



ನವ ಮಂಗಳೂರು ಬಂದರು ಪ್ರಾಧಿಕಾರ
ನವ ಮಂಗಳೂರು ಪತ್ತನ ಪ್ರಾಧಿಕರಣ
NEW MANGALORE PORT AUTHORITY
(Fully Solar Powered)

ಭಾರತ ಸರ್ಕಾರ (ಪತ್ತನ, ಪೊತ ಪರಿವಹನ ಔರ ಜಲಮಾರ್ಗ ಮಂತ್ರಾಲಯ)
Govt of India (Ministry of Ports, Shipping and Waterways)
ಪೆಣಂಬೂರು ಪಣಮ್ಬೂರ Panambur / ಮಂಗಳೂರು ಮಂಗಳೂರು Mangalore - 575010

By Speed 14r
75
Azadi Ka
Amrit Mahotsav



3/11/EMP/CE(C)/2021-22/TS

Date: 29-08-2022

To:

K.P.SINGH
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.

Sir,

Sub: Submission of half yearly Compliance report from **October- 2021 to March -2022** -Environmental Clearance issued by the Ministry of Environment, Forest & Climate-intimation -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

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 Air samples, Drinking water samples, Waste Water (STP), Noise level ,DG stack emission from **October 2021 to March 2022** 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 19-05-1999.

The soft copy of same information is mailed to rosz.bng-mef@nic.in and roszmon@yahoo.in.. The half yearly Compliance report from **October 2021 to March 2022** is uploaded in Port website www.newmangaloreport.gov.in

Thanking you,

Encl: As above

Yours faithfully,

Chief Engineer (Civil)

Stipulated Environmental Clearances Report as per

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 and work 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.
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 Port has developed its own Nursery and many species such as Eucalyptus, Casurina, Dalbergia, Termalia etc were planted near beach side Port has developed 30% Green belt area. 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. Port is submitting the air and water quality reports to MOEF&CC and KSPCB Port is under the process 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 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

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 mitigative 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


 Dy. Manager Environment

ANNEXURE-I

FIRE FIGHTING SYSTEM DETAILS AT OIL BERTHS AT NMPA					
Description	OISD Requirement	Berth 10	Berth 11	Berth 12	Berth 13
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. 900 m3/hr pump is provided which is adequate and meets the OISD 156 requirement	Tower monitors (2 nos. X 6000 LPM) provided. 900 m3/hr pump is provided which is adequate and meets the OISD 156 requirement	Tower monitors (2 nos. X 6000 LPM) provided. 900 m3/hr pump is provided which is adequate and meets the OISD 156 requirement	Tower monitors (4 nos. X 6000 LPM) provided. 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) 8778 LPM in all 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) 6516 LPM in all. 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) 5792 LPM in all 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) 820 m3/hr pump is provided which is adequate as per the OISD 156 requirement
Jockey pump capacity		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 <u>Foam calculation</u> = 14800 X .03X 60 = 26640 litre	Tower monitors (2 nos. x 5000 LPM) Ground monitor (1 No.x5000 LPM) As per calculation requirement is (15000 X .03 X 60) =27000 litre Available = 15 cu.m tank which is lesser by 12 cu.m as per OISD 156	Tower monitors (2 nos. X 6000 LPM) Ground monitor (1 No.x 3000 LPM) As per calculation requirement is (15000 X .03 X 60) =27000 litre Available = 30 cu.m tank which meets OISD 156 requirement	Tower monitors (2 nos. X 6000 LPM) Ground monitor (1 No.x 3000 LPM). As per calculation requirement is (15000 X .06 X 60) =54000 litre(since 6% foam is available) Available = 2 X 30 cu.m tank which meets OISD 156 requirement	Tower monitors (4 nos. X 6000 LPM) Ground monitor (2 No.x 3000 LPM) As per calculation requirement is (18000 X .03 X 60) =32400 litre. Available = 35 cu.m tank which meets OISD 156 requirement

Foam Pump Capacity		54 Cu.m /hr @ 18 kg/cm ² X 2 nos pumps available Adequate	27 Cu.m /hr @ 17 kg/cm ² X 2 nos pumps available Adequate	54 Cu.m /hr @ 17 kg/cm ² X 2 nos pumps available Adequate	28 Cu.m /hr @ 17 kg/cm ² X 2 nos pumps available 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 / Booster Pumps		2	2	2	2
International shore connection	minimum 1 per berth	1 No.	1 No.	1 No.	1 No
Hydrant	Single headed		3	3	9
	Double headed	16	16	12	16
Fixed water spray system	To be provided for all jetties handling more than 20,000 DWT		2 No.	2 No.	2 no.
Gas Detectors	as per requirement	4	4	4	4
Flame Detectors	as per requirement		10	10	10

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 Trust 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, Mongoose, Jungle Fowls etc. At present, the bird population has increased to nearly 100 varieties. 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 Trust houses immovable butterflies. At present, New Mangalore Port Trust 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 Trust 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 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 awarded NMPA for Environmental Protection.

Green Belt at NMPA

Annexure II



Annexure-III

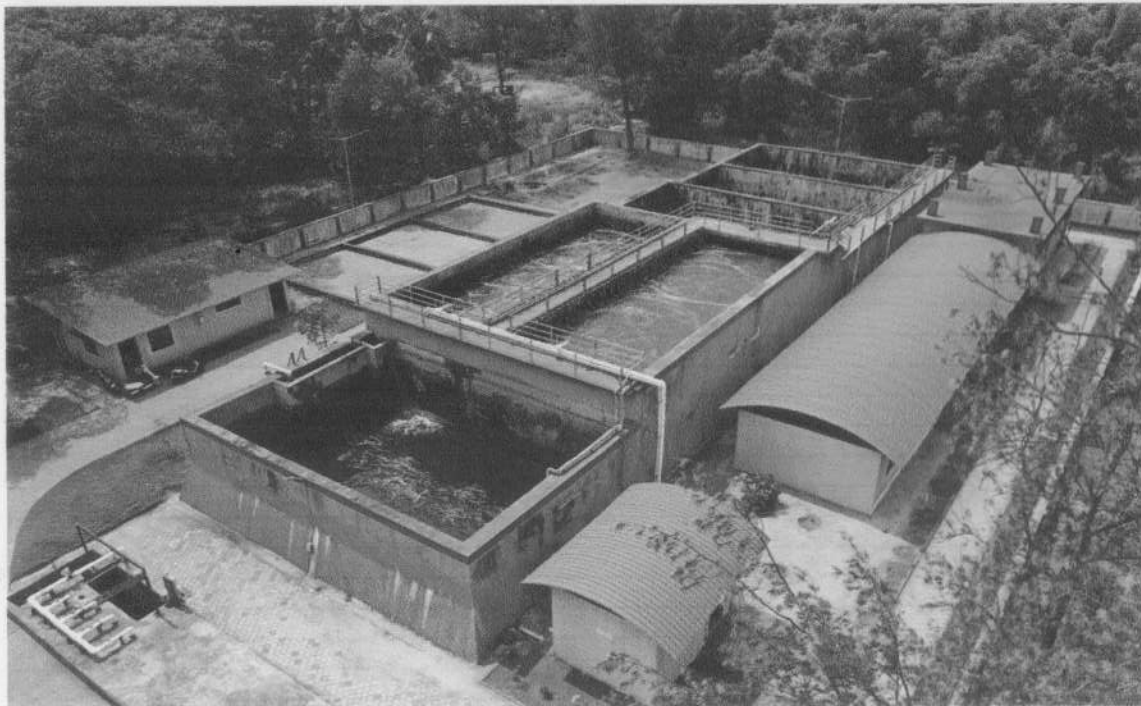
1.2 MLD Sewage Treatment Plant at NMPA

New Mangalore Port Trust has commissioned 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 achieved 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.



Annexure-IV

Environmental Monitoring System: There is a scientific monitoring system in place in the Port. The monitoring process is carried out through NABL aggregated established laboratories having resources and spare capacity. NMPA monitors air and water qualities through third party 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 particular. 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 certified since 2011 and it demands various Compliances to protect the Environment. The Port has successfully complied the standards

CONTINUOUS AMBIENT AIR QUALITY MONITORING SYSTEM

- a. New Mangalore Port Authority Shortly Installing the CAAQMS.
- b. The Karnataka State Pollution Control Board team visited to Port verified the tender and location for the installation
- c. As per the Wind Rose diagram of last year 2021, Location was identified by the pollution control board team
- d. As per the suggestions obtained by the KSPCB team, Old tender was discharged and again new estimation prepared for tender is under process.
- e. All tender documents are shared to Regional Pollution Control Board for information.

Berth No. 18 Environment conditions

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.	Obtained. Valid up to 5 year from 23/05/2014 Consent for Operation valid upto 22-06-2022
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 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. Total land of the Port: 2290 acres Total Green belt of the port : 734 acres No vacant land available in the port.
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 II

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 Environmental Engineer under the supervision of Chief Engineer Civil for effective implementation of the stipulated environmental safeguards has been setup.
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. 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 Bangaluru 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 2021 to Sep 2021
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
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
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.	N.A
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 in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.	Complied
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 .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.	At the time of construction issued
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 MoEF&CC, the respective Zonal Office of CPCB and the SPCB.	Uploaded in. www. Newmangalore-port.com
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 October2021-March2022

18	The environmental statement for each financial year ending 31 st 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 30/09/2022. Soft copy uploaded in the company web site.
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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. 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. 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

Rupf
Dy. Manager Environm

**COMPREHENSIVE ENVIRONMENTAL
MONITORING REPORT**

(October 2021- March 2022)

For



**NEW MANGALORE PORT AUTHORITY
Panambur, Mangalore, Karnataka**

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-



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1.0 INTRODUCTION

The New Mangalore Port was declared as the 9th major port on 4th May 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.



2.1.1. Frequency and Parameters

On each sampling day, a set of 30 spot / 24 hour average samples for each of the parameters listed below were collected by sampling during the sampling period.

Sl. No.	Location of Station
1	Mangalore Coast
2	Old Jetty and Near L.N.C. Terminal
3	VIMS Port Compound
4	Old Customs Guard Office
5	NMPA Hospital

AMBIENT AIR QUALITY MONITORING

2.1.2. Frequency and Parameters

On each sampling day, a set of 30 spot / 24 hour average samples for each of the parameters listed below were collected by sampling during the sampling period.

- 1. Particulate matter (PM10)
- 2. Particulate matter (PM2.5)
- 3. Sulphur dioxide (SO2)
- 4. Oxides of Nitrogen (NOx)
- 5. Benzene (C6H6)
- 6. Benzene
- 7. Carbon monoxide
- 8. Arsenic
- 9. Cadmium
- 10. Lead
- 11. Manganese
- 12. Zinc

2.1.3 Sampling and Analysis Procedure

The sampling is conducted in accordance with the following procedure:

The sampling is conducted in accordance with the following procedure:

The sampling is conducted in accordance with the following procedure:

The sampling is conducted in accordance with the following procedure:

The sampling is conducted in accordance with the following procedure:



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 October 2021 to 31st March 2022.

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 (PM₁₀)
2. Particulate matter (PM_{2.5})
3. Sulphur dioxide (SO₂)
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 (PM₁₀)

The sampling of ambient air for evaluating PM₁₀ 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 PM₁₀ 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



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 (SO₂)

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 SO₂, 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 SO₂ in the sample was computed. The ambient SO₂ concentrations were computed from the amount of SO₂ 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 H₂O₂, 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 NO_x 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 m³/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°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, 23rd edition.



2.1.4 Techniques for Measurement

The techniques used for measurement of pollutants may 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, Desiccator
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.

