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

NASHIK

Post-Monsoon (December 2023 to February 2024)

Maharashtra Pollution Control Board

Kalptaru Point, Sion East, Mumbai – 400 022

Index

ABBREVIATION

APHA	American Public Health Association
ASTM	American Society for Testing and Materials
BIS	Bureau of Indian Standards
BLQ	Below the Limit of Quantification
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CEMS	Continuous Emission Monitoring System
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 Nashik CEPI area including MIDC Ambad and MIDC Satpur was monitored for Ambient Air Quality, Ground and Surface Waters quality and CEPI Score was calculated based on the Latest directions 120 of Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016 of Central Pollution Control Board (CPCB). Maharashtra Pollution Control Board (MPCB) has carried out monitoring at CPCB location with the additional location of samplings for ambient air, surface and ground Water in consideration with the previous CEPI monitoring and covering the entire CEPI Impact Zone. The Post-monsoon monitoring was carried out during the period of December 2023 to February 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 all locations except for CO (8 hours). In surface water of Nashik the level of BOD exceeds in four samples collected out of five samples are collected. In ground water, the concentrations of Iron, Selenium and Total Chromium have exceeded in one 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 69.49 of 2018 to 48.74 of March 2024. Based on the study results of December 2023 to February 2024 the CEPI score as per the revised CPCB 2016 guidelines, the CEPI index of Post-Monsoon - Ambient Air is 17, Surface Water is 46.75, and Ground Water is 22. The overall CEPI score for Nashik area for the Post-monsoon 2023-24 is 48.74.

2. Introduction

In the vibrant tapestry of India's industrial landscape, the state of Maharashtra stands as a testament to both the promise and perils of rapid economic development. With countless number of industrial clusters, Maharashtra has witnessed unprecedented growth and prosperity in recent decades. However, this surge in industrial activity has come at a significant environmental cost, with pollution emerging as a pressing concern in many regions across the state.

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 Nashik., Maharashtra. After Pune and Mumbai, Nashik is third industrial hub of the Maharashtra state, for the highly industrial development in Maharashtra. Existing industrial areas in Nashik district are Satpur, Ambad, Sinnar, Igatpuri, Dindori and Vinchur. The proposed areas are Additional Sinnar and Malegaon MIDC. Large-scale industries present in Nashik district are Mahindra & Mahindra, BOSCH, Epiroc Mining India Limited, CEAT Limited, CG Power and Industrial Solutions Ltd, Graphite India, ThyssenKrupp, TDK India Private Limited, Everest Industries, Gabriel India, GlaxoSmithKline, Hindustan Unilever Limited, Jindal Polyster, Kirlosker Oil Engines, KSB Pumps, Hindustan National Glass & Industries Ltd, Mahindra Sona, United Spirits Limited, Perfect Circle Industries, Samsonite, Shalimar Paints, Siemens, VIP Industries, Indian Oil Corporation, XLO India Limited and Jindal Saw.

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 Nashik.

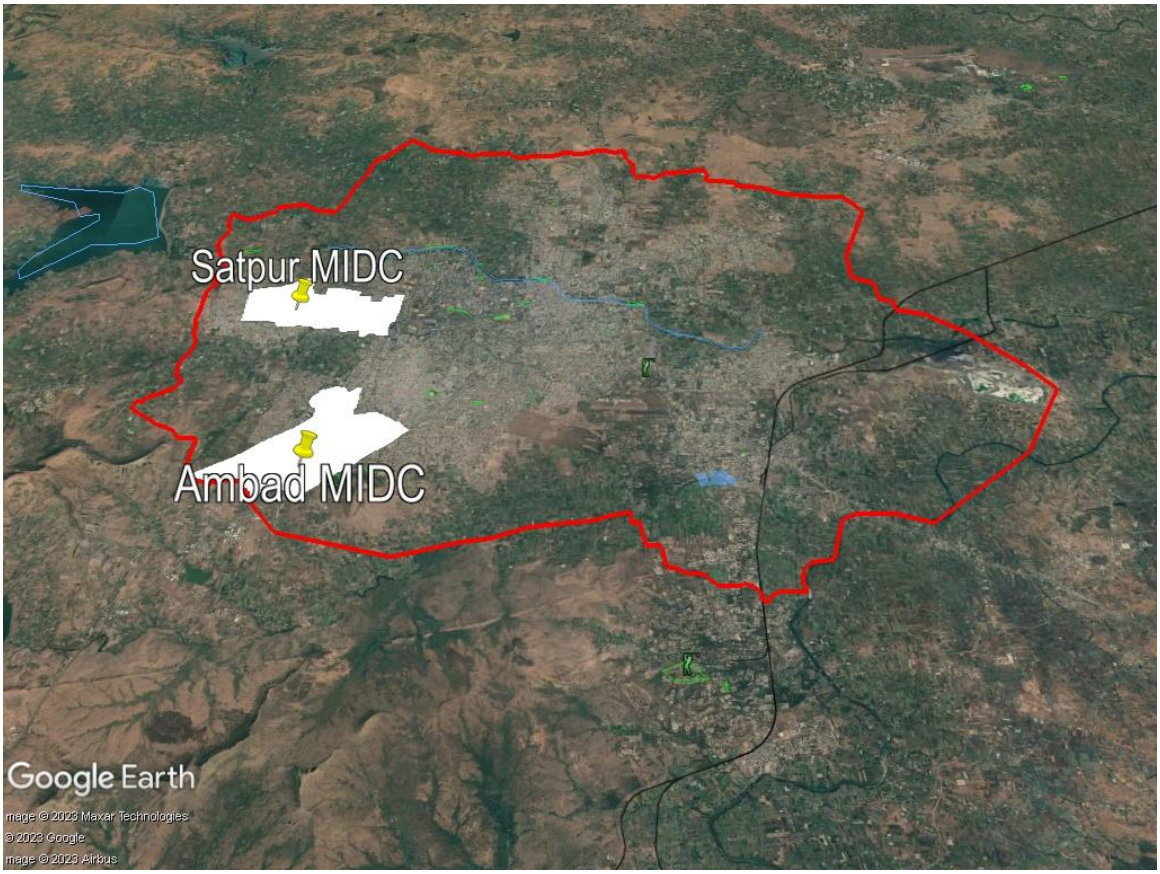


Fig. Nashik region CEPI monitoring zone

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 Nashik, 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 Nashik

Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
Ambient Air Quality	• MIDC Ambad -04 • MIDC Satpur -04	**08**	PM_{10}, $PM_{2.5}$, SO_2, NO_2, NH_3, O_3, C_6H_6, CO, BaP, Pb, Ni, As
Volatile Organic Compounds	• MIDC Ambad -02 • MIDC Satpur -02	**04**	Dichloromethane, Chloroform, Carbon Tetrachloride, Trichloroethylene, Bromodichloromethane, 1,3-Dichloropropane, 1,4-Dichlorobenzene, 1,3-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dibromo-3-Chloropropane, Napthalene, Bromobenzene,1,2,4-Trimethylbenzene, 2-Chlorotoluene, Tert-Butylbenzene, SEC-Butylbenzene, P-Isopropyl toluene, M-Xylene, P-Xylene, Styrene, Cumene 1,2,3-Trichloropropane, N-Propyl benzene, Dibromochloromethane, 1,2-Dibromoethane, Chlorobenzene, 1,1,1,2-Tetrachloroethane, Ethylbenzene, 1,1-Dichloropropylene, 1,2-Dichloroethane, 1,2-Dichloropropane, Trans-1,3-Dichloropropene, CIS 1,3-Dichloropropene, 1,1,2-Trichloroethane, Tetrachloroethylene, 1,3,5-Trimethylbenzene, N-Butylbenzene, 1,2,3-Trichlorobenzene, Hexachlorobutadiene, 1,2,4-Trichlorobenzene, 2,2-Dichloropropane, Dibromo

Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
			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 Ambad -06 • MIDC Satpur -06	**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.
	Ground water • MIDC Ambad -06 • MIDC Satpur -06	**12**	

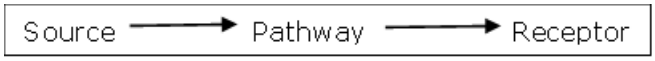
Table 3.2 Frequency of Sampling

	Parameter	Round of Sampling	Frequency in Each Round
A	**Ambient Air Quality Monitoring**		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	03	3 Shifts of 8 hrs each
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	03	1 Shift of 24 hrs
3.	Sulphur Dioxide (SO_2)	03	6 Shifts of 4 hrs each
4.	Nitrogen Dioxide (NO_2)	03	6 Shifts of 4 hrs each
5.	Ammonia (NH_3)	03	6 Shifts of 4 hrs each

	Parameter	Round of Sampling	Frequency in Each Round
6.	Ozone (O_3)	03	24 Shifts of 1 hr each
7.	Benzene (C_6H_6)	03	1 Shifts of 24 hrs
8.	Carbon Monoxide (CO)	03	24 Shifts of 1 hr each
9.	Benzo (a) Pyrene (BaP) – particulate phase only	03	3 Shifts of 8 hrs each
10.	Lead (Pb)	03	3 Shifts of 8 hrs each
11.	Arsenic (As)	03	3 Shifts of 8 hrs each
12.	Nickel (Ni)	03	3 Shifts of 8 hrs each
B	**Volatile Organic Compounds (VOCs)**		
	As mentioned in Table 3.1	03	3 Shifts of 24 hrs each
C	**Ground Water**		
	As mentioned in Table 3.1	03	01 sample at each round
D	**Surface Water**		
	As mentioned in Table 3.1	03	01 sample at each round

4. Methodology

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



Ambient air stations, Surface water locations and Ground water locations were decided by the respective regional officers. The sampling was done in 3 rounds with an interval of one or two days at each location. Sampling has been done at the potential polluted areas so as to arrive at the CEPI. This will further help the authorities to monitor the areas in order to improve the current status of their environmental components such as air and water quality data, ecological damage and visual environmental conditions.

Methodology for sampling, preservation and analysis have been done according to the CPCB/ EPA/ APHA/ IS/ ASTM standard methods for the samples.

AIR ENVIRONMENT

5. Air Environment

For studying the Air Environment of Nashik 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. **MIDC Ambad:** In MIDC Ambad four locations have been monitored of checking the Ambient Air Quality (AAQ). The concentration of all the ambient air parameters was found well within the limits prescribed by NAAQS at all locations except Carbon Monoxide (CO) (8 h). It exceeds few of location.

Table 5.1 MIDC Ambad - 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.	Near Koso India	$19^0$94'58.4"N	$73^0$72'81.8"E	28.12.2023	30.12.2023	01.01.2024
2.	Near Siemens India Ltd.	$19^0$95'70.1"N	$73^0$73'67.2"E	28.12.2023	30.12.2023	01.01.2024
3.	Near Gemini Instratech Ltd.	$19^0$95'32.5"N	$73^0$74'82.8"E	28.12.2023	30.12.2023	01.01.2024
4.	Near CG Power and Industrial Solutions Ltd.	19°94'62.4"N	73°74'23.6"E	28.12.2023	30.12.2023	01.01.2024

Table 5.2 MIDC Ambad - 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.	Near Rainbow Decoplus Pvt. Ltd.	$19^0$95'46.31"N	$73^0$74'97.71"E	28.12.2023	30.12.2023	01.01.2024
2.	Near Kirloskar oil India Ltd.	$19^0$95'72.27"N	$73^0$73'25.58"E	28.12.2023	30.12.2023	01.01.2024

Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Ambad

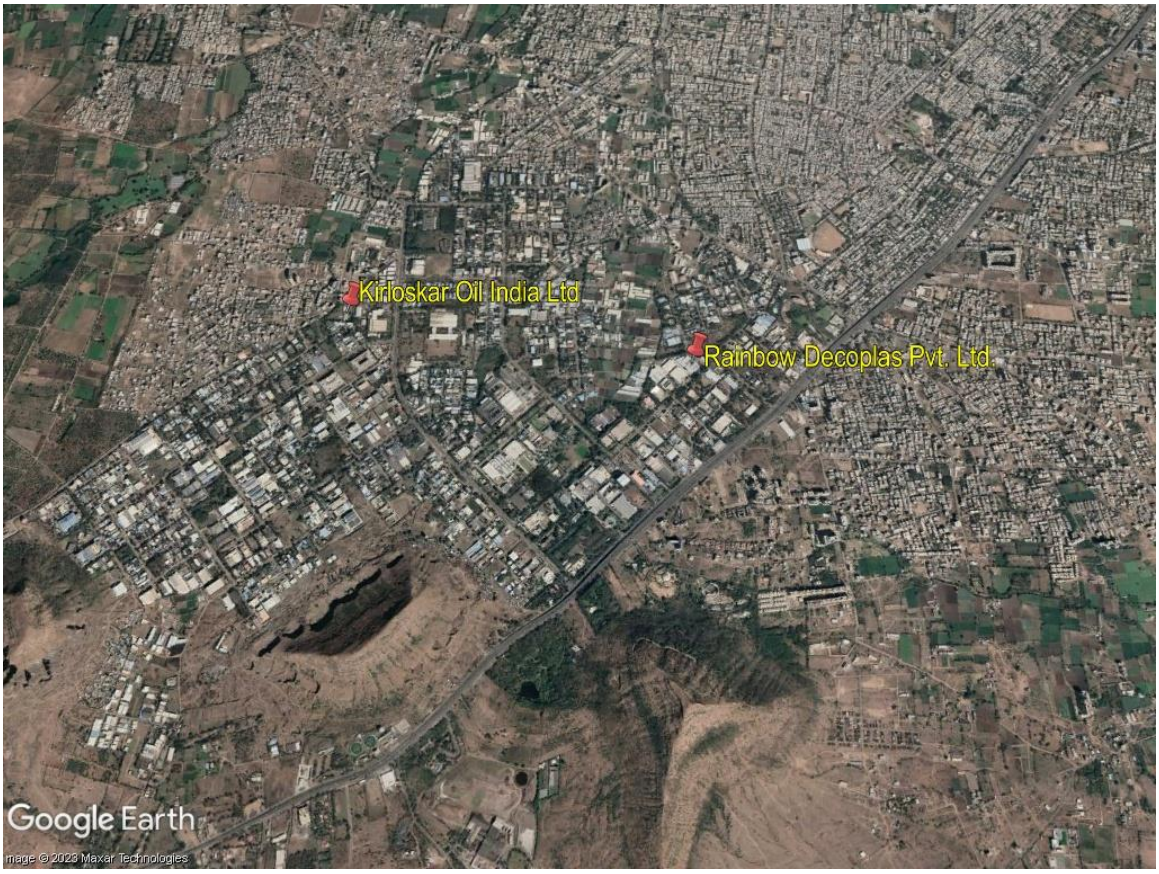


Fig. Geographical Locations of VOCs Monitoring MIDC Ambad

Table 5.3 MIDC Ambad - Ambient Air Quality Monitoring Results

Parameters	Unit	Results			
		Near Koso India	Near Siemens India Ltd.	Near Gemini Instratech Ltd.	Near CG Power and Industrial Solutions Ltd.
Sulphur Dioxide (SO_2)	µg/m^3	BLQ	BLQ	BLQ	BLQ
Nitrogen Dioxide (NO_2)	µg/m^3	BLQ	BLQ	BLQ	BLQ
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m^3	67	66	66	70
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m^3	19	17	18	20
Ozone (O_3)	µg/m^3	BLQ	BLQ	BLQ	BLQ
Lead (Pb)	µg/m^3	0.042	0.03	0.029	0.02
Carbon Monoxide (CO) (1 h)	mg/m^3	0.9	0.88	1.01	0.92
Carbon Monoxide (CO) (8 h)	mg/m^3	2.09	2.38	1.86	2.37
Ammonia (NH_3)	µg/m^3	BLQ	26	BLQ	BLQ
Benzene (C_6H_6)	µg/m^3	2.33	1.78	2.32	3.35
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m^3	1.48	0.84	0.94	1.95
Nickel (Ni)	ng/m^3	5.76	3.83	4.16	BLQ

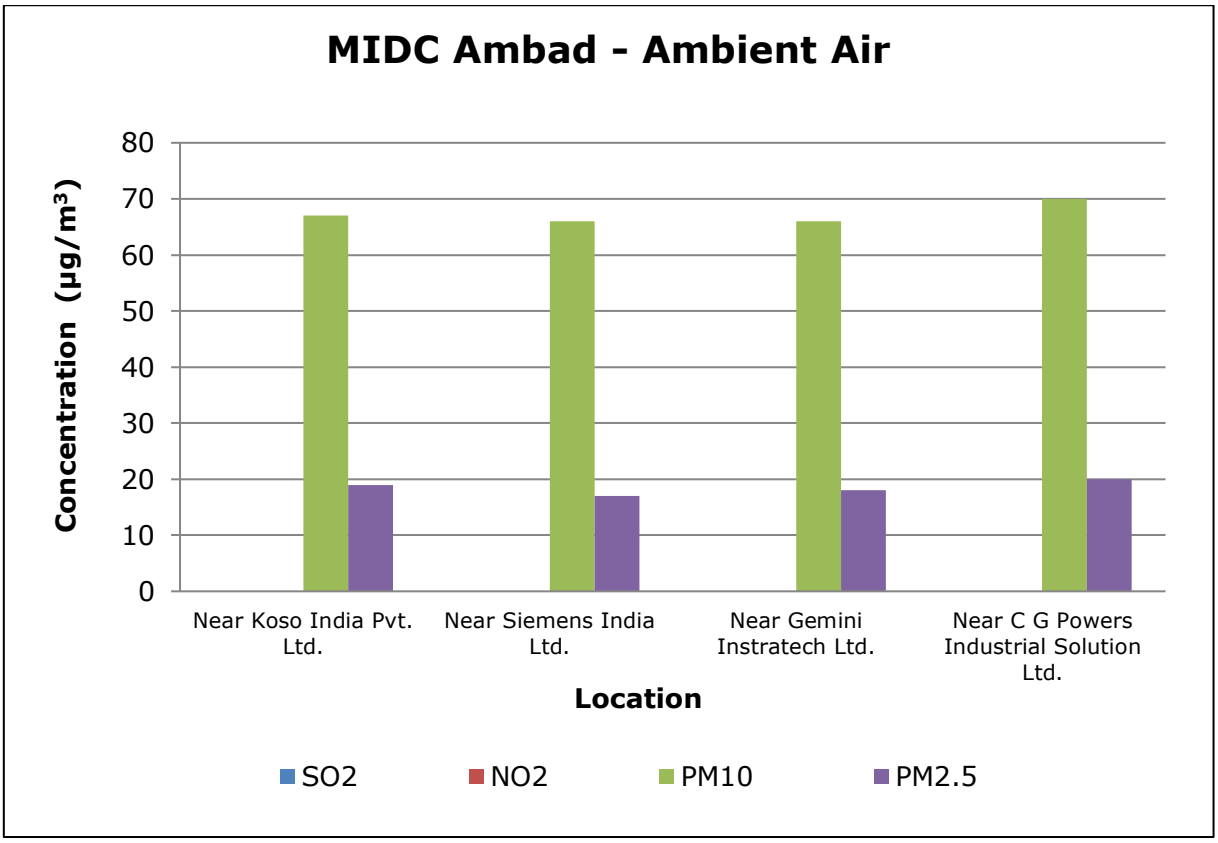
Table 5.4 MIDC Ambad - Volatile Organic Compounds (VOCs) in Ambient Air Results

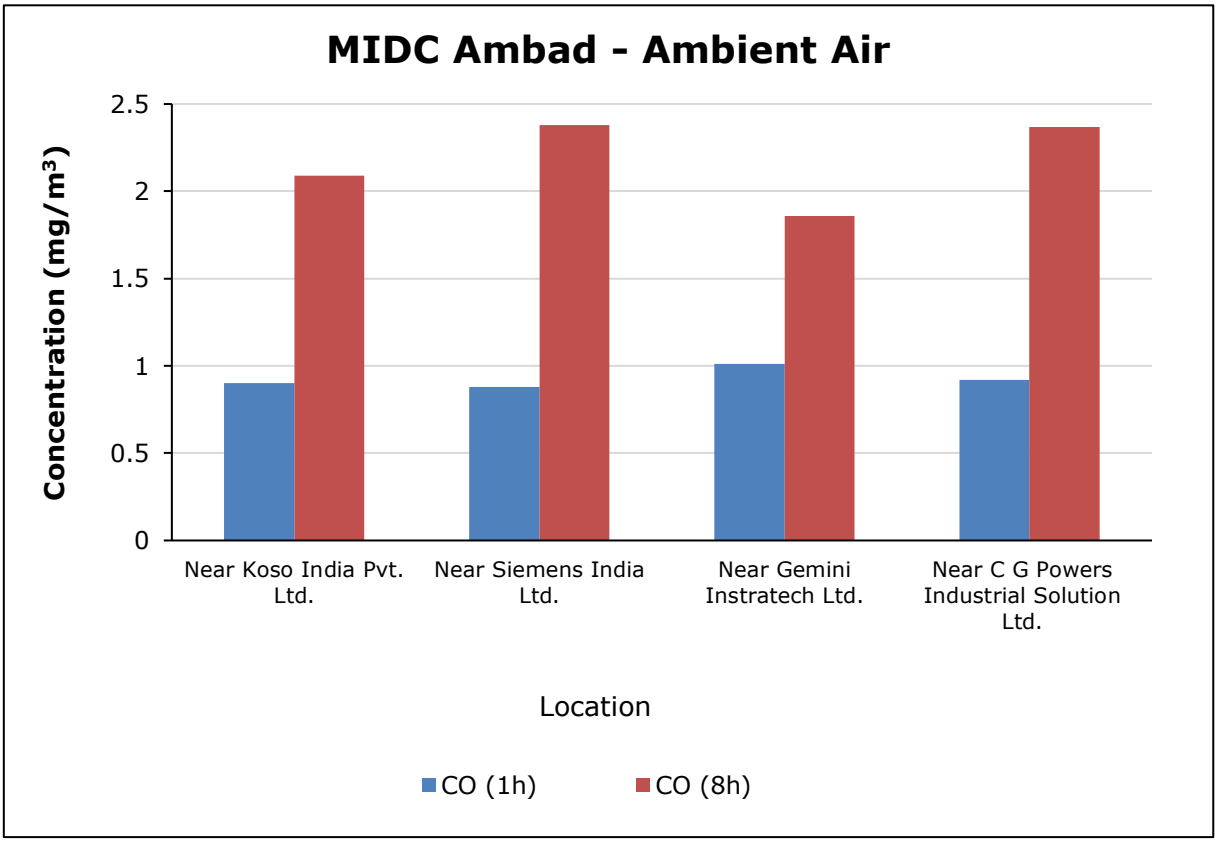
Parameters	Unit	Results	
		Near Rainbow Decoplus Pvt. Ltd.	Near Kirloskar oil India Ltd.
Dichloromethane	µg/m³	2.49	1.64
Chloroform	µg/m³	0.924	BLQ
Carbon Tetrachloride	µg/m³	1.03	0.515
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	4.2	11.6
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ

