Coliforms
Faecal Coliforms


MIDC Ghugus - Ground Water
120
100
80
60
40
20
0
% Survival
Tukdoji Nagar Ghugus Village
Nakoda Village
Usgaon Village
Location
Bioassay Test on Fish

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

- All three water samples collected are acceptable in general appearance, colour and smell.
- pH, suspended solids, Electrical conductivity and BOD 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 Zinc, Nickel, Copper, Hexavalent Chromium, Total Chromium, Arsenic 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.
- Zinc, Nickel, Copper and Iron exceeds in one sample out of three samples collected.
- Total Phosphate exceeds in two samples out of 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 7.7 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	27.06.2024	29.06.2024	30.06.2024
2.	Near Fire Station (Bore Well Water)	19°51'11.8''N	79°20'45.8''E	27.06.2024	29.06.2024	30.06.2024
3.	Visapur Village (Bore well Water)	19°53'13.7''N	79°19'49.7''E	27.06.2024	29.06.2024	30.06.2024

Fig. Geographical Locations of Ground Water Sampling MIDC Ballarpur

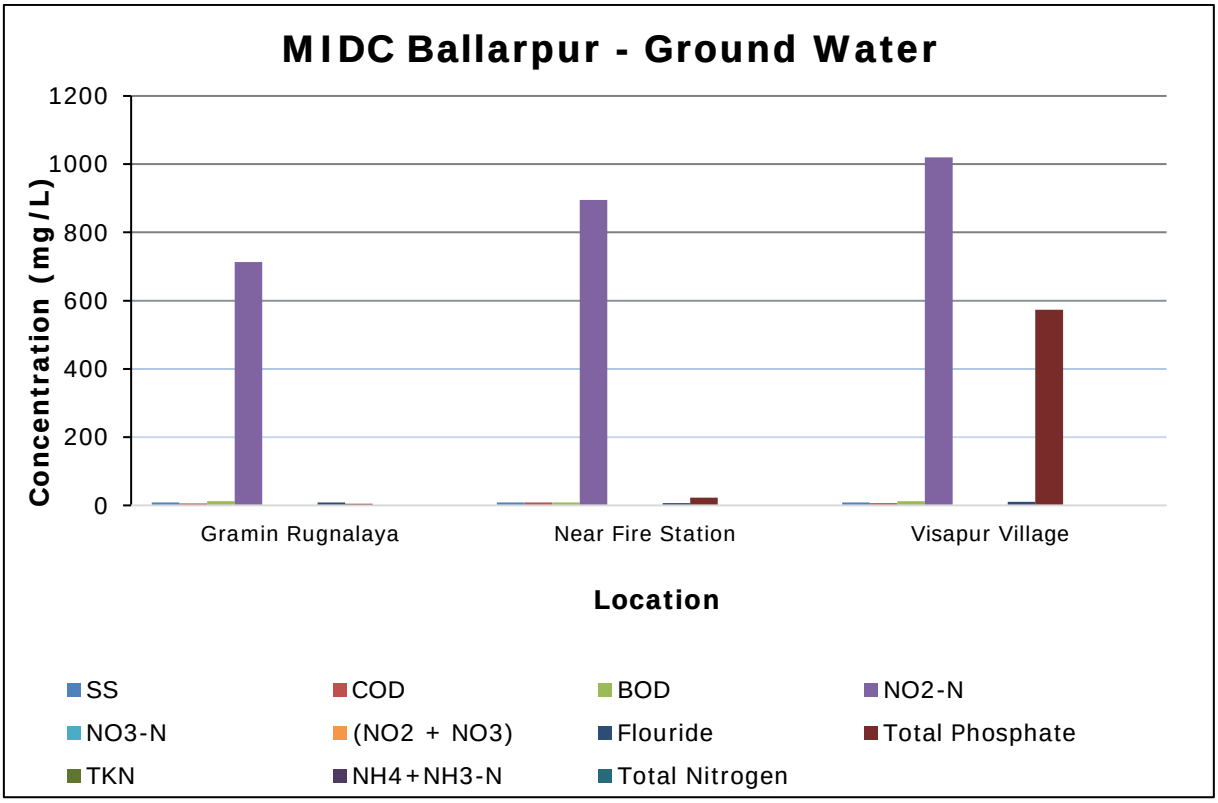
Table 7.8 MIDC Ballarpur – Details of Sampling Location of Ground Water