AIR QUALITY MONITORING DATA FOR MARCH 2022

Sl. No.	Location	Parameter	Unit	Min	Max	Avg
1	100/1	PM ₁₀	µg/m ³	100	250	150
2	100/2	PM ₁₀	µg/m ³	120	280	170
3	100/3	PM ₁₀	µg/m ³	110	270	160
4	100/4	PM ₁₀	µg/m ³	130	290	180
5	100/5	PM ₁₀	µg/m ³	140	300	190



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr.NO.	Locations			US Malya gate	Oil Jetty area Near I.M.C. Terminal	VTMS Port Control	Old Coastal Guard Office	NMPA Hospital
1	PM10	$\mu\text{g}/\text{m}^3$	Min.	80.46 (Mar. 2022)	88.12 (Oct.2021)	78.43 (Oct.2021)	72.84 (Oct.2021)	78.11 (Mar. 2022)
			Max.	96.6 (Dec.2021)	96.46 (Jan.2022)	90.68 (Jan.2022)	86.24 (Mar. 2022)	88.8 (Dec.2021)
			Avg.	90.02	93.30	85.46	79.82	82.02
2	PM2.5	$\mu\text{g}/\text{m}^3$	Min.	30.62 (Mar. 2022)	34.18 (Mar. 2022)	32.28 (Mar. 2022)	30.42 (Oct.2021)	28.26 (Mar. 2022)
			Max.	36.48 (Oct.2021)	46.28 (Nov.2021)	42.61 (Jan.2022)	38.24 (Jan.2022)	38.6 (Dec.2021)
			Avg.	34.69	40.21	38.43	34.95	34.35
3	SO2	$\mu\text{g}/\text{m}^3$	Min.	12.64 (Mar. 2022)	14.28 (Mar. 2022)	11.28 (Mar. 2022)	10.68 (Oct.2021)	10.64 (Mar. 2022)
			Max.	20.36 (Nov.2021)	24.82 (Nov.2021)	20.9 (Dec.2021)	17.62 (Jan.2022)	18.2 (Dec.2021)
			Avg.	18.03	21.13	17.46	15.76	15.79
4	NO2	$\mu\text{g}/\text{m}^3$	Min.	24.61 (Feb.2022)	26.94 (Mar. 2022)	23.16 (Mar. 2022)	21.94 (Oct.2021)	22.24 (Mar. 2022)
			Max.	30.16 (Jan.2022)	36.48 (Nov.2021)	32.66 (Jan.2022)	28.22 (Mar. 2022)	29.76 (Oct.2021)
			Avg.	27.22	33.05	28.55	25.94	25.86
5	CO	mg/m^3	Min.	0.16 (Oct.2021)	0.21 (Oct.2021)	0.13 (Oct.2021)	0.11 (Oct.2021)	0.08 (Nov.2021)
			Max.	0.62 (Mar. 2022)	0.68 (Jan.2022)	0.66 (Mar. 2022)	0.81 (Jan.2022)	0.15 (Mar. 2022)
			Avg.	0.44	0.47	0.35	0.44	0.95
6	NH3	$\mu\text{g}/\text{m}^3$	Min.	38.6 (Nov.2021)	42.16 (Mar. 2022)	40.58 (Mar. 2022)	38.18 (Mar. 2022)	36.26 (Mar. 2022)
			Max.	44.16 (Jan.2022)	58.8 (Nov.2021)	48.02 (Dec 2021)	56.4 (Dec 2021)	48.06 (Dec 2021)
			Avg.	42.03	52.33	43.34	47.84	45.13
7	O3	$\mu\text{g}/\text{m}^3$	Min.	16.26 (Mar. 2022)	15.22 (Mar. 2022)	20.42 (Oct.2021)	18.9 (Dec 2021)	14.66 (Mar. 2022)
			Max.	22.14 (Oct.2021)	28.21 (Nov.2021)	18.61 (Mar. 2022)	24.68 (Oct.2021)	30.39 (Oct.2021)
			Avg.	19.05	21.33	19.51	22.02	21.07
8	Pb	$\mu\text{g}/\text{m}^3$		ND	ND	ND	ND	ND
9	C6H6			ND	ND	ND	ND	ND
10	BAP			ND	ND	ND	ND	ND
11	As	mg/m^3		ND	ND	ND	ND	ND
12	Ni			ND	ND	ND	ND	ND



2.1.6 Air Quality Standards

MINISTRY OF ENVIRONMENT AND FORESTS

NOTIFICATION

New Delhi, the 16th 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 :

- (i) These rules may 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.
- In the Environment (Protection) Rules, 1986 hereinafter 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.
- 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	-Ultraviolet 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
		24-hours**	100	100	-TOEM -Beta attenuation



4.	Particulate Matter (Size less than 2.5µm) or PM _{2.5} µg/m ³	Annual*	40	40	-Gravimetric -TOEM
		24-hours**	60	60	-Beta attenuation
5.	Ozone (O ₃), µg/m ³	8-hours*	100	100	-UV Photometric - Chemiluminescence
		1-hour**	180	180	-Chemical Method
6.	Lead (Pb), µg/m ³	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/m ³	8-hours*	02	02	-NDIR Spectroscopy
		1-hour**	04	04	
8.	Ammonia (NH ₃), µg/m ³	Annual*	100	100	-Chemiluminescence -Indophenol Blue Method
		24-hours**	400	400	
9.	Benzene (C ₆ H ₆), µg/m ³	Annual*	05	05	- Gas Chromatography based continuous Analyzer -Adsorption and Desorption, followed by GC Analysis
10.	Benzo(α)Pyrene (BAP)- particulate phase only, ng/m ³	Annual*	01	01	-Solvent Extraction followed by HPLC/GC Analysis
11.	Arşenic (As), ng/m ³	Annual*	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni), ng/m ³	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 may 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.



2.1.7 Results & Discussion on Observations**2.1.7.1 Particulate Matter (PM₁₀)**

During the study period, the PM₁₀ concentrations were observed in the range of **72.84 to 96.60** µg/m³, with the average value ranged between of **79.82 to 93.30** µg/m³. It can be observed that the average value is within the limits specified in the ambient air quality standards. It is, therefore, concluded that PM₁₀ 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 **28.26 to 46.28** µg/m³, with the average value ranged between of **34.35 to 40.21** µg/m³. 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 (SO₂)

During the study period, the SO₂ concentrations were observed in the range of **10.64 to 24.82** µg/m³, with the average value ranged between of **15.76 to 21.13** µg/m³. It can be observed that the average value is within the limits specified in the ambient air quality standards. It is, therefore, concluded that SO₂ 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 **21.94 to 36.48** µg/m³, with the average value ranged between of **25.86 to 33.05** µg/m³. 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 (C₆H₆)

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 (a) pyrene

During the study period, the Benzo (a) 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 **0.08 to 0.81** mg/m³, with the average value ranged between of **0.35 to 0.95** mg/m³. 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 (NH₃)

During the study period, the ammonia concentrations were observed in the range of **36.26 to 58.80** µg/m³, with the average value ranged between of **42.03 to 52.33** µg/m³. 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 (O₃)

During the study period, the O₃ concentrations were observed in the range of **14.66 to 30.39** µg/m³, with the average value ranged between of **19.05 to 22.02** µg/m³. Thus, the average values of O₃ concentrations are within the limits specified in the ambient air quality. It is, therefore, concluded that O₃ concentrations in the area are well within standards and the atmosphere has adequate receptive capacity.



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.



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 October 2021 to March 2022.

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.



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 October 2021 to March 2022 Summary

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)	65.8 (Oct. 2021)	73.3 (Nov.) 2021	70.02		55.2 (Oct. 2021)	63.2 (Nov.) 2021	60.28	
2	Wharf Berth (Inside)	60.3 (Oct. 2021)	71.4 (Nov.) 2021	65.85		50.2 (Oct. 2021)	55.4 (Nov.) 2021	53.46	
3	Administrative Office Building	55.9 (Oct. 2021)	72.5 (Nov.) 2021	64.35	Industrial Area Day Time Avg. 75 dB(A)	45.3 (Oct. 2021)	56.8 (Jan.) 2022	51.62	Industrial Area Day Time Avg. 70 dB(A)
4	J.N.C. Hall in the campus	51.3 (Oct. 2021)	69.46 (Mar.) 2022	60.06		42.4 (Oct.) 2021	58.24 (Mar.) 2022	49.62	
5	Wharf Canteen	61.2 (Oct.) 2021	72.52 (Mar.) 2022	64.05		52.2 (Jan.) 2022	60.14 (Mar.) 2022	55.84	
6	Container Yard	65.9 (Oct.) 2021	71.26 (Mar.) 2022	68.24		57.5 (Jan.) 2022	61.62 (Mar.) 2022	59.3	



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



DRINKING WATER QUALITY MONITORING

- 1. Drinking Water Quality Monitoring
- 2. Drinking Water Quality Monitoring
- 3. Drinking Water Quality Monitoring
- 4. Drinking Water Quality Monitoring
- 5. Drinking Water Quality Monitoring
- 6. Drinking Water Quality Monitoring
- 7. Drinking Water Quality Monitoring
- 8. Drinking Water Quality Monitoring
- 9. Drinking Water Quality Monitoring
- 10. Drinking Water Quality Monitoring
- 11. Drinking Water Quality Monitoring
- 12. Drinking Water Quality Monitoring
- 13. Drinking Water Quality Monitoring
- 14. Drinking Water Quality Monitoring
- 15. Drinking Water Quality Monitoring
- 16. 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, an Water sampling was conducted at 19 locations during the period from October 2021 to March 2022.

Table - 4
Location of Drinking Water Sampling Stations

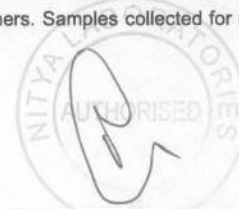
Sr. No.	Location of Station	Frequency
1.	Administration Building as DW1	Once in a Month
2.	NMPA School as DW2	Once in a Month
3.	NMPA Canteen as DW3	Once in a Month
4.	Hospital as DW4	Once in a Month
5.	NMPA Any Water Inlet Inside Wharf as DW5	Once in a Month
6.	Wharf Canteen (Inside the Port Area) as 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. HNO₃.



4.4 Results & Discussion on Observations

4.4.1 Administration Building as DW1

During the study period, at this location, pH was found between **6.58 to 6.84**. Total Hardness was found between **30.0 to 48.36** mg/l. Chlorides and Sulphates were found between **12.3 to 22.99** mg/l and **1.6 to 33.69** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.06 to 0.33** mg/l and **0.04 to 0.30** mg/l respectively. Standard Plate Count is between **48 to 56**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 **6.72 to 7.18**. Total Hardness was found between **35.53 to 65.14**mg/l. Chlorides and Sulphates were found between **17.9 to 25.99** mg/l and **1.28 to 35.62** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04 to 0.32** mg/l and **0.04 to 0.29** mg/l respectively. Standard Plate Count is between **48 to 56** 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 **6.72 to 6.91**. Total Hardness was found between **40.0 to 72.0** mg/l. Chlorides and Sulphates were found between **15.9 to 25.99** mg/l and **6.20 to 34.66** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04 to 0.24** mg/l and **0.02 to 0.23** mg/l respectively. Standard Plate Count is between **44 to 78**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

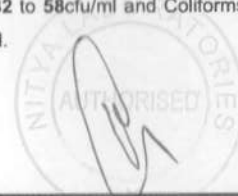
During the study period, at this location, pH was found between **6.64 to 6.77**. Total Hardness and Total Dissolved Solids were found between **24.0 to 52.31** mg/l and **65.4 to 152**. Chlorides and Sulphates were found between **13.9 to 24.99** mg/l and **1.82 to 39.47** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04 to 0.28** mg/l and **0.03 to 0.26** mg/l respectively. Standard Plate Count is between **39 to 60**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 **6.63 to 6.94**. Total Hardness and Total Dissolved Solids were found between **35.53 to 68.00** mg/l and **70.8 to 156**. Chlorides and Sulphates were found between **15.9 to 30.99** mg/l and **1.2 to 43.41** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.06 to 0.27** mg/l and **0.05 to 0.25** mg/l respectively. Standard Plate Count is between **48 to 60** 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 **6.67 to 7.28**. Total Hardness and Total Dissolved Solids were found between **5.9 to 72.0** mg/l and **30.0 to 167.0**. Chlorides and Sulphates were found between **7.99 to 25.99** mg/l and **0.96 to 43.41** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.06 to 0.26** mg/l and **0.04 to 0.38** mg/l respectively. Standard Plate Count is between **32 to 58**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 **6.73** to **7.02**. Total Hardness and Total Dissolved Solids were found between **8.88** to **82.0** mg/l and **54.0** to **112.0**. Chlorides and Sulphates were found between **12.99** to **30.99** mg/l and **2.11** to **42.30** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.03** to **0.86** mg/l and **0.04** to **0.409** mg/l respectively. Standard Plate Count is between **52** to **60**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 **6.67** to **7.26**. Total Hardness and Total Dissolved Solids were found between **39.48** to **176.0** mg/l and **66.53** to **364.0**. Chlorides and Sulphates were found between **21.99** to **47.98** mg/l and **2.64** to **35.69** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.08** to **0.82** mg/l and **0.04** to **0.37** mg/l respectively. Standard Plate Count is between **50** to **56**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 **6.71** to **7.30**. Total Hardness and Total Dissolved Solids were found between **32.0** to **130.28** mg/l and **66.66** to **372.0**. Chlorides and Sulphates were found between **13.9** to **47.98** mg/l and **2.28** to **42.30** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.05** to **1.04** mg/l and **0.05** to **0.37** mg/l respectively. Standard Plate Count is between **44** to **62**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

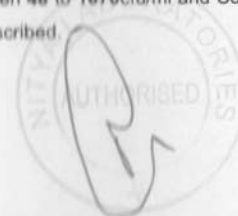
During the study period, at this location, pH was found between **6.69** to **7.16**. Total Hardness and Total Dissolved Solids were found between **31.58** to **45.40** mg/l and **69.93** to **127.0**. Chlorides and Sulphates were found between **17.9** to **22.99** mg/l and **1.80** to **39.47** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.02** to **0.36** mg/l and **0.05** to **0.30** mg/l respectively. Standard Plate Count is between **44** to **50**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 **6.56** to **6.86**. Total Hardness and Total Dissolved Solids were found between **28.0** to **46.38** mg/l and **64.3** to **130.0**. Chlorides and Sulphates were found between **17.9** to **26.99** mg/l and **2.1** to **37.54** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.03** to **0.28** mg/l and **0.04** to **0.35** mg/l respectively. Standard Plate Count is between **42** to **54**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

4.4.12 Fifth Avenue Open Well as S1

During the study period, at this location, pH was found between **6.43** to **6.72**. Total Hardness and Total Dissolved Solids were found between **27.36** to **42.00** mg/l and **67.37** to **124.0**. Chlorides and Sulphates were found between **17.9** to **21.99** mg/l and **3.75** to **31.77** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.10** to **0.15** mg/l and **0.10** to **0.28** mg/l respectively. Standard Plate Count is between **48** to **1670**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.