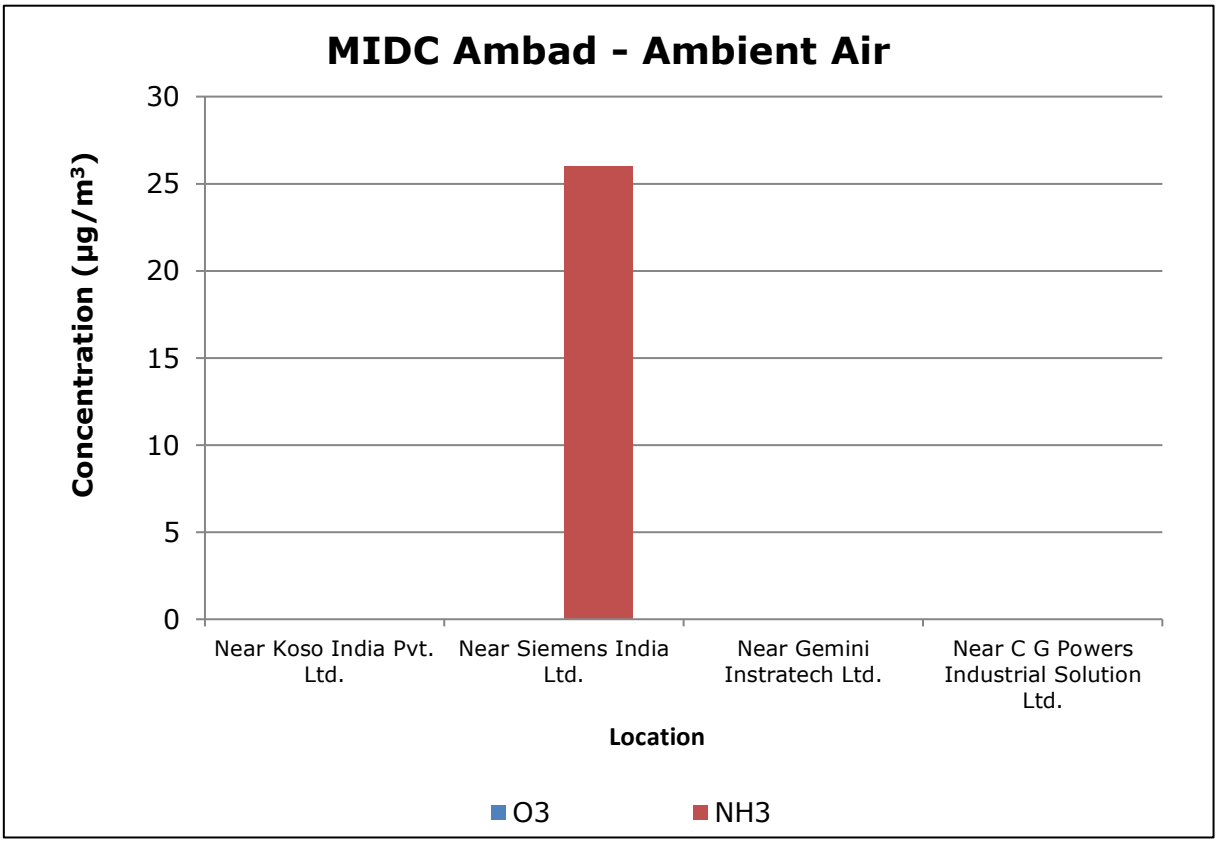
Parameters	Unit	Results	
		Near Rainbow Decoplus Pvt. Ltd.	Near Kirloskar oil India Ltd.
1,2-Dichlorobenzene	µg/m³	BLQ	0.551
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	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	2.88	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	1.47	3.31
1,1,1,2-Tetrachloroethane	µg/m³	BLQ	BLQ
Ethylbenzene	µg/m³	BLQ	BLQ
1,1-Dichloropropylene	µg/m³	0.75	0.523
1,2-Dichloroethane	µg/m³	BLQ	0.75
1,2-Dichloropropane	µg/m³	1.62	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	0.655	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

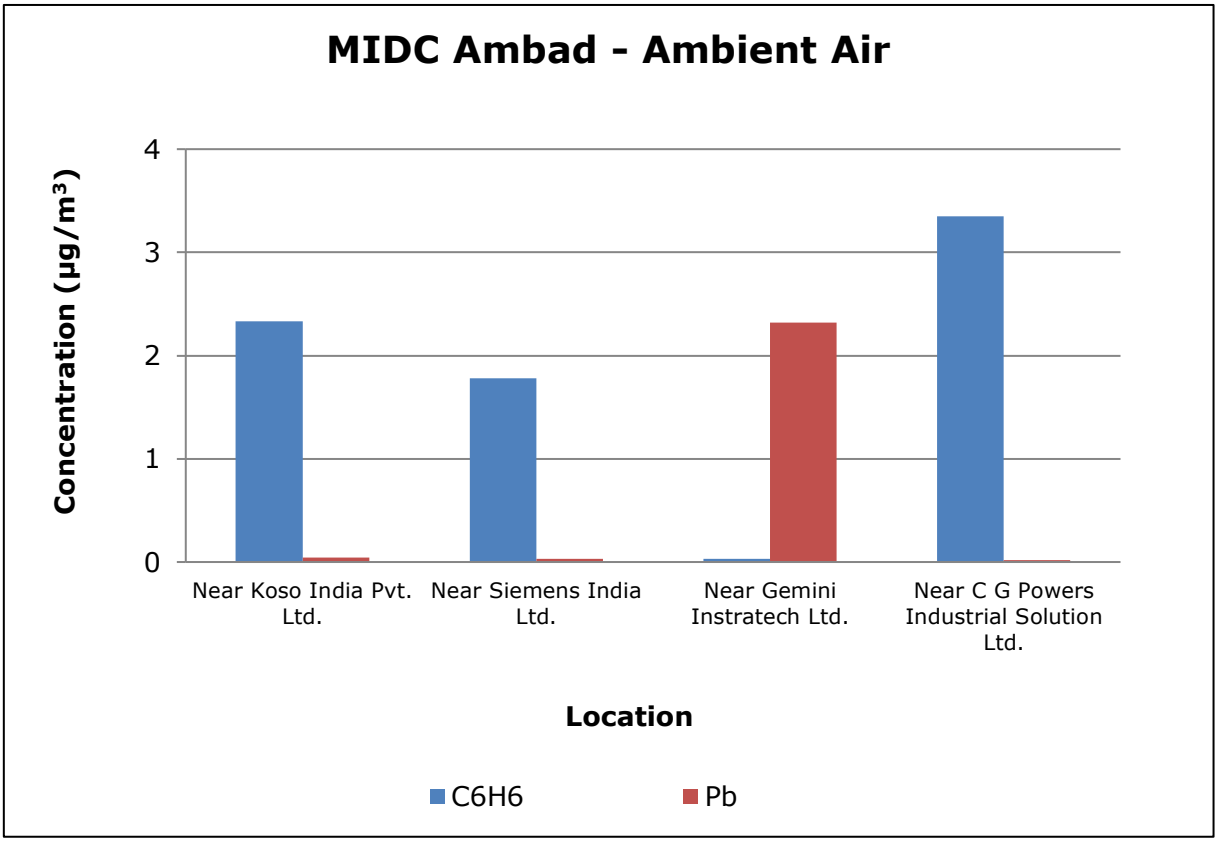
Parameters	Unit	Results	
		Near Rainbow Decoplus Pvt. Ltd.	Near Kirloskar oil India Ltd.
2,2-Dichloropropane	µg/m³	BLQ	BLQ
Dibromomethane	µg/m³	BLQ	BLQ
Toluene	µg/m³	1.57	0.71
O-Xylene	µg/m³	1.37	2.59
Bromoform	µg/m³	0.525	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	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	0.56	BLQ

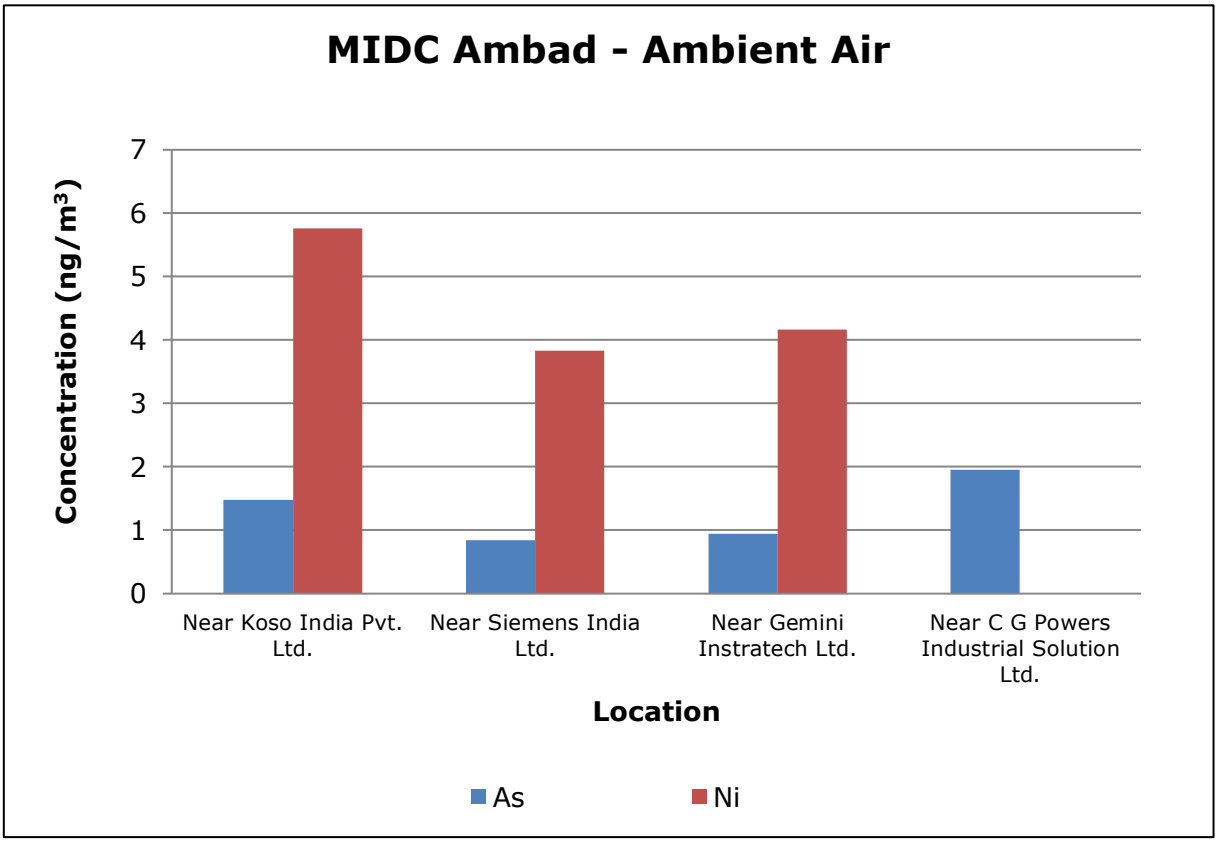
Graphs - Ambient Air Quality Monitoring of MIDC Ambad




MIDC Ambad - Ambient Air
Concentration (mg/m³)
2.5
2
1.5
1
0.5
0
Near Koso India Pvt. Ltd.
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near C G Powers Industrial Solution Ltd.
Location
CO (1h)
CO (8h)


MIDC Ambad - Ambient Air
Concentration (µg/m³)
30
25
20
15
10
5
0
Near Koso India Pvt. Ltd.
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near C G Powers Industrial Solution Ltd.
Location
O3
NH3


MIDC Ambad - Ambient Air
Concentration (µg/m³)
4
3
2
1
0
Near Koso India Pvt. Ltd.
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near C G Powers Industrial Solution Ltd.
Location
C6H6
Pb


MIDC Ambad - Ambient Air
Concentration (ng/m³)
7
6
5
4
3
2
1
0
Near Koso India Pvt. Ltd.
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near C G Powers Industrial Solution Ltd.
Location
As
Ni

MIDC Satpur: In MIDC Satpur four locations have been monitored of checking the Ambient Air Quality (AAQ). The concentration of all the ambient air parameters was found well within the limits prescribed by NAAQS at all locations.

Table 5.5 MIDC Satpur - 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.	Near Mahindra & Mahindra Plant-I	19°99'59.54"N	73°71'63.31"E	22.12.2023	24.12.2023	26.12.2023
2.	Near ABB India Pvt. Ltd.	20°00'04.91"N	73°71'72.53"E	22.12.2023	24.12.2023	26.12.2023
3.	Near ESDS Software Solution Ltd.	20°0'02.85"N	73°74'0.43"E	22.12.2023	24.12.2023	26.12.2023
4.	Near Bosch Ltd.	19°99'78.16"N	73°71'67.76"E	22.12.2023	24.12.2023	26.12.2023

Table 5.6 MIDC Satpur - 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.	Near Mahindra & Mahindra Plant-I	19°99'59.54"N	73°71'63.31"E	22.12.2023	24.12.2023	26.12.2023
2.	Near MSL Drive Line System	19°99'78.16"N	73°71'67.76"E	22.12.2023	24.12.2023	26.12.2023

Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Satpur

Fig. Geographical Locations of VOCs Monitoring MIDC Satpur

Table 5.7 MIDC Satpur - Ambient Air Quality Monitoring Results

Parameters	Unit	Results			
		Near Mahindra & Mahindra Plant- I	Near ABB India Pvt. Ltd.	Near ESDS Software Solution Ltd.	Near Bosch Ltd.
Sulphur Dioxide (SO_2)	µg/m^3	18	53	33	4.66
Nitrogen Dioxide (NO_2)	µg/m^3	17	13	6	23.6
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m^3	66	74	77	75
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m^3	17	20	21	19
Ozone (O_3)	µg/m^3	BLQ	20	22	BLQ
Lead (Pb)	µg/m^3	BLQ	BLQ	BLQ	0.027
Carbon Monoxide (CO) (1 h)	mg/m^3	1	1	1	1
Carbon Monoxide (CO) (8 h)	mg/m^3	1.92	1.91	1.84	1.79
Ammonia (NH_3)	µg/m^3	61	52	48	51
Benzene (C_6H_6)	µg/m^3	2	2	2	2
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m^3	2	2	2	BLQ
Nickel (Ni)	ng/m^3	BLQ	BLQ	BLQ	3.08

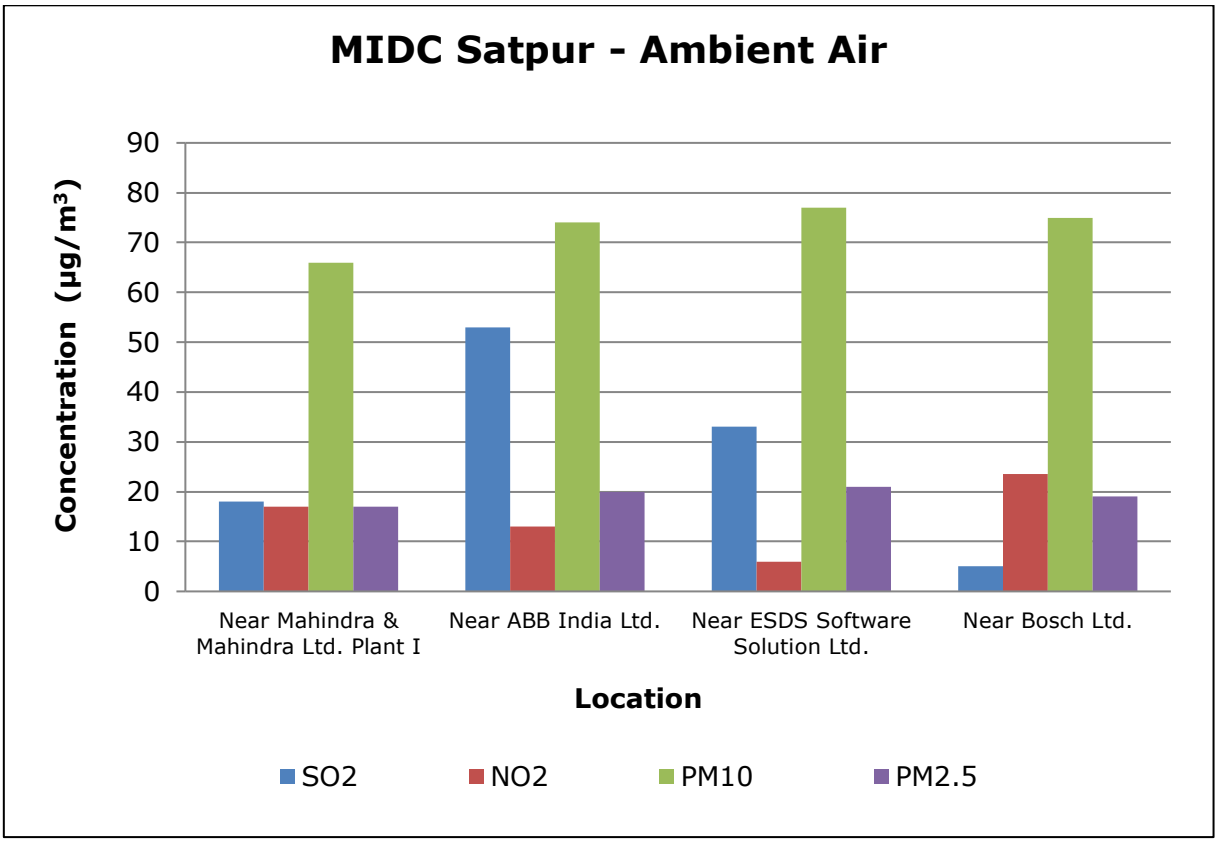
Table 5.8 MIDC Satpur - Volatile Organic Compounds (VOCs) in Ambient Air Results

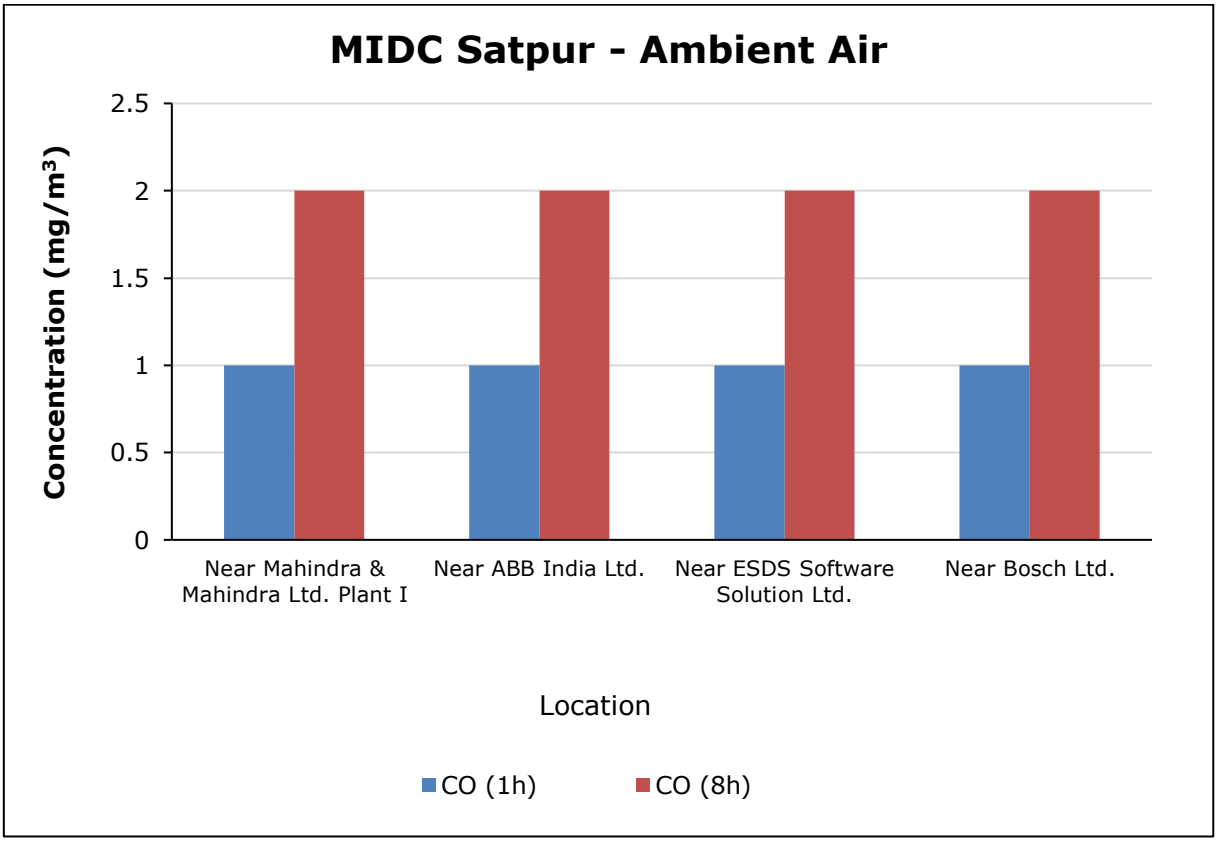
Parameters	Unit	Results	
		Near Mahindra & Mahindra Plant I	Near MSL Drive Line System
Dichloromethane	µg/m³	5.06	2.61
Chloroform	µg/m³	0.73	0.74
Carbon Tetrachloride	µg/m³	BLQ	0.893
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	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

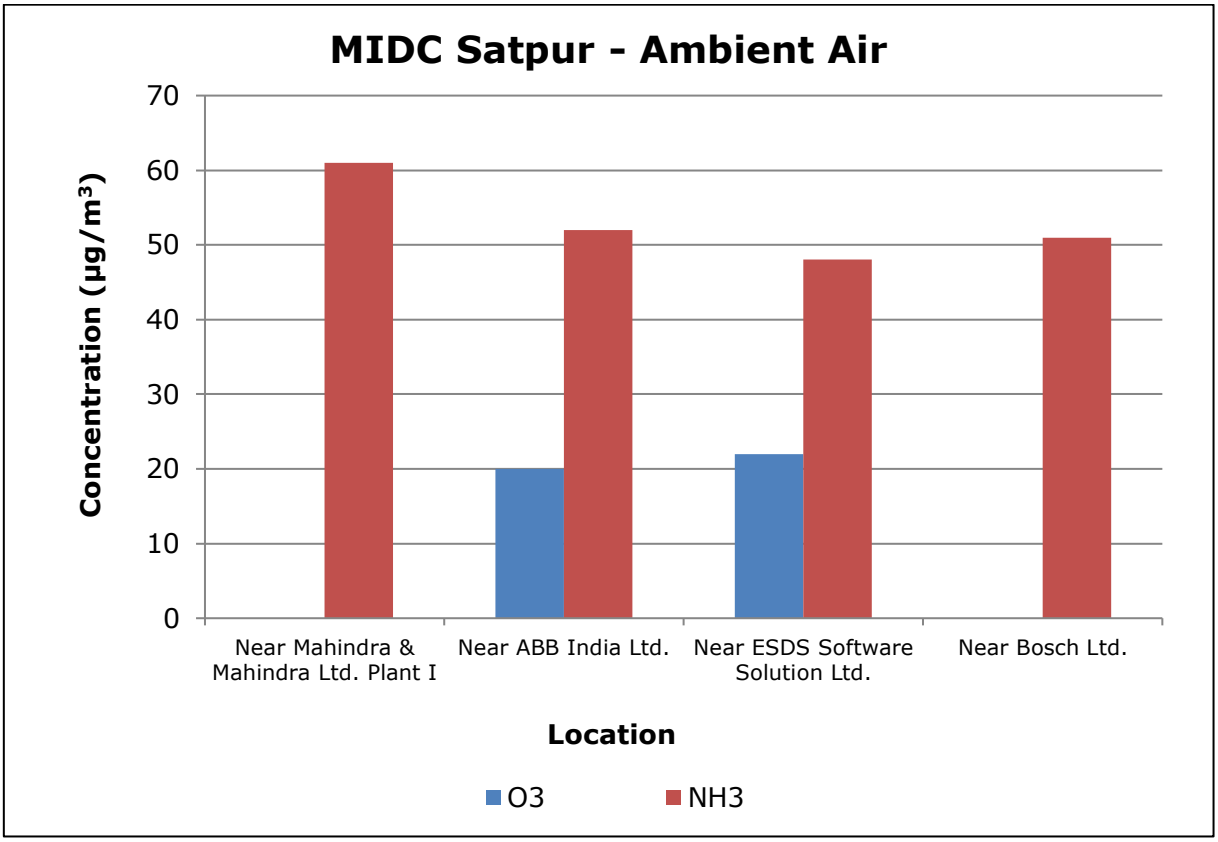
Parameters	Unit	Results	
		Near Mahindra & Mahindra Plant I	Near MSL Drive Line System
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	9.89	14.9
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	1.60	1.81
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

