Development of Vizhinjam International Deepwater Multipurpose Seaport

Environmental Clearance F. No. 11-122/2011-IA.III dated 3rd January 2014

Half Yearly Compliance Report (HYCR) for the Period October 2024 to March 2025

Project Concessionaire

Adani Vizhinjam Port Private Ltd. (AVPPL)

Project Authority

Government of Kerala (GoK)

Implementing Agency on behalf of GoK

Vizhinjam International Seaport Limited (VISL)

(A GoK Undertaking)

May 2025

Vizhinjam International Seaport Limited
(A Government of Kerala Undertaking)

VISL/53/ 2021-GM1 (E) 28th May 2025

To

Additional Principal Chief Conservator of Forests (C),
Ministry of Environment Forest and Climate Change (MoEF&CC),
Regional Office (SZ), Kendriya Sadan,
4th Floor, E&F Wings, 17th Main Road,
Koramangala II Block, Bangalore-560034 (Karnataka)
rosz.bng-mefcc@nic.in; Ph: 080-25635901

Sub: Half Yearly Compliance Report (HYCR) of Environmental and CRZ Clearance (EC) for Vizhinjam International Multipurpose Deepwater Seaport for the period of **October 2024 to March 2025** – Reg.

Ref: 1)File No. 11-122/2011-IA.III dated 3rd January 2014
2)Letter No. 1285/A3/13/KCZMA/S&TD dated 24th August 2013
3) File No: EP/12.1/7/2013-14/Ker 829 dated 20th August 2019
4) F.No.11-122/2011-IA.III Proposal No. IA/KL/MIS/178082/2020 dated 29th Dec 2020
5) EC Validity Extension Identification No. EC24A3501KL5383004N,dated 9th Dec 2024

Dear Sir,

This has reference to the Environmental & CRZ Clearance (EC) issued on 3rd January 2014 (vide reference cited 1) by the Ministry of Environment, Forest & Climate Change (MoEF&CC) for the proposed Vizhinjam International Multipurpose Deepwater Seaport at Vizhinjam in Thiruvananthapuram District of Kerala State based on the recommendation of KCZMA (vide the reference cited 2). Subsequently, the validity of EC was extended by MoEF&CC dated 29th December 2020 (vide reference cited 4) and further extended dated 9th December 2024 (vide reference 5). The EC is presently valid till 2nd January 2026.

The Half Yearly Compliance Report (HYCR) of the conditions stipulated in the cited references for the period from **October 2024 to March 2025** is enclosed herewith for record and reference.

As per the MoEF&CC Letter (vide the reference cited 3), wherein submission of HYCRs by email/soft copy is declared acceptable, therefore the HYCR for the period **October 2024 to March 2025** is being submitted to the MoEF&CC, Regional Office (Bangalore), Zonal office of the CPCB (Bangalore), KSPCB & KCZMA via email.

Yours Sincerely
For Vizhinjam International Seaport Ltd. (VISL)

Chief Executive Officer
Encl: As Stated Above

Copy to: CEO, Adani Vizhinjam Port Private Ltd. (AVPPL)
01, Port Operation Building, Vizhinjam Seaport, Mulloor P.O, Vizhinjam, Thiruvananthapuram-695521, Kerala, India

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014 for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
11.	**Specific Conditions**	
(i)	"Consent for Establishment" shall be obtained from Kerala 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.	**Complied** Adani Vizhinjam Port Pvt. Ltd. (AVPPL) had applied for and obtained Consent to Establish (CTE) for Phase I of the Vizhinjam Port Project from Kerala State Pollution Control Board (KSPCB) vide Consent No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 which was valid up to 31.07.2018. The CTE was renewed vide Consent No. PCB/HO/TVM/ICE-R/02/2018 dated 19.07.2018 valid up to 31.07.2023. The CTE was further renewed vide Consent No. KSPCB/TV/ICE/10029484/2023 dated 30.07.2023 valid up to 31.07.2028. A copy of the renewed CTE was submitted to Ministry of Environment and Climate Change (MoEF&CC) along with the Half Yearly Compliance Report (HYCR) for the period April 2023 to September 2023. Additionally, as the port is now in operational phase, AVPPL have applied for and obtained Consent to Operate (CTO) from KSPCB for Phase I of the Vizhinjam Port Project vide Consent No. KSPCB/TV/ICO/10076351/2024 dated 03.12.2024 valid up to 31.07.2029. A copy of the CTO is enclosed as **Annexure I**.
(ii)	Project Proponent shall carry out intensive monitoring with regulatory reporting six monthly on shoreline changes to the Regional Office, MoEF.	**Being Complied** Based on the Shoreline Monitoring Plan prepared by L&T Infra Engineers Ltd (L&T IEL) under the guidance of National Institute of Ocean Technology (NIOT), oceanographic and shoreline monitoring is being carried out by agency Shankar Surveys Pvt. Ltd. (SSPL) for a stretch of 40 km (20 km on both sides of the project site) and reports are being regularly submitted to Ministry of Environment and Forests & Climate Change (MoEF&CC) as a part of the HYCRs. Broadly the scope covers: • Wave Observations • Onshore Cross beach profiling • Offshore Cross beach profiling • Littoral Environmental Observations (LEO) • Beach Sampling • Multi-beam Echo Sounder (MBES) survey

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		• Grab Sampling • Current & Tide Observations • Weather Observations • Marine Water Sampling Shoreline Monitoring Report by SSPL for the period October 2024 to March 2025 is enclosed as **Annexure II**. L&T IEL (Now Assystem India Ltd.) had conducted data analysis based on available oceanographic and shoreline monitoring data provided by SSPL and carried out accompanying model study and the corresponding data analysis and modelling reports, which were vetted by NIOT, were submitted to MoEF&CC as a part HYCRs. Following modelling reports have been prepared by Assystem so far and submitted as detailed below: **Data Period** / **Modelling Report Submitted with HYCR for the Period** Feb 2015 to Feb 2017 — Apr 2017 to Sep 2017 Mar 2017 to Feb 2018 — Apr 2018 to Sep 2018 Mar 2018 to Feb 2019 — Apr 2019 to Sep 2019 Mar 2019 to Feb 2020 — Apr 2020 to Sep 2020 Mar 2020 to Feb 2021 — Apr 2021 to Sep 2021 Mar 2021 to Sep 2022 — Apr 2022 to Sep 2022 Oct 2022 to Sep 2023 — Apr 2023 to Sep 2023 Oct 2023 to Sep 2024 — Apr 2024 to Sep 2024 Thereafter, the present study to carry out the data analysis and accompanying model study of the shoreline changes based on the oceanographic and shoreline monitoring data being collected for the period October 2024 to September 2025 is ongoing.
(iii)	The capital dredged material (7.6 Mm^3) shall be utilized for reclamation of berths.	**Complied** A total 7.21 Mm^3 dredged material has been utilized for reclamation of 63.43 Ha area of land. With respect to dredged material, the requirements for reclamation of berths for Phase I development of the port have been completed.

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(iv)	Additional fish landing centre shall be developed as part of the proposed Vizhinjam port for upliftment of fisheries sector.	**Being Complied** Planning work for the fish landing center and the associated breakwater had been initiated as part of the funded work component of the Port concession agreement. However, based on the recommendations of the report on physical model studies carried out by Central Water and Power Research Station (CWPRS), the geometry of the breakwater originally proposed for the fishing harbour is found to be not suitable with respect to tranquillity and hence the design of the new fishing landing centre was revisited. Consultations between Fisheries Department and Ports Department, Government of Kerala (GoK) are held to decide the suitable location for the additional fishing harbour in consultation with the fishermen community. GoK would soon be finalising the plan of action based on the final CWPRS report to develop and make available the additional fish landing facilities for the benefit of the local fishermen in line with the blue economy vision of the Government of India (GoI) along with the completion of the Port.
(v)	The project shall be executed in such a manner that there is minimum disturbance to fishing activity.	**Complied** Following are being practiced ensuring minimum disturbance to fishing activity: • Navigational buoys/marker buoys are placed for demarcation of port area for fishing boats to maintain a safe distance from the breakwater. • For mutual understanding of the port operation activities with the local fishing community an exclusive CSR (Corporate Social Responsibility) team of AVPPL has been assigned. The dedicated CSR team are in constant touch (through WhatsApp Groups, etc.) with the fishermen/fishing community members to facilitate the flow of various project related information/updates. • AVPPL CSR team also provides regular updates to the committee which has been formed by the local church leaders/other representatives adjoining to the port area, who in turn pass on relevant port project information to the fishermen.

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		• Marine Water Quality is being monitored regularly, and results are submitted as part of the compliance reports. No abnormal results were observed during the compliance period (**Refer Annexure III**). • Central Marine Fisheries Research Institute (CMFRI) have conducted a study on estimation of marine fish landings data from the potential impact zones of Vizhinjam International Seaport for the period June 2021 to May 2022. The report (submitted as part of HYCR for the period April 2023 to September 2023) concluded that Fish landings survey recorded an increase of 3.35% compared to the total landings reported in 2011. Seasonal and zonal variations of fish catch analysis portrays the higher catches in the direct footprint zone, implying that no significant impacts due to the development of Vizhinjam on the availability of fish resources. • Higher level engagement with the fishing community is also being carried out by the Fisheries Department of GoK at Director Fisheries level and at Minister Level.
(vi)	Steps would be taken to safeguard the interests of the fisheries sector as detailed in the Resettlement Action Plan (RAP), Corporate Social Responsibility (CSR) and in the Integrated Fishing Community Management (IFCMP), namely a component of Rs.7.1 crores as part of the compensation package for the fisheries sector, as livelihood restoration measures for mussel collectors, shore seine fishermen and others. Rs.41.30 crores as part of CSR activities in the	**Being Complied** In consultation with the fishermen, enhanced livelihood compensation of Rs. 115 Crores was sanctioned and distributed by GoK up to date by VISL to the fishermen as livelihood compensation. Till 31.03.2025 an amount of Rs. 114.30 Crores have been disbursed for a total number of 2936 Livelihood Affected Persons (LAPs) whose verification was complete in all respects; this includes boat owners to whom kerosene is supplied free of cost during the breakwater construction period. Remaining few disbursals would be done as soon as possible up on verification of the remaining appeal applications. The status of the Social Welfare activities taken up in the fisheries sector is as follows: **Water Supply Scheme**: Kerala Water Authority (KWA) set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake

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	fisheries sector under (i) water supply scheme (7.3crores) (ii) new fishing landing centre (16crores) (iii) adoption of existing fishing harbor (5crores) (iv) sea food park (4crores) (iii) skill development centre (4crores) (iv) environmental sanitation (3crores) and (v) solid waste management (2crores).	which was commissioned in April 2013 by VISL by expending an amount of Rs. 8.10 Crores. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0 MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. For Operation & Maintenance (O&M) of the same, an amount of Rs. 5.38 Crores have been spent up to 31.03.2021. From 04.04.2019 onwards, O&M of the scheme is being done by KWA. An additional amount of Rs. 1.74 Crores has been sanctioned and deposited by VISL to KWA to extend piped water connections for treated water supply facilities to the community at Kottapuram Village. More than 1000 free domestic water connections have been given to the project affected areas. KWA now have adequate coverage of water supply around the port and project affected areas. VISL is coordinating with local body representatives to identify water shortage areas and taking effort to resolve the same. **New Fish Landing Centre**: Refer Specific Condition S. No. iv. **Adoption of Existing Fishing Harbour**: GoK has formed a higher-level committee to prepare a master plan for the old fishing harbour. Government Departments concerned are coordinating to resolve the differences and to arrive at an acceptable plan in consultation with all stakeholders and accordingly a proposal for Rs. 25 Crores for additional landing facilities at the southern side and a project for Rs. 45 Crores with necessary facilities at the Northern Part has been formulated and submitted under PMMSY scheme and waiting for approval of GoI. **Seafood Park**: Procurement of land for seafood park (Rs. 26.00 Crores) by VISL has been completed. Action for development of seafood park is being taken up to be commissioned along with the

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		completion of the new fishing landing facilities planned. A study prepared by Matsyafed (a GoK owned society) submitted a proposal for setting up a Seafood Park for the local populace. The proposal is being considered for technical and financial sanctions. However, this project is linked with the proposal of new fishing harbour and the new blue economy vision of GoI and being taken up accordingly. **Skill Development Centre:** Additional Skill Acquisition Program (ASAP) is a GoK initiative aimed to impart required skills to local youth for improving their employability. A Community Skill Park (CSP) in an area of 1.5 acres of land handed over by VISL has been developed at Vizhinjam. The CSP operates on a PPP model wherein 25,000 sq. ft. building with facilities for students' hostel have been constructed by GoK by ASAP under ADB assistance, whereas the operation of the centre with logistics and other high-end courses are being taken up by Adani Skill Development Centre (ASDC) as per an agreement with GoK/ASAP/VISL. The CSP developed is a 3 storied building with facilities such as office space, seminar hall, training rooms, IT lab, library, meeting room, faculty room, etc. On 15.06.2024, the CSP training building and hostel block was inaugurated by Dr. R Bindhu, Minister for Higher Education, GoK. The functioning of the CSP has started and ASDC is conducting various domain courses, livelihood related courses, and high-end port related courses according to the anticipated vacancies arising in the port, in other top organizations and ports in India and abroad to benefit the community youth in and around Vizhinjam area and other locals.

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		 **ASDC Nursing Assistant Course**  **ASDC Advance Technologies Course**  **ASDC Data Entry Operator Course**

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		Environmental Sanitation/Solid Waste Management: Material Recovery Facility (MRF): As per the request received from Thiruvananthapuram Municipal Corporation an MRF has been developed on land allotted by Harbour Engineering Department. This is carried out as a shared activity and funded by VISL, Thiruvananthapuram Corporation, Adani Foundation and AVPPL. Material Recovery Facility is mainly designed to effectively manage plastic waste generated in Vizhinjam. Waste materials generated at source level are collected at MRF and segregated to sort plastic wastes. Stones and glass materials are initially removed. Segregated plastic wastes are dust removed, transported via conveyor belt to the shredding unit. Plastic with size below 6 microns are crushed to powdered form. Plastics of size above 6 microns are shredded to cube form. These shredded plastics will be taken from MRF for further reuse. Nearly 1 ton of plastic is expected to reach MRF daily. Waste will be collected from the wards of Kottapuram, Vizhinjam, Mulloor, Harbour and Venganoor by Haritha Karmasena members hired by Corporation. The MRF is constructed in an area of 3500 sq. ft. and all the civil works are completed. Clean Kerala Company (CKC), a GoK Owned Company, procured the required machinery, and once necessary electrical works are completed, the facility can be commissioned. The operation and maintenance of the MRF building will be undertaken by CKC.

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		 **MRF**
(vii)	Rail connectivity shall be parallel to the harbour road on elevated structures at +4/5.00 m level without affecting the entry to the existing harbor.	**EC Amendment granted by MoEF&CC** Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, about 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway and Railway Board. EC amendments in this regard have been granted by MoEF&CC on 17.07.2024 vide EC Identification Number EC24A033KL158955 and related compliances are being filed under the same.
(viii)	Compensation packages in accordance with the Central/State Government norms shall be given to all the authorized-cum-affected (having valid clearances as applicable) resort owners.	**Being Complied** All authorized-cum-affected resort owners evicted have been compensated adequately for land as per Central/State government norms. Payment transfer for the land acquisition of the last three resorts has been made to District Collector, and which is in the process of acquisition.
(ix)	The port shall ensure that all ships under operation follow the MARPOL convention regarding discharge or spillage of any toxic, hazardous or polluting material like ballast water, oily water or sludge, sewage, garbage etc. The emission of NOx &	**Being Complied** All vessels entering the port are complying with DGS Circular No 02 of 2023 for Annex VI of MARPOL. Vizhinjam Port is also registered under Swachh Sagar portal of DG shipping. KSPCB approved vendors for waste collection under Swatch Sagar Portal has been adopted for disposals. De-ballasting inside port premises is allowed as per MARPOL regulations with prior permission from the port authorities. However, no muddy water de-ballasting is permitted. All vessels

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	SOx shall remain within permissible limits.	calling at Vizhinjam port shall have Ballast water treatment plant certificate with D2 category and shall share ballast exchange prior to arrival. Summary of the Ambient Air Quality Monitoring (AAQM) during the compliance period October 2024 to March 2025 at 5 monitoring locations in and around the port site are provided below:

Parameter	Unit	Max	Avg.	Min	Perm. Limit
PM_{10}	$\mu g/m^3$	89.5	60.2	37.8	100
$PM_{2.5}$	$\mu g/m^3$	48.7	29.9	18.6	60
SO_2	$\mu g/m^3$	5.87	4.53	4.10	80
NO_2	$\mu g/m^3$	6.79	5.29	4.10	80
CO	mg/m^3	BDL	BDL	BDL	4
HC	ppm	BDL	BDL	BDL	--

(x)	CSR activities shall cover villages within 10 km radius of the project.	**Being Complied** CSR activities are being carried out in villages within 10 km radius of the project. CSR activities are being taken up mainly in the fields of education, community health, sustainable livelihood development, community infrastructure development and general administration; after receiving formal demands from social controlled institutions, government-controlled institutions and recognized platforms. An amount of Rs. 332.64 Lakhs has been spent on CSR activities during the compliance period (October 2024 to March 2025) as shown below:

S. No.	Head	Amount (Rs. Lakhs)
1	Education	117.80
2	Community Health	7.92
3	Sustainable Livelihood Development	31.00
4	Community Infrastructure Development	165.60
5	General Administration	10.32
Total		**332.64**

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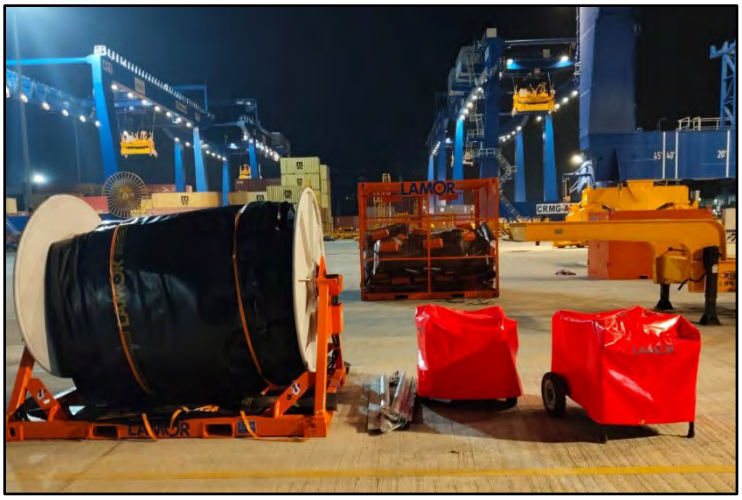
		Details on CSR activities carried out by AVPPL during compliance period (October 2024 to March 2025) are enclosed as **Annexure IV**.
(xi)	Oil Contingency Management Plan shall be put in place.	**Being Complied** Procurement and delivery of Oil Spill Response Equipment (OSRE) is completed as per the NOSDCP-2018 for Category 'B' and the equipment has been commissioned and is available at Vizhinjam Project site operationally ready. AVPPL updated the OSDCP after making necessary amendments in accordance with the observations issued and resubmitted to the same to Indian Coast Guard (ICG) vide Letter AVPPL/ICG/2024-25/3640 dated 12.02.2025 (Enclosed as **Annexure V**).   **OSRE at Site** Additionally, all the required manpower for the Category 'B' port (IMO Level 1: 15 Nos, IMO Level 2: 07

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		Nos, IMO Level 3: 03 Nos, Oil Handlers: 10 Nos) have been trained and are positioned in Vizhinjam Port site. These staff will be readily deployed based on the requirements in the contingency case of an oil spill at Vizhinjam Port.   **IMO OSRE Training and Handling** A pollution response workshop and live demonstration of the OSRE was also conducted in coordination with the Indian Coast Guard (ICG) Station Vizhinjam on 09.01.2025.

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		  **ICG OSRE Live Demonstration**
(xii)	All the recommendations /conditions stipulated by Kerala Coastal Zone Management Authority (KCZMA) shall be complied with.	**Being Complied** The recommendations/conditions of KCZMA are being complied with. Copies of the HYCRs are also being submitted to KCZMA. Compliance to the recommendations/conditions of KCZMA for the period October 2024 to March 2025 is enclosed as **Annexure VI**.
(xiii)	The responses/ commitments made during public hearing shall be complied with in letter and spirit.	**Being Complied** The project proponent is complying with the responses/commitments made during public hearing (as applicable). Status of the same is being submitted regularly along with HYCRs to all the authorities concerned. The compliance status of the commitments made during Public Hearing and actions taken on the same during the period October 2024 to March 2025 is enclosed as **Annexure VII**.
(xiv)	All the recommendation of the EMP shall be complied with in letter and spirit. All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the	**Being Complied** Recommendations of the EMP are being implemented. Status of EMP compliance in matrix format is enclosed as **Annexure VIII**.

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	compliance for each mitigation plan shall be submitted to MoEF along with half yearly compliance report to MoEF-RO.	
(xv)	The project proponent shall bring out a special tourism promotion package for the area in consultation with the State Government and implement the same along with the project.	**Being Complied** Implementation of the Tourism Management Plan which would be integrated with the overall tourism directorates plan in the area is being discussed with the tourism department and would be implemented along with the completion of the Master Plan of the port project.
(xvi)	The project proponent shall place on its website its response to the Public Hearing, and representations as presented to the EAC in the 128th meeting held on 23rd November 2013, for information of the general public.	**Complied** All the relevant details pertaining to EIA, ToR, EAC meetings, Public Hearing, etc. related to the project have been placed on VISL website: https://vizhinjamport.in/.
(xvii)	There shall be no withdrawal of groundwater in Coastal Regulation Zone Area, for this project. In case any groundwater is proposed to be withdrawn from outside the CRZ area, specific prior permission from the concerned State/Central Groundwater Board shall be obtained in this regard.	**Noted** There will not be any withdrawal of groundwater from the CRZ Area. In case of requirement of groundwater withdrawal outside CRZ area, specific prior permission will be obtained from State/Central Groundwater Board. At present, the water for construction purposes for the port is being sourced from the open market/private suppliers. On an average ~67 KLD water is being consumed for construction related activities, dust suppression sprinkling, and construction workers drinking water during the compliance period (October 2024 to March 2025). For water for operation purposes, AVPPL have applied for Kerala Water Authority (KWA) connection through E-Tapp dated 19.01.2024. KWA Water Supply Division Neyyattinkara have subsequently facilitated the connection of water supply to Vizhinjam port through

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		deposit of necessary funds by AVPPL and have provided a tapping point along with water meter inside the project site in August 2024. During the compliance period October 2024 to March 2025, 2935 KL of water has been utilized for port related operations and port office buildings.
(xviii)	The Hazardous waste generated shall be properly collected and handled as per the provision of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008.	**Being Complied** The Hazardous Waste at site are being disposed to authorized (CPCB/KSPCB) handlers as per the provision of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008. During the compliance period (October 2024 to March 2025) for construction related activities 1.09 KL of used oil, 15 KGs of oily cotton material, 10 Nos. oil contaminated filters and 32 Nos. of discarded containers had been generated and are being disposed to authorized (CPCB/KSPCB) handlers.
(xix)	No hazardous chemicals shall be stored in the Coastal Regulation Zone area.	**Noted for Compliance** No hazardous chemical is being stored in the CRZ area.
(xx)	The wastewater generated from the activity shall be collected, treated and reused properly.	**Noted** All the wastewater generated from the port is of the nature of sewage and will be collected and treated in the STP and reused properly for watering of horticulture/landscape developments in the port.
(xxi)	Sewage Treatment facility should be provided in accordance with the CRZ Notification.	**Complied** Sewage Treatment Plant (STP) facility of 50 KLD capacity in accordance with the CRZ Notification (CRZ-II Area) has been developed as a part of Phase I of the port project and will be further augmented with additional modular unit of 50 KLD, based on the requirement. The STP technology is MBBR (Moving Bed Biofilm Reactor). The treated water generated is being used for horticulture (landscape development), dust suppression (water sprinkling), etc. The sewerage system is connected to the areas wherever office buildings, canteens, and other operational buildings are constructed. There are 8 Sewage Pumping Stations (SPS) with coverage over

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		the area of the port which send the wastewater through pressure lines to the STP, except one SPS which is connected through gravity line.  **STP**  **SPS** The STP is commissioned on 31.03.2025. Sewage generated of 64 KL from port office buildings and construction site offices during the compliance period (October 2024 to March 2025) were collected through tankers and sent to the STP at Muttathara being operated by Thiruvananthapuram Corporation. From April 2025 onwards, sewage will be treated in the Vizhinjam Port STP.

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(xxii)	No solid waste will be disposed of in the Coastal Regulation Zone area. The solid waste shall be properly collected, segregated and disposed as per the provision of Solid Waste (Management and Handling) Rules, 2000.	**Noted for Compliance** No solid waste is being disposed in the CRZ area. Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and the output is being used as manure in greenbelt development within the port project areas. The dry waste is being properly collected, segregated, and disposed of in line with the Solid Waste Management Rules 2016, as amended. The Half Yearly Report of the Solid Waste Management at Vizhinjam Port for the period October 2024 to March 2025 is enclosed as **Annexure IX**.
(xxiii)	Installation and operation of DG set if any shall comply with the guidelines of CPCB. Oil spills if any shall be properly collected and disposed as per the Rules. Project proponent shall install necessary oil spill mitigation measures.	**Being Complied** 27 DG sets (21 for construction purposes and 6 for operations) were on site during the compliance period October 2024 to March 2025. These are compliant to CPCB guidelines. Oil spill will not occur during normal operation, however, in case of emergency, if any oil spill occurs, it shall be properly collected and disposed as per the Rules.
(xxiv)	No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.	**Complied** Construction of the project has been carried out as per the approval obtained under CRZ Notification.
(xxv)	The approach channel shall be properly demarcated with lighted buoys for safe navigation and adequate traffic control guidelines shall be framed.	**Complied** 18 sets of navigation buoys/navigational aids along with Sinker and Solar lantern light with all accessories and Marine Lantern light and Port entry light for the Vizhinjam Port Deployment have been deployed and are operational. A layout of the approach channel demarcated with Buoys for safe navigation with navigational aid buoys was submitted as a part of HYCR for the period April 2023 to September 2023.

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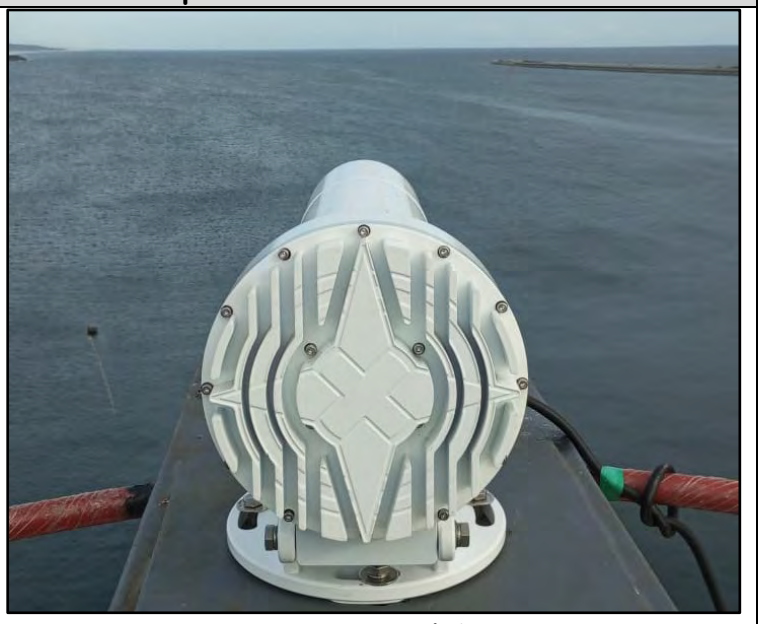
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		 **Port Entry Light**  **GRP Tower**

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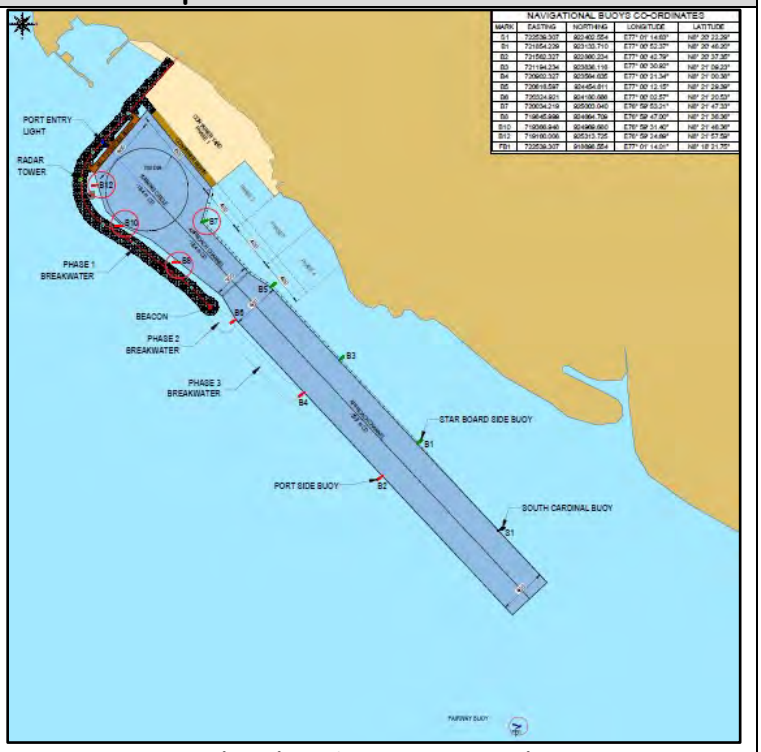
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		 **Navigational Buoys Locations** A Vessel Traffic Management System (VTMS) is being implemented. The berthing tariff and policy structure (BPTS) which has port information on traffic guidelines has been uploaded to APSEZ website and can be downloaded by relevant trade forums. The Navigation Chart of Vizhinjam International Seaport was released by Joint Chief Hydrographer of India and handed over to AVPPL on 25.09.2024.
(xxvi)	The project proponent shall take up development of greenbelt in the project area, wherever possible. Adequate budget shall be provided in the Environment Management Plan for such development.	**Being Complied** Greenbelt: A natural greenbelt exists around the port boundary towards the landward side. A greenbelt development plan has been considered in the Master Plan and budgetary provision has been kept for this purpose. Greenbelt of adequate width with suitable species as identified in the EIA is being developed in all possible areas in line with the establishment of the port.

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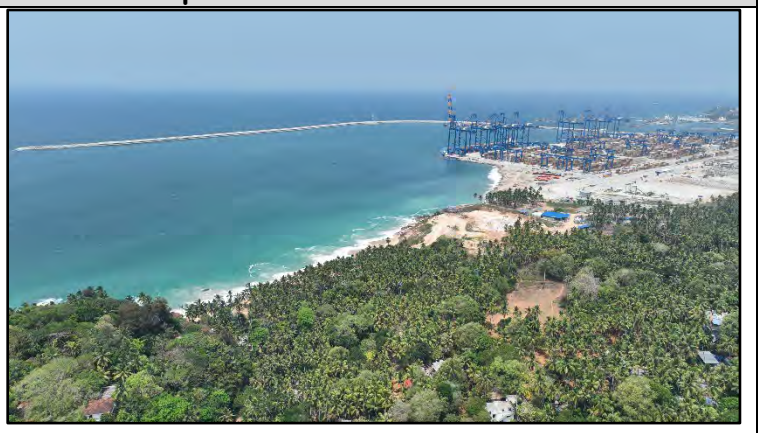
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		 **Natural Greenbelt around the Port** <u>Landscape Development:</u> Landscape development work has also been completed at several locations in the port areas. The landscaping at the port site is maintained by Vanitha Karsheeka Karma Sena, one of the livelihood groups formed as part of the CSR activities. This includes the daily watering, weed control and management.  **Landscape Development** <u>Compensatory Afforestation (CA):</u> AVPPL, in collaboration with Forest department, have carried out planting of 40,040 trees in two Phases in adequate land as identified by social Forest Department, for a total area of 29.65 Ha spending Rs.

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S. No.	Conditions	Compliance Status as on 31.03.2025
		254.50 Lakhs. This has sufficiently covered the obligation of compensatory afforestation required for the development of all the phases of Vizhinjam Port. Details of the same are provided below:

Phase	Location	Area (ha)	No. of Trees	Cost (Rs. Lakhs)
1	Sainik School, Kazhakootam	12.05	15,540	80.50
2	Kerala University (KU) Campus, Karyavattom	12.60	16,500	174.00
	STP, Muttathara	5.00	8,000	
Total		**29.65**	**40,040**	**254.50**

Compensatory Afforestation at KU

(xxvii)	The fund earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes.	**Complied** An amount of 40 Crores was kept solely for EMP implementation as per the commitment in the EIA; and this amount was not diverted for any other purpose. However, despite having exhausted the funds earmarked through EMP activities and having exceeded the required expenditure, AVPPL continue to be committed to environmental responsibility. An amount of Rs. 8.12 Crores has been utilized towards EMP implementation measures during compliance period October 2024 to March 2025. Till

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S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		date, an amount of ~Rs. 46 Crores has been spent on environmental protection measures. The details of EMP expenditure are enclosed as **Annexure X**.
(xxviii)	The project proponent shall set up an organizational mechanism/institutional structure for Environment, Health & Safety & CSR under the supervision of a General Manager as outlined in the EIA Report for effective implementation of the stipulated EHS safeguards & CSR activities.	**Complied** An officer of VISL has been appointed at the level of General Manager – Environment for the supervision of the stipulated Environment, Health and Safety (EHS) safeguards along with Government level Social Welfare Activities. AVPPL has also appointed competent and qualified professional team for the effective implementation of EHS safeguards & CSR activities. In addition to the above, an Environmental Expert of the independent engineer and safety consultants have been appointed as per concession agreement signed between GoK and AVPPL. It is also ensured that contractors executing the work also deploy qualified and competent EHS personnel for effective implementation of EHS measures. Organizational Structure for EHS & CSR is enclosed as **Annexure XI**.
(xxix)	Staff Colony should be located beyond CRZ area.	**Not Applicable** Phase I of the Vizhinjam Port Project Development does not envisage a Staff Colony for employees. As the Port is located at a reasonable distance from the existing residential zones of Thiruvananthapuram Corporation and adjoining Municipalities and Panchayaths, staff of the Port are availing accommodation independently in the existing residential zones outside the Port.
12.	**General Conditions**	
(i)	Construction of the proposed structures shall be undertaken meticulously conforming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification, 2011 & its amendments. All the construction designs/drawings relating	**Complied** All the construction activities are being carried out as per existing Central/local rules. Necessary permissions under CRZ Notification 2011 and its amendments have been obtained. Further, necessary approvals from concerned Statutory Departments/Agencies have been obtained for the construction designs/drawings as mentioned hereunder: • CTE No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018 was renewed from KSPCB vide Consent No. PCB/HO/TVM/ICE-

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014 for the Period October 2024 to March 2025		
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	to the proposed construction activities must have approvals of the concerned Statutory Departments / Agencies.	R/02/2018, dated 19.07.2018 valid up to 31.07.2023 and further renewed vide Consent No. KSPCB/TV/ICE/10029484/2023 dated 30.07.2023 valid up to 31.07.2028 (A Copy of the same was submitted along with HYCR for the period April 2023 to September 2023). All other port construction related aligned activities such as paver blocks, batching plants, etc. fall under this CTE taken for the port development. • CTO No. KSPCB/TV/ICO/10076351/2024 dated 03.12.2024 valid up to 31.07.2029 (**Annexure I**). • No Objection Certificate from Airport Authority of India (AAI) vide NOC No. AAI/SR/NOC/RHQ dated 07.12.2015. • As per the exemption granted by GoK G.O. No. 310/2015/LSGD dated 01.10.2015, AVPPL is not required to obtain any further building permits/permission to construct port related building within the port premises. • Permissions with respect to store petroleum in tank/s in connection with pump outfit for fuelling motor conveyances has been obtained in Form XIV for the storage of 40.00 KL of Petroleum class B in tank/s in the port premises from Petroleum & Explosives Safety Organisation (PESO) as per the provisions of the Petroleum Act, 1934 and under the Petroleum Rules, 2002 vide License No.: P/SC/KL/14/3732(P499906) dated 05.10.2023 (Copy of the same was submitted along with HYCR for the period October 2023 to March 2024).
(ii)	Adequate provision for infrastructure facilities including water supply, fuel and sanitation must be ensured for construction workers during the construction phase of the project to avoid any damage to the environment.	**Complied** There is no labour camp. It is ensured that construction workers who are staying outside in the contractor rented houses/apartments are provided with necessary infrastructure facilities.
(iii)	Appropriate measures must be taken while	**Being Complied**

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	undertaking digging activities to avoid any likely degradation of water quality.	Mitigation measures are being followed while undertaking digging activities. Surface and Groundwater quality is monitored monthly in line to Environment Monitoring Plan prescribed in EIA and analysis reports are enclosed as **Annexure III**. There are no significant changes observed in the water quality during the compliance period.
(iv)	Borrow sites for each quarry sites for road construction material and dump sites must be identified keeping in view the following: (a) No excavation or dumping on private property is carried out without written consent of the owner. (b) No excavation or dumping shall be allowed on wetlands, forest areas or other ecologically valuable or sensitive locations. (c) Excavation work shall be done in close consultation with the Soil Conservation and Watershed Development Agencies working in the area, and (d) Construction spoils including bituminous material and other hazardous materials must not be allowed to contaminate water courses and the dump sites for such materials must be secured so that they shall not	**Complied** • Quarry material has been obtained from approved sites only. The building stone materials for Phase I Development of Vizhinjam Port has been attained and requirement for further rock supply from quarries is not envisaged. • No excavation has been carried out in private property. • No excavation or dumping has been carried out in wetlands, forest area or other ecologically valuable or sensitive locations. • Kerala State Remote Sensing and Environment Centre (KSREC) have studied the impact due to construction of port approach road. Recommendations of KSREC are being implemented and suitable mitigation measures as suggested in the KSREC report are being adopted during construction. • No bituminous or hazardous material has been used. • Construction spoils are stored in such a way that they do not contaminate water courses and the dump sites for such materials are secured so that they shall not leach into the ground water. • Surface and Ground water quality is monitored monthly in line to Environment Monitoring Plan prescribed in EIA and analysis reports are enclosed as **Annexure III**.

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	leach into the ground water.	
(v)	The construction material shall be obtained only from approved quarries. In case new quarries are to be opened, specific approvals from the competent authority shall be obtained in this regard.	**Complied** The construction material was obtained from approved quarries only. The building stone materials for Phase I Development of Vizhinjam Port has been attained and requirement for further rock supply from quarries is not envisaged.
(vi)	The project authorities shall make necessary arrangements for disposal of solid wastes and for the treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid wastes and noise level etc. must conform to the standards laid down by the competent authorities including the Central/State Pollution Control Board and the Union Ministry of Environment and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.	**Being Complied** • No solid waste is being disposed in the CRZ area. • Bio-degradable waste is being treated in an OWC installed at site and output is being used as manure in greenbelt development. • The dry waste is being properly collected, segregated, and disposed in line to Solid Waste Management Rules 2016, as amended. • The Half Yearly Report of the Solid Waste Management at Vizhinjam Port for the period October 2024 to March 2025 is enclosed as **Annexure IX**. • A Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner in accordance with the CRZ Notification is being implemented. • Environment Monitoring is being carried out as per Environment Monitoring Plan prescribed in EIA by NABL accredited agency Standards Environmental & Analytical Laboratories. • Ambient Noise is being monitored as per Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) at 5 locations (Residential, commercial & Industrial) twice a month. It is observed that noise readings at the port site were within limits on all monitoring days during the monitoring months (from October 2024 to March 2025). • Half Yearly Environmental Monitoring Report for the period October 2024 to March 2025 is attached as **Annexure III**.
(vii)	The proponent shall obtain the requisite	**Complied**

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	consents for discharge of effluents and emissions under the Water (Prevention and control of Pollution) Act, 1974 and the Air (Prevention and control of Pollution) Act, 1981 from the Kerala State Pollution Control Board before commissioning of the project and a copy of each of these shall be sent to this Ministry.	CTE was obtained from KSPCB vide Consent No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018. The CTE was renewed vide Consent No. PCB/HO/TVM/ICE-R/02/2018 dated 19.07.2018 valid up to 31.07.2023. The CTE was further renewed vide Consent No. KSPCB/TV/ICE/10029484/2023 dated 30.07.2023 valid up to 31.07.2028. Further, as the port is now in operational phase, AVPPL have applied for and obtained Consent to Operate (CTO) from KSPCB for Phase I of the Vizhinjam Port Project on 03.12.2024 vide Consent No. KSPCB/TV/ICO/10076351/2024 dated 03.12.2024 valid up to 31.07.2029. A copy of the CTO is enclosed as **Annexure I**.
(viii)	Adequate precautions shall be taken during transportation of the construction material so that it does not affect the environment adversely.	**Complied** Following precautionary measures are undertaken during transportation of the construction material as environment safeguard: • Tarpaulin cover is being used during transportation of construction material. • All vehicles coming into the site are under a speed restriction of 20 km/hr. • Regular Water Sprinkling is done on the approach road by water tankers. • It is ensured that all vehicles entering the Port have a valid PUC certification. • The dumpers have speed governors ensuring adherence to speed limit. • AVPPL have engaged a dust sweeper sprinkling system for dust suppression along the roads, berth and on the storage yard.

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S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		 **Dust Sweeper**  **Water Sprinkling**

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S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		 **Tarpaulin Covered Truck**
(ix)	Full support shall be extended to the officers of this Ministry/Regional Office at Bangalore by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities.	**Noted**
(x)	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.	**Noted for Compliance** MoEF&CC have granted extension of validity of the existing EC for Phase-I development of Vizhinjam port up to the period of 02.01.2026 vide Letter dated 09.12.2024 with Validity Extension Identification No. EC24A3501KL5383004N (Copy enclosed as **Annexure XII**) with the following specific conditions. The compliance to the same is also provided below:

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S. No.	Conditions	Compliance Status as on 31.03.2025
		<table><tr><th>S. No.</th><th>Conditions</th><th>Compliance Status as on 31.03.2025</th></tr><tr><td>1.1</td><td>PP shall submit six-monthly Certified Compliance Report w.r.t. Earlier EC from the Regional Office of MoEFCC.</td><td>Will be Complied</td></tr><tr><td>1.2</td><td>All the specific conditions and general conditions mentioned in the EC/CRZ letter F.No.11-122/2011-IA.III, dated 3rd January, 2014 shall remain the same.</td><td>Noted for Compliance</td></tr><tr><td>1.3</td><td>The directions issued in the Pending Court Cases shall be complied with letter and spirit.</td><td>Noted</td></tr></table>
(xi)	The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied to the satisfaction of the Ministry.	**Noted**
(xii)	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 & Forests.	**Noted and Will be Complied** AVPPL is the concessionaire for implementing the project and operating it for the next 40 years, based on concession agreement signed between the GoK and AVPPL on 17.08.2015. Vizhinjam International Seaport Limited (VISL) is the Project Proponent and the nodal agency for development of the port on behalf of GoK. As on date, there is no change in the project profile.
(xiii)	The project proponent 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.	**Complied** Concession agreement with AVPPL was signed on 17.08.2015. The layout of the port has been approved by GoK vide letter No.308799/E1/15/F&PD dated 30.10.2015 (Submitted along with HYCR for the period October 2015 to March 2016). The preliminary construction activities commenced at Vizhinjam site on 16.11.2015 followed by official inauguration on 05.12.2015. Financing agreement forming part of

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		financial closure was submitted by the concessionaire on 13.05.2016.
(xiv)	Kerala State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industries Center and Collector's Office/Tehsildar's office for 30 days.	**Noted** This condition does not pertain to the project proponent. KSPCB had complied with the same.
13.	These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification 2006, including the amendments and rules made thereafter.	**Noted for Compliance**
14.	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 Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	**Complied** All the construction activities are being carried out as per existing Central/State rules. Necessary permissions under CRZ Notification 2011 and its amendments have been obtained. Further, necessary approvals from concerned Statutory Departments/Agencies have been obtained for the construction designs/drawings as mentioned hereunder: • No Objection Certificate from Airport Authority of India (AAI) vide NOC No. AAI/SR/NOC/RHQ dated 07.12.2015. • As per the exemption granted by GoK G.O. No. 310/2015/LSGD dated 01.10.2015, AVPPL is not required to obtain any further building permits/permission to construct port related building within the port premises.

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S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		• Permissions with respect to store petroleum in tanks in connection with pump outfit for fuelling motor conveyances has been obtained in Form XIV for the storage of 40.00 KL of Petroleum class B in tank/s in the port premises from Petroleum & Explosives Safety Organisation (PESO) as per the provisions of the Petroleum Act, 1934 and under the Petroleum Rules, 2002 vide License No.: P/SC/KL/14/3732(P499906) dated 05.10.2023.
15.	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 Environment Clearance and copies of the clearance letters are available with the Kerala State Pollution Control Board and may also be seen on the website of the Ministry of Environment & Forest at http://www.envfor.nic.in. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bangalore.	**Complied** Details regarding the advertisement that the project had been accorded EC and copies of the clearance letter that were published in local newspapers was intimated (along with copy of advertisement) to the regional office of MoEF&CC, vide letter No. VISL/EC/MoEF/2013 dated 20.01.2014 (Submitted along with the HYCR for the period October 2015 to March 2016). Copy of the EC is available on VISL website at https://vizhinjamport.in/environmental-clearance/. The same is also uploaded on Adani Ports and Special Economic Zone (APSEZ) website at https://www.adaniports.com/Downloads.
16.	This Clearance 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.	**Noted** There are no eco-sensitive zones (ESZ), national parks and sanctuaries in the project area.

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17.	Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	**Noted** Three appeals challenging the EC granted to the project (two appeals filed at NGT, Southern Regional Bench, Chennai and one at NGT, Principal Bench, Delhi) and one original application (OA-filed at NGT, Principal Bench Delhi) indirectly challenging the CRZ Notification, 2011 were filed as per the NGT Act, 2010. The appeals filed at Chennai bench were later transferred to the Delhi bench. The Delhi Bench of NGT has upheld the EC granted to the project vide its judgment dated 02.09.2016.
18.	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, ZilaParishad/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.	**Complied** A copy of the EC was submitted to the concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the Local NGOs from whom representations were received vide letter No. VISL/EC/MoEF/2013 dated 29.01.2014. Soft copy of the EC is available on VISL website at https://vizhinjamport.in/environmental-clearance/. The same is also uploaded on APSEZ website at https://www.adaniports.com/Downloads.
19.	The proponent shall upload the status of compliance of the stipulated Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO_2, NOx	**Being Complied** The copy of the latest HYCR for the period April 2024 to September 2024 including the results of six monthly monitoring data for the same period has been uploaded on VISL website https://vizhinjamport.in/compliance/ and also on the APSEZ website https://www.adaniports.com/Downloads. The HYCR for the period April 2024 to September 2024 has been submitted to the MoEF&CC, Regional Office (Bangalore), Zonal office of the CPCB (Bangalore), KSPCB & KCZMA via email dated 29.11.2024 (a copy of the email is enclosed as **Annexure XIII**).

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	(ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	Environment Monitoring is being carried out as per Environment Monitoring Plan prescribed in EIA by NABL accredited agency Standards Environmental & Analytical Laboratories. Detailed Monitoring reports (Air, Water, Noise, Marine Water, and Sediment) for the Compliance Period October 2024 to March 2025 are enclosed as **Annexure III**. Additionally, summary of monthly Environment monitoring results is also uploaded on the APSEZ website: https://www.adaniports.com/Downloads. Furthermore, in consultation with KSPCB, AVPPL have established a CAAQMS (Continuous Ambient Air Quality Monitoring Station) at the port project site. The data transmission of the CAAQMS is connected to the servers of KSPCB. A display board for the same has been installed and placed next to the CAAQMS where the Air Quality parameter values are visible to the public from the port entry gates.  **Display Board**
20.	The project proponent shall also submit six monthly reports on the status of compliance of	**Being Complied** HYCRs on the status of compliance of the stipulated clearance conditions including results of monitored data are regularly being submitted to the concerned

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014 for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	the stipulated Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.	agencies. As per the MoEF&CC Notification dated 26.11.2018, wherein submission of HYCRs by email/soft copy is declared acceptable, therefore the HYCR for the period April 2024 to September 2024 has been submitted to the MoEF&CC, Regional Office (Bangalore), Zonal office of the CPCB (Bangalore), KSPCB & KCZMA via email dated 29.11.2024 (a copy of the email is enclosed as **Annexure XIII**). Additionally, as per the MoEF&CC Office Memorandum dated 14.06.2022, the HYCR for the period April 2024 to September 2024 has been submitted online through compliance module in the PARIVESH Portal.
21.	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned KSPCB as prescribed under the Environment (Protection) Rules, 1986 as amended subsequently, shall also be put on the website of the company along with the status of compliance of Clearance conditions and shall also be sent to the respective Regional Offices of MoEF by e-mail.	**Will be Complied** AVPPL obtained CTO for Phase I of Vizhinjam Port on 03.12.2024. The Environmental statement in Form V for the financial year ending on 31.03.2025 will be submitted to KSPCB on or before 30.09.2025.

Enclosures:

Annexure No.	Details of Annexure
Annexure I:	CTO from KSPCB for Phase I of Vizhinjam Port
Annexure II:	Shoreline Monitoring Report (October 2024 to March 2025)
Annexure III:	Environment Monitoring Report (October 2024 to March 2025)
Annexure IV:	CSR Activities by AVPPL (October 2024 to March 2025)

Annexure No.	Details of Annexure
Annexure V:	AVPPL Letter resubmitting OSDCP to ICG
Annexure VI:	Compliance to Conditions of KCZMA Recommendation
Annexure VII:	Compliance of the Commitments made during Public Hearing
Annexure VIII:	Status of Environment Management Plan
Annexure IX:	Solid Waste Management Report (October 2024 to March 2025)
Annexure X:	EMP Expenditure
Annexure XI:	Environment Health, Safety & CSR Organizational Structure
Annexure XII:	MoEF&CC Letter granting One Year Extension to Validity of Existing EC
Annexure XIII:	Email Submission of HYCR for the Period April 2024 to September 2024

Annexure I

CTO from KSPCB for Phase I of Vizhinjam Port

FILE NO : KSPCB/TV/ICO/10076351/2024
Date of issue : 03-12-2024

KERALA STATE POLLUTION CONTROL BOARD

CONSENT TO

OPERATE/AUTHORISATION/REGISTRATION

ISSUED UNDER

The Water (Prevention & Control of Pollution) Act, 1974

The Air (Prevention & Control of Pollution) Act, 1981

and

The Environment (Protection) Act, 1986

As per Application No. : 10076351
Dated : 26-11-2024

To

Adani Vizhinjam Port Pvt. Ltd.
Adani Vizhinjam Port Pvt Ltd Mulloor Post, Vizhinjam

Consent No. : KSPCB/TV/ICO/10076351/2024
Valid Upto : 31-07-2029

1. GENERAL

1.1. This integrated consent is granted subject to the power of the Board to withdraw consent, review and make variation in or revoke all or any of the conditions as the Board deems fit

1	**VALIDITY**	31-07-2029
2	Name and Address of the establishment	Adani Vizhinjam Port Pvt. Ltd. Adani Vizhinjam Port Pvt Ltd Mulloor Post, Vizhinjam E-Mail : hebin.c@adani.com Contact Number : 9099056757
3	Occupier Details	Adani Vizhinjam Port Pvt Limited (AVPPL) 01, PORT OPERATION BUILDING, Mullur Road, Mullur, Thiruvananthapuram, Kerala, 695521 E-Mail : hebin.c@adani.com Contact Number :
4	Local Body	Vizhinjam
5	Survey Number	Block no 14 Survey no 270/11
6	Village	Vizhinjam
7	Taluk	Neyyattinkara
8	District	THIRUVANANTHAPURAM
9	Capital Investment(Rs in Lakhs)	159305.0
10	Scale	Large
11	Category	RED
12	Annual fee(Rs) Total Fee remitted(Rs)	1.1104E7 1.1104E7
13	Activity	Operation of Deep water multi purpose seaport and connected activities within the project premises.
14	Machinery details	DG sets: 83 KVA (Workshop building Stationary), 125 KVA (GIS Stationary), 35 KVA (Magazine House Stationary) and 15 KVA (Mobile)

2. CONDITIONS AS PER

The Water(Prevention and Control of Pollution)Act, 1974

2.1 Sewage Treatment Plant (STP) consisting of treatment units having adequate capacity shall be made functional/ arrangement for sewage treatment shall be provided, before commissioning of the establishment. Additional facilities required, if any, to achieve the standards laid down by the Board u/s 17(1)(g) of the Water Act shall also be made along with.

2.2 Water Consumption : 210 KLD

2.3 Effluent Generation : 100 KLD

2.4. The characteristics of effluent after treatment shall conform to the following tolerance limits:

SI.NO.	**parameter**	**Unit**	**Tolerance Limit**	
			For irrigation/soak pit	**Gardening/ flushing/ car washing**
1	pH	-	6.5-9	6.5 – 8.5
2	BOD	mg/l	<10	<3
3	COD	mg/l	<50	<25
4	TSS	mg/l	<10	<10
5	Ammoniacal Nitrogen	mg/l	<5	<5
6	Oil & grease	mg/l	<10	<1
7	Total Nitrogen	mg/l	<10	<10
8	Fecal Coliform	MPN/100 ml	<230	<230
9	Total Phosphorous	mg/l	<2	<2

2.5 Mode of disposal of treated effluent : Reuse for watering of horticulture/landscape developments in the port.

2.6 Time of Day meter installed for the effluent treatment and reuse system and shall be maintained properly.

2.7.There shall be easy access to each and every effluent treatment unit and the final outlet for inspection and drawing of effluent samples.

2.8. Water meter provided to record water consumption shall be maintained properly.

3. CONDITIONS AS PER

The Air(Prevention and Control of Pollution)Act, 1981

3.1 Adequate air pollution control measures shall be provided before commissioning of the industry. Additional facilities required, if any, to achieve the standards laid down by the Board shall also be made along with.

4. CONDITIONS AS PER

The Environment (Protection) Act, 1986.

4.1. All the waste generated in the premises shall be disposed off as per the relevant Rules under Environment(Protection) Act, 1986.

4.2 Solid Waste Management Rules, 2016 shall be followed for the management of solid wastes. Biodegradable waste shall be segregated from non biodegradable waste at source.Biodegradable waste shall be disposed through biobins/aerobins/biogas plant . Non biodegradable wastes shall be given to authorised collectors namely Haritha Karma Sena for the disposal of wastes.

4.3 Plastic Waste Management Rules, 2016 and amendments shall be followed for the management of plastic waste. Single use plastic ban as per notifications and orders for Kerala shall be strictly be followed.
4.4Hazardous waste generated if any, shall be disposed of in compliance with the provisions of the Hazardous and other Wastes (Management and Trans boundary Movement) Rules, 2016.
4.5 Waste batteries shall be disposed of as per the Battery Waste Management Rules,2022
4.6 E-waste shall be disposed off safely as per the E-Waste (Management) Rules, 2022 and amendments.
4.7 Conditions of Environmental Clearance shall be strictly followed.
4.8 Environmental statement shall be submitted in Form V for each financial year ending on March 31st.

5. ADDITIONAL CONDITIONS

5.1. This consent is granted subject to the power of the Board to review and make variations in all or any of the conditions as per section 21 of the Air (Prevention and Control of Pollution) Act 1981 and section 25 of the Water (Prevention and Control of pollution) Act 1974.
5.2. This consent, unless withdrawn earlier and subject to condition no. 5.1, shall be valid upto 31.07.2029. For continuing to operate beyond the validity date application for the renewal has to be submitted through online (website : keralapcbonline.com) before 31.05.2028.
5.3. The applicant shall comply with the instructions that the Board may issue from time to time regarding prevention and control of air, water and land pollution.
5.4. Any change or alteration of the unit shall be made only with the prior permission of the Board. Any change in the particulars furnished and/or in the identity of the occupier/authorised agent is to be intimated to the Board forthwith.
5.5. Signboard showing the name of the establishment shall be displayed at the entrance of the unit.
5.6. Sewage treatment plant shall be operational at all times and the discharge shall meet the standards stipulated.
5.7. No effluent shall be discharged outside the premises.
5.8. All wastewater treatment units including septic tank and soak pit shall be accessible and visible above ground level.
5.9. All operations likely to produce dust or noise shall be carried out within closed and insulated premises.
5.10. The sound level measured at 1 m outside the boundary of the unit shall not exceed the National Ambient Air Quality Standards for noise applicable to the adjoining area.
5.11. There shall not be any fugitive emission from the premises.
5.12. All biodegradable wastes generated from the unit shall be disposed through the biogas plant/composting facility of adequate capacity.
5.13. Non-biodegradable waste shall be segregated properly and transferred to local bodies or an authorized agency of the same as stipulated in the Solid Waste Management Rules, 2016.
5.14. Generator shall be TYPE APPROVED and noise measured at 1m outside the enclosure shall not exceed 75 dB(A).
5.15. This consent is issued subject to the information furnished in the affidavit and other documents submitted and is liable to be revoked if any information is found false or misleading on verification.
5.16. Provide minimum clear distance of 10 log Q metres (where Q is the discharge in cubic metres) from STP and Sq root (KVA/2) metres from DG set respectively to nearby residences/public buildings/water bodies. The DG set shall be acoustically enclosed and provided with a stack of minimum 0.2 x Square root (KVA) metres above roof level of enclosure or 2m above roof level of nearest building whichever is higher.
5.17 Proper Solid waste management system shall be provided in the unit, arrangements for collection, segregation, storage, handling and disposal of solid Waste including garbage shall be provided as per SWM Rules 2016 and the facility shall be maintained properly.
5.18 Pollution control measures provided in the unit to control air pollution, noise pollution and water pollution shall be maintained properly and made functional while the unit is in operation.

5.19 Hygienic condition and good housekeeping practices shall be maintained in and around the unit.

5.20 **Sewage Treatment Plant (STP) consisting of units having adequate capacity shall be made functional within 3 months**. Additional facilities required, if any, to achieve the standards laid down by the Board u/s 17(1)(g) of the Water Act shall also be made along with.

5.21 There shall be easy access to each and every treatment unit for inspection. Sufficient sampling points shall be provided to facilitate collection of samples. Lighting arrangements shall be provided in the sewage treatment plant area. Each and every sewage treatment unit shall be labeled.

5.22 **Until the commencement of operation of STP, sewage generated on the premises shall be transferred to the KWA CSTP at Muttathara and records shall be maintained.**

5.23 CAAQMS shall be installed along with display board in a location visible to public.

5.24 Oil spill Contingency plan shall be prepared and facilities shall be provided accordingly.

5.25 Capital Investment shown in 1.9 may be read as Rs 5552 crores .

5.26 **Outlet Location plan shall be submitted to the Board and shall get approved on completion of STP.**

SIGNATURE OF ISSUING AUTHORITY

CHAIRMAN

KERALA STATE POLLUTION CONTROL BOARD
KERALA

To

M/s Adani Vizhinjam Port Pvt. Ltd.
Adani Vizhinjam Port Pvt Ltd Mulloor Post, Vizhinjam
E-Mail : hebin.c@adani.com
Contact Number : 9099056757

1.This digitally signed document is legally valid as per the Information Technology Act 2000

2. For verifying this document please go to www.keralapcbonline.com and search using Certificate Number/name of the unit/Application Number in “Certificate Verification” link in the home page of the Board’s Phoenix website.

Annexure II

Shoreline Monitoring Report

(October 2024 to March 2025)

SHANKAR SURVEYS

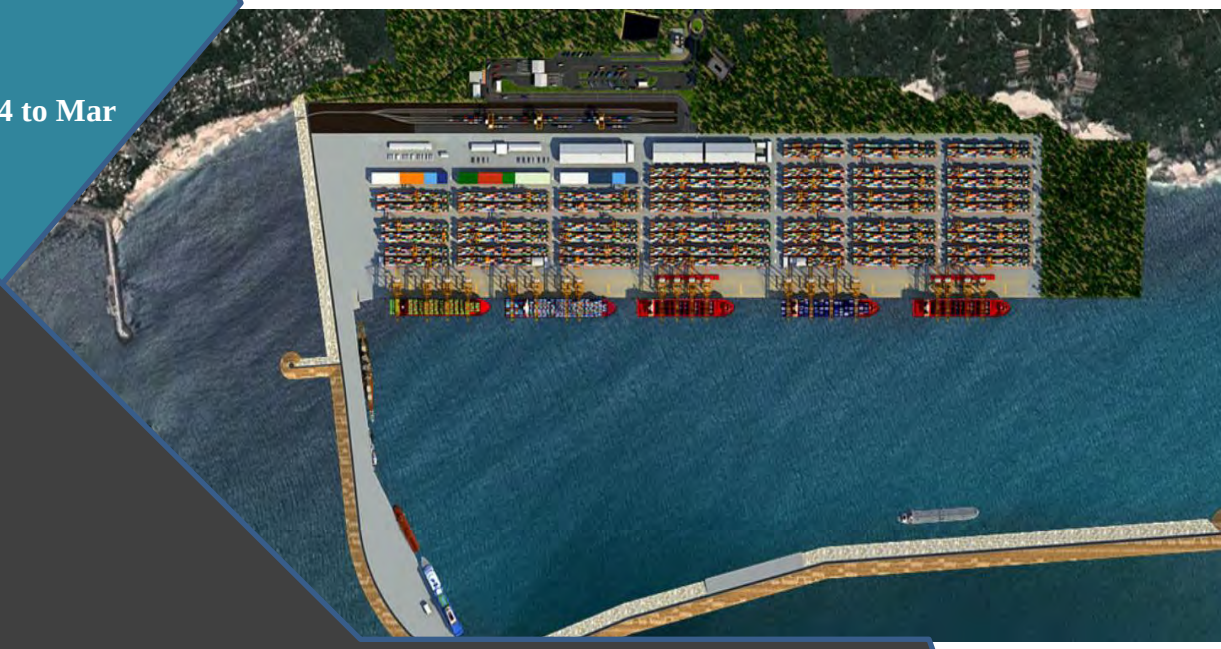
Adani Vizhinjam Port Pvt. Ltd.

OCEANOGRAPHIC AND BATHYMETRIC DATA COLLECTION FOR ASSESSMENT OF SHORELINE CHANGES

Shankar Surveys Pvt. Ltd.
115, Neco Chambers,
CBD Belapur,
Navi Mumbai – 400 614

Date: **20th May 2025**

SSPL Ref #
SSPL/P050-24/Oct 2024 to Mar 2025 Rev 1



HALF YEARLY REPORT

(OCTOBER 2024 TO MARCH 2025)

"APPROVAL SHEET"

Prepared by:	*Signed*	*Date*
V Mehta		*22/05/2025*

Approved by:	*Signed*	*Date*
S Philip		*23/05/2025*

REVISION CONTROL

Date	Rev	Section / Page No.	Remarks	Comment made by
24/04/2025	0		Submitted for approval	
23/05/2025	1	Sec 1, Pg 7	Amended website URL	NIOT
		Sec 2, Pg 8	Amended website URL	NIOT
		Sec 3.1, Pg 14	Amended coordinates in Table 3-3	NIOT
		Sec 6, Pg 33 & 34	Corrections made in Table 6-1 as suggested	AVPPL & NIOT
		Sec 6.2, Pg 39	Amended last paragraph as suggested	AVPPL & NIOT
		Sec 6.3, Pg 47	Text box deleted	NIOT
		Sec 6.5, Pg 56 and 57	Replaced 'post monsoon 2024' with 'reporting' in last sentence, Figure 6-14 amended	AVPPL
		Sec 6.7, Pg 58	Amendments made in the first paragraph as suggested	AVPPL
		Sec 6.10, Pg 68 -72	Time series graphs of TSS and turbidity amended as suggested	AVPPL
		Sec 6.12, Pg 87	3 cross section profiles north of the port and 3 cross sections on the south of the port added.	NIOT

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ABBREVIATIONS

ADCP	Acoustic Doppler Current Profiler
APHA	American Public Health Association Guidelines
CES	Coastal Erosion Stone
AVPPL	Adani Vizhinjam Port Pvt. Ltd.
BDL	Below Detectable Level
C.M.	Central Meridian
CD	Chart Datum
cm	Centimetre
COG	Course over ground
dd mm.mmm	Degrees minutes. Decimal minutes
DGPS	Differential Global Positioning System
DTM	Digital Terrain Model
EC	Environmental & CRZ Clearance
EIL	Engineer In Charge
EEZ	Exclusive Economic Zone
GoI	Government of India
GoK	Government of Kerala
GPS	Global Positioning System
HSE	Health, Safety & Environment
HWM	High Water Mark
IHO	International Hydrographic Organization
INCOIS	Indian National Centre for Ocean Information Services
IS 1498	Indian Standard for Classification and Identification of Soils for General Engineering Purposes
IS 3025	Indian Standard or Methods of Sampling and Test for Water and Waste water Part 1 - Sampling
kHz	Kilohertz
Km	Kilometre
kPa	Kilo Pascal
LAT	Lowest Astronomical Tide
Lat	Latitude
LEO	Littoral environmental observation
Long	Longitude
m	Metre
MBES	Multibeam Echo Sounder
Mg/L	Milligram per litre
MoEF	Ministry of Environment & Forests

MoU	Memorandum of Understanding
MSL	Mean Sea Level
MV	Motor Vessel
NA	Not Applicable
NABL	National Accreditation Board for Testing and Calibration Laboratories
NHO	Naval Hydrographic Organization
NIOT	National Institute of Ocean Technology
nm	Nautical mile
NTU	Nephelometric Turbidity Units
PEP	Project Execution Plan
PVD	Progressive vector diagram
PPP	Public Private Partnership
ppt	Parts per Thousand
RTK	Real Time Kinematics
SSPL	Shankar Surveys Private Limited
SBES	Single Beam Echo Sounder
SoI	Survey of India
SOG	Speed over ground
SOW	Scope of Work
TEU	Twenty Foot Equivalent Unit
UNCLOS	United Nations Convention on the Law of the Sea
UTM	Universal Transverse Mercator projection
VISL	Vizhinjam International Seaport Ltd.
w.d.	Water depth
WGS84	World Geodetic System 1984
WMO	World Meteorological Organisation

DEFINITIONS

Project Owner	Vizhinjam International Seaport Ltd (VISL), Thiruvananthapuram
Project Concessionaire	Adani Vizhinjam Port Pvt. Ltd. (AVPPL), Thiruvananthapuram
Advisor to VISL	National Institute of Ocean Technology (NIOT), Chennai
Survey Contractor	Shankar Surveys Private Limited (SSPL), Navi Mumbai
Survey Requirement	Oceanographic & Bathymetric Survey for Shoreline Monitoring
Chart Datum	Chart datum is the level to which soundings on published charts are reduced, and above which tidal predictions and tidal levels are given in the Tide Table. All depths on charts are referred to this datum.
Rip Current	A relatively strong, narrow current flowing outward from the beach through the surf zone
LEO	Littoral Environmental Observations
Wave Peak period (Tp)	The peak period gives the characteristic frequency of the arriving wave energy. This gives the period at which the spectrum has its highest value.
Significant Wave Height (Hs)	Significant wave height is the average peak-to-peak amplitude of the largest one third of the waves in a given field.
Wave direction	The direction **from which** the waves are coming. A westerly wave implies that the waves are moving from west to east.
Wind Speed	The speed at which the air moves with respect to the surface of earth. The speed is denoted in m/s
Wind Direction	Wind direction is an indicator of the direction that the wind is **blowing from**. A northerly wind is coming from the north and blowing towards the south
Atmospheric pressure	It is defined as the force per unit area exerted against a surface by the weight of the air above that surface. Atmospheric pressure is expressed in millibars (mb)
Relative Humidity	Relative humidity is defined as the ratio of the water vapor density (mass per unit volume) to the saturation water vapor density, usually expressed in percent

1 EXECUTIVE SUMMARY

The **Vizhinjam International Deepwater Multipurpose Seaport** is an ambitious project taken up by the Government of Kerala, (GoK). It is designed primarily to cater to container trans-shipment besides multi-purpose and break-bulk cargo. The port is being currently developed in a Public-Private Partnership (PPP) component on a design, build, finance, operate and transfer ("DBFOT") basis. The private partner, the Concessionaire - **M/s Adani Vizhinjam Port Private Limited** (**AVPPL**) had commenced construction on 5th December 2015.

Vizhinjam International Seaport Ltd (**VISL**) - a company fully owned by GoK is the implementing agency for the project, will be responsible for all obligations and responsibilities of GoK in respect of the Project and the Concession Agreement.

With its numerous natural advantages and potential, the port will contribute greatly to economic development and will be an asset in terms of infrastructure development in the country.

The project obtained Environmental & CRZ Clearance ("EC") from the Ministry of Environment & Forests (MoEF), Government of India (GoI) on 3rd January 2014, wherein it has been specified to carry out intense monitoring and regulatory reporting of the shoreline changes in the project area. Accordingly, VISL has entered into a memorandum of understanding (MoU) with the National Institute of Ocean Technology (NIOT), Chennai, under the Ministry of Earth Sciences (MoES), for a long-term shoreline monitoring programme including the seasonal bathymetry mapping.
① (Source: https://www.vizhinjamport.in)

Shankar Surveys Private Limited, hereinafter referred to as SSPL, based in Navi Mumbai, has been awarded the contract to carry out Shoreline Monitoring – Oceanographic & Bathymetric Data Collection in the vicinity of the proposed site for the development of the Vizhinjam International Deepwater Multipurpose Seaport.

This report provides the results of the data collected for the half yearly period from October 2024 to March 2025.

All the co-ordinates in the report are referenced to WGS-84, UTM Projection, CM 75° East, Zone 43, Northern Hemisphere.

2 INTRODUCTION

The project is being developed as a PPP project on a DBFOT basis in accordance with the terms and conditions set forth in the concession agreement signed between AVPPL and GoK/ VISL. The investment for land, external infrastructure (rail, water and power) and breakwater will be borne by the landlord (VISL/ GoK). The investments for other port infrastructure (dredging & reclamation, berths, terminals, superstructure & equipment) will be shared on PPP basis availing Viability Gap Funding (VGF). The PPP concessionaire, AVPPL has been given the right to operate the port for a specified concession period of 40 years. Traffic-linked stage-wise future development of the project with an ultimate berth length of 2000m is also envisaged.

The site is endowed with a natural depth of 23 to 25m (which is by far the best compared to other ports in the world) as close as 2 km from the coast. This will enable berthing of mother vessels of 18000 TEU and higher. Since the port site is located at the southern tip of India, barely 10 nautical miles from the international sea route (Suez – Far East route & Far East – Middle East route), it has the potential to become the future trans-shipment hub of the country.

① (Source: https://vizhinjamport.in/wp-content/uploads/2023/09/Feasibility-Report.pdf)

The study includes carrying out Met-Ocean observations (meteorological parameters and tide) at one location, bathymetric survey of up to 20m contour in two seasons, cross-shore profiling (CSP) from 10m CD (4 CSP lines carried out up to a depth of 20m during the months of January, May, August and October) to 100m inland from the high-water line along a stretch of 40 km, water & grab sampling, and littoral environmental observation. All these surveys and field data measurements are to be carried out for a period of 1 year commencing April 2024.

The Google Earth images, showing the Multibeam survey area, locations of the Automatic Tide Gauge (ATG), Wave Rider Buoy (WRB) and Automatic Weather Station (AWS) are given in Figure 2-1, Figure 2-2 and Figure 2-3.

Figure 2-1: Location of Multibeam survey area and WRB

Figure 2-2: Location of ATG

Figure 2-3: Location of AWS

The CSP lines, which coincide with the Littoral Environment Observation (LEO), beach sampling and photographic documentation, are indicated in Figure 2-4. The cross-shore profiles are named as CSP-01 to CSP-81. CSP-01 corresponds to the southernmost profile which lies to the south of the existing Vizhinjam Harbour and gradually increases progressing towards north for the entire 40 Km stretch (20 Km on either side of the port) with a 500m interval between each CSP line, CSP-81 being the northernmost profile.

Figure 2-4: CSP, LEO and Photographic Documentation Locations

3 SCOPE OF WORK

The survey scope of work as per the Contract includes the following:

- To mobilize a suitable marine spread including a survey boat at site for carrying out the survey operations.
- To provide requisite personnel and equipment for undertaking of oceanographic measurements and study of the shoreline.
- Monthly cross-shore beach profiling perpendicular to the shoreline for a 40 Km stretch at intervals of 500m; using RTK or total station landward up to 100m from HTL or +2m of HTL and using shallow draft boats, sled or any other suitable techniques, seaward down to 10m CD (4 CSP Lines carried out up to a depth of 20m in the months of January, May, August and October, i.e CSP 2, CSP 35, CSP 64 and CSP 74).
- Monthly monitoring of littoral zone (at the CSP locations) to observe the littoral transport direction and alongshore current speed by means of appropriate drogue observations and visual observations.
- Monthly photographic documentation of geomorphological changes (at the cross-shore beach profiling locations in four directions).
- Seasonal beach sediment sampling and analysis (at the CSP locations).
- Bathymetry survey twice in a year, i.e., just after the monsoon season and just prior to the commencement of the next monsoon to generate 0.5m contours (with bathymetric survey lines spaced at 25m interval) in areas with depths to 20m CD using multibeam echo sounder.
- Seabed sediment sampling and analysis in 80 sq. Km with one sample per sq Km; once in a year.
- Collection and analysis of water samples at specified periods (seasonal) for total suspended solids (TSS) and turbidity from four specified locations.
- Tide measurements using an automatic tide gauge close to the survey area to observe the tidal variations around the clock at 6-minute intervals or as specified to cover one full year. The tide gauge shall be connected to the nearest Survey of India Benchmark.
- Collection of wind speed & direction, atmospheric pressure, humidity, temperature at 1 location specified by the Client/ EIC (Engineer-in-Charge) by establishing an automatic weather station (AWS).
- Processing and documentation of monthly wave data provided by INCOIS.
- Processing and documentation of seasonal current data provided by INCOIS.

- Shoreline monitoring survey using RTK in GPS mode is to be carried out along the entire 40 Km stretch every month (commenced from November 2021 onwards).
- Sled survey to be carried out for the nearshore areas along 7 CSP transects (CSP-2, CSP-33, CSP-34, CSP-68, CSP-69, CSP-73 and CSP-74) every month using pressure sensor. This survey shall be carried out till the minimum depth which can be navigated by the offshore CSP survey boat.
- Analysis and processing of the data and submission of periodic reports.

3.1 Location Coordinates

The location co-ordinates of the tide station are provided below:

Table 3-1: Tide station location coordinates

Relocated Tide Station Co-ordinates WGS-84 Spheroid, Geodetic Coordinates			
Name	**Latitude**	**Longitude**	**Height above CD (m)**
Tide Station	08° 22' 17.50" N	76° 59' 39.69" E	3.687

The EMCON Automatic Weather Station (AWS) was installed on the terrace of the Port Control Office. The following table shows the coordinates of the AWS installation.

Table 3-2: Weather station location coordinates

Weather Station Co-ordinates WGS-84 Spheroid, Geodetic Coordinates			
Name	**Latitude**	**Longitude**	**Height above CD (m)**
Weather Station	08° 22' 0.94"N	77° 00' 14.45"E	19.180

Note: The wind sensor was installed at a height of 18.631m above MSL (19.18m above CD). As per the formula provided in the WMO manual, a reduction factor of 12% was worked out to derive the wind speeds at 10m above MSL as per WMO standards.

The Datawell DWR 4 Wave Rider Buoy (WRB) was deployed by INCOIS and AVPPL on 21st December 2023. The location co-ordinates of the Wave rider buoy are provided below:

Table 3-3: Wave rider buoy location coordinates

WRB Co-ordinates			
WGS-84 Spheroid, Geodetic Coordinates			
Name	**Latitude**	**Longitude**	**Water Depth (m)**
WRB	08° 19.656918' N	77° 1.078776' E	Approx. 25m

3.2 Beach and Water Sampling

A total of 81 beach samples were to be collected in each season, as part of the contract. The samples were to be analyzed for grain size distribution as per Wentworth classification.

In the monsoon 2024 period, 38 samples could be collected out of 81. The samples which could not be collected due to lack of beach were BS-11 to BS-14, BS-35, BS-35A, BS-38 to BS-40, BS-41, BS-47 to BS-52, BS-56 to BS-61, BS-63, BS-64, BS-65 to BS-68 and BS-70. Beach samples at CSP locations 1 to 9 and 23 to 30 could not be collected due to the protests from local people residing at those locations.

Table 3-4: Beach Sampling Locations

BEACH SAMPLING LOCATIONS		
WGS-84, Geodetic Coordinates		
Location	**Latitude**	**Longitude**
BS-1	8° 16.0265' N	77° 7.9532' E
BS-2	8° 16.1775' N	77° 7.7195' E
BS-3	8° 16.3348' N	77° 7.4987' E
BS-4	8° 16.4955' N	77° 7.2778' E
BS-5	8° 16.6565' N	77° 7.0579' E
BS-6	8° 16.8176' N	77° 6.8379' E
BS-7	8° 16.9782' N	77° 6.6187' E
BS-8	8° 17.1382' N	77° 6.3980' E
BS-9	8° 17.2984' N	77° 6.1765' E
BS-10	8° 17.4586' N	77° 5.9566' E
BS-11	8° 17.6207' N	77° 5.7379' E
BS-12	8° 17.7276' N	77° 5.5946' E
BS-13	8° 17.8899' N	77° 5.3756' E
BS-14	8° 18.0524' N	77° 5.1568' E

BEACH SAMPLING LOCATIONS		
WGS-84, Geodetic Coordinates		
BS-15	8° 18.2151' N	77° 04.9388' E
BS-16	8° 18.3603' N	77° 04.7165' E
BS-17	8° 18.5517' N	77° 04.5120' E
BS-18	8° 18.7213' N	77° 04.3003' E
BS-19	8° 18.8852' N	77° 04.0829' E
BS-20	8° 19.0488' N	77° 03.8659' E
BS-21	8° 19.2152' N	77° 03.6499' E
BS-22	8° 19.3848' N	77° 03.4369' E
BS-23	8° 19.5582' N	77° 03.2282' E
BS-24	8° 19.7318' N	77° 03.0196' E
BS-25	8° 19.9075' N	77° 02.8098' E
BS-26	8° 20.0796' N	77° 02.5989' E
BS-27	8° 20.2492' N	77° 02.3841' E
BS-28	8° 20.4130' N	77° 02.1703' E
BS-29	8° 20.5731' N	77° 01.9581' E
BS-30	8° 20.7305' N	77° 01.7499' E
BS-31	8° 20.8951' N	77° 01.5274' E
BS-32	8° 21.0493' N	77° 01.2973' E
BS-33	8° 21.1815' N	77° 01.0911' E
BS-34	8° 21.3210' N	77° 00.8491' E
BS-35	8° 21.3974' N	77° 00.6359' E
BS-36	8° 21.6830' N	77° 00.4829' E
BS-37	8° 21.8799' N	77° 00.2980' E
BS-38	8° 22.1369' N	77° 00.1947' E
BS-39	8° 22.3420' N	76° 59.9895' E
BS-40	8° 22.5417' N	76° 59.7689' E
BS-41	8° 22.8201' N	76° 59.0753' E
BS-42	8° 23.0287' N	76° 58.7934' E
BS-43	8° 23.1727' N	76° 58.6741' E
BS-44	8° 23.3709' N	76° 58.5145' E
BS-45	8° 23.7061' N	76° 58.3743' E
BS-46	8° 23.8974' N	76° 58.3798' E
BS-47	8° 24.1304' N	76° 58.2814' E
BS-48	8° 24.4789' N	76° 58.1346' E

BEACH SAMPLING LOCATIONS		
WGS-84, Geodetic Coordinates		
BS-49	8° 24.6320' N	76° 58.0289' E
BS-50	8° 24.8665' N	76° 57.8917' E
BS-51	8° 25.0976' N	76° 57.7474' E
BS-52	8° 25.3176' N	76° 57.5868' E
BS-53	8° 25.5653' N	76° 57.4562' E
BS-54	8° 25.7602' N	76° 57.2767' E
BS-55	8° 25.9643' N	76° 57.0963' E
BS-56	8° 26.1500' N	76° 56.9073' E
BS-57	8° 26.3461' N	76° 56.7308' E
BS-58	8° 26.5741' N	76° 56.5678' E
BS-59	8° 26.7782' N	76° 56.4051' E
BS-60	8° 26.9997' N	76° 56.2272' E
BS-61	8° 27.2030' N	76° 56.0492' E
BS-62	8° 27.4175' N	76° 55.8762' E
BS-63	8° 27.6142' N	76° 55.6937' E
BS-64	8° 27.8102' N	76° 55.5014' E
BS-65	8° 28.0132' N	76° 55.3255' E
BS-66	8° 28.2159' N	76° 55.1437' E
BS-67	8° 28.4224' N	76° 54.9642' E
BS-68	8° 28.6228' N	76° 54.7840' E
BS-69	8° 28.8276' N	76° 54.6048' E
BS-70	8° 29.0316' N	76° 54.4243' E
BS-71	8° 29.1104' N	76° 54.3586' E
BS-72	8° 29.3118' N	76° 54.1755' E
BS-73	8° 29.5150' N	76° 53.9964' E
BS-74	8° 29.7202' N	76° 53.8181' E
BS-75	8° 29.9258' N	76° 53.6393' E
BS-76	8° 30.1345' N	76° 53.4652' E
BS-77	8° 30.3450' N	76° 53.2940' E
BS-78	8° 30.5558' N	76° 53.1226' E
BS-79	8° 30.7701' N	76° 52.9558' E
BS-80	8° 30.9840' N	76° 52.7867' E
BS-81	8° 31.1988' N	76° 52.6188' E

The water samples (132 from four locations) were collected and analysed for TSS as per IS 3025, Part 17:1984 (reaffirmed 2012); Turbidity was analysed as per IS 3025, Part 10:1984 (reaffirmed 2012) technical specifications. The salinity was analysed as per American Public Health Association (APHA) guidelines.

This report provides the results of water samples collected for the post-monsoon 2024 period.

The location co-ordinates of water sampling locations are provided below:

Table 3-5: Water Sampling Locations

WATER SAMPLING LOCATIONS WGS-84, Geodetic Coordinates			
Location	**Water Depth (m)**	**Latitude**	**Longitude**
L1 (Mulloor)	21.1	08° 21.923’ N	76° 58.860' E
L2 (Proposed Dredge dumping)	23.2	08° 21.705’ N	76° 59.565’ E
L3 (Pachalloor)	27.4	08° 24.143' N	76° 56.268' E
L4 (Poovar)	23.0	08° 17.597’ N	77° 04.058’ E

4 SURVEY CONTROL

4.1 Geodesy

The survey operations were conducted in the WGS 84 Spheroid, Universal Transverse Mercator Projection based on the geodetic parameters presented below. All co-ordinates quoted within this document are with reference to it.

Table 4-1: Geodetic Parameters

GEODETIC PARAMETERS	
Satellite Datum	
Spheroid	WGS-84
Datum	WGS 84
Semi-Major Axis	6378137.000m
Semi Minor Axis	6356752.314m
Inverse Flattening	298.2572
Projection Parameters	
Grid Projection	Universal Transverse Mercator
Latitude of Origin of Projection	0° (Equator)
Longitude of Origin of Projection	75° E, Zone 43
Hemisphere	North
False Easting (metres)	500000
False Northing (metres)	0
Scale Factor on CM	0.9996
Units	Metres

4.2 Survey Vessel

The survey boats Bismi and CKF were utilized for the survey operations:

Figure 4-1: Multibeam Survey Boat “Bismi”

Figure 4-2: Multibeam Survey Boat CKF

4.3 Personnel

The following survey personnel from SSPL / AVPPL were assigned to the project in the capacities listed in the table below during the period.

Table 4-2: Personnel

Shankar Surveys Pvt. Ltd.		
Name	**Designation**	**Period**
Sharon Philip	Project Manager (Navi Mumbai office)	Duration of Project
Akash K. Joshilal	Operations Manager	Duration of Project
Sachu S.	Party Chief / Hydrographic Surveyor	1st October 2024 – 13th December 2024
Vishnu K.	Party Chief / Hydrographic Surveyor	7th December 2024 – 31st March 2025
Abhiram J	Land Surveyor	Duration of Project
Ajeesh A.S.	Assistant Surveyor	Duration of Project
Amal Deva	Assistant Engineer	1st October – 28th December 2024
Thouheed S N	Assistant Surveyor	1st October 2024 – 31st March 2025
Sanjeevanee Khaire	Data Processor (Navi Mumbai office)	Duration of Project
Vishtasp Mehta	Reporting Geophysicist (Navi Mumbai office)	Duration of Project
Adani Vizhinjam Port Pvt. Ltd.		
Name	**Designation**	**Period**
Hebin C	Senior Manager - Environment	Duration of Project
Jesse Fullonton	Assistant Manager - Environment	Duration of Project

5 SURVEY EQUIPMENT DETAILS

5.1 Automatic Tide Gauge

The Valeport TideMaster Automatic Tide Gauge (ATG) was installed at berth area, inside the Vizhinjam Adani Seaport for measuring the tides. The tide gauge is a pressure-sensor based instrument, measuring the water level due to change in pressure on the surface of sensor. The sensor was installed in such a way that the zero of sensor is always in water, irrespective of the phases of tide. This was levelled to the local benchmark, situated on top of the jetty. The tide station was programmed to measure the tide at 6-minute intervals throughout the duration of the project.

A photograph of the tide gauge location is shown below.

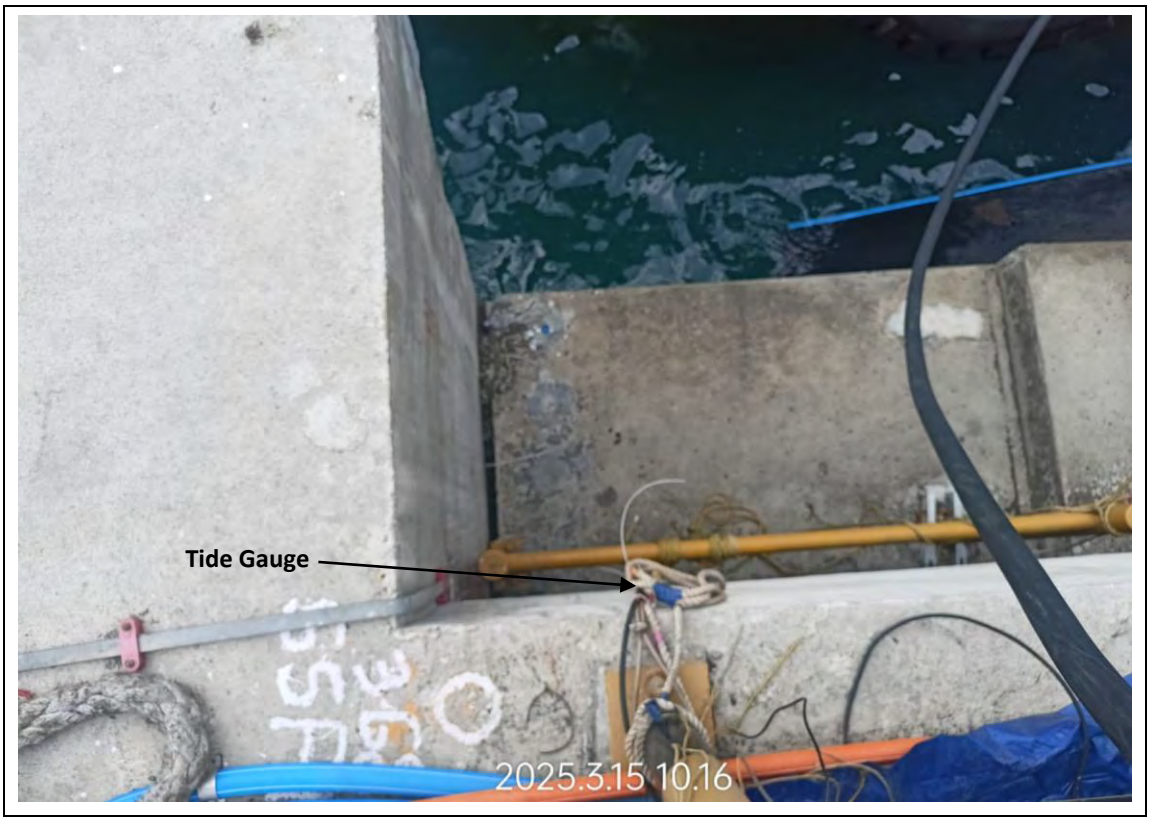


Figure 5-1: Automatic Tide Gauge

5.2 Wave Rider Buoy (WRB)

The Datawell DWR4 Wave Rider Buoy was deployed by INCOIS and AVPPL. The WRB was programmed to measure all the wave parameters at half-hourly intervals. The data is collected by INCOIS and sent to SSPL after quality check.

The system has an accuracy of 1 cm + 0.5% of vertical motion; resolution of 1mm and range of ± 20 m at the sampling rate of 5.12 Hz. The directional accuracy and resolution are 0.1° within the range of 0° to 360°.

Figure 5-2: WRB deployed at site

5.3 Automatic Weather Station (AWS)

An EMCON Automatic Weather Station (AWS) was installed on top of the Port Control Office building. Since this building was being converted into an Immigration Check Post, the system was shifted to the Sub-station building on 3rd July 2024. The system measures wind speed/direction, atmospheric pressure, temperature, relative humidity and rainfall.

The system consists of the following:

- Cup anemometer
- Relative humidity & temperature sensor
- Pressure sensor
- Rainfall Gauge
- Datalogger

The data is logged in a datalogger installed at the receiving station at intervals of 10 minutes. The data is also transmitted from the data logger to a cloud-based server for further processing and QC checks.

Some images of the automatic weather station are provided below:

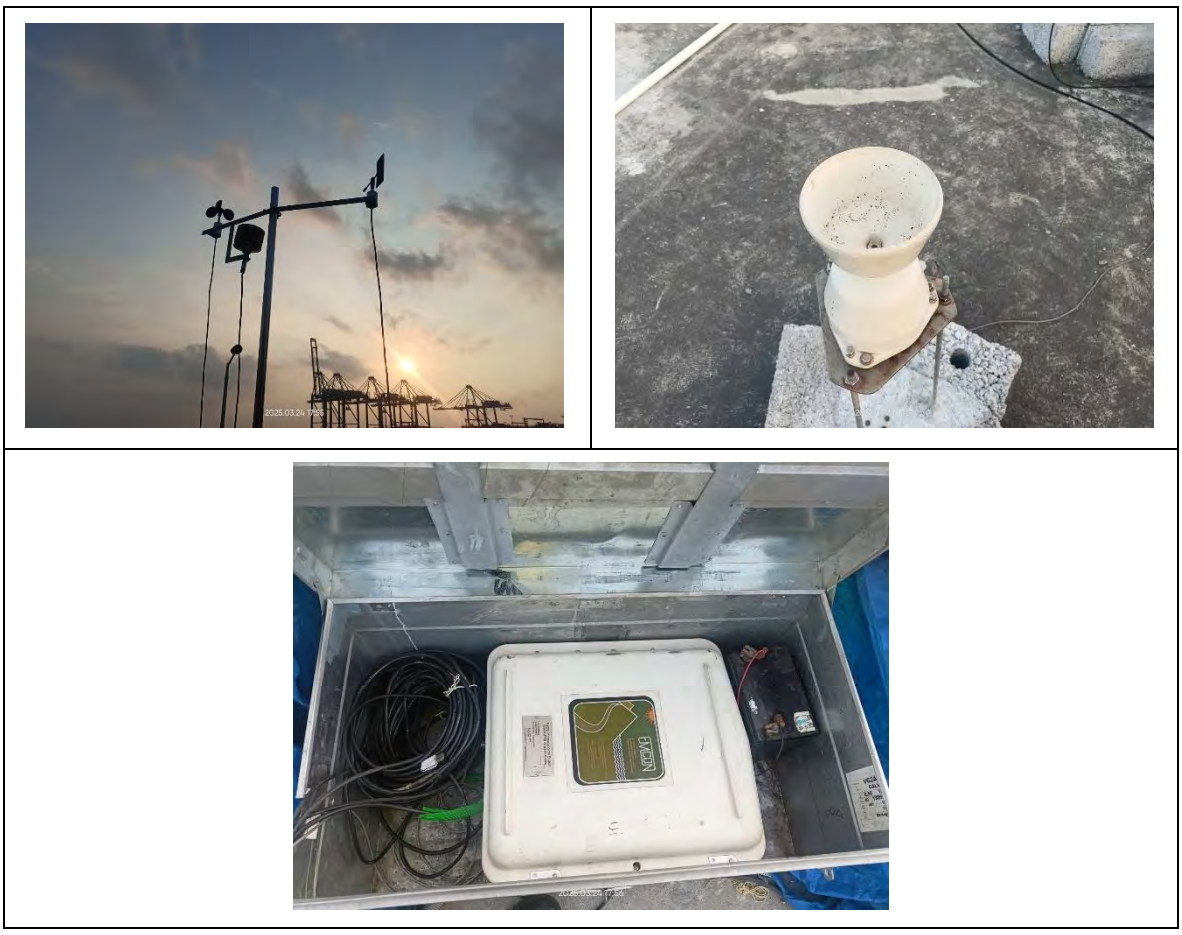


Figure 5-3: AWS on top of Sub-station building

5.4 Real Time Kinematic (RTK) Survey

An RTK system was mobilized at site to carry out cross-shore profiling on the landward side. The system used was a Geomax Zenith 35 Pro RTK system with base station and rover. A photograph of the system is provided below:

Figure 5-4: RTK System (base station)

5.5 DGPS Positioning System

Vessel positioning was carried out by the Trimble SPS 461 dual antenna DGPS system which also provided vessel heading. Vessel track and offset positions were recorded digitally in the navigation software. The positioning system was interfaced to the navigation software as well as the digital data acquisition system. DGPS positioning accuracy of the moving vessel was better than ±1m.

The computed position of the vessel from the DGPS receiver was interfaced to the navigation computer system. Hypack navigation and data acquisition software was used to provide track guidance information to the survey crew and also output the position of the vessel to assist the helmsman in maintaining the selected track guidance line. The VDU displays the selected survey line, the position of the vessel in relation to that line

and numerical data to assist the helmsman such as the along-line and off-line distances, vessel speed and course made good, gyro heading, distance and bearing to end of line and water depth. The position of each fix, together with other information such as fix numbers, depths, PDOP and along-line distances were logged to the hard drive.

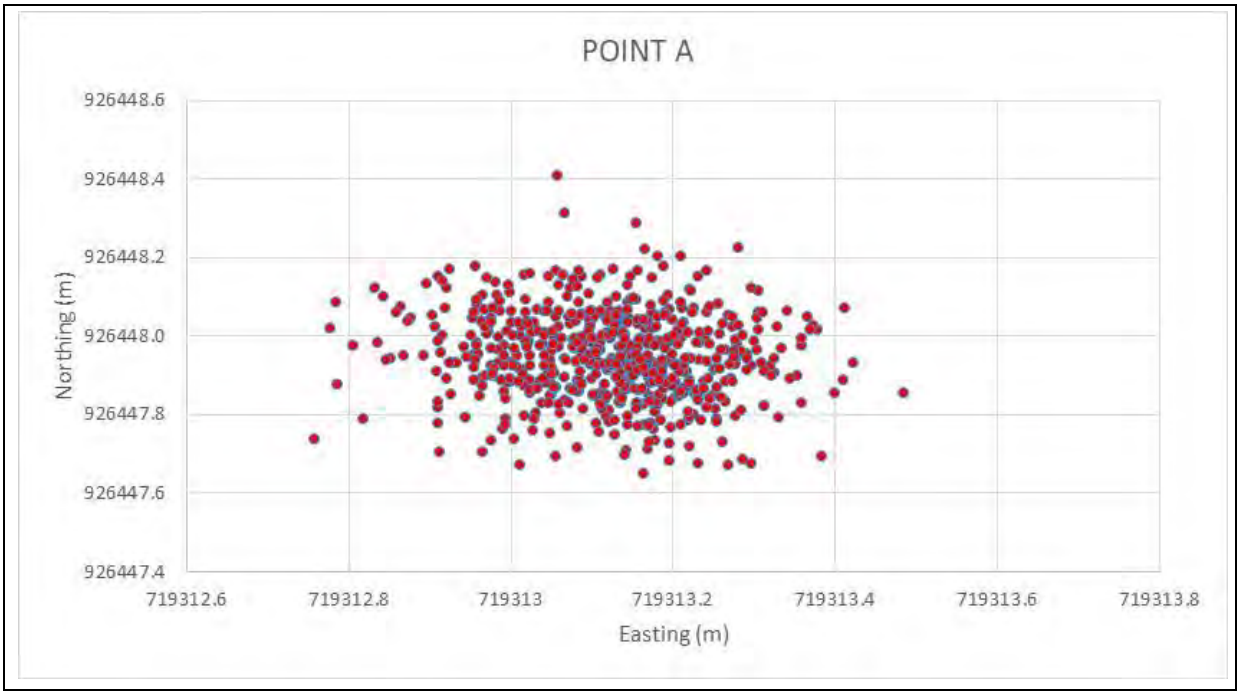
5.5.1 DGPS Consistency Check

In order to determine the integrity and reliability of the positioning system, the system was checked for its consistency during mobilization.

After installing the Trimble DGPS positioning system on board the vessel, two points were marked on the jetty. The DGPS antenna was set up on the jetty at these two points, designated as Point A and Point B.

Time was synchronized between Trimble, Hypack and the observer's watch, for which local time (GMT+5:30) was used. The Trimble SPS 461 DGPS antenna positions were logged in the Hypack navigation software. The logged data was processed to derive the final positions of both the points.

The difference between the calculated distance and measured distance was found to be within the permissible accuracy. The scatter plot of the DGPS calibration carried out for the month of January 2025 is shown in the figure below.



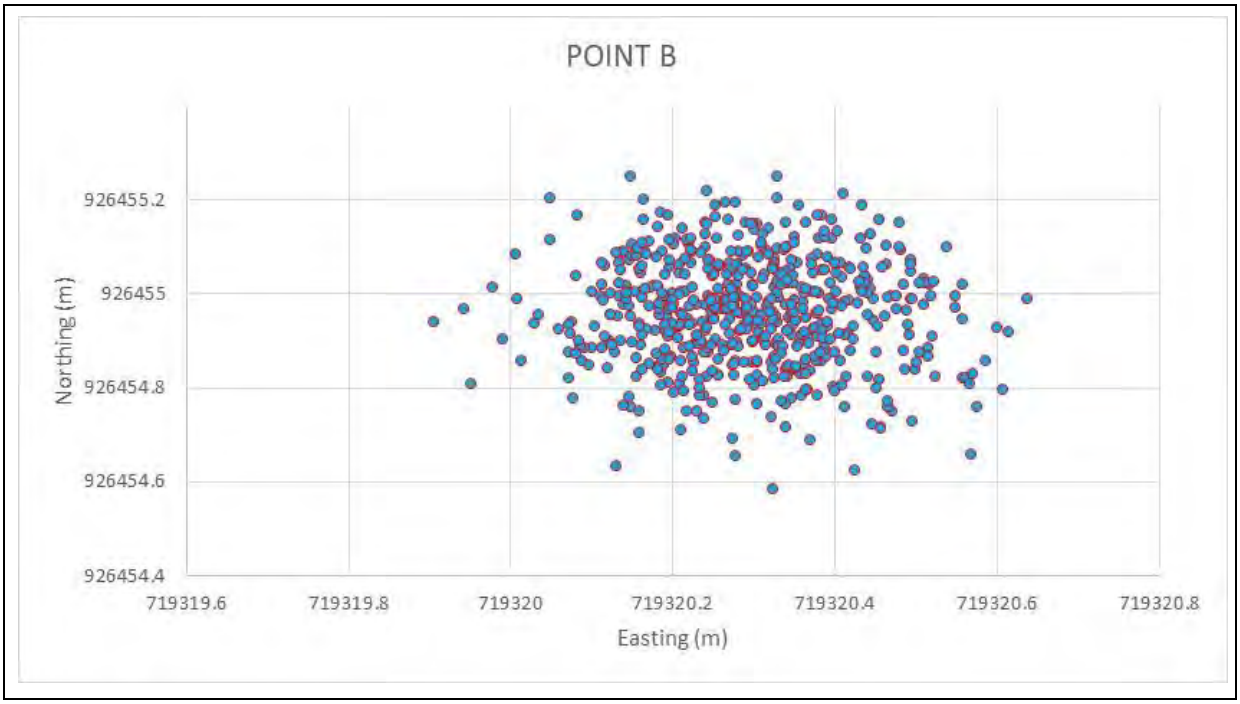


Figure 5-5: Scatter plot of DGPS calibration on board multibeam survey boat CKF

Table 5-1: DGPS Calibration results

Average Positions		
Point	**Easting**	**Northing**
A	719313.12	926447.95
B	719320.30	926454.94
Distance between points		10.03m
Measured Distance		10.00m
Difference		0.03m

5.5.2 Gyrocompass Calibration

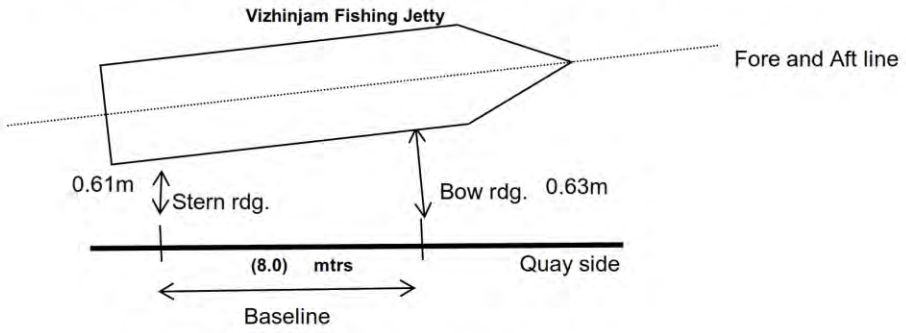
The calculated heading of the vessel was compared with the recorded gyrocompass heading to derive a calculated-observed (C-O) value. A final C-O of -0.10° was obtained, which was entered into the navigation software before commencing the survey. The Gyrocompass verification table for the month of January 2025 is placed below.

GYRO CALIBRATION
(Quay / Tape Offset Method)

Job	**AVPPL Shoreline Monitoring**	**Job No**	**P050-24**
Client	**AVPPL**	**Vessel**	**CKF**
Location	**Vizhinjam Fishing Jetty**	**Date**	**11-Jan-25**
Gyro S/N	**12172**		

Quay heading(T)	**Baseline length(m)**	**Gyro Name : TRIMBLE GA 830**	**Quayside on:**
45.64	**8.00**	**S/No. 12172**	**Starboard**

Observations				**Calculations**			
Time	Gyro (true)	Bow	Stern	Calc. angle	Calculated Heading	True Quay Hdg	**C-O**
10:15:00	45.7	0.4	0.7	2.15	43.55	45.64	2.09
10:15:10	45.6	0.4	0.5	0.72	44.88	45.64	0.76
10:15:20	45.7	0.6	0.7	0.72	44.98	45.64	0.66
10:15:30	45.6	0.9	0.4	-3.58	49.18	45.64	-3.54
10:15:40	45.7	0.6	0.7	0.72	44.98	45.64	0.66
10:15:50	45.5	0.7	0.5	-1.43	46.93	45.64	-1.29
10:16:00	45.7	0.8	0.8	0.00	45.70	45.64	-0.06
	45.64	**0.63**	**0.61**	**-0.10**	**45.74**	**45.64**	**-0.10**



Note: Drawing not on scale only for representaion purpose

Signed			
Designation	**Name**	**Signature**	**Date**
Surveyor	**Ajeesh A S**		**11-Jan-25**
Party Chief	**Vishnu K**		**11-Jan-25**

Figure 5-6: Gyrocompass Calibration on board multibeam survey boat CKF

5.6 Multibeam Echo Sounder System

A GeoAcoustics Geoswath 4 multibeam echo sounder, operating at a frequency of 250 kHz, is used to delineate the topography of the seabed. The measured sound velocity and observed tide are fed into the system during data processing.

5.6.1 Multibeam Swath Calibration

The calibration (or patch test) was used to fix the time and angle offsets between the various positioning systems and the transducer head. This was done after mobilization.

The system offsets were entered in the acquisition software prior to surveying and raw data acquisition. Some of these were easily measured and entered and others were corrected through the calibration procedure. The details of the patch test carried out for the month of April 2024 are provided below.

Offsets:

The directly measured system offsets are:

- Transducer sensor offsets measured as the distance from the COG to the transducer point (X= -2.20m, Y= 2.70m, Z = -1.42m from water line for CKF).
- Antenna offsets measured as the distance from the COG to the antenna (X= -4.885m, Y= 0.420m and Z = 5.640m from transducer).
- Heave offset measured as the vertical distance from the centre of the transducer to the water surface (X= 0.150m Y= 0.00m, Z= 3.790m for CKF).
- Time offset (latency) introduced by DGPS computer/ navigation computers or during the serial data transfers.

A DMS-05 MRU provided compensation for vessel heave, roll, pitch and yaw. The sound velocity profiles and tide readings were used to get an accurate calibration form the patch test.

The recommended order of calibration is:

- Calibrate for Latency
- Calibrate for Roll
- Calibrate for Pitch
- Calibrate for Yaw

This is called the LRPY sequence. The figure below shows the sensor offsets for the survey vessel CKF in the proprietary GS+ software.

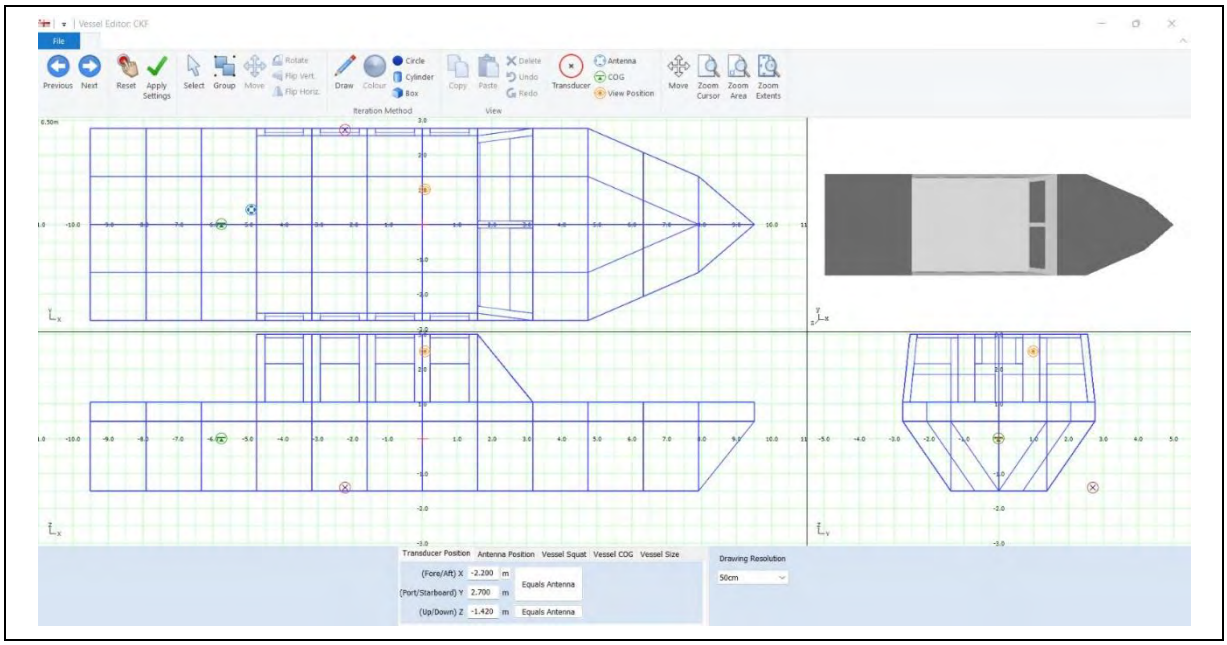


Figure 5-7: Multibeam sensor offsets of MBES survey boat CKF

Roll Calibration:

- Three survey lines, were run in opposite directions at 4 knots over flat topography approximately 600m long with 100% overlap before the start of the survey.
- The sound velocity profile was carried out before running the calibration lines.
- Observed ATG tide at berth area at Vizhinjam Port was applied with respect to Chart Datum correction to the calibration files.

Pitch Bias and Navigation Delay Calibration:

- Unlike the roll offset, these offsets will not cause false depth values, but will assign the measured depth values to wrong positions. Both calibrations are dependent on each other and have to be separated by calculating the offsets in a fixed order.
- Three lines were run in opposite directions for pitch and two lines were run in the same direction at different speeds, over a distinct object or a steep slope perpendicular to the contours.

Yaw Calibration:

Three lines were run in opposite directions for yaw correction on either side of a conspicuous object. This is often the same object that is used calculate the residual pitch bias and navigation time delay.

- The lines length was approximately 600m since the seabed feature exhibited a good slope in the area.

- The lines were run at normal survey speed, approximately 4 knots, to obtain a "suitably high resolution".

The Table below shows the calibration values which were obtained and used for data processing.

Table 5-2: MBES Calibration results

Parameter	Value	Comments
Latency	0.00s	Trimble SPS 461 positioning system
Roll	-0.60°	DMS accuracy 0.05° in roll
Pitch	0.00º	DMS accuracy 0.05° in pitch
Yaw	--4.40º	Accuracy better than 0.2°

6 SURVEY RESULTS

① The following table illustrates the data collection parameters along with duration and frequency of measurement.

Table 6-1: Summary table of data collection parameters

Parameter	Duration of Measurement			Frequency of Measurement
Tide	1st October 2024 to 22nd March 2025			6 minutes
Wave height and direction	1st October 2024 to 31st March 2025			10 minutes
Wind speed and direction				10 minutes
Current speed and direction				10 minutes
Temperature				10 minutes
Atmospheric Pressure				10 minutes
Relative Humidity				10 minutes
	Locations Surveyed			**Remarks**
Littoral Environment Observations	Oct 2024: 64 out of 81 Nov 2024: 64 out of 81 Dec 2024: 64 out of 81 Jan 2025: 64 out of 81 Feb 2025: 64 out of 81 Mar 2025: 64 out of 81			CSP-1 to CSP-9 and CSP-23 to CSP-30 could not be approached due to protests from locals
Photographic Documentation	Oct 2024: 64 out of 81 Nov 2024: 64 out of 81 Dec 2024: 64 out of 81 Jan 2025: 64 out of 81 Feb 2025:64 out of 81 Mar 2025: 64 out of 81			
Cross Shore Profiles	**Month**	**Onshore**	**Offshore**	CSP -1 to CSP-9 and CSP-23 to CSP-30 could not be approached due to protests from locals. Offshore profiles could not be attempted due to rough weather
	Oct 2024	64 of 81	0 of 81	
	Nov 2024	63 of 81	64 of 81	
	Dec 2024	63 of 81	78 of 81	
	Jan 2025	64 of 81	76 of 81	
	Feb 2025	64 of 81	0 of 81	
	Mar 2025	64 of 81	76 of 81	
Near Shore Survey	17 out of 42			Near-shore surveys could not be undertaken at certain locations in the

		months of November and December 2024 due to rough weather
Shoreline monitoring Survey	81.4%	CSP-1 to 9 and CSP-23 to 30 could not be approached due to protests from the locals
Collection of beach samples	38 out of 81 (Monsoon 2024) 48 out of 81 (Post-monsoon 2024)	BS-01 to BS-09 and BS-23 to BS-30 could not be collected due to protest from locals. Others could not be collected due to lack of beach. The samples were collected in the months of August 2024 and January 2025
Collection of water samples	0 out 132 samples (monsoon 2024) 132 out of 132 (pre-monsoon 2024 season)	The water sampling activity for the monsoon 2024 period was not carried out due to rough sea conditions The samples were collected in the months of December 2024 and January 2025
Bathymetry	Post-monsoon 2024	1300 / 1300 line km

6.1 Tidal Measurements

The tides were observed near the newly constructed berth inside the breakwater. The tide is referenced to the chart datum. The latest updated image of the jetty top value marked on the wharf to which the tide gauge has been levelled is provided below.