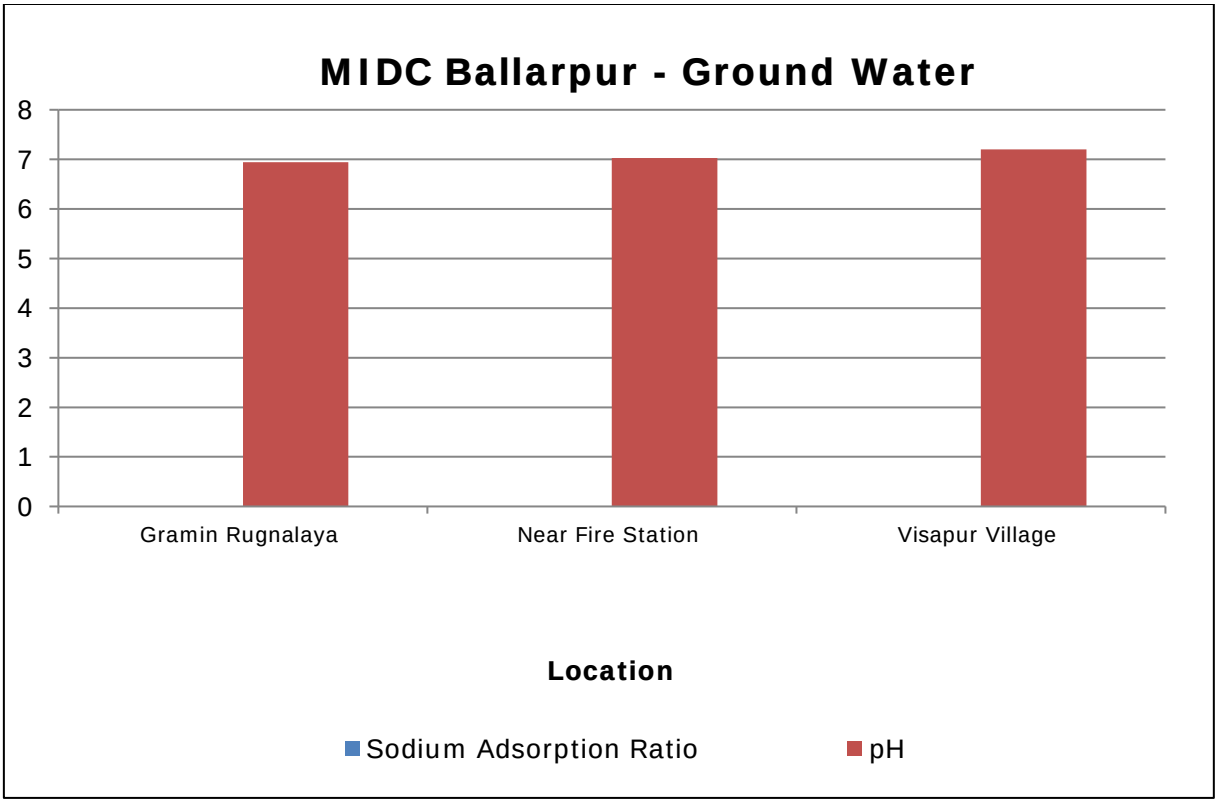
Parameters	Unit	Results		
		Gramin Rugnalaya (Bore Well Water)	Near Fire Station (Bore Well Water)	Visapur Village (Bore well Water)
Sanitary Survey	-	Very Clean Neighbourhood and catchment	Very Clean Neighbourhood and catchment	Very Clean Neighbourhood and catchment
General Appearance	-	Not Applicable	Not Applicable	Not Applicable
Transparency	m	Not Applicable	Not Applicable	Not Applicable
Temperature	^{o}C	28	28	27
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	6.94	7.03	7.20
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	9	9	9
Total Dissolved Solids	mg/L	402	503	549
Chemical Oxygen Demand	mg/L	9	12	10
Biochemical Oxygen Demand (3 days, $27^{o}C$)	mg/L	2	3	3
Electrical Conductivity (at $25^{o}C$)	µmhos/cm	895	1020	1480
Nitrite Nitrogen	mg/L	BLQ	BLQ	0.35
Nitrate Nitrogen	mg/L	6.31	10.5	2.05