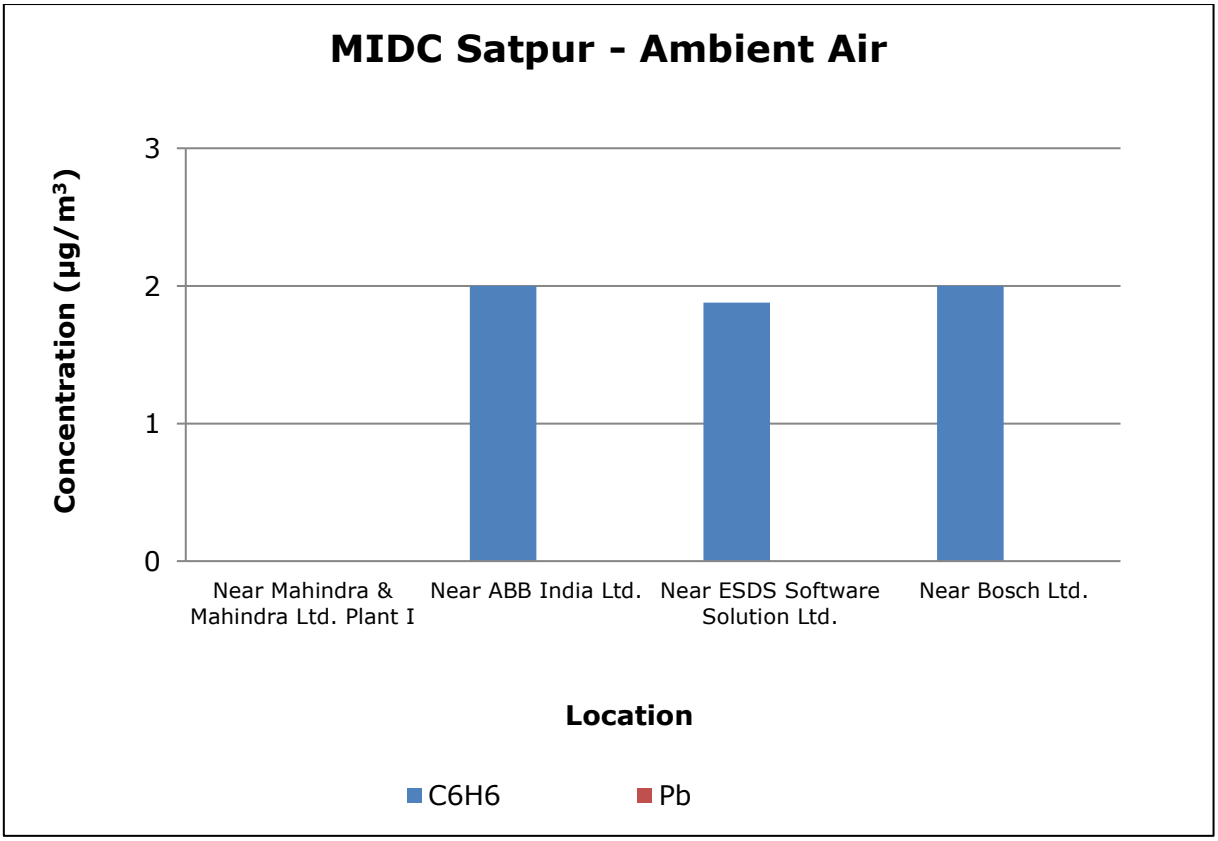
Parameters	Unit	Results	
		Near Mahindra & Mahindra Plant I	Near MSL Drive Line System
Toluene	µg/m³	BLQ	1.69
O-Xylene	µg/m³	3.47	1.3
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
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	0.502	0.536

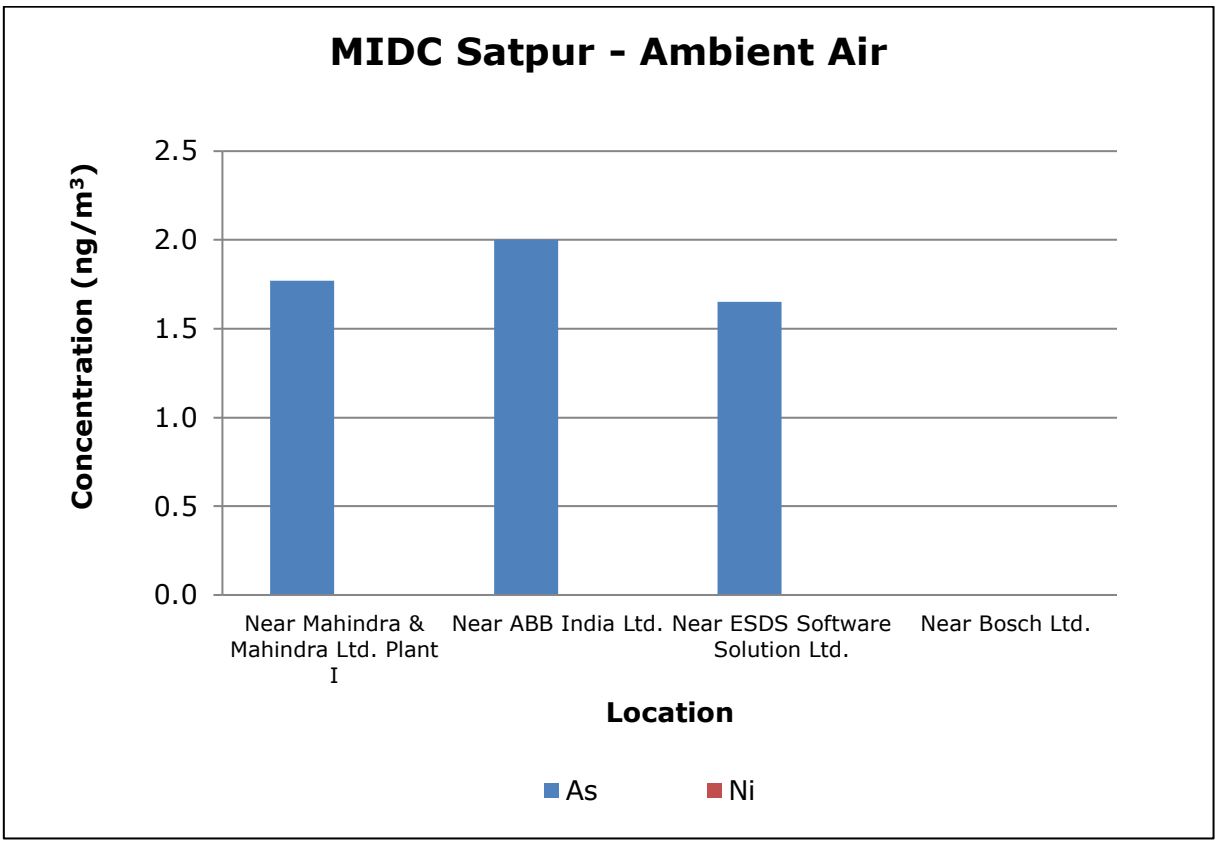
Graphs - Ambient Air Quality Monitoring of MIDC Satpur






MIDC Satpur - Ambient Air
Concentration (µg/m³)
70
60
50
40
30
20
10
0
Near Mahindra & Mahindra Ltd. Plant I
Near ABB India Ltd.
Near ESDS Software Solution Ltd.
Near Bosch Ltd.
Location
O3
NH3


MIDC Satpur - Ambient Air
Concentration (µg/m³)
3
2
1
0
Near Mahindra & Mahindra Ltd. Plant I
Near ABB India Ltd.
Near ESDS Software Solution Ltd.
Near Bosch Ltd.
Location
C6H6
Pb


MIDC Satpur - Ambient Air
Concentration (ng/m³)
2.5
2.0
1.5
1.0
0.5
0.0
Near Mahindra & Mahindra Ltd. Plant I
Near ABB India Ltd.
Near ESDS Software Solution Ltd.
Near Bosch Ltd.
Location
As
Ni

WATER ENVIRONMENT

6. Water Environment

For studying the water Environment of Nashik area, surface water was collected from MIDC Ambad and MIDC Satpur. Total 5 samples are collected.

1. **MIDC Ambad:** Two surface water samples are collected from MIDC Ambad region.

- All two samples are acceptable in sanitary survey and smell.
- pH, suspended solids, total dissolved solids are well within the limits in both samples collected.
- BOD, Total Phosphate, Total Kjeldahl Nitrogen, Total Ammonia-Nitrogen exceeded in all the samples collected.
- 100% survival in Fish Bioassay was not observed in both the samples collected.
- Metals like Hexavalent Chromium (Cr^{6+}),Total Arsenic, Lead, Cadmium, Mercury, etc. are observed either below limit of quantification or below their standard limits.
- Metals like Zinc, Nickel, Copper, Manganese, Iron are found above the standard limits.
- Parameters like Cyanide, Fluoride, 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 both samples collected.
- Organo Chlorine Pesticides are also below the detectable limit in both samples collected.

Table 6.1 MIDC Ambad - 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.	Kirloskar Industry back side Nalla	19°95'9.05"N	73°73'2.37"E	29.12.2023	31.12.2023	02.01.2024
2.	Ambadgaon Nalla	19°96'0.91"N	73°74'5.36"E	29.12.2023	31.12.2023	02.01.2024

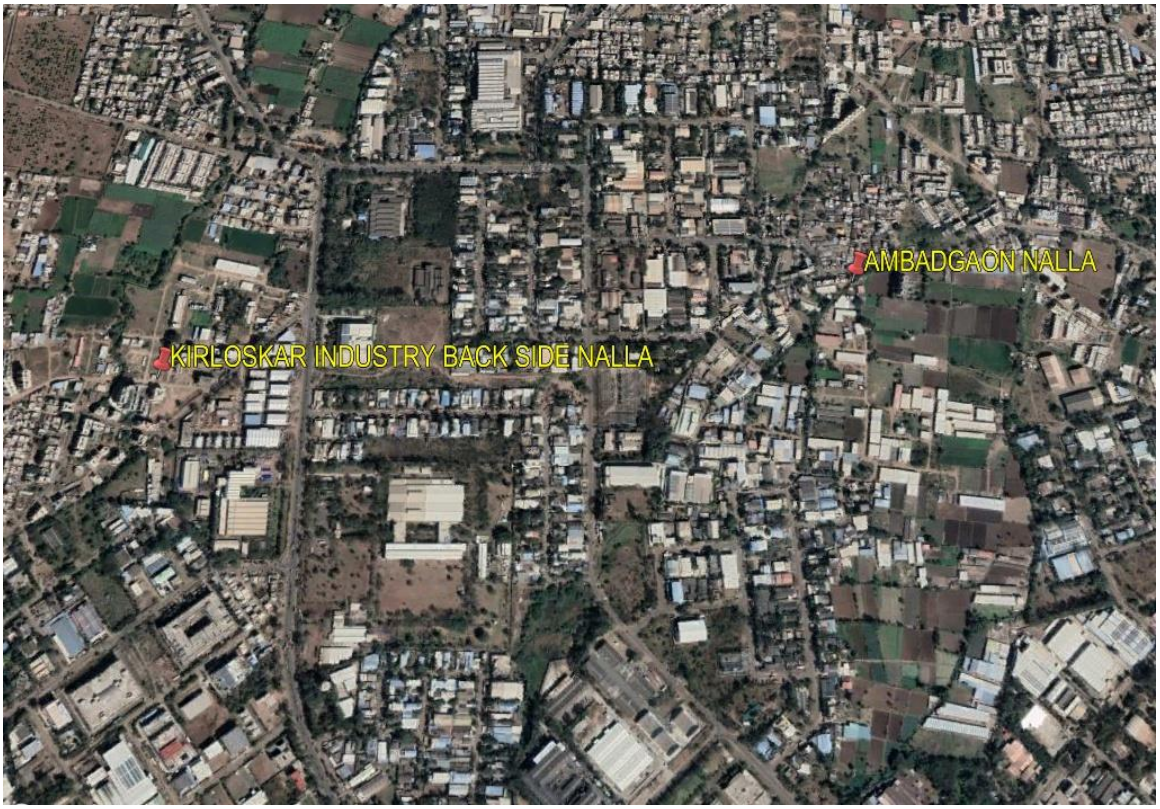


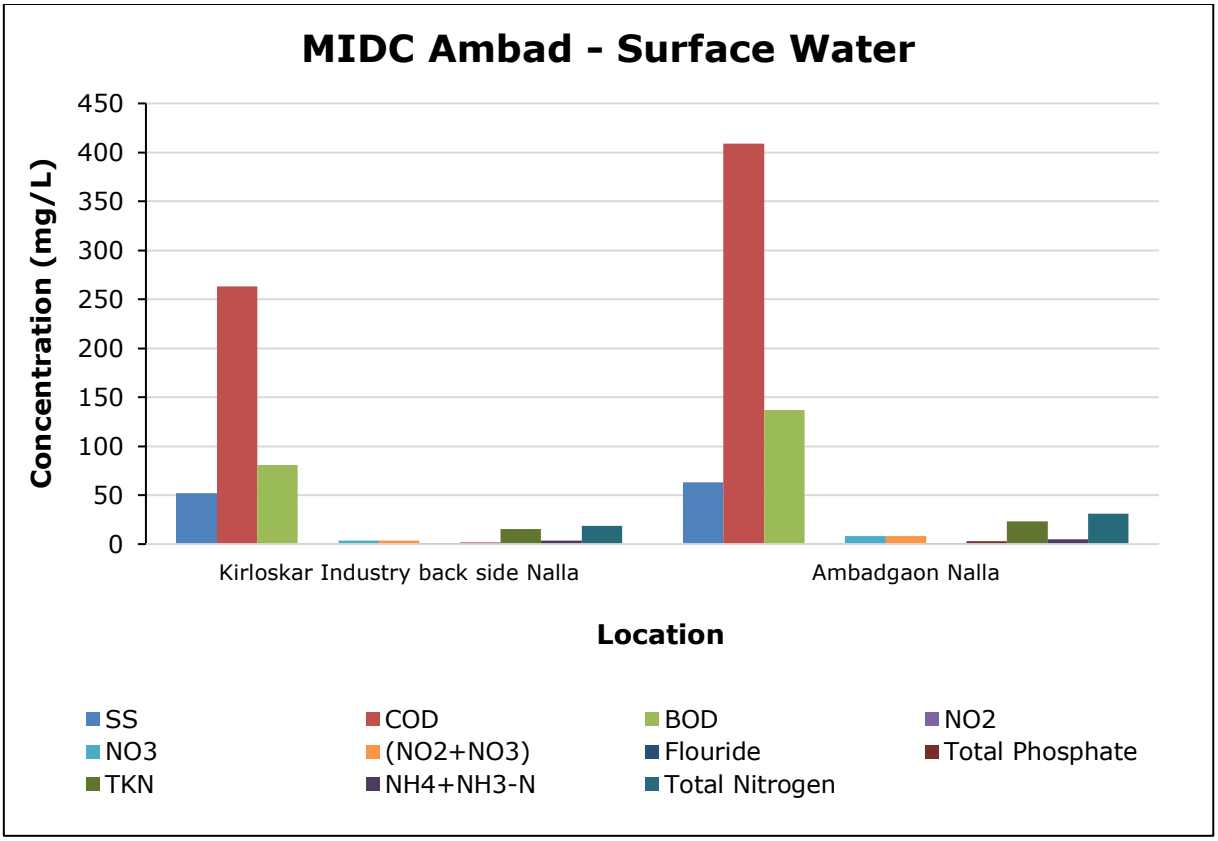
Fig. Geographical Locations of Surface Water Sampling MIDC Ambad

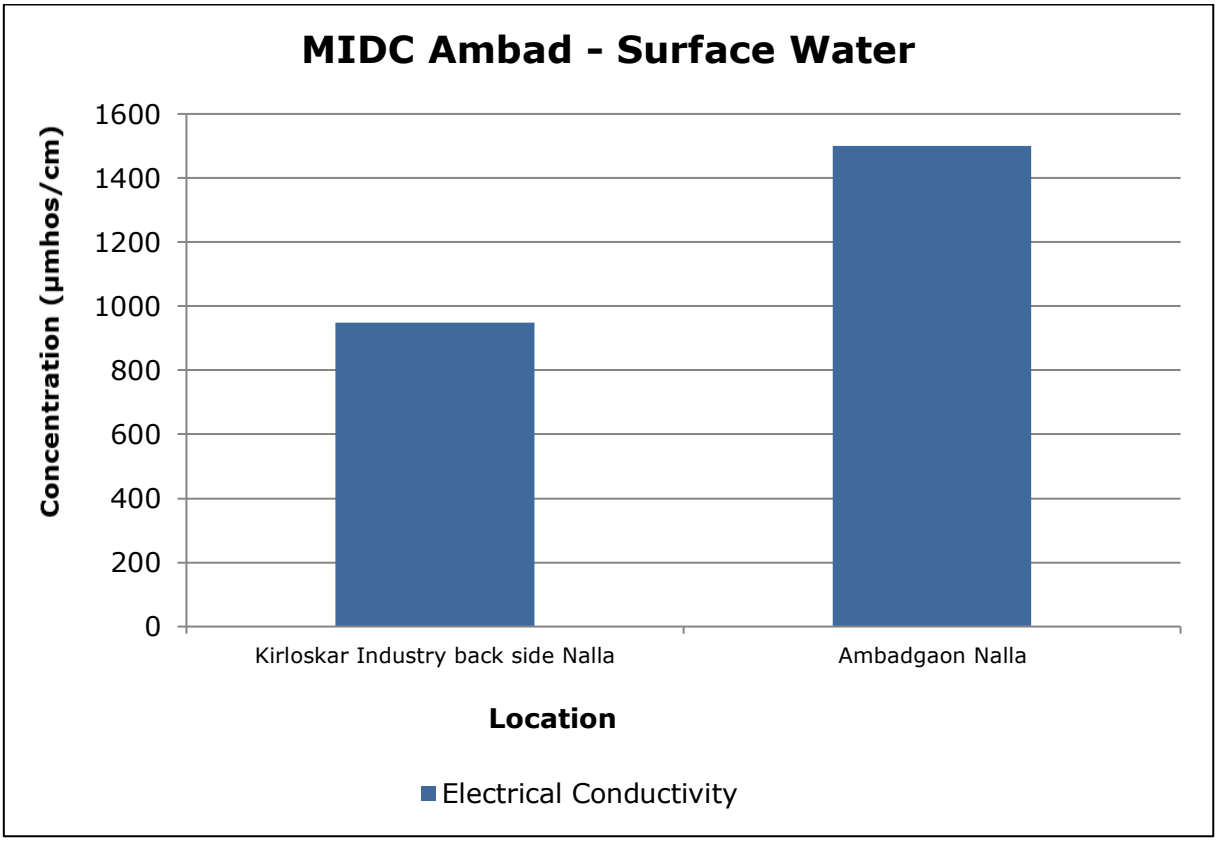
Table 6.2 MIDC Ambad - Results of Surface Water

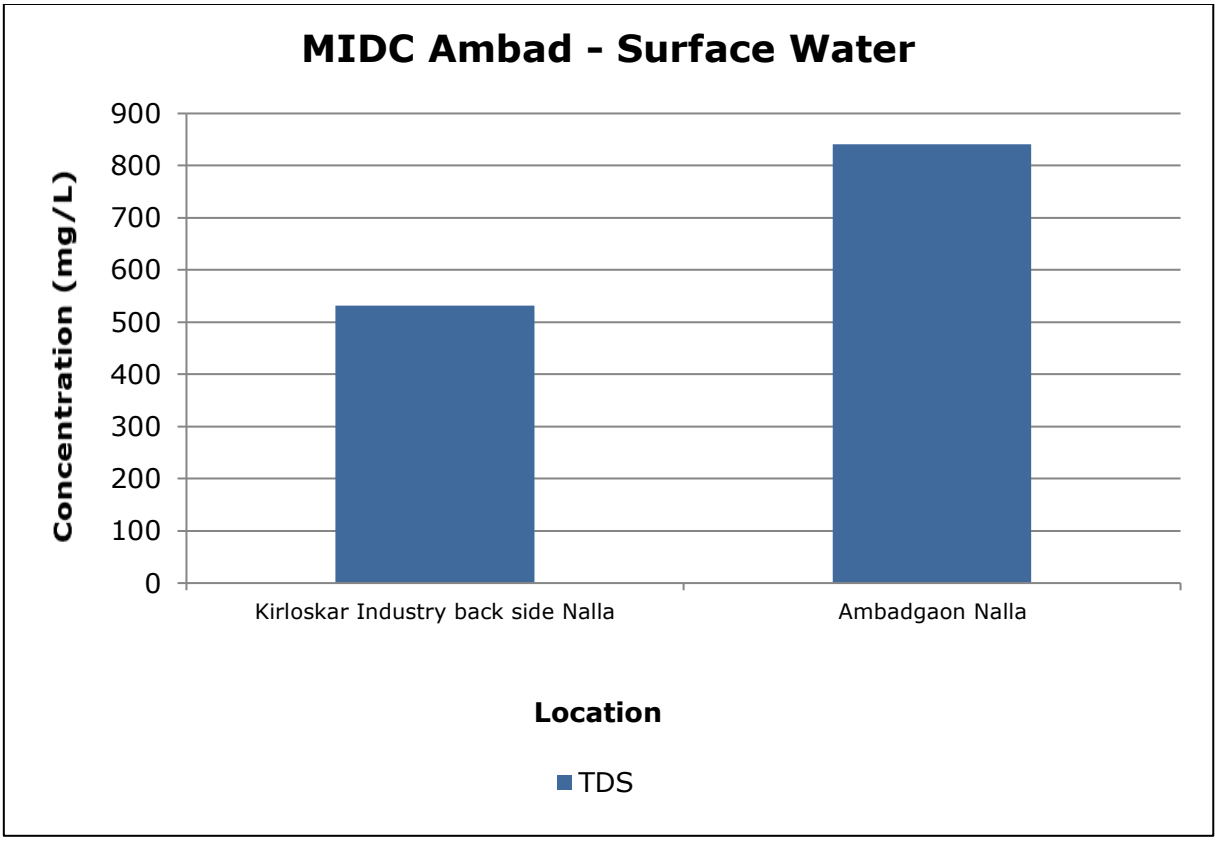
Parameters	Unit	Results	
		Kirloskar Industry back side Nalla	Ambadgaon Nalla
Sanitary Survey	-	Generally clean neighbourhood	Generally clean neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.13	0.1
Temperature	^oC	26	26
Colour	Hazen	8.50	12
Smell	-	Not agreeable	Agreeable
pH	-	7.20	6.88
Oil & Grease	mg/L	BLQ	BLQ
Total Suspended Solids	mg/L	52	63
Total Dissolved Solids	mg/L	532	841
Dissolved Oxygen (% Saturation)	%	41	40
Chemical Oxygen Demand	mg/L	263	409
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	81	137
Electrical Conductivity (at 25 ^oC)	µmho/cm	948	1500
Nitrite Nitrogen (as NO_2)	mg/L	0.04	0.19
Nitrate Nitrogen (as NO_3)	mg/L	3.48	8.18

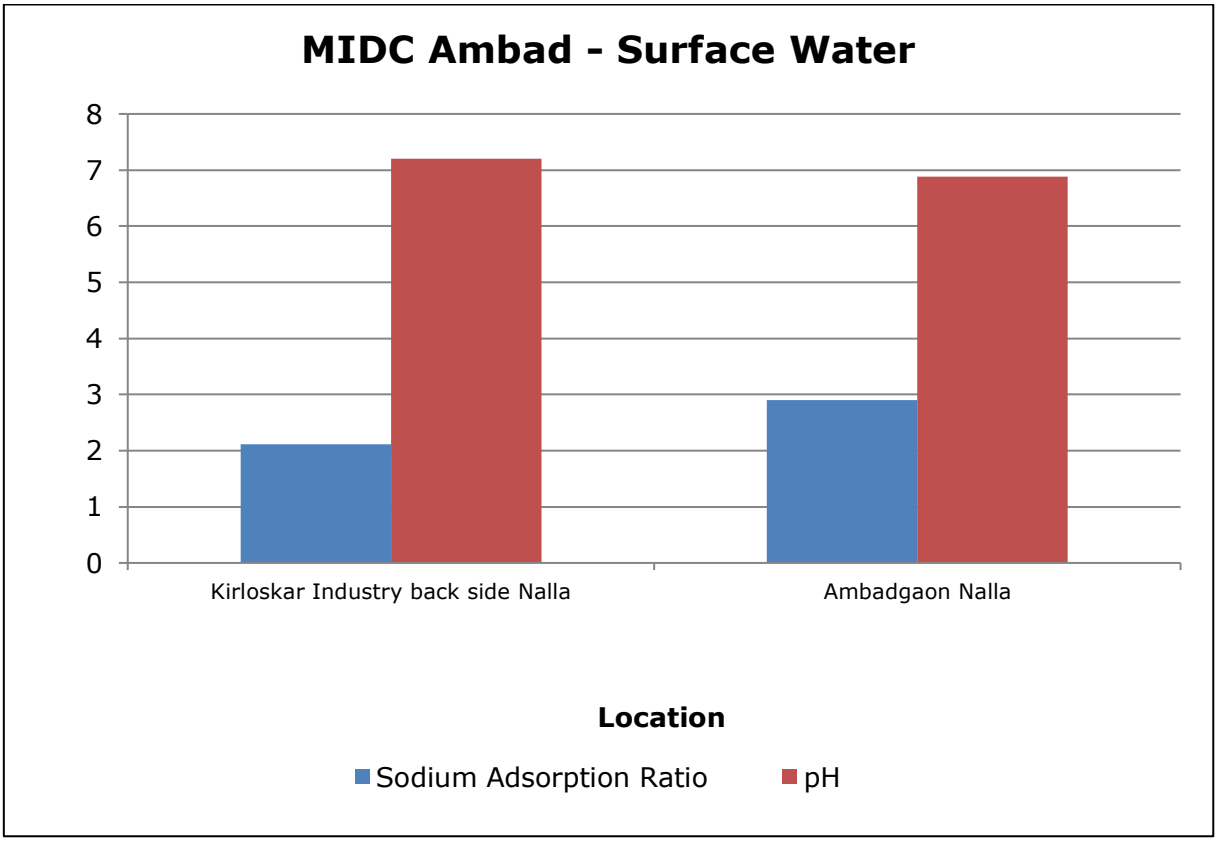
Parameters	Unit	Results	
		Kirloskar Industry back side Nalla	Ambadgaon Nalla
(NO_2 + NO_3)-Nitrogen	mg/L	3.51	8.35
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ
Free Residual Chlorine	mg/L	0.07	0.07
Cyanide (as CN)	mg/L	BLQ	BLQ
Fluoride (as F)	mg/L	0.83	1
Sulphide (as H_2S)	mg/L	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	1.78	2.69
Sodium Adsorption Ratio	-	2.11	2.90
Total Coliforms	MPN Index/ 100 ml	670	634
Faecal Coliforms	MPN Index/ 100 ml	167	138
Total Phosphate (as P)	mg/L	1.86	2.78
Total Kjeldahl Nitrogen (as N)	mg/L	15.2	22.9
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	3.87	4.96
Total Nitrogen	mg/L	18.7	31.3
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS, mol.wt.288.38)	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	1.16	1.78
Nickel (as Ni)	mg/L	0.18	0.05
Copper (as Cu)	mg/L	0.06	0.62
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.40	0.04
Total Arsenic (as As)	mg/L	BLQ	0.006
Lead (as Pb)	mg/L	BLQ	BLQ
Cadmium (as Cd)	mg/L	0.01	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ
Manganese (as Mn)	mg/L	0.21	0.41
Iron (as Fe)	mg/L	3.32	1.41
Vanadium (as V)	mg/L	BLQ	BLQ
Selenium (as Se)	mg/L	0.01	0.019
Boron (as B)	mg/L	0.36	0.335
Bioassay Test on fish	% survival	67	63