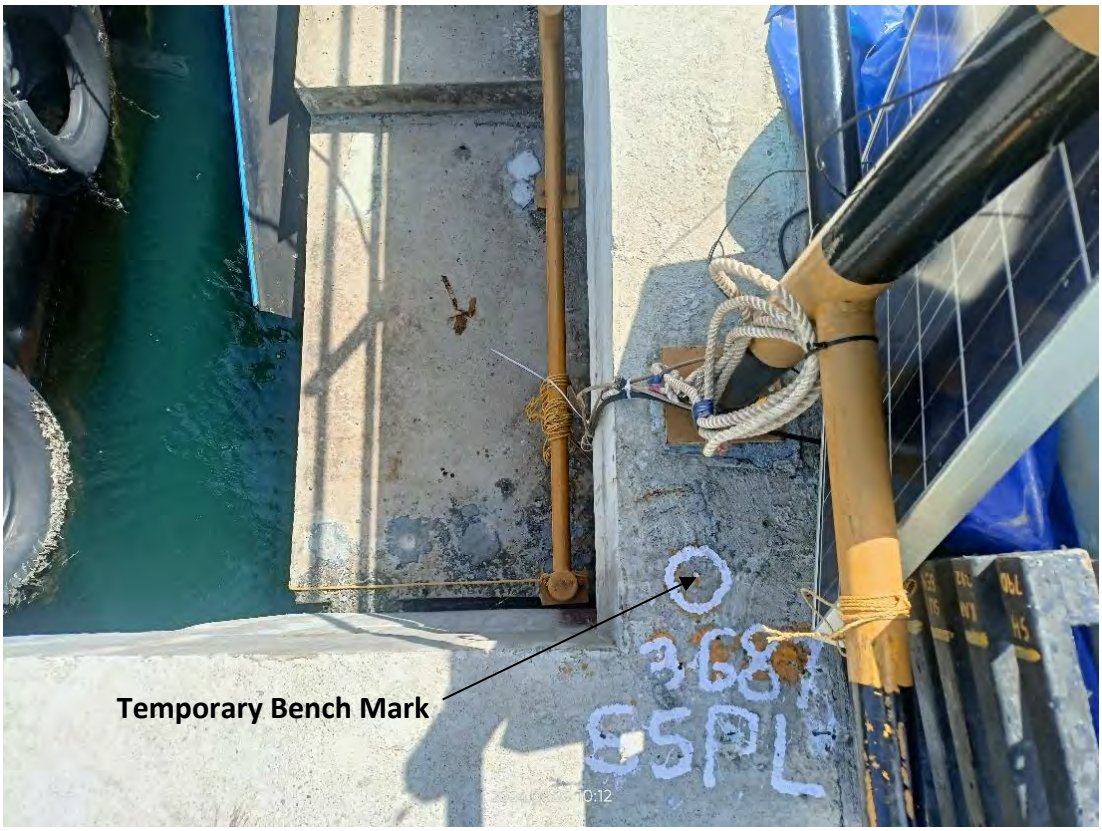


Figure 6-1: Location of TBM

The offset calculation of the Tidemaster tide gauge based on the 'jetty top' value is given in the figure below:

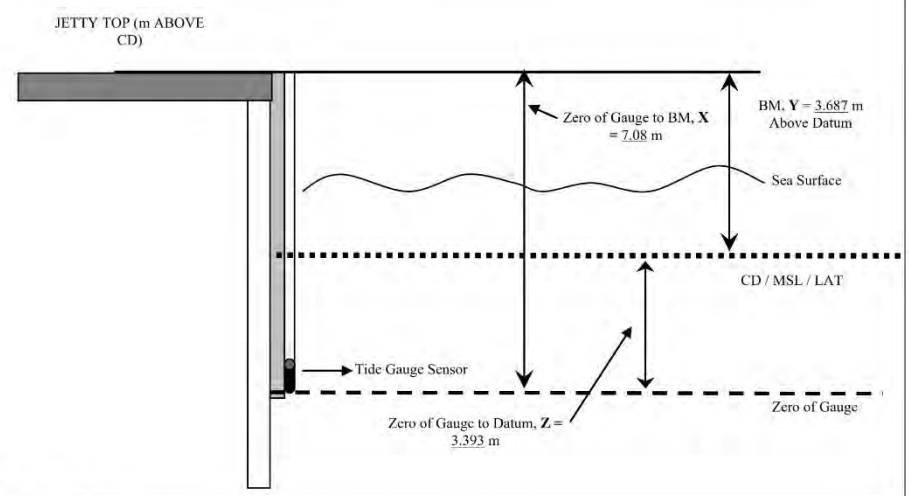
SHANKAR SURVEYS

OP 21
ATG Installation Schematic

Job Number	P050-24	**Project**	AVPPL Shoreline Monitoring
Client	AVPPL		
Location	Vizhinjam	**Installation Date**	03/02/2025
Tide Gauge Sr. No.	84143	**Party Chief**	Vishnu K

Tide Gauge setup refers to: ✓ **CD** | **MSL** | **LAT**

Diagram



Bench Mark details:

Value of Bench Mark	**3.687 Meters above Chart Datum**
Levelled By	**Abhiram J.**
Date	**19/07/2024**

Checked the level from zero of the gauge to TBM on: 03/02/2025

Calculations:

X, Length from Bench Mark to Zero of Tide Gauge	**7.080 m**
Y, Level of Bench Mark above Datum	**3.687 m**
Z, Tide Correction factor, Z=X - Y	**3.393 m**
Tide height in m above Datum = Raw Tide reading - Z	

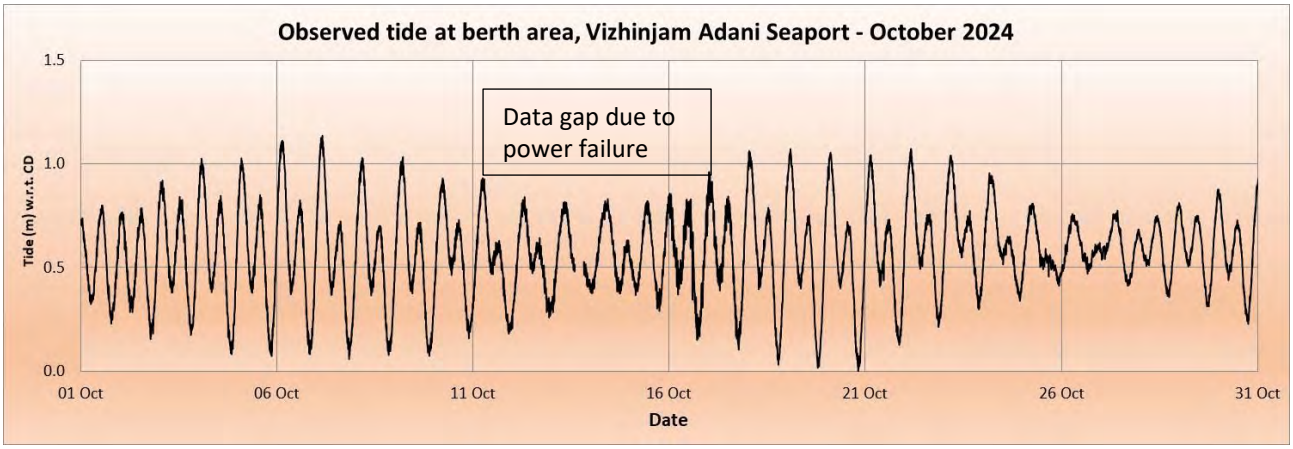
Signature:

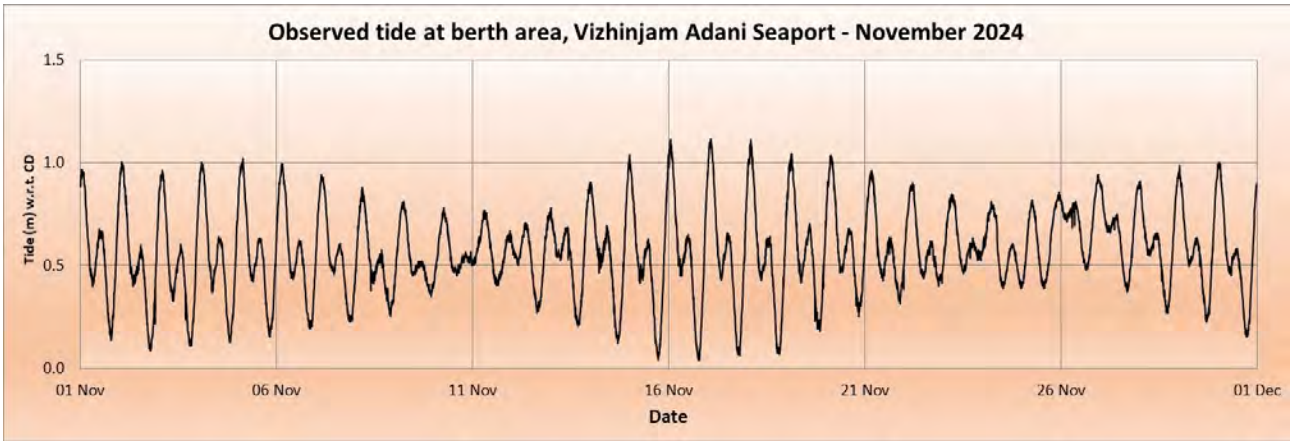
Party Chief	**Vishnu K**
Surveyor / Engineer	**Ajeesh Anilkumar**

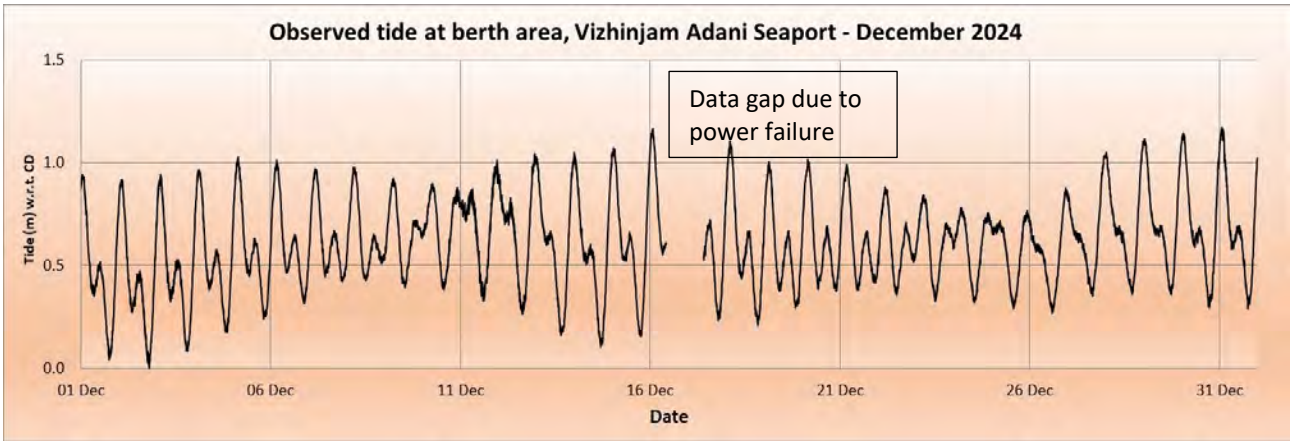
OP 21 Page: 1 of 1 Rev. No. 0: Date: 29 July 2024

Figure 6-2: Schematic Diagram of Valeport Tidemaster Tide Gauge

The tides observed are mixed semi-diurnal in nature, with the maximum range being observed in the springs. The representation of tide data collected, in the form of graphs is placed below.







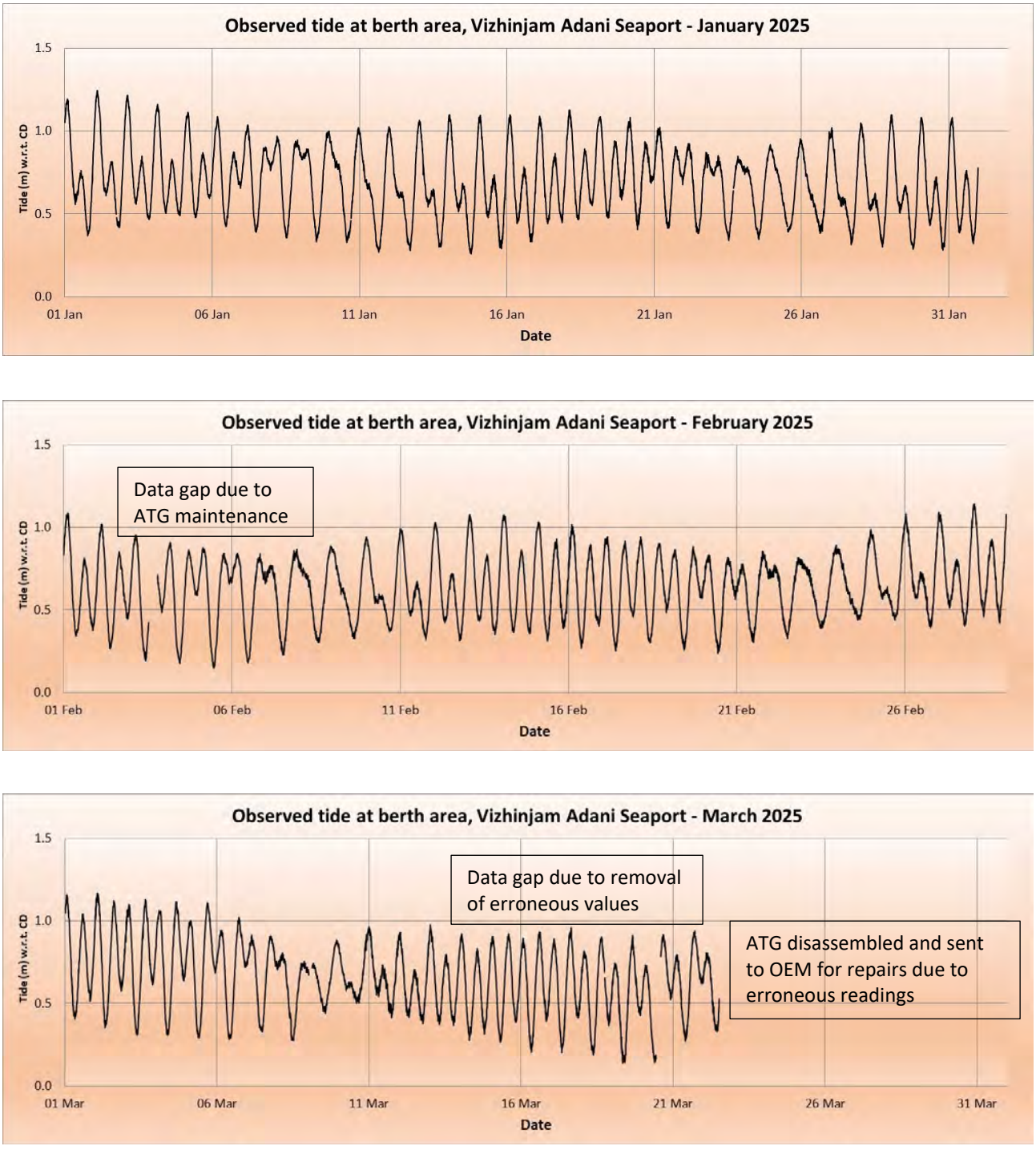


Figure 6-3: Time series of tide

6.2 Wave Measurements

The data from the WRB (provided by INCOIS after processing and quality control) was used to produce the time series and rose diagram, which are provided below:

Refer to the following rose plots of significant height (Hs) v/s direction for the entire period from October 2024 to March 2025.

① The WRB drifted away on 24th August 2024. It was redeployed on 8th October 2024, therefore, no wave data is available from 1st to 8th October 2024 during the reporting period.

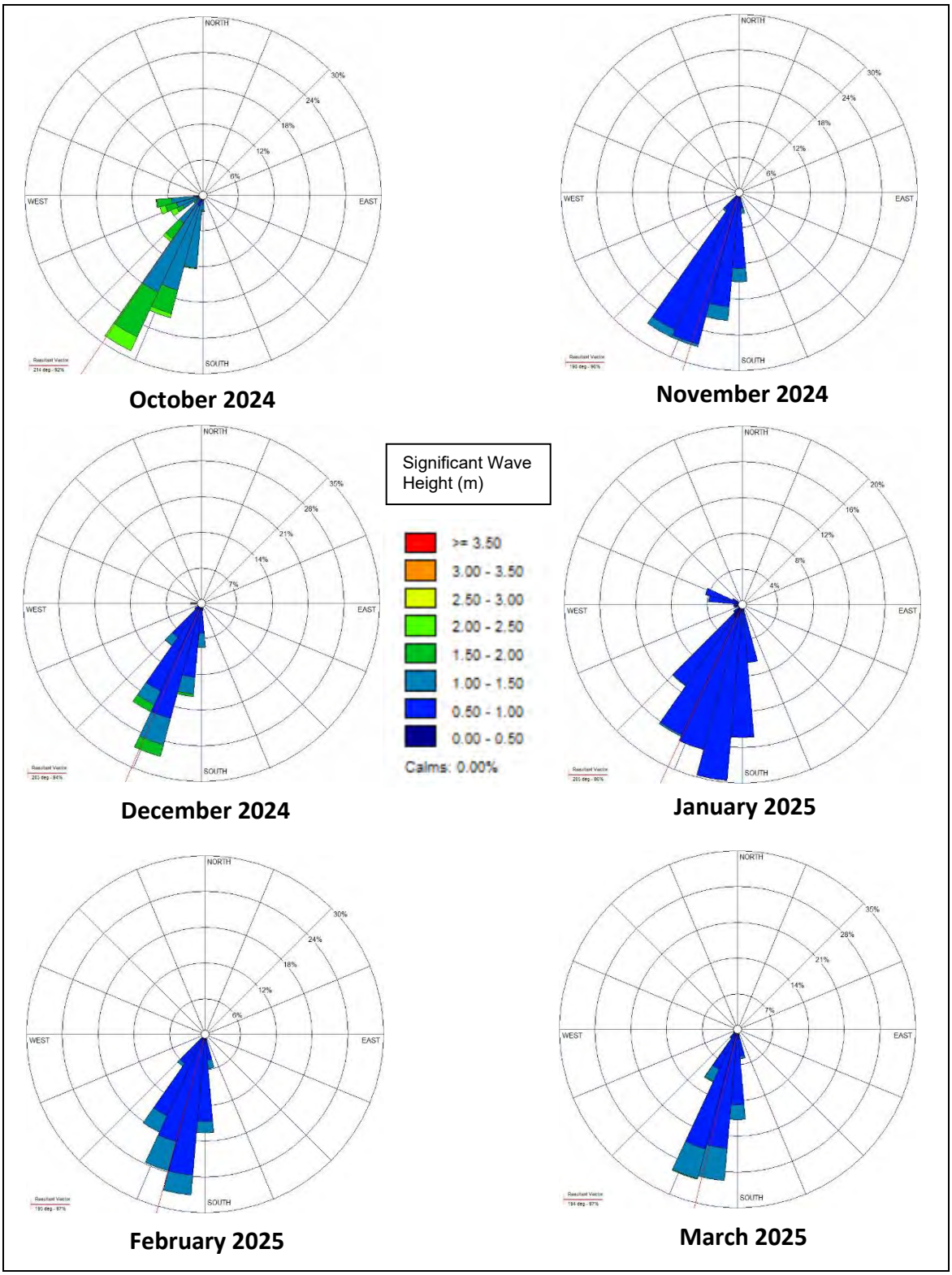


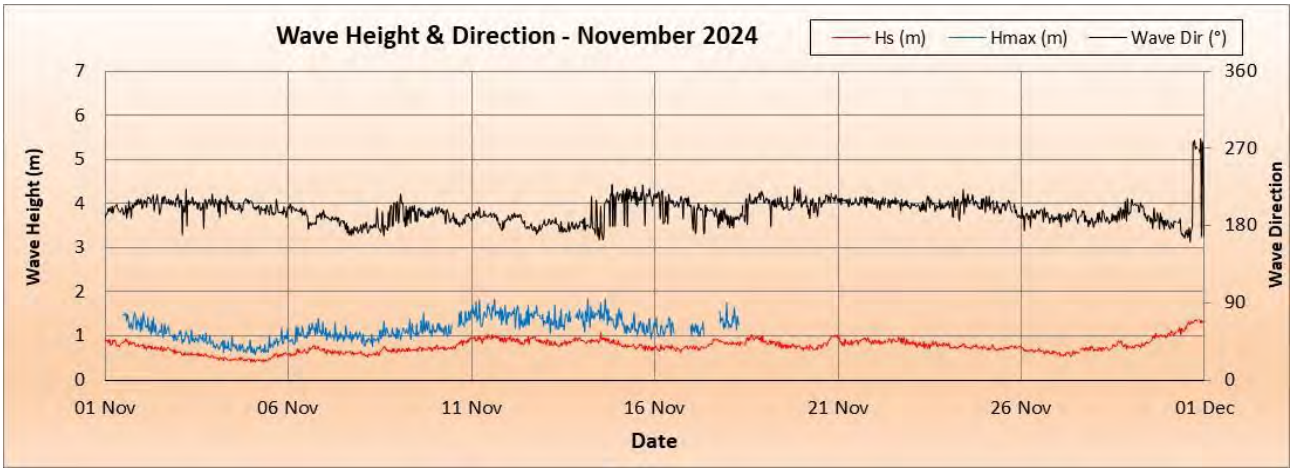
Figure 6-4: Wave Rose (Hs in metre v/s Direction)

The following table provides the monthly maximum significant wave height (Hs), wave period (Tp) and Zero upcross period (Tz) observed during the period from October 2024 to March 2025.

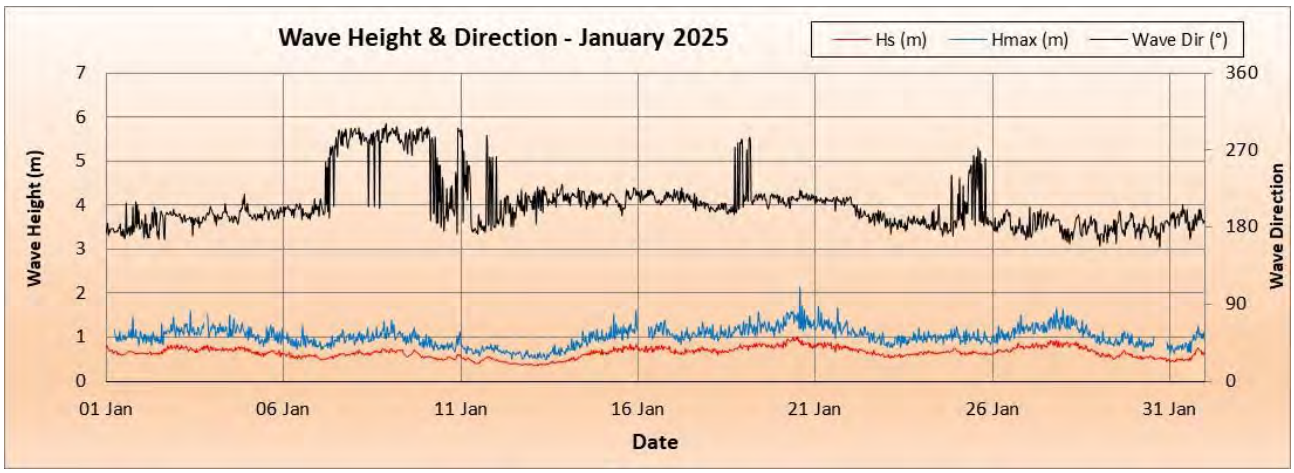
Table 6-2: Monthly maximum Hs and Tp

Maximum significant wave height (Hs), Maximum wave period (Tp) and Zero upcross period (Tz)				
Month	**Hs (m)**	**Predominant Direction (°)**	**Tp (sec)**	**Tz (sec)**
October 2024	2.20	214	22.22	9.30
November 2024	1.38	198	18.18	8.06
December 2024	1.87	203	22.22	9.44
January 2025	1.01	205	20.00	7.79
February 2025	1.41	195	20.00	8.99
March 2025	1.62	194	18.18	8.09

The time series graphs of the available wave data from October 2024 to March 2025 are shown in the figures below.


Wave Height & Direction - November 2024
Hs (m)
Hmax (m)
Wave Dir (°)
Wave Height (m)
Wave Direction
0
1
2
3
4
5
6
7
0
90
180
270
360
01 Nov
06 Nov
11 Nov
16 Nov
21 Nov
26 Nov
01 Dec
Date


Wave Height & Direction - December 2024
Hs (m)
Hmax (m)
Wave Dir (°)
Wave Height (m)
Wave Direction
0
1
2
3
4
5
6
7
0
90
180
270
360
01 Dec
06 Dec
11 Dec
16 Dec
21 Dec
26 Dec
31 Dec
Date


Wave Height & Direction - January 2025
Hs (m)
Hmax (m)
Wave Dir (°)
Wave Height (m)
Wave Direction
0
1
2
3
4
5
6
7
0
90
180
270
360
01 Jan
06 Jan
11 Jan
16 Jan
21 Jan
26 Jan
31 Jan
Date

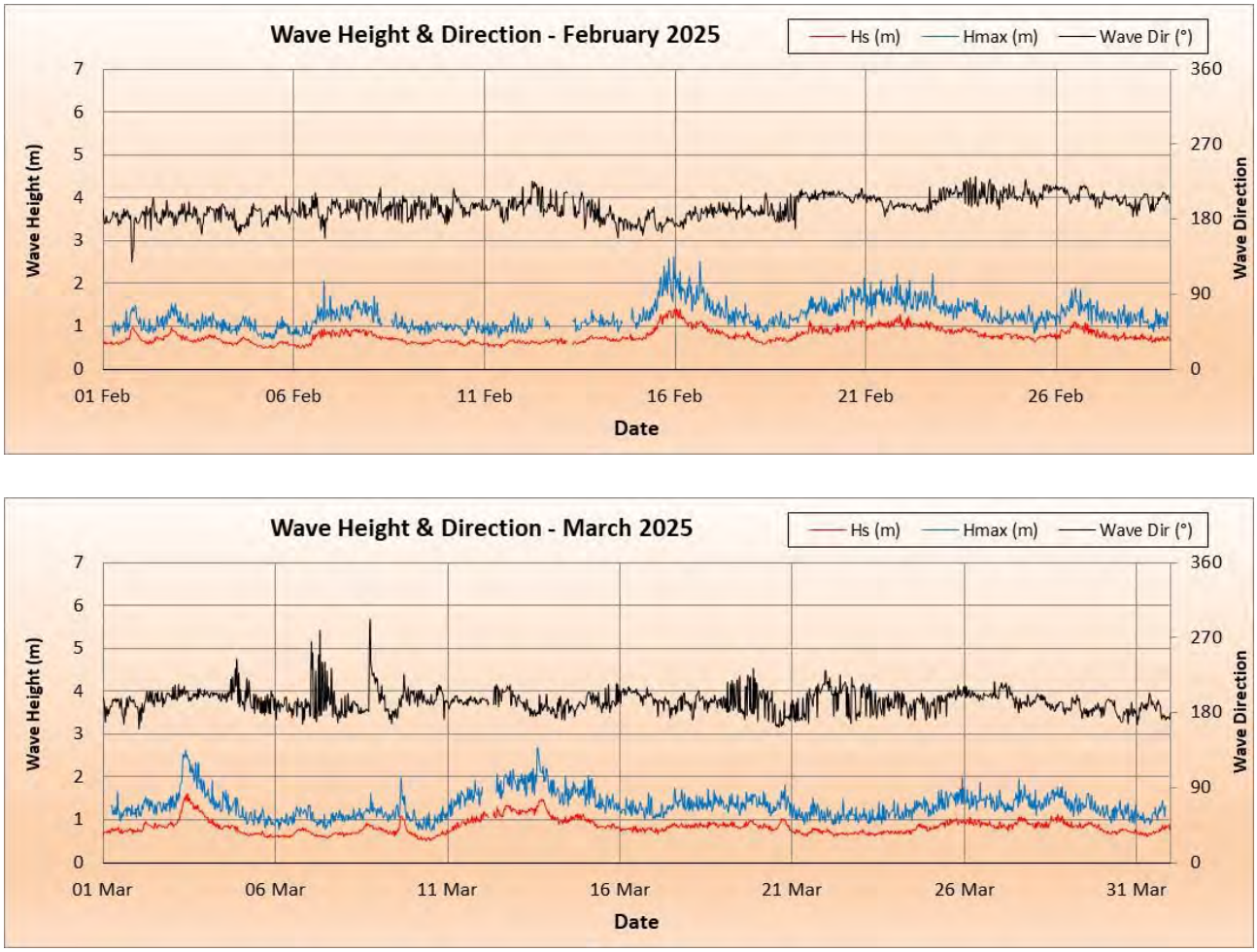


Figure 6-5: Time series of wave parameters

6.3 Current observations from WRB

The data from the wave rider buoy also provides the surface current speeds and directions at the location. The data available for the period of October 2024 to March 2025 is provided in this report.

Refer to the following rose plots of current speed v/s direction for the available data.

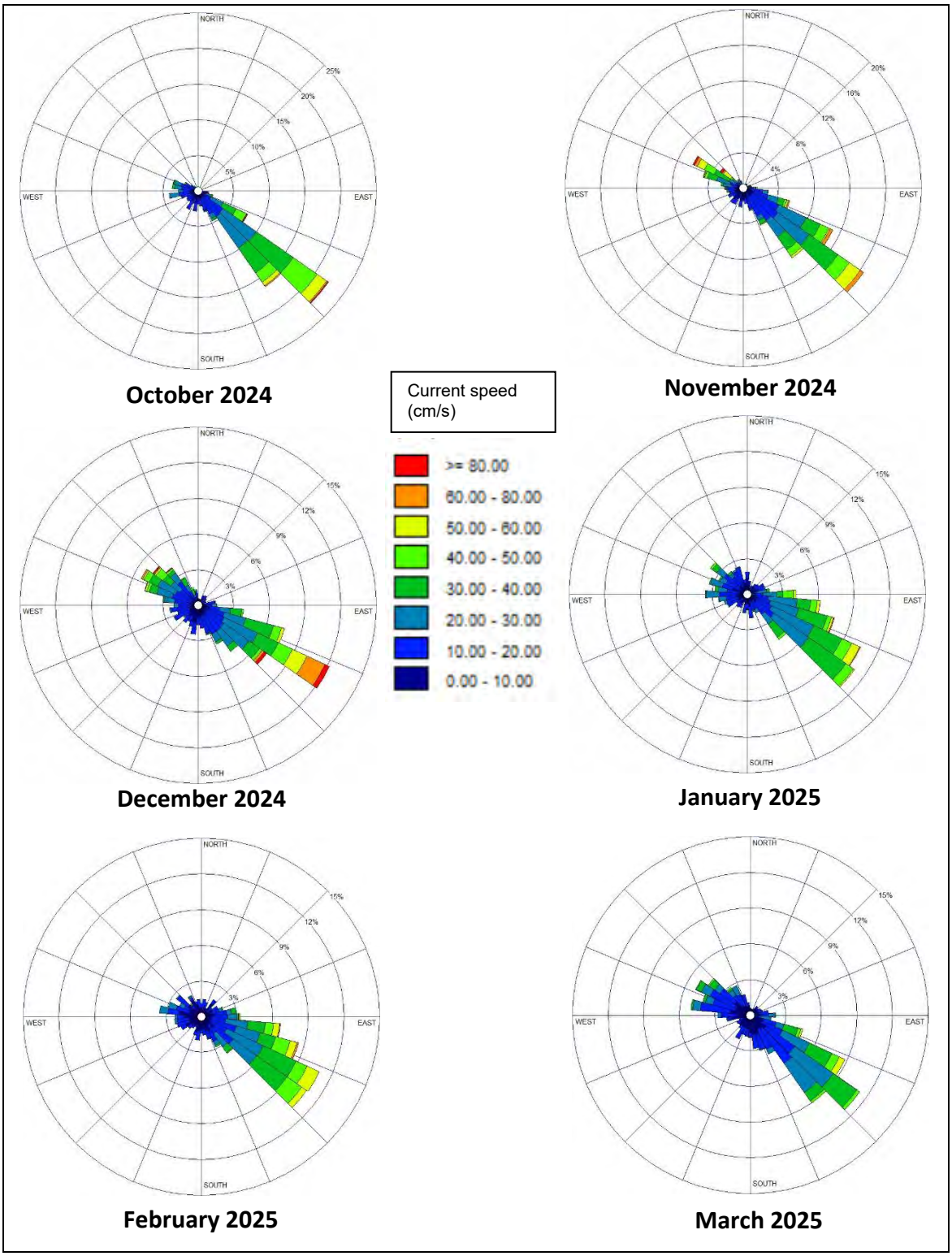


Figure 6-6: Wave Rose (current speed v/s direction)

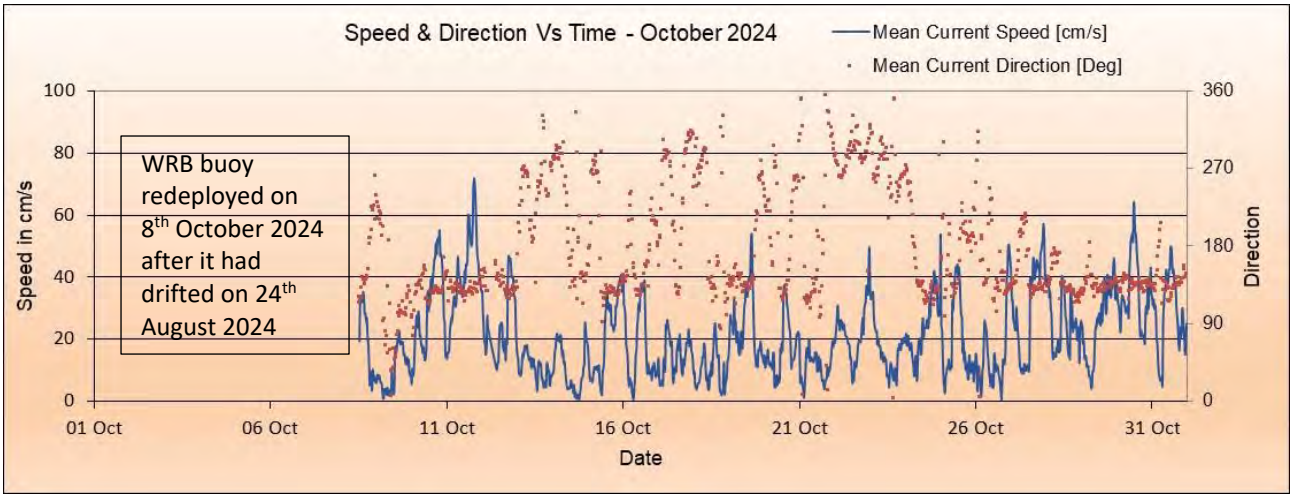
The following table provides the monthly maximum surface current speed (cm/s) and predominant direction observed during the period from October 2024 to March 2025.

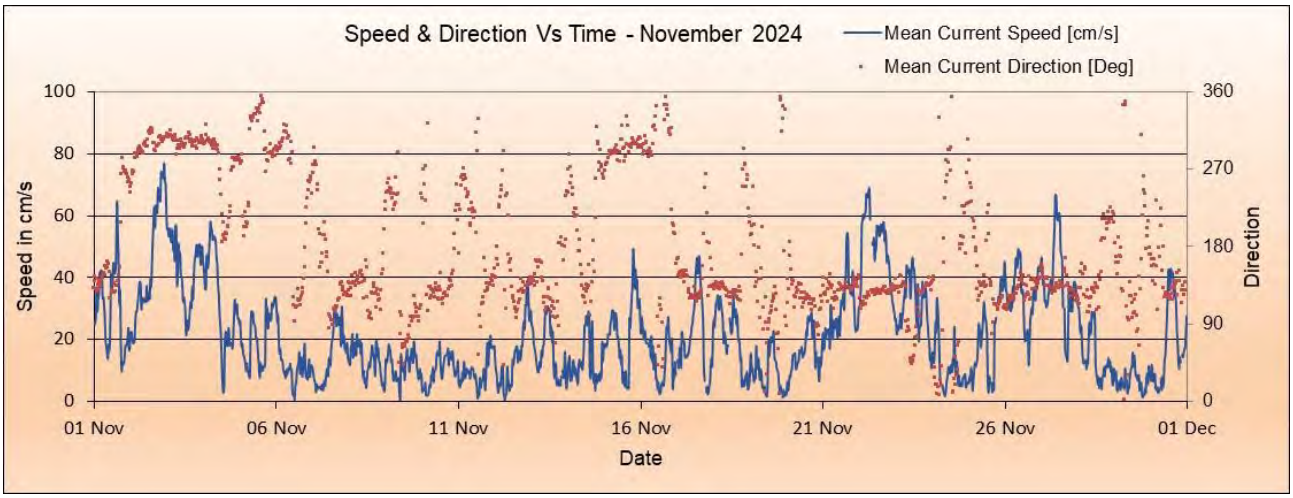
Table 6-3: Monthly maximum current speed and predominant direction

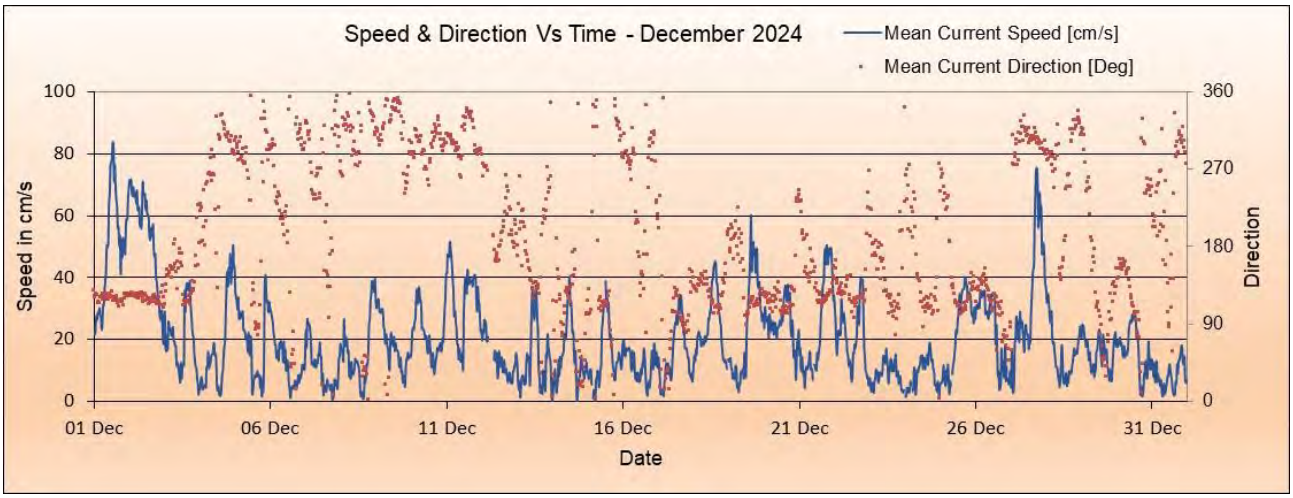
Maximum current speed (cm/s) and predominant direction		
Month	**Speed (cm/s)**	**Predominant Direction**
October 2024	71.8	Southeast
November 2024	77.0	Southeast
December 2024	83.8	Southeast
January 2025	61.6	Southeast
February 2025	65.3	Southeast
March 2025	58.3	Southeast

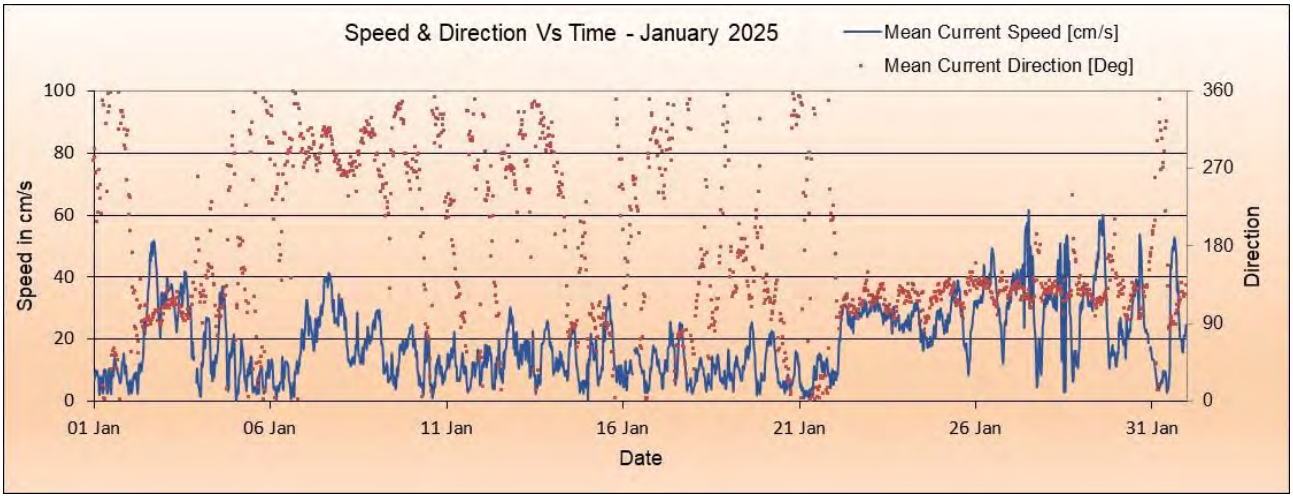
The rose plot reveals a flow parallel to the shore. During the observation period, the flow was predominantly towards the southeast. The current speed decreased after the retreat of monsoon.

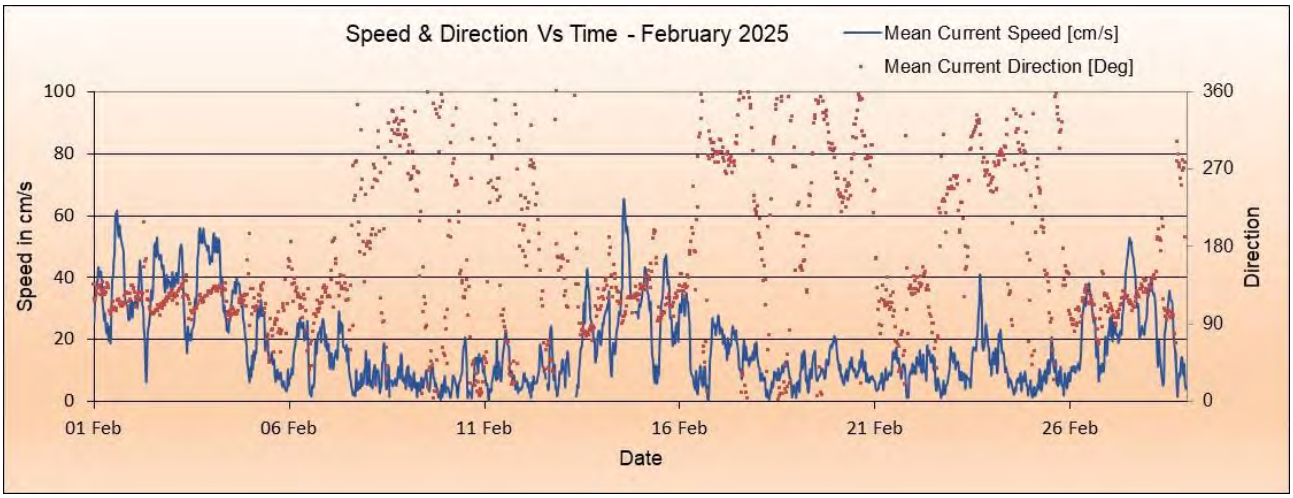
The time series of the available current data from October 2024 to March 2025 is shown below:


Speed & Direction Vs Time - October 2024
Mean Current Speed [cm/s]
Mean Current Direction [Deg]
WRB buoy redeployed on 8th October 2024 after it had drifted on 24th August 2024
Speed in cm/s
Direction
Date
01 Oct
06 Oct
11 Oct
16 Oct
21 Oct
26 Oct
31 Oct


Speed & Direction Vs Time - November 2024
Mean Current Speed [cm/s]
Mean Current Direction [Deg]
Speed in cm/s
Direction
Date
01 Nov
06 Nov
11 Nov
16 Nov
21 Nov
26 Nov
01 Dec


Speed & Direction Vs Time - December 2024
Mean Current Speed [cm/s]
Mean Current Direction [Deg]
Speed in cm/s
Direction
Date
01 Dec
06 Dec
11 Dec
16 Dec
21 Dec
26 Dec
31 Dec





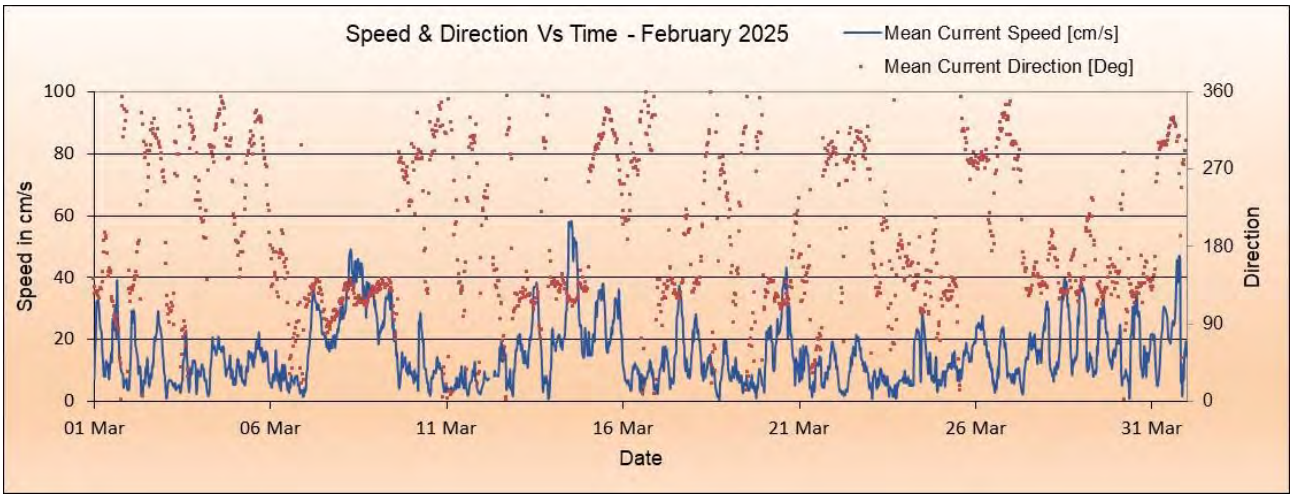


Figure 6-7: Time series of current speed and direction

6.4 Measurement of Meteorological Parameters

The automatic weather station was installed on the terrace of the Sub-station building. The wind data from October 2024 to March 2025 is compiled and presented in the form of rose plots below.

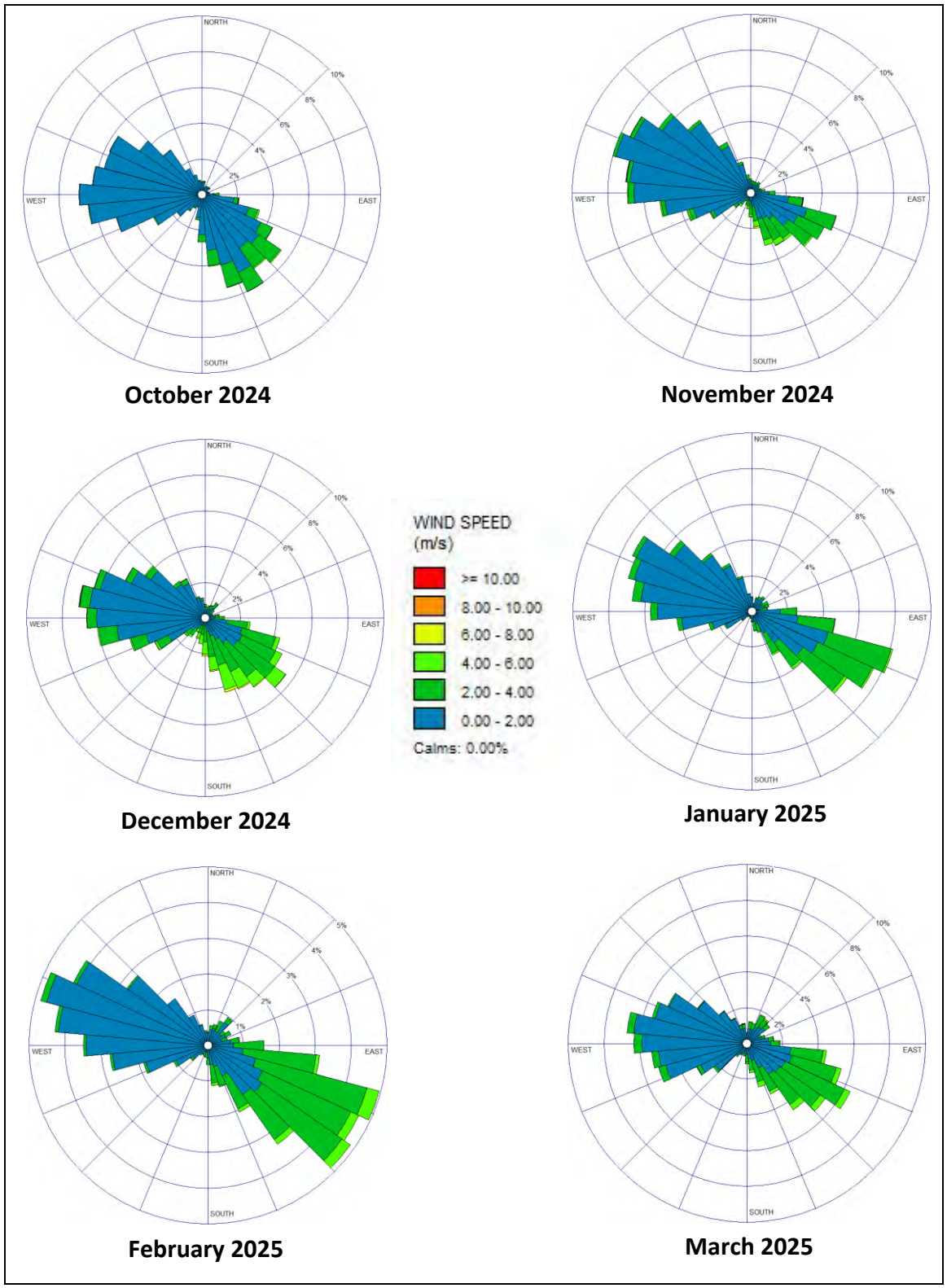


Figure 6-8: Wind rose (Speed in m/s vs direction)

The monthly maximum wind speed and predominant direction are provided in the tables below.

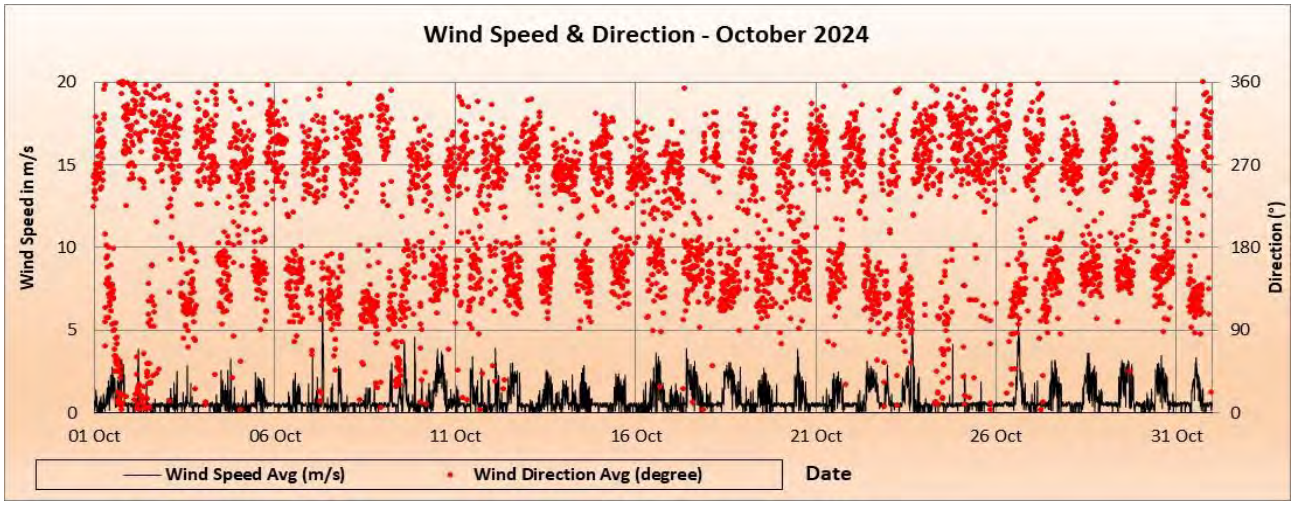
Table 6-4: Monthly maximum landward wind speed

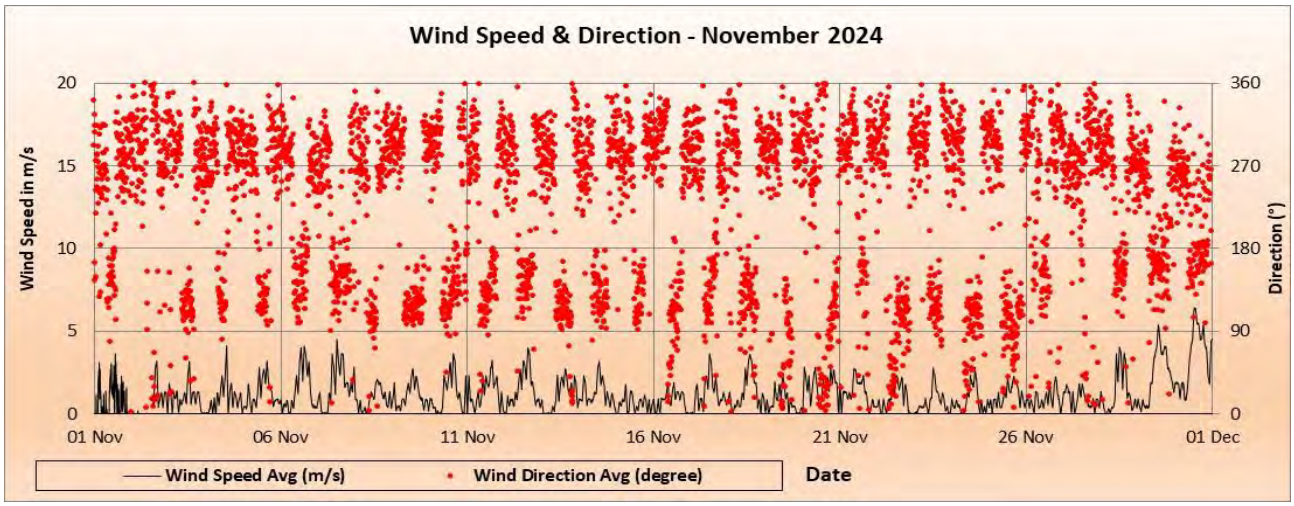
Month	Wind Speed (m/s)	Predominant Direction (°)
October 2024	7.50	136.33
November 2024	6.41	120.96
December 2024	7.28	128.74
January 2025	4.94	115.11
February 2025	5.02	116.80
March 2025	5.63	115.77

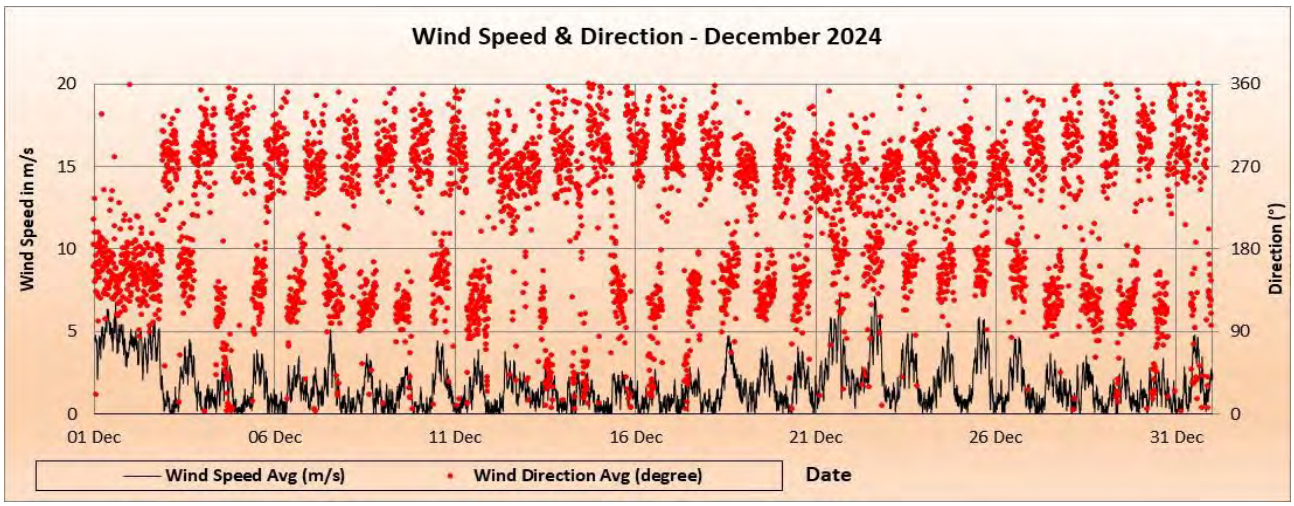
Table 6-5: Monthly maximum seaward wind speed

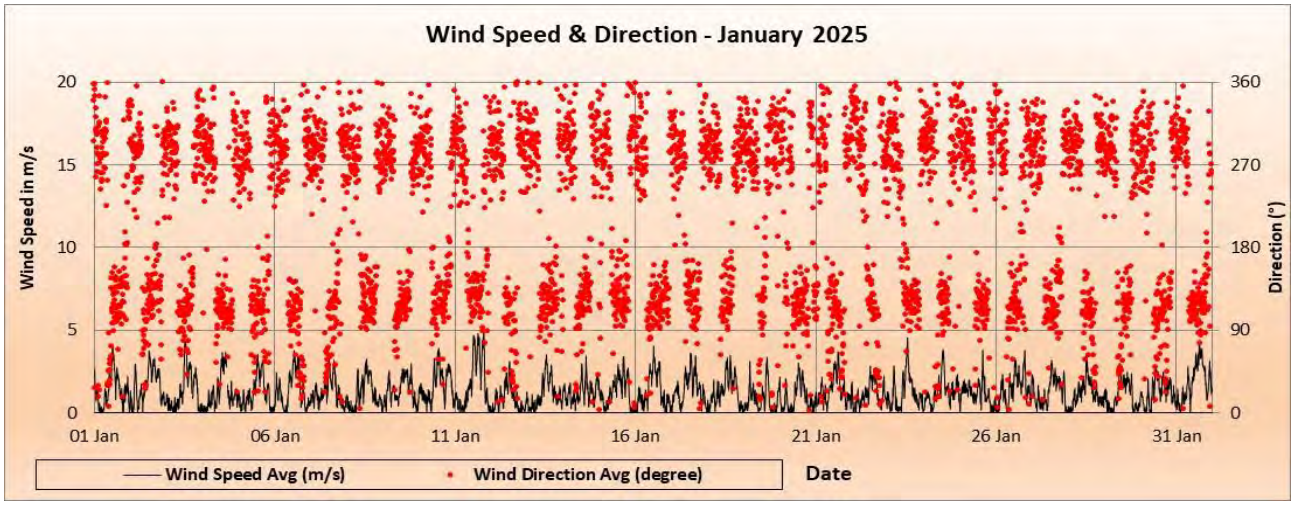
Month	Wind Speed (m/s)	Predominant Direction (°)
October 2024	3.71	275.05
November 2024	6.39	286.65
December 2024	7.01	276.91
January 2025	4.69	289.77
February 2025	4.09	284.40
March 2025	6.20	275.29

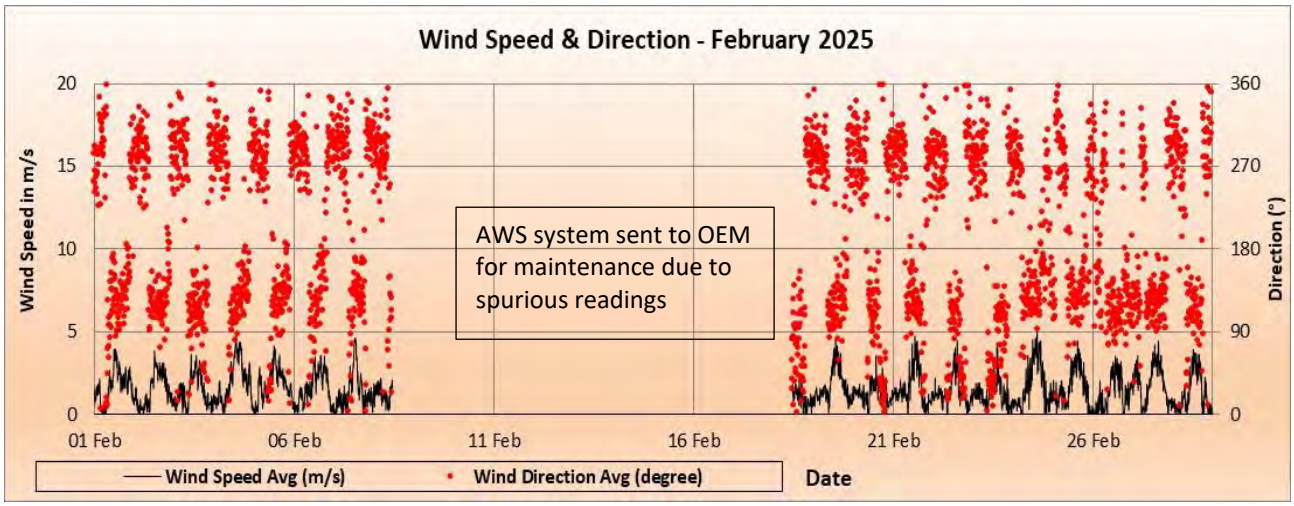
The time series of wind data from October 2024 to March 2025 is shown below:


Wind Speed & Direction - October 2024
Wind Speed in m/s
Direction (°)
0
5
10
15
20
0
90
180
270
360
01 Oct
06 Oct
11 Oct
16 Oct
21 Oct
26 Oct
31 Oct
Wind Speed Avg (m/s)
Wind Direction Avg (degree)
Date


Wind Speed & Direction - November 2024
Wind Speed in m/s
Direction (°)
0
5
10
15
20
0
90
180
270
360
01 Nov
06 Nov
11 Nov
16 Nov
21 Nov
26 Nov
01 Dec
Wind Speed Avg (m/s)
Wind Direction Avg (degree)
Date


Wind Speed & Direction - December 2024
Wind Speed in m/s
Direction (°)
0
5
10
15
20
0
90
180
270
360
01 Dec
06 Dec
11 Dec
16 Dec
21 Dec
26 Dec
31 Dec
Wind Speed Avg (m/s)
Wind Direction Avg (degree)
Date





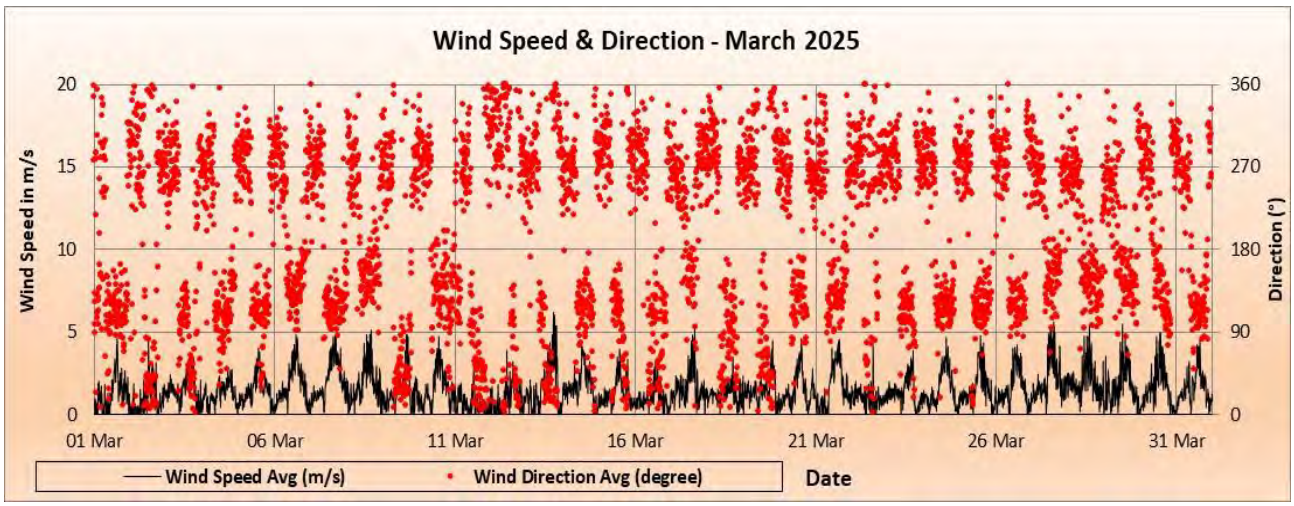


Figure 6-9: Time series of wind data

The percentage occurrence tables for atmospheric pressure, temperature and relative humidity for the period of October 2024 to March 2025 are shown below.

Table 6-6: Frequency distribution of atmospheric pressure

Frequency Distribution	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25
Atm. Pressure (mb)	**Percentage Occurrence**					
<1000	61.52	69.62	53.58	55.37	29.80	47.13
1000-1004	37.85	30.08	43.66	43.82	59.67	46.11
1004-1008	0.63	0.30	2.76	0.81	10.54	6.72
>1008	0.00	0.00	0.00	0.00	0.00	0.04
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 6-7: Frequency distribution of temperature

Frequency Distribution	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25
Temperature (°)	**Percentage Occurrence**					
20-24	0.00	2.51	1.01	0.73	1.00	0.07
24-28	5.09	49.43	44.96	42.03	40.76	33.71
28-32	28.33	40.49	43.03	43.49	58.20	64.45
>32	66.58	7.57	11.00	13.75	0.04	1.77
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 6-8: Frequency distribution of relative humidity

Frequency Distribution	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25
Rel. Humidity (%)	**Percentage Occurrence**					
50-60	0.00	0.00	0.60	4.26	5.21	1.12
60-70	0.38	2.41	11.16	25.62	26.55	26.77
70-80	30.97	27.62	39.16	33.59	41.49	72.11
>80	68.65	69.97	49.08	36.53	26.75	0.00
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 6-9: Cumulative rainfall in mm

Cumulative rainfall in mm	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25
	354.4	136.0	7.4	31.4	0.6	4.2

The frequency histograms for atmospheric pressure, temperature and relative humidity for the period of October 2024 to March 2025 are shown below.

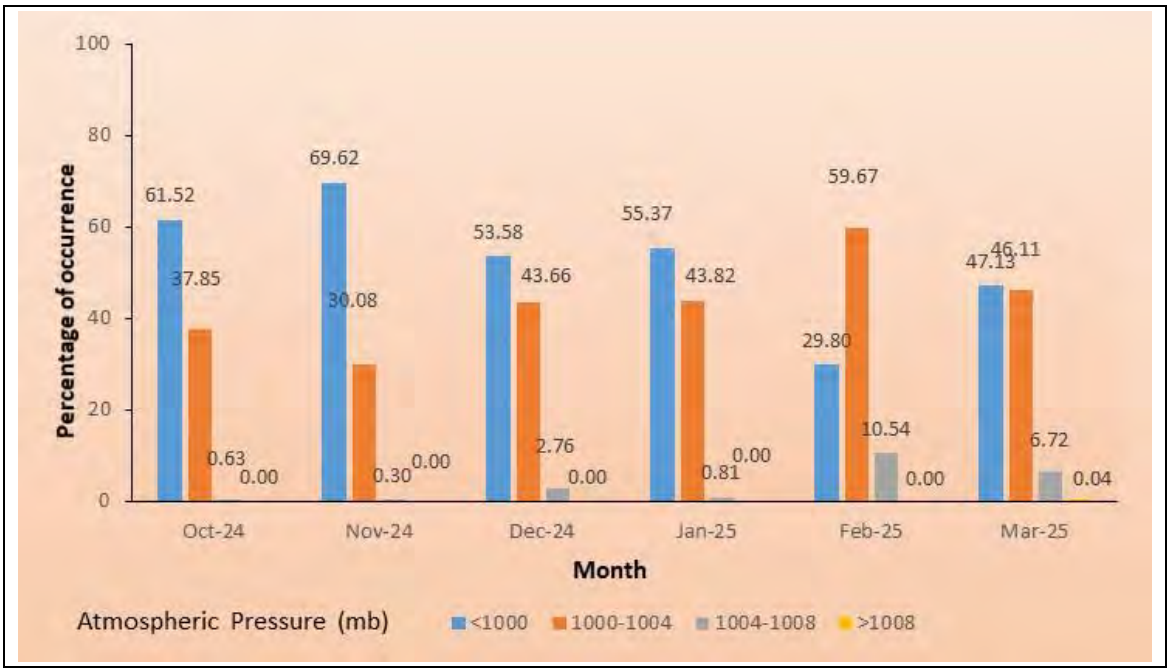


Figure 6-10: Histogram of atmospheric pressure

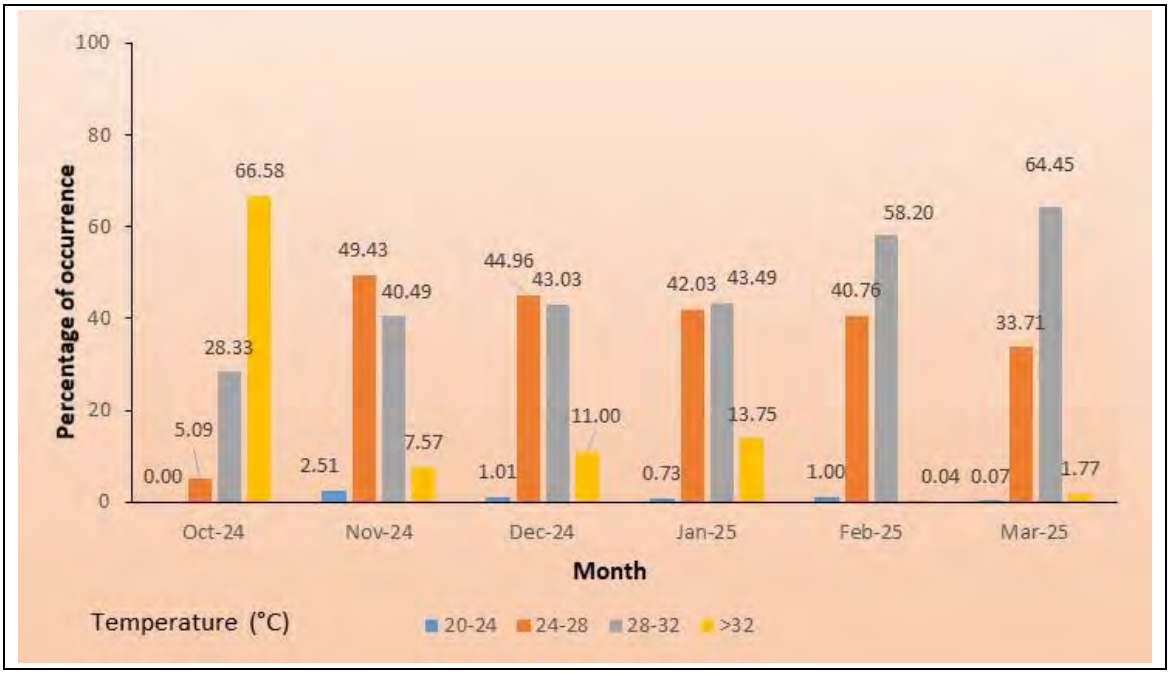


Figure 6-11: Histogram of temperature

Figure 6-12: Histogram of relative humidity

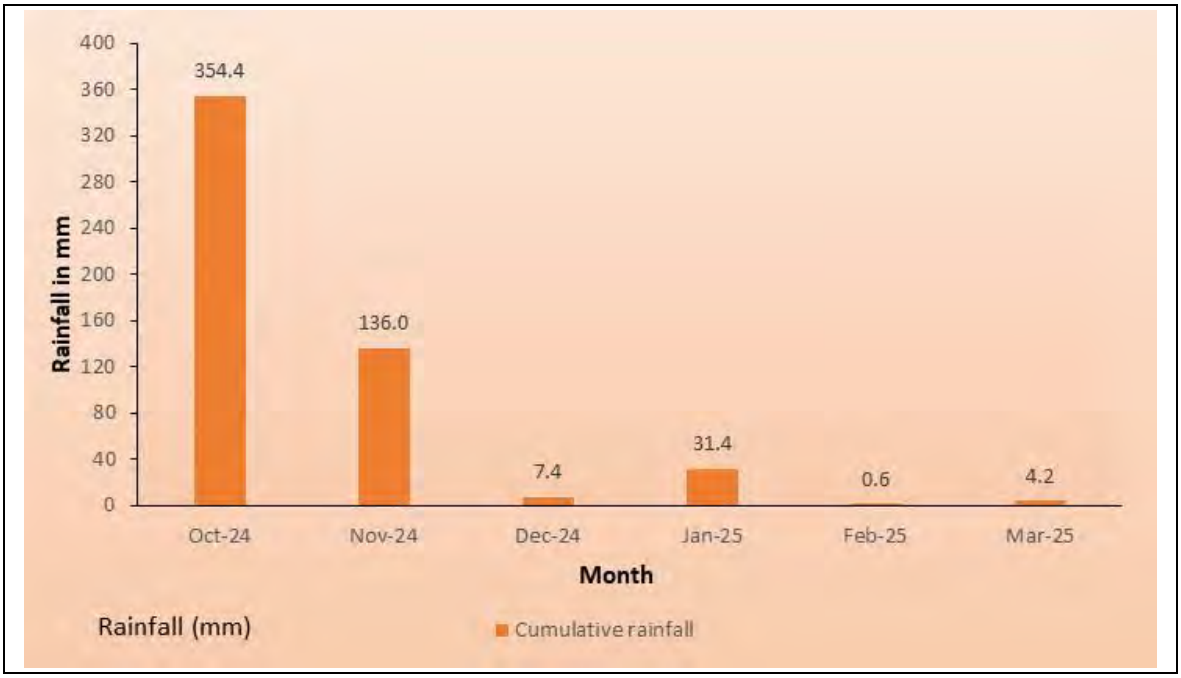


Figure 6-13: Histogram of cumulative rainfall

The data reveals that the temperature increased after the month of January 2025. The maximum occurrence of relative humidity readings greater than 80% was observed in the month of November 2024.

6.5 Littoral Environment Observations

The LEO was to be carried out at 81 locations from October 2024 to March 2025. The activity was hampered from CSP locations 1 to 9 and 23 to 30 due to the protests faced from the locals residing in these areas. The LEO plate was deployed at all the locations and the same was tracked for about five minutes, as per the site conditions. The initial and final GPS positions were then used to calculate the SOG and COG. The estimated wave height, angle of wave, period and the stretch of breakers were also noted down in the log.

The along shore current followed a northward trend in the post-monsoon 2024 period. The following table shows the maximum along shore current speed recorded in each month.

Table 6-10: Monthly maximum along shore current

Month	Max Speed (cm/s)	Predominant Direction	Line No.	Location
October 2024	13.55	South	48	Panathura
November 2024	9.68	North	76	Kochuveli
December 2024	7.75	Bi-directional	34	Adimalathura
January 2025	9.06	North	21	Poovar Beach North
February 2025	20.75	North	70	Shangumugham
March 2025	18.47	North	76	Kochuveli

① A pictorial representation of the alongshore current direction during the reporting period is shown in the Google Earth image below.

Figure 6-14: Representation of surface current direction from October 2024 to March 2025

6.6 Photographic Documentation

Photographic documentation was to be carried out for all the 81 locations from October 2024 to March 2025, coinciding with the cross-shore profiling. Due to the local agitation, photographic documentation could not be carried out at CSP locations 1 to 9 and 23 to 30.

The latest photographs for the month of March 2025 are provided in **Annexure I**. As a common reference point, a flag was fixed at each of the cross-shore profiling alignments while taking the photograph. Using the RTK system, this point was staked during the photography.

6.7 Cross Shore Profiles

The cross-shore profiling for the October 2024 to March 2025 period was carried out using RTK in the onshore region and a wide swath bathymetric system in the offshore region. The onshore profiling was done for all locations except CSP locations 1 to 9 and 23 to 30 due to the local protests. The offshore profiling could not be carried out in the month of October 2024 as a result of bad weather and rough sea conditions. In November 2024, the offshore surveys were carried out at locations 41 to 54 and 66 to 75. In the months of January 2025 and March 2025, the offshore profiling was carried out using a jet-ski (water scooter). Offshore profiling could not be carried out in the month of February 2025 as a result of technical snag with the jet-ski engine, which could not be resolved in time. The nearest depth which could be attained was about 5m to 6m due to the presence of waves breaking in the zone.

The table below provides the identification of CSP vis-à-vis the local name. CSP locations 1 to 11 and 23 to 30 were not approachable due to the protests from locals in these areas. Hence, the shoreline details are not available. However, the details of groynes have been provided.

Table 6-11: CSP Location names

CSP NO.	LANDMARK	LOCATION	SITE CONDITION
CSP-1	CATHOLIC CHARISMATIC PRAYER CENTER	EDAPPADU BEACH	Groyne No. 1, Inaccessible due to opposition from locals
CSP-2			Inaccessible due to opposition from locals
CSP-3			Inaccessible due to opposition from locals
CSP-4	ST. MARY'S CHURCH	VALLAVILAY	Groyne Nos. 2 to 5 in the vicinity, Inaccessible due to opposition from locals
CSP-5			Groyne Nos. 6 to 8 in the vicinity, Inaccessible due to opposition from locals
CSP-6			Groyne Nos. 9 to 13 in the vicinity, Inaccessible due to opposition from locals
CSP-7	ST. NICOLAS' CHURCH	NEERODY	Groyne Nos. 14 to 16 in the vicinity, Inaccessible due to opposition from locals
CSP-8			Groyne Nos. 17 to 21 in the vicinity, Inaccessible due to opposition from locals
CSP-9			Groyne Nos. 22 to 24 in the vicinity, Inaccessible due to opposition from locals
CSP-10	SREE BHADRAKALI TEMPLE	POZHIYOOR	Groyne Nos. 25 to 27 in the vicinity, Beach and Seawall
CSP-11			Groyne Nos. 28 and 29 in the vicinity, Seawall
CSP-12			Seawall
CSP-13	ST. MATHEW'S CHURCH	PARUTHIYOOR	Seawall
CSP-14	CHURCH OF CHRIST		Seawall
CSP-15	POOVAR ISLAND RESORT	POOVAR BEACH SOUTH	Beach
CSP-16			Beach
CSP-17			Beach
CSP-18	POZHIKARA BEACH	POOVAR	Beach
CSP-19			Beach
CSP-20	ST. ANTONY'S CHAPEL	POOVAR BEACH NORTH	Beach
CSP-21			Beach
CSP-22	ST. ANTONY'S CHURCH	KARUMKULAM	Beach
CSP-23			Inaccessible due to opposition from locals
CSP-24			Inaccessible due to

CSP NO.	LANDMARK	LOCATION	SITE CONDITION
			opposition from locals
CSP-25			Inaccessible due to opposition from locals
CSP-26			Inaccessible due to opposition from locals
CSP-27	GOTHAMBU ROAD	PULLUVILA	Inaccessible due to opposition from locals
CSP-28			Inaccessible due to opposition from locals
CSP-29			Inaccessible due to opposition from locals
CSP-30			Inaccessible due to opposition from locals
CSP-31	ADIMALATHURA CATHOLIC CHURCH	ADIMALATHURA	Beach
CSP-32			Beach
CSP-33			Beach
CSP-34			Beach
CSP-35	AZHIMALA TEMPLE	AZHIMALA	Rocky area
CSP-35A	AZHIMALA TEMPLE	AZHIMALA	Beach
CSP-36	NAGAR BHAGAVATHY TEMPLE	MULLUR	Beach
CSP-37			Beach and Seawall
CSP-38	ADANI PORT RECLAMATION AREA	ADANI PORT OFFICE VIZHINJAM	Port Construction
CSP-39			Port Construction
CSP-40			Port Construction
CSP-40A			Beach and Seawall
CSP-41	VIZHINJAM LIGHT HOUSE	KOVALAM	Beach and Seawall
CSP-42			Beach and Compound Wall
CSP-43			Beach and Compound Wall
CSP-44			Beach and Seawall
CSP-45			Beach and Compound Wall
CSP-46			Beach and Seawall
CSP-47	SAMUDRA BEACH PARK		Beach and Seawall
CSP-48	MOSQUE	PANATHURA	Beach and Seawall
CSP-49			Seawall
CSP-50	PANATHURA TEMPLE		Seawall
CSP-51			Seawall
CSP-52			Groyne No. 30 in the vicinity, Seawall
CSP-53	PUNTHURA FISH MARKET	PUNTHURA	Groyne No. 31 in the vicinity, Beach and Estuary
CSP-54			Beach

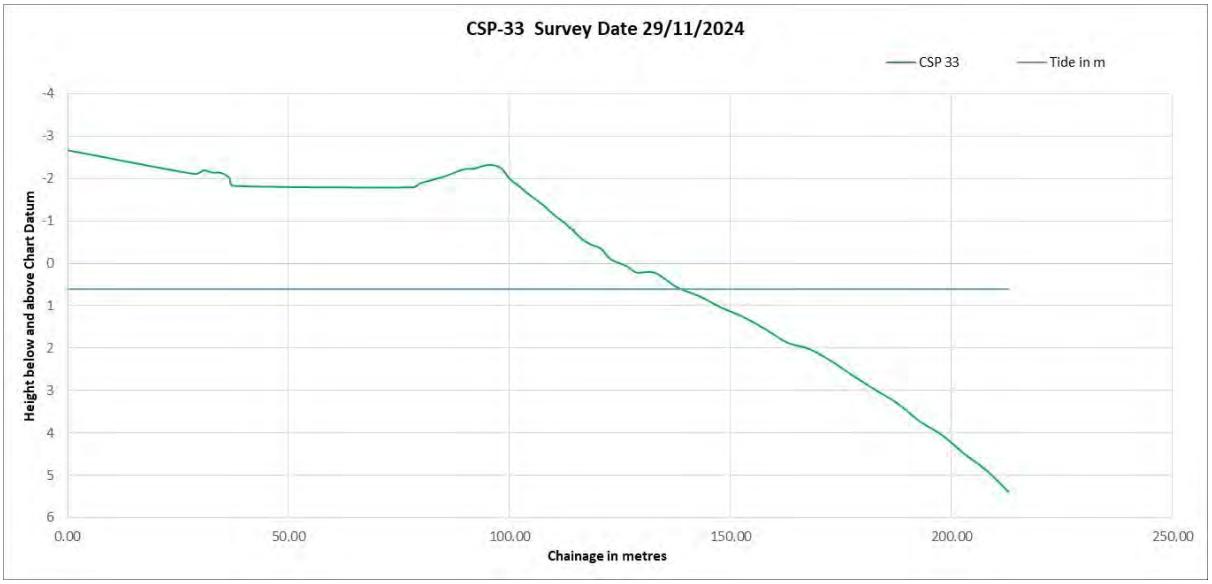
CSP NO.	LANDMARK	LOCATION	SITE CONDITION
CSP-55			Beach and Seawall
CSP-56			Seawall
CSP-57			Beach and Seawall
CSP-58	BEEMA PALLY	BEEMA PALLY	Beach and Seawall
CSP-59			Seawall
CSP-60			Beach and Seawall
CSP-61	CHERIYATHURA SPORTS GROUND	CHERIYATHURA	Groyne Nos. 38 to 42 in the vicinity, Beach and Seawall
CSP-62			Groyne Nos. 43 to 47 in the vicinity, Beach and Seawall
CSP-63	VALIYATHURA BRIDGE	VALIYATHURA	Groyne Nos. 48 to 51 in the vicinity, Seawall
CSP-64			Beach and Seawall, Valiyathura Bridge
CSP-64A			Beach
CSP-65			Seawall
CSP-66			Seawall
CSP-67			Beach and Seawall
CSP-68	SHANGUMUGHAM BEACH	SHANGUMUGHAM	Beach and Seawall
CSP-69			Beach and Seawall
CSP-70	ST. PETER'S CHURCH		Beach and Seawall
CSP-71			Beach and Seawall
CSP-72	VETTUCAUD CHURCH	VETTUCAUD	Beach
CSP-73			Beach and Seawall
CSP-74			Beach
CSP-75	VELI CHILDREN'S PARK	KOCHUVELI	Beach
CSP-76			Beach
CSP-77			Beach
CSP-78	ST. THOMAS' CHURCH	VALIYAVELI	Beach and Seawall
CSP-79			Beach and Seawall
CSP-80	CHRISTIAN BROTHEREN CHURCH	THUMBA	Beach
CSP-81			Beach

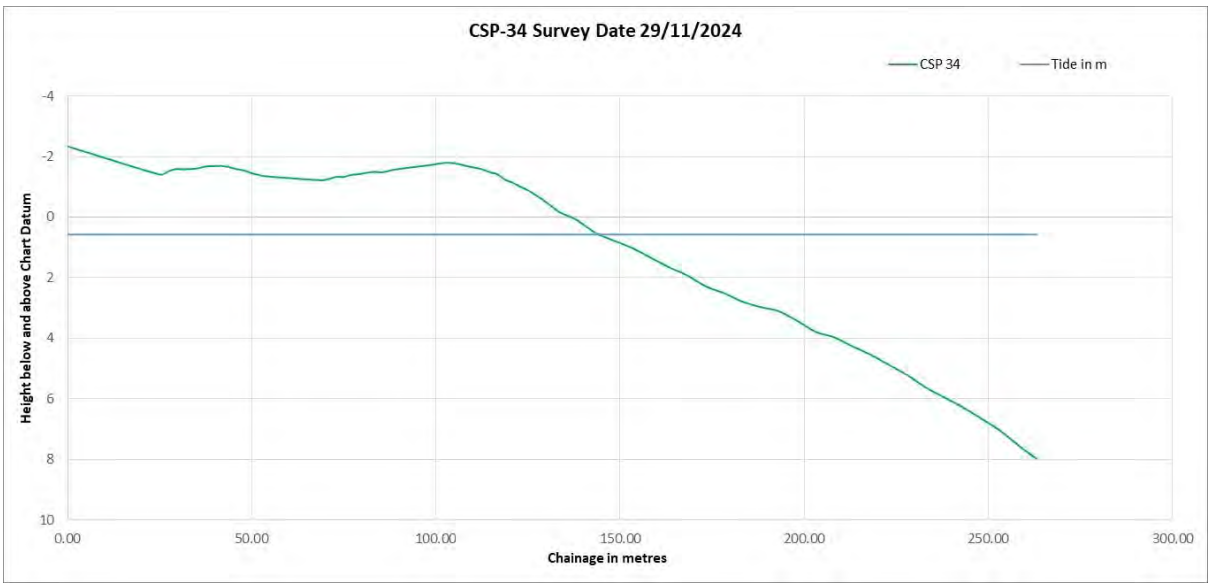
6.8 Near-shore Survey

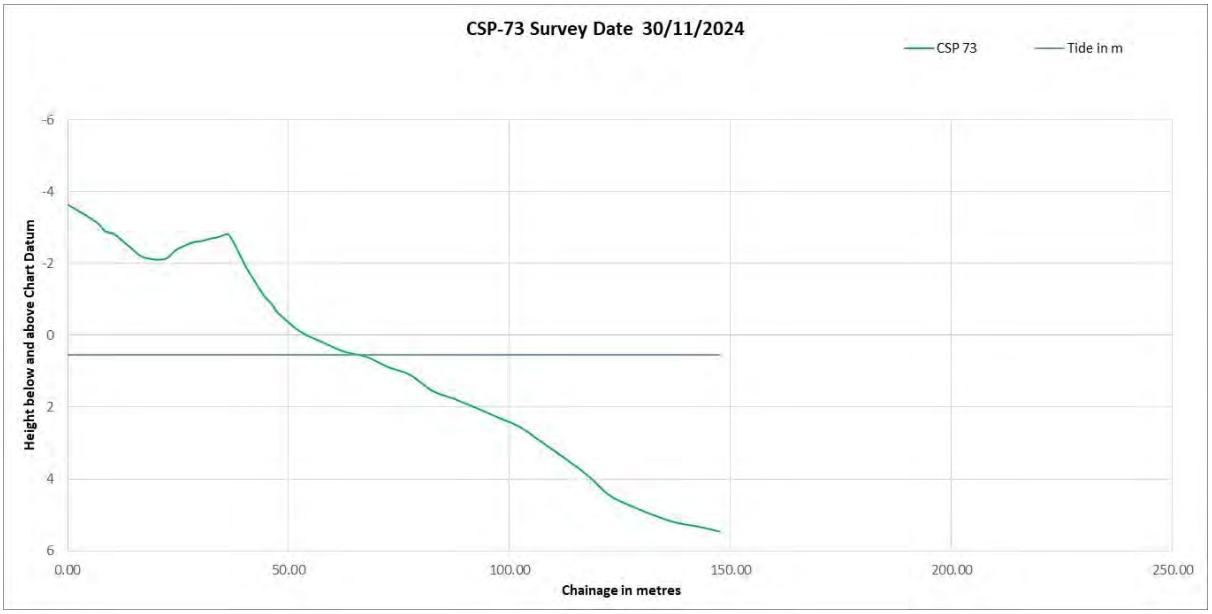
Near-shore survey was carried out along 4 CSP lines namely namely CSP-33, CSP-34 (Adimalathura), CSP-73 and CSP-74 (Vettucaud) in the month of November 202, and along 6 CSP lines i.e. CSP-33, CSP-34 (Adimalathura), CSP-68, CSP-69 (Shangumugham), CSP-73 and CSP-74 (Vettucaud) in the month of December 2024 using pressure sensor.

No near-shore survey could be carried out in the month of October 2024 as a result of rough sea conditions, and in the month of February 2025 due to non-availability of jet-ski.

The graphs for the near-shore survey carried out during November 2024 are provided below:







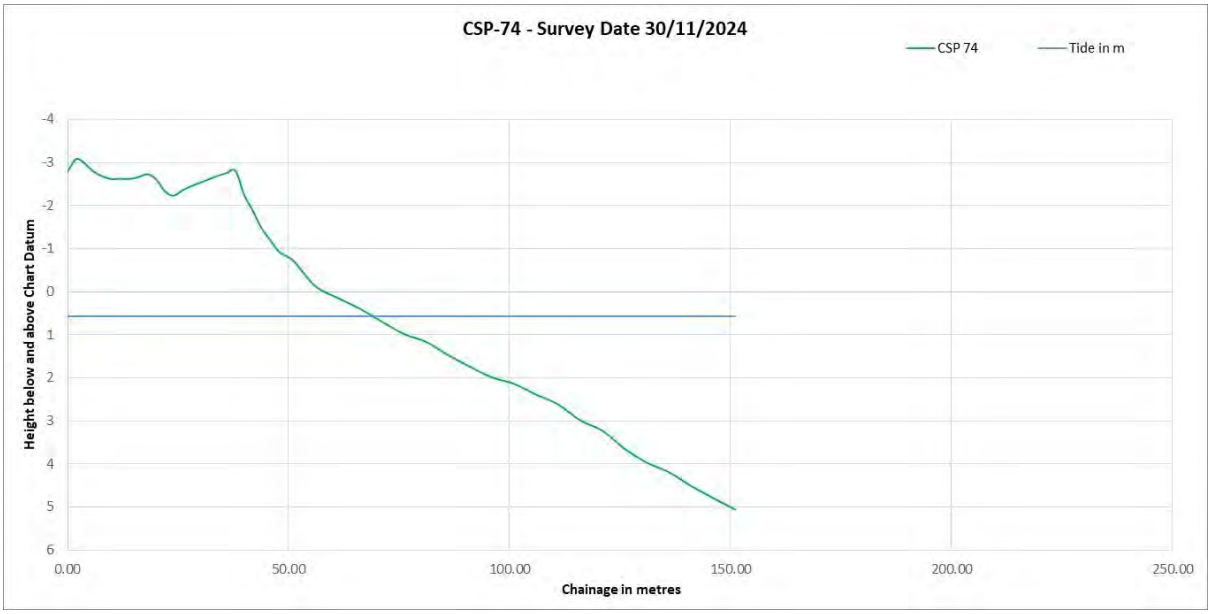
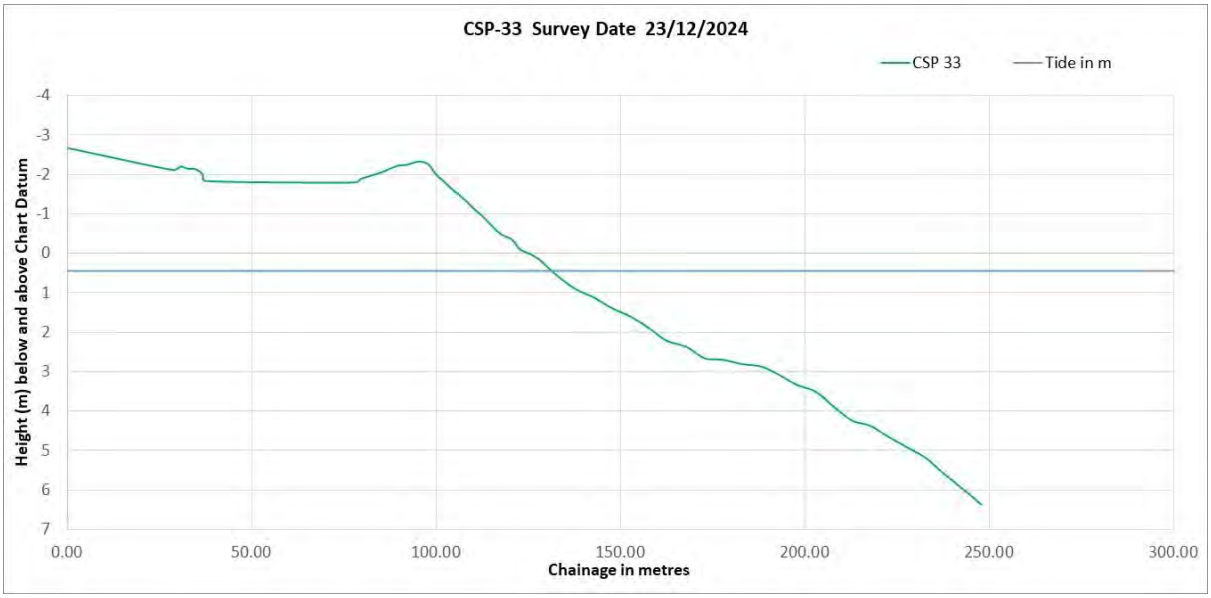
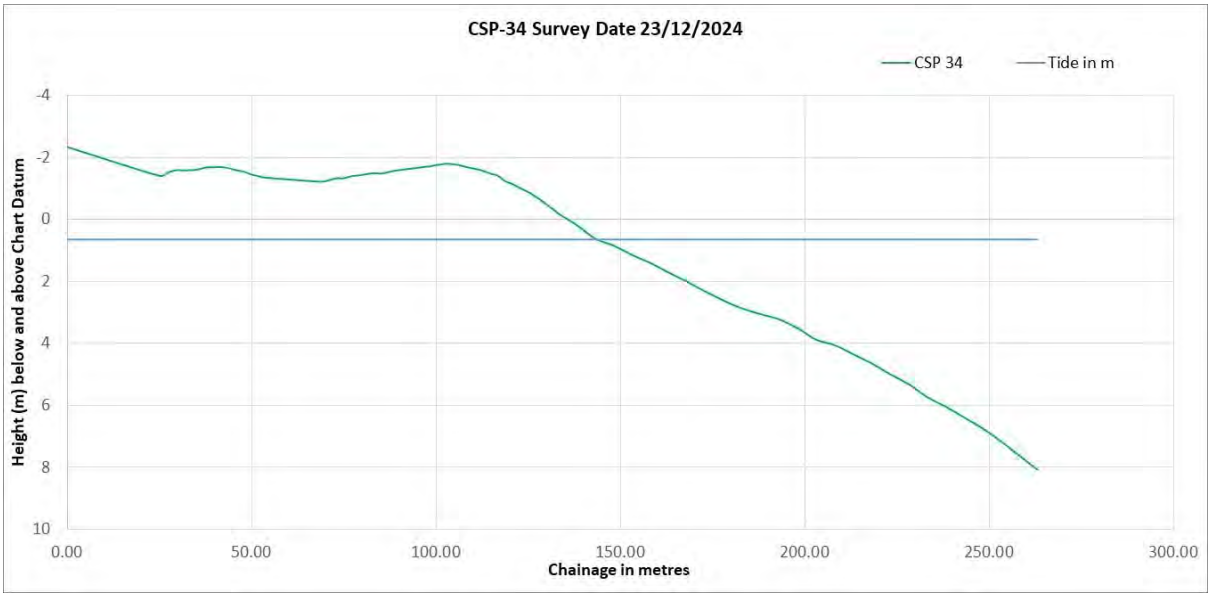
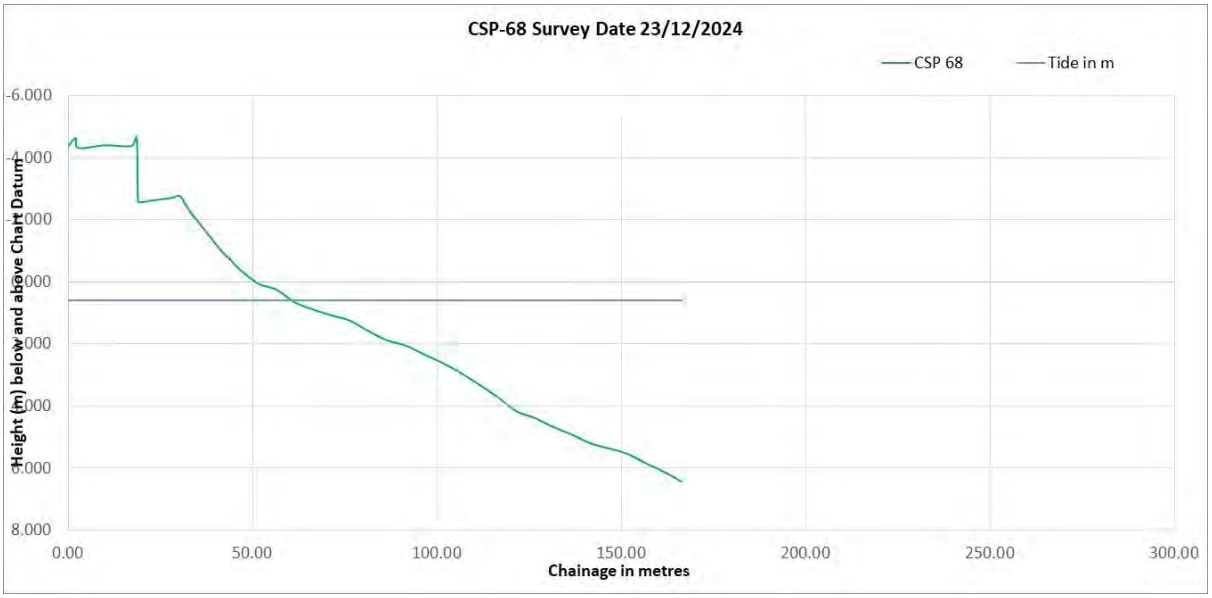


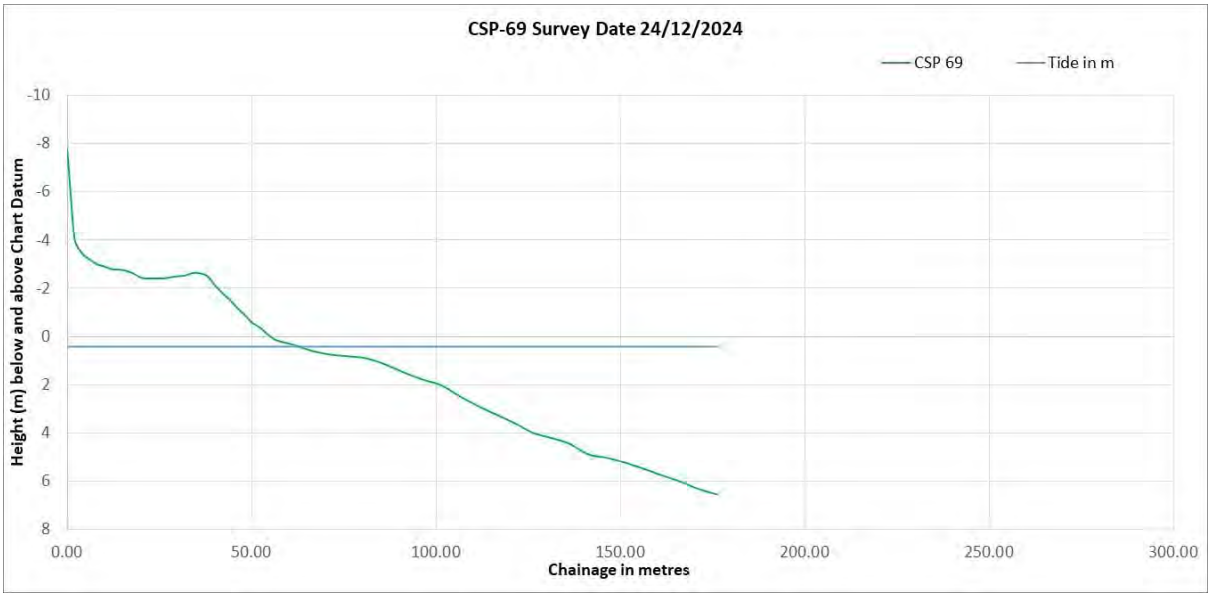
Figure 6-15: Graphs of near-shore survey carried out in November 2024

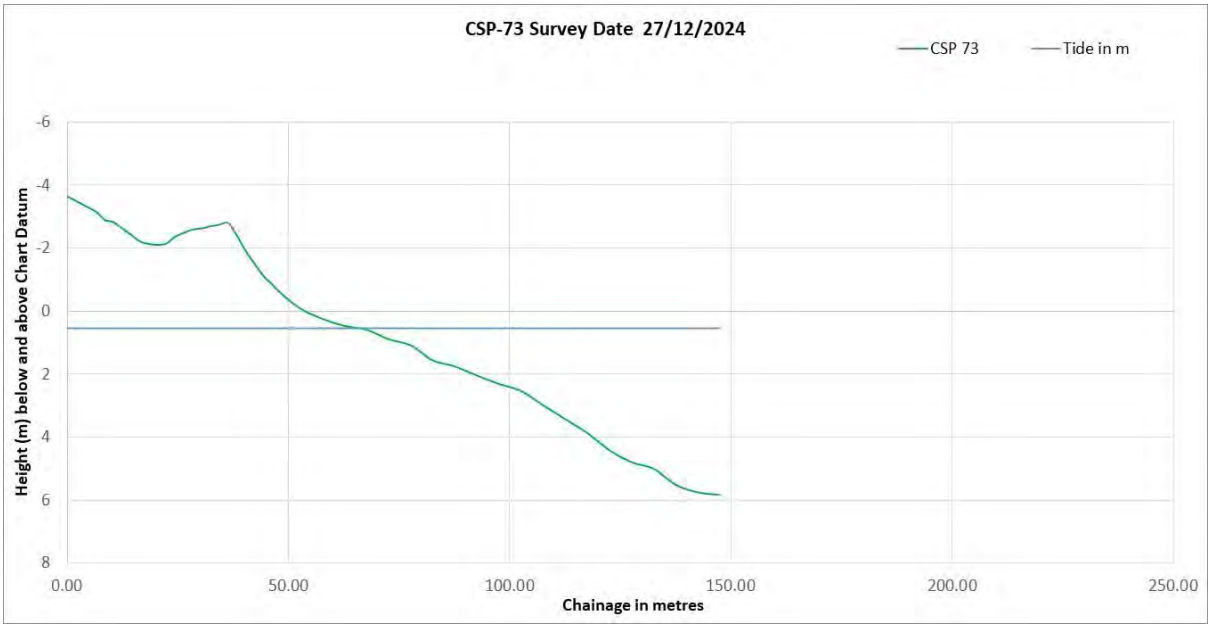
The graphs for the near-shore survey carried out during December 2024 are provided below:


CSP-33 Survey Date 23/12/2024
CSP 33
Tide in m
Height (m) below and above Chart Datum
-4
-3
-2
-1
0
1
2
3
4
5
6
7
0.00
50.00
100.00
150.00
200.00
250.00
300.00
Chainage in metres


CSP-34 Survey Date 23/12/2024
CSP 34
Tide in m
Height (m) below and above Chart Datum
-4
-2
0
2
4
6
8
10
0.00
50.00
100.00
150.00
200.00
250.00
300.00
Chainage in metres


CSP-68 Survey Date 23/12/2024
CSP 68
Tide in m
-6.000
-4.000
-2.000
0.000
2.000
4.000
6.000
8.000
Height (m) below and above Chart Datum
0.00
50.00
100.00
150.00
200.00
250.00
300.00
Chainage in metres


CSP-69 Survey Date 24/12/2024
CSP 69
Tide in m
-10
-8
-6
-4
-2
0
2
4
6
8
Height (m) below and above Chart Datum
0.00
50.00
100.00
150.00
200.00
250.00
300.00
Chainage in metres



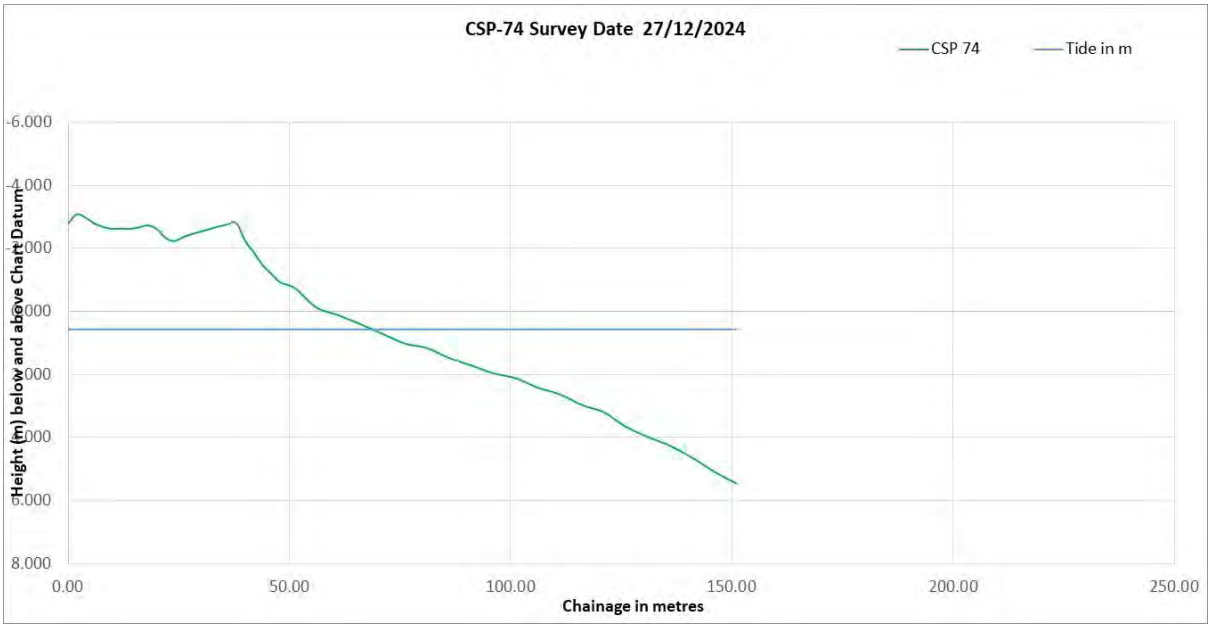


Figure 6-16: Graphs of near-shore survey carried out in December 2024

6.9 Shoreline Monitoring Survey

The entire 41 km of shoreline was to be surveyed during the period of October 2024 to March 2025. CSP locations 1 to 11 and 23 to 30 could not be approached due to the agitation by the locals. The survey was carried out using RTK system in GPS mode. This stretch extends from CSP-1 in the south (Eddapadu) to CSP-81 in the north (Thumba). A total of 51 groynes have been observed within the survey area. An overlay of month-on-month GPS survey charts is provided in **Annexure II** (8 charts).

Table 6-12: Area wise number of groynes

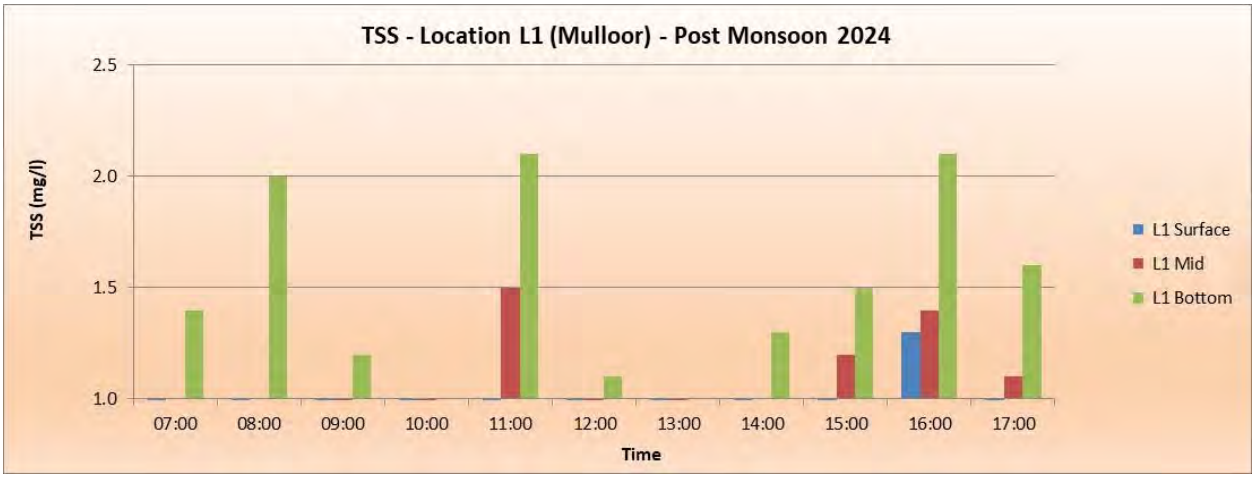
Area	Number of Groynes	North / South of the Port Area	Total no. of Groynes North/South of the Port
Edappadu Beach	1	South	29 South
Vallavilay	12	South	
Neerody	11	South	
Pozhiyoor	5	South	
Panathura	1	North	22 North
Punthura	2	North	
Beemapally	4	North	
Cheriyathura	10	North	
Valiyathura	5	North	
Total number of groynes			**51**

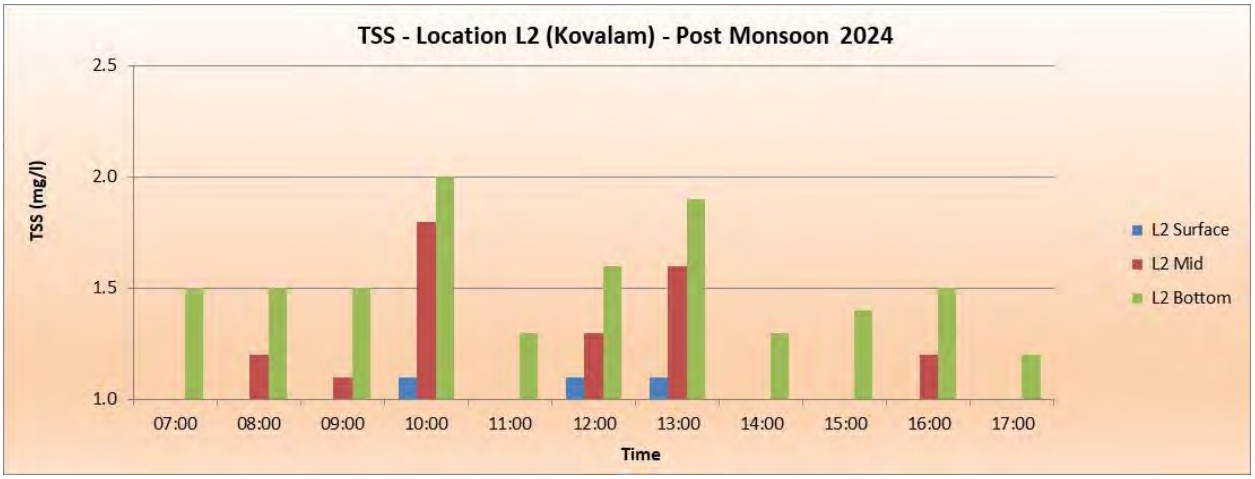
6.10 Water Sampling

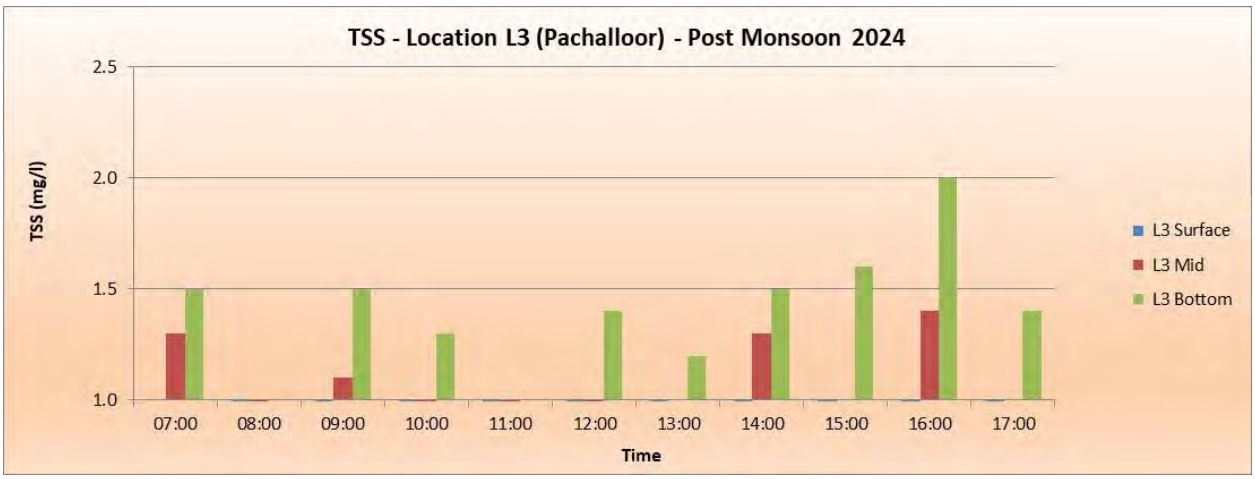
For the post-monsoon 2024 period, water samples were collected from 4 locations, namely L1 (Mulloor) on 1st January 2025, L2 (Kovalam) on 30th December 2024, L3 (Pachalloor) on 31st December 2024 and L4 (Poovar) on 2nd January 2025. The parameters measured were Total Suspended Solids (TSS), salinity and turbidity.

The histograms for TSS (in mg/l) for the above-mentioned locations are provided below.