4.4.13 RCHW Colony Open Well as S2

During the study period, at this location, pH was found between **6.38** to **6.76**. Total Hardness and Total Dissolved Solids were found between **39.48** to **76.00** mg/l and **69.99** to **135.0**. Chlorides and Sulphates were found between **21.99** to **29.99** mg/l and **4.28** to **35.62** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.07** to **0.28** mg/l and **0.14** to **0.19** mg/l respectively. Standard Plate Count is between **50** to **110**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

4.4.14 RCHW Colony New Open Well as S3

During the study period, at this location, pH was found between **6.58** to **6.96**. Total Hardness and Total Dissolved Solids were found between **39.48** to **58.00** mg/l and **70.13** to **196.0**. Chlorides and Sulphates were found between **20.9** to **39.99** mg/l and **3.36** to **37.54** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.08** to **0.26** mg/l and **0.14** to **0.37** mg/l respectively. Standard Plate Count is between **42** to **720**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

4.4.15 Sump Tank (Pump House) as S4

During the study period, at this location, pH was found between **6.59** to **6.81**. Total Hardness and Total Dissolved Solids were found between **12.83** to **84.00** mg/l and **63.67** to **218.0**. Chlorides and Sulphates were found between **18.9** to **70.98** mg/l and **5.47** to **34.66** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.13** to **0.31** mg/l and **0.12** to **0.33** mg/l respectively. Standard Plate Count is between **52** to **60**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

4.3.16 New UGR Open Well as S5

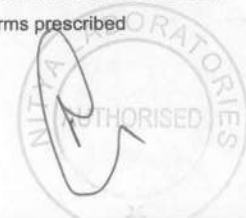
During the study period, at this location, pH was found between **6.62** to **7.14**. Total Hardness and Total Dissolved Solids were found between **12.83** to **62.00** mg/l and **40.0** to **120**. Chlorides and Sulphates were found between **11.99** to **16.99** mg/l and **2.7** to **37.54** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.08** to **0.49** mg/l and **0.04** to **0.31** mg/l respectively. Standard Plate Count is between **42** to **210**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

4.4.17 Timber Yard as S6

During the study period, at this location, pH was found between **6.58** to **6.82**. Total Hardness and Total Dissolved Solids were found between **39.48** to **88.00** mg/l and **69.89** to **186.0**. Chlorides and Sulphates were found between **21.9** to **27.99** mg/l and **6.24** to **35.62** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04** to **1.66** mg/l and **0.02** to **0.30** mg/l respectively. Standard Plate Count is between **52** to **90**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.

4.4.18 Thimmappayya Well as S7

During the study period, at this location, pH was found between **6.57** to **6.91**. Total Hardness and Total Dissolved Solids were found between **7.89** to **64.00** mg/l and **37.0** to **112.0**. Chlorides and Sulphates were found between **11.99** to **16.99** mg/l and **1.62** to **39.47** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.04** to **0.48** mg/l and **0.08** to **0.37**mg/l respectively. Standard Plate Count is between **50** to **130**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed.



4.4.19TMCC Water at New UGR as S8

During the study period, at this location, pH was found between **6.64** to **6.72**. Total Hardness and Total Dissolved Solids were found between **12.83** to **78.9** mg/l and **70.7** to **104.0**. Chlorides and Sulphates were found between **7.9** to **27.99** mg/l and **2.5** to **109.75** mg/l respectively. Iron is found **ND**. The Ammonical Nitrogen and Phosphates are found between **0.08** to **0.29** mg/l and **0.09** to **0.245**mg/l respectively. Standard Plate Count is between **42** to **234**cfu/ml and Coliforms were **absent**. All these values were found well within the IS: 10500-2012 norms prescribed

Sl. No.	Parameter	Unit	Value	IS: 10500-2012 Norms
1	pH		6.64 - 6.72	6.5 - 8.5
2	Total Hardness	mg/l	12.83 - 78.9	500
3	Total Dissolved Solids	mg/l	70.7 - 104.0	500
4	Chlorides	mg/l	7.9 - 27.99	250
5	Sulphates	mg/l	2.5 - 109.75	400
6	Iron	mg/l	ND	0.3
7	Ammonical Nitrogen	mg/l	0.08 - 0.29	0.5
8	Phosphates	mg/l	0.09 - 0.245	0.1
9	Standard Plate Count	cfu/ml	42 - 234	500
10	Coliforms		absent	absent



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Administration Building as DW1			Requirement IS:10500	Protocol
			Minimum	Maximum	Average		
1	pH	-	6.58 (Nov. 2021)	6.84 (Jan. 2022)	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 23 rd Ed.
5	Electrical Conductivity	us/cm	101.38 (Oct. 2021)	157.17 (Mar. 2022)	132.39	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	69.38 (Oct. 2021)	115 (Feb. 2022)	89.86	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	30 (Jan. 2022)	48.36 (Feb. 2022)	40.55	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	12.3 (Dec. 2021)	22.99 (Mar. 2022)	18.19	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	1.6 (Jan. 2022)	33.69 (Oct. 2021)	9.62	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.06 (Feb. 2022)	0.33 (Nov. 2021)	0.19	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.04 (Feb. 2022)	0.30 (Oct. 2021)	0.15	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	48 (Jan. 2022)	54 (Mar. 2022)	50	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No	Parameters	Unit	Test Results NMPA School as DW2			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.72 (Oct. 2021)	7.18 (Dec. 2021)	6.87	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 23 rd Ed.
5	Electrical Conductivity	us/cm	99.89 (Oct. 2021)	212 (Feb. 2022)	161.79	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	68.89 (Oct. 2021)	154 (Feb. 2022)	108.41	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	35.53 (Oct. 2021)	65.14 (Mar. 2022)	57.47	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	17.9 (Dec. 2021)	25.99 (Feb. 2022)	22.96	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	1.28 (Jan. 2022)	35.62 (Oct. 2021)	10.63	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.04 (Mar. 2022)	0.32 (Nov. 2021)	0.15	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄	mg/l	0.04 (Mar. 2022)	0.29 (Oct. 2021)	0.13	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	48 (Dec. 2021)	56 (Jan. 2022)	53.33	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No	Parameters	Unit	Test Results NMPA Canteen as DW3			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.72 (Nov. 2021)	6.91 (Dec. 2021)	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 23 rd Ed.
5	Electrical Conductivity	us/cm	102.99 (Oct. 2021)	226 (Dec. 2021)	176.71	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	71.39 (Oct. 2021)	142.0 (Dec. 2021)	119.33	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	40.0 (Nov. 2021)	72 (Dec. 2021)	49.20	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	15.9 (Jan. 2022)	25.99 (Mar. 2022)	21.12	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	6.2 (Nov. 2021)	34.66 (Oct. 2021)	12.55	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.04 (Feb. 2022)	0.24 (Dec. 2021)	0.15	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.02 (Feb. 2022)	0.23 (Oct. 2021)	0.12	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	44 (Jan 2022)	78 (Mar. 2022)	55	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Hospital as DW4			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.64 (Nov. 2021)	6.77 (Oct. 2021)	6.7	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 23 rd Ed.
5	Electrical Conductivity	us/cm	93.3 (Nov. 2021)	186 (Feb. 2022)	139.04	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	65.4 (Nov. 2021)	152 (Feb. 2022)	98.06	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	24.0 (Nov. 2021)	52.31 (Feb. 2022)	40.00	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	13.9 (Jan. 2022)	24.99 (Feb. 2022)	19.29	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	1.82 (Jan. 2022)	39.47 (Oct. 2021)	11.66	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.04 (Feb. 2022)	0.28 (Dec. 2021)	0.18	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄	mg/l	0.03 (Mar. 2022)	0.26 (Oct. 2021)	0.13	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	39 (Mar. 2022)	60 (Jan 2022)	53.25	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results NMPA Any Water Inlet Inside Wharf as DW5			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.63 (Nov. 2021)	6.94 (Dec. 2021)	6.75	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 23 rd Ed.
5	Electrical Conductivity	us/cm	98.89 (Oct. 2021)	200 (Feb. 2022)	141.89	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	70.8 (Nov. 2021)	156 (Feb. 2022)	99.98	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	35.53 (Oct. 2021)	68.0 (Nov. 2021)	52.70	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	15.9 (Dec. 2021)	30.99 (Feb. 2022)	24.12	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	1.2 (Jan. 2022)	43.41 (Oct. 2021)	11.89	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.06 (Feb. 2022)	0.27 (Nov. 2021)	0.17	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.05 (Mar. 2022)	0.25 (Oct. 2021)	0.14	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	48 (Jan 2022)	60 (Dec. 2021)	52	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Wharf Canteen (Inside the Port Area) as DW6			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.67 (Oct. 2021)	7.28 (Dec. 2021)	6.90	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 23 rd Ed.
5	Electrical Conductivity	us/cm	25 (Feb. 2022)	146 (Dec. 2021)	106.08	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	30 (Feb. 2022)	167 (Jan. 2022)	85.47	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	5.9 (Feb. 2022)	72 (Dec. 2021)	29.18	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	7.99 (Nov. 2021)	25.99 (Oct. 2021)	15.46	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	0.96 (Feb. 2022)	43.41 (Oct. 2021)	10.96	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.06 (Feb. 2022)	0.26 (Jan. 2022)	0.16	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.04 (Feb. 2022)	0.38 (Oct. 2021)	0.15	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	32 (Mar. 2022)	58 (Dec. 2021)	45.50	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Traffic Building (Inside The Port Area) as DW7			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.73 (Oct. 2021)	7.02 (Jan. 2022)	6.82	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 23 rd Ed.
5	Electrical Conductivity	us/cm	52 (Feb. 2022)	168 (Dec. 2021)	125.67	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	54 (Feb. 2022)	112 (Dec. 2021)	87.07	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	8.88 (Feb. 2022)	82.0 (Dec. 2021)	40.01	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	12.99 (Mar. 2022)	30.99 (Feb. 2022)	20.62	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	2.11 (Feb. 2022)	42.30 (Oct. 2021)	10.20	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.03 (Feb. 2022)	0.86 (Jan. 2022)	0.35	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.04 (Feb. 2022)	0.409 (Oct. 2021)	0.18	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	52 (Jan 2022)	60 (Dec. 2021)	54.66	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

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	-	6.67 (Nov. 2021)	7.26 (Dec. 2021)	6.89	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 23 rd Ed.
5	Electrical Conductivity	us/cm	97.72 (Oct. 2021)	452.23 (Mar. 2022)	354.32	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	66.53 (Oct. 2021)	364 (Feb. 2022)	245.08	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	39.48 (Oct. 2021)	176.0 (Dec. 2021)	123.50	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	21.99 (Oct. 2021)	47.98 (Feb. 2022)	35.12	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	2.64 (Jan. 2022)	35.69 (Oct. 2021)	18.79	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.08 (Feb. 2022)	0.82 (Jan. 2022)	0.28	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻³	mg/l	0.04 (Mar. 2022)	0.37 (Oct. 2021)	0.16	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	50 (Mar. 2022)	56 (Jan 2022)	54	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