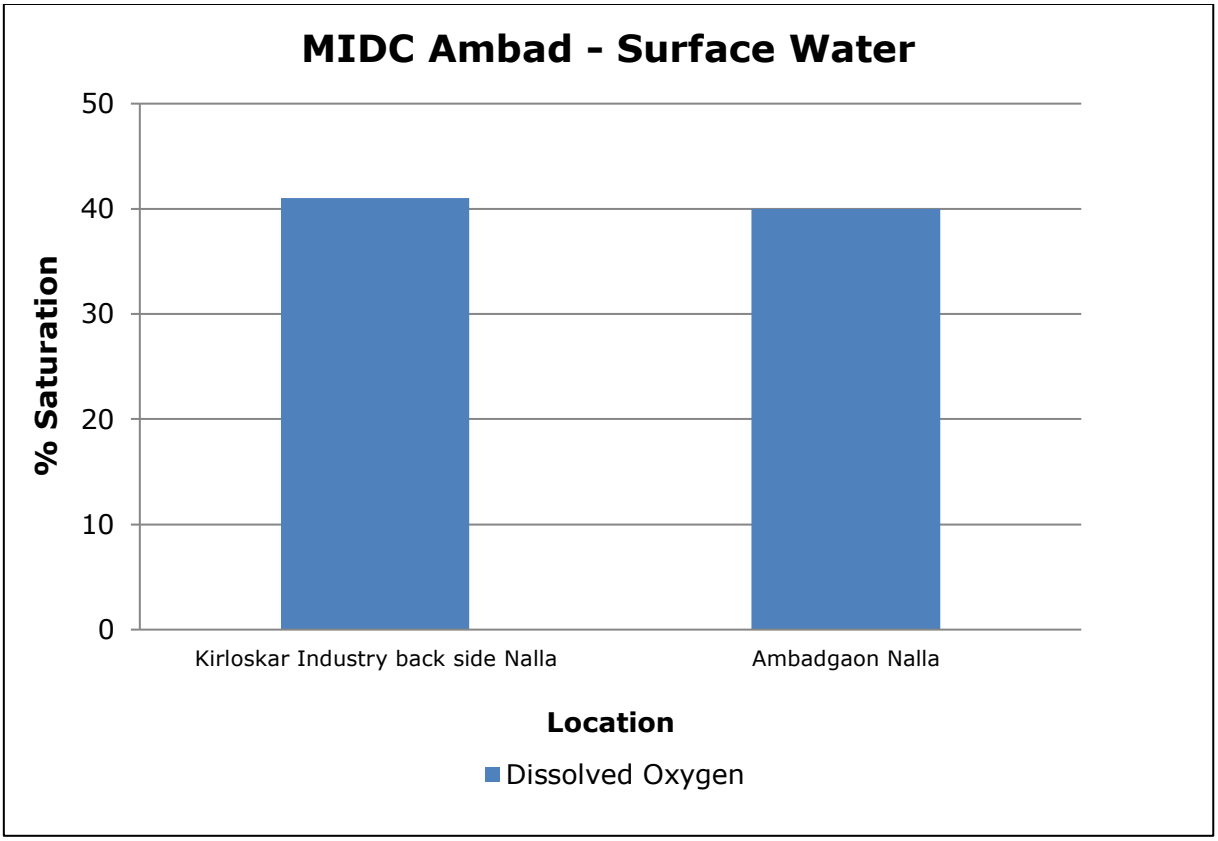
Graphs - Surface Water Quality of MIDC Ambad

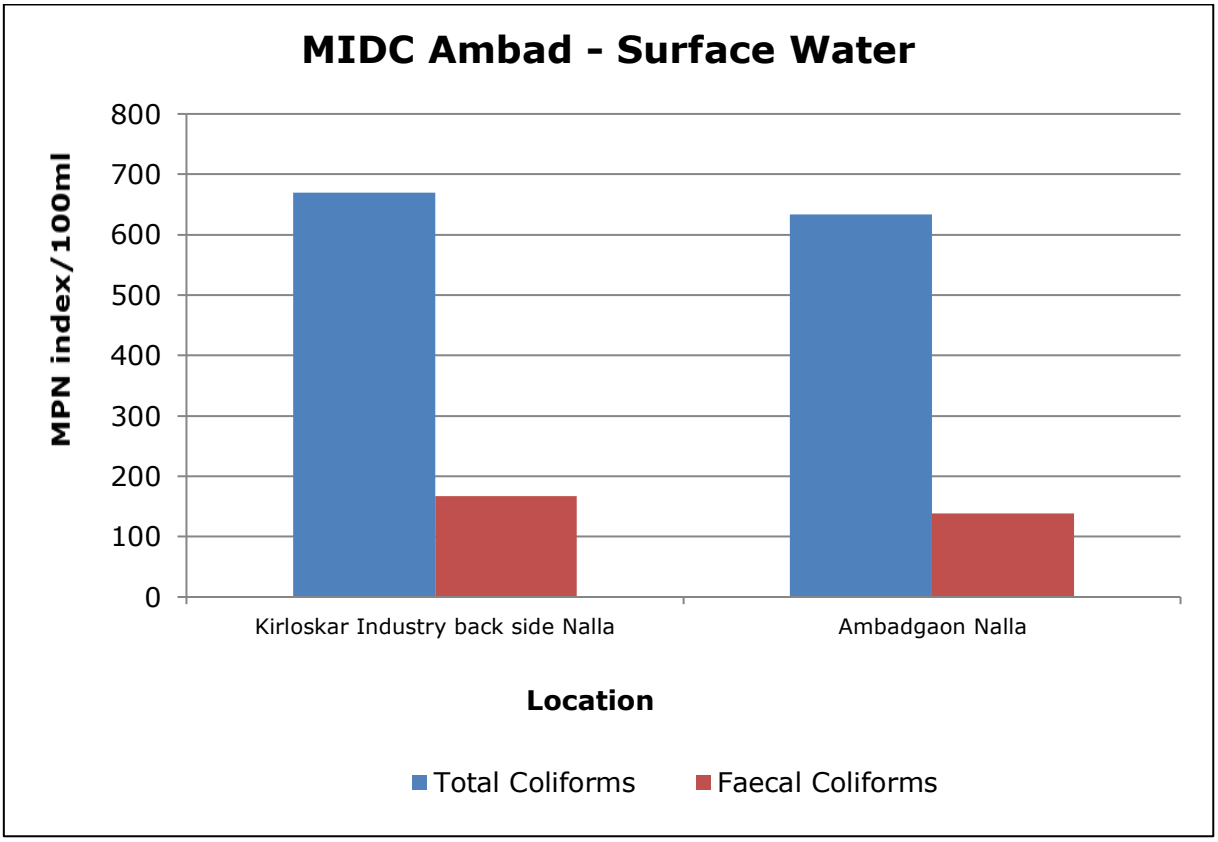


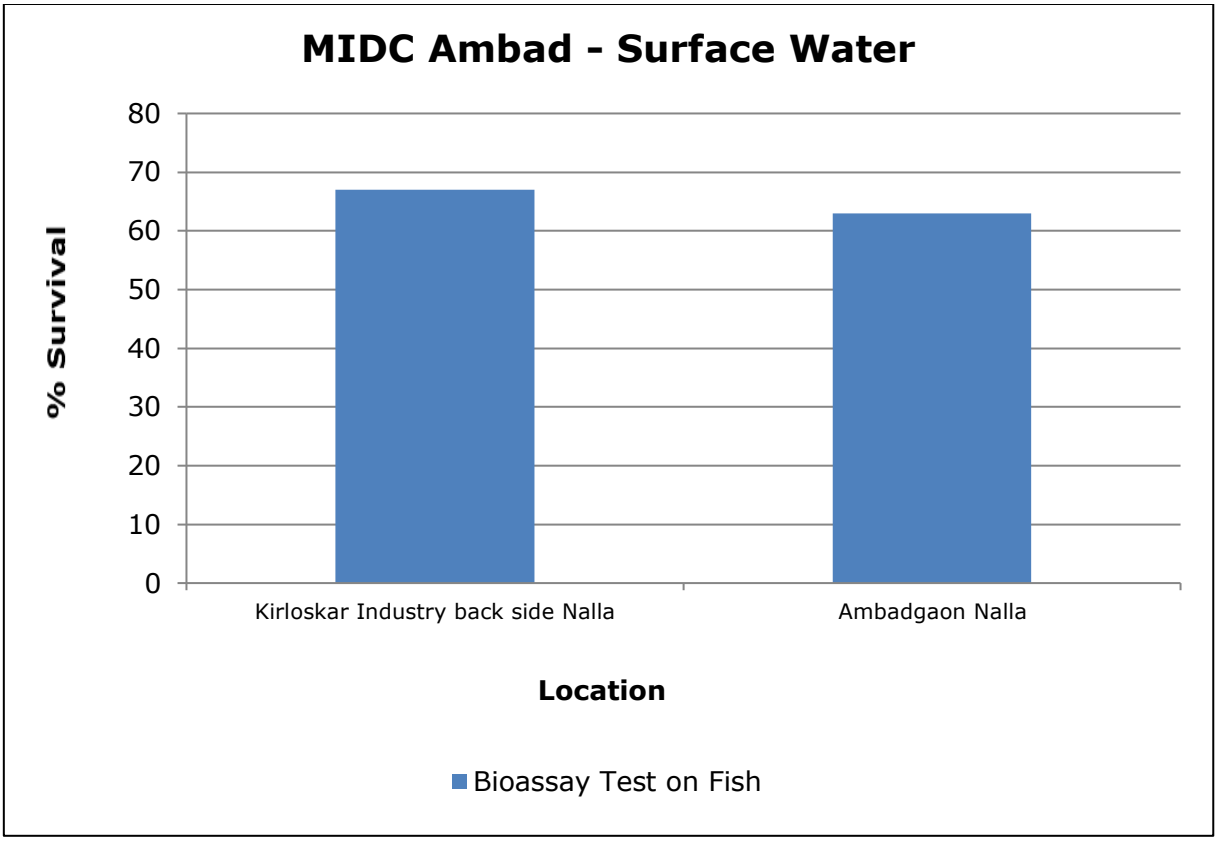



MIDC Ambad - Surface Water
900
800
700
600
500
400
300
200
100
0
Concentration (mg/L)
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
TDS


MIDC Ambad - Surface Water
8
7
6
5
4
3
2
1
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Sodium Adsorption Ratio
pH


MIDC Ambad - Surface Water
50
40
30
20
10
0
% Saturation
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Dissolved Oxygen


MIDC Ambad - Surface Water
800
700
600
500
400
300
200
100
0
MPN index/100ml
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Total Coliforms
Faecal Coliforms


MIDC Ambad - Surface Water
% Survival
80
70
60
50
40
30
20
10
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Bioassay Test on Fish

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

- All two samples are acceptable in sanitary survey and smell.
- pH, suspended solids, total dissolved solids are well within the limits in all three samples collected.
- BOD, Total Phosphate, Total Kjeldahl Nitrogen, Total Ammonia-Nitogen exceeded in few of the samples collected.
- 100% survival in Fish Bioassay was in one of the sample out of three samples collected.
- Metals like Zinc, Hexavalent Chromium (Cr^{6+}), Total Arsenic, Lead, Mercury, Manganese etc. are observed either below limit of quantification or below their standard limits.
- Metals like Nickel, Copper, Total Chromium, Cadmium, Iron and Selenium are found above the standard limits.
- Parameters like Cyanide, Fluoride, Sulphide, Dissolved Phosphate 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 both samples collected.
- Organo Chlorine Pesticides are also below the detectable limit in both samples collected.

Table 6.3 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.	Sahid Arun Chittee Pool, Anandvalil Gangapur Road, Satpur	20°02'58.86"N	73°75'5.26"E	21.12.2023	23.12.2023	25.12.2023
2.	Nasardi Pool, Near EPF Office Satpur	19°98'8.99"N	73°75'01.85"E	21.12.2023	23.12.2023	25.12.2023
3.	ALF industry Opposite side Nalla	20°00'6.78"N	73°71'4.04"E	21.12.2023	23.12.2023	25.12.2023

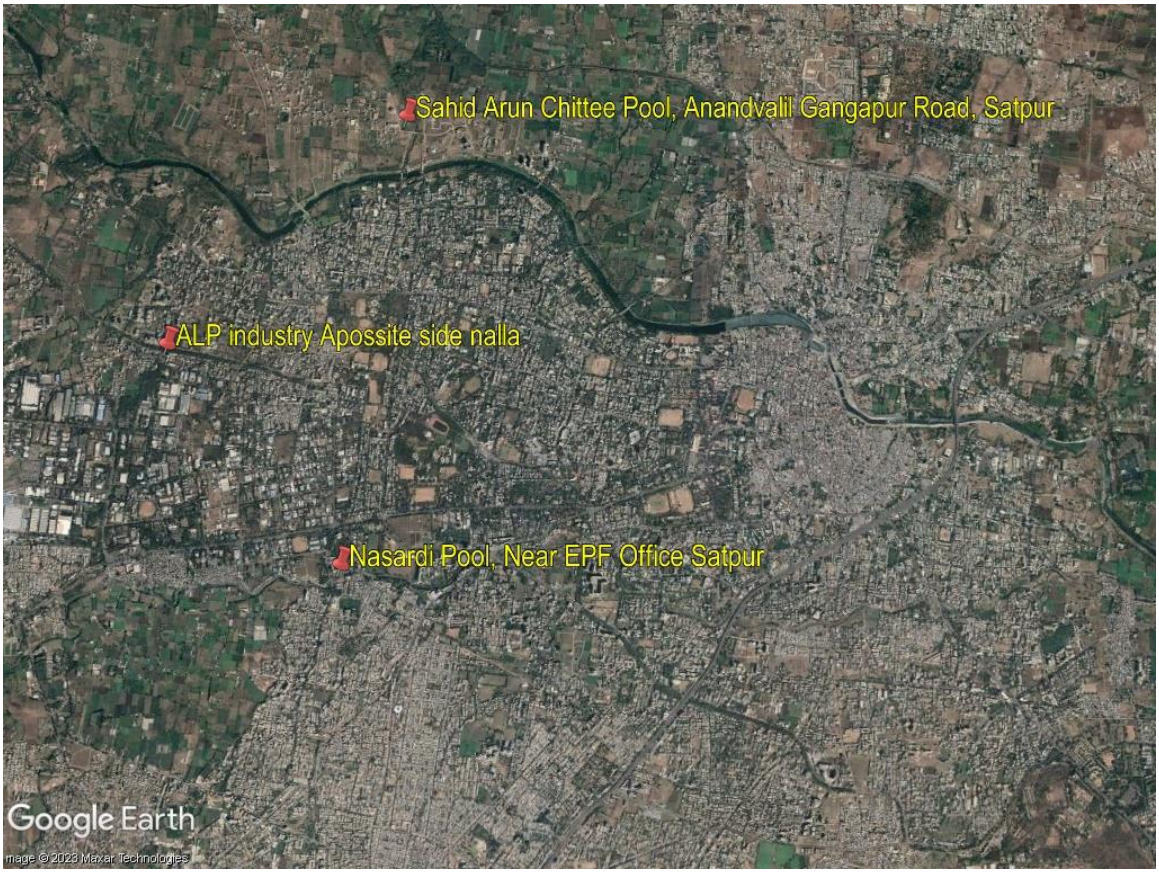


Fig. Geographical Locations of Surface Water Sampling MIDC Satpur

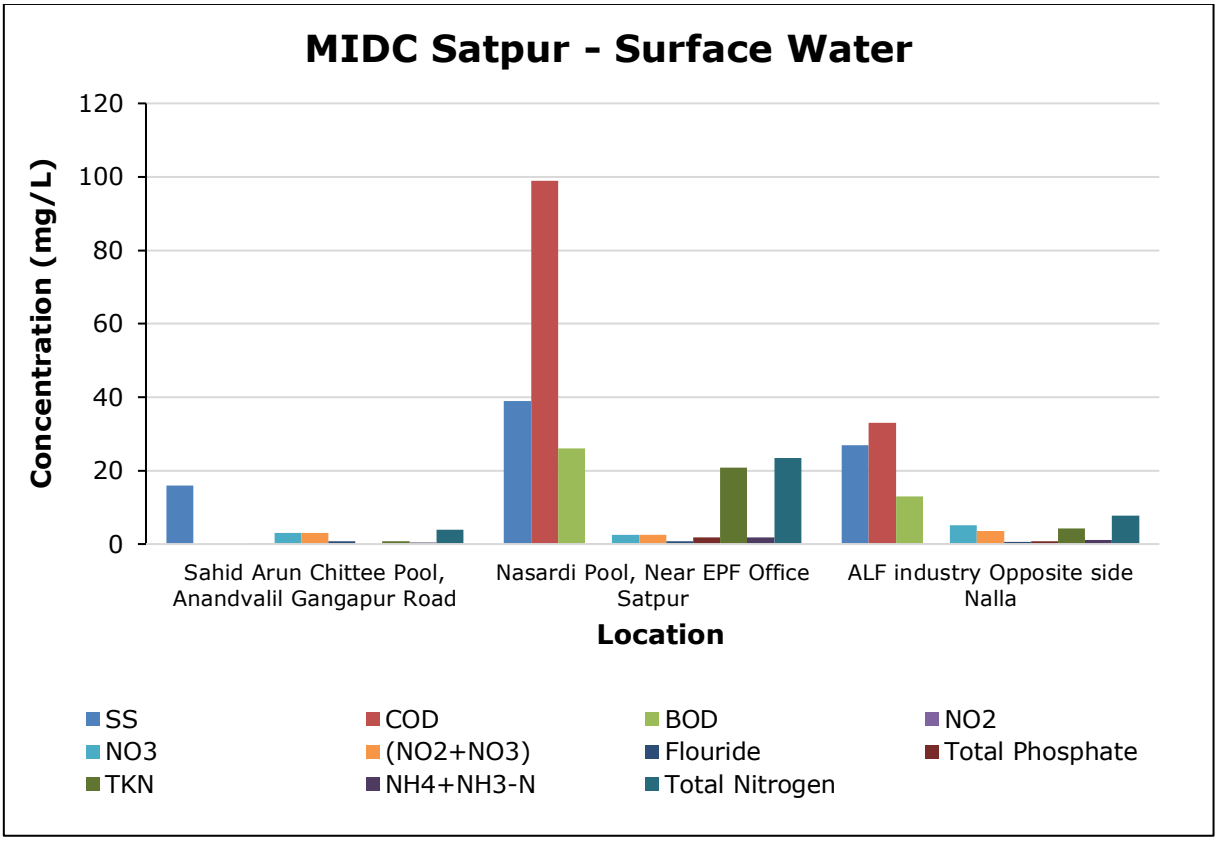
Table 6.4 MIDC Satpur Results of Surface Water

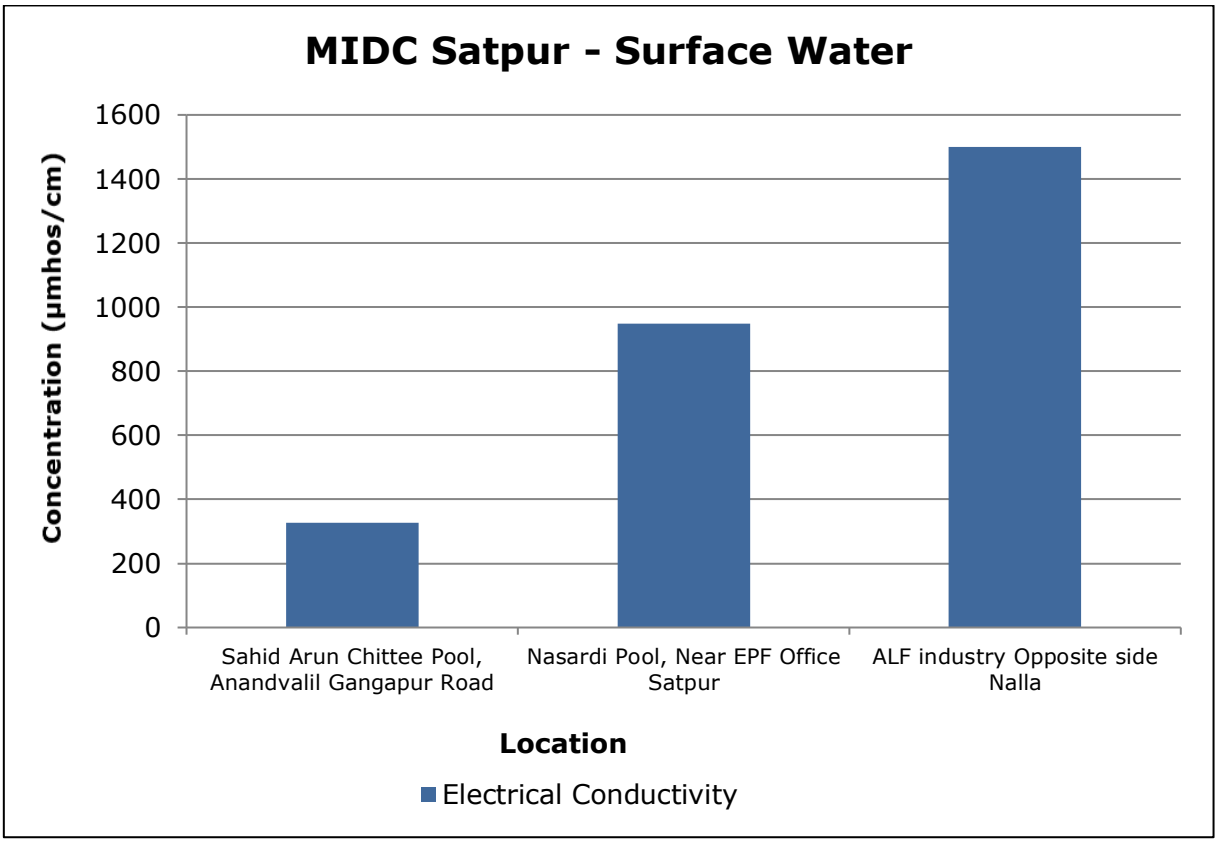
Parameters	Unit	Results		
		Sahid Arun Chittee Pool, Anandvalil Gangapur Road	Nasardi Pool, Near EPF Office Satpur	ALF industry Opposite side Nalla
Sanitary Survey	-	Generally clean neighbourhood	Generally clean neighbourhood	Generally clean neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.2	0.17	0.1
Temperature	°C	25	25	25
Colour	Hazen	1	6	1
Smell	-	Agreeable	Agreeable	Agreeable
pH	-	8.30	7.66	7.46
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	16	39	27
Total Dissolved Solids	mg/L	423	484	327
Dissolved Oxygen (% Saturation)	%	71	50	61
Chemical Oxygen Demand	mg/L	BLQ	99	33
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	BLQ	26	13

