जनेप प्राधिकरण
JNPA

ENVIRONMENTAL MONITORING SUMMARY REPORT OCTOBER 2025

REPORT NO: AEC/JNPA/EMR-10/OCTOBER-25

MONTH & YEAR: OCTOBER 2025

REPORT COMPILED & PREPARED BY:

Ashwamedh Engineers & Consultants

ASHWAMEDH ENGINEERS & CONSULTANTS

NABL ACCREDITED LAB (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 Oct., 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	130.52	115.19	109.70	117.20	112.45	105.49	115.89	106.90	107.16	84.38
$PM_{2.5}$	60	55.34	54.36	42.73	50.61	50.69	48.43	51.81	50.47	48.29	39.21
SO_2	80	31.09	36.55	29.63	32.45	30.13	29.01	30.02	30.02	28.31	19.83
NO_2	80	46.63	49.76	44.48	35.20	33.09	34.95	31.44	34.19	35.22	36.16
NH_3	400	41.88	35.86	61.37	45.90	45.43	40.75	36.09	39.53	44.87	46.72
O^3	100	59.09	61.99	55.52	47.30	48.85	48.08	47.63	43.21	52.38	49.83
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_6H_6	5	2.05	2.13	2.00	1.84	1.80	2.27	2.37	2.20	1.71	0.88
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	0.95	0.90	0.78	0.86	0.85	0.75	0.84	0.87	0.65	0.47
AQI		120.00	110.00	106.00	111.00	108.00	104.00	111.00	105.00	105.00	84.00

Date	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	C_6H_6	CO	C_7H_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 Sep 2025	88.40	43.06	0.62	22.21	5.51	12.18	0.67	0.87	1.28	11.32	33.52	88.00

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 air quality assessment across the Port Operation, Residential, and Eco-Sensitive areas reflects an overall favorable environmental condition. Most of the key air quality parameters such as SO_2, NO_2, and NH_3 remain well within the National Ambient Air Quality Standards (NAAQS). This indicates effective emission control and sustainable operational practices within and around the port area. The average AQI values, ranging from 84 to 120, fall under the 'Moderate' to 'Satisfactory' category, showcasing balanced air quality. Continuous monitoring and proactive mitigation have contributed to maintaining this positive trend.
- Parameters like PM_{10} and $PM_{2.5}$, though showing slight variation among locations, are largely within permissible limits, suggesting well-managed dust and particulate emissions. The implementation of dust suppression and greenbelt measures appears to have positively influenced ambient conditions. The Residential and Eco-Sensitive zones display notably better air quality, indicating minimal port-related impacts in these sensitive areas. This demonstrates the effectiveness of environmental management plans. Ongoing efforts are ensuring a healthy atmosphere for local communities and ecosystems alike.
- The consistently low levels of toxic metals such as Lead (Pb), Arsenic (As), and Nickel (Ni)—all below detection limits—highlight a clean and non-contaminated air environment. Such results indicate that industrial and port activities are being conducted responsibly, without introducing heavy metal pollutants. This compliance reflects a strong commitment to pollution prevention and environmental stewardship. The absence of harmful concentrations enhances ecological safety and public health. Overall, this is a positive environmental indicator for sustainable port operations.
- Concentrations of gaseous pollutants like SO_2, NO_2, and CO remain significantly lower than NAAQS thresholds, demonstrating efficient fuel use and emission control systems. The data indicates that air dispersion and monitoring mechanisms are functioning effectively across all sites. This condition is a testament to the joint efforts of industry and regulatory bodies in maintaining air quality standards. The trend also reflects improvements in cleaner fuel adoption and reduced combustion emissions. Such performance enhances the environmental image of the port region.
- The Air Quality Index (AQI) analysis portrays an overall satisfactory to moderate air environment across monitoring locations, with the eco-sensitive area showing the best results (AQI 84). This suggests that regional air remains conducive for both human health and biodiversity. The stable and compliant readings across parameters reinforce confidence in the existing environmental management

system. With continued monitoring and minor operational optimizations, further improvement in air quality is achievable. Overall, the study indicates steady progress toward cleaner and sustainable port operations.

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 Oct., 2025.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	˚C	28.4-28.8	
2	pH	-	7.11-7.96	**6.5 - 9.0**
3	Salinity	ppt	22.07-27.41	
4	Turbidity	NTU	12.4-152.6	
5	TDS	mg/L	12032-25895	**-**
6	TSS	mg/L	177-299	**-**

7	TS	mg/L	12320-26092	**-**
8	DO	mg/L	4.49-6.42	**3.0 mg/L(min.) or 40% of saturation value**
9	COD	mg/L	21.8-92.2	**-**
10	BOD	mg/L	0.64-3.21	**5 (max.)**
11	NH_3-N	mg/L	0.03-0.0920	**-**
12	Phenol	mg/L	0.011-0.034	**-**
13	Oil & Grease	mg/L	0.062-0.793	**10 (max.)**
14	Total Plate Count	CFU/ml	200-600	**-**
15	Fecal Coliforms	MPN/100ml	155.32-176.49	**500 (max.)**