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	-	6.71 (Nov. 2021)	7.30 (Jan. 2022)	6.91	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 23 rd Ed.
5	Electrical Conductivity	us/cm	96.81 (Oct. 2021)	396 (Feb. 2022)	189.59	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	66.66 (Oct. 2021)	372 (Feb. 2022)	144.94	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	32.0 (Nov. 2021)	130.28 (Mar. 2022)	75.15	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	13.9 (Jan. 2022)	47.98 (Feb. 2022)	28.12	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	2.28 (Jan. 2022)	42.30 (Oct. 2021)	16.14	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.05 (Mar. 2022)	1.04 (Jan. 2022)	0.32	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄	mg/l	0.05 (Feb. 2022)	0.37 (Oct. 2021)	0.16	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	44 (Jan 2022)	62 (Mar. 2022)	52	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results NMPA Guest House as DW10			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.69 (Nov. 2021)	7.16 (Dec. 2021)	6.81	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 23 rd Ed.
5	Electrical Conductivity	us/cm	99.31 (Oct. 2021)	160.08 (Mar. 2022)	138.39	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	69.93 (Oct. 2021)	127 (Feb. 2022)	95.35	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	31.58 (Oct. 2021)	45.40 (Mar. 2022)	39.56	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	17.9 (Dec. 2021)	22.99 (Mar. 2022)	21.46	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	1.8 (Jan. 2022)	39.47 (Oct. 2021)	11.90	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.02 (Feb. 2022)	0.36 (Dec. 2021)	0.17	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.05 (Feb. 2022)	0.30 (Oct. 2021)	0.13	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	44 (Jan 2022)	50 (Dec. 2021)	46	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Marshalling Yard as DW11			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.56 (Dec. 2021)	6.86 (Mar. 2022)	6.71	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 23 rd Ed.
5	Electrical Conductivity	us/cm	99.1 (Nov. 2021)	178.17 (Mar. 2022)	136.26	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	64.3 (Nov. 2021)	130 (Feb. 2022)	92.11	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	28.0 (Nov. 2021)	46.38 (Feb. 2022)	37.06	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	17.9 (Jan. 2022)	26.99 (Feb. 2022)	22.12	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	2.1 (Jan. 2022)	37.54 (Oct. 2021)	14.54	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.03 (Feb. 2022)	0.28 (Nov. 2021)	0.17	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.04 (Mar. 2022)	0.35 (Nov. 2021)	0.16	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	42 (Nov. 2021)	54 (Jan 2022)	49.6	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Fifth Avenue Open Well as S1			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.43 (Dec. 2021)	6.72 (Nov. 2021)	6.59	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 23 rd Ed.
5	Electrical Conductivity	us/cm	99.21 (Oct. 2021)	187 (Feb. 2022)	139.71	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	67.37 (Oct. 2021)	124 (Mar. 2022)	92.61	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	27.36 (Oct. 2021)	42.0 (Dec. 2021)	31.26	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	17.9 (Dec. 2021)	21.99 (Mar. 2022)	20.27	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	3.75 (Jan. 2022)	31.77 (Oct. 2021)	10.36	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.1 (Feb. 2022)	0.15 (Dec. 2021)	0.12	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.10 (Mar. 2022)	0.28 (Oct. 2021)	0.19	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	48 (Oct. 2021)	1670 (Mar. 2022)	322	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results RCHW Colony Open Well as S2			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.38 (Dec. 2021)	6.76 (Nov. 2021)	6.60	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 23 rd Ed.
5	Electrical Conductivity	us/cm	101.23 (Oct. 2021)	176 (Dec. 2021)	147.35	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	69.99 (Oct. 2021)	135 (Feb. 2022)	107.99	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	39.48 (Oct. 2021)	76.0 (Dec. 2021)	55.19	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	21.99 (Nov. 2021)	29.99 (Oct. 2021)	25.77	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	4.28 (Mar. 2022)	35.62 (Oct. 2021)	13.40	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.07 (Feb. 2022)	0.28 (Dec. 2021)	0.18	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.14 (Dec. 2021)	0.198 (Oct. 2021)	0.16	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	50 (Oct. 2021)	110 (Mar. 2022)	63.66	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results RCHW Colony New Open Well as S3			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.58 (Feb. 2022)	6.96 (Jan. 2022)	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 23 rd Ed.
5	Electrical Conductivity	us/cm	102.30 (Oct. 2021)	282 (Jan. 2022)	180.78	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	70.13 (Oct. 2021)	196 (Feb. 2022)	129.70	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	39.48 (Oct. 2021)	58.0 (Dec. 2021)	45.88	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	20.9 (Dec. 2021)	39.99 (Feb. 2022)	31.62	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	3.36 (Feb. 2022)	37.54 (Oct. 2021)	11.57	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.08 (Mar. 2022)	0.26 (Dec. 2021)	0.17	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.14 (Dec. 2021)	0.37 (Oct. 2021)	0.24	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	42 (Oct. 2021)	720 (Mar. 2022)	158.66	-	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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Sump Tank (Pump House) as S4			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.59 (Mar. 2022)	6.81 (Dec. 2021)	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 23 rd Ed.
5	Electrical Conductivity	us/cm	93.63 (Oct. 2021)	324 (Mar. 2022)	232.43	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	63.67 (Oct. 2021)	218 (Mar. 2022)	152.17	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	12.83 (Feb. 2022)	84.0 (Dec. 2021)	52.60	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	18.9 (Dec. 2021)	70.98 (Mar. 2022)	38.77	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	5.47 (Mar. 2022)	34.66 (Oct. 2021)	12.67	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.13 (Feb. 2022)	0.31 (Nov. 2021)	0.19	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻³	mg/l	0.12 (Nov. 2021)	0.33 (Oct. 2021)	0.18	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	52 (Dec. 2021)	60 (Jan 2022)	57.33	-	IS:1622
14	Total Coliform	MPN/1 00 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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results New UGR Open Well as S5			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.62 (Feb. 2022)	7.14 (Dec. 2021)	6.77	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 23 rd Ed.
5	Electrical Conductivity	us/cm	62.4 (Jan. 2022)	188 (Dec. 2021)	115.16	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	40 (Jan. 2022)	120 (Dec. 2021)	80.34	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	12.83 (Feb. 2022)	62 (Dec. 2021)	27.50	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	11.99 (Oct. 2021)	16.99 (Mar. 2022)	14.77	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	2.7 (Feb. 2022)	37.54 (Oct. 2021)	9.31	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.08 (Feb. 2022)	0.49 (Jan. 2022)	0.23	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.04 (Feb. 2022)	0.31 (Oct. 2021)	0.15	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	42 (Jan 2022)	210 (Mar. 2022)	88.50	-	IS:1622
14	Total Coliform	MPN/1 00 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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Timber Yard as S6			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.58 (Dec. 2021)	6.82 (Jan. 2022)	6.70	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 23 rd Ed.
5	Electrical Conductivity	us/cm	95.43 (Oct. 2021)	263.09 (Mar. 2022)	227.58	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	69.89 (Oct. 2021)	186 (Feb. 2022)	152.14	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	39.48 (Oct. 2021)	88.0 (Nov. 2021)	71.75	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	21.9 (Dec. 2021)	27.99 (Oct. 2021)	25.11	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	6.24	35.62 (Oct. 2021)	15.39	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.04 (Feb. 2022)	1.66 (Jan. 2022)	0.54	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.02 (Feb. 2022)	0.30 (Oct. 2021)	0.17	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	52 (Dec. 2021)	90 (Mar. 2022)	62.50	-	IS:1622
14	Total Coliform	MPN/1 00 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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Thimmappayya Well as S7			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.57 (Feb. 2022)	6.91 (Dec. 2021)	6.67	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 23 rd Ed.
5	Electrical Conductivity	us/cm	56.1 (Jan. 2022)	168 (Dec. 2021)	108.58	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	37 (Jan. 2022)	112 (Dec. 2021)	76.38	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	7.89 (Mar. 2022)	64 (Dec. 2021)	27.74	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	11.99 (Nov. 2021)	16.99 (Mar. 2022)	14.94	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	1.62 (Jan. 2022)	39.47 (Oct. 2021)	8.74	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.04 (Feb. 2022)	0.48 (Mar. 2022)	0.21	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.08 (Feb. 2022)	0.37 (Oct. 2021)	0.16	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	50 (Dec. 2021)	130 (Mar. 2022)	66.66	-	IS:1622
14	Total Coliform	MPN/1 00 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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results MCC Water At New UGR as S8			Requirement IS:10500	Protocol
			Minimum	Maximum	Average	Desirable	
1	pH	-	6.64 (Mar. 2022)	6.72 (Jan. 2022)	6.68	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 23 rd Ed.
5	Electrical Conductivity	us/cm	128 (Dec. 2021)	155 (Feb. 2022)	130.50	-	IS:3025 (P-14)
6	Total Dissolved Solids	mg/l	70.7 (Nov. 2021)	104.0 (Mar. 2022)	81.34	500	IS:3025 (P-16)
7	Total Hardness as (CaCO ₃)	mg/l	12.83 (Feb. 2022)	78.9 (Oct. 2021)	36.59	200	IS:3025 (P-21)
8	Chlorides as Cl	mg/l	7.9 (Jan. 2022)	27.99 (Oct. 2021)	14.11	250	IS:3025(P-32)
9	Sulphate as SO ₄	mg/l	2.5 (Jan. 2022)	109.75 (Oct. 2021)	21.07	200	APHA 23 rd Ed.
10	Iron (as Fe)	mg/l	ND	ND	ND	0.3	APHA 23 rd Ed.
11	Ammonical Nitrogen	mg/l	0.08 (Feb. 2022)	0.29 (Nov. 2021)	0.21	-	IS:3025 (P-34)
12	Total Phosphate as PO ₄ ⁻	mg/l	0.09 (Feb. 2022)	0.245 (Oct. 2021)	0.16	-	IS:3025 (P-31)
13	Standard Plate Count	Cfu/ml	42 (Oct. 2021)	234 (Mar. 2022)	79.66	-	IS:1622
14	Total Coliform	MPN/1 00 ml	-	-	-	-	IS:1622



Monitoring Locations

Monitoring Location

The Nitya Laboratories have formulated and the Engineer in Charge has approved the frequency and pattern of monitoring stations. From April, 2021 to March, 2022, the following points have been monitored.

Table-4
Location of Monitoring Stations

No. No.	Location of Station
1	Effluent Water
2	Wastewater Collection Water
3	Effluent Tank
4	RAW TANK

Results

The monitoring data is mainly within the limits and the maximum values are also within the limits of the standards.

WASTE WATER QUALITY MONITORING

The analysis for wastewater quality is carried out as per the guidelines given in the Manual for the Engineer in Charge. The analysis is carried out at the following points: Effluent Water, Wastewater Collection Water, Effluent Tank, and RAW TANK. The analysis is carried out at the following points: Effluent Water, Wastewater Collection Water, Effluent Tank, and RAW TANK. The analysis is carried out at the following points: Effluent Water, Wastewater Collection Water, Effluent Tank, and RAW TANK.



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 2022.

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. HNO₃.