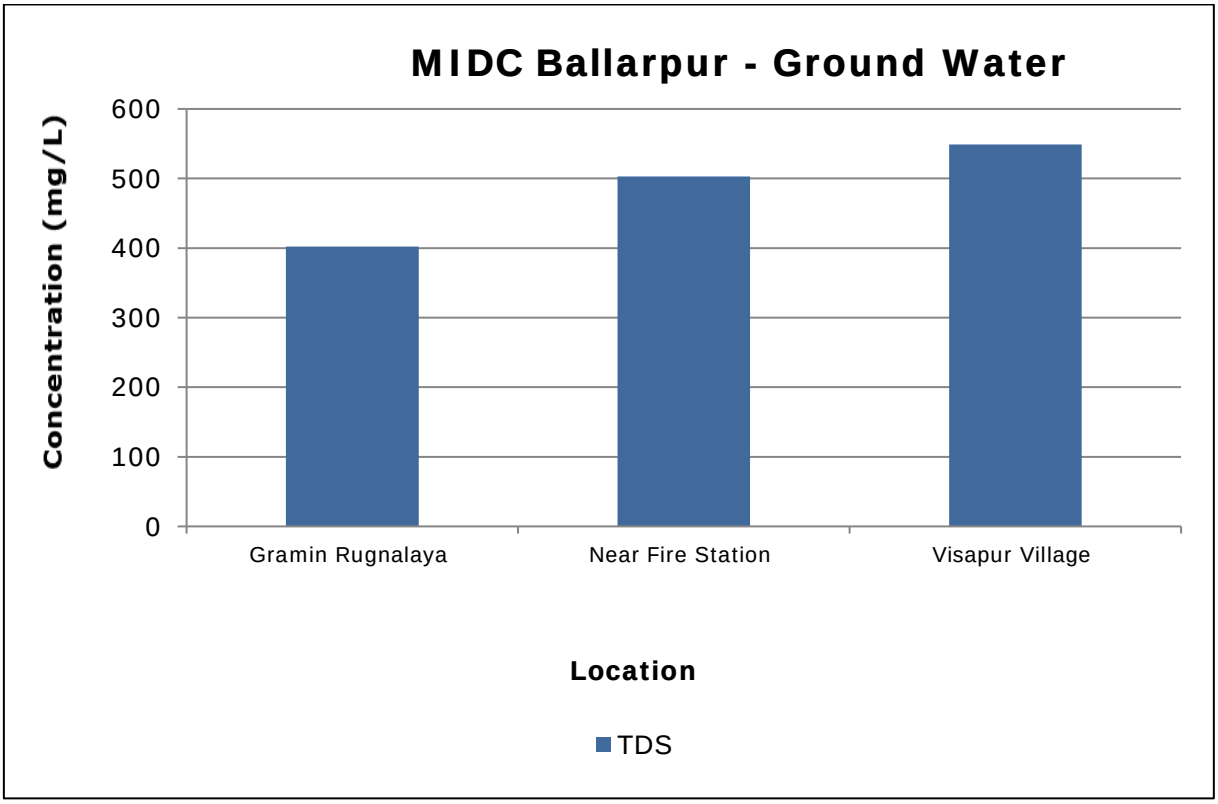
Parameters	Unit	Results		
		Gramin Rugnalaya (Bore Well Water)	Near Fire Station (Bore Well Water)	Visapur Village (Bore well Water)
(NO_2+ NO_3)-Nitrogen	mg/L	6.31	10.5	2.17
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.3	1.2	1.27
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	0.25
Sodium Adsorption Ratio	-	1.9	2.00	2.72
Total Coliforms	MPN Index/ 100 ml	19.9	654	7.80
Faecal Coliforms	MPN Index/ 100 ml	23	573	<1.8
Total Phosphate (as P)	mg/L	0.68	0.31	0.37
Total Kjeldahl Nitrogen (as N)	mg/L	1.31	1.23	1.01
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.12	BLQ	0.18
Total Nitrogen	mg/L	7.62	12	3.18
Phenols (as C_6H_5OH)	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	2.94	0.09	BLQ
Nickel (as Ni)	mg/L	0.162	0.018	0.018
Copper (as Cu)	mg/L	6.423	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.149	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	0.006	0.009
Lead (as Pb)	mg/L	0.009	0.011	0.018
Cadmium (as Cd)	mg/L	BLQ	BLQ	0.03
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.170	0.1135	0.085
Iron (as Fe)	mg/L	0.565	0.217	0.171
Vanadium (as V)	mg/L	0.029	0.012	0.011
Selenium (as Se)	mg/L	BLQ	0.009	0.006
Boron (as B)	mg/L	0.144	0.27	0.154

