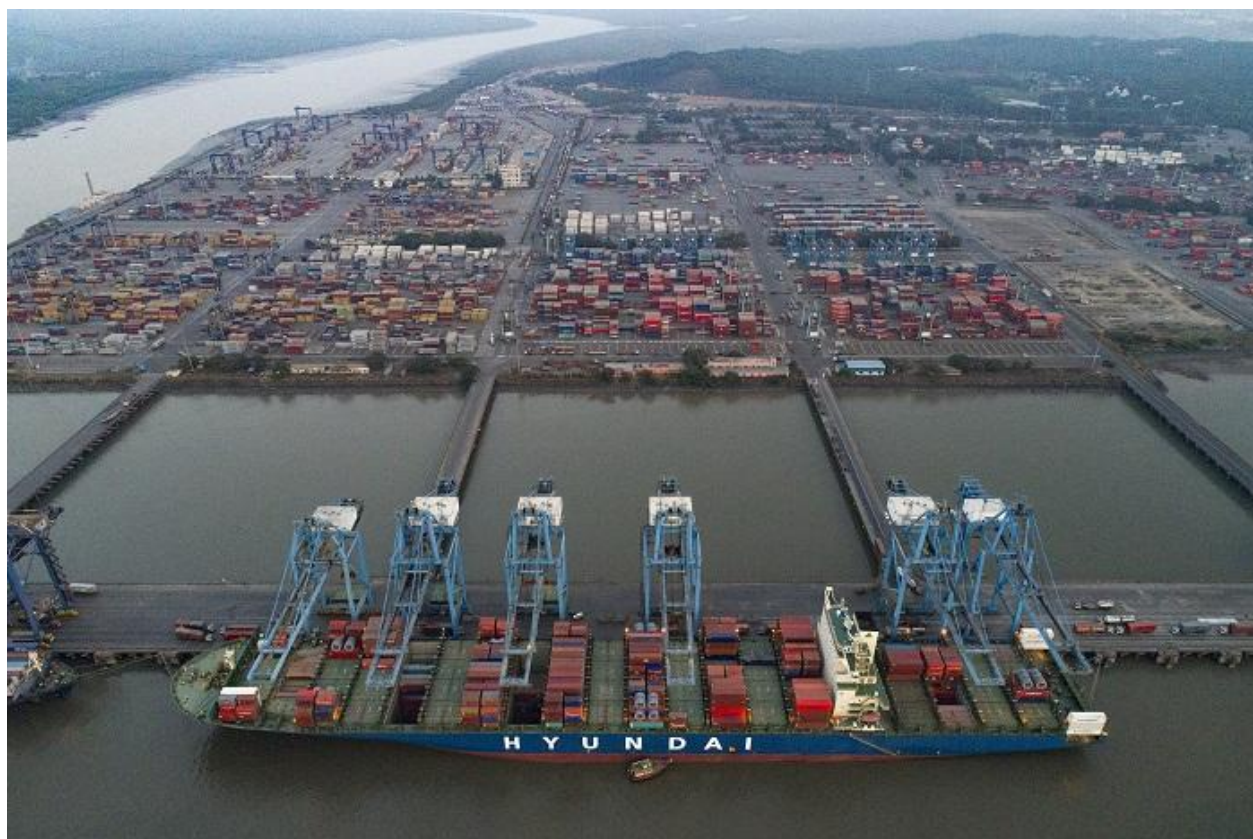




**MONITORING OF ENVIRONMENTAL PLAN FOR JN PORT
ENVIRONMENTAL MONITORING REPORT- Aug, 2025
EXECUTIVE SUMMARY**

REPORT NO: AEC/JNPA/Summary-08/Aug-25

MONTH & YEAR: Aug 2025

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NABL ACCREDITED LAB National Accreditation Board for Testing and Calibration Laboratories (NABL) (ISO/IEC 17025): Chemical, Biological & Mechanical disciplines (NABL certificate number: TC-5509).

1.0 Ambient Air Monitoring:

Table 1. Monthly average values of Air Quality parameters at various stations in JNP Area during Aug, 2025.

