ನವ ಮಂಗಳೂರು ಬಂದರು ಪ್ರಾಧಿಕಾರ
नव मंगलूर पत्तन प्राधिकरण
NEW MANGALORE PORT AUTHORITY
(Fully Solar Powered)
भारत सरकार ( पत्तन, पोत परिवहन और जलमार्ग मंत्रालय )
Govt of India (Ministry of Ports, Shipping and Waterways)
ಪಣಂಬೂರು पणम्बूर Panambur / ಮಂಗಳೂರು मंगलूर Mangalore - 575010

Azadi Ka Amrit Mahotsav

SAGARMALA
PORT-LED PROSPERITY

**No: 3/11/EMP/CE(C)/2022-23/TS** **Date:13-12-2023**

To:

Regional Officer
Ministry of Environment , Forest & Climate Change
Regional Office (South Zone), 4th Floor, E&F Wings,
KendriyaSadan, 17th Main Road, II Block,
Koramangala,
BANGALORE – 560 034.
Email: roszmon@yahoo.in &
rosz.bng-mef@nic.in

Sir,

Sub: Submission of half yearly Compliance report from **April- 2023 to September-2023** for the EC issued by MOEF&CC -reg

Ref:
1. EC No: PD/26017/11//98-PDZ(CRZ) issued on 13-05-1999.
2. EC No. PD/26018/12//98-PDZ(CRZ) issued on 19-05-1999
3. EC No. J-16011/13/2002-IA-III issued on 16-01-2003
4. EC No 10-54/2007-IA-III issued on 29-07-2008
5. EC No: 11-2/2010-IA-III issued on 19-09-2011
6. EC No: 11-2/2010-IA-III issued on 14-12-2016

*****

With reference to the subject cited above, please find enclosed here with the revised half yearly Compliance report on stipulated environmental clearance terms and conditions along with tabulated test results on ambient air samples, Drinking water samples, Waste Water (STP), Noise level ,DG stack emission from **April- 2023 to September -2023** for information.

The compliance report is submitted for the EC No: PD/26017/11//98-PDZ(CRZ) issued on 13-05-1999 &EC No. PD/26018/12//98-PDZ(CRZ) issued on

मुख्य अभियंता (सिविल)
Chief Engineer (Civil)
नव मंगलूर पत्तन प्राधिकरण
New Mangalore Port Authority
पणम्बूर / Panambur - 575 010.

19-05-1999. EC No. J-16011/13/2002-IA-III issued on 16-01-2003, EC No 10-54/2007-IA-III issued on 29-07-2008, EC No: 11-2/2010-IA-III issued on 19-09-2011, EC No: 11-2/2010-IA-III issued on 14-12-2016.

The soft copy of same information is mailed to rosz.bng-mef@nic.in and roszmon@yahoo.in. The half yearly Compliance report from **April- 2023 to September - 2023** - is also uploaded in Port website www.newmangaloreport.gov.in for your kind information

Thanking you,

Yours faithfully,

(Shekhar B Lagwankar)
Chief Engineer (Civil)

मुख्य अभियंता (सिविल)
Chief Engineer (Civil)
नव मंगलूर पत्तन प्राधिकरण
New Mangalore Port Authority
पणंबूर / Panambur - 575 010.

Encl: As above

CC to: Environmental Officer, Regional Office, KSPCB, Mangalore.

**Environmental Clearances Compliance Report**

1. EC No: PD/26017/11//98-PDZ(CRZ) issued on 13-05-1999 and
2. EC No. PD/26018/12//98-PDZ(CRZ) issued on 19-05-1999

| Sl. No. | EC Conditions | Remarks |
|---|---|---|
| 1 | All construction design/drawings relating to construction activities must have the approval of the concerned State Govt. Departments/Agencies. Ground water should not be tapped for construction activities. | Statutory approval were obtained at the time of construction and work is completed |
| 2 | Adequate provision for all infrastructural facilities such as water supply, fuel, sanitation etc. must be extended for labourers during the construction period in order to avoid damage to the environment. | During the project work provision for all infra structural facilities like water supply, Sanitation etc., was provided for labourers |
| 3 | Dredging operations, if any, should be undertaken in consultation with either the Central Water and Power Research Station, Pune or the National Institute of Oceanography, Goa to ensure that dredging operations do not cause adverse impact on water quality and marine productivity in the vicinity. Dredging operation as far as possible should be kept to the minimum for avoiding any adverse impact on marine life. | Capital dredging operations conducted during the project work in consultation with CWPRS, Pune and all necessary precautions were taken to avoid any adverse impact on marine life |
| 4 | Disposal sites for excavated material should be so designed that the revised land use after dumping and changes in the land use pattern do not interfere with the natural damage. | The excavated material of the project work was used for Reclamation of Tannirbhavi beach and didn't interfere with natural damage |
| 5 | To meet any emergency situation, adequate foam containers should be kept ready with supporting fire fighting system and water pipeline. | Fire fighting system & water pipeline was provided at construction area.**Annexure-I** |
| 6 | The staff posted in sensitive areas should be trained in implementation of the Crisis Management Plan already drawn by the authorities. Mock drill(s) for this purpose should be conducted on a regular basis. Provisions of Dock Safety Act and the guidelines issued by the DG,FASLI/CLI, Bombay for the safety and health of the dock workers should be followed. | During the project work safety and health of the dock workers was considered. In-house Medical facility was provided and regularly Mock drills for different situations was provided |
| 7 | For development of green buffer including mangroves wherever feasible, the authorities should start growing large nursery of multipurpose species such as Eucalyptus, Casurina, Dalbergia, Termalia etc. The norm of about 2000-2500 trees per hectare maybe adopted for raising of green belt. | The Port developed 250 acre land near kudupu and Bondel quarry area for plantation<br>Port has developed its own Nursery and many species such as Eucalyptus, Casurina, Dalbergia, Termalia etc were planted near beach side<br>Port has developed 30% Green belt area<br><br>**Annexure-II** |

| | | |
|---|---|---|
| 8 | To prevent discharge of sewage and other liquid wastes including ballast into marine environment, adequate system for collection, treatment and disposal of liquid wastes must be provided to the satisfaction of Karnataka Pollution Control Board. | Sewage Treatment Plant with 1.2 MLD capacity was constructed to treat the sewage and other liquid waste including ballast as per the KSPCB **Annexure-III** |
| 9 | Adequate noise control measures must be provided to maintain noise level at various workplaces within the standard prescribed by the competent authorities. If need be, ear plugs and ear muffs should be provided to the workers in the port area. | Acoustic DG sets were used for the project work and the Noise level was maintained within the standard as per KSPCB |
| 10 | The quality of treated effluents, solid wastes and emissions must conform to the standards laid down by the competent authority including Central/State Pollution Control Boards. | Environmental Monitoring was conducted regularly through Third party and the reports were submitted to KSPCB& MOEF&CC |
| 11 | An Environmental Cell should be immediately made operational with adequate laboratory facilities, equipments and a mobile van for collecting air samples. The record and the data should be submitted with proper analysis and corrective measures required, if any, for maintaining the levels within the prescribed limits to the Regional Office of the ministry of Environment & Forests at Bangalore, which shall be monitoring these conditions stipulated for according the Environment approval. The Environmental Cell should coordinate and monitor environmental mitigative measures executed in the New Mangalore Port area. | An Environmental cell is functioned effectively to mitigate the Environmental pollution.<br>Port is submitting the air and water quality reports to MOEF&CC and KSPCB<br><br>Port will install CAAQMS shortly . **Annexure-IV** |
| 12 | Necessary leakage detection devices with early warning system must be provided at strategic locations. | Complied |
| 13 | Standby DG sets must be provided to ensure uninterrupted power supply to the pump house and the fire fighting system. | Accoustic DG sets were used for the project work to supply power |
| 14 | Third party inspection should be ensured during construction and operation phases with adequate insurance cover. The project authorities should confirm on regular intervals of six months to the Ministry about the implementation of the suggested safeguard measures and the data/report should be opened for inspection by the Team which would be constituted by the Ministry, if found necessary. | KSPCB and Director, MOEF&CC, Bangalore inspected the Port and verified the compliance reports maintained by the Ports<br>From 26-11-2021 to 30-11-2020 a performance audit on conservation of Marine Ecosystems was conducted by Mr. Bala Ravi Senior audit officer, Accountant General AMG-I, Bangalore & Verifies MOEF&CC compliance report |

| | | |
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| 15 | Full support should be extended to the Regional Office of the Ministry of Environment & Forests at Bangalore during inspection of the project monitoring purposes by the project proponents by furnishing full details and action plans including action taken report on mitigate measures. | Complied |
| 16 | Adequate funding provisions, year-wise and item-wise, must be made for implementation of the above mentioned safeguard measures. | Complied |
| 17 | No other chemical product save those mentioned in the Annex III appended to Govt. of India Notification in the Ministry of Environment & Forests, S.O. No.494 (E) dated July 9, 1997 will be allowed to handle/store in any port area. | Complied |
| 18 | The project authorities would ensure that safety regulations and guidelines issued by Oil Safety Directorate in the Govt. of India, Ministry of Petroleum & Natural Gas are implemented. | Complying with all the stipulations |
| 19 | The approval of the Chief Controller of Explosives (CCO & E) shall be obtained for operational purpose before undertaking any storage/handling activity. | Complying with all the stipulations |

| | F.NO.11-2/2010-IA-III 19/SEP/2011<br><br>Development of 4 berths in the western dock arm | |
|---|---|---|
| **Sl. No.** | **Specific Conditions** | **Remarks** |
| 1 | "Consent for Establishment" shall be obtained from State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site. | Renewed with validity period of<br>*30-06-2027* |
| 2 | The authenticate map of the HTL/LTL together with their respective coordinates at discrete intervals shall be submitted so as to identify them later on the ground if and when necessary. | Submitted to MOEF&CC on 08.12.2014 |
| 3 | The project shall be executed in such a manner that there shall not be any disturbance to the fishing activity. | The Project is taken up within the security compound of the operating Port. Hence the fishing activity is not affected during the course of execution of the project. |
| 4 | It shall be ensured that there is no displacement of people, houses or fishing activity as a result of the project. | The Project is taken up within the security compound of the operating Port. Hence there is no displacement of people, houses or fishing activity during the course of execution of the project. |
| 5 | No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area. | Constructed as per CRZ Notification 2019 |
| 6 | The project proponent shall set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive. | Environmental cell headed by the Dy. Manager Environment under the supervision of Chief Engineer Civil for effective implementation of the stipulated environmental safeguards has been setup. |

| | | |
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| 7 | The funds earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes. | An amount of Rs 50 lakhs towards Fire fighting and environmental mitigation measures and Rs 80 lakhs towards Environmental and social concern has been earmarked in the Estimate. |
| | **General conditions** | |
| 1 | Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality. | The excavated material and the bore muck shall be disposed at designated areas away from the Sea/water bodies.<br>The dredged material has been dumped at the designated dumping ground suggested by the CWPRS. |
| 2 | Full support shall be extended to the officers of this Ministry/Regional Office at Bangalore by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities. | Full support and cooperation will be extended to the officers of Ministry/Regional Office. |
| 3 | A six-monthly monitoring report shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bangaluru regarding the implementation of the stipulated conditions | Complied Statement of Monitoring report of Air, water, Noise, from April- 2023 to September -2023 |
| 4 | Ministry of Environment & Forests or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environment and the same shall be complied with. | No additional conditions stipulated or proposed |
| 5 | The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry. | Complying with all the stipulations |
| 6 | In the event of a change in project profile or change in the implementation agency, a fresh reference shall be made to the Ministry of Environment and Forests. | Complied |

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|---|---|---|
| 7 | The project proponents shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of land development work. | Project Completed on 31.08.2016. |
| 8 | A copy of the clearance letter shall be marked to concerned Panchayat/local NGO, if any, from whom any suggestion/ representation has been made/ received while processing the proposal. | At the time of construction informed |
| 9 | Karnataka Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industries Center and Collector's Office/Tahsildar's office for 30 days. | Noted ( Pertains to KSPCB) |
| 10 | These stipulations would be enforced among others under the provisions of water ( Preservation and Control of Pollution) Act 1974, the Air( Preservation and Control of Pollution) Act, 1981, the Environment (Protection) Act 1986 , the Public liability (Insurance Act,1991 and EIA notification 1994, including the amendments and rules made thereafter. | Complied |
| 11 | All other statutory clearances such as the approvals for storage of diesel from Chief controller of Explosives, Fire department, Civil Aviation department , Forest Conservation Act, 1980 and wild life(protection) Act,1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities. | Obtained |
| 12 | The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the state Pollution Control Board and may also be seen on the website of the ministry MOEF at http://www.envfor.nic.in | Paper advertisement was given in Udayavani, Manipal and Deccan Herald, Mangalore dated 29.09.2011 . |
| 13 | Environmental clearances is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation vs. Union of India | Complied |

| | | |
|---|---|---|
| | in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project. | |
| 14 | Status of Compliance to the various stipulated environmental conditions and environmental safe guards will be uploaded by the project proponent in its website. | Uploaded at www. newmangalore-port.com |
| 15 | A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions / representations, if any , were received while Processing the Proposal . The clearance letter shall also be put on the website of the company by the Proponent. | Issued At the time of construction |
| 16 | The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall upload the same periodically. It shall simultaneously be sent to the Regional office of MoE&CC, the respective Zonal Office of CPCB and the SPCB. | Uploaded at.www. newmangalore-port.com and complied |
| 17 | The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data(both in hard copies as well as by e-mail) to the respective Regional Office of MEF&CC , the respective Zonal Office of CPCB and the SPCB. | Complied Statement of Monitoring report of Air, water, Noise, STP and Stack emission from April- 2023 to September -2023 |
| 18 | The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MOEF&CC by e-mail. | Submitted to KSPCB on 30/09/2023. Soft copy uploaded *in the Port web* site and sent mail to respective officers |

**Revised stipulated environmental clearances report as per the Letter No. F.No.11-2/2010-IA.III (Pt.)Dated:-14th December 2016**

| Sl.No. | Specific Conditions: | Remarks |
|---|---|---|
| 1 | Construction activity shall be carried out strictly according to the provisions of CRZ Notification, 2011.<br>No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area. | Complied |
| 2 | All the recommendations and conditions specified by Karnataka Coastal Zone Management Authority (KCZMA) vide letter no. FEE 580 CRZ 2015 dated 07.01.2016 shall be complied with. | Complied. |
| 3 | As proposed, a fully mechanised coal unloading system shall be provided for Berth 18. Air pollution control measures to be provided are water sprinklers; closed conveyor, bag filter and mechanised cargo handling. | Complied. |
| 4 | Automatic / online monitoring system (24 x 7) monitoring devices for air pollution as well as water pollution in respect of flow measurement and relevant pollutants in the treatment system shall be installed. The data should be made available to the respective SPCB and in the Company's website. | Regular Air & Water quality sample testing shall be conducted till the Installation of Online monitoring system 24X7 and all efforts are made to install it in time frame of 06months.<br>Flow measurement is installed for relevant Water pollution pollutants in the treatment system. |
| 5 | All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented. | Implemented |
| 6 | All other conditions will remain unchanged. | Noted |

ANNEXURE - I

| | | | | | |
|---|---|---|---|---|---|
| Fire water design requirement | 600 m3/ hrs for water/ foam monitors ( 2 tower monitors X 5000 lpm) | Tower monitors (2 nos. x 5000 LPM) provided.<br>.<br>**900 m3/hr pump is provided which is adequate and meets the OISD 156 requirement** | Tower monitors ( 2 nos. X 6000 LPM) provided.<br><br>**900 m3/hr pump is provided which is adequate and meets the OISD 156 requirement** | Tower monitors ( 2 nos. X 6000 LPM) provided.<br><br>**900 m3/hr pump is provided which is adequate and meets the OISD 156 requirement** | Tower monitors ( 4 nos. X 6000 LPM) provided.<br><br>**820 m3/hr pump is provided which is adequate and meets the OISD 156 requirement** |
| | 600 m3/ hrs for hydrant & water curtains ( 2 Jumbo nozzles X 5000 lpm) | 8 x 1.5" (690 LPM each) and 9 x 1" (362 LPM each)<br>8778 LPM in all<br><br>**900 m3/hr pump is provided which is adequate but the nozzle output is lesser by 1222 lpm as per the OISD 156 requirement** | 18 x 1" (362 LPM each)<br>6516 LPM in all.<br><br>**900 m3/hr pump is provided which is adequate but the nozzle output is lesser by 3484 lpm as per the OISD 156 requirement** | 16 x 1" (362 LPM each)<br>5792 LPM in all<br><br>**900 m3/hr pump is provided which is adequate but the nozzle output is lesser by 4208 lpm as per the OISD 156 requirement** | 64 X 1 " ( 362 LPM)<br>.<br>820 **m3/hr pump is provided which is adequate as per the OISD 156 requirement** |
| Jockey pump capcity | | 25 m3/ hr | 54 cu.m/hr | 54 cu.m/hr | 54 cu.m/hr |
| Foam System | 2 X 5000 lpm Tower foam monitor + 2 X 2400 lpm base foam monitor<br><br>Foam calculation = 14800 X .03X 60 = 26640 litre | Tower monitors (2 nos. x 5000 LPM)<br>Ground monitor (1 No.x5000 LPM)<br><br>As per calculation requirement is<br>( 15000 X .03 X 60) =27000 litre<br><br>**Available = 15 cu.m tank which is lesser by 12 cu.m as per OISD 156** | Tower monitors ( 2 nos. X 6000 LPM)<br>Ground monitor (1 No.x 3000 LPM)<br><br>As per calculation requirement is ( 15000 X .03 X 60) =27000 litre<br><br>**Available = 30 cu.m tank which meets OISD 156 requirement** | Tower monitors ( 2 nos. X 6000 LPM)<br>Ground monitor (1 No.x 3000 LPM).<br><br>As per calculation requirement is ( 15000 X .06 X 60) =54000 litre( since 6% foam is avaiable)<br>**Available = 2 X 30 cu.m tank which meets OISD 156 requirement** | Tower monitors ( 4 nos. X 6000 LPM)<br>Ground monitor (2 No.x 3000 LPM)<br><br>As per calculation requirement is ( 18000 X .03 X 60) =32400 litre.<br>**Available = 35 cu.m tank which meets OISD 156 requirement** |
| Foam Pump Capcity | | 54 Cu.m /hr @ 18 kg/cm2 X 2 nos pumps avaiable<br><br>**Adequate** | 27 Cu.m /hr @ 17 kg/cm2 X 2 nos pumps avaiable<br><br>**Adequate** | 54 Cu.m /hr @ 17 kg/cm2 X 2 nos pumps avaiable<br><br>**Adequate** | 28 Cu.m /hr @ 17 kg/cm2 X 2 nos pumps avaiable<br><br>**Adequate** |
| Extinguishers | 6x10 kg. DCP extinguisher | 1 X 5 kg, 2 X 10 kg, 2 X 20 Kg | 2 X 10 Kg, 2 X 20 Kg | 4 X 10 kg, 2 X 20 | 12 X 10 Kg, 4 X 5 Kg |
| | 4x75 wheeled DCP | 4 X 25 kg, 2 X 50 Kg | 4 X 25 Kg, 2 X 50 kg | 4X 25 Kg, 5 X 75 kg | 4 X 75 Kg |
| Jockey pumps / | | 2 | 2 | 2 | 2 |