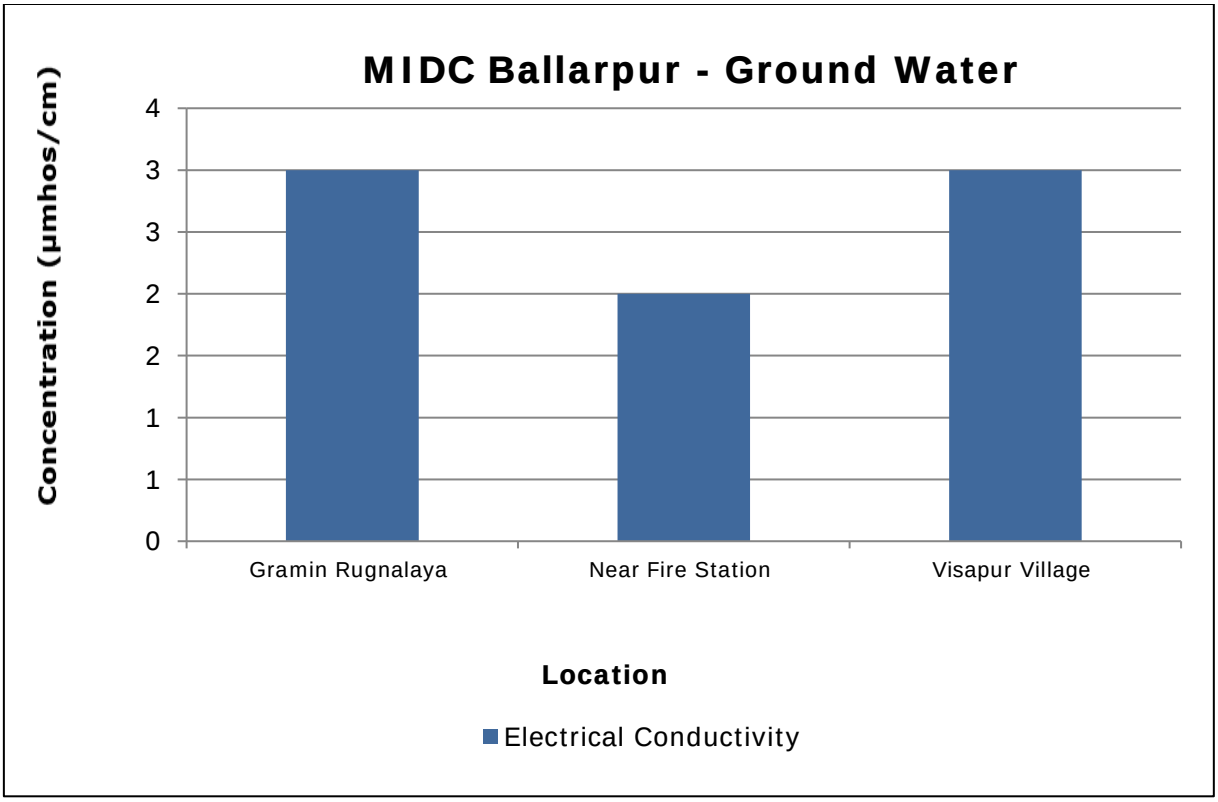
Parameters	Unit	Results		
		Gramin Rugnalaya (Bore Well Water)	Near Fire Station (Bore Well Water)	Visapur Village (Bore well Water)
Bioassay Test on fish	% survival	100	100	100