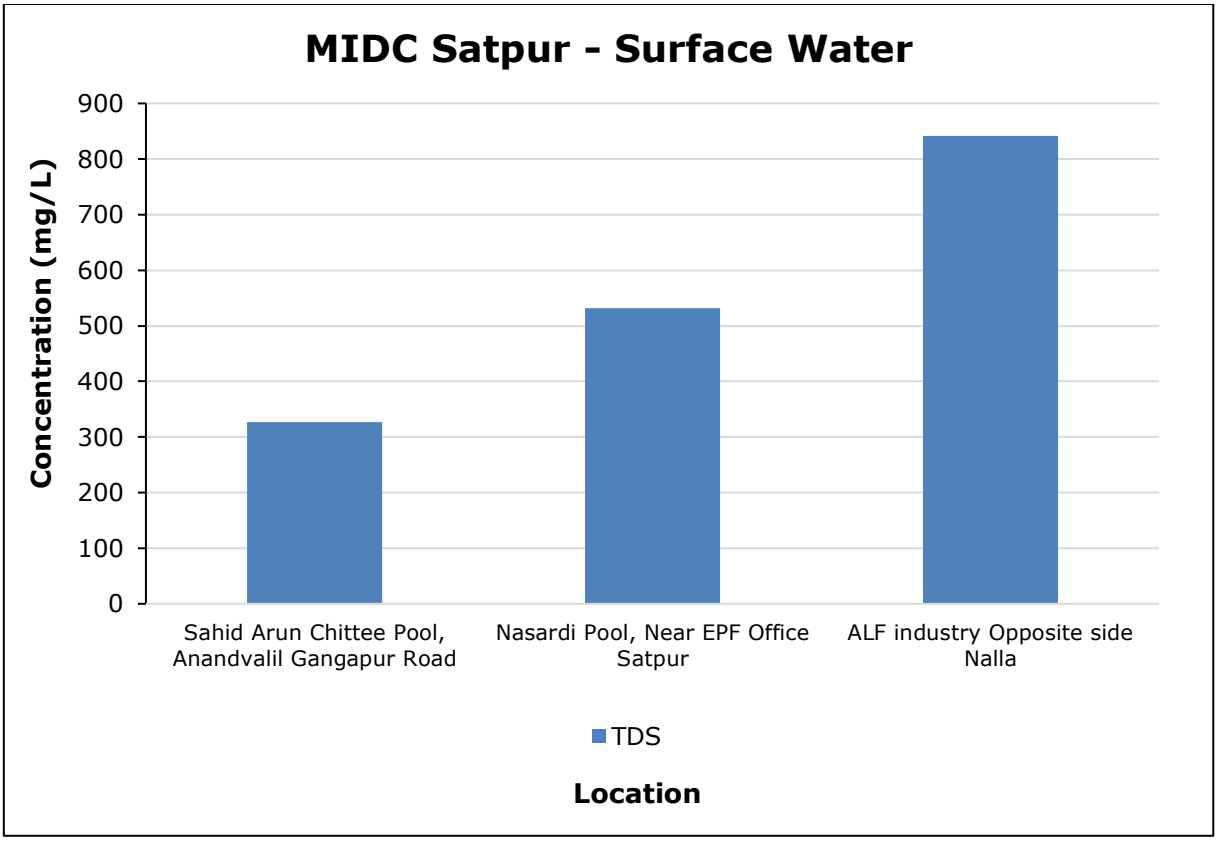
Parameters	Unit	Results		
		Sahid Arun Chittee Pool, Anandvalil Gangapur Road	Nasardi Pool, Near EPF Office Satpur	ALF industry Opposite side Nalla
Electrical Conductivity (at 25 °C)	µmho/cm	754	863	583
Nitrite Nitrogen (as NO_2)	mg/L	0.03	0.02	0.05
Nitrate Nitrogen (as NO_3)	mg/L	2.97	2.58	5.06
(NO_2 + NO_3)-Nitrogen	mg/L	3.00	2.59	3.55
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	0.08	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.7	0.80	0.53
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	1.73	0.78
Sodium Adsorption Ratio	-	0.71	0.98	0.69
Total Coliforms	MPN Index/ 100 ml	1070	920	1600
Faecal Coliforms	MPN Index/ 100 ml	920	127	1600
Total Phosphate (as P)	mg/L	BLQ	1.82	0.8
Total Kjeldahl Nitrogen (as N)	mg/L	0.82	20.9	4.21
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.33	1.86	1.1
Total Nitrogen	mg/L	3.82	23.5	7.77
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS, mol.wt.288.38)	µg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	mg/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	0.068	0.17	0.50
Nickel (as Ni)	mg/L	BLQ	0.05	0.043
Copper (as Cu)	mg/L	BLQ	0.04	0.080
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	0.11	BLQ
Total Arsenic (as As)	mg/L	0.008	0.01	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	0.01	BLQ

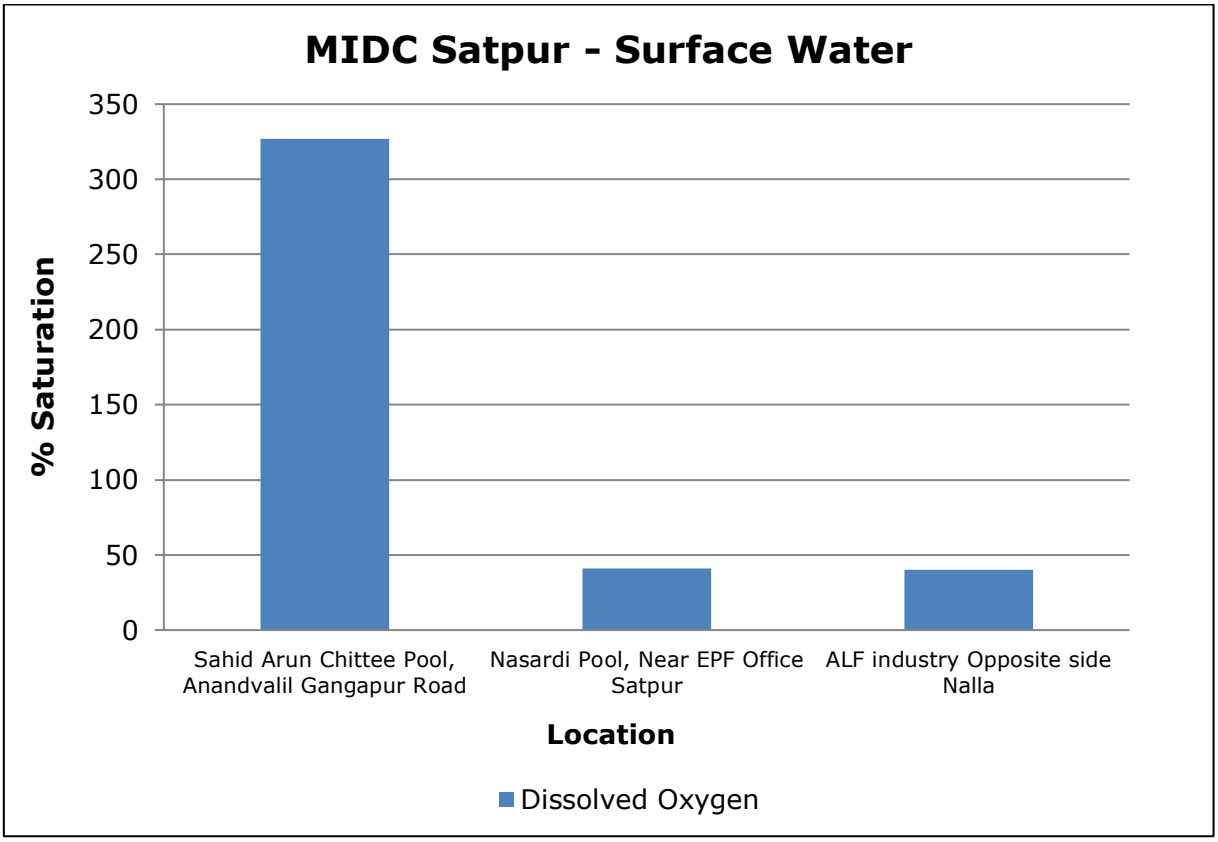
Parameters	Unit	Results		
		Sahid Arun Chittee Pool, Anandvalil Gangapur Road	Nasardi Pool, Near EPF Office Satpur	ALF industry Opposite side Nalla
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	BLQ	0.24	0.07
Iron (as Fe)	mg/L	0.132	0.94	0.55
Vanadium (as V)	mg/L	0.03	0.02	BLQ
Selenium (as Se)	mg/L	0.010	0.02	0.012
Boron (as B)	mg/L	BLQ	0.78	0.29
Bioassay Test on fish	% survival	97	67	100

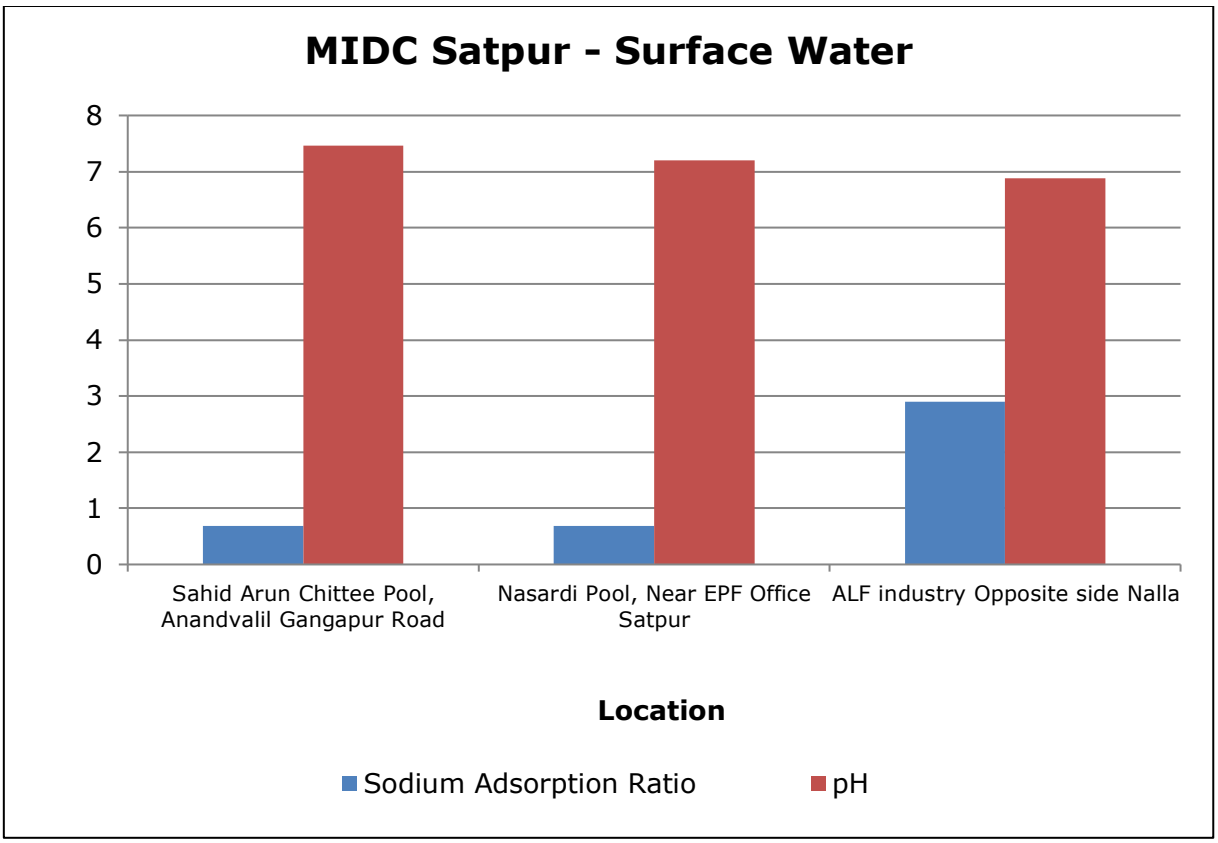
Graphs - Surface Water Quality of MIDC Satpur

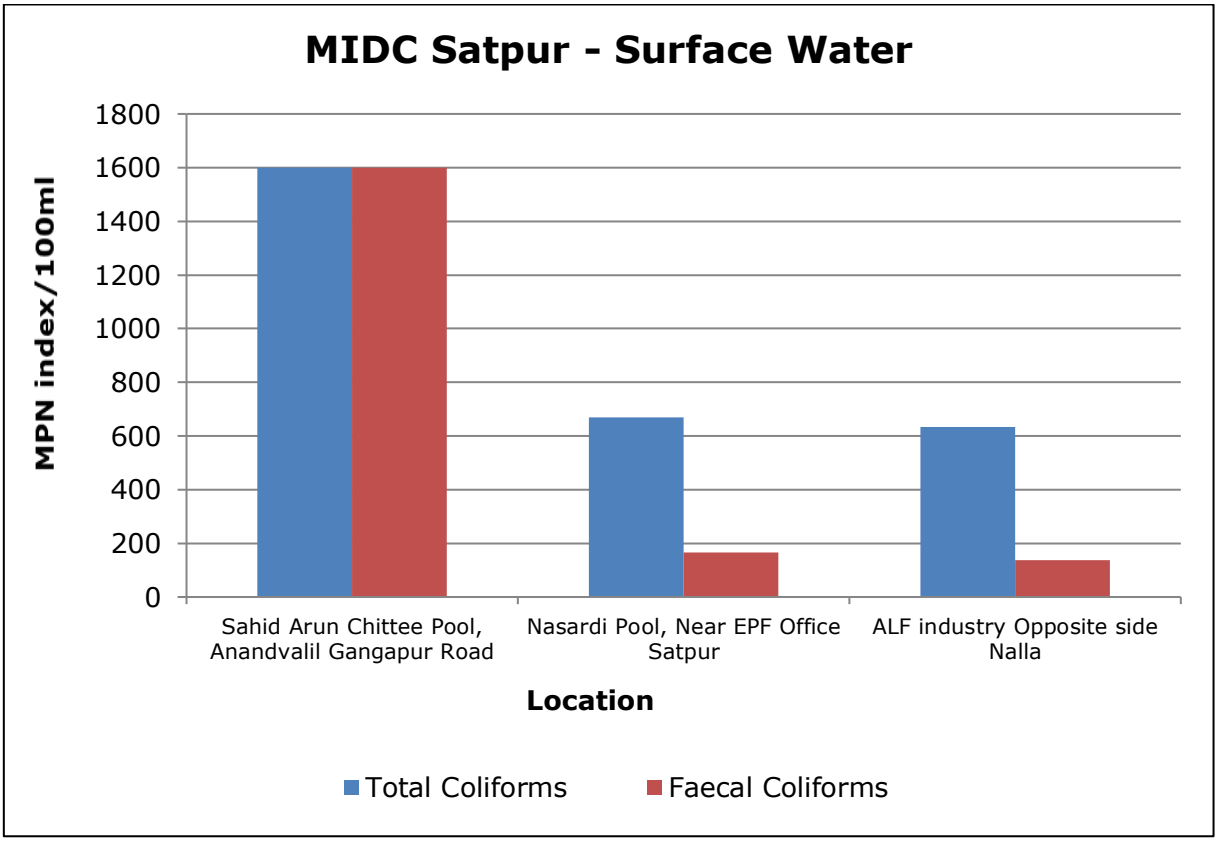


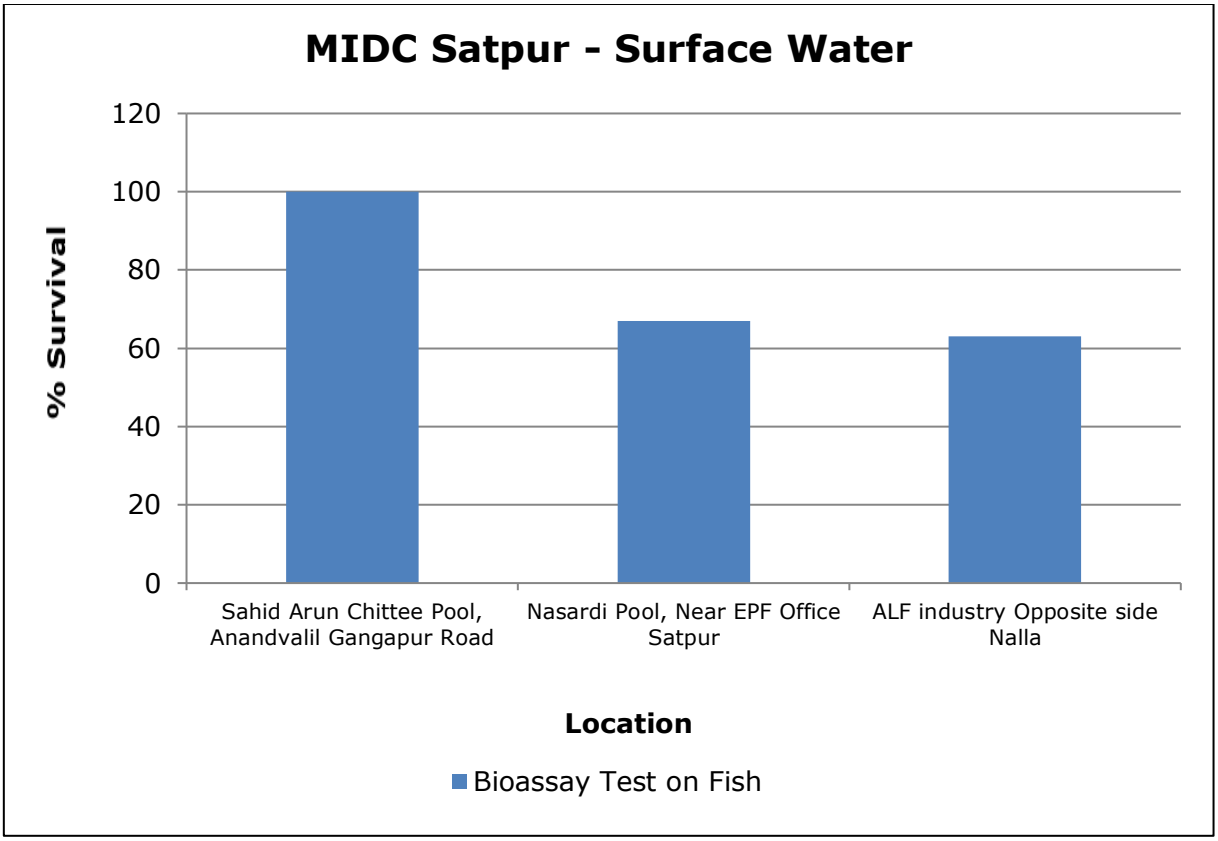



MIDC Satpur - Surface Water
Concentration (mg/L)
900
800
700
600
500
400
300
200
100
0
Sahid Arun Chittee Pool, Anandvalil Gangapur Road
Nasardi Pool, Near EPF Office Satpur
ALF industry Opposite side Nalla
TDS
Location


MIDC Satpur - Surface Water
% Saturation
350
300
250
200
150
100
50
0
Sahid Arun Chittee Pool, Anandvalil Gangapur Road
Nasardi Pool, Near EPF Office Satpur
ALF industry Opposite side Nalla
Location
Dissolved Oxygen


MIDC Satpur - Surface Water
8
7
6
5
4
3
2
1
0
Sahid Arun Chittee Pool, Anandvalil Gangapur Road
Nasardi Pool, Near EPF Office Satpur
ALF industry Opposite side Nalla
Location
Sodium Adsorption Ratio
pH


MIDC Satpur - Surface Water
MPN index/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
Sahid Arun Chittee Pool, Anandvalil Gangapur Road
Nasardi Pool, Near EPF Office Satpur
ALF industry Opposite side Nalla
Location
Total Coliforms
Faecal Coliforms


MIDC Satpur - Surface Water
% Survival
120
100
80
60
40
20
0
Sahid Arun Chittee Pool, Anandvalil Gangapur Road
Nasardi Pool, Near EPF Office Satpur
ALF industry Opposite side Nalla
Location
Bioassay Test on Fish

LAND ENVIRONMENT

7. Land Environment

For studying the land Environment of Nashik area, ground water was collected from Bore well, open well and hand pumps. A total of 12 samples were collected.