**Annexure-II**

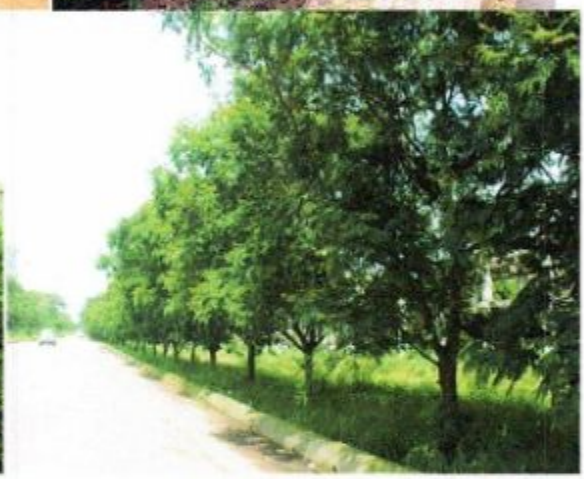
## Green Belt at NMPA

Port in its Endeavour to develop Green Belt has already provided a green cover of more than 33% with 95% survival of plants. Even though the Port is categorized as a service oriented organization, it has complied with the stipulations of an industry. The initiative for the greenery in the estate, include the operational and non operational area within the Port limits to control pollution mitigate emission of dust , air and water contamination. The Port, in its Endeavour has planted more than 2lakhs saplings of both endemic and non-endemic species .

The Ports a generally associated with cargo. It is unbelievable that New Mangalore Port Authority apart from its thriving business is also a natural heaven for the bird population. The species existing in the Port varies from Peacocks to Plovers and Pythons to Flower Peckers, Jackals, Mangoose, Jungle Fowls etc. At present, the bird population has increased to nearly 100 varities. The relentless efforts taken by the Management has ushered the growth of butterflies also. Butterflies are the indicators of best ecological system. New Mangalore Port Authority houses immovable butterflies. At present, New Mangalore Port st is the only Port in the country that maintain the best ecological balance in the midst of its business activity without compromising its Environment.

The presence of beautiful garden and parks indicate the maturity of civilized society. They are not only provide soothness to the eyes , but act as bio-diversity engines. New Mangalore Port Authority has more than 10 beautiful parks, three inside the colony area and rest inside the wharf. Each park is distinct in supporting the environment with endemic species and exotic sapplings. These parks are under 24/7 strict supervision and they are well maintained. All the parks exhibit different hue during the spring time to invoke the colours of rainbow. Recently Green Tech foundation awared NMPA for Environmental Protection.

**Green Belt at NMPA**



**Annexure-III**

## 1.2 MLD Sewage Treatment Plant at NMPA

New Mangalore Port Authority has commisioned 1.2 MLD Sewage Treatment Plant with SBR Technology, it consumes 329 KW power/day for treating 0.75 MLD water/day.

The domestic sewage emanated from the NMPA township containing floating matter and solids both inorganic and organic matter will be treated in the STP and reused for irrigating the Green Belt after ensuring its suitability Periodic inspection and maintenance is carried out by Engineers and monitored by the Environment Cell of the Port.

NMPA has achived the Zero Discharge as NMPA is re using the entire quantity of treated water for **green belts** created inside the Port in order to reduce the burden on water resources. Besides, it is also used for sprinkling inside the wharf to suppress the dust emanating out of cargo handling.

There is a scientific monitoring system in place in the Port. The monitoring process is carried out through established NABL and MOEF&CC certified laboratory regularly and taken both preventive and corrective actions which results in very low BOD and Zero Turbidity.The Port has been fully complying with the statutory requirements.

## Rain Water Harvesting

The prudence exhibited in utilizing this **scarce resource** depends upon **determination, vision and mission** of the management. New Mangalore Port is perhaps **the only Port** that is blessed with this resource due to its topography. After Kerala on the West Coast, Mangalore is the second location on Indian map to catch the early rain. Mangalore receives roughly, around 4000 mm rain in Mansoon period which is perhaps the highest rain fall next to Chirapunji. However, most of the water runs into Arabian Sea, since the land mass in the Port is significantly less and hilly terrain with laterite soil. Despite these adverse conditions, New Mangalore Port has envisaged **comprehensive plan** to harvest the rain water. In this direction, 3 large **Rainwater Harvesting Ponds and Ground water Recharge ponds** have been created inside the Port area, in the catchment areas covering 64,217 Sq.Mtrs. with a capacity of 1,10,340 CUM of water. This water is constantly used for **"development of green belt"** , sprinkling to control dust emission and also drinking source for the animals, flora and fauna. Due to this rain water harvesting ponds, the water levels in the nearby village wells has constantly recharging. Port is not depend on MCC for water supply since Port is self sustain with its own Raintwater harvested ponds for water consumption.

**Rain Water Harvesting Near Thimmppaiah Well**

## Mechanized Sprinkling System:

Sprinkling system inside the Port was the brain child of **Inhouse Engineers**. All most all the concrete roads inside the Port Have been installed with mechanised sprinklers on either side of the road. It operates every 30 minutes. This system ensures **minimizing dust pollution** in cargo opertional areas. The water used for this system is partly out of treated sewage water and partly from rain harvesting. This system is Complementary to the "Tank sprinkling" system. The sprinkling system is also provided in Railway Marshalling Yard to prevent / arrest the dust suppressed during the loading and unloading time.

**Sprinkling system**

Sprinklers are installed in the coal yards which can rotate 180 degrees and cover the entire coal stacks. This completely settles the dust generated from the coal stacks during operations. The automation mechanism gives aid to effective usage of water. The Sprinklers will Switch Off and Switch On for the predetermined time cycle automatically throughout the process thus minimizing water usage. The water will be recycled & reused for the same purpose after sediment separation.

## Solar Energy

NMPA has installed Solar power plant at an expenditure of 33.75 Crores during the year 2016-17. NMPA is generating 5.2 MW with its own ground mounted & roof top solar grid contributing towards Carbon reduction NMPA has become 100% solar powered Port. Using Solar power, NMPA has reduced the carbon foot print reduction of about 30,437 Tonnes every year.

**Solar Power Plant at NMPA**

**Annexure -IV**

## Environmental Monitoring System

There is a scientific monitoring system in place in the Port. The monitoring process is carried out through NABL accrediated established laboratories having resources and spare capacity. NMPA monitors air and water qualities through third pary authorised from KSPCB, MOEF&CC, regularly and taken both preventive and corrective actions. This Environmental Management System improves the environmental conditions in general and public health of its employees in partiucular. The treated water out of Sewage Treatment Plant is used for the green belts created inside the Port in order to reduce the burden on water resources. Besides, it is also used for sprinkling inside the wharf to suppress the dust emanating out of cargo handling. The Port is an ISO 14001:2015 certifed since 2011 and it demands various Compliances to predict the Environment. The Port has sucessfulluy complied the standards

## CONTINUOUS AMBIENT AIR QUALITY MONITORING SYSTEM

a. New Mangalore Port Authority is under the process of installation of CAAQMS.
b. Presently Environmental monitoring is carried out by MOEF&CC, NABL certified laboratory
c. The Enviromental monitoring reports will be submitted to Karnataka State Pollution Control Board regularly.

# COMPREHENSIVE ENVIRONMENTAL MONITORING REPORT

**(April 2023- September 2023)**

***For***

**NEW MANGALORE PORTAUTHORITY**

**Panambur, Mangalore, Karnataka**

NIRAYA LABORATORIES AUTHORISED

**SIX MONTHLY ENVIRONMENTAL MONITORING COMPLIANCE REPORT FOR M/s NEW MANGALORE PORT AUTHORITY, KARNATAKA, INDIA**

| | |
|---|---|
| Name of Client: | M/s. NEW MANGALORE PORT AUTHORITY, KARNATAKA, INDIA |
| Name of Contractor: | M/s. NITYA LABORATORIES |
| Work Order No: | No.3/12/EMMP/CE/2020-21/TS |
| Nature of Job: | Monitoring of Environmental Parameters on Air, Marine, Water, STP Water, Drinking Water, Noise, DG Stack as per KSPCB/CPCB Standards for the Years 2020-21 and 2021-22 |

NITYA LABORATORIES AUTHORISED

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## CONTENTS



NITYA LABORATORIES AUTHORISED

## 1.0 INTRODUCTION

The New Mangalore Port was declared as the 9th major port on 4th APRIL 1974 and was formally inaugurated on 11th January 1975. The provisions of major port trusts act, 1963 were extended to the new Mangalore port and a port trust board was formed with effective from 1.4.1980 over the years the port has grown from the level of handling less than a lakh tones' of cargo to 42.05 million tonnes handled during the years 2017-18. The port area is of 2032 acres. The port facilities provided are to face the growing challenges and emerging needs of the 21st century. Lying south, the Indian ocean provided major sea routes connecting the middle East Africa, East Asia with Europe and the USA.

The major commodities exporting through the port are Iron ore fines, coffee, Granite, stones, fish meal and oil, iron ore pellets by containerized cargo. The major imports of the port are crude petroleum products, LPG raw cashew other liquid chemicals containerized cargo, coal, limestone, fertilizer, edible oil and cement.

### 1.1 Environmental Management Plan

### 1.1.1 Environmental Policy

NMPA is an ISO 9001:2015; 14001-2015 & ISPS Compliant Port. NMPA is prepared to protect the environment by minimizing the pollution impacts of the port activities and follows the sustainable development through environmental management performance. Prevent and control pollution and maintain eco-friendly environment. Organize environment awareness among staff, user and visitors. Team up shop floor personnel, service providers and other stake holders to work towards pollution free environment.

Being concerned towards environmental protection, NMPA has prepared an extensive environmental management plan for port operations. The field environmental monitoring studies were carried out for ambient air, noise level, stack emission, marine and drinking water quality, sludge and waste water quality, and half yearly complied data are presented here.

## 2.0 Air Environment

## 2.1 Ambient Air Quality

### 2.1.1 Monitoring Stations

M/s Nitya Laboratories team in consultation with Engineer In-charge of New Mangalore Port Authority fixed the frequency and number of sampling stations. Accordingly, an ambient air quality monitoring was conducted at 05 locations during the period of 1st April 2023 to 31st September 2023.

**Table - 1**
**Location of Air Quality Monitoring Stations**

| Sr. No. | Location of Station | Direction w.r.t. centre of New Mangalore Port Authority |
|---|---|---|
| 1. | US Malya Gate | Once in a Month |
| 2. | Oil Jetty area Near I.M.C. Terminal | Once in a Month |
| 3. | VTMS Port Control | Once in a Month |
| 4. | Old Coastal Guard Office | Once in a Month |
| 5. | NMPA Hospital | Once in a Month |

### 2.1.2 Frequency and Parameters

On each sampling day, 1 set of 24 hour / 8 hour average samples was collected. The following air pollution parameters were measured by sampling during the sampling period.

1. Particulate matter ($PM_{10}$)
2. Particulate matter ($PM_{2.5}$)
3. Sulphur dioxide ($SO_2$)
4. Oxides of nitrogen ($NO_x$)
5. Benzo (α) pyrene
6. Benzene
7. Carbon monoxide
8. Ammonia
9. Ozone
10. Nickel
11. Arsenic
12. Lead

### 2.1.3 Sampling and Analytical Procedure

A brief description of the sampling and analytical procedures followed during the ambient air quality survey is as follows:

**Particulate Matter ($PM_{10}$)**

The sampling of ambient air for evaluating $PM_{10}$ levels were performed with a RDS Sampler fitted with a cyclone separator. Air exiting the separator is drawn at a measured rate through pre-weighed glass fiber filter sheets of 20 cm x 25 cm sizes. The concentration of $PM_{10}$ were computed from the average air flow rate, sampling period and the mass of particulate matter collected over the filter surface.

**Particulate Matter ($PM_{2.5}$)**

$PM_{2.5}$ is determined as per USEPA (United State Environment Protection Agency) guidelines with the help of Fine Dust Sampler (FDS). Ambient air @ 16.67 lpm is allowed to pass through Louvered inlet and WINS Impactor assembly having a 37mm dia. filter paper. Particulate matter of size <2.5 microns is deposited on 46.2mm dia. PTFE filter. The difference of final weight and initial weight of filter paper gives the weight of particulate matter of size <2.5



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microns. The concentration of $PM_{2.5}$ is computed as the weight of dust deposited on the filter divided by volume of air sampled.

**Sulphur Dioxide ($SO_2$)**

The sampling of ambient air for evaluating the gaseous pollutants were performed with a Multigas Sampler, using the vacuum created by the FDS Sampler for drawing the air samples through the impingers. For $SO_2$, air was drawn at a measured and controlled rate of 400 to 500 ml/min & passed through a solution of potassium tetrachloromercurate (TCM). After sampling, the absorbing reagent was treated with dilute solutions of sulfamic acid, formaldehyde and para-rosaniline hydrochloride. The absorbance of the intensely coloured para-rosaniline methyl sulphonic acid was measured at the wavelength of 560 nm using spectrophotometer and the amount of $SO_2$ in the sample was computed. The ambient $SO_2$ concentrations were computed from the amount of $SO_2$ collected and the volume of air sampled.

**Oxides of Nitrogen**

Air was drawn at a measured and controlled rate of about 200 ml/minute through an orifice-tipped impinger containing solutions of sodium hydroxide and sodium arsenite. After completion of the sampling, an aliquot of the used absorbing solution was treated with solutions of $H_2O_2$, sulphanilamide and NEDA. The nitrite ion present in the impinger was calculated from the absorbance of the resulting solution measured at 540 nm using spectrophotometer. The ambient NOx concentrations were computed from the total nitrite ion present in the impingers, overall efficiency of the impinger and the procedure, and the volume of air sampled.

**Benzene**

Air was drawn through a glass tube containing 5 -15 gm of silica gel (300-600 µm size) at the rate not exceeding 1.5 litre/minute for a period of 20-30 minutes to get representative volume of sample. Transfer the silica gel into a 50 ml bottle. Add 20 ml iso-propyl alcohol, shake for 2 minutes and allowed to settle for at least 5 minute. Analyze alcohol layer on gas-liquid chromatography over polypropylene glycol using flame ionization detector.

**Benzo (α) Pyrene**

Ambient air samples were collected for Benzo (α) pyrene in cellulose 8' x 10' membrane filters exposed for 24 h using RDS, at the average flow rate of 1.1 $m^3$/min for particulate phase. These filter papers were extracted and analyzed by GC.

**Carbon Monoxide**

Rubber Bladder and Aspirators have been used to collect the 8 hourly samples for carbon monoxide. The CO levels were analyzed through Gas Chromatography with Methanizer.

**Ammonia**

The ambient air is collected through FDS fitted with two Midget impingers containing 10 ml absorbing solution i.e. dilute Sulphuric acid in each (one for blank) at the rate of 1.0 l/min for a period of 10-15 minutes. Ammonium sulphate solution thus formed is treated with Nessler reagent to produce yellow-brown colour complex. The Ammonia concentration is determined by spectrophotometer at 440 nm and comparing it with a standard curve.

**Ozone**

Air is drawn through a midget impinger containing potassium iodide in a neutral buffer in between 0.2 lpm to 2.0 lpm for a period of 30 minutes. The Iodine liberated in the absorbing reagent is determined by spectrophotometer at 352 nm.

**Heavy Metals (Nickel, Arsenic & Lead)**

Dust sample was collected on EPM 2000 filter paper with the help of Respirable Dust Sampler & dried at 105$^0$C for removal of moisture. Appropriate weight of sample was subjected for digestion with aqua-regia. Silica was separated by precipitation & filtration of digested sample. Filtrate was used for determination of heavy metals by using Atomic Absorption Spectrophotometer as per standard method given in APHA, 23$^{nd}$ edition.