①


TSS - Location L1 (Mulloor) - Post Monsoon 2024
TSS (mg/l)
2.5
2.0
1.5
1.0
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
Time
L1 Surface
L1 Mid
L1 Bottom


TSS - Location L2 (Kovalam) - Post Monsoon 2024
TSS (mg/l)
2.5
2.0
1.5
1.0
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
Time
L2 Surface
L2 Mid
L2 Bottom


TSS - Location L3 (Pachalloor) - Post Monsoon 2024
TSS (mg/l)
2.5
2.0
1.5
1.0
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
Time
L3 Surface
L3 Mid
L3 Bottom

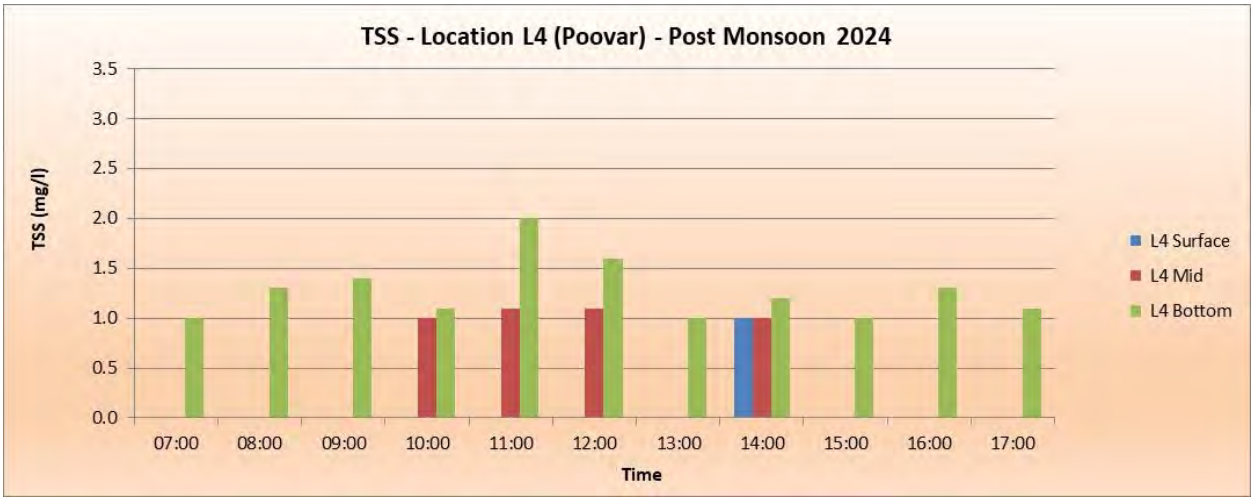
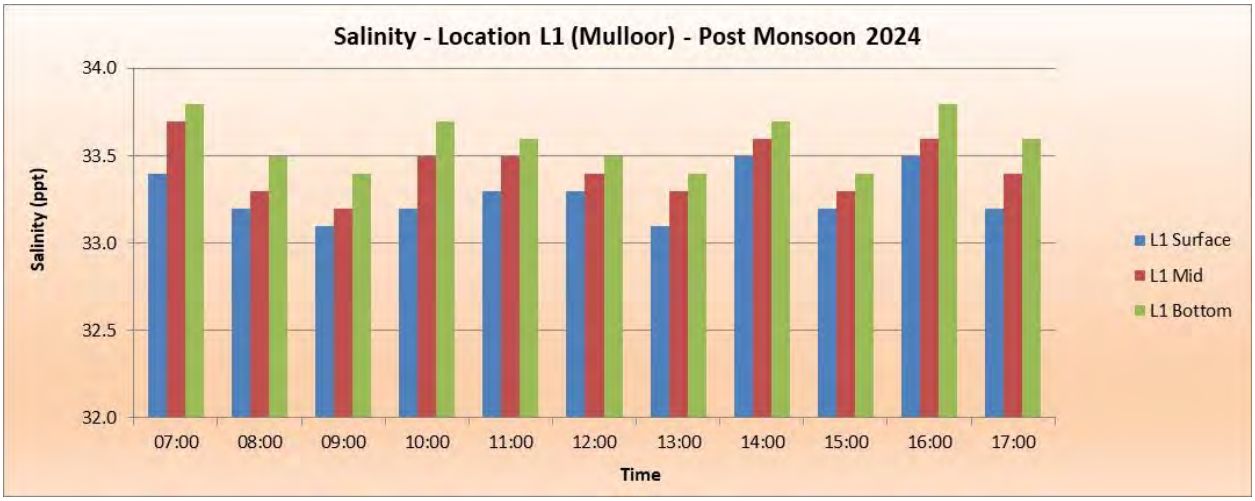


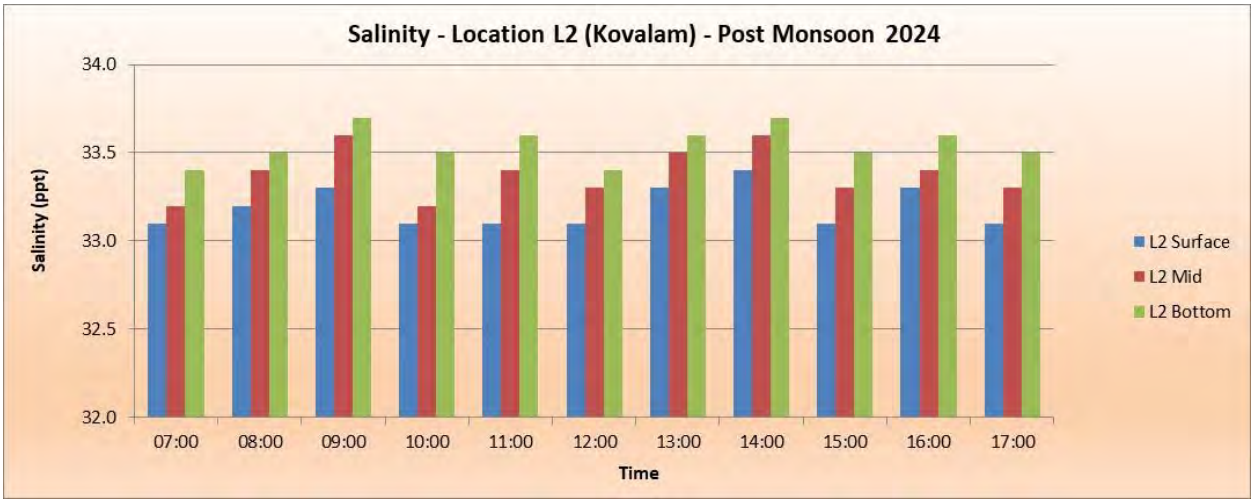
Figure 6-17: Time Series of TSS

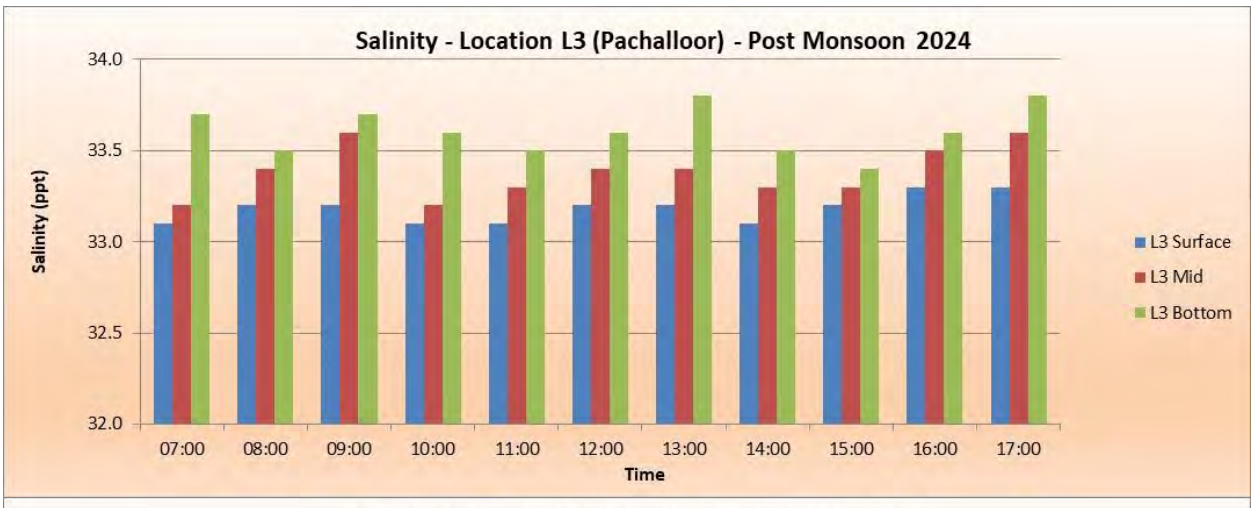
The maximum TSS recorded was 2.1 mg/l near the bottom at Location L1 (Mulloor).

Note: TSS values below 1 mg/l are Below Detectable Limit (BDL) of the system and are hence not shown on the bar charts.

The histograms for salinity at all three levels for all the locations are given as follows.







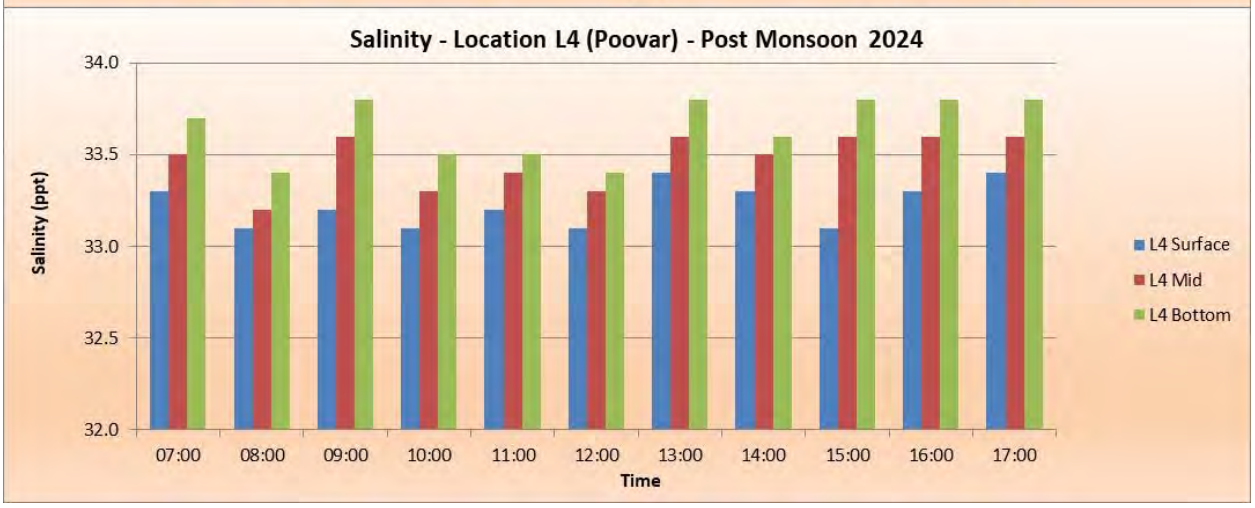


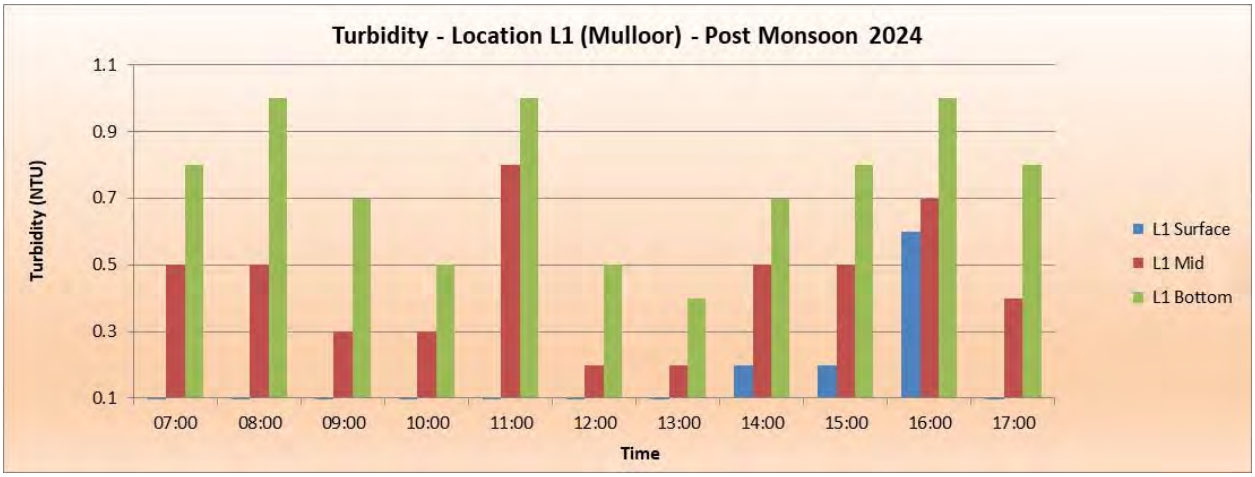
Figure 6-18: Time Series of salinity

The salinity at all locations is seen to be between 33.1 and 33.8 parts per thousand (ppt). The maximum salinity recorded was 33.8 ppt at Locations L1 (Mulloor) and L4 (Poovar), both near the bottom.

The histograms for turbidity at all levels for the locations are shown below. The maximum turbidity recorded was 1.0 NTU near the bottom at Locations L1 (Mulloor) and L2 (Kovalam).

Note: Turbidity values below 0.1 NTU are Below Detectable Level (BDL) of the system and are hence not displayed on the bar charts.

①



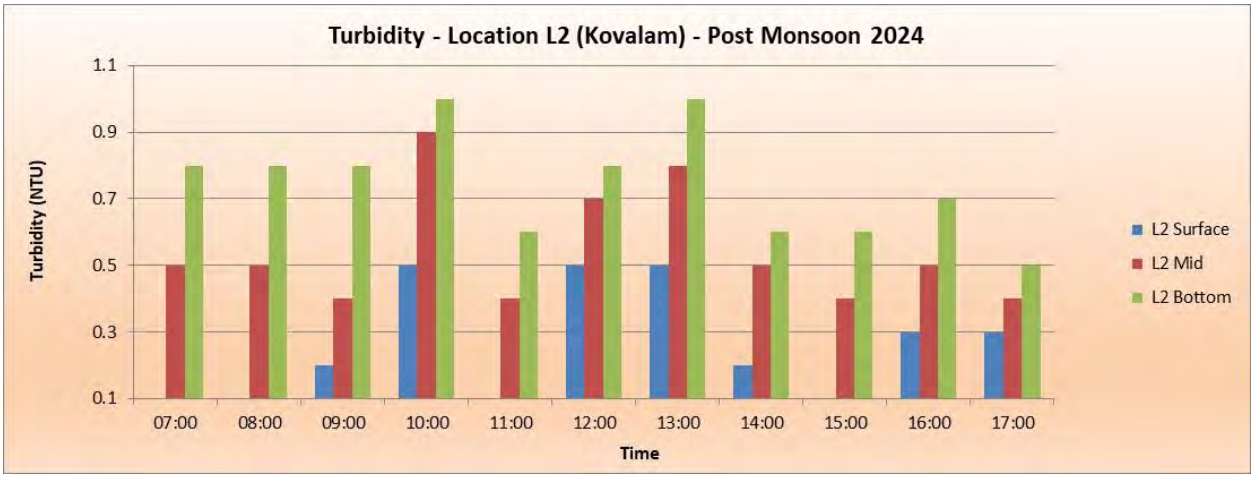


Figure 6-19: Time Series of Turbidity at water sampling locations

6.11 Beach Sampling

Beach samples were collected from 38 out of the 81 locations for the monsoon 2024 period in the month of September 2024. The samples which could not be collected due to lack of beach were BS-11 to BS-14, BS-35, BS-35A, BS-38 to BS-40, BS-41, BS-47 to BS-52, BS-56 to BS-61, BS-63, BS-64, BS-65 to BS-68 and BS-70.

In the post-monsoon 2024 period, 48 beach samples could be collected out of 81. The samples which could not be collected due to lack of beach were BS-11 to BS-13, BS-35, BS-38 to BS-40, BS-47, BS-49 to BS-52, BS-56, BS-58, BS-59, BS-63, BS-64, BS-65 and BS-66. In both the seasons, beach samples at CSP locations 1 to 8 and 23 to 30 could not be collected due to the protests from local people residing at those locations. The following table shows the D50 value (in mm) of the sediments collected along with the soil classification as per Wentworth scale.

Table 6-13: Beach sample soil classification (Monsoon 2024)

Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-1	Sampling locations not approachable due to protests from locals					
BS-2						
BS-3						
BS-4						
BS-5						
BS-6						
BS-7						
BS-8						
BS-9						
BS-10	0.00	100.00	0.00	100.00	0.5874	Coarse Sand
BS-11	Not collected due to lack of beach					
BS-12						
BS-13						
BS-14						
BS-15	0.00	100.00	0.00	100.00	0.4436	Medium Sand
BS-16	0.00	100.00	0.00	100.00	0.4001	Medium Sand
BS-17	0.00	100.00	0.00	100.00	0.3207	Medium Sand
BS-18	0.00	100.00	0.00	100.00	0.3154	Medium Sand
BS-19	0.00	100.00	0.00	100.00	0.3525	Medium Sand
BS-20	0.00	100.00	0.00	100.00	0.5744	Coarse Sand
BS-21	0.00	100.00	0.00	100.00	0.3782	Medium Sand
BS-22	0.00	100.00	0.00	100.00	0.3686	Medium Sand
BS-23	Sampling locations not approachable due to protests from locals					
BS-24						
BS-25						
BS-26						
BS-27						
BS-28						
BS-29						
BS-30						
BS-31	0.00	100.00	0.00	100.00	0.4288	Medium Sand
BS-32	0.00	100.00	0.00	100.00	0.5001	Coarse Sand
BS-33	0.00	100.00	0.00	100.00	0.3896	Medium Sand
BS-34	0.00	100.00	0.00	100.00	0.3936	Medium Sand
BS-35	Not collected due to lack of beach					
BS-35A						
BS-36	0.00	100.00	0.00	100.00	0.9219	Coarse Sand
BS-37	0.00	100.00	0.00	100.00	0.8078	Coarse Sand
BS-38	Not collected due to lack of beach					
BS-39						
BS-40						
BS-40A	0.00	100.00	0.00	100.00	0.9277	Coarse Sand

Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-41	Not collected due to lack of beach					
BS-42	0.00	100.00	0.00	100.00	0.1680	Fine Sand
BS-43	0.00	100.00	0.00	100.00	0.2250	Fine Sand
BS-44	0.00	100.00	0.00	100.00	0.3115	Medium Sand
BS-45	0.00	100.00	0.00	100.00	0.1845	Fine Sand
BS-46	0.00	100.00	0.00	100.00	0.2075	Fine Sand
BS-47	Not collected due to lack of beach					
BS-48						
BS-49						
BS-50						
BS-51						
BS-52						
BS-53	0.00	100.00	0.00	100.00	0.2559	Medium Sand
BS-54	0.00	100.00	0.00	100.00	0.2746	Medium Sand
BS-55	0.00	100.00	0.00	100.00	0.1828	Fine Sand
BS-56	Not collected due to lack of beach					
BS-57						
BS-58						
BS-59						
BS-60						
BS-61						
BS-62	0.00	100.00	0.00	100.00	0.3256	Medium Sand
BS-63	Not collected due to lack of beach					
BS-64						
BS-64A	0.00	100.00	0.00	100.00	0.3055	Medium Sand
BS-65	Not collected due to lack of beach					
BS-66						
BS-67						
BS-68						
BS-69	0.00	100.00	0.00	100.00	0.3404	Medium Sand
BS-70	Not collected due to lack of beach					
BS-71	0.00	100.00	0.00	100.00	0.2012	Fine Sand
BS-72	0.00	100.00	0.00	100.00	0.3750	Medium Sand
BS-73	0.00	100.00	0.00	100.00	0.3506	Medium Sand
BS-74	0.00	100.00	0.00	100.00	0.3391	Medium Sand
BS-75	0.00	100.00	0.00	100.00	0.3215	Medium Sand
BS-76	0.00	100.00	0.00	100.00	0.3335	Medium Sand
BS-77	0.00	100.00	0.00	100.00	0.3199	Medium Sand
BS-78	0.00	100.00	0.00	100.00	0.3431	Medium Sand
BS-79	0.00	100.00	0.00	100.00	0.3326	Medium Sand
BS-80	0.00	100.00	0.00	100.00	0.3341	Medium Sand
BS-81	0.00	100.00	0.00	100.00	0.3549	Medium Sand

Table 6-14: Beach sample soil classification (Post-monsoon 2024)

Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-1	Sampling locations not approachable due to protests from locals					
BS-2						
BS-3						
BS-4						
BS-5						
BS-6						
BS-7						
BS-8						
BS-9						
BS-10	0.00	100.00	0.00	100.00	0.6211	Coarse Sand
BS-11	Samples not collected due to non-availability of beach					
BS-12						
BS-13						
BS-14	0.00	100.00	0.00	100.00	0.5712	Coarse Sand
BS-15	0.00	100.00	0.00	100.00	0.4689	Medium Sand
BS-16	0.00	100.00	0.00	100.00	0.4969	Medium Sand
BS-17	0.00	100.00	0.00	100.00	0.4662	Medium Sand
BS-18	0.00	100.00	0.00	100.00	0.4460	Medium Sand
BS-19	0.00	100.00	0.00	100.00	0.5236	Coarse Sand
BS-20	0.00	100.00	0.00	100.00	0.4901	Medium Sand
BS-21	0.00	100.00	0.00	100.00	0.4118	Medium Sand
BS-22	0.00	100.00	0.00	100.00	0.5316	Coarse Sand
BS-23	Sampling locations not approachable due to protests from locals					
BS-24						
BS-25						
BS-26						
BS-27						
BS-28						
BS-29						
BS-30						
BS-31	0.00	100.00	0.00	100.00	0.5385	Coarse Sand
BS-32	0.00	100.00	0.00	100.00	0.4232	Medium Sand
BS-33	0.00	100.00	0.00	100.00	0.4579	Medium Sand
BS-34	0.00	100.00	0.00	100.00	0.5932	Coarse Sand
BS-35	Sample not collected due to non-availability of beach					
BS-35A	0.00	100.00	0.00	100.00	0.3784	Medium Sand
BS-36	0.00	100.00	0.00	100.00	0.5975	Coarse Sand
BS-37	0.00	100.00	0.00	100.00	0.4451	Medium Sand
BS-38	Samples not collected as they are located in port construction area					
BS-39						
BS-40						
BS-40A	0.00	100.00	0.00	100.00	0.5881	Coarse Sand
BS-41	0.00	100.00	0.00	100.00	0.5368	Coarse Sand
BS-42	0.00	100.00	0.00	100.00	0.4019	Medium Sand

Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-43	0.00	100.00	0.00	100.00	0.5910	Coarse Sand
BS-44	0.00	100.00	0.00	100.00	0.5989	Coarse Sand
BS-45	0.00	100.00	0.00	100.00	0.2313	Fine Sand
BS-46	0.00	100.00	0.00	100.00	0.4548	Medium Sand
BS-47	Sample not collected due to non-availability of beach					
BS-48	0.00	100.00	0.00	100.00	0.3432	Medium Sand
BS-49	Samples not collected due to non-availability of beach					
BS-50						
BS-51						
BS-52						
BS-53	0.00	100.00	0.00	100.00	0.4395	Medium Sand
BS-54	0.00	100.00	0.00	100.00	0.4856	Medium Sand
BS-55	0.00	100.00	0.00	100.00	0.4798	Medium Sand
BS-56	Sample not collected due to non-availability of beach					
BS-57	0.00	100.00	0.00	100.00	0.4198	Medium Sand
BS-58	Samples not collected due to non-availability of beach					
BS-59						
BS-60	0.00	100.00	0.00	100.00	0.5172	Coarse Sand
BS-61	0.00	100.00	0.00	100.00	0.5243	Coarse Sand
BS-62	0.00	100.00	0.00	100.00	0.4641	Medium Sand
BS-63	Samples not collected due to non-availability of beach					
BS-64						
BS-64A	0.00	100.00	0.00	100.00	0.4041	Medium Sand
BS-65	Samples not collected due to non-availability of beach					
BS-66						
BS-67	0.00	100.00	0.00	100.00	0.5008	Coarse Sand
BS-68	0.00	100.00	0.00	100.00	0.3974	Medium Sand
BS-69	0.00	100.00	0.00	100.00	0.5138	Coarse Sand
BS-70	0.00	100.00	0.00	100.00	0.3990	Medium Sand
BS-71	0.00	100.00	0.00	100.00	0.5356	Coarse Sand
BS-72	0.00	100.00	0.00	100.00	0.4327	Medium Sand
BS-73	0.00	100.00	0.00	100.00	0.5298	Coarse Sand
BS-74	0.00	100.00	0.00	100.00	0.5433	Coarse Sand
BS-75	0.00	100.00	0.00	100.00	0.4587	Medium Sand
BS-76	0.00	100.00	0.00	100.00	0.4187	Medium Sand
BS-77	0.00	100.00	0.00	100.00	0.4878	Medium Sand
BS-78	0.00	100.00	0.00	100.00	0.4835	Medium Sand
BS-79	0.00	100.00	0.00	100.00	0.5084	Coarse Sand
BS-80	0.00	100.00	0.00	100.00	0.5466	Coarse Sand
BS-81	0.00	100.00	0.00	100.00	0.4656	Medium Sand

The classification is based on Wentworth scale as provided below:

Very fine Sand – 0.0625 to 0.125 mm
Fine Sand – 0.125 to 0.250 mm
Medium Sand – 0.250 to 0.500 mm
Coarse Sand – 0.500 to 1.000 mm
Very coarse Sand – 1.000 to 2.000 mm

The following graphs shows the distribution of D50 value of the sediments collected in each location.

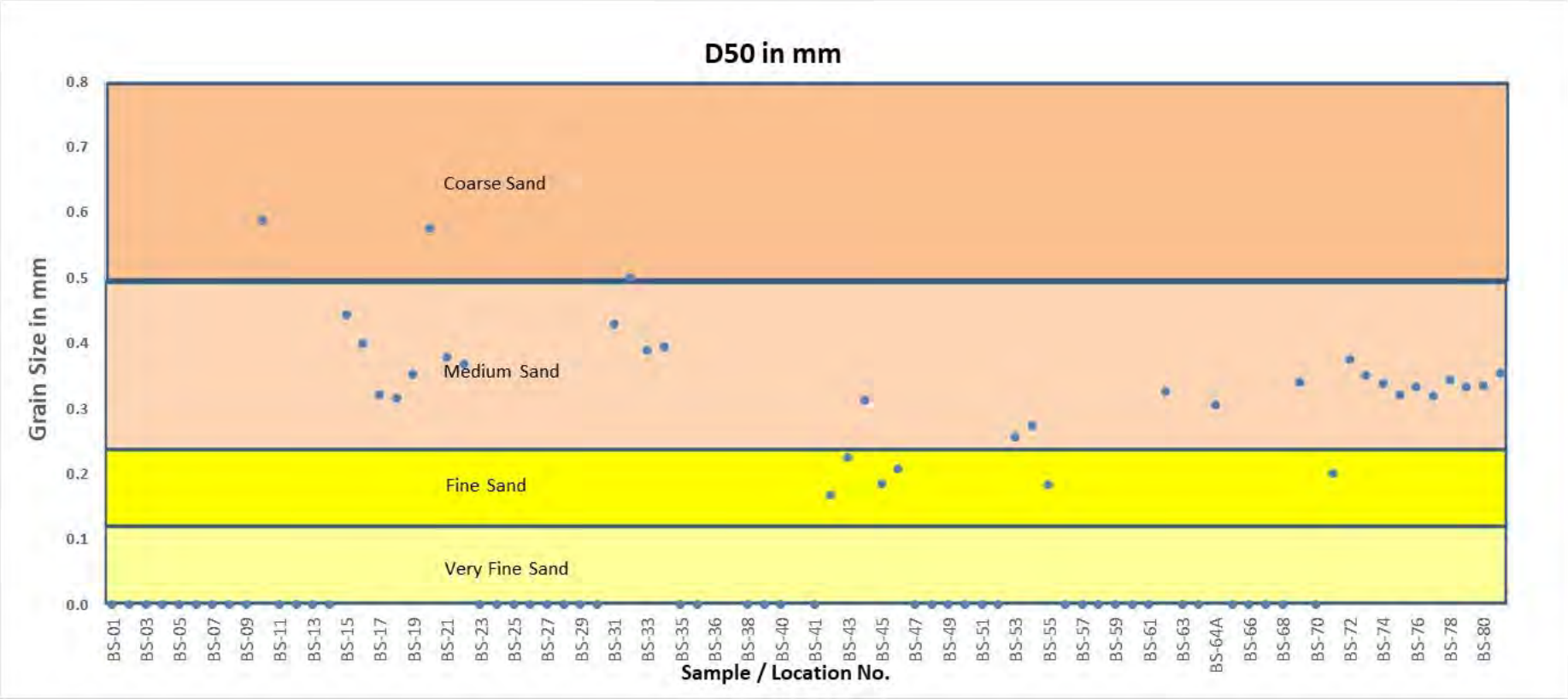


Figure 6-20: Distribution of D50 value of beach samples (Monsoon 2024)

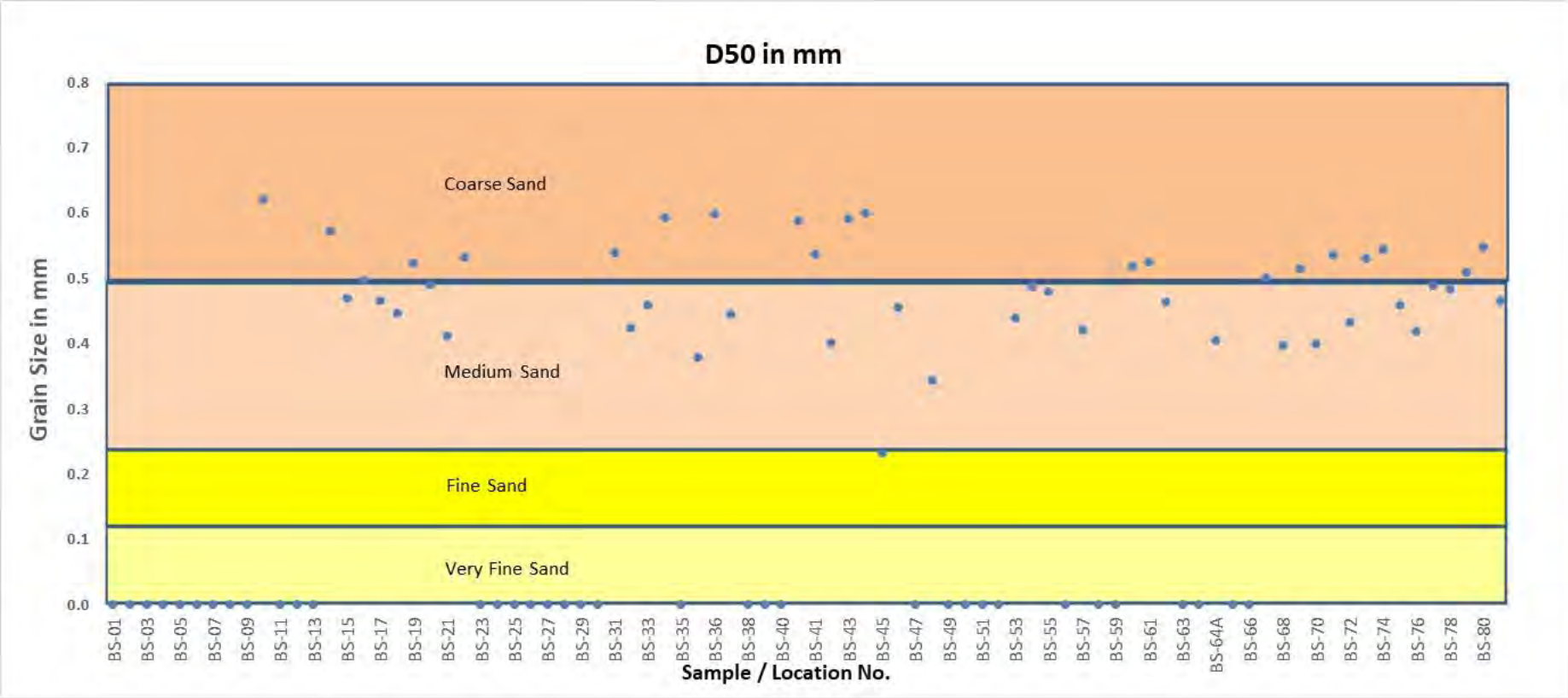
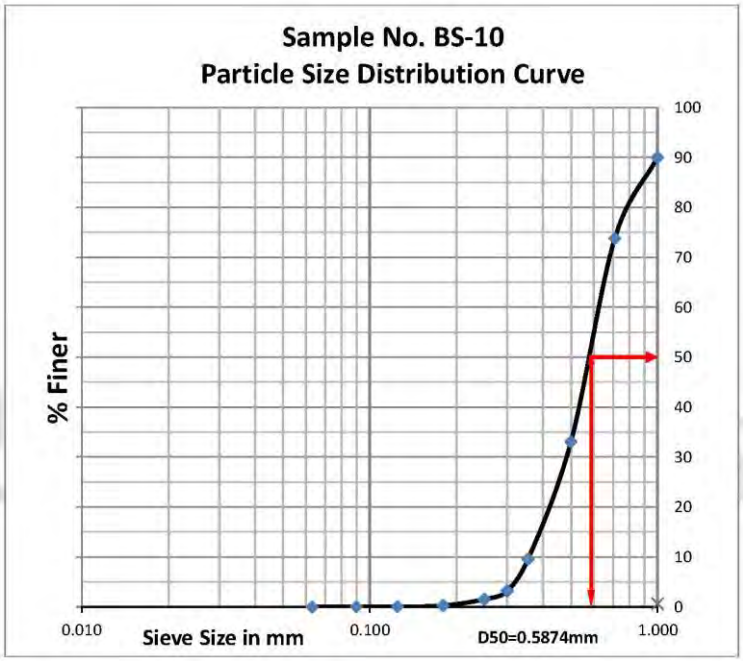


Figure 6-21: Distribution of D50 value of beach samples (Post-monsoon 2024)

The particle size distribution curves for beach samples collected a few locations are placed in the images below.

Standards



The results are related only to the samples submitted for analysis and this test report shall not be reproduced except in full, without the written approval of the laboratory.

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

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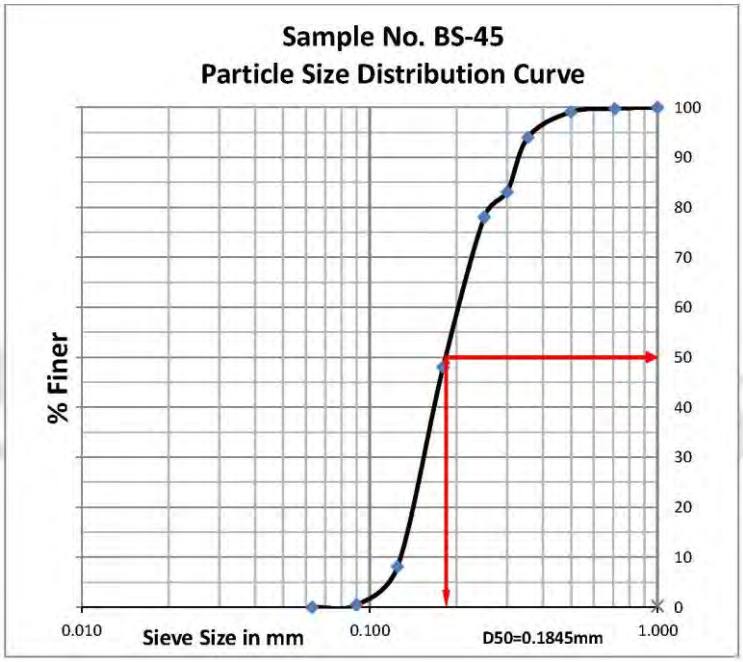
Figure 6-22: Grain size distribution curve for BS-10 (Monsoon 2024)

Standards



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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

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Figure 6-23: Grain size distribution curve for BS-45 (Monsoon 2024)

Standards

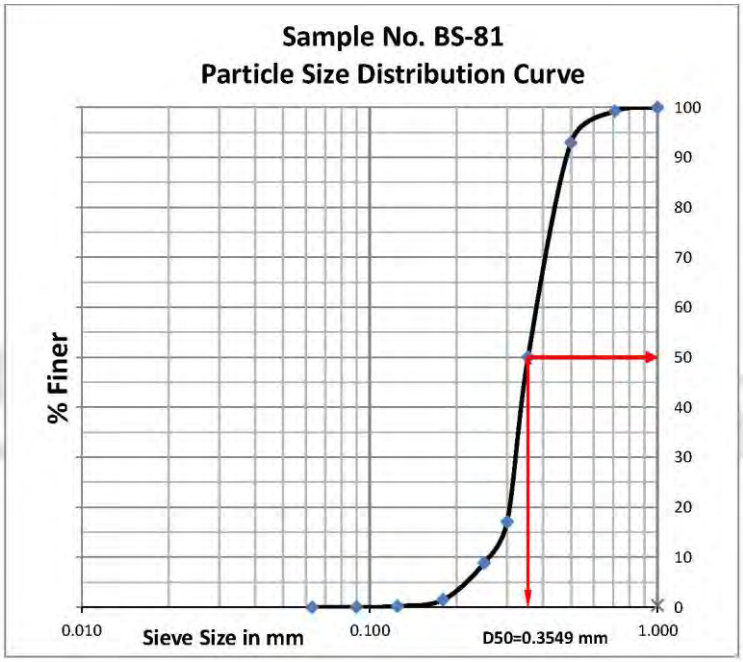

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Figure 6-24: Grain size distribution curve for BS-81 (Monsoon 2024)

Standards
Quality Services Through Technical Excellence

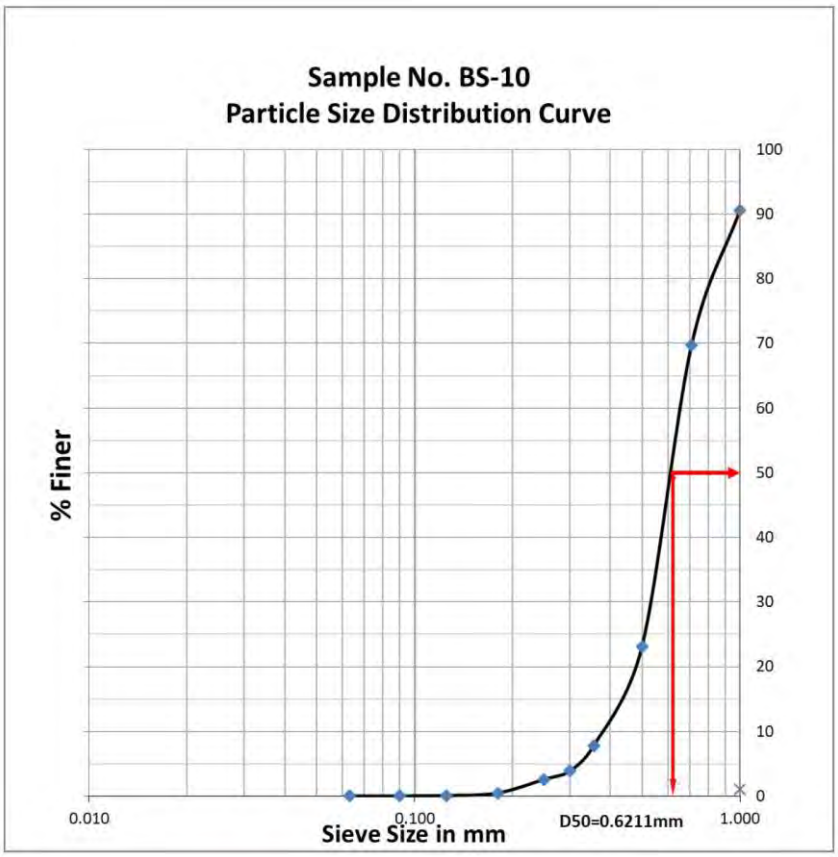

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Figure 6-25: Grain size distribution curve for BS-10 (Post-monsoon 2024)

Standards
Quality Services Through Technical Excellence

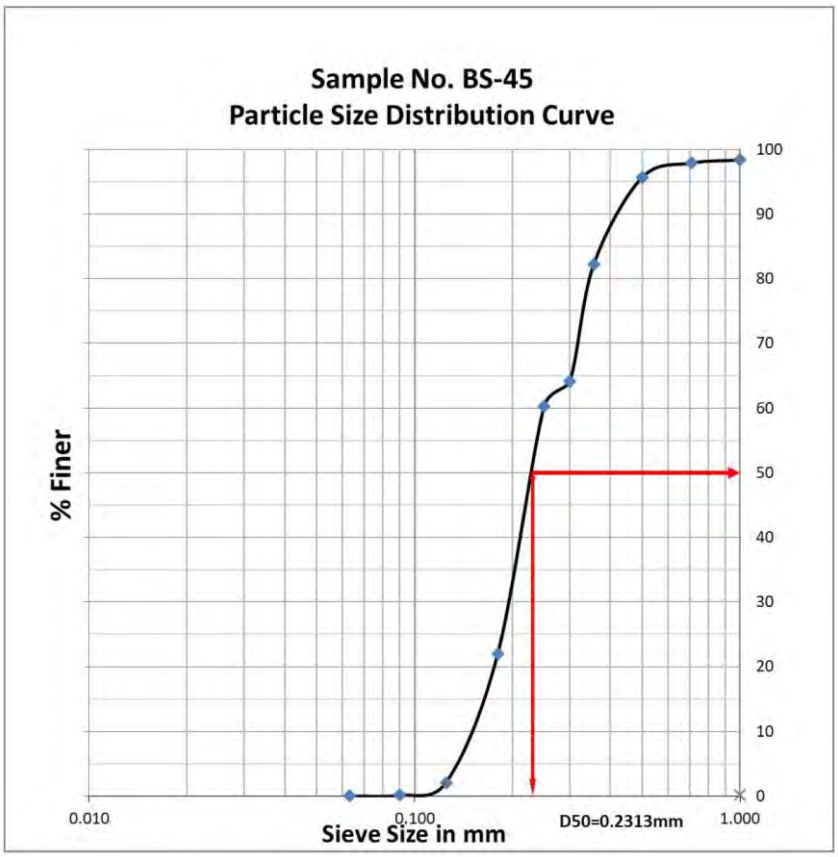

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Figure 6-26: Grain size distribution curve for BS-45 (Post-monsoon 2024)

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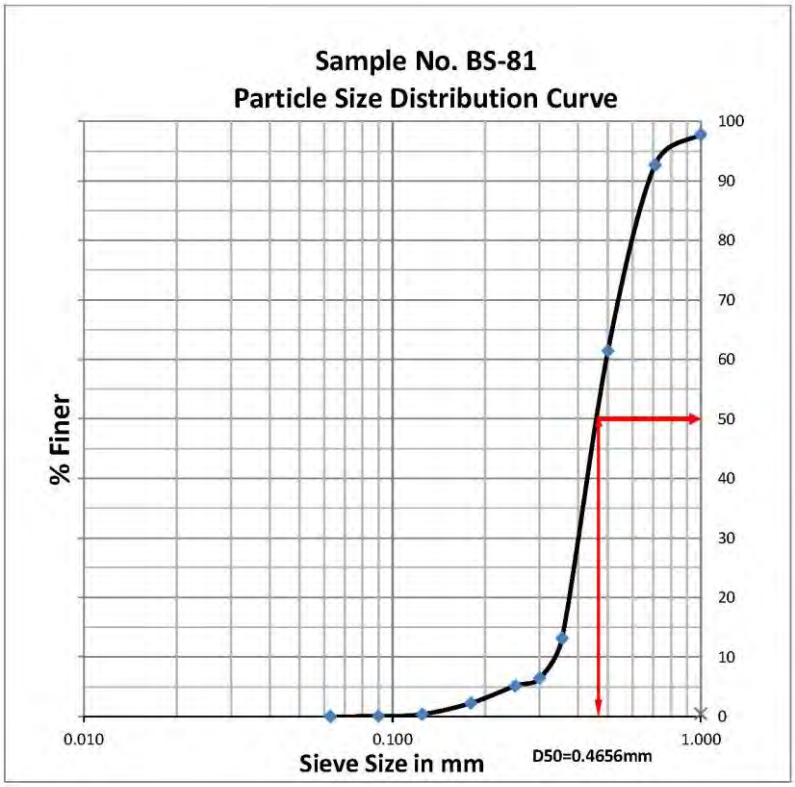

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Figure 6-27: Grain size distribution curve for BS-81 (Post-monsoon 2024)

6.12 Bathymetry

Survey Location

The following image shows the coverage of the area surveyed using R2Sonic 2020 multibeam echo sounder.

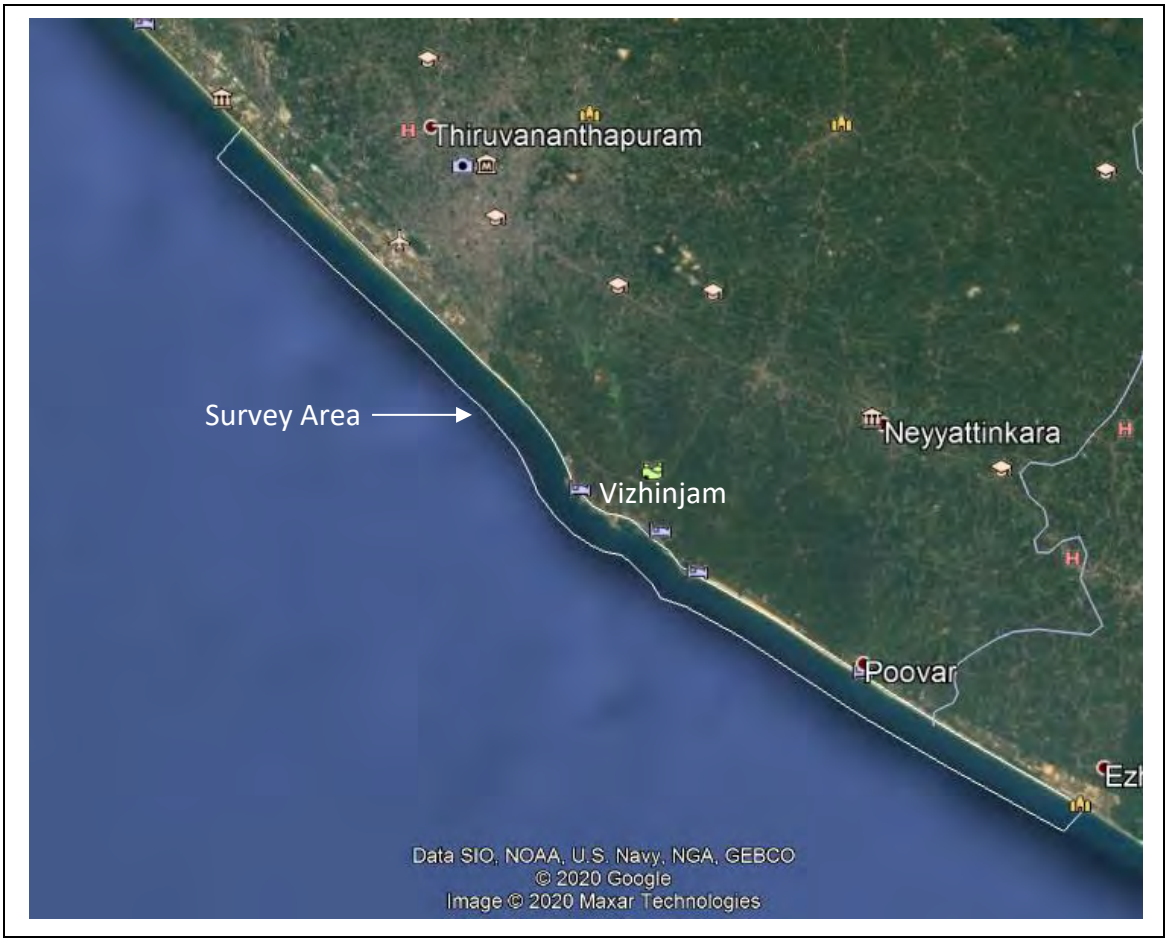


Figure 6-28: Bathymetry area coverage

Line Plan and Survey Methodology

The survey lines were planned at intervals of 25m parallel to the coast up to the depth of 20m for the post-monsoon 2024 period. The vessel was positioned using a Trimble DGPS system which also provided the heading. The vessel tracks and offset positions were recorded digitally and the data from the multibeam echo sounder was logged digitally within the Hypack acquisition software.

Prior to commencement of the survey, the DGPS and gyrocompass calibrations were carried out when the survey vessel was berthed at the Vizhinjam Fishing Jetty. The multibeam echo sounder was calibrated by conducting the patch test. The bathymetric data was reduced to Chart Datum (CD) by using the observed tides from the tide gauge

installed at berth area, Vizhinjam Port. A Valeport Sound Velocity Probe (SVP) was used to measure the speed of sound in the water column. Motion compensation was achieved by the DMS-05 Motion Reference Unit (MRU). Data was processed using Hypack software. Calibration values obtained from the patch test were applied to the acquired data along with the required sound velocity profile and tide data for creation of final xyz file.

Results

The maximum depth recorded by multibeam echo sounder is 26.4m below CD in the northern part of the survey area along the western boundary. The seabed is seen to slope gently towards the southwest.

A colour-coded image of the post-monsoon 2024 bathymetry is provided below.

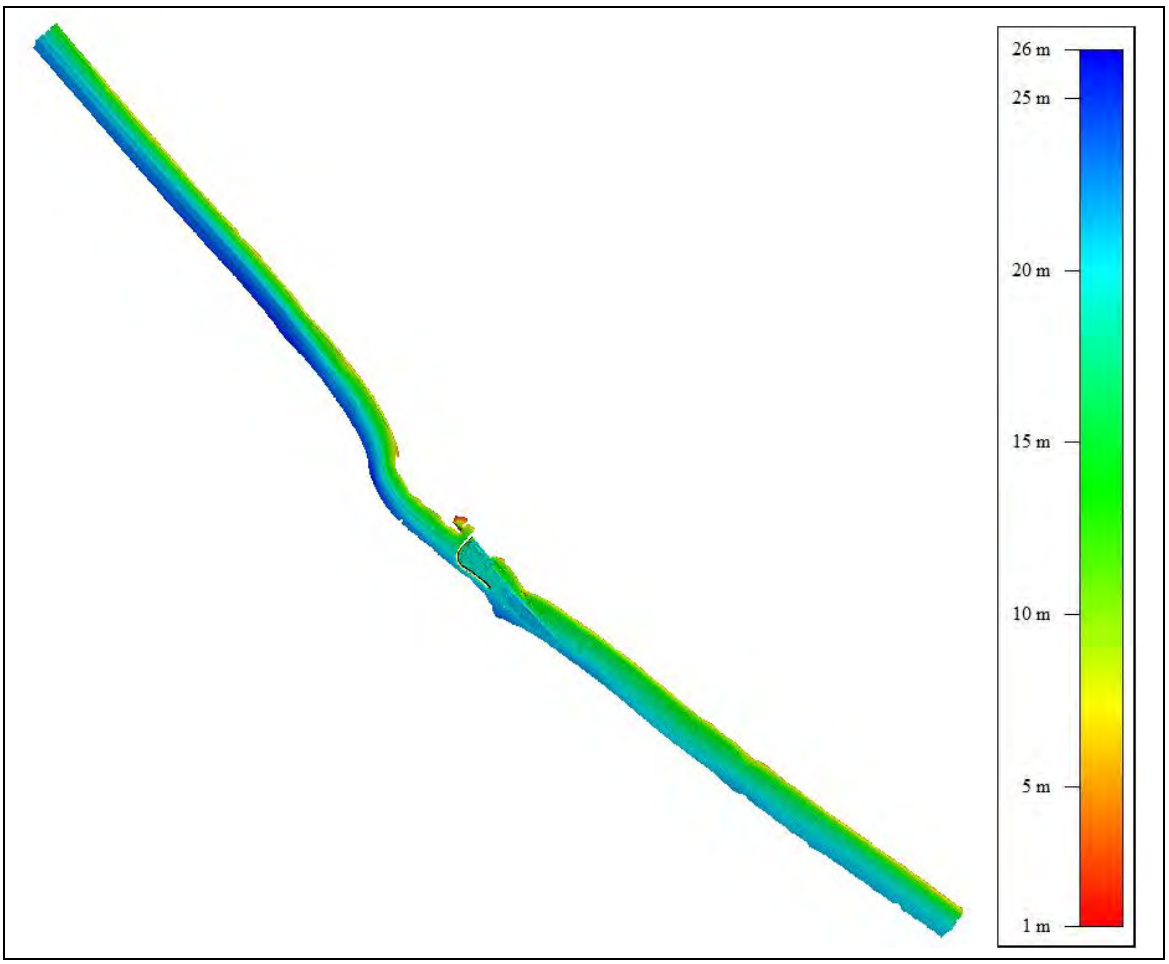
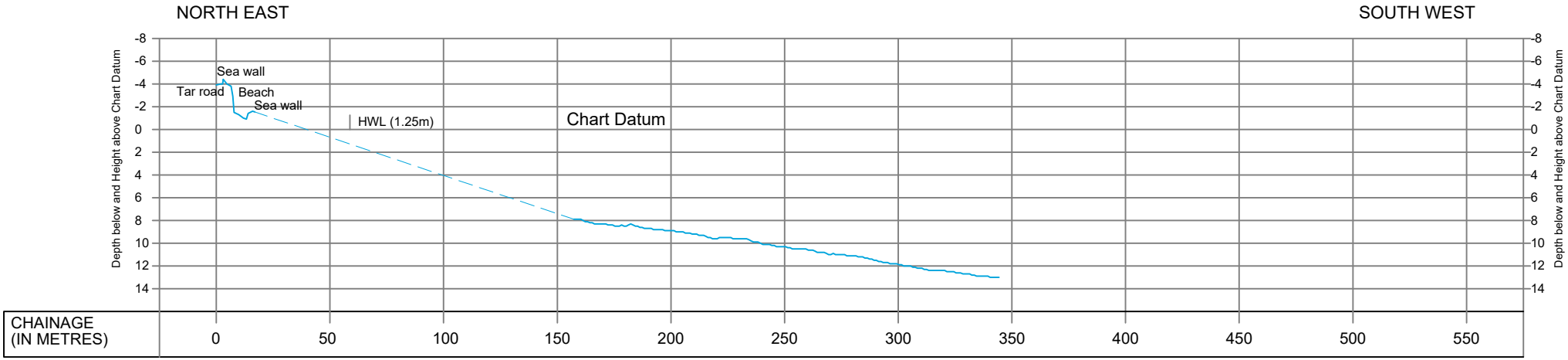


Figure 6-29: Colour-coded bathymetry image

Cross Section Line No.CSP-12 (March 2025)



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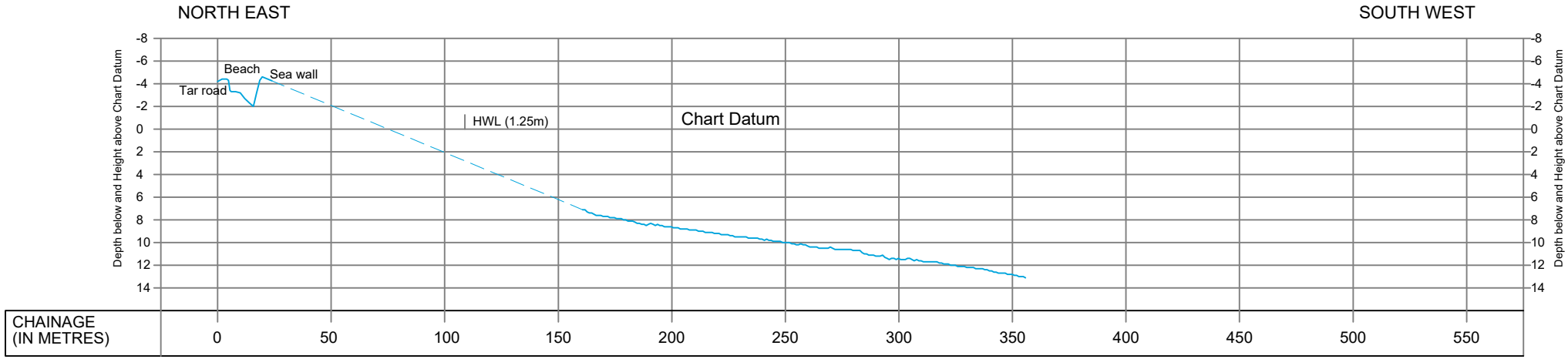
Cross Section Line No.CSP-11 (March 2025)



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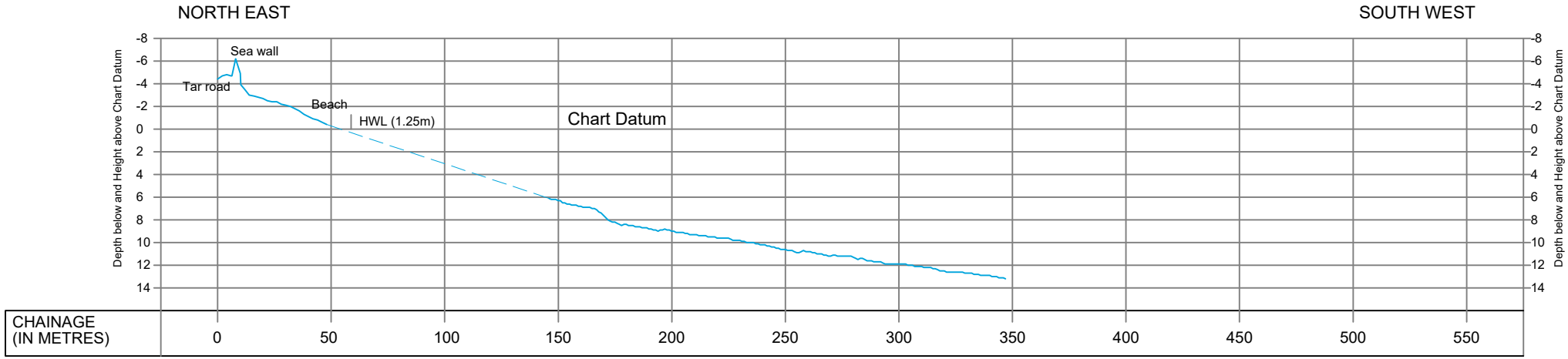

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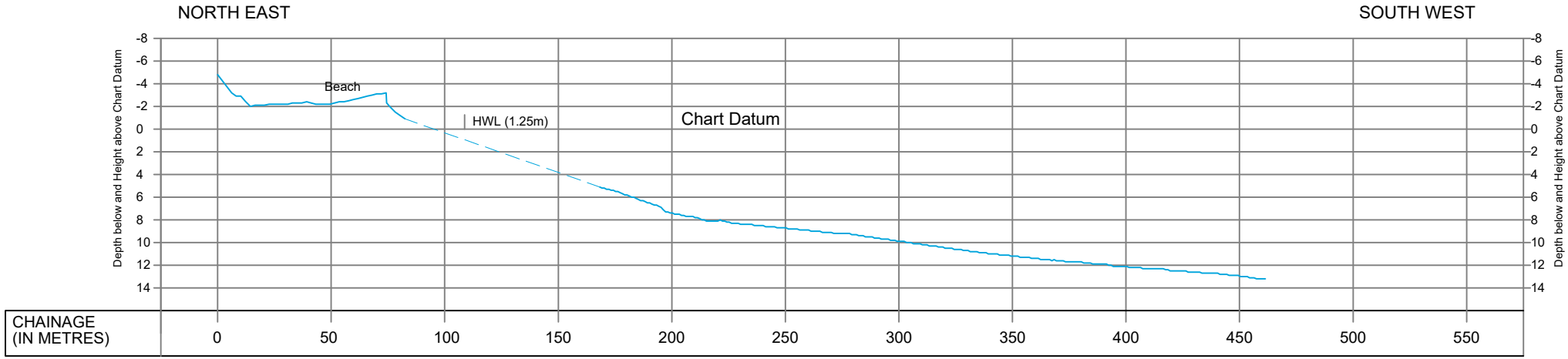

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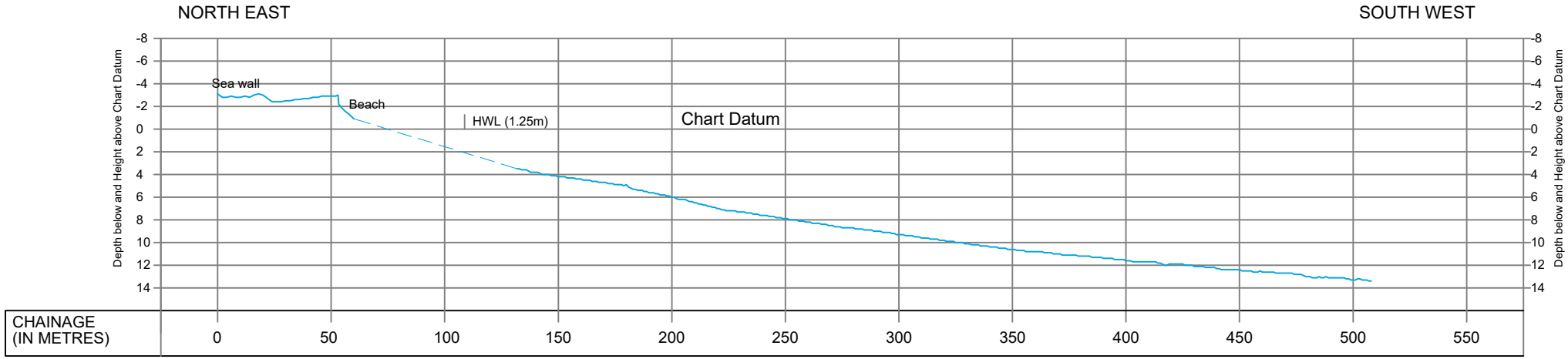
Cross Section Line No.CSP-54 (March 2025)



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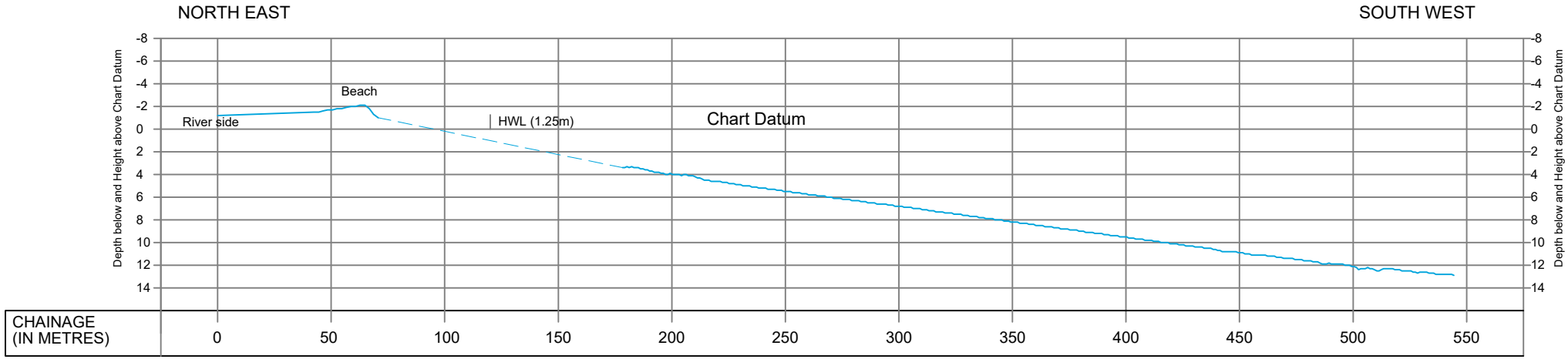
Cross Section Line No.CSP-53 (March 2025)



SCALE
HORIZONTAL 1: 1000
VERTICAL 1: 200

7 WEATHER

The weather was not conducive to the survey operations. The offshore survey was carried out during favorable weather windows.

8 REFERENCES

The following documents/web sites were referenced during the preparation of the report.

- AVPPL Service order 5702011433 dated 05th June 2023
- Web site https://www.vizhinjamport.in/home.html, and https://www.vizhinjamport.in/download/Feasibility-Report.pdf
- WMO manual, section 5.2.2
- Monthly survey reports from October 2024 to March 2025.

9 CONCLUSIONS

The following conclusions were made during this phase of the project:

1. Tide was mixed semi diurnal with a maximum range being observed during spring tide. The maximum tidal range of 1.07 m was observed in the month of November 2024.
2. The significant wave heights decreased after the retreat of monsoon. The maximum significant wave height observed was 2.20 m in the month of October 2024. The maximum surface current speed of 83.8 cm/s was observed in the month of December 2024. The current direction was predominantly towards southeast direction.
3. The maximum wind speeds were blowing from the west-northwest and east-southeast during the post-monsoon period. The maximum wind speed recorded was 7.50 m/s in the month of October 2024.
4. The along-shore current speed was recorded in a northward direction in post-monsoon period. The maximum along shore current speed recorded was 20.75 cm/sec at CSP-70 (Shangumugham) in the month of February 2025.
5. At the water sampling locations, a maximum TSS content of 2.1 mg/l was recorded at Location L1 (Mulloor) at the bottom, the salinity was in the range of 33.1 and 33.8 ppt

and maximum turbidity of 1.0 NTU was observed near the bottom of Locations L1 (Mulloor) and L2 (Kovalam).

6. The beach sediments are seen to consist of medium to coarse sand in most locations, though fine sand was also observed at a few locations during the monsoon 2024 period.
7. The seabed is seen slope gently towards the southwest. The maximum depth recorded by multibeam echo sounder is 26.4m below CD in the northern part of the survey area at few locations along the western boundary.

10 ACKNOWLEDGEMENTS

During the course of project, the support received from AVPPL staff is highly appreciated and acknowledged. The guidance received throughout the project from NIOT scientists is also hereby appreciated. The boat crew and all others, who had supported us during the project is also acknowledged.

Annexure I

Photo Documentation At CSP Locations

Figure 1- March 2025 CSP 10

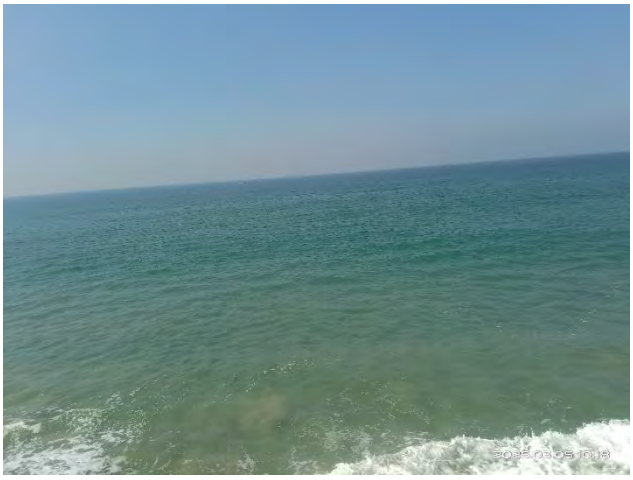


Figure 2- March 2025 CSP 11

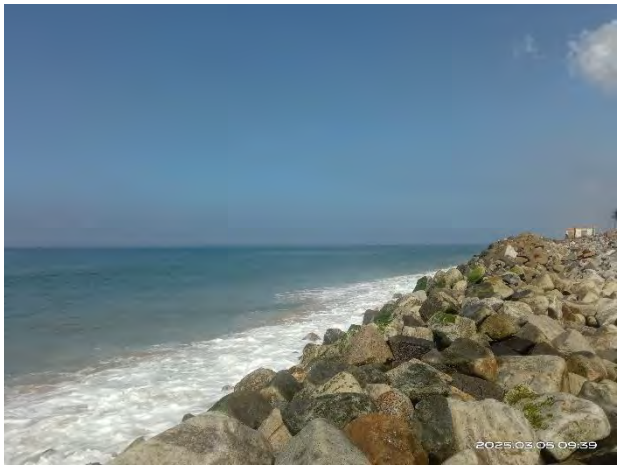


Figure 3- March 2025 CSP 12

Figure 4- March 2025 CSP 13

Figure 5- March 2025 CSP 14

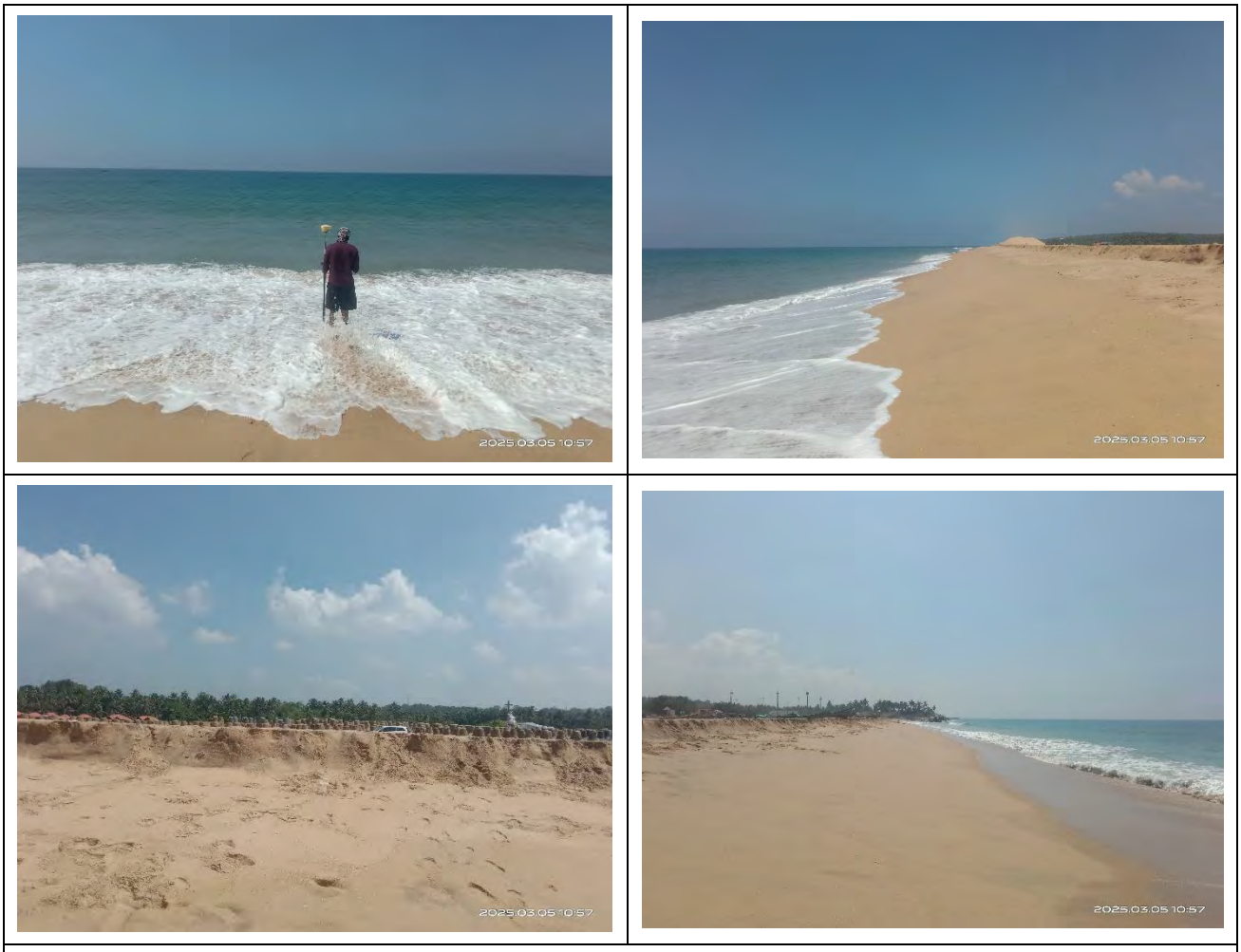


Figure 6- March 2025 CSP 15

Figure 7- March 2025 CSP 16

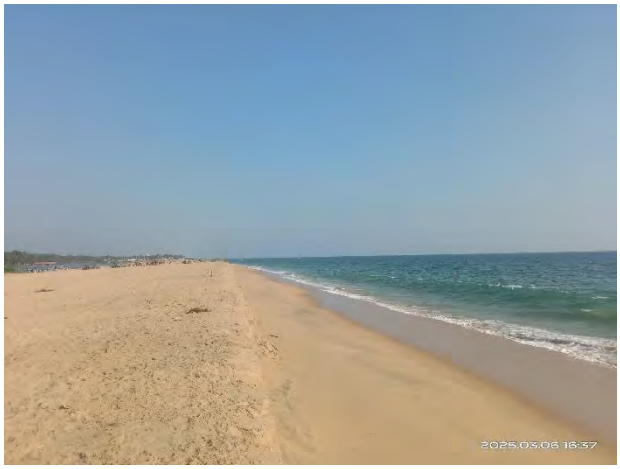


Figure 8- March 2025 CSP 17

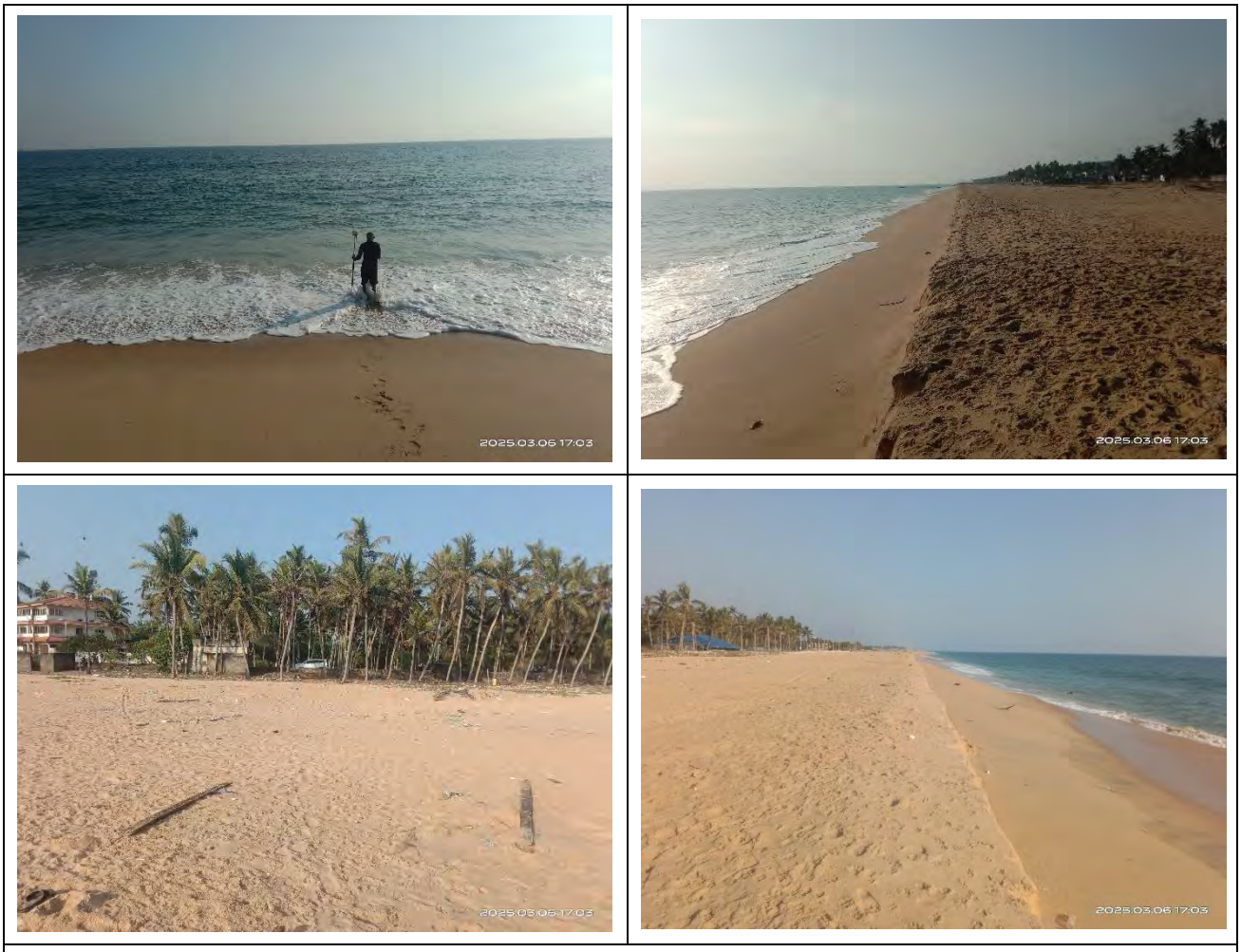
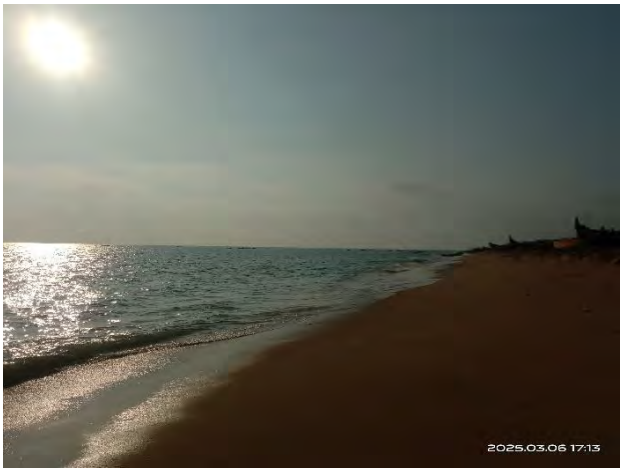
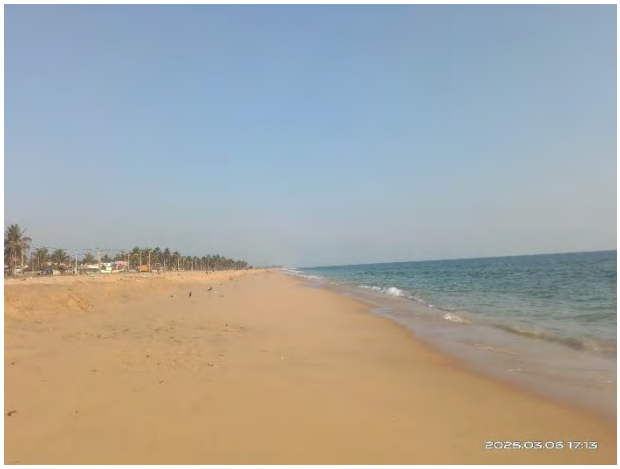


Figure 9- March 2025 CSP 18





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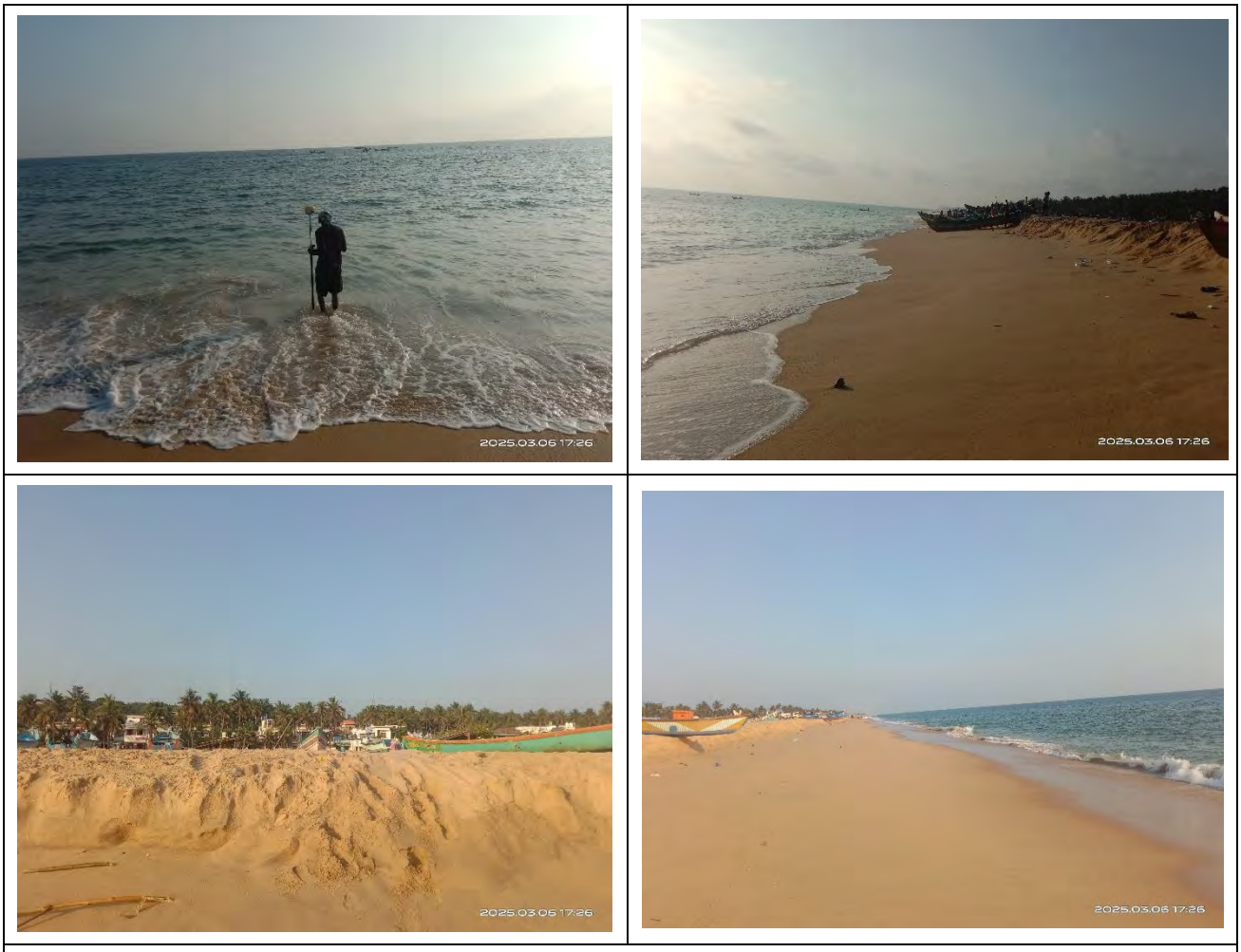

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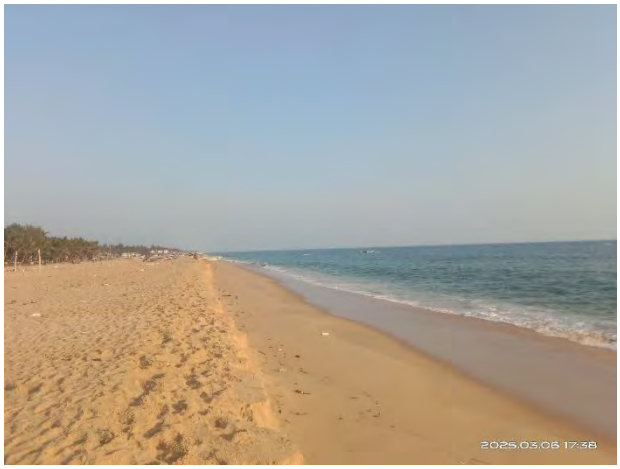

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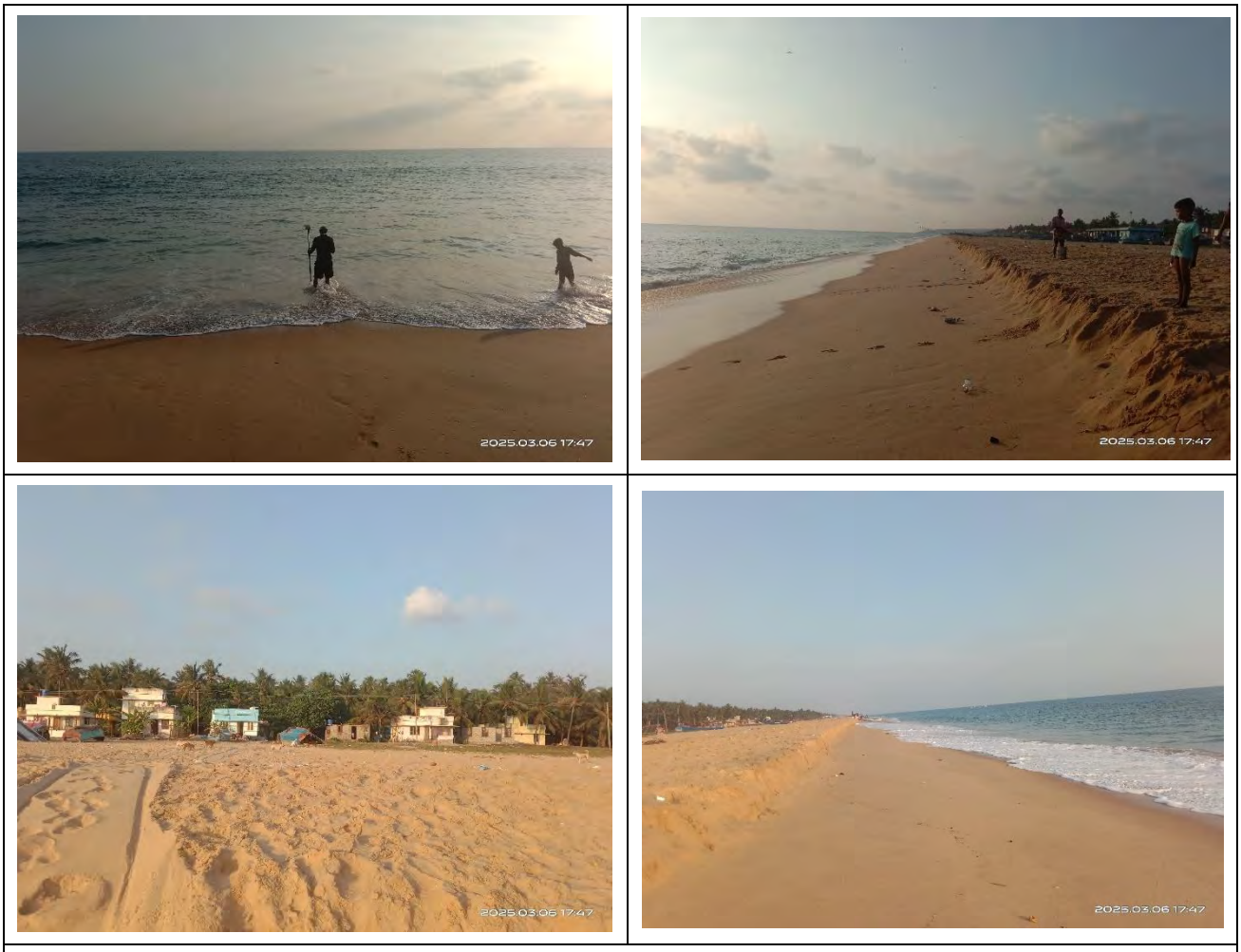


Figure 13 March 2025 CSP 22

Figure 14- March 2025 CSP 31

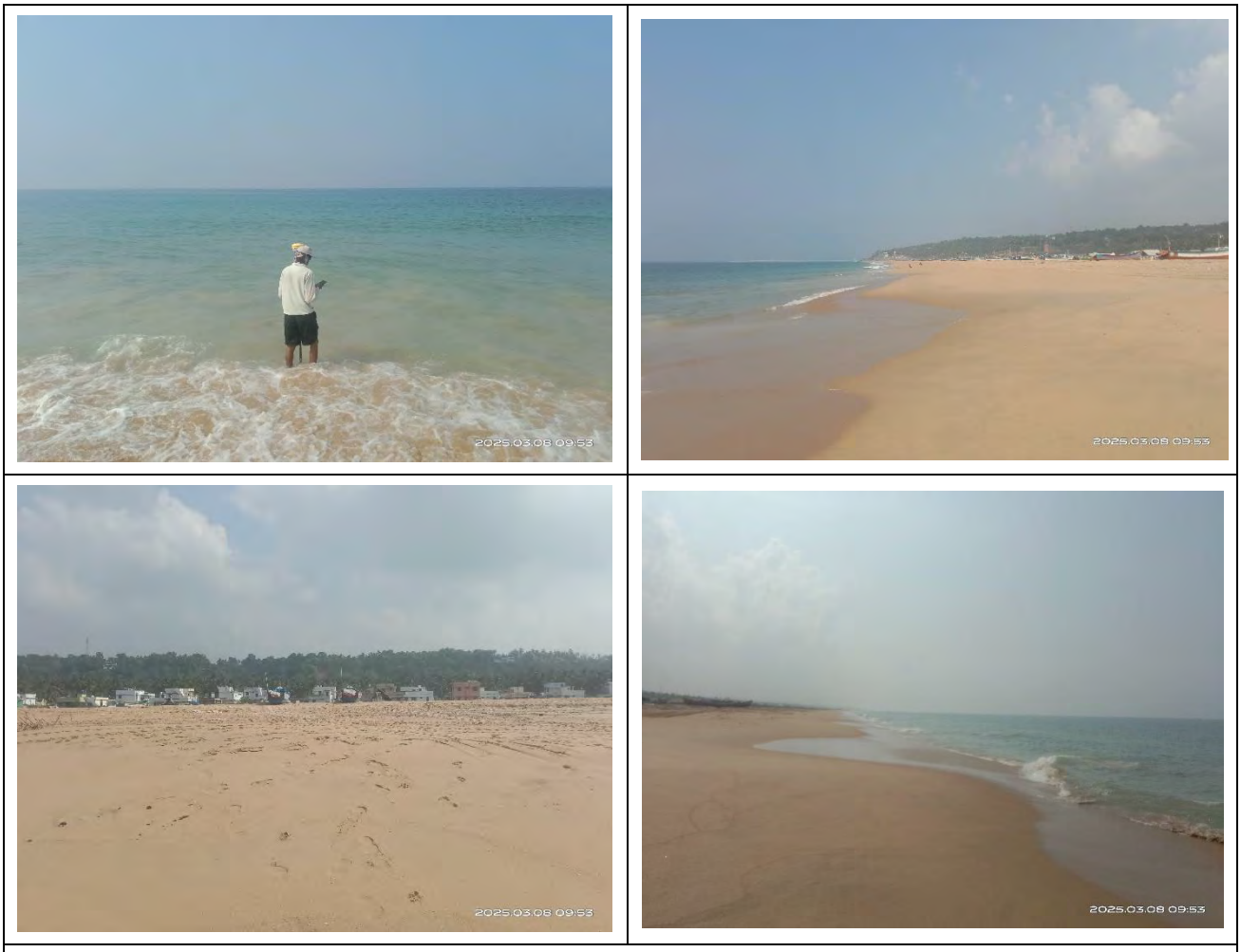


Figure 15- March 2025 CSP 32

Figure 16- March 2025 CSP 33

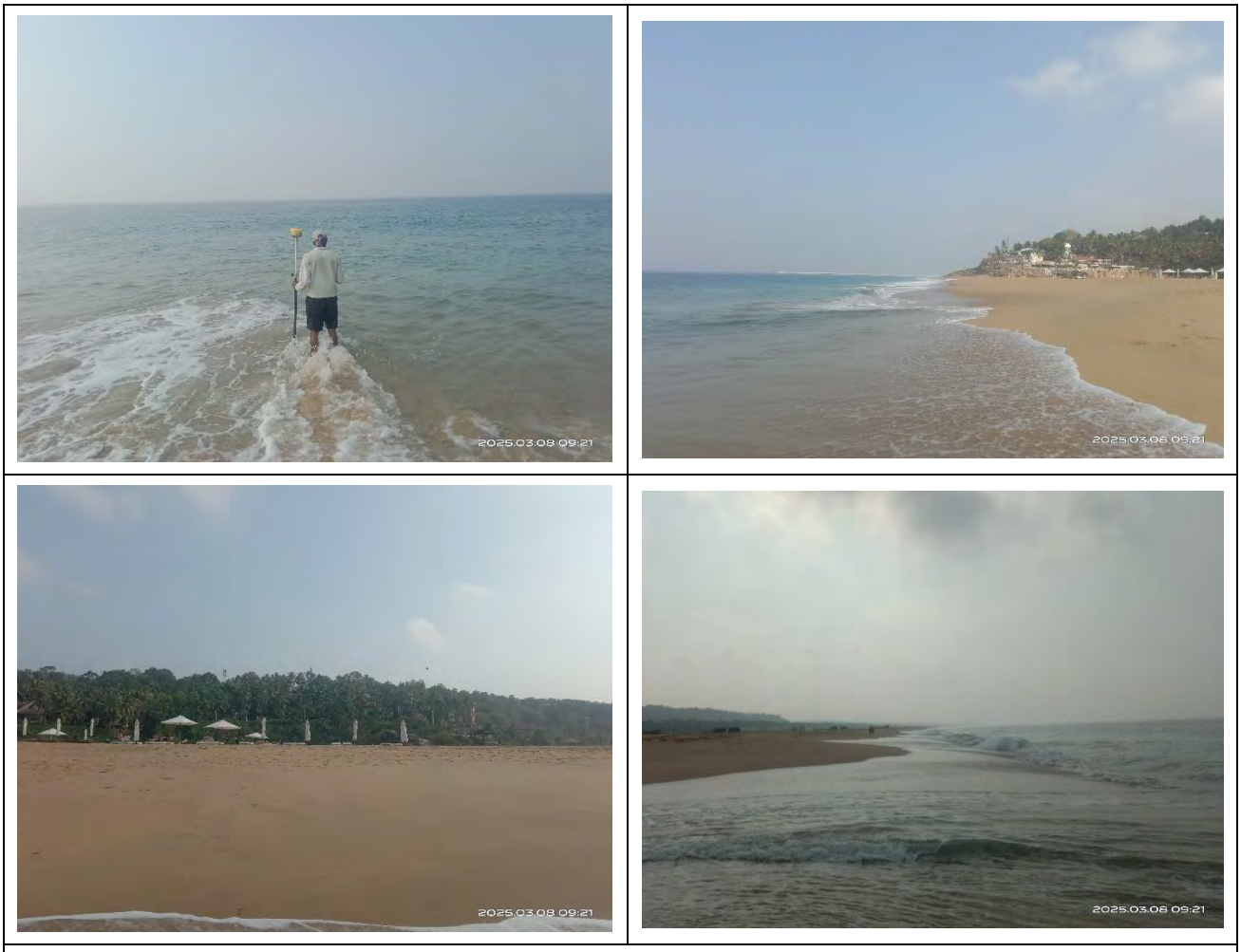
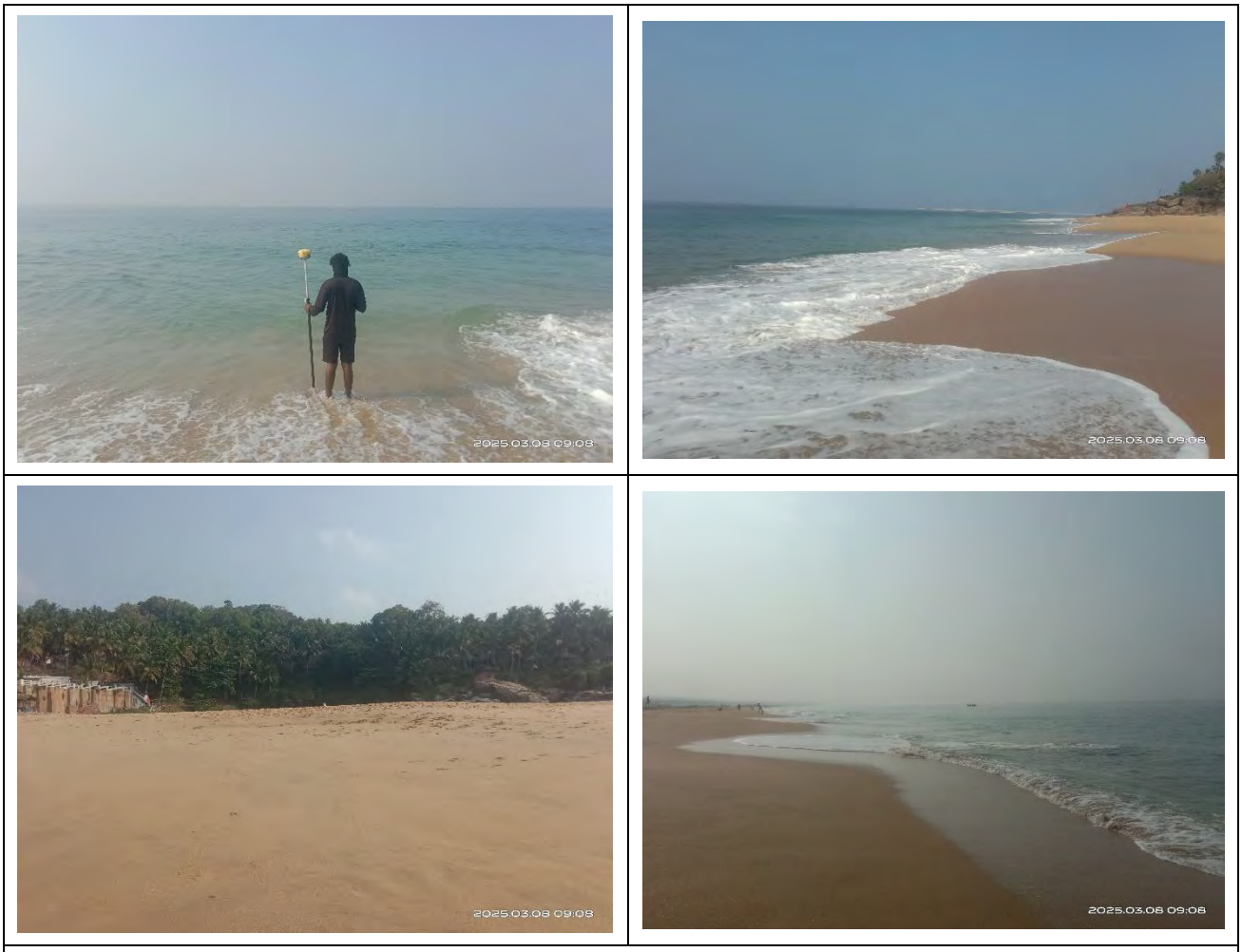


Figure 17- March 2025 CSP 34



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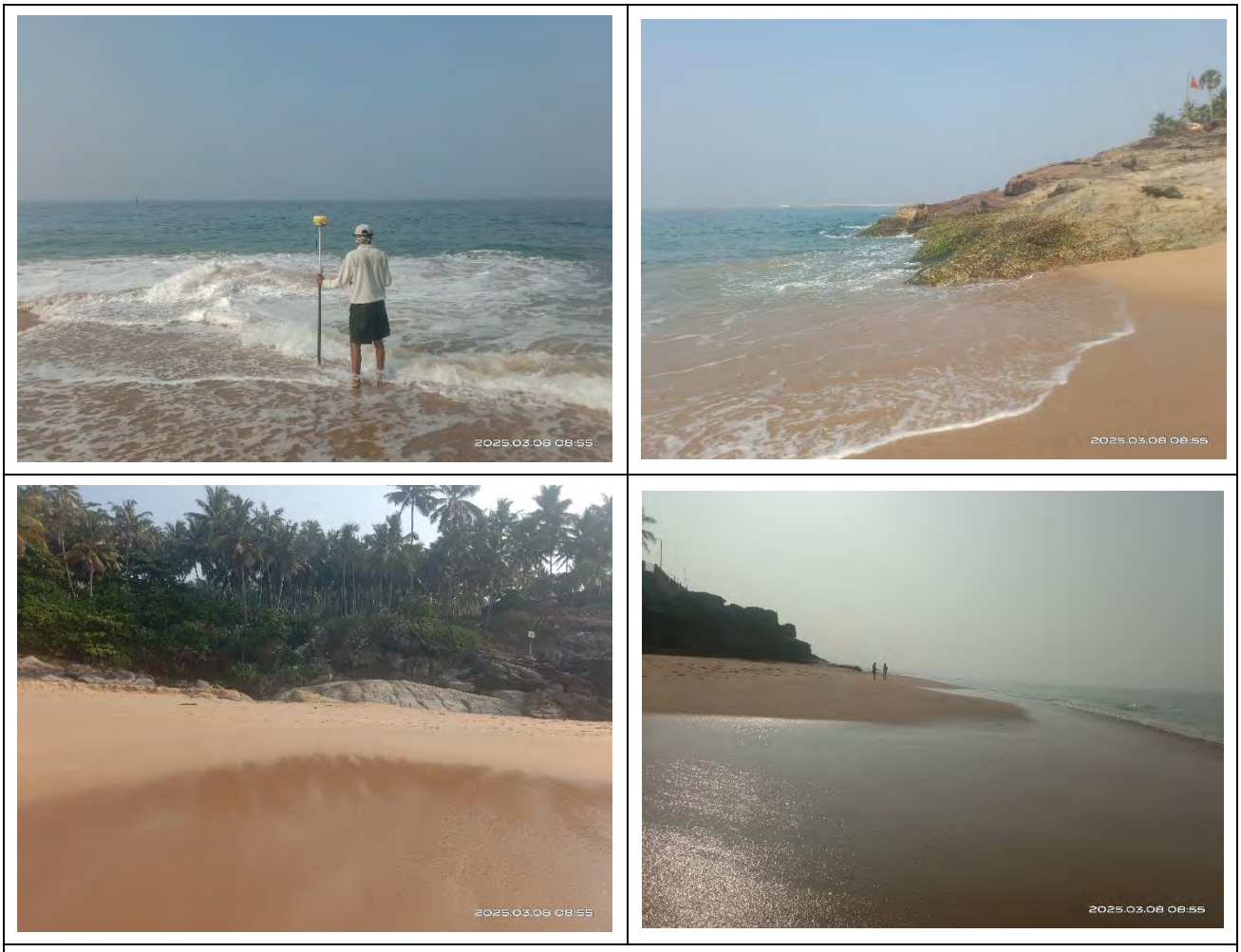
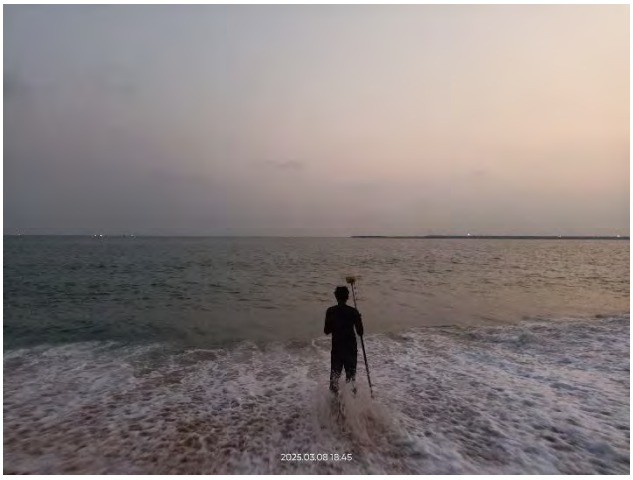
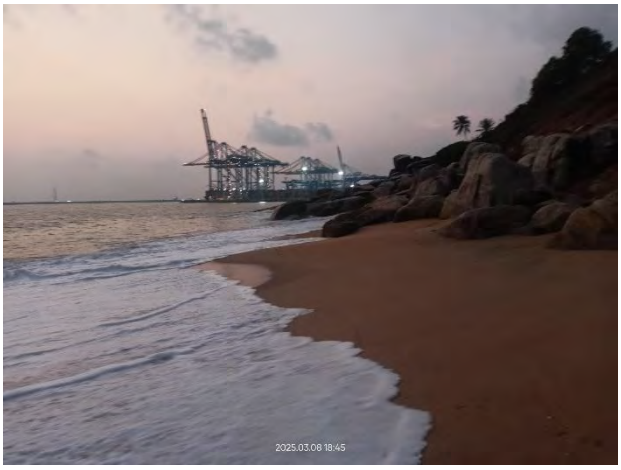
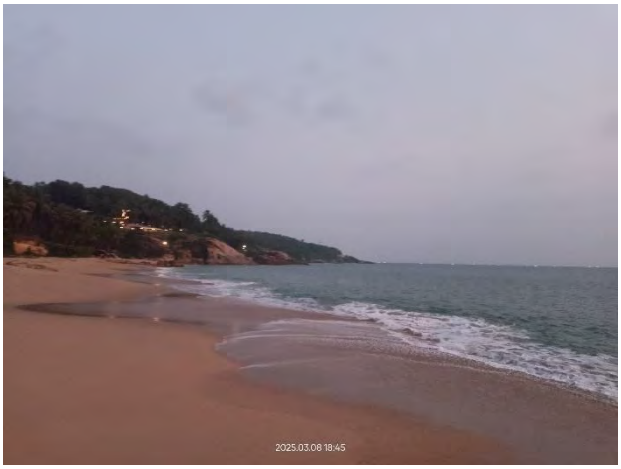


Figure 29- March 2025 CSP 35

Figure 20- March 2025 CSP 36







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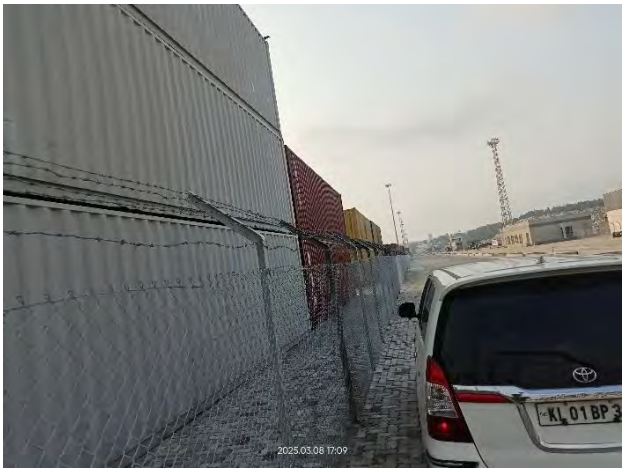


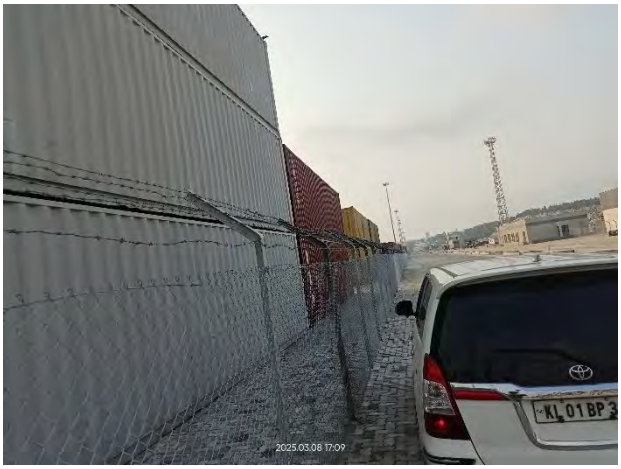
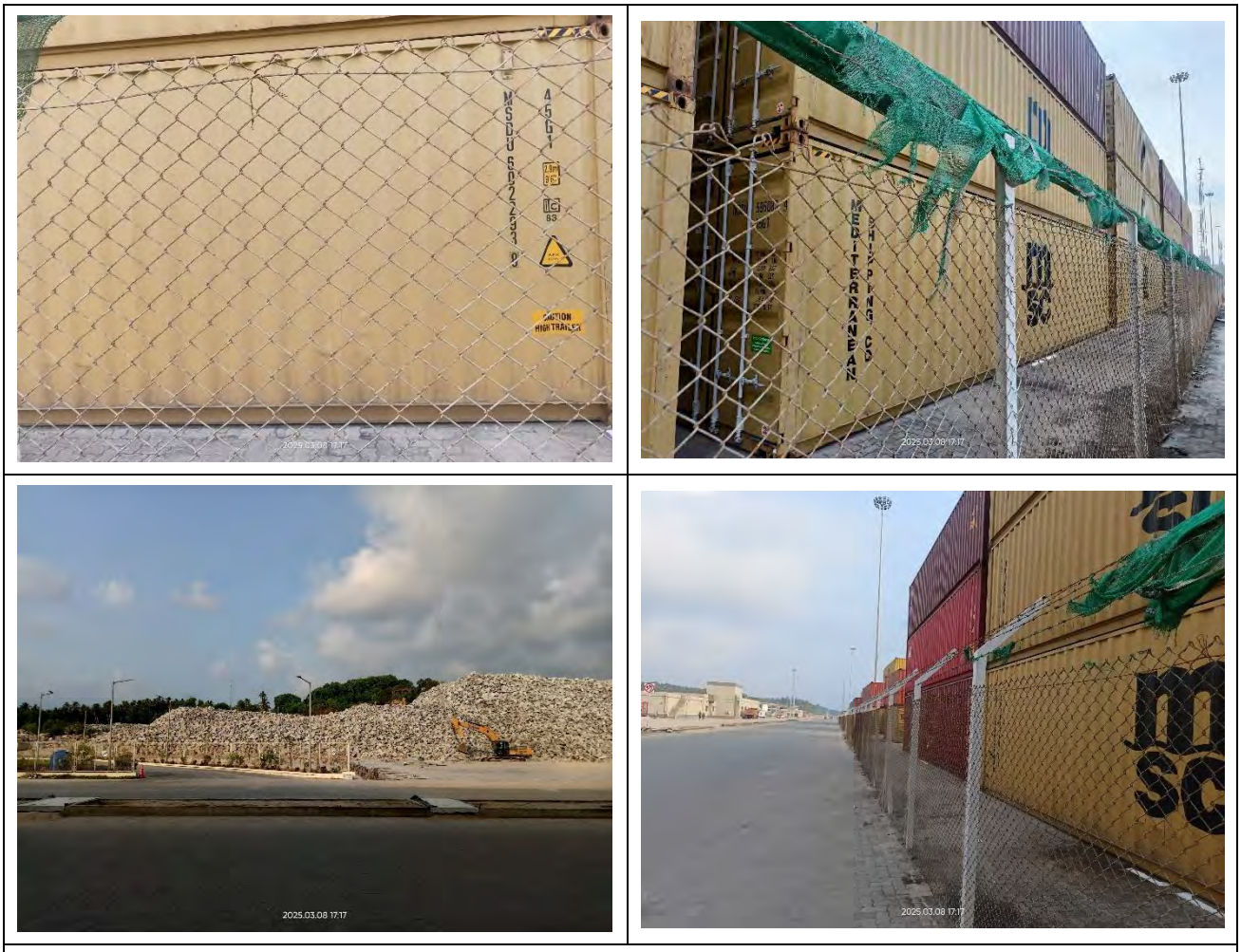


Figure 22- March 2025 CSP 38



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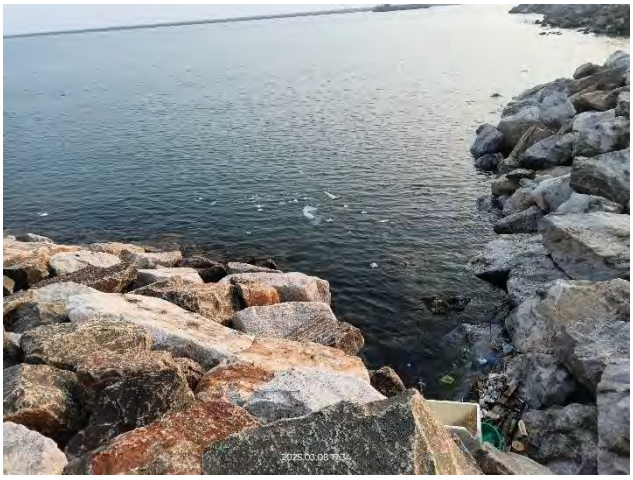

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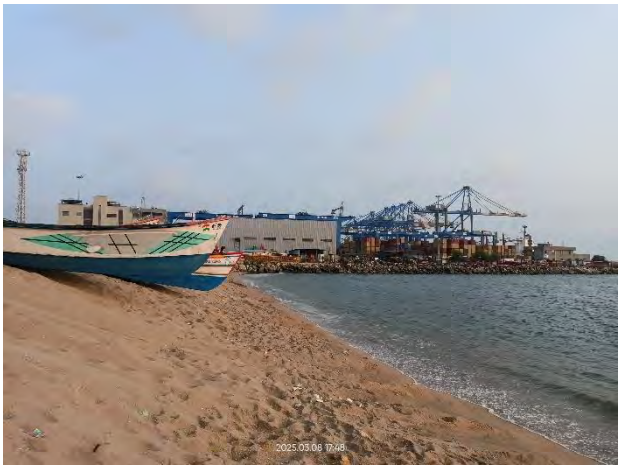

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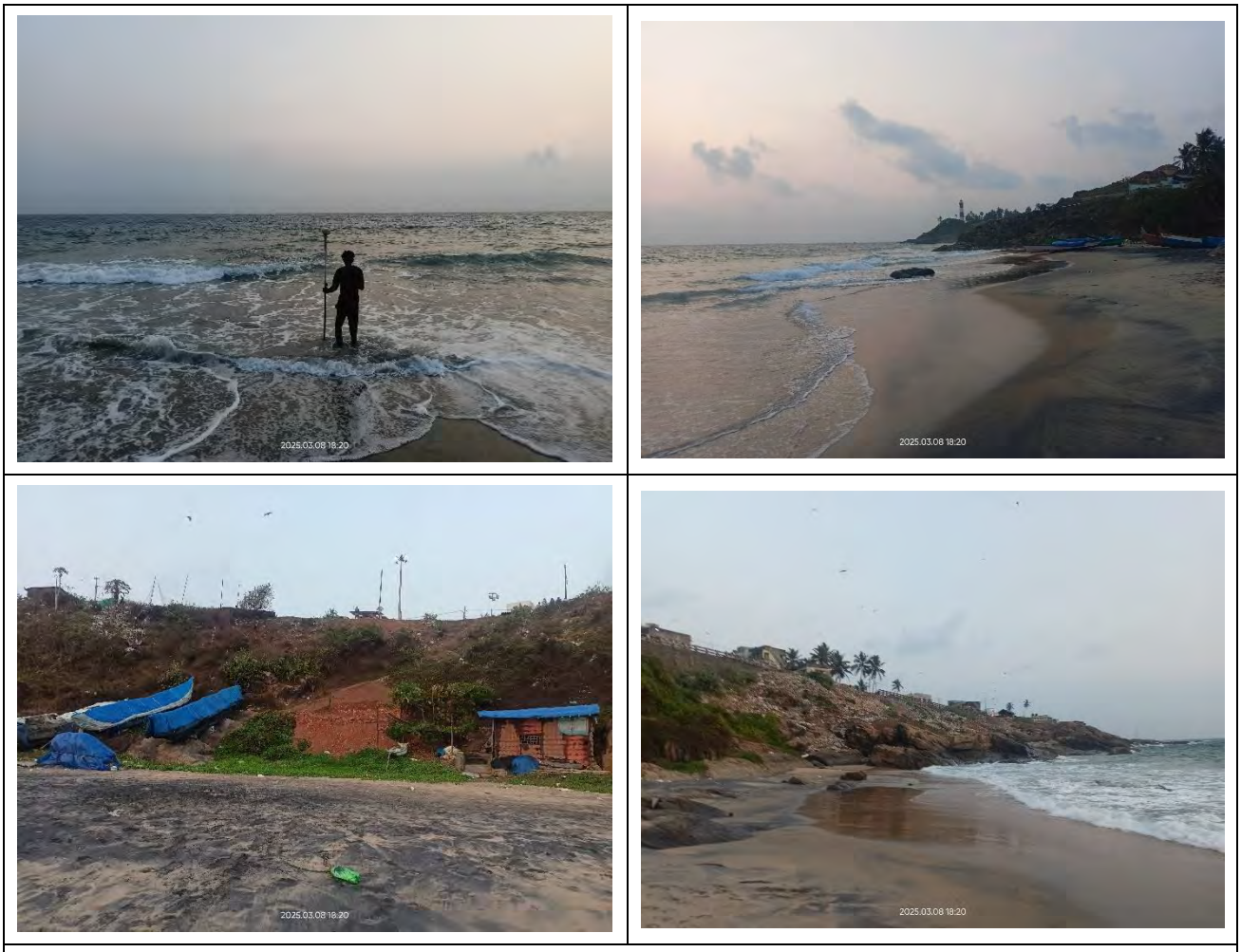
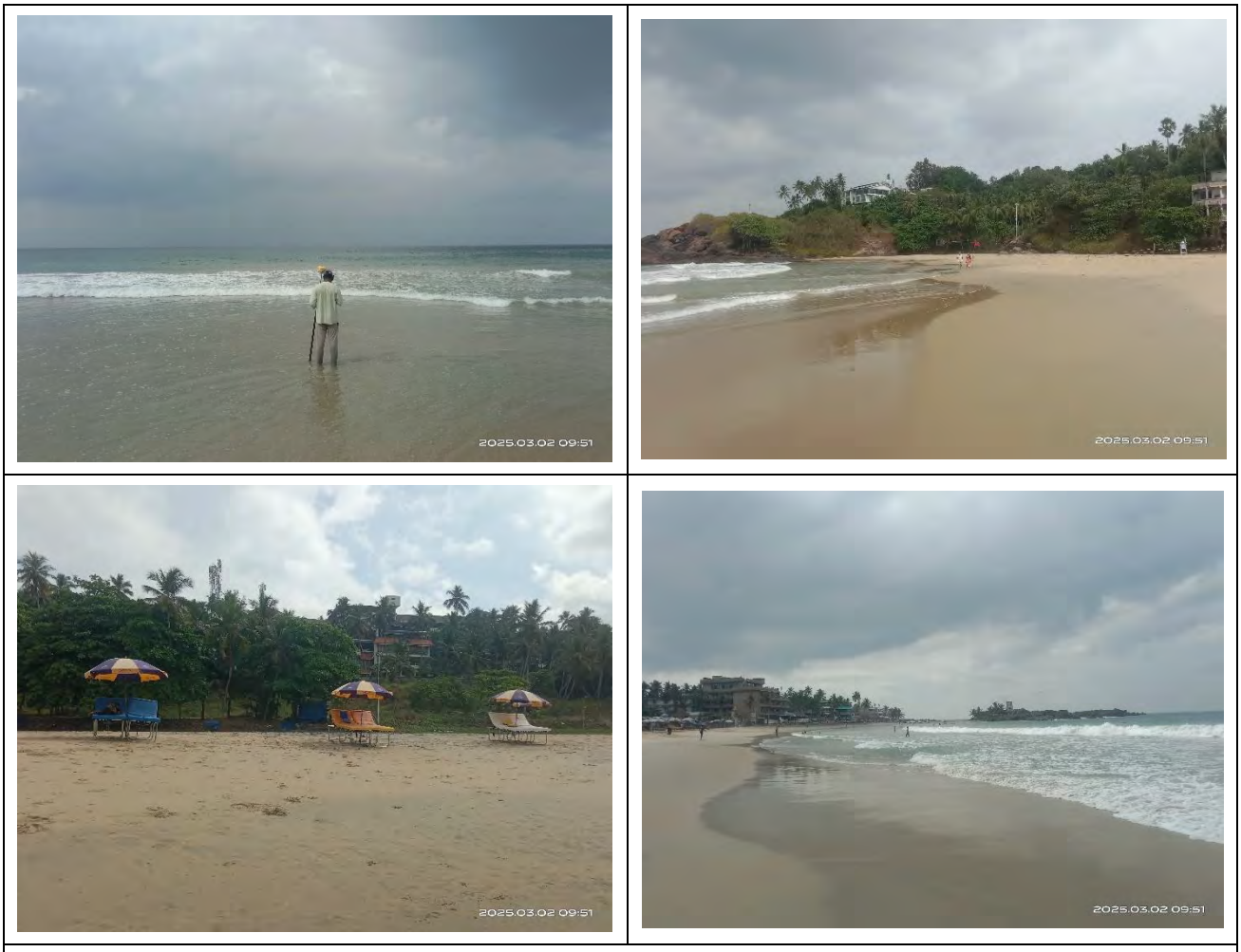