5.4 Results & Discussion on Observations**5.4.1 Treated Water**

During the study period, at this location, pH was found between 6.98 to 7.46. Oil & Grease was found between 6.4 to 12.0 mg/l. BOD and COD were found between 3.0 to 34.00 mg/l and 12.0 to 124.0 mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between 12.0 to 172.0 mg/l and 4.76 to 6.3mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between 12.0 to 348.0 mg/l and 0.028 to 1.2 mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between 274.0 to 676 mg/l and 1.5 to 6.4mg/l. The Faecal Coliform is found 109 MPN/100 ml only in March. 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 6.84 to 7.46. Oil & Grease was found between 16.0 to 21.0 mg/l. BOD and COD were found between 18.0 to 208.00 mg/l and 80.0 to 740.0 mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between 336.0 to 1436.0 mg/l and 0.4 to 3.8mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between 366.0 to 1644.0 mg/l and 0.55 to 14.6 mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between 212.0 to 672mg/l and 6.3 to 14.3mg/l. The Faecal Coliform is found 1600 MPN/100 ml only in March. 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 6.89 to 7.74. Oil & Grease was found between 8.0 to 12.0 mg/l. BOD and COD were found between 4.0 to 23.00 mg/l and 20.0 to 80.0 mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between 12.0 to 296.0 mg/l and 4.08 to 5.7mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between 14.0 to 324.0 mg/l and 0.04 to 1.4 mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between 252.0 to 586mg/l and 2.6 to 4.8mg/l. The Faecal Coliform is found 1600 MPN/100 ml only in March. 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 6.49 to 7.15. Oil & Grease was found between 6.0 to 8.0 mg/l. BOD and COD were found between 16.0 to 1116.00 mg/l and 80.0 to 4468.0 mg/l respectively. The Mix Liquid Suspended Solids and Dissolved Oxygen were found between 14.0 to 8272.0 mg/l and 0.5 to 4.28mg/l. The Total Suspended Solids and Ammonical Nitrogen are found between 16.0 to 8198.0 mg/l and 0.24 to 3.8 mg/l respectively. The Total Dissolved Solids and Total Nitrogen were found between 250.0 to 2010.0mg/l and 2.1 to 6.8mg/l. The Faecal Coliform is found 1600 MPN/100 ml only in March. 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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Treated Water			Tolerance Limit as per KSPCB	Protocol
			Minimum	Maximum	Average		
1	pH	..	6.98 (Oct. 2021)	7.46 (Nov. 2021)	7.15	6.5-9.0	IS:3025 (P-11)
2	Colour	Hazen	10 (Jan. 2022)	14 (Dec. 2021)	12	-	IS:3025 (P-4)
3	Odour	-	Objectionable	Objectionable	Objectionable	-	IS:3025 (P-6)
4	Oil & Grease	mg/L	6.4 (Nov. 2021)	12 (Oct. 2021)	7.46	10	IS:3025 (P-39)
5	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	3.0 (Mar. 2022)	34 (Oct. 2021)	9.33	≤10	IS:3025 (P-44)
6	Chemical Oxygen Demand as COD	NTU	12 (Feb. 2022)	124 (Oct. 2021)	39	≤50	IS:3025 (P-58)
7	Sludge Volume Index	mg/L	ND	ND	ND	-	APHA 23 rd ED.
8	Mix Liquid Suspended Solids	mg/L	12 (Oct. 2021)	172 (Mar. 2022)	112	-	APHA 23 rd ED.
9	Phenolic Compound	mg/L	ND	ND	ND	1.0	IS:3025 (P-43)
10	Dissolved Oxygen	mg/L	6.3 (Dec. 2021)	4.76 (Oct. 2021)	5.47	Min of 3	IS:3025 (P-38)
11	Total Suspended Solids	mg/L	12 (Nov. 2021)	348 (Dec. 2021)	176	≤20	IS:3025 (P-17)
12	Ammonical Nitrogen	mg/L	0.028 (Nov. 2021)	1.2 (Oct. 2021)	0.26	≤5	IS:3025 (P-34)
13	Electrical Conductivity	uS/cm	405 (Dec. 2021)	979.86 (Oct. 2021)	681.74	-	IS:3025 (P-14)
14	Total Dissolved Solids	mg/L	274 (Dec. 2021)	676 (Oct. 2021)	453.50	2100	IS:3025 (P-16)
15	Total Nitrogen	mg/L	1.5 (Nov. 2021)	6.4 (Jan. 2022)	4.21	≤10	IS:3025 (P-34)
16	Faecal Coliform	MPN/100 ml	-	-	-	<100	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results Sewage Collection Water			Tolerance Limit as per KSPCB	Protocol
			Minimum	Maximum	Average		
1	pH	-	6.84 (Nov. 2021)	7.46 (Jan. 2022)	7.13	6.5-9.0	IS:3025 (P-11)
2	Colour	Hazen	30 (Jan. 2022)	42 (Oct. 2021)	34.66	-	IS:3025 (P-4)
3	Odour	-	Objectionable	Objectionable	Objectionable	-	IS:3025 (P-6)
4	Oil & Grease	mg/L	16 (Dec. 2021)	21 (Oct. 2021)	18.16	10	IS:3025 (P-39)
5	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	18 (Feb. 2022)	208 (Oct. 2021)	78.66	≤10	IS:3025 (P-44)
6	Chemical Oxygen Demand as COD	NTU	80 (Feb. 2022)	740 (Oct. 2021)	335.33	≤50	IS:3025 (P-58)
7	Sludge Volume Index	mg/L	105 (Oct. 2021)	121.9 (Nov. 2021)	113.45	-	APHA 23 rd ED.
8	Mix Liquid Suspended Solids	mg/L	336 (Feb. 2022)	1436 (Dec. 2021)	722.66	-	APHA 23 rd ED.
9	Phenolic Compound	mg/L	ND	ND	ND	1.0	IS:3025 (P-43)
10	Dissolved Oxygen	mg/L	0.4 (Dec. 2021)	3.8 (Nov. 2021)	1.63	Min of 3	IS:3025 (P-38)
11	Total Suspended Solids	mg/L	366 (Oct. 2021)	1644 (Dec. 2021)	763.66	≤20	IS:3025 (P-17)
12	Ammonical Nitrogen	mg/L	0.55 (Feb. 2022)	14.6 (Nov. 2021)	6.02	≤5	IS:3025 (P-34)
13	Electrical Conductivity	uS/cm	413 (Dec. 2021)	1096 (Oct. 2021)	724.33	-	IS:3025 (P-14)
14	Total Dissolved Solids	mg/L	212 (Dec. 2021)	672 (Oct. 2021)	448.33	2100	IS:3025 (P-16)
15	Total Nitrogen	mg/L	6.3 (Dec. 2021)	14.3 (Oct. 2021)	8.61	≤10	IS:3025 (P-34)
16	Faecal Coliform	MPN/100 ml	-	-	-	<100	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results UF Field Tank			Tolerance Limit as per KSPCB	Protocol
			Minimum	Maximum	Average		
1	pH	..	6.89 (Dec. 2021)	7.74 (Nov. 2021)	7.16	6.5-9.0	IS:3025 (P-11)
2	Colour	Hazen	12 (Dec. 2021)	16 (Mar. 2022)	13.66	-	IS:3025 (P-4)
3	Odour	-	Objectionable	Objectionable	Objectionable	-	IS:3025 (P-6)
4	Oil & Grease	mg/L	08 (Nov. 2021)	12 (Mar. 2022)	9.66	10	IS:3025 (P-39)
5	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	04 (Feb. 2022)	23 (Oct. 2021)	9.23	≤10	IS:3025 (P-44)
6	Chemical Oxygen Demand as COD	NTU	20 (Feb. 2022)	80 (Oct. 2021)	41.33	≤50	IS:3025 (P-58)
7	Sludge Volume Index	mg/L	-	-	-	-	APHA 23 rd ED.
8	Mix Liquid Suspended Solids	mg/L	12 (Nov. 2021)	296 (Dec. 2021)	167.66	-	APHA 23 rd ED.
9	Phenolic Compound	mg/L	ND	ND	ND	1.0	IS:3025 (P-43)
10	Dissolved Oxygen	mg/L	4.08 (Oct. 2021)	5.7 (Dec. 2021)	4.88	Min of 3	IS:3025 (P-38)
11	Total Suspended Solids	mg/L	14 (Nov. 2021)	324 (Dec. 2021)	208	≤20	IS:3025 (P-17)
12	Ammonical Nitrogen	mg/L	0.04 (Dec. 2021)	1.4 (Oct. 2021)	0.62	≤5	IS:3025 (P-34)
13	Electrical Conductivity	uS/cm	398 (Dec. 2021)	898 (Jan. 2022)	743.70	-	IS:3025 (P-14)
14	Total Dissolved Solids	mg/L	252 (Dec. 2021)	586 (Jan. 2022)	478	2100	IS:3025 (P-16)
15	Total Nitrogen	mg/L	2.6 (Oct. 2021)	4.8 (Dec. 2021)	3.85	≤10	IS:3025 (P-34)
16	Faecal Coliform	MPN/100 ml	-	-	-	<100	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Test Results SBR TANK			Tolerance Limit as per KSPCB	Protocol
			Minimum	Maximum	Average		
1	pH	..	6.49 (Nov. 2021)	7.15 (Feb. 2022)	6.90	6.5-9.0	IS:3025 (P-11)
2	Colour	Hazen	08 (Oct. 2021)	40 (Mar. 2022)	16.66	-	IS:3025 (P-4)
3	Odour	-	Objectionable	Objectionable	Objectionable	-	IS:3025 (P-6)
4	Oil & Grease	mg/L	06 (Dec. 2021)	8.0 (Jan. 2022)	7.16	10	IS:3025 (P-39)
5	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	16 (Oct. 2021)	1116 (Jan. 2022)	540.83	≤10	IS:3025 (P-44)
6	Chemical Oxygen Demand as COD	NTU	80 (Nov. 2021)	4468 (Jan. 2022)	2249.11	≤50	IS:3025 (P-58)
7	Sludge Volume Index	mg/L	39.93 (Mar. 2022)	160 (Jan. 2022)	97.77	-	APHA 23 rd ED.
8	Mix Liquid Suspended Solids	mg/L	14 (Oct. 2021)	8272 (Dec. 2021)	4627.33	-	APHA 23 rd ED.
9	Phenolic Compound	mg/L	ND	ND	ND	1.0	IS:3025 (P-43)
10	Dissolved Oxygen	mg/L	0.5 (Feb. 2022)	4.28 (Oct. 2021)	1.74	Min of 3	IS:3025 (P-38)
11	Total Suspended Solids	mg/L	16 (Oct. 2021)	8198 (Jan. 2022)	4419.66	≤20	IS:3025 (P-17)
12	Ammonical Nitrogen	mg/L	0.24 (Feb. 2022)	3.8 (Dec. 2021)	1.98	≤5	IS:3025 (P-34)
13	Electrical Conductivity	uS/cm	388 (Dec. 2021)	2941 (Jan. 2022)	1427.28	-	IS:3025 (P-14)
14	Total Dissolved Solids	mg/L	250 (Dec. 2021)	2010 (Jan. 2022)	898.66	2100	IS:3025 (P-16)
15	Total Nitrogen	mg/L	2.1 (Nov. 2021)	6.8 (Mar. 2022)	4.55	≤10	IS:3025 (P-34)
16	Faecal Coliform	MPN/100 ml	-	-	-	<100	IS:1622



1.4. Marine Water Sampling

1.4.1 Sampling Locations

A Review on monthly sampling locations with the compliance data is provided in the following table. The sampling locations are provided in the following table with the sampling depth in meters below surface (MBS).

Table - E
Location of Marine Water Sampling Stations

Sr. No.	Location of Station
1	Western Dock Arm (Quarantine) 1m Below Surface
2	Western Dock Arm (Main) 10 m Below Surface
3	Eastern Dock Arm (Main) 10 m Below Surface
4	Western Dock Arm (100-meter water) 10 m Below Surface
5	Western Dock Arm (200-meter water) 10 m Below Surface
6	Western Dock Arm (300-meter water) 10 m Below Surface
7	Western Dock Arm 1m Below Surface
8	Western Dock Arm 10 m Below Surface
9	Western Dock Arm 20 m Below Surface
10	Oil Dock Arm (Discharge Jetty) 1m Below Surface
11	Oil Dock Arm (Discharge Jetty) 10 m Below Surface
12	Oil Dock Arm (Discharge Jetty) 20 m Below Surface
13	Lingayat Area (Turning Circle) 1m Below Surface
14	Lingayat Area (Turning Circle) 10 m Below Surface
15	Lingayat Area (Turning Circle) 20 m Below Surface

MARINE WATER QUALITY MONITORING

1.5 Methodology

The sampling of marine water quality parameters were carried out as per IS 3025 (Part 1) Method for the Determination of Water Quality Parameters in Seawater. The sampling was carried out at the locations specified in the table above. The samples were collected in clean, sterilized and acid-washed bottles. The samples were preserved in the dark and analyzed within 24 hours of collection.

1.6 Results

The results of the sampling are provided in the following table. The results are provided in the following table with the compliance data.



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 October 2021 to March 2022.

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.	Lagoon Area (Turning Circle)-1m Below Surface	Once in a Month
14.	Lagoon Area (Turning Circle)-10 m Below Surface	Once in a Month
15.	Lagoon 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. HNO₃.

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.



6.4 Results & Discussion on Observations

6.4.1 Eastern Dock Arm

Surface: At this location pH was found between 7.28 to 8.54. The TSS and TDS were found between 270.0 to 2124.0 mg/l and 37823.0 to 48916.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.508 to 0.68 mg/l, 806.3 to 1461.4 mg/l and 155.4 to 1690.6 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.0 to 7.06 mg/l. The value of Calcium, Sodium and Potassium were found between 292.15 to 371.2 mg/l, 10208.0 to 10588.0 mg/l and 398.0 to 516.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.024 to 0.43 mg/l, 0.051 to 0.12 mg/l and 38094.0 to 51040.0 mg/l. The Faecal Coliform was found between 212 to 278 MPN/100 ml.

Middle: At this location pH was found between 7.54 to 8.49. The TSS and TDS were found between 278.0 to 2184.0 mg/l and 37844.0 to 48982.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.452 to 0.647 mg/l, 832.6 to 1487.64 mg/l and 162.6 to 1708.3 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.1 to 6.98 mg/l. The value of Calcium, Sodium and Potassium were found between 307.94 to 392.6 mg/l, 10250.0 to 10600.0 mg/l and 402.0 to 558.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.036 to 0.489 mg/l, 0.04 to 0.22 mg/l and 38126.0 to 51166.0 mg/l. The Faecal Coliform was found between 221 to 278 MPN/100 ml.

Bottom: At this location pH was found between 7.56 to 8.62. The TSS and TDS were found between 284.0 to 2224.0 mg/l and 37952.0 to 49140.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.452 to 0.78 mg/l, 853.8 to 1468.0 mg/l and 172.14 to 1718.1 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.1 to 7.12 mg/l. The value of Calcium, Sodium and Potassium were found between 312.04 to 406.3 mg/l, 10284.0 to 10634.0 mg/l and 412.0 to 595.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.41 to 0.54 mg/l, 0.05 to 0.28 mg/l and 38236.0 to 51364.0 mg/l. The Faecal Coliform was found 253MPN/100 ml.

6.4.2 Eastern Baseline (Up to 800-meter west)

Surface: At this location pH was found between 7.49 to 8.72. The TSS and TDS were found between 226.0 to 2148.0 mg/l and 41454.0 to 46936.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.48 to 0.678 mg/l, 879.36 to 1492.39 mg/l and 160.75 to 1702.2mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.2 to 6.7 mg/l. The value of Calcium, Sodium and Potassium were found between 256 to 376.3 mg/l, 10104.0 to 10658.0 mg/l and 336.0 to 426.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.016 to 0.46mg/l, 0.04 to 0.16 mg/l and 41682.0 to 49084.0 mg/l. The Faecal Coliform was found between 221 to 240 MPN/100 ml.

Middle: At this location pH was found between 7.94 to 8.70. The TSS and TDS were found between 234.0 to 2360.0 mg/l and 41473.0 to 46972.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.52 to 0.71 mg/l, 898.94 to 1499.71 mg/l and 166.6 to 1712.9 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.0 to 6.68 mg/l. The value of Calcium, Sodium and Potassium were found between 288 to 397.3 mg/l, 10118.0 to 10670.0 mg/l and 356.0 to 440.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.022 to 0.584 mg/l, 0.058 to 0.28 mg/l and 41706.0 to 49156.0 mg/l. The Faecal Coliform was found between 253 to 278 MPN/100 ml.

Bottom: At this location pH was found between 7.42 to 8.78. The TSS and TDS were found between 242.0 to 2216.0 mg/l and 41710.0 to 47108.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.46 to 0.86 mg/l, 903.34 to 1526.0 mg/l and 168.23 to 1742.5 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.1 to 6.62 mg/l. The value of Calcium, Sodium and Potassium were found between 312 to 402.5 mg/l, 10188.0 to 10695.0 mg/l and 368.0 to 446.0 mg/l. The value of



Nitrite, Phosphate and Total Solids were found between 0.024 to 0.61 mg/l, 0.047 to 0.34 mg/l and 41952.0 to 49324.0 mg/l. The Faecal Coliform was found between 221 to 278 MPN/100 ml.

6.4.3 Western Dock Arm

Surface: At this location pH was found between 7.46 to 8.61. The TSS and TDS were found between 190.0 to 2098.0 mg/l and 37946.0 to 44192.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.46 to 0.701 mg/l, 837.18 to 1433.14 mg/l and 164.2 to 1687.7 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 0.9 to 6.5 mg/l. The value of Calcium, Sodium and Potassium were found between 260.56 to 374.4 mg/l, 10104.0 to 10384.0 mg/l and 335.0 to 418.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.012 to 0.15 mg/l, 0.018 to 0.082 mg/l and 38136.0 to 49202.0 mg/l. The Faecal Coliform was found between 221 to 253 MPN/100 ml.