### 2.1.4 Techniques for Measurement

The techniques used for measurement of pollutants APRIL be summarized as under:

**TABLE - 2**

**Measurement Techniques**

| Sr. No. | Parameters | Code of Practice | Sampler | Instruments used for Analysis |
|---|---|---|---|---|
| 1. | $PM_{10}$ | IS: 5182(Part-IV) | RDS Sampler with Cyclone Separator | Balance, Desiccator |
| 2. | $PM_{2.5}$ | USEPA's Quality Assurance Guideline Documents 2.12 | FDS Sampler with Wins Impactor | Balance, Dedicator |
| 3. | $SO_2$ | IS: 5182(Part-V) | RDS Sampler | Spectrophotometer |
| 4. | $NO_x$ | IS: 5182(Part-V) | RDS Sampler | Spectrophotometer |
| 5. | Benzene | IS:5182(Part -11) | Handy Sampler | Gas Chromatograph with FID Detector |
| 6. | Benzo (α) pyrene | - | RDS Sampler | Gas Chromatograph |
| 7. | Carbon Monoxide | IS: 5182(Part-X) | Bladder & Aspirator | Gas Chromatograph |
| 8. | Ammonia | APHA | RDS Sampler | Spectrophotometer |
| 9. | Ozone | IS: 5182 (Part-XVIII) | RDS Sampler | Spectrophotometer |
| 10. | Heavy Metal (Ni & As) | - | RDS Sampler (EPM-2000) | Atomic Absorption Spectrophotometer |
| 11. | Heavy Metal (Pb) | IS: 5182(Part 22) | RDS Sampler (EPM-2000) | Atomic Absorption Spectrophotometer |

### 2.1.5 Results

The observations made on air quality parameters at 05 locations have been presented in the test reports. Minimum and maximum values, arithmetic mean values of the 24 hour / 8 hour average concentrations have also been computed and presented.

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur , Mangalore -575010

Sample Description: Air Pollution

Sample Drawn By: Nitya Laboratories

**AMBIENT AIR MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023 SUMMARY**

| S.No. | Locations | | | US Malya gate | Oil Jetty area Near I.M.C. Terminal | VTMS Port Control | New Mangalore Coal Terminal | NMPA Hospital |
|---|---|---|---|---|---|---|---|---|
| | PM10 | µg/m³ | Min. | 67.4 (APRIL. 2023) | 53.70 (APRIL. 2023) | 58.90 (APRIL. 2023) | 64.60 (APRIL.2023) | 68.20 (APRIL. 2023) |
| | | | Max. | 80.48 (Sep .2023) | 60.70 (July.2023) | 76.20 (Sep.2023) | 90.56 (Sep. 2023) | 78.70 (Sep. 2023) |
| | | | Avg. | 74.62 | 57.20 | 67.55 | 77.58 | 73.20 |
| 2 | PM2.5 | µg/m³ | Min. | 36.20 (APRIL. 2023) | 30.46 (APRIL. 2023) | 31.70 (APRIL. 2023) | 35.70 (APRIL.2023) | 34.20 (APRIL. 2023) |
| | | | Max. | 45.36 (Sep. 2023) | 38.20 (Sep.2023) | 44.54 (Sep.2023) | 50.10 (Sep.2023) | 41.24 (Sep .2023) |
| | | | Avg. | 40.78 | 34.43 | 38.12 | 43.40 | 37.27 |
| 3 | SO2 | µg/m³ | Min. | 25.50 (APRIL. 2023) | 20.50 (APRIL. 2023) | 21.60 (APRIL. 2023) | 21.70 (APRIL.2023) | 27.26 (APRIL. 2023) |
| | | | Max. | 33.20 (Sep. 2023) | 27.80 (July.2023) | 30.54 (Sep. 2023) | 32.40 (Sep.2023) | 35.70 (July. 2023) |
| | | | Avg. | 29.35 | 24.15 | 26.07 | 27.05 | 31.48 |
| 4 | NO2 | µg/m³ | Min. | 28.40 (June. 2023) | 27.20 (APRIL. 2023) | 24.50 (APRIL. 2023) | 25.70 (APRIL.2023) | 30.70 (APRIL. 2023) |
| | | | Max. | 33.20 (Sep. 2023) | 34.80 (july. 2023) | 35.48 (Sep.2023) | 38.30 (Sep. 2023) | 38.00 (Sep. 2023) |
| | | | Avg. | 30.80 | 31.00 | 30.99 | 32.09 | 34.50 |
| 5 | CO | mg/m³ | Min. | 1.24 (APRIL. 2023) | 0.91 (APRIL. 2023) | 0.99 (APRIL. 2023) | 0.98 (APRIL. 2023) | 1.05 (APRIL. 2023) |
| | | | Max. | 1.40 (Sep. 2023) | 1.16 (July. 2023) | 1.50 (Sep. 2023) | 1.64 (Sep.2023) | 1.25 (Sep. 2023) |
| | | | Avg. | 1.32 | 1.03 | 1.24 | 1.31 | 1.15 |
| 6 | NH3 | µg/m³ | Min. | 35.70 (APRIL. 2023) | 29.50 (APRIL. 2023) | 31.70 (APRIL. 2023) | 29.50 (APRIL. 2023) | 32.40 (APRIL. 2023) |
| | | | Max. | 45.10 (Sep. 2023) | 36.80 (July. 2023) | 37.80 (July. 2023) | 40.20 (Sep. 2023) | 37.40 (July. 2023) |
| | | | Avg. | 40.30 | 33.15 | 34.75 | 34.85 | 34.90 |
| 7 | O3 | µg/m³ | Min. | 29.50 (APRIL. 2023) | 25.50 (APRIL. 2023) | 27.40 (APRIL. 2023) | 26.90 (APRIL. 2023) | 28.40 (APRIL. 2023) |
| | | | Max. | 38.70 (Sep. 2023) | 32.10 (July. 2023) | 36.80 (Sep. 2023) | 37.50 (Sep. 2023) | 35.50 (July. 2023) |
| | | | Avg. | 33.85 | 28.90 | 32.10 | 32.50 | 31.95 |
| 8 | Pb | µg/m³ | | ND | ND | ND | ND | ND |
| 9 | C6H6 | | | ND | ND | ND | ND | ND |
| 10 | BAP | mg/m³ | | ND | ND | ND | ND | ND |
| 11 | As | | | ND | ND | ND | ND | ND |
| 12 | Ni | | | ND | ND | ND | ND | ND |

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### 2.1.6 Air Quality Standards

**MINISTRY OF ENVIRONMENT AND FORESTS**

**NOTIFICATION**

**New Delhi, the 16th of November, 2009**

G.S.R. 826(E) – In exercise of the power conferred by section 6 and section 25 of the Environment (Protection) Act 1986, the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986 namely :

1. (i) These rules APRIL be called the Environment (Protection) Seventh Amendment Rules, 2009
   (ii) They shall come into force on the date of their publication in the official gazette.
2. In the Environment (Protection) Rules, 1986 thereinafter referred to as the said rules, in rule 3, in sub-rule (3B), for the words, brackets, figures and letters, "in columns (3) to (5) of Schedule VII", the words, brackets, figures and letters "in columns (4) and (5) of Schedule-VII" shall be substituted.
3. For Schedule VII to the said rules and entries relating thereto, the following schedule and entries shall be substituted namely:

**TABLE - 8**

**ENVIRONMENT (PROTECTION) SEVENTH AMENDMENT RULES, 2009**

**NATIONAL AMBIENT AIR QUALITY STANDARDS**

**"[SCHEDULE VII]**

[See Rule 3 (3B)]

NATIONAL AMBIENT AIR QUALITY STANDARDS

| Sr. No. | Pollutants | Time Weighted Average | Concentration in Ambient Air | | Methods of Measurement |
|---|---|---|---|---|---|
| | | | Industrial, Residential, Rural & Other Areas | Ecologically Sensitive Area (notified by Central Govt.) | |
| (1) | (2) | (3) | (4) | (5) | (6) |
| 1. | Sulphur Dioxide ($SO_2$), µg/m$^3$ | Annual* | 50 | 20 | -Improved West &Gaeke |
| | | 24-hours** | **80** | **80** | -Ultravoilet Fluorescence |
| 2. | Nitrogen Dioxide ($NO_2$), µg/m$^3$ | Annual* | 40 | 30 | -Modified Jacob &Hochheiser (Na-Arsenite) |
| | | 24-hours** | **80** | **80** | -Chemiluminescence |
| 3. | Particulate Matter (Size less than 10µm) or $PM_{10}$, µg/m$^3$ | Annual* | 60 | 60 | -Gravimetric<br>-TOEM |
| | | 24-hours** | **100** | **100** | -Beta attenuation |
| 4. | Particulate Matter (Size less than 2.5µm) or $PM_{2.5}$µg/m$^3$ | Annual* | 40 | 40 | -Gravimetric<br>-TOEM |
| | | 24-hours** | **60** | **60** | -Beta attenuation |

| | | | | | |
|---|---|---|---|---|---|
| 5. | Ozone ($O_3$), µg/m³ | 8-hours* | **100** | **100** | -UV Photometric<br>- Chemiluminescence |
| | | 1-hour** | 180 | 180 | -Chemical Method |
| 6. | Lead (Pb), µg/m³ | Annual* | 0.50 | 0.50 | -AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper |
| | | 24-hours** | **1.0** | **1.0** | -ED-XRI using Teflon filter |
| 7. | Carbon Monoxide (CO), mg/m³ | 8-hours* | **02** | **02** | -NDIR Spectroscopy |
| | | 1-hour** | 04 | 04 | |
| 8. | Ammonia ($NH_3$), µg/m³ | Annual* | 100 | 100 | -Chemiluminescence<br>-Indophenol Blue Method |
| | | 24-hours** | **400** | **400** | |
| 9. | Benzene ($C_6H_6$), µg/m³ | Annual* | **05** | **05** | - Gas Chromatography based continuous Analyzer<br>-Adsorption and Desorption followed by GC Analysis |
| 10. | Benzo(α)Pyrene (BAP)- particulate phase only, ng/m³ | Annual* | **01** | **01** | -Solvent Extraction followed by HPLC/GC Analysis |
| 11. | Arsenic (As), ng/m³ | Annual* | **06** | **06** | -AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper |
| 12. | Nickel (Ni), ng/m³ | Annual* | **20** | **20** | -AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper |

* Annual Arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24-hourly at uniform intervals.

** 24-hourly or 08-hourly or 01-hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they APRIL exceed the limits but not on two consecutive days of monitoring.

**Note: Whenever and wherever monitoring result on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.**

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### 2.1.7 Results & Discussion on Observations

#### 2.1.7.1 Particulate Matter ($PM_{10}$)

During the study period, the $PM_{10}$ concentrations were observed in the range of **53.70** to **90.56** $\mu g/m^3$, with the average value ranged between of **57.20** to **77.58** $\mu g/m^3$. It can be observed that the average value is within the limits specified in the ambient air quality standards. It is, therefore, concluded that $PM_{10}$ concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

#### 2.1.7.2 Particulate Matter ($PM_{2.5}$)

During the study period, the $PM_{2.5}$concentrations were observed in the range of **30.46** to **50.10** $\mu g/m^3$, with the average value ranged between of **34.43** to **43.40**$\mu g/m^3$. It can be observed that the average value is within the limits specified in the ambient air quality standards. It is, therefore, concluded that $PM_{2.5}$concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

#### 2.1.7.3 Sulphur Dioxide ($SO_2$)

During the study period, the $SO_2$ concentrations were observed in the range of **20.50** to **35.70** $\mu g/m^3$, with the average value ranged between of **24.15** to **31.48** $\mu g/m^3$.It can be observed that the average value is within the limits specified in the ambient air quality standards. It is, therefore, concluded that $SO_2$ concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

#### 2.1.7.4 Oxides of Nitrogen ($NO_x$)

During the study period, the $NO_x$ concentrations were observed in the range of **24.50** to **38.30** $\mu g/m^3$, with the average value ranged between of **30.80** to **34.50** $\mu g/m^3$. It can be observed that the average value is within the limits specified in the ambient air quality standards. It is, therefore, concluded that $NO_x$ concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

#### 2.1.7.5 Benzene ($C_6H_6$)

During the study period, the Benzene concentrations were found below detection level. The concentration of Benzene cannot be compared with National Ambient Air Quality Standard as there is no standard for 24-hrs average in NAAQS.

#### 2.1.7.6 Benzo (α) pyrene

During the study period, the Benzo (α) pyrene concentrations were found below detection level

#### 2.1.7.7 Carbon monoxide (CO)

During the study period, the CO concentrations were observed in the range of **0.91** to **1.64** $mg/m^3$, with the average value ranged between of **1.03** to **1.24**$mg/m^3$. Thus, the average values of CO concentrations are within the limits specified in the ambient air quality. It is, therefore, concluded that CO concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

#### 2.1.7.8 Ammonia ($NH_3$)

During the study period, the ammonia concentrations were observed in the range of **29.50** to **45.10** $\mu g/m^3$, with the average value ranged between of **33.15** to **40.30** $\mu g/ m^3$. Thus, the average values of ammonia concentrations are within the limits specified in the ambient air quality. It is, therefore, concluded that ammonia concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

#### 2.1.7.9 Ozone ($O_3$)

During the study period, the $O_3$ concentrations were observed in the range of **25.50** to **38.70** $\mu g/m^3$, with the average value ranged between of **28.90** to **33.85**$\mu g/m^3$. Thus, the average values of $O_3$ concentrations are within the limits specified in the ambient air quality. It is, therefore, concluded that $O_3$ concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.

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#### 2.1.7.10 Nickel (Ni)

During the study period, the Nickel concentrations were found below detection level. The concentration of nickel cannot be compared with National Ambient Air Quality Standard as there is no standard for 24-hrs average in NAAQS.

#### 2.1.7.11 Arsenic (As)

During the study period, the Arsenic concentrations were found below detection level. The concentration of arsenic cannot be compared with National Ambient Air Quality Standard as there is no standard for 24-hrs average in NAAQS.

#### 2.1.7.12 Lead (Pb)

During the study period, the Lead concentrations were found below detection level.

# NOISE MONITORING

## 3.0 NOISE MONITORING

### 3.1 Monitoring Stations

The Nitya Laboratories team in consultation with the Engineer In-charge of New Mangalore Port Authority, Paradip fixed the frequency and number of sampling stations. Accordingly, a Noise monitoring was conducted at 06 locations during the period from APRIL 2023 TO SEPTEMBER 2023.

**Table - 3**
**Location of Noise Monitoring Stations**

| Sr. No. | Location of Station | Frequency |
|---|---|---|
| 1. | Malya Gate (Main Gate) | Once in a Month |
| 2. | Wharf Berth (Inside) | Once in a Month |
| 3. | Administrative Office Building | Once in a Month |
| 4. | J.N.C. Hall in the campus | Once in a Month |
| 5. | Wharf Canteen | Once in a Month |
| 6. | Container Yard | Once in a Month |

### 3.2 Results

The observations made on Noise Monitoring at 06 locations have been presented through Table-2. Minimum and maximum values and arithmetic mean values of the 24-hour average concentrations have also been computed and presented.

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**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Noise Monitoring

Sample Drawn By: Nitya Laboratories

**Ambient Noise Monitoring for Six Months APRIL 2023 TO SEPTEMBER 2023Summary**

| Sr. No. | Location | Noise Level in dB(A) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day Time | | | | Night Time | | | |
| | | Min. | Max. | Average | CPCB Limit | Min. | Max. | Average | CPCB Limit |
| 1 | Malya Gate (Main Gate) | 70.80 (Aug. 2023) | 80.3 (Sep) 2023 | 75.55 | Industrial Area Day Time Avg. 75 dB(A) | 63.5 (Aug. 2023) | 70.4 (Sep. 2023 ) | 66.95 | Industrial Area Day Time Avg. 70 dB(A) |
| 2 | Wharf Berth (Inside) | 68.80 (Sep 2023) | 73.8 (Aug 2023) | 71.3 | | 62.4 (Sep 2023) | 64.9 (June 2023) | 63.65 | |
| 3 | Administrative Office Building | 71.3 (Sep 2023) | 73.8 (July 2023) | 72.55 | | 48.4 (Sep 2023) | 65.4 (July 2023) | 56.9 | |
| 4 | J.N.C. Hall in the campus | 64.5 (Sep 2023) | 71.6 (Aug 2023) | 68.05 | | 60.9 (Sep 2023) | 66.90 (July 2023) | 63.90 | |
| 5 | Wharf Canteen | 69.70 (APRIL 2023) | 80.3 (Sep 2023) | 75 | | 62.8 (July 2023) | 65.4 (APRIL 2023 | 64.1 | |
| 6 | Container Yard | 69.8 (June 2023) | 80.8 (Sep 2023) | 75.3 | | 64.80 (July 2023) | 67.6 (Sep 2023) | 66.2 | |

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### 3.3 Sampling and Analytical Procedure

The ambient Noise Level in four cardinal directions were carried out using anLutron sound level meter with windscreen during the daytime as well as night-time. Noise measurements were made at 1.5 meter above the ground level and about 3 m away from the walls, buildings or other sound reflecting sources. The measurements were carried out in such a way that 1 meter away from the sources and 1 meter away from the edge of the roads. In order to reduce the disturbance from standing waves, the noise level measured were averaged over +0.5m each of at less three positions. The mean values were taken for reporting.

# ***DRINKING WATER QUALITY MONITORING***

## 4.0 Drinking Water Sampling

### 4.1 Sampling Location

The Nitya Laboratories team in consultation with the Engineer In-charge of New Mangalore Port Authority, Paradip fixed the frequency and number of sampling stations. Accordingly, a Water sampling was conducted at 19 locations during the period from APRIL 2023 To September 2023.