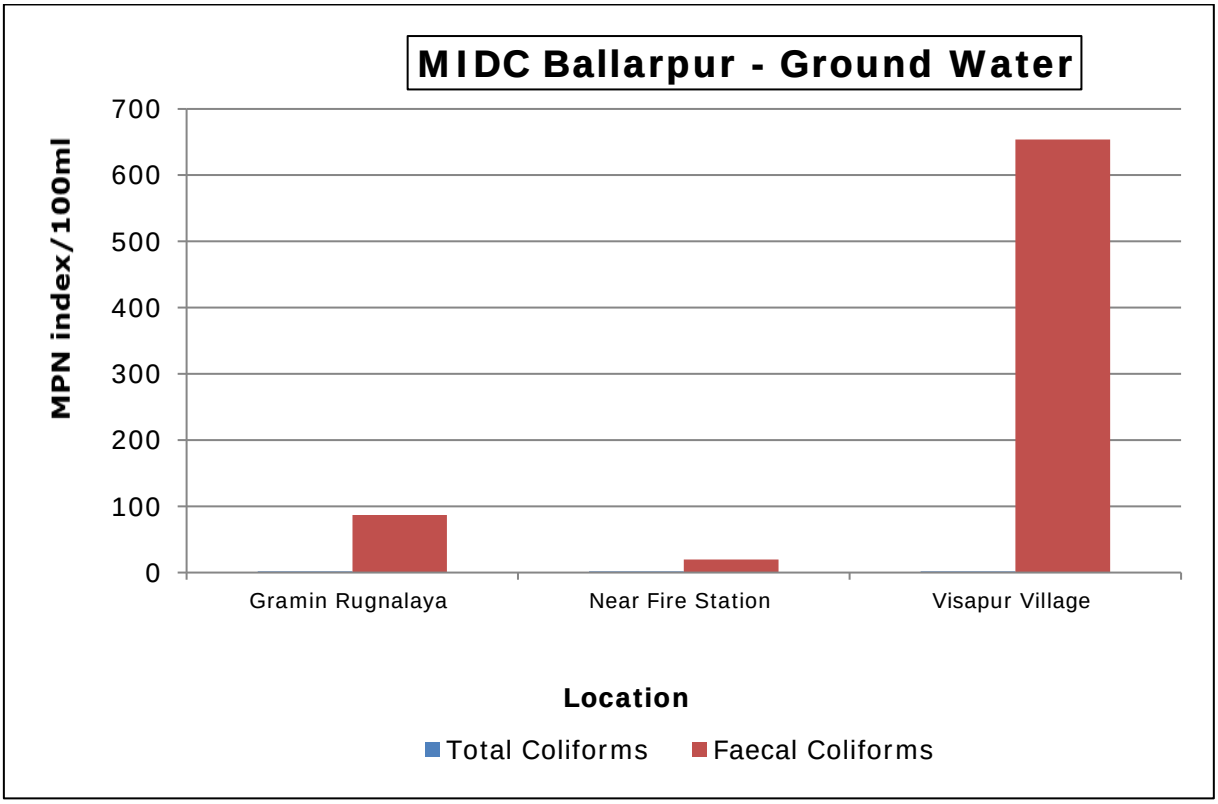
Graphs - Ground water Quality of MIDC Ballarpur