1. **MIDC Ambad:**

- All six 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 six samples collected.
- 100% survival was achieved in Fish Bioassay in one samples out of 6 samples collected.
- Metals like Zinc, Hexavalent Chromium (Cr^{6+}), Total Arsenic, Lead, Cadmium, Mercury, Manganese, etc. are observed either below limit of quantification or below their standard limits.
- Parameters like Free Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Phosphate exceeded in the one out of six samples 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 7.1 MIDC Ambad - 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.	Hotel Tapovan Garvare Point (Bore well Water)	19°34'37.86"N	73°74'34.08"E	29.12.2023	31.12.2023	02.01.2024
2.	Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water)	19°95'75.31"N	73°75'45.12"E	29.12.2023	31.12.2023	02.01.2024
3.	Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)	19°95'72.04"N	73°72'13.06"E	29.12.2023	31.12.2023	02.01.2024

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
4.	Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	19°95'14.02"N	73°72'88.58"E	29.12.2023	31.12.2023	02.01.2024
5.	Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water)	19°95'31.15"N	73°73'89.06"E	29.12.2023	31.12.2023	02.01.2024
6.	Sai Eknath Park (Near Indoline Furniture) (Bore Well Water)	19°96'08.35"N	73°75'02.32"E	29.12.2023	31.12.2023	02.01.2024

Fig. Geographical Locations of Ground Water Sampling MIDC Ambad

Table 7.2 MIDC Ambad - Results of Ground Water

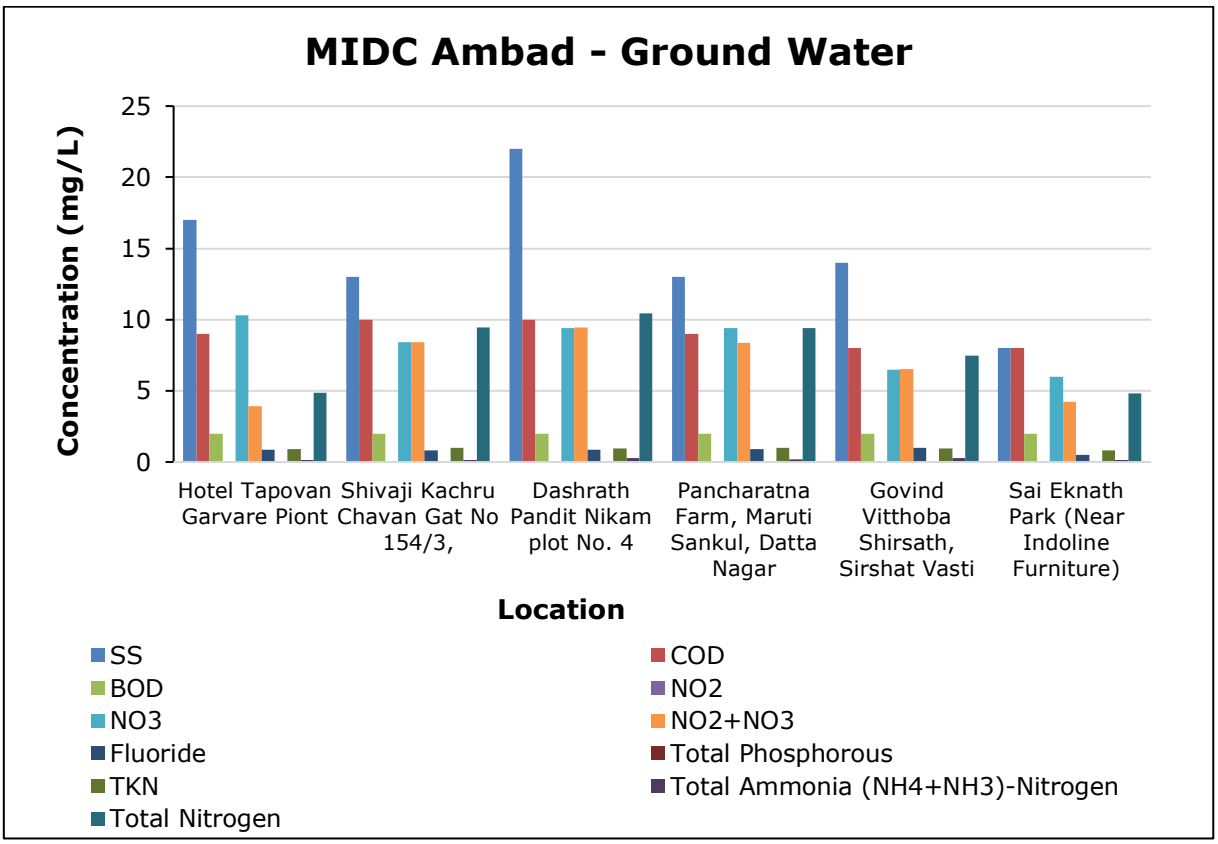
Parameters	Unit	Results		
		Hotel Tapovan Garvare Point (Bore well Water)	**Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water)**	**Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)**
Sanitary Survey	-	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment	Generally Clean Neighbourhood
General Appearance	-	Not Applicable	Floating Matter Evident	Not Applicable
Transparency	m	Not Applicable	0.2	Not Applicable
Temperature	^oC	26	25	25
Colour	Hazen	2	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.70	7.79	7.52
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	17	13	22
Total Dissolved Solids	mg/L	574	493	625
Chemical Oxygen Demand	mg/L	9	10	10
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	2	2	2
Electrical Conductivity (at 25^oC)	µmhos/cm	1023	877	1114
Nitrite Nitrogen (as NO_2)	mg/L	0.02	0.04	0.045
Nitrate Nitrogen (as NO_3)	mg/L	10.3	8.42	9.43
(NO_2+ NO_3)-Nitrogen	mg/L	3.93	8.44	9.45
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	0.87	0.8	0.87
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	1.05	0.98	0.93
Total Coliforms	MPN Index/ 100 ml	13	24	622
Faecal Coliforms	MPN Index/ 100 ml	<1.8	13	614
Total Phosphate (as PO_4)	mg/L	BLQ	BLQ	BLQ

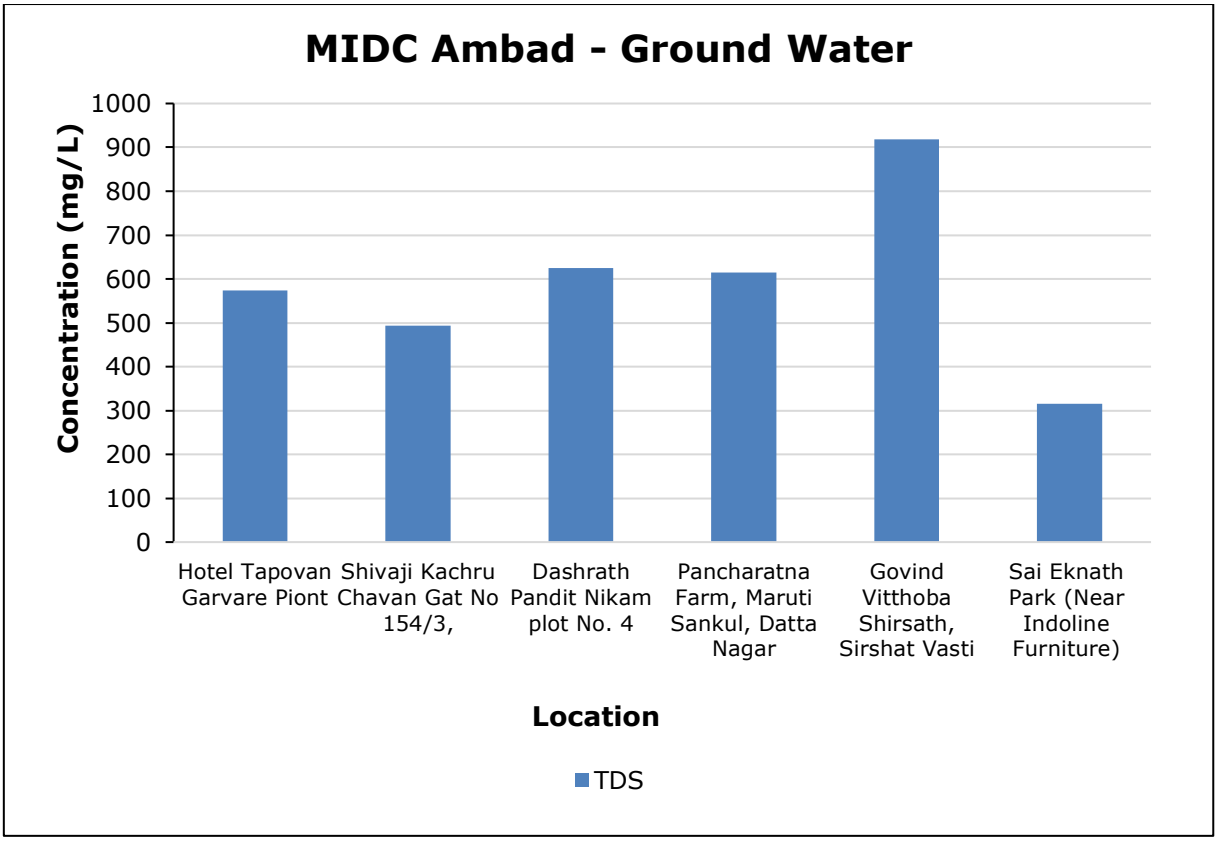
Parameters	Unit	Results		
		Hotel Tapovan Garvare Point (Bore well Water)	Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water)	Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)
Total Kjeldahl Nitrogen	mg/L	0.93	1.01	0.97
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.13	0.16	0.30
Total Nitrogen	mg/L	4.86	9.46	10.45
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	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	0.06
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	0.008	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	BLQ	BLQ	BLQ
Iron (as Fe)	mg/L	1.51	BLQ	0.241
Vanadium (as V)	mg/L	0.044	0.059	0.012
Selenium (as Se)	mg/L	0.022	0.0155	0.0115
Boron (as B)	mg/L	0.158	0.158	0.103
Bioassay Test on fish	% survival	97	97	100

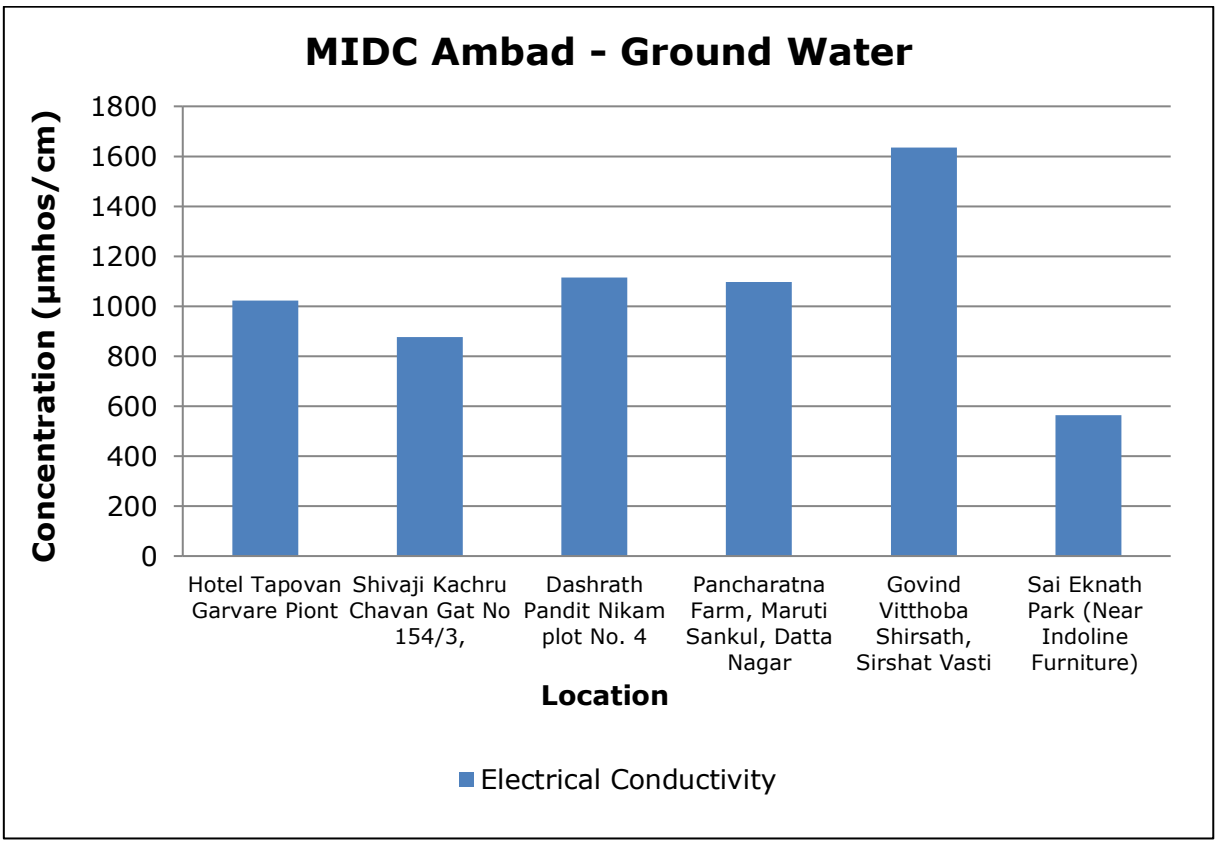
Parameters	Unit	Results		
		Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water)	Sai Eknath Park (Near Indoline Furniture) (Bore Well Water)
Sanitary Survey	-	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment
General Appearance	-	Not Applicable	No Floating Matter	Not Applicable
Transparency	m	Not Applicable	0.2	Not Applicable
Temperature	^oC	26	26	25
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.80	7.49	7.54
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	13	14	8
Total Dissolved Solids	mg/L	615	918	316
Chemical Oxygen Demand	mg/L	9	8	8
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	2	2	2
Electrical Conductivity (at 25^oC)	µmhos/cm	1096	1635	563
Nitrite Nitrogen (as NO_2)	mg/L	0.04	0.03	0.03
Nitrate Nitrogen (as NO_3)	mg/L	8.38	6.50	5.97
(NO_2+ NO_3)-Nitrogen	mg/L	8.39	6.51	4.25
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	0.9	1.00	0.5
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	1.06	1.37	0.81
Total Coliforms	MPN Index/ 100 ml	1600	807	1260
Faecal Coliforms	MPN Index/ 100 ml	540	127	37
Total Phosphate (as PO_4)	mg/L	BLQ	BLQ	BLQ
Total Kjeldahl Nitrogen	mg/L	1.01	0.97	0.84
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.20	0.30	0.15

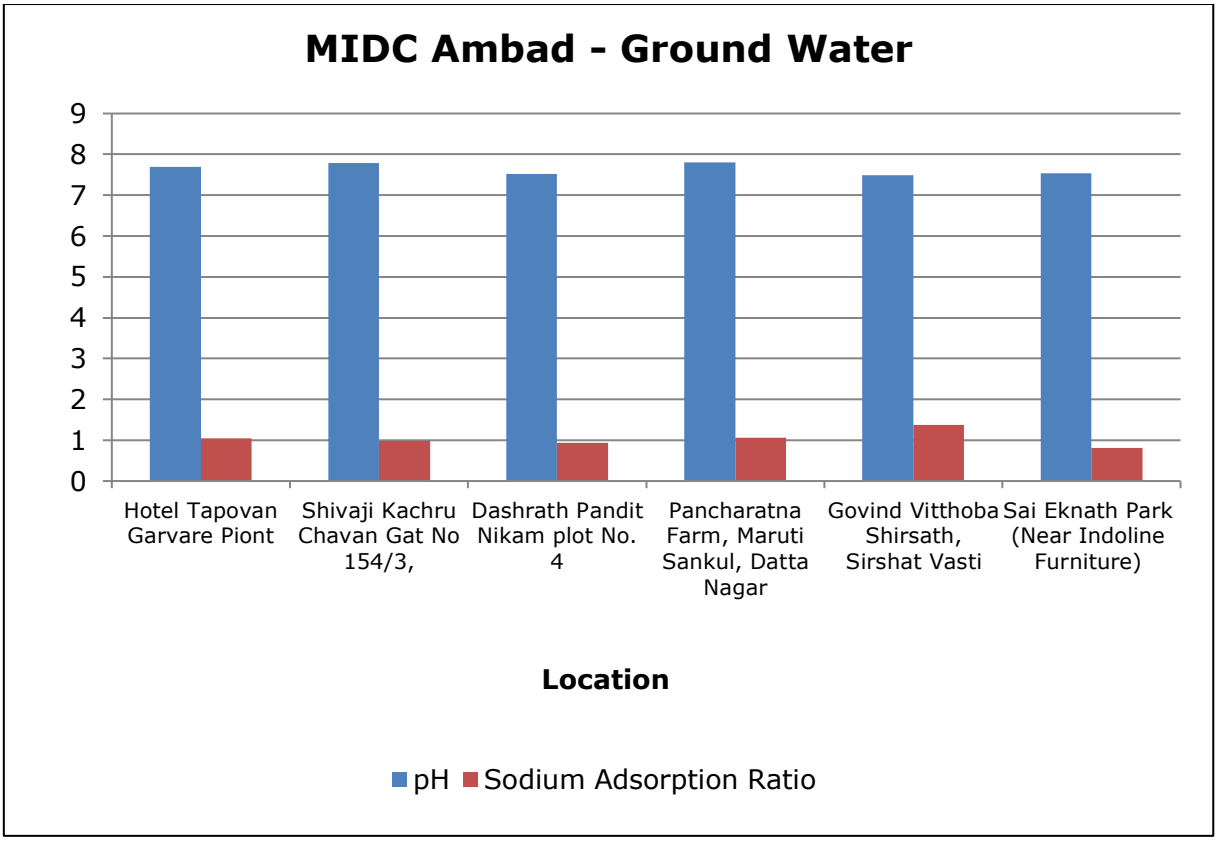
Parameters	Unit	Results		
		Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water)	Sai Eknath Park (Near Indoline Furniture) (Bore Well Water)
Total Nitrogen	mg/L	9.41	7.49	4.81
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	BLQ	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	0.33	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	0.01
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	BLQ	0.02	BLQ
Iron (as Fe)	mg/L	0.062	0.09	0.072
Vanadium (as V)	mg/L	0.028	0.016	0.029
Selenium (as Se)	mg/L	0.014	0.015	0.014
Boron (as B)	mg/L	1.53	1.44	0.129
Bioassay Test on fish	% survival	97	97	97

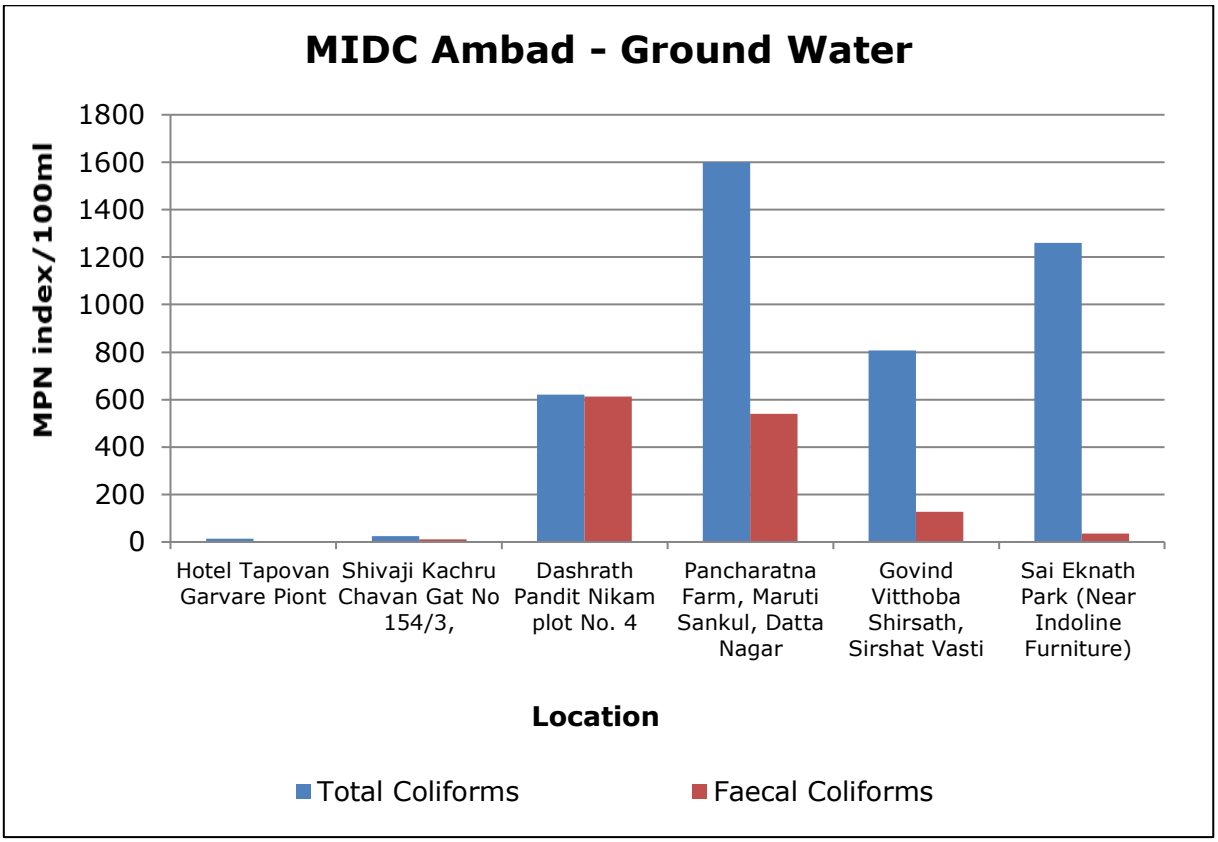
Graph - Ground Water Quality Monitoring for MIDC Ambad

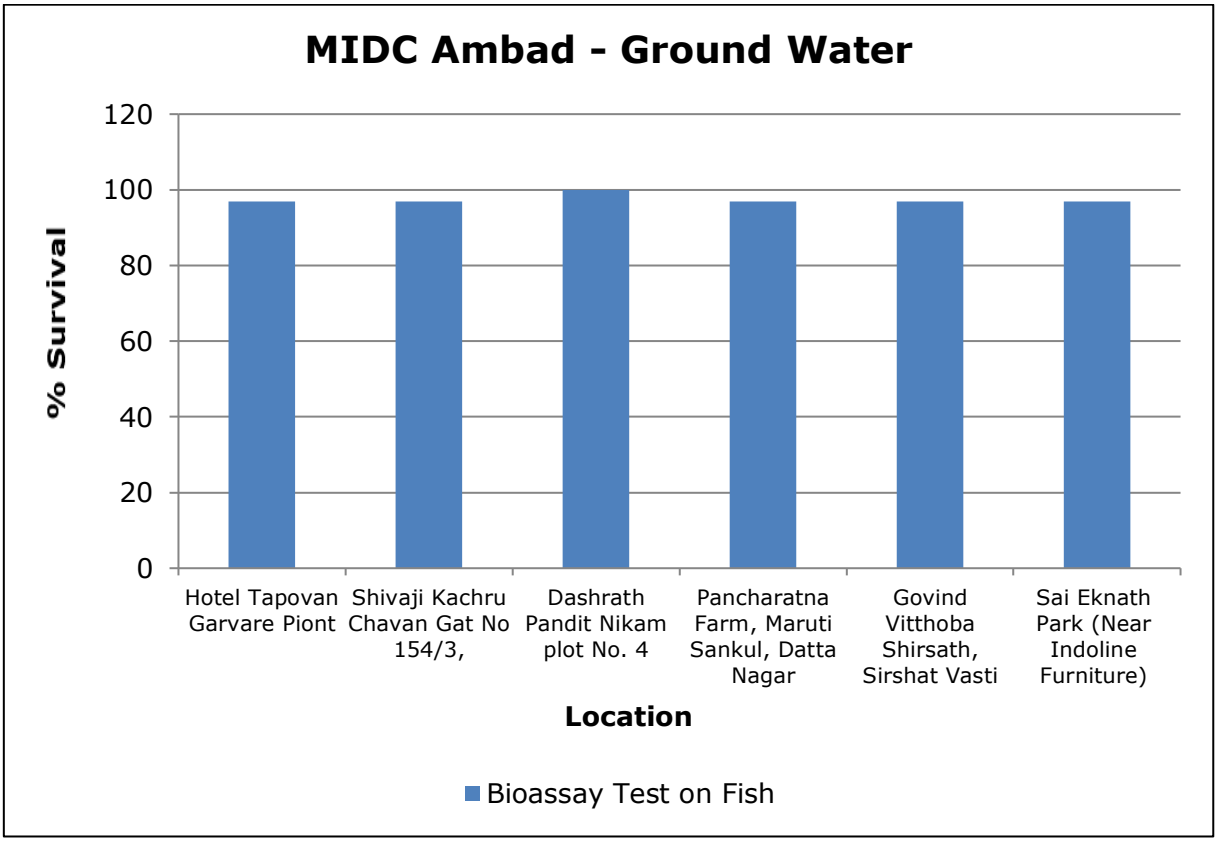





MIDC Ambad - Ground Water
Concentration (µmhos/cm)
1800
1600
1400
1200
1000
800
600
400
200
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
Electrical Conductivity


MIDC Ambad - Ground Water
9
8
7
6
5
4
3
2
1
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
pH
Sodium Adsorption Ratio


MIDC Ambad - Ground Water
MPN index/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
Total Coliforms
Faecal Coliforms


MIDC Ambad - Ground Water
% Survival
120
100
80
60
40
20
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
Bioassay Test on Fish

2. MIDC Satpur:

- All six water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids, total dissolved solids and BOD are also well within the limits at all six samples collected.
- 100% survival was achieved in Fish Bioassay in four samples out of 6 samples collected.
- All metals like Zinc, Nickel, Copper, Hexavalent Chromium (Cr^{6+}), Total Chromium, Total Arsenic, Lead, Cadmium, Mercury, etc. are observed either below limit of quantification 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.
- 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 7.3 MIDC Satpur - 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.	Ramesh Chandra Kale, Near ESI Hospital (Hand Well Water)	19°99'0.94"N	73°71'12.79"E	21.12.2023	23.12.2023	25.12.2023
2.	Seva Developers Pvt. Ltd. (Bore Well Water)	20°00'29.42"N	73°74'96.97"E	21.12.2023	23.12.2023	25.12.2023
3.	Shivaji Nagar, Shushila Hospital, Plot No 55/6 (Bore Well Water)	20° 00'16.34"N	73°71'12.79"E	21.12.2023	23.12.2023	25.12.2023
4.	Shradha Farmhouse, Shardha Motors (Back Side) (Well Water)	20°00'5.16"N	73°72'69.48"E	21.12.2023	23.12.2023	25.12.2023
5.	Amit Deelip Yadav, Plot No 50, Ganesh Nagar (Bore Well Water)	20°00'57.45"N	73°73'80.03"E	21.12.2023	23.12.2023	25.12.2023

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
6.	Virshab Industries Back Side, Vanvihar Colony (Bore Well Water)	20°00'57.45"N	73°73'80.03"E	21.12.2023	23.12.2023	25.12.2023