**Table - 4**
**Location of Drinking Water Sampling Stations**

| Sr. No. | Location of Station | Frequency |
|---|---|---|
| 1. | Administration Building as DW1 | Once in a Month |
| 2. | NMPA School as DW2 | Once in a Month |
| 3. | NMPA Canteen as DW3 | Once in a Month |
| 4. | Hospital as DW4 | Once in a Month |
| 5. | NMPA Any Water Inlet Inside Wharf as DW5 | Once in a Month |
| 6. | Wharf Canteen (Inside the Port Area) as DW6 | Once in a Month |
| 7. | Traffic Building (Inside the Port Area) as DW7 | Once in a Month |
| 8. | Berth No.14 (Inside the Port Area) as DW8 | Once in a Month |
| 9. | Berth No.9 (Inside the Port Area) as DW9 | Once in a Month |
| 10. | NMPA Guest House as DW10 | Once in a Month |
| 11. | Marshalling Yard as DW11 | Once in a Month |
| 12. | Fifth Avenue Open Well as S1 | Once in a Month |
| 13. | RCHW Colony Open Well as S2 | Once in a Month |
| 14. | RCHW Colony New Open Well as S3 | Once in a Month |
| 15. | Sump Tank (Pump House) as S4 | Once in a Month |
| 16. | New UGR Open Well as S5 | Once in a Month |
| 17. | Timber Yard as S6 | Once in a Month |
| 18. | Thimmappayya Well as S7 | Once in a Month |
| 19. | MCC Water at New UGR as S8 | Once in a Month |

### 4.2 Results

The observations made on drinking water sampling at 19 locations have been presented through Table-2. Minimum and maximum values and arithmetic mean values of the 24-hour average concentrations have also been computed and presented.

### 4.3 Methodology

The samples for drinking water quality characterization were collected and analysed as per the procedures specified in "Standard Method for the Examination of Water & Wastewater published by "American Public Health Association" (APHA: 23rd edition) and IS 3025. All the parameters except Heavy metals and Bacteriological were analysed at the site i.e., at Panambur. Samples of heavy metals and bacteriological parameters have been sent to our Laboratory. Samples for chemical analysis were collected in polyethylene containers. Samples collected for metal content were acidified with 1 ml. $HNO_3$.

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### 4.4 Results & Discussion on Observations

#### 4.4.1 Administration Building as DW1

During the study period, at this location, pH was found between **6.65** to **6.72.** Total Hardness was found between **16** to **23.66** mg/l and TDS was found between **64** to **94** mg/l. Chlorides and Sulphates were found between **13** to **16.85** mg/l and **7.76** to **8.16** mg/l respectively. Iron is found **ND.** The Ammonical Nitrogen and Phosphates are found between **0.06** to **0.11** mg/l and **0.08** to **0.13** mg/l respectively. Standard Plate Count is between **56** to **88** cfu/ml and Coliforms were absent. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.2 NMPA School as DW2

During the study period, at this location, pH was found between **6.63** to **6.76**. Total Hardness was found between **20** to **31.49**mg/l and TDS was found between **98** to **116** mg/l. Chlorides and Sulphates were found between **18.90** to **23.80** mg/l and **7.81** to **8.21** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.06** to **0.10** mg/l and **0.07** to **0.16** mg/l respectively. Standard Plate Count is between **60** to **69** cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.3 NMPA Canteen as DW3

During the study period, at this location, pH was found between **6.60** to **6.67**. Total Hardness was found between **12** to **21.70** mg/l and TDS was found between **84** to **110** mg/l. Chlorides and Sulphates were found between **13** to **15** mg/l and **7.82** to **8.05** mg/l respectively. Iron is found **ND.** The Ammonical Nitrogen and Phosphates are found between **0.05** to **0.09** mg/l and **0.09** to **0.12** mg/l respectively. Standard Plate Count is between **59** to **75**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.4 Hospital as DW4

During the study period, at this location, pH was found between **6.62** to **6.74**.Total Hardness and Total Dissolved Solids were found between **25.64** to **37.39** mg/l and **80** to **102**. Chlorides and Sulphates were found between **12** to **30.74** mg/l and **7.06** to **8.12** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.05** to **0.08** mg/l and **0.08** to **0.12** mg/l respectively. Standard Plate Count is between **66** to **98**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.5 NMPA any Water Inlet Inside Wharf as DW5

During the study period, at this location, pH was found between **6.54** to **6.68**.Total Hardness and Total Dissolved Solids were found between **29.60** to **60** mg/l and **120** to **228**. Chlorides and Sulphates were found between **19.12** to **35.09** mg/l and **9.6** to **17.84** mg/l respectively. Iron is found **ND.** The Ammonical Nitrogen and Phosphates are found between **0.06** to **0.11** mg/l and **0.05** to **0.12** mg/l respectively. Standard Plate Count is between **58** to **75** cfu/ml and Coliforms were absent. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.6 Wharf Canteen (Inside the Port Area)as DW6

During the study period, at this location, pH was found between **6.75** to **6.81**.Total Hardness and Total Dissolved Solids were found between **14** to **27.55** mg/l and **112** to **154**. Chlorides and Sulphates were found between **8.0** to **14.87**mg/l and **7.90** to **8.30** mg/l respectively. Iron is found ND. The Ammonical Nitrogen and Phosphates are found between **0.05** to **0.11** mg/l and **0.05** to **0.12** mg/l respectively. Standard Plate Count is between **54** to **69**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.7 Traffic Building (Inside the Port Area) as DW7

During the study period, at this location, pH was found between **6.60** to **6.78.**Total Hardness and Total Dissolved Solids were found between **20** to **31.49** mg/l and **136** to **290.** Chlorides and Sulphates were found between **18** to **27.76** mg/l

and **7.02** to **8.18** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.040** to **0.12** mg/l and **0.07** to **0.11** mg/l respectively. Standard Plate Count is between **49** to **69** cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.8 Berth No.14 (Inside the Port Area) as DW8

During the study period, at this location, pH was found between **6.71** to **6.88.**Total Hardness and Total Dissolved Solids were found between **104.52** to **128** mg/l and **284** to **356**. Chlorides and Sulphates were found between **74.40** to **90.22** mg/l and **29.56** to **36.40** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.05** to **0.14** mg/l and **0.07** to **0.13** mg/l respectively. Standard Plate Count is between **36** to **67**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.9 Berth No.9 (Inside the Port Area) as DW9

During the study period, at this location, pH was found between **6.64** to **6.67.**Total Hardness and Total Dissolved Solids were found between **72** to **108.20** mg/l and **296** to **324.** Chlorides and Sulphates were found between **68.80** to **92.20** mg/l and **25** to **40.12** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04** to **0.12** mg/l and **0.07** to **0.11** mg/l respectively. Standard Plate Count is between **69** to **98**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.10 NMPA Guest House as DW10

During the study period, at this location, pH was found between **6.59** to **6.67.**Total Hardness and Total Dissolved Solids were found between **24** to **29.60** mg/l and **64** to **136**. Chlorides and Sulphates were found between **14.87** to **18.90** mg/l and **6.57** to **7.54** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04** to **0.12** mg/l and **0.05** to **0.12** mg/l respectively. Standard Plate Count is between **64** to **98**cfu/ml and Coliforms were **absent.** All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.11 Marshalling Yard as DW11

During the study period, at this location, pH was found between **6.60** to **6.67.**Total Hardness and Total Dissolved Solids were found between **20** to **35.42** mg/l and **58** to **108**. Chlorides and Sulphates were found between **24** to **27.20** mg/l and **6.31** to **6.71** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.05** to **0.10** mg/l and **0.06** to **0.14** mg/l respectively. Standard Plate Count is between **59** to **98**cfu/ml and Coliforms were **absent.** All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.12 Wharf Open well (Inside Port Area)

During the study period, at this location, pH was found between **6.94** to **7.01.**Total Hardness and Total Dissolved Solids were found between **92.68** to**112** mg/l and **412** to **472**. Chlorides and Sulphates were found between **44** to **67.42** mg/l and **7.84** to **8.62** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.06** to **0.16** mg/l and **0.11** to **0.18** mg/l respectively. Standard Plate Count is between **549** to **672** cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.13 Fifth Avenue Open Well as S1

During the study period, at this location, pH was found between **6.59** to **6.71.**Total Hardness and Total Dissolved Solids were found between **18** to **27.60** mg/l and **96** to **272**. Chlorides and Sulphates were found between **24** to **29** mg/l and **6.07** to **8.36** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.07** to **0.12** mg/l and **0.07** to **0.16** mg/l respectively. Standard Plate Count is between **1002** to **1152**cfu/ml and Coliforms is between **84 to 148** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.14 RCHW Colony Open Well as S2

During the study period, at this location, pH was found between **6.68** to **6.84**.Total Hardness and Total Dissolved Solids were found between **16** to **25.64** mg/l and **80** to **280**. Chlorides and Sulphates were found between **27.76** to **39** mg/l and **7.80** to **8.12** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.08** to **0.12** mg/l and **0.11** to **0.19** mg/l respectively. Standard Plate Count is between **984** to **1012**cfu/ml and Coliforms is between **70 to 88** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.15 RCHW Colony New Open Well as S3

During the study period, at this location, pH was found between **6.65** to **8.82**.Total Hardness and Total Dissolved Solids were found between **28** to **34** mg/l and **84** to **296**. Chlorides and Sulphates were found between **23.2** to **32** mg/l and **7.60** to **8.40** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.05** to **0.12** mg/l and **0.10** to **0.21** mg/l respectively. Standard Plate Count is between **822** to **874**cfu/ml and Coliform is between **58 to 82** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.16 Sump Tank (Pump House) as S4

During the study period, at this location, pH was found between **6.59** to **6.68**.Total Hardness and Total Dissolved Solids were found between **10** to **29.60** mg/l and **108** to **264**. Chlorides and Sulphates were found between **23.80** to **27.90** mg/l and **9.6** to **10.40** mg/l respectively. Iron is found **ND.** The Ammonical Nitrogen and Phosphates are found between **0.09** to **0.14**mg/l and **0.19** to **0.34** mg/l respectively. Standard Plate Count is between **1162** to **1312**cfu/ml and Coliforms is between **79 to 114** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.3.17 New UGR Open Well as S5

During the study period, at this location, pH was found between **6.60** to **6.80**.Total Hardness and Total Dissolved Solids were found between **8** to **33.52** mg/l and **210** to **268**. Chlorides and Sulphates were found between **22.4** to **28.90** mg/l and **6.10** to **8.05** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.10** to **0.14** mg/l and **0.11** to **0.17** mg/l respectively. Standard Plate Count is between **798** to **898** cfu/ml and Coliforms is between **63 to 129** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.18 Timber Yard as S6

During the study period, at this location, pH was found between **6.62** to **6.83**. Total Hardness and Total Dissolved Solids were found between **12** to **25.64** mg/l and **218** to **264**. Chlorides and Sulphates were found between **24.80** to **26.90** mg/l and **9.20** to **10.10**mg/l respectively. Iron is found ND. The Ammonical Nitrogen and Phosphates are found between **0.08** to **0.15** mg/l and **0.16** to **0.23**mg/l respectively. Standard Plate Count is between **959** to **1054** cfu/ml and Coliforms is between **84 to 148** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

#### 4.4.19 Thimmappayya Well as S7

During the study period, at this location, pH was found between **6.80** to **6.98**.Total Hardness and Total Dissolved Solids were found between **22** to **29.60** mg/l and **120** to **136**. Chlorides and Sulphates were found between **18.90** to **28** mg/l and **8.30** to **9.0** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.07** to **0.17** mg/l and **0.11** to **0.19**mg/l respectively. Standard Plate Count is between **1202** to **1286** cfu/ml and Coliforms is between **94 to 184** MPN/100ml. All these values were found well within the IS: 10500-2012 norms prescribed.

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Administration Building as DW1 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | | |
| 1 | pH | - | 6.65 (July. 2023) | 6.72 (Sep.2023) | 6.68 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 88.7 (Aug. 2023) | 114.8 (July.2023) | 101.55 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 64 (APRIL. 2023) | 94 (Sep. 2023) | 79 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 16 (July. 2023) | 23.66 (Sep. 2023) | 19.83 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 13 (June. 2023) | 16.85 (Sep. 2023) | 14.29 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.76 (July 2023) | 8.16 (APRIL. 2023) | 7.96 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.06 (June. 2023) | 0.11 (Sep. 2023) | 0.085 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.08 (APRIL. 2023) | 0.13 (Sep. 2023) | 0.105 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 56 (APRIL. 2023) | 88 (Sep. 2023) | 72 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results NMPA School as DW2 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.63 (Aug. 2023) | 6.76 (Dec. 2023) | 6.69 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 116.9 (Sep. 2023) | 135.8 (June. 2023) | 126.15 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 98 (July. 2023) | 116 (Sep. 2023) | 107 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 20 (July. 2023) | 31.49 (Aug. 2023) | 25.74 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 18.90 (July. 2023) | 23.80 (Sep. 2023) | 21.35 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.81 (Sep. 2023) | 8.21 (APRIL. 2023) | 8.01 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.06 (June. 2023) | 0.10 (Sep. 2023) | 0.08 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.07 (APRIL. 2023) | 0.16 (Sep. 2023) | 0.115 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 60 (APRIL. 2023) | 69 (June. 2025) | 64 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results NMPA Canteen as DW3 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.60 (Aug. 2023) | 6.67 (Sep. 2023) | 6.63 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 121 (July. 2023) | 192.6 (June. 2023) | 156.80 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 84 (July. 2023) | 110 (June. 2023) | 97 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 12 (APRIL. 2023) | 21.70 (Sep. 2023) | 16.85 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 13 (July. 2023) | 15 (June. 2023) | 14 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.82 (July. 2023) | 8.05 (June. 2023) | 7.93 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.05 (June. 2023) | 0.09 (Sep. 2023) | 0.076 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^{-}$ | mg/l | 0.09 (June. 2023) | 0.12 (Aug. 2023) | 0.105 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 59 (Oct. 2023) | 75 (July. 2023) | 67 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Hospital as DW4 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.62 (July. 2023) | 6.74 (Aug. 2023) | 6.68 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 102.6 (Aug. 2023) | 129.7 (July. 2023) | 116.15 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 80 (APRIL. 2023) | 102 (Sep. 2023) | 91 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 25.64 (Sep. 2023) | 37.39 (Aug. 2023) | 31.51 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 12 (June. 2023) | 30.74 (Sep. 2023) | 21.37 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.06 (July. 2023) | 8.12 (Sep. 2023) | 7.59 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.05 (APRIL. 2023) | 0.08 (July. 2023) | 0.065 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.08 (APRIL. 2023) | 0.12 (Sep. 2023) | 0.10 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 66 (APRIL. 2023) | 98 (Aug 2023) | 82 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results NMPA Any Water Inlet Inside Wharf as DW5 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.54 (APRIL. 2023) | 6.68 (Aug. 2023) | 6.61 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Color | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 154.49 (Aug. 2023) | 183.3 (June. 2023) | 168.89 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 120 (July. 2023) | 228 (APRIL. 2023) | 178 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 29.60 (Sep. 2023) | 60 (July. 2023) | 44.80 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 19.12 (APRIL. 2023) | 35.09 (Sep. 2023) | 27.06 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 9.6 (July. 2023) | 17.84 (Aug. 2023) | 13.72 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.06 (Aug. 2023) | 0.11 (Sep. 2023) | 0.085 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.05 (June. 2023) | 0.12 (Sep. 2023) | 0.087 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 58 (APRIL. 2023) | 75 (Sep. 2023) | 66 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Wharf Canteen (Inside the Port Area) as DW6 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.75 (Sep. 2023) | 6.81 (June. 2023) | 6.78 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 153.61 (Sep. 2023) | 179 (July. 2023) | 166.10 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 112 (APRIL. 2023) | 154 (Sep. 2023) | 133 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 14 (APRIL. 2023) | 27.55 (Aug. 2023) | 20.77 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 8.0 (APRIL. 2023) | 14.87 (Sep. 2023) | 11.43 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.90 (Sep. 2023) | 8.30 (July. 2023) | 8.10 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.051 (July. 2023) | 0.11 (Sep. 2023) | 0.08 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.05 (July. 2023) | 0.12 (Aug. 2023) | 0.084 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 54 (APRIL. 2023) | 69 (July. 2023) | 62 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Traffic Building (Inside The Port Area) as DW7 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.60 (June. 2023) | 6.78 (Aug. 2023) | 6.69 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 225 (Sep. 2023) | 280.1 (June. 2023) | 252.6 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 136 (APRIL. 2023) | 290 (Aug. 2023) | 213 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 20 (July. 2023) | 31.49 (Aug. 2023) | 25.69 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 18 (July. 2023) | 27.76 (Sep. 2023) | 25.75 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.02 (APRIL. 2023) | 8.18 (Sep. 2023) | 7.06 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.040 (June. 2023) | 0.12 (Sep. 2023) | 0.08 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as PO4 | mg/l | 0.07 (June. 2023) | 0.11 (Sep. 2023) | 0.090 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 49 (APRIL 2023) | 69 (July. 2023) | 59 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Berth No.14 (Inside the Port Area) as DW8 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.71 (Aug. 2023) | 6.88 (July. 2023) | 6.75 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 373.7 (Sep. 2023) | 468 (July. 2023) | 420.48 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 284 (Aug. 2023) | 356 (July. 2023) | 320 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 104.52 (Sep. 2023) | 128 (July. 2023) | 116.10 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 74.40 (APRIL. 2023) | 90.22 (Sep. 2023) | 82.31 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 29.56 (APRIL. 2023) | 36.40 (Sep. 2023) | 32.98 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.05 (June. 2023) | 0.14 (Sep. 2023) | 0.095 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^{-}$ | mg/l | 0.07 (June. 2023) | 0.13 (Aug. 2023) | 0.105 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 36 (Aug. 2023) | 67 (June 2023) | 51 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Berth No.9 (Inside the Port Area) as DW9 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.64 (APRIL. 2023) | 6.67 (July. 2023) | 6.71 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Color | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 320 (July. 2023) | 454 (APRIL. 2023) | 387.3 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 296 (Aug. 2023) | 324 (APRIL. 2023) | 310 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 72 (July. 2023) | 108.20 (Aug. 2023) | 90.10 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 68.80 (APRIL. 2023) | 92.20 (Sep. 2023) | 80.55 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 25 (July. 2023) | 40.12 (Sep. 2023) | 32.56 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.04 (June. 2023) | 0.12 (Sep. 2023) | 0.08 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^{-}$ | mg/l | 0.07 (June. 2023) | 0.11 (Sep. 2023) | 0.09 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 69 (APRIL. 2023) | 98 (July. 2023) | 84 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results NMPA Guest House as DW10 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.59 (Sep. 2023) | 6.67 (July. 2023) | 6.63 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 180.4 (Sep. 2023) | 230.6 (APRIL. 2023) | 205.50 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 64 (Sep. 2023) | 136 (July. 2023) | 100.20 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 24 (July. 2023) | 29.60 (Sep. 2023) | 26.50 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 14.87 (Sep. 2023) | 18.90 (Aug. 2023) | 16.88 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 6.57 (APRIL. 2023) | 7.54 (Sep. 2023) | 7.02 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.04 (APRIL. 2023) | 0.12 (Sep. 2023) | 0.080 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^{-}$ | mg/l | 0.05 (APRIL. 2023) | 0.12 (Sep. 2023) | 0.084 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 64 (APRIL. 2023) | 98 (Sep. 2023) | 84 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Marshalling Yard as DW11 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.60 (June. 2023) | 6.67 (July. 2023) | 6.635 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 168 (July. 2023) | 215 (June. 2023) | 198.20 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 58 (Sep. 2023) | 108 (July. 2023) | 83.40 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 20 (July. 2023) | 35.42 (Aug. 2023) | 23.60 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 24 (July. 2023) | 27.20 (APRIL. 2023) | 25.60 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 6.31 (June. 2023) | 6.71 (Sep. 2023) | 6.51 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.05 (APRIL. 2023) | 0.10 (Sep. 2023) | 0.075 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.06 (APRIL. 2023) | 0.14 (Sep. 2023) | 0.104 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 59 (APRIL. 2023) | 98 (July. 20233) | 78 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Wharf Open well (Inside Port Area) | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.94 (July. 2023) | 7.01 (June. 2023) | 6.97 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 629 (APRIL. 2023) | 706.4 (Sep. 2023) | 667.5 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 412 (APRIL. 2023) | 472 (June. 2023) | 442 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 92.68 (Sep. 2023) | 112 (July. 2023) | 102.14 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 44 (June. 2023) | 67.42 (Sep. 2023) | 35.61 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.84 (June. 2023) | 8.62 (Sep. 2023) | 8.23 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.06 (June. 2023) | 0.16 (July. 2023) | 0.11 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.11 (Aug. 2023) | 0.18 (Sep. 2023) | 0.145 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 549 (APRIL. 2023) | 672 (Sep. 2023) | 620 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | - | - | - | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Fifth Avenue Open Well as S1 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.59 (Aug. 2023) | 6.71 (Sep. 2023) | 6.65 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Color | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 108 (Sep. 2023) | 130.5 (July. 2023) | 119.25 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 96 (July. 2023) | 272 (APRIL. 2023) | 184 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 18 (July. 2023) | 27.60 (Sep. 2023) | 22.80 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 24 (Aug. 2023) | 29 (July. 2023) | 26.59 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 6.07 (APRIL. 2023) | 8.36 (Sep. 2023) | 7.215 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.07 (June. 2023) | 0.12 (Sep. 2023) | 0.119 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.07 (Aug. 2023) | 0.16 (July. 2023) | 0.115 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 1002 (APRIL. 2023) | 1152 (Aug. 2023) | 1077 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 84 (APRIL. 2023) | 148 (Aug. 2023) | 116 | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results RCHW Colony Open Well as S2 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.68 (July. 2023) | 6.84 (Aug. 2023) | 6.76 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 90.6 (Aug. 2023) | 105.1 (July. 2023) | 97.85 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 60 (June. 2023) | 280 (APRIL. 2023) | 180 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 16 (APRIL. 2023) | 25.64 (Sep. 2023) | 20.82 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 27.76 (Sep. 2023) | 39 (June. 2023) | 33.38 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.80 (Sep. 2028) | 8.12 (Aug. 2023) | 7.96 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.08 (Sep. 2023) | 0.12 (July. 2024) | 0.10 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.11 (APRIL. 2023) | 0.19 (July. 2023) | 0.15 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 984 (Sep. 2023) | 1012 (Aug. 2023) | 998 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 70 (APRIL. 2023) | 88 (Sep. 2023 | 79 | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results RCHW Colony New Open Well as S3 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.65 (July. 2023) | 8.82 (Aug. 2023) | 7.73 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 101.4 (June. 2023) | 114.3 (July. 2023) | 107.85 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 84 (July. 2023) | 296 (Aug. 2023) | 190 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 28 (July. 2023) | 34 (Aug. 2023) | 31 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 23.2 (Aug. 2023) | 32 (July. 2023) | 27.60 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 7.60 (Aug. 2023) | 8.40 (June. 2023) | 8.04 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.05 (June. 2023) | 0.12 (Sep. 2023) | 0.108 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.11 (Sep. 2023) | 0.21 (July. 2023) | 0.16 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 822 (July. 2023) | 874 (June. 2023) | 848 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 58 (APRIL. 2023) | 82 (Sep. 2023) | 70 | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Sump Tank (Pump House) as S4 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.59 (APRIL. 2023) | 6.68 (June. 2023) | 6.63 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 140.2 (Sep. 2023) | 182.6 (July. 2023) | 161.4 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 108 (July. 2023) | 264 (Aug. 2023) | 186 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 10 (APRIL. 2023) | 29.60 (Sep. 2023) | 19.80 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 23.80 (Sep. 2023) | 27.90 (June. 2023) | 25.85 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 9.6 (Sep. 2023) | 10.40 (Aug. 2023) | 10.12 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.09 (July. 2023) | 0.14 (APRIL. 2023) | 0.102 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.19 (APRIL. 2023) | 0.35 (July. 2023) | 0.275 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 1162 (Sep. 2023) | 1312 (Aug. 2023) | 1237 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 79 (June. 2023) | 114 (Sep. 2023) | 96 | - | IS:1622 |