Middle: At this location pH was found between 7.82 to 8.65. The TSS and TDS were found between 208.0 to 2328.0 mg/l and 37961.0 to 47538.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.49 to 0.74 mg/l, 854.65 to 1421.06 mg/l and 170.8 to 1698.5 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.0 to 6.48 mg/l and 0.019 to 0.046 mg/l. The value of Calcium, Sodium and Potassium were found between 312 to 380.6 mg/l, 10116.0 to 10482.0 mg/l and 342.0 to 466.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.016 to 0.22 mg/l, 0.036 to 0.083 mg/l and 38168.0 to 50866.0 mg/l. The Faecal Coliform was found between 212 to 278 MPN/100 ml.

Bottom: At this location pH was found between 7.58 to 8.86. The TSS and TDS were found between 216.0 to 2165.0 mg/l and 37970.0 to 46064.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.54 to 0.82 mg/l, 860.40 to 1504.6 mg/l and 173.68 to 1705.9 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.0 to 6.42 mg/l and 0.024 to 0.047 mg/l. The value of Calcium, Sodium and Potassium were found between 328 to 386.4 mg/l, 10128.0 to 10498.0 mg/l and 354.0 to 485.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.019 to 0.34 mg/l, 0.053 to 0.44 mg/l and 38186.0 to 50984.0 mg/l. The Faecal Coliform was found between 240 to 278 MPN/100 ml.

6.4.4 Oil Dock Arm (Diaphragm Jetty)

Surface: At this location pH was found between 7.46 to 8.72. The TSS and TDS were found between 170.0 to 2134.0 mg/l and 39322.0 to 47800.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.49 to 0.678 mg/l, 798.45 to 1487.64 mg/l and 163.8 to 1709.9 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO was found between 1.0 to 6.68 mg/l. The value of Calcium, Sodium and Potassium were found between 255.4 to 378.35 mg/l, 10106.0 to 10659.0 mg/l and 414.0 to 484.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.028 to 0.52 mg/l, 0.054 to 0.088 mg/l and 40690.0 to 49740.0 mg/l. The Faecal Coliform was found between 221 to 253 MPN/100 ml.

Middle: At this location pH was found between 8.16 to 8.56. The TSS and TDS were found between 178.0 to 2138.0 mg/l and 39841.0 to 47748.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.54 to 0.681 mg/l, 812.36 to 1449.71 mg/l and 170.04 to 1735.6 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.0 to 6.54 mg/l and 0.027 to 0.046 mg/l. The value of Calcium, Sodium and Potassium were found between 268 to 390.08 mg/l, 10116.0 to 10684.0 mg/l and 422.0 to 510.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.033 to 0.62 mg/l, 0.068 to 0.096 mg/l and 40756.0 to 49886.0 mg/l. The Faecal Coliform was found between 221 to 278 MPN/100 ml.

Bottom: At this location pH was found between 7.46 to 8.62. The TSS and TDS were found between 186.0 to 2208.0 mg/l and 40280.0 to 47890.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.55 to 0.72 mg/l, 845.52 to 1494.91 mg/l and 172.71 to 1766.4 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.2 to 6.48 mg/l and 0.032 to 0.062 mg/l. The



value of Calcium, Sodium and Potassium were found between 280.2 to 399.56 mg/l, 10132.0 to 10712.0 mg/l and 428.0 to 516.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.042 to 0.78 mg/l, 0.07 to 0.12 mg/l and 40806 to 50098.0 mg/l. The Faecal Coliform was found between 240 to 345 MPN/100 ml.

6.4.5 Lagoon Area (Turning Circle)

Surface: At this location pH was found between 7.81 to 8.72. The TSS and TDS were found between 268.0 to 2164.0 mg/l and 36228.0 to 47632.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.42 to 0.698 mg/l, 818.98 to 1465.29 mg/l and 158.6 to 1688.75 mg/l. Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.1 to 6.76 mg/l and 0.015 to 0.036 mg/l. The value of Calcium, Sodium and Potassium were found between 280.0 to 372.8 mg/l, 10112.0 to 10879.0 mg/l and 318.0 to 462.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.016 to 0.62 mg/l, 0.042 to 0.094 mg/l and 38356.0 to 49834.0 mg/l. The Faecal Coliform was found between 212 to 221 MPN/100 ml.

Middle: At this location pH was found between 7.62 to 8.70. The TSS and TDS were found between 276.0 to 2456.0 mg/l and 36414.0 to 45414.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.52 to 0.706 mg/l, 825.36 to 1487.64 mg/l and 164.2 to 1705.45 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.1 to 6.64 mg/l and 0.019 to 0.046 mg/l. The value of Calcium, Sodium and Potassium were found between 312 to 387.6 mg/l, 10140.0 to 10989.0 mg/l and 331.0 to 486.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.021 to 0.68 mg/l, 0.035 to 0.099 mg/l and 38554.0 to 47630.0 mg/l. The Faecal Coliform was found between 221 to 278 MPN/100 ml.

Bottom: At this location pH was found between 7.86 to 8.68. The TSS and TDS were found between 284.0 to 2296.0 mg/l and 36624.0 to 45812.0 mg/l respectively. The value of Nitrate, Magnesium and Sulphate were found between 0.54 to 0.74 mg/l, 846.36 to 1498.75 mg/l and 172.43 to 1765.32 mg/l. The Oil & Grease, Silica, Total Nitrogen & Organic Nitrogen were absent during the analysis. The DO & Iron was found between 1.0 to 6.42 mg/l and 0.021 to 0.054 mg/l. The value of Calcium, Sodium and Potassium were found between 326 to 406.4 mg/l, 10172.0 to 11203.0 mg/l and 354.0 to 495.0 mg/l. The value of Nitrite, Phosphate and Total Solids were found between 0.026 to 0.74 mg/l, 0.053 to 0.108 mg/l and 38816 to 48994.0 mg/l. The Faecal Coliform was found between 221 to 253 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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Eastern Dock Arm (Marine)-1m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	8.54 (Oct. 2021)	7.28 (Mar. 2022)	8.11	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	270 (Nov. 2021)	2124 (Jan. 2022)	1428.33	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	37823 (Oct. 2021)	48916 (Jan. 2022)	43433.67	IS:3025 (P-16)
4	Turbidity	NTU	4.2 (Nov. 2021)	6.8 (Jan. 2022)	5.68	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.5085 (Dec. 2021)	0.68 (Jan. 2022)	1.52	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	806.3 (Nov. 2021)	1461.4 (Dec. 2021)	1221.07	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	155.4 (Mar. 2022)	1690.6 (Oct. 2021)	575.36	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	7.06 (Nov. 2021)	5.03	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.012 (Jan. 2022)	0.025 (Dec. 2021)	0.01	APHA 23rd Ed.
11	Calcium As Ca	mg/L	292.15 (Feb. 2022)	371.2 (Nov. 2021)	336.09	IS:3025 (P-40)
12	Sodium As Na	mg/L	10208 (Oct. 2021)	10588 (Nov. 2021)	10415.33	IS:3025 (P-45)
13	Potassium As K	mg/L	398 (Oct. 2021)	516 (Nov. 2021)	452.16	IS:3025 (P-45)
14	Nitrite	mg/L	0.024 (Oct. 2021)	0.43 (Nov. 2021)	0.30	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.051 (Feb. 2022)	0.12 (Jan. 2022)	0.07	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38094 (Oct. 2021)	51040 (Jan. 2022)	44833.5	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 MI	212 (Dec. 2021)	278 (Feb. 2022)	237	IS:1622



Test Report

Name Of the Client: New Mangalore Port Authority

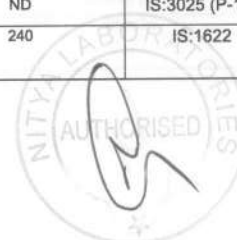
Address Of the Client: Panambur, Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

RESULT OF MARINE WATER FOR SIX MONTHS OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Eastern Dock Arm (Marine)-10 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.54 (Mar. 2022)	8.49 (Nov. 2021)	8.19	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	278 (Oct. 2021)	2184 (Jan. 2022)	1491	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	37844 (Oct. 2021)	48982 (Jan. 2022)	44096.67	IS:3025 (P-16)
4	Turbidity	NTU	5.4 (Feb. 2022)	6.69 (Oct. 2021)	5.86	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.452 (Dec. 2021)	0.647 (Oct. 2021)	0.56	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	832.6 (Oct. 2021)	1487.64 (Dec. 2021)	1316.30	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	162.6 (Mar. 2022)	1708.3 (Oct. 2021)	584.10	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.1 (Nov. 2021)	6.98 (Oct. 2021)	3.06	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.016 (Jan. 2022)	0.034 (Dec. 2021)	0.026	APHA 23rd Ed.
11	Calcium As Ca	mg/L	307.94 (Feb. 2022)	392.6 (Oct. 2021)	336.75	IS:3025 (P-40)
12	Sodium As Na	mg/L	10250 (Oct. 2021)	10600 (Nov. 2021)	10441	IS:3025 (P-45)
13	Potassium As K	mg/L	402 (Oct. 2021)	558 (Nov. 2021)	479.83	IS:3025 (P-45)
14	Nitrite	mg/L	0.036 (Oct. 2021)	0.489 (Nov. 2021)	0.35	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.04 (Dec. 2021)	0.22 (Jan. 2022)	0.088	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38126 (Oct. 2021)	51166 (Jan. 2022)	45618.33	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 MI	221 (Dec. 2021)	278 (Jan. 2022)	240	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Eastern Dock Arm (Marine)-20 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.56 (Mar. 2022)	8.62 (Jan. 2022)	8.22	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	284 (Oct. 2021)	2224 (Jan. 2022)	1533.33	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	37952 (Oct. 2021)	49140 (Jan. 2022)	44482.17	IS:3025 (P-16)
4	Turbidity	NTU	5.2 (Feb. 2022)	7.4 (Jan. 2022)	6.39	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.452 (Dec. 2021)	0.78 (Jan. 2022)	0.62	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	853.8 (Oct. 2021)	1468 (Jan. 2022)	1238.96	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	172.14 (Feb. 2022)	1718.1 (Oct. 2021)	591.63	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.1 (Dec. 2021)	7.12 (Oct. 2021)	3.44	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.036 (Nov. 2021)	0.052 (Mar. 2022)	0.043	APHA 23rd Ed.
11	Calcium As Ca	mg/L	312.04 (Feb. 2022)	406.3 (Nov. 2021)	358.10	IS:3025 (P-40)
12	Sodium As Na	mg/L	10284 (Oct. 2021)	10634 (Nov. 2021)	10481.33	IS:3025 (P-45)
13	Potassium As K	mg/L	412 (Oct. 2021)	595 (Nov. 2021)	497	IS:3025 (P-45)
14	Nitrite	mg/L	0.41 (Oct. 2021)	0.54 (Nov. 2021)	0.47	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.05 (Dec. 2021)	0.28 (Jan. 2022)	0.10	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38236 (Oct. 2021)	51364 (Jan. 2022)	46100.83	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 MI	253 (Dec. 2021)	253 (Jan. 2022)	253	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Baseline (Up to 800-meter west)-1m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	-	7.49 (Mar. 2022)	8.72 (Dec. 2021)	8.34	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	226 (Oct. 2021)	2148 (Dec. 2021)	1496	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	41454 (Oct. 2021)	46936 (Dec. 2021)	44598	IS:3025 (P-16)
4	Turbidity	NTU	4.8 (Mar. 2022)	6.43 (Oct. 2021)	5.60	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.48 (Jan. 2022)	0.678 (Oct. 2021)	0.56	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	879.36 (Oct. 2021)	1492.39 (Dec. 2021)	1319.38	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	160.75 (Feb. 2022)	1702.2 (Oct. 2021)	578.92	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.2 (Dec. 2021)	6.7 (Nov. 2021)	4.91	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.018 (Jan. 2022)	0.04 (Nov. 2021)	0.02	APHA 23rd Ed.
11	Calcium As Ca	mg/L	256 (Mar. 2022)	376 (Oct. 2021)	308.17	IS:3025 (P-40)
12	Sodium As Na	mg/L	10104 (Mar. 2022)	10658 (Oct. 2021)	10391.33	IS:3025 (P-45)
13	Potassium As K	mg/L	336 (Mar. 2022)	426 (Oct. 2021)	366.66	IS:3025 (P-45)
14	Nitrite	mg/L	0.016 (Oct. 2021)	0.46 (Nov. 2021)	0.29	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.04 (Feb. 2022)	0.16 (Jan. 2022)	0.087	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	41682 (Oct. 2021)	49084 (Dec. 2021)	46094.33	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 MI	221 (Feb. 2022)	240 (Jan. 2022)	233.66	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Baseline (Up to 800-meter west)-10 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	--	7.94 (Mar. 2022)	8.7 (Dec. 2021)	8.39	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	234 (Oct. 2021)	2360 (Dec. 2021)	1558	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	41473 (Oct. 2021)	46972 (Jan. 2022)	44273	IS:3025 (P-16)
4	Turbidity	NTU	5.1 (Mar. 2022)	6.65 (Oct. 2021)	5.84	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.52 (Jan. 2022)	0.71 (Mar. 2022)	0.60	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	898.94 (Oct. 2021)	1499.71 (Feb. 2022)	1351.89	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	166.66 (Feb. 2022)	1712.9 (Oct. 2021)	586.95	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.68 (Oct. 2021)	3.61	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.024 (Oct. 2021)	0.044 (Nov. 2021)	0.029	APHA 23rd Ed.
11	Calcium As Ca	mg/L	288 (Mar. 2022)	397.3 (Oct. 2021)	329.89	IS:3025 (P-40)
12	Sodium As Na	mg/L	10118 (Mar. 2022)	10670 (Oct. 2021)	10408.67	IS:3025 (P-45)
13	Potassium As K	mg/L	356 (Jan. 2022)	440 (Oct. 2021)	384	IS:3025 (P-45)
14	Nitrite	mg/L	0.022 (Oct. 2021)	0.584 (Nov. 2021)	0.34	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.058 (Dec. 2021)	0.28 (Jan. 2022)	0.11	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	41706 (Oct. 2021)	49156 (Jan. 2022)	45830.83	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 MI	253 (Dec. 2021)	278.0 (Jan. 2022)	269.66	IS:1622