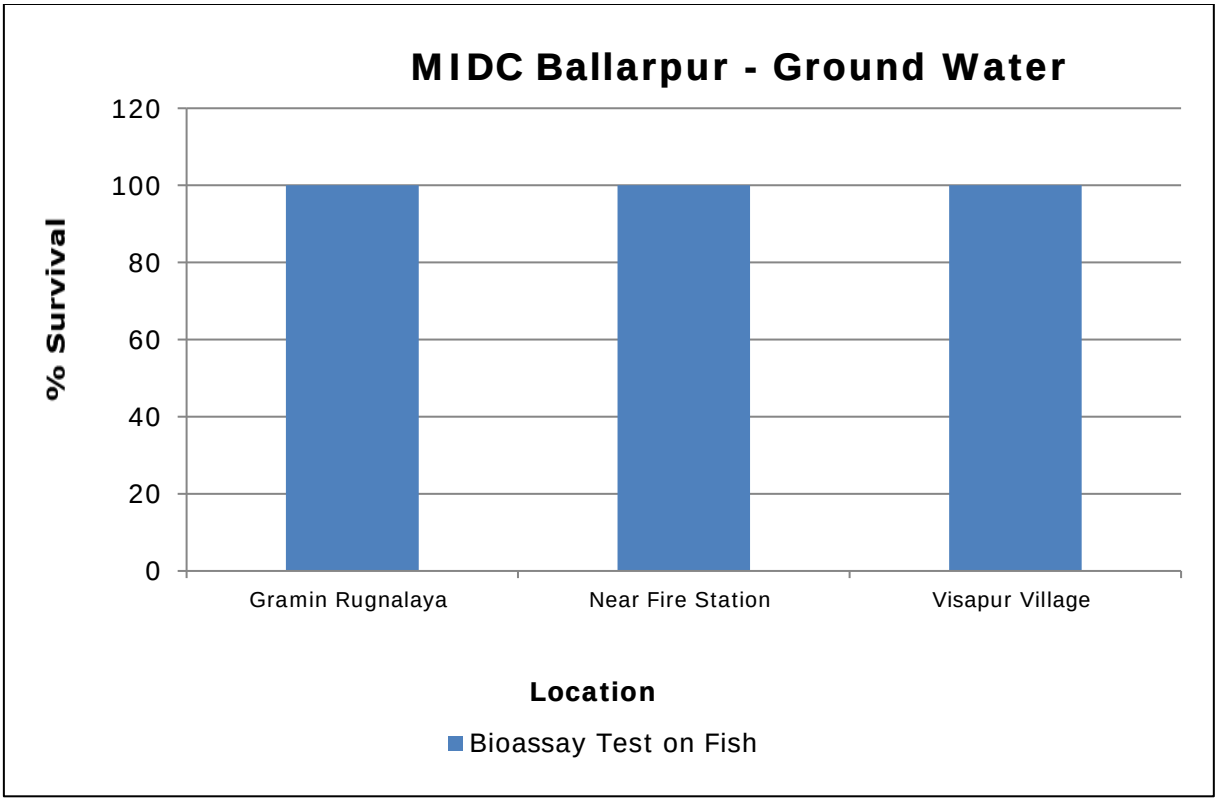



MIDC Ballarpur - Ground Water
8
7
6
5
4
3
2
1
0
Gramin Rugnalaya
Near Fire Station
Visapur Village
Location
Sodium Adsorption Ratio
pH


MIDC Ballarpur - Ground Water
Concentration (mg/L)
600
500
400
300
200
100
0
Gramin Rugnalaya
Near Fire Station
Visapur Village
Location
TDS


MIDC Ballarpur - Ground Water
Concentration (µmhos/cm)
4
3
3
2
2
1
1
0
Gramin Rugnalaya
Near Fire Station
Visapur Village
Location
Electrical Conductivity


MIDC Ballarpur - Ground Water
MPN index/100ml
700
600
500
400
300
200
100
0
Gramin Rugnalaya
Near Fire Station
Visapur Village
Location
Total Coliforms
Faecal Coliforms


MIDC Ballarpur - Ground Water
120
100
80
60
40
20
0
% Survival
Gramin Rugnalaya
Near Fire Station
Visapur Village
Location
Bioassay Test on Fish

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 Pre monsoon season 2024

	A1	A2	A	B	C	D	CEPI
Air Index	3	2.5	7.50	9	0	10	26.50
Water Index	2	2.5	5	40	0	10	55.00
Land Index	1.5	2.5	3.75	42.75	0	10	56.50
						Aggregated CEPI	**62.84**

Land Index is highest with 56.50 The reason for increase in Land index is due to the exceedance of concentration of Iron which has exceeded at 5 samples out of 12 samples collected. The Water EPI is 55.00 and the concentration of and Air EPI is 26.50.

Table 8.2 Comparison of CEPI Scores

	Air Index	Water Index	Land Index	CEPI
CEPI score June 2024	26.50	55.00	56.50	**62.84**
CEPI score March 2024	41.00	53.13	53.50	**63.63**
CEPI score June 2023	26.88	51.75	60.88	**66.32**
CEPI score March 2023	38.10	59.30	41.90	**65.76**
CEPI score June 2021	22.00	57.30	59.00	**64.20**
CEPI Score March 2021	54.30	43.50	42.30	**62.70**
CEPI score March 2020	65.00	22.00	21.00	**66.60**
CEPI score June 2019	37.07	51.10	54.40	**54.56**
CEPI score March 2019	44.50	48.90	47.10	**57.28**
CEPI score June 2018	41.32	40.58	44.36	**51.88**

CEPI score March 2018	46.80	49.20	56.90	**61.69**
CPCB CEPI score March 2018	75.00	23.75	23.75	**76.41**

The result shows that CEPI score of the present report is 62.84. The present study is the compilation of pre 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:

Ambient Air Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
PM_{10}	B	2	Moderate	
CO	B	0.5		
$PM_{2.5}$	B	0.5		
		3	**2.5**	**7.5**

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}	62.25	100	0.62	2	16	0.08	M	9
CO	1.28	2	0.64	0	16	0.00	L	0
$PM_{2.5}$	16.21	60	0.27	0	16	0.00	L	0
B score = (B1+B2+B3)							**B**	**9**

C	**0**	**< 5 %**
D	**10**	**A-A-IA**

Air CEPI Score	**(A+B+C+D)**	**26.50**

Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
Fe	A	1	Moderate	
TP	B	0.5		
BOD	B	0.5		
		2	**2.5**	**5**