Figure 26- March 2025 CSP 41

Figure 27- March 2025 CSP 42

Figure 28- March 2025 CSP 43



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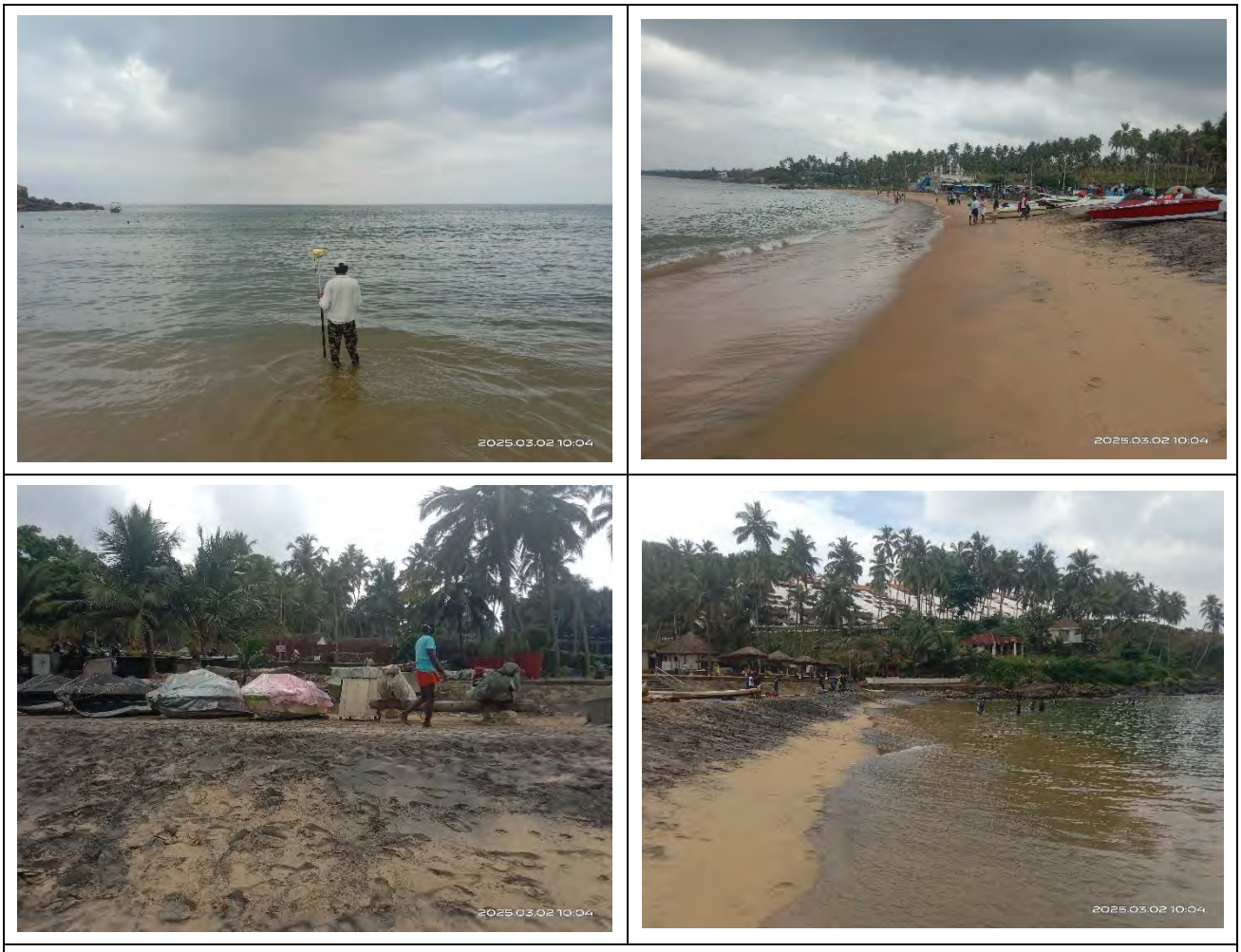

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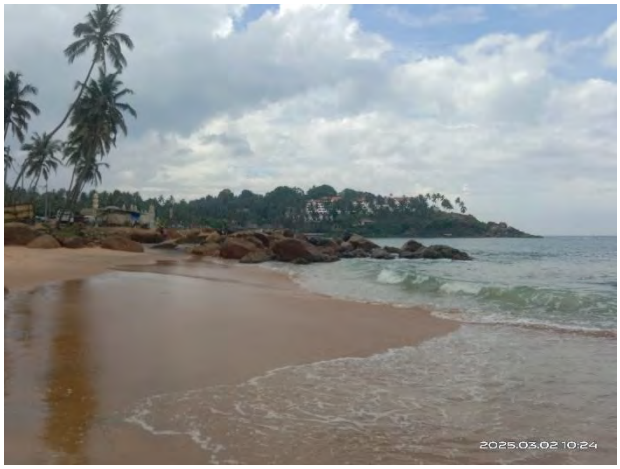


Figure 31- March 2025 CSP 46

Figure 32- March 2025 CSP 47

Figure 33- March 2025 CSP 48

Figure 34- March 2025 CSP 49

Figure 35- March 2025 CSP 50

Figure 36- March 2025 CSP 51

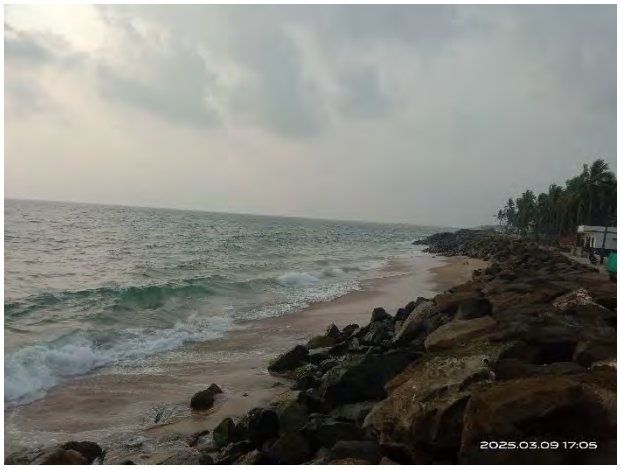


Figure 37- March 2025 CSP 52

Figure 38- March 2025 CSP 53

Figure 39- March 2025 CSP 54

Figure 40- March 2025 CSP 55

Figure 41- March 2025 CSP 56

Figure 42 - March 2025 CSP 57

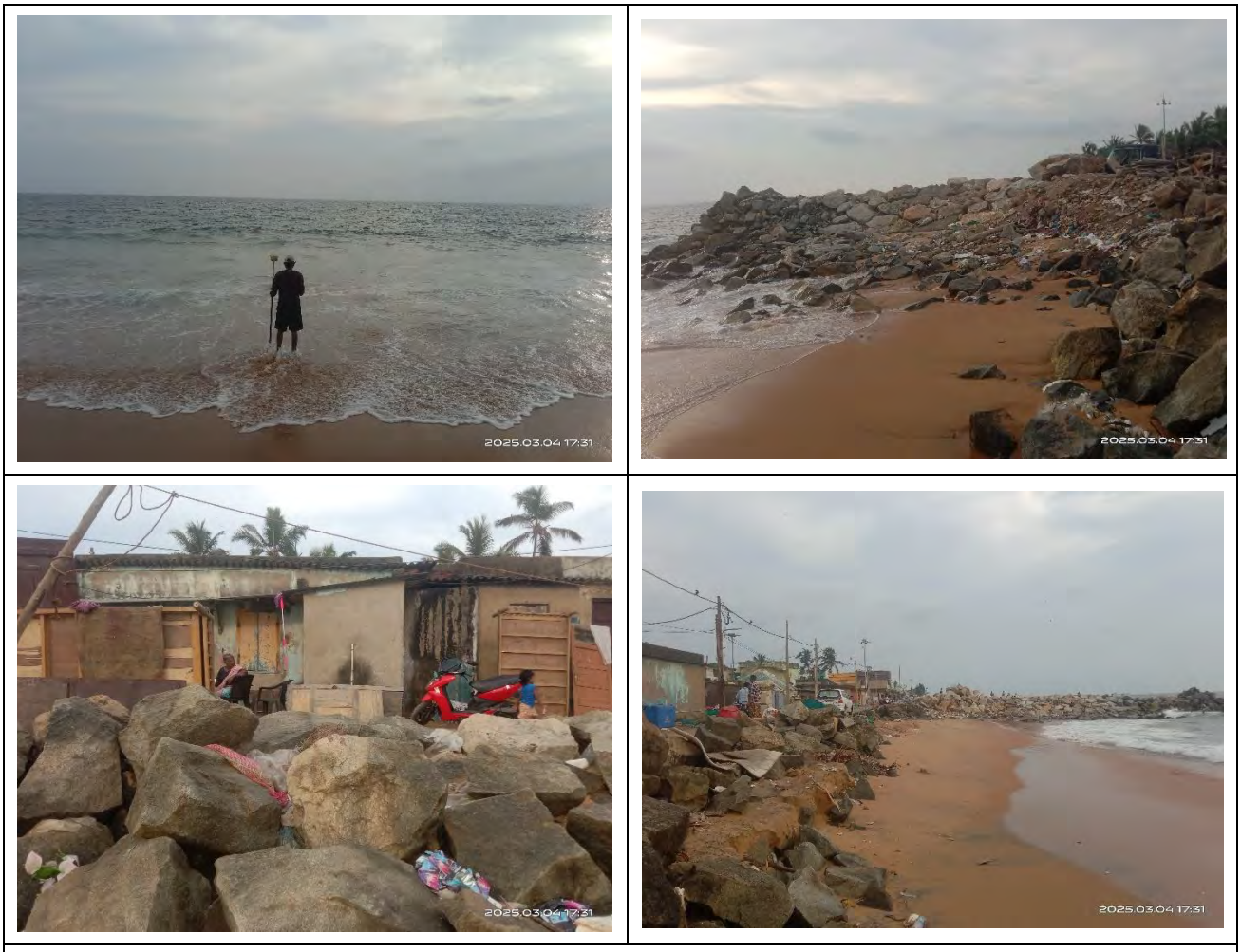


Figure 43- March 2025 CSP 58

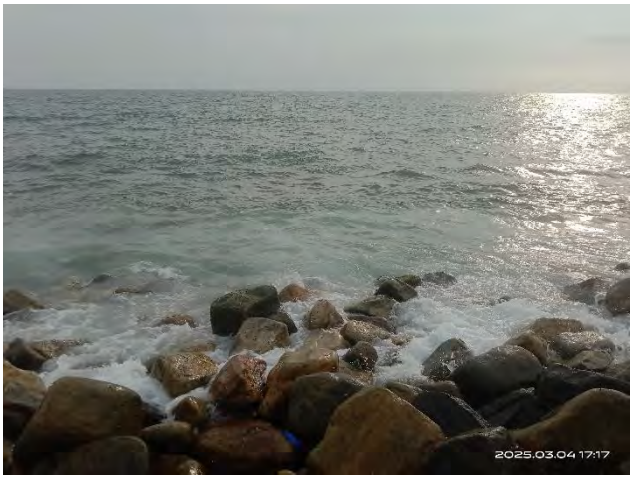


Figure 44- March 2025 CSP 59

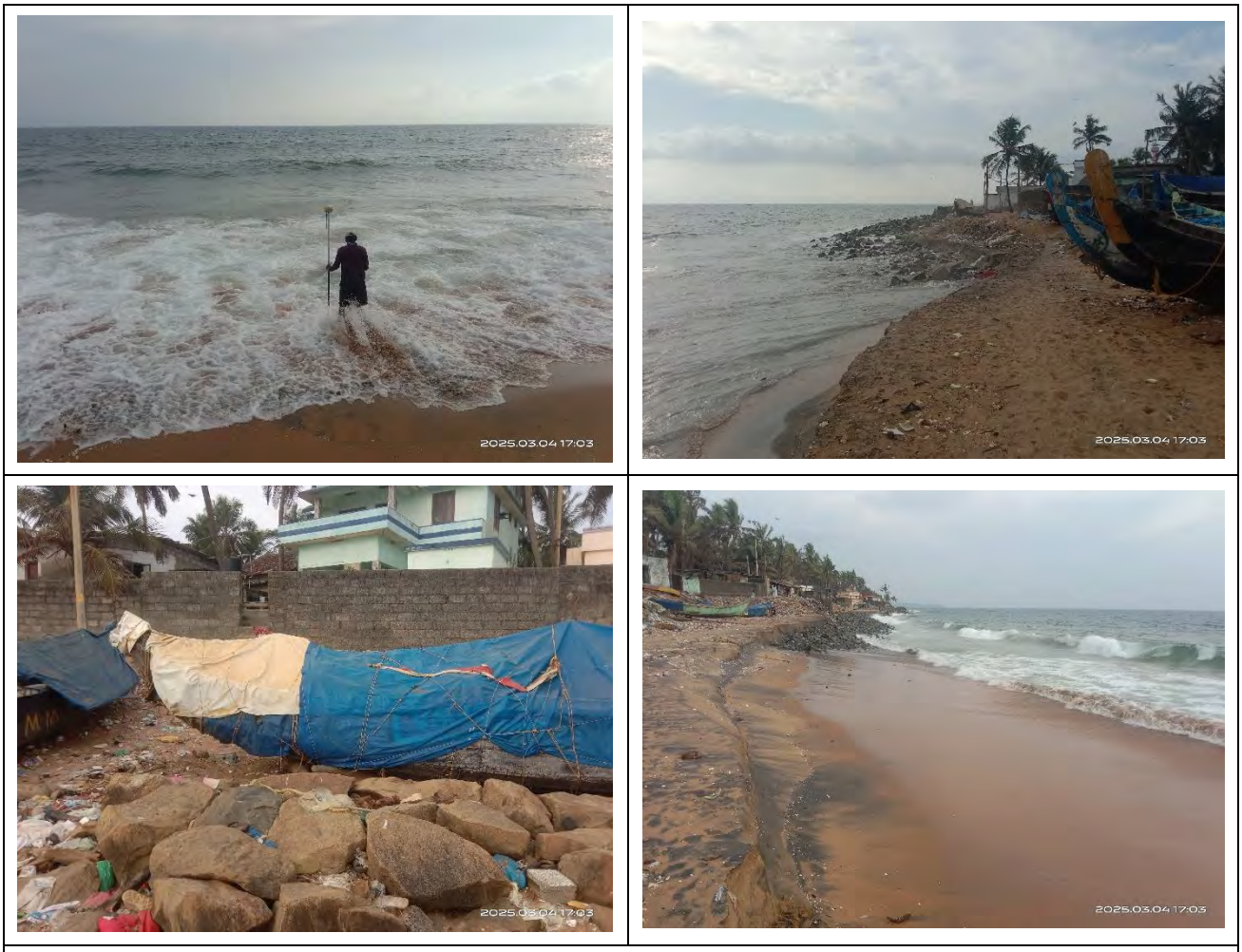


Figure 45- March 2025 CSP 60

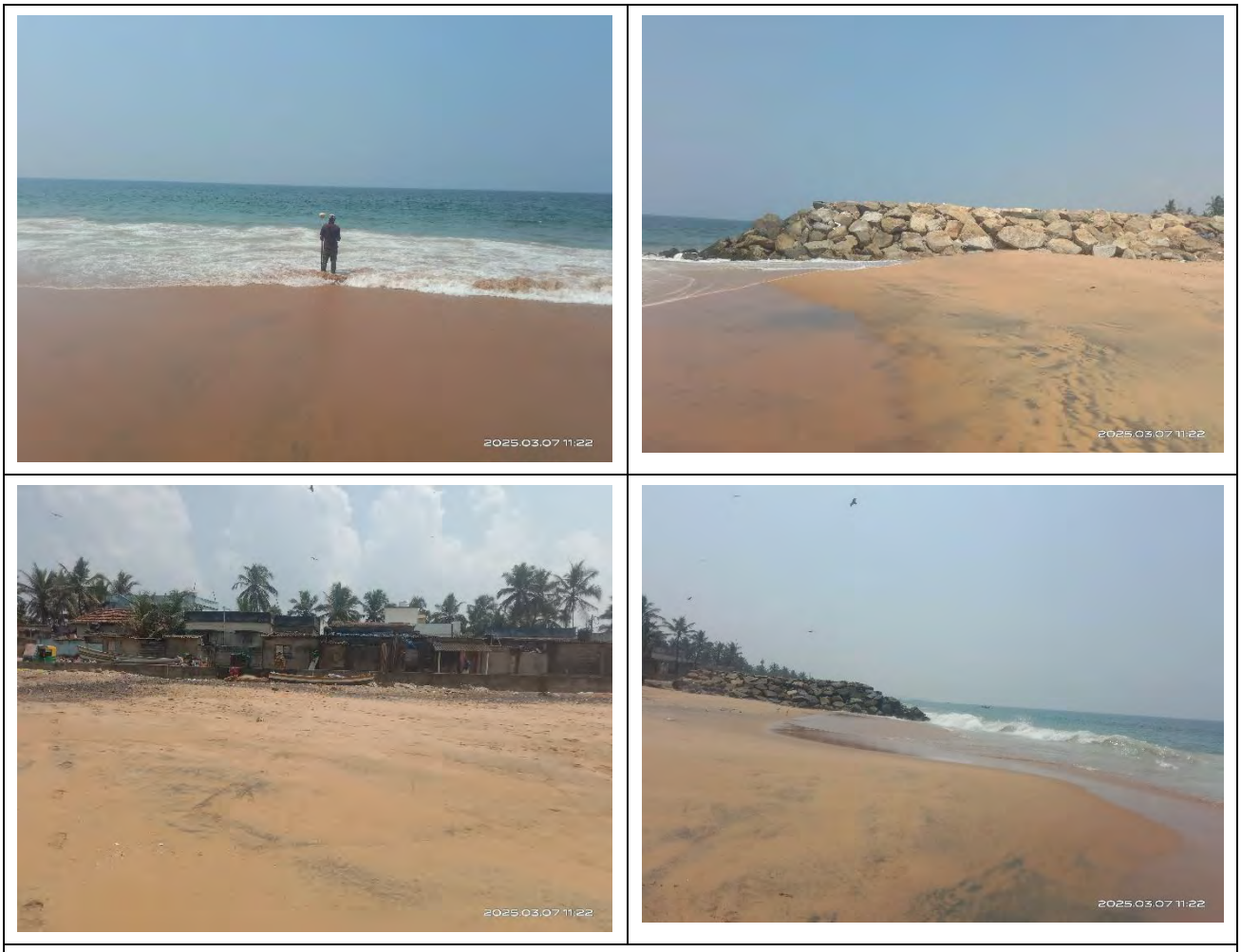


Figure 46- March 2025 CSP 61

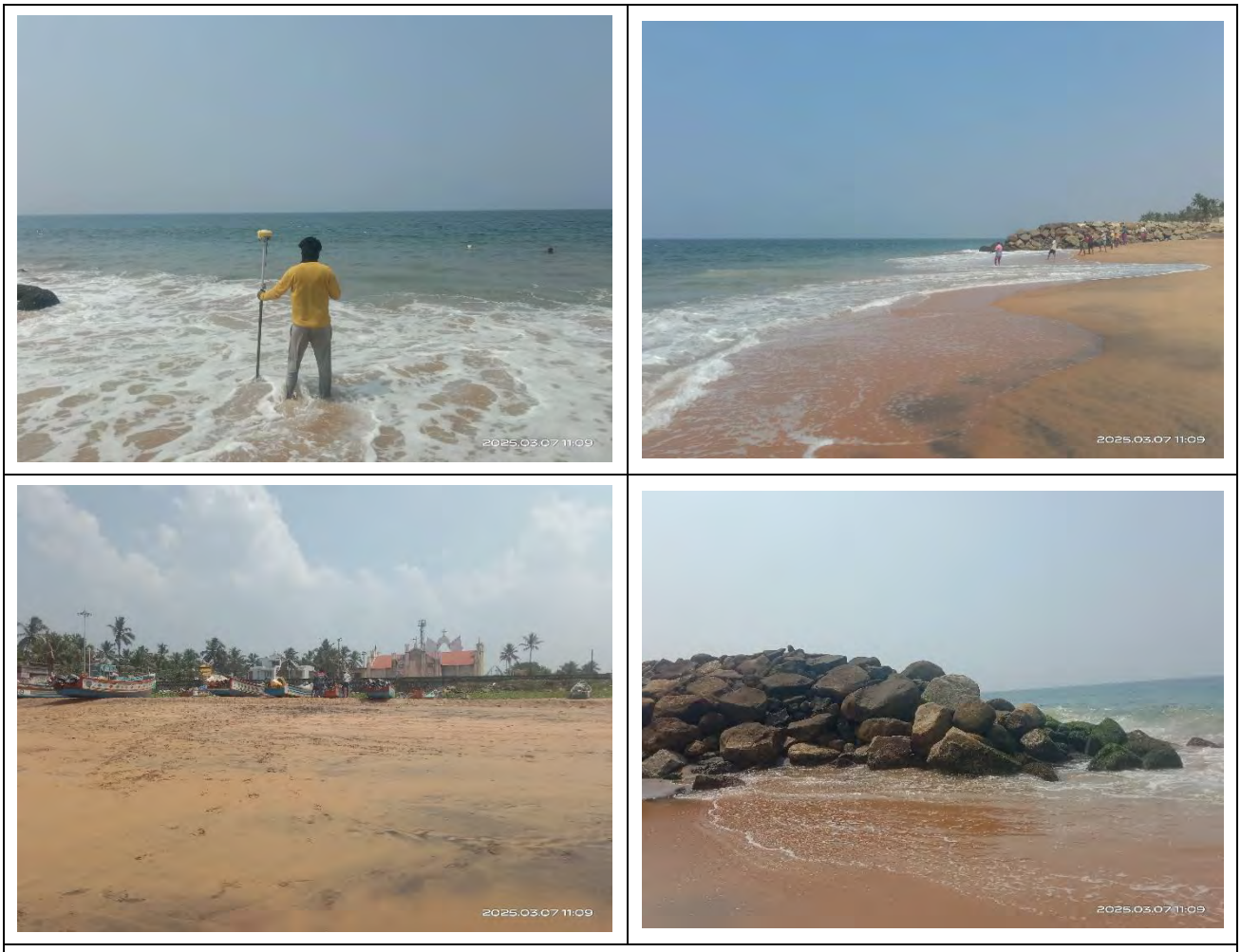


Figure 47- March 2025 CSP 62

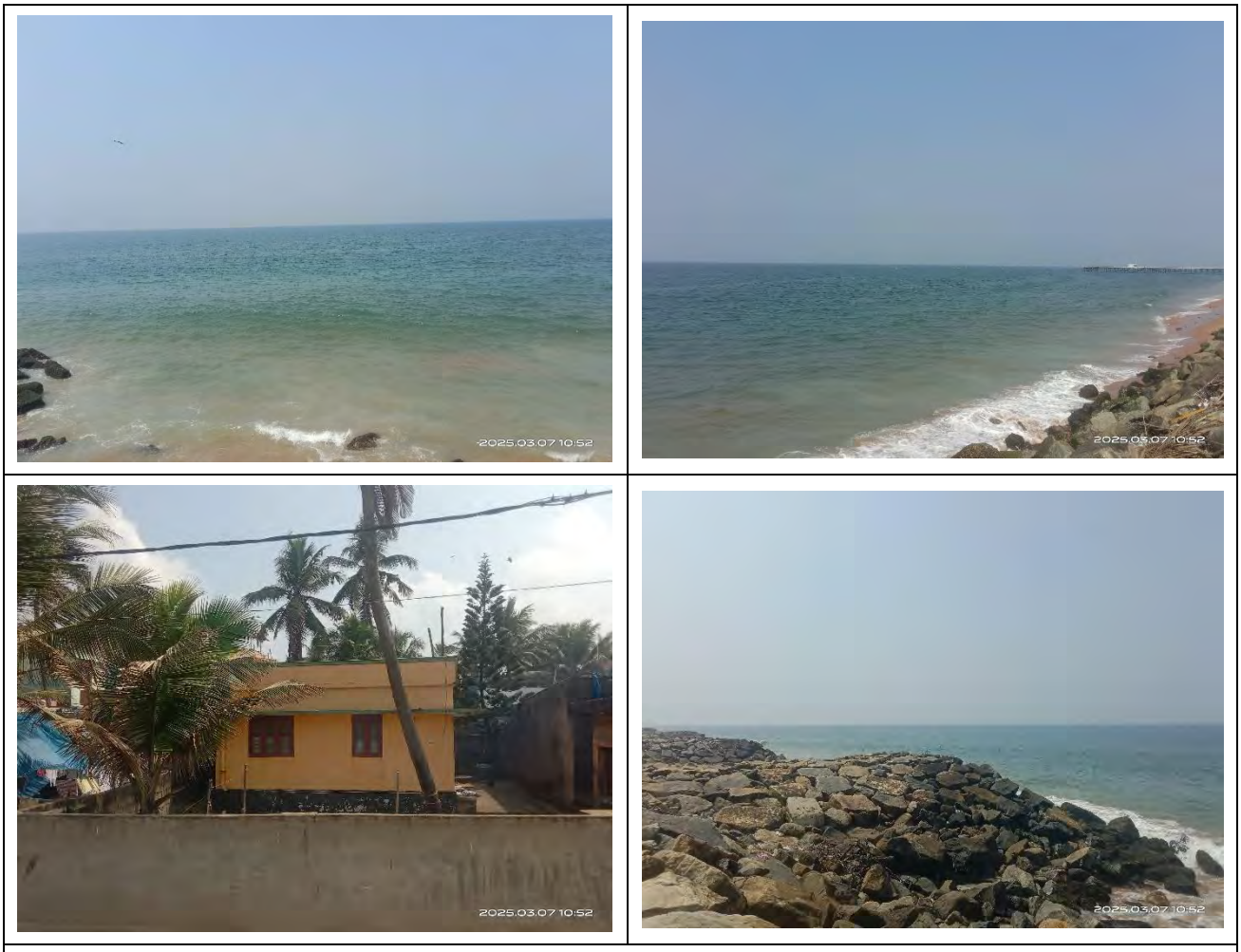


Figure 48- March 2025 CSP 63

Figure 49- March 2025 CSP 64

Figure 50- March 2025 CSP 64A

Figure 51- March 2025 CSP 65

Figure 52- March 2025 CSP 66

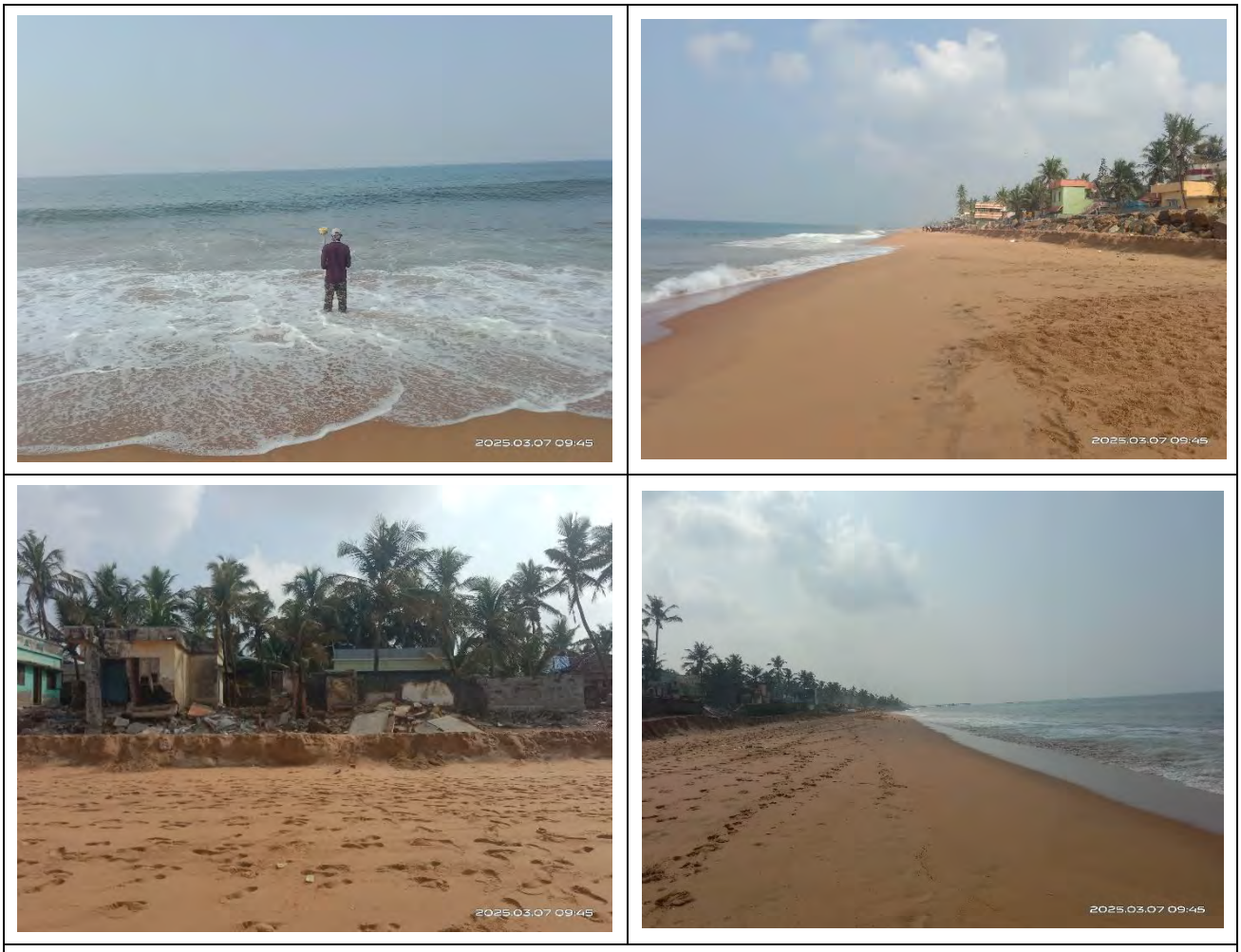


Figure 53- March 2025 CSP 67

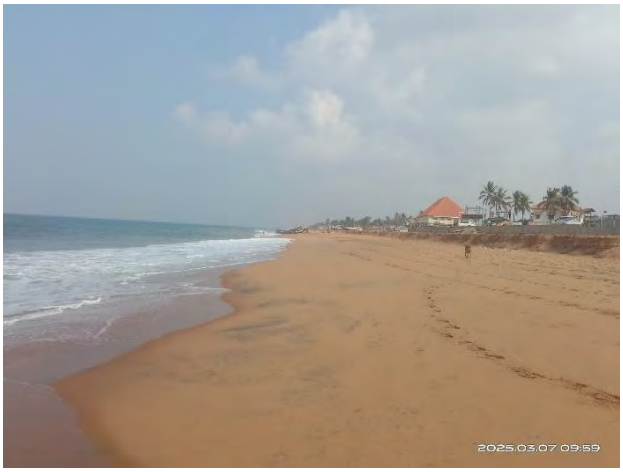


Figure 54- March 2025 CSP 68

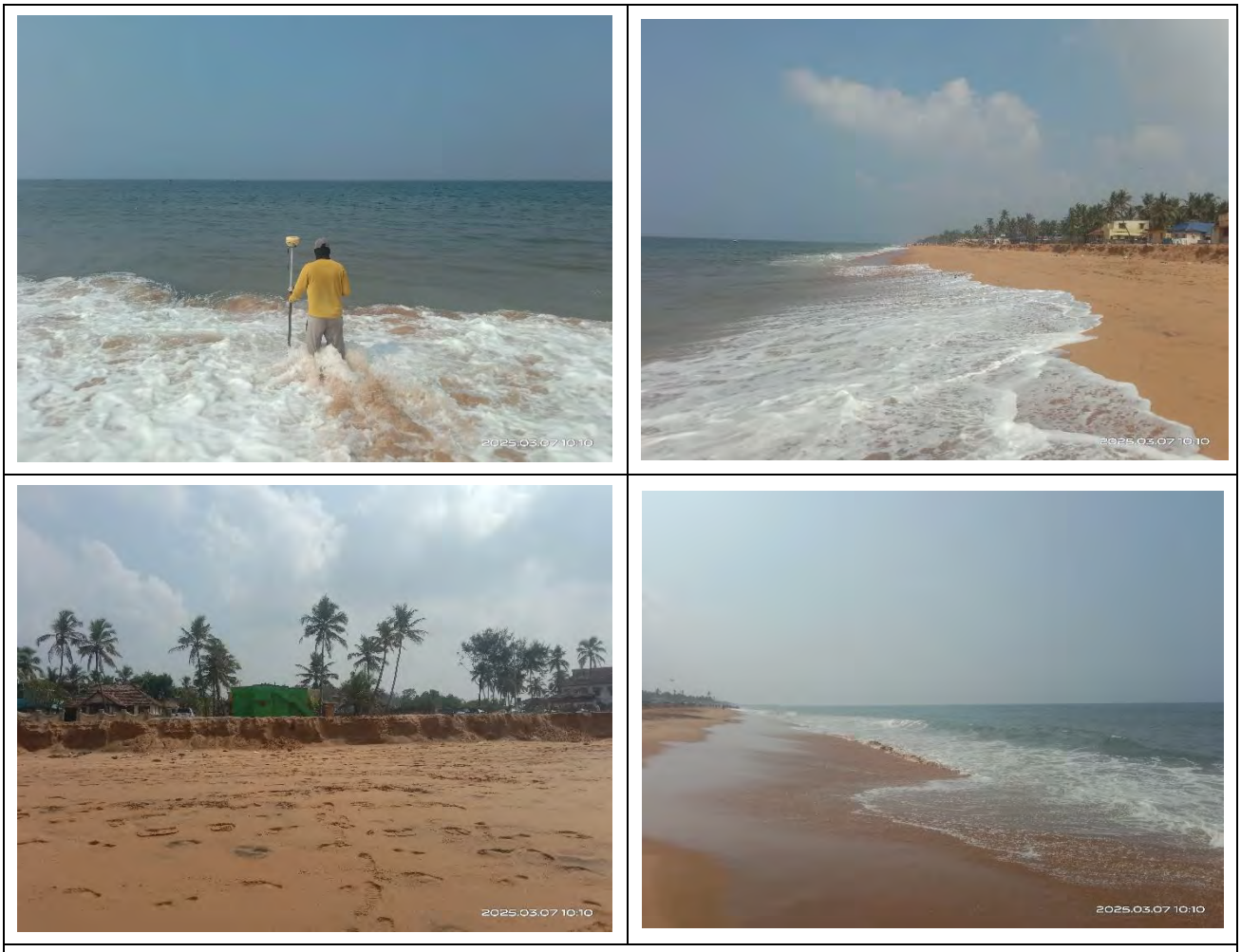


Figure 55- March 2025 CSP 69

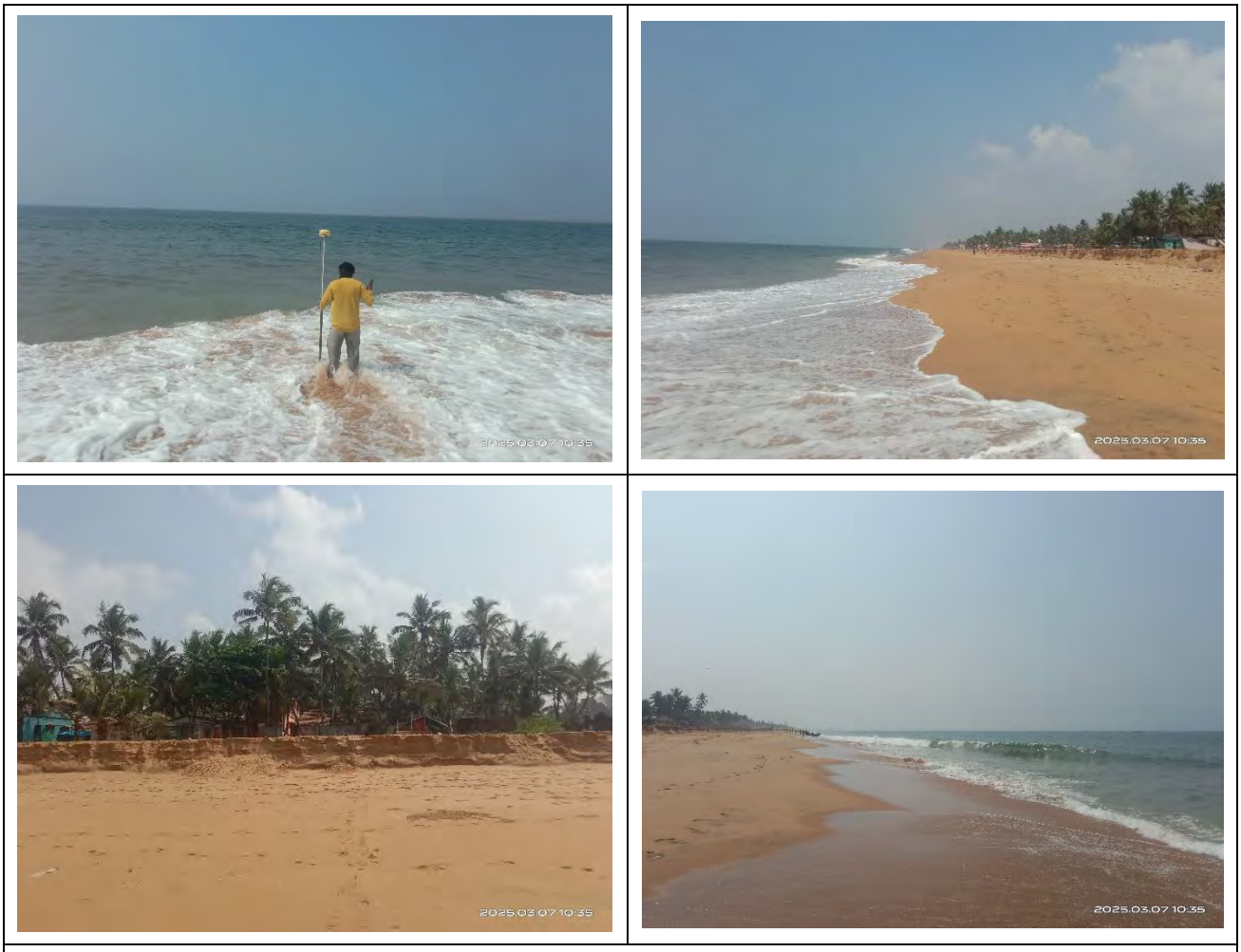


Figure 56- March 2025 CSP 70

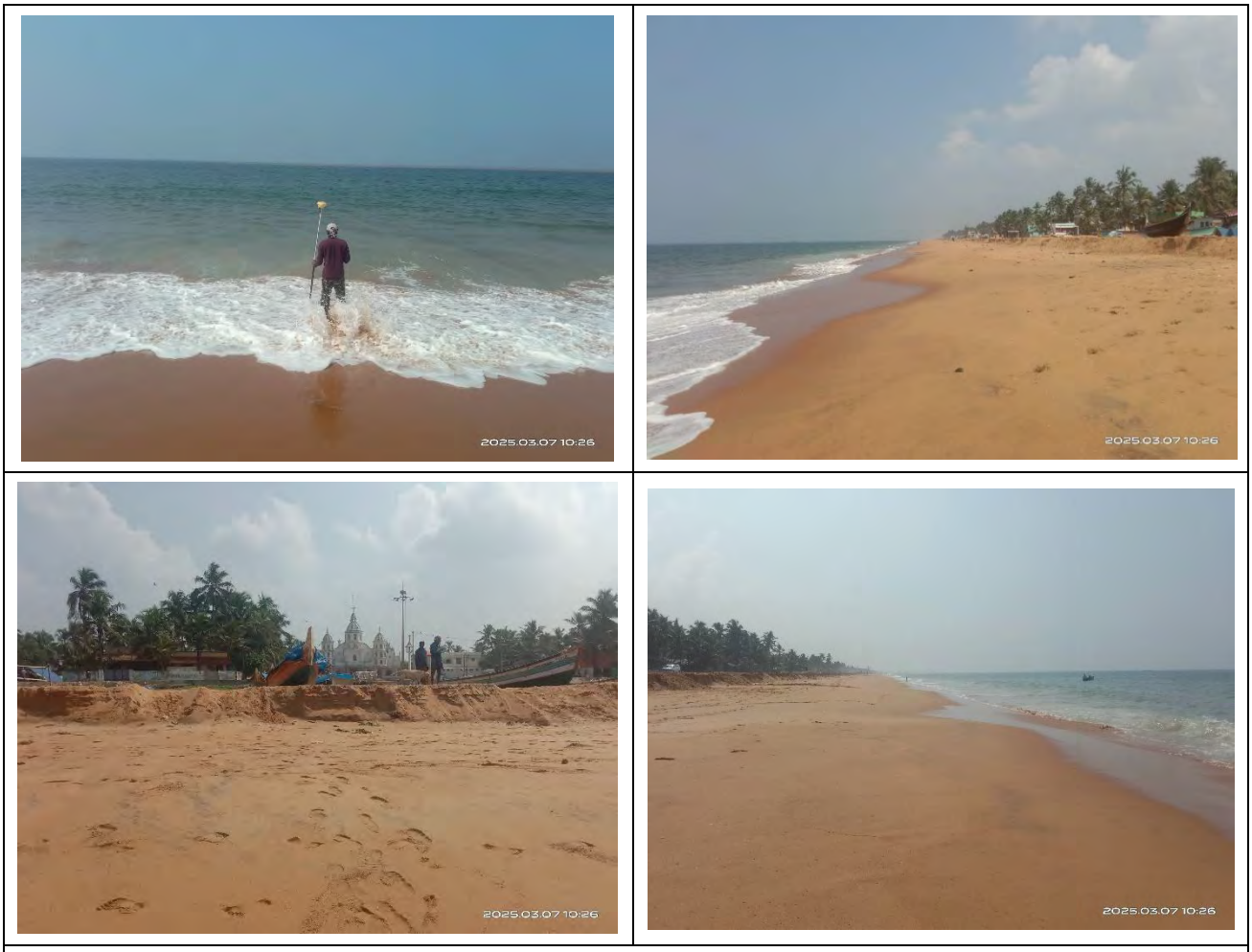


Figure 57- March 2025 CSP 71

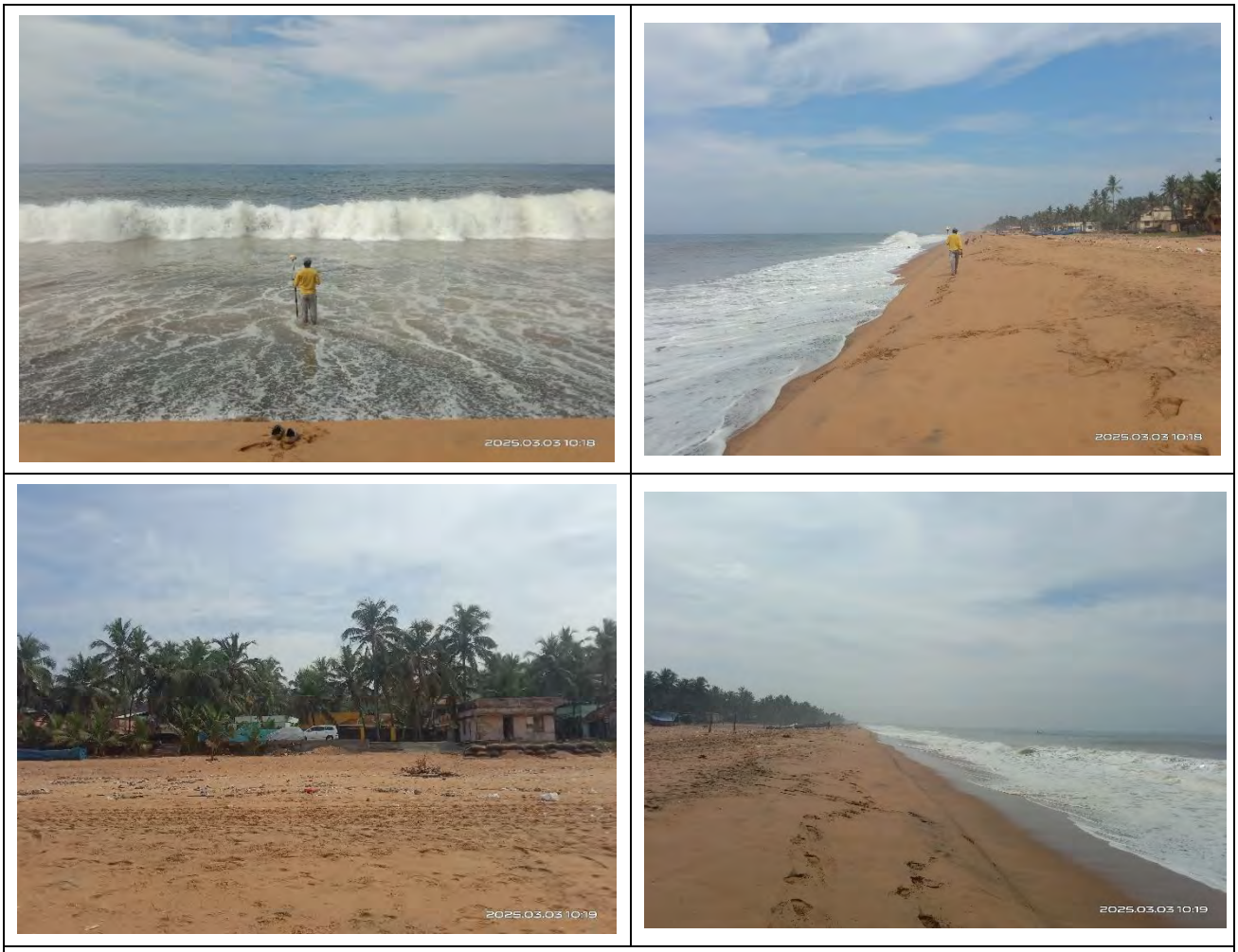


Figure 58- March 2025 CSP 72

Figure 59- March 2025 CSP 73

Figure 60- March 2025 CSP 74

Figure 61- March 2025 CSP 75

Figure 62- March 2025 CSP 76

Figure 63- March 2025 CSP 77

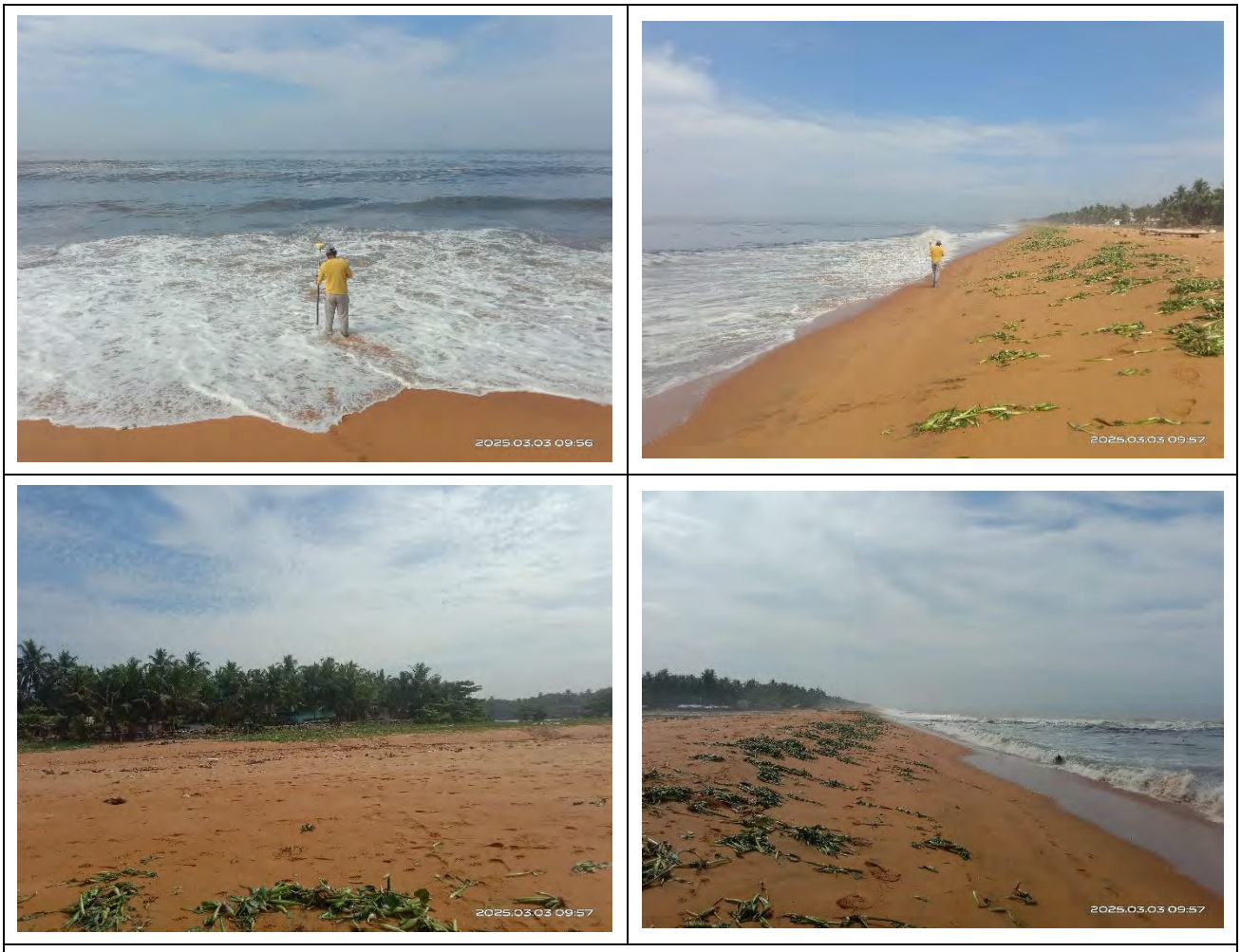


Figure 64- March 2025 CSP 78

Figure 65- March 2025 CSP 79

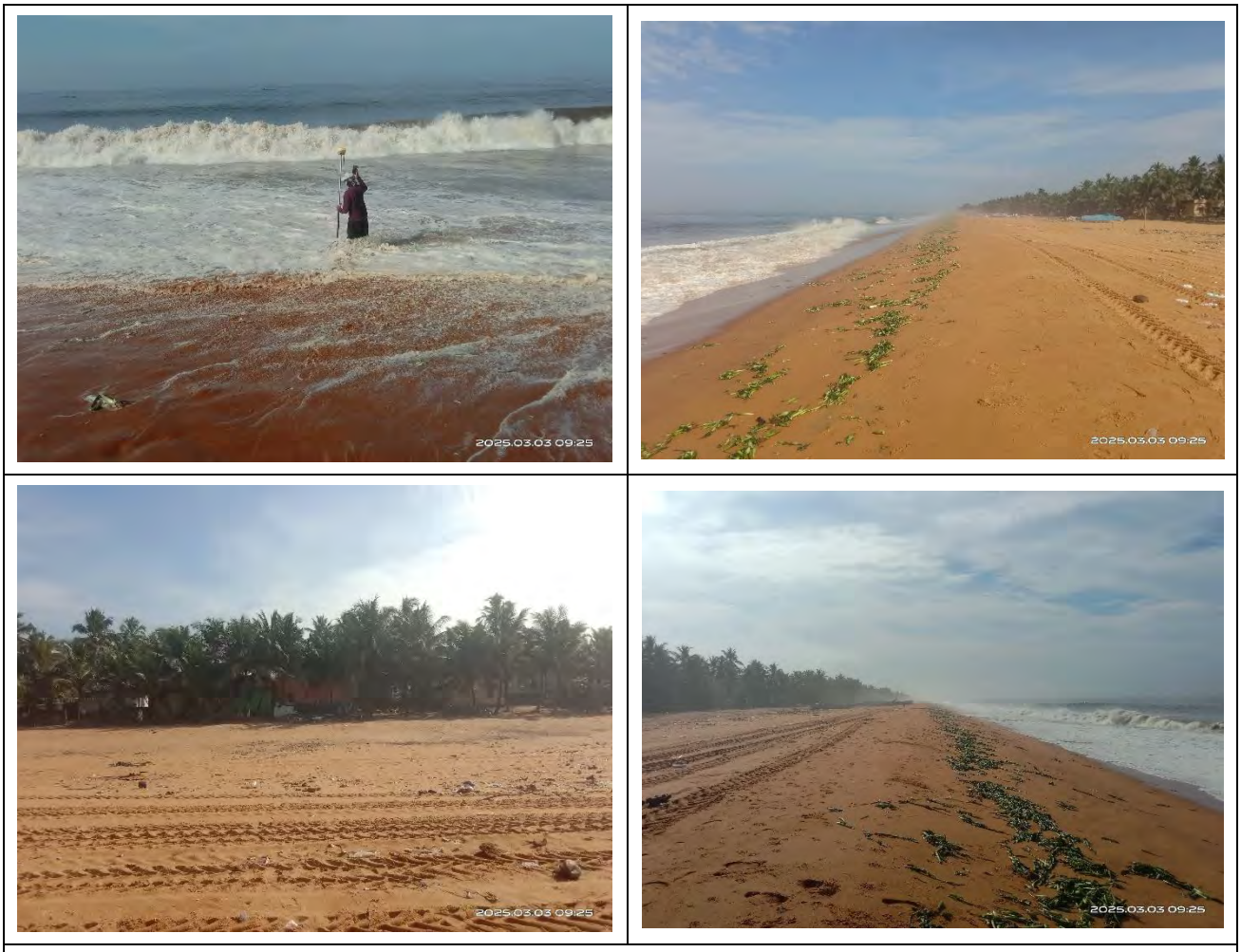
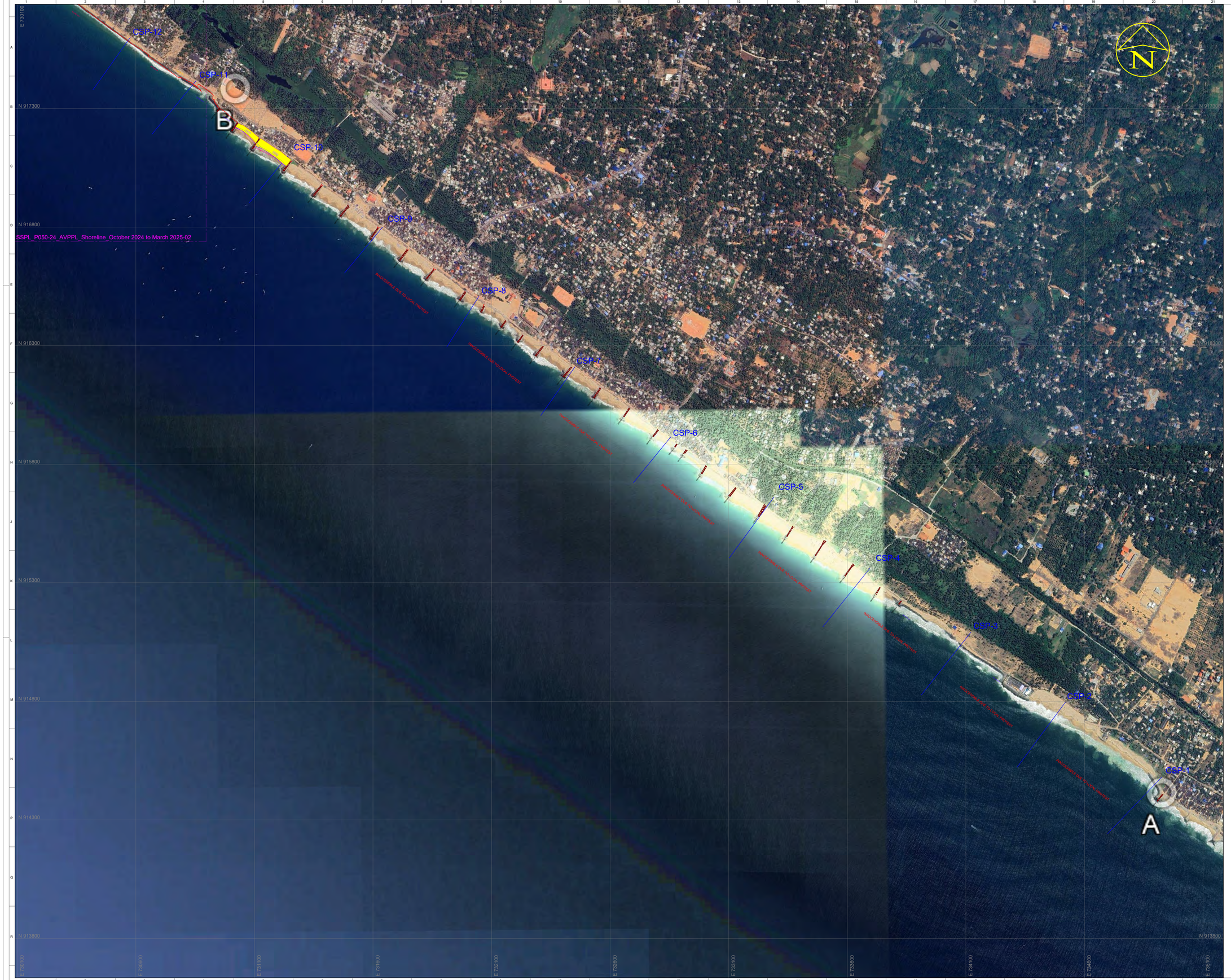


Figure 66- March 2025 CSP 80

Figure 67- March 2025 CSP 81

Annexure II

Overlay of month-on-month Shoreline Monitoring Charts



Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rd Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

SHANKAR SURVEYS PVT.LTD
115, 1st Floor, Neco Chambers
Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

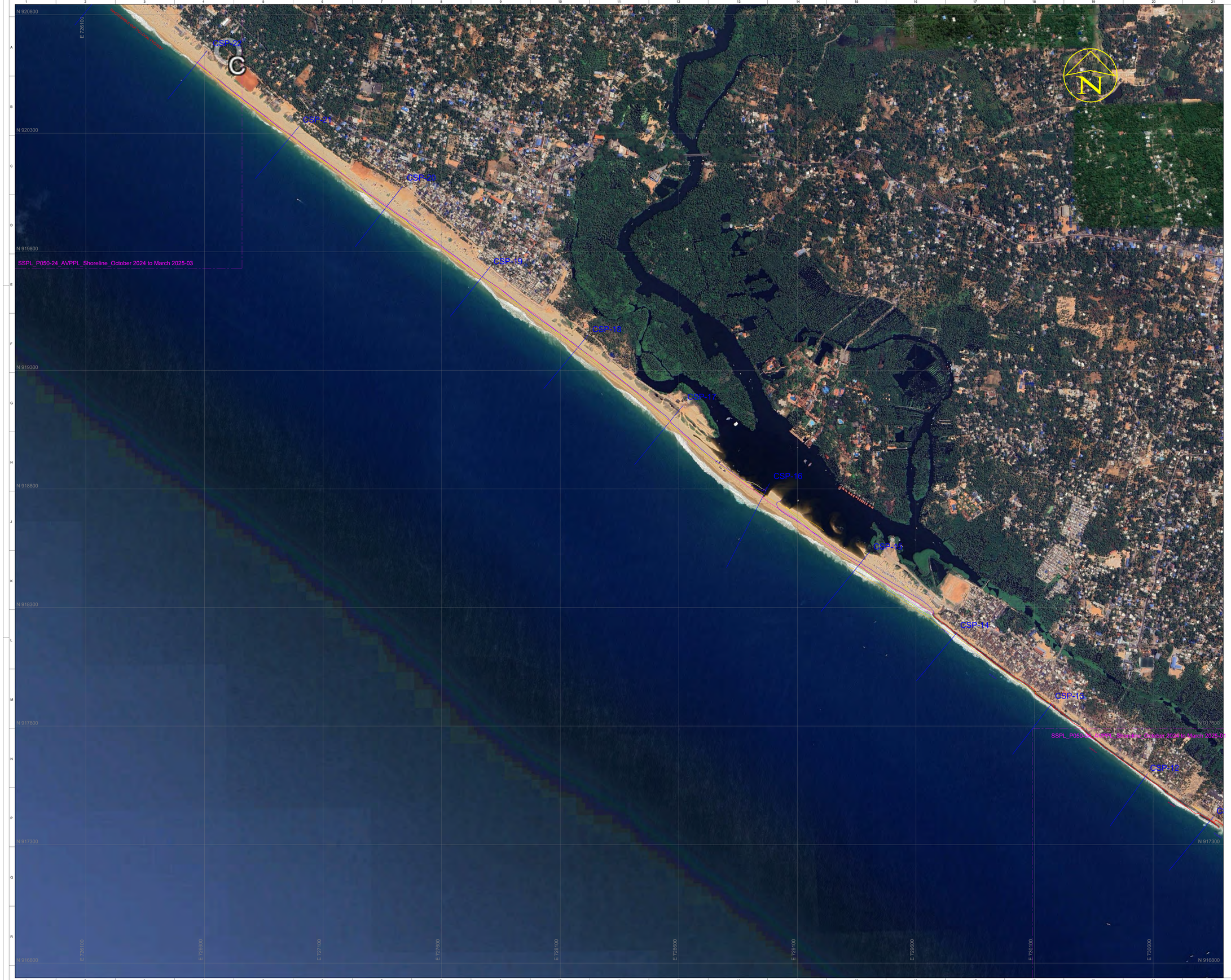
Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu. R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-01



Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

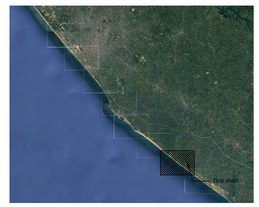
Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan



Client

ADANI VIZHINJAM PORT PVT. LTD.
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Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

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Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

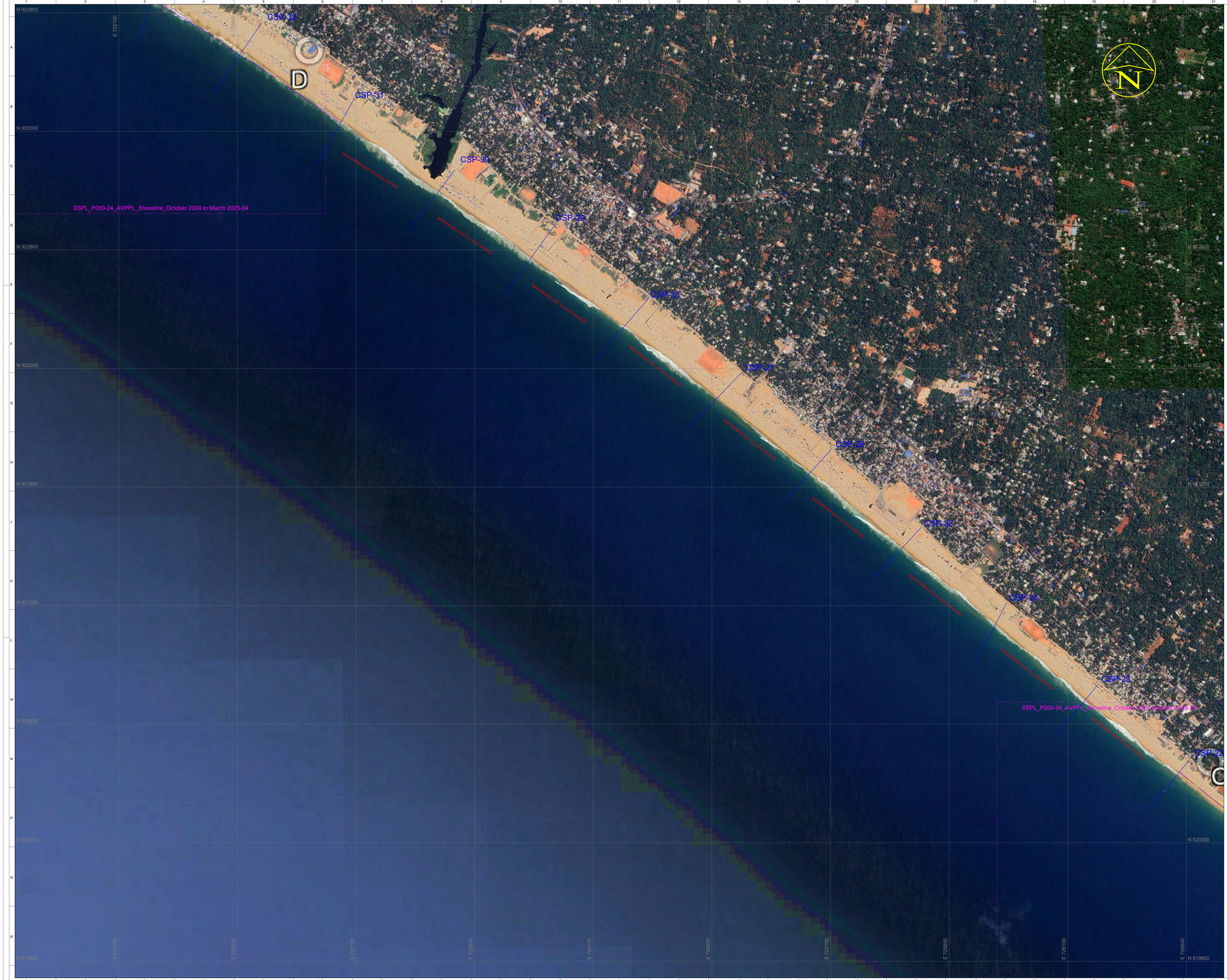
Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu. R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-02



Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rd Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

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Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu. R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-03

Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rD Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

SHANKAR SURVEYS PVT.LTD
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Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu. R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-04

Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rD Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

SHANKAR SURVEYS Pvt. Ltd.
115, 1st Floor, Neco Chambers
Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project

Oceanograohic And Bathymetric Data Collection
For Assessment of Shoreline Changes

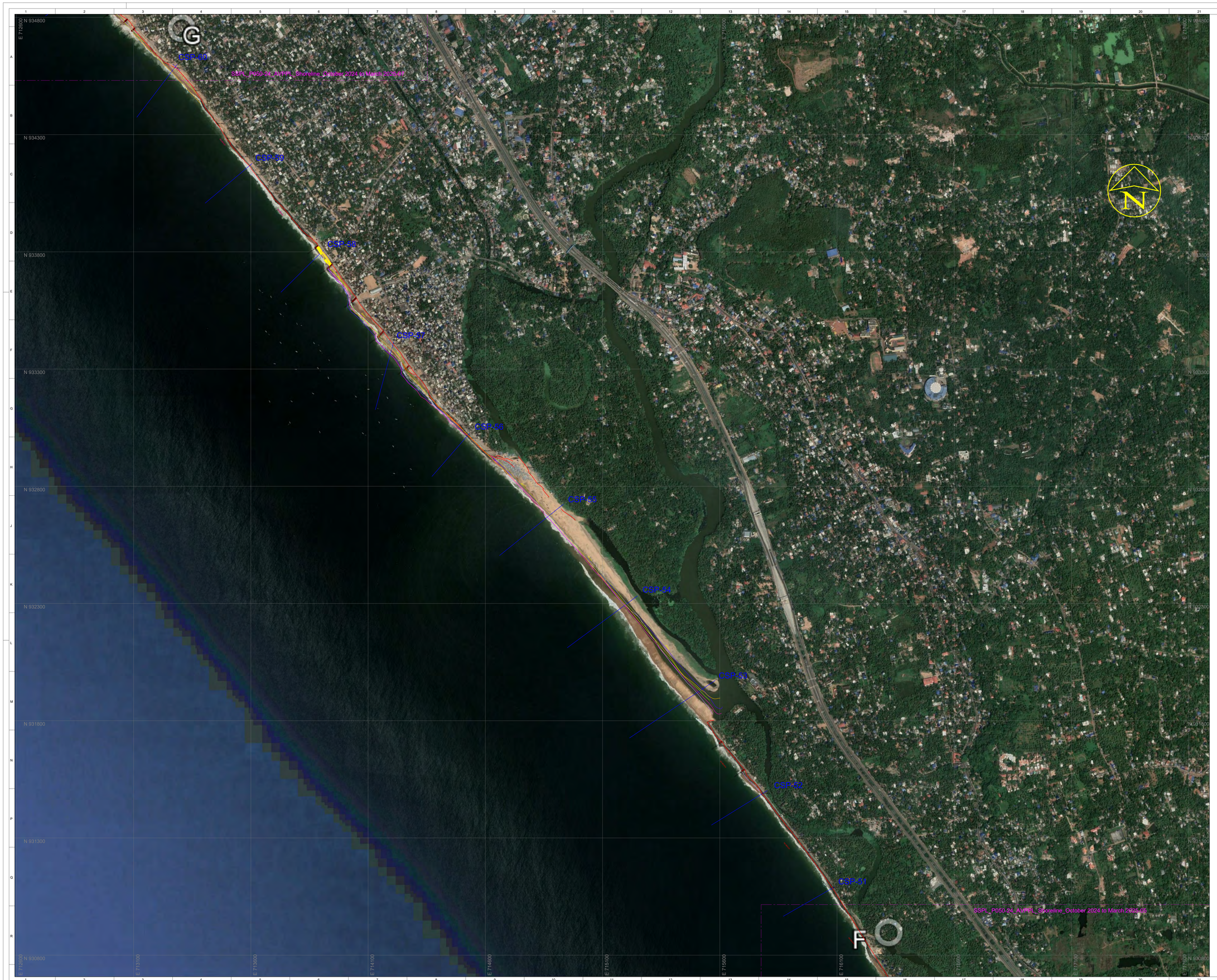
Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu. R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-05



Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rD Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

SHANKAR SURVEYS PVT.LTD
115, 1st Floor, Neco Chambers
Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu. R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-06

Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
Longitude of Origin (CM)	:	75° E (Zone 43)
Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rD Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

SHANKAR SURVEYS PVT.LTD
115, 1st Floor, Neco Chambers
Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

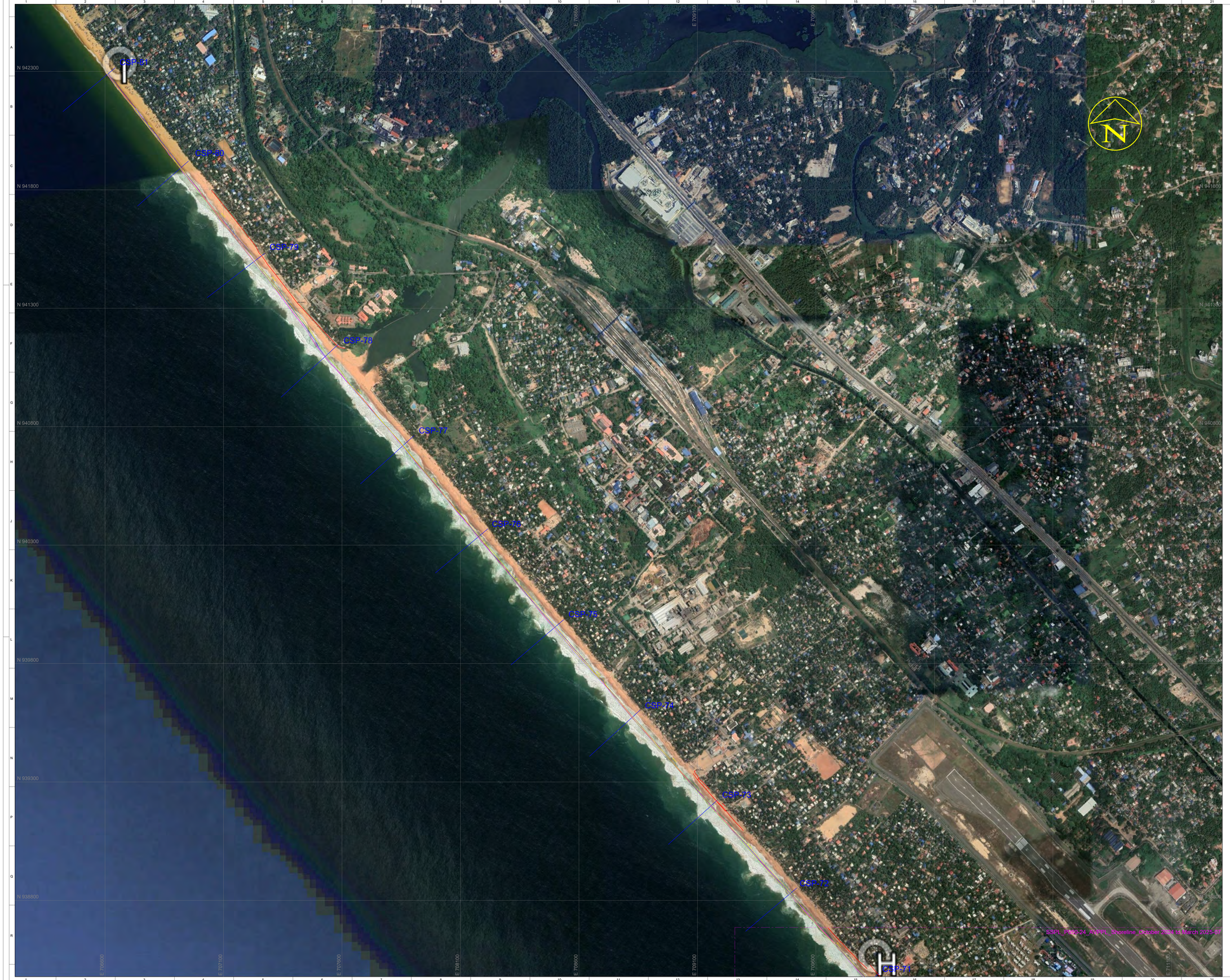
Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu.R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-07



Notes :

1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2024
- SHORELINE NOVEMBER 2024
- SHORELINE DECEMBER 2024
- SHORELINE JANUARY 2025
- SHORELINE FEBRUARY 2025
- SHORELINE MARCH 2025

Survey Notes

Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	:	WGS84
Geodetic Datum / Spheroid	:	WGS84
Semi-Major Axis (a) (meters)	:	6378137.000m
Semi-Minor Axis	:	6356752.314245m
Inverse Flattening	:	298.2572235630
Projection	:	Universal Transverse Mercator
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Latitude of Origin	:	0° N (Equator)
Hemisphere	:	North
False Easting	:	500 000 m
False Northing	:	0 m
Scale Factor at CM	:	0.9996
Units	:	Metres

Scale

HORIZONTAL 1 : 5000

100 0 100 200 300 400 500metres

Key Plan

Client

ADANI VIZHINJAM PORT PVT. LTD.
3rD Floor, Aspinwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor

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Project

Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

Drawing Title

Shoreline Monitoring Chart

Rev.No.	Description	Date
0	First issue	22.04.2025

Drawn : S. Khaire | Interpreted : Vishnu.R | Checked : V. Mehta

Dwg No. SSPL_P050-24_AVPPL_Shoreline_October 2024 to March 2025-08

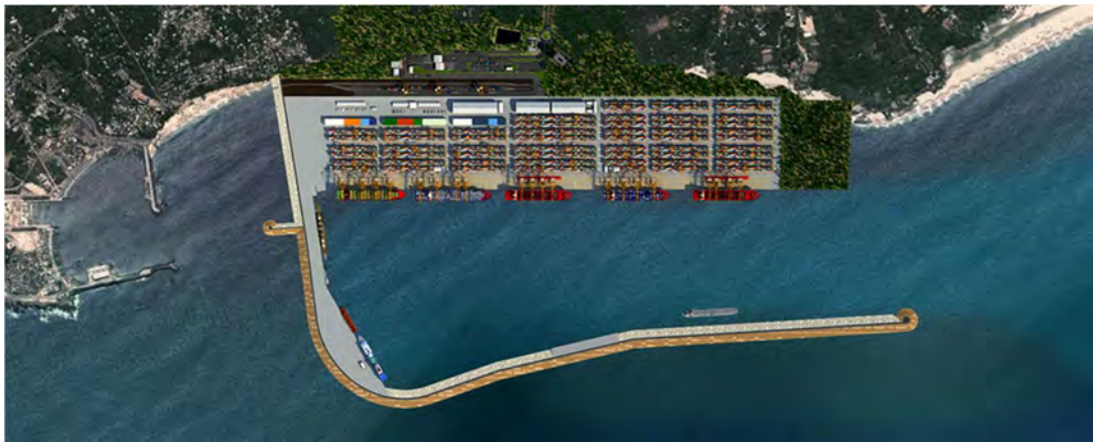
Annexure III

Environment Monitoring Report

(October 2024 to March 2025)

HALF-YEARLY ENVIRONMENT MONITORING REPORT

FOR THE PERIOD OCTOBER 2024 TO MARCH 2025



ADANI VIZHINJAM PORT PVT. LTD.
Vizhinjam, Kerala

Report No.: SEAAL/EMR-AVPPL-2425HY-II

Report Date: 23rd April, 2025

This Report presents the discussion and the results of Environmental Monitoring at Adani Vizhinjam Port. The monitoring has been conducted and the report has been prepared & issued by Standards

HYR-A	Table of Contents

HYR-1	Introduction

Standards Environmental & Analytical Laboratories is an organization providing Testing Services, Technical Consultancy for Environmental Pollution Control, Designing, Commissioning & Operation of Effluent & Sewage Treatment Plants to clients of various industries, Hotels, Hospitals & Building Apartments. It provides various training for the industries and for the budding scientists.

Standards Environmental & Analytical Laboratories was established in 2013 at K.J. Tower, Pathalam, Udhyogamandal, Ernakulam – 683501. The Lab has built a state of art building of 7000 sq. Ft. with fully furnished at 'Standards', Building No. 338/A, B, C, D, E, (Behind BPCL Petrol Pump), Edayar, Muppathadam, P.O., Ernakulam – 683110. The lab is relocated to the new building in June, 2023.It has been provided with sophisticated instruments such as GC-MS, AAS, UV Spectrophotometer, Flame Photometer and other Supporting Instruments with required accuracy & precision.

Standards is guided and lead by highly qualified scientists with rich experiences. Its technical personnel are well trained and competent and dedicated.

Testing Laboratory of Standards is accredited as per ISO/IEC 17025:2017 by NABL for testing of Food & Agricultural Products, Water and Environmental Samples, Medical Accessories under Chemical & Biological Disciplines. It is an "A" Grade laboratory certified by Kerala State Pollution Control Board (KSPCB). It delivers reliable testing services on time to the customers after ensuring the compliance of each stage of the testing activities to the stringent Quality Control and Quality Assurance Criteria established by international forums.

Standards gives Technical Consultancy in the field of Water & Waste Water Treatment and has completed a number of Turn-Key projects to solve the water pollution issues for different clients and making them compliant to the statutory requirements.

Standards had been engaged by Adani Vizhinjam Port Pvt. Ltd. (AVPPL) for performing Environmental Monitoring as per the Plan mentioned in EIA and EC. AVPPL issued Service Order vide email dated 23-10-2024 which mentions the matrix, parameters and frequency of environmental monitoring. Standards carried out said environmental monitoring strictly

as per above mentioned service order, viz. Ambient Air Monitoring (twice in a week), Ambient Noise Monitoring (fortnightly), Marine Ecological Survey including marine water, sediment, phytoplankton and zooplankton analysis (monthly), Ground Water and Surface Water Analysis (monthly), Soil Analysis (yearly).

Standards submits monthly reports of Environmental Monitoring which includes details of sampling locations, methodology used, analytical results and summary of reports. The monthly environmental monitoring report serves the information about the present environmental status as per terms and conditions mentioned in service order.

This present report is the consolidated half yearly report over the period from October 2024 to March 2025.

The quality assurance and quality control plan include following elements:

- Monitoring and Collection, Preservation & Transportation of samples;
- Sample Registration, Chain of Custody & Report Preparation;
- Laboratory Analysis & Review of Results; and
- Validation of Technical Activities.

HYR-2.1. Monitoring and Collection, Preservation & Transportation of samples:

The authorized Laboratory Sampling Team prepares the checklist for the required Sampling Kits, other auxiliary equipment and Sampling Procedures including Datasheets. The team collects the required item as per the list and visits the sampling site.

The team identifies the appropriate monitoring location as per the agreement and keep the sampling kits at the identified location. The team notes down the environmental conditions of the site in the sampling data sheets and all other required information. Then the team starts the monitoring activity.

Periodically the team inspects the status of the conditions of the sampling kits and records the necessary data on the sampling data sheet as per the requirements.

After the completion of monitoring as per PCB standards, the team collects the samples and preserves them safely and securely in an appropriate labelled container as per the procedure to prevent from contamination and deterioration.

Then the team returns to the laboratory and takes due care to maintain the integrity of the samples during transport. The team submits the samples and sampling data sheets to the Executives - Sample Registration.

HYR-2.2. Sample Registration, Chain of Custody & Report Preparation:

After receiving the samples, the Executive - Sample Registration examines the sample conditions and the sampling data sheets along with the agreement as per the Checklist and records the findings.

The executive registers the samples for testing in the Sample Entry Register and assigns the unique Sample Code for each sample only if all the criteria are fulfilled. The Executive prepares the Job Card for each sample as per the agreement and enters the allotted Sample Code in the Job Card and on the Test Item. The Test Item is identified throughout its life in the laboratory only by the unique Sample Code.

The executive then delivers the sample to the respective section of the Laboratory and the Job Card along with necessary sampling details required for performing the analysis excluding the details of the origin of the samples. The delivery is recorded in the Sample Delivery Register and the same is acknowledged by the Laboratory Technical personnel.

The information available in the Job Card are the test parameters to be performed, test method to be adopted, units in which the analytical results to be expressed, the due date for completion of analysis and the details about sample storage and retention conditions.

The executive submits the other Customer information and Sample details to the Reporting Section for preparing the Test Reports.

After completion of analysis, the technical personnel enter all the results and dates of analysis in the Job Card and submit the same to Reporting Section.

The Reporting Executive decodes the Job Card with the Test Request details, prepares the Draft Report as per the respective report format and submits the draft report to the Authorized Signatory. This draft report is verified and returned back to the Reporting Section for making the final report. Final reports are prepared by the Reporting Executive with necessary corrections if any and authorized by the Authorized Signatory. Then the Final Test Report is delivered to the customer.

HYR-2.3. Laboratory Analysis & Review of Test Results:

After receiving the Test Items along with the Job Card, the Technical Manager allots the Job to the authorized Technical Personnel. The assigned Technical Personnel performs the allotted tests as per the method mentioned in the Job Card as well as the required Quality Control Checks (QC) and submits the results to the Technical Manager. The Technical Personnel conforms that all the required calibration status of the equipment is valid and the Certified Reference Material are valid. Also, the Technical Personnel ensures that the results of daily verification conforming to the specified criteria.

The Technical Manager reviews the results of samples & QC checks and approves the results only if the results of QC checks are compliance to the Acceptance Criteria. Then the Job Card is submitted to the Reporting Section.

HYR-2.4. Validation of Technical Activities:

For the validation of Technical Activities, the laboratory performs Internal Quality Assurance Check, Proficiency Testing and Inter Laboratory Comparison. Quality Assurance Team prepares Annual Internal Quality Assurance Check (IQC) Plan, Inter laboratory Comparison (ILC)/ Proficiency Testing (PT) Plan.

As per the IQA plan, Quality Assurance Team prepare and send the Test Items to the respective section of the Laboratory. After getting the results, Quality Assurance team evaluates the results against the predefined criteria. The results of evaluation are submitted and discussed during Management Review meeting.

Quality Assurance Team identify and register the suitable PT Scheme authorized by NABL. Also, Quality Assurance Team identifies suitable ILC or conducts by covering at least five NABL accredited Laboratories.

If the QA team conducts ILC, then they evaluate the performance and calculate the Z-score after getting the results of the participating laboratories.

The acceptance criteria for the ILC/PT is ±2. The summary of the PT/ILC is prepared and discussed during Management Review Meeting.

The Quality Assurance Team monitors the performance of the Laboratory activities by conducting Internal Quality Audits and Vertical Audit periodically. The Audit reports are prepared and discussed during Management Review Meeting.

HYR-3	Ambient Air Quality Monitoring

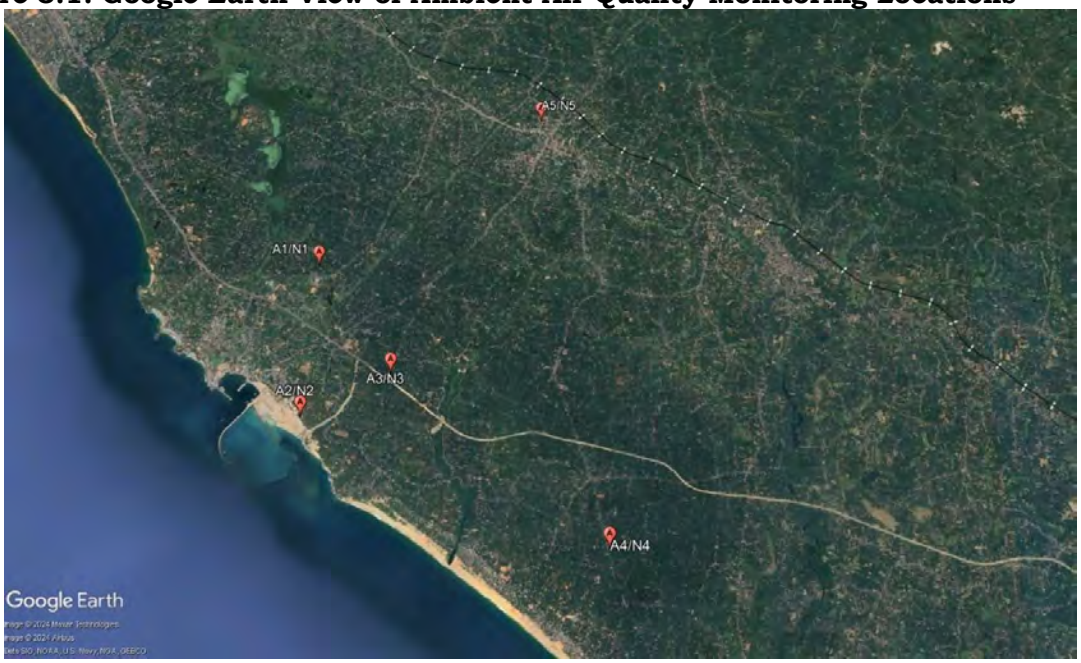
HYR-3.1. Ambient Air Quality Monitoring location details:

This section describes the sampling location, methodology adopted for monitoring and analysis of Ambient Air Quality. The prime objective of the environment monitoring with respect to Ambient Air Quality is to establish the air quality of present condition and its conformity to Applicable Standards. Ambient Air quality monitoring was carried out at five (5) locations including Venganoor, Port Site, Proposed Port Estate Area, Chani and Balarampuram from October 2024 to March 2025.

Table 3.1: Coordinates of Ambient Air Quality Monitoring Locations

Location	Legend	Latitude	Longitude
Venganoor	A1	8°23'55.10"N	77°00'12.19"E
Port Site	A2	8°22'13.73"N	77°00'08.39"E
Proposed Port Estate Area	A3	8°22'41.37"N	77°01'03.17"E
Chani	A4	8°20'53.49"N	77°03'18.76"E
Balarampuram	A5	8°25'43.85"N	77°02'38.79"E

Figure 3.1: Google Earth View of Ambient Air Quality Monitoring Locations



HYR-3.2. Methodology of Sampling and Analysis:

Table 3.2: Ambient Air Quality Monitoring Methodology

Sl. No.	Parameter	Unit	Detection Limit	Method Reference
1.	Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	5.0	IS 5182 (Part 23) : 2006
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	2.0	IS 5182 (Part 24): 2019
3.	Sulphur Dioxide (SO_2)	µg/m³	2.0	IS 5182 Part 2: 2001
4.	Nitrogen Dioxide (NO_2)	µg/m³	2.0	IS 5182 Part 6: 2006
5.	Carbon Monoxide (CO)	mg/m³	1.15	IS 5182: Part 10:1999 (NDIR Method)
6.	Hydrocarbon (HC)	Ppm	0.0003	IS 5182 Part 17: 1979

HYR-3.3. National Ambient Air Quality Standards (NAAQS):

Table 3.3: National Ambient Air Quality Standards dated 16th November 2009

Sl. No.	Pollutant, Unit	Time Weighted Average	Concentration in Ambient Air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive Areas
1.	Sulphur dioxide (SO_2), µg/m³	Annual	50	20
		24 h	80	80
2.	Nitrogen Dioxide (NO_2), µg/ m³	Annual	40	30
		24 h	80	80
3.	Particulate matter (size less than 10µm) or PM_{10}, µg/ m³	Annual	60	60
		24 h	100	100
4.	Particulate matter (size less than 2.5µm) or $PM_{2.5}$, µg/m³	Annual	40	40
		24 h	60	60
5.	Carbon Monoxide (CO), mg/m³	8 h	02	02
		1 h	04	04
6.	Hydrocarbon (HC), ppm	-	-	-

HYR-3.4. Ambient Air Quality Monitoring Results for the period from October 2024 to March 2025:

Table 3.4: Location – Venganoor (A1)

Venganoor (A1)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-10-2024	56.3	27.6	4.46	5.32	BDL	BDL
07-10-2024	55.2	25.9	4.39	5.25	BDL	BDL
10-10-2024	53.2	25.1	4.55	4.96	BDL	BDL
14-10-2024	55.3	26.8	4.59	5.26	BDL	BDL
17-10-2024	53.1	24.8	4.39	5.18	BDL	BDL
21-10-2024	51.9	25.6	4.42	5.10	BDL	BDL
24-10-2024	56.4	29.3	4.96	5.49	BDL	BDL
28-10-2024	55.4	26.8	4.73	5.50	BDL	BDL
31-10-2024	52.9	25.7	4.43	5.29	BDL	BDL
04-11-2024	52.3	25.6	4.22	4.89	BDL	BDL
07-11-2024	50.6	24.1	4.32	4.75	BDL	BDL
11-11-2024	54.6	25.9	4.39	4.99	BDL	BDL
14-11-2024	52.8	24.2	4.25	4.89	BDL	BDL
18-11-2024	51.3	23.6	4.29	4.79	BDL	BDL
21-11-2024	50.1	23.9	4.19	4.88	BDL	BDL
25-11-2024	53.4	26.4	4.38	4.99	BDL	BDL
28-11-2024	52.5	23.9	4.25	4.79	BDL	BDL
02-12-2024	55.3	27.2	4.46	5.11	BDL	BDL
05-12-2024	53.4	26.4	4.40	4.87	BDL	BDL
09-12-2024	47.5	23.5	4.25	4.65	BDL	BDL
12-12-2024	56.1	26.4	4.49	4.76	BDL	BDL
16-12-2024	49.5	22.8	4.15	4.56	BDL	BDL
19-12-2024	53.1	25.4	4.22	4.69	BDL	BDL
23-12-2024	49.7	23.1	4.25	4.77	BDL	BDL
26-12-2024	54.5	25.7	4.37	4.98	BDL	BDL
30-12-2024	50.4	23.9	4.25	4.87	BDL	BDL
02-01-2025	48.5	24.9	4.25	4.92	BDL	BDL
06-01-2025	43.9	22.5	4.18	4.74	BDL	BDL

Venganoor (A1)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
09-01-2025	50.5	26.3	4.35	4.99	BDL	BDL
13-01-2025	53.4	27.5	4.69	5.31	BDL	BDL
16-01-2025	49.8	24.8	4.45	4.98	BDL	BDL
20-01-2025	46.9	23.5	4.24	4.87	BDL	BDL
23-01-2025	52.4	25.1	4.29	5.21	BDL	BDL
27-01-2025	54.6	26.9	4.47	5.61	BDL	BDL
30-01-2025	49.8	23.5	4.19	4.87	BDL	BDL
03-02-2025	60.2	31.8	4.28	5.45	BDL	BDL
06-02-2025	56.4	28.5	4.25	5.31	BDL	BDL
10-02-2025	52.1	25.8	4.19	4.86	BDL	BDL
13-02-2025	60.9	29.5	4.53	5.24	BDL	BDL
17-02-2025	55.4	26.7	4.56	5.62	BDL	BDL
20-02-2025	45.0	22.1	4.15	4.68	BDL	BDL
24-02-2025	54.6	26.1	4.48	4.96	BDL	BDL
27-02-2025	50.2	23.9	4.36	4.72	BDL	BDL
03-03-2025	54.5	25.8	4.65	5.16	BDL	BDL
06-03-2025	57.2	27.9	4.78	5.40	BDL	BDL
10-03-2025	49.4	22.3	4.39	5.49	BDL	BDL
13-03-2025	57.3	26.2	4.63	5.10	BDL	BDL
17-03-2025	50.6	24.9	4.12	4.23	BDL	BDL
20-03-2025	47.7	23.3	4.26	4.69	BDL	BDL
24-03-2025	43.2	21.1	4.12	4.32	BDL	BDL
27-03-2025	43.9	21.5	4.16	4.91	BDL	BDL
31-03-2025	53.1	27.2	4.59	5.23	BDL	BDL
NAAQS 2009 Limits	**100**	**60**	**80**	**80**	**4**	**-**

BDL: Below Detectable Limit

Table 3.5: Location – Project Site (A2)

Project Site (A2)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-10-2024	86.3	44.3	5.18	5.96	BDL	BDL
07-10-2024	88.5	47.3	5.00	5.98	BDL	BDL
10-10-2024	85.3	43.2	4.63	5.49	BDL	BDL
14-10-2024	88.4	46.6	5.25	6.12	BDL	BDL
17-10-2024	80.6	44.2	4.72	5.22	BDL	BDL
21-10-2024	82.6	41.3	4.99	5.63	BDL	BDL
24-10-2024	83.5	41.9	4.89	5.55	BDL	BDL
28-10-2024	82.9	40.5	4.80	5.49	BDL	BDL
31-10-2024	85.4	44.9	4.96	5.66	BDL	BDL
04-11-2024	81.3	39.7	4.99	5.45	BDL	BDL
07-11-2024	78.6	36.5	4.67	5.35	BDL	BDL
11-11-2024	77.1	35.9	4.58	5.31	BDL	BDL
14-11-2024	79.5	37.9	5.11	5.89	BDL	BDL
18-11-2024	76.6	36.4	4.59	5.05	BDL	BDL
21-11-2024	77.5	38.4	4.89	5.42	BDL	BDL
25-11-2024	78.9	35.8	4.75	4.93	BDL	BDL
28-11-2024	77.8	36.8	4.96	5.20	BDL	BDL
02-12-2024	86.4	44.8	5.38	6.14	BDL	BDL
05-12-2024	83.5	41.5	4.84	5.78	BDL	BDL
09-12-2024	80.6	41.2	4.79	5.47	BDL	BDL
12-12-2024	82.6	42.9	4.58	5.41	BDL	BDL
16-12-2024	80.9	40.9	4.51	5.38	BDL	BDL
19-12-2024	84.9	43.7	4.67	5.69	BDL	BDL
23-12-2024	83.4	42.6	4.58	5.49	BDL	BDL
26-12-2024	79.8	39.7	4.72	5.51	BDL	BDL
30-12-2024	85.4	43.9	4.87	5.77	BDL	BDL
02-01-2025	89.5	45.6	4.85	5.75	BDL	BDL
06-01-2025	82.5	41.8	4.59	5.67	BDL	BDL
09-01-2025	85.4	44.3	4.49	5.59	BDL	BDL
13-01-2025	80.9	39.7	4.45	5.62	BDL	BDL

Project Site (A2)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
16-01-2025	78.7	38.4	4.55	5.49	BDL	BDL
20-01-2025	84.7	42.5	4.48	5.59	BDL	BDL
23-01-2025	80.4	40.1	4.40	5.29	BDL	BDL
27-01-2025	76.8	36.8	4.38	5.38	BDL	BDL
30-01-2025	81.7	39.7	4.58	5.60	BDL	BDL
03-02-2025	76.5	37.9	5.42	6.38	BDL	BDL
06-02-2025	78.1	38.1	5.25	6.11	BDL	BDL
10-02-2025	86.9	46.8	5.51	6.17	BDL	BDL
13-02-2025	85.1	44.1	5.48	6.42	BDL	BDL
17-02-2025	85.6	42.8	4.99	5.87	BDL	BDL
20-02-2025	78.9	37.5	4.87	5.59	BDL	BDL
24-02-2025	88.4	48.7	5.87	6.75	BDL	BDL
27-02-2025	84.9	42.8	5.46	6.61	BDL	BDL
03-03-2025	78.5	39.5	4.69	5.65	BDL	BDL
06-03-2025	82.5	40.2	4.80	6.09	BDL	BDL
10-03-2025	72.5	35.9	4.63	5.50	BDL	BDL
13-03-2025	87.1	43.7	5.38	6.79	BDL	BDL
17-03-2025	68.7	33.6	5.02	5.56	BDL	BDL
20-03-2025	72.3	35.5	5.19	5.92	BDL	BDL
24-03-2025	68.2	34.5	5.39	6.31	BDL	BDL
27-03-2025	73.5	36.2	4.72	5.35	BDL	BDL
31-03-2025	83.5	40.8	5.16	6.05	BDL	BDL
NAAQS 2009 Limits	**100**	**60**	**80**	**80**	**4**	**-**

BDL: Below Detectable Limit

Table 3.6: Location – Proposed Port Estate Area (A3)

Proposed Port Estate Area (A3)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-10-2024	48.9	24.1	4.46	5.22	BDL	BDL
07-10-2024	50.3	25.5	4.50	5.25	BDL	BDL

Proposed Port Estate Area (A3)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
10-10-2024	51.6	25.9	4.29	4.76	BDL	BDL
14-10-2024	50.6	25.4	4.63	5.13	BDL	BDL
17-10-2024	48.3	24.1	4.45	5.21	BDL	BDL
21-10-2024	49.8	23.4	4.39	5.54	BDL	BDL
24-10-2024	53.6	27.3	4.63	5.45	BDL	BDL
28-10-2024	55.3	25.9	4.83	5.63	BDL	BDL
31-10-2024	55.7	26.7	4.69	5.60	BDL	BDL
04-11-2024	43.5	22.2	4.25	4.75	BDL	BDL
07-11-2024	42.5	21.5	4.12	4.56	BDL	BDL
11-11-2024	43.9	21.8	4.10	4.85	BDL	BDL
14-11-2024	45.2	24.1	4.25	4.68	BDL	BDL
18-11-2024	44.5	23.1	4.19	4.44	BDL	BDL
21-11-2024	45.1	23.5	4.26	4.67	BDL	BDL
25-11-2024	46.2	24.6	4.21	4.58	BDL	BDL
28-11-2024	43.8	22.5	4.22	4.69	BDL	BDL
02-12-2024	53.6	26.4	4.46	4.88	BDL	BDL
05-12-2024	54.2	25.4	4.29	4.64	BDL	BDL
09-12-2024	49.8	24.9	4.24	4.67	BDL	BDL
12-12-2024	49.5	25.8	4.38	4.76	BDL	BDL
16-12-2024	48.3	24.1	4.28	4.65	BDL	BDL
19-12-2024	50.4	25.4	4.62	5.75	BDL	BDL
23-12-2024	52.4	26.1	4.45	4.67	BDL	BDL
26-12-2024	52.1	25.9	4.56	4.75	BDL	BDL
30-12-2024	55.6	26.9	4.35	4.59	BDL	BDL
02-01-2025	53.8	25.8	4.52	5.39	BDL	BDL
06-01-2025	51.5	24.6	4.38	5.42	BDL	BDL
09-01-2025	54.6	26.4	4.49	5.54	BDL	BDL
13-01-2025	50.2	24.2	4.25	4.98	BDL	BDL
16-01-2025	52.5	26.8	4.31	5.12	BDL	BDL
20-01-2025	55.4	27.2	4.69	5.45	BDL	BDL
23-01-2025	50.9	25.3	4.39	5.30	BDL	BDL
27-01-2025	50.5	24.9	4.28	5.41	BDL	BDL

Proposed Port Estate Area (A3)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
30-01-2025	51.5	25.9	4.35	5.38	BDL	BDL
03-02-2025	44.5	21.9	4.34	4.75	BDL	BDL
06-02-2025	46.1	22.4	4.21	4.55	BDL	BDL
10-02-2025	39.2	19.3	4.18	4.52	BDL	BDL
13-02-2025	38.6	19.0	4.25	4.67	BDL	BDL
17-02-2025	37.8	18.6	4.18	4.54	BDL	BDL
20-02-2025	40.5	19.9	4.5	5.71	BDL	BDL
24-02-2025	42.6	20.8	4.31	4.55	BDL	BDL
27-02-2025	41.9	20.4	4.47	4.62	BDL	BDL
03-03-2025	48.4	24.6	4.49	5.26	BDL	BDL
06-03-2025	39.6	20.7	4.35	4.94	BDL	BDL
10-03-2025	53.6	28.2	4.65	5.21	BDL	BDL
13-03-2025	47.5	22.8	4.30	4.10	BDL	BDL
17-03-2025	46.6	23.5	4.22	4.85	BDL	BDL
20-03-2025	59.8	28.8	4.75	5.39	BDL	BDL
24-03-2025	54.4	26.6	4.36	5.13	BDL	BDL
27-03-2025	39.2	20.4	4.16	4.92	BDL	BDL
31-03-2025	44.9	22.6	4.28	5.00	BDL	BDL
NAAQS 2009 Limits	**100**	**60**	**80**	**80**	**4**	**-**

BDL: Below Detectable Limit

Table 3.7: Location – Chani (A4)

Chani (A4)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-10-2024	51.3	24.3	4.25	4.69	BDL	BDL
07-10-2024	48.3	22.5	4.28	4.75	BDL	BDL
10-10-2024	53.2	26.4	4.35	4.99	BDL	BDL
14-10-2024	50.9	24.9	4.29	4.95	BDL	BDL
17-10-2024	48.3	24.6	4.26	4.90	BDL	BDL
21-10-2024	46.2	23.2	4.13	4.89	BDL	BDL
24-10-2024	50.2	25.4	4.19	4.95	BDL	BDL

Chani (A4)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
28-10-2024	47.5	23.8	4.20	4.83	BDL	BDL
31-10-2024	51.6	24.5	4.22	4.90	BDL	BDL
04-11-2024	44.5	22.9	4.39	4.99	BDL	BDL
07-11-2024	41.8	20.1	4.12	4.68	BDL	BDL
11-11-2024	45.9	24.6	4.21	4.85	BDL	BDL
14-11-2024	42.1	20.1	4.18	4.79	BDL	BDL
18-11-2024	41.9	19.9	4.15	4.71	BDL	BDL
21-11-2024	43.5	21.5	4.22	4.68	BDL	BDL
25-11-2024	42.5	22.2	4.28	5.10	BDL	BDL
28-11-2024	43.8	24.1	4.45	5.21	BDL	BDL
02-12-2024	54.9	27.1	4.56	5.37	BDL	BDL
05-12-2024	49.8	25.4	4.37	5.18	BDL	BDL
09-12-2024	56.1	28.7	4.61	5.61	BDL	BDL
12-12-2024	55.1	25.7	4.52	5.25	BDL	BDL
16-12-2024	50.6	24.9	4.38	5.11	BDL	BDL
19-12-2024	51.8	26.4	4.45	5.21	BDL	BDL
23-12-2024	52.8	26.7	4.54	5.38	BDL	BDL
26-12-2024	54.7	27.5	4.64	5.51	BDL	BDL
30-12-2024	52.4	25.4	4.51	5.37	BDL	BDL
02-01-2025	52.9	24.8	4.38	5.18	BDL	BDL
06-01-2025	55.4	28.9	4.51	5.68	BDL	BDL
09-01-2025	51.5	25.6	4.27	5.24	BDL	BDL
13-01-2025	53.4	26.5	4.64	5.49	BDL	BDL
16-01-2025	53.9	26.9	4.34	5.12	BDL	BDL
20-01-2025	50.6	23.8	4.19	4.89	BDL	BDL
23-01-2025	55.8	27.5	4.58	5.62	BDL	BDL
27-01-2025	53.5	25.8	4.48	5.47	BDL	BDL
30-01-2025	56.8	28.7	4.55	5.58	BDL	BDL
03-02-2025	44.8	22.3	4.42	5.4	BDL	BDL
06-02-2025	41.3	21.1	4.35	5.12	BDL	BDL
10-02-2025	49.3	25.1	4.63	5.62	BDL	BDL
13-02-2025	46.8	23.6	4.52	5.25	BDL	BDL

Chani (A4)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
17-02-2025	42.9	20.2	4.3	5.09	BDL	BDL
20-02-2025	43.5	22.2	4.43	5.19	BDL	BDL
24-02-2025	45.3	22.8	4.53	5.33	BDL	BDL
27-02-2025	46.6	23.4	4.55	5.46	BDL	BDL
03-03-2025	43.9	21.8	4.39	5.28	BDL	BDL
06-03-2025	39.8	19.7	4.26	5.02	BDL	BDL
10-03-2025	46.5	22.6	4.54	5.55	BDL	BDL
13-03-2025	44.7	22.0	4.40	5.14	BDL	BDL
17-03-2025	41.3	20.5	4.22	5.01	BDL	BDL
20-03-2025	41.8	20.6	4.33	5.10	BDL	BDL
24-03-2025	43.2	20.8	4.42	5.25	BDL	BDL
27-03-2025	44.6	21.7	4.50	5.41	BDL	BDL
31-03-2025	48.5	23.1	4.56	5.63	BDL	BDL
NAAQS 2009 Limits	**100**	**60**	**80**	**80**	**4**	**-**

BDL: Below Detectable Limit

Table 3.8: Location – Balarampuram (A5)

Balarampuram (A5)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-10-2024	71.2	35.1	4.83	5.88	BDL	BDL
07-10-2024	68.9	32.9	4.75	5.67	BDL	BDL
10-10-2024	70.4	35.9	4.56	5.59	BDL	BDL
14-10-2024	72.6	36.5	4.66	5.49	BDL	BDL
17-10-2024	69.8	33.9	4.52	5.39	BDL	BDL
21-10-2024	72.1	36.5	4.67	5.45	BDL	BDL
24-10-2024	71.6	35.9	4.65	5.39	BDL	BDL
28-10-2024	68.7	34.2	4.50	5.34	BDL	BDL
31-10-2024	69.9	34.9	4.65	5.39	BDL	BDL
04-11-2024	69.6	34.9	4.71	5.38	BDL	BDL
07-11-2024	65.9	33.1	4.62	5.33	BDL	BDL

Balarampuram (A5)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
11-11-2024	68.1	34.1	4.85	5.78	BDL	BDL
14-11-2024	69.2	35.1	4.75	5.35	BDL	BDL
18-11-2024	68.7	32.7	4.76	5.15	BDL	BDL
21-11-2024	69.1	34.9	4.61	5.25	BDL	BDL
25-11-2024	67.8	33.6	4.72	5.45	BDL	BDL
28-11-2024	66.9	33.5	4.68	5.55	BDL	BDL
02-12-2024	75.4	37.8	4.69	5.85	BDL	BDL
05-12-2024	77.4	39.5	4.82	5.96	BDL	BDL
09-12-2024	74.9	36.7	4.72	5.62	BDL	BDL
12-12-2024	70.5	32.5	4.59	5.54	BDL	BDL
16-12-2024	74.5	35.9	4.67	5.45	BDL	BDL
19-12-2024	72.9	34.8	4.54	5.49	BDL	BDL
23-12-2024	70.5	35.8	4.68	5.58	BDL	BDL
26-12-2024	73.4	36.1	4.82	5.69	BDL	BDL
30-12-2024	75.4	37.8	4.88	5.74	BDL	BDL
02-01-2025	78.4	35.9	4.35	5.28	BDL	BDL
06-01-2025	80.5	38.9	4.63	5.67	BDL	BDL
09-01-2025	75.9	35.1	4.41	5.52	BDL	BDL
13-01-2025	81.5	40.2	4.49	5.64	BDL	BDL
16-01-2025	79.8	39.5	4.53	5.55	BDL	BDL
20-01-2025	82.6	41.5	4.58	5.60	BDL	BDL
23-01-2025	78.8	37.8	4.63	5.75	BDL	BDL
27-01-2025	84.1	42.5	4.49	5.54	BDL	BDL
30-01-2025	81.5	40.4	4.50	5.69	BDL	BDL
03-02-2025	68.5	34.7	4.63	5.85	BDL	BDL
06-02-2025	70	35.6	4.85	5.96	BDL	BDL
10-02-2025	68.2	35.2	4.66	5.63	BDL	BDL
13-02-2025	64.5	32.6	4.55	5.52	BDL	BDL
17-02-2025	66.3	33.2	4.61	5.43	BDL	BDL
20-02-2025	63.4	31.9	4.48	5.4	BDL	BDL
24-02-2025	60.7	30.6	4.56	5.53	BDL	BDL
27-02-2025	65.6	32.4	4.78	5.58	BDL	BDL

Balarampuram (A5)						
Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-03-2025	66.2	33.6	4.58	5.67	BDL	BDL
06-03-2025	69.3	36.1	4.67	5.69	BDL	BDL
10-03-2025	65.4	33.5	4.59	5.47	BDL	BDL
13-03-2025	60.5	31.0	4.48	5.50	BDL	BDL
17-03-2025	68.9	35.3	4.63	5.41	BDL	BDL
20-03-2025	65.8	33.7	4.26	5.39	BDL	BDL
24-03-2025	62.7	32.5	4.37	5.52	BDL	BDL
27-03-2025	66.2	33.9	4.58	5.49	BDL	BDL
31-03-2025	71.4	36.1	4.46	5.87	BDL	BDL
NAAQS 2009 Limits	**100**	**60**	**80**	**80**	**4**	**-**

BDL: Below Detectable Limit

HYR-3.5. Monthly Average Results of Ambient Air Quality Monitoring (October 2024 to March 2025)

Table 3.9: Monthly Average Results

Parameter, Unit	NAAQS 2009 Limits	Month	Venganoor (A1)			Port Site (A2)			Proposed Port Estate Area (A3)			Chani (A4)			Balarampuram (A5)		
			Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min
Particulate matter (size less than 10µm) or PM_{10}, µg/ m^3	100	Oct-24	56.4	54.4	51.9	88.5	84.8	80.6	55.7	51.6	48.3	53.2	49.7	46.2	72.6	70.6	68.7
		Nov-24	54.6	52.2	50.1	81.3	78.4	76.6	46.2	44.3	42.5	45.9	43.3	41.8	69.6	68.2	65.9
		Dec-24	56.1	52.2	47.5	86.4	83.1	79.8	55.6	51.8	48.3	56.1	53.1	49.8	77.4	73.9	70.5
		Jan-25	54.6	50.0	43.9	89.5	82.3	76.8	55.4	52.3	50.2	56.8	53.8	50.6	84.1	80.3	75.9
		Feb-25	60.9	54.4	45.0	88.4	83.1	76.5	46.1	41.4	37.8	49.3	45.1	41.3	70.0	65.9	60.7
		Mar-25	57.3	50.8	43.2	87.1	76.3	68.2	59.8	48.2	39.2	48.5	43.8	39.8	71.4	66.3	60.5
		Half yearly	**60.9**	**52.3**	**43.2**	**89.5**	**81.3**	**68.2**	**59.8**	**48.3**	**37.8**	**56.8**	**48.1**	**39.8**	**84.1**	**70.9**	**60.5**
Particulate matter (size less than 2.5µm) or PM $_{2.5}$, µg/ m^3	60	Oct-24	29.3	26.4	24.8	47.3	43.8	40.5	27.3	25.4	23.4	26.4	24.4	22.5	36.5	35.1	32.9
		Nov-24	26.4	24.7	23.6	39.7	37.2	35.8	24.6	22.9	21.5	24.6	21.9	19.9	35.1	34.0	32.7
		Dec-24	27.2	24.9	22.8	44.8	42.4	39.7	26.9	25.7	24.1	28.7	26.4	24.9	39.5	36.3	32.5
		Jan-25	27.5	25.0	22.5	45.6	41.0	36.8	27.2	25.7	24.2	28.9	26.5	23.8	42.5	39.1	35.1
		Feb-25	31.8	26.8	22.1	48.7	42.3	37.5	22.4	20.3	18.6	25.1	22.6	20.2	35.6	33.3	30.6
		Mar-25	27.9	24.5	21.1	43.7	37.8	33.6	28.8	24.2	20.4	23.1	21.4	19.7	36.1	34.0	31
		Half yearly	**31.8**	**25.4**	**21.1**	**48.7**	**40.7**	**33.6**	**28.8**	**24.0**	**18.6**	**28.9**	**23.9**	**19.7**	**42.5**	**35.3**	**30.6**
Sulphur dioxide (SO_2), µg/m^3	80	Oct-24	4.96	4.55	4.39	5.25	4.94	4.63	4.83	4.54	4.29	4.35	4.24	4.13	4.83	4.64	4.50
		Nov-24	4.39	4.29	4.19	5.11	4.82	4.58	4.26	4.20	4.10	4.45	4.25	4.12	4.85	4.71	4.61
		Dec-24	4.49	4.32	4.15	5.38	4.77	4.51	4.62	4.40	4.24	4.64	4.51	4.37	4.88	4.71	4.54
		Jan-25	4.69	4.35	4.18	4.85	4.53	4.38	4.69	4.41	4.25	4.64	4.44	4.19	4.63	4.51	4.35
		Feb-25	4.56	4.35	4.15	5.87	5.36	4.87	4.50	4.31	4.18	4.63	4.47	4.30	4.85	4.64	4.48
		Mar-25	4.78	4.41	4.12	5.39	5.00	4.63	4.75	4.40	4.16	4.56	4.40	4.22	4.67	4.51	4.26
		Half yearly	**4.96**	**4.38**	**4.12**	**5.87**	**4.90**	**4.38**	**4.83**	**4.38**	**4.10**	**4.64**	**4.38**	**4.12**	**4.88**	**4.62**	**4.26**
	80	Oct-24	5.50	5.26	4.96	6.12	5.68	5.22	5.63	5.31	4.76	4.99	4.87	4.69	5.88	5.51	5.34
		Nov-24	4.99	4.87	4.75	5.89	5.33	4.93	4.85	4.65	4.44	5.37	4.88	4.68	5.78	5.41	5.15

Parameter, Unit	NAAQS 2009 Limits	Month	Venganoor (A1)			Port Site (A2)			Proposed Port Estate Area (A3)			Chani (A4)			Balarampuram (A5)		
			Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min
Oxides of Nitrogen (NO_x), µg/m^3		Dec-24	5.11	4.81	4.56	6.14	5.63	5.38	5.75	4.82	4.59	5.61	5.33	5.11	5.96	5.66	5.45
		Jan-25	5.61	5.06	4.74	5.75	5.55	5.29	5.54	5.33	4.98	5.68	5.36	4.89	5.75	5.58	5.28
		Feb-25	5.62	5.11	4.68	6.75	6.24	5.59	5.71	4.74	4.52	5.62	5.31	5.09	5.96	5.61	5.40
		Mar-25	5.49	4.95	4.23	6.79	5.91	5.35	5.39	4.98	4.10	5.63	5.27	5.01	5.87	5.56	5.39
		Half yearly	**5.62**	**5.01**	**4.23**	**6.79**	**5.72**	**4.93**	**5.75**	**4.97**	**4.10**	**5.68**	**5.17**	**4.68**	**5.96**	**5.55**	**5.15**
Carbon Monoxide (CO), mg/m^3	4	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Half yearly	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**
Hydrocarbon (HC), ppm	-	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Half yearly	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**

HYR-3.6. Graphical representation of Half-Yearly Results (October-2024 to March-2025)

Figure 3.2: Respirable Particulate Matter (PM10)

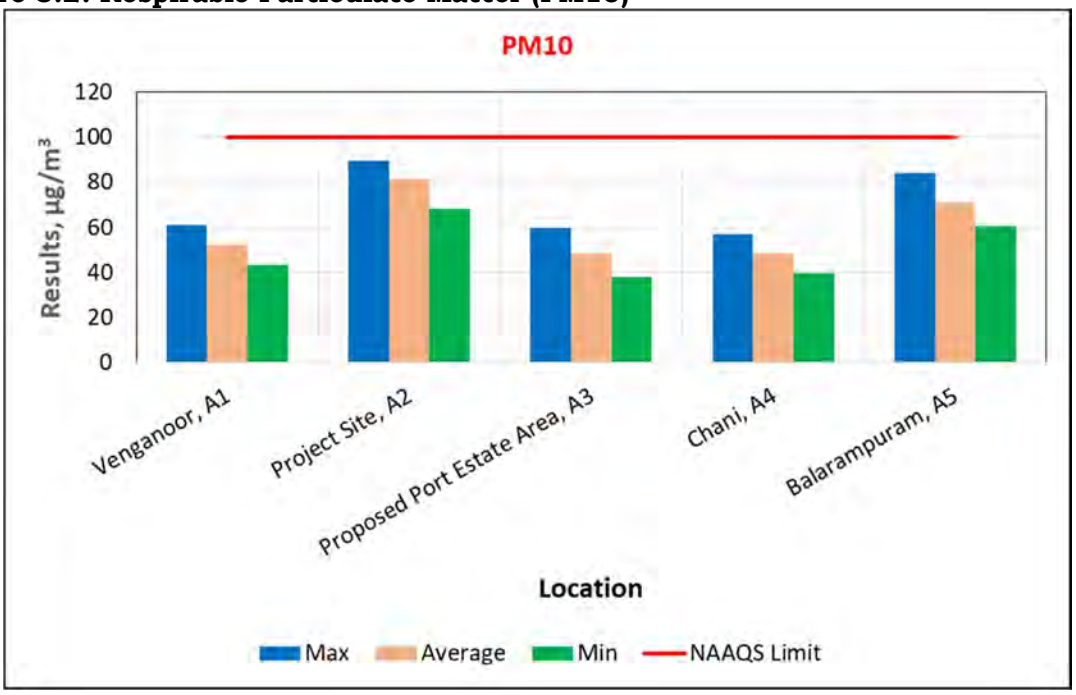


Figure 3.3: Fine Particulate matter (PM2.5)

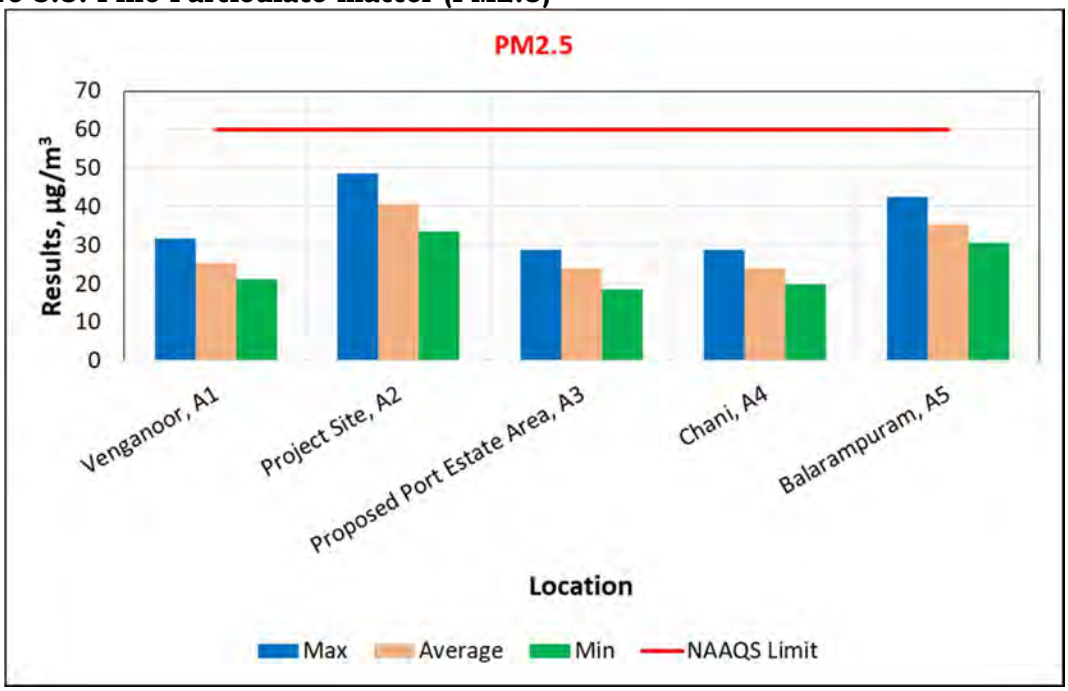


Figure 3.4: Sulphur Dioxide as SO_2

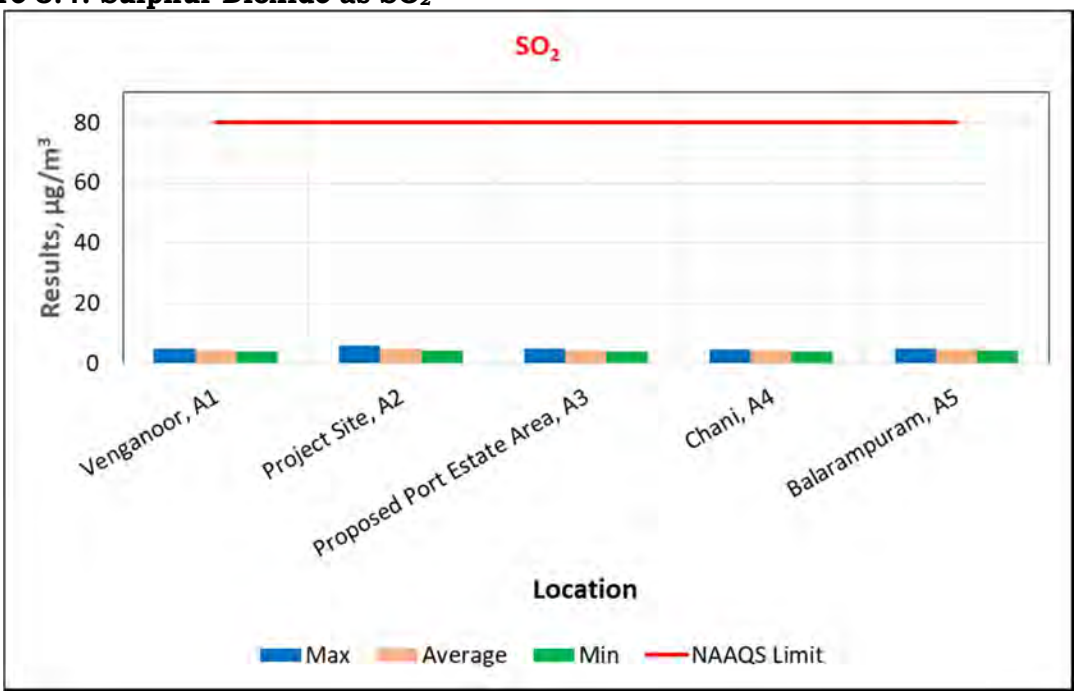
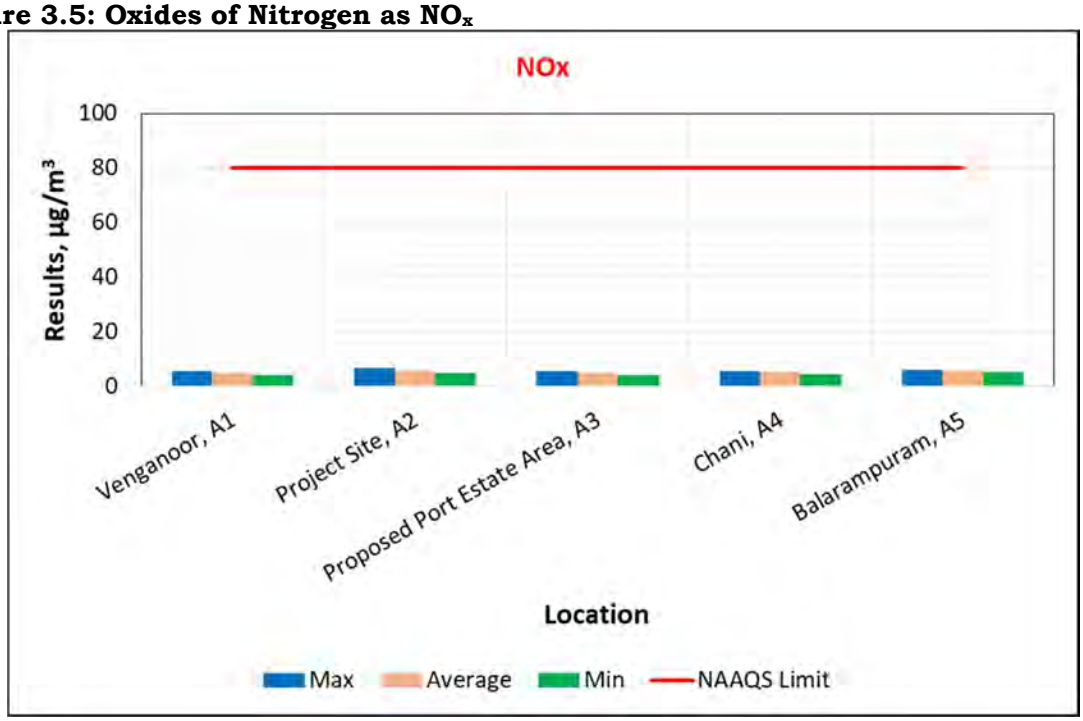


Figure 3.5: Oxides of Nitrogen as NO_x



HYR-3.7. Summary - Ambient Air Quality

During the period of October 2024 to March 2025, following is the summary of ambient air quality results:

a) At the location **Venganoor**:

- PM_{10} was observed in the range between 43.2-60.9µg/m³ with an average of 52.3µg/m³
- $PM_{2.5}$ was observed in the range between 21.1-31.8µg/m³ with an average of 25.4 µg/m³
- SO_2 was observed in the range between 4.12-4.96µg/m³ with an average of 4.38µg/m³
- NO_2 was observed in the range between 4.23–5.62µg/m³ with an average of 5.01µg/m³
- CO & HC were observed below detectable limits

b) At the location **Port Site**:

- PM_{10} was observed in the range between 68.2-89.5µg/m³ with an average of 81.3µg/m³
- $PM_{2.5}$ was observed in the range between 33.6-48.7µg/m³ with an average of 40.7µg/m³
- SO_2 was observed in the range between 4.38-5.87µg/m³ with an average of 4.90µg/m³
- NO_2 was observed in the range between 4.93– 6.79µg/m³ with an average of 5.72µg/m³
- CO & HC were observed below detectable limits

c) At the location **Proposed Port Area**:

- PM_{10} was observed in the range between 37.8-59.8µg/m³ with an average of 48.3µg/m³
- $PM_{2.5}$ was observed in the range between 18.6-28.8µg/m³ with an average of 24.0µg/m³

- SO_2 was observed in the range between 4.10-4.83µg/m³ with an average of 4.38µg/m³
- NO_2 was observed in the range between 4.10–5.75µg/m³ with an average of 4.97µg/m³
- CO & HC were observed below detectable limits

d) At the location **Chani**:

- PM_{10} was observed in the range between 39.8-56.8µg/m³ with an average of 48.1µg/m³
- $PM_{2.5}$ was observed in the range between 19.7-28.9µg/m³ with an average of 23.9µg/m³
- SO_2 was observed in the range between 4.12-4.64µg/m³ with an average of 4.38µg/m³
- NO_2 was observed in the range between 4.68–5.68µg/m³ with an average of 5.17µg/m³
- CO & HC were observed below detectable limits

e) At the location **Balarampuram**:

- PM_{10} was observed in the range between 60.5-84.1µg/m³ with an average of 70.9µg/m³
- $PM_{2.5}$ was observed in the range between 30.6-42.5µg/m³ with an average of 35.3µg/m³
- SO_2 was observed in the range between 4.26-4.88µg/m³ with an average of 4.62µg/m³
- NO_2 was observed in the range between 5.15– 5.96µg/m³ with an average of 5.55µg/m³
- CO & HC were observed below detectable limits

f) Overall Comparison of Results from **all Locations**:

- PM_{10} was observed a maximum of 89.5µg/m³ at Port Site and a minimum of 37.8µg/m³ at Proposed Port Estate Area. The overall average of all locations is 60.2µg/m³

- $PM_{2.5}$ was observed a maximum of 48.7µg/m^3 at Port Site and a minimum of 18.6µg/m^3 at Proposed Port Estate Area. The overall average of all locations is 29.9µg/m^3
- SO_2 was observed a maximum of 5.87µg/m^3 at Port Site and a minimum of 4.10µg/m^3 at Proposed Port Estate Area. The overall average of all locations is 4.53µg/m^3
- NO_2 was observed a maximum of 6.79µg/m^3 at Port Site and a minimum of 4.10µg/m^3 at Proposed Port Estate Area. The overall average of all locations is 5.29µg/m^3
- CO & HC were observed below detectable limits at all times at all locations.