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results New UGR Open Well as S5 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.60 (Aug. 2023) | 6.80 (Sep. 2023) | 6.72 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 99.10 (APRIL. 2023) | 116.5 (Sep. 2023) | 107.80 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 210 (Sep. 2023) | 268 (June. 2023) | 239 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 8 (APRIL. 2023) | 33.52 (Sep. 2023) | 20.76 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 22.4 (Aug. 2023) | 28.90 (June. 2023) | 25.65 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 6.1 (APRIL. 2023) | 8.05 (Sep. 2023) | 7.075 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.10 (APRIL. 2023) | 0.14 (July. 2023) | 0.1034 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as PO4' | mg/l | 0.11 (June. 2023) | 0.17 (Sep. 2023) | 0.143 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 798 (Aug. 2023) | 898 (July. 2023) | 848 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 63 (APRIL. 2023) | 129 (Sep. 2023 | 96 | - | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Timber Yard as S6 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.62 (APRIL. 2023) | 6.83 (Aug. 2023) | 6.725 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Color | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 148 (Sep. 2023) | 165.4 (APRIL. 2023) | 156.70 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 218 (APRIL. 2023) | 264 (Sep. 2023) | 241 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 12 (APRIL. 2023) | 25.64 (Sep. 2023) | 18.82 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 24.80 (Aug. 2023) | 26.90 (June. 2023) | 25.85 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 9.20 (June. 2023) | 10.10 (Aug. 2023) | 9.65 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.083 (APRIL. 2023) | 0.15 (Sep. 2023) | 0.112 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO_4$ | mg/l | 0.16 (APRIL. 2023) | 0.23 (Sep. 2023) | 0.195 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 959 (APRIL. 2023) | 1054 (Sep. 2023) | 1006 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 84 (Jan. 2023) | 148 (July. 2023) | 116 | - | IS:1622 |

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**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur, Mangalore -575010

Sample Description: Drinking Water

Sample Drawn By: Nitya Laboratories

**RESULT OF DRINKING WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Thimmappayya Well as S7 | | | Requirement IS:10500 | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | Desirable | |
| 1 | pH | - | 6.80 (July. 2023) | 6.89 (Aug. 2023) | 6.845 | 6.5-8.5 | IS:3025 (P-11) |
| 2 | Colour | Hazen | <5 | <5 | <5 | 5 | IS:3025 (P-4) |
| 3 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | IS:3025 (P-5) |
| 4 | Turbidity | NTU | <1 | <1 | <1 | 1 | APHA 23rd Ed. |
| 5 | Electrical Conductivity | us/cm | 72 (APRIL. 2023) | 102.5 (July. 2023) | 87.25 | - | IS:3025 (P-14) |
| 6 | Total Dissolved Solids | mg/l | 120 (APRIL. 2023) | 136 (June. 2023) | 128.69 | 500 | IS:3025 (P-16) |
| 7 | Total Hardness as ($CaCO_3$) | mg/l | 22 (June. 2023) | 29.60 (Sep. 2023) | 25.80 | 200 | IS:3025 (P-21) |
| 8 | Chlorides as Cl | mg/l | 18.90 (APRIL. 2023) | 28 (Aug. 2023) | 23.45 | 250 | IS:3025(P-32 |
| 9 | Sulphate as $SO_4$ | mg/l | 8.30 (APRIL. 2023) | 9.0 (Sep. 2023) | 8.65 | 200 | APHA 23rd Ed. |
| 10 | Iron (as Fe) | mg/l | ND | ND | ND | 0.3 | APHA 23rd Ed. |
| 11 | Ammonical Nitrogen | mg/l | 0.07 (June. 2023) | 0.17 (Aug. 2023) | 0.125 | - | IS:3025 (P-34) |
| 12 | Total Phosphate as $PO4^-$ | mg/l | 0.11 (Aug. 2023) | 0.19 (July. 2023) | 0.154 | - | IS:3025 (P-31) |
| 13 | Standard Plate Count | Cfu/ml | 1202 (Sep. 2023) | 1286 (July. 2023) | 1244 | - | IS:1622 |
| 14 | Total Coliform | MPN/100 ml | 94 (Jan. 2023) | 184 (Mar. 2023) | 139 | - | IS:1622 |

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# WASTE WATER QUALITY MONITORING

## 5.0 Wastewater Sampling

### 5.1 Sampling Location

The Nitya Laboratories team in consultation with the Engineer In-charge of New Mangalore Port Authority, Paradip fixed the frequency and number of sampling stations. Accordingly, a Water sampling was conducted at 4 locations during the period from October 2021 to March 2023.

**Table –5**
**Location of Wastewater Sampling Stations**

| Sr. No. | Location of Station | Frequency |
|---|---|---|
| 1. | Treated Water | Once in a Month |
| 2. | Sewage Collection Water | Once in a Month |
| 3. | UF Field Tank | Once in a Month |
| 4. | SBR TANK | Once in a Month |

### 5.2 Results

The observations made on drinking water sampling at 4 locations have been presented through Table-2. Minimum and maximum values and arithmetic mean values of the 24-hour average concentrations have also been computed and presented.

### 5.3 Methodology

The samples for wastewater quality characterization were collected and analyzed as per the procedures specified in "Standard Method for the Examination of Water & Wastewater published by "American Public Health Association" (APHA: 23rd edition) and IS 3025. All the parameters except Heavy metals and Bacteriological were analyzed at the site i.e., at Panambur. Samples of heavy metals and bacteriological parameters have been sent to our Laboratory. Samples for chemical analysis were collected in polyethylene containers. Samples collected for metal content were acidified with 1 ml. $HNO_3$.

### 5.4 Results & Discussion on Observations

#### 5.4.1 Treated Water

During the study period, at this location, pH was found between **7.13 to 7.41.** Oil & Grease was found between **2.4 to 4.0** mg/l. BOD and COD were found between **14 to 17** mg/l and **50.48 to 66** mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between **160 to 174** mg/l and **4.9 to 5.7** mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between **236 to 284** mg/l and **0.40 to 0.90** mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between **410 to 468** mg/l and **1.9 to 2.5** mg/l. The Faecal Coliform is found between **48 to 136** MPN/100ml. The Phenolic Compound is not detected during the analysis.

#### 5.4.2 Sewage Collection Water

During the study period, at this location, pH was found between **5.81 to 7.38**.Oil & Grease was found between **8.0 to 9.5** mg/l. BOD and COD were found between **84 to 96** mg/l and **248 to 354** mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between **380 to 484** mg/l and **0.6 to 0.8** mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between **424 to 508** mg/l and **3.9 to 4.35** mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between **416 to 460** mg/l and **4.50 to 6.20** mg/l. The Faecal Coliform is found between **1405** to **1600** MPN/100ml. The Phenolic Compound is not detected during the analysis.

#### 5.4.3 UF Field Tank

During the study period, at this location, pH was found between **6.95 to 7.30**. Oil & Grease was found between **2.0 to 3.5** mg/l. BOD and COD were found between **5 to 9.0** mg/l and **23 to 38** mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between **120 to 154** mg/l and **4.8 to 5.8**mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between **160 to 216** mg/l and **0.54 to 0.60** mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between **198 to 408** mg/l and **1.32 to 3.92** mg/l. The Faecal Coliform is found between **177 to 227** MPN/100 ml. The Phenolic Compound is not detected during the analysis.

#### 5.4.4 SBR Tank

During the study period, at this location, pH was found between **6.81 to 7.12.** Oil & Grease was found between **4.1 to 6** mg/l. BOD and COD were found between **30 to 48** mg/l and **102 to 163.3** mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between **1420 to 1854** mg/l and **4.0 to 4.6** mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between **1862 to 2048** mg/l and **2.1 to 3.32** mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between **410 to 480** mg/l and **2.34 to 4.10** mg/l. The Faecal Coliform is found Between **1398** to **1546** MPN/100ml. The Phenolic Compound is not detected during the analysis.

**Test Report**

Name of the Client: New Mangalore Port Authority

Address of the Client: Panambur ,Mangalore -575010

Sample Description: Wastewater (STP)

Sample Drawn By: NITYA LABORATORIES

**RESULT OF WASTEWATER (STP) FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Treated Water | | | Tolerance Limit as per KSPCB | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | | |
| 1 | pH | .. | 7.13 (July. 2023) | 7.41 (APRIL. 2023) | 7.402 | 6.5-9.0 | IS:3025 (P-11) |
| 2 | Colour | Hazen | 25 (APRIL. 2023) | 35 (Aug. 2023) | 29 | - | IS:3025 (P-4) |
| 3 | Odour | - | Objectionable | Objectionable | Objectionable | - | IS:3025 (P-6) |
| 4 | Oil & Grease | mg/L | 2.4 (July. 2023) | 4.0 (Sep. 2023) | 3.39 | 10 | IS:3025 (P-39) |
| 5 | Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD) | mg/L | 14 (APRIL. 2023) | 17 (July. 2023) | 15.8 | ≤10 | IS:3025 (P-44) |
| 6 | Chemical Oxygen Demand as COD | NTU | 50.48 (APRIL. 2023) | 66 (July. 2023) | 55.6 | ≤50 | IS:3025 (P-58) |
| 7 | Sludge Volume Index | mg/L | ND | ND | ND | - | APHA 23rd ED. |
| 8 | Mix Liquid Suspended Solids | mg/L | 160 (Aug. 2023) | 174 (July. 2023) | 169.2 | - | APHA 23rd ED. |
| 9 | Phenolic Compound | mg/L | ND | ND | ND | 1.0 | IS:3025 (P-43) |
| 10 | Dissolved Oxygen | mg/L | 4.9 (July. 2023) | 5.7 (Aug. 2023) | 5.36 | Min of 3 | IS:3025 (P-38) |
| 11 | Total Suspended Solids | mg/L | 236 (Aug. 2023) | 284 (July. 2023) | 259.3 | ≤20 | IS:3025 (P-17) |
| 12 | Ammonical Nitrogen | mg/L | 0.40 (June. 2023) | 0.90 (Sep. 2023) | 0.783 | ≤5 | IS:3025 (P-34) |
| 13 | Electrical Conductivity | uS/cm | 661 (June. 2023) | 730 (July. 2023) | 702.3 | - | IS:3025 (P-14) |
| 14 | Total Dissolved Solids | mg/L | 410 (APRIL. 2023) | 468 (Sep. 2023) | 442.3 | 2100 | IS:3025 (P-16) |
| 15 | Total Nitrogen | mg/L | 1.9 (July. 2023) | 2.5 (June. 2023) | 2.132 | ≤10 | IS:3025 (P-34) |
| 16 | Faecal Coliform | MPN/100 ml | 48 (APRIL. 2023) | 136 (Sep. 2023) | 89 | <100 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name of the Client:New Mangalore Port Authority

Address of the Client:Panambur ,Mangalore -575010

Sample Description:Wastewater (STP)

Sample Drawn By: Nitya Laboratories

**RESULT OF WASTE WATER (STP) FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results Sewage Collection Water | | | Tolerance Limit as per KSPCB | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | | |
| 1 | pH | .. | 5.81 (APRIL. 2023) | 7.38 (June. 2023) | 6.78 | 6.5-9.0 | IS:3025 (P-11) |
| 2 | Colour | Hazen | 90 (APRIL. 2023) | 110 (June. 2023) | 101 | - | IS:3025 (P-4) |
| 3 | Odour | - | Objectionable | Objectionable | Objectionable | - | IS:3025 (P-6) |
| 4 | Oil & Grease | mg/L | 8.0 (Sep. 2023) | 9.5 (June. 2023) | 8.89 | 10 | IS:3025 (P-39) |
| 5 | Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD) | mg/L | 84 (July. 2023) | 96 (Aug. 2023) | 89.6 | ≤10 | IS:3025 (P-44) |
| 6 | Chemical Oxygen Demand as COD | NTU | 248 (July. 2023) | 354 (Sep. 2023) | 302 | ≤50 | IS:3025 (P-58) |
| 7 | Sludge Volume Index | mg/L | ND | ND | ND | - | APHA 23rd ED. |
| 8 | Mix Liquid Suspended Solids | mg/L | 380 (APRIL. 2023) | 484 (Aug. 2023) | 442 | - | APHA 23rd ED. |
| 9 | Phenolic Compound | mg/L | ND | ND | ND | 1.0 | IS:3025 (P-43) |
| 10 | Dissolved Oxygen | mg/L | 0.6 (APRIL. 2023) | 0.8 (June. 2023) | 0.723 | Min of 3 | IS:3025 (P-38) |
| 11 | Total Suspended Solids | mg/L | 424 (APRIL. 2023) | 508 (July. 2023) | 464.1 | ≤20 | IS:3025 (P-17) |
| 12 | Ammonical Nitrogen | mg/L | 3.9 (APRIL. 2023) | 4.35 (July. 2023) | 4.198 | ≤5 | IS:3025 (P-34) |
| 13 | Electrical Conductivity | uS/cm | 694.7 (Aug. 2023) | 782 (July. 2023) | 748 | - | IS:3025 (P-14) |
| 14 | Total Dissolved Solids | mg/L | 416 (Aug. 2023) | 460 (APRIL. 2023) | 434 | 2100 | IS:3025 (P-16) |
| 15 | Total Nitrogen | mg/L | 4.50 (APRIL. 2023) | 6.20 (Sep. 2023) | 5.783 | ≤10 | IS:3025 (P-34) |
| 16 | Faecal Coliform | MPN/100 ml | 1405 (APRIL.2023) | 1600 (July. 2023) | 1489 | <100 | IS:1622 |