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)	
Fe	1.490	0.3	4.97	17	18	4.69	C	30
TP	0.786	0.3	2.62	16	18	2.33	C	10

BOD	3.17	8	0.40	0	18	0.00	L	0
B score = (B1+B2+B3)							**B**	**40**

C	**0**	**< 5 %**
D	**10**	**A-IA-A**

Water CEPI Score	**(A+B+C+D)**	**55.00**

Ground Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
Fe	A	1	Moderate	
F	A	0.25		
TDS	A	0.25		
		1.5	**2.5**	**3.75**

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)	
Fe	1.80	0.3	6.00	5	12	2.50	C	30
F	1.387	0.3	4.62	3	12	1.16	C	10
TDS	798.00	2000	0.40	1	12	0.03	M	2.75
B score = (B1+B2+B3)							**B**	**42.75**

C	**0**	**< 5 %**
D	**10**	**A-IA-A**

Land CEPI Score	**(A+B+C+D)**	**56.50**

Land CEPI Score (im) **56.50**

Water CEPI Score (i2) **55.00**

Air CEPI Score (i3) **26.50**

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 = **62.84**

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 at all locations except PM_{10} exceeding at two locations.
- In the CEPI score calculated for Air environment by CPCB in March 2018, the concentration of PM10 and PM2.5 has exceeded at all studied locations, which contributed to air index (75.00). However, in the present report, concentration of both PM10 and PM2.5 are found below permissible levels except two locations resulted in less exceedance factor, hence lower air index (26.50).

Surface Water Quality

- Higher concentration of Selenium, Fluoride, Iron, etc 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.

Ground Water Quality

- Ground water samples were collected from different Dug well, well and Bore well in the region.
- Higher concentration of Selenium and Fluoride was observed in the ground water samples collected.
- 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 pre monsoon season is 62.84.
- When CEPI Score is 63.63 of March 2024 is compared, a decrease in the Air Index and increase in Water Index and Land index are found to get decrease in June 2024.
- 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.

- In CEPI score of CPCB 2018, Air index is higher as compared to the present (June, 2024) indices. However, water index (55.00) and land index (56.5) of present CEPI is higher than the water (23.75) and land CEPI (23.75) calculated by CPCB in 2018.
- As per the CPCB, CEPI calculation revised in 2016, Health statistics represented by Receptor C in CEPI Calculation, also plays an important role.
- Efforts taken to reduce the pollution level is represents factor D in CEPI Calculation, which also affects the overall CEPI score.
- The present study is the compilation of pre-monsoon season, which results in dilution of environmental samples resulting in lower pollution load, hence also affects the total score.
- In conclusion, approximately 17.7 % decrease in CEPI score is observed from 76.41 (CPCB CEPI score) in 2018 to 62.84 in June 2024.

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

Dust Suppression Vehicle

Public Awareness Programs

Mechanical Sweeper Machine

12. Photographs

MIDC Tadali-Ambient Air Sampling at Near Chaman Metallic Boundary Wall	**MIDC Tadali-Ambient Air Sampling at MIDC WTP Building**
MIDC Chandrapur - Ambient Air Sampling at Opposite Super Hygienic CBMW Site	**MIDC Chandrapur - Ambient Air Sampling at Multi Organics**

MIDC Ghugus - Ambient Air Sampling at Terrace of Transit Hostel Rajiv Colony WCL	**MIDC Ghugus - Ambient Air Sampling at WTP Water Supply Tank**
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 Manidhari Industry

MIDC Chadrapur – Surface Water Sampling at Nallah Near Gagangiri Village

MIDC Chadrapur – Surface Water Sampling at Nallah at Dhanora Bridge

MIDC Ghugus – Surface Water Sampling at Wardha river Near WCL WTP Ghugus OCM	**MIDC Ghugus – Surface Water Sampling at Domestic Effluent Nallah Near lokhandi bridge at WTP of Ghugus OCM**
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)**
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)**

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI)
Pre-monsoon Season (April 2024- June 2024) Study by
Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	CHANDRAPUR
Name of the major health center/ organization	Bilt Hospital
Name and designation of the Contact person	Dr. Nitin V. Bhalerao C.M.O
Address Bilt. Hospital .	Ballarpur, Tal.: Ballarpur, Dist.: Chandrapur