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	77.57	72.08	55.66	81.95	70.36	82.69	80.15	77.54	61.36	45.69
PM _{2.5}	60	24.20	27.43	23.12	29.06	25.11	22.94	34.88	29.08	21.43	15.85
SO ₂	80	33.72	12.95	12.78	17.13	13.60	13.87	10.22	26.25	6.62	4.28
NO ₂	80	53.88	32.83	21.51	23.84	34.23	35.06	41.36	31.32	15.42	13.09
NH ₃	400	26.88	24.99	20.91	24.52	31.40	20.99	19.36	20.21	17.52	12.415
O ₃	100	37.47	23.15	11.33	14.09	32.53	10.43	15.39	24.50	14.48	10.02
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	2.16	2.17	1.48	1.74	2.13	1.96	1.18	1.07	1.04	1.52
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	0.78	0.62	0.75	0.84	0.79	0.85	0.87	1.31	0.54	0.16
AQI		78.00	72.00	56.00	82.00	70.00	83.00	80.00	78.00	61.00	46.00

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 August 2025	41.97	18.02	0.50	19.34	6.47	7.11	0.56	0.18	0.67	11.55	30.89	42.00

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:

- The monitoring results across all study locations indicate that air quality is mostly within the prescribed National Ambient Air Quality Standards (NAAQS). Both particulate matter (PM₁₀ and PM_{2.5}) and gaseous pollutants were maintained at safe levels across port, residential, and eco-sensitive zones. These results show that effective control and mitigation measures are in place. SO₂ and NO₂ values, usually linked with fuel burning, were found to be well within permissible limits. This reflects a healthy balance between Port activity and environmental safety. Overall, the monitoring shows a stable air quality trend across all areas.
- Heavy metals such as lead (Pb), arsenic (As), and nickel (Ni) were consistently below detectable limits at all stations. This is an encouraging finding, as these pollutants can cause serious long-term health risks if present. Their absence indicates strict compliance with emission standards and proper Port controls. Such results also suggest that port are following clean fuel and advanced emission management practices. The lack of heavy metal contamination also reduces the chances of soil and water pollution from deposition. This highlights strong environmental responsibility within the region.
- The Air Quality Index (AQI) values for all sites were mainly in the “Good” to “Satisfactory” range. Operational areas had slightly higher AQI compared to residential and sensitive zones, but still well within safe levels. Importantly, none of the sites showed AQI values in the “Moderate” or “Unhealthy” category. This proves that Port and port-related activities are being managed efficiently. AQI scores ranging between 46 and 83 confirm an acceptable level of air quality. The results are positive for both community well-being and ecological health.
- Residential and eco-sensitive areas showed comparatively lower concentrations of PM₁₀, PM_{2.5}, and gaseous pollutants than the port operation zones. This indicates that protective measures such as green buffers and zoning regulations are working effectively. Lower pollution levels in these locations reduce risks to human health and protect natural ecosystems. Eco-sensitive areas, in particular, recorded some of the best results, showing a commitment to preserving biodiversity. Residential zones also reflected safe and comfortable living conditions. These results demonstrate successful pollution control at the community level.
- Overall, the study findings confirm that air quality across the port and surrounding areas is under proper control. The consistent compliance with NAAQS shows that authorities are maintaining strict monitoring and preventive action. Port development and environmental care are being balanced successfully in the region. Such outcomes provide confidence to local communities and stakeholders. The results also highlight the positive impact of ongoing

environmental management practices. In conclusion, the air quality status is both safe and sustainable for the present scenario.

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 Aug, 2025.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	°C	26.0 -27.8	
2	pH	-	7.03 - 7.98	6.5 - 9.0
3	Salinity	ppt	12.25 - 24.68	
4	Turbidity	NTU	14.2 - 95.5	
5	TDS	mg/L	12278 - 42541	-
6	TSS	mg/L	92 - 242	-
7	TS	mg/L	12520 - 42756	-

8	DO	mg/L	3.15 - 4.72	3.0 mg/L(min.) or 40% of saturation value
9	COD	mg/L	40.52 - 69.26	-
10	BOD	mg/L	0.67 - 2.56	5 (max.)
11	NH ₃ -N	mg/L	0.0291 - 0.4153	-
12	Phenol	mg/L	0.01 - 0.034	-
13	Oil & Grease	mg/L	0.15 - 0.992	10 (max.)
14	Total Plate Count	CFU/ml	100 - 516	-
15	Fecal Coliforms	MPN/100ml	94.86 - 470.87	500 (max.)