The obtained results were compared with National Ambient Air Quality Standards (NAAQS), 2009. The results were well within the limits on all monitoring days at all 5 locations during the monitoring months (from October 2024 to March 2025).

Table 3.10: Overall Summary of Results from all Locations

Parameter	Unit	NAAQS 2009 Limits	Max	Avg.	Min
PM10	µg/m^3	100	89.5	60.2	37.8
PM 2.5	µg/m^3	60	48.7	29.9	18.6
SO2	µg/m^3	80	5.87	4.53	4.10
NOx	µg/m^3	80	6.79	5.29	4.10
CO	mg/m^3	4	BDL	BDL	BDL
HC	ppm	--	BDL	BDL	BDL

HYR-4	Ambient Noise Monitoring

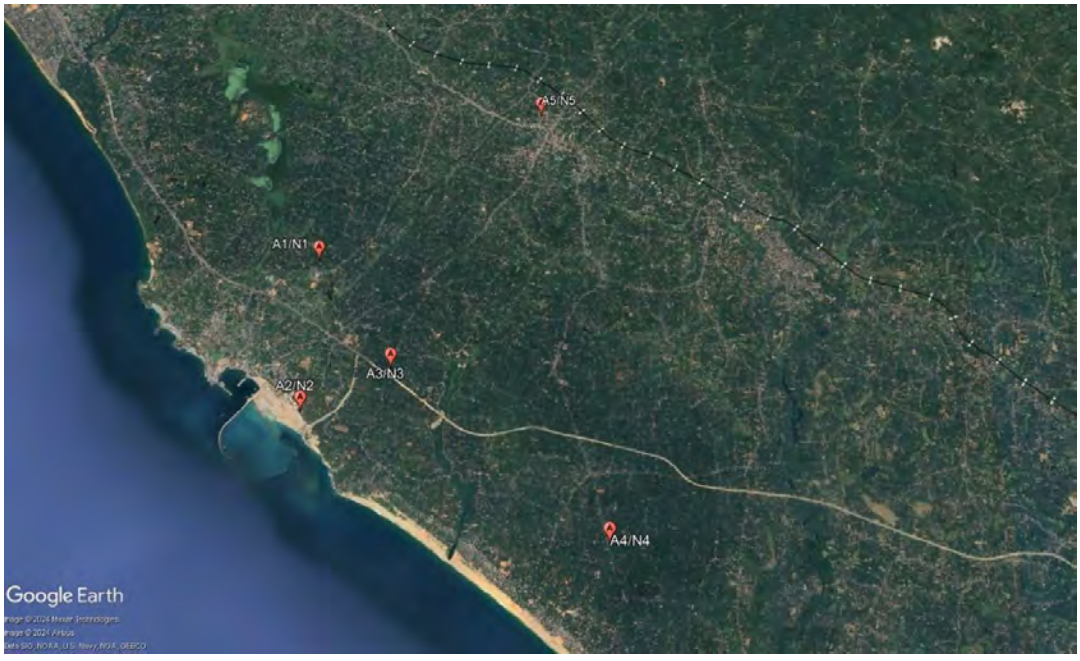
HYR-4.1. Ambient Noise Monitoring location details

This section describes the sampling location, methodology adopted for monitoring ambient noise and analysis of monitored results. Ambient Noise Monitoring during October 2024 to March 2025 was carried out at Venganoor, Port Site, Proposed Port Estate Area, Chani and Balarampuram. Classification of locations as per the Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) are as below.

Table 4.1: Coordinates of Ambient Noise Monitoring Locations

Location	Legend	Area Type	Latitude	Longitude
Venganoor	N1	Residential	8°23'55.10"N	77°00'12.19"E
Port Site	N2	Industrial	8°22'13.73"N	77°00'08.39"E
Proposed Port Estate Area	N3	Residential	8°22'41.37"N	77°01'03.17"E
Chani	N4	Residential	8°20'53.49"N	77°03'18.76"E
Balarampuram	N5	Commercial	8°25'43.85"N	77°02'38.79"E

Figure 4.1: Google Earth View of Ambient Noise Monitoring Locations



HYR-4.2. Methodology of Sampling

Ambient Noise Monitoring is being carried out as per IS 9989:1981.

HYR-4.3. Ambient Noise Standards

The results obtained were compared with the standards as per the Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) given in the Table 4.2.

Table 4.2: Ambient Noise Standard

Area Code	Area Type	Limits in dB (A) Leq	
		Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45

HYR-4.4. Ambient Noise Monitoring Results for the period from October 2024 to March 2025.

Table 4.3: Location – Venganoor, N1 - (Residential Area)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-24	04-10-2024	89.6	72.8	37.8	36.3	53.0	43.8
	18-10-2024	86.1	75.1	36.9	35.9	54.1	42.9
Nov-24	05-11-2024	75.0	70.5	35.0	32.5	54.2	43.9
	19-11-2024	76.8	70.4	36.4	32.1	53.7	42.7
Dec-24	03-12-2024	77.3	74.9	32.9	31.5	53.7	43.8
	17-12-2024	71.7	69.2	30.9	29.7	52.9	43.2
Jan-25	03-01-2025	87.9	73.1	33.0	32.3	52.0	44.1
	17-01-2025	85.6	71.2	34.5	32.0	53.4	43.8
Feb-25	04-02-2025	85.6	75.6	32.5	32.1	53.7	43.5

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
	18-02-2025	85.7	71.6	33.1	32.6	54.1	44.3
Mar-25	04-03-2025	86.9	74.2	34.5	34.2	54.1	44.2
	18-03-2025	85.3	74.9	35.6	33.5	53.7	43.6
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						**55**	**45**

Table 4.4: Location – Port Site, N2 - (Industrial Area)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-24	08-10-2024	95.6	88.5	41.1	39.7	65.4	59.8
	22-10-2024	95.3	82.7	45.2	43.8	61.5	57.2
Nov-24	06-11-2024	95.7	80.5	48.5	46.4	63.1	55.3
	20-11-2024	84.6	76.2	46.7	44.4	60.7	54.3
Dec-24	04-12-2024	86.7	85.1	45.5	43.1	63.5	60.2
	18-12-2024	84.7	83.5	44.2	42.5	61.8	59.4
Jan-25	07-01-2025	91.7	80.0	41.2	40.4	62.5	54.9
	21-01-2025	90.3	85.2	41.3	40.1	61.0	55.3
Feb-25	05-02-2025	96.9	96.1	41.1	40.3	61.1	60.3
	19-02-2025	93.5	86.7	35.6	35.2	62.5	61.9
Mar-25	05-03-2025	89.5	87.3	42.1	40.5	65.5	60.8
	19-03-2025	86.9	85.7	42.5	41.9	64.9	63.4
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						**75**	**70**

Table 4.5: Location – Proposed Port Estate Area, N3 - (Residential Area)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-24	09-10-2024	75.8	73.8	32.3	31.4	63.1	44.2
	23-10-2024	83.4	75.9	33.7	32.4	53.8	43.7
Nov-24	08-11-2024	94.7	82.3	38.5	38.5	62.8	52.0
	22-11-2024	78.2	76.4	37.4	34.4	53.7	42.6
Dec-24	06-12-2024	84.9	82.3	37.6	36.7	52.6	43.2
	20-12-2024	79.6	76.7	36.9	35.3	51.4	40.9
Jan-25	08-01-2025	78.5	75.0	32.7	32.4	53.9	43.4
	22-01-2025	76.2	75.8	33.2	32.4	53.4	43.7
Feb-25	07-02-2025	91.9	79.8	32.5	31.5	61.5	52.1
	21-02-2025	78.4	75.2	32.1	31.9	53.9	42.9
Mar-25	07-03-2025	75.5	72.9	34.5	33.1	52.8	42.5
	21-03-2025	74.8	71.3	34.8	33.0	53.8	42.9
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						**55**	**45**

Table 4.6: Location – Chani, N4 - (Residential Area)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Month	11-10-2024	87.7	78.1	32.9	30.8	54.2	43.9
	25-10-2024	85.1	78.6	36.2	35.0	53.4	43.1
Oct-24	12-11-2024	70.4	69.4	34.7	33.7	52.4	44.1
	26-11-2024	72.4	71.6	35.2	34.2	52.9	42.1
Nov-24	10-12-2024	79.4	75.9	34.3	32.9	51.7	44.2
	24-12-2024	77.5	76.1	38.0	37.4	50.8	43.7
Dec-24	10-01-2025	79.4	75.9	32.7	31.4	54.1	44.1

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
	24-01-2025	73.5	72.9	33.1	32.4	53.9	42.7
Jan-25	11-02-2025	79.8	75.2	33.2	32.8	53.1	43.7
	25-02-2025	78.6	72.4	32.4	31.9	51.4	43.5
Feb-25	11-03-2025	79.5	72.5	36.2	35.4	53.7	42.9
	25-03-2025	75.4	72.3	37.2	35.4	51.9	42.8
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						**55**	**45**

Table 4.7: Location – Balarampuram, N5 - (Commercial Area)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-24	15-10-2024	90.4	81.7	38.5	34.3	58.4	54.2
	29-10-2024	88.4	78.8	34.6	32.6	58.7	54.4
Nov-24	15-11-2024	89.7	79.8	36.4	35.2	57.6	50.2
	29-11-2024	83.0	75.2	36.0	33.6	57.6	48.1
Dec-24	13-12-2024	81.7	78.1	35.6	32.7	58.3	47.6
	27-12-2024	79.1	76.0	31.5	30.4	54.9	49.7
Jan-25	14-01-2025	87.4	68.5	33.4	32.4	58.5	49.5
	28-01-2025	89.0	72.9	34.8	32.2	57.9	48.7
Feb-25	14-02-2025	83.4	68.8	33.0	32.8	58.1	45.9
	28-02-2025	85.0	70.5	34.2	33.7	57.8	45.8
Mar-25	14-03-2025	80.7	75.8	34.8	33.1	56.8	49.7
	28-03-2025	79.9	75.8	37.8	32.8	56.0	48.5
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						**65**	**55**

HYR-4.5. Half Yearly Average Results of Ambient Noise Monitoring (October-2024 to March-2025)

Table 4.8: Half Yearly Average Results

Parameter		Venganoor (N1)	Proposed Port Estate Area (N3)	Chani (N4)	Port Site (N2)	Balarampuram (N5)
		Residential	Residential	Residential	Industrial	Commercial
L_{max} Day time dB (A)	Max	89.6	94.7	87.7	96.9	90.4
	Min	71.7	74.8	70.4	84.6	68.5
	Avg.	82.8	81.0	78.2	91.0	80.0
L_{max} Night time dB (A)	Max	75.6	82.3	78.6	96.1	81.7
	Min	69.2	71.3	69.4	76.2	68.5
	Avg.	72.8	76.4	74.2	84.8	75.2
L_{min} Day time dB (A)	Max	37.8	38.5	38.0	48.5	38.5
	Min	30.9	32.1	32.4	35.6	31.5
	Avg.	34.4	34.7	34.7	42.9	35.0
L_{min} Night time dB (A)	Max	36.3	38.5	37.4	46.4	35.2
	Min	29.7	31.4	30.8	35.2	30.4
	Avg.	32.9	33.6	33.6	41.5	33.0
Leq Day time dB (A)	Max	54.2	63.1	54.2	65.5	58.7
	Min	52.0	51.4	50.8	60.7	54.9
	Avg.	**53.6**	**55.6**	**52.8**	**62.8**	**57.5**
	Limit	**55**	**55**	**55**	**75**	**65**
Leq Night time dB (A)	Max	44.3	52.1	44.2	63.4	54.4
	Min	42.7	40.9	42.1	54.3	45.8
	Avg.	**43.7**	**44.5**	**43.4**	**58.6**	**49.4**
	Limit	**45**	**45**	**45**	**70**	**55**

HYR-4.6. Graphical Representation of Half Yearly Results (October-2024 to March-2025)

Figure 4.2: Residential Area Noise Level

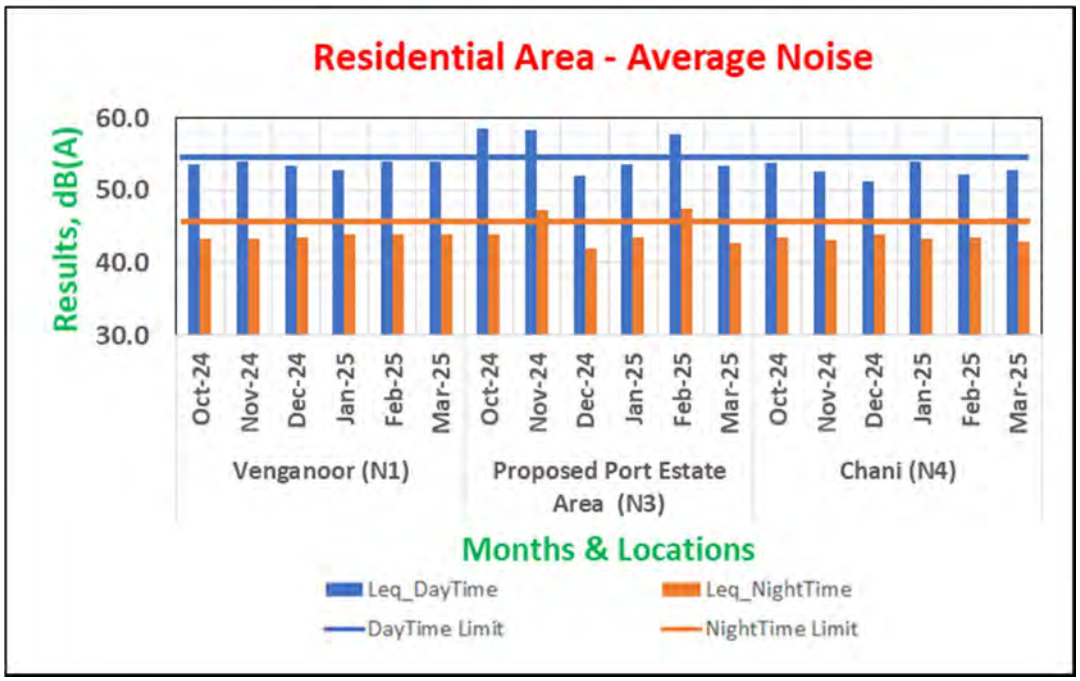


Figure 4.3: Industrial Area Noise Level

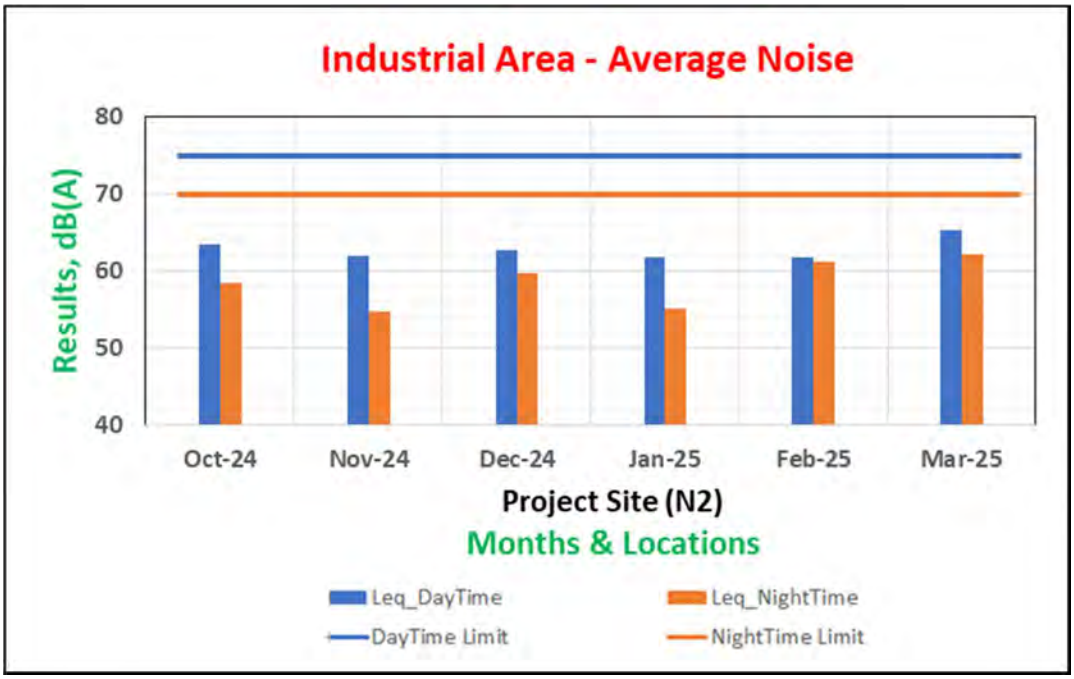
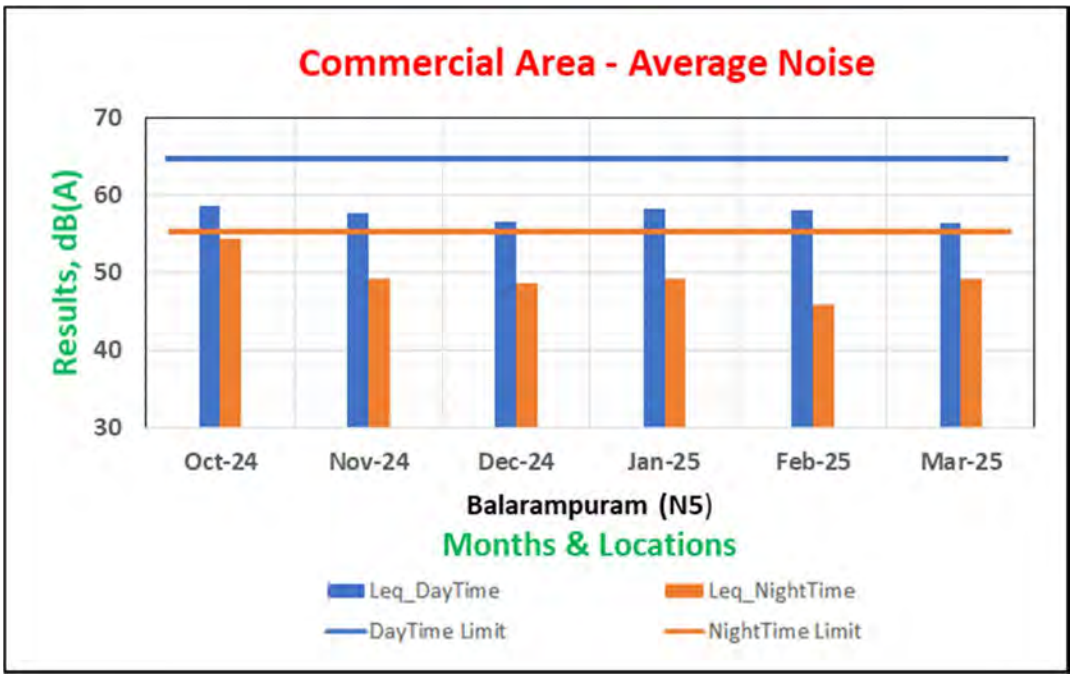


Figure 4.4: Commercial Area Noise Level



HYR-4.7. Summary - Ambient Noise Monitoring

During the period from October 2024 to March 2025, the following is the average noise levels observed.

Table 4.9: Summary - Ambient Noise Monitoring

Parameter		Venganoor (N1)	Proposed Port Estate Area (N3)	Chani (N4)	Port Site (N2)	Balarampuram (N5)
		Residential	Residential	Residential	Industrial	Commercial
		Day Time (Limit: 55) Night Time (Limit: 45)			Day Time (Limit: 75) Night Time (Limit: 70)	Day Time (Limit: 65) Night Time (Limit: 55)
Leq Day time dB (A)	Avg	53.6	55.6	52.8	62.8	57.5
Leq Night time dB (A)	Avg	43.7	44.5	43.4	58.6	49.4

- The average Leq values observed at day time and night time are 53.6 and 43.7 dB(A) respectively at Venganoor (Residential)

- The average Leq values observed at day time and night time are 62.8 and 58.6 dB(A) respectively at Port Site (Industrial)
- The average Leq values observed at day time and night time are 55.6 and 44.5 dB(A) respectively at Proposed Port Estate Area (Residential)
- The average Leq values observed at day time and night time are 52.8 and 43.4 dB(A) respectively at Chani (Residential)
- The average Leq values observed at day time and night time are 57.5 and 49.4 dB(A) respectively at Balarampuram (Commercial)

The results obtained were compared with Noise Pollution (Regulation & Control) Rule, 2000 (Rule 3(1) and 4(1)) and it is observed that Leq values were within limits during the monitoring months (from October 2024 to March 2025) except Proposed Port Estate Area on following dates:

- Day time Leq values on 09-10-2024 due to noise played from loudspeaker on account of Navaratri festival
- Both day time and night time Leq values on 08-11-2024 due to noise played from loud speaker on account of festival in Subramanya temple
- Both day and night time Leq values on 07-02-2025 due to noise played from loudspeaker on account of Therivila Sreedurga Bagavathy Temple Festival.

HYR-5	Marine Water & Sediment Analysis

HYR-5.1. Marine Water and Sediment Sampling Location Details:

This section describes the sampling location, methodology adopted for analysis and the analysis of monitored data for Marine Water and Sediment. Sampling and analysis of marine water at high tide and low tide during from October 2024 to March 2025 carried out at different locations such as Near Kovalam Beach, Proposed Dredging site, South of Break Water, Port Basin, Inner Approach Channel and Kovalam Beach.

Table 5.1: Coordinates of Marine Water and Sediment Sampling Locations

Location	Legend	Latitude	Longitude
Near Kovalam Beach	M1/MS1	8°22'49.29"N	76°58'40.77"E
Proposed Dredging Site	M2/MS2	8°22'31.11"N	76°58'57.92"E
Port Basin	M3/MS3	8°22'06.96"N	76°59'27.85"E
South of Breakwater	M4/MS4	8°21'51.07"N	77°00'00.21"E
Inner Approach Channel	M5/MS5	8°21'12.68"N	77°00'35.14"E
Kovalam Beach	M6/MS6	8°23'08.16"N	76°58'26.09"E

Figure 5.1: Google earth view of Marine Water and Sediment Sampling Locations

HYR-5.2. Methodology of Sampling and Analysis

Table 5.2: Sampling and Analysis Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Marine Water Analysis				
1.	Temperature	˚C	15	IS 3025 (Part 9): 2023
2.	pH Value	-	2	IS 3025 (Part 11): 2022
3.	Turbidity	N.T.U.	0.1	IS 3025 (Part 10) : 2023
4.	Electrical Conductivity (at 25°C)	µmhos/cm	10	IS 3025 Part 14: 2013
5.	Total Suspended Solids	mg/L	5	IS 3025 (Part 17): 2022
6.	Total Dissolved Solids	mg/L	10	IS 3025 (Part 16): 2023
7.	Dissolved Oxygen	mg/L	0.2	IS 3025 Part 38 : 1989
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	IS 3025 (Part 44): 2023
9.	Floating Materials – Oil, Grease and Scum (Including Petroleum Products)	mg/L	1	IS 3025 Part 39: 2021
10.	Nitrite (as NO_2)	mg/L	0.02	IS 3025 Part 34: 1998
11.	Nitrate (as NO_3)	mg/L	1	APHA (24th Edn) -4500 - NO3- B : 2023
12.	Phenolic Compounds (as C_6H_5OH)	mg/L	0.01	APHA (24th Edn) 5530 - B,C,D: 202319
13.	Ammonical Nitrogen (as NH_3-N)	mg/L	1	IS 3025 Part 34 : 1988
14.	Total Nitrogen (as N)	mg/L	1	IS 3025 Part 34 : 1988
15.	Total Phosphorous (as P)	mg/L	0.01	IS 3025 (Part 31/Sec 1): 2022
16.	Reactive Phosphorous	mg/L	0.01	IS 3025 (Part 31/Sec 1): 2022
17.	Polycyclic Aromatic Hydrocarbon	mg/L	0.000005	SEAAL/INS/SOP/7.2/05
18.	Salinity	ppt	0.0036	APHA (24th Edn) 2520 - B: 2023
19.	Total Chlorophyll	mg/m^3	0.1	APHA 24th Edn:10200. H
20.	Total Coliforms	MPN/100 ml	2	IS 1622: 1981
21.	Faecal Coliforms	MPN /100ml	2	IS 1622: 1981
22.	Phytoplanktons	No./100ml	--	APHA 24th Edn:10200. F
23.	Zooplanktons	No./100ml	--	APHA 24th Edn:10200. G
Sediment Analysis				
1.	Texture	-	--	SEAAL/CHL/SOP/7.2/21
2.	Organic Matter	%	0.1	IS 2720 Part 22:1972
3.	Total Phosphorus (as P)	mg/kg	10	IS 10158: 1982
4.	Aluminium (as Al)	mg/kg	5	USEPA 7000B: 2017
5.	Chromium (as Cr)	mg/kg	5	USEPA 7000B: 2007
6.	Copper (as Cu)	mg/kg	1.5	USEPA 7000B: 2007
7.	Iron (as Fe)	mg/kg	2.5	USEPA 7000B: 2007
8.	Lead (as Pb)	mg/kg	5	USEPA 7000B: 2007

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
9.	Manganese (as Mn)	mg/kg	1.5	USEPA 7000B: 2007
10.	Mercury (as Hg)	mg/kg	0.10	SEAAL/CHL/SOP/7.2/19
11.	Zinc (as Zn)	mg/kg	1	USEPA 7000B: 2007
12.	Nickel (as Ni)	mg/kg	2.5	USEPA 7000B: 2007
13.	Benthic Organism	No./m^2	1	APHA 24th Edn:10750. B

HYR-5.3. Marine Water Standards

As per the Environment (Protection) Rules, 1986 Schedule I.

Table 5.3: Marine Water Standard

Parameter	Unit	# E(P)A Rules, 1986
pH Value	-	6.5-9.0
Dissolved Oxygen	mg/L	3.0 mg/L or 40% saturation value; whichever is higher
Colour and Odour	-	No visible colour or offensive odour
Floating Materials (Oil, Grease and Scum) (Including Petroleum Products)	mg/L	*Max.* 10
Faecal Coliforms	MPN/100ml	*Max.* 500
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	*Max.* 5
#: Environment (Protection) Rules, 1986, Schedule I, Table 1.4, Primary Water Quality Criteria for Class – IV Water (For Harbour Waters).		

HYR-5.4. Marine Water Analysis Results for the period from October 2024 to March 2025.

Table 5.4: Marine Water Analysis Results

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
1	Temperature (°C)	Oct-24	HT	28.1	27.8	28.5	27.4	28.3	27.5
			LT	27.9	27.1	27.7	27.2	27.4	27.1
		Nov-24	HT	28.7	27.9	28.3	27.7	28.1	27.5
			LT	28.2	27.5	27.6	27.4	27.5	27.2
		Dec-24	HT	28.3	28.6	28.1	27.9	28.3	27.8
			LT	27.9	28.1	27.3	27.4	27.9	27.1
		Jan-25	HT	28.9	28.4	27.9	27.6	28.6	27.7
			LT	28.4	28.1	27.4	27.1	28.2	27.3
		Feb-25	HT	27.9	27.3	28.2	27.7	28.5	27.8
			LT	27.5	27.1	27.9	27.3	28.1	27.2
		Mar-25	HT	28.1	27.6	27.6	27.8	28.3	27.6
			LT	27.9	27.4	27.5	27.1	28.1	27.1
2	Colour	Oct-24	HT	1	1	1	1	1	1
			LT	1	1	1	1	1	1
		Nov-24	HT	1	1	1	1	1	1
			LT	1	1	1	1	1	1
		Dec-24	HT	1	1	1	1	1	1
			LT	1	1	1	1	1	1
		Jan-25	HT	1	1	1	1	1	1
			LT	1	1	1	1	1	1
		Feb-25	HT	1	1	1	1	1	1
			LT	1	1	1	1	1	1

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
		Mar-25	HT	1	1	1	1	1	1
			LT	1	1	1	1	1	1
3	pH Value	Oct-24	HT	7.55	7.78	7.71	7.83	7.85	7.86
			LT	7.85	7.89	7.89	7.86	7.93	7.89
		Nov-24	HT	7.75	7.84	7.82	7.75	7.74	7.75
			LT	7.76	7.85	7.85	7.78	7.80	7.89
		Dec-24	HT	8.00	7.92	7.95	7.96	7.94	7.85
			LT	8.08	7.98	7.98	7.95	7.95	8.34
		Jan-25	HT	7.66	7.96	8.00	7.99	7.96	7.97
			LT	7.77	7.97	8.01	8.01	7.97	8.05
		Feb-25	HT	7.82	7.88	7.90	7.92	7.94	7.93
			LT	7.85	7.90	7.91	7.95	7.95	7.96
		Mar-25	HT	7.66	7.78	7.80	7.71	7.86	7.80
			LT	7.77	7.80	7.85	7.86	7.87	7.81
4	Turbidity (N.T.U.)	Oct-24	HT	0.7	0.4	0.4	BDL	BDL	0.6
			LT	0.5	0.2	BDL	BDL	BDL	0.15
		Nov-24	HT	1.5	0.12	1.7	1.4	1.4	2
			LT	1.1	BDL	1.2	2.3	0.6	1.9
		Dec-24	HT	0.8	0.6	3.1	0.3	0.6	1.3
			LT	0.6	0.9	2.4	0.3	2.8	0.4
		Jan-25	HT	1.2	0.2	0.7	0.2	0.2	BDL
			LT	1.6	0.3	0.8	0.6	0.3	BDL
		Feb-25	HT	BDL	BDL	0.3	0.9	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	1.2	0.4	0.3	0.8	0.5	0.3
			LT	0.2	0.3	0.12	0.5	0.11	0.6

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
5	Electrical Conductivity (at 25°C) (µmho/cm)	Oct-24	HT	52850	52800	52500	52100	52600	52800
			LT	52100	52400	52200	51900	52450	52500
		Nov-24	HT	51200	51450	51600	51900	51800	51500
			LT	50850	51100	51450	51700	51400	51250
		Dec-24	HT	53700	53300	53100	53200	53600	53400
			LT	53540	53250	52900	53100	53305	53100
		Jan-25	HT	53100	52800	52900	53210	53500	53500
			LT	52400	52400	52250	52420	53100	53700
		Feb-25	HT	53550	53600	53200	53200	53400	53400
			LT	53120	53410	52750	53100	53200	53100
		Mar-25	HT	53400	53700	53350	53450	53380	53500
			LT	53250	53180	53150	53240	53260	53350
6	Total Suspended Solids (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
7	Total Dissolved Solids	Oct-24	HT	33824	33792	33600	33344	33664	33792
			LT	33344	33536	33408	33216	33568	33600

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
	(mg/L)	Nov-24	HT	32768	32928	33024	33216	33152	32960
			LT	32544	32704	32928	33088	33896	32800
		Dec-24	HT	34368	34112	33984	34432	34304	34176
			LT	34266	34080	33856	34240	34115	33984
		Jan-25	HT	33984	33792	33856	34050	34240	34240
			LT	33536	33536	33440	33550	33984	34368
		Feb-25	HT	34272	34304	34048	34432	34176	34176
			LT	33997	34182	33760	34240	34048	33984
		Mar-25	HT	34176	34368	34144	34208	34163	34240
			LT	34080	34035	34016	34074	34086	34144
8	Dissolved Oxygen (mg/L)	Oct-24	HT	6.8	6.9	6.8	6.9	6.8	6.9
			LT	6.9	7.1	6.9	7.1	7.0	7.0
		Nov-24	HT	6.9	7.1	6.9	7.0	6.9	6.9
			LT	7.1	7.1	7.0	7.2	7.2	6.9
		Dec-24	HT	6.8	6.9	6.8	6.7	6.8	6.7
			LT	6.9	7.1	6.9	6.8	6.9	6.8
		Jan-25	HT	7.0	6.7	6.8	6.8	6.9	6.8
			LT	7.1	7.0	7.2	7.0	7.0	7.0
		Feb-25	HT	6.9	7.0	6.9	6.7	6.9	6.7
			LT	7.1	7.0	7.1	6.8	7.1	6.8
		Mar-25	HT	7.1	6.9	6.8	6.9	7.0	6.9
			LT	7.2	7.1	6.9	7.0	7.1	7.1
9	Biochemical Oxygen Demand (3 days, 27°C)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
	(mg/L)	Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
10	Floating Materials (Oil, Grease and Scum) (Including Petroleum Products) (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
11	Nitrite (as NO_2) (mg/L)	Oct-24	HT	0.031	0.025	0.031	0.024	BDL	0.029
			LT	0.038	0.032	0.038	0.036	BDL	0.040
		Nov-24	HT	0.034	0.031	0.036	0.029	BDL	0.036
			LT	0.042	0.038	0.045	0.036	BDL	0.048
		Dec-24	HT	0.042	0.036	0.026	0.032	BDL	0.029
			LT	0.046	0.041	0.034	0.045	BDL	0.035

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
		Jan-25	HT	0.028	0.024	0.025	0.022	BDL	0.022
			LT	0.031	0.026	0.031	0.027	0.024	0.025
		Feb-25	HT	0.038	0.029	0.029	0.032	BDL	0.029
			LT	0.042	0.038	0.035	0.045	BDL	0.035
		Mar-25	HT	0.032	0.032	0.022	0.025	BDL	0.022
			LT	0.038	0.036	0.029	0.038	BDL	0.031
12	Nitrate (as NO_3) (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
13	Phenolic Compounds (as C_6H_5OH) (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
14	Ammonical Nitrogen (as NH_3-N) (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
15	Total Nitrogen (as N) (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
16	Total Phosphorous (as P) (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
17	Reactive Phosphorous (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
18	Polycyclic Aromatic Hydrocarbon (mg/L)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
19	Salinity (ppt)	Oct-24	HT	34.963	34.925	34.702	34.404	34.776	34.925
			LT	34.404	34.627	34.478	34.255	34.665	34.702
		Nov-24	HT	33.735	33.921	34.032	34.255	34.181	33.958
			LT	33.476	33.661	33.921	34.107	33.884	33.772
		Dec-24	HT	34.780	34.670	34.523	34.597	34.890	34.743
			LT	34.846	34.633	34.377	34.523	34.673	34.523
		Jan-25	HT	34.523	34.304	34.377	34.427	34.084	34.817
			LT	34.011	34.011	33.901	33.916	34.523	34.963
		Feb-25	HT	34.853	34.890	34.597	34.597	34.743	34.743
			LT	34.538	34.750	34.267	34.523	34.597	34.523
		Mar-25	HT	34.743	34.963	34.706	34.780	34.728	34.817
			LT	34.633	34.582	34.560	34.626	34.640	34.706
20	Total Chlorophyll	Oct-24	HT	0.5	0.4	0.4	0.5	0.4	0.4
			LT	0.7	0.5	0.7	0.6	0.5	0.5

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
	(mg/m^3)	Nov-24	HT	0.4	0.5	0.5	0.4	0.5	0.5
			LT	0.6	0.7	0.6	0.7	0.7	0.6
		Dec-24	HT	0.4	0.4	0.4	0.5	0.4	0.5
			LT	0.7	0.6	0.6	0.6	0.7	0.7
		Jan-25	HT	0.5	0.4	0.5	0.5	0.4	0.4
			LT	0.6	0.5	0.6	0.7	0.5	0.5
		Feb-25	HT	0.5	0.5	0.5	0.5	0.5	0.5
			LT	0.6	0.7	0.6	0.6	0.7	0.7
		Mar-25	HT	0.4	0.5	0.4	0.7	0.5	0.4
			LT	0.5	0.6	0.5	0.5	0.7	0.5
21	Total Coliforms (MPN/100mL)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
22	Faecal Coliforms (MPN/100mL)	Oct-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter /unit	Month/Tide		Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
		Dec-24	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-25	HT	BDL	BDL	BDL	BDL	BDL	BDL
			LT	BDL	BDL	BDL	BDL	BDL	BDL

Note: HT (High Tide), LT (Low Tide).

HYR-5.5. Graphical representation of Results for marine water

Figure 5.2: Marine Water Analysis for Temperature

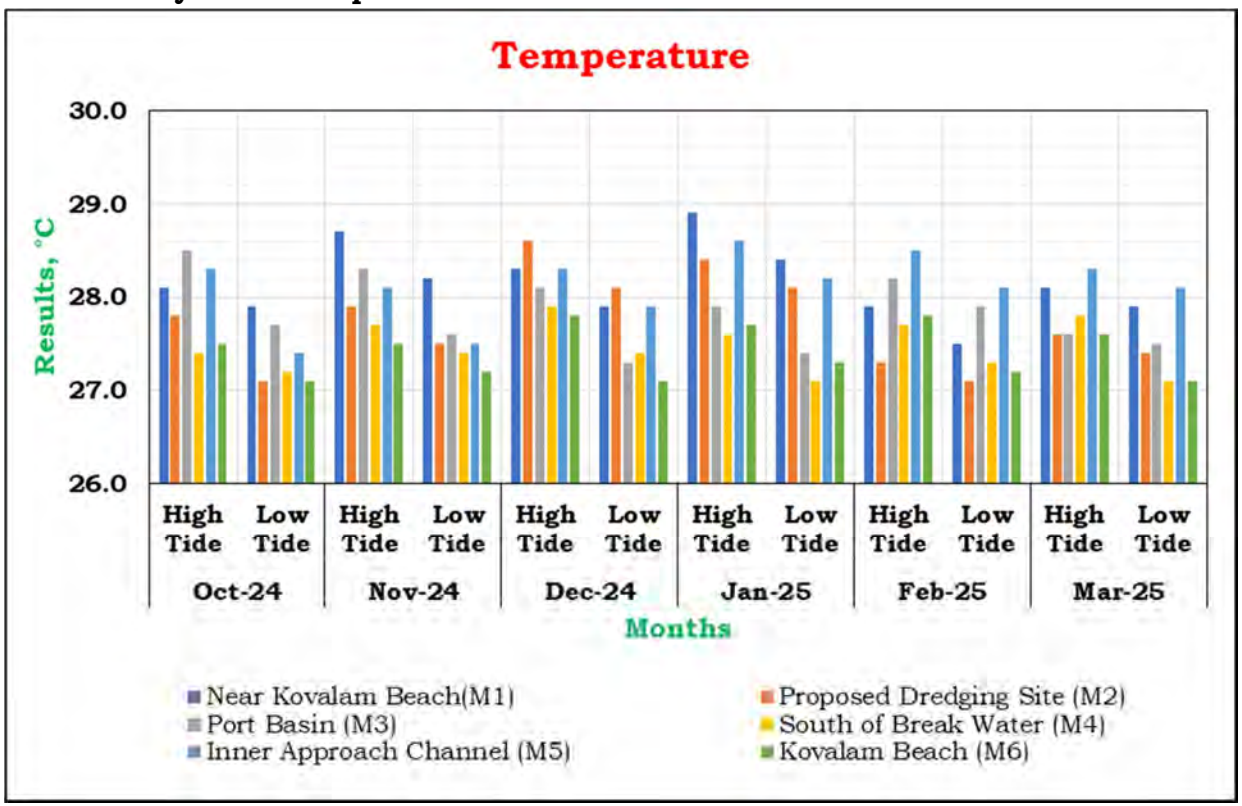


Figure 5.3: Marine Water Analysis for pH

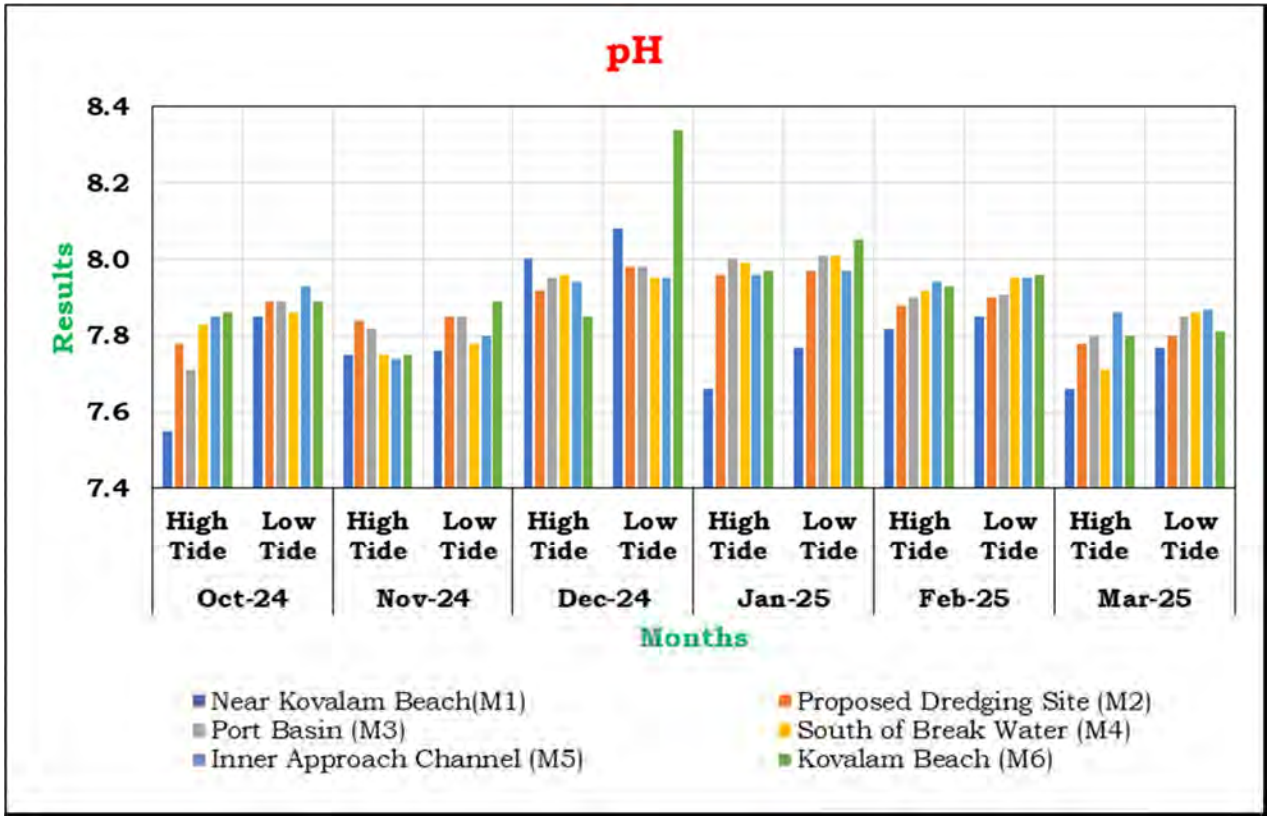


Figure 5.4: Marine Water Analysis for Electrical Conductivity

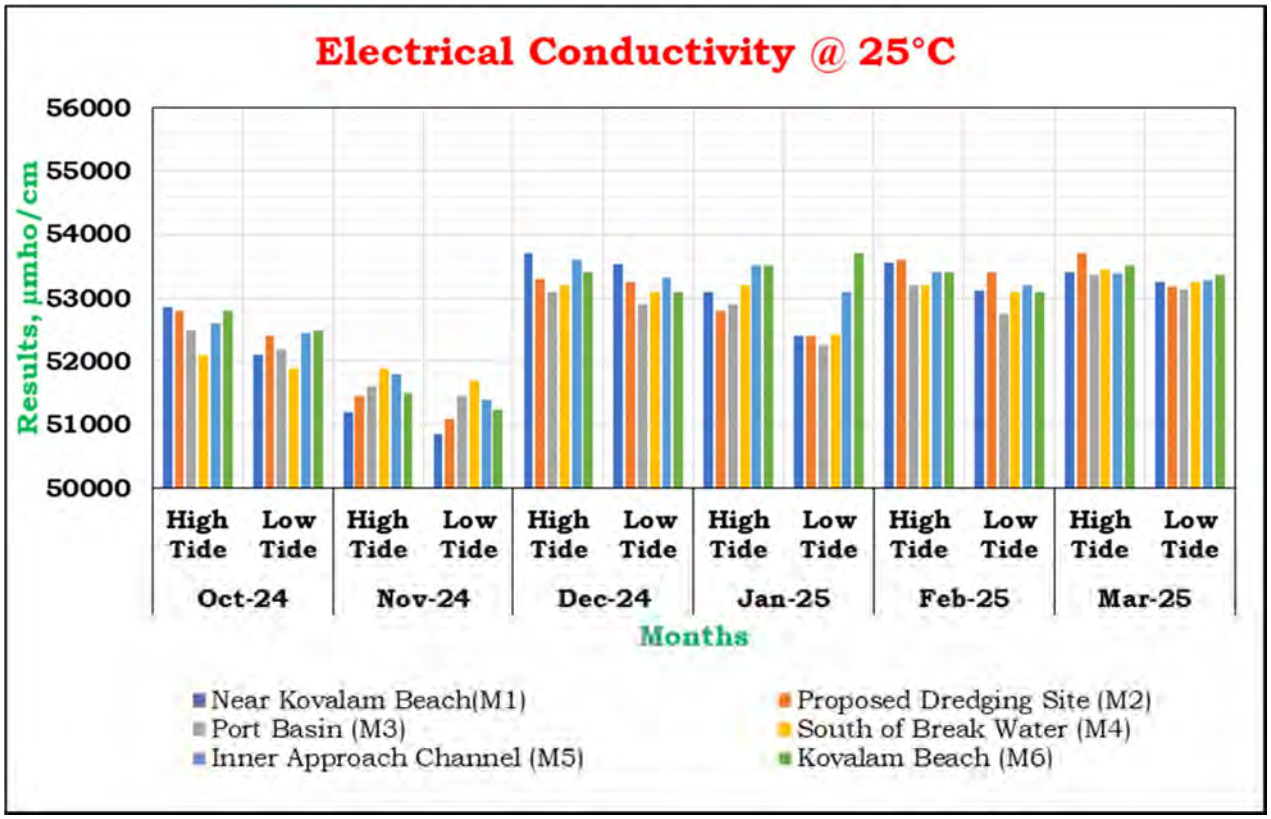


Figure 5.5: Marine Water Analysis for Total Dissolved Solids

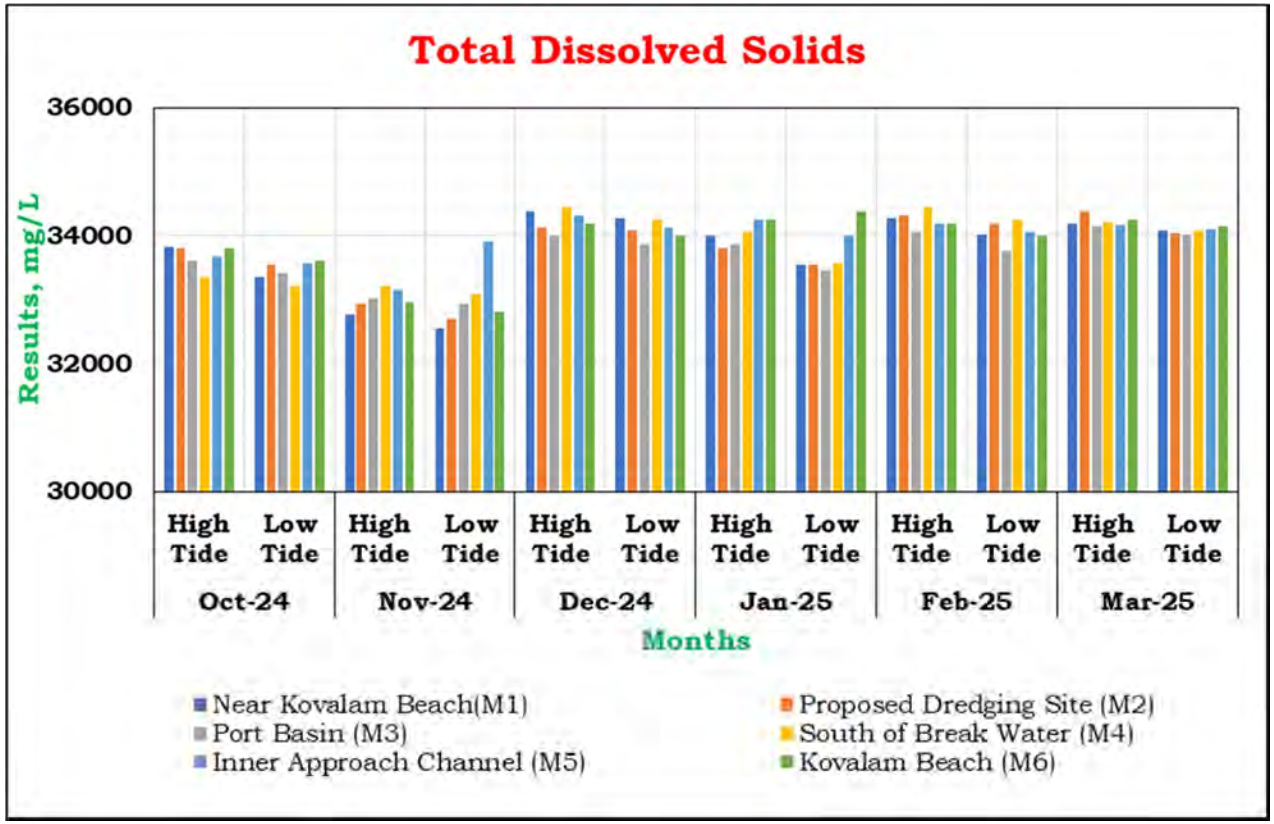


Figure 5.6: Marine Water Analysis for Dissolved Oxygen

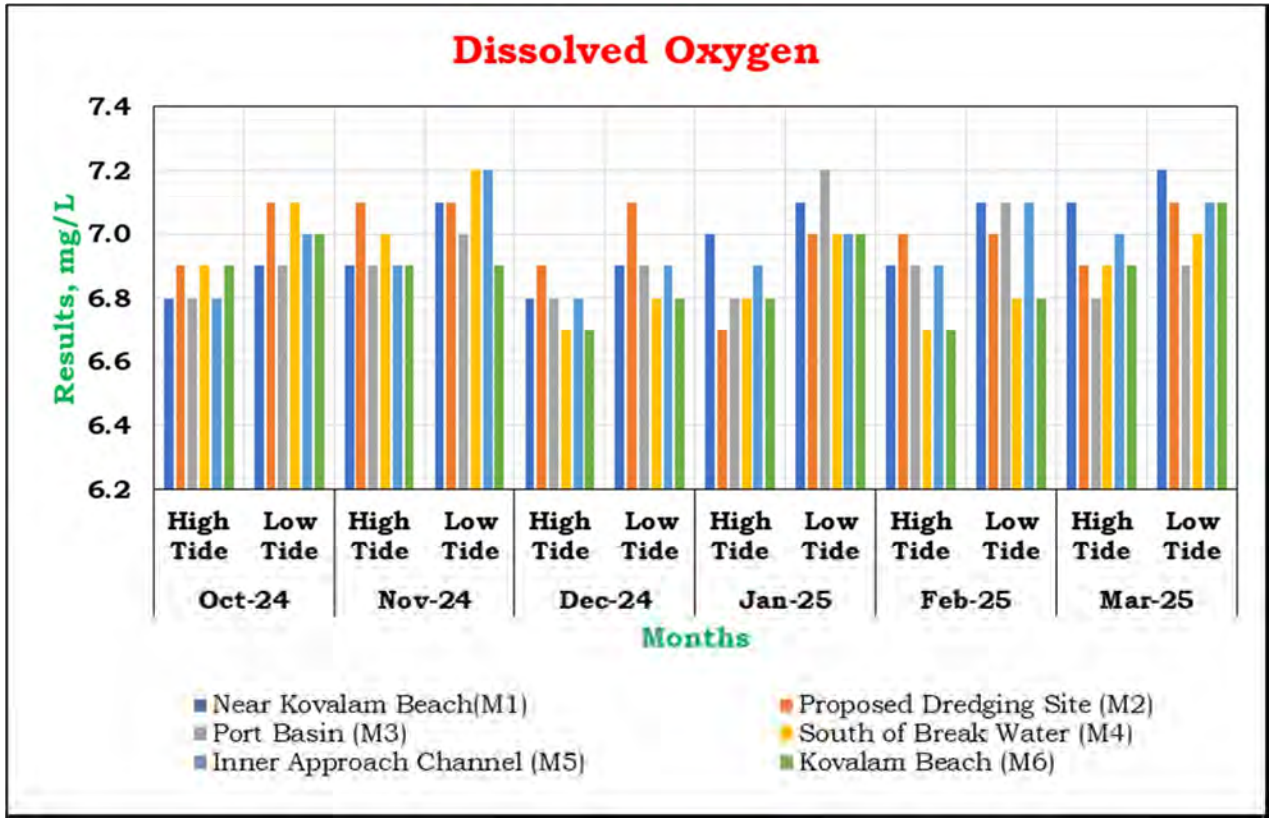


Figure 5.7: Marine Water Analysis for Salinity

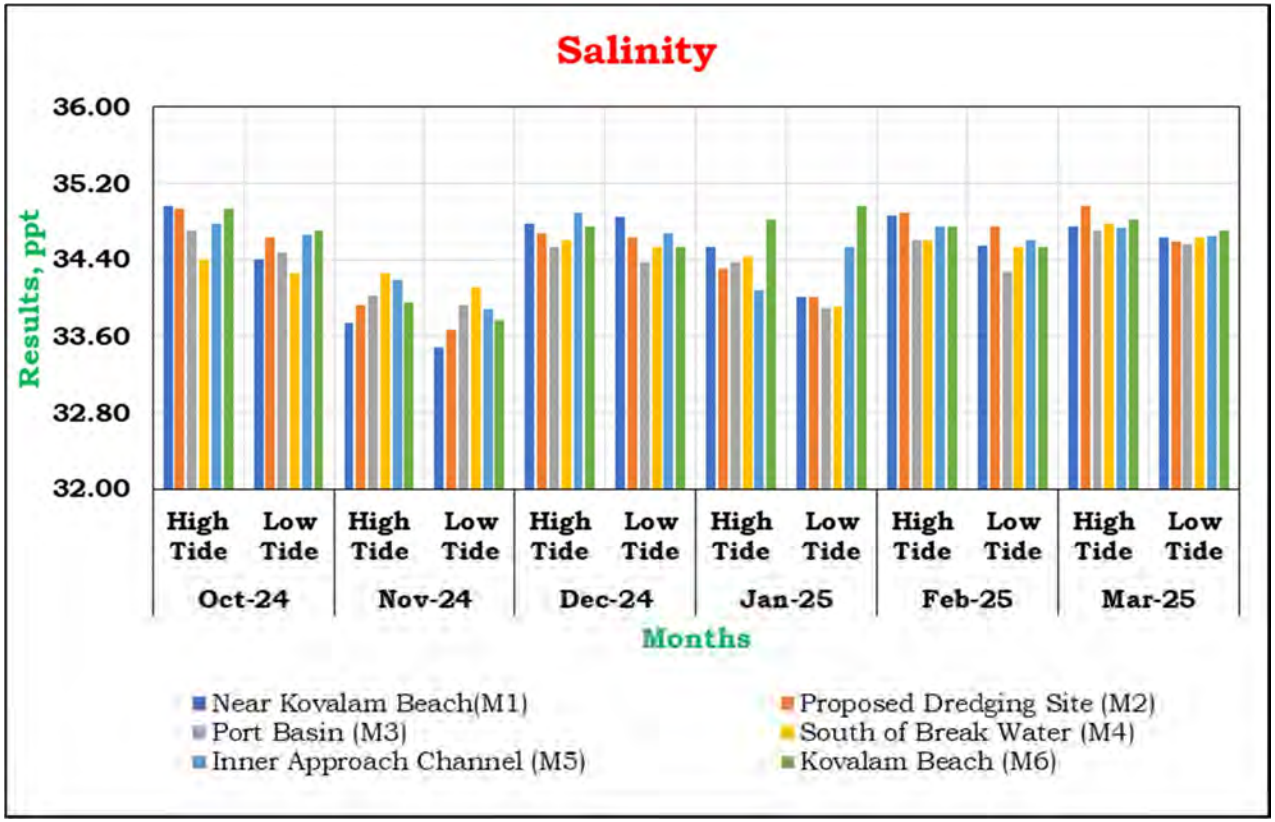


Figure 5.8: Marine Water Analysis for Chlorophyll

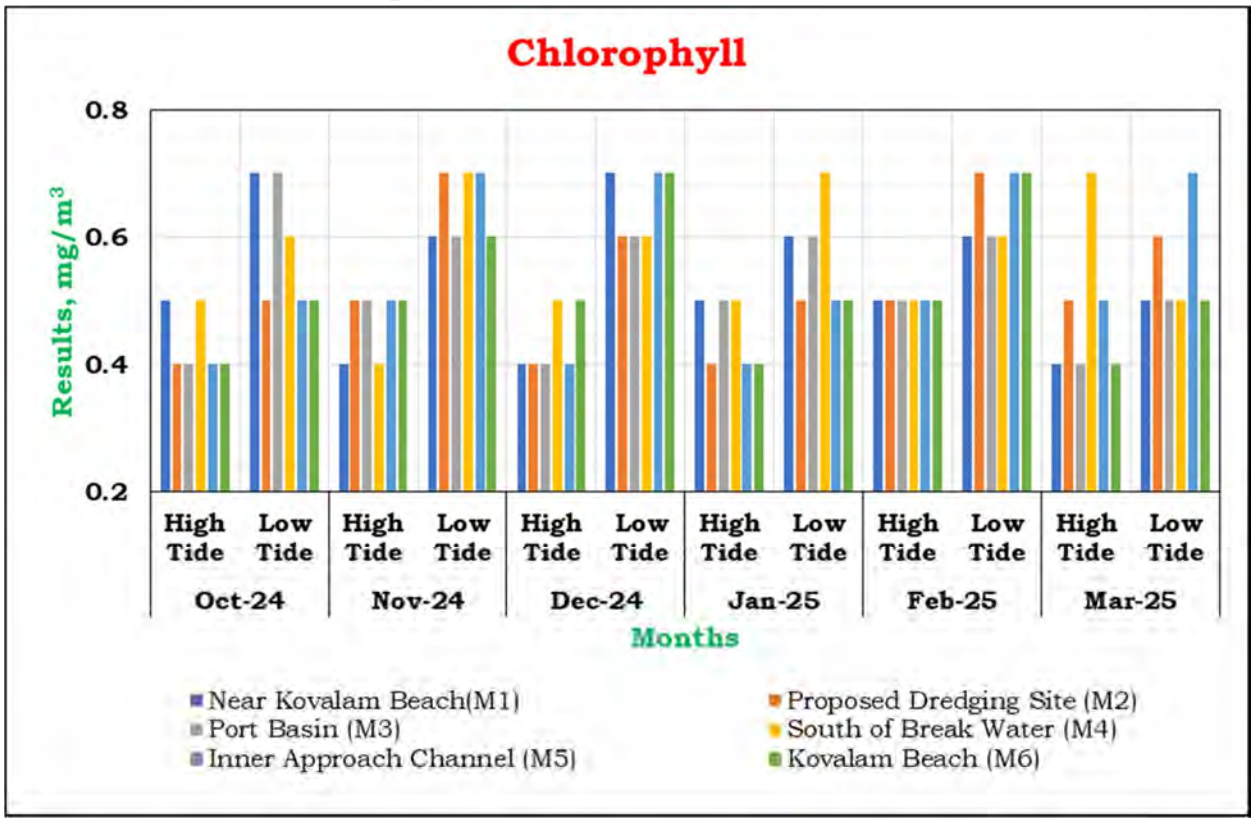


Figure 5.9: Marine Water Analysis for Nitrite

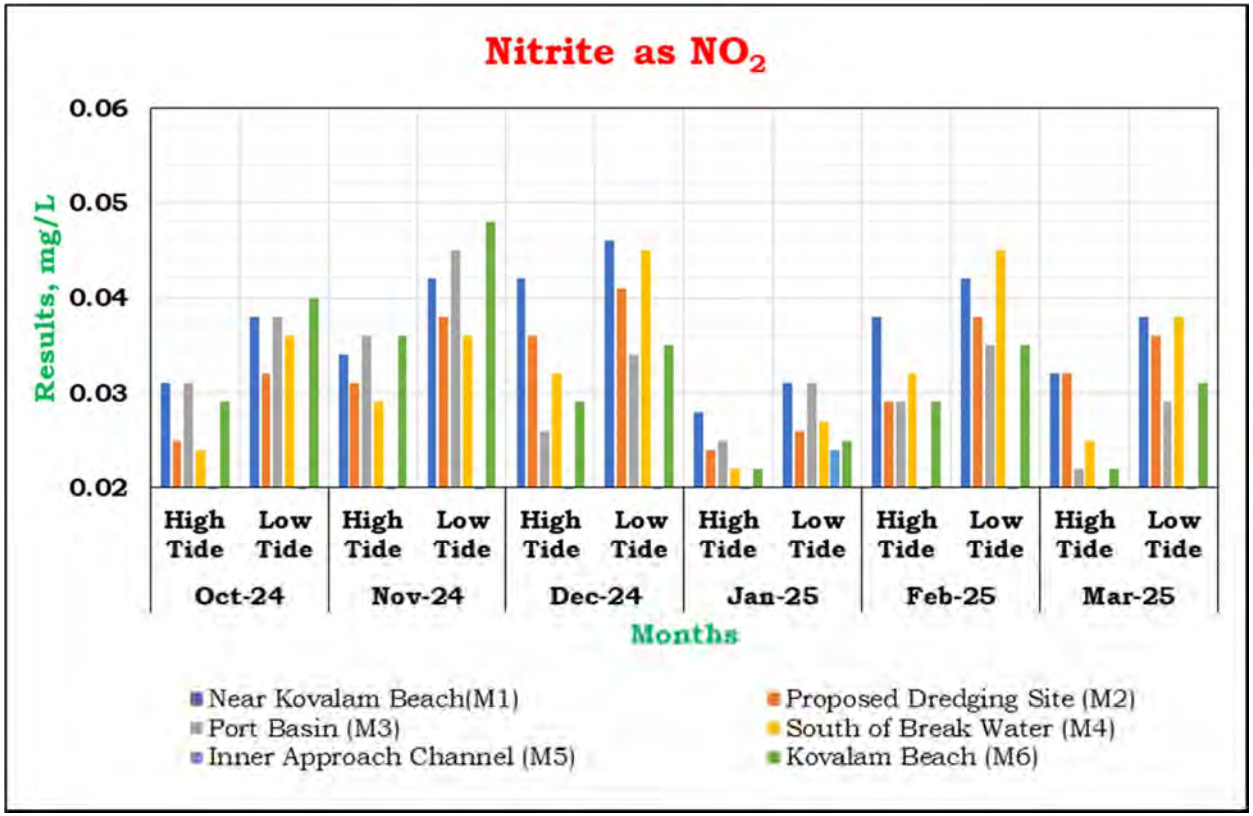
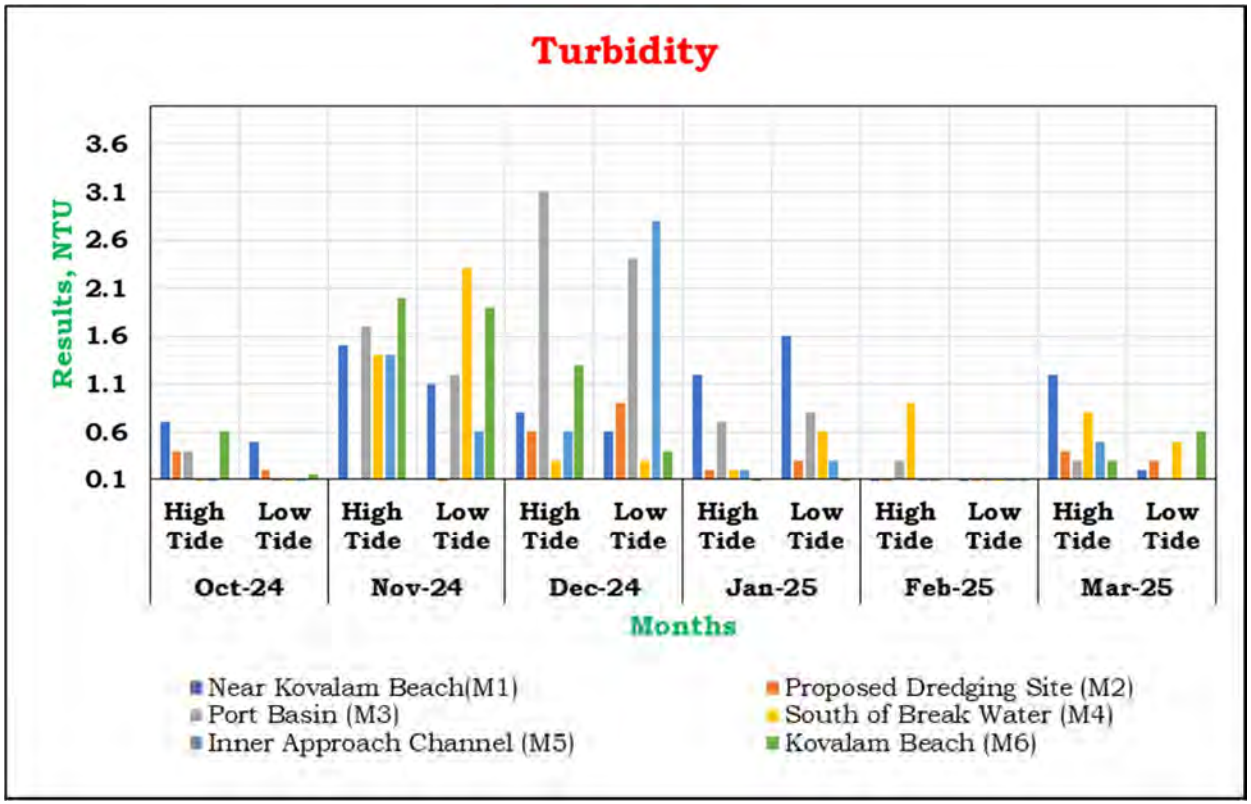


Figure 5.10: Marine Water Analysis for Turbidity



HYR-5.6. Summary - Marine water analysis:

During the months from October 2024 to March 2025, following is the summary of the marine water analysis:

a) At the location **Near Kovalam Beach** (low tide & high tide),

- Temperature was observed in the range from 27.5 to 28.9°C
- No visible colour was observed
- pH was observed in the range from 7.55 to 8.08
- Turbidity was observed in the range from 0.2 to 1.6NTU
- Electrical Conductivity (at 25°C) was observed in the range from 50850 to 53700 µmho/cm
- Total Dissolved Solids were observed in the range from 32544 to 34368 mg/L
- Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
- Nitrite (as NO_2) was observed in the range from 0.03 to 0.05 mg/L
- Salinity was observed in the range from 33.476 to 34.963 ppt
- Total Chlorophyll was observed in the range from 0.4 to 0.7 mg/m^3
- Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

b) At the location **Proposed Dredging Site** (low tide & high tide),

- Temperature was observed in the range from 27.1 to 28.6°C
- No visible colour was observed
- pH was observed in the range from 7.78 to 7.98
- Turbidity was observed in the range from 0.1 to 0.9NTU
- Electrical Conductivity (at 25°C) was observed in the range from 51100 to 53700 µmho/cm
- Total Dissolved Solids were observed in the range from 32704 to 34368 mg/L
- Dissolved Oxygen was observed in the range from 6.7 to 7.1 mg/L
- Nitrite (as NO_2) was observed in the range from 0.02 to 0.04 mg/L
- Salinity was observed in the range from 33.661 to 34.963 ppt

- Total Chlorophyll was observed in the range from 0.4 to 0.7 mg/m^3
- Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

c) At the location **Port basin** (low tide & high tide),

- Temperature was observed in the range from 27.3 to 28.5°C
- No visible colour was observed
- pH was observed in the range from 7.71 to 8.01
- Turbidity was observed in the range from 0.1 to 3.1NTU
- Electrical Conductivity (at 25°C) was observed in the range from 51450 to 53350 µmho/cm
- Total Dissolved Solids were observed in the range from 32928 to 34144 mg/L
- Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
- Nitrite (as NO_2) was observed in the range from 0.02 to 0.05 mg/L
- Salinity was observed in the range from 33.901 to 34.706 ppt
- Total Chlorophyll was observed in the range from 0.4 to 0.7 mg/m^3
- Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

d) At the location **South of Break Water** (low tide & high tide),

- Temperature was observed in the range from 27.1 to 27.9°C
- No visible colour was observed
- pH was observed in the range from 7.71 to 8.01
- Turbidity was observed in the range from 0.2 to 2.3NTU
- Electrical Conductivity (at 25°C) was observed in the range from 51700 to 53450 µmho/cm
- Total Dissolved Solids were observed in the range from 33088 to 34432 mg/L
- Dissolved Oxygen was observed in the range from 6.7 to 7.2 mg/L

- Nitrite (as NO_2) was observed in the range from 0.02 to 0.05 mg/L
- Salinity was observed in the range from 33.916 to 34.780 ppt
- Total Chlorophyll was observed in the range from 0.4 to 0.7 mg/m^3
- Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

e) At the location **Inner Approach Channel** (low tide & high tide),

- Temperature was observed in the range from 27.4 to 28.6°C
- No visible colour was observed
- pH was observed in the range from 7.74 to 7.97
- Turbidity was observed in the range from 0.1 to 2.8NTU
- Electrical Conductivity (at 25°C) was observed in the range from 51400 to 53600 µmho/cm
- Total Dissolved Solids were observed in the range from 33152 to 34304 mg/L
- Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
- Nitrite (as NO_2) was observed in the range from 0.02 to 0.02 mg/L
- Salinity was observed in the range from 33.884 to 34.890 ppt
- Total Chlorophyll was observed in the range from 0.4 to 0.7 mg/m^3
- Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

f) At the location **Kovalam Beach** (low tide & high tide),

- Temperature was observed in the range from 27.1 to 27.8°C
- No visible colour was observed
- pH was observed in the range from 7.75 to 8.34
- Turbidity was observed in the range from 0.2 to 2.0NTU
- Electrical Conductivity (at 25°C) was observed in the range from 51250 to 53700 µmho/cm

- Total Dissolved Solids were observed in the range from 32800 to 34368 mg/L
- Dissolved Oxygen was observed in the range from 6.7 to 7.1 mg/L
- Nitrite (as NO_2) was observed in the range from 0.02 to 0.05 mg/L
- Salinity was observed in the range from 33.772 to 34.963 ppt
- Total Chlorophyll was observed in the range from 0.4 to 0.7 mg/m^3
- Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

g) Overall Comparison of Results from **all Locations**:

- Temperature was observed a maximum of 28.9 °C at Near Kovalam Beach and a minimum of 27.1 °C at Kovalam Beach, South of Break water and Proposed Dredging site. The overall average of all locations is 27.8 °C
- pH was observed a maximum of 8.34 at Kovalam Beach and a minimum of 7.55 at Near Kovalam Beach. The overall average of all locations is 7.88
- Turbidity was observed a maximum of 3.1 NTU at Port Basin and a minimum of 0.11 NTU at Proposed Dredging Site and Inner Approach Channel. The overall average of all locations is 0.83 NTU
- Electrical Conductivity (at 25°C) was observed a maximum of 53700 µmho/cm at Near Kovalam Beach, Proposed Dredging Site and Kovalam Beach and a minimum of 50850 µmho/cm at Near Kovalam Beach. The overall average of all locations is 52784 µmho/cm
- Total Dissolved Solids was observed a maximum of 34432 mg/L at South of Break water and a minimum of 32544 mg/L at Near Kovalam Beach. The overall average of all locations is 33813 mg/L
- Dissolved Oxygen was observed a maximum of 7.2 mg/L at Near Kovalam Beach, Port basin, South Break of Water & Inner Approach Channel and a minimum of 6.7 mg/L at Proposed Dredging Site , Kovalam Beach & South Break of Water. The overall average of all locations is 6.9 mg/L

- Nitrite (as NO2) was observed a maximum of 0.048 mg/L at Kovalam Beach and a minimum of 0.022 mg/L at Kovalam Beach & Port Basin. The overall average of all locations is 0.03 mg/L
- Salinity was observed a maximum of 34.963 ppt at Near Kovalam Beach & Proposed Dredging Site and a minimum of 33.476 ppt at Near Kovalam Beach. The overall average of all locations is 34.48 ppt
- Total Chlorophyll was observed a maximum of 0.7 mg/m^3 at Near Kovalam Beach, Port basin, Proposed Dredging Site, South Break of Water, Inner Approach Channel & Kovalam Beach and a minimum of 0.4 mg/m^3 at Near Kovalam Beach, Port basin, Proposed Dredging Site, South Break of Water, Inner Approach Channel & Kovalam Beach. The overall average of all locations is 0.53 mg/m^3
- Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C_6H_5OH), Ammonical Nitrogen (as NH_3-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits at all locations.

HYR-5.7. Maximum Values observed - Marine water analysis:

During the period from October 2024 to March 2025, the following is the maximum value observed.

Table 5.5: Maximum Values observed

Sl. No.	Parameter /unit	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
1	Temperature (°C)	28.9	28.6	28.5	27.9	28.6	27.8
2	Colour	1	1	1	1	1	1
3	pH Value	8.08	7.98	8.01	8.01	7.97	8.34
4	Turbidity (N.T.U.)	1.6	0.9	3.1	2.3	2.8	2
5	Electrical Conductivity (at 25°C) (µmho/cm)	53700	53700	53350	53450	53600	53700
6	Total Suspended Solids (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
7	Total Dissolved Solids (mg/L)	34368	34368	34144	34432	34304	34368
8	Dissolved Oxygen (mg/L)	7.2	7.1	7.2	7.2	7.2	7.1
9	Biochemical Oxygen Demand (3 days, 27°C) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
10	Floating Materials (Oil, Grease and Scum) (Including Petroleum Products) (mg/L)	0.05	0.04	0.05	0.05	0.02	0.05
11	Nitrite (as NO_2) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
12	Nitrate (as NO_3) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
13	Phenolic Compounds (as C_6H_5OH) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter /unit	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
14	Ammonical Nitrogen (as NH_3-N) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
15	Total Nitrogen (as N) (mg/L)	34.963	34.963	34.706	34.780	34.890	34.963
16	Total Phosphorous (as P) (mg/L)	0.7	0.7	0.7	0.7	0.7	0.7
17	Reactive Phosphorous (mg/L)	28.9	28.6	28.5	27.9	28.6	27.8
18	Polycyclic Aromatic Hydrocarbon (mg/L)	1	1	1	1	1	1
19	Salinity (ppt)	8.08	7.98	8.01	8.01	7.97	8.34
20	Total Chlorophyll (mg/m^3)	1.6	0.9	3.1	2.3	2.8	2.0
21	Total Coliforms (MPN /100 mL)	BDL	BDL	BDL	BDL	BDL	BDL
22	Faecal Coliforms (MPN /100 mL)	BDL	BDL	BDL	BDL	BDL	BDL

HYR-5.8. Sediment Analysis Results

Table 5.6: Sediment Analysis Results

Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
1	Texture	-	Oct-24	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
			Nov-24	Sand	Sand	Sandy Loam	Sand	Sand	Sand
			Dec-24	Sand	Sand	Sandy Loam	Sand	Sand	Sand
			Jan-25	Sand	Sand	Sandy Loam	Sand	Sand	Sand
			Feb-25	Sand	Sand	Sandy Loam	Sand	Sand	Sand
			Mar-25	Sand	Sand	Sandy Loam	Sand	Sand	Sand
2	Organic Matter	%	Oct-24	0.38	0.35	0.43	0.34	0.44	0.38
			Nov-24	0.42	0.36	0.48	0.23	0.35	0.36
			Dec-24	0.45	0.42	0.35	0.26	0.32	0.39
			Jan-25	0.39	0.35	0.45	0.42	0.35	0.35
			Feb-25	0.38	0.49	0.31	0.33	0.25	0.31
			Mar-25	0.44	0.38	0.35	0.29	0.32	0.25
3	Total Phosphorus (as P)	mg/kg	Oct-24	275	315	145	184	255	520
			Nov-24	296	385	180	146	310	615
			Dec-24	278	345	210	189	350	586
			Jan-25	245	405	215	145	180	450
			Feb-25	225	310	245	205	410	628
			Mar-25	245	380	268	195	480	554
4	Aluminium (as Al)	mg/kg	Oct-24	1432	1156	1045	1386	1592	1020
			Nov-24	1652	1326	1543	1423	1460	1250
			Dec-24	1420	1036	1252	1263	1220	1623
			Jan-25	1232	1056	1765	1243	570	2159
			Feb-25	1640	1136	1426	1010	1028	1436

Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
			Mar-25	1420	1045	1685	1205	1136	1765
5	Chromium (as Cr)	mg/kg	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL	BDL	BDL
6	Copper (as Cu)	mg/kg	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL	BDL	BDL
7	Iron (as Fe)	mg/kg	Oct-24	4425	1425	3875	1860	1163	485
			Nov-24	6213	1832	4102	2100	1362	650
			Dec-24	8150	2012	3986	2250	1036	768
			Jan-25	6786	2450	4523	2152	1145	1352
			Feb-25	9063	2421	4036	2485	1115	940
			Mar-25	10250	2465	4860	2215	1065	1089
8	Lead (as Pb)	mg/kg	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL	BDL	BDL

Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
9	Manganese (as Mn)	mg/kg	Oct-24	2.78	2.22	2.60	2.52	2.15	2.02
			Nov-24	3.11	2.45	2.23	2.95	3.11	2.30
			Dec-24	3.56	2.90	3.10	2.65	2.78	2.96
			Jan-25	2.34	2.35	2.15	1.45	1.62	1.55
			Feb-25	4.15	3.28	3.66	3.24	3.70	3.46
			Mar-25	5.50	2.96	2.45	3.88	2.96	2.70
10	Mercury (as Hg)	mg/kg	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL	BDL	BDL
11	Zinc (as Zn)	mg/kg	Oct-24	1.22	1.45	1.70	1.52	1.45	1.35
			Nov-24	1.30	1.22	1.40	1.63	1.12	1.60
			Dec-24	1.15	1.63	1.25	1.45	1.30	1.42
			Jan-25	1.26	1.35	2.99	1.52	2.60	2.45
			Feb-25	2.01	1.88	1.65	1.78	1.60	1.92
			Mar-25	2.50	2.11	1.45	1.74	1.26	1.45
12	Nickel (as Ni)	mg/kg	Oct-24	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL	BDL	BDL
Benthic Organism									

Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
13	Micro Benthic Organism	No./m^2	Oct-24	64289	63278	59787	62389	61278	65023
			Nov-24	66789	61248	60785	63412	60237	64785
			Dec-24	67148	62486	62475	60457	61278	65278
			Jan-25	67845	62789	64789	66932	67124	63478
			Feb-25	62789	61459	64789	61248	60487	62043
			Mar-25	60045	65789	63120	64045	59876	61240
14	Macro Benthic Organism	No./m^2	Oct-24	60389	61254	59086	59726	59123	63895
			Nov-24	62357	61378	60289	60247	58127	62214
			Dec-24	61357	61428	61025	58697	59638	63758
			Jan-25	61098	59876	61387	62278	64247	60245
			Feb-25	63145	61007	63485	59785	58674	56792
			Mar-25	62145	62378	60378	61245	56783	57124
15	**Total Benthos**	**No./m^2**	**Oct-24**	**124678**	**124532**	**118873**	**122115**	**120401**	**128918**
			Nov-24	**129146**	**122626**	**121074**	**123659**	**118364**	**126999**
			Dec-24	**128505**	**123914**	**123500**	**119154**	**120916**	**129036**
			Jan-25	**128943**	**122665**	**126176**	**129210**	**131371**	**123723**
			Feb-25	**125934**	**122466**	**128274**	**121033**	**119161**	**118835**
			Mar-25	**122190**	**128167**	**123498**	**125290**	**116659**	**118364**

HYR-5.9. Graphical representation of Results for Sediment analysis

Figure 5.10: Sediment Analysis for Organic Matter

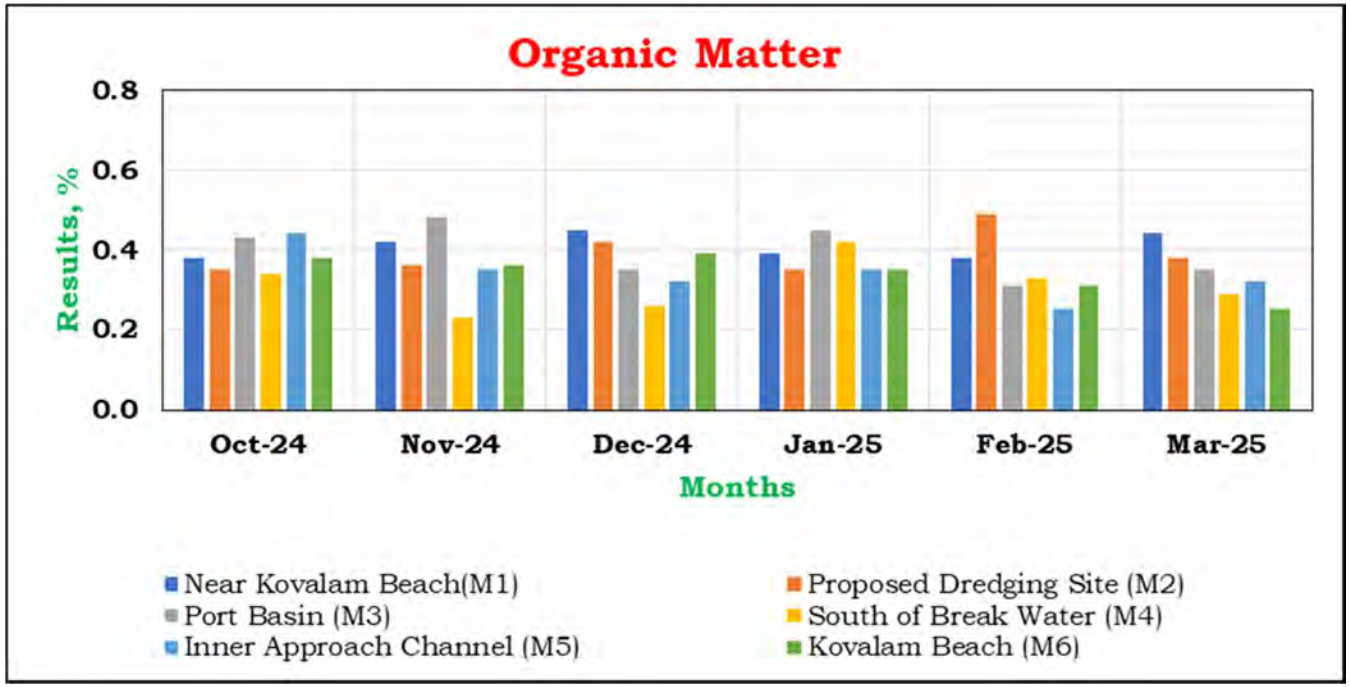


Figure 5.11: Sediment Analysis for Total Phosphorous as P

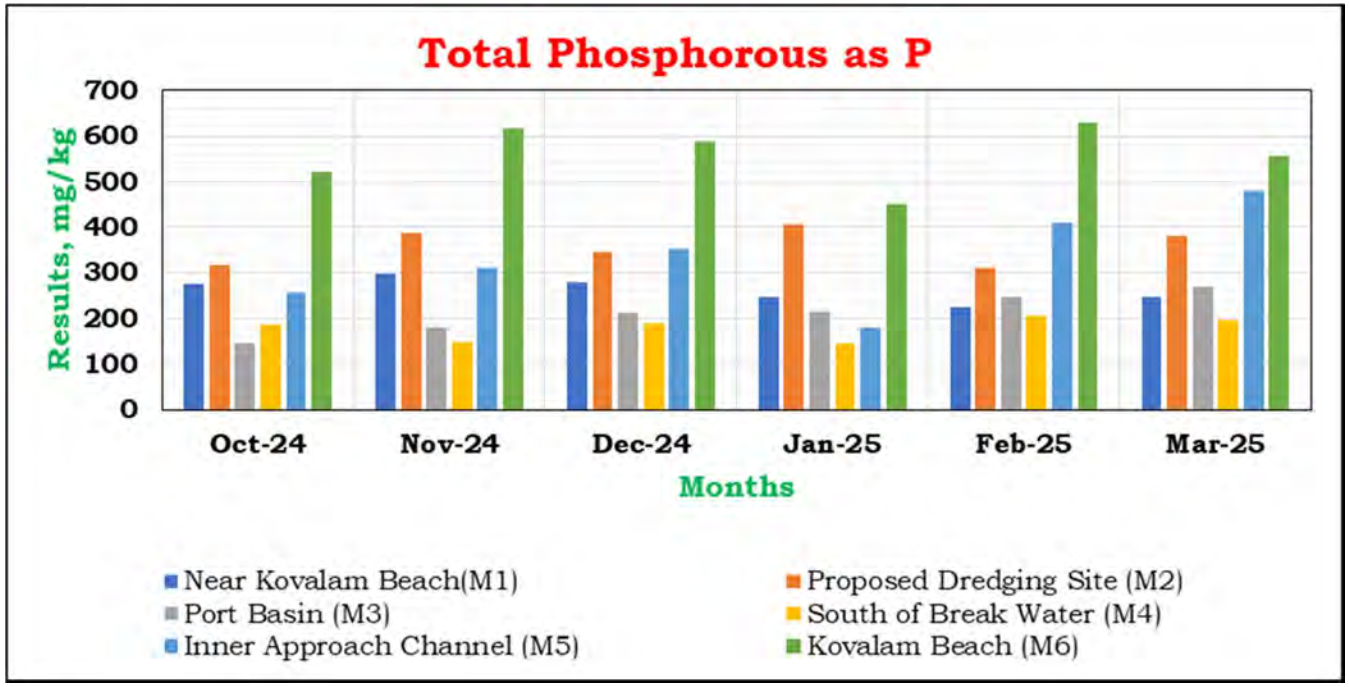


Figure 5.12: Sediment Analysis for Aluminium as Al

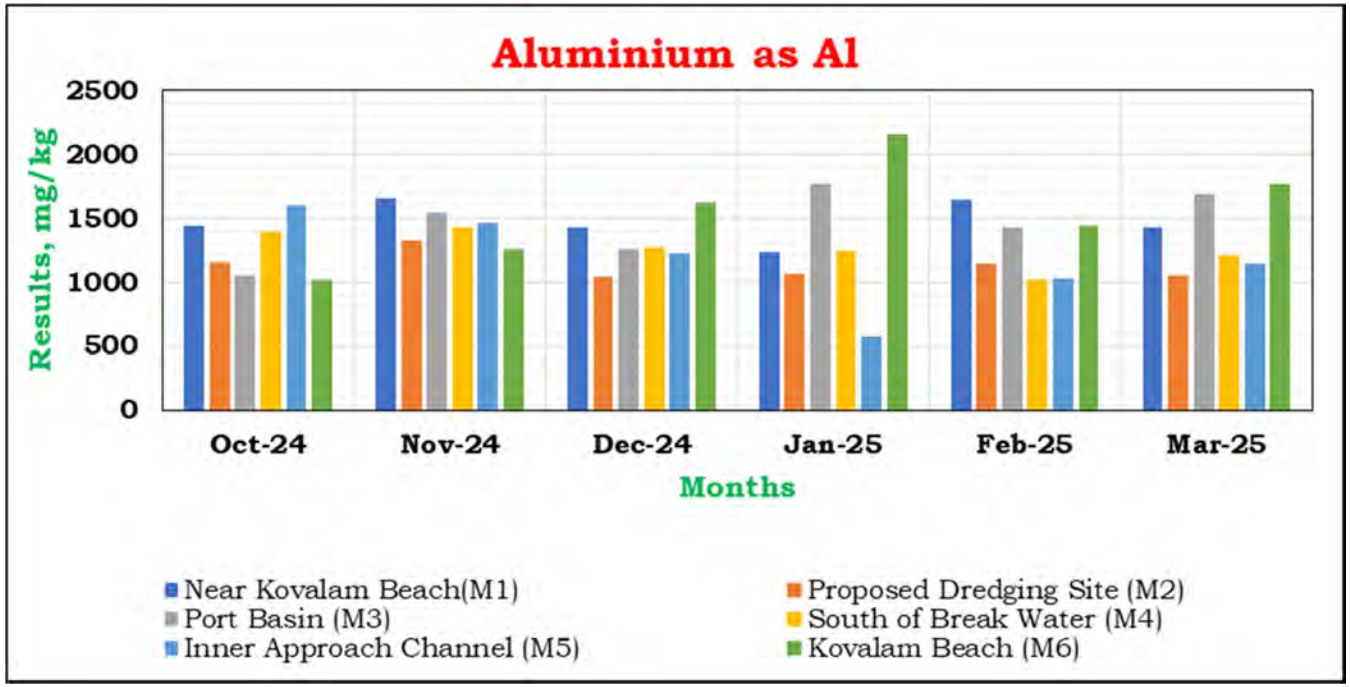


Figure 5.13: Sediment Analysis for Iron as Fe

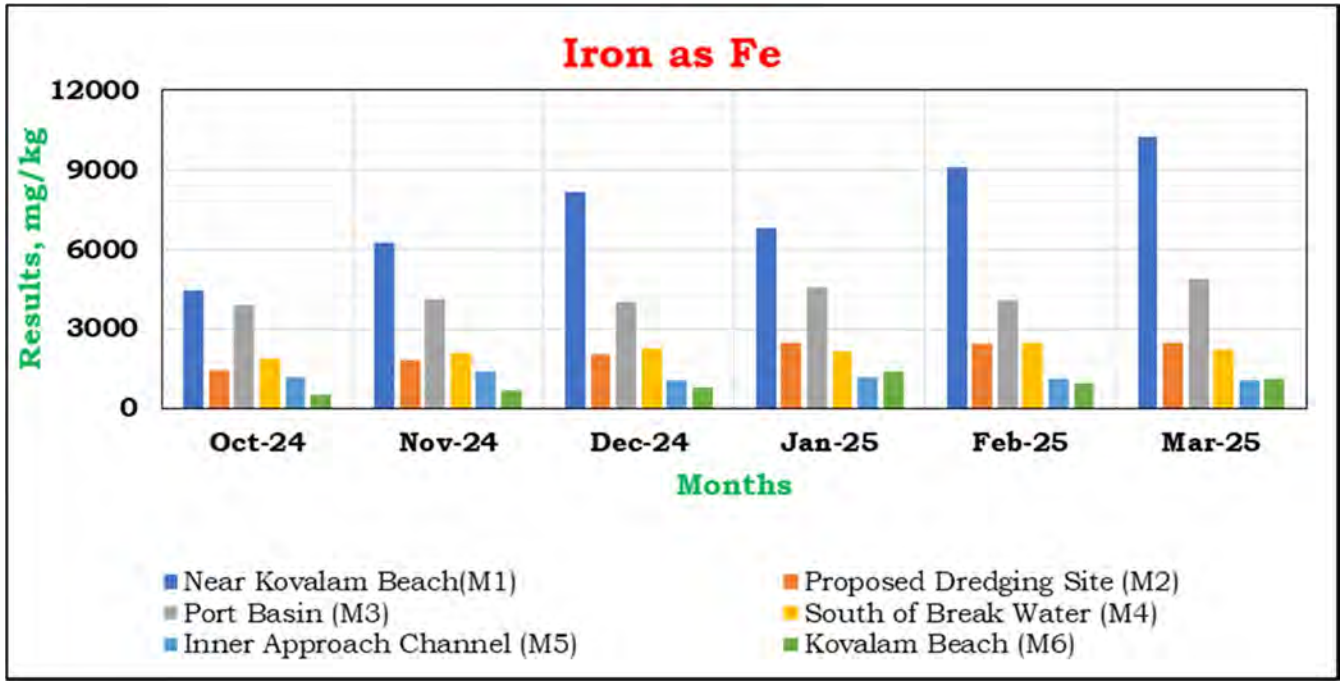


Figure 5.14: Sediment Analysis for Manganese as Mn

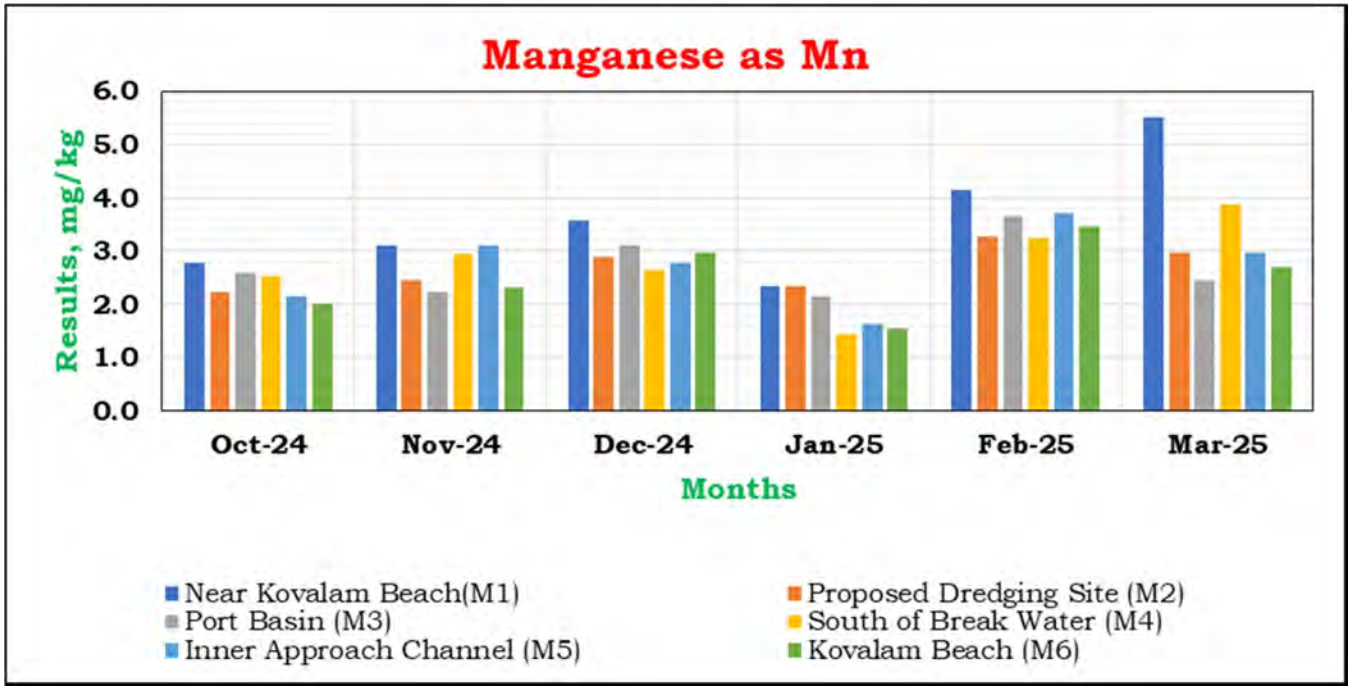


Figure 5.15: Sediment Analysis for Zinc as Zn

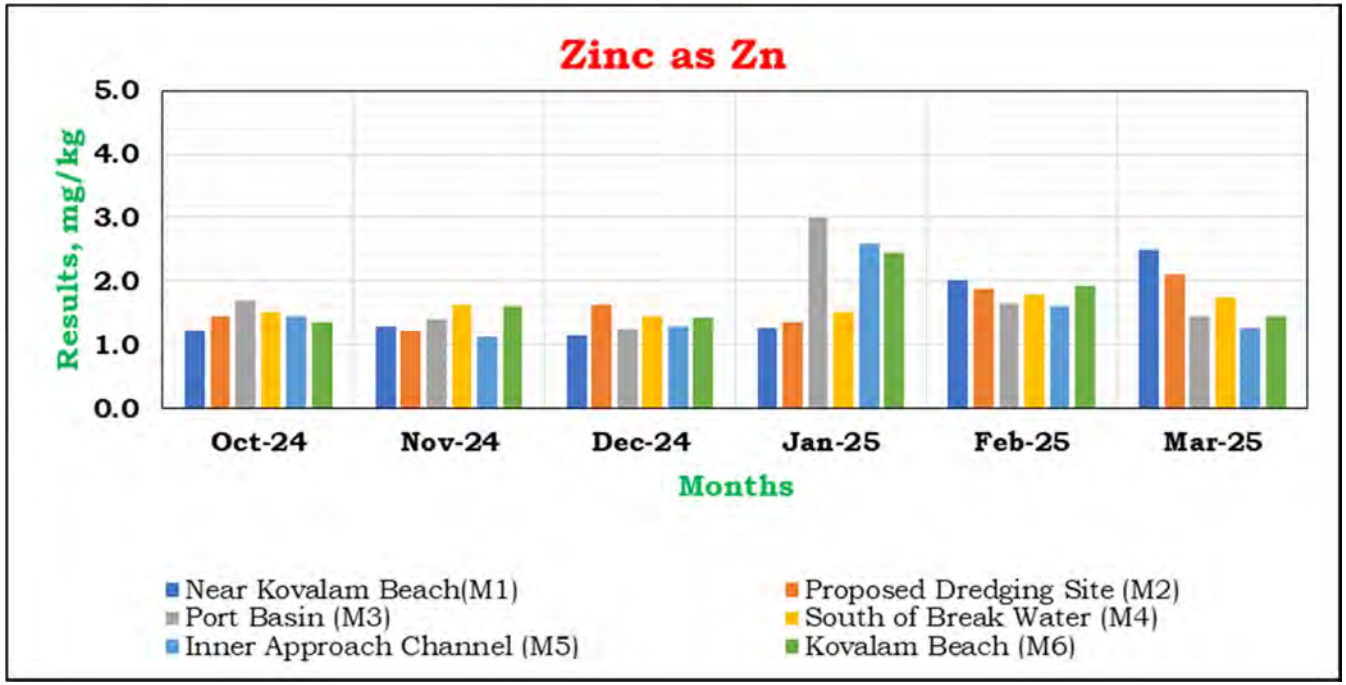
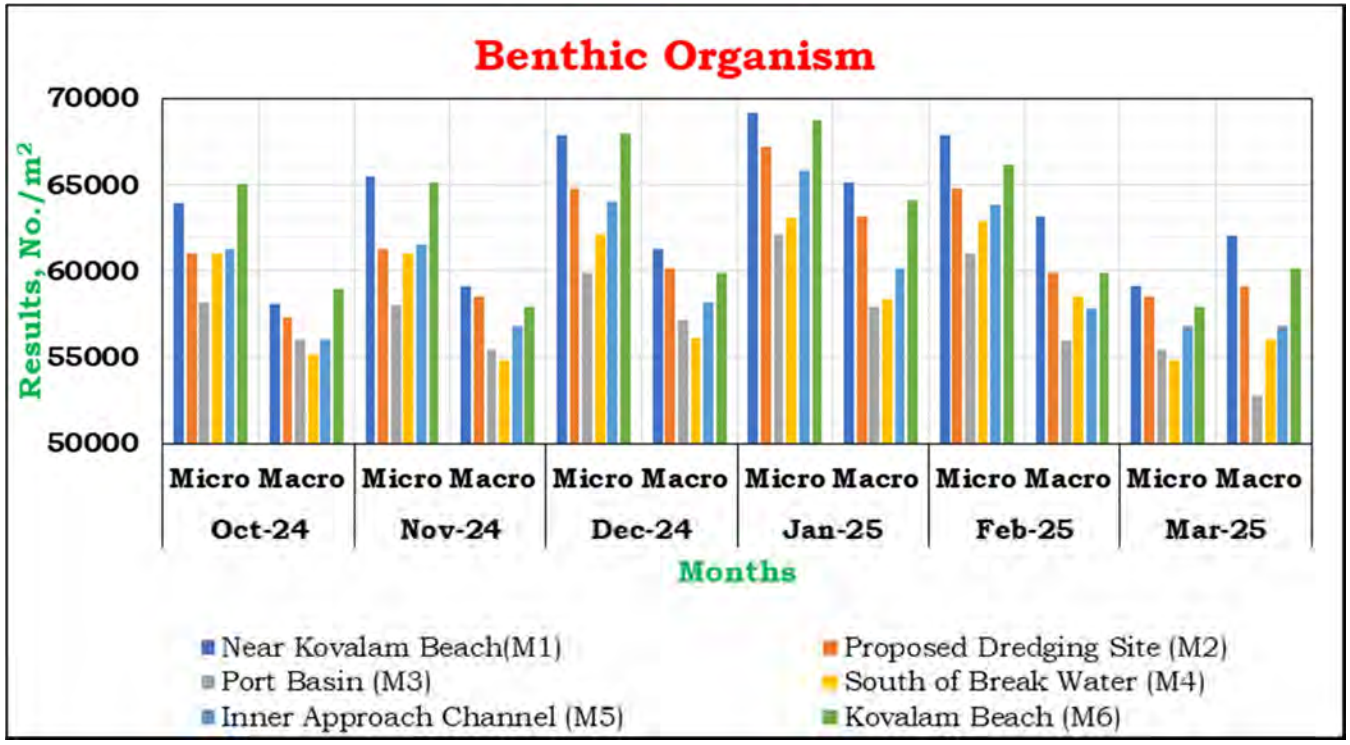


Figure 5.16: Sediment Analysis for Benthic Organism



HYR-5.10. Summary - Sediment Analysis:

During the months from October 2024 to March 2025, following is the summary of sediment analysis:

a) At the location **Near Kovalam Beach**,
- The observed texture was sand
- Organic matter was observed in the range from 0.38 to 0.45 %
- Total Phosphorus (as P) was observed in the range from 225 to 296mg/kg
- Aluminium (as Al) was observed in the range from 1232 to 1652 mg/kg
- Iron (as Fe) was observed in the range from 4425 to 10250 mg/kg
- Manganese (as Mn) was observed in the range from 2.34 to 5.50 mg/kg
- Zinc (as Zn) was observed in the range from 1.15 to 2.5 mg/kg
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
- Micro benthic organisms were observed in the range from 60045 to 67845/m^2
- Macro benthic organisms were observed in the range from 60389 to 63145/m^2

b) At the location **Proposed Dredging Site**,
- The observed texture was sand
- Organic matter was observed in the range from 0.35 to 0.49 %
- Total Phosphorus (as P) was observed in the range from 310 to 405 mg/kg
- Aluminium (as Al) was observed in the range from 1036 to 1326 mg/kg
- Iron (as Fe) was observed in the range from 1425 to 2465 mg/kg
- Manganese (as Mn) was observed in the range from 2.22 to 3.28 mg/kg
- Zinc (as Zn) was observed in the range from 1.22 to 2.11 mg/kg
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
- Micro benthic organisms were observed in the range from 61248 to 65789/m^2
- Macro benthic organisms were observed in the range from 59876 to 62378/m^2

c) At the location **Port Basin**,
- The observed texture was sandy loam

- Organic matter was observed in the range from 0.31 to 0.48 %
- Total Phosphorus (as P) was observed in the range from 145 to 268 mg/kg
- Aluminium (as Al) was observed in the range from 1045 to 1765 mg/kg
- Iron (as Fe) was observed in the range from 3875 to 4860 mg/kg
- Manganese (as Mn) was observed in the range from 2.15 to 3.66 mg/kg
- Zinc (as Zn) was observed in the range from 1.25 to 2.99 mg/kg
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
- Micro benthic organisms were observed in the range from 59787 to 64789/m^2
- Macro benthic organisms were observed in the range from 59086 to 63485/m^2

d) At the location **South of Break Water**,

- The observed texture was sand
- Organic matter was observed in the range from 0.23 to 0.42 %
- Total Phosphorus (as P) was observed in the range from 145 to 205 mg/kg
- Aluminium (as Al) was observed in the range from 1010 to 1423 mg/kg
- Iron (as Fe) was observed in the range from 1860 to 2485 mg/kg
- Manganese (as Mn) was observed in the range from 1.45 to 3.88 mg/kg
- Zinc (as Zn) was observed in the range from 1.45 to 1.78 mg/kg
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
- Micro benthic organisms were observed in the range from 60457 to 66932/m^2
- Macro benthic organisms were observed in the range from 58697 to 62278/m^2

e) At the location **Inner Approach Channel**,

- The observed texture was sand
- Organic matter was observed in the range from 0.25 to 0.44 %
- Total Phosphorus (as P) was observed in the range from 180 to 480mg/kg
- Aluminium (as Al) was observed in the range from 570 to 1592 mg/kg
- Iron (as Fe) was observed in the range from 1036 to 1362 mg/kg
- Manganese (as Mn) was observed in the range from 1.62 to 3.70 mg/kg
- Zinc (as Zn) was observed in the range from 1.12 to 2.60 mg/kg
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits

- Micro benthic organisms were observed in the range from 59876 to 67124/m^2
- Macro benthic organisms were observed in the range from 56783 to 64247/m^2

f) At the location **Kovalam Beach**,

- The observed texture was sand
- Organic matter was observed in the range from 0.25 to 0.39 %
- Total Phosphorus (as P) was observed in the range from 450 to 628 mg/kg
- Aluminium (as Al) was observed in the range from 1020 to 2159 mg/kg
- Iron (as Fe) was observed in the range from 485 to 1352 mg/kg
- Manganese (as Mn) was observed in the range from 1.55 to 3.46 mg/kg
- Zinc (as Zn) was observed in the range from 1.35 to 2.45 mg/kg
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
- Micro benthic organisms were observed in the range from 61240 to 65278/m^2
- Macro benthic organisms were observed in the range from 56792 to 63895/m^2

g) Summary – Comparison of Results of **All Locations**,

- The observed texture was sand in all locations except Port Basin which was sandy loam
- Maximum value of Organic matter observed was 0.49 % at Proposed Dredging Site
- Maximum value of Total Phosphorus (as P) observed was 628 mg/kg at Kovalam Beach
- Maximum value of Aluminium (as Al) observed was 2159 mg/kg at Kovalam Beach
- Maximum value of Iron (as Fe) observed was 10250 mg/kg at Near Kovalam Beach.
- Maximum value of Manganese (as Mn) observed was 5.55 mg/kg at Near Kovalam Beach.
- Maximum value of Zinc (as Zn) observed was 2.99 mg/kg at Port Basin
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits at all locations.
- Maximum value of Micro benthic organisms observed was 67845/m^2 at Near Kovalam Beach.
- Maximum value of Macro benthic organisms observed was 64247/m^2 at Inner Approach Channel

HYR-5.11. Marine Water Analysis for Phytoplankton and Zooplankton

Table 5.7: Total Phytoplankton and Zooplankton Results

Parameter	Month	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
Total Phytoplankton No/100 mL	Oct-24	79146	74537	76009	72466	64032	68217
	Nov-24	81487	72481	84269	78119	72785	70295
	Dec-24	72434	84241	81018	78084	73646	79380
	Jan-25	81418	76946	86192	82826	70428	72635
	Feb-25	85622	73815	80709	75440	81983	78346
	Mar-25	81491	79482	76048	70292	77502	82721
Total Zooplankton No/100 mL	Oct-24	14054	10849	13517	12502	12649	13182
	Nov-24	14349	12204	14761	13765	14071	10913
	Dec-24	12953	13830	14226	14443	14943	13302
	Jan-25	12755	13677	13134	12264	11964	12507
	Feb-25	13870	13191	10388	9958	11146	12745
	Mar-25	10370	7774	12311	8724	11052	9994

HYR-5.12. Graphical representation of Results for Marine Phytoplankton and Zooplankton

Figure 5.17: Marine Water Analysis for Total Phytoplankton

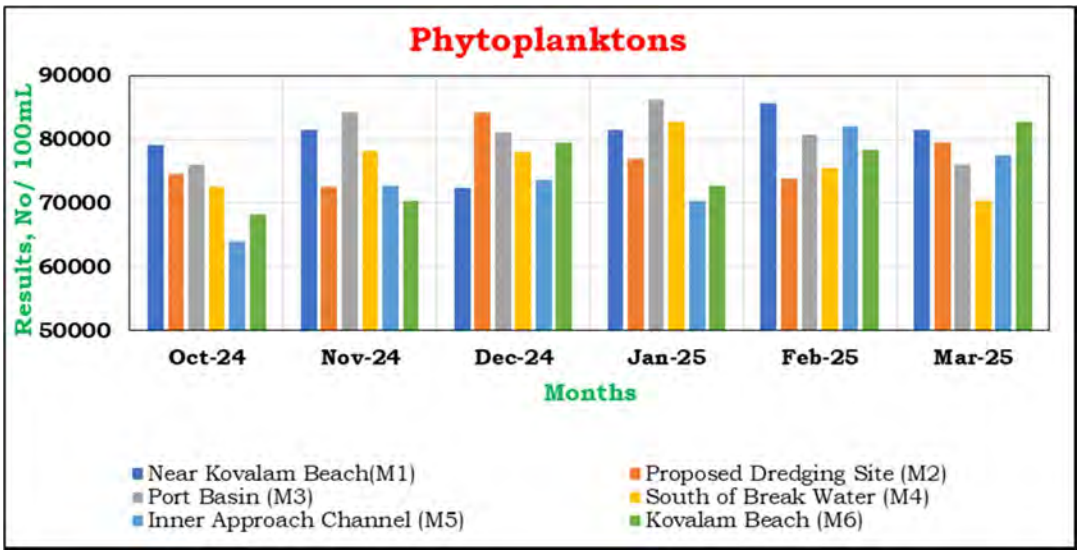
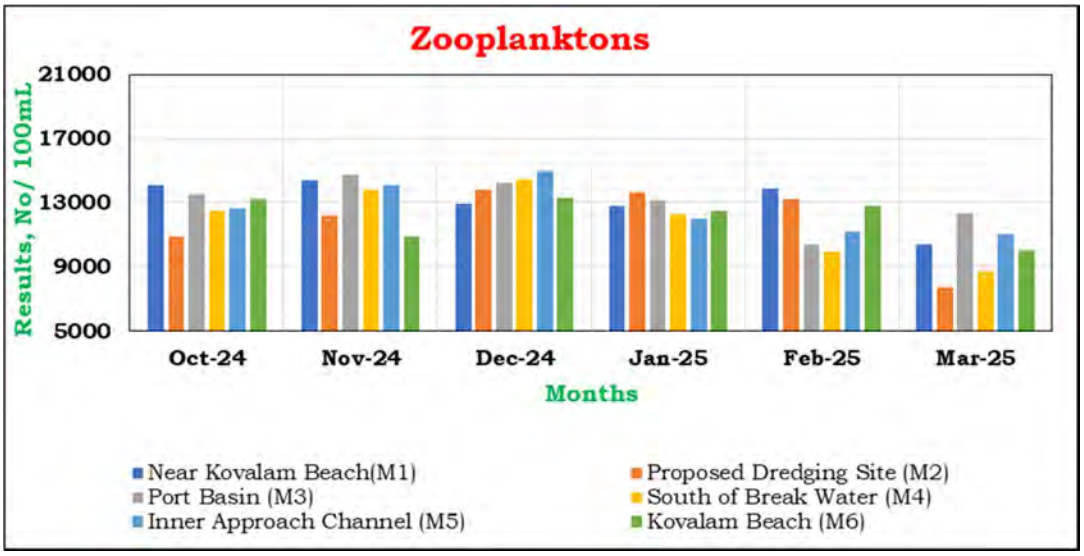


Figure 5.18: Marine Water Analysis for Total Zooplankton



HYR-5.13. Summary-Marine Water Analysis for Phytoplankton and Zooplankton

During the months from October 2024 to March 2025, following is the summary of Marine Water Analysis for Phytoplankton and Zooplankton:

Table 5.8: Summary-Marine Water Analysis for Phytoplankton and Zooplankton Results

Parameter	Range	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
Total Phytoplankton No/100 mL	From	72434	72481	76009	70292	64032	68217
	To	85622	84241	86192	82826	81983	82721
Total Zooplankton No/100 mL	From	10370	7774	10388	8724	11052	9994
	To	14349	13830	14761	14443	14943	13302

a) At the location **Near Kovalam Beach**,
- Total Phytoplankton were observed in the range from 72434 to 85622 No/100 mL
- Total Zooplankton were observed in the range from 10370 to 14349 No/100 mL

b) At the location **Proposed Dredging Site**,
- Total Phytoplankton were observed in the range from 72481 to 84241 No/100 mL
- Total Zooplankton were observed in the range from 7774 to 13830 No/100 mL

c) At the location **Port Basin**,
- Total Phytoplankton were observed in the range from 76009 to 86192 No/100 mL
- Total Zooplankton were observed in the range from 10388 to 14761 No/100 mL

d) At the location **South of Break Water**,
- Total Phytoplankton were observed in the range from 70292 to 82826 No/100 mL
- Total Zooplankton were observed in the range from 8724 to 14443 No/100 mL

e) At the location **Inner Approach Channel**,
- Total Phytoplankton were observed in the range from 64032 to 81983 No/100 mL
- Total Zooplankton were observed in the range from 11052 to 14943 No/100 mL

f) At the location **Kovalam Beach**,

- Total Phytoplankton were observed in the range from 68217 to 82721 No/100 mL
- Total Zooplankton were observed in the range from 9994 to 13302 No/100 mL

g) Summary – Comparison of Results of **All Locations**,

- Maximum value of Total Phytoplankton observed was 86192 No/100 mL at Port Basin
- Maximum value of Total Zooplankton observed was 14943 No/100 mL at Inner approach channel.

