



ENVIRONMENTAL MONITORING SUMMARY REPORT MAY 2026

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REPORT COMPILED & PREPARED BY:



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1.0 Ambient Air Monitoring:

Table 1. Monthly average values of Air Quality parameters at various stations in JNP Area during May., 2026.

Parameters		Port (Port Operation) Area								Residential area	Eco Sensitive area
	NAAQS	IMC	NSFT-NG	SEZ	APM	BMCT	NSDT-CB	DP World	BPCL	RC	EC
PM ₁₀	100	106.61	101.25	92.95	100.04	101.40	105.93	101.39	103.91	92.13	64.55
PM _{2.5}	60	46.01	44.21	43.94	49.37	48.59	45.05	46.38	44.50	43.15	34.24
SO ₂	80	28.35	22.36	17.02	19.09	26.28	27.05	23.47	25.85	15.03	11.61
NO ₂	80	40.59	35.06	29.84	30.44	26.49	33.22	30.67	33.15	26.36	17.12
NH ₃	400	45.45	24.48	41.61	29.82	21.54	30.14	25.81	21.38	18.65	10.38
O ₃	100	55.57	54.51	52.46	55.57	56.51	54.06	55.53	55.20	46.16	49.30
Pb	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
As	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ni	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
C ₆ H ₆	5	2.67	1.71	1.64	1.57	1.40	1.54	2.04	1.78	1.43	1.12
B(a)P	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CO	4	1.52	1.12	0.87	1.03	0.73	0.83	0.53	0.82	0.76	0.91
AQI		104.00	101.00	93.00	100.00	101.00	104.00	101.00	103.00	92.00	65.00

Date	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	C ₆ H ₆	CO	C ₇ H ₈	NO	NO _x	AQI
	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	Remarks:
NAAQS	100	60	80	80	400	100	5	2	--	--	--	
Average MAY, 2026	80.89	35.99	0.50	25.24	20.84	38.42	0.49	0.26	0.47	5.74	30.98	81.00

IMC - Indian Molasses Company, NSFT-NGC –Nhava Sheva Free Port Terminal- North Gate Complex, SEZ Special Economic Zone, APM- A.P. Moller, BMCT- Bharat Mumbai Container Terminals, NSDT CB- Nhava Sheva Distribution Terminal-Coastal Berth, DP World - Dubai Ports International, BPCL- Bharat Petroleum Corporation Limited, RC- Residential Complex, EC- Elephanta Caves

Conclusion:

- Ambient air quality monitoring conducted across Port Operational Areas, Residential Areas, and the Eco-Sensitive Area indicated stable atmospheric conditions throughout the study period. Sulphur Dioxide (SO₂) concentrations ranged from 11.61 to 28.35 µg/m³, while Nitrogen Dioxide (NO₂) concentrations varied between 17.12 and 40.59 µg/m³, remaining well within the National Ambient Air Quality Standards (NAAQS). Ammonia (NH₃) concentrations ranged from 10.38 to 45.45 µg/m³ and Ozone (O₃) concentrations varied between 46.16 and 56.51 µg/m³. The observed values indicate balanced atmospheric conditions and effective dispersion of gaseous pollutants across the monitored locations.
- Particulate matter concentrations exhibited moderate spatial variation across the monitoring network. PM₁₀ concentrations ranged from 64.55 to 106.61 µg/m³, while PM_{2.5} concentrations varied between 34.24 and 49.37 µg/m³. Lower particulate concentrations were observed at the Eco-Sensitive Area compared to operational locations, reflecting the influence of distance from activity zones and the presence of natural vegetation cover. The distribution pattern of particulate matter indicates effective dust management measures and controlled emission conditions within the monitored region.
- Trace pollutants including Lead (Pb), Arsenic (As), Nickel (Ni), and Benzo(a)Pyrene [B(a)P] were recorded below detectable limits at all monitoring stations. The absence of measurable concentrations of these parameters demonstrates minimal accumulation of hazardous air contaminants within the study area. The results reflect the effectiveness of pollution control measures and environmental management practices implemented across the monitored locations.
- Carbon Monoxide (CO) concentrations ranged from 0.53 to 1.52 mg/m³, while Benzene (C₆H₆) concentrations varied between 1.12 and 2.67 µg/m³, both remaining significantly below the prescribed standards. These observations indicate controlled combustion-related emissions and efficient management of vehicular and operational activities. The recorded concentrations suggest that atmospheric pollutant levels remained well regulated during the monitoring period.