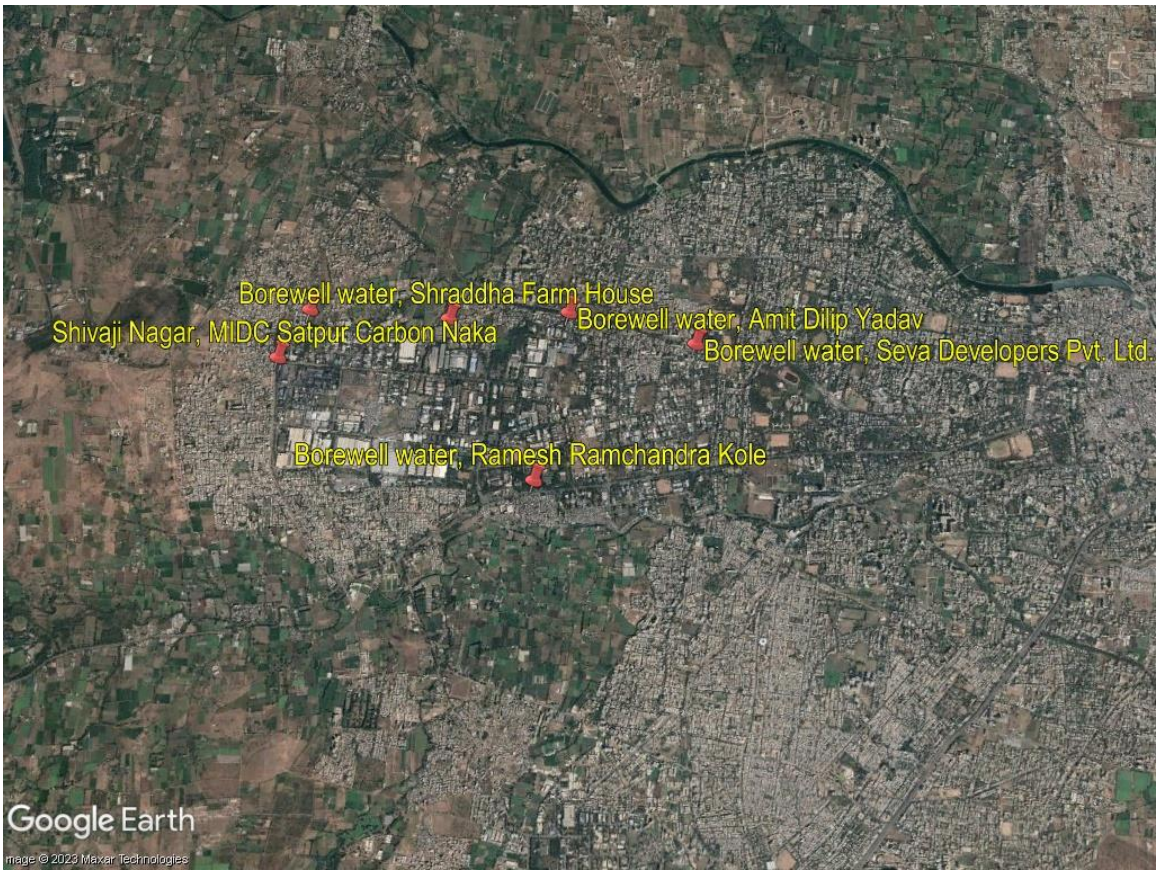


Fig. Geographical Locations of Ground Water Sampling MIDC Satpur

Table 7.4 MIDC Satpur - Results of Ground Water

Parameters	Unit	Results		
		Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)	Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (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

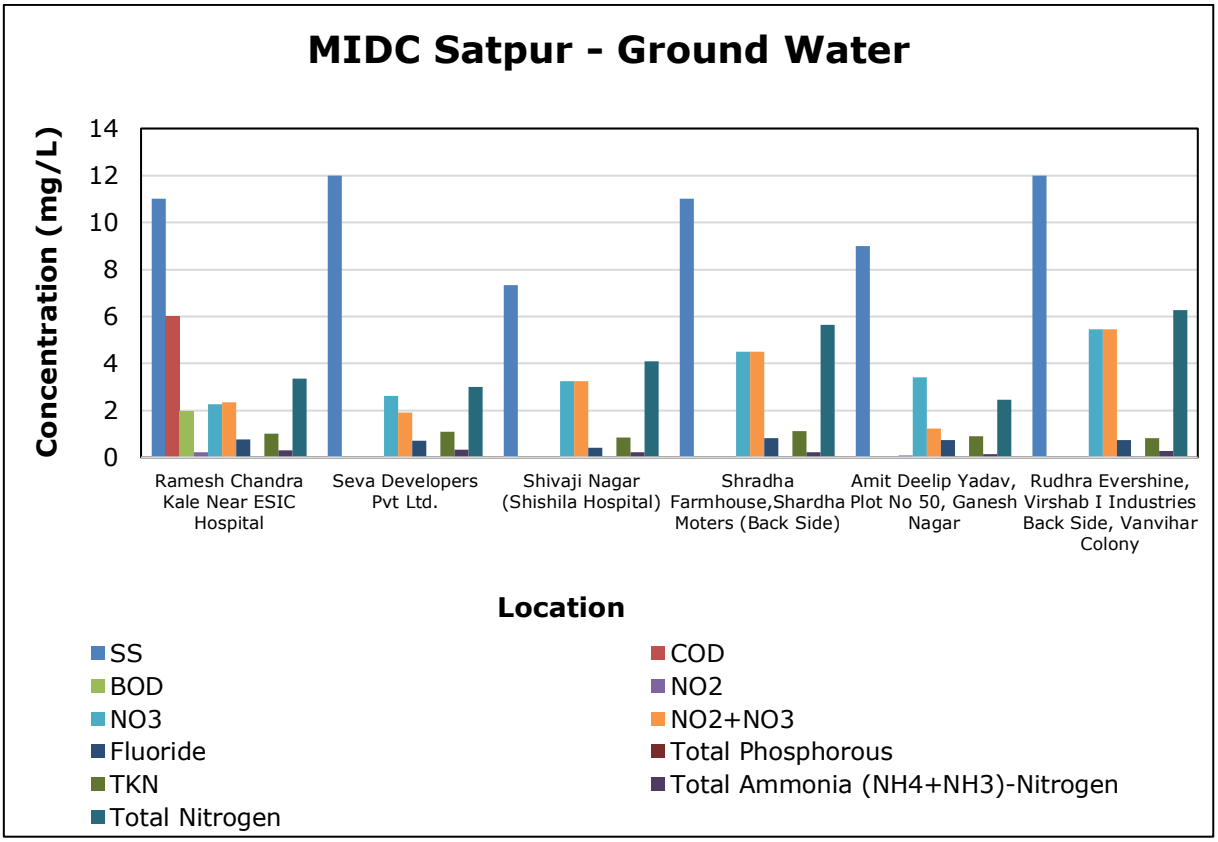
Parameters	Unit	Results		
		Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)	Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water)
Temperature	^oC	26	26	26
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.94	7.88	7.97
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	11	12	7.33
Total Dissolved Solids	mg/L	480	423	266
Chemical Oxygen Demand	mg/L	6	BLQ	BLQ
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	2	BLQ	BLQ
Electrical Conductivity (at 25^oC)	µmhos/cm	855	755	473
Nitrite Nitrogen (as NO_2)	mg/L	0.21	0.02	BLQ
Nitrate Nitrogen (as NO_3)	mg/L	2.27	2.62	3.24
(NO_2+ NO_3)-Nitrogen	mg/L	2.35	1.92	3.24
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	0.77	0.7	0.4
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	0.87	0.69	0.54
Total Coliforms	MPN Index/ 100 ml	23	817	920
Faecal Coliforms	MPN Index/ 100 ml	23	807	340
Total Phosphate (as PO_4)	mg/L	BLQ	BLQ	BLQ
Total Kjeldahl Nitrogen	mg/L	1.01	1.08	0.86
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.31	0.32	BLQ
Total Nitrogen	mg/L	3.36	3.0	7.69
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ

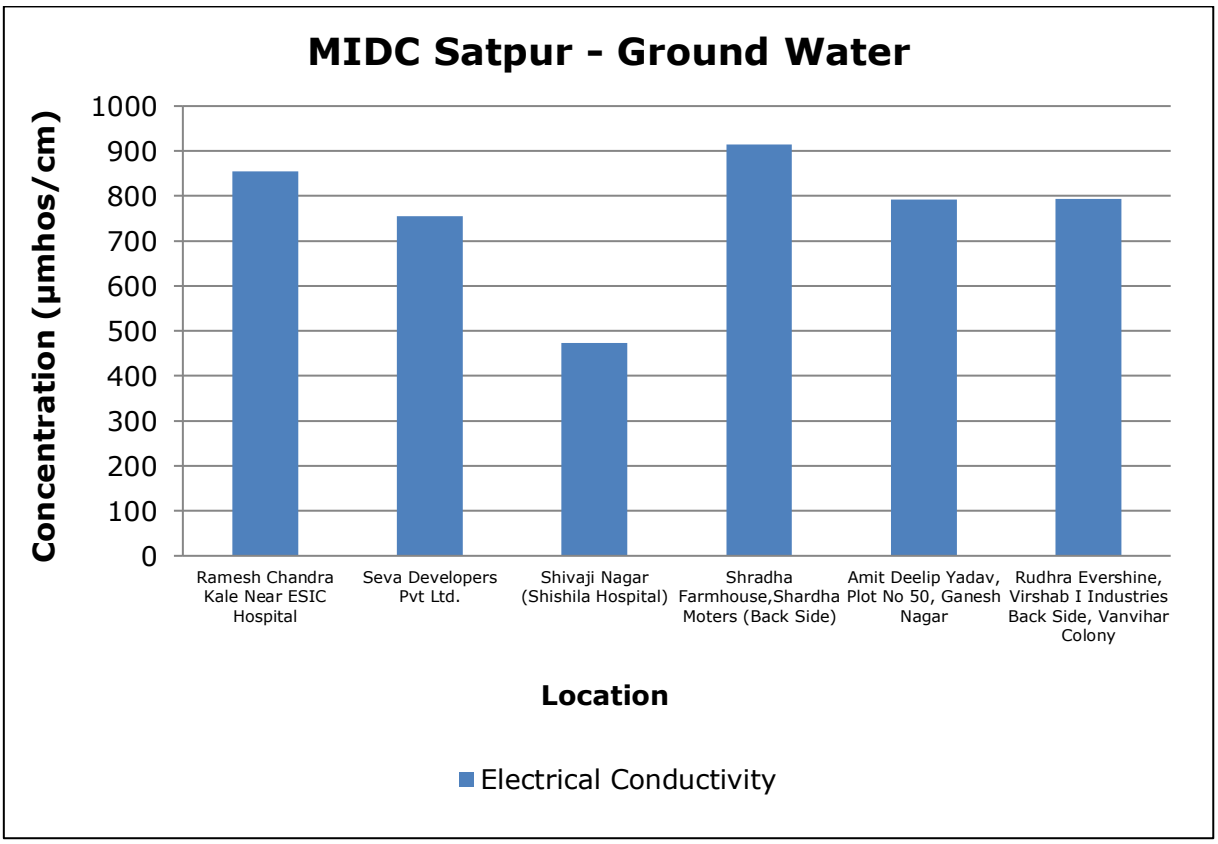
Parameters	Unit	Results		
		Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)	Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water)
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.12	BLQ	0.091
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.02
Total Arsenic (as As)	mg/L	BLQ	0.009	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	0.04	0.06	0.03
Iron (as Fe)	mg/L	0.23	0.10	0.11
Vanadium (as V)	mg/L	0.06	0.04	0.04
Selenium (as Se)	mg/L	0.012	0.013	0.01
Boron (as B)	mg/L	0.21	0.10	BLQ
Bioassay Test on fish	% survival	100	100	90

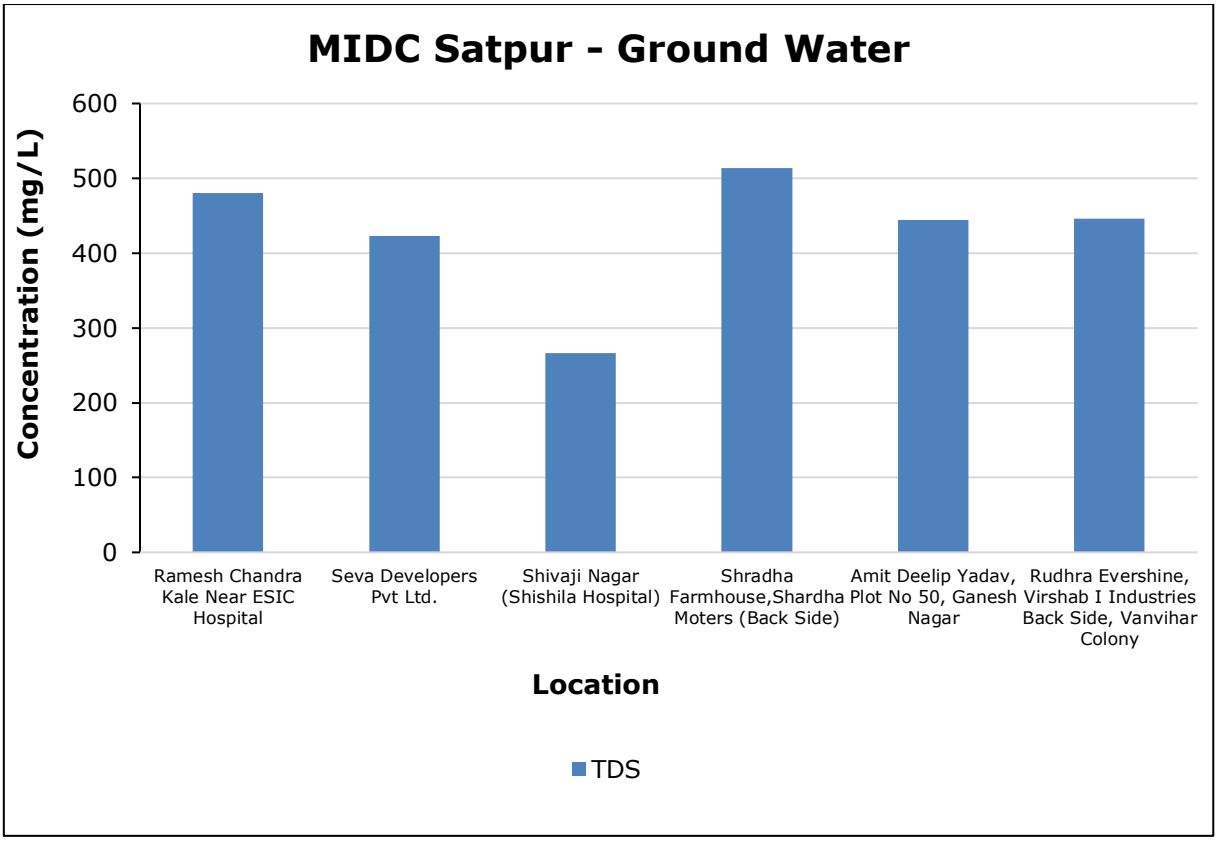
Parameters	Unit	Results		
		Shradha Farmhouse, Shardha Moters (Back Side) MIDC Satpur (Well Water)	Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water)	Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water)
Sanitary Survey	-	Very Clean Neighbourhood 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	°C	26	28	26
Colour	Hazen	1	1	1

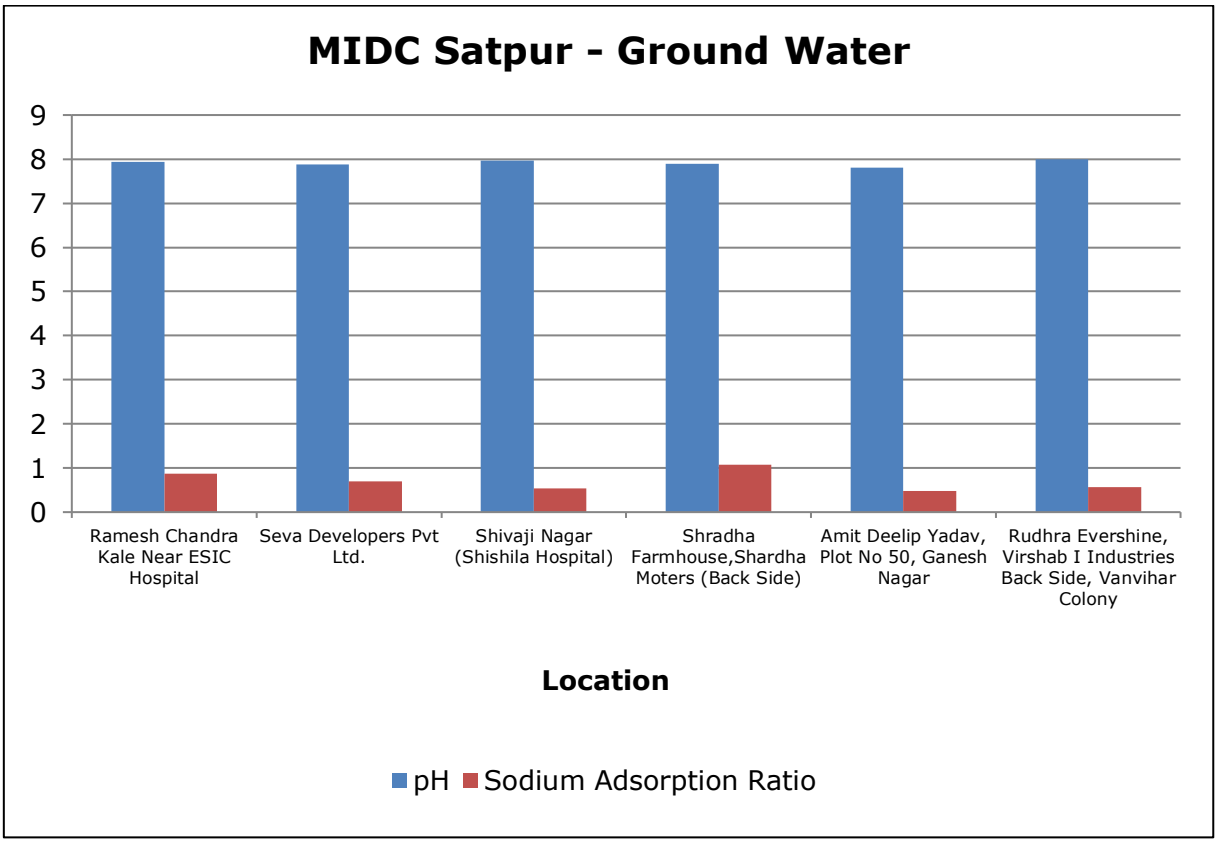
Parameters	Unit	Results		
		Shradha Farmhouse, Shardha Moters (Back Side) MIDC Satpur (Well Water)	**Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water)**	**Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water)**
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.81	7.30	7.99
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	11	9	12
Total Dissolved Solids	mg/L	514	444	446
Chemical Oxygen Demand	mg/L	BLQ	BLQ	BLQ
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	BLQ	BLQ	BLQ
Electrical Conductivity (at 25°C)	µmhos/cm	915	792	794
Nitrite Nitrogen (as NO_2)	mg/L	BLQ	0.09	BLQ
Nitrate Nitrogen (as NO_3)	mg/L	4.51	3.41	5.44
(NO_2+ NO_3)-Nitrogen	mg/L	4.51	1.24	5.45
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	0.07	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.83	0.73	0.73
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	1.08	0.48	0.57
Total Coliforms	MPN Index/ 100 ml	657	801	571
Faecal Coliforms	MPN Index/ 100 ml	323	540	557
Total Phosphate (as PO_4)	mg/L	BLQ	BLQ	BLQ
Total Kjeldahl Nitrogen	mg/L	1.12	0.90	0.82
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.21	0.15	0.28
Total Nitrogen	mg/L	5.64	2.45	6.27
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	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

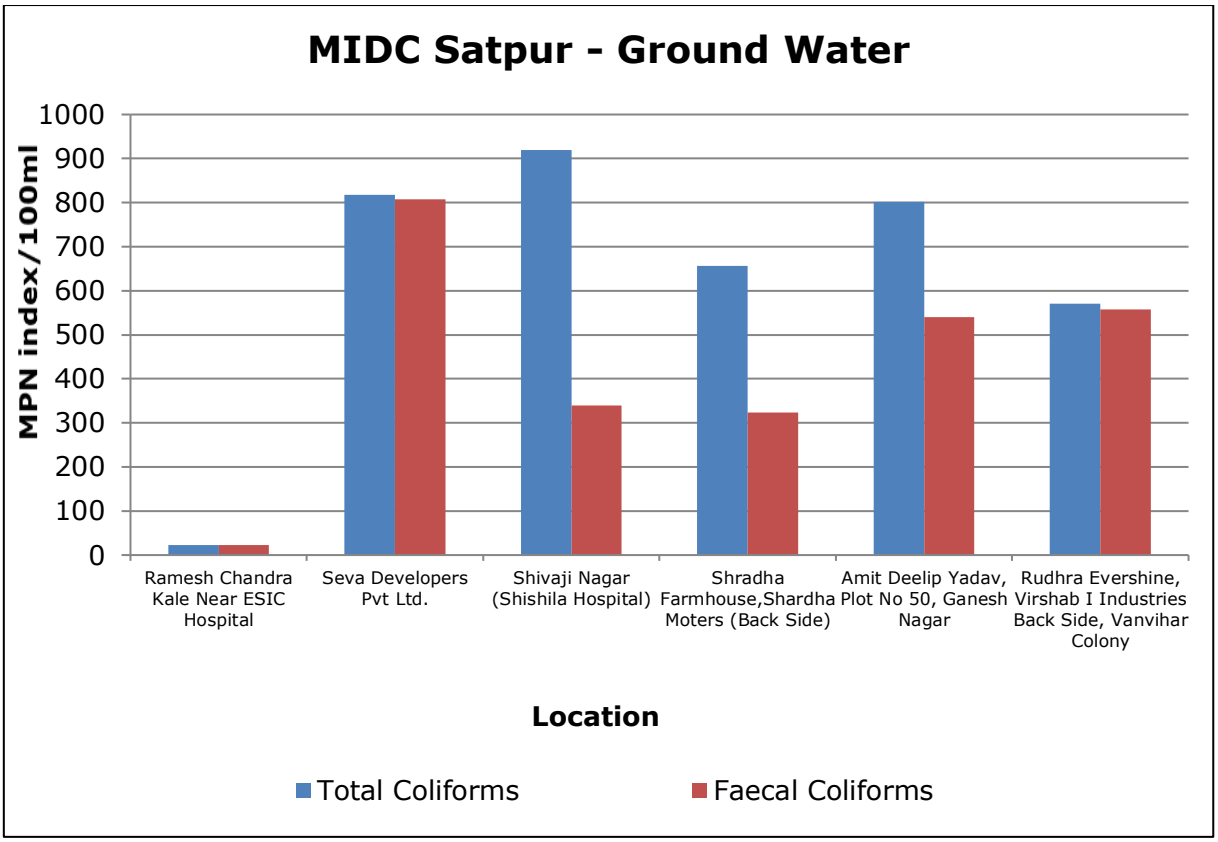
Parameters	Unit	Results		
		Shradha Farmhouse, Shardha Moters (Back Side) MIDC Satpur (Well Water)	Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water)	Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water)
Zinc (as Zn)	mg/L	BLQ	0.095	BLQ
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.028	0.022	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	0.007
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	BLQ	BLQ	0.027
Iron (as Fe)	mg/L	0.06	0.20	0.14
Vanadium (as V)	mg/L	0.03	0.028	0.060
Selenium (as Se)	mg/L	0.01	0.014	0.01
Boron (as B)	mg/L	0.18	BLQ	BLQ
Bioassay Test on fish	% survival	97	100	100

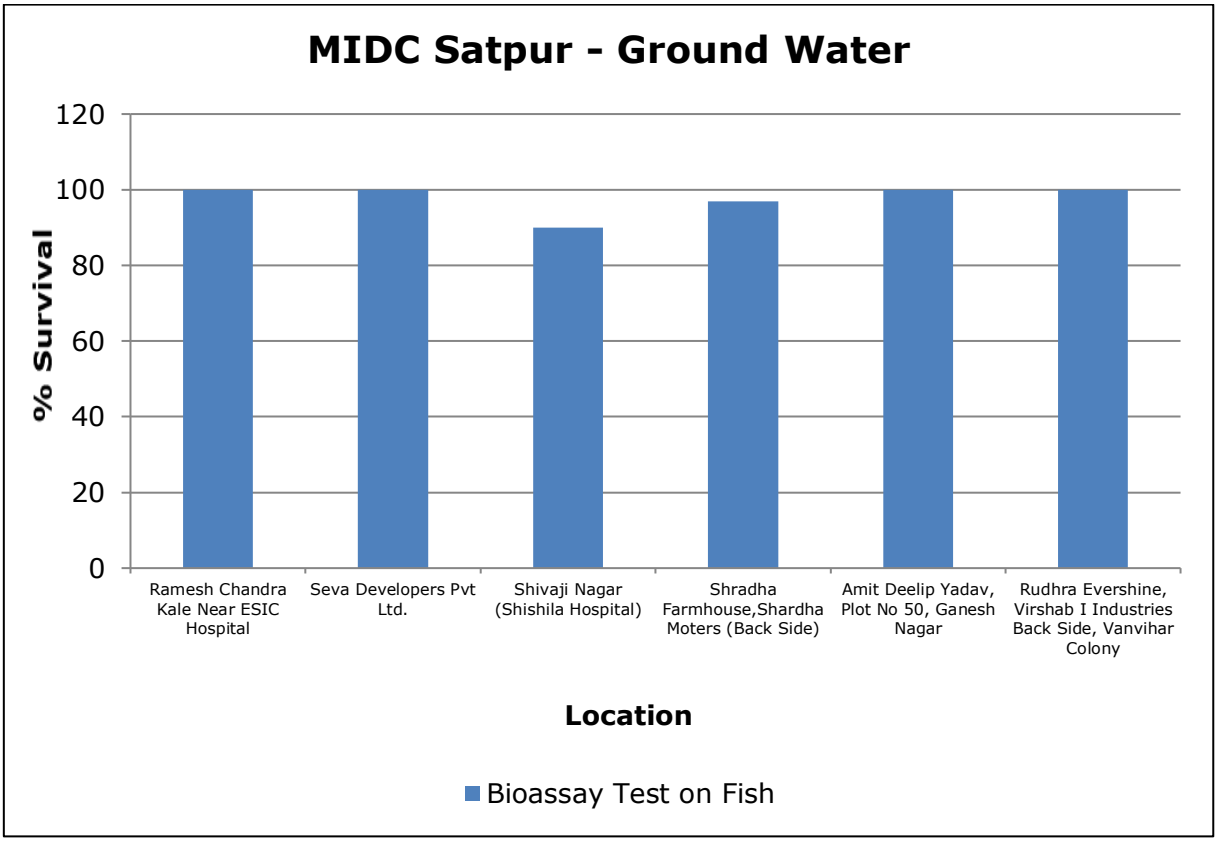

MIDC Satpur - Ground Water
Concentration (mg/L)
14
12
10
8
6
4
2
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
SS
COD
BOD
NO2
NO3
NO2+NO3
Fluoride
Total Phosphorous
TKN
Total Ammonia (NH4+NH3)-Nitrogen
Total Nitrogen


MIDC Satpur - Ground Water
Concentration (µmhos/cm)
1000
900
800
700
600
500
400
300
200
100
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
Electrical Conductivity


MIDC Satpur - Ground Water
Concentration (mg/L)
600
500
400
300
200
100
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
TDS


MIDC Satpur - Ground Water
9
8
7
6
5
4
3
2
1
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
pH
Sodium Adsorption Ratio


MIDC Satpur - Ground Water
MPN index/100ml
1000
900
800
700
600
500
400
300
200
100
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
Total Coliforms
Faecal Coliforms


MIDC Satpur - Ground Water
% Survival
120
100
80
60
40
20
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
Bioassay Test on Fish

8. Health Related Data

C: Receptor

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

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

Annexure – I Health Related Data enclosed.