HYR-6	Ground Water & Surface Water Analysis

HYR-6.1. Ground Water & Surface Water Location Details:

This section describes the sampling location, methodology adopted for analysis and analysis results of Ground Water and Surface Water during the period from October 2024 to March 2025.

Ground water sampling was carried out at three locations including Port Site, PAF Area and Proposed Port Estate Area.

Surface water sampling was carried out at four locations including Poovar West Canal, Vizhinjam Branch Canal, Vellayani Lake and Poovar Estuary.

Table 6.1: Coordinates of Ground Water Location

Location	Legend	Latitude	Longitude
Project Site	G1	8°22'03.72"N	77°00'16.92"E
Proposed Port Estate Area	G2	8°22'24.96"N	77°01'45.84"E
PAF Area	G3	8°22'17.60"N	77°00'11.12"E

Table 6.2: Coordinates of Surface Water Location

Location	Legend	Latitude	Longitude
Poovar West Canal	S1	8°19'22.66"N	77°04'31.70"E
Vizhinjam Branch Canal	S2	8°22'55.59"N	76°59'36.29"E
Vellayani Lake	S3	8°25'31.91"N	76°59'37.10"E
Poovar Estuary	S4	8°18'30.71"N	77°04'36.95"E

Figure 6.1: Google earth views of Ground Water & Surface Water Sampling Locations

HYR-6.2. Methodology of Sampling and Analysis:

Table 6.3: Ground Water & Surface Water Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Surface and Ground Water Analysis				
1.	Colour	Hazen Units	1	IS 3025 (Part 4): 2021
2.	Odour	-	--	IS 3025 (Part 5): 2018
3.	pH Value	-	2	IS 3025 (Part 11): 2022
4.	Turbidity	N.T.U.	0.1	IS 3025 (Part 10): 2023
5.	Electrical Conductivity (at 25°C)	µs/cm	1.0	IS 3025 (Part 14): 2013
6.	Total Dissolved Solids	mg/L	5	IS 3025 (Part 16): 2023
7.	Dissolved Oxygen	mg/L	0.2	IS 3025 (Part 38) : 1989
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	IS 3025 (Part 44) : 2023
9.	Oil & Grease	mg/L	1	IS 3025 Part 39: 2021
10.	Aluminium (as Al)	mg/L	0.2	IS 3025 Part 55:2003
11.	Ammonia (as NH_3- N)	mg/L	0.1	IS 3025 (Part 34): 1998
12.	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	0.1	IS 13428 Annex K:2005

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
13.	Barium (as Ba)	mg/L	0.5	APHA (24th Edn) 3111-D : 2023
14.	Boron (as B)	mg/L	0.2	IS 3025 (Part 57): 2021
15.	Calcium (as Ca)	mg/L	1	IS 3025 Part 40: 1991
16.	Chloramines (as Cl_2)	mg/L	1	APHA (24th Edn) 4500-Cl G : 2023
17.	Chloride (as Cl)	mg/L	1	IS 3025 Part 32: 1988
18.	Copper (as Cu)	mg/L	0.05	IS 3025 Part 42: 1992
19.	Fluoride (as F)	mg/L	0.1	APHA (24th Edn) 4500-F- B, D: 2023
20.	Iron (as Fe)	mg/L	0.1	IS 3025 Part 53: 2003
21.	Magnesium (as Mg)	mg/L	1	IS 3025 (Part 46): 2023
22.	Manganese (as Mn)	mg/L	0.05	IS 3025 Part 59: 2006 RA 2017
23.	Mineral Oil	mg/L	0.50	IS 3025 Part 39: 1991 RA 2019
24.	Nitrate (as NO_3)	mg/L	1	APHA (24th Edn) 4500-NO3 B: 2023
25.	Phenolic Compounds (as C_6H_5OH)	mg/L	0.01	IS 3025 (Part 43/Sec 1): 2022
26.	Selenium (as Se)	mg/L	0.002	APHA (24th Edn) 3114C : 2023
27.	Silver (as Ag)	mg/L	0.1	APHA (24th Edn) 3111-B : 2023
28.	Sulphate (as SO_4)	mg/L	1	IS 3025 (Part 24/Sec 1): 2022
29.	Sulphide (as H_2S)	mg/L	0.01	IS 3025 (Part 29): 2022
30.	Total Phosphate (as PO_4)	mg/L	0.1	IS 3025 (Part 31/Sec 1): 2022
31.	Total Alkalinity (as $CaCO_3$)	mg/L	1	IS 3025 (Part 23): 2023
32.	Total Hardness (as $CaCO_3$)	mg/L	1	IS 3025 Part 21: 2009
33.	Calcium Hardness (as $CaCO_3$)	mg/L	1	IS 3025 Part 40: 1991
34.	Zinc (as Zn)	mg/L	0.025	APHA (24th Edn) 3111-B : 2023
35.	Sodium (as Na)	mg/L	1	IS 3025 Part 45: 1993
36.	Potassium (as K)	mg/L	0.5	IS 3025 Part 45: 1993
37.	Sodium Absorption Ratio	-	0.1	IS 11624: 1986
38.	Cadmium (as Cd)	mg/L	0.03	IS 3025 (Part 41) : 2023
39.	Cyanide (as CN)	mg/L	0.01	IS 3025 (Part 27/Sec 1): 2021
40.	Lead (as Pb)	mg/L	0.2	IS 3025 Part 47: 1994 RA 2019
41.	Mercury (as Hg)	mg/L	0.002	IS 3025 Part 48: 1994 RA 2019
42.	Molybdenum (as Mo)	mg/L	0.25	APHA (24th Edn) 3111-D : 2023
43.	Nickel (as Ni)	mg/L	0.1	IS 3025 Part 54: 2003
44.	***Pesticide Residues***			
i.	Alachlor	µg/L	0.005	SEAAL/INS/SOP/7.2/03
ii.	Atrazine	µg/L	0.005	SEAAL/INS/SOP/7.2/03
iii.	Aldrin/Dieldrin	µg/L	0.005	SEAAL/INS/SOP/7.2/03
iv.	Alpha HCH	µg/L	0.005	SEAAL/INS/SOP/7.2/03
v.	Beta HCH	µg/L	0.005	SEAAL/INS/SOP/7.2/03
vi.	Butachlor	µg/L	0.005	SEAAL/INS/SOP/7.2/03
vii.	Chlorpyrifos	µg/L	0.005	SEAAL/INS/SOP/7.2/03

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
viii.	Delta HCH	µg/L	0.005	SEAAL/INS/SOP/7.2/03
ix.	2,4D chlorophenoxyacetic acid	µg/L	0.005	SEAAL/INS/SOP/7.2/03
x.	DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xi.	Endosulfan (α, β & Sulphate)	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xii.	Ethion	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xiii.	γ HCH (Lindane)	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xiv.	Isoproturon	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xv.	Malathion	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xvi.	Methyl Parathion	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xvii.	Monocrotophos	µg/L	0.005	SEAAL/INS/SOP/7.2/03
xviii.	Phorate	µg/L	0.005	SEAAL/INS/SOP/7.2/03
45.	Polychlorinated Biphenyls (PCB)	mg/L	0.000005	SEAAL/INS/SOP/7.2/04
46.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	0.000005	SEAAL/INS/SOP/7.2/05
47.	Total Arsenic (as As)	mg/L	0.002	IS 3025(Part 37) : 2022
48.	Total Chromium (as Cr)	mg/L	0.4	IS 3025 Part 52 :2003
49.	Volatile organic Compounds			
a)	Bromoform	mg/L	0.005	SEAAL/INS/SOP/7.2/02
b)	Dibromochloromethane	mg/L	0.005	SEAAL/INS/SOP/7.2/02
c)	Bromodichloroethane	mg/L	0.005	SEAAL/INS/SOP/7.2/02
d)	Chloroform	mg/L	0.005	SEAAL/INS/SOP/7.2/02
50.	*E.coli*	MPN/100 ml	2	IS 1622: 1981
51.	Total Coliforms	MPN/100 ml	2	IS 1622: 1981
52.	Faecal Coliforms	MPN/100 ml	2	IS 1622: 1981

HYR-6.3. Ground Water Analysis Results for the period from October 2024 to March 2025:

Table 6.4: Ground Water Analysis Results

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
Organoleptic & Physical Parameters							
1.	Colour	Hazen Units	*Max.* 5	Oct-24	1	1	1
				Nov-24	1	1	1
				Dec-24	1	1	1
				Jan-25	1	1	1
				Feb-25	1	1	1

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Mar-25	1	1	1
2.	Odour	-	Agreeable	Oct-24	Agreeable	Agreeable	Agreeable
				Nov-24	Agreeable	Agreeable	Agreeable
				Dec-24	Agreeable	Agreeable	Agreeable
				Jan-25	Agreeable	Agreeable	Agreeable
				Feb-25	Agreeable	Agreeable	Agreeable
				Mar-25	Agreeable	Agreeable	Agreeable
3.	pH Value	-	6.5 to 8.5	Oct-24	7.39	7.05	7.37
				Nov-24	6.88	6.98	7.10
				Dec-24	7.92	6.98	6.52
				Jan-25	8.15	7.27	6.67
				Feb-25	7.8	6.93	6.58
				Mar-25	8.2	6.96	6.5
4.	Turbidity	N.T.U.	Max. 1	Oct-24	0.3	2.1	1.6
				Nov-24	1.7	1.1	1.2
				Dec-24	0.9	1.1	0.4
				Jan-25	BDL	0.3	0.5
				Feb-25	0.5	0.8	0.3
				Mar-25	0.2	0.5	BDL
5.	Total Dissolved Solids	mg/L	Max. 500	Oct-24	354	190	330
				Nov-24	370	185	335
				Dec-24	391	146	302
				Jan-25	276	387	297
				Feb-25	342	120	330
				Mar-25	350	150	348
General Parameters concerning substances undesirable in excessive amounts							
6.	Aluminium (as Al)	mg/L	Max. 0.03	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
7.	Ammonia (as NH_3-N)	mg/L	Max.0.5	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
8.		mg/L	Max. 0.2	Oct-24	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38			Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
9.	Barium (as Ba)	mg/L	Max. 0.7	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
10.	Boron (as B)	mg/L	Max. 0.5	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
11.	Calcium (as Ca)	mg/L	Max. 75	Oct-24	29.6	8.0	32.2
				Nov-24	30.4	8.0	29.6
				Dec-24	32.0	8.0	26.4
				Jan-25	24.8	20.0	17.6
				Feb-25	25.6	8.0	24.0
				Mar-25	29.6	8.0	29.6
12.	Chloramines (as Cl_2)	mg/L	Max. 4.0	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
13.	Chloride (as Cl)	mg/L	Max.250	Oct-24	97	68	114
				Nov-24	100	61.3	102
				Dec-24	110	55.0	95
				Jan-25	70.0	140	101
				Feb-25	94.3	50	99.3
				Mar-25	98	54	100
14.	Copper (as Cu)	mg/L	Max.0.05	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
15.	Fluoride (as F)	mg/L	Max. 1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
16.	Iron (as Fe)	mg/L	Max.0.3	Oct-24	0.19	0.25	BDL
				Nov-24	0.22	0.21	0.18
				Dec-24	0.25	0.29	0.22
				Jan-25	BDL	BDL	BDL
				Feb-25	0.20	0.25	0.190
				Mar-25	0.18	0.21	0.170
17.	Magnesium (as Mg)	mg/L	Max. 30	Oct-24	8.77	3.9	9.74
				Nov-24	8.8	3.41	8.8
				Dec-24	9.9	2.36	8.04
				Jan-25	8.04	6.15	5.7
				Feb-25	11.20	1.46	10.70
				Mar-25	9.35	2.46	8.85
18.	Manganese (as Mn)	mg/L	Max.0.1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
19.	Mineral Oil	mg/L	Max.0.5	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
20.	Nitrate (as NO_3)	mg/L	Max.45	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
21.		mg/L	Max. 0.001	Oct-24	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
	Phenolic Compounds (as C6H5OH)			Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
22.	Selenium (as Se)	mg/L	Max. 0.01	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
23.	Silver (as Ag)	mg/L	Max. 0.1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
24.	Sulphate (as SO_4)	mg/L	Max. 200	Oct-24	30.5	14.5	48.0
				Nov-24	25.6	10.20	36.0
				Dec-24	32.0	8.85	28.5
				Jan-25	28.5	18.2	26.2
				Feb-25	22.5	7.7	24.8
				Mar-25	26.1	10.5	22.4
25.	Sulphide (as H_2S)	mg/L	Max. 0.05	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
26.	Total Alkalinity (as $CaCO_3$)	mg/L	Max.200	Oct-24	84.8	8.08	30.3
				Nov-24	83.6	10.5	27.2
				Dec-24	92.7	16.5	20.60
				Jan-25	78.3	20.6	6.18
				Feb-25	86.9	14.5	22.8
				Mar-25	90.9	14.1	20.2
27.	Total Hardness (as $CaCO_3$)	mg/L	Max. 200	Oct-24	110	38.0	120.0
				Nov-24	112	34.0	110.0
				Dec-24	118	29.1	97.1
				Jan-25	93	73.8	66.0

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Feb-25	110.0	26.0	104.0
				Mar-25	113.0	30.3	111.0
28.	Zinc (as Zn)	mg/L	Max. 5	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
Parameters Concerning Toxic Substances							
29.	Cadmium (as Cd)	mg/L	Max. 0.003	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
30.	Cyanide (as CN)	mg/L	Max.0.05	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
31.	Lead (as Pb)	mg/L	Max. 0.01	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
32.	Mercury (as Hg)	mg/L	Max. 0.001	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
33.	Molybdenum (as Mo)	mg/L	Max. 0.07	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
34.	Nickel (as Ni)	mg/L	Max.0.02	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
35. Pesticide Residues							
i.	Alachlor	µg/L	20	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
ii.	Atrazine	µg/L	2	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
iii.	Aldrin/Dieldrin	µg/L	0.03	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
iv.	Alpha HCH	µg/L	0.01	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
v.	Beta HCH	µg/L	0.04	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
vi.	Butachlor	µg/L	125	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
vii.	Chlorpyrifos	µg/L	30	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
viii.	Delta HCH	µg/L	0.04	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
ix.	2,4D chlorophenoxyacetic acid	µg/L	30	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
x.	DDT (o,p & p,p-Isomers of DDT, DDE, DDD)	µg/L	1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xi.	Endosulfan (α,β & Sulphate)	µg/L	0.4	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xii.	Ethion	µg/L	3	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Mar-25	BDL	BDL	BDL
xiii.	γ HCH (Lindane)	µg/L	2	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xiv.	Isoproturon	µg/L	9	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xv.	Malathion	µg/L	190	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xvi.	Methyl Parathion	µg/L	0.3	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xvii.	Monocrotophos	µg/L	1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
xviii.	Phorate	µg/L	2	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
36.		mg/L	Max.0.0005	Oct-24	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
	Polychlorinated Biphenyls (PCB)			Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
37.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	Max.0.0001	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
38.	Total Arsenic (as As)	mg/L	Max. 0.01	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
39.	Total Chromium (as Cr)	mg/L	Max. 0.05	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
40.Trihalomethanes							
a)	Bromoform	mg/L	Max. 0.1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
b)	Dibromochloromethane	mg/L	Max. 0.1	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
c)	Bromodichloroethane	mg/L	Max. 0.06	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
d)	Chloroform	mg/L	Max. 0.2	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
Bacteriological Analysis							
41.	E.coli	MPN Index /100 ml	Not Detectable	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL
42.	Total Coliforms	MPN Index /100 ml	Not Detectable	Oct-24	BDL	BDL	BDL
				Nov-24	BDL	BDL	BDL
				Dec-24	BDL	BDL	BDL
				Jan-25	BDL	BDL	BDL
				Feb-25	BDL	BDL	BDL
				Mar-25	BDL	BDL	BDL

HYR-6.4. Graphical representation of Results for Ground Water Analysis:

Figure 6.2: Ground Water Analysis for pH

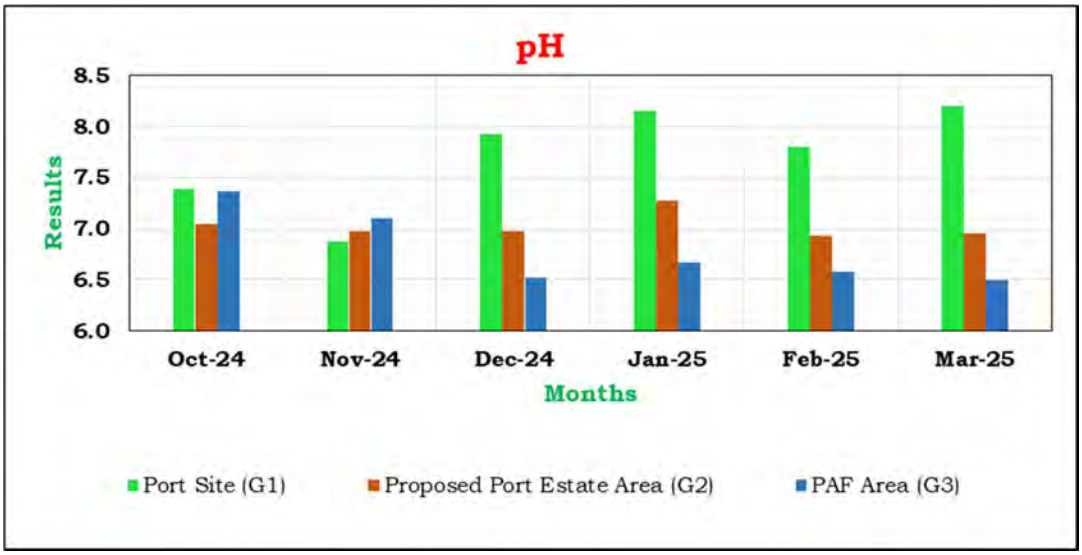


Figure 6.3: Ground Water Analysis for Total Dissolved Solids

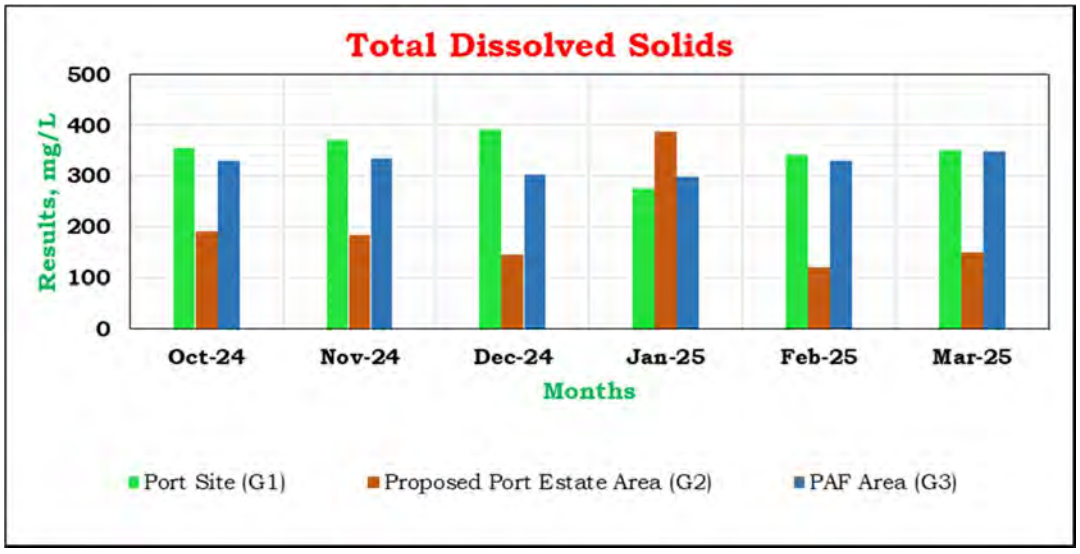


Figure 6.4: Ground Water Analysis for Chloride

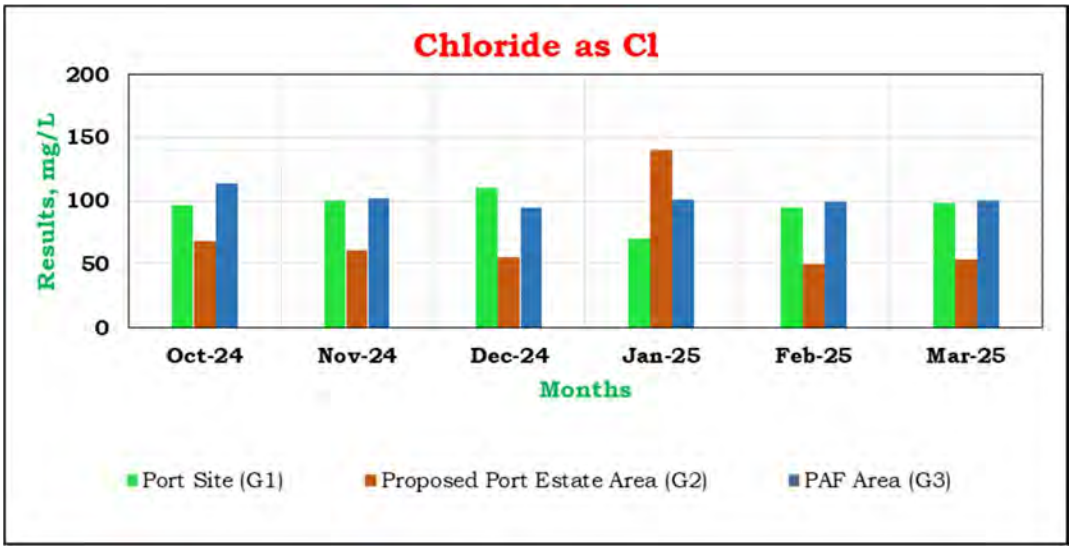


Figure 6.5: Ground Water Analysis for Sulphate as SO_4

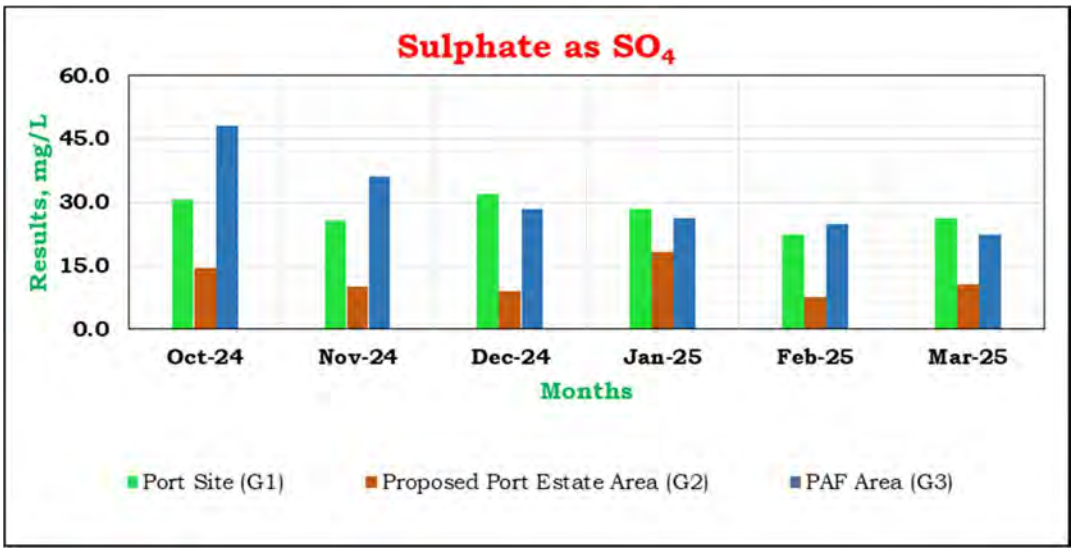


Figure 6.6: Ground Water Analysis for Calcium as Ca

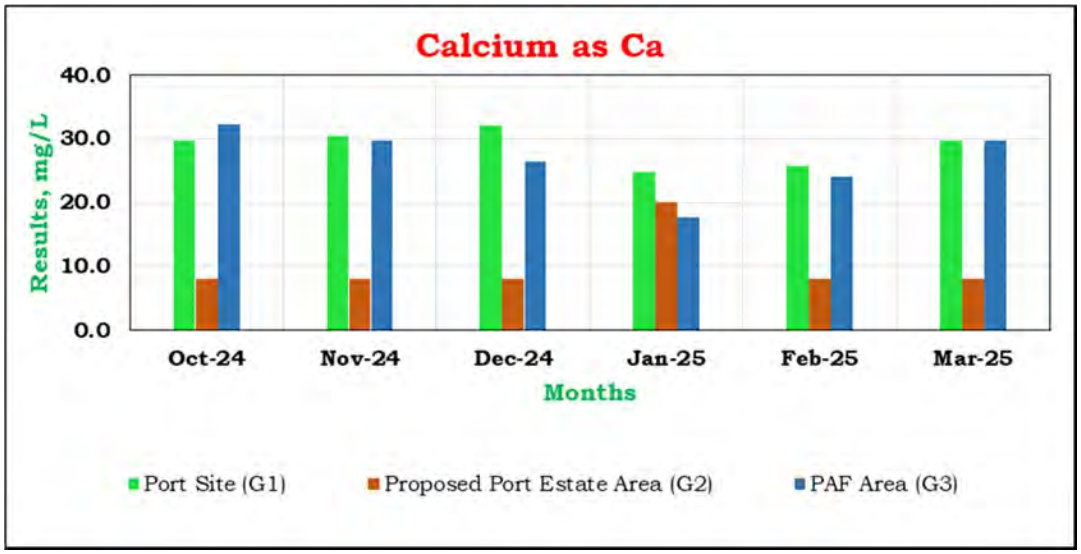


Figure 6.7: Ground Water Analysis for Magnesium as Mg

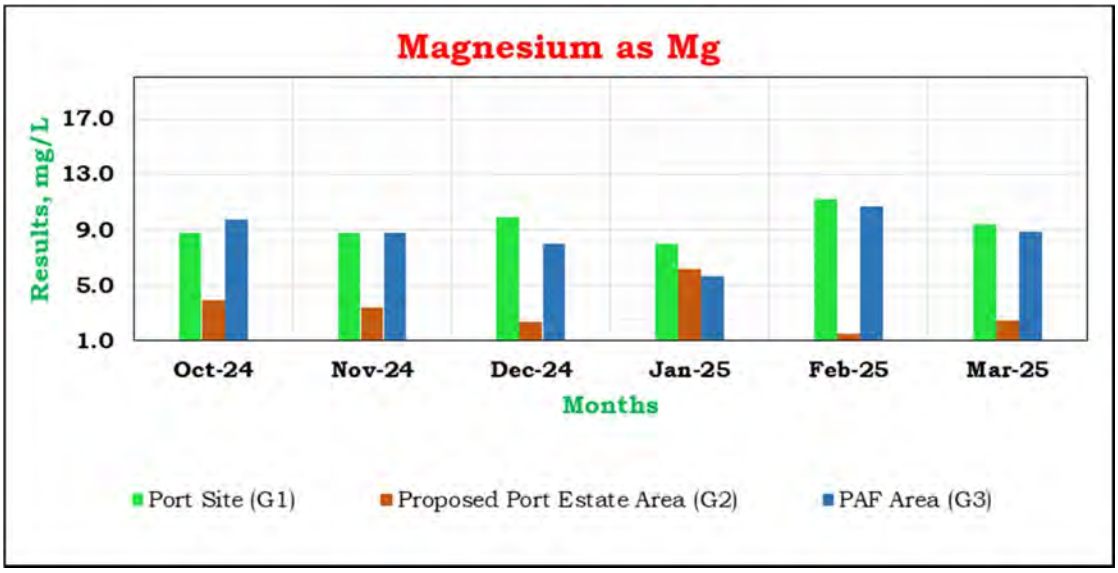


Figure 6.8: Ground Water Analysis for Iron as Fe

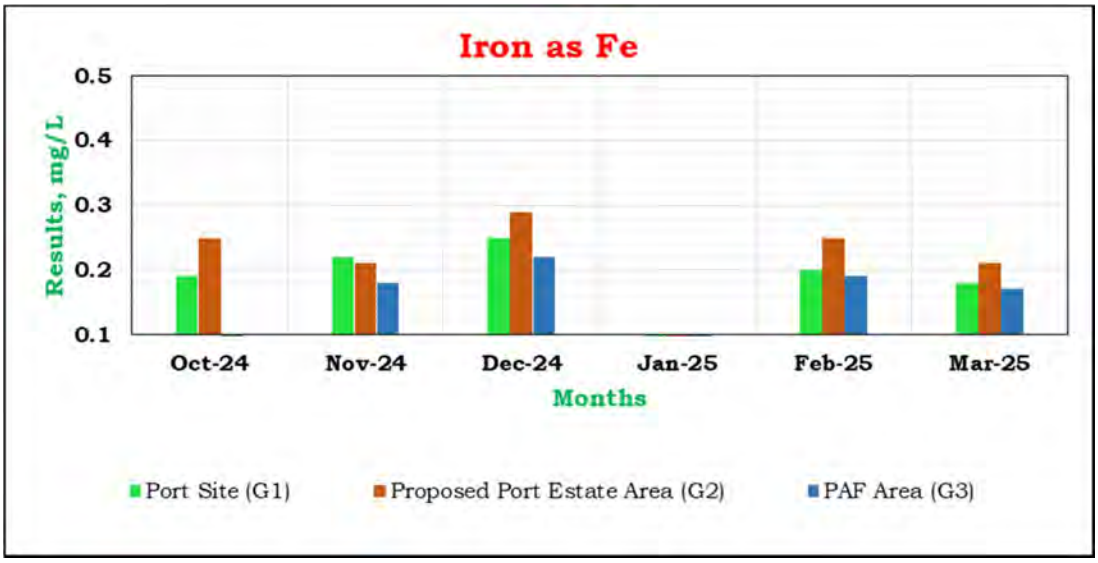


Figure 6.9: Ground Water Analysis for Total Alkalinity as $CaCO_3$

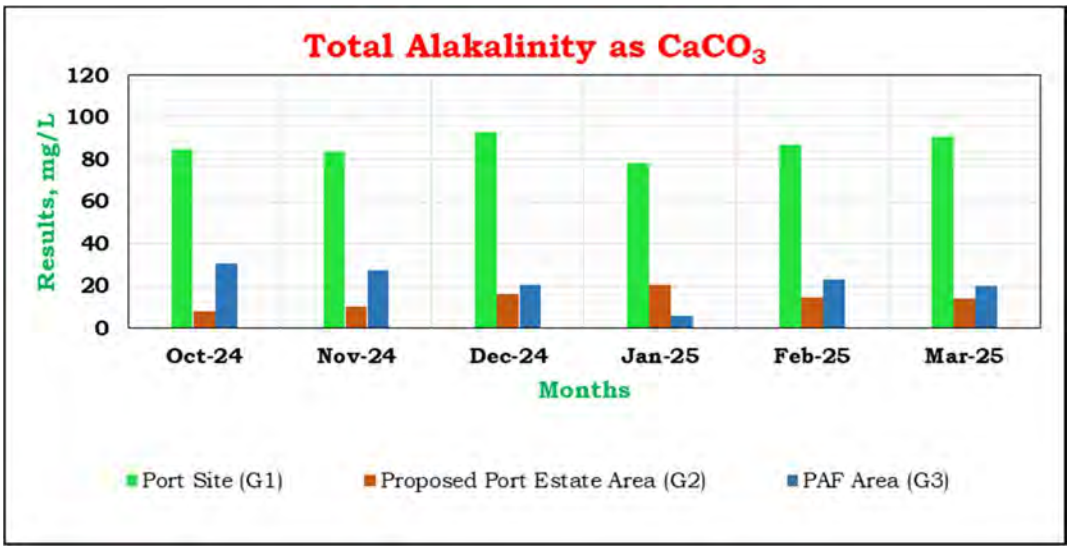


Figure 6.10: Ground Water Analysis for Total Hardness as $CaCO_3$

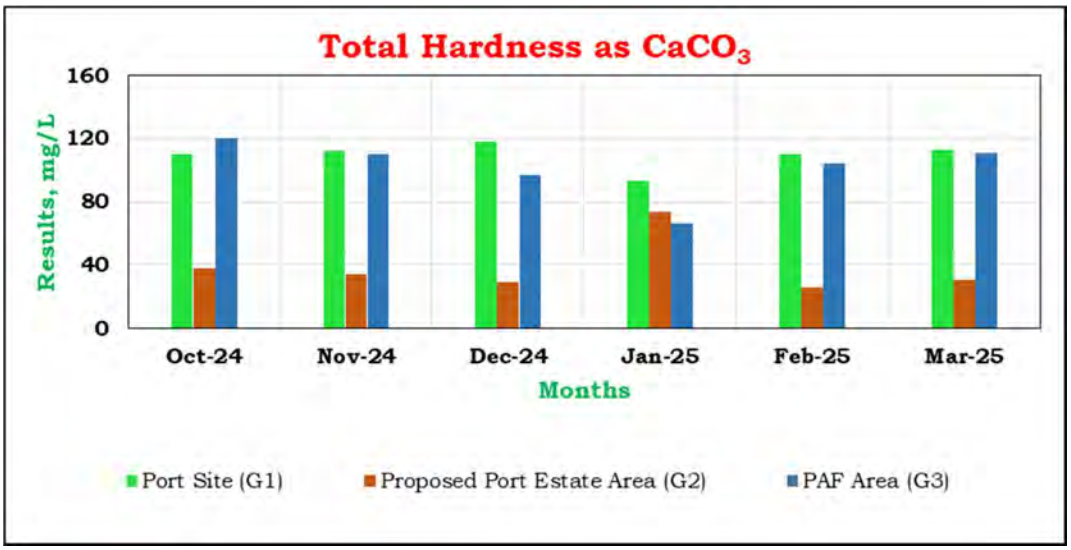
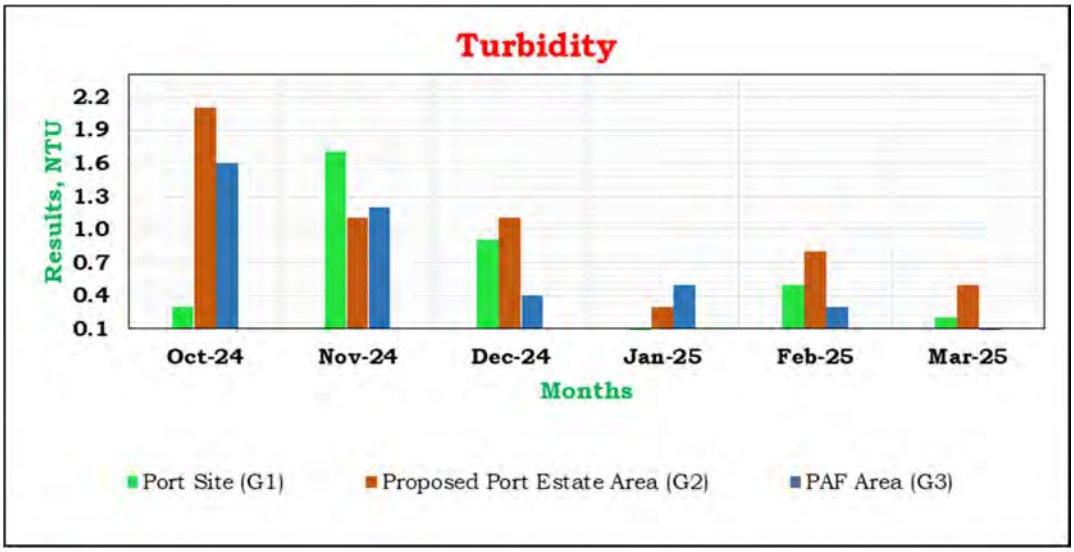


Figure 6.11: Ground Water Analysis for Turbidity



HYR-6.5. Summary- Ground Water Analysis

During the period from October 2024 to March 2025, following is the summary of ground water analysis:

a) At the location **Port Site** (Open Well),

- Colour observed was 1 Hazen unit and the odour was agreeable
- pH was observed in the range from 6.88 to 8.20
- Turbidity was observed in the range from BDL to 1.7 NTU
- Total Dissolved Solids were observed in the range from 276 to 391 mg/L
- Calcium (as Ca) was observed in the range from 24.8 to 32.0 mg/L
- Chloride (as Cl) was observed in the range from 70.0 to 110 mg/L
- Iron (as Fe) was observed in the range from BDL to 0.25 mg/L
- Magnesium (as Mg) was observed in the range from 8.04 to 11.20 mg/L
- Sulphate (as SO_4) was observed in the range from 22.5 to 32.0 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 78.3 to 92.7 mg/L
- Total Hardness (as $CaCO_3$) was observed in the range from 93.0 to 118 mg/L
- Ammonia (as NH_3-N), Manganese (as Mn), Nitrate (as NO_3), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl_2), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C_6H_5OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H_2S), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB) and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits
- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected.

b) At the location **Proposed Port Estate Area** (Open Well),

- Colour observed was 1 Hazen unit and the odour was agreeable
- pH was observed in the range from 6.93 to 7.27
- Turbidity was observed in the range from 0.3 to 2.1 NTU
- Total Dissolved Solids were observed in the range from 120 to 387 mg/L
- Calcium (as Ca) was observed in the range from 8.0 to 20.0 mg/L
- Chloride (as Cl) was observed in the range from 50.0 to 140 mg/L
- Iron (as Fe) was observed in the range from BDL to 0.29 mg/L
- Magnesium (as Mg) was observed in the range from 1.46 to 6.15 mg/L
- Sulphate (as SO_4) was observed in the range from 7.70 to 18.20 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 8.08 to 20.6 mg/L
- Total Hardness (as $CaCO_3$) was observed in the range from 26.0 to 73.8 mg/L
- Ammonia (as NH_3-N), Manganese (as Mn), Nitrate (as NO_3), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl_2), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as

C_6H_5OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H_2S), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB) and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits

- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected.

c) At the location **PAF Area** (Open Well),

- Colour observed was 1 Hazen unit and the odour was agreeable
- pH was observed in the range from 6.50 to 7.37
- Turbidity was observed in the range from BDL to 1.6 NTU
- Total Dissolved Solids were observed in the range from 297 to 348 mg/L
- Calcium (as Ca) was observed in the range from 17.6 to 32.2 mg/L
- Chloride (as Cl) was observed in the range from 95.0 to 114 mg/L
- Iron (as Fe) was observed in the range from BDL to 0.22 mg/L
- Magnesium (as Mg) was observed in the range from 5.70 to 10.70 mg/L
- Sulphate (as SO_4) was observed in the range from 22.4 to 48.0 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 6.18 to 30.3 mg/L
- Total Hardness (as $CaCO_3$) was observed in the range from 66.0 to 120.0 mg/L
- Ammonia (as NH_3-N), Manganese (as Mn), Nitrate (as NO_3), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl_2), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C_6H_5OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H_2S), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB) and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits
- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected.

d) Summary – Comparison of Results of **All Locations**,

- Colour observed was 1 Hazen unit and the odour was agreeable in all locations
- Maximum value of pH observed was 8.20 at Port Site
- Maximum value of Turbidity observed was 2.1 NTU at Proposed Port Estate Area
- Maximum value of Total Dissolved Solids observed was 391 mg/L at Port Site
- Maximum value of Calcium (as Ca) observed was 32.2 mg/L at PAF Area.
- Maximum value of Chloride (as Cl) observed was 140 mg/L at Proposed Port Estate Area
- Maximum value of Iron (as Fe) observed was 0.29 mg/L at Proposed Port Estate Area
- Maximum value of Magnesium (as Mg) observed was 11.20 mg/L at Port Site

- Maximum value of Sulphate (as SO_4) observed was 48.0 mg/L at PAF area
- Maximum value of Total Alkalinity (as $CaCO_3$) observed was 92.7 mg/L at Port Site
- Maximum value of Total Hardness (as $CaCO_3$) observed was 120.0 mg/L at PAF area
- Ammonia (as NH_3-N), Manganese (as Mn), Nitrate (as NO_3), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl_2), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C_6H_5OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H_2S), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB) and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits at all locations
- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected at all locations.

HYR-6.6. Surface Water Analysis Results for the period from October 2024 to March 2025:

Table 6.5: Surface Water Analysis Results

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
Physical Parameters							
1.	Colour	Hazen Units	Oct-24	1	1	1	1
			Nov-24	1	1	1	1
			Dec-24	1	1	1	1
			Jan-25	1	1	1	1
			Feb-25	1	1	1	1
			Mar-25	1	1	1	1
2.	Odour	-	Oct-24	Agreeable	Agreeable	Agreeable	Agreeable
			Nov-24	Agreeable	Agreeable	Agreeable	Agreeable
			Dec-24	Agreeable	Agreeable	Agreeable	Agreeable
			Jan-25	Agreeable	Agreeable	Agreeable	Agreeable
			Feb-25	Agreeable	Agreeable	Agreeable	Agreeable
			Mar-25	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH Value	-	Oct-24	6.73	7.1	7.11	7.01
			Nov-24	7.05	7.06	6.87	7.32
			Dec-24	7.26	7.58	7.4	7.2
			Jan-25	7.32	7.78	7.3	7.76
			Feb-25	7.08	7.31	7.07	7.27
			Mar-25	8.03	7.37	7.54	7.56
4.	Turbidity	N.T.U.	Oct-24	2	4.5	3.2	4.2
			Nov-24	4.6	3.1	2.5	3.5
			Dec-24	4.8	4.2	5.1	1.2
			Jan-25	5.1	4.8	0.2	1.8
			Feb-25	3.6	1.6	3.7	1.2
			Mar-25	3.2	2.9	2.5	0.4
5.	Electrical Conductivity (at 25°C)	µmho/cm	Oct-24	1529	253	190	4100
			Nov-24	1200	279	207	3800
			Dec-24	2182	255	200	5100
			Jan-25	1394	223	268	4920
			Feb-25	2280	179	245	4825
			Mar-25	2450	165	280	4785
6.	Total Dissolved Solids	mg/L	Oct-24	840	160	95.5	2624
			Nov-24	660	152	110	2090
			Dec-24	982	140	102	3264
			Jan-25	766	112	172	2952
			Feb-25	1206	153	122	2412
			Mar-25	1348	132	154	2392
Chemical Parameters							

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
7.	Dissolved Oxygen	mg/L	Oct-24	6.80	6.90	7.10	6.90
			Nov-24	7.10	7.00	6.80	7.10
			Dec-24	6.80	7.00	7.00	6.80
			Jan-25	6.90	7.00	7.00	6.90
			Feb-25	6.70	7.10	7.20	6.90
			Mar-25	6.80	6.90	7.00	6.80
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
9.	Oil & Grease	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
10.	Free Ammonia	mg/L	Oct-24	BDL	BDL	BDL	1.11
			Nov-24	BDL	BDL	BDL	1.20
			Dec-24	BDL	BDL	BDL	1.45
			Jan-25	BDL	BDL	BDL	1.24
			Feb-25	BDL	BDL	BDL	1.15
			Mar-25	BDL	BDL	BDL	1.22
11.	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
12.	Barium (as Ba)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
13.	Boron (as B)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
14.	Calcium (as Ca)	mg/L	Oct-24	32.0	12.8	8.0	73.6
			Nov-24	26.4	13.6	8.0	58.4

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
			Dec-24	33.6	12.8	8.0	63.2
			Jan-25	64.8	8.0	10.4	72.0
			Feb-25	36.0	13.6	8.0	50.4
			Mar-25	40.8	12.8	8.0	48.0
15.	Chloride (as Cl)	mg/L	Oct-24	140.00	61.8	28.5	513
			Nov-24	123.00	73.5	32.7	490
			Dec-24	130.00	68.0	30.0	580
			Jan-25	150.00	28.0	52.0	610
			Feb-25	139.00	74.4	30.0	486
			Mar-25	145.00	68.0	35.0	475
16.	Copper (as Cu)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
18.	Iron (as Fe)	mg/L	Oct-24	0.65	0.75	1.15	0.78
			Nov-24	2.80	0.95	0.80	1.25
			Dec-24	2.02	1.10	2.45	1.21
			Jan-25	0.65	0.75	BDL	0.65
			Feb-25	1.90	0.85	2.80	0.89
			Mar-25	1.24	0.90	1.14	0.65
19.	Magnesium (as Mg)	mg/L	Oct-24	9.74	3.90	2.44	22.4
			Nov-24	8.28	4.38	3.41	18.0
			Dec-24	10.90	4.26	2.84	19.9
			Jan-25	20.80	2.84	3.78	44.9
			Feb-25	11.20	4.38	2.84	15.6
			Mar-25	11.80	3.93	4.43	14.8
20.	Manganese (as Mn)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
21.	Mineral Oil	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
22.	Nitrate (as NO_3)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
23.	Phenolic Compounds (as C_6H_5OH)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
24.	Selenium (as Se)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
25.	Silver (as Ag)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
26.	Sulphate (as SO_4)	mg/L	Oct-24	45	2.94	2.43	170
			Nov-24	34.5	4.6	3.5	145
			Dec-24	38.4	3.5	3.15	142
			Jan-25	25.2	9.22	7.5	165
			Feb-25	32.0	3.5	4.02	127
			Mar-25	45.0	2.89	5.11	118
27.	Total Phosphate (as PO_4)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
28.	Total Alkalinity (as $CaCO_3$)	mg/L	Oct-24	24.2	20.2	26.3	26.3
			Nov-24	29.3	27.2	26.3	27.2
			Dec-24	43.3	30.9	24.7	26.8
			Jan-25	11.9	37.1	35	39
			Feb-25	39.3	24.8	22.8	31.1
			Mar-25	46.5	28.3	26.3	36.4

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
29.	Total Hardness (as $CaCO_3$)	mg/L	Oct-24	120	48	30	276
			Nov-24	100	52	34	220
			Dec-24	126	48.9	31.1	235
			Jan-25	243.0	31.1	40.8	359
			Feb-25	136.0	52.0	34.0	190
			Mar-25	152	48.5	38.4	182
30.	Calcium Hardness (as $CaCO_3$)	mg/L	Oct-24	80	32	20	184
			Nov-24	66	34	20	146
			Dec-24	81.6	31.1	19.4	153
			Jan-25	157.0	19.4	25.2	175
			Feb-25	90.0	34.0	20.0	126
			Mar-25	103.0	32.3	20.2	121
31.	Zinc (as Zn)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
32.	Sodium (as Na)	mg/L	Oct-24	48.2	10.0	8.0	210
			Nov-24	38.9	14.2	10.1	175
			Dec-24	48.2	11.3	9.3	225
			Jan-25	92.5	10.3	28.9	245
			Feb-25	41.2	8.9	11.0	185
			Mar-25	47.0	10.1	12.2	170
33.	Potassium (as K)	mg/L	Oct-24	3.89	1.18	1.22	12.60
			Nov-24	2.45	2.50	1.85	15.30
			Dec-24	4.20	2.10	1.30	21.80
			Jan-25	10.50	1.80	5.25	18.50
			Feb-25	3.75	1.90	2.10	16.50
			Mar-25	4.11	2.10	1.85	16.50
34.	Sodium Adsorption Ratio	-	Oct-24	1.912	0.627	0.631	5.494
			Nov-24	1.691	0.856	0.753	5.129
			Dec-24	1.846	0.698	0.714	6.316
			Jan-25	2.556	0.796	1.949	5.578
			Feb-25	1.536	0.533	0.820	5.833
			Mar-25	1.665	0.626	0.858	5.496
35.	Salinity	ppt	Oct-24	0.767	0.123	0.094	2.17
			Nov-24	0.596	0.135	0.101	2.002
			Dec-24	1.096	0.122	0.097	2.692
			Jan-25	0.685	0.107	0.128	2.59
			Feb-25	1.096	0.122	0.097	2.692
			Mar-25	1.238	0.081	0.134	2.515
36.	Cadmium (as Cd)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
37.	Cyanide (as CN)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
38.	Lead (as Pb)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
39.	Mercury (as Hg)	mg/L	Oct-24	BDL	BDL	BDL	BDL
			Nov-24	BDL	BDL	BDL	BDL
			Dec-24	BDL	BDL	BDL	BDL
			Jan-25	BDL	BDL	BDL	BDL
			Feb-25	BDL	BDL	BDL	BDL
			Mar-25	BDL	BDL	BDL	BDL
40. Pesticide Residues							
i.	Alachlor	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
ii.	Atrazine	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
iii.	Aldrin/Dieldrin	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
iv.	Alpha HCH	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
v.	Beta HCH	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
vi.	Butachlor	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
vii.	Chlorpyrifos	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
viii.	Delta HCH	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
ix.	2,4D chlorophenoxyacetic acid	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
x.	DDT (o,p & p,p-Isomers of DDT, DDE, DDD)	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xi.	Endosulfan (α,β & Sulphate)	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
			Mar-24	BDL	BDL	BDL	BDL
xii.	Ethion	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xiii.	γ HCH (Lindane)	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xiv.	Isoproturon	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xv.	Malathion	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xvi.	Methyl Parathion	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xvii.	Monocrotophos	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
xviii.	Phorate	µg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
		mg/L	Oct-23	BDL	BDL	BDL	BDL

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)	Poovar Estuary (S4)
41.	Polynuclear Aromatic Hydrocarbons (PAH)		Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
42.	Total Arsenic (as As)	mg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
43.	Total Chromium (as Cr)	mg/L	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
Biological Analysis							
44.	Total Coliforms	MPN Index/100 ml	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL
45.	Faecal Coliforms	MPN Index/100 ml	Oct-23	BDL	BDL	BDL	BDL
			Nov-23	BDL	BDL	BDL	BDL
			Dec-23	BDL	BDL	BDL	BDL
			Jan-24	BDL	BDL	BDL	BDL
			Feb-24	BDL	BDL	BDL	BDL
			Mar-24	BDL	BDL	BDL	BDL

HYR-6.7. Graphical representation of Results for Surface Water Analysis:

Figure 6.10: Surface Water Analysis for pH value

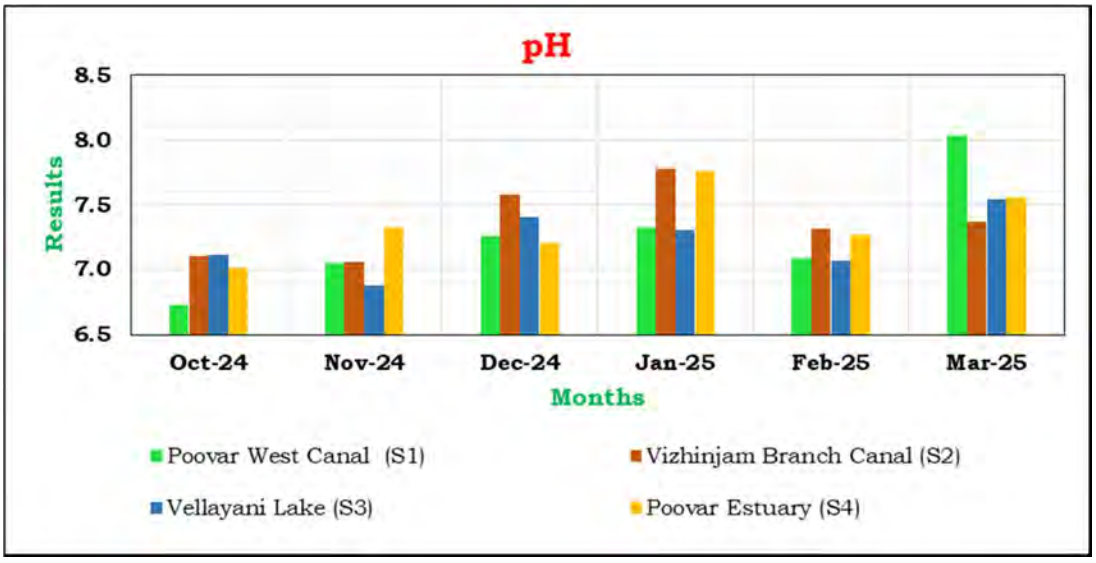


Figure 6.11: Surface Water Analysis for Turbidity

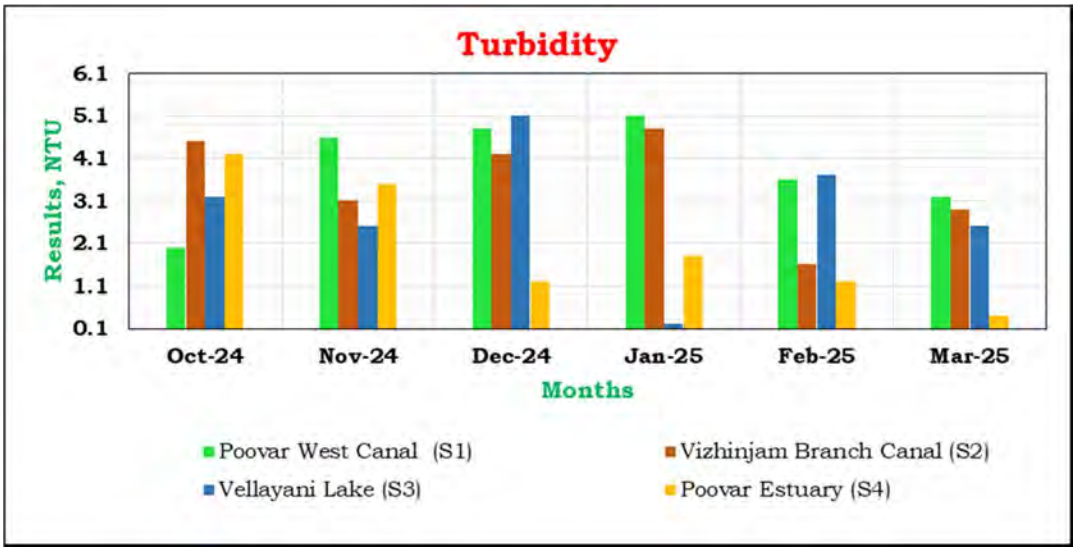


Figure 6.12: Surface Water Analysis for Electrical Conductivity @ 25 °C

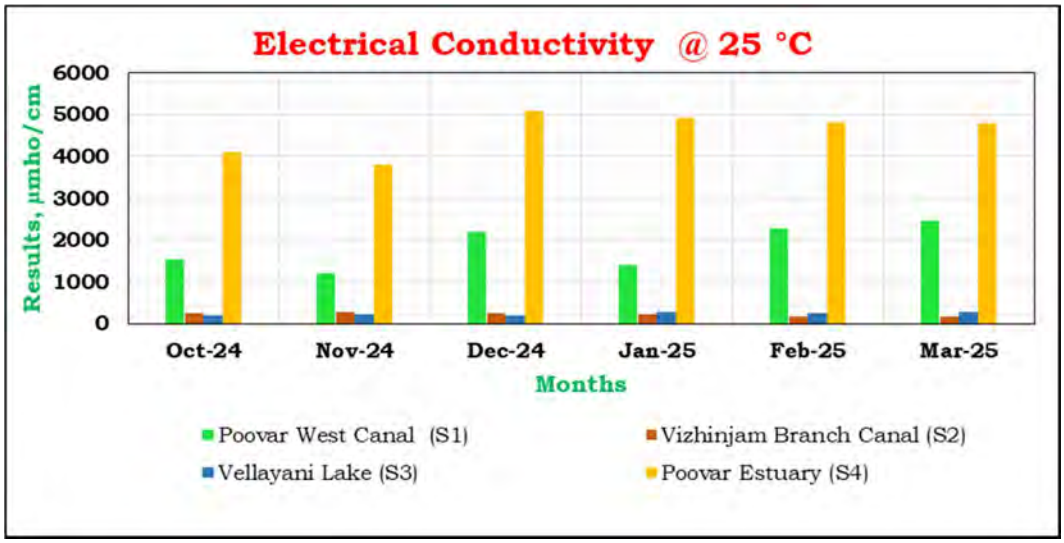


Figure 6.13: Surface Water Analysis for Total Dissolved Solids

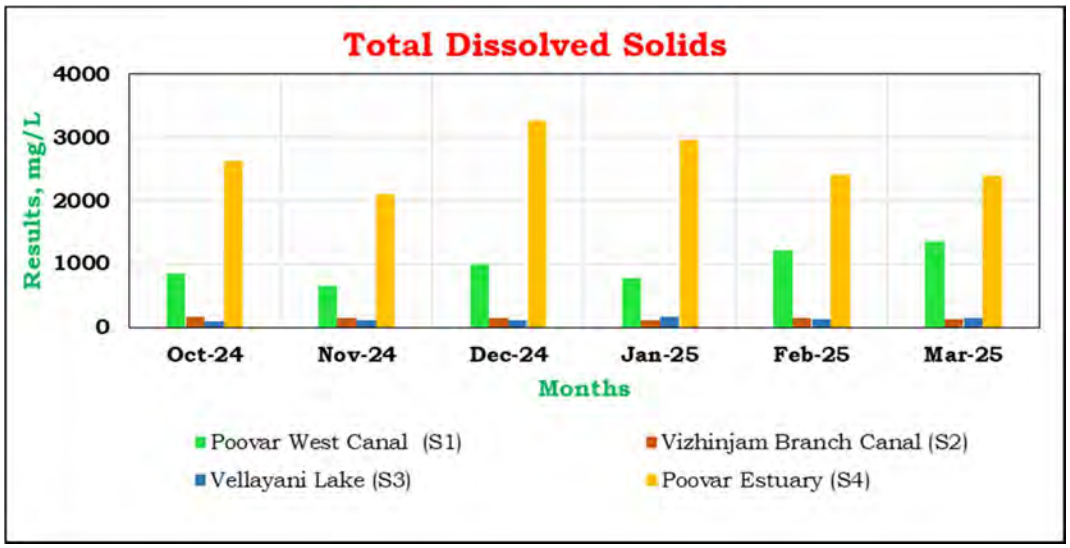


Figure 6.14: Surface Water Analysis for Dissolved Oxygen

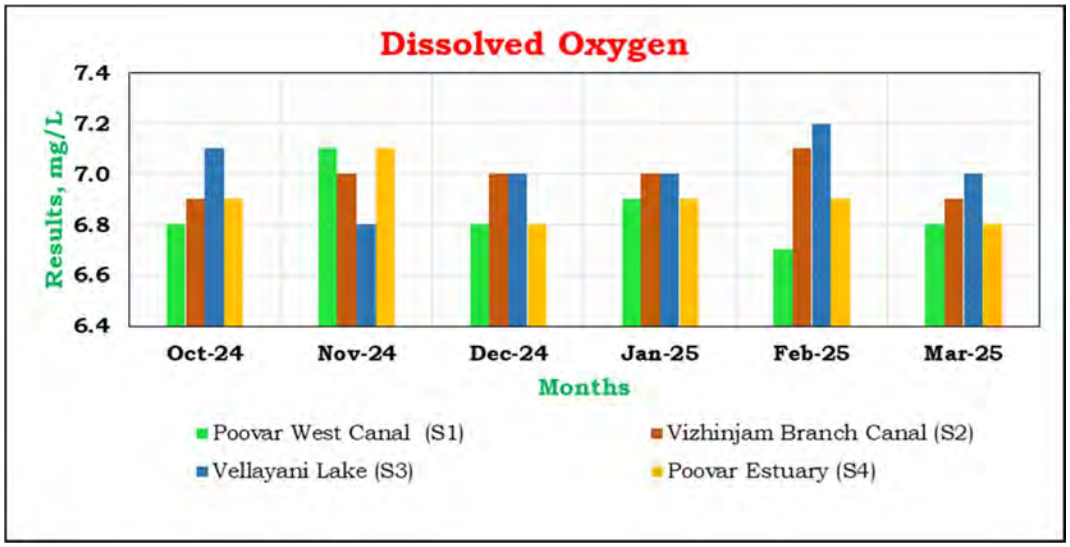


Figure 6.15: Surface Water Analysis for Chloride as Cl

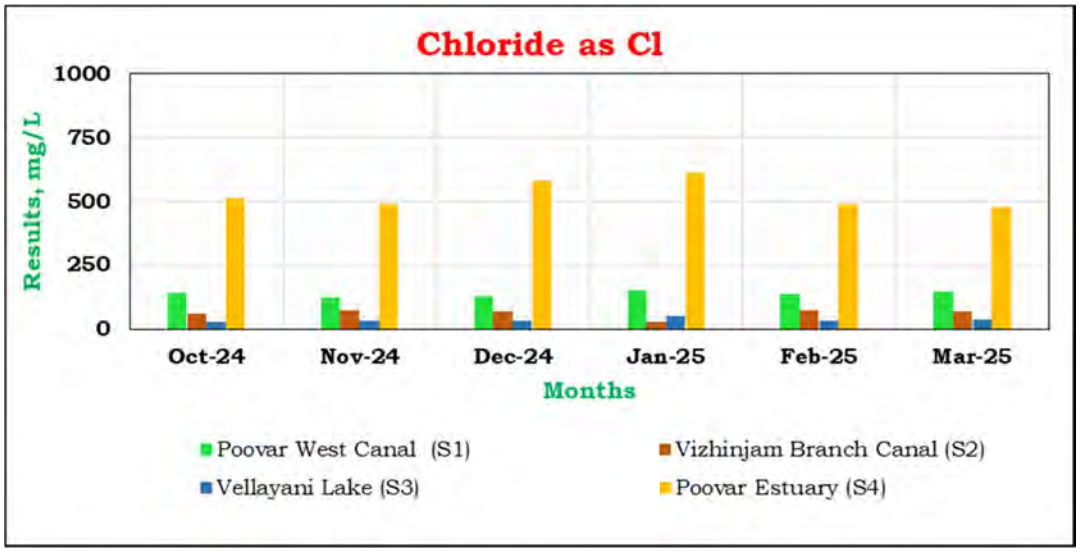


Figure 6.16: Surface Water Analysis for Sulphate as SO_4

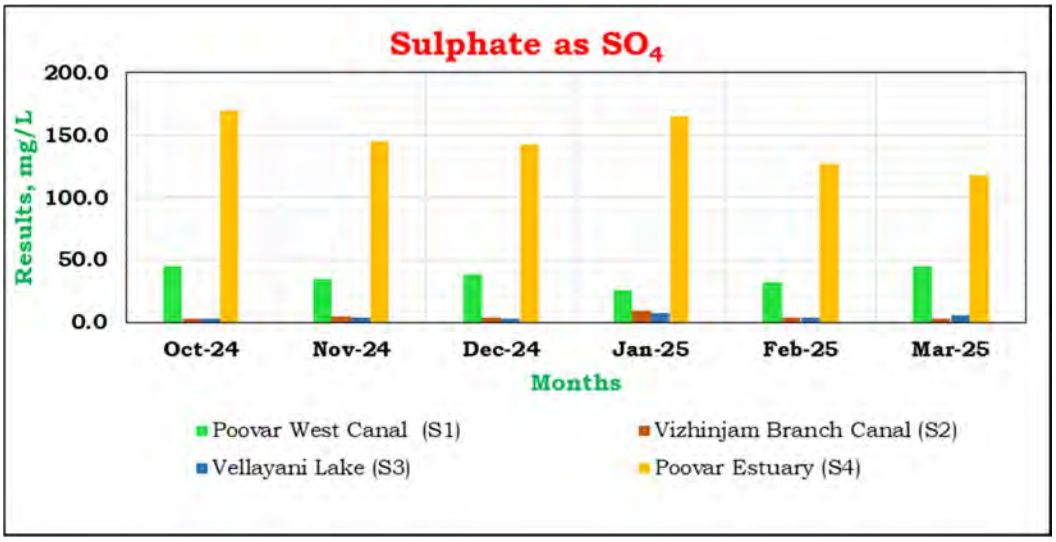


Figure 6.17: Surface Water Analysis for Calcium as Ca

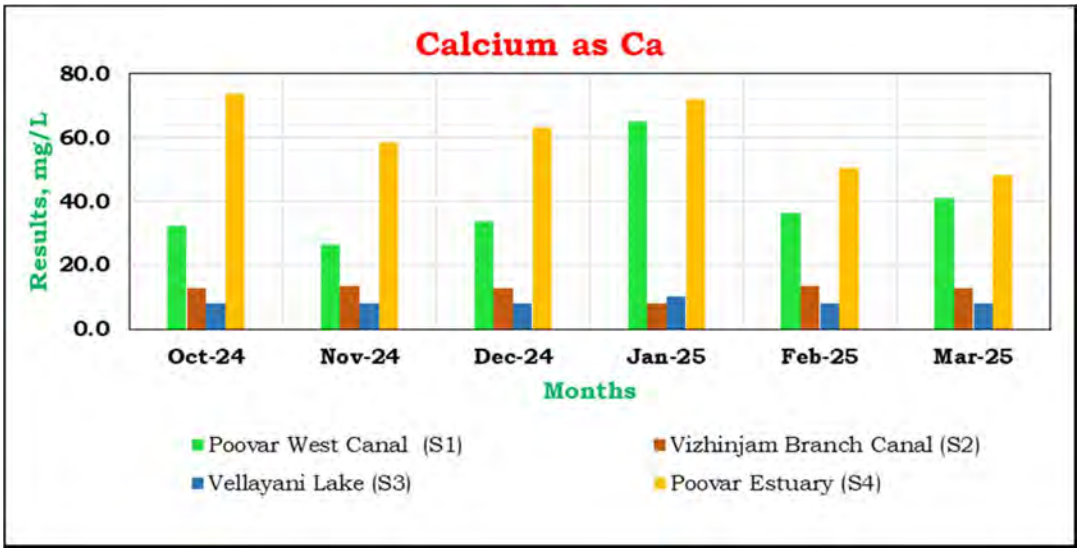


Figure 6.18: Surface Water Analysis for Magnesium as Mg

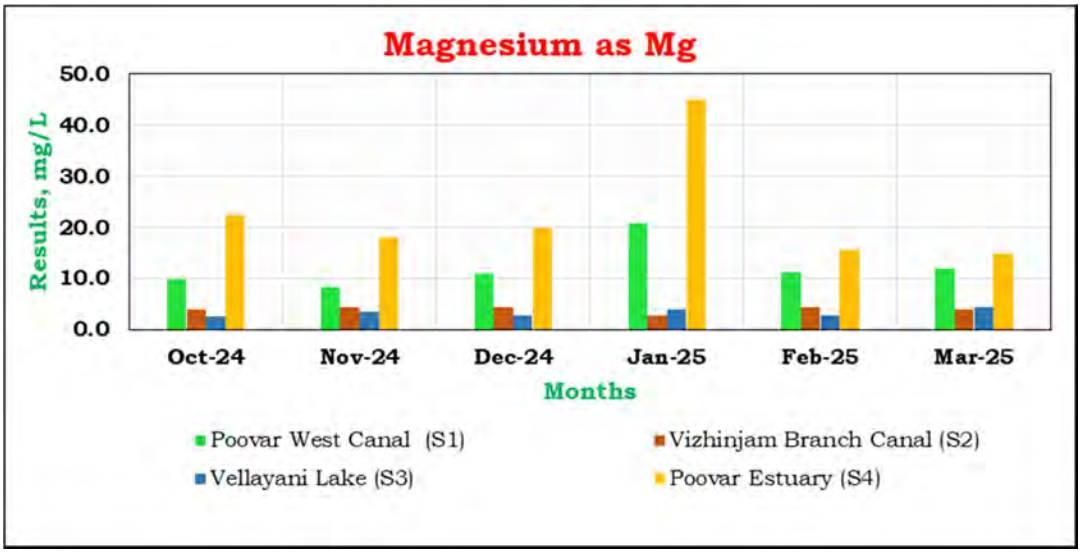


Figure 6.19: Surface Water Analysis for Iron as Fe

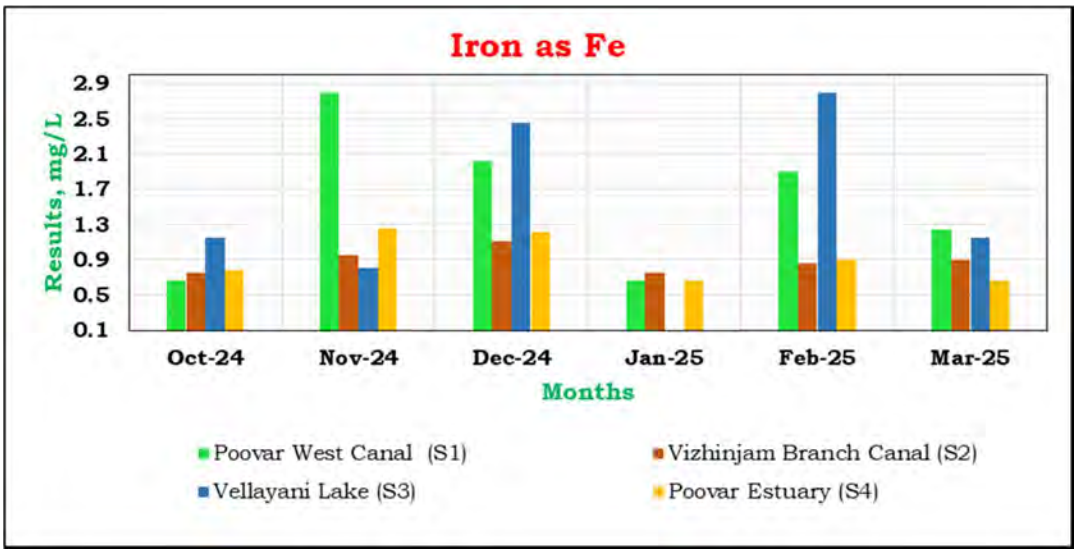


Figure 6.20: Surface Water Analysis for Total Alkalinity as $CaCO_3$

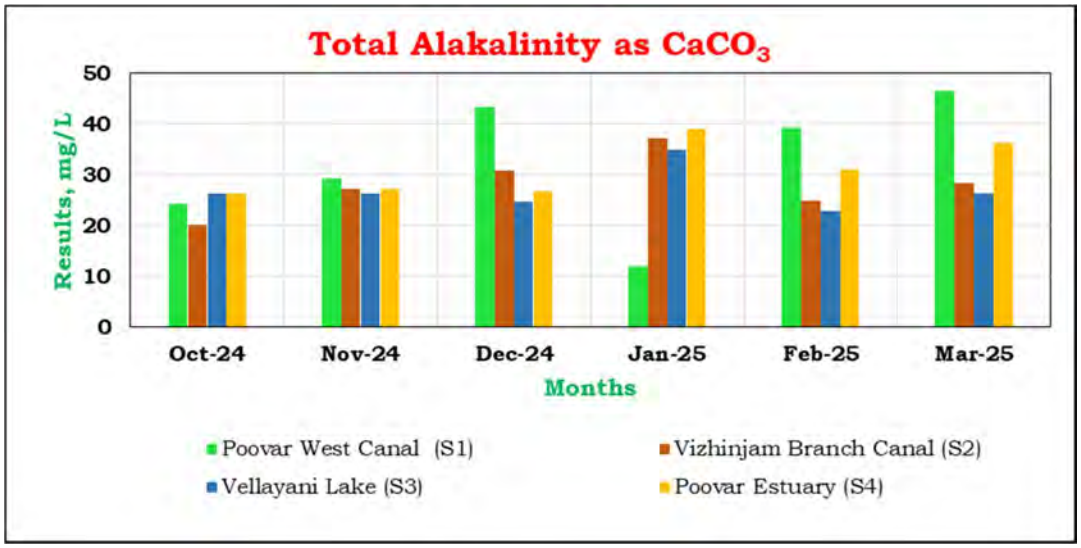


Figure 6.21: Surface Water Analysis for Total Hardness as $CaCO_3$

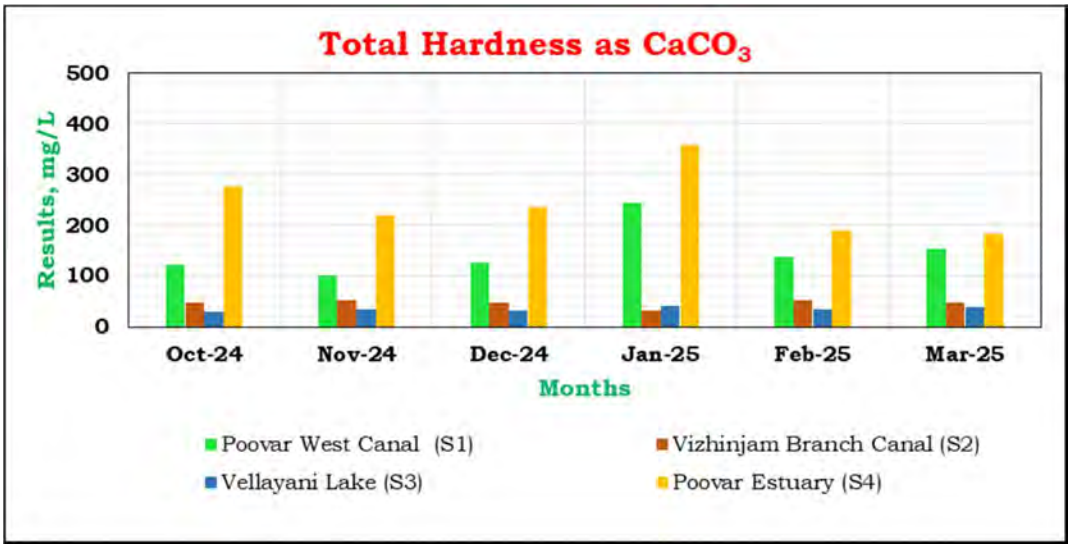


Figure 6.22: Surface Water Analysis for Calcium Hardness as $CaCO_3$

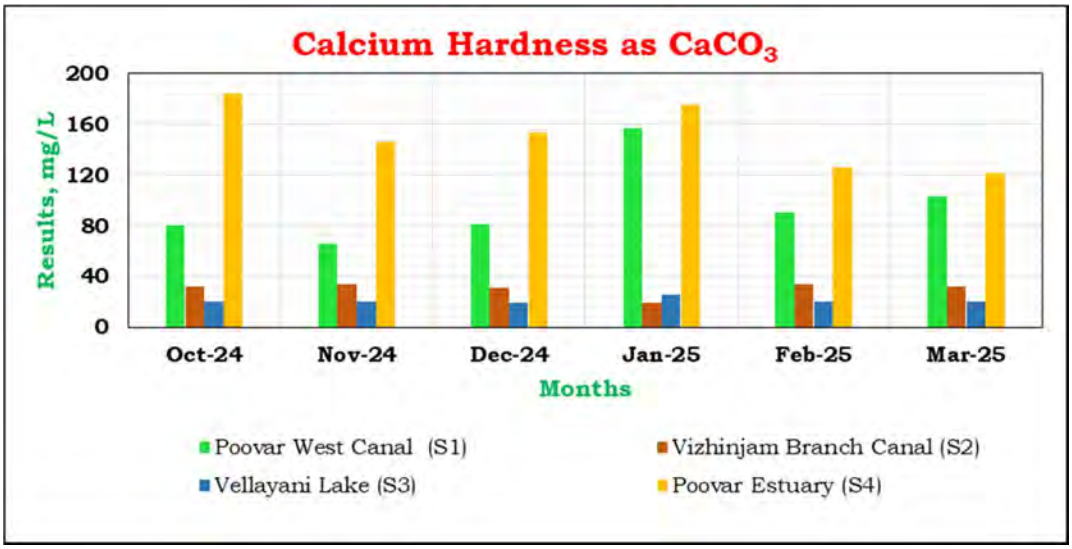


Figure 6.23: Surface Water Analysis for Sodium as Na

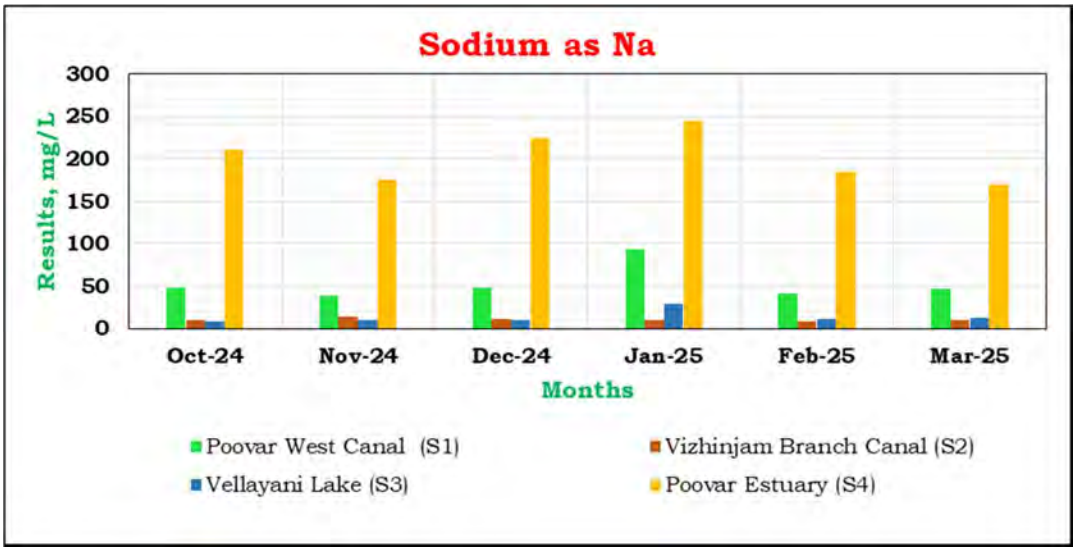


Figure 6.24: Surface Water Analysis for Potassium as K

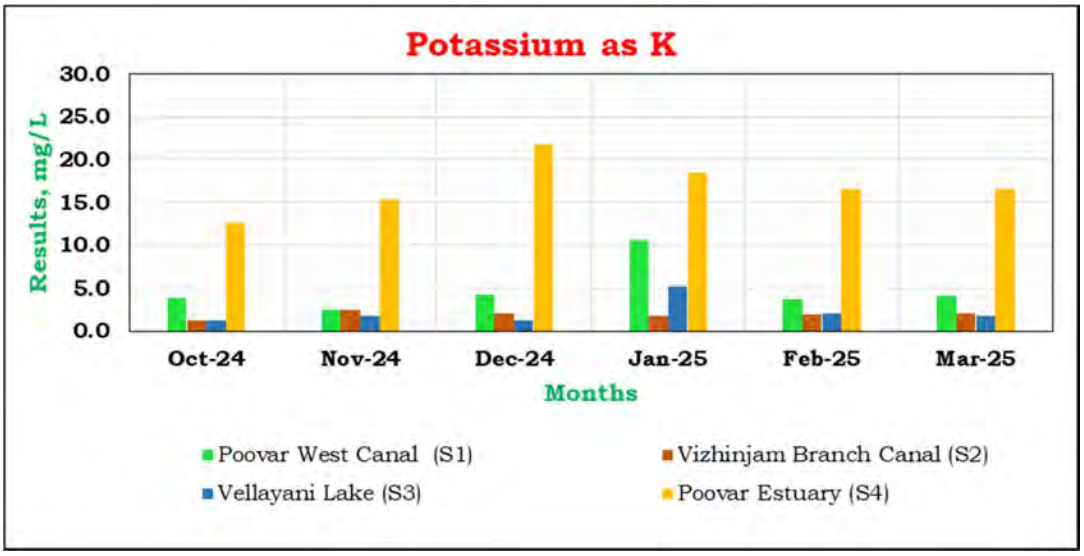


Figure 6.25: Surface Water Analysis for Sodium Adsorption Ratio

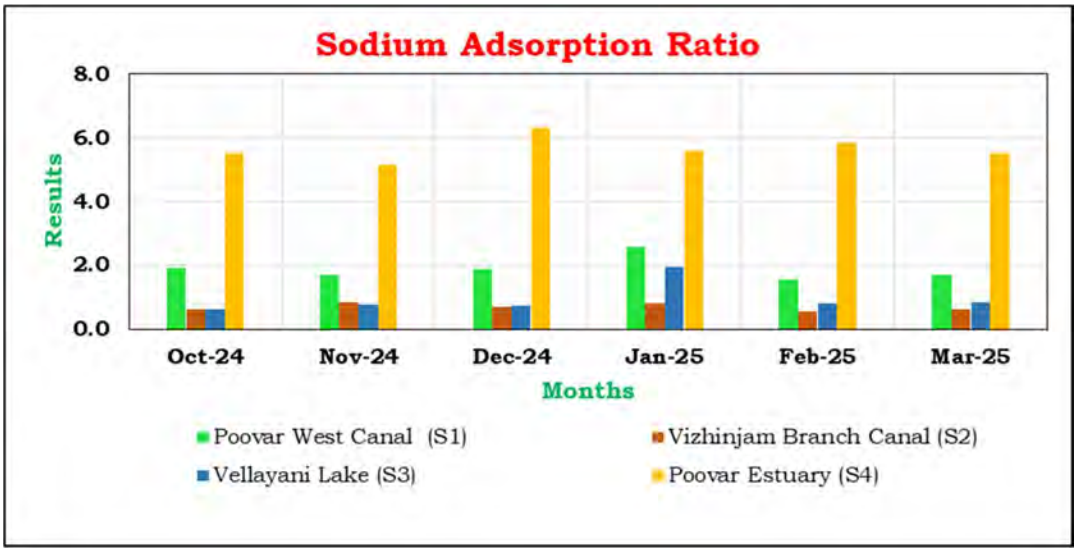


Figure 6.26: Surface Water Analysis for Salinity

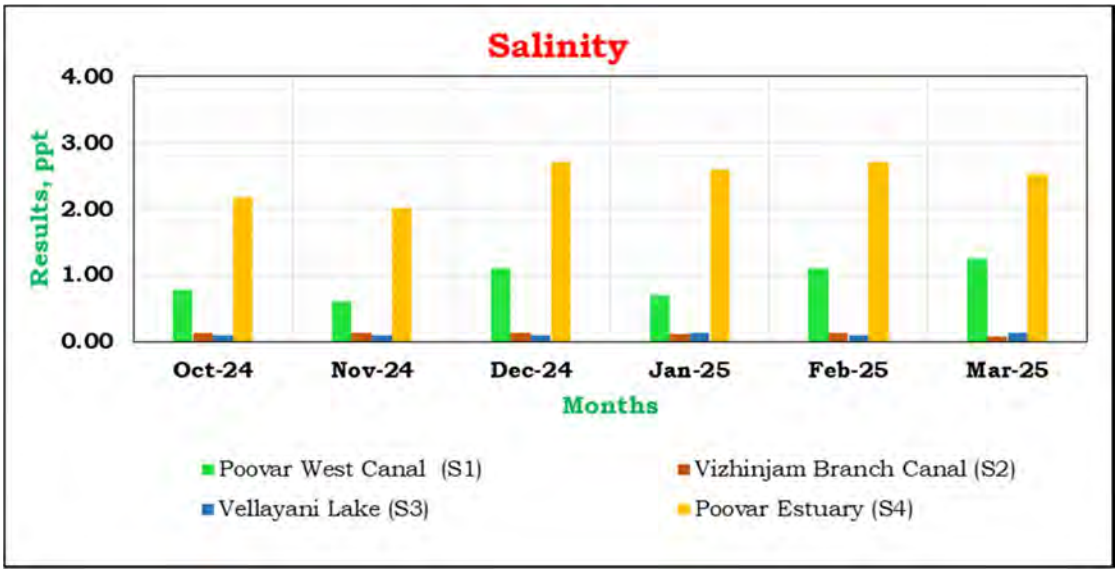
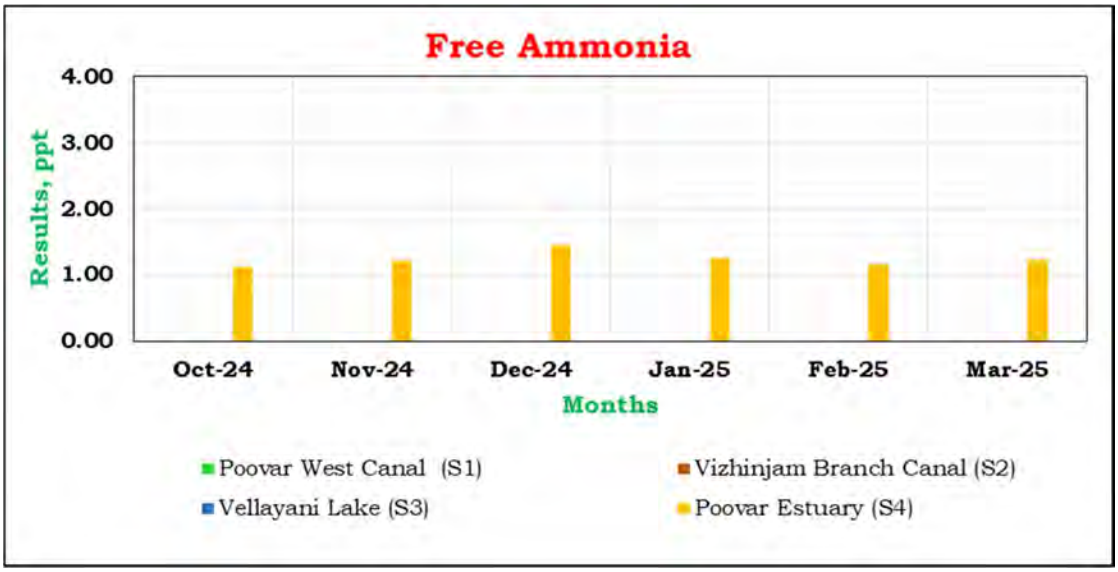


Figure 6.27: Surface Water Analysis for Ammonia



HYR-6.8. Summary of Surface water

During the period from October 2024 to March 2025, following is the summary of surface water analysis:

a) At the location **Poovar West Canal**,

- Colour was observed 1 Hazen unit
- Odour was agreeable
- pH was observed in the range from 6.73 to 8.03
- Turbidity was observed in the range from 2.0 to 5.1 N.T.U.
- Electrical Conductivity was observed in the range from 1394 to 2450 µmho/cm
- Total Dissolved Solids were observed in the range from 660 to 1348 mg/L
- Dissolved Oxygen was observed in the range from 6.7 to 7.1 mg/L
- Calcium (as Ca) was observed in the range from 26.4 to 64.8 mg/L
- Chloride (as Cl) was observed in the range from 123.0 to 150.0 mg/L
- Iron (as Fe) was observed in the range from 0.65 to 2.80 mg/L
- Magnesium (as Mg) was observed in the range from 8.28 to 20.8 mg/L
- Sulphate (as SO_4) was observed in the range from 25.2 to 45.0 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 11.9 to 46.5 mg/L
- Total Hardness (as $CaCO_3$) was observed in the range from 100 to 243 mg/L
- Calcium Hardness (as $CaCO_3$) was observed in the range from 66.0 to 157.0 mg/L
- Sodium (as Na) was observed in the range from 38.9 to 92.5 mg/L
- Potassium (as K) was observed in the range from 2.45 to 10.5 mg/L
- Sodium Absorption Ratio was observed in the range from 1.536 to 2.556
- Salinity was observed in the range from 0.596 to 1.238 ppt
- Free Ammonia, Zinc (as Zn), Fluoride, Manganese (as Mn), Nitrate (as NO_3), Total Phosphate (as PO_4), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se), Silver (as Ag), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected.

b) At the location **Vizhinjam Branch Canal**,

- Colour was observed 1 Hazen unit
- Odour was agreeable
- pH was observed in the range from 7.06 to 7.78

- Turbidity was observed in the range from 1.6 to 4.8 N.T.U.
- Electrical Conductivity was observed in the range from 165 to 279 µmho/cm
- Total Dissolved Solids were observed in the range from 112 to 160 mg/L
- Dissolved Oxygen was observed in the range from 6.9 to 7.1 mg/L
- Calcium (as Ca) was observed in the range from 8.0 to 13.6 mg/L
- Chloride (as Cl) was observed in the range from 28.0 to 74.4 mg/L
- Iron (as Fe) was observed in the range from 0.75 to 1.10 mg/L
- Magnesium (as Mg) was observed in the range from 2.84 to 4.38 mg/L
- Sulphate (as SO_4) was observed in the range from 2.89 to 9.22 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 20.2 to 37.1 mg/L
- Total Hardness (as $CaCO_3$) was observed in the range from 31.1 to 52.0 mg/L
- Calcium Hardness (as $CaCO_3$) was observed in the range from 19.4 to 34.0 mg/L
- Sodium (as Na) was observed in the range from 8.90 to14.2 mg/L
- Potassium (as K) was observed in the range from 1.18 to 2.50 mg/L
- Sodium Absorption Ratio was observed in the range from 0.533 to 0.856
- Salinity was observed in the range from 0.081 to 0.135 ppt
- Free Ammonia, Zinc (as Zn), Total Phosphate (as PO_4), Nitrate (as NO_3), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Manganese (as Mn), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se), Silver (as Ag), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected

c) At the location **Vellayani Lake**,

- Colour was observed 1 Hazen unit
- Odour was agreeable
- pH was observed in the range from 6.87 to 7.54
- Turbidity was observed in the range from 0.2 to 5.1 N.T.U.
- Electrical Conductivity was observed in the range from 190 to 280 µmho/cm
- Total Dissolved Solids were observed in the range from 95.5 to 172 mg/L
- Dissolved Oxygen was observed in the range from 6.80 to 7.10 mg/L
- Calcium (as Ca) was observed in the range from 8.0 to 10.4 mg/L
- Chloride (as Cl) was observed in the range from 28.5 to 52.0 mg/L
- Iron (as Fe) was observed in the range from BDL to 2.80 mg/L
- Magnesium (as Mg) was observed in the range from 2.44 to 4.43 mg/L
- Sulphate (as SO_4) was observed in the range from 2.43 to 7.50 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 22.8 to 35.0mg/L

- Total Hardness (as $CaCO_3$) was observed in the range from 30.0 to 40.8 mg/L
- Calcium Hardness (as $CaCO_3$) was observed in the range from 19.4 to 25.2 mg/L
- Sodium (as Na) was observed in the range from 8.0 to 28.9 mg/L
- Potassium (as K) was observed in the range from 1.22 to 5.25 mg/L
- Sodium Absorption Ratio was observed in the range from 0.631 to 1.949
- Salinity was observed in the range from 0.094 to 0.134 ppt
- Free Ammonia, Zinc (as Zn), Total Phosphate (as PO_4), Nitrate (as NO_3), Manganese (as Mn), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se), Silver (as Ag), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected

d) At the location **Poovar Estuary**,

- Colour was observed 1 Hazen unit
- Odour was agreeable
- pH was observed in the range from 7.01 to 7.76
- Turbidity was observed in the range from 0.4 to 4.2 N.T.U.
- Electrical Conductivity was observed in the range from 3800 to 5100 µmho/cm
- Total Dissolved Solids were observed in the range from 2090 to 3264 mg/L
- Dissolved Oxygen was observed in the range from 6.8 to 7.10 mg/L
- Free Ammonia was observed in the range from 1.11 to 1.45 mg/L
- Calcium (as Ca) was observed in the range from 48.0 to 73.6 mg/L
- Chloride (as Cl) was observed in the range from 475 to 610 mg/L
- Iron (as Fe) was observed in the range from 0.65 to 1.25 mg/L
- Magnesium (as Mg) was observed in the range from 14.8 to 44.9 mg/L
- Sulphate (as SO_4) was observed in the range from 118 to 170 mg/L
- Total Alkalinity (as $CaCO_3$) was observed in the range from 26.3 to 39.0 mg/L
- Total Hardness (as $CaCO_3$) was observed in the range from 182 to 359 mg/L
- Calcium Hardness (as $CaCO_3$) was observed in the range from 121 to 184 mg/L
- Sodium (as Na) was observed in the range from 170 to 245 mg/L
- Potassium (as K) was observed in the range from 12.6 to 21.80 mg/L
- Sodium Absorption Ratio was observed in the range from 5.129 to 6.316
- Salinity was observed in the range from 2.002 to 2.692 ppt
- Zinc (as Zn), Total Phosphate (as PO_4), Nitrate (as NO_3), Manganese (as Mn), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Mineral Oil,

Phenolic Compounds (as C_6H_5OH), Selenium (as Se), Silver (as Ag), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits

- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected

e) Summary – Comparison of Results of **All Locations**,

- Colour was observed 1 Hazen unit at all locations
- Odour was agreeable at all locations
- Maximum value of pH observed was 8.03 at Poovar West Canal
- Maximum value of Turbidity observed was 5.1 N.T.U. at Poovar West Canal and Vellayani Lake
- Maximum value of Electrical Conductivity observed was 5100 µmho/cm at Poovar Estuary
- Maximum value of Total Dissolved Solids observed was 3264 mg/L at Poovar Estuary
- Maximum value of Dissolved Oxygen observed was 7.2 mg/L at all locations
- Maximum value of Free Ammonia observed was 1.45 mg/L at Poovar Estuary.
- Maximum value of Calcium (as Ca) observed was 73.6 mg/L at Poovar Estuary
- Maximum value of Chloride (as Cl) observed was 610 mg/L at Poovar Estuary
- Maximum value of Iron (as Fe) observed was 2.80 mg/L at Poovar west canal and Vellayani Lake
- Maximum value of Magnesium (as Mg) observed was 44.9 mg/L at Poovar Estuary
- Maximum value of Sulphate (as SO_4) observed was 170 mg/L at Poovar Estuary
- Maximum value of Total Alkalinity (as $CaCO_3$) observed was 46.5 mg/L at Poovar west canal
- Maximum value of Total Hardness (as $CaCO_3$) observed was 359 mg/L at Poovar Estuary
- Maximum value of Calcium Hardness (as $CaCO_3$) observed was 184 mg/L at Poovar Estuary
- Maximum value of Sodium (as Na) observed was 245 mg/L at Poovar Estuary
- Maximum value of Potassium (as K) observed was 21.80 mg/L at Poovar Estuary
- Maximum value of Sodium Absorption Ratio observed was 6.316 at Poovar Estuary
- Maximum value of Salinity observed was 2.692 mg/L at Poovar Estuary

- Zinc (as Zn)Total Phosphate (as PO_4), Nitrate (as NO_3), Manganese (as Mn), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se), Silver (as Ag), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detectable limits at all locations
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected at all locations.

HYR-7	Soil Analysis

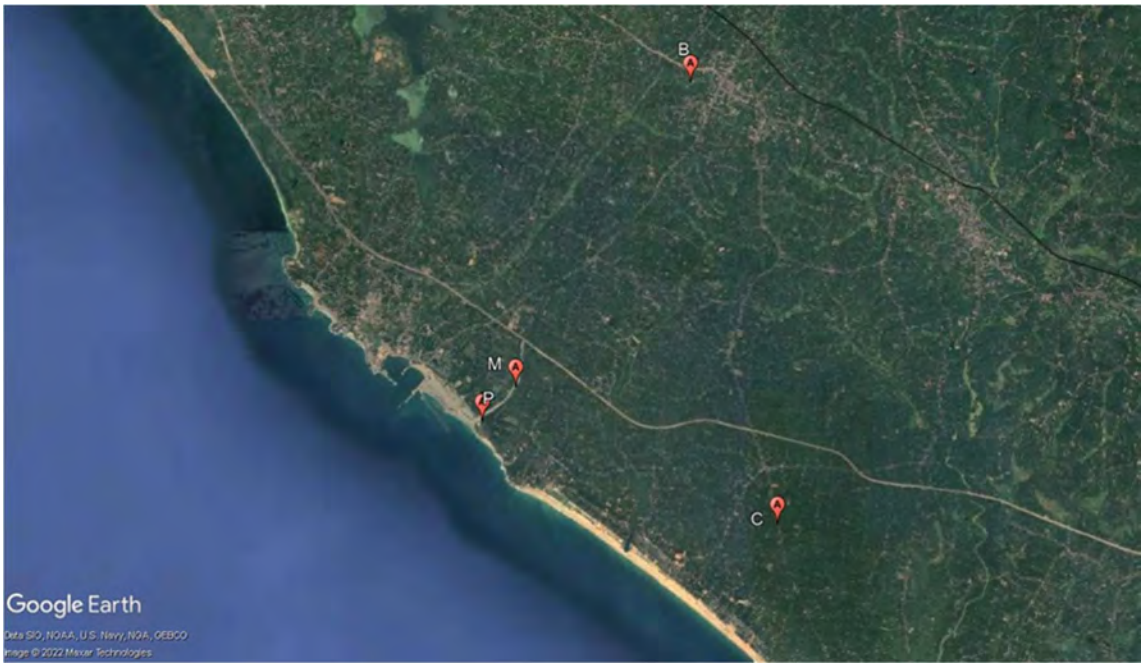
HYR-7.1. Soil Sampling Location Details:

This section describes the location and analysis results of Soil Sampling during January 2025. Soil sampling was carried out at four locations including Port Site, Proposed Port Estate Area, Along road Network (Mulloor) and Along Rail Network (Balarampuram).