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**Test Report**

Name of the Client:New Mangalore Port Authority

Address of the Client:Panambur ,Mangalore -575010

Sample Description: Waste Water (STP)

Sample Drawn By: Nitya Laboratories

**RESULT OF WASTEWATER (STP) FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results UF Field Tank | | | Tolerance Limit as per KSPCB | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | | |
| 1 | pH | .. | 6.95 (APRIL. 2023) | 7.30 (Sep. 2023) | 7.12 | 6.5-9.0 | IS:3025 (P-11) |
| 2 | Colour | Hazen | 22 (APRIL. 2023) | 45 (Aug. 2023) | 33 | - | IS:3025 (P-4) |
| 3 | Odour | - | Objectionable | Objectionable | Objectionable | - | IS:3025 (P-6) |
| 4 | Oil & Grease | mg/L | 2.0 (Sep. 2023) | 3.5 (APRIL. 2023) | 2.9 | 10 | IS:3025 (P-39) |
| 5 | Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD) | mg/L | 5 (June. 2023) | 9.0 (July. 2023) | 7 | ≤10 | IS:3025 (P-44) |
| 6 | Chemical Oxygen Demand as COD | NTU | 23 (Aug. 2023) | 38 (June. 2023) | 31 | ≤50 | IS:3025 (P-58) |
| 7 | Sludge Volume Index | mg/L | - | - | - | - | APHA 23rd ED. |
| 8 | Mix Liquid Suspended Solids | mg/L | 120 (APRIL. 2023) | 154 (Sep. 2023) | 138.40 | - | APHA 23rd ED. |
| 9 | Phenolic Compound | mg/L | ND | ND | ND | 1.0 | IS:3025 (P-43) |
| 10 | Dissolved Oxygen | mg/L | 4.8 (Aug. 2023) | 5.8 (July. 2023) | 5.23 | Min of 3 | IS:3025 (P-38) |
| 11 | Total Suspended Solids | mg/L | 160 (APRIL. 2023) | 216 (Sep. 2023) | 196.46 | ≤20 | IS:3025 (P-17) |
| 12 | Ammonical Nitrogen | mg/L | 0.54 (Aug. 2023) | 0.60 (Sep. 2023) | 0.586 | ≤5 | IS:3025 (P-34) |
| 13 | Electrical Conductivity | uS/cm | 583.7 (Aug. 2023) | 673 (June. 2023) | 636.76 | - | IS:3025 (P-14) |
| 14 | Total Dissolved Solids | mg/L | 198 (Aug. 2023) | 408 (July. 2023) | 316.20 | 2100 | IS:3025 (P-16) |
| 15 | Total Nitrogen | mg/L | 1.32 (APRIL. 2023) | 3.92 (June. 2023) | 2.983 | ≤10 | IS:3025 (P-34) |
| 16 | Faecal Coliform | MPN/100 ml | 177 (APRIL. 2023) | 221 (June. 2023) | 208 | <100 | IS:1622 |

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**Test Report**

Name Of theClient:New Mangalore Port Authority

Address Of theClient:Panambur ,Mangalore -575010

Sample Description:Wastewater (STP)

Sample Drawn By: Nitya Laboratories

**RESULT OF WASTE WATER (STP) FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Test Results SBR TANK | | | Tolerance Limit as per KSPCB | Protocol |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | | |
| 1 | pH | .. | 6.81 (July. 2023) | 7.12 (Sep. 2023) | 6.981 | 6.5-9.0 | IS:3025 (P-11) |
| 2 | Colour | Hazen | 26 (July. 2023) | 48 (Sep. 2023) | 36 | - | IS:3025 (P-4) |
| 3 | Odour | - | Objectionable | Objectionable | Objectionable | - | IS:3025 (P-6) |
| 4 | Oil & Grease | mg/L | 4.1 (APRIL. 2023) | 6 (Sep. 2023) | 5.43 | 10 | IS:3025 (P-39) |
| 5 | Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD) | mg/L | 30 (Sep. 2023) | 48 (July. 2023) | 42 | ≤10 | IS:3025 (P-44) |
| 6 | Chemical Oxygen Demand as COD | NTU | 102 (Sep. 2023) | 163.90 (APRIL. 2023) | 136.66 | ≤50 | IS:3025 (P-58) |
| 7 | Sludge Volume Index | mg/L | 45.04 (Sep. 2023) | 60 (Aug. 2023) | 52 | - | APHA 23rd ED. |
| 8 | Mix Liquid Suspended Solids | mg/L | 1420 (Aug. 2023) | 1854 (July. 2023) | 1645 | - | APHA 23rd ED. |
| 9 | Phenolic Compound | mg/L | ND | ND | ND | 1.0 | IS:3025 (P-43) |
| 10 | Dissolved Oxygen | mg/L | 4.0 (June. 2023) | 4.6 (Sep. 2023) | 4.31 | Min of 3 | IS:3025 (P-38) |
| 11 | Total Suspended Solids | mg/L | 1862 (APRIL. 2023) | 2048 (July. 2023) | 1926 | ≤20 | IS:3025 (P-17) |
| 12 | Ammonical Nitrogen | mg/L | 2.1 (APRIL. 2023) | 3.32 (Sep. 2023) | 2.96 | ≤5 | IS:3025 (P-34) |
| 13 | Electrical Conductivity | uS/cm | 658 (APRIL. 2023) | 702 (July. 2023) | 684 | - | IS:3025 (P-14) |
| 14 | Total Dissolved Solids | mg/L | 410 (APRIL. 2023) | 480 (Aug. 2023) | 446.96 | 2100 | IS:3025 (P-16) |
| 15 | Total Nitrogen | mg/L | 2.34 (APRIL. 2023) | 4.10 (June. 2023) | 3.641 | ≤10 | IS:3025 (P-34) |
| 16 | Faecal Coliform | MPN/100 ml | 1398 (APRIL. 2023) | 1546 (July. 2023) | 1446 | <100 | IS:1622 |

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# ***MARINE WATER QUALITY MONITORING***

## 6.0 Marine Water Sampling

### 6.1 Sampling Location

The Nitya Laboratories team in consultation with the Engineer In-charge of New Mangalore Port Authority, Paradip fixed the frequency and number of sampling stations. Accordingly, a Marine Water sampling was conducted at 5 locations of each three depth during the period from APRIL 2023 TO SEPTEMBER 2023.

**Table - 6**
**Location of Marine Water Sampling Stations**

| Sr. No. | Location of Station | Frequency |
|---|---|---|
| 1. | Eastern Dock Arm (Marine)-1m Below Surface | Once in a Month |
| 2. | Eastern Dock Arm (Marine)-10 m Below Surface | Once in a Month |
| 3. | Eastern Dock Arm (Marine)-20 m Below Surface | Once in a Month |
| 4. | Baseline (Up to 800-meter west)-1m Below Surface | Once in a Month |
| 5. | Baseline (Up to 800-meter west)-10 m Below Surface | Once in a Month |
| 6. | Baseline (Up to 800-meter west)-20 m Below Surface | Once in a Month |
| 7. | Western Dock Arm -1m Below Surface | Once in a Month |
| 8. | Western Dock Arm -10 m Below Surface | Once in a Month |
| 9. | Western Dock Arm -20 m Below Surface | Once in a Month |
| 10. | Oil Dock Arm (Diaphragm Jetty)-1m Below Surface | Once in a Month |
| 11. | Oil Dock Arm (Diaphragm Jetty)-10 m Below Surface | Once in a Month |
| 12. | Oil Dock Arm (Diaphragm Jetty)-20 m Below Surface | Once in a Month |
| 13. | Langoon Area (Turning Circle)-1m Below Surface | Once in a Month |
| 14. | Langoon Area (Turning Circle)-10 m Below Surface | Once in a Month |
| 15. | Langoon Area (Turning Circle)-20 m Below Surface | Once in a Month |

### 6.2 Methodology

The samples for surface water quality characterization were collected and analyzed as per the procedures specified in "Standard Method for the Examination of Water & Wastewater published by "American Public Health Association" (APHA: 23rd edition) and IS 3025. All the parameters except Heavy metals and Bacteriological were analyzed at the site i.e., at Panambur. Samples of heavy metals and bacteriological parameters have been sent to our Laboratory. Samples for chemical analysis were collected in polyethylene containers. Samples collected for metal content were acidified with 1 ml. $HNO_3$.

### 6.3 Results

The observations made on drinking water sampling at 5 locations have been presented through Table-2. Minimum and maximum values and arithmetic mean values of the 24-hour average concentrations have also been computed and presented.

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### 6.4 Results & Discussion on Observations

#### 6.4.1 Eastern Dock Arm

**Surface:** At this location pH was found between **7.42 to 7.86**.The TSS and TDS were found between **892 to 1080** mg/l and **39986 to 44218** mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.23 to 0.43 mg/l, 942 to 1098 mg/l and 548.9 to 712 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.8 to 3.2 mg/l. The value of Calcium, Sodium and Potassium were found between 360 to 552 mg/l, 11101 to 12790 mg/l and 1001 to 1270 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.12 to 0.30 mg/l, 0.07 to 0.24 mg/l and 4285 to 47650 mg/l. The Faecal Coliform was found between 41 to 65 MPN/100 ml.

**Middle:** At this location pH was found between 7.81 to 7.98.The TSS and TDS were found between 898 to 1128 mg/l and 38996 to 45832 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.22 to 0.42 mg/l, 942.84 to 1112 mg/l and 548.9 to 712.24 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.4 to 2.6 mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 540 mg/l, 12475 to 13240 mg/l and 1190 to 1295 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.32 to 0.42 mg/l, 0.06 to 0.26 mg/l and 42960 to 47654 mg/l. The Faecal Coliform was found between 49 to 76 MPN/100 ml.

**Bottom:** At this location pH was found between 7.90 to 8.01.The TSS and TDS were found between 890 to 1132 mg/l and 39652 to 45856 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.26 to 0.48 mg/l, 981 to 1132 mg/l and 598 to 715 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.4 to 2.8 mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 540 mg/l, 13236 to 14653 mg/l and 1152 to 1410 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.40 to 0.60 mg/l, 0.08 to 0.23 mg/l and 43120 to 48188 mg/l. The Faecal Coliform was found between 63 to 94 MPN/100 ml.

#### 6.4.2 Eastern Baseline (Up to 800-meter west)

**Surface:** At this location pH was found between 7.88 to 8.05.The TSS and TDS were found between 910 to 1040 mg/l and 39858 to 42856 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.29 to 0.30 mg/l, 942 to 1120 mg/l and 574 to 693.10 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.2 to 3.5 mg/l. The value of Calcium, Sodium and Potassium were found between 360 to 513.76 mg/l, 8750 to 9826 mg/l and 650 to 970 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.10 to 0.24 mg/l, 0.08 to 0.17 mg/l and 40115 to 46124 mg/l. The Faecal Coliform was found between 32 to 67 MPN/100 ml.

**Middle:** At this location pH was found between 7.94 to 8.13.The TSS and TDS were found between 884 to 1132 mg/l and 40124 to 43540 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.296 to 0.32 mg/l, 933.12 to 1130 mg/l and 581 to 700 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.4 to 3.1 mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 502 mg/l, 7726 to 9562 mg/l and 718 to 850 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.11 to 0.32 mg/l, 0.11 to 0.19 mg/l and 43580 to 46520 mg/l. The Faecal Coliform was found between 41 to 76 MPN/100 ml.

**Bottom:** At this location pH was found between 8.0 to 8.15.The TSS and TDS were found between 884 to 1088 mg/l and 40329 to 44428 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.23 to 0.36 mg/l, 962 to 1146 mg/l and 604 to 703 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.3 to 3.0 mg/l. The value of Calcium, Sodium and Potassium were found between 440 to 520 mg/l, 8413 to 9854 mg/l and 790 to 980 mg/l. The value of Nitrite, Phosphate and Total Solids

were found between 0.29 to 0.49 mg/l, 0.09 to 0.18 mg/l and 45024 to 47028 mg/l. The Faecal Coliform was found between 17 to 338 MPN/100 ml.

**6.4.3 Western Dock Arm**

**Surface:** At this location pH was found between 7.83 to 8.02. The TSS and TDS were found between 878 to 1054 mg/l and 40120 to 43940 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.23 to 0.41 mg/l, 874 to 1102 mg/l and 563 to 680 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.2 to 3.5 mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 502 mg/l, 11024 to 13640 mg/l and 890 to 1390 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.10 to 0.30 mg/l, 0.09 to 0.18 mg/l and 43846 to 47232 mg/l. The Faecal Coliform was found between 46 to 102 MPN/100 ml.

**Middle:** At this location pH was found between 7.97 to 8.06.The TSS and TDS were found between 898 to 1096 mg/l and 40168 to 44128 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.25 to 0.48 mg/l, 873.3 to 1128 mg/l and 595.3 to 693 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.1 to 2.6 mg/l and 0.40 to0.054 mg/l. The value of Calcium, Sodium and Potassium were found between 360 to 553.4 mg/l, 10950 to 11954 mg/l and 990 to 1170 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.35 to 0.60 mg/l, 0.08 to 0.18 mg/l and 40413 to 47894 mg/l. The Faecal Coliform was found between 46 to 112 MPN/100 ml.

**Bottom:** At this location pH was found between 7.93 to 8.06.The TSS and TDS were found between 906 to 1160 mg/l and 40396 to 44956 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.28 to 0.47 mg/l, 972 to 1146 mg/l and 599.3 to 693.2 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.4 to 3.2 mg/l and 0.29 to 0.75mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 553.3 mg/l, 11895 to 13421 mg/l and 1150 to 1341 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.25 to 0.70 mg/l, 0.10 to 0.19 mg/l and 44912 to 47894 mg/l. The Faecal Coliform was found between 56 to 124 MPN/100 ml.

**6.4.4 Oil Dock Arm (Diaphragm Jetty)**

**Surface:** At this location pH was found between 7.85 to 7.99.The TSS and TDS were found between 872 to 998 mg/l and 39894 to 45028 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.21 to 0.56 mg/l, 962 to 1110 mg/l and 536 to 668 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 2.1 to 3.5 mg/l and iron 0.14 to 0.28mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 512.72 mg/l, 7415 to 10208 mg/l and 741 to 958 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.09 to 0.30 mg/l, 0.09 to 0.16 mg/l and 41441 to 45380 mg/l. The Faecal Coliform was found between 76 to 414 MPN/100 ml.

**Middle:** At this location pH was found between 7.95 to 8.02.The TSS and TDS were found between 872 to 1088 mg/l and 39894 to 45624 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.29 to 0.48 mg/l, 952 to 1100 mg/l and 588 to 681 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.3 to 2.9 mg/l and 0.22 to 0.35mg/l. The value of Calcium, Sodium and Potassium were found between 360 to 512 mg/l, 10091 to 11009 mg/l and 990 to 1030 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.15 to 0.40 mg/l, 0.09 to 0.17 mg/l and 44128 to 46231 mg/l. The Faecal Coliform was found between 84 to 141 MPN/100 ml.

**Bottom:** At this location pH was found between 8.03 to 8.08.The TSS and TDS were found between 896 to 1172 mg/l and 38990 to 45994 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.24 to 0.51 mg/l, 903 to 1162 mg/l and 601 to 685 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.1 to 3.0 mg/l and 0.35 to 0.50mg/l. The value of Calcium,

Sodium and Potassium were found between 400 to 548 mg/l, 11231 to 13048 mg/l and 1040 to 1275 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.41 to 0.60 mg/l, 0.09 to 0.17 mg/l and 44580 to 48414 mg/l. The Faecal Coliform was found between 70 to 172 MPN/100 ml.

**6.4.5 Lagoon Area (Turning Circle)**

**Surface:** At this location pH was found between 7.79 to 7.98.The TSS and TDS were found between 900 to 1024 mg/l and 40726 to 43863 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.31 to 0.49 mg/l, 913 to 1124 mg/l and 568 to 649 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.1 to 3.5 mg/l and 0.15 to 0.30 mg/.The value of Calcium, Sodium and Potassium were found between 400 to 473 mg/l, 8510 to 10240 mg/l and 780 to 986 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.05 to 0.20 mg/l, 0.10 to 0.20 mg/l and 41786 to 48745 mg/l. The Faecal Coliform was found between 31 to 60 MPN/100 ml.

**Middle:** At this location pH was found between 7.85 to 8.06.The TSS and TDS were found between 920 to 1136 mg/l and 39768 to 44280 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.25 to 0.51 mg/l, 671 to 947 mg/l and 598 to 671.7 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.3 to 2.8 mg/l and 0.36 to 0.45mg/l. The value of Calcium, Sodium and Potassium were found between 400 to 553 mg/l, 8930 to 10236 mg/l and 820 to 974 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.10 to 0.27 mg/l, 0.10 to 0.21 mg/l and 35412 to 47584 mg/l. The Faecal Coliform was found between 41 to 86 MPN/100 ml.