9. CEPI Score

Comprehensive Environmental Pollution Index (CEPI) is intended to act as early warning tool which helps in categorization of industrial clusters/ areas in terms of priority of needing attention. The CEPI score have been calculated based on CPCB Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016. The scoring system involves an algorithm that considers the basic selection criteria. It is proposed to develop the CEPI based on Sources of pollution, real time observed values of the pollutants in the ambient air, surface water and ground water in & around the industrial cluster and health related statistics.

Table 8.1 CEPI score of the Post monsoon season 2024

	A1	A2	A	B	C	D	CEPI
Air Index	3.5	1	3.5	13.5	0	0	**17.00**
Water Index	2.50	1	2.50	34.25	10	0	**46.75**
Land Index	1.50	1	1.50	10.50	10	0	**22.00**
						Aggregated CEPI	**48.74**

Table 8.2 Comparison of CEPI Scores

	Air Index	Water Index	Land Index	CEPI
CEPI Score March 2024	17.00	46.75	22.00	**48.74**
CEPI Score June 2023	22.75	52.50	44.25	**57.28**
CEPI Score March 2023	32.50	52.50	42.80	**59.10**
CEPI Score June 2021	20.00	46.00	48.30	**53.10**
CEPI Score March 2021	33.30	46.00	27.00	**50.90**
CEPI score March 2020	50.00	32.80	37.80	**56.20**
CEPI score June 2019	36.30	43.30	40.60	**47.49**
CEPI score March 2019	35.50	42.70	38.50	**46.10**
CEPI score June 2018	39.00	31.00	41.30	**46.80**

CEPI score March 2018	26.98	31.81	30.10	**33.96**
CPCB CEPI score March 2018	56.50	60.00	42.00	**69.49**

The result shows that CEPI score of present report is 48.74 The present study is the compilation of post-monsoon season, which also affects the score value. This time CEPI score is observed lower than the CPCB CEPI score March 2018 which was 69.49.

CEPI score calculation:

Ambient Air Analysis Report

Pollutant	**Group**	**A1**	**A2**	**A (A1 X A2)**
CO	B	2	Limited	
PM10	B	0.5		
Benzene	C	1		
		3.5	**1**	**3.5**

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)**	
CO	2.02	2	1.01	3	8	0.38	M	13.5
PM10	70.13	100	0.70	0	8	0.00	L	0
Benzene	2.22	5	0.44	0	8	0.00	L	0
B score = (B1+B2+B3)							**B**	**13.5**

C	**0**	**>10 %**
D	**0**	**A-IA-A**

Air CEPI Score	**(A+B+C+D)**	**17.00**

Water Quality Analysis Report

Pollutant	**Group**	**A1**	**A2**	**A (A1 X A2)**
BOD	B	2	Limited	
Zn	A	0.25		
TDS	A	0.25		
		2.5	**1**	**2.5**

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)**	
BOD	35.20	8	4.40	3	5	2.64	C	30

Zn	0.52	0.3	1.73	1	5	0.35	M	4.25
TDS	499.60	2000	0.25	0	5	0.00	L	0
B score = (B1+B2+B3)							**B**	**34.25**

C	**10**	**>10%**
D	**0**	**A-IA-A**

Water CEPI Score	**(A+B+C+D)**	**46.75**

Ground Water Quality Analysis Report

Pollutant	**Group**	**A1**	**A2**	**A (A1 X A2)**
Fe	A	1	Limited	
F	A	0.25		
TDS	A	0.25		
		1.5	**1**	**1.5**

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	0.30	0.3	0.99	2	12	0.17	M	10.5
F	0.61	1.5	0.41	0	12	0.00	L	0
TDS	489.33	2000	0.24	0	12	0.00	L	0
B score = (B1+B2+B3)							**B**	**10.5**

C	**10**	**>10%**
D	**0**	**A-IA-A**

Land CEPI Score	**(A+B+C+D)**	**22.00**

Water CEPI Score (im) **46.75**

Land CEPI Score (i2) **22.00**

Air CEPI Score (i3) **17.00**

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 = **48.74**

10. Conclusion

Ambient Air Quality

- The AAQ stations were identified in the CEPI impact area to cover both upwind and crosswind directions and AAQ survey was conducted.
- All parameters are well within the limits as per NAAQS except three locations of MIDC Ambad.

Surface Water Quality

- Higher concentration of BOD and Total phosphates was observed in the surface water samples collected which may be due to increase in microbial activity, poor agricultural practices, leaking septic systems or discharges from sewage treatment plants.
- Total Kjeldahl Nitrogen also exceeded in most of the samples collected.
- All the industries in Nashik 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 Bore well in the region.
- Iron and Selenium also exceeded in few of the samples collected.

CEPI Score

- The CEPI Score Pre-monsoon season is 48.74.
- In comparison with the CEPI Score of June 2023, a decrease in the Air Index, Water Index and Land Index is observed in the present study.
- The present study is the compilation of Post-monsoon season, which shows an decease in health impact of Ambient Air, hence resulted in lower CEPI score in comparison to the previous year.

11. Efforts taken by MPCB to control and reduce Environmental Pollution Index

- Drive against open burning of biomass, crop residue, garbage, leaves, etc.: Directions issued by Board to ULB for not to allow open burning.
- **Organic Waste Compost machines**: 08 machines are installed.
- **Waste collection and segregation centers**:
  - ✓ **Domestic Solid Waste**: NMC has provided on site waste collection and segregation facility for residential area.
  - ✓ **Industrial Non Hazardous waste**: Recyclable waste is sent to authorized waste recyclers and other waste collected by corporations.
  - ✓ **Hazardous Waste:** Industrial hazardous waste sent to common hazardous treatment and disposal facility by industries.
- **Construction of Common Effluent Treatment plant (CETP)**: Yet not established proposal under consideration.
- **Installation of CEMS installed for Air and Water in Large and Medium scale RED category industries**: 04 no.
- Arrangement of scientific collection and treatment of sewage generated: Nashik Municipal Corporation has provided Sewage network and collection system in residential area and provided Sewage 11 number of STP.
- Installation of CAAQMS station: 04 stations
- Establishment of Monitoring stations under National Water Quality Monitoring Programme (NWMP) are 10.
- Steps are taken for industrial area/other units to recycle 100% treated effluent to achieve zero liquid discharge (ZLD): Directions were issued to the unit to provide ZLD and use 100% treated water for the secondary purpose. About 110 units have been provided by ZLD system.
- Steps taken to reduce dust emission:
  1. Conservation of traditional crematorium to electric based technology and three are converted to electricity and solar power.
  2. Conversion 100% city transport bus in to CNG. At present 120 buses are in operation.
  3. Conversion of Auto into PNG and CNG based fuel.
  4. The industries have changed their fuel F.O. to low Sulphur fuel and Green fuel like LPG, PNG and Electricity.
  5. Regular cleaning of roads and traffic diversions and signals shall be installed by the corporation.
  6. Road swiping machine provided.
- Tree plantation in last one year (2021-2022): 8000 nos.
- Other initiatives taken to control and reduce pollution in air, surface water and ground water in last one year (2021-2022):
  a) Presently 04 CAAQM stations are installed at 1. KTHM College, Nashik 2. Guru Govind Singh Collage, Pathardi, Nashik 3. AIIMA Ambad, Nashik 4. Swargiya Sadashiv Gngaram Bhore Natyagruhu Hirawadi, Nashik and 4 manual stations at 1. Old NMC Building, Main Road, Nashik

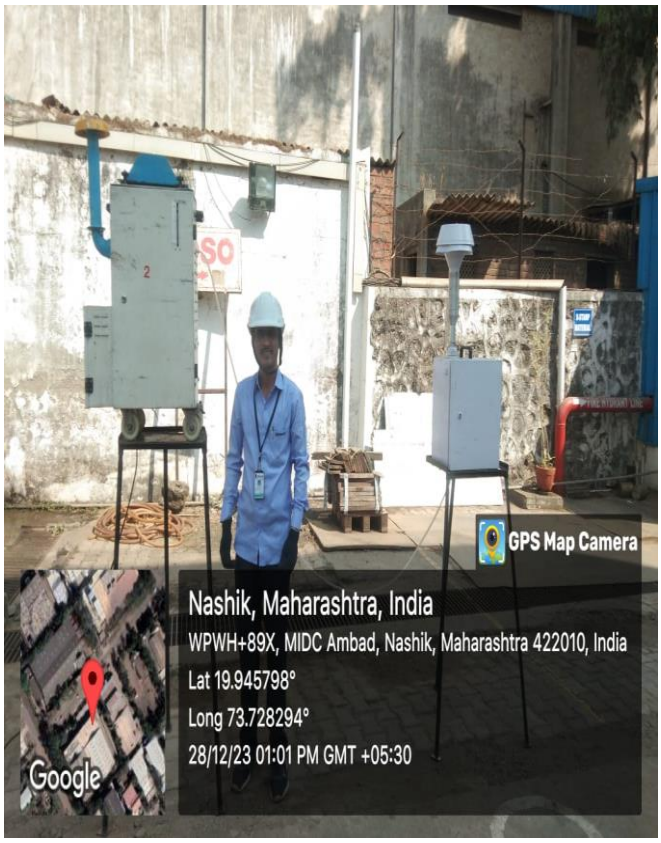
2. RTO Office old, Sharanpur Road 3. VIP Industries Ltd. MIDC Satpur and 4. Udyog Bhavan, ITI Signal, Nashik. As per the population criteria proposed 4 locations of CAAQMS are installed and are in operation for monitoring of air quality.

b) The ZP has installed three STP (in-situ nalla) treatments at four village and waste work on other villages is in progress.
c) A clean up drive of Darna River back water and collection of plastic waste from river.
d) Public awareness campaign on the Godavari River pollution control.
e) Clean up drive in MIDC Satpur.
f) Tree Plantation drive in MIDC Ambad.

Continuous Ambient Air Quality Monitoring Station

Ambient Air Quality Monitoring Van

12. Photographs



MIDC Ambad - Ambient Air Sampling Near Koso India

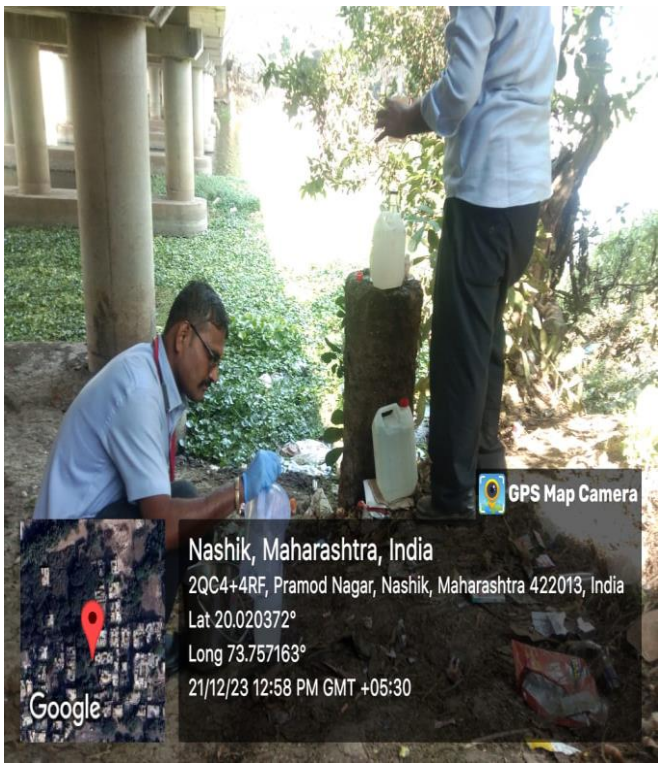
MIDC Ambad - Ambient Air Sampling Near Siemens India Limited

MIDC Ambad - Ambient Air Sampling Near Gemini Instratech Ltd.

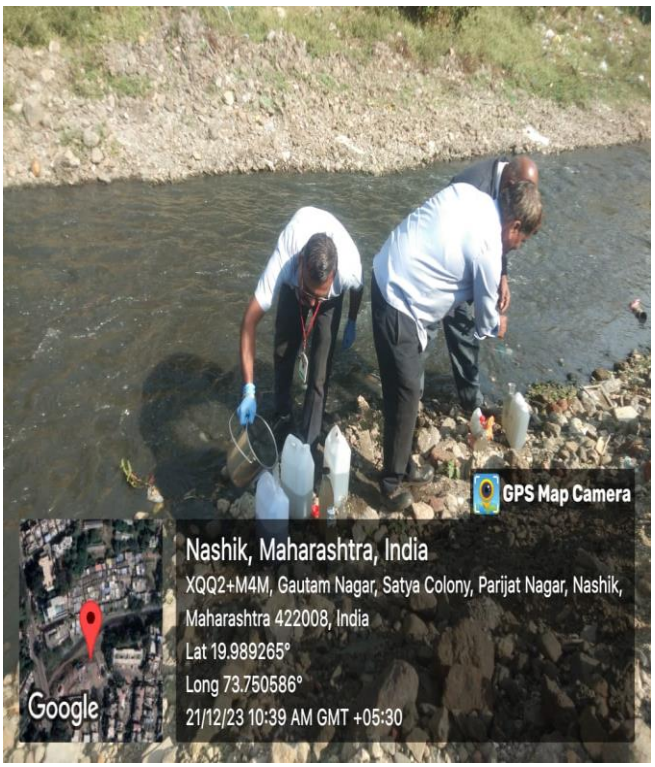
MIDC Satpur - Ambient Air Sampling Near Mahindra & Mahindra Ltd. P-I

MIDC Satpur - Ambient Air Sampling Near Bosch Ltd.

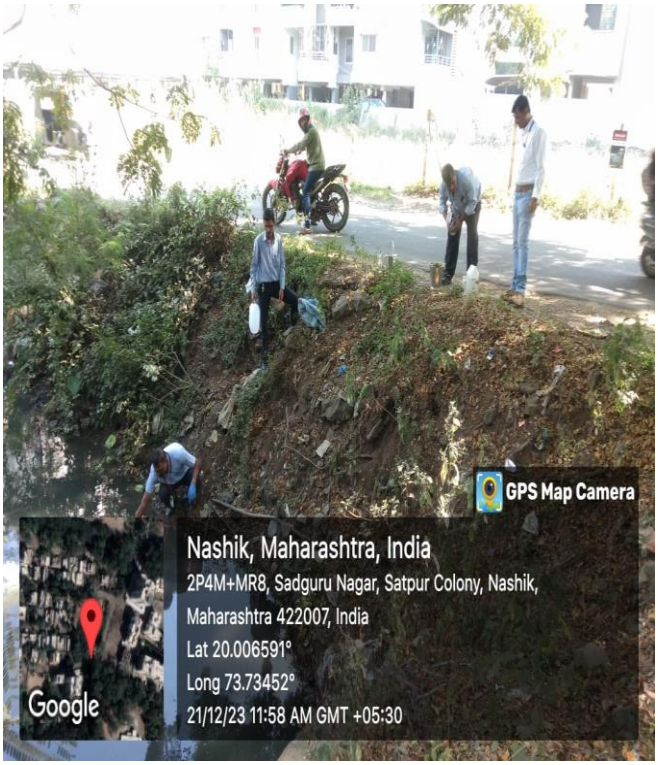
MIDC Satpur - Ambient Air Sampling Near ESDS Software Solution Ltd.



MIDC Satpur – Surface water Sampling Sahid Arun Chittee Pool, Anandvalil Gangapur Road



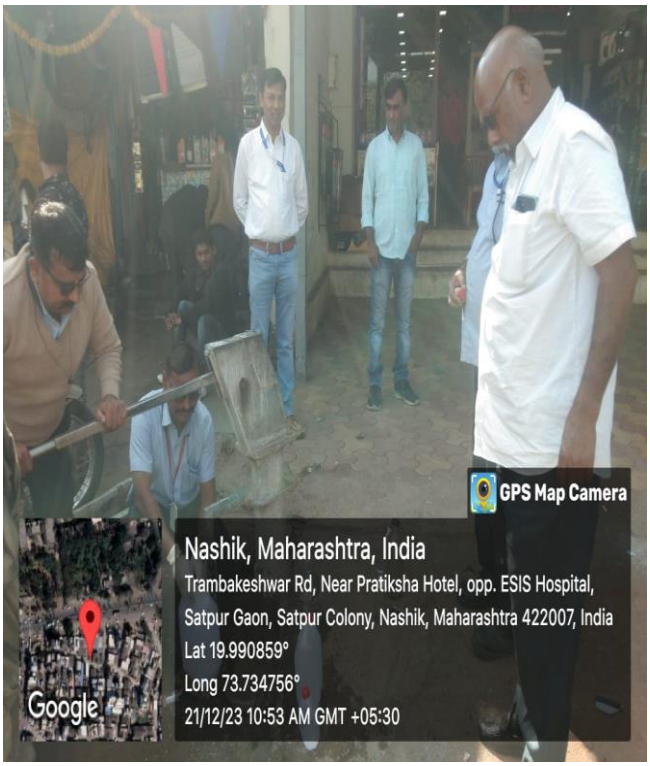
MIDC Satpur – Surface water Sampling Nasardi Pool, Near EPF Office



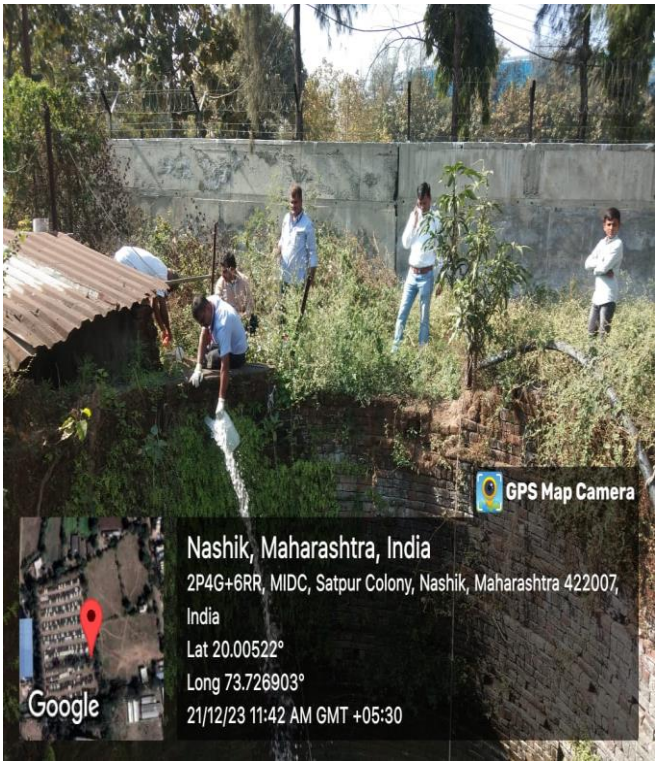
MIDC Satpur – Surface water Sampling ALP industry Opposite side Nalla

MIDC Ambad – Ground water Sampling Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)

MIDC Ambad – Ground water Sampling Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)



MIDC Satpur – Ground water Sampling Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)

	
MIDC Satpur – Ground water Sampling Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	**MIDC Satpur – Ground water Sampling Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water)**

Annexure – I Health Related Data

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Pre-monsoon Season (December-2023-February 2024) Study by Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	NASHIK
Name of the major health center/ organization	Civil Hospital
Name and designation of the Contact person	Asst.Civil Surgon
Address	Dist. Hospital Trimbak Road Nashik

S No.	Diseases	No. of Patients Reported	
		Year 2021-2022	Year 2022-2023
AIRBORNE DISEASES			
1.	Asthma	1981	1772
2.	Acute Respiratory Infection	2271	1069
3.	Bronchitis	2429	2241
4.	Cancer	–	–
WATERBORNE DISEASES			
1.	Gastroenteritis	248	766
2.	Diarrhea	307	810
3.	Renal diseases	91	168
4.	Cancer	–	–

Date:

Signature

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Pre-monsoon Season (December-2023-February 2024) Study by Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	NASHIK
Name of the major health center/ organization	Employees' State Insurance Scheme Hospital
Name and designation of the Contact person	
Address	Trimbak Road, Satpur

S No.	Diseases	No. of Patients Reported	
		Year 2021-2022	Year 2022-2023
AIRBORNE DISEASES			
1.	Asthma	24	42
2.	Acute Respiratory Infection	75	319
3.	Bronchitis	51	87
4.	Cancer	2	4
WATERBORNE DISEASES			
1.	Gastroenteritis	146	347
2.	Diarrhea	–	–
3.	Renal diseases	143	183
4.	Cancer	8	10

Date: 05/02/2024

Signature

वैद्यकीय अधिक्षक
महाराष्ट्र राज्य कामगार विमा सोसायटी
रुग्णालय नाशिक सातपुर-७

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Pre-monsoon Season (December-2023-February 2024) Study by Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	**NASHIK**
Name of the major health center/ organization	**Life Care Super Speciality Hospital**
Name and designation of the Contact person	
Address	**Lekha nagar, CIDCO -Nashik**

S No.	Diseases	No. of Patients Reported	
		Year 2021-2022	Year 2022-2023
AIRBORNE DISEASES			
1.	Asthma	52	16
2.	Acute Respiratory Infection	89	22
3.	Bronchitis	34	12
4.	Cancer		
WATERBORNE DISEASES			
1.	Gastroenteritis	150	222
2.	Diarrhea	124	156
3.	Renal diseases CKD / Dialysis	18 / 3600	24 / 4500
4.	Cancer Surgery / chemo	8 / 196	12 / 356

Date: 07/03/2024

Signature

Life Care Hospital Lekha Nagar Nashik-9 Reg. No.491