- Air Quality Index (AQI) values ranged from 65 to 104 across all monitoring stations. The lowest AQI value was recorded at the Eco-Sensitive Area (EC), while values at port operational and residential locations remained within the satisfactory to moderate category. The observed AQI pattern demonstrates good air quality conditions across the region and indicates that environmental protection measures are effectively supporting public health, ecological integrity, and ambient environmental quality.

Solution towards the Green port:

- Implement shore power (cold ironing) to reduce ship emissions at berth.
- Promote use of cleaner fuels like LNG or biofuels in port operations.
- Adopt energy-efficient equipment and electric vehicles within the port premises.
- Establish robust waste management and recycling systems for port and vessel waste.
- Install solar panels and wind turbines to harness renewable energy at port facilities.
- Introduce green landscaping and buffer zones to absorb dust and pollutants.
- Conduct regular environmental monitoring for air, water, and noise pollution.
- Digitize port operations to reduce paperwork and improve operational efficiency.
- Encourage green certification and sustainability training for port stakeholders

2.0 Marine Water Quality:

Observed concentration ranges of Marine Water for various parameters for JNP area during tidal cycle (For May., 2026.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	°C	26.77 - 32.49	
2	pH	-	7.16 - 7.56	6.5 - 9.0
3	Salinity	ppt	33.44 - 36.87	

4	Turbidity	NTU	22.1 - 44.2	
5	TDS	mg/L	25779 - 26780	-
6	TSS	mg/L	263 - 344	-
7	TS	mg/L	29713 - 30736	-
8	DO	mg/L	3.38 - 4.94	3.0 mg/L(min.) or 40% of saturation value
9	COD	mg/L	35.2 - 86.8	-
10	BOD	mg/L	1.26 - 2.91	5 (max.)
11	NH ₃ -N	mg/L	0.0108 - 0.0296	-
12	Phenol	mg/L	0.012 - 0.035	-
13	Oil & Grease	mg/L	0.121 - 0.874	10 (max.)
14	Total Plate Count	CFU/ml	186 - 388	-
15	Fecal Coliforms	MPN/100ml	105 - 320	500 (max.)

The marine water quality assessment indicated stable physio-chemical and microbiological conditions across the monitored locations. Water temperature ranged from 26.77°C to 32.49°C, while pH values varied between 7.16 and 7.56, remaining within the prescribed limit of 6.5–9.0. Salinity ranged from 33.44 ppt to 36.87 ppt, reflecting typical marine water characteristics. Dissolved Oxygen concentrations varied from 3.38 mg/L to 4.94 mg/L, remaining above the prescribed minimum limit of 3.0 mg/L, while Biochemical Oxygen Demand ranged from 1.26 mg/L to 2.91 mg/L, well below the prescribed limit of 5 mg/L. Turbidity values ranged from 22.1 to 44.2 NTU, and Total Dissolved Solids, Total Suspended Solids, and Total Solids ranged from 25,779–26,780 mg/L, 263–344 mg/L, and 29,713–30,736 mg/L, respectively. Nutrient-related parameters such as NH₃-N (0.0108–0.0296 mg/L) and

Phenol (0.012–0.035 mg/L) were recorded at low concentrations, while Oil and Grease levels ranged from 0.121 to 0.874 mg/L, remaining substantially below the prescribed limit of 10 mg/L. Total Plate Count varied from 186 to 388 CFU/ml and Fecal Coliform counts ranged from 105 to 320 MPN/100 ml, remaining below the prescribed limit of 500 MPN/100 ml. The observed results indicate a healthy marine environment with adequate dissolved oxygen, low organic loading, and acceptable microbiological quality capable of supporting aquatic ecological functions.