Table 7.1: Coordinates of Soil Sampling Location

Location	Legend	Latitude	Longitude
Port Site	P	8°22'03.00"N	77°00'16.92"E
Proposed Port Estate Area	C	8°21'02.16"N	77°03'15.84"E
Along road Network (Mulloor)	M	8°22'23.88"N	77°00'37.08"E
Along Rail Network (Balarampuram)	B	8°25'28.92"N	77°02'23.64"E

Figure 7.1: Google earth views of Soil Sampling Locations



HYR-7.2. Methodology of Soil Sampling and Analysis

Table 7.2: Soil Sampling Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Soil Analysis				
1.	Texture	-	--	SEAAL/CHL/SOP/7.2/21
2.	Particle Size Distribution	%	0.1	SEAAL/CHL/SOP/7.2/21
3.	pH (1:5 Suspension)	-	1	IS 10158: 1982
4.	Electrical Conductivity (1:5 Suspension at 25^{0}C)	µS/cm	1	IS 14767: 2000
5.	Porosity	%	5	SEAAL/CHL/SOP/7.2/15
6.	Total Kjeldhal Nitrogen (as TKN)	mg/kg	50	IS 14684: 1999
7.	Available Phosphorus (as P)	mg/kg	1	SEAAL/CHL/SOP/7.2/12
8.	Available Potassium (as K)	mg/kg	0.5	SEAAL/CHL/SOP/7.2/11
9.	Total Organic Carbon	g/100g	0.1	IS 2720 Part 22:1972
10.	Organic Matter	g/100g	0.1	IS 2720 Part 22:1972
11.	Available Sodium	mg/kg	0.2	SEAAL/CHL/SOP/7.2/11
12.	Lead (as Pb)	mg/kg	5	USEPA 7000B : 2007

HYR-7.3. Soil Analysis Results in the month of January 2025:

Table 7.3: Soil Analysis Results

Date of Sampling	**10-01-2025**

Parameter	Unit	Results			
		Port Site (P)	**Proposed Port Estate Area (C)**	**Along road Network (Mulloor) (M)**	**Along Rail Network (Balarampuram) (B)**
Texture	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Particle Size Distribution - Gravel	%	1.55	1.38	1.25	1.95
Particle Size Distribution - Sand	%	72.80	70.50	69.10	74.80

Parameter	Unit	Results			
		Port Site (P)	Proposed Port Estate Area (C)	Along road Network (Mulloor) (M)	Along Rail Network (Balarampuram) (B)
Particle Size Distribution - Silt	%	21.20	18.40	17.54	20.11
Particle Size Distribution - Clay	%	4.45	9.72	12.11	3.14
pH (1:5 Suspension)	-	8.02	7.15	7.80	6.75
Electrical Conductivity (1:5 Suspension at 25 °C)	µS/cm	487	210	325	410
Porosity	%	28.5	20.1	26.0	32.0
Infiltration (Void Ratio)	-	6.11	5.75	5.65	5.45
Total Kjeldhal Nitrogen (as TKN)	mg/kg	2045	1580	1345	2450
Available Phosphorus (as P)	mg/kg	245	387	241	1052
Available Potassium (as K)	mg/kg	32.5	30.1	24.5	45.2
Total Organic Carbon	%	1.08	2.22	1.36	4.15
Organic Matter	%	0.67	1.45	0.59	1.85
Available Sodium	mg/kg	145	162	168	192
Lead (as Pb)	mg/kg	1.18	1.52	1.95	1.12

BDL: Below Detectable Limit

HYR-7.4. Graphical Representation of Results for Soil Analysis:

Figure 7.2: Soil Analysis for Particle Distribution

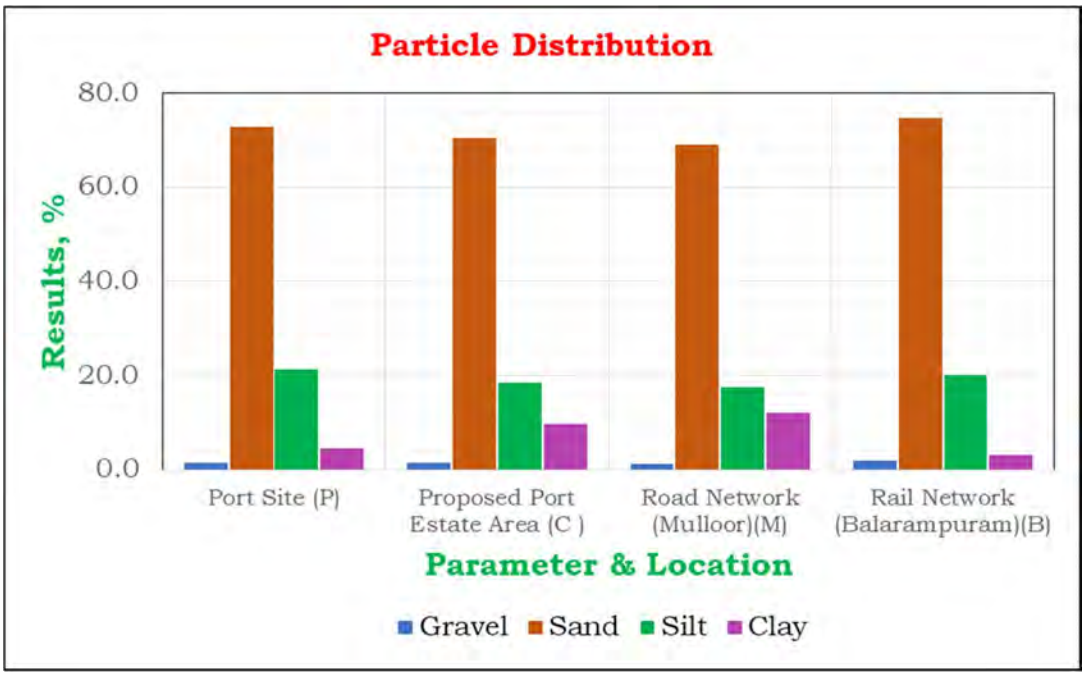


Figure 7.3: Soil Analysis for pH

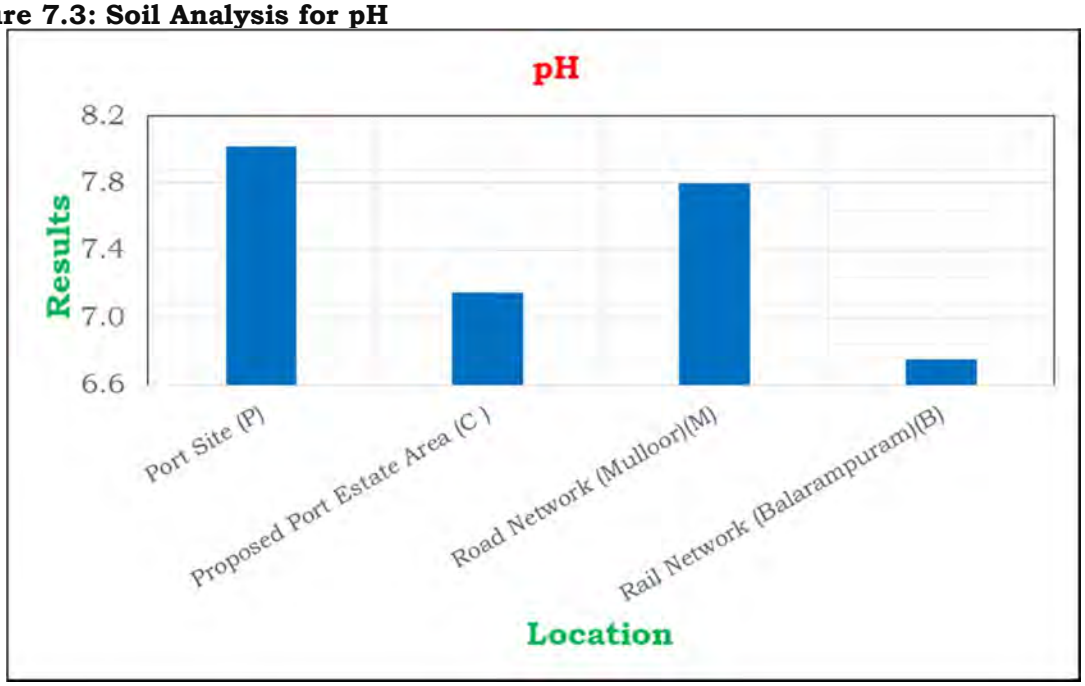


Figure 7.4: Soil Analysis for Electrical Conductivity

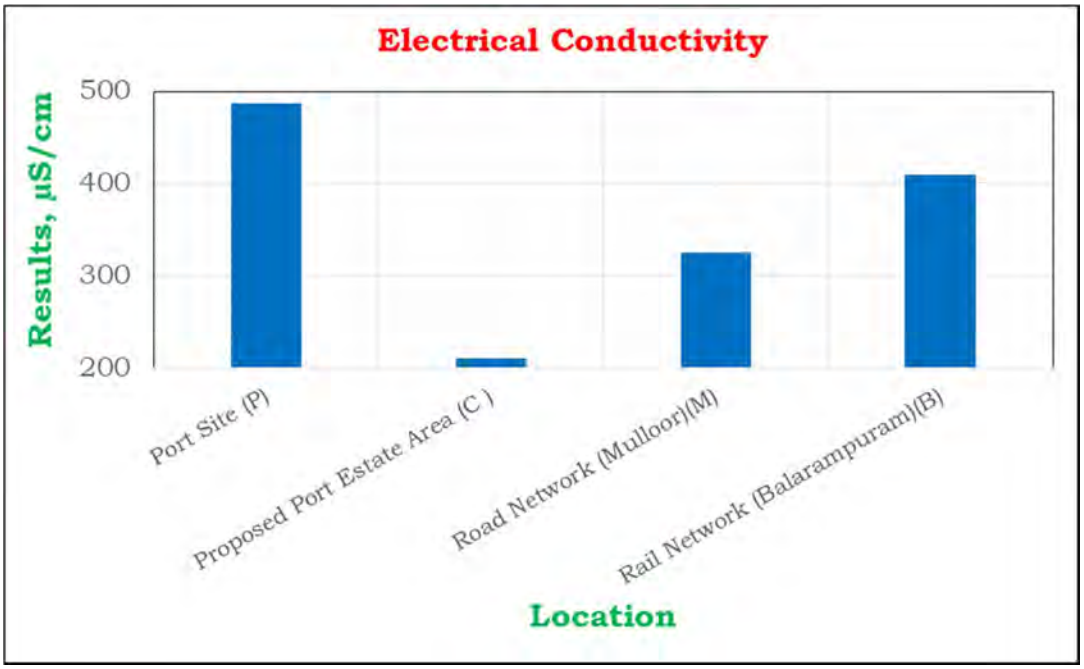


Figure 7.5: Soil Analysis for Porosity

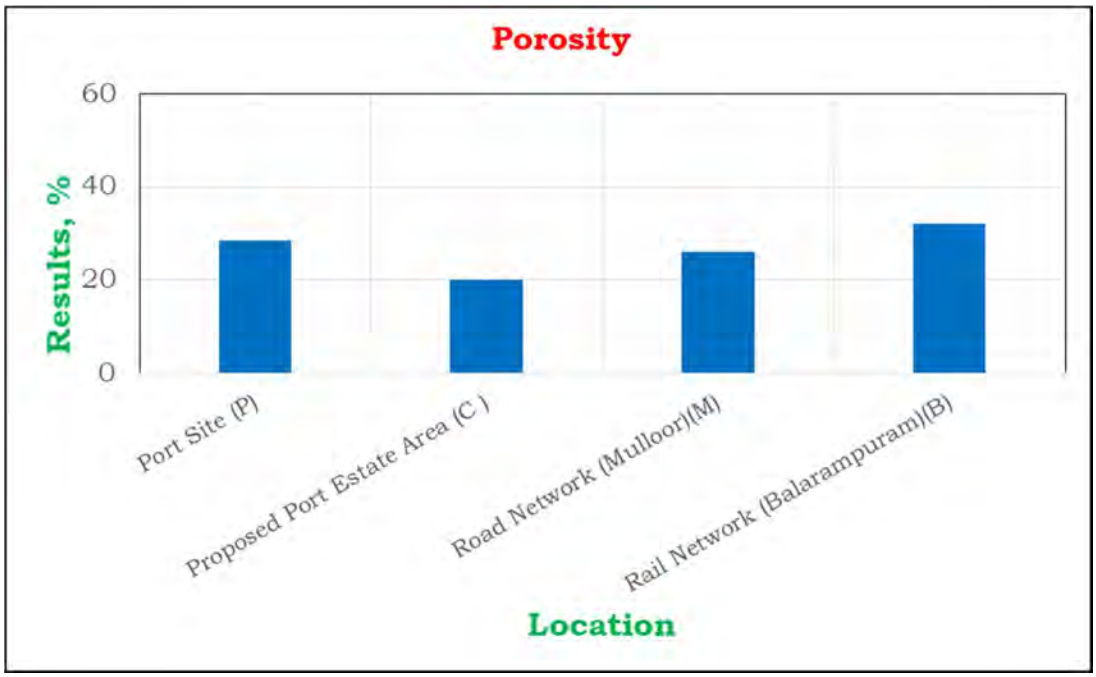


Figure 7.6: Soil Analysis for Infiltration Ratio

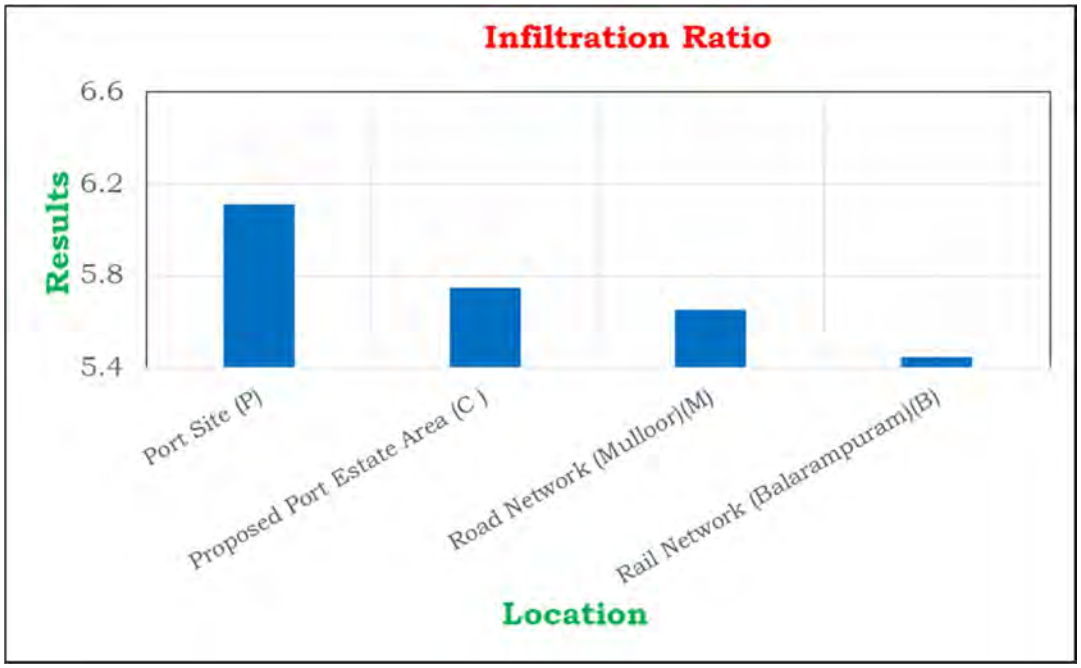


Figure 7.7: Soil Analysis for Total Kjeldhal Nitrogen

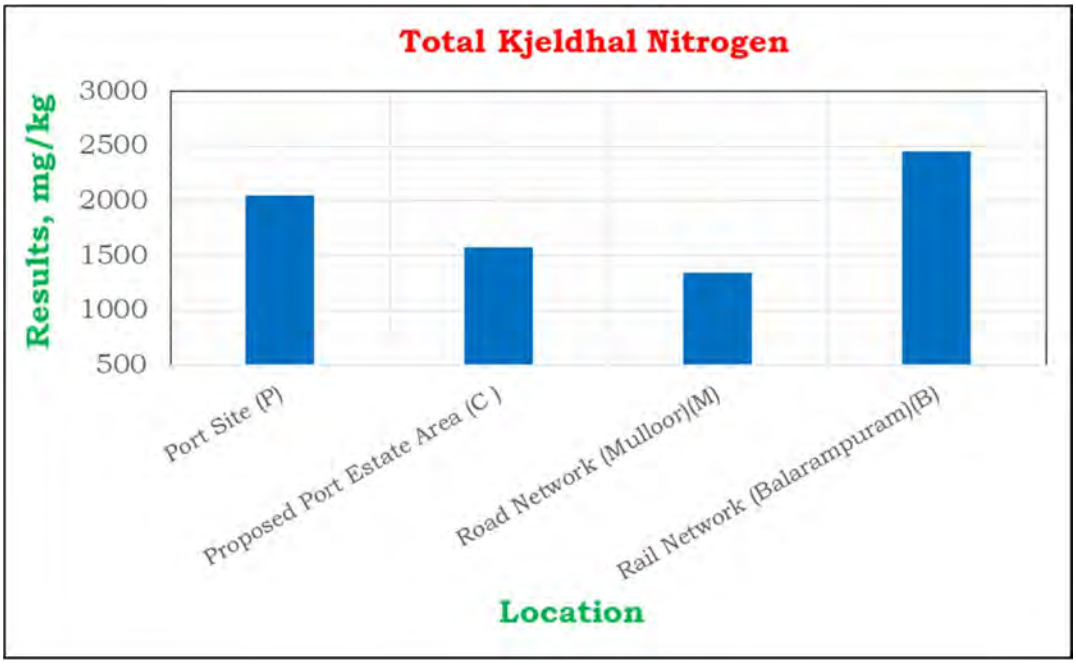


Figure 7.8: Soil Analysis for Available Phosphorous (as P)

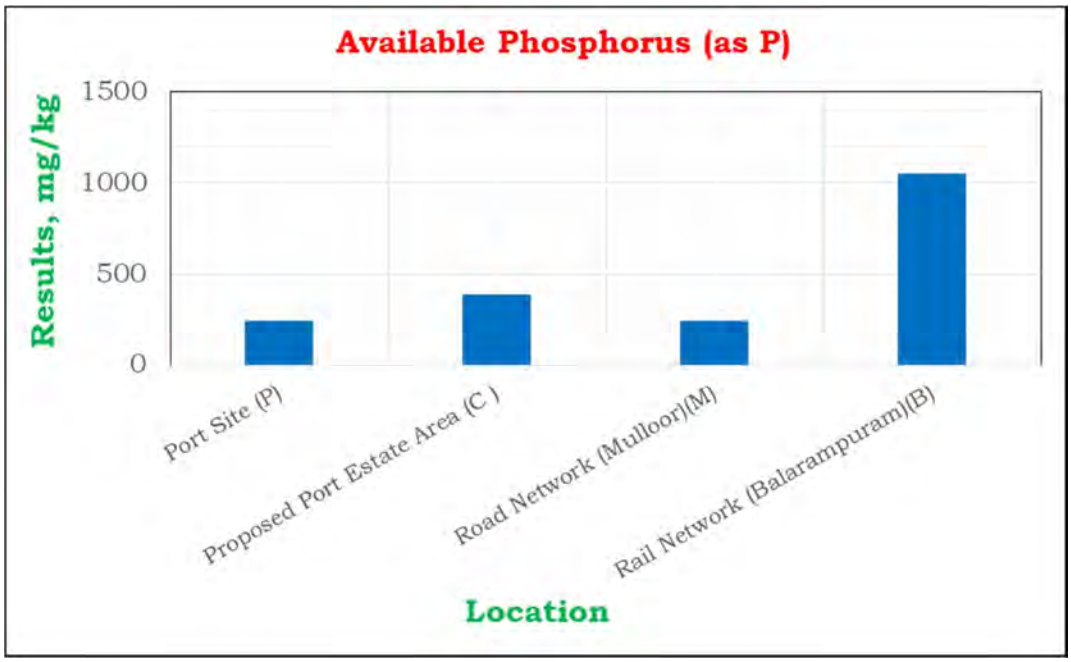


Figure 7.9: Soil Analysis for Available Potassium (as K)

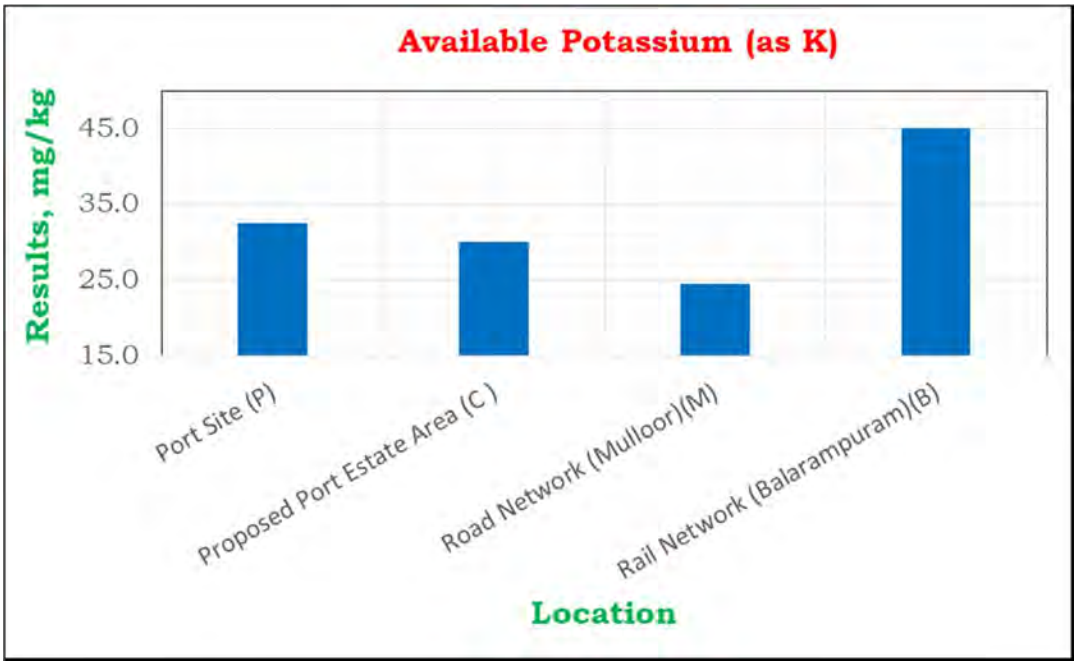


Figure 7.10: Soil Analysis for Total Organic Carbon

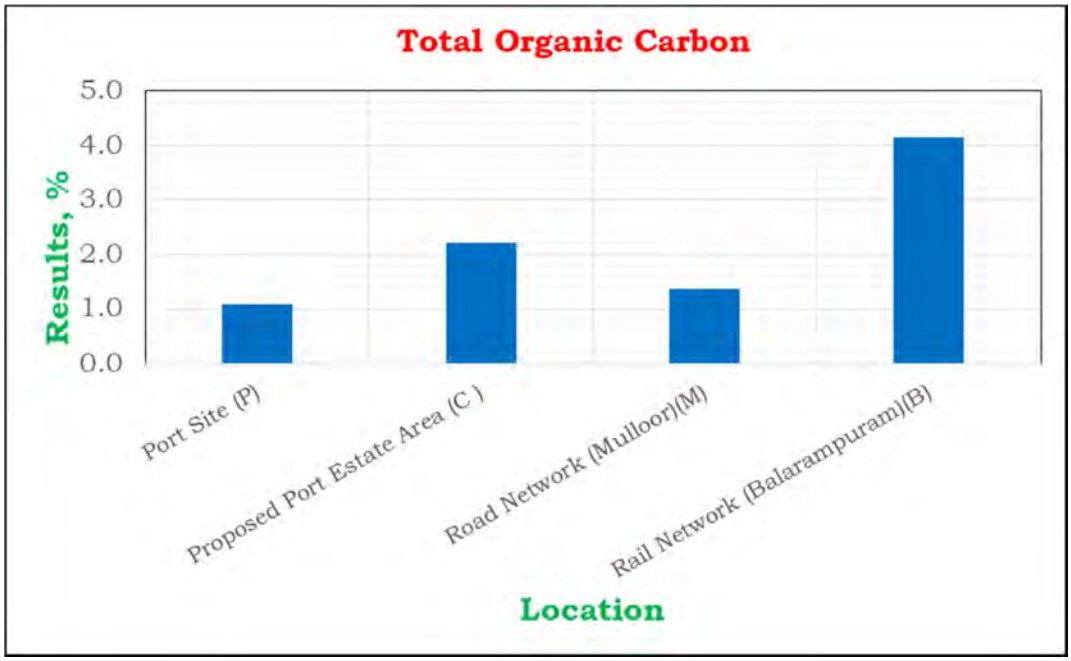


Figure 7.11: Soil Analysis for Organic Matter

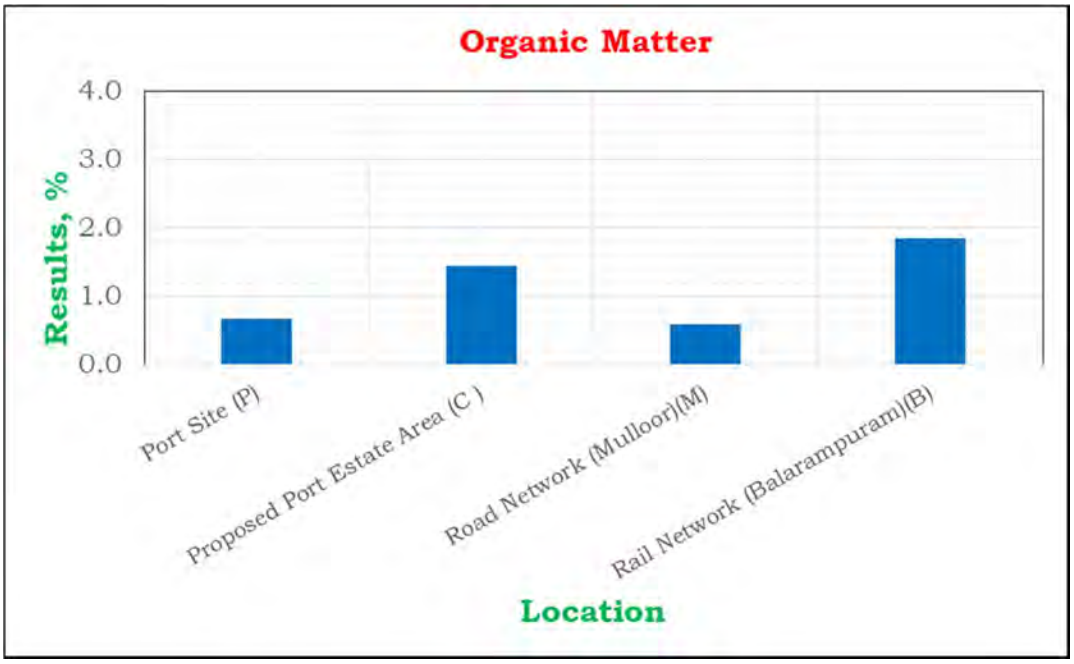


Figure 7.12: Soil Analysis for Available Sodium

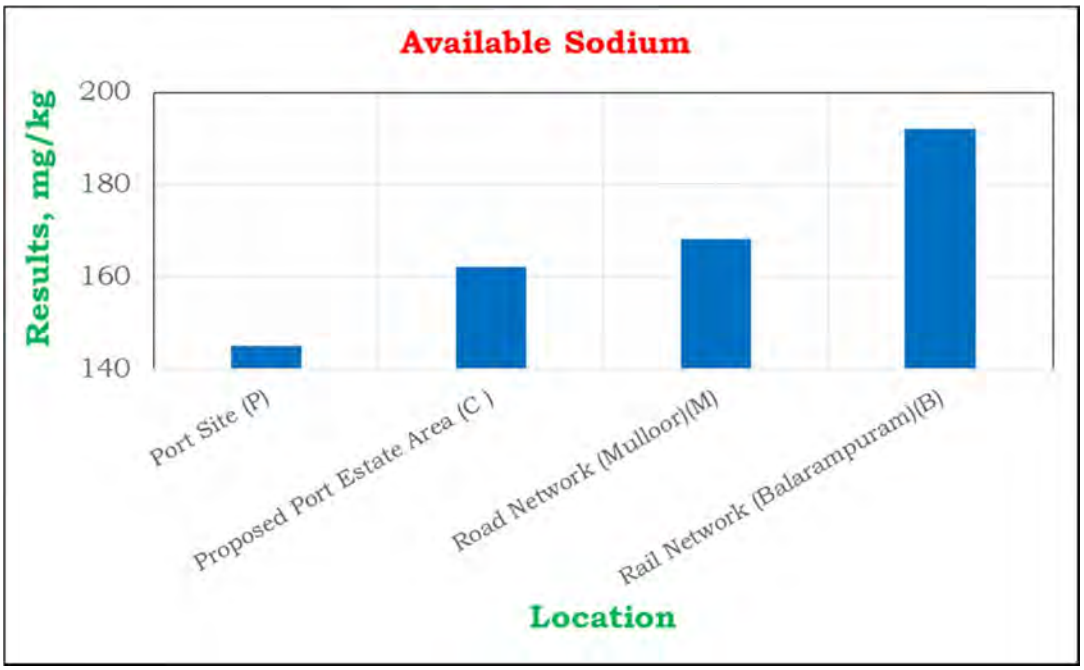
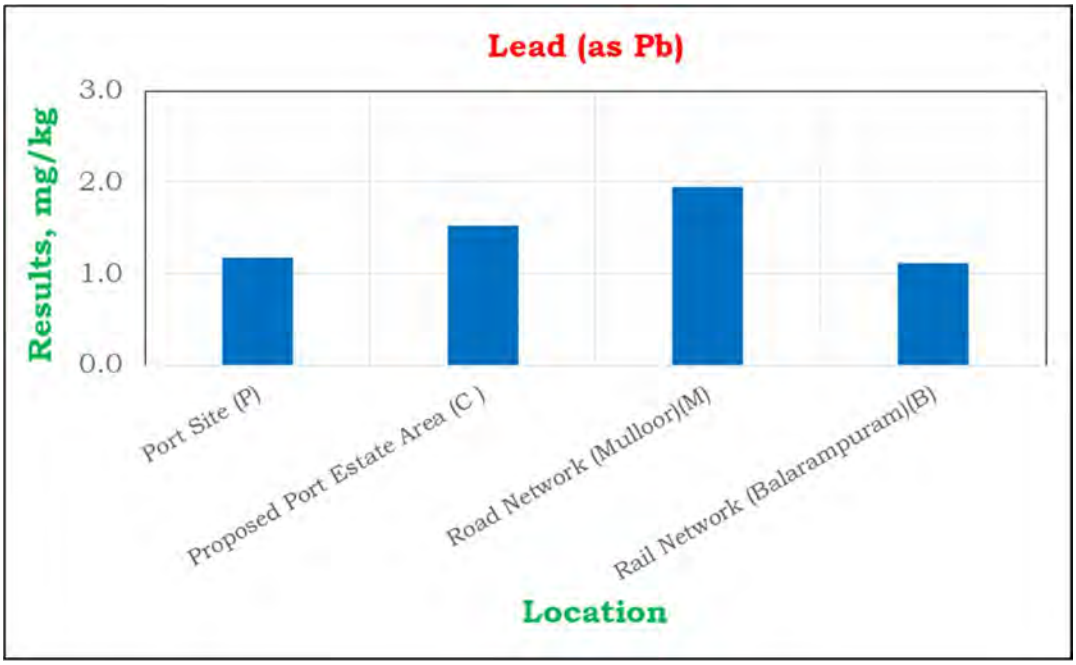


Figure 7.13: Soil Analysis for Lead (as Pb)



HYR-7.5. Summary of Soil Analysis:

- Texture was sandy loam at all locations
- Maximum value of Particle Size Distribution - Gravel observed was 1.95% at Along Rail Network (Balarampuram)
- Maximum value of Particle Size Distribution - Sand observed was 74.8% at Along Rail Network (Balarampuram)
- Maximum value of Particle Size Distribution - Silt observed was 21.2% at Port site
- Maximum value of Particle Size Distribution - Clay observed was 12.11% at Along Road Network (Mulloor)
- Maximum value of pH (1:5 Suspension) observed was 8.02 at Port Site
- Maximum value of Electrical Conductivity (1:5 Suspension at 25 °C) observed was 487 µS/cm at Port Site
- Maximum value of Porosity observed was 32.0% at Along Rail Network (Balarampuram)
- Maximum value of Infiltration (Void Ratio) observed was 6.11 at Port site
- Maximum value of Total Kjeldhal Nitrogen (as TKN) observed was 2450 mg/kg at Along Rail Network (Balarampuram)
- Maximum value of Available Phosphorus (as P) observed was 1052 mg/kg at Along Rail Network (Balarampuram)
- Maximum value of Available Potassium (as K) observed was 45.2 mg/kg at Along Rail Network (Balarampuram)
- Maximum value of Total Organic Carbon observed was 4.15 % at Along Rail Network (Balarampuram)
- Maximum value of Organic Matter observed was 1.85 % at Along Rail Network (Balarampuram)
- Maximum value of Available Sodium observed was 192 mg/kg at Along Rail Network (Balarampuram)
- Maximum value of Lead (as Pb) observed was 1.95 mg/kg at Along Rail Network (Mulloor)

End of Report

Annexure IV

CSR Activities by AVPPL

(October 2024 to March 2025)

CSR REPORT VIZHINJAM

(OCTOBER 2024 – MARCH 2025)

Adani Vizhinjam Port Pvt. Ltd, 2nd Floor.
01, Port Operation Building, Mulloor Road, Mulloor,
Trivandrum-695521

CSR REPORT VIZHINJAM

(FOR THE PERIOD FROM OCTOBER 2024 TO MARCH 2025)

Adani Foundation, the CSR arm of Adani Group has been implementing the CSR activities of Adani Vizhinjam Port Pvt. Ltd since 2016 at Vizhinjam. Every month, Adani Foundation touches more than ten thousand people through its various CSR activities. In continuation to that, Adani Foundation has done many activities in the following heads during the reporting period (October 2024 to March 2025).

1. Community Health
2. Sustainable Livelihood Development
3. Community Infrastructure Development
4. Others

1. Community Health

Cancer Care Support - providing nutritious Food supplements & Medicines to poor cancer patients.

Cancer care support is a flagship program as part of the CSR of AVPPL/AF. A total of 180 patients were provided with nutritious food support during the months of October 2024 to March 2025. The nutritious food kit includes 1 kg of oats, 1 kg of Milk powder and 0.5 kg of protein powder like ensure. This is in addition to regular house visits to the families of suffering patients for consolation and to provide further mental strength.

Sl No	Month	No of Patients provided Food
1	October	30
2	November	30
3	December	30
4	January	30
5	February	30
6	March	30
Total		**180**

Special Medical Camps

Specialized medical camps are one of the major activities as part of the health-related CSR activities. This will provide specialized treatment facilities at their doorsteps. AVPPL/AF is conducting medical camps in association with Govt. Medical college, Social Security Mission, Govt. Ayurveda hospital and Regional Cancer Centre Trivandrum. During the reporting year 3 types of specialized medical camps were conducted as follows

1. Cancer Detection Camps
2. Lifestyle disease detection camps
3. Ayurveda Medical Camps

All the medical camps were coordinated at the filed level with the support and in association with grassroots organizations like clubs, residence associations, Gram panchayats, religious institutions and Kudumbhasree units. Community mobilization, Venue arrangements, food & refreshments for the medical team, inauguration, sessions on various ailments and branding of the programme are done with the support of these Organizations. The details of the special medical camps are as follows.

Cancer Detection Camps

The cancer detection camps are being conducted with the support of the Regional Cancer Centre, one of the leading cancer institutions in Asia. During the reporting period 4 such camps were conducted in the project area as follows:

Sl NO	Date	Venu	No of Participants	Referrals
1	21.10.2024	NSS karayogam,Panagoude	66	14
2	11.12.2024	Lions Club,Mullor	76	7
3	29.01.2025	Jai Christ Library	91	10

4	19.02.2025	Family Health Centre Mukkola	105	23
Total			**338**	**54**

A total of 338 people were screened in the camp in which 54 people are referred to the community oncology department in the Regional Cancer Centre. The community volunteers at the filed level coordinated by the CSR team will follow up with the referred people

Cancer prevention mass awareness campaign

In addition to the detection camps a mass cancer prevention awareness campaign was organized by the Adani Foundation in collaboration with the Thiruvananthapuram Regional Cancer Centre and the Mukkola Family Health Centre during the reporting period. This was along with the year-long cancer prevention campaign innocence by the Govt. of Kerala, running from February 4 to March 8, 2025, aims to improve women's health by encouraging all women above the age of 30 to undergo breast and cervical cancer screenings.

As part of this initiative, cancer awareness sessions were conducted in various parts of Vizhinjam followed by a Cancer detection camp at Family Health Centre, Vizhinjam, Mukkola in association with FHC Mukkola and Regional Cancer Centre, Trivandrum.

House Visit-Patient care support programme/Benevolent support programme

As part of the patient care support programme, community volunteers along with CSR team have been visiting the houses of bedridden patients for treatment support. During the period the community volunteers visited 94 houses and provided support as follows

Sl No	Month	No. of House Visits
1	October	18
2	November	18
3	December	13
4	January	15
5	February	15
6	March	15
Total House visits		**94**

Lifestyle Disease detection Camps

As part of the community Health initiative, a lifestyle diseases Camps was organized in association with Kerala Social Security Mission during the period as follows

SL No	Venu	Date	Participants
1	Lions Club, Mulloor	11.12.2024	76

A total of 76 people were screened, of these 11 cases referred to nearby PHC & District hospitals for further checkups

As of now AVPPL/AF conducted a total of 20 lifestyle disease detection camps in association with Social Security Mission, Govt. of Kerala. The screening details are as follows.

Sl. No	Type of Tests	Tested	Total Screened		
			Male	Female	Total
1	Blood Pressure	Tested	556	1117	1673
		referred	48	45	93
2	Blood Sugar	Tested	556	1117	1673
		referred	48	57	105
3	Total Cholesterol	Tested	556	1117	1673
		referred	114	146	260
4	Blood Count	Tested	556	1117	1673
		referred	18	26	44
5	Urine Sugar	Tested	556	1117	1673
		referred	16	17	33
6	Urine Albumin	Tested	556	1117	1673
		referred	17	16	33
7	Creatine	Tested	556	1117	1673
		referred	11	6	17
8	Urea	Tested	556	1117	1673
		referred	4	3	7
59	Uric Acid	Tested	556	1117	1673
		referred	3	2	5
10	ECG	Tested	556	1117	1673
		referred	2	2	4
116	Bilirubin	Tested	556	1117	1673
		referred	10	6	16
12	HB	Tested	556	1117	1673
		referred	80	105	185
Total		**Tested**	556	1117	1673
		referred	**371**	**431**	**802**

Ayurveda Medical Camp

During the reporting period, one Ayurveda Medical camp was conducted as part of the CSR activities in association with Govt. Ayurveda Hospital, Kovalam.

SL No	Venu	Date	Participar
1	Janamythri Police Station,Vizhinjam	23.11.2024	113

Out of the 113 people screened for Ayurveda Camp, the samples of 14 people were sent for TB testing.

Community Awareness Campaign – (Citizen led behavior change communication)

Community awareness sessions are an ongoing programme as part of the CSR activities in the areas of health, sanitation, education and other developmental issues. It is important for all members of community to have awareness on personal cleanliness, cleanliness of the surroundings and ensure proper community monitoring for its effectiveness. Community Volunteers platform, promoted under the CSR of AVPPL/AF- is coordinating the Awareness sessions in the community. The Community awareness programme as part of the CSR activities includes the following major items

A. Monthly dissemination of the Port Project Progress to the community
B. Training follow-up and monitoring kitchen garden as new norms for internal subsistence and sustainability. (Monthly Agro clinic training by trained community Volunteers)

C. Promotion of **Swachhagrahi-Kutumb** including good practices in SWM, green and clean campaigns. This needs education on better handling of waste, making clusters to practice proper segregation and disposal of waste. Further includes organizing campaigns, and sessions on cleanliness, ocean cleaning, sanitation, lake cleaning, etc as per CSR mandate

The following activities are conducted as part of the community awareness campaign during the period

32 community volunteers took 1680 sessions in the community during the period in which 28970 community people participated.




Convergence of Govt. Schemes

The community volunteers at the field level are providing information regarding various Govt. Schemes. Almost all the CSR activities and programmes are converging with various govt. Grant-in-aids schemes as far as possible. In addition to that information regarding various schemes have been shared through the

WhatsApp groups named "Phoenix – for Widows and divorced" and 'Shalabhangal-Butterflies for children under 18yrs old. Job recruitments at Central & state Govt. Departments, Public sector institutions, corporate companies and community level announcements of various institutions/departments are sharing through the platform. More than 160 pieces of information were provided during the year.

Ayushman Bharath Pradhan Mantri Jan Arogya yojana (PMJAY) Registration Campaign

A registration campaign for the Ayushman Bharath Pradhan Mantri Jan Arogya yojana (PMJAY) was successfully conducted at various Sites .43 senior citizens were registered under the scheme. The Ayushman Bharat Yojana offers cashless healthcare benefits of up to Rs. 5 lakh per eligible family per year. The benefits can be availed at empaneled hospitals and healthcare providers across the country, ensuring access to quality healthcare for the beneficiaries.

Sl No	Date	Venu	No of Benefited Person
1	10.11.2024	CSR Office	12
2	18.12.2024	Venganoor	9
3	29.01.2024	Jai Christ Library Adimalathura	8
4	08.02.2024	Vadukkum Bhagam Jamayath	14
Total			**43**

Safe to Eat Vegetables for All Homes (SEVAH) – 1760 homestead vegetable garden.

The Kitchen Garden programme, Safe to Eat Vegetables for All Homes (SEVA), reached 1760 homes this year with the addition of another 500 member families. The kitchen garden programme is intended to cultivate pesticide free organic homely needs of vegetables at the space available to a minimum 600 Sqft within each homestead. This has made its footprint spread across all corporation wards of Vizhinjam and selected areas of Venganoor and Kottukal Panchayaths.

Kitchen garden item wise yield obtained across homes for year - 2024-25

Sl. no	Items	Items (%)
1	Bhindi	15
2	Brinjal	10
3	Yard long beans	11
4	Coccinea	5
5	Bitter Guard	12
6	Cabbage	18
7	Cauliflower	14
8	Tomato	13
9	Spinach and other leafy veggies	2
Total		**100**

Details of the programme in Sequential order

- Survey of proposed beneficiaries
- Training in the technique of planting grow bags is done as training for trainers (kitchen garden Coordinators).
- field level training for all beneficiaries given in 500 homes.
- Consolidation of field level requirement.
- Meeting of coordinators of prior field assessment and logistics for kit and plants.
- Review to access post planting scenario at CSR office level. Fig: meeting, and Training.
- Harvesting -the yield.
- Start of next Cycle.

Programme inauguration was done by panchayath president of Venganoor Mr. Sreekumar on 19 th July 2024, in presence of group members, kitchen garden coordinator and officials of Adani foundation.

Recognitions for SEVA programme 2024-25

National Attention for: for SEVAH- Kitchen Garden -programme is at Adani Foundation web site.

Titled *"Through SEVAH Kitchen Gardens, the Adani Foundation is Cultivating Good Health & Prosperity".*

Adani Foundation has published the SEVAH (Safe to eat Vegetables for All Homes on 30/10/2024) Kitchen Garden programme -model in its web site sequencing the chronology of achievements, the process to sustainability and benefits to savings, health and for environment. Kitchen garden production in peak stage with average production comes to 35 kg /household with average savings of 2300/family for the year 2024-25.

SEVAH -Kitchen Garden through -social media. *Hamare badalthe kirdar – Cultivating prosperity through SEVAH Kitchen Garden*

SEVAH kitchen Garden program is enabling women (mostly belonging to fisherfolk communities) to cultivate and consume pesticide free fruits and vegetables in their own households. This initiative has brought about an impressive transformation in the lives of more than 1760 families, significantly improving their health and overall wellbeing

Farm School 1.0 @ Mukkola

The Farm school activities are progressing commendably during the

reporting period. The Farm School serves as a community school for agricultural learning. It is set in a majestic landscape with a bamboo house as training house and a lawn set in the shape of a leaf, symbolizing the solar energy receptor and plant food factory, thus ultimately the factory feeding humanity, and key oxygen producing organ for mother earth. Farm school has the functional specification of Horticultural Garden and honey production unit, Crop Museum (to house possible Crop Introduction for Vizhinjam), Vegetable and nutrition Garden, Vegetable nursery, Hi tech banana Farming. The activities at Farm School during the period are as follows.

Consolidated yield of Farm School during the year (April 2024-March 2025)

Sl. No	Item	Qty (Kg)
1	Yard long beans	360.30
2	Cluster beans	156.75
3	Cucumber	519.00
4	Salad cucumber	575.50
5	Bhindi	496.25
6	Tomato	235.5
7	Brinjal Long	202.25
8	Bitter gourd	123.00
9	Sword beans	19.00
10	Colocasia	101.00
11	Chilli	254.50
12	Snake gourd	241.25
13	Brinjal round	142.50
14	Papaya	44.75
15	Sapota	112.50
16	Spinach	RS. 2110
17	Culinary Banana	135.00
18	Rasakadali	172.50
19	Palayankodan	42.00
20	Nentran banana	2777.50
21	Tapioca	264.00
22	Rose apple	8.00
23	Punkadali banana	7.00
24	Pumkin	20.5
25	Rambuttan	2.25
26	Guava	0.750
27	Capsicum	42.00
28	Ginger	53.00

29	Lemon	15.00
30	Drumstick	28.00
31	Mango - raw	15.00
32	Green Amaranthus	18.00
33	G7 Banana	25.00
34	Coconut dehusked	54.00
35	Corriander	10.00
36	Curry leaf	15.00
37	Ash guard	124.00
38	Elephant foot yam	41.00
39	Kaveri banana	10.50
40	Morris banana	102.00
41	Winged bean	3.95
42	Ridge gourd	7.25
43	Ivy gourd	10.75
44	Cauliflower	55.5
45	Cabbage	52.00
46	Annaan banana	15.00
Total		**7710.50**

Model Miyawaki Forest

The Miyawaki method adopted in farm school Mukkola isn't just unique because it restores native habitats using native medicinal trees; the afforestation principles are based on an understanding of how these species would interact in a natural forest. The original idea by planting a diverse mixture of medicinal trees close together to maximize density and create balance. Nature doesn't thrive in grids of 1.5m; seeds drop from trees randomly to stimulate growth, or fallen trees open clearings to the sun. As the closely planted saplings must compete for light, which only shines on them from above, they shoot upwards very fast instead of sideways. The denseness of growth provides a greater amount of forage at present for pollinators and refuge for birds. More canopies cover shades out weeds and creates a cool home for insects, plus the increased leaf litter builds fertility and life in the soil. Also, if you have a variety of tree species, you have others to step in if one succumbs to disease.

Miyawaki medicinal cum fruit -forest recorded maximum growth of 10 ft at the central core area for tree Njaval /jamun tree

Reference year	Outer circle height	Second circle	Third circle	Mid circle
2025-Jan	7 ft	17 ft	20 ft	23 ft
2024 - March	5 ft	12 ft	15 ft	18 ft
2023-March	2 ft	7 ft	10 ft	12 ft

Visitors to Farm School

Vellanad Block panchayath members and old age home. 38 members from old age home visited the farm school on 18.3.2025.

Official Visitors Farm school.

In connection with ESG -Audit, the audit team visited the Farm school on 24th February 2025. They visited sites of composting yards, farming areas and Miyawaki forest

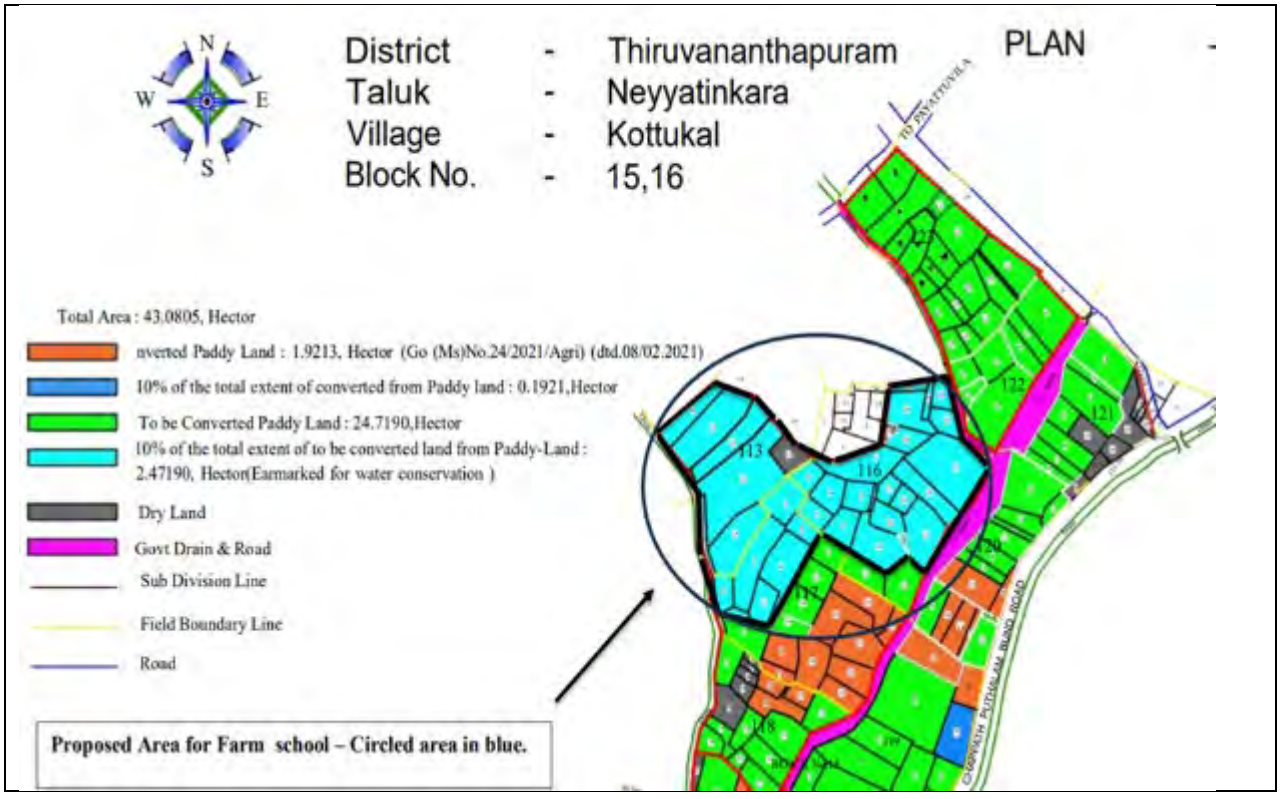
Video shooting as Instructed by HO.

As instructed by HO, a shooting was arranged at farm school, and kitchen garden sites to prepare a 4-minute film on Kitchen Garden highlights and achievements till date.

Farm school- extension works

Farm school 2.0

As the initiative of Adani foundation, land development work of the new farm school is in process. The selected terrain was low lying land with water table at 2-3 ft depth. The apportioned 6 acres of land, kept for the purpose of water conservation as per Environment clearance guidelines. The land waterlogged drains are made in fields and connected to the main canal. The designated area entitled for water conservation has the following Survey no's 116, and 113. The sketch is as attached below.



Horticulture Land scaping at port

The Horticulture Landscaping at the port site is maintained by Vanitha Karsheeka Karma Sena, one of the livelihood groups formed as part of the CSR activities.

Landscaping maintenance at Port - Phase1

Horticulture maintenance and management of phase -1 area by Vanitha Karshika Karmasena are as follows.

- Completed chemical fertilizer application at median from 400 point to Zero point.
- Weed removal of extended areas of slope to road was also completed using brush cutter.
- Completed the lawn grass cutting, pruning and fertilizer application in median and slope.
- Weeding along the median completed for fringes and machine weeding done along the slopes.
- Maintenance at zero point and median from Poovar road end.
- In connection with arrival of first cargo ship -San Fernando, all landscaped areas were further beautified by Vanitha Karshika karma Sena.

Maintenance of Landscaping at Port Fuel Station

Fuel Station maintenance is in progress, the activities include.

- Applied fertilizers and manures for all plants as plants show poor nutrition intake.

- Chemical nutrients applied to jasmine plants slow growth.
- Fertilizer application is done on all plants as top dressing.
- Tanker irrigation progresses daily to the maximum of 2500 KL/day.
- The horticulture landscaping at fuel station, Vizhinjam port recorded good growth on all flowering Annuals and perennials, soon after the application of the fertilizers during the period.
- The theme flower garden recorded a maximum growth after the application of fertilizer 18: 18: 18.
- An average of 2 labors were engaged for the watering works inside the fuel station for

Landscaping maintenance at Port Security Building.

The interior horticulture arrangement including the pots at the security building assigned to Vanitha Karshika Karma Sena

progressing during the period. This includes repotting and placing new plants at vertical Garden, Inside arrangement with Anthurium plants with variety flowers. Rearranging with China doll, at point of entry and staircase. Tabletop arrangement with Cacti and lucky bamboo. The vertical Garden pattern was periodically changed, and plants are thinned for a better view. Maintenance including replacing the potted plants (indoors) done inside the security building.

POB-Building

Indoor plant arrangement done at POB at corridors of 3 floors, staircase and CEO cabin during the period

Landscaping -2nd phase work initiated inside POB -5 terminalia mentalis. Maintenance of plants include plant exposure to sun, watering and removing dead leaves.

Green belt -work.

Planting completed for all plants except bamboo, a total number of 850 trees planted during the year.

Fruit orchard – site at GIS premises and Substation premises

- Total weeding using Brush -cutter completed for 10 cents of orchard.
- Weeding completed in Substation Zone inside port premises.
- Chemical fertilizer applied to all land scaped Area of phase 1 Zone.
- Thinning completed for bougainvillea slope.

1.2 Sustainable Livelihood

"Coaching for Victory" – Competitive Exam Coaching Programme

Offline Training Classes

ASDC Vizhinjam centre started offline training sessions for the Competitive Exam Preparation candidates based on the notifications declared by the Central/State Government job openings under different departments. As of now the offline sessions are going on at Sahridayananda Library Hall, Uchakkada, Mulloor since June 2023. Subject wise classes for syllabus-based examinations focus on regular daily mock tests. In FY 2024-25, we achieved 88 admissions and completed the registration procedures on ERP. Intensive syllabus-based training is provided for the candidates by the experts.

Learning Activities

In addition to the offline classes, other learning methods have been progressing simultaneously as follows.

- Study materials like Rank file pages, easy study methods from You Tube and voice clips related to the daily test topics links have been shared to groups on a regular basis.
- Different vacancy announcements from Central and State government have also been circulating through digital media.
- Daily mock test for a score of 30 has been conducted on a regular basis.
- After the successful completion of every day mock test the top scorers will be announced by the coordinator in the group.
- From this year onwards, a 100 marks mock test purely based on the previous question papers is conducted on regular weekends and the results will be announced through the groups.

As of now we are providing training sessions on the following topics,

i. General English.
ii. Mathematics.
iii. Indian Constitution.
iv. Malayalam.
v. General Knowledge.
vi. History.

Notifications from the Government agencies were circulated on a weekly basis through social media groups.

Achievements:

- ✓ 100% of the candidates are applying and attending Central/State Govt. examinations.
- ✓ In total 18 candidates are included in 59 various 10th/+2/Degree Level Shortlists/ Ranklists published by Kerala Public Service Commission.
- ✓ 10 candidates joined different departments under Government of Kerala in various districts.

SKILL DEVELOPMENT PROGRAMME

- In this FY 2024-25, we are continuing eight different domain courses for the community youths in and around Vizhinjam area. The registration process for the courses started in the month of April 2024. All the batches will start only after successfully conducting the Induction Programme.

✓ The number of trainees in different domains admitted for training in FY 2024-25 are as follows,

Sl. No.	Course Name	Eligibility	Duration	Certification	Venue of Classes	Participants
1	ITV Truck Operator	10th	200 hrs	ASDC & ASAP	Community Skill Park, Vizhinjam	60
2	Lasher	10th	190 hrs	ASDC & ASAP	Community Skill Park, Vizhinjam	13
3	Advanced Nursing Assistant – ANA	10th	420 hrs	ASDC & ASAP	Community Skill Park, Vizhinjam	65
4	Data Entry with Office Automation - DEOA	10th	400 hrs	ASDC & ASAP	Community Skill Park, Vizhinjam	33
5	Beauty Therapist - BT	10th	340 hrs	ASDC & ASAP	CSR Office Building, Mukkola	7
6	Hair Stylist - HS	10th	340 hrs	ASDC & ASAP	CSR Office Building, Mukkola	7
7	Self Employed Tailor – SET	10th	340 hrs	ASDC & ASAP	VizMart Building, Vizhinjam	43
8	Advance Technologies (Project)	Engg. (Ongoing)	150 hrs	ASDC	Community Skill Park, Vizhinjam	28

ITV Truck Operator

For enhancing the driving skills, ASDC Vizhinjam centre started a new course for the localities who are passionate in Heavy Motor Vehicle driving. The course was developed with the support of Operations and Safety teams. As this is exclusive for Vizhinjam port, we added Overview of Vizhinjam Port, Security Norms at site, Defensive driving, Communication Techniques at site, Soft Skills as well as digital technologies.

Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical	Non-Domain
						Language & Soft Skills
1	ITV Truck Operator	200 hrs	Classroom & Practical	50 hrs	100 hrs	50 hrs

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	ITV Truck Operator	Batch-2	28-10-2024	29-11-2024	19	Completed and placed at Vizhinjam port
2	ITV Truck Operator	Batch-3	20-01-2025	28-02-2025	25	Completed and placed at Vizhinjam port

Advance Technologies - Projects on Advanced Electronics, AI, IoT & Robotics

ASDC Vizhinjam centre took the initiative to start a training program on facilitating project works for the ongoing final year engineering students in Advanced Electronics, Artificial Intelligence, Internet of Things and Robotics. As part of

mobilization, Mr. Anilkumar B S, Trainer-IoT, visited several colleges near to Vizhinjam and briefed about the program in detail. 7 Engineering Colleges showed interest in deploying their students for doing the academic projects at ASDC Vizhinjam centre. As of now, weekly 2 days, Friday & Saturday, the students from all the colleges will come and attend the program. An induction was given to the students and the registration process is going on.


Industrial Exposure Visit – Vizhinjam Port

As a new initiative Adani Skill Development Centre Vizhinjam started a program on facilitating project works in Advanced Electronics, AI, IoT & Robotics for the Engineering ongoing students. Students from different Engineering Colleges showed interest in the same and we selected 28 students as 7 batches. These 7 batch students selected various activities at port as their final year project and with the guidance of Mr. Anilkumar B S, they started doing.


General Duty Assistant (GDA)

Focusing on the healthcare sector, ASDC Vizhinjam centre conducted General Duty Assistant course at Transit Campus, Mukkola

Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical + OJT	Non-Domain
						Language & Soft Skills
1	General Duty Assistant	420 hrs	Classroom & Practical	100 hrs	280 hrs	40 hrs

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	General Duty Assistant	Batch-1	13-05-2024	15-11-2024	22	Completed
2	General Duty Assistant	Batch-2	13-05-2024	15-11-2024	22	Completed




Advanced Nursing Assistant (ANA)

As part of the upgradation of the course, ASDC Vizhinjam centre started the updated version of General Duty Assistant course as Advanced Nursing Assistant (ANA), which has a total duration of 900 hrs including mandatory practical & OJT sessions. Ms. Sheeja M, Trainer-GDA, is handling the sessions.

Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical + OJT	Non-Domain
						Language & Soft Skills
1	Advanced Nursing Assistant	900 hrs	Classroom & Practical	250 hrs	330 hrs + 270 hrs	50 hrs

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	Advanced Nursing Assistant	Batch-1	02-12-2024	02-05-2025	12	Ongoing

2	Advanced Nursing Assistant	Batch-2	02-12-2024	02-05-2025	13	Ongoing

Data Entry with Office Automation (DEOA)

As part of course upgradation, ASDC Vizhinjam centre added more Artificial Contents to the existing Domestic Data Entry Operator course and renamed as Data Entry with Office Automation. Ms. Neethu V Nath, Trainer-DDEO is handling the sessions which covers typing skills, English & Malayalam Typing, MS Office, Artificial Intelligence application like Canva, Chat GPT, Copilot, Gamma etc. Advanced training on MS Office 365 is also providing for the trainees.

Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical	Non-Domain
						Language & Soft Skills
1	Data Entry with Office Automation	440 hrs	Classroom & Practical	100 hrs	300 hrs	40 hrs

The theory and practical sessions are handled by Ms. Neethu V Nath, Trainer-DDEO. Learn with Fun activities, Guest Lecture etc. are conducting as part of effective training.

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	Data Entry with Office Automation	Batch-1	14-10-2024	28-02-2025	26	Completed




Beauty Therapist

In the Beauty and Wellness sector, ASDC Vizhinjam centre is conducting Beauty Therapist (BT) course for the women beneficiaries from the community. This course is planned as an opportunity for the women to become self-employed. We provide necessary guidance and support to earn for their family through employment.

Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical	Non-Domain
						Language & Soft Skills
1	Beauty Therapist	340 hrs	Classroom & Practical	50 hrs	250 hrs	40 hrs

The theory and practical sessions are handled by Ms. Mini Jose, Trainer-BT & HS. Learn with Fun activities, Guest Lecture etc. are conducting as part of effective training.

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	Beauty Therapist	Batch-1	18-03-2024	15-11-2024	16	Completed
2	Beauty Therapist	Batch-2	18-03-2024	15-11-2024	17	Completed
3	Beauty Therapist	Batch-3	12-12-2024	31-03-2025	7	Ongoing




Hair Stylist

As a specialization training in the Beauty and Wellness sector, ASDC Vizhinjam centre is conducting Hair Stylist courses not only for the fresher but also for the experienced beautician beneficiaries. This program only focusses on the Hair Treatment related topics especially Hair Dressing, Hair Coloring, Hair Cutting etc.

Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical	Non-Domain
						Language & Soft Skills
1	Hair Stylist	340 hrs	Classroom & Practical	50 hrs	250 hrs	40 hrs

The theory and practical sessions are handled by Ms. Mini Jose, Trainer-BT & HS. Learn with Fun activities, Guest Lecture etc. are conducting as part of effective training.

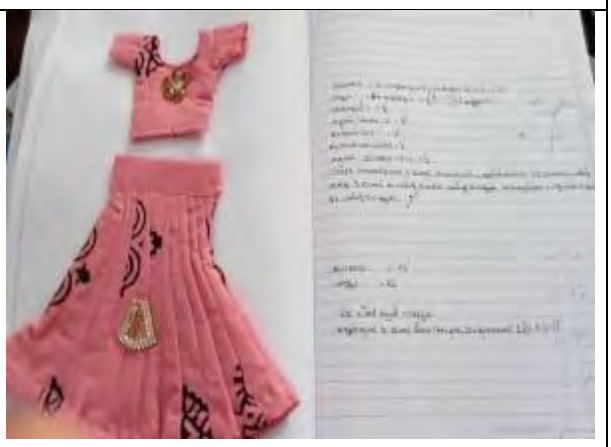
Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	Hair Stylist	Batch-1	18-03-2024	15-11-2024	16	Completed
2	Hair Stylist	Batch-2	18-03-2024	15-11-2024	17	Completed
3	Hair Stylist	Batch-3	12-12-2024	31-03-2025	6	Ongoing

Self-Employed Tailoring (SET)

Focusing the housewives who are having basic literacy, Self-Employed Tailor course is started under ASDC Vizhinjam centre at VizMart building, Vizhinjam. This course is supporting the beneficiaries to become self-employed.



Course Details

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical	Non-Domain
						Language & Soft Skills
1	Self-Employed Tailor	340 hrs	Classroom & Practical	50 hrs	250 hrs	40 hrs

The theory and practical sessions are handled by Ms. Preeja U P, Trainer- SET. Learn with Fun activities, Guest Lecture etc. are conducting as part of effective training.

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	Self-Employed Tailor	Batch-3	02-09-2024	31-01-2025	15	Ongoing
2	Self-Employed Tailor	Batch-4	02-09-2024	31-01-2025	14	Ongoing
3	Self-Employed Tailor	Batch-5	24-02-2025	23-05-2025	14	Ongoing

Job Portal Registration

ASDC Vizhinjam centre has taken the initiative to introduce the most common job portals available online and guiding trainees to register in the same. Mr. Sreejith S, and the domain trainers are coordinating the same to make it happen. This may help trainees to find suitable jobs as per their convenience and other support will be provided by our team. A total of 54 trainees from the various domain courses registered in different job portals.

Placement/Self-Employment Details

ASDC Vizhinjam centre supported the trained candidates to become employable or self-employed through becoming entrepreneurs. All the trainees have undergone interviews in various companies and were selected. For the self-employed trainees we encourage them to do the Udhyam Registration as a process of Entrepreneurship. During the period 204 candidates got salaried job and 47 candidates started self- employment.

Community Placement Support Details

As well as providing training for the community, ASDC Vizhinjam centre provides support for the eligible community people for placement in various organizations. After conducting counselling, based on the educational qualification and experience, we redirect the beneficiary to the employer and schedule interviews for the corresponding job roles. 6 community people got salaried job during the period.

Association with Kerala Accademy for Skills Excellence

Adani Skill Development Centre started conducting batches for the Lasher, Front of House and Diploma in Warehouse Management courses at KASE building from this month onwards. Total admissions achieved in the FY 2024-25 is as follows:

#	Course Name	Eligibility	Duration	Certification	Venue of Classes	Participants
1	Lasher	10th	190 hrs	ASDC & KASE	District Skill Development Centre-Pappanamcode	10
2	Diploma in Warehouse Management	Degree	400 hrs	ASDC & KASE	District Skill Development Centre-Pappanamcode	30

Diploma in Warehouse Management (DWM)

Under ASDC Vizhinjam, Diploma in Warehouse Management batch were started at District Skill Development Centre, Pappanamcode in this year onwards. This is one the course comes under the logistics sector. The session is handled by Mr. Nidhin S Raj, Trainer-Warehouse Management.

#	Trade	Training duration	Particulars	Classroom Training Duration	Practical	Non-Domain
						Language & Soft Skills
1	Diploma in Warehouse Management	400 hrs	Classroom & Practical	300 hrs	50 hrs	50 hrs

Batch Details

#	Course Name	Batches	Start Date	End Date	Admissions	Status
1	Diploma in Warehouse Management	Batch-2	02-09-2024	03-01-2025	18	Completed
2	Diploma in Warehouse Management	Batch-3	03-02-2025	09-05-2025	6	Ongoing

General Activities

- Inauguration of Community Skill Park – Vizhinjam
- World Hepatitis Day
- World Youth Skills Day – 2024
- Adani Foundation Day Celebration
- Independence Day Celebration - 2024
- International Youth Day – 2024
- Organ Donation Day

- Onam Celebration
- Career Guidance Session
- Teacher's Day Celebration
- Gandhi Jayanthi Celebration
- Global Handwashing Day Celebration
- Navarathri Celebration
- Diwali Celebration
- Games & Sports Activities
- Christmas Celebration
- National Startup Day
- National Youth Day
- Leprosy Day
- International Mother Tongue Day
- Safer Internet Day
- Women Self Defense Training Program
- World Cancer Day
- International Women's Day Celebration
- Details of existing livelihood groups

LIVELIHOOD UPDATES

Sl No	Group	Business type/ Status up
1	Clean 4 U (5 Members)	Hi Tech Cleaning for Flats, Hospitals, Offices, water tank, Vehicle and Public Institutions
2	Anaswara Poultry Unit (7Members)	Hi-tech poultry with 14 cages of 630 chicken for 7 members
3	Thripti Poultry Unit (7 Members)	Hi-tech poultry with 14 cages capacity of 630 chicken for 7-member group
4	Harbour Canteen Unit (5 Members)	Canteen unit specially for traditional seafood's
5	Sreebhadra Big Shopper Unit (3 Members)	Big shopper / Cloth Bag / Nonwoven Bag Unit
6	Eco Shop unit (3 members)	Selling of fresh vegetables at Viz Mart
7	Vizhinjam Karshika Karmasena (4 Members)	Clearing of vegetation and other Agri works
8	Prime Events (5 Members)	Power Laundry Unit and Steam Pressing Consultancy partner for Viz Mart – Livelihood market
9	Data Plus (3 Members)	Data entry Photostat, projects, designing and online jobs.

10	Thattukkada Unit (3 members)	Shop for preparation & selling steam-based snacks.
11	You Me & Tea Café (3 members)	Canteen unit, traditional Kerala Foods.
12	SRM Stitching & Garments unit. (3 Members)	Spot stitching and garments
13	Turn to fresh -organic shop. (3 members)	Virgin coconut oil, natural pickles, and other provisional items
14	SWAP Data Services (3 Members)	Providing online services like PAN card, notice printing and designing, art works, Photostat, Money Transfer etc.... CSP of State Bank of India
15	SPANDHANAM Patient Care Unit (5 Members)	Providing patient care services for bedridden patients in houses as well as in nearby hospitals.
16	Samudra Activity Group	Making of fresh fish pickles and other pickle items.
17	Milk and Milk products – Milma Parlor	Selling of Milk and Milk products
19	Port Canteen	Canteen unit, traditional Kerala Foods. Especially working for port drivers

Total turnover of livelihood groups for the year

Name of IG activity of SHG's/JLG/FPC's	Financial Year of inception	Income (From April. to this reporting month of the (FY 24-25) in Rs.	Cumulative income (from inception of the groups)	
			No. of groups/JLG/FPC's	Amount in Rs.
Stiching/ weaving - (SRM Stitching Unit)	05.09.2019	69,170.00	1	910,384.00
Cleaning Services - Clean 4 U	10.04.2017	3,253,620.00	1	37,201,509.00
Poultry Units - Anaswara &Thripthi	20.01.2018	148,866.00	2	2,066,973.00
Canteen/Hotel Unit - Harbour, Canteen/Hotel Unit - U Me & Tea Canteen/Hotel Unit -Thattukada	13.07.2017 05.09.2019 16.07.2019	4,832,013.00	4	19,485,857.00
Eco friendly bag unit - Sreebhadhra Bags	05.11.2017	262,373.00	1	1,068,599.00
Vegetation Cleaning unit - Vanitha Karsheeka Karma Sena	05.09.2019	2,106,120.00	1	1,936,870.00
Laundry Service - Prime Events/Power laundry	06.02.2018 (Prime Events) 12.11.2019 (Laundry)	65,709.00	1	2,077,176.00
Data Entry and online services - Data Plus & SWAP	22.03.2018 (Data Plus) 01.12.2020 (SWAP)	630,920.00	2	695,090.00
Sales of Organic/Provisions - Turn to Fresh Organic Shop &/Provisions - Samudra Activity group	05.09.2019 (Turn to fresh) 03.12.2020	2,293,614.00	2	4,129,897.00

Sale of State Lottery & Tender Coconut	02.02.2022		0	51,034.00
Sale of organic Vegetable - Eco Shop	10.08.2018	583,536.00	1	3,883,445.00
Patient Care Services - Spandanam	01.03.2021	7,440,000.00	1	4,009,300.00
Milk and Milk products – Milma Parlor	02.04.2022	483,733.00	1	2,025,032.00
Viz Mart Consortium	01.08.2024	10,270,986.00	1	10,270,986.00
Total		**32,440,660.00**	**19.00**	**89,812,152.00**

Individual- micro–Enterprise Initiatives

AF has been supporting group enterprise since 2017 onwards, last year a new initiative of individual enterprise support programme started, under this programme the following enterprises were progressing during the reporting period.

Number of Individual Beneficiaries	Income (From April. to this reporting month of the (FY24-25) in Rs.	Cumulative income (from inception of the groups)	Average Income / Month in Rs.
Chinnu Stores - Sheeja	547,440.00	1,756,860.00	45,620.00
Sindhu Tailoring shop - Sindhu	208,533.00	557,023.00	17,377.00
Petty Tea Shop - Sulekhs	300,000.00	834,036.00	25,000.00
Stitching bag & Chappals - Peter	230,786.00	463,166.00	19,232.00
Petty Tea Shop - Baby	337,126.00	871,422.00	28,093.00
Street shop - Baby		1,052,548.00	-
Mrs. Nirmala - Fish Vending	592,893.00	1,365,501.00	49,407.00
Mrs. Jespi - Fish Vending	417,200.00	1,920,802.00	34,766.00
Mrs. Gulastic Amma	724,400.00	2,228,002.00	60,366.00
	3,358,378.00	**11,049,360.00**	

Sports Support

Sports Support to St. Mary's School Kottappuram

The sports training support to St. Mary's School Kottappuram is progressing well during the reporting period. The training support includes coaching to Football, Basketball, and volleyball has been providing daily two hours after class hours 6

days in a week. In addition to that coaching support for athletic items has also been provided for selected students.

Nutritious food support including milk, boiled egg and banana have also been provided as part of the programme for selected students. The playground on the school premises is being used for this purpose.

Sports support to Kovalm FC

Adani Foundation has been supporting the selected players from the coastal part of Vizhinjam of Kovalm FC, a professional football club in Trivandrum. The support has been providing in the form of Nutritious food supplements practice materials and motivation sessions for players.

Community Development

Material Recovery Facility (MRF)

Material Recovery Facility is mainly designed to effectively manage plastic waste generated in Vizhinjam. Waste materials generated at source level are collected at MRF and segregated to sort plastic waste. Stones and glass materials are initially removed. Segregated plastic wastes are dust removed, transported via conveyor belt to the shredding unit. Plastic with size below 6 microns are crushed to powdered form. Plastics of size above 6 microns are shredded to cube form. These shredded plastics will be taken from MRF for further reuse. Nearly 1 ton of plastic is expected to reach MRF daily. Waste will be collected from the municipal wards of Kottapuram, Vizhinjam, Mulloor, Harbour and Venganoor by Haritha Karmasena members hired by Corporation.

The mentioned MRF is constructed in a 3500 square feet area. (36.0X9.0=324m2). The structure is supported on 22 RCC column footings and super structure completed in solid block masonry. The roof of the building is covered using corrugated G.I sheets. The area is divided into a spacious material receiving area, 6 numbers of waste segregation rooms, shredded plastic collection area, office room, MRF hall, workers changing room and toilet. Compound wall of 1.9m height and 44.10 m length is constructed behind the facility. The maintenance of the MRF building will be undertaken by Trivandrum Municipal Corporation. Waste Management activities are implemented by Clean Kerala Company.

All the civil works for the construction of the building was completed during the period. The installation procedure for machines is progressing with the help of Clean Kerala Company by Trivandrum Municipal Corporation .

Community Health Centre-NEW BLOCK

The new CHC building is a three storeyed RCC building (7000 sq feet area in each floor) constructed near to old CHC. As the existing CHC building could not provide medical facilities in gynecology, second floor (top floor) of the new block was constructed and allocated under CSR.This floor will function exclusively for attending pregnant women and gynaec related cases.

Once upgraded to a taluk level hospital, the mentioned gynecology ward can attend 100 patients a day for periodic examination and medical advice.7labours can be carried out per day and admission ensured for baby and mother. The main facilities designed for the department are listed below.

1. Reception Area.
2. Gynaec Operation Theatre-2 nos.
3. Post Operation Area.
4. Nebulisation Unit.
5. Anaesthesia /Counselling Room.
6. Labour rooms-2 nos.
7. Prewash Area.
8. Doctor's Lounge.
9. Nurse Station.
10. Staff Lounge.
11. Changing Room.

12. Sterile Store.
13. Toilets for Men and Women.

The new hospital may be converted to Taluk Hospital in future thereby curtailing almost all the limitations of existing CHC. The inpatient admission will be raised from 40 to 100nos. The present services of the CHC will be slowly shifted to a new block. All civil work is completed and the entire building is getting ready for inauguration.


Model Anganwadi Building

Model Anganwadi is located inside Vizhinjam Govt LPS School compound which is near to Vizhinjam Police Station. As the majority of Anganwadis are functioning on rental basis with limited facilities, Adani Foundation in cooperation with Government has come up with an ideal plan to provide a kinder garden that can render Montessori environment to kids of Vizhinjam community. Montessori classrooms make use of real photographs of animals and objects, ceramic and metal utensils instead of plastic kid's size tables and chairs. Kids experience freedom of movement, choice, and time, help each other, concentrate, and explore themselves.

The building consists of a spacious classroom, colored with BaLA painting, Kitchen, storeroom, toilets for kids and staff separately. All civil works, BaLA paintings and installation of child-friendly furniture were completed during the period.

New Block at St. Mary's HSS, Kottappuram

The new building bock is being constructed inside ST. Mary's Higher Secondary School Campus Kottapuram. The total area of new block is nearly 8028.44 square feet. The ground floor is meant to be an open space leading to the existing playground area. The first floor consists of 3class rooms, stairways, and passageway. The second floor is also allocated for 4 classrooms.

All the civil work completed, and Rev. Dr. Thomas J Netto, Archbishop, Roman Catholic Archdiocese of Trivandrum blessed and handed over to the school authority in the presence of Dr. Anil Balakrishnan, Head CSR, South India and Rev. Fr. Nicholas, Parish priest, Vizhinjam parish.

LAYING OF PAVER BLOCKS IN VIZMART

The existing passage area to Vizmart was concreted years ago and was in a deteriorating stage. During rainy seasons, rainwater collected in the area creating unclean environment for community people. As requested by the livelihood groups, it was decided to lay paver blocks in the passage area. The procedure for laying paver blocks consists of excavation, preparing the base, laying the pavers and compaction was done at Viz Mart as part of the CSR of AVPPL during the period

as follows. The open area between the Supply Co supermarket and Vizmart canteen is 35.40 m in length and 3.6m in width. The area in front of cafeteria is 2.70m long and 3.4m wide. The mentioned area was excavated for nearly 4 inches using JCB. Next the excavated area was prepared by spreading chips for proper drainage of water into the soil during rains. Required number of concrete paver blocks were procured from Vizhinjam Port at free of cost. The size of each paver block was 225mmx112. 5mmx100mm. Nearly 5345 nos of pavers were interlocked carefully. The front area of entrance gate was concreted using 1:3:6 mix for 5.40 m length and 4.10 m width.

Renovation of Gangayar canal -Waste Water Drain construction

The Gangayar works included clearing off waste materials from canal, desilting, construction of 2 silt traps, construction of foot slab bridge and core wall. All works except core wall construction were carried out. The Church authorities suggested construction of RCC wastewater drain near one side within Gangayar thodu instead of core wall. This partially submerged drain is proposed near ice plants receives generated wastewater and discharges into sea without polluting canal water. This drain will be 230 m long and 1.25 meters wide and work is being initiated by the Irrigation department. The top of drain will be capped using RCC slabs. The size of slab is nearly 120X90X10cm.

The work for the entire drain is now completed. The total length of reinforced concrete drains is nearly 230m. Internal plastering of the work, capping of the drain, construction of ramp for allowing JCB to perform cleaning activities are completed. The fencing works completed for nearly 200m.


PLAYGROUND AT VELYAKADAPURAM

A temporary playground was constructed in Velyakadapuram for youth of fishermen community. The playground area is 70m long and 60m wide. The boundary for playground got completed in reinforced cement concrete for a height 60cm and width 30cm.Owing to lose and weak soil condition of site, dredging sand and murrum were mixed in equal proportions for providing a stable and firm ground surface.

Preliminary works have started, levelling the site was carried out for 3 days. Ground was excavated on 3 sides for a width 1. 2metre.At the bottom, plain cement concrete was laid 55cm width and 15cm thick on 3 sides. Above PCC reinforced concrete work was done for 12m3, for a width 30cm and 60cm height. Inside, the ground was excavated for a depth of 40 cm and filled with murrum and dredging sand.17 m3 each of murrum and sand were dumped and levelled at site.


Human interest stories (max 3 stories - indicating outcome /impact of intervention)

Case Study Report – Lasher Batch

"I'm the first one to get a job in my family, I'm so happy!

My parents have done so much for me. They taught me perseverance—the gritty, relentless kind that lives in the calluses of a mason's hands and is only learned through the quiet sighs of a mother cradling an empty wallet. When my father passed away in 2019, I felt the world tilt. There were days when it felt like trudging through relentlessness.

But then life, that trickster with its odd sense of timing, offered me a hand in the form of a job at Adani Port in Vizhinjam. Just two months with ASDC—only two—and there I was, being handed a key, the kind that unfastens destinies.

Did you know that I am the first in my family to ever get a job? I'm absolutely thrilled about it, and I'm sure my father would have been proud. As I tread this new path, I hope to stand tall enough to give back—to become the unwavering support my family deserves" - says Mr. Arjun Thankaraj, Lasher Vizhinjam Port, Kerala

From the calloused hands off his father to the quiet strength of his mother, Arjun Thankaraj carried their perseverance into every step. Now, as he begins this new chapter, he honours their sacrifices and forges a brighter path forward.

The story doesn't end with this beneficiary only. We are happy to announce that through providing training on Lasher course ASDC Vizhinjam equipped 46 candidates for the job role. VizMart Livelihood Federation, Vizhinjam supported through the placement for all these candidates at Vizhinjam port.

Here is the list of candidates, who were placed at Vizhinjam Port as "Trainee-Lasher" under VizMart Livelihood Federation Group.

Case on -local women employment in Vizhinjam port as Crane operators.

Vizhinjam international Seaport is the largest and most modern multipurpose seaport complex in the country. This is the first automated port in India and the only port in the country with hi tech facility for automated logistics management.

For the same reason it has opened job arenas for qualified computer savvy youngsters. As a company envisioned to goodness with growth, is committed to the development of women and designed specific job openings to develop female careers. In tune with goodness theme the CER intervention ever since its beginning at Vizhinjam has its focus on SLD for Skill development and sustainable income generation for every connected family. By default, women have its focus. Adani foundation, in implementing CER/CSR follows the theme of female Empowerment in accordance with the Sustainability Strategy based on SDG 5 of UN. The objective here is to create career opportunities for women in port related works, in addition to generating a positive and lasting impact on the members' careers and family wellbeing.

Crane operation is one such tech savvy profession which has paved way for qualified women from poor and lower middle-class background to pursue a career. However out of many applications, 9 women handpicked by CSR team among connected communities surrounding Vizhinjam project area. These 9 women were selected for training and later appointed as Crane operators.

The 9 women who were appointed for the Crane operation job had their job profile Operate CRMG Cranes (Candle Lever Rail Mounted Gantry) to load and unload cargo from Yard to ITV and ITV to yard safely and efficiently. Monitor and maintain the functionality of crane equipment to ensure optimal performance. Coordinate with team members to ensure the timely completion of logistics operations. They must work on two shifts from 8 am to 8 pm in day shift for two days followed by off day and 8 Pm to 8 am for two days followed by off day in rotation basis. Sunday also is working. In a way, all will have to work night and day every two weeks.

1.**Anisha,** who hails for Nellikunnu, happy to express her feelings for getting a job in high profile company. She said that her dream had come true that her parents, amid their hardships given her good education that she completed her BSC - mathematics and DCA. Her father was a Maison and mother housewife. She is the youngest among the two-girl children. The eldest girl is married and works as a private tuition teacher. She presents herself complacently on the work and working conditions, The addon income as Crane operators, has supported for a decent living for her family including small kid (2 yrs), husband mother-in-law.

2.**Karthika** has 1 year of experience in DP world cochin working with Cranes for nearly 1 yr. She had her qualifications in Diploma in instrumentations and engineering. Her father was an Oil mill worker assisting in oil extraction. Her family background was too poor, expressing her gratitude to CSR officials in picking her from community and forwarding her application. Her experience fetched her the opportunity to work with Vizhinjam port. The acquired income is a cumulated benefit besides her husband's small savings from her husband working as a store manager.

3.**Sunitha Raj** L Age 35 from Nellimoodu, qualified in Diploma in electronics and instrumentation and also perused skill development in Data Entry Operator from ASDC Vizhinjam. Hailing from a poor family with a father as a daily wage earner. Husband is a Civil police officer. Her daughter is in 2nd standard. Add on income as crane operator makes her independent financially in taking decisions managing home and child's immediate needs.

4.**Stefy Age** 30 from Thennoorkonam Vizhinjam was happy that she got a sharp salary escalation from her previous earning which was only 6000/- Rs to current handsome income more than 3 times pertaining to her qualification on BSC physics, Bed, thus working in POB Vizhinjam port as CRMG-Crane operator. Her parents were daily wage earners, lives with husband, a teacher @ a private school and a child studying in 1st standard.

5.**Rajitha R N** Age 36 yrs, hailing from Kottapuram had a poor childhood period with her parents as cooly workers strived hard to give her a good education. She is qualified in BSC physics and Husband in ITD company inside Vizhinjam port. She is thankful for handpicking her by CSR -Vizhinjam and appointing as Crane operator. Though she had to work in shifts, complacent enough on handsome earning for a decent living and for upbringing of her 10-yr old daughter.

6.**Asha Lakshmi** 33yr old from Mulloor Vizhinjam was delighted on her climb to take new job on CRMG crane operator at Vizhinjam port. Previously working as computer operator at RCC. Parents were daily waged Cooley workers able to pursue her with, twin degree on BA history and Diploma in computer engineering. CSR found her from community level interactions and later enlisted for the mentioned position. She survives with her husband who is a CPO, a 9yr old

daughter and 3yr old son, and with her father, mother. Her add on income has increased her share for wellbeing of children and a small savings for future.

7.**Sree devi** aged 37 years, from Poovar belongs to a lower middle-class family with B-Tech computer science qualification. She was complacent on her new profile as CRMG operator. Thanks to CSR for picking her through one of her relatives, a regular community opinion leader. She told me that now she had a regular income as her husband's income source was erratic through pharma as a chemist. She could now be able to take care of her 5yr old girl child's upbringing cost at regular basis.

8.**Prinu** age 30 yrs, hails from a fisherman family of Kottapuram. Her husband and Father are fishermen's. She is qualified in B.Sc. Chemistry, BEd and computer diploma. It was hard for her subsistence. The income from fish catch was little. Hence, she considers this escalation as a boon. As regular income starts coming it becomes relief and freedom for her spending as her husband does not stick to strict utilization. Extending thanks to her parent's connection to CSR team and later submitting her resume for CRMG operator.

9. **Nathana** 23yrs from Nellikunnu mulloor, joined on 21st January 2025 as crane operator ,hails from a lower middle-class family . She is qualified in BSc physics and currently pursuing MSc psychology through IGNOU. Her father Jayakumar is working in a private aided college as a herbarium Keeper. Mother Daisy is a home maker. She had two brothers both working as guest lectures @ private colleges .This is her first job .

These 9 member women who were once having subordinate role but after assuming charge on CRMG crane operation and becoming income earners, now graduates to leadership within each home, thus empowered on economic and social fronts. The main responsibility above all for woman is on establishment for happy and prosperous family. Simply put, a woman has duties of being mother and household manager; it is a kind of whole-heart duty to stand her own family up as a part of society. The role of mother and household manager becomes effective with economic freedom. This is what achieved through all the 8 cases mentioned. The role played by CSR -of AVPPL stands strong and vindicated.

1.5. Media coverage

കേരള കൗമുദി

പ്ലാസ്റ്റിക് മാലിന്യ സംസ്കരണം

കെട്ടിടനിർമ്മാണം പൂർത്തിയായി

പ്രവർത്തനം ഇങ്ങനെ

പ്ലാന്റ് സ്ഥാപിക്കുന്നത് 15 സെന്റിൽ

പൂർത്തിയായത് 3500 ചതുരശ്രയടി കെട്ടിടം

പ്രതിദിനശേഷി 90 ലക്ഷം (കെട്ടിട നിർമ്മാണത്തിന് 70 ലക്ഷം,20 ലക്ഷം പ്ലാന്റ് സ്ഥാപിക്കാൻ)

45 ലക്ഷം രൂപ വീതം അനാന്ത് തുറമുഖ കമ്പനിയും വിസിൽ കമ്പനിയും നൽകും

ഉത്പന്നങ്ങൾ പലതരം

കേരളകൗമുദി

അദാനി ഫൗണ്ടേഷൻ സൗജന്യ ആയുർവേദ ക്യാമ്പ്

അദാനി ഫൗണ്ടേഷന്റെ നേതൃത്വത്തിൽ നടന്ന ക്യാമ്പ്

വിഴിഞ്ഞം: അന്താരാഷ്ട്ര തുറമുഖത്തിന്റെ സാമൂഹ്യപ്രതിബദ്ധതാ പദ്ധതികളുടെ ഭാഗമായി കോവളം ഗവൺമെന്റ് ആയുർവേദ ഡിസ്പെൻസറി, മുക്കോല കുടുംബാരോഗ്യ കേന്ദ്രം എന്നിവയുടെ സഹകരണത്തോടെ അദാനി ഫൗണ്ടേഷനും വിഴിഞ്ഞം ജനമൈത്രി പൊലീസ് സ്റ്റേഷനും സംയുക്തമായി രോഗനിർണയ ക്യാമ്പ് നടത്തി. വിഴിഞ്ഞം ജനമൈത്രി പൊലീസ് സ്റ്റേഷൻ എസ്.ഐ ദിനേശ് ഉദ്ഘാടനം ചെയ്തു. വിഴിഞ്ഞം ജനമൈത്രി പൊലീസ് സ്റ്റേഷനിലെ ഉദ്യോഗസ്ഥരും [illegible] വിഴിഞ്ഞം മേഖലയിലെ ജനങ്ങളും പങ്കെടുത്തു. അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ സെബാസ്റ്റ്യൻ ബ്രിട്ടോ, മുക്കോല കുടുംബാരോഗ്യ ഹെൽത്ത് ഇൻസ്പെക്ടർ ഐ.പി. [illegible], ശാന്തകുമാർ, ഗോപിനാഥൻ, ജോർജ് സെൻ, വിനോദ്, രാധ, ലിന, പ്രിജി, കോവളം ഗവൺമെന്റ് ആയുർവേദ ഡിസ്പെൻസറിയിലെ ഡോ. സ്മിത എന്നിവർ ക്യാമ്പിന് നേതൃത്വം നൽകി.

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newssixnews.com/De

ജീവിതശൈലി രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു .

23.11.2024

വിഴിഞ്ഞം : അന്താരാഷ്ട്ര തുറമുഖത്തിന്റെ സാമൂഹ്യ പ്രതിബദ്ധത പദ്ധതികളുടെ ഭാഗമായി ഗവൺമെൻറ് ആയുർവേദ ഡിസ്പെൻസറി,മുക്കോല കുടുംബാരോഗ്യ കേന്ദ്രം എന്നിവരുടെ സഹകരണത്തോടെ അദാനി ഫൗണ്ടേഷനും വിഴിഞ്ഞം ജനമൈത്രി പോലീസ് സ്റ്റേഷനും സംയുക്തമായി ജീവിതശൈലി രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു . വിഴിഞ്ഞം ജനമൈത്രി പോലീസ് സ്റ്റേഷൻ സബ് ഇൻസ്പെക്ടർ ദിനേശ് ക്യാമ്പ് ഉദ്ഘാടനം ചെയ്തു. ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ സെബാസ്റ്റ്യൻ ബ്രിട്ടോ, ഹെൽത്ത്

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newssixnews.com/De

ക്യാൻസർ, ജീവിതശൈലി രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു.

12.12.2024

വിഴിഞ്ഞം :വിഴിഞ്ഞം അന്താരാഷ്ട്ര തുറമുഖത്തിന്റെ സാമൂഹ്യപ്രതിബദ്ധത പദ്ധതികളുടെ ഭാഗമായി തിരുവനന്തപുരം റീജണൽ കാൻസർ സെന്ററിന്റെ നേതൃത്വത്തിൽ വിഴിഞ്ഞം ലയൺസ് ക്ലബ്ബ്,മുക്കോല കുടുംബാരോഗ്യ കേന്ദ്രം എന്നിവരുടെ സഹകരണത്തോടെ ക്യാൻസർ-

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ദേശീയ സ്റ്റാർട്ടപ്പ് ദിനാചാരണവും കോഴ്സ് സർട്ടിഫിക്കറ്റ് വിതരണവും നടന്നു.

17.01.2025

വിഴിഞ്ഞം: .അദാനി സ്കിൽ ഡെവലപ്പ്മെന്റ് വിഴിഞ്ഞം സെന്ററിൽ ദേശീയ സ്റ്റാർട്ടപ്പ് ദിനം ആഘോഷിച്ചു. ജനറൽ ഡ്യൂട്ടി അസിസ്റ്റന്റ്, ബ്യൂട്ടി തെറാപ്പിസ്റ്റ്, ഡാറ്റാ എൻട്രി ഓപ്പറേറ്റർ, ഹെയർ സ്റ്റൈലിസ്റ്റ് എന്നീ കോഴ്സുകളുടെ പരിശീലനം വിജയകരമായി പൂർത്തിയാക്കിയ കുട്ടികൾക്കുള്ള സർട്ടിഫിക്കറ്റ്

Mathrubhumi
മാതൃഭൂമി

അദാനി ഫൗണ്ടേഷന്റെ അർബുദരോഗ നിർണയ ക്യാമ്പ്

വിഴിഞ്ഞം► അന്താരാഷ്ട്ര തുറമുഖത്തിന്റെ സാമൂഹികപ്രതിബദ്ധത പദ്ധതികളുടെ ഭാഗമായി അർബുദരോഗ നിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു. തിരുവനന്തപുരം റീജണൽ കാൻസർ സെന്ററിന്റെ നേതൃത്വത്തിൽ അടിമലത്തുറ ജയ്ക്രൈസ്റ്റ് ലൈബ്രറിയുടെ സഹകരണത്തോടെ അദാനി ഫൗണ്ടേഷനാണ് ക്യാമ്പ് സംഘടിപ്പിച്ചത്. അടിമലത്തുറ പള്ളി സഹവികാരി ഫാ. മാർത്തോമ ക്യാമ്പ് ഉദ്ഘാടനം ചെയ്തു. ലൈബ്രറി പ്രസിഡന്റ് ജോയ് അധ്യക്ഷനായി. റീജണൽ കാൻസർ സെൻറർ കമ്യൂണിറ്റി ഓങ്കോളജി വിഭാഗം അസോസിയേറ്റീവ് പ്രൊഫസർമാരായ ഡോ. ജയകൃഷ്ണൻ, കലാപതി, അദാനി ഫൗണ്ടേഷൻ ലൈവ്‌ലിഹുഡ് കോഡിനേറ്റർ ജോർജ് സെൻ, തുടങ്ങിയവർ പങ്കെടുത്തു.

01/02/2025 TRIVANDRUM Pg 02

കേരള കൗമുദി
Epaper
22 Feb 2025

ക്യാമ്പെയിൻ

വിഴിഞ്ഞം: അന്താരാഷ്ട്ര തുറമുഖത്തിന്റെ സാമൂഹ്യപ്രതിബദ്ധത പദ്ധതികളുടെ ഭാഗമായി തിരുവനന്തപുരം റീജിയണൽ ക്യാൻസർ സെന്ററിന്റെ നേതൃത്വത്തിൽ മുക്കോല കുടുംബാരോഗ്യ കേന്ദ്രത്തിന്റെ സഹകരണത്തോടെ അദാനി ഫൗണ്ടേഷൻ ക്യാൻസർ പ്രതിരോധ ജനകീയ ക്യാമ്പെയിൻ നടത്തി. 30 വയസിന് മുകളിലുള്ള എല്ലാ സ്ത്രീകളും സ്തനാർബുദ, ഗർഭാശയഗള അർബുദ ക്യാൻസർ പരിശോധനയ്ക്ക് വിധേയരാകാം. വിഴിഞ്ഞം മേഖലയിൽ ക്യാൻസർ ബോധത്കരണ ക്ലാസുകളും നടത്തി. ക്യാമ്പിന്റെ ഉദ്ഘാടനം മുക്കോല കുടുംബാരോഗ്യ കേന്ദ്രത്തിലെ മെഡിക്കൽ ഓഫീസർ ഡോ.ബിനീഷ് നിർവഹിച്ചു.

KERALA KAUMUDI EPAPER
Clipping Kerala Kaumudi - Epaper

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SPECTRUM

Taking charge

APJ Abul Kalam media voice Excellence Award for social work

Dr. Anil Balakrishnan, Head CSR, South India received APJ Abdul Kalam media voice Excellence award for in social work on behalf of Adani Foundation, Adani Vizhinjam Port Pvt. Ltd, for its CSR activities at Vizhinjam on 25th January 2025.

Adani Foundation team

S.No.	Name	Position
1.	Anil Balakrishnan	Southern Regional head for CSR and Chief Project Officer- Community Skill Park, Adani Skill Development Centre
2.	Sebastian Britto. A. G	Programme Manager
3.	Rakesh R. S	Sr. Project Officer
4.	Stephen Vinod	Project Officer
5.	George Zen	Consultant – Livelihood
6.	Maya G	Project Officer Community Health
7.	Preji P. Daniel	SuPoshan Officer
8.	Radha S	Engineer
9.	Limna B	Senior Assistant
10.	Sreekutty SR	Horticulture Assistant
11.	Dr. T.M George	Technical Advisor
12.	Anurag MJ	Centre Head
13.	Sreejith	Placement Manager
14.	Kavitha TR	Trainer – Language & Soft Skill
15.	Neethu V Nath	Trainer – Domestic Data Entry Operator
16.	Mini Jose	Trainer – Beauty Therapist & Hair Stylist
17.	Sheeja. M	Trainer – General Duty Assistant
18.	Anilkumar BS	Trainer - IOT
19.	Vipin S	Trainer – Lasher
20.	Nidhin S Raj	Trainer – Warehouse Management

Site office address:
Adani Foundation
Ronan House
Kottappuram
Vizhinjam
Thiruvananthapuram =695521

Annexure V

AVPPL Letter resubmitting OSDCP to ICG

adani

Ports and Logistics

Ref: AVPPL/ICG/2024-25/3460

Date: 14th Feb-2025

The Commander
(for District Ops & Plans Officer)
Headquarters,
No.4, Coast Guard District (K&M)
Kalvathy Road, Fort Kochi-682001

Sub: Oil Spill Disaster Contingency Plan (OSDCP) for Vizhinjam International Seaport – Re-submission of OSDCP on Post Holding of Pollution Response Equipment for Final Approval – Reg.

Ref:
1. AVPPL letter No. AVPPL/GoK/2021-22/1722 dated 19th Oct 2021
2. No. 4 Coast Guard Dist letter No. 737/4 dated 06th Oct 2021
3. No. 4 Coast Guard Dist letter No. 737/4 dated 05th Jun 2020
4. AVPPL letter no. AVPPL/ICG/2020-21/1134 dated 22nd May 2020

Dear Sir,

Vizhinjam International Seaport commenced its Commercial Operation on 03rd December 2024. The Port is also getting ready for the official Inauguration at the earliest date.

As per AVPPL letter dated 22nd May 2020 referred above, we submitted the Oil Spill Disaster Contingency Plan (OSDCP) for Adani Vizhinjam Port for your scrutiny and approval. Following detailed scrutiny, it was recommended to resubmit the plan after the commissioning of the Pollution Response (PR) equipment.

Please note that the commissioning of the PR equipment is now completed, and we have updated the OSDCP in accordance with the observations issued.

A brief update on the resolution of the observations is as follows:-

- The port is planned to be implemented primarily as a Cat B Port which will be upgraded to Cat A once the oil handling facilities are in place. As advised the present OSDCP is submitted for approval as a Cat B Port and the PR equipment is also placed in line with the same. We shall submit the revised contingency plan for approval once the oil handling facilities are in place as a Cat A Port.
- The PR Equipment and OSD are procured in line with NOS DCP Guidelines.
- As the port is in the phase of commissioning, the essential manpower as mentioned in the OSDCP is available for training as part of OSDCP.
- The OSR maintenance schedule and the cost estimate is excluded from the plan. The record on the maintenance schedule shall be made available during the Tier 1 audit.
- The Port shall notify any instances of oil spill as per Appendix K of NOSDCP and the same proforma is integrated in the OSDCP with contact details.

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Registered Office:
Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad-382421

adani
Ports and Logistics

We are re-submitting the OSDCP enclosed at **Annexure I**, for your kind review and approval. In this context, we express our readiness for Tier 1 Audit and also, we kindly request for an early approval of the OSDCP.

Thanking You
Yours sincerely

Pradeep Jayaraman
Chief Executive Officer
Adani Vizhinjam Port Pvt Ltd

Encl: Annexure I- Oil Spill Disaster Contingency Plan (OSDCP) for Vizhinjam International Seaport

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Annexure VI

Compliance to Conditions of KCZMA Recommendation

Annexure VI

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendations for Environment and CRZ Clearance (EC) for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
(i)	The developmental works and the construction of the structures may be undertaken as per the plans approved by the concerned local Authorities, local administration, conforming to the existing local and central rules and regulations including the existing provisions of CRZ Notification.	**Complied** All the construction activities are being carried out as per existing Central/local rules. Necessary permissions under CRZ Notification 2011 & its amendments have been obtained. Further, necessary approvals from concerned Statutory Departments/Agencies have been obtained for the construction designs/drawings relating to construction activities as mentioned hereunder: • Consent to Establish (CTE) No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018 was renewed from Kerala State Pollution Control Board (KSPCB) vide Consent No. PCB/HO/TVM/ICE-R/02/2018, dated 19.07.2018 valid up to 31.07.2023 and further renewed vide Consent No. KSPCB/TV/ICE/10029484/2023 dated 30.07.2023 valid up to 31.07.2028 (A Copy of the same was submitted along with HYCR for the period April 2023 to September 2023). All other port construction-related aligned activities such as paver blocks, batching plants, etc. fall under this CTE taken for the port development. • Consent to Operate (CTO) No. KSPCB/TV/ICO/10076351/2024 dated 03.12.2024 valid up to 31.07.2029. • No Objection Certificate (NOC) from Airport Authority of India (AAI) vide NOC No. AAI/SR/NOC/RHQ dated 07.12.2015. • As per the exemption granted by GoK G.O. No. 310/2015/LSGD dated 01.10.2015, AVPPL is not required to obtain any further building permits/permission to construct port-related building within the port premises. • Permissions with respect to store petroleum in tank/s in connection with pump outfit for fueling motor conveyances has been obtained in Form XIV for the storage of 40.00 KL of Petroleum class B in tank/s in the port premises from Petroleum &

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendations for Environment and CRZ Clearance (EC) for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		Explosives Safety Organization (PESO) as per the provisions of the Petroleum Act, 1934 and under the Petroleum Rules, 2002 vide License No.: P/SC/KL/14/3732(P499906) dated 05.10.2023 (Copy of the same was submitted along with HYCR for the period October 2023 to March 2024).
(ii)	Since the project envisages development of roads, infrastructural facilities, dredging of the lake and kayals proper environmental safety measures must be ensured.	**Complied** All safety measures are being adopted. Full-time Environment & Safety professionals are employed by AVPPL, contractors & subcontractors, to oversee the implementation of environmental safety measures. Organizational Structure for Environment, Health, and Safety (EHS) & CSR for construction phase is enclosed as **Annexure XI**. All work plans are executed after assessing the defined EHS plans. It is also submitted that dredging of lakes or kayals are not envisaged as part of this project.
(iii)	The project proponent must obtain necessary clearance separately from the Kerala State Pollution Control Board, Health Department and other appropriate Authorities when such implementation programmes are undertaken.	**Complied** Consent to Establish (CTE) has been obtained from Kerala State Pollution Control Board (KSPCB) vide Consent No. PCB/HO/TVM/ICE/08/2015, dated 15.09.2015 valid up to 31.07.2018. Subsequently, the CTE was renewed vide Consent No. PCB/HO/TVM/ICE-R/02/2018 dated 19.07.2018 valid up to 31.07.2023. The CTE was further renewed vide Consent No. KSPCB/TV/ICE/10029484/2023 dated 30.07.2023 valid up to 31.07.2028 (A Copy of the same was submitted along with HYCR for the period April 2023 to September 2023). Further, AVPPL have applied for and obtained Consent to Operate (CTO) from KSPCB for Phase I of the Vizhinjam Port Project on 03.12.2024 Vide Consent No. KSPCB/TV/ICO/10076351/2024 dated 03.12.2024 valid up to 31.07.2029. A copy of the CTO is enclosed as **Annexure I**.
(iv)	The construction should be undertaken, if any with least	**Not Applicable**

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendations for Environment and CRZ Clearance (EC) for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	damages to the existing mangroves. A buffer zone of 50m shall be provided for mangroves present in the area.	There are no mangroves in the vicinity of the project area.
(v)	The project proponent must take necessary arrangements for disposal of solid wastes and for the treatment of effluents / wastes. It must be ensured that the effluents/solid wastes are not discharged into the backwater area/sea.	**Being Complied** No solid waste is being disposed in the CRZ area. Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and the output is being used as manure in greenbelt development within the port project areas. The dry waste is being properly collected, segregated, and disposed of in line with the Solid Waste Management Rules 2016, as amended. The Half Yearly Report of the Solid Waste Management at Vizhinjam Port for the period October 2024 to March 2025 is enclosed as **Annexure IX**. Sewage Treatment Plant (STP) facility of 50 KLD capacity in accordance with the CRZ Notification has been developed as a part of Phase I of the port project and will be further augmented with an additional unit of 50 KLD based on the requirement, therefore, with a total capacity of 100 KLD. The STP technology is MBBR (Moving Bed Biofilm Reactor). The treated water generated is being used for horticulture (landscape development), dust suppression (water sprinkling), etc.
(vi)	The project proponent should provide necessary facilities for official of the Kerala Coastal Zone Management Authority (KCZMA) for inspection of the project site and its premises at any time.	**Noted** All necessary support will be extended to officials of KCZMA during inspection of the project/site visit; at any time.
(vii)	The KCZMA may be duly informed of any	**Being Complied**

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendations for Environment and CRZ Clearance (EC) for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	construction/developmental works/major activities undertaken in the CRZ area of the project	• Member Secretary KCZMA is also the member secretary of NGT appointed committee; the committee meets every six months to review the compliance of Environmental & CRZ Clearance and the progress of the project is presented. • Meetings are held with officials of KCZMA to appraise them on various project related activities. • HYCRs are being furnished to KCZMA including the details of the development works. • Most of the major works at the Vizhinjam port project are completed and the port has been operational since July 2024 for trial operations and has been commissioned on 03.12.2024. Remaining punch list related construction works such as Port Approach Road, electrical works for Reefer Structure at Yard 3 and area development works near Port User Building are in progress.
(viii)	Environmental clearance must be obtained from the Ministry of Environment & Forests.	**Complied** Environment & CRZ Clearance (EC) has been obtained from Ministry of Environment & Forest vide MoEF letter dated 03.01.2014 (F.No.11-122/2011-IA.III). Due to the validity limit of Five (05) years at the time, the EC was valid till 02.01.2019. Thereafter, as per EIA Notification 2006 and Office Memorandum (O.M.) dated 12.04.2016, the validity of the EC will stand automatically for Seven (07) years and thereafter valid up to 02.01.2021. Additionally, as per the provisions of MoEF&CC, the validity of the EC may be extended for a period of three years. Based on the application submitted by VISL for extension of the EC, MoEF&CC vide their Letter No. IA/KL/MIS/178082/2020 dated 29.12.2020 have extended the validity of EC of Vizhinjam Seaport by three years till 02.01.2024. Considering the outbreak of COVID-19 pandemic, MoEF&CC have issued Notification (SO-221 E) dated 18.01.2021 such that the period from 01.04.2020 to

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendations for Environment and CRZ Clearance (EC) for the Period October 2024 to March 2025		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		the 31.03.2021 shall not be considered for the purpose of calculation of validity of existing ECs. Therefore, the EC of Vizhinjam Seaport was valid till 02.01.2025 (which can be further extended up on application to MoEF&CC for 1 more year). VISL had submitted application and MoEF&CC have granted extension of validity of the existing EC for Phase-I development of Vizhinjam port up to the period of 02.01.2026 vide Letter dated 09.12.2024 with validity Extension Identification No, EC24A3501KL5383004N (Enclosed as **Annexure XII**).
(ix)	An adequate financial provision has to be made for environmental protection measures.	**Complied** An amount of 40 Crores was kept solely for EMP implementation as per the commitment in the EIA; and this amount was not diverted for any other purpose. Till date, an amount of ~Rs. 46 Crores have been spent on environmental protection measures. Despite having exhausted the funds earmarked through EMP activities and having exceeded the required expenditure, AVPPL are committed to environmental responsibility and are continuing to carry out environmental protection measures.
(x)	Scrutiny fee of Rs. 10,00,000/- (Rupees Ten lakh only) to be remitted under the head account 1425-800-97 applications for scrutiny fee etc. for CRZ clearance, in the district/Sub Treasury concerned, if private parties are involved in the project and the challan receipt in original be forwarded to the Science & Technology Department quoting this letter.	**Not Applicable** The condition is not applicable since the application for EC was submitted by Vizhinjam International Seaport Ltd. (VISL), a Government of Kerala (GoK) undertaking.

Annexure VII

Compliance of the Commitments made during Public Hearing

Annexure VII

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
1	Good compensation package for all livelihood issues have been included for all related PAPs for all affected sectors including the fisheries sector. Strict adherence to EMP compliance with all relevant rules and regulations will be done	**Being Complied** In consultation with the fishermen, enhanced livelihood compensation of Rs. 115 Crores was sanctioned and distributed by GoK up to date by VISL to the fishermen as livelihood compensation. Till 31.03.2025 an amount of Rs. 114.30 Crores have been disbursed for a total number of 2937 Livelihood Affected Persons (LAPs) whose verification was complete in all respects; this includes boat owners to whom kerosene is supplied free of cost during the breakwater construction period. Remaining few disbursals would be done as soon as possible up on verification of the remaining appeal applications.
2	Land under the Jamaath which includes Karimppaly, Magham, Varuthari Pally, etc. need to be protected and should not be acquired.	**Complied** These lands have not been acquired.
3	Compensation for the land acquired (rail/road connectivity and back up areas) are paid promptly and any for additional land required also will be paid in the same way.	**Complied** Compensation for all the procured land has been disbursed along with R&R package as per applicable rules in force. Similar policy will be followed for the remaining extent of land acquisition also viz-a-viz applicable.
4	Additional fish landing centre will be constructed	**Being Complied** Planning work for the fish landing center and the associated breakwater had been initiated as part of the funded work component of the Port concession agreement. However, based on the recommendations of the report on physical model studies carried out by Central Water and Power Research Station (CWPRS), the geometry of the breakwater originally proposed for the fishing harbour is found to be not suitable with respect to tranquillity and hence the design of the new fishing landing centre was revisited. Consultations between Fisheries Department and Ports Department, Government of Kerala (GoK) are held to decide the suitable location for the additional fishing harbour in consultation with the fishermen

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		community. GoK would soon be finalising the plan of action based on the final CWPRS report to develop and make available the additional fish landing facilities for the benefit of the local fishermen in line with the blue economy vision of the Government of India (GoI) along with the completion of the Port.
5	Existing harbour will be improved under the CSR provisions of the project	**Being Complied** GoK has formed a higher-level committee to prepare a master plan for the old fishing harbour. Government Departments concerned are coordinating to resolve the differences and to arrive at an acceptable plan in consultation with all stakeholders and accordingly a proposal for Rs. 25 crores for additional landing facilities at the southern side and a project for Rs. 45 crores with necessary facilities at the Northern Part has been formulated and submitted under PMMSY scheme and waiting for approval of GoI.
6	Fisherman will get first preference to cross the ship channel	**Will be Complied as per the Applicable Laws**
7	GoK/VISL will monitor the shore line changes during construction and operational phases. If necessary, intervention to arrest erosion will be carried out.	**Being Complied** AVPPL engaged NIOT to study the long-term shoreline change monitoring based on high resolution satellite imageries, beach profile analysis and other related measurements supported with ground truthing. Annual Reports on Shoreline Change Analysis of Vizhinjam Coast Using Beach Profiles and Satellite Images had been prepared for the study periods: Feb 2015 to Sep 2018, Oct 2018 to Sep 2019, Oct 2019 to Sep 2020, Oct 2020 to Sep 2021, Oct 2021 to Sep 2022 and Oct 2022 to Sep 2023. These studies on the Shoreline Change Analysis of Vizhinjam Coast have not observed any shoreline change erosion occurring within 10 km due to the Vizhinjam port project. The Annual Reports after vetting by NGT appointed expert committee and shoreline monitoring cell, are uploaded on to the KCZMA website. The link for the last Annual Report on the KCZMA website is provided below: (https://keralaczma.gov.in/index.php/reports/annual-reports).

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		The NIOT Annual Study Report for the period October 2023 to September 2024 has been submitted to KCZMA and is presently being reviewed by the NGT Expert Committee and Shoreline Monitoring Cell. Thereafter, for the study period October 2024 to September 2025, NIOT has been engaged by AVPPL and the report is under preparation.
8	Water supply provision to the Vizhinjam fishing village	**Complied** Kerala Water Authority (KWA) set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake which was commissioned in April 2013 by VISL by expending an amount of Rs. 8.10 Crores. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0 MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. For Operation & Maintenance (O&M) of the same, an amount of Rs. 5.38 crores have been spent up to 31.03.2021. From 04.04.2019 onwards, O&M of the scheme is being done by KWA. An additional amount of Rs. 1.74 Crores has been sanctioned and deposited by VISL to KWA to extend piped water connections for treated water supply facilities to the community at Kottapuram Village. More than 1000 free domestic water connections have been given to the project affected areas. KWA now have adequate coverage of water supply around the port and project affected areas. VISL is coordinating with local body representatives to identify water shortage areas and taking effort to resolve the same.
9	Construction of the new fishing harbour will be simultaneously completed with the port project	**Being Complied** Refer point 4 above
10	Railway work will be initiated after Environment Clearance (EC)	**EC Amendment granted by MoEF&CC** Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, about 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		population. Detailed Project Report (DPR) has been approved by Southern Railway and Railway Board. EC amendments in this regard have been granted by MoEF&CC on 17.07.2024 vide EC Identification Number EC24A033KL158955 and related compliances are being filed under the same.
11	Job Opportunity - Preference will be given to local people during construction stage	**Being Complied** Preference is being given to local people based on skill & competency during the construction stage. Presently, 416 people from Kerala are employed in different construction activities wherein 115 people are from the five nearby wards of Port.
14	Appropriate action like providing compensation or alternate employment etc to fishermen will be implemented wherever applicable after the Environment Clearance	**Being Complied** Refer point 1 above
17	Upgradation of PHC at Vizhinjam will be carried out	**Being Complied** Community Health Centre (CHC) at Vizhinjam at a project cost of Rs. 7.79 Crore is being developed through HED where funding is split between GoK component of Rs. 482 Lakhs and Rs. 297 Lakhs from Adani Foundation. The new CHC building is a three storeyed RCC building (7000 sq. ft. area in each floor) constructed adjacent to the old CHC. The inpatient admission will be raised from 40 to 100 Nos. The main facilities designed for the department are: • Reception Area • Gynaec Operation Theatre-2 Nos. • Post Operation Area • Nebulisation Unit • Anaesthesia /Counselling Room • Labour rooms-2 Nos. • Prewash Area • Doctor's Lounge • Nurse Station

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		• Staff Lounge • Changing Room • Sterile Store • Toilets for Men and Women All work on the second floor completed, except lift services. In ground floor and first floor, electrical works, Aluminium partition works, floor works, lift services are pending. Interlock works in between the new and old building is being carried out. Primary Health Centre is functioning with enhanced facilities and the same would be with full capacity once necessary health staff, equipment, furniture are deployed by the Health Department of the GoK.  **CHC Vizhinjam**
18	New fishing harbour with all the infrastructural facilities will be constructed with reserved rights to mooring/berthing the boats	**Being Complied** Refer point 4 above
19	Appropriate compensation will be given to the resort owners as per the regulatory advice of KCZMA and MoEF	**Complied** Resort owners evicted have been compensated for land and not for the structures since they were in violation of CRZ notification. The acquisition of all resort related land is completed.

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	since the resorts are seen to be located in No Development Zone (NDZ) as per CRZ Notification 2011	
20	Rail, Road, Coastal and Inland Waterways connectivity will be ensured to the rest of Kerala and other Indian Peninsula Ports	**Being Complied** Multi-Modal (Road, Rail & Coastal) connectivity is within the scope of the project, and this will be fully materialised once all phases of the project are implemented. <u>Railway:</u> Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, about 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway and Railway Board. EC amendments in this regard have been granted by MoEF&CC on 17.07.2024 vide EC Identification Number EC24A033KL158955. <u>Road:</u> A proposal was initiated by GoK with NHAI for the development of a clover leaf intersection and a design consultant has been appointed for the study and preparation of the Detailed Engineering Design and Drawings for the proposed Cloverleaf Interchange at the Junction Point at NH-66 connecting the Port Approach Road, NH-66 and Outer Ring Road (ORR). Land acquisition for the clover leaf interchange is underway. In the meantime, the Port is being connected with NH-66 by way of a temporary connectivity by merging the service road with NH-66 at 2 locations, which is being considered by NHAI based on the Port Traffic Movement Scheme submitted by AVPPL. Development of Coastal shipping and Inland Waterways connectivity are being planned to the rest of Kerala and other peninsular ports by Government Departments concerned.
21	Waste Management, Water Treatment plants, etc. will be	**Being Complied** The dry waste is being properly collected, segregated, and disposed of in line with the Solid Waste Management Rules 2016, as amended. No solid waste

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	part of an operational EMP	is being disposed in the CRZ area. Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and the output is being used as manure in greenbelt development within the port project areas. A Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner in accordance with the CRZ Notification is being implemented.
22	Shoreline monitoring on 15 km both sides on regular basis during construction and operation as suggested in EIA report will be carried out	**Being Complied** Based on the Shoreline Monitoring Plan prepared by L&T IEL under the guidance of NIOT, oceanographic and shoreline monitoring is being carried out for a stretch of 40 km (20 km on both sides of the project site) and reports are being regularly submitted to MoEF&CC as a part of the HYCRs. Broadly the scope covers: • Wave Observations • Onshore Cross beach profiling • Offshore Cross beach profiling • Littoral Environmental Observations (LEO) • Beach Sampling • Multi-beam Echo Sounder (MBES) survey • Grab Sampling • Current & Tide Observations • Weather Observations • Marine Water Sampling
23	VISL will ensure that appropriate dredging and reclamation methodology as suggested in EIA report will be adopted to contain the turbidity within applicable limits.	**Complied** A total 7.21 Mm^3 dredged material has been utilized for reclamation of 63.43 Ha area of land. With respect to dredging and reclamation, the requirements for reclamation of berths for Phase I development of the port have been completed.
24	Appropriate measures relating to maintenance of health, hygiene, safety and security will be implemented as per EIA report	**Complied** An officer of VISL has been designated as Head (EHS & CSR) for effective implementation of the stipulated EHS safeguards & CSR activities. AVPPL has also appointed competent and qualified professional for effective implementation of EHS safeguards & CSR activities. In addition to the above, independent environment, health and safety consultants have

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		been appointed as per concession agreement signed between GoK and AVPPL. It is also ensured that contractors executing the work also deploy qualified and competent EHS personnel for effective implementation of EMP measures.
25	VISL will ensure that livelihood issues of Mussel collectors are addressed as per the EIA report	**Being Complied** Government Orders have been issued for disbursal of Rs. 12.65 Crore for 271 mussel collectors. Till date 262 Mussel collectors have collected the compensation amount totalling to Rs. 12.36 Crore. Although they were offered alternate livelihood plan through cage fishing, they opted for one-time settlement citing the risks involved in such fishing.
26	VISL will ensure all the project components i.e., including road/rail connectivity are implemented in time. In addition the planned CSR and EMP measures will also be implemented and monitored to ensure the socio-economic development of the region.	**Being Complied** Refer point 20 above EMP as prescribed in the EIA are being implemented. CSR activities are being activities are being carried out in villages within 10 km radius of the project. Details of the same are being submitted as a part of the HYCRs.
27	The implementation of the EMP/RAP/CSR will be ensured through the institutional and regulatory mechanism with regular monitoring and periodic compliance reports to the MoEF	**Being Complied** EMP as prescribed in the EIA are being implemented and reported in the HYCRs. CSR activities are being activities are being carried out in villages within 10 km radius of the project. Details of the same are being submitted as a part of the HYCRs.
28	Special care will be taken to minimise the tree felling in the backup area and to plan the development	**Complied** Cutting of trees is minimised to the extent possible. AVPPL, in collaboration with Forest department, have carried out planting of 40,040 trees in two Phases in adequate land as identified by social Forest Department, for a total area of 29.65 Ha spending Rs.