The overall marine water quality assessment at JNPA indicates a healthy and sustainable aquatic environment, with most parameters well within prescribed limits. The pH levels (7.03–7.98) remained within the safe range of 6.5–9.0, ensuring a stable aquatic balance, while Dissolved Oxygen (3.15–4.72 mg/L) met the minimum requirement for aquatic life. Organic pollution indicators were highly favorable, with BOD (0.67–2.56 mg/L) significantly below the 5 mg/L limit and COD values (40.52–69.26 mg/L) reflecting controlled organic load. Oil and grease concentrations (0.15–0.992 mg/L) were far lower than the permissible 10 mg/L, and phenol levels (0.01–0.034 mg/L) also remained minimal, highlighting low Port contamination. Microbiological quality was satisfactory, with fecal coliforms (94.86–470.87 MPN/100ml) well within the limit of 500, indicating limited sewage influence, while total plate counts were moderate and non-alarming. Physical parameters such as temperature, salinity, turbidity, and total solids showed natural variation due to tidal and seasonal influence but did not pose any ecological stress. Collectively, the results confirm that JNPA's marine waters are maintained in good condition, demonstrating effective pollution control measures, compliance with environmental standards, and a strong balance between port operations and ecological protection.

3.0 Continuous Marine Water Quality Monitoring;

A Continuous Marine Water Quality Monitoring system was installed at the JNPA berth bridge location to monitor parameters such as Temperature, pH, Dissolved Oxygen, Ammonia, Conductivity, Nitrate, Salinity, Turbidity, and Total Dissolved Solids. These parameters are found satisfactory as per prescribed limits.

3.0 Marine Ecology (Flora and Fauna):

Sr. No.	Parameter	Observed Range	Criteria
1	Net Primary Productivity	The observed values falls under 35.00 -54.42 mgC/m ³ /day	<1500 mg C/m ³ /day at surface
2	Chlorophyll A	0.2189 – 1.7889 mg/m ³ 63.69 – 93.09 µg/L 642.84 – 992.85 µg/L	<4 mg/m ³ (Oligotrophic class), 4-10 mg/m ³ (Mesotrophic class), >10 mg/m ³ (Eutrophic class)
3	Phosphate	24.14 – 52.2 µg/L	0.1-90 µg/L
4	Nitrate	The observed values falls under 10.64-34.29 mg/m ³	1.0-500 µg/L
5	Nitrite	The observed values falls under 29.4 – 52.2 µg/L	<125 µg/ L
6	Particulate Organic Carbon	The observed values falls under 35.00 -54.42 mgC/m ³ /day	10-100 mg/m ³
7	Silicate	0.2189 – 1.7889 mg/m ³	10-5000 µg/L

The analysis of biological productivity and nutrient parameters at JNPA indicates favorable and balanced marine water conditions well within ecological criteria. Net Primary Productivity (35.00–54.42 mg C/m³/day) was found to be much lower than the threshold of 1500 mg C/m³/day, confirming that the waters are not under excessive nutrient enrichment. Chlorophyll-A values (0.2189–1.7889 mg/m³) place the waters in the oligotrophic category (<4 mg/m³), suggesting low nutrient concentrations and healthy, stable conditions without algal bloom risks. Phosphate (24.14–52.2 µg/L), nitrate (10.64–34.29 µg/L), and nitrite (29.4–52.2 µg/L) all fall within their respective permissible ranges, reflecting controlled nutrient levels and no signs of eutrophication. Similarly, particulate organic carbon (35.00–54.42 mg/m³)

lies well within the expected range of 10–100 mg/m³, indicating balanced organic matter levels. Silicate concentrations (0.2189–1.7889 mg/m³) also remain within natural limits, supporting phytoplankton growth without any excessive loading. Overall, the results confirm that JNPA marine waters are nutrient-balanced, biologically stable, and free from pollution-related enrichment, ensuring sustainable ecosystem functioning alongside port activities.

4.0 Drinking Water Quality:

The drinking water quality across all sampling stations is highly satisfactory and well within the IS 10500:2012 standards. The water was colourless, odourless, and clear, with low turbidity and stable pH values, reflecting its good acceptability. TDS, hardness, and essential minerals remained at desirable levels, ensuring both safety and palatability. Toxic heavy metals were either absent or detected in negligible amounts, far below the permissible limits. Most importantly, microbiological quality was excellent, with no presence of coliforms or E. coli. These results confirm that the water is safe, clean, and reliable for drinking and domestic use.

5.0 Monitoring Performance of Sewage Treatment Plant

The performance of the Township STP plant reflects a strong and efficient treatment process, with notable improvement across all key water quality parameters. The plant shows effective reduction in suspended solids and organic matter, ensuring that the treated water is much cleaner and safer for discharge. The substantial decrease in both oxygen-demanding substances and oil and grease highlights the plant's ability to maintain environmental quality. Overall, the treatment process is working well, demonstrating reliability and consistency in improving wastewater quality to meet regulatory standards.