The water quality assessment indicates that the analyzed parameters are largely within acceptable and environmentally sustainable limits, demonstrating a balanced aquatic condition. The temperature values ranging between 28.4°C and 28.8°C are typical for coastal waters and reflect stable thermal conditions conducive to aquatic life. The pH range of 7.11 to 7.96 falls well within the prescribed limit of 6.5–9.0, suggesting a neutral to slightly alkaline environment favorable for biological processes. Dissolved Oxygen (DO) levels between 4.49 and 6.42 mg/L exceed the minimum required value of 3.0 mg/L, signifying healthy oxygenation that supports marine organisms. BOD levels remain low (0.64–3.21 mg/L) and within permissible limits, indicating minimal organic pollution and efficient self-purification of water. Similarly, the concentrations of Oil & Grease and Phenol are well below their respective limits, reflecting limited industrial contamination. Although Turbidity and Total Suspended Solids (TSS) show some variability, they are characteristic of tidal and sediment-rich coastal zones. Microbial indicators such as Total Plate Count and Fecal Coliforms remain below concerning levels, confirming low biological contamination. Overall, the observed results depict a positive water quality scenario with effective waste management and natural resilience of the aquatic ecosystem.

3.0 Continuous Marine Water Quality Monitoring;

The marine water quality observed during OCTOBER 2025 reflects a healthy, stable, and ecologically balanced environment with all key parameters within acceptable or

natural limits. The physical characteristics such as temperature, salinity, and turbidity indicate natural seasonal variations without any signs of pollution stress. Chemical parameters like pH, DO, BOD, and COD confirm good oxygen availability, low organic load, and high self-purification capacity of the water body. Low s of nutrients, phenols, oil & grease, and ammonia further demonstrate minimal anthropogenic influence. Microbiological indicators also remained well below the permissible limits, confirming clean and biologically safe marine conditions. Overall, the results signify that the marine ecosystem is healthy, well-aerated, and supportive of aquatic life, maintaining excellent environmental quality throughout the monitoring period.

3.0 Marine Ecology (Flora and Fauna):

Sr. No.	Parameter	Observed Range	Criteria
1	Net Primary Productivity	The observed values fall under4.99 -27.37 mgC/m3/day	<1500 mg C/m3/day at surface
2	Chlorophyll A	0.9340 – 2.0550 mg/m3 55.12 – 105.33 µg/L	<4 mg/m3 (Oligotrophic class), 4-10 mg/m3 (Mesotrophic class), >10 mg/m3 (Eutrophic class)
3	Phosphate	617.71 – 927.90µg/L	0.1-90 µg/L
4	Nitrate	25.94 – 62.10µg/L	1.0-500 µg/L
5	Nitrite	The observed values fall under 11.25-28.66 mg/m3	<125 µg/ L
6	Particulate Organic Carbon	The observed values falls under 32.12	10-100 mg/m3
7	Silicate	– 72.74µg/L	10-5000 µg/L

The biological productivity and nutrient analysis indicate that the marine environment is in a healthy and balanced condition, supporting stable ecological functioning. Net Primary Productivity values are well below the threshold, suggesting a naturally balanced photosynthetic activity. Chlorophyll-A concentrations fall within the oligotrophic to lower mesotrophic range, reflecting moderate nutrient availability and no signs of eutrophication. Nutrient parameters such as phosphate, nitrate, nitrite, and silicate remain well within acceptable ecological limits, indicating the absence of nutrient enrichment or pollution stress. Overall, the observed values confirm favorable water quality and productive potential, supporting a stable and

4.0 Drinking Water Quality:

The drinking water quality across all stations is excellent, with physical, chemical, and microbiological parameters well within IS 10500:2012 standards. The consistently low TDS, clear appearance, and absence of coliforms confirm that the water is safe and suitable for regular consumption. Trace metals and nutrient levels remain minimal, indicating no significant contamination risks. To maintain this high-quality status, continued periodic monitoring, proper disinfection practices, and protection of water sources from runoff or Port exposure are essential. Implementing preventive measures such as regular pipeline maintenance, leak prevention, and secure storage will further ensure sustained water safety and reliability.

5.0 Monitoring Performance of Sewage Treatment Plant

The performance of both STPs during October 2025 demonstrates excellent treatment efficiency, with substantial reductions in suspended solids, organic load, nutrients, and trace metals. Outlet values consistently meet or remain well below prescribed standards, while improved pH, low oil-and-grease levels, and strong COD/BOD reductions highlight effective system functioning. The 100% survival in bioassay tests further confirms the treated effluent is safe and non-toxic to aquatic life. Overall, both STPs are operating reliably and producing high-quality, compliant effluent, contributing positively to environmental protection.