Test Report

Name Of the Client: New Mangalore Port Authority

Address Of The Client: Panambur ,Mangalore -575010

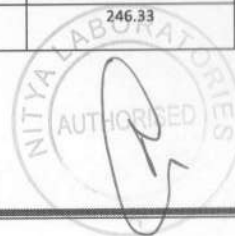
Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

RESULT OF MARINE WATER FOR SIX MONTHS OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Baseline (Up to 800-meter west)-20 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.42 (Mar. 2022)	8.78 (Jan. 2022)	8.41	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	242 (Oct. 2021)	2216 (Feb. 2022)	1559	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	41710 (Oct. 2021)	47108 (Jan. 2022)	44414.83	IS:3025 (P-16)
4	Turbidity	NTU	5.6 (Feb. 2022)	7.4 (Nov. 2021)	6.42	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.46 (Dec. 2021)	0.86 (Jan. 2022)	0.64	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	903.34 (Oct. 2021)	1526 (Mar. 2022)	1365.94	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	168.23 (Feb. 2022)	1742.5 (Oct. 2021)	596.37	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.62 (Oct. 2021)	2.82	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.03 (Oct. 2021)	0.048 (Nov. 2021)	0.035	APHA 23rd Ed.
11	Calcium As Ca	mg/L	312 (Mar. 2022)	402.5 (Oct. 2021)	352.52	IS:3025 (P-40)
12	Sodium As Na	mg/L	10188 (Mar. 2022)	10695 (Oct. 2021)	10445.83	IS:3025 (P-45)
13	Potassium As K	mg/L	368 (Jan. 2022)	446 (Oct. 2021)	399.33	IS:3025 (P-45)
14	Nitrite	mg/L	0.024 (Oct. 2021)	0.61 (Nov. 2021)	0.40	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.047 (Dec. 2021)	0.34 (Jan. 2022)	0.14	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	41952 (Oct. 2021)	49324 (Jan. 2022)	46128.5	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 MI	221 (Jan. 2022)	278 (Dec. 2021)	246.33	IS:1622

Test Report



Name Of The Client: New Mangalore Port Authority

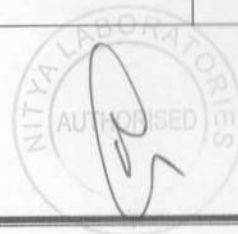
Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

RESULT OF MARINE WATER FOR SIX MONTHS OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Western Dock Arm -1m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.46 (Mar. 2022)	8.61 (Oct. 2021)	8.17	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	190 (Oct. 2021)	2098 (Feb. 2022)	1435.33	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	37946 (Oct. 2021)	44192 (Dec. 2021)	41498.33	IS:3025 (P-16)
4	Turbidity	NTU	4.3 (Nov. 2021)	6.3 (Jan. 2022)	5.51	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.46 (Mar. 2022)	0.701 (Oct. 2021)	0.53	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	837.18 (Oct. 2021)	1433.14 (Dec. 2021)	1243.40	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	164.2 (Mar. 2022)	1687.7 (Oct. 2021)	572.58	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	0.9 (Dec. 2021)	6.5 (Oct. 2021)	4.66	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.018 (Oct. 2021)	0.036 (Nov. 2021)	0.027	APHA 23rd Ed.
11	Calcium As Ca	mg/L	260.56 (Feb. 2022)	374.4 (Oct. 2021)	311.92	IS:3025 (P-40)
12	Sodium As Na	mg/L	10104 (Feb. 2022)	10384 (Nov. 2021)	10250.67	IS:3025 (P-45)
13	Potassium As K	mg/L	335 (Feb. 2022)	418 (Nov. 2021)	365.5	IS:3025 (P-45)
14	Nitrite	mg/L	0.012 (Dec. 2021)	0.15 (Feb. 2022)	0.060	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.018 (Mar. 2022)	0.082 (Oct. 2021)	0.052	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38136 (Oct. 2021)	49202 (Dec. 2021)	43433.67	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 MI	221 (Feb. 2022)	253 (Jan. 2022)	238	IS:1622



Test Report

Name Of the Client: New Mangalore Port Authority

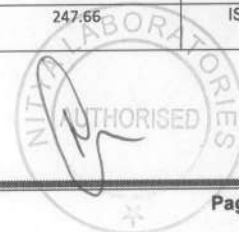
Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

RESULT OF MARINE WATER FOR SIX MONTHS OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Western Dock Arm-10 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.82 (Mar. 2022)	8.65 (Oct. 2021)	8.2	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	208 (Oct. 2021)	2328 (Dec. 2021)	1513.33	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	37961 (Oct. 2021)	47538 (Dec. 2021)	42093.17	IS:3025 (P-16)
4	Turbidity	NTU	5.4 (Nov. 2021)	6.8 (Jan. 2022)	5.85	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.49 (Dec. 2021)	0.74 (Oct. 2021)	0.59	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	854.65 (Oct. 2021)	1421.06 (Dec. 2021)	1262.28	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	170.8 (Mar. 2022)	1698.5 (Oct. 2021)	579.82	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.48 (Oct. 2021)	3.46	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.019 (Oct. 2021)	0.046 (Mar. 2022)	0.034	APHA 23rd Ed.
11	Calcium As Ca	mg/L	312 (Nov. 2021)	380.6 (Oct. 2021)	334.72	IS:3025 (P-40)
12	Sodium As Na	mg/L	10116 (Feb. 2022)	10482 (Nov. 2021)	10287	IS:3025 (P-45)
13	Potassium As K	mg/L	342 (Feb. 2022)	466 (Nov. 2021)	383.83	IS:3025 (P-45)
14	Nitrite	mg/L	0.016 (Dec. 2021)	0.22 (Mar. 2022)	0.090	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.036 (Mar. 2022)	0.083 (Nov. 2021)	0.058	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38168 (Oct. 2021)	50866 (Dec. 2021)	43773	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 MI	212 (Dec. 2021)	278 (Jan. 2022)	247.66	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Western Dock Arm -20 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.58 (Mar. 2022)	8.86 (Jan. 2022)	8.3	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	216 (Oct. 2021)	2165 (Feb. 2022)	1502.83	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	37970 (Oct. 2021)	46064 (Dec. 2021)	41914.33	IS:3025 (P-16)
4	Turbidity	NTU	5.7 (Dec. 2021)	8.2 (Jan. 2022)	6.7	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.54 (Dec. 2021)	0.82 (Jan. 2022)	0.65	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	860.4 (Oct. 2021)	1504.6 (Mar. 2022)	1309.26	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	173.68 (Dec. 2021)	1705.9 (Oct. 2021)	588.75	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.42 (Oct. 2021)	2.80	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.024 (Oct. 2021)	0.047 (Nov. 2021)	0.038	APHA 23rd Ed.
11	Calcium As Ca	mg/L	328 (Mar. 2022)	386.4 (Oct. 2021)	347.83	IS:3025 (P-40)
12	Sodium As Na	mg/L	10128 (Feb. 2022)	10498 (Nov. 2021)	10312.67	IS:3025 (P-45)
13	Potassium As K	mg/L	354 (Feb. 2022)	485 (Nov. 2021)	399.16	IS:3025 (P-45)
14	Nitrite	mg/L	0.019 (Dec. 2021)	0.34 (Mar. 2022)	0.13	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.053 (Feb. 2022)	0.44 (Mar. 2022)	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	38186 (Oct. 2021)	50984 (Dec. 2021)	43885.83	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 MI	240 (Jan. 2022)	278 (Dec. 2021)	252.66	IS:1622

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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Oil Dock Arm (Diaphragm Jetty)-1m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.46 (Mar. 2022)	8.72 (Nov. 2021)	8.2	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	170 (Oct. 2021)	2134 (Dec. 2021)	1417	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	39322 (Mar. 2022)	47800 (Dec. 2021)	42884	IS:3025 (P-16)
4	Turbidity	NTU	4.8 (Mar. 2022)	5.9 (Dec. 2021)	5.31	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.49 (Feb. 2022)	0.678 (Oct. 2021)	0.56	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	798.45 (Oct. 2021)	1487.64 (Dec. 2021)	1245.24	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	163.8 (Mar. 2022)	1709.9 (Oct. 2021)	560.63	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.68 (Oct. 2021)	4.89	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.025 (Dec. 2021)	0.038 (Jan. 2022)	0.030	APHA 23rd Ed.
11	Calcium As Ca	mg/L	255.4 (Mar. 2022)	378.35 (Oct. 2021)	306.36	IS:3025 (P-40)
12	Sodium As Na	mg/L	10106 (Feb. 2022)	10659 (Oct. 2021)	10295	IS:3025 (P-45)
13	Potassium As K	mg/L	414 (Dec. 2021)	484 (Jan. 2022)	447.83	IS:3025 (P-45)
14	Nitrite	mg/L	0.028 (Dec. 2021)	0.52 (Jan. 2022)	0.16	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.054 (Feb. 2022)	0.088 (Nov. 2021)	0.074	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-36)
17	Total Solids	mg/L	40690 (Oct. 2021)	49740 (Jan. 2022)	44159	IS:3025 (P-16)
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 MI	221 (Jan. 2022)	253 (Dec. 2021)	238	IS:1632

Test Report

Name Of the Client: New Mangalore Port Authority

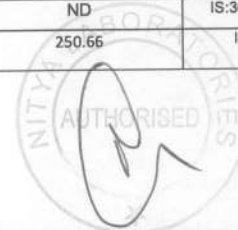
Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

RESULT OF MARINE WATER FOR SIX MONTHS OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Oil Dock Arm (Diaphragm Jetty)-10 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	8.16 (Feb. 2022)	8.56 (Nov. 2021)	8.3	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	178 (Oct. 2021)	2138 (Jan. 2022)	1453.66	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	39841 (Mar. 2022)	47748 (Jan. 2022)	42673.67	IS:3025 (P-16)
4	Turbidity	NTU	5.1 (Mar. 2022)	6.2 (Oct. 2021)	5.66	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.54 (Dec. 2021)	0.681 (Oct. 2021)	0.59	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	812.36 (Oct. 2021)	1449.71 (Feb. 2022)	1258.13	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	170.04 (Feb. 2022)	1735.6 (Oct. 2021)	571.09	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.54 (Oct. 2021)	3.62	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.027 (Dec. 2021)	0.046 (Jan. 2022)	0.037	APHA 23rd Ed.
11	Calcium As Ca	mg/L	268 (Mar. 2022)	390.08 (Oct. 2021)	325.68	IS:3025 (P-40)
12	Sodium As Na	mg/L	10116 (Feb. 2022)	10684 (Oct. 2021)	10330.33	IS:3025 (P-45)
13	Potassium As K	mg/L	422 (Dec. 2021)	510 (Jan. 2022)	465.83	IS:3025 (P-45)
14	Nitrite	mg/L	0.033 (Dec. 2021)	0.62 (Jan. 2022)	0.19	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.068 (Feb. 2022)	0.096 (Jan. 2022)	0.084	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	40756 (Oct. 2021)	49886 (Jan. 2022)	44097.5	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 MI	221 (Feb. 2022)	278 (Dec. 2021)	250.66	IS:1622



Test Report

Name Of the Client: New Mangalore Port Authority

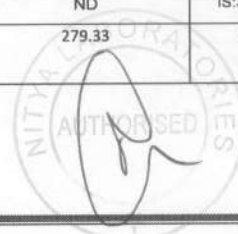
Address Of The Client: Panambur ,Mangalore -575010

Sample Description: Marine Water

Sample Drawn By: Nitya Laboratories

RESULT OF MARINE WATER FOR SIX MONTHS OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Oil Dock Arm (Diaphragm Jetty)-20 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.46 (Mar. 2022)	8.62 (Nov. 2021)	8.2	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	186 (Oct. 2021)	2208 (Jan. 2022)	1490.5	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	40280 (Mar. 2022)	47890 (Jan. 2022)	43050.67	IS:3025 (P-16)
4	Turbidity	NTU	5.4 (Mar. 2022)	6.5 (Jan. 2022)	6.13	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.55 (Dec. 2021)	0.72 (Mar. 2022)	0.64	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	845.52 (Oct. 2021)	1494.91 (Feb. 2022)	1294.15	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	172.71 (Feb. 2022)	1766.4 (Oct. 2021)	581.12	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.2 (Dec. 2021)	6.48 (Oct. 2021)	2.963	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.032 (Dec. 2021)	0.062 (Mar. 2022)	0.044	APHA 23rd Ed.
11	Calcium As Ca	mg/L	280.2 (Mar. 2022)	399.56 (Oct. 2021)	340.21	IS:3025 (P-40)
12	Sodium As Na	mg/L	10132 (Feb. 2022)	10712 (Oct. 2021)	10359.67	IS:3025 (P-45)
13	Potassium As K	mg/L	428 (Dec. 2021)	516 (Jan. 2022)	478.66	IS:3025 (P-45)
14	Nitrite	mg/L	0.042 (Dec. 2021)	0.78 (Jan. 2022)	0.23	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.07 (Dec. 2021)	0.12 (Jan. 2022)	0.086	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	40806 (Oct. 2021)	50098 (Jan. 2022)	44647.17	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 MI	240 (Jan. 2022)	345 (Dec. 2021)	279.33	IS:1622