3.0 Continuous Marine Water Quality Monitoring;

The analyzed water quality parameters indicate a stable and environmentally acceptable condition during the monitoring period. Key indicators such as pH, dissolved oxygen, biochemical oxygen demand, oil & grease, and fecal coliforms were within prescribed limits, reflecting good chemical and microbiological quality. Temperature, salinity, solids, and turbidity values showed natural variation consistent with coastal or saline water characteristics rather than abnormal disturbance. Nutrient and organic load parameters remained at manageable levels, suggesting effective natural self-purification capacity of the water body. Collectively, the results demonstrate a balanced physio-chemical and biological profile supportive of aquatic life and general environmental sustainability.

3.1 Marine Ecology (Flora and Fauna):

Sr. No.	Parameter	Observed Range	Criteria
1	Net Primary Productivity	42.74 – 51.28 mgC/m ³ /day	<1500 mg C/m ³ /day at surface
2	Chlorophyll A	0.8796 – 1.6815 mg/m ³	<4 mg/m ³ (Oligotrophic class),
			4-10 mg/m ³ (Mesotrophic class),
		79.21 – 91.12 µg /L 434.18 – 494.18 µg/L	>10 mg/m ³ (Eutrophic class)

3	Phosphate	μg 52.5 – 69	0.1-90 $\mu\text{g/L}$
4	Nitrate	/L	1.0-500 $\mu\text{g/L}$
5	Nitrite	33.94 – 48.28 mg/m^3	<125 $\mu\text{g/L}$
6	Particulate Organic Carbon	28.26 – 64.42 $\mu\text{g/L}$	10-100 mg/m^3
7	Silicate	42.74 – 51.28 $\text{mgC/m}^3/\text{day}$	10-5000 $\mu\text{g/L}$

The marine productivity assessment indicated active biological productivity and a balanced nutrient environment within the study area. Net Primary Productivity (NPP) ranged from 42.74 to 51.28 $\text{mgC/m}^3/\text{day}$, remaining substantially below the criterion value of 1500 $\text{mgC/m}^3/\text{day}$, reflecting stable primary production conditions. Chlorophyll-a concentrations varied from 0.8796 to 1.6815 mg/m^3 , placing the study area within the oligotrophic category (<4 mg/m^3), which is indicative of low to moderate algal biomass and balanced ecological conditions. Phosphate concentrations ranged from 52.5 to 69 $\mu\text{g/L}$, nitrate concentrations from 434.18 to 494.18 $\mu\text{g/L}$, and nitrite concentrations from 33.94 to 48.28 $\mu\text{g/L}$, remaining within the applicable assessment criteria and providing essential nutrients required for phytoplankton growth. Particulate Organic Carbon (POC) concentrations ranged from 28.26 to 64.42 mg/m^3 , falling within the expected range of 10–100 mg/m^3 and indicating the availability of organic matter supporting the aquatic food web. Silicate concentrations ranged from 42.74 to 51.28 $\mu\text{g/L}$, demonstrating the presence of nutrients necessary for sustaining diatom productivity. The observed productivity and nutrient characteristics reflect a biologically active marine ecosystem with stable ecological functioning and continued support for marine life.

4.0 Drinking Water Quality:

Summary Table for JNPA Drinking Water Locations.