**Bottom:** At this location pH was found between 7.96 to 8.12.The TSS and TDS were found between 908 to 1120 mg/l and 38898 to 45108 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.27 to 0.30 mg/l, 972 to 1128 mg/l and 596.6 to 880.4 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 2.0 to 2.5 mg/l and 0.50 to 0.65mg/l. The value of Calcium, Sodium and Potassium were found between 440 to 556 mg/l, 9941 to 11241 mg/l and 940 to 1070 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.16 to 0.35 mg/l, 0.10 to 0.18 mg/l and 39442 to 46020 mg/l. The Faecal Coliform was found between 48 to 136 MPN/100 ml.

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of the Client: Panambur,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Eastern Dock Arm (Marine)-1m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.42 (APRIL. 2023) | 7.86 (Aug. 2023) | 7.69 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 892 (APRIL. 2023) | 1080 (Sep. 2023) | 986 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 39986 (June. 2023) | 44218 (Sep. 2023) | 42474.21 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.7 (July. 2023) | 6.02 (Sep. 2023) | 5.93 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.23 (APRIL. 2023) | 0.43 (June. 2023) | 0.30 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 942 (APRIL. 2023) | 1098 (Sep. 2023) | 1002 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 548.9 (June. 2023) | 712 (Sep. 2023) | 658.63 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.8 (July. 2023) | 3.2 (APRIL. 2023) | 3.01 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.20 (June. 2023) | 0.30 (APRIL. 2023) | 0.256 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 360 (June. 2023) | 552 (Sep. 2023) | 459 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 11101 (APRIL. 2023) | 12790 (June. 2023) | 11999.3 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 1001 (APRIL. 2023) | 1270 (June. 2023) | 1123.23 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.12 (June. 2023) | 0.30 (APRIL. 2023) | 0.231 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.07 (June. 2023) | 0.24 (Sep. 2023) | 0.152 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 4285 (July. 2023) | 47650 (Sep. 2023) | 45458 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 41 (APRIL. 2023) | 65 (Sep. 2023) | 54 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of the Client: Panambur,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Eastern Dock Arm (Marine)-10 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.81 (july 2023) | 7.98 (Aug. 2023) | 7.91 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 898 (April 2023)) | 1128 (Sep. 2023) | 1023 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 38996 (April 2023) | 45832 (Sep. 2023) | 42382 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.7 (April. 2023) | 6.2 (Aug. 2023) | 5.98 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.22 (Aug. 2023) | 0.42 (June. 2023) | 0.345 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 942.84 (April. 2023) | 1112 (Sep. 2023) | 1099 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 548.9 (June. 2023) | 712.24 (Sep 2023) | 685 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.4 (Aug. 2023) | 2.6 (Dec. 2023) | 2.51 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.25 (Aug. 2023) | 0.28 (April. 2023) | 0.265 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (June. 2023) | 540 (April. 2023) | 498 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 12475 (April. 2023) | 13240 (Aug. 2023) | 13002 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 1190 (July. 2023) | 1295 (Aug. 2023) | 1245.63 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.32 (July. 2023) | 0.42 (Sep. 2023) | 0.364 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.06 (July. 2023) | 0.26 (Sep. 2023) | 0.198 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 42960 (July. 2023) | 47654 (Sep. 2023) | 44564 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 49 (April. 2023) | 76 (Aug. 2023) | 62 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Eastern Dock Arm (Marine)-20 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.90 (July. 2023) | 8.01 (April. 2023) | 7.99 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 890 (April. 2023) | 1132 (Sep. 2023) | 1009 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 39652 (April. 2023) | 45856 (Sep. 2023) | 42658 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.9 (April. 2023) | 6.1 (July. 2023) | 6.03 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.26 (Aug. 2023) | 0.48 (July. 2023) | 0.34 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 981.72 (April. 2023) | 1132 (Sep. 2023) | 1098 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 598.8 (July. 2023) | 715.8 (Sep. 2023) | 674.36 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.4 (Aug. 2023) | 2.8 (Sep. 2023) | 2.66 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.50 (April. 2023) | 0.70 (Aug. 2023) | 0.623 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (April. 2023) | 540 (July. 2023) | 489 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 13236 (April. 2023) | 14653 (Sep. 2023) | 14026 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 1152 (Sep. 2023) | 1410 (Aug. 2023) | 1296 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.40 (April. 2023) | 0.60 (June. 2023) | 0.53 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.08 (July. 2023) | 0.23 (Sep. 2023) | 0.123 | IS:3025 (P-31) |
| 16 | Silica As $SIO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 43120 (July. 2023) | 48188 (Sep. 2023) | 43844 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS;3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 63 (Aug. 2023) | 94 (July. 2023) | 78 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Baseline (Up to 800-meter west)-1m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.88 (July. 2023) | 8.05 (June. 2023) | 7.98 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 910 (April. 2023) | 1040 (Sep. 2023) | 998 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 39858 (April. 2023) | 42856 (Sep. 2023) | 41003 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.7 (June. 2023) | 6.0 (Aug. 2023) | 5.89 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.29 (Aug. 2023) | 0.30 (April. 2023) | 0.298 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 942 (April. 2023) | 1120 (Aug. 2023) | 1096 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 574 (April. 2023) | 693.10 (Sep 2023) | 669.3 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.2 (Aug. 2023) | 3.5 (April. 2023) | 2.95 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.45 (Aug. 2023) | 0.85 (April. 2023) | 0.669 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 360 (April. 2023) | 513.76 (Aug. 2023) | 478 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 8750 (April. 2023) | 9826 (Sep. 2023) | 9569 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 650 (April. 2023) | 970 (June. 2023) | 785.69 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.10 (April. 2023) | 0.24 (Sep. 2023) | 0.198 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.08 (April. 2023) | 0.17 (Sep. 2023) | 0.148 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 40115 (April. 2023) | 46124 (Sep. 2023) | 43963 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 32 (April. 2023) | 67 (Sep. 2023) | 54 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Baseline (Up to 800-meter west)-10 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | .. | 7.94 (July. 2023) | 8.13 (June. 2023) | 8.03 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 884 (April. 2023) | 1132 (Sep. 2023) | 1012 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 40124 (April. 2023) | 43540 (Sep. 2023) | 41968 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.8 (April. 2023) | 6.2 (Aug. 2023) | 6.032 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.296 (April. 2023) | 0.32 (Aug. 2023) | 0.302 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 933.12 (April. 2023) | 1130 (Sep. 2023) | 1099.36 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 581 (April. 2023) | 700 (Sep. 2023) | 635.1 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.4 (Aug. 2023) | 3.1 (June. 2023) | 2.78 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.62 (July. 2023) | 0.90 (April. 2023) | 0.774 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (June. 2023) | 502 (July. 2023) | 485.3 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 7726 (Aug. 2023) | 9562 (Sep. 2023) | 8998 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 718 (Aug. 2023) | 850 (June. 2023) | 798.36 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.11 (June. 2023) | 0.32 (Sep. 2023) | 0.236 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.11 (June. 2023) | 0.19 (Sep. 2023) | 0.156 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 43580 (June. 2023) | 46520 (Sep. 2023) | 44789 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 41 (Jan. 2023) | 76 (Dec. 2023) | 59 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Baseline (Up to 800-meter west)-20 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | - | 8.0 (July. 2023) | 8.15 (June. 2023) | 8.02 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 884 (April. 2023) | 1088 (Aug. 2023) | 963.21 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 40329 (April. 2023) | 44428 (Aug. 2023) | 42363.12 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.5 (June. 2023) | 6.9 (Aug. 2023) | 6.12 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.23 (Aug. 2023) | 0.36 (Sep. 2023) | 0.302 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 962 (April. 2023) | 1146 (Sep. 2023) | 1096.63 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 604 (June. 2023) | 703 (Sep. 2023) | 668.2 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.3 (Sep. 2023) | 3.0 (June. 2023) | 2.760 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.40 (July. 2023) | 0.80 (June. 2023) | 0.653 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 440 (June. 2023) | 520 (July. 2023) | 489.21 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 8413 (April. 2023) | 9854 (Sep. 2023) | 9269.23 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 790 (Aug. 2023) | 980 (Sep. 2023) | 889.74 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.29 (June. 2023) | 0.49 (Sep. 2023) | 0.36 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.09 (April. 2023) | 0.18 (July. 2023) | 0.133 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 45024 (July. 2023) | 47028 (Sep. 2023) | 46321 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 39 (April. 2023) | 94 (July. 2023) | 66 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Western Dock Arm -1m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | .. | 7.83 (Sep. 2023) | 8.02 (June. 2023) | 7.98 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 878 (July. 2023) | 1054 (Sep. 2023) | 958.61 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 40120 (June. 2023) | 43940 (Sep. 2023) | 42012.3 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.6 (April. 2023) | 6.3 (Aug. 2023) | 6.102 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.23 (Aug. 2023) | 0.41 (Dec. 2023) | 0.34 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 874 (April. 2023) | 1102 (Sep. 2023) | 1036.3 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 563 (April. 2023) | 680 (Sep. 2023) | 623.3 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.2 (July. 2023) | 3.5 (April. 2023) | 2.963 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.25 (June. 2023) | 0.45 (Aug. 2023) | 0.361 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (June. 2023) | 502 (July. 2023) | 446.32 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 11024 (Sep. 2023) | 13640 (Aug. 2023) | 12651 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 890 (April. 2023) | 1390 (Aug. 2023) | 1123.30 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.10 (April. 2023) | 0.30 (Aug. 2023) | 0.232 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.09 (June. 2023) | 0.18 (Sep. 2023) | 0.140 | IS:3025 (P-31) |
| 16 | Silica As $SIO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 43846 (July. 2023) | 47232 (Sep. 2023) | 45966.32 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 46 (April. 2023) | 102 (Sep. 2023) | 84 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Western Dock Arm-10 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.97 (April. 2023) | 8.06 (Aug. 2023) | 8.01 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 898 (July. 2023) | 1096 (Sep. 2023) | 968.21 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 40168 (June. 2023) | 44128 (Sep. 2023) | 42683 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.87 (Sep. 2023) | 6.2 (Aug. 2023) | 6.032 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.25 (Aug. 2023) | 0.48 (July. 2023) | 0.361 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 873.3 (June. 2023) | 1128 (Sep. 2023) | 1060.98 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 595.8 (June. 2023) | 693.7 (Sep. 2023) | 644.58 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.1 (July. 2023) | 2.6 (June. 2023) | 2.35 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.40 (June. 2023) | 0.54 (Sep. 2023) | 0.487 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 360 (June. 2023) | 553.28 (Aug. 2023) | 475.3 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 10950 (July. 2023) | 11954 (April. 2023) | 11231.25 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 990 (July. 2023) | 1170 (Aug. 2023) | 1102.2 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.35 (April. 2023) | 0.60 (Aug. 2023) | 0.493 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.08 (April. 2023) | 0.18 (July. 2023) | 0.148 | IS:3025 (P-31) |
| 16 | Silica As $SIO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 40413 (April. 2023) | 47894 (Sep. 2023) | 44987.98 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.70 (June. 2023) | 0.90 (April. 2023) | 0.832 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 46 (July. 2023) | 112 (Sep. 2023) | 79 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Western Dock Arm -20 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.93 (Sep. 2023) | 8.06 (Aug. 2023) | 7.993 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 906 (April. 2023) | 1160 (Sep. 2023) | 1078.3 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 40396 (June. 2023) | 44956 (Sep. 2023) | 42912.31 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.8 (June. 2023) | 6.8 (Aug. 2023) | 6.231 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.28 (Aug. 2023) | 0.47 (July. 2023) | 0.378 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 972 (April. 2023) | 1146 (Sep. 2023) | 1089.3 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 599.6 (June. 2023) | 693.2 (Sep. 2023) | 656.97 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.4 (Aug. 2023) | 3.2 (June. 2023) | 2.87 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.29 (April. 2023) | 0.75 (Aug. 2023) | 0.52 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (June. 2023) | 553.3 (Aug. 2023) | 485.12 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 11895 (July. 2023) | 13421 (April. 2023) | 12783.19 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 1150 (July. 2023) | 1341 (April. 2023) | 1269 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.25 (April. 2023) | 0.70 (Aug. 2023) | 0.53 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.10 (June. 2023) | 0.19 (Sep. 2023) | 0.142 | IS:3025 (P-31) |
| 16 | Silica As $SIO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 44912 (July. 2023) | 47894 (Sep. 2023) | 45896.56 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.85 (Sep.2023) | 1.10 (April. 2023) | 1.098 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 56 (April. 2023) | 124 (Sep. 2023) | 96 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Oil Dock Arm (Diaphragm Jetty)-1m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | .. | 7.85 (July. 2023) | 7.99 (June. 2023) | 7.92 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 872 (July. 2023) | 998 (Sep. 2023) | 935 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 39894 (April. 2023) | 45028 (Sep. 2023) | 42461 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.4 (April. 2023) | 6.1 (July. 2023) | 5.75 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.21 (April. 2023) | 0.56 (July. 2023) | 0.385 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 962.28 (April. 2023) | 1110 (Sep. 2023) | 1036.14 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 536.8 (June. 2023) | 668.5 (Sep. 2023) | 602.65 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.1 (Aug. 2023) | 3.5 (April. 2023) | 2.80 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.14 (July. 2023) | 0.28 (Sep. 2023) | 0.21 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (April. 2023) | 512.72 (Sep. 2023) | 456.36 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 7415 (April. 2023) | 10208 (Sep 2023) | 8811.5 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 741 (April. 2023) | 958 (Sep. 2023) | 849.50 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.09 (April. 2023) | 0.30 (Aug. 2023) | 0.195 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.09 (April. 2023) | 0.16 (Sep. 2023) | 0.125 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 41441 (April. 2023) | 45380 (Aug. 2023) | 43410.5 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.30 (April.2023) | 0.80 (July.2023) | 0.55 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 76 (April. 2023) | 141 (July. 2023) | 108 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Oil Dock Arm (Diaphragm Jetty)-10 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.95 (Sep. 2023) | 8.02 (June. 2023) | 7.985 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 872 (April. 2023) | 1088 (Sep. 2023) | 980 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 39894 (April. 2023) | 45624 (Sep. 2023) | 42759 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.53 (Sep. 2023) | 6.0 (Aug 2023) | 5.765 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.29 (Aug. 2023) | 0.48 (July. 2023) | 0.385 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 952 (April. 2023) | 1100 (Sep. 2023) | 1026 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 588 (July. 2023) | 681 (Sep. 2023) | 634.75 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.3 (Aug. 2023) | 2.9 (April. 2023) | 2.6 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.22 (July. 2023) | 0.35 (April. 2023) | 0.285 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 360 (June. 2023) | 512.72 (Sep. 2023) | 436.36 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 10091 (April. 2023) | 11009 (Aug. 2023) | 10550 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 990 (Aug. 2023) | 1030 (Sep. 2023) | 1010 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.15 (April. 2023) | 0.40 (Aug. 2023) | 0.275 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.09 (April. 2023) | 0.17 (Sep. 2023) | 0.13 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 44128 (July. 2023) | 46231 (April. 2023) | 45179.5 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.41 (April 2023) | 0.88 (July 2023) | 0.645 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 84 (April. 2023) | 141 (Aug. 2023) | 112 | IS:1822 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Oil Dock Arm (Diaphragm Jetty)-20 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 8.03 (April. 2023) | 8.08 (Aug. 2023) | 8.055 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 896 (April. 2023) | 1172 (Sep. 2023) | 1034 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 38990 (April. 2023) | 45994 (Sep. 2023) | 42492 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.62 (Sep. 2023) | 6.4 (Aug. 2023) | 6.01 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.24 (Aug. 2023) | 0.51 (July. 2023) | 0.375 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 903.96 (April. 2023) | 1162 (Sep. 2023) | 1032 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 601.6 (June. 2023) | 685.6 (Sep. 2023) | 643.6 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.1 (July. 2023) | 3.0 (April. 2023) | 2.55 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.35 (Aug. 2023) | 0.50 (June. 2023) | 0.425 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (June. 2023) | 548 (July. 2023) | 474 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 11231 (April. 2023) | 13045 (Aug. 2023) | 12138 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 1040 (July. 2023) | 1275 (Aug. 2023) | 689.5 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.41 (April. 2023) | 0.60 (Aug. 2023) | 0.505 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.09 (June. 2023) | 0.17 (Sep. 2023) | 0.13 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 44580 (July. 2023) | 48414 (July. 2023) | 46497 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.80 (Sep. 2023) | 0.95 (July. 2023) | 0.875 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 70 (April. 2023) | 172 (July. 2023) | 141 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Langoon Area (Turning Circle)-1m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.79 (Sep. 2023) | 7.98 (June. 2023) | 7.863 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 900 (July. 2023) | 1024 (Sep. 2023) | 996.23 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 40726 (April. 2023) | 43836 (Sep. 2023) | 42012.32 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.4 (April. 2023) | 6.1 (Aug. 2023) | 5.86 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.31 (April. 2023) | 0.49 (Sep. 2023) | 0.421 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 913.68 (April. 2023) | 1124 (July. 2023) | 1096.66 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 568.4 (July. 2023) | 649.7 (Sep. 2023) | 596.96 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.1 (June. 2023) | 3.5 (April. 2023) | 2.864 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.15 (June. 2023) | 0.30 (April. 2023) | 0.245 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (April. 2023) | 473.28 (Sep. 2023) | 446.89 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 8510 (July. 2023) | 10240 (Sep. 2023) | 9563.79 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 780 (July. 2023) | 986 (Sep. 2023) | 836.46 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.05 (April. 2023) | 0.20 (Aug. 2023) | 0.120 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.10 (April. 2023) | 0.20 (Sep. 2023) | 0.149 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 41786 (July. 2023) | 48475 (April. 2023) | 44475.96 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.62 (Sep.2023 | 0.80 (June. 2023) | 0.763 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 31 (April. 2023) | 60 (Sep. 2023) | 48 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Langoon Area (Turning Circle)-10 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.85 (Sep. 2023) | 8.06 (June. 2023) | 7.96 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 920 (April. 2023) | 1136 (Sep. 2023) | 11096.3 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 39768 (April. 2023) | 44280 (Sep. 2023) | 42663.69 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.3 (April. 2023) | 6.4 (Aug. 2023) | 5.96 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.25 (April. 2023) | 0.51 (July. 2023) | 0.36 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 671.7 (Sep. 2023) | 947 (June. 2023) | 846. | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 598 (July. 2023) | 671.7 (Sep. 2023) | 626.36 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.3 (Aug. 2023) | 2.8 (April. 2023) | 2.56 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.36 (July. 2023) | 0.45 (April. 2023) | 0.402 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 400 (April. 2023) | 553.28 (Aug. 2023) | 486.69 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 8930 (Aug. 2023) | 10236 (Sep. 2023) | 9968.66 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 820 (Aug. 2023) | 974 (Sep. 2023) | 902.68 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.10 (April. 2023) | 0.27 (Sep. 2023) | 0.18 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.10 (July. 2023) | 0.21 (Sep. 2023) | 0.146 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 35412 (April. 2023) | 47584 (Sep. 2023) | 44189.64 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.70 (Sep. 2023 | 1.05 (April. 2023 | 0.92 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 41 (April. 2023) | 86 (Sep. 2023) | 66 | IS:1622 |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