S No.	Diseases	No. of Patients Reported	
		JAN-DEC (2023)	JAN-JUNE (2024)
AIRBORNE DISEASES			
1.	Asthma	01	01
2.	Acute Respiratory Infection	52	24
3.	Bronchitis	07	03
4.	Cancer	- Nil -	- Nil -
WATERBORNE DISEASES			
1.	Gastroenteritis	29	13
2.	Diarrhea	43	18
3.	Renal diseases	- Nil -	- Nil -
4.	Cancer	- Nil -	- Nil -

Date: 5/7/2024

Signature
Dr. Nitin V. Bhalerao
MBBS, PGEOH, AFIH
Reg. No. 074641
Chief Medical Officer
BGPPL Hospital, Ballarpur

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI)
Pre-monsoon Season (April 2024- June 2024) Study by
Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

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

S No.	Diseases	No. of Patients Reported	
		JAN-DEC (2023)	JAN-JUNE (2024)
AIRBORNE DISEASES			
1.	Asthma	17	5
2.	Acute Respiratory Infection	208	72
3.	Bronchitis	34	12
4.	Cancer	9	0
WATERBORNE DISEASES			
1.	Gastroenteritis	73	38
2.	Diarrhea	73	38
3.	Renal diseases	137	55
4.	Cancer	9	0

Date: 9/07/2024

Signature

DR. ROHAN V. AINCHWAR
M.D. (Medicine); D.M. (Cardiology)
MMC Reg.No.2004/03/2011

CHL MULTISPECIALITY HOSPITAL & RESEARCH CENTRE ★ Reg. 132

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI)
Pre-monsoon Season (April 2024- June 2024) Study by
Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

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	Ram Nagar, T.B. Hospital Premises, In front of Dr. Ambedkar College, Tal. & Dist.: Chandrapur

S No.	Diseases	No. of Patients Reported	
		JAN-DEC (2023)	JAN-JUNE (2024)
AIRBORNE DISEASES			
1.	Asthma	367	143
2.	Acute Respiratory Infection	7817	2511
3.	Bronchitis	260	54
4.	Cancer	149	131
WATERBORNE DISEASES			
1.	Gastroenteritis	2104	880
2.	Diarrhea	1016	190
3.	Renal diseases	6232	3675
4.	Cancer	149	131

Date:

Signature

अधिसेविका
शासकीय महाविद्यालय व रुग्णालय
चंद्रपूर

Medical Superintendent
Govt. Medical College & Hospital
Chandrapur

1485
05/7/24

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Pre-monsoon Season (**JAN-DEC-2023 ,JAN-JUNE-2024**) Study by Maharashtra Pollution Control Board (MPCB) , MAHARASHTRA

Name of the polluted Industrial Area (PIA)	CHANDRAPUR
Name of the major health center / Organization	WCL,Rajiv Ratan Central Hospital ,Ghugus
Name and Designation of the Contact Person	Dr.D.C.ANAND
Address	WCL, WANI AREA , PO : GHUGUS , Tq. & Dist : CHANDRAPUR 442505

S.NO.	Diseases	No. of Patients Reported	
		JAN-DEC(2023)	JAN-JUNE(2024)
AIRBORNE DISEASES			
1	Asthma	36	22
2	Acute Respiratory Infection	1672	1092
3	Bronchitis	375	501
4	Cancer	01	00
WATERBORNE DISEASES			
1	Gastroenteritis	1447	1124
2	Diarrhea	12	20
3	Renal Diseases	32	12
4	Cancer	0	0

Date :

Signature
क्षेत्रीय चिकित्सा अधिकारी
Area Medical Officer
राजीव रतन केंद्रीय चिकित्सालय घुग्घुस क्षेत्र
Rajiv Ratan Central Hospital Ghugus Area

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI)
Pre-monsoon Season (April 2024- June 2024) Study by
Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

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	Dr. Samrudhi Lakade
Address	**Ballarpur, Tal.: Ballarpur, Dist.: Chandrapur**

S No.	Diseases	No. of Patients Reported	
		JAN-DEC (2023)	JAN-JUNE (2024)
AIRBORNE DISEASES			
1.	Asthma	16	11
2.	Acute Respiratory Infection	0	0
3.	Bronchitis	0	0
4.	Cancer	7	0
WATERBORNE DISEASES			
1.	Gastroenteritis	168	136
2.	Diarrhea	26	25
3.	Renal diseases	0	0
4.	Cancer	0	0

Date: 05/07/2024

Signature

Medical Officer
Rural Hospital, Ballarpur
Dist Chandrapur