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Lagoon Area (Turning Circle)-1m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.81 (Mar. 2022)	8.72 (Dec. 2021)	8.3	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	268 (Oct. 2021)	2164 (Jan. 2022)	1529	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	36228 (Mar. 2022)	47632 (Dec. 2021)	42141.83	IS:3025 (P-16)
4	Turbidity	NTU	5.2 (Feb. 2022)	6.72 (Oct. 2021)	5.98	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.42 (Jan. 2022)	0.698 (Oct. 2021)	0.53	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	818.98 (Oct. 2021)	1465.29 (Dec. 2021)	1248.40	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	158.6 (Mar. 2022)	1688.75 (Oct. 2021)	569.48	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.1 (Dec. 2021)	6.76 (Oct. 2021)	4.82	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.015 (Dec. 2021)	0.036 (Mar. 2022)	0.022	APHA 23rd Ed.
11	Calcium As Ca	mg/L	280 (Nov. 2021)	372.8 (Oct. 2021)	310.30	IS:3025 (P-40)
12	Sodium As Na	mg/L	10112 (Feb. 2022)	10879 (Oct. 2021)	10364.83	IS:3025 (P-45)
13	Potassium As K	mg/L	318 (Jan. 2022)	462 (Oct. 2021)	378.5	IS:3025 (P-45)
14	Nitrite	mg/L	0.016 (Oct. 2021)	0.62 (Jan. 2022)	0.17	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.042 (Feb. 2022)	0.094 (Oct. 2021)	0.071	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38356 (Mar. 2022)	49834 (Dec. 2021)	43679.5	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 MI	212 (Jan. 2022)	221 (Feb. 2022)	215	IS:1622

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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Lagoon Area (Turning Circle)-10 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.62 (Mar. 2022)	8.7 (Dec. 2021)	8.3	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	276 (Oct. 2021)	2456 (Dec. 2021)	1602	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	36414 (Mar. 2022)	45414 (Jan. 2022)	41717.33	IS:3025 (P-16)
4	Turbidity	NTU	5.6 (Feb. 2022)	6.85 (Oct. 2021)	6.22	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.52 (Dec. 2021)	0.706 (Oct. 2021)	0.58	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	825.36 (Oct. 2021)	1487.64 (Dec. 2021)	1276.59	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	164.2 (Mar. 2022)	1705.45 (Oct. 2021)	580.33	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.1 (Dec. 2021)	6.64 (Oct. 2021)	3.74	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.019 (Dec. 2021)	0.046 (Mar. 2022)	0.029	APHA 23rd Ed.
11	Calcium As Ca	mg/L	312 (Nov. 2021)	387.6 (Oct. 2021)	340.55	IS:3025 (P-40)
12	Sodium As Na	mg/L	10140 (Feb. 2022)	10989 (Oct. 2021)	10406.83	IS:3025 (P-45)
13	Potassium As K	mg/L	331 (Dec. 2021)	486 (Oct. 2021)	392.33	IS:3025 (P-45)
14	Nitrite	mg/L	0.021 (Oct. 2021)	0.68 (Jan. 2022)	0.20	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.035 (Dec. 2021)	0.099 (Oct. 2021)	0.068	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38554 (Mar. 2022)	47630 (Jan. 2022)	43219.33	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 MI	221 (Dec. 2021)	278 (Feb. 2022)	250.66	IS:1622

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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Parameters	Unit	Lagoon Area (Turning Circle)-20 m Below Surface			Protocol
			Minimum	Maximum	Average	
1	pH	..	7.86 (Mar. 2022)	8.68 (Dec. 2021)	8.3	IS:3025 (P-11)
2	Total Suspended Solids	mg/L	284 (Oct. 2021)	2296 (Jan. 2022)	1604.33	IS:3025 (P-17)
3	Total Dissolved Solids	mg/L	36624 (Mar. 2022)	45812 (Dec. 2021)	42070.67	IS:3025 (P-16)
4	Turbidity	NTU	5.8 (Feb. 2022)	7.8 (Nov. 2021)	6.75	IS:3025 (P-10)
5	Nitrate As NO ₃	mg/L	0.54 (Dec. 2021)	0.74 (Mar. 2022)	0.63	IS:3025 (P-34)
6	Magnesium As Mg	mg/L	846.36 (Oct. 2021)	1498.75 (Feb. 2022)	1304.89	IS:3025 (P-46)
7	Sulphates As SO ₄	mg/L	172.43 (Feb. 2022)	1765.32 (Oct. 2021)	597.39	IS:3025 (P-24)
8	Oil & Grease	mg/L	ND	ND	ND	IS:3025 (P-39)
9	Dissolved Oxygen	mg/L	1.0 (Dec. 2021)	6.42 (Oct. 2021)	2.87	IS:3025 (P-38)
10	Iron As Fe	mg/L	0.021 (Dec. 2021)	0.054 (Mar. 2022)	0.034	APHA 23rd Ed.
11	Calcium As Ca	mg/L	326 (Nov. 2021)	406.4 (Oct. 2021)	354.28	IS:3025 (P-40)
12	Sodium As Na	mg/L	10172 (Feb. 2022)	11203 (Oct. 2021)	10465.17	IS:3025 (P-45)
13	Potassium As K	mg/L	354 (Dec. 2021)	495 (Oct. 2021)	414.16	IS:3025 (P-45)
14	Nitrite	mg/L	0.026 (Oct. 2021)	0.74 (Jan. 2022)	0.24	IS:3025 (P-34)
15	Phosphate As P	mg/L	0.053 (Feb. 2022)	0.108 (Nov. 2021)	0.08	IS:3025 (P-31)
16	Silica As SiO ₂	mg/L	ND	ND	ND	IS:3025 (P-35)
17	Total Solids	mg/L	38816 (Mar. 2022)	48994 (Dec. 2021)	43823.33	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 MI	221 (Jan. 2022)	253 (Dec. 2021)	238	IS:1622

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 October 2021 to March 2022.

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
- 14) Extension cord
- 15) Thermocouple
- 16) Syringes
- 17) Tool kit
- 18) Instruction manual or SOP
- 19) Filled data 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.

7.4.3.2 Velocity 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.

$$\text{Velocity of Gases } V = K \sqrt{H \times T_s}$$

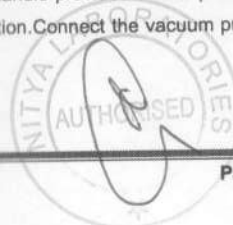
7.4.3.3. Sampling for SPM and Gaseous Pollutant

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 inverse Tighten the screw keeping the thimble straight. Keep on tightening till the edge of thimble strikes against back surface.

$$\text{Isokinetic Flow Rate } Q_s = \frac{V * A_n * 60 * 1000 * (273 + 25)}{T_s}$$

- Isokinetic Flow Rate Q_s
- Q_s = 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 Q_s 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 for 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

Volume of air sampled Q_m (lit) = $\frac{Q_s * (740 - P_m)}{760} \times \frac{298 * t}{273 + T_a}$

PM (mg/Nm³) = $\frac{W_2 - W_1 * 10^6}{Q_m}$



7.5 Results & Discussion on Observations

DG Set of Signal Station

At this location Particulate Matter as PM was found between 0.043 to 0.182 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 0.043 to 0.921 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 0.065 to 0.289 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 0.134 to 1.728 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 0.172 to 0.293 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 0.821 to 1.928 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 0.191 to 0.293 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 1.124 to 2.019 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 0.172 to 0.236 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 0.933 to 2.104 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 0.072 to 0.176 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 0.419 to 0.935 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 0.081 to 0.093 g/kw-hr. The Value of Oxide of Nitrogen as NO_x was found between 0.687 to 0.876 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 29.6 to 45.6 mg/Nm³. The Value of Oxide of Nitrogen as NO_x was found between 123 to 138 mg/Nm³. The Value of Oxide of Sulphur as SO_x was absent during the analysis.

Oily Jetty Pump-1 of Capacity 890 HP

At this location Particulate Matter as PM was found between 29.4 to 39.0 mg/Nm³. The Value of Oxide of Nitrogen as NO_x was found between 127 to 139 mg/Nm³. The Value of Oxide of Sulphur as SO_x was absent during the analysis.

Oily Jetty Pump-3 of Capacity 890 HP

At this location Particulate Matter as PM was found between 31.2 to 42.0 mg/Nm³. The Value of Oxide of Nitrogen as NO_x was found between 128 to 143 mg/Nm³. The Value of Oxide of Sulphur as SO_x was absent during the analysis.

Hydrant Pump of Capacity 450 HP

At this location Particulate Matter as PM was found between 89.0 to 228.0 mg/Nm³. The Value of Oxide of Nitrogen as NO_x was found between 85 to 98 mg/Nm³. The Value of Oxide of Sulphur as SO_x was absent during the analysis.

Monitor Pump

At this location Particulate Matter as PM was found between 27.6 to 34.6 mg/Nm³. The Value of Oxide of Nitrogen as NO_x was found between 82 to 94.2 mg/Nm³. The Value of Oxide of Sulphur as SO_x was absent during the analysis.

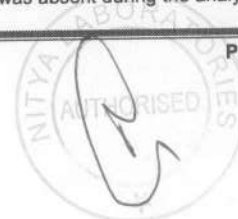


Table 10.1.1

Summary of the Status of New Mangalore Port Trust
 related to the Environmental Management System
 through Development, Operation and
 Transfer Order by MPA

STATUS OF ENVIRONMENT MONITORING FOR AIR MONITORING STATIONS

Sr. No.	GIS List of Region Station	Medium
1	Pericardial Station, (on PMU, Station-01)	SO ₂ & CO (Jan. 2022)
2	Centre of Nitrogen (on TACG, Station-02)	SO ₂ & CO (Jan. 2022)
3	Centre of Sulphur (on TACG, Station-03)	SO ₂



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG Set of Signal Station	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.043 (Oct. 2021)	0.182 (Mar. 2022)	0.094
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	0.043 (Oct. 2021)	1.092 (Mar. 2022)	0.64
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG Set of 500 KVA of Electrical Substation DG-1	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.065 (Oct. 2021)	0.289 (Mar. 2022)	0.18
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	0.134 (Feb. 2022)	1.728 (Mar. 2022)	0.99
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG-1 Set of 33 KVA Main of Capacity 1000 KVA	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.172 (Dec. 2021)	0.293 (Nov. 2021)	0.216
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	0.821 (Jan. 2022)	2.019 (Oct. 2021)	1.480
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG-2 Set of 33 KVA Main of Capacity 1000 KVA	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.191 (Dec. 2021)	0.293 (Nov. 2021)	0.216
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	1.124 (Feb. 2022)	2.019 (Nov. 2021)	1.615
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG Set of 500 KVA of Electrical Substation DG-2	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.172 (Oct. 2021)	0.236 (Nov. 2021)	0.205
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	0.933 (Jan. 2022)	2.104 (Nov. 2021)	1.39
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG Set of 160 KVA at Hospital	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.072 (Nov. 2021)	0.176 (Mar. 2022)	0.10
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	0.419 (Oct. 2021)	0.935 (Mar. 2022)	0.71
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	DG Set of 50 KVA of ADM Building	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	0.081 (Oct. 2021)	0.093 (Nov. 2021)	0.085
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	0.687 (Jan. 2022)	0.876 (Oct. 2021)	0.78
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Oily Jetty Pump-2 of Capacity 890 HP	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	29.6 (Oct. 2021)	45.6 (Feb. 2022)	36.18
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	123.0 (Oct. 2021)	138.0 (Jan. 2022)	128.0
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Oily Jetty Pump-1 of Capacity 890 HP	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	29.4 (Oct. 2021)	39.0 (Mar. 2022)	34.5
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	127.0 (Oct. 2021)	139.0 (Mar. 2022)	131.6
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Oily Jetty Pump-3 of Capacity 890 HP	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	31.2 (Jan. 2022)	42.0 (Mar. 2022)	35.9
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	128.0 (Oct. 2021)	143.0 (Mar. 2022)	135.1
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Hydrant Pump of Capacity 450HP	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	89.0 (Feb. 2022)	228.0 (Jan. 2022)	132.1
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	85.0 (Dec. 2021)	98.0 (Jan. 2022)	94.6
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



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 OCTOBER 2021 TO MARCH 2022 SUMMARY

Sr. No.	Monitor Pump	Minimum	Maximum	Average
1	Particulate Matter, (as PM), (g/kw-hr)	27.6 (Jan. 2022)	34.6 (Oct. 2021)	31.5
2	Oxide of Nitrogen (as NO _x) (g/kw-hr)	82.0 (Jan. 2022)	94.2 (Nov. 2021)	88.2
3	Oxides of Sulphur (as SO _x) (mg/Nm ³)	ND	ND	ND