Sr. No.	Parameter	Unit	Observed Range (DW1–DW22)
1	Colour	Hazen	Colourless
2	Odour	-	Odourless
3	pH	pH unit	7.01 – 7.32
4	Turbidity	NTU	0.1 – 0.8
5	Total Dissolved Solids	mg/l	8 – 36
6	Aluminium as Al	mg/l	0.0034 – 0.0082
7	NH ₃ -N	mg/l	0.0002 – 0.0026
8	Barium as Ba	mg/l	0.0133 – 0.4950
9	Calcium as Ca	mg/l	6.21 – 9.87
10	Chloride as Cl	mg/l	12 – 18
11	Copper as Cu	mg/l	0.0001 – 0.0008
12	Free Residual Chlorine	mg/l	<0.1
13	Iron as Fe	mg/l	0.0014 – 0.0083
14	Magnesium as Mg	mg/l	1.92 – 2.68
15	Manganese as Mn	mg/l	0.0001 – 0.0028
16	Oil & Grease	mg/l	0.003 – 0.009
17	Nitrate as NO ₃	mg/l	0.478 – 1.987
18	Selenium as Se	mg/l	0.0004 – 0.0005
19	Silver as Ag	mg/l	0.0001 – 0.0009
20	Sulphate as SO ₄	mg/l	3.49 – 5.01
21	Total Alkalinity as CaCO ₃	mg/l	22 – 46

22	Total Hardness as CaCO ₃	mg/l	20 – 40
23	Fluoride	mg/l	0.635 – 0.788
24	Phenolic Compounds	mg/l	0.002 – 0.004
25	Zinc as Zn	mg/l	0.0042 – 0.2794
26	Lead as Pb	mg/l	0.0015 – 0.0098
27	Mercury as Hg	mg/l	0.0001 – 0.0041
28	Molybdenum	mg/l	0.0208 – 0.0349
29	Nickel as Ni	mg/l	0.0001 – 0.0037
30	Total Arsenic as As	mg/l	0.0005 – 0.0110
31	Total Chromium as Cr	mg/l	0.0011 – 0.0090
32	Total Coliform	-	Absent
33	E-coli	-	Absent

The drinking water quality monitoring conducted at 22 locations (DW1–DW22) indicated consistent physio-chemical and microbiological characteristics across the study area. All samples were colorless and odorless, while pH values ranged from 7.01 to 7.32, indicating near-neutral water conditions. Turbidity remained low, varying from 0.1 to 0.8 NTU, and Total Dissolved Solids ranged from 8 to 36 mg/l, reflecting low dissolved mineral content. Major ions such as calcium (6.21–9.87 mg/l), magnesium (1.92–2.68 mg/l), chloride (12–18 mg/l), sulphate (3.49–5.01 mg/l), alkalinity (22–46 mg/l), hardness (20–40 mg/l), and fluoride (0.635–0.788 mg/l) were recorded at low concentrations. Nutrient parameters including NH₃-N (0.0002–0.0026 mg/l) and nitrate (0.478–1.987 mg/l) remained at minimal levels, while oil and grease concentrations varied from 0.003 to 0.009 mg/l. Trace elements such as aluminum, iron, manganese, copper, zinc, nickel, chromium, arsenic, lead, mercury, selenium, silver, and molybdenum were present in low concentrations throughout the monitoring locations. Microbiological analysis showed the absence of Total Coliforms and *E. coli* in all samples, indicating good sanitary quality of the

drinking water. The observed results demonstrate stable drinking water quality and suitability for potable use.

5.0 Monitoring Performance of Sewage Treatment Plant

The performance evaluation of the Sewage Treatment Plants (STPs) at JNPA Township and POC during May 2026 demonstrated efficient wastewater treatment and substantial improvement in effluent quality. At JNPA Township, Total Suspended Solids (TSS) decreased from 205 mg/L to 30 mg/L, Chemical Oxygen Demand (COD) from 286 mg/L to 121 mg/L, and Biochemical Oxygen Demand (BOD) from 114 mg/L to 26 mg/L, while at POC, TSS decreased from 158 mg/L to 29 mg/L, COD from 328 mg/L to 84 mg/L, and BOD from 158 mg/L to 26 mg/L. Significant reductions were also observed in oil and grease, sulphide, ammonia nitrogen, phenolic compounds, fluoride, and trace metals following treatment. The treated effluent from both STPs remained within the prescribed standards for all monitored parameters and was colourless and odourless. Furthermore, the bio-assay tests recorded 100% survival in treated effluent samples from both locations, indicating effective treatment performance and compliance with applicable discharge requirements