**RESULT OF MARINE WATER FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Parameters | Unit | Langoon Area (Turning Circle)-20 m Below Surface | | | Protocol |
|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | |
| 1 | pH | -- | 7.96 (Sep. 2023) | 8.12 (June. 2023) | 8.065 | IS:3025 (P-11) |
| 2 | Total Suspended Solids | mg/L | 908 (June. 2023) | 1120 (Sep. 2023) | 1056.6 | IS:3025 (P-17) |
| 3 | Total Dissolved Solids | mg/L | 38898 (April. 2023) | 45108 (Aug. 2023) | 42468.63 | IS:3025 (P-16) |
| 4 | Turbidity | NTU | 5.6 (June. 2023) | 6.7 (Aug. 2023) | 6.06 | IS:3025 (P-10) |
| 5 | Nitrate As $NO_3$ | mg/L | 0.27 (Aug. 2023) | 0.30 (April. 2023) | 0.286 | IS:3025 (P-34) |
| 6 | Magnesium As Mg | mg/L | 972 (June. 2023) | 1128 (Sep. 2023) | 1076 | IS:3025 (P-46) |
| 7 | Sulphates As $SO_4$ | mg/L | 596.6 (April. 2023) | 880.4 (Sep. 2023) | 715.89 | IS:3025 (P-24) |
| 8 | Oil & Grease | mg/L | ND | ND | ND | IS:3025 (P-39) |
| 9 | Dissolved Oxygen | mg/L | 2.0 (April. 2023) | 2.5 (July. 2023) | 2.310 | IS:3025 (P-38) |
| 10 | Iron As Fe | mg/L | 0.50 (Sep. 2023) | 0.65 (April. 2023) | 0.586 | APHA 23rd Ed. |
| 11 | Calcium As Ca | mg/L | 440 (April. 2023) | 556 (July. 2023) | 496.86 | IS:3025 (P-40) |
| 12 | Sodium As Na | mg/L | 9941 (Aug. 2023) | 11241 (June. 2023) | 1076.84 | IS:3025 (P-45) |
| 13 | Potassium As K | mg/L | 940 (July. 2023) | 1070 (June. 2023) | 996.44 | IS:3025 (P-45) |
| 14 | Nitrite | mg/L | 0.16 (April. 2023) | 0.35 (Sep. 2023) | 0.263 | IS:3025 (P-34) |
| 15 | Phosphate As P | mg/L | 0.10 (June. 2023) | 0.18 (Sep. 2023) | 0.146 | IS:3025 (P-31) |
| 16 | Silica As $SiO_2$ | mg/L | ND | ND | ND | IS:3025 (P-35) |
| 17 | Total Solids | mg/L | 39442 (April. 2023) | 46020 (Sep. 2023) | 43668.69 | IS:3025 (P-15) |
| 18 | Total Nitrogen | mg/L | 0.80 (Aug.2023) | 1.10 (April.2023) | 0.963 | IS:3025 (P-34) |
| 19 | Organic Nitrogen | mg/L | ND | ND | ND | IS:3025 (P-11) |
| 20 | Faecal Coliform | MPN/100 Ml | 48 (April. 2023) | 136 (Aug. 2023) | 86 | IS:1622 |

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# STACK EMISSION MONITORING

## 7.0 Stack Emission Monitoring

### 7.1 Sampling Location

The Nitya Laboratories team in consultation with the Engineer In-charge of New Mangalore Port Authority, Paradip fixed the frequency and number of sampling stations. Accordingly, a flue gas monitoring was conducted at 12 locations during the period from APRIL 2023 to SEPTEMBER 2023.

**Table - 7**
**Location of Stack Emission Stations**

| Sr. No. | Location of Station | Frequency |
|---|---|---|
| 1. | DG Set of Signal Station | Once in a Month |
| 2. | DG Set of 500 KVA of Electrical Substation DG-1 | Once in a Month |
| 3. | DG-1 Set of 33 KVA Main of Capacity 1000 KVA | Once in a Month |
| 4. | DG-2 Set of 33 KVA Main of Capacity 1000 KVA | Once in a Month |
| 5. | DG Set of 500 KVA of Electrical Substation DG-2 | Once in a Month |
| 6. | DG Set of 160 KVA at Hospital | Once in a Month |
| 7. | DG Set of 50 KVA of ADM Building | Once in a Month |
| 8. | Oily Jetty Pump-2 of Capacity 890 HP | Once in a Month |
| 9. | Oily Jetty Pump-1 of Capacity 890 HP | Once in a Month |
| 10. | Oily Jetty Pump-3 of Capacity 890 HP | Once in a Month |
| 11. | Hydrant Pump of Capacity 450HP | Once in a Month |
| 12. | Monitor Pump | Once in a Month |

### 7.2 Results

The observations made on drinking water sampling at 12 locations have been presented through Table-2. Minimum and maximum values and arithmetic mean values of the 24-hour average concentrations have also been computed and presented.

### 7.3 Methodology

Day to day increasing industrialization in creating most critical global problem i.e., Air pollution. Many type of industries including thermal power station, cement plant, refineries, pulp and paper industries etc emitted so many types of pollutant in atmosphere monitor flue gas emission form stationary source. Monitoring of stack and vent emission is now becoming a routine requirement not only for large but even the medium and small industrial units.

### 7.4 Instrument / Accessories:

1) Panel Box Assembly
2) Vacuum pump
3) Dry gas meter
4) Cold box assembly
5) Pitot tube
6) Impingers
7) Nozzels
8) Sampling pobe
9) Inter connection tubings
10) Thimble holder
11) Pre-weighted Thimble
12) Red oil
13) Distilled water

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14) Extension cord
15) Thermocouple
16) Syringes
17) Tool kit
18) Instruction manual or SOP
19) Filled date sheet
20) Hand globs

**7.4.1 Preparation**

Sampling port and port hole should be at specified height as specified by Central Pollution Control Board Height of sampling port should be less than the length of vacuum hose if required increase length of vacuum hose (maximum 40 meter recommended by manufacturer). Thimble must be pre-weighted according. Depending upon the parameter required absorbing solution.

**7.4.2 Assembling**

Before attempting stack monitoring it is necessary to assemble all parts of stack monitoring unit that should be properly assembled as per manufacture instruction.

**7.4.3 Procedure**

***7.4.3.1 Temperature measurement***

1. Connect the thermocouple lead to panel box assemble by inserting the dual plug.
2. Switch on the pyrometer to note down the ambient temperature
3. Insert thermocouple sensor into the stack through the hole provided on the stack.
4. Allow temperature to stabilize for 10 minutes then read the on the pyrometer.
5. Remover the thermocouple from the stack hole.

***7.4.3.2Velocity Measurement***

Digital manometer to measure the velocity of air – stream inside the chimney or duct. The Pitot tube inserted into a stack develops a differential pressure proportional to the kinetic head of the smoke-stream.

Velocity of Gases V $= K \sqrt{H} X Ts$

***7.4.3.3. Sampling for SPM and Gaseous Pollutant***

Loading of thimble in thimble holder Open the thimble holder by unscrewing the front end Push the thimble (open end) on the conical surface. Slip the thimble slightly inverseTighten the screw keeping the thimble straight. Keep on tightening till the edge of thimble strikes against back surface.

Isokinetic Flow Rate Qs $= \frac{V * An * 60 * 1000 * (273 + 25)}{Ts}$

Qs = Isokinetic Flow Rate
V = Velocity of stack gas
$A_n$ = Area of nozzle
$T_S$ = Stack Temperature

There are three nozzles of ¼ and ½" and 3/8". The nozzle is to be selected in such a way so that Qs false within the range of 60 LPM rotameter. Connect the filter holder nozzle and probe pipe in such a way that handle provided on the probe pipe must be oriented so that it indicates the direction, nozzle is facing in the same direction.Connect the vacuum pump to panel box assembly and switch on.

Set an appropriate flow for gaseous sampling on the 3 LPM flow meter. Gaseous sampling rate should be between 1 to 2 LPM.Subtract the gaseous sampling rate from the iso-kinetic sampling rate and the balance set on 30 LPM flow meter. Flow of PM should always be adjusted after the flow adjusted for gaseous sampling.

Pressure switch knob can be use for determination of pressure drop at the metering point by turning the knob towards PM and gas side. The corresponding redoubt is given on the vacuum gauge.

**Calculation** :

$$\text{Volume of air sampled Qm (lit)} = \frac{Qs*(740-Pm)}{760} X \frac{298*t}{273+Ta}$$

$$\text{PM (mg/Nm}^3\text{)} = \frac{W2-W1*10^6}{Qm}$$

## 7.5 Results & Discussion on Observations

**DG Set of Signal Station**

At this location Particulate Matter as PM was found between 0.043 to 0.167 g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 1.021 to 2.143 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**DG Set of 500 KVA of Electrical Substation DG-1**

At this location Particulate Matter as PM was found between 0.043 to 0.206 g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 1.011 to 2.839 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**DG-1 Set of 33 KVA Main of Capacity 1000 KVA**

At this location Particulate Matter as PM was found between 0.102 to 0.203 g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 1.321 to 1.827 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**DG-2 Set of 33 KVA Main of Capacity 1000 KVA**

At this location Particulate Matter as PM was found between 0.119 to 0.192 g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 2.028 to 2.927 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**DGSet of 500 KVA of Electrical Substation DG-2**

At this location Particulate Matter as PM was found between 0.101 to 0.224 g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 1.273 to 3.019 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**DGSet of 160 KVA at Hospital**

At this location Particulate Matter as PM was found between 0.12 to 0.123 g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 1.736 to 2.201 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**DGSet of 50 KVA ADM Building**

At this location Particulate Matter as PM was found between, 0.076 to 0.181g/kw-hr. The Value of Oxide of Nitrogen as $NO_X$ was found between 2.017 to 3.019 g/kw-hr. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Oily Jetty Pump-2 of Capacity 890 HP**

At this location Particulate Matter as PM was found between 12.46 to 56mg/$Nm^3$. The Value of Oxide of Nitrogen as $NO_X$ was found between 142 to 178 mg/$Nm^3$. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Oily Jetty Pump-1 of Capacity 890 HP(Hydrant)**

At this location Particulate Matter as PM was found between 14 to 58 mg/$Nm^3$. The Value of Oxide of Nitrogen as $NO_X$ was found between 154 to 172 mg/$Nm^3$. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Oily Jetty Pump-3 of Capacity 890 HP(Hydrant)**

At this location Particulate Matter as PM was found between 14.26 to 56 mg/$Nm^3$. The Value of Oxide of Nitrogen as $NO_X$ was found between 112 to 132 mg/$Nm^3$. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Oil Jetty Pump-2 Capacity-890HP-Pump-2**

At this location Particulate Matter as PM was found between 11.22 to 68 mg/$Nm^3$. The Value of Oxide of Nitrogen as $NO_X$ was found between 123 to 156 mg/$Nm^3$. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Oil Jetty Pump-1 Capacity-890HP-Monitor**

At this location Particulate Matter as PM was found between 13.23 to 94 mg/$Nm^3$. The Value of Oxide of Nitrogen as $NO_X$ was found between 132 to 192 mg/$Nm^3$. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Oily Jetty Pump-3 of Capacity 890 HP(Monitor Pump)**

At this location Particulate Matter as PM was found between 13.28 to 120 mg/Nm$^3$. The Value of Oxide of Nitrogen as $NO_X$ was found between 120 to 143 mg/Nm$^3$. The Value of Oxide of Sulphur as $SO_X$ was absent during the analysis.

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG Set of Signal Station | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.043 (Aug. 2023) | 0.167 (June. 2023) | 0.105 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 1.021 (Aug. 2023) | 2.143 (April. 2023) | 1.582 |
| 3 | Oxides of Sulphur (as $SO_x$) ($mg/Nm^3$) | ND | ND | ND |

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**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG Set of 500 KVA of Electrical Substation DG-1 | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.043 (Aug. 2023) | 0.206 (June. 2023) | 0.124 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 1.011 (Sep. 2023) | 2.839 (June. 2023) | 1.925 |
| 3 | Oxides of Sulphur (as $SO_x$) ($mg/Nm^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG-1 Set of 33 KVA Main of Capacity 1000 KVA | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.102 (July. 2023) | 0.203 (Sep. 2023) | 0.152 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 1.321 (Aug. 2023) | 1.827 (April. 2023) | 1.574 |
| 3 | Oxides of Sulphur (as $SO_X$) (mg/$Nm^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG-2 Set of 33 KVA Main of Capacity 1000 KVA | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.119 (July. 2023) | 0.192 (Aug. 2023) | 0.155 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 2.028 (Aug. 2023) | 2.756 (June. 2023) | 2.392 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/$Nm^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG Set of 500 KVA of Electrical Substation DG-2 | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.101 (July. 2023) | 0.224 (June. 2023) | 0.162 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 1.273 (April. 2023) | 3.019 (June. 2023) | 2.146 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/$Nm^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG Set of 160 KVA at Hospital | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.112 (April. 2023) | 0.123 (June. 2023) | 0.117 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 1.736 (Sep. 2023) | 2.201 (Aug. 2023) | 1.968 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/$Nm^3$) | ND | ND | ND |

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**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | DG Set of 50 KVA of ADM Building | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (g/kw-hr) | 0.076 (April 2023 | 0.181 (Aug. 2023) | 0.128 |
| 2 | Oxide of Nitrogen (as $NO_x$) (g/kw-hr) | 2.017 (Aug. 2023) | 3.019 (Sep. 2023) | 2.518 |
| 3 | Oxides of Sulphur (as $SO_x$) ($mg/Nm^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Oily Jetty Pump-2 of Capacity 890 HP Pump No.1 | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (mg/Nm$^3$) | 12.46 (June. 2023) | 56 (April. 2023) | 34.23 |
| 2 | Oxide of Nitrogen (as $NO_x$) (mg/Nm$^3$) | 142 (April. 2023) | 178 (Aug. 2023) | 160 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/Nm$^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Oily Jetty Pump-1 of Capacity 890 HP Hydrant | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM),(mg/Nm$^3$) | 14 (July. 2023) | 58 (April. 2023) | 36 |
| 2 | Oxide of Nitrogen (as $NO_x$)(mg/Nm$^3$) | 154 (April. 2023) | 172 (July. 2023) | 163 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/Nm$^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Oily Jetty Pump-3 of Capacity 890 HP Hydrant | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM),(mg/Nm$^3$) | 14.26 (June. 2023) | 56 (April. 2023) | 35.13 |
| 2 | Oxide of Nitrogen (as $NO_x$) (mg/Nm$^3$) | 112 (July. 2023) | 132 (Sep. 2023) | 122 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/Nm$^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Oily Jetty Pump-2 Capacity890HP-Pump No.2 | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM),(mg/Nm$^3$) | 11.22 (June. 2023) | 68 (April. 2023) | 39.61 |
| 2 | Oxide of Nitrogen (as $NO_x$) (mg/Nm$^3$) | 123 (Sep. 2023) | 156 (June. 2023) | 139.5 |
| 3 | Oxides of Sulphur (as $SO_X$) (mg/Nm$^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Oily Jetty Pump-1 of Capacity 890 HP Monitor | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM),(mg/Nm$^3$) | 13.23 (June. 2023) | 94 (April. 2023) | 53.61 |
| 2 | Oxide of Nitrogen (as $NO_x$) (mg/Nm$^3$) | 132 (Sep. 2023) | 192 (June. 2023) | 162 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/Nm$^3$) | ND | ND | ND |

NITYA LABORATORIES AUTHORISED

**Test Report**

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur , Mangalore -575010

Sample Description: Stack Emission

Sample Drawn By: Nitya Laboratories

**STACK EMISSION MONITORING FOR SIX MONTHS APRIL 2023 TO SEPTEMBER 2023SUMMARY**

| Sr. No. | Oily Jetty Pump-3 of Capacity 890 HP (Monitor Pump) | Minimum | Maximum | Average |
|---|---|---|---|---|
| 1 | Particulate Matter, (as PM), (mg/Nm$^3$) | 13.28 (June. 2023) | 120 (April. 2023) | 66.64 |
| 2 | Oxide of Nitrogen (as $NO_x$) (mg/Nm$^3$) | 120 (April. 2023) | 143 (Sep. 2023) | 131.5 |
| 3 | Oxides of Sulphur (as $SO_x$) (mg/Nm$^3$) | ND | ND | ND |

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