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	in tune with the topography.	254.50 Lakhs. This has sufficiently covered the obligation of compensatory afforestation required for the development of all the phases of Vizhinjam Port.
29	The livelihood restoration measures for fisherman affected during construction phase as reported in the EIA has to be implemented	**Being Complied** Refer point 1 above
30	Dredging materials will be used for reclaiming (filling) the sea and additional materials are not required	**Complied** Refer point 23 above
31	The number of fishermen who will be temporarily affected in the Adimalathura stretch have been assessed and livelihood restoration measures have been framed for the construction period	**Complied** Originally it was proposed that the fishermen at Adimalathura will be compensated for the construction period of three years, treating them as temporarily affected. However, based on the request of the fishermen (stating that demarcation of the shipping channel and movement of ships would affect them permanently) their compensation has been enhanced considering seven years of livelihood loss. The GoK order to this effect has been issued on 31.05.2018 and compensation has already been disbursed to 602 eligible fishermen amounting to a total of Rs. 36.42 Crore.
32	There will be no erosion on the shoreline on account of dredging the deep sea at (-) 18m to (-) 20m	**Being Complied** Refer point 7 above
33	An Area Development Plan (ADP) is being prepared by CEPT University (Ahmedabad) for planned development of the region to avoid	**Being Complied** The final Integrated Area Development Plan prepared through CEPT University, Ahmadabad in consultation with Town Planning, Tourism, Industry and other line departments was reviewed by the expert committee constituted by GoK. Tourism management plan would be discussed with tourism department for a way forward. A transaction advisory services tender for

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	haphazard development.	planned business promotion and development in the nearby area has been floated and in process. A new Logistic Park policy and Industrial policy has been issued by GoK based on which a new Port based ecosystem would be generated around the port. Similarly, an Outer Area Growth Corridor (OAGC) and an Outer Ring Road proposal has been developed by GoK and which would be acting as a guideline for the area development plan.
34	Maximum 3 ships are expected per day in phase I. Appropriate traffic mechanism to cross the ship channel for fisherman with first priority will be practised as is happening in Cochin Port where fishing harbour, container berth, navy, shipyard, inland water transport etc are co-existing	**Will be Complied** Restrictions on fishing will be as per the applicable laws.
35	An additional fish landing centre has been suggested at Vizhinjam to decongest the existing harbour, and to cater to the needs of the fisherman in the 15 km vicinity including Pozhiyur & Poovar, considering the suitability of the site having natural bay, increased tranquillity and operational / infrastructural convenience than location like	**Being Complied** Refer point 4 above

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	Pozhiyur–Poovar estuary	
36	Implementation of CSR measures and planned development of the region through well designed area development plan will arrest the formation of slums and the like.	**Being Complied** Refer point 27 above
37	"Inconvenience Allowances" during construction period of three years to the fisherman (As per EIA Report)	**Complied** An amount of Rs. 31.57 Crores have been sanctioned by the GoK as inconvenience compensation in the form of kerosene. The entire Rs. 31.57 Crore has been given to the disbursal agency (Matsyafed) for the distribution.
38	As per the Entitlement Framework, Hardship Allowance is suggested in the EIA/EMP for resort workers who lost their job due to acquisition of the resort	**Complied** Compensation for livelihood loss; Rs 6.45 Crores out of allocated Rs. 6.45 Crores has been disbursed to 226 number of resorts workers and settled completely. The remaining two workers were unable to provide the requisite necessary documents and therefore could not be confirmed for disbursement.
39	During the construction period of three years livelihood assistance to the shore seine fisherman in the 2km ship channel foot print beach has been suggested although they can move further southward and continue with their activity.	**Being Complied** Refer point 1 above
40	Ensure that all EMP related aspects are properly implemented during construction and operational phase	**Being Complied** Refer point 23 above

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
41	A dedicated port road directly connecting to NH-47 bypass is envisaged.	**Being Complied** Refer point 20 above
42	Rail connectivity is proposed along the outer side of the stream running parallel to the harbour road and that too on elevated structures without affecting the entry to the fishing harbour	**Being Complied** Refer point 20 above
43	The port project will not affect the inflow of Neyyar river and AVM canal	**Not Applicable** This is a fact, since both are away from the project site
44	The port road will be access controlled for the exclusive use of container and related port movements. The suggestion for a new approach road can be considered on technical feasibility and subject to surrendering of adequate land by the beneficiaries	**Not Applicable** The port road will not be access controlled and connectivity for the residents will not be affected.
45	The Master Plan has already included a reservoir/ground water recharge facility adjoining the road for water-shed management	**Complied** Kerala State Remote Sensing and Environment Centre (KSREC) have studied the impact due to construction of port approach road. Recommendations of KSREC are being implemented and suitable mitigation measures as suggested in the KSREC report are being adopted during construction.
46	Where ever possible and based on eligibility, local people will be employed	**Being Complied** Refer point 11 above
47	Reconstruction of Roads in the nearby	**Being Complied**

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	area- Adequate provisions have been made for the old fishing harbour and its linkage roads as it will be adopted as a part of best practice and beautification process	GoK has formed a higher-level committee to prepare a master plan for the old fishing harbour. Government Departments concerned are coordinating to resolve the differences and to arrive at an acceptable plan in consultation with all stakeholders and accordingly a proposal for 25 crores for additional landing facilities at the southern side and a project for 45 crores with necessary facilities at the Northern Part has been formulated and submitted under PMMSY scheme and waiting for approval of GoI.
48	The development of the warehouse area will be taken up	**Will be Complied** This is part of the proposed port estate development.
49	Livelihood Compensation considered for those who were affected at Adimalathura during construction phase and those affected in the project foot print area at Mulloor and Valiyakadappuram during construction/ operation phase	**Complied** Earlier it was proposed that the fishermen at Adimalathura will be compensated for the construction period of three years, treating them as temporarily affected. However, based on the request of the fishermen (stating that demarcation of the shipping channel and movement of ships would affect them permanently) their compensation has been enhanced considering seven years of livelihood loss. The GoK order to this effect has been issued on 31.05.2018 and compensation has been disbursed to 602 eligible fishermen amounting to a total of Rs. 36.42 Crore.
50	CSR activity suggested a skill development centre to equip the local people to adapt to the industrial needs of port/tourism and fisheries so that they can be appropriately employed based on their merit. However during construction period the EIA study has suggested to adequately employ local population to the maximum extent possible	**Complied** Additional Skill Acquisition Program (ASAP) is a GoK initiative aimed to impart required skills to local youth for improving their employability. A Community Skill Park (CSP) in an area of 1.5 acres of land handed over by VISL has been developed at Vizhinjam. The CSP operates on a PPP model wherein 25,000 sq. ft. building with facilities for students' hostel have been constructed by GoK by ASAP under ADB assistance, whereas the operation of the centre with logistics and other high-end courses are being taken up by Adani Skill Development Centre (ASDC) as per an agreement with GoK/ASAP/VISL. The CSP developed is a 3 storied building with facilities such as office space, seminar hall, training rooms, IT lab, library, meeting room, faculty room, etc. ASDC is conducting various domain courses, livelihood related courses, and high-end port related

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		courses according to the anticipated vacancies arising in the port, in other top organizations and ports in India and abroad to benefit the community youth in and around Vizhinjam area and other locals. The CSP developed is a 3 storied building with facilities such as office space, seminar hall, training rooms, IT lab, library, meeting room, faculty room, etc. On 15.06.2024, the CSP training building and hostel block was inaugurated by Dr. R Bindhu, Minister for Higher Education, GoK. Preference is being given to local people based on skill & competency during the construction stage. Presently, 416 people from Kerala are employed in different construction activities wherein 115 people are from the five nearby wards of Port.
51	Loss of livelihood to the traditional fisherman who do shell fishing in the Mulloor beach area is a real issue/impact. All necessary provisions for livelihood assistance have been considered in the EIA Report.	**Being Complied** Refer point 1 above
52	Only prohibited area for fishing is inside the breakwater. However fishing will be restricted along ship channel and port limits subject to safety norms and operational requirements.	**Will be Complied** Restrictions on fishing will be as per the applicable laws.
53	The existing notification of the Vizhinjam Port includes the Vizhinjam Fishing harbour. The revised Notification will	**Complied** GoK notified the limits of the Vizhinjam International Deepwater Multipurpose Seaport and altered the limits of the existing Vizhinjam Port (Vizhinjam Fishing harbour) vide G.O. (P) No. 22/2019/F&D dated 21.05.2019. Vizhinjam fishing harbour is excluded from revised notification.

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	include the Vizhinjam Deep Water Port based on revised Port limit provided in the EIA report. Except inside the breakwater of the Deep Water Port in all other areas of the port limit fishing is allowed with all safety and operational restrictions.	Restrictions on fishing will be as per the applicable laws.
54	There will only be a movement of 8 barges per day during the construction period of 3 years and the same will not be a hindrance for the fisherman to cross since this is far less than the number of ships being crossed by them daily in the international ship channel.	**Being Complied** The project is being executed in a manner that there is minimum disturbance to fishing activity. Restrictions on fishing will be as per the applicable laws.
55	The maximum rate of accretion at southern side of the harbour will be 21.6 m/year in the 1st year and by the end of tenth year it reduces to 0.5 m/year. The shoreline evolution along the south side of the port will get stabilized in the initial years. On stabilization, the maximum net increase in the shoreline accretion would be around 27m immediately south of	**Being Complied** Several studies on the Shoreline Change Analysis of Vizhinjam Coast have not observed any shoreline change erosion occurring within 10 km due to the Vizhinjam port project.

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
	the port which reduces to negligible levels within 2.3km alongshore. There will not be any impact on the shoreline along Poovar-Pozhiyar sector which is about 7km away from the proposed port.	
56	The 8 resorts affected will be compensated in line with R&R package in place but subject to the advice of the KCZMA/MoEF considering that all these resorts are in NDZ as per CRZ Notification, 2011	**Being Complied** All authorized-cum-affected resort owners evicted have been compensated adequately for land as per Central/State government norms.
57	The cruise terminal proposed in the project, will promote tourism in the Kovalam-Poovar belt and the region may become the cruise hub/tourism gate way of India in future	**Noted** Once the first phase of port becomes operational, it would naturally attract tourism. Action is also being taken in consultation with the State Tourism Department, to design port linked tourism packages focussing on the Kovalam-Vizhinjam-Poovar tourism corridor.
58	CSR activity considers training the local people to adapt to the new economic development of the area	**Being Complied** Refer point 50 above
59	The Coast Guard & Navy Berth are as per the needs of the Ministry of Defence on national security	VISL and GoK conducted a series of discussions with Coast Guard, Navy and Ministry of Defence for in-principle approval for the proposal of Navy and Coast Guard. The in-principle approval was then essential as the issue of both the RFP for PPP and EPC works were dependent on them and any further postponement then would have resulted in inordinate delay in implementation of the project. The matter was placed before the Empowered

Compliance of the Response/Commitments made during Public Hearing		
S. No.	**Conditions**	**Compliance Status as on 31.03.2025**
		Committee of Secretaries constituted for implementation of Vizhinjam Seaport and chaired by Chief Secretary. The Empowered Committee in its 15th meeting held on 15.02.2014 decided and recommended to GoK to go ahead without participation of the Indian Navy and Coast Guard if the 'In-Principle' approval is not received by 25.02.2014. As an in-principle approval for development of the Navy and Coast Guard Berths was not provided by the Ministry of Defence, GoK, based on recommendation of the Empowered Committee and vide Government Order G.O(MS) No.21/2014/F&PD dated 01.03.2014, decided to proceed without the participation of Indian Navy/Coast Guard for development of Vizhinjam International Seaport.

Annexure VIII

Status of Environment Management Plan

Annexure VIII

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
1	Cargo handling and Inland Cargo movement and storage areas	Air Quality	o Use of Multi Purpose Cranes such as RTGs with provision of electric RTGs in future. o Use of low sulphur diesel fuel is proposed o Regularization of truck movement o Periodic cleaning of cargo spills, o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation o Greenbelt Development	**Being Complied** o 8 nos. of Rail Mounted Quay Cranes (RMQC) at the Container Berth and 24 nos. of Cantilever Rail Mounted Gantry (CRMG) cranes at the Container Backup Yard are deployed at the port; these are electric powered. o Spillages will not occur during normal operation, however, in case of emergency, it shall be properly collected and disposed as per the Rules. o Internal Transfer Vehicles (ITVs) are utilized for transportation of containers and therefore do not require tarpaulin covers. o All employees are provided with relevant Personal Protective Equipment (PPEs) like Helmets, Shoes, Fluorescent Reflective Jackets, etc. o Road: A proposal was initiated by GoK with NHAI for the development of a clover leaf intersection and a design consultant has been appointed for the study and preparation of the Detailed Engineering Design and Drawings for the proposed Cloverleaf Interchange at the Junction Point at NH-66 connecting the Port Approach Road, NH-66 and Outer Ring Road (ORR). Land acquisition for the clover leaf interchange is underway. In the meantime, the Port is being connected with NH-
		Noise	o Acoustic Barriers and Enclosures o Personal Protecting Equipment (PPE) o Greenbelt Development o Counselling and traffic regulation	
		Traffic Addition	o A dedicated road network of approximately 2.0 km is proposed from port to NH -47 bypass o Regularization of truck movement o A dedicated rail network of approximately 15 km is proposed from port to Nemom railway station	

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				66 by way of a temporary connectivity by merging the service road with NH-66 at 2 locations, which is being considered by NHAI based on the Port Traffic Movement Scheme submitted by AVPPL. o Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, about 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway and Railway Board. EC amendments in this regard have been granted by MoEF&CC on 17.07.2024 vide EC Identification Number EC24A033KL158955.
2	Aqueous discharges in harbour basin	Marine water quality and ecology	o Ships are prohibited from discharging wastewater, bilge, oil wastes, etc. into the near-shore as well as harbour waters. o Ships would also comply with the MARPOL convention. o As a mitigation measure for spillages an Oil spill contingency plan will be prepared and implemented. o Provision of waste reception facility	**Being Complied** o All vessels entering the port are complying with DGS Circular No 02 of 2023 for Annex VI of MARPOL. Vizhinjam Port is also registered under Swachh Sagar portal of DG shipping. KSPCB approved vendors for waste collection under Swatch Sagar Portal has been adopted for disposals. De-ballasting inside port premises is allowed as per MARPOL regulations with prior permission from the port authorities. However, no muddy water de-ballasting is permitted. All vessels calling at Vizhinjam port shall have Ballast water

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				o treatment plant certificate with D2 category and shall share ballast exchange prior to arrival. o AVPPL have prepared and updated an Oil Spill Disaster Contingency Plan (OSDCP) after making necessary amendments in accordance with the observations issued and resubmitted to the same to Indian Coast Guard (ICG) vide Letter AVPPL/ICG/2024-25/3640 dated 12.02.2025 (Enclosed as **Annexure V**).
3	Cargo and Oil spills	Marine water quality and ecology	o In case of any cargo spillage during transfer from/to ships, it will be attempted to recover the spills. o Oil spill control equipment such as booms / barriers will be provided for containment and skimmers will be provided for recovery. o Response time for shutting down the fuelling, containment and recovery will be quicker.	**Being Complied** o Oil spill will not occur during normal operation, however, in case of emergency, if any oil spill occurs, it shall be properly collected and disposed as per the Rules. o Procurement and delivery of Oil Spill Response Equipment (OSRE) is completed as per the NOSDCP-2018 for Category 'B' and the equipment has been commissioned and is available at Vizhinjam Project site operationally ready.
4	Maintenance dredging	Marine water quality Marine Ecology	o As per design, bathymetry, oceanographic conditions and modelling results quantity of dredge negligible. Maintenance dredged material will be dumped at the identified offshore disposal area for capital dredged material..	**Noted for Compliance** o Capital Dredging for Phase I of the project is completed. o There is no maintenance dredging carried out till date. o Based on the shoreline monitoring data, maintenance dredged material, if any, shall be utilized for appropriate mitigation measures after consulting NGT expert committees.

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			o Additional Environmental Monitoring Programme comprising of monitoring of marine water quality, marine sediment quality and marine ecology will be initiated one week prior to commencement of dredging and will be carried out during the dredging period.	
5	Water Supply	Water resources	o Water requirement 0.5 MLD during Phase 1 and this water will be met from Vellayani lake o Water treatment plant, storage and distribution network developed.	**Noted** o For water for operation purposes, AVPPL have applied for Kerala Water Authority (KWA) connection through E-Tapp dated 19.01.2024. KWA Water Supply Division Neyyattinkara have subsequently facilitated the connection of water supply to Vizhinjam port through deposit of necessary funds by AVPPL and have provided a tapping point along with water meter inside the project site in August 2024.
6	Wastewater Discharge	Water Quality	o Separate Collection and treatment for oil and grease for runoff from workshop area, truck parking etc o Sewage treatment plant will be constructed within port area and port colony area o Treated wastewater from STP will be used for irrigating the greenbelt	**Being Complied** o Sewage Treatment Plant (STP) facility of 50 KLD capacity in accordance with the CRZ Notification (CRZ-II Area) has been developed as a part of Phase I of the port project and will be further augmented with additional modular unit of 50 KLD, based on the requirement. The STP technology is MBBR (Moving Bed Biofilm Reactor).

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				o The treated water generated is being used for horticulture (landscape development), dust suppression (water sprinkling), etc.
7	Solid Waste Management	Groundwater and Soil quality	o An integrated solid waste management plan is proposed for port and associated facilities o Composted bio-degradable waste will be used as manure in greenbelt. o Other recyclable wastes will be sold.	**Being Complied** o Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and the output is being used as manure in greenbelt development within the port project areas. o The dry waste is being properly collected, segregated, and disposed of in line with the Solid Waste Management Rules 2016, as amended.
8	Handling of hazardous wastes	Fire accidents due to products handling	o Hazardous materials if any will be stored as per the prescribed/approved safety norms. o Hazardous wastes (used oil & used battery) will be sent to KSPCB/CPCB approved recyclers. o Medical facilities including first aid will be available for attending to injured workers o Emergency alarms, provision of fire hydrant system and fire station. o Effective Disaster Management Plan (DMP) which covers onsite and	**Being Complied** o Hazardous Waste at site are being disposed to authorized (CPCB/KSPCB) handlers as per the provision of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008.

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			offsite emergency plans. o Recovery of spills to the extent possible.	
9	Fishing activity	Fishermen livelihood	o Educating the fishermen about the orientation of approach channel and movement of ships o Regular Interactions will be initiated with the fishing community o Conflicts if any with fishing community will be amicably resolved in all cases o A fishing harbour with all the required infrastructural facilities (i.e., landing terminals, road network, fish processing as well as auction area, ice plant, transportation facilities, drainage and solid waste management facilities) shall be constructed. o Fishermen using the beaches of Mulloor for mussel collection and Nellikkunnu for shore seine in the project footprint area will be	**Being Complied** o Restrictions on fishing will be as per the applicable laws. o Navigational buoys/marker buoys are placed for demarcation of approach channel and breakwater for fishing boats to maintain a safe distance. o For mutual understanding of the port operation activities with the local fishing community an exclusive CSR (Corporate Social Responsibility) team of AVPPL has been assigned. The dedicated CSR team are in constant touch (through WhatsApp Groups, etc.) with the fishermen/fishing community members to facilitate the flow of various project related information/updates. o AVPPL CSR team also provides regular updates to the committee which has been formed by the local church leaders/other representatives adjoining to the port area, who in turn pass on relevant port project information to the fishermen. o Higher level engagement with the fishing community is also being carried out by the Fisheries Department of

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			compensated with either alternate employment or to be suitably integrated to the new fishing harbour /port activities	GoK at Director Fisheries level and at Minister Level. o Planning work for the fish landing center and the associated breakwater had been initiated as part of the funded work component of the Port concession agreement. However, based on the recommendations of the report on physical model studies carried out by Central Water and Power Research Station (CWPRS), the geometry of the breakwater originally proposed for the fishing harbour is found to be not suitable with respect to tranquillity and hence the design of the new fishing landing centre was revisited. Consultations between Fisheries Department and Ports Department, Government of Kerala (GoK) are held to decide the suitable location for the additional fishing harbour in consultation with the fishermen community. GoK would soon be finalising the plan of action based on the final CWPRS report to develop and make available the additional fish landing facilities for the benefit of the local fishermen in line with the blue economy vision of the Government of India (GoI) along with the completion of the Port. o Government Orders have been issued for disbursal of Rs. 12.65 Crore for 271 mussel collectors. Till date 262 Mussel collectors have collected the compensation

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				amount totaling Rs. 12.36 Crore. Although they were offered alternate livelihood plan through cage fishing, they opted for one-time settlement citing the risks involved in such fishing.
10	Tourism	Tourism	o Tourism activity is observed at Kovalam located about 2.0 km towards the North of Proposed Port. Mathematical Modelling studies on shoreline changes show the insignificant impact due to the port development on the existing coastline. However, the Shoreline monitoring during construction as well as operation Phases were proposed. o Since cruise terminal is planned at port, tourism sector in this regions will be enhanced o An appropriate tourism management plan is being prepared for implementation.	**Noted** o The final Integrated Area Development Plan prepared through CEPT University, Ahmadabad in consultation with Town Planning, Tourism, Industry and other line departments was reviewed by the expert committee constituted by GoK. The tourism management plan would be discussed with tourism department for a way forward. A transaction advisory services tender for planned business promotion and development in the nearby area has been floated and in process. o Implementation of the Tourism Management Plan which would be integrated with the overall tourism directorates plan in the area is being discussed with the tourism department and would be implemented along with the completion of the Master Plan of the port project. o Action is also being taken in consultation with the State Tourism Department, to design port linked tourism packages focusing on the Kovalam-Vizhinjam-Poovar tourism corridor.

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
11	Breakwaters	Shoreline	o Shoreline monitoring shall be carried o Suitable Shoreline protection measures will be implemented based on the observations	**Being Complied** o Based on the Shoreline Monitoring Plan prepared by L&T Infra Engineers Ltd (L&T IEL) under the guidance of National Institute of Ocean Technology (NIOT), oceanographic and shoreline monitoring is being carried out by agency Shankar Surveys Pvt. Ltd. (SSPL) for a stretch of 40 km (20 km on both sides of the project site) and reports are being regularly submitted to Ministry of Environment and Forests & Climate Change (MoEF&CC) as a part of the HYCRs. o Several studies on the Shoreline Change Analysis of Vizhinjam Coast have not observed any shoreline change erosion occurring within 10 km due to the Vizhinjam port project.
12	Operation of port	Socio-economic conditions of the region	o During construction phase, the employment potential is estimated at about 2350 persons (including road/rail connectivity). During operational phase, the port is likely to generate direct employment of 650 and nearly 2000 indirect employment opportunities. Local people will be given preference based on their qualification and	**Being Complied** o Construction of Phase I of the port is nearing completion. Phase I operations of the port began on 03.12.2024. o Presently, 416 people from Kerala are employed in different construction activities wherein 115 people are from the five nearby wards of Port.

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			skill set. Together with this employment potential, project will help to enhance the socio economic conditions of the area with better schooling, communication and transport facilities that will be developed/ triggered as a part of overall economic development of the region. Further a project of this size could trigger multitude of opportunities and such employment generations cannot be estimated at this juncture.	
		Natural Hazards	o Disaster Management Plan (DMP) will be prepared; Manager (EHS) will act as the overall in-charge of the control of educative, protective and rehabilitation activities to ensure least damage to life and property.	**Being Complied** o An officer of VISL has been appointed at the level of General Manager – Environment for the supervision of the stipulated Environment, Health and Safety (EHS) safeguards along with Government level Social Welfare Activities. o AVPPL has also appointed competent and qualified professional team for the effective implementation of EHS safeguards & CSR activities. o In addition to the above, an Environmental Expert of the independent engineer and safety consultants have been

Status of Environment Management Plan-Port Site-Operation Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				appointed as per concession agreement signed between GoK and AVPPL. o It is also ensured that contractors executing the work also deploy qualified and competent EHS personnel for effective implementation of EHS measures.
		Induced Development	o Offers an efficient and cost effective supply chain/ value proposition to the local importers and exporters in states of Kerala, Tamil Nadu and Karnataka.	**Noted**
13	Shoreline changes	erosion/accretion	o Final shoreline Impact management plan will be prepared in consultation with agencies like CESS/INCOIS, NGO and local bodies and will implemented.	**Being Complied** o Based on the Shoreline Monitoring Plan prepared by L&T Infra Engineers Ltd (L&T IEL) under the guidance of National Institute of Ocean Technology (NIOT), oceanographic and shoreline monitoring is being carried out by agency Shankar Surveys Pvt. Ltd. (SSPL) for a stretch of 40 km (20 km on both sides of the project site) and reports are being regularly submitted to Ministry of Environment and Forests & Climate Change (MoEF&CC) as a part of the HYCRs.

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
1	Capital dredging	Marine water quality Marine ecology	o Check turbidity levels with baseline levels as reference during entire monitoring programme o Preparation of Dredge/reclamation Management plan o Discharge of waste into sea will be prohibited o Oil Spill control measures will be adopted o Ensure that slop tanks will be provided to barges/ workboats for collection of liquid/ solid waste o Marine environmental monitoring as per environmental monitoring programme	**Compiled** A total 7.21 Mm^3 dredged material has been utilized for reclamation of 65.71 Ha area of land. With respect to dredging and reclamation, the requirements for reclamation of berths for Phase I development of the port have been completed.
2	Material transport and construction activities	Air Quality	o Most of the Breakwater stones will be transported from the quarries to the nearest harbour. From there through Barges it will be transported to project site. This is will avoid substantiate flow of Heavy Vehicles during construction Phase thereby minimizing impact on Air and Noise Quality in the project region.	**Complied** Phase I Breakwater is completed, and further requirement of stones are not envisaged.

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt o Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water sprinkling will be carried out	

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			to suppress fugitive dust o Environmental awareness program will be provided to the personnel involved in developmental works o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented	**Being Complied** o Noise levels are being monitored every fortnight and are found to be well within the permissible limits within the project area. o Contractors are also monitoring the Noise level in their work area and results are within the stipulated limits. o Protective gear like earplugs, muffs are provided to workers exposed to noise level beyond threshold limits. o Acoustic Barriers and Enclosures shall be set up wherever necessary for noisy equipment. o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, is being used. o Piling for Phase I construction has been completed.

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			so that the noise is directed away from sensitive receptors o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
		Disturbance to Natural Drainage pattern	o Port development is mostly on reclaimed land o Rainwater/surface water harvesting pond included in design o Existing drainage near port boundary (backup area) will be integrated with port storm water drainage & management plan	**Being Complied** o Measures have been taken for maintaining the natural flow of the streams. o A study was conducted to access the rainwater harvesting potential and recommend for planning accurate, successful and implementable rainwater harvesting management system within the proposed sites for the sustainable development of existing

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			o Existing drains / Streams that are passing in ware house area will not be closed/ diverted. And these streams will be de-silted and enhanced to improve their carrying capacities	groundwater resources and thereby suitable rainwater harvesting structures are recommended. To capture, store and reuse a percentage of the estimated runoff, rainwater collection and storage sumps are recommended at suitable locations. However, since the area within the port is reclaimed land, rainwater harvesting structures at the suggested locations were found to be not feasible. o Drains/streams passing through the port area are not closed.
		Vegetation and Strain on existing infrastructure	o Port development is planned mostly on reclaimed land; o Land use at backup area, PAF Zone and warehouse area will be mostly coconut plantation and low mixed plantation o Adequate green belt will be developed in port and its associated (backup area, PAF, warehouse and road & rail connectivity). o Temporary workers camp with self-sufficient infrastructure facilities.	**Being Complied** o Although a natural greenbelt exists, the greenbelt of adequate width with suitable species as identified in the EIA will be developed in all possible areas including back-up areas and along the boundary of the project area in line with the establishment of the project. A greenbelt development plan has been considered in the Master Plan and adequate budgetary provision has been kept for this purpose. Landscape development work has been completed at several locations in the port areas. o Care is taken to limit the falling of trees to the minimum. Due permission is taken for trees to be cut down because of the port development from the department concerned (Forest Department). o AVPPL, in collaboration with Forest department, have

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				carried out planting of 40,040 trees in two Phases in adequate land as identified by social Forest Department, for a total area of 29.65 Ha spending Rs. 254.50 Lakhs. This has sufficiently covered the requirement of compensatory afforestation required for the entire Master Plan development of Vizhinjam Port. o There are no labourers residing in the labour camps. It is ensured that construction workers who are staying outside in contractor rented houses/apartments are provided with necessary infrastructure facilities.
		Existing Traffic	o NH-47 bypass under construction around 2.0 km from the proposed Port site and the Transportation of construction materials will be carried out during non- peak hours. Hence a dedicated road of 45 M RoW is proposed to connect site with NH Bypass o Regularization of truck movement o Majority of rock for breakwater construction will be transported through sea route via barges from nearby quarry sites o A dedicated rail network of approximately 15 km is proposed	**Being Complied** o Development of dedicated road connectivity approach road (2.0 km) from the port to the NH-47 Bypass is in progress. A proposal was initiated by GoK with NHAI for the development of a clover leaf intersection and a design consultant has been appointed for the study and preparation of the Detailed Engineering Design and Drawings for the proposed Cloverleaf Interchange at the Junction Point at NH-66 connecting the Port Approach Road, NH-66, and Outer Ring Road (ORR). Land acquisition for the clover leaf interchange is underway. In the meantime, temporary connectivity by way of median cutting at NH 66 is being proposed, which is being considered by NHAI based on the Port Traffic Movement Scheme submitted by AVPPL.

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			from port to Nemom railway station	o Traffic monitoring and regularization is being carried out for maximum efficiency. o Transportation of construction materials is being carried out considering the non-peak traffic timing and local restrictions during festivals, strikes, etc. o Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, about 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway and Railway Board. EC amendments in this regard has been granted by MoEF&CC on 17.07.2024 vide EC Identification Number EC24A033KL158955.
3.	Land Reclamation	Existing Water Resources like Groundwater and surface water	o Land to be reclaimed will be separated from adjoining land by creating containment bund. o Return sea water will be sent back to sea through appropriate channels.	**Being Complied** o A total 7.21 Mm^3 dredged material has been utilized for reclamation of 63.43 Ha area of land. With respect to dredging and reclamation, the requirements for reclamation of berths for Phase I development of the port have been completed. o The existing drains are maintained for unhindered disposal of surface drainage water.
4.	Solid Waste Management	Soil quality	o Construction waste will be used within port site for filling of low	**Being Complied** o Construction waste is used within port site for filling of

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			lying areas. o Composted bio-degradable waste will be used as manure in greenbelt. o Other recyclable wastes will be sold. o Excavated soil at backup, PAF Zone and ware house area will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. o General refuse generated on-site will be collected in waste skips and separated from construction waste. o Burning of refuse at construction sites will be prohibited. o All control measure will be taken to avoid the contamination of groundwater during construction phase	low-lying areas in line to C&D Waste Management Rules 2016, as amended. o Contractors working at the site have been made responsible for management of Solid Waste during construction stage and are complying with the provisions pertaining to Solid Waste Management Rules 2016, as amended. o An Organic Waste Converter (OWC) has been installed at site and is operating for bio-degradable waste; output is being used as manure in greenbelt development. o General refuse waste is being stored separately and sent to approved recyclers and/or sold. o No burning of refuse at construction sites is being done. o There is no disposal of waste in the project area which may lead to groundwater contamination.
5.	Handling of hazardous wastes	Human safety and property loss	o Adequate safety measures as per OSHA standards will be adopted o Construction site will be secured	**Being Complied** o Adequate safety measures as per OSHA standards are adopted as and when necessary, as per the HSE Plan. o Construction site is being secured by fencing wherever

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			by fencing with controlled/limited entry points. o Hazardous materials such as lubricants, paints, compressed gases, and varnishes etc., will be stored as per the prescribed/approved safety norms. o Medical facilities including first aid will be available for attending to injured workers. o Handling and storage as per statutory guidelines. o Positive isolation procedures will be adhered o Hazardous wastes will be disposed through approved KSPCB/CPCB vendors.	possible with controlled/limited entry points. Boundary wall construction is ongoing at available fronts. o Medical facilities including first aid are available for attending to injured workers. Ambulance is also available at site for shifting the injured to the nearby hospitals. o Handling and storage of Hazardous Materials is being done as per statutory guidelines. o Hazardous waste is disposed through approved KSPCB/CPCB vendors.
6.	Water Resources	Water scarcity / Pollution	o Water requirement during the construction is expected to be around 0.10 MLD o Water will be sourced from Vellayani lake o Avoid/minimise the loss during conveyance	**Being Complied** o KWA set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			o Optimized utilization of the water o Care will be taken to prevent the runoff from the construction site to the nearby natural streams, if any	MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. o The water for construction purposes for the port is being sourced from the open market/private suppliers. o Care is being taken to prevent the runoff from the construction site to the nearby natural streams.
7.	Fishing	Fishermen and fishing villages	o Signboards will be placed at the construction activities in order to make fishermen aware of the ongoing construction activities o Necessary marker buoys will be installed o Interactions will be initiated with the fishing community before commencement of construction works	**Being Complied** o Signboards have been placed for demarcation of construction area. o Navigational buoys/marker buoys are placed in the marine area for fishing boats to maintain a safe distance from the areas of breakwater construction. o The number of buoys for monitoring in the project area has been optimized, considering the safety of fishermen and ease of movement during construction. o Using the technological advancement the dedicated CSR team of AVPPL are in constant touch with the fishermen/fishing community members to facilitate the flow of various project related information/updates. o AVPPL CSR team also provides regular updates to the committee which has been formed by the local church representatives adjoining to the port area, who in turn pass on port project execution information to the fishermen.

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
8.	Tourism	Effect on tourism	o Tourism activity is observed at Kovalam located about 2.0 km towards the North of Proposed Port. Mathematical Modelling studies on shoreline changes show the insignificant impact due to the port development on the existing coastline. However, the Shoreline monitoring during construction as well as operation Phases were proposed. o A cruise terminal and related facilities is part and parcel of the project. This is to largely compensate the losses made o For all acquired properties and land adequate compensation will be provided based on legally valid documents	**Being Complied** o The tourism activity in the nearby Kovalam area is not impacted by the construction of the port. o Shoreline monitoring for a stretch of 40 km (20 km on both sides of the project site) is being done and reports are regularly submitted to regulatory authorities. o Implementation of the Tourism Management Plan is being discussed with tourism department and which would be integrated with the tourism directorates plan in the area. o All authorized-cum-affected resort owners evicted have been compensated adequately for land as per Central/State government norms. Payment transfer for the land acquisition of the last three resorts has been made to District Collector and which is in the process of acquisition.
9	Breakwater	Change in shoreline	o Shoreline monitoring shall be carried out o Suitable Shoreline protection measures will be implemented based on the observations	**Being Complied** o Comprehensive Shoreline Monitoring is being carried out under the technical Guidance of NIOT and Six monthly monitoring reports are being submitted regularly as part of EC & CRZ Compliance. The existing Shoreline Monitoring consists of:

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				o Wave and Current Observations by INCOIS o Onshore & Offshore Cross beach profiling o Littoral Environmental Observations (LEO) o Beach Sampling o Multi-beam Echo Sounder (MBES) survey o River cross section surveys o Grab Sampling o Tide Observations o Weather Observations o Water Sampling o L&T Infrastructure Engineering Ltd. (L&T IEL) had prepared Mathematical Modelling Reports based on Shoreline Monitoring data; which were vetted by National Institute of Ocean Technology (NIOT). o Suitable Shoreline protection measures will be implemented based on the observations, if any.
10	Effect on existing fishing harbour	Movement of fishing boats	o Detailed modelling studies have been carried out on tranquillity conditions in the fishing harbour with port development. The studies reveal that the tranquillity conditions will be improved in fishing harbour with construction of the port. Further minor	**Being Complied** o Wave, current and tide data are being monitored along with the shoreline monitoring of 40 km stretch. Based on the above, the modelling studies done at the EIA stage has been further evaluated. o During operation phase traffic of Marine vessel/fishing boats will be planned without affecting each other as per the applicable laws.

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			accretion happening within the fishing harbour will be arrested o Traffic of Marine vessel/ fishing boats will be planned without affecting each other o Adoption of fishing harbour to manage it to perform as per International standard o A new fishing harbour provided under CSR initiatives because of additional tranquillity creator. o Loss of livelihood will be either taken care of in the new port premises or adequately compensated mostly in the form of employment	o Based on the recommendations of the report on physical model studies carried out by CWPRS, the geometry of the breakwater originally proposed for the fishing harbour is found to be not suitable with respect to tranquillity and therefore the design of the new fishing landing centre needed to be revisited. Consultations between Fisheries Department and Ports Department, GoK are being held to decide the suitable location for the additional fishing harbour in consultation with the fishermen community. GoK would soon be finalising the plan of action based on the final CWPRS report to develop and make available the additional fish landing facilities for the benefit of the local fishermen in a time bound manner. *(Source: VISL)* o In consultation with the fishermen, enhanced livelihood compensation of Rs. 108.32 Crores was sanctioned by GoK and distributed up to date by VISL to the fishermen as livelihood compensation. Till 30.09.2024 an amount of Rs. 106.93 Crores have been disbursed for a total number of 2697 Livelihood Affected Persons (LAPs) whose verification was complete in all respects; this includes boat owners to whom kerosene is supplied free of cost during the breakwater construction period. Remaining few disbursals would be done as soon as

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				possible.
11	Shoreline changes	Erosion/accretion	Final shoreline Impact management plan will be prepared in consultation with agencies like CESS/INCOIS, NGO and local bodies and will implemented.	**Being Complied** o NIOT has been engaged to give technical advice on aspects related to shoreline monitoring & shoreline evolution. o Comprehensive Shoreline Monitoring is being carried out under the technical Guidance of NIOT and six-monthly monitoring reports are being submitted regularly as part of EC & CRZ Compliance. o Wave, current and tide data are being monitored a 40 km stretch. o L&T IEL had prepared Mathematical Modelling Reports based on Shoreline Monitoring data; which were vetted by NIOT.

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
1	Environmental Management and Monitoring Facility Equipment for EMP (Meters, Vehicles and Buildings)	o This will include institutional requirements, training, environmental management and monitoring. Provision for purchasing required equipment.	**Noted for Compliance** o An Environment Management Cell has been established to look after day-to-day affairs like Monitoring, Training, etc. o Appropriate institutional mechanism for maintenance of health, hygiene, safety, security has been put in place. o An officer of VISL has been designated as General Manager – Environment for supervision of the stipulated Environment, Health and Safety (EHS) safeguards. AVPPL has also appointed competent and qualified professional team for the effective implementation of EHS safeguards & CSR activities. In addition to the above, an Environmental Expert of the independent engineer and safety consultants have been appointed as per concession agreement signed between GoK and AVPPL. o It is also ensured that contractors executing the work also deploy qualified and competent EHS personnel for effective implementation of EHS measures. o Third party environmental monitoring through NABL accredited laboratory has commenced since August 2016 and the monitoring results are satisfactory.
2	Altered Road embankment	o Retaining walls and gabions should be provided	**Noted for Compliance** o AVPPL engaged Kerala State Remote Sensing and Environment Centre (KSREC) to undertake study on Groundwater impact due to construction of port approach road. The suitable mitigation measures as suggested by KSREC are being adopted during construction.

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
3	Dust	o Water should be sprayed during the construction phase, at mixing sites, and temporary roads. o In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to prevent dust. o Vehicles delivering materials should be covered to reduce spills and dust blowing off the load.	**Being Compiled** o Regular Water Sprinkling is done on the approach road by water tankers. o Water spraying is carried out at regular intervals after compaction o Tarpaulin cover is used in vehicles delivering materials.
4	Air Pollution	o Vehicles and machinery are to be maintained so that emissions conform to National and State standards. o All vehicles and machineries should obtain Pollution Under Control Certificates (PUC).	**Being Complied** o It is ensured that all vehicles entering the port have Pollution Under Control (PUC) Certificate.
5	Noise	o Machinery and vehicles will be maintained to keep their noise to a minimum. o Construction of noise barriers of an average length of 100m and eight feet height wherever necessary. o Proper maintenance of the rail track and rail wagon, by frequent lubrication to avoid frictional noise. o Regular monitoring shall be carried out	**Being Compiled** o All the machinery and vehicles are maintained to keep the noise at minimum. o Noise monitoring is being done since August 2016, and the readings are within the limits at port site. o Regular monitoring of ambient Noise is carried out since August 2016 as per the Environmental Monitoring Plan prescribed in EIA and results are within the prescribed limit at port site.

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
		as per the Environmental Monitoring Plan.	
6	Loss of low lying land and ponds	o Impacted ponds can be enhanced by constructing bridged structures like Gabions to avoid plugging of springs. o Mitigation/Compensation shall be affected for the completely impacted ponds. o At Chainage km 6.500 the Railway alignment goes below the Existing NH and then at km 6.600 it will hit pond. The pond will be excavated partially and the soil material shall be used to fill in the western part and an equivalent area lost may be excavated to compensate the loss of effective pond area.	**Being Complied** o AVPPL engaged KSREC to undertake study on Groundwater impact due to construction of port approach road. KSREC had provided recommendations for AVPPL in the process of constructing the approach road to port: o The de-silting and rejuvenating the existing pond at the higher elevation, between chainages 1510 to 1570, and by constructing elevated road and the status quo maintenance of the pond A at the lower elevation within the chainages 980 to 1080 and by building elevated road will improve the recharge. o Subsurface dyke suggested will provide additional recharge not only nullify the impact of impervious area generated due to the road construction but will provide water in the wells during summer. o Cross Vents suggested below the road will help in sustaining the recharge of groundwater in the lean period and will act as drain-out mechanism at times of high groundwater level. o The surface ponds suggested are additional facilities to improve the recharge and to increase the water retaining capacity of the watershed. o These suitable mitigation measures as suggested by KSREC are being adopted during construction.

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
			o KRCL has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, about 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway and Railway Board. EC amendments in this regard has been granted by MoEF&CC on 17.07.2024 vide EC Identification Number EC24A033KL158955 and related compliances are being filed under the said the same.
7	Flood Impacts and Cross Drainage Structures	o Formation level should be raised according to the design and the cross drainage structures suitably planned for the flood events.	**Being Complied** o Care is taken such that the formation level is as per suitable design and the cross-drainage structures are also being implemented.
8	Alteration of drainage	o In sections along watercourses, earth and stone will be properly disposed of so as not to block rivers and streams, thereby preventing any adverse impact on water quality. o All necessary measures shall be taken to prevent earthworks and stone works from impeding cross drainage at streams and canals or existing irrigation and drainage systems in conformity to the Contractors visual integration and management plan and EMP.	**Being Complied** o AVPPL engaged KSREC to undertake study on Groundwater impact due to construction of port approach road. KSREC had provided recommendations for AVPPL in the process of constructing the approach road to port: o The de-silting and rejuvenating the existing pond at the higher elevation, between chainages 1510 to 1570, and by constructing elevated road and the status quo maintenance of the pond A at the lower elevation within the chainages 980 to 1080 and by building elevated road will improve the recharge. o Subsurface dyke suggested will provide additional recharge not only nullify the impact of impervious area

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
			generated due to the road construction but will provide water in the wells during summer. o Cross Vents suggested below the road will help in sustaining the recharge of groundwater in the lean period and will act as drain-out mechanism at times of high groundwater level. o The surface ponds suggested are additional facilities to improve the recharge and to increase the water retaining capacity of the watershed. o These suitable mitigation measures as suggested by KSREC are being adopted during construction.
9	Contamination from Wastes	o All justifiable measures will be taken to prevent the wastewater produced during construction from entering directly into rivers and irrigation systems.	**Being Complied** o Measures are being taken up to prevent the wastewater produced during construction from entering directly into rivers and irrigation systems. o No waste water is disposed into the water bodies.
10	Borrow pits	o Borrow pits are to be identified, opened and closed after consultations and proper documentation.	**Will be Complied as and when required**
11	Quarrying and Material sources	o Quarrying will be carried out at approved and licensed quarries only.	**Noted**
12	Soil Erosion and Soil Conservation	o On slopes and other suitable places along the two proposed corridors, trees and grass should be planted. o On sections with filling and deep cutting	**Being Complied** o AVPPL engaged KSREC to undertake study on Groundwater impact due to construction of port approach road. KSREC had provided recommendations for AVPPL in the process of

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
		their slopes should be covered by sod, or planted with grass, etc. o If existing irrigation and drainage system, ponds are damaged, they will be suitably repaired. o Retaining walls and gabions shall be suitably provided.	constructing the approach road to port. o The suitable mitigation measures as suggested by KSREC are being adopted during construction.
13	Loss of agricultural topsoil	o Arable land should not be used for topsoil borrowing. o Topsoil will be kept and reused after excavation is over. o Any surplus to be used on productive agricultural land.	**Being Complied** o Arable land is not being used for topsoil borrowing o The topsoil excavated is being stored and will be reused during development of greenbelt.
14	Compaction of Soil and Damage to Vegetation	o Construction vehicles should operate within the Corridor of Impact avoiding damage to soil and vegetation.	**Being Complied** o Construction vehicles are being operated only alongside the road boundary; thereby avoiding damage to soil and vegetation.
15	Loss of trees and Avenue Planting	o Areas of trees cleared will be replaced according to Compensatory Afforestation Policy under the Forest Conservation Act - 1980. o Landscaping shall be done at major junctions.	**Being Compiled** o Although a natural greenbelt exists, the greenbelt of adequate width with suitable species as identified in the EIA will be developed in all possible areas including back-up areas and along the boundary of the project area in line with the establishment of the project. Landscape development work is also being implemented at several locations in the port areas. o Care is taken to limit the felling of trees to the bare minimum.

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
			Due permission is taken for trees to be cut down because of the port development from the department concerned (Forest Department). o AVPPL, in collaboration with Forest department, have carried out planting of 40,040 trees in two Phases in adequate land as identified by social Forest Department, for a total area of 29.65 Ha spending Rs. 254.50 Lakhs. This has sufficiently covered the requirement of compensatory afforestation required for the entire Master Plan development of Vizhinjam Port. o Plantation of saplings along the road margins, road junctions and road medians are being carried out as part of the greenbelt development plan.
16	Vegetation clearance	o Tree clearing within the ROW should be avoided beyond that which is directly required for construction activities and/ or to reduce accidents. o Especially in plantation and house garden areas both along road and rail alignment.	**Being Complied** o Care is taken to limit the felling of trees to the bare minimum. o Permission for trees to be cut down because of the port development has been obtained from concerned department (Forest Department).
17	Fauna	o Construction workers should protect natural resources and animals. Hunting of birds and other local animals is prohibited.	**Being Complied** o Regular awareness sessions are conducted for construction workers regarding the importance of natural resources and animals. o Hunting of birds & other local animals is strictly prohibited
18	Traffic Jams and congestion	o If there is traffic congestion during construction, measures should be taken to	**Being Complied** o In order to avoid traffic congestion, if any, during the

Environmental Management Plan – Rail*/Road Corridors *No Construction work was carried out during the compliance period in the rail corridor			
S. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2025**
		relieve it as far as possible with the co-operation of the traffic police.	construction of the road, measures will be taken to relieve it as far as possible with the co-operation of the traffic police.
19	Health and Safety	o All contractors' staff and workers must wear high visibility purpose made overalls or trousers/waist coat at all times. All operators working with any materials above head height (even in trenches) must wear hard hats all at times on the worksite.	**Being Compiled** o All the workers are provided with Personal Protective Equipment's (PPEs), and it is ensured that they wear it all the time o Also, all the contractors working at the site have a dedicated health and safety person to oversee the work carried out.
20	Pollution of Streams parallel or along the alignments	o Construction material/waste should be disposed of properly so as not to block or pollute streams or ponds with special attention to confining concrete work.	**Being Complied** o Construction materials/waste are being disposed of properly; so as not to block or pollute streams or ponds.
21	Cultural Remains	o Construction should be stopped until authorised department assess the remains to preserve Archaeological relics and cultural structures like Temples, mosques and churches. o Archaeologists will supervise the excavation to avoid any damage in the relics.	**Noted for Compliance**

Environment Management Plan – Warehouse Area* (Construction Phase) *No work was carried out in the Warehouse area during compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
1	Material transport and construction activities	Air Quality/Dust	o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards. o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt. o Providing adequately sized construction yard for storage of construction materials, equipment, tools, earthmoving equipment, etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water should be sprayed during the construction phase, at mixing sites, and temporary roads. o In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried	**Complied** o Monthly Environment Monitoring is being carried out and the parameters are within the stipulated limit. o It is ensured that all vehicles entering the area have a valid PUC certification.

Environment Management Plan – Warehouse Area* (Construction Phase) *No work was carried out in the Warehouse area during compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			out at regular intervals to prevent dust. o Vehicles delivering materials should be covered to reduce spills and dust blowing off the load. o Environmental awareness program will be provided to the personnel involved in developmental works. o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation.	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB. o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A). o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors. o Noise attenuation will be practiced for noisy equipment by employing suitable techniques	**Complied** o Ambient Noise is being monitored fortnightly for Day & Nighttime and results are within the prescribed limit. o Construction equipment and machinery procurement are done in accordance with specifications conforming to the prescribed standards. o Personnel engaged in construction activity are provided with appropriate PPE's (Earplugs/muffs)

Environment Management Plan – Warehouse Area* (Construction Phase) *No work was carried out in the Warehouse area during compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			such as acoustic controls, insulation and vibration dampers. o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimize noise impacts. o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
2	Construction of Buildings, Roads, Sheds, etc.	Vegetation and Strain on existing infrastructure	o Most of the land is covered with coconut trees and few other trees. Trees that are cut down will be accounted for and the same no. of trees of the same or some other species will be replanted at another location to compensate for the loss of greenery.	**Being Complied** o Care is taken to limit the falling of trees to the bare minimum. Due permission is taken for trees to be cut down because of the port development from the department concerned (Forest Department). o AVPPL, in collaboration with the Forest department, have carried out planting of 40,040 trees in two Phases in adequate land as identified by social Forest Department, for a total area of 29.65 Ha spending Rs. 254.50 Lakhs. This has sufficiently covered the requirement of compensatory afforestation required for

Environment Management Plan – Warehouse Area* (Construction Phase) *No work was carried out in the Warehouse area during compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
				the entire Master Plan development of Vizhinjam Port.
		Water Environment	o The streams 1 and 2 will be made to avoid entering the warehouse area by diverging them into the Karichal River. o A tunnel like arrangement with RCC structures will be used so as to not affect the streams (3 and 4) that will go through the warehouse area. The streams will be made to go under the warehouse areas through the tunnel. o Another option is to divert the stream through the boundary o An application has been filed with the irrigation department for permission.	**Will be Complied** o Will be appropriately planned during the development stage. There is no work carried out during the compliance period.
			o The low lying area in the region is already made use by the local people, and has been degraded. There are no active ecological systems in the area. As far as possible, during operation phase the network of streams that add to the low lying area of the region will be diverted or channeled under the constructed buildings to avoid impact to the low lying area. o Filling of low lying areas (if required) shall be done	**Will be Complied** o Will be appropriately planned during the development stage. There is no work carried out during the compliance period. o In G.O. dated GO(MS)No.27/2022/AGRI dated 18.04.2022, the government verified the area in detail and has given permission and order for the conversion of the 24.7980 Ha of paddy land for use of port activities.

Environment Management Plan – Warehouse Area* (Construction Phase) *No work was carried out in the Warehouse area during compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			o Construction waste such as cement, paint, and other construction waste will flow into the downstream parts of the streams and Karichal River. Construction will be avoided during rainy season. Good housekeeping practices, such as cement being stored in dry areas will be taken care of. Labour camps will be provided with proper support services.	**Will be Complied** o Will be appropriately planned during the development stage. There is no work carried out during the compliance period.
		Disturbance to Natural Drainage pattern	o As mentioned above, formidable measures will be taken to avoid the disturbance to the natural flow of water. If some structure or building comes in the way of the existing flow of water, the flow will be redirected to the closest stream in the drainage pattern. o In sections along watercourses, earth and stone will be properly disposed of so as not to block rivers and streams, thereby preventing any adverse impact on water quality. o All necessary measures shall be taken to prevent earthworks and stone works from impeding cross drainage at streams and canals or existing irrigation and drainage systems in conformity EMP.	**Will be Complied** o Will be appropriately planned during the development stage. There is no work carried out during the compliance period.
		Existing Traffic	o Transportation of construction materials will	**Will be Complied**

Environment Management Plan – Warehouse Area* (Construction Phase) *No work was carried out in the Warehouse area during compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			be carried out during non- peak hours. o Regularization of truck movement. o Existing roads shall be strengthened and shall be used for the construction material transportation.	
3	Solid Waste Management	Soil quality	o Construction waste will be used within warehouse site for filling of low lying areas. o Composted bio-degradable waste will be used as manure in greenbelt. Other recyclable wastes will be sold. o Excavated soil will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. o General refuse generated on-site will be collected in waste skips and separated from construction waste. o Burning of refuse at construction sites will be prohibited.	**Will be Complied** o Will be appropriately planned during the development stage. There is no work carried out during the compliance period.

Project Annex Facility (PAF) Zone - Construction Phase *Construction work was carried out in a limited way during the compliance period in PAF Zone				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
1	Material transport and construction activities	Air Quality/Dust	o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards. o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt. o Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment, etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water should be sprayed during the construction phase, at mixing sites, and temporary roads o In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to prevent dust.	**Complied** o Monthly Ambient Air Monitoring is being carried out and the parameters are within the stipulated limits. o It is ensured that all vehicles entering the area have a valid PUC certification. o Vehicles entering the site are following speed limit. o Tarpaulin cover is used for vehicles transporting construction material. o Environment awareness programs are provided to the personnel engaged in development work.

Project Annex Facility (PAF) Zone - Construction Phase *Construction work was carried out in a limited way during the compliance period in PAF Zone				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			o Vehicles delivering materials should be covered to reduce spills and dust blowing off the load. o Environmental awareness program will be provided to the personnel involved in developmental works. o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation.	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB. o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A). o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors. o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers. o High noise generating activities such as piling	**Complied** o Ambient Noise is being monitored fortnightly for Day & Nighttime and results are within the prescribed limits. o Construction equipment machinery procurement is done in accordance with specifications conforming to prescribed standards. o Personnel engaged in construction activity are provided with appropriate PPE's (Earplugs/muffs).

Project Annex Facility (PAF) Zone - Construction Phase *Construction work was carried out in a limited way during the compliance period in PAF Zone				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts. o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
2	Construction of Buildings, Roads, Parking features, etc.	Vegetation and Strain on existing infrastructure	o Most of the land is covered with coconut trees and few other trees. Trees that are cut down will be accounted for and the same no. of trees of the same or some other species will be replanted at another location to compensate for the loss of greenery. o There are very few existing buildings and infrastructure on the PAF zone area land which will be acquired and people in that area will be rehabilitated.	**Being Complied** o Due permission is taken for trees to be cut down because of the port development from the concerned department (Forest Department). o AVPPL, in collaboration with the Forest department, have carried out planting of 40,040 trees in two Phases in adequate land as identified by social Forest Department, for a total area of 29.65 Ha spending Rs. 254.50 Lakhs. This has sufficiently covered the requirement of compensatory afforestation required for the entire Master Plan development of Vizhinjam Port. o Land acquisition has been completed by following due process.

Project Annex Facility (PAF) Zone - Construction Phase *Construction work was carried out in a limited way during the compliance period in PAF Zone				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
		Existing Traffic	o Transportation of construction materials will be carried out during non-peak hours. o Regularization of truck movement. o The existing roads shall be strengthened and shall be used for the construction material transportation.	**Being Complied** o Transportation of construction materials is being carried out considering the non-peak traffic timing and local restrictions during festivals, strikes, etc. o Traffic monitoring & regularization is being carried out for maximum efficiency. o Existing roads are being used for transportation of construction material.
		Solid Waste	o Construction waste will be used within port site for filling of low lying areas. o Composted bio-degradable waste will be used as manure in greenbelt. Other recyclable wastes will be sold. o Excavated soil will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. o General refuse generated on-site will be collected in waste skips and separated from construction waste. o Burning of refuse at construction sites will be prohibited.	**Being Complied** o Construction waste is used within port site for filling of low-lying areas in line to C&D Waste Management Rules 2016, as amended. o No burning of refuse at construction sites is being done. o The dry waste is being properly collected, segregated, and disposed of in line with the Solid Waste Management Rules 2016, as amended. o Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and the output is being used as manure in greenbelt development within the port project areas.

BACK UP AREA – Construction Phase Construction is ongoing in reclaimed area during the compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
1	Material transport and construction activities	Air Quality	o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt o Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment, etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water sprinkling will be carried out to suppress fugitive dust o Environmental awareness program will be provided to the personnel involved in developmental works o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation	**Being Complied** o Ambient air quality monitoring is carried out at 5 locations (including one location at port site) as per the Environment Monitoring Plan prescribed in EIA. The results obtained are within the limits prescribed by NAAQS. o It is ensured that all vehicles entering the port have PUCs. o Water sprinkling is being carried out at regular intervals over the temporary road during transportation of materials. o All the trucks transporting material are covered by tarpaulin cover. o Signage's for speed control are placed within the port area. o Adequate storage for construction material is provided within the port area on reclaimed land. o Environmental awareness programs are regularly carried out for contractors working at site. o AVPPL have engaged a dust sweeper sprinkling system for dust suppression along the roads and on the storage yard.

BACK UP AREA – Construction Phase Construction is ongoing in reclaimed area during the compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB o Procurement of machinery/construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	**Being Compiled** o All the machinery and vehicles are maintained to keep the noise at minimum. o Regular Ambient Noise monitoring is being carried out as per the Environmental Monitoring Plan prescribed in EIA since August 2016, and the readings are within the limits at port site. o Personnel exposed to noise levels beyond threshold limits are provided with protective gear.

BACK UP AREA – Construction Phase Construction is ongoing in reclaimed area during the compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
2	Construction Activities	Water Environment	o Formation level should be raised according to the design and the cross drainage structures suitably planned for the flood events. o All justifiable measures will be taken to prevent the wastewater produced during construction from entering directly into the water bodies.	**Being Compiled** o During the construction, care was taken such that the formation level is as per suitable design and the cross-drainage structures are also being implemented. o No wastewater is disposed into the water bodies.
		Land Environment	o On slopes and other suitable places along the two proposed corridors, trees and grass should be planted. o On sections with filling and deep cutting their slopes should be covered by sod, or planted with grass, etc. o If existing irrigation and drainage system, ponds are damaged, they will be suitably repaired. o Retaining walls and gabions shall be suitably provided.	**Being Complied** o Plantation of saplings along the port boundary is being carried out as a part of the master plan development/greenbelt development plan. o Retaining walls or gabions are suitably provided.
			o Arable land should not be used for topsoil borrowing. o Topsoil will be kept and reused after excavation is over. o Any surplus to be used on productive agricultural land.	**Being Complied** o Topsoil is not being used for borrowing. o If any topsoil needs to be excavated, the same will be stored in a designated area and will be utilized for greenbelt development as per the greenbelt development plan.
			o Construction vehicles should operate within the	**Being Complied**

BACK UP AREA – Construction Phase Construction is ongoing in reclaimed area during the compliance period				
S. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2025**
			Backup Areas avoiding damage to soil and vegetation.	o Construction vehicles are being operated only alongside the road and port boundaries; thereby avoiding damage to soil and vegetation.
			o Areas of trees cleared will be replaced according to Compensatory Afforestation Policy under the Forest Conservation Act - 1980. o Landscaping shall be done at major junctions.	Refer point No.15 of Environment Management Plan – Road/Rail Corridors
			o Tree clearing within the backup areas should be avoided beyond that which is directly required for construction activities and/or to reduce accidents.	**Being Complied** o Tree clearing is done only for the purpose of development of port and/or for avoiding causalities due to natural calamities where the trees were standing very dangerously.

Annexure IX

Solid Waste Management Report

(October 2024 to March 2025)

HALF YEARLY REPORT
Solid Waste Management at Vizhinjam Port

October 2024 - March 2025

Client: Adani Vizhinjam Port Pvt. Ltd.
01, Port Operation Building, Vizhinjam Seaport, Mulloor P.O., Vizhinjam,
Thiruvananthapuram - 695521, Kerala, India

Contractor: Qrex Bio Solutions Pvt. Ltd.
Door No.26/391(11), Sathabdhi Smaraka Building, Municipal Market,
Market Road, Attingal, Thiruvananthapuram - 695 101, Kerala

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1 Introduction

Qrex Bio Solutions Pvt. Ltd, a reputable company in the field of waste management, has been actively engaged in various initiatives aimed at promoting sustainable environmental practices. With a proven track record spanning 23 years, we have consistently played a central role in the conception, development, and execution of impactful waste management projects across diverse sectors.

Our commitment to excellence and innovation has been demonstrated through our involvement in municipal, industrial, and commercial waste management projects. The versatility and expertise of Qrex Bio Solutions Pvt. Ltd have been showcased through the successful implementation of effective waste management strategies. Notably, our organization introduced innovative composting techniques to the Attingal Municipality, resulting in a substantial reduction of 4500 tons of organic waste sent to landfills annually.

At Qrex Bio Solutions Pvt. Ltd, we pride ourselves on utilizing cutting-edge technologies such as windrow composting, vermicomposting, bio methanation, and black soldier fly methods. These advanced techniques are instrumental in contributing to a cleaner environment and promoting a more responsible approach to waste management.

We express our sincere gratitude for the trust placed in us by Adani Vizhinjam Port Pvt.Ltd. (AVPPL) as reflected in the service order (Order no 5702011963, Date 11.07.2023). With this opportunity, we are committed to ensuring that all solid waste management processes are executed effectively and with the utmost dedication.

2 Scope of Work

This project of waste management at Vizhinjam Seaport aims to achieve Zero Waste to Landfill of waste generated from the Port through end-to-end solutions in coordination with environment department of AVPPL. Qrex has been made responsible for handling solid waste management activities from Collection, Segregation, Transportation, Treatment till final disposal of all the various types of organic and inorganic domestic solid waste being generated at Vizhinjam port and managing with 5R principles of waste management (Reduce- Reprocess-Reuse-Recycle & Recover), aligned with all govt. rules & regulations.

2.1 Responsibility

- Waste collection & transportation from various locations in the Vizhinjam port site and specified AVPPL locations within a radius of 2 km outside the project site.
- Waste from AVPPL locations not within the port processed separately outside of the port site.
- Sorting and segregation and management of segregated waste.
- Ensuring collected waste undergoes proper disposal procedures through approved and authorized channels and submit the required documentation to uphold environmental standards and regulatory compliance.

3 Activity Overview

This comprehensive waste management process involves the systematic collection, handling, and disposal of various types of waste generated by vessels, construction and operations, and related activities. The primary objective is to mitigate the environmental impact of maritime and land ward side operations while complying with international regulations and standards to create a cleaner and more sustainable environment within the port premises and beyond. Our company focused on prioritizing environmental cleanliness and implemented various activities to achieve this goal.

October 2024 – March 2025 activities are described as follows.

3.1 Daily Activities

A significant aspect of our activities involves the daily collection of waste from strategically placed bins throughout the port premises. During this period, we maintained our rigorous collection schedule, ensuring that waste was properly sorted and segregated according to designated categories for efficient disposal. Our team meticulously gathered waste from these bins daily apart from Sundays (Weekly off), thereby promoting an organized waste management system. Our daily activities are detailed in the following sections.

3.1.1 Bin Monitoring

Our team employs a proactive approach by closely monitoring waste bins placed strategically throughout the port. Through regular checks, we ensure that waste bins are not allowed to overflow, preventing litter accumulation and potential hazards.

Table 1: Waste Bin Details

S. No.	Waste Bin Locations	Waste Bin	Qty (Set of 2: Dry & Wet)
1	GIS Building, Mukkola	Bin 1	1
2	Police Aid Post	Bin 2	1
3	Substation	Bin 3	1
4	Main Gate	Bin 4	1
5	Security Building	Bin 5	1
6	CSR Canteen	Bin 6	1
7	Dredging Canteen	Bin 7	1
8	POB Inside	Bin 8	1
9	POB Outside	Bin 9	1
10	Workshop Building	Bin 10	1
11	Outside Workshop Building	Bin 11	1
12	RMU Building	Bin 12	1
13	Fire Station	Bin 13	1
14	Berth	Bin 14	1
15	Berth Area 2	Bin 15	1
16	Near Workshop(Navin Group)	Bin 16	1
17	Yard Near ZPMC	Bin 17	1
18	Scanner Building	Bin 18	1
TOTAL			**18**

Bin 1

Bin 2

Bin 3

Bin 4

Bin 5

Bin 6

Bin 7

Bin 8

Bin 9

Bin 10

Bin 11

Bin 12

Bin 13

Bin 14

Bin 15

Bin 16

Bin 17

Bin 18

Figure 1: Strategically Placed Waste Bins in the Port

3.1.2 Collection of waste from bins

Waste Collection:

Our team diligently collects waste from the designated bins placed throughout the port premises on a daily basis. Our waste collection team adheres to a predetermined schedule. Every morning our team initiates a comprehensive waste collection effort within the port premises. Our trained personnel follow waste handling protocols, employing appropriate safety equipment and techniques to collect waste efficiently.

Figure 2: Collection of waste from strategically placed bins

3.1.3 Weighing and Segregation of Collected Waste

Weighing:

Each day, our team ensures that the accumulated waste undergoes a systematic weighing process and is documented in daily and monthly reports.

Segregation:

Waste is segregated at the point of collection to separate different types of waste, such as general waste, recyclables, and more. This initial sorting streamlines the recycling process.

Figure 3: Waste Segregation

Transport to Processing Centre:

Collected waste is transported to a centralized processing centre equipped to handle different waste types. This reduces transportation-related emissions and facilitates efficient waste management.

Figure 4: Transportation of Waste

Sorting Facility:

At the processing centre, waste undergoes further sorting to categorize materials accurately. Automated and manual sorting processes are employed to separate recyclable materials from non-recyclables.

Figure 5: Waste Sorting

3.1.4 Emergency Response

Our waste collection team remains prepared to address urgent waste disposal needs, responding promptly to unexpected situations or spills that require immediate attention.

3.2 Waste Audit and Reporting

We conduct regular waste audits to assess our waste management processes and generate detailed reports for analysis.

3.2.1 Month wise waste collection report October 2024 – March 2025

Waste collection details are provided in the tables below:

Table 2: Waste Collection Details October 2024

Date	Food	Plastic	Paper	Card Board	Thermocol	Tin	Wood
	Quantity in kg						
01-10-2024	187.7	21.1	28.7	1.8	-	0.2	-
02-10-2024	181.9	22.2	27.6	4.7	0.4	0.2	-
03-10-2024	176.9	19.2	26.6	1.4	-	-	-
04-10-2024	162.7	19.1	28.6	1.7	0.2	-	-
05-10-2024	169.9	18.5	22.7	2.1	0.1	0.2	-
06-10-2024	Sunday (Weekly off)						
07-10-2024	153.4	21.8	30.1	3.2	0.1	0.4	-
08-10-2024	188.4	21.1	25.6	1.6	-	-	-
09-10-2024	171.6	21.7	25.8	2.5	0.2	-	-
10-10-2024	164.7	18.3	25.2	1.8	-	0.4	-
11-10-2024	163.2	23.1	23.3	2.2	-	-	-
12-10-2024	157.2	17.9	24.0	-	0.1	0.1	-
13-10-2024	Sunday (Weekly off)						
14-10-2024	159.9	29.0	27.6	3.2	0.2	0.2	-
15-10-2024	196.5	20.1	27.3	3.0	-	-	-
16-10-2024	194.4	23.0	25.6	1.0	0.2	-	-
17-10-2024	187.3	22.9	22.8	0.7	-	0.5	-
18-10-2024	199.2	22.3	21.9	4.3	-	-	-
19-10-2024	206.6	21.4	19.3	0.9	0.2	-	-
20-10-2024	Sunday (Weekly off)						
21-10-2024	185.6	23.9	28.8	2.4	0.4	0.4	-
22-10-2024	188.0	23.5	27.5	4.1	0.5	0.3	-
23-10-2024	182.2	22.6	25.9	1.9	-	-	-
24-10-2024	180.7	21.4	25.1	1.8	0.2	0.2	-
25-10-2024	160.9	22.8	27.4	5.2	0.3	0.3	-
26-10-2024	169.9	19.4	26.2	0.6	-	-	-
27-10-2024	Sunday (Weekly off)						
28-10-2024	184.7	25.3	28.6	2.9	0.3	0.3	-
29-10-2024	188.8	26.7	23.2	4.0	0.1	-	-
30-10-2024	177.6	19.6	24.3	3.0	0.2	0.2	-
31-10-2024	169.6	23.4	21.6	3.8	0.4	0.4	-
Total	**4809.5**	**591.3**	**691.3**	**65.8**	**4.1**	**4.3**	**-**

Table 3: Waste Collection Details Nov 2024

Date	Food	Plastic	Paper	Cardboard	Thermocol	Tin	Wood
01-11-2024	179.1	24.6	29.5	1.8	0.2	0.1	-
02-11-2024	199.5	22.7	29.2	1.6	-	0.1	-
03-11-2024	Sunday (Weekly off)						
04-11-2024	244.7	24.9	33.4	2.9	0.4	0.2	-
05-11-2024	201.6	24.7	30.9	2.4	0.6	0.4	-
06-11-2024	199.5	26.8	28.9	1.7	-	-	-
07-11-2024	177.6	23.4	29.7	2.4	1.9	0.2	-
08-11-2024	185.4	26.1	33.0	1.2	-	0.4	-
09-11-2024	190.8	22.5	26.2	1.4	-	0	-
10-11-2024	Sunday (Weekly off)						
11-11-2024	222.5	26.6	32.1	1.1	-	0.1	-
12-11-2024	182.8	21.5	28.5	3.2	0.5	-	-
13-11-2024	221.2	25.7	27.0	1.3	-	0.1	-
14-11-2024	199.0	24.1	27.0	1.1	1.1	-	-
15-11-2024	148.9	22.7	27.3	1.8	-	0.4	-
16-11-2024	171.8	19.3	21.2	4.3	1.2	-	-
17-11-2024	Sunday (Weekly off)						
18-11-2024	187.2	21.9	28.2	3.9	0.2	0.2	-
19-11-2024	198.5	28.9	27.9	0.8	-	0.1	-
20-11-2024	177.2	23.7	27.0	5.5	1.3	-	-
21-11-2024	189.6	24.0	32.9	1.6	-	0.3	-
22-11-2024	207.0	24.7	26.9	1.1	-	0.1	-
23-11-2024	190.2	24.9	26.2	3.1	0.2	0.3	-
24-11-2024	Sunday (Weekly off)						
25-11-2024	210.6	22.6	31.7	3.1	0.5	0.4	-
26-11-2024	214.3	22.3	29.7	2.1	-	-	-
27-11-2024	183.5	25.4	25.8	0.9	0.6	0.3	-
28-11-2024	211.5	23.7	27.3	1.8	0.1	0.1	-
29-11-2024	207.4	23.0	27.7	1.9	0.9	0.1	-
30-11-2024	206.8	25.4	29.9	3.5	-	0.4	-
TOTAL	**5108.2**	**626.1**	**745.1**	**57.5**	**9.7**	**4.3**	**-**

Table 4: Waste Collection Details December 2024

Date	Food	Plastic	Paper	Cardboard	Thermocol	Tin	Wood
	Quantity in kg						
01-12-2024	Sunday (Weekly off)						
02-12-2024	182.1	22.0	31.7	3.7	0.2	0.3	-
03-12-2024	160.9	20.1	31.3	3.8	0.2	-	-
04-12-2024	175.7	22.4	28.3	1.4	-	-	-
05-12-2024	188.4	21.6	31.7	2.4	0.2	0.1	-
06-12-2024	184.8	22.1	30.5	3.6	-	0.1	-
07-12-2024	176.2	17.9	27.0	0.7	-	-	-
08-12-2024	Sunday (Weekly off)						
09-12-2024	203.2	24.7	33.2	1.9	0.2	-	-
10-12-2024	189.0	22.8	29.0	1.4	-	0.6	-
11-12-2024	188.8	22.9	29.2	2.9	0.3	0.2	-
12-12-2024	218.0	22.3	30.8	0.5	-	0.2	-
13-12-2024	179.9	21.1	30.6	2.1	-	-	-
14-12-2024	168.3	19.8	22.9	1.7	-	-	-
15-12-2024	Sunday (Weekly off)						
16-12-2024	218.7	24.4	38.1	2.0	0.1	0.4	-
17-12-2024	202.5	24.4	31.1	3.4	-	-	-
18-12-2024	188.2	24.5	29.8	0.3	-	0.2	-
19-12-2024	182.9	22.9	26.6	3.1	0.2	-	-
20-12-2024	172.3	23.3	30.8	0.7	0.1	-	-
21-12-2024	177.4	18.0	24.3	0.9	-	0.2	-
22-12-2024	Sunday (Weekly off)						
23-12-2024	200.3	26.7	36.8	1.6	-	0.1	-
24-12-2024	208.8	23.9	29.2	2.9	0.2	-	-
25-12-2024	178.2	22.2	31.3	1.5	-	0.4	-
26-12-2024	179.9	21.9	29.0	2.0	-	-	-
27-12-2024	182.5	24.1	34.2	1.6	0.3	0.2	-
28-12-2024	187.6	18.0	23.5	0.8	0.3	-	-
29-12-2024	Sunday (Weekly off)						
30-12-2024	207.8	28.7	36.5	2.1	0.6	0.4	-
31-12-2024	207.0	23.7	31.3	1.9	-	-	-
TOTAL	**4909.4**	**586.4**	**788.7**	**50.9**	**2.9**	**3.4**	**-**

Table 5: Waste Collection Details January 2025

Date	Food	Plastic	Paper	Cardboard	Thermocol	Tin	Wood
	Quantity in kg						
01-01-2025	177.5	23.3	31.7	0.6	-	0.2	-
02-01-2025	167.4	21.7	27.9	2.1	-	-	-
03-01-2025	183.9	21.6	31.5	1.8	0.2	0.2	-
04-01-2025	157.3	17.6	22.5	1.0	0.1	0.4	-
05-01-2025	Sunday (Weekly off)						
06-01-2025	213.2	25.4	41.0	1.6	0.1	0.4	-
07-01-2025	157.8	22.7	27.8	0.9	-	-	-
08-01-2025	192.4	21.0	27.2	1.1	-	-	-
09-01-2025	177.7	23.4	29.1	2.3	0.4	-	-
10-01-2025	164.3	24.0	23.8	1.5	-	0.2	-
11-01-2025	164.8	19.8	23.3	0.5	-	-	-
12-01-2025	Sunday (Weekly off)						
13-01-2025	201.6	24.0	38.1	1.2	-	0.2	-
14-01-2025	146.8	23.2	21.7	2.1	-	-	-
15-01-2025	183.7	25.5	24.6	0.8	-	0.4	-
16-01-2025	169.9	21.5	27.0	1.3	0.2	-	-
17-01-2025	158.4	22.0	27.1	1.6	-	-	-
18-01-2025	154.9	19.4	19.8	0.4	-	0.2	-
19-01-2025	Sunday (Weekly off)						
20-01-2025	229.2	26.3	38.7	1.1	0.4	-	-
21-01-2025	165.8	19.4	30.7	2.4	-	0.4	-
22-01-2025	176.7	21.0	28.1	2.1	0.4	-	-
23-01-2025	197.8	22.6	27.0	0.2	-	0.2	-
24-01-2025	184.5	21.8	23.4	2.5	0.1	-	-
25-01-2025	173.9	20.4	26.2	0.6	-	0.4	-
26-01-2025	Sunday (Weekly off)						
27-01-2025	217.8	26.5	37.3	1.2	0.3	0.2	-
28-01-2025	183.1	23.4	29.6	3.0	0.1	-	-
29-01-2025	163.9	21.5	24.3	1.1	0.2	0.4	-
30-01-2025	177.0	23.3	26.8	1.7	0.1	-	-
31-01-2025	168.7	21.7	25.8	3.2	0.5	0.4	-
TOTAL	**4810.0**	**604.0**	**762.0**	**39.9**	**3.1**	**4.2**	**-**

Table 6: Waste Collection Details February 2025

Date	Food	Plastic	Paper	Cardboard	Thermocol	Tin	Wood
	Quantity in kg						
01-02-2025	195.3	19.3	30.5	2.4	0.2	0.2	-
02-02-2025	Sunday (Weekly off)						
03-02-2025	226.1	21.2	41.2	2.5	0.3	0.4	-
04-02-2025	208.7	22.9	37.0	1.5	-	-	-
05-02-2025	206.2	22.9	27.0	1.9	0.3	0.4	-
06-02-2025	190.8	21.7	31.3	1.5	0.4	0.2	-
07-02-2025	198.7	21.5	31.2	2.0	-	-	-
08-02-2025	176.3	19.3	22.8	1.0	0.1	0.2	-
09-02-2025	Sunday (Weekly off)						
10-02-2025	212.4	25.3	40.7	2.7	0.2	0.4	-
11-02-2025	206.7	26.9	36.0	1.7	0.2	-	-
12-02-2025	194.2	21.6	27.7	1.0	0.3	0.6	-
13-02-2025	210.6	25.7	28.2	2.6	0.1	0.2	-
14-02-2025	190.9	23.8	29.0	0.8	0.1	-	-
15-02-2025	170.2	20.9	24.4	1.2	0.1	0.2	-
16-02-2025	Sunday (Weekly off)						
17-02-2025	221.1	30.1	40.5	1.2	-	0.2	-
18-02-2025	206.0	24.7	34.3	1.3	0.2	0.4	-
19-02-2025	203.7	21.8	32.8	1.4	0.3	-	-
20-02-2025	224.4	25.0	36.7	1.5	0.5	0.4	-
21-02-2025	190.2	22.7	37.1	0.4	-	0.2	-
22-02-2025	173.8	18.2	24.3	0.4	-	-	-
23-02-2025	Sunday (Weekly off)						
24-02-2025	223.0	29.4	38.5	2.7	0.4	0.8	-
25-02-2025	179.3	23.2	23.0	0.8	0.1	0.2	-
26-02-2025	192.4	21.2	21.1	2.2	0.2	-	-
27-02-2025	179.1	20.6	23.5	2.7	-	0.6	-
28-02-2025	177.0	21.2	28.3	0.6	0.1	0.4	-
TOTAL	**4757.1**	**551.1**	**747.1**	**38.0**	**4.1**	**6.0**	**-**

Table 7: Waste Collection Details March 2025

Date	Food	Plastic	Paper	Cardboard	Thermocol	Tin	Wood
	Quantity in kg						
01-03-2025	143.5	19.0	37.0	1.8	0.3	0.1	-
02-03-2025	Sunday (Weekly off)						
03-03-2025	195.1	21.8	37.6	1.4	-	0.2	-
04-03-2025	180.8	20.1	37.2	1.7	1.6	0.3	-
05-03-2025	191.6	24.8	35.1	0.9	-	0.2	-
06-03-2025	173.6	28.7	40.1	-	-	0.1	-
07-03-2025	176.2	24.3	32.9	1.9	-	0.4	-
08-03-2025	156.7	23.2	32.6	0.9	-	0.2	-
09-03-2025	Sunday (Weekly off)						
10-03-2025	199.0	26.3	40.1	0.5	-	0.4	-
11-03-2025	197.7	28.7	37.0	39.2	0.3	0.2	-
12-03-2025	180.0	23.1	36.5	2.1	-	0.1	-
13-03-2025	179.8	26.7	29.3	1.6	0.1	-	-
14-03-2025	182.5	23.6	36.3	0.7	0.8	0.4	6.2
15-03-2025	154.0	21.2	31.8	1.4	-	0.2	-
16-03-2025	Sunday (Weekly off)						
17-03-2025	213.2	27.8	38.2	0.6	0.5	0.4	-
18-03-2025	183.3	21.0	31.2	2.2	-	0.1	-
19-03-2025	182.1	22.6	35.6	12.5	-	-	-
20-03-2025	193.2	22.5	32.9	2.5	0.2	0.4	-
21-03-2025	173.3	22.6	30.3	2.1	-	0.2	-
22-03-2025	162.8	17.7	32.9	0.4	0.2	0.1	-
23-03-2025	Sunday (Weekly off)						
24-03-2025	193.7	25.9	44.2	0.6	-	0.2	-
25-03-2025	176.5	24.1	30.2	2.5	2.0	0.3	-
26-03-2025	187.9	19.6	32.9	5.2	0.3	0.4	-
27-03-2025	187.1	22.2	35.4	1.7	-	0.1	-
28-03-2025	170.8	20.5	30.6	1.5	0.2	0.2	-
29-03-2025	171.6	17.5	32.5	1.0	0.6	-	-
30-03-2025	Sunday (Weekly off)						
31-03-2025	178.7	18.9	24.6	2.4	-	0.4	-
TOTAL	**4684.7**	**594.4**	**895.0**	**89.3**	**7.1**	**5.6**	**6.2**

3.2.2 Total waste collection report October 2024 - March 2025

Item wise collection report October 2024 - March 2025 is given below:

Table 8: Total waste collection report October 2024 – March 2025

Month	Food	Plastic	Paper	Card Board	Thermocol	Tin	Wood
	Quantity in kg						
October 2024	4809.5	591.3	691.3	65.8	4.1	4.3	-
November 2024	5108.2	626.1	745.1	57.5	9.7	4.3	-
December2024	4909.4	586.4	788.7	50.9	2.9	3.4	-
January 2025	4810.0	604.0	762.0	39.9	3.1	4.2	-
February 2025	4757.1	551.1	747.1	38.0	4.1	6.0	-
March 2025	4684.7	594.4	895.0	89.3	7.1	5.6	6.2
Total	**29078.9**	**3553.3**	**4629.2**	**341.4**	**31.0**	**27.8**	**6.2**

Figure 6: Month Wise Waste Collection October 2024 - March 2025

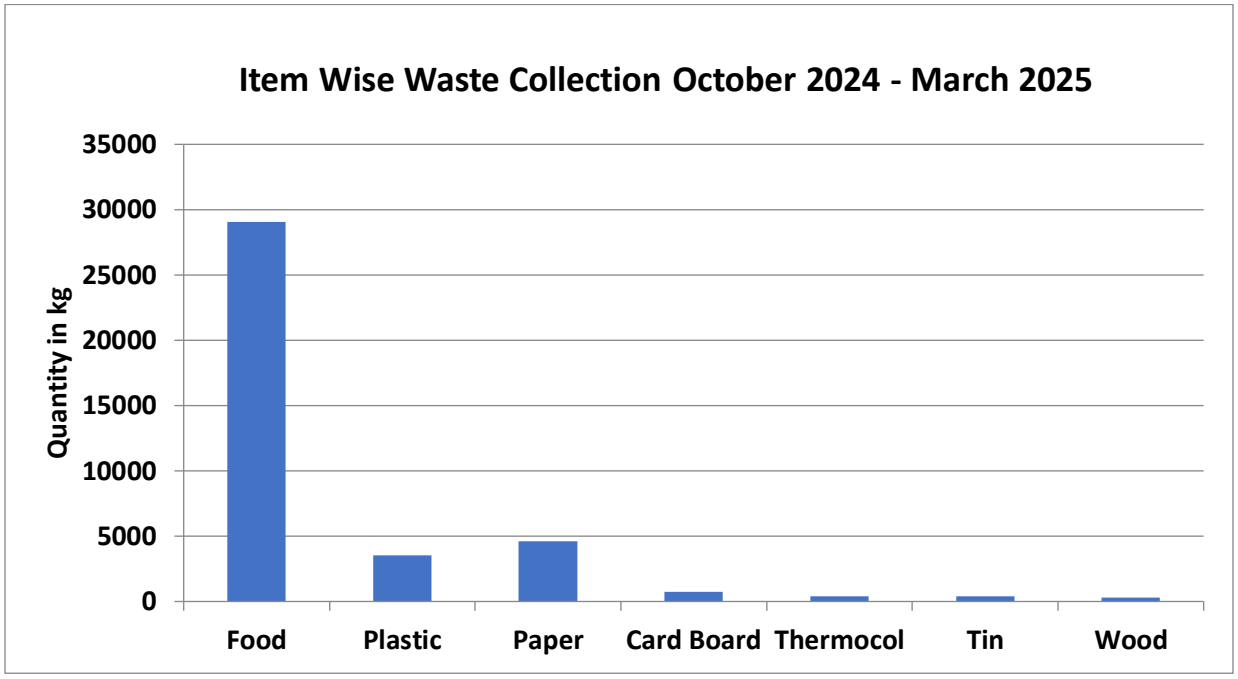

Figure 7: Item Wise Waste Collection October 2024 - March 2025

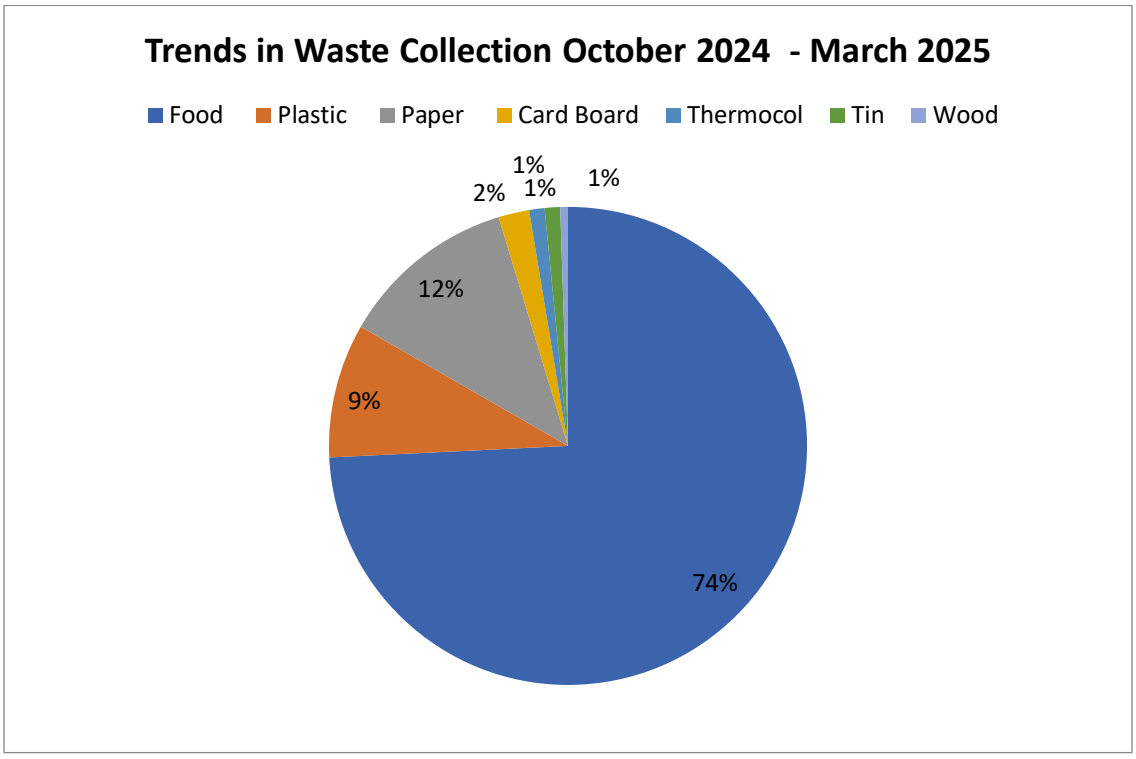

Figure 8: Trends in Waste collection October 2024 - March 2025

3.2.3 Total Bin Wise collection (Dry and Wet) October 2024 - March 2025

Bin wise collection report October 2024 - March 2025 is given below:

Table 9: Bin Wise Collection Dry Waste

S.No.	Bin	Dry Waste (Quantity in kg)						
		Oct - 25	Nov - 25	Dec - 25	Jan - 25	Feb -25	Mar -25	Total
1	BIN 1	29.3	29.6	28.3	26.9	26.6	31.1	171.8
2	BIN 2	100.1	103.1	97.7	103.6	120.8	125.9	651.2
3	BIN 3	34.2	38.9	27.5	29.7	24.8	25.6	180.7
4	BIN 4	146.6	142.2	139.5	120.1	107.5	115.9	771.8
5	BIN 5	43.4	47.3	40.3	42.4	32.7	38.7	244.8
6	BIN 6	168.7	161.2	163.0	152.3	139.1	143.7	928.0
7	BIN 7	154.2	221.0	208.7	185.7	172.3	179.6	1121.5
8	BIN 8	224.7	235.3	218.6	218.4	202.0	230.2	1329.2
9	BIN 9	133.9	153.7	130.2	146.6	129.1	149.0	842.5
10	BIN 10	46.8	53.9	48.6	55.6	60.1	64.9	329.9
11	BIN 11	46.9	66.2	58.5	59.9	61.3	65.7	358.5
12	BIN 12	89.2	79.8	73.9	51.7	42.8	51.3	388.7
13	BIN 13	57.1	52.7	48.0	43.5	42.6	57.6	301.5
14	BIN 14	81.7	57.8	50.3	56.1	49.0	58.9	353.8
15	BIN 15	-	-	24.3	47.7	42.9	52.6	165.9
16	BIN 16	-	-	35.6	40.6	34.4	133.7	241.0
17	BIN 17	-	-	39.3	32.4	35.4	44.8	149.6
18	BIN 18	-	-	-	-	22.9	28.4	51.3
Total		**1356.8**	**1442.7**	**1432.3**	**1413.2**	**1346.3**	**1597.6**	**8588.9**

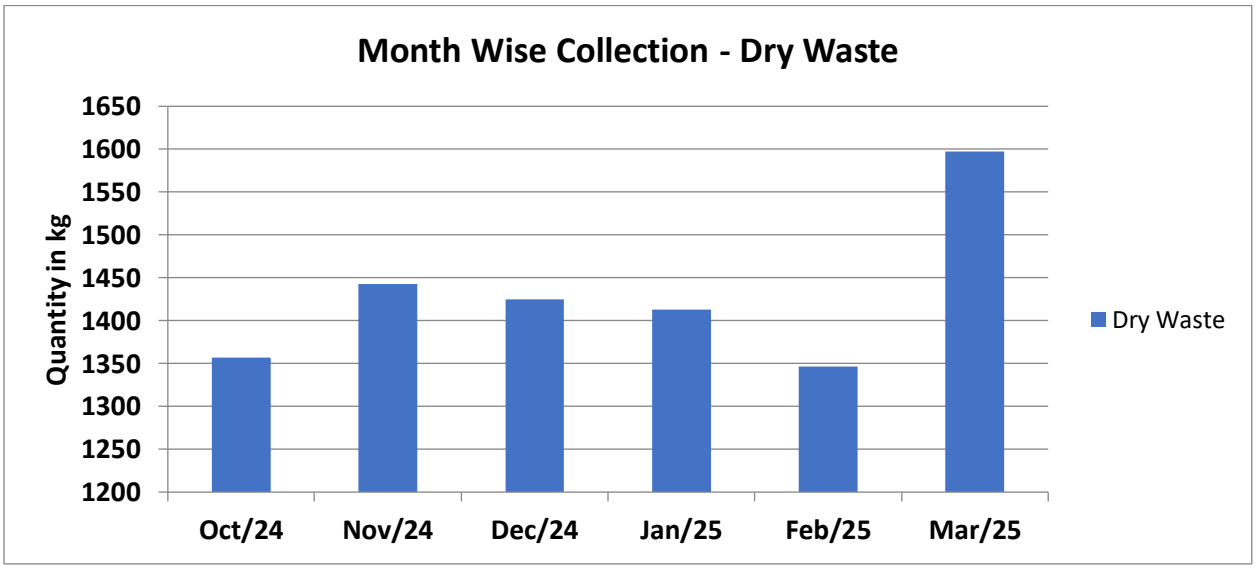

Figure 9: Bin wise Dry waste collection Oct 2024 – Mar 2025

Table 10: Bin Wise Collection Wet Waste

S.No.	Bin	Wet Waste (Quantity in kg)						
		Oct - 25	Nov - 25	Dec - 25	Jan -25	Feb - 25	Mar -25	Total
1	BIN 1	41.9	49.5	39.4	38.0	26.8	24.6	220.2
2	BIN 2	183.9	233.0	187.9	210.1	364.3	378.5	1557.7
3	BIN 3	54.4	52.9	50.8	50.3	39.6	44.8	292.8
4	BIN 4	523.4	536.4	507.6	373.7	410.0	405.8	2756.9
5	BIN 5	81.1	79.4	76.1	73.5	52.4	50.6	410.1
6	BIN 6	491.3	492.5	491.2	380.7	458.0	462.1	2775.8
7	BIN 7	470.2	564.4	497.9	434.4	420.4	434.0	2821.3
8	BIN 8	1079.4	1037.6	1013.2	1300.0	1092.4	1145.2	6667.8
9	BIN 9	1503.7	1596.3	1357.4	1203.2	1167.7	1006.7	7833.0
10	BIN 10	52.1	80.6	74.5	72.9	64.2	72.9	417.2
11	BIN 11	78.8	86.3	79.6	87.8	73.5	79.6	485.6
12	BIN 12	83.2	93.5	79.3	84.5	64.4	77.1	482.0
13	BIN 13	82.8	106.1	85.8	86.1	68.5	81.3	510.6
14	BIN 14	83.3	99.7	87.1	89.2	80.2	75.7	515.2
15	BIN 15	-	-	100.4	113.8	157	141.9	513.1
16	BIN 16	-	-	115.7	132.0	91.7	66.6	405.4
17	BIN 17	-	-	65.5	79.8	74.7	78.9	298.9
18	BIN 18	-	-	-	-	51.3	58.4	9829.1
Total		**4809.5**	**5108.2**	**4909.4**	**4810.0**	**4757.1**	**4684.7**	**29078.9**

Figure 10: Bin wise Wet waste collection Oct 2024 – Mar 2025

Table 11: Month Wise Processed Manure Oct 2024 – Mar 2025

Month	Wet Waste	Processed Wet Waste	Manure
	Quantity in kg		
Oct-24	4809.5	1026.0	225.7
Nov-24	5108.2	991.0	231.7
Dec-24	4909.4	663.0	163.8
Jan-25	4810.0	-	-
Feb-25	4757.1	444.0	101.5
Mar-25	4684.7	990.0	261.8
Total	**29078.9**	**4114.0**	**984.5**

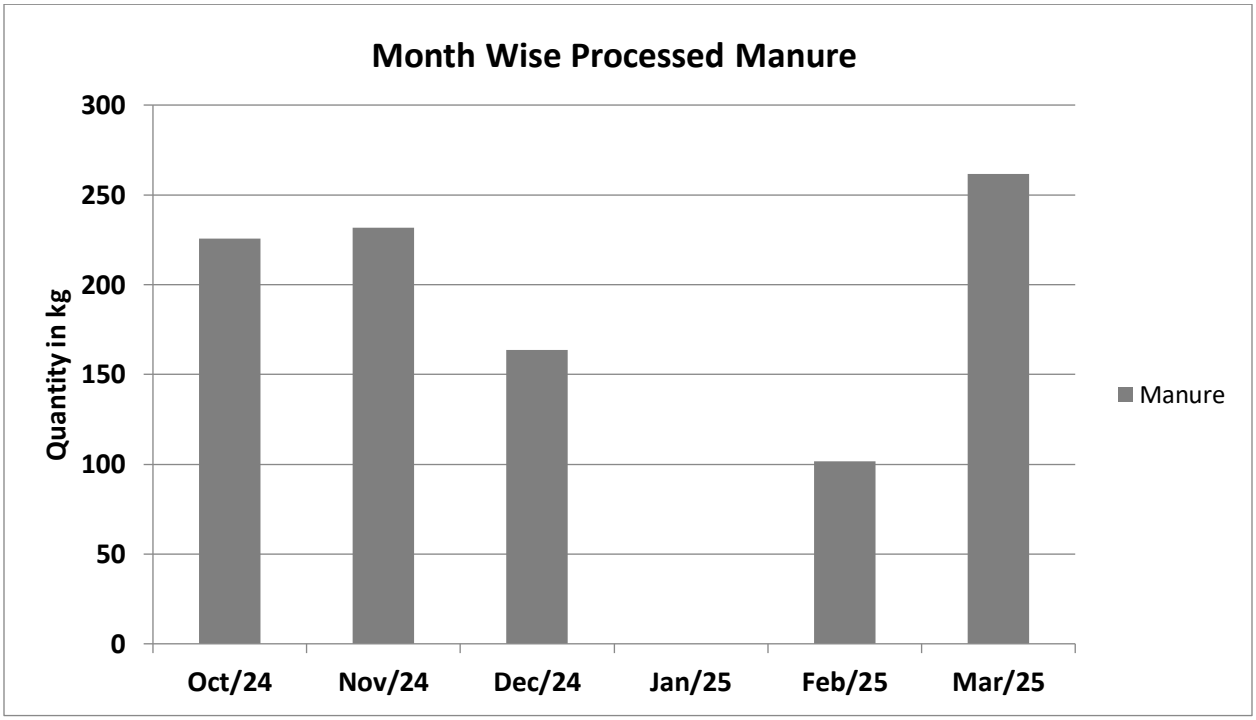

Figure 11: Month Wise Processed Manure Oct 2024 – Mar 2025

3.3 Other Activities

During the period from October 2024 to March 2025, our activities at the Adani Vizhinjam Port were marked by a good approach to environmental conservation and community engagement. The schedule was aimed at the port's cleanliness and promoting environmental awareness. The activities are described as follows.

3.3.1 Drainage Cleaning Near Karimpallikara

Our commitment to maintaining a pollution-free environment extends to regular drainage cleaning activities. We encountered a drainage blockage issue resulting from the accumulation of plastic waste from the nearby local community at Karimpllikara. Our response and proactive approach ensured the swift removal of the blockage, allowing for unimpeded water flow and preventing potential health hazards.

Figure 12: Drainage Cleaning near Karimpallikara

During the cleaning process, trained personnel equipped with the necessary tools and equipment diligently remove debris, silt, and other potential obstructions from the drainage channels. By doing so, the flow of water was restored, minimizing the chances of flooding during heavy rainfall and reducing the likelihood of waterborne illnesses.

3.3.2 Port Environment Cleaning

Maintaining a pristine port environment is integral to our commitment to maritime sustainability. Our port environment cleaning program encompasses a range of practices designed to uphold the integrity of marine ecosystems, ensure operational excellence, and promote a safe and attractive port facility for all stakeholders. Our daily activities include street cleaning, drain cleaning, and the identification and mitigation of unauthorized disposal sites.

Figure 13: Daily Port Environment Cleaning Activities

Our cleaning teams conduct daily rounds to remove litter, debris, and waste from designated areas within the port. This routine prevents accumulation, enhances visual appeal, and minimizes the risk of pollution.

4 Waste Recycling and Decomposition

Waste Recycling and Decomposition activities are detailed in the following Sections.

4.1 Recycling and Treatment of Various Waste Types

Wet Waste:

Each day, we treat and compost 40 kg of wet waste using an Organic Waste Converter (OWC). This waste is carefully processed within the converter to facilitate rapid decomposition. The end result of process is a high-quality, nutrient-rich compost that serves as a valuable resource for agricultural initiatives, landscaping, and horticulture.

Figure 14: Composting Process using Organic Waste Converter

During this period, 29078.9 kg wet waste was collected and the OWC efficiently transformed the 4114.0 kg of wet waste into 984.5 kg of high-quality organic manure. Currently manure is kept in the storage for handing over to Adani Foundation for use in the Farm School and Greenbelt/Landscape Development.

Figure 15: Manure Handover to Adani CSR Team for Agricultural/Farming Initiatives

Plastic:

Total of 3553.3 kg of plastic was collected. Embracing a responsible approach to recycling, we handed over 875.0 kg of recyclable plastic to scrap plastic buyers , ensuring these materials find new life in the production cycle, the remaining 2678.3 kg of plastic has been thoughtfully allocated to an authorized cement company for use in their process.

Paper:

4629.2 kg of paper has been collected and handed over to an authorized cement company.

Cardboard:

341.4 kg of cardboard was collected from the port premises. Following the collection process, these recyclable materials are handed over to recycling unit (annexure attached).

Others:

During this period, we collected,31.0 kg of thermocol,6.2 kg of wood,27.8 kg of tin .Following the collection process, these recyclable materials are handed over to recycling unit(annexure attached).

5 Machinery Details

We operate in coordination with a range of machinery, including an Organic Waste Converter (OWC), Collection Vehicle, Waste Collection Bins, and various tools that aid our operations.

Table 12: Machinery Details

S. No.	Item	Qty	Owned by
1	Organic Waste Converter (OWC)	1	AVPPL
2	Collection Vehicle	2	Qrex
3	Waste Collection Bins	36	Qrex
4	Sprayers, Hand Tools, etc..	-	Qrex

6 Employee Details

Our dedicated team, consisting of a Manager, Driver Cum Supervisor, Workers, and Drivers, actively contributes to the success of our waste management initiatives.

Table 13: Employee Details

S. No.	Designation	Number
1	Manager	1
2	Driver Cum Supervisor	1
3	Worker	4
4	Driver	2

7 Initiatives and Future Plans

Our initiatives and future plans in waste management exemplify our dedication to a more sustainable future. By implementing innovative practices, engaging the community, and fostering responsible waste management habits, we are working towards creating a greener, cleaner, and more resilient port environment.

1. Enhanced Waste Sorting and Segregation:

Invest in advanced waste sorting technologies to improve the efficiency of separating recyclables, organic waste and general waste at source.

2.Introduction of New Recycling Programs:

We are actively working on introducing new recycling programs to enhance waste management practices at Vizhinjam Port.

3. Zero-Waste Port:

Our ultimate goal is to transform the port into a zero-waste facility, where waste generation is minimized, and the majority of waste is recycled.

4. Environmental Audits:

Conduct regular environmental audits to assess the environmental impact of waste management operations and identify areas for improvement.

8 Conclusion

Collection of 3553.3 kg of plastic have implemented recycling, redirecting 875.0 kg of recyclable plastic to scrap buyers and allocating the remaining quantity to an authorized cement company. Similarly, the collection of 4629.2 kg of paper has been handed over to an authorized cement company. Additionally, the collection of 341.4 kg cardboard handed over to the authorized recycling unit. We collected 31.0 kg of thermocol, 6.2 kg of wood,27.8 kg of tin. These recyclable materials are handed over to recycling unit. By employing advanced processes, we ensure these materials contribute to a circular economy.

Table 14: Waste Collection Summary October 2024 to March 2025

S.No.	Waste Category	Quantity (kg)
1	Dry Waste (Plastic,Paper,Cardboard, etc..)	8588.90
2	Wet Waste (Food Waste,Vegetable Peels,Fruits,Leftovers,,etc..)	29078.90
Total Quantity		**37667.80**

Annexure X

EMP Expenditure

Annexure X

S. No.	Environmental Management Plan	Commitment in EIA	Oct 2024 to Mar 2025	Total Till Date
		(In Rs. Crores)		
1	Cost of Contractors EMP for all planned EMP implementation measures (Action plan report)	1	-	1.07
2	Cost of Capacity building- Training and Institutional strengthening (Training workshop)	0.2	-	0.0738
3	Compensatory afforestation for the green cover lost for the port and its associated facilities (2500 plants per Ha for 25 Ha area)	1.25	-	2.55
4	Air quality monitoring at sensitive locations	0.252	0.160	5.56
5	Water quality monitoring at major water bodies	0.054		
6	Noise monitoring at sensitive locations	0.009		
7	Soil quality monitoring at sensitive locations	0.002		
8	Marine water quality and sediment and marine biology	1.08		
9	Shoreline changes	0.3	0.62	18.67
10	Cost of Median planting with a suitable species of creepers and metallic wire mesh fencing along the road (2000 m long median planting)	0.83	-	0.972
11	Solid waste management (sector wise)- Collection disposal system	2.5	0.18	0.955
12	Storm Water Management	5	-	4.3
13	Marine Life Protection out of Oil Spill (Provision for scavenger boat) One tugboat with booms and skimmer and dust exhausting equipment	20	5.80	5.80
14	Cost of scavenger boat including manpower (Cost of boat)	0.2	-	0.03
15	Dust Sweeper (2 Nos.)	0.6	0.13	0.1466
16	Air Pollution Control (Four water tankers for wetting of road surface and sprinkling system)	1	0.09	1.20
17	Water and wastewater treatment plants	4	-	1.685
18	Battery of toilets with bimonthly maintenance provision	1	0.14	0.81
19	Desilting and strengthening of Streams	0.5	-	0.6
20	Enhancement of water bodies (ponds along road & rail)	0.1	1.00	1.49
21	Enhancement of religious structures (Temple)	0.05	-	0.082
22	Cultural property rehabilitation cost for sacred grove	0.01	-	0.001
TOTAL		**39.937**	**8.12**	**45.99**

Annexure XI

Environment Health, Safety & CSR Organizational Structure

Annexure XI

Environment, Health & Safety Organizational Structure:

S. No.	Name	Designation	Experience (Years)	Qualification	Organization
1.	Prasad Kurien	GM-Environment	30	B-Tech Civil Engg., M-Tech Env Engg., PMP	Vizhinjam International Seaport Ltd.
2.	Dr. Nehru Kumar Vaithilingam	Environmental Expert (Independent Engineer)	27	BE Civil Engg., ME Env Engg., PhD Env	Indian Institute of Technology (IIT), Madras
3.	Dr. Anil Kumar Trivedi	AVP & Head Environment	23	Ph. D. in Environment (EIA), M.Tech. in Environment Management, Diploma in Industrial Safety, Certified professional in Ergonomics from BOSH (UK)	Adani Ports & Special Economic Zone Ltd. (APSEZ)
4.	Hebin C	Head – Environment	17	MS, Oceanography & Coastal Area Studies	Adani Vizhinjam Port Pvt. Ltd. (AVPPL)
5.	Anshul Sanduja	Manager - Environment	13	B. Tech – Chemical Engineering, M. Tech – Environment Engineering & Science, PG Diploma in Environment Law & Policy, PG Diploma in Environment Sustainability	APSEZ
6.	Jesse Benjamin Fullonton	Assistant Manager - Environment	13	BSc. Chemical Tech; Msc. Env. Tech	AVPPL
7.	Arumugam S	Deputy Manager -	5	M. Tech – Industrial Safety	AVPPL

S. No.	Name	Designation	Experience (Years)	Qualification	Organization
		Safety, Environment and Health		Engineering	
8.	Sreenath S. P.	Senior Associate – Environment	13	B. Tech – Civil	AVPPL
9.	Radha S	Engineer	9	MTech	AVPPL
10.	Limna B	Senior Assistant	16	Pre-degree, ITI	AVPPL
11.	Sreekutty SR	Horticulture Assistant	1	BSc Botany	AVPPL
12.	Shaji Joseph	Assistant Manager - HSE	16	Diploma in mechanical & Diploma in fire and safety, NEBOSH IGC, IOSH MS	HOWE

CSR Organizational Structure:

S. No.	Name	Designation	Experience (Years)	Qualification	Organization
1.	Anil Balakrishnan	Southern Regional head for CSR	27	M7SW, Phd.	Adani Foundation
2.	Sebastian Britto. A. G	Programme Manager	28	MA, Economics	Adani Foundation
3.	Rakesh R. S	Sr. Project Officer	27	MBA, Bsc Agriculture	Adani Foundation
4.	Stephen Vinod	Project Officer	24	BA, Economics	Adani Foundation
5.	George Zen	Consultant – Livelihood	39	BA, Sociology	Adani Foundation
6.	Maya G	Project Officer Community Health	15	BA, IT-TTC	Adani Foundation
7.	Preji P	SuPoshan Officer	2	MSW	Adani Foundation
8.	Dr. T.M George	Technical Advisor	31	M Tech, PHD	Adani Skill Development
9.	Anurag MJ	Centre Head	11	MSc. Computer Science	Adani Skill Development Centre

S. No.	Name	Designation	Experience (Years)	Qualification	Organization
10.	Sreejith	Placement Manager	11	MBA (Marketing)	Adani Skill Development Centre
11.	Kavitha TR	Trainer – Language & Soft Skill	16	MA, B.Ed. (Eng.), SET, CTET, MA Sociology	Adani Skill Development Centre
12.	Neethu V Nath	Trainer – Domestic Data Entry Operator	6	MTech (Computer Science)	Adani Skill Development Centre
13.	Mini Jose	Trainer – Beauty Therapist & Hair Stylist	14	S.S.L.C, Diploma in Fashion Technology, Diploma in Beauty Therapy,	Adani Skill Development Centre
14.	Sheeja. M	Trainer – General Duty Assistant	11	BSc Nursing	Adani Skill Development Centre
15.	Anilkumar BS	Trainer - IOT	23	BTech (ECE)	Adani Skill Development Centre
16.	Nidhin S Raj	Trainer – Warehouse Management	8	MBA (Business Admn.)	Adani Skill Development Centre)

Annexure XII

MoEF&CC Letter granting One Year Extension to Validity of Existing EC

सत्यमेव जयते

File No.: 11-122/2011-IA.III
Government of India
Ministry of Environment, Forest and Climate Change
IA Division
****

Dated **09/12/2024**

To,

Dr Jayakumar Venugopal Nair
VIZHINJAM INTERNATIONAL SEAPORT LIMITED
ceo@vizhinjamport.in

Subject: **Extension of Validity of EC Clearance F.No.11-122/2011-IA.III, dated 3rd January, 2014 granted for the Phase-I of proposed development of Vizhinjam International Deepwater Multipurpose Seaport at Vizhinjam in Thiruvananthapuram District, Kerala by M/s Vizhinjam International Seaport Ltd-Extension of validity of EC and CRZ clearance-regarding.**

Sir/Madam,

This is in reference to your application submitted to Ministry vide proposal number IA/KL/INFRA1/500104/2024 dated 09/10/2024 for an extension in validity of prior Environmental Clearance (EC) granted to the project under the provision of the EIA Notification 2006-and as amended thereof.

2. The particulars of the proposal are as below :

(i) Validity Extension Identification No.	EC24A3501KL5383004N
(ii) File No.	11-122/2011-IA.III
(iii) Clearance Type	Application for Validity Extension of EC- Form-6
(iv) Category	A
(v) Schedule No./ Project Activity	7(e) Ports, harbors, breakwaters, dredging
(vi) Sector	INFRA-1
(vii) Name of Project	Environmental and CRZ Clearance for Development of Vizhinjam International Deepwater Multipurpose Seaport at Vizhinjam in Thiruvananthapuram District, Kerala by M/s Vizhinjam International Seaport Ltd
(viii) Location of Project (District, State)	THIRUVANANTHAPURAM, KERALA
(ix) Issuing Authority	MoEF&CC
(x) EC date	
(xi) Status of implementation of the project	CTE was taken and project is under construction/development

(xiii) Whether any amendment to the earlier EC has been sought?	No

3. The proposal is for seeking the extension of validity of EC and CRZ Clearance F.No.11-122/2011-IA.III, dated 6th January, 2014 granted by the Ministry for Phase-I of 'Development of Vizhinjam International Deepwater Multipurpose Seaport at Vizhinjam in Thiruvananthapuram District, Kerala by M/s Vizhinjam International Seaport Ltd. (VISL)', a Government of Kerala undertaking. The port is being developed under a PPP mode between GoK and M/s. Adani Vizhinjam Port Private Limited (AVPPL).

4. EC and CRZ clearance for Phase-I of Development of Vizhinjam International Deepwater Multipurpose Seaport at Vizhinjam in Thiruvananthapuram District, Kerala by M/s Vizhinjam International Seaport Ltd. was granted vide F.No.11-122/2011- IA.III, dated 3rd January, 2014, Further, Validity of Phase-I EC had been extended up to 02.01.2024, vide letter No.11-122/2011-IA.III, dated 29th December, 2020. Ministry issued a Notification dated 18th January, 2021 stating that the period from the 1st April, 2020 to the 31st March, 2021 shall not be considered for the purpose of calculation of the period of validity of Prior Environmental Clearances(in view of outbreak of Corona Virus (COVID-19)). Thus, the EC is valid till 2nd January, 2025. Further, Ministry has issued a Notification S.O.No.1807(E) dated 12th April, 2022 and OM dated 13th December, 2022; as per the said notification, EC is valid for 10 years. Further extendable to 1 year, if an application is made in the laid down proforma to the regulatory authority by the applicant as per the EIA notification, 2006.

5. Now M/s Vizhinjam International Seaport Ltd submitted the online application vide proposal no: IA/KL/INFRA1/500104/2024 submitted to Ministry on 09/10/2024 seeking extension of validity for Environmental and CRZ Clearance vide letter dated F.No.11-122/2011- IA.III, dated 3rd January, 2014 and 29th December, 2020 for the aforementioned project as per the provisions of the Environment Impact Assessment (EIA) Notification, 2006 and CRZ notification, 2011 and subsequent amendments.

6. The proposed project activity is listed at schedule S.No.7(e) Ports, harbors, breakwaters, dredging under Category- 'A', of the schedule of the EIA Notification, 2006. Total Project Cost is Rs. 7700 Cr.

7. Reason: The EC and CRZ clearance for Phase-I of Development of Vizhinjam International Deepwater Multipurpose Seaport at Vizhinjam in Thiruvananthapuram District, Kerala by M/s Vizhinjam International Seaport Ltd. was granted vide F.No.11-122/2011- IA.III, dated 3 rd January, 2014. Due to then EC validity limit of Five (05) years, EC/ CRZ Clearance was limited to Phase-I development only. It has been mentioned that after obtaining EC from MoEF&CC and signing of the Concessionaire Agreement, Phase I development of the project is in advance stage of construction. Further, Validity of Phase-I EC had been extended up to 02.01.2024, vide letter No.11-122/2011-IA.III, dated 29th December, 2020. Considering the MoEF&CC provision of one (01) year COVID blanket extension vide SO dated 18th January 2021, the current validity of the EC is until 02.01.2025.

8. However, the project development has not progressed as planned and has encountered delays due to various reasons, namely:(a) Unavailability of stones/rocks for breakwater construction and delays linked to it, (b) delays due to local protests, (c) awaiting approval of funds from PMMSY for upgradation of existing fishing harbour, local protest against the location of the new fishing harbour on account of tranquillity concerns and its physical model studies by CWPRS, (d) COVID-19 pandemic and delays linked to it, (e) EC Amendment process to accommodate the change in mode of implementation of the port's rail connectivity from the earlier 'above ground' to the now proposed tunnel connectivity; amendment has since been obtained vide F.No.11-122/2010-IA.III, dated 17th July, 2024. (f) Finalisation of design and Land Acquisition process for the port's road connectivity. Due to these delays, the activities as planned to be taken up under Phase I development cannot be completed within existing EC validity period of 02.01.2025. Hence, in order to complete balance activities with valid EC, an extension of EC validity, based on the available provisions of MoEF&CC vide OM's dated April 12, 2022 and December 13, 2022, is being sought by the project proponent for a period of 1 year.

9. After obtaining EC from MoEF&CC and signing of the Concessionaire Agreement, Phase-I development of the project is in advance stage of construction. Trial runs at the port have commenced since July 2024 and Phase-I operations are expected to commence by December 2024. The overall status of progress of Phase-I development as of September 2024 is about 92% of the port components. The status of the project is as follows:

S. No.	Port Project Components	Status/Percentage Completed
1	Land Acquisition	97%
2	Dredging & Reclamation	100%
3	Container Terminal	100%
4	Breakwater	92%
5	Container Yards	75%
6	Port Operation Building, Workshop, GIS Sub-Station, Port Substation, and Security Building	100%
7	Cargo Handling Equipment, Port Crafts, Navigational Aids, Weigh Bridge	99%
8	Fire Protection System	80%
9	Water Supply, Power Supply & Other utilities	100%
10	Road connectivity & Gate Complex	71%
11	Rail Connectivity	Under planning
12	Fish landing facility for the local community	Under planning
Overall Completion Percentage		92%

10. Schedule of Completion of the Activities/ Project: The balance works are envisaged to be completed within a period of 12 months. The balance works include the following developments: Balance minor activities as punch list: a. Breakwater Construction, b. Container Yards, c. Fire Protection System, d. Road Connectivity & Gate Complex. Setting up of a new fish landing facility and amenities for the fishermen, upgradation and adoption of the existing fishing harbour a. Existing Fish Landing Centre/Facilities – North, b. Existing Fish Landing Centre/Facilities – South, Road Connectivity to NH.

11. The aforementioned proposal was placed before the EAC during its 377th meeting during 16th-17th October, 2024. The EAC, after examining the documents submitted by the project proponent and detailed deliberations **recommended** the proposal for the extension of validity of the Environmental and CRZ clearance granted by the Ministry vide letter dated F.No.11-122/2011- IA.III, dated 3rd January, 2014 and 29th December, 2020 up to the period of 2nd January 2026 for the original proposals for which Environmental and CRZ Clearance was granted with specific conditions.

12. As per the recommendation of the EAC, the Ministry of Environment, Forest and Climate Change hereby accords extension of validity of environmental and CRZ clearance granted by the Ministry vide letter dated F.No.11-122/2011-IA.III, dated 3rd January, 2014 and 29th December, 2020 up to the period of 2nd January 2026 for the original proposals for which Environmental and CRZ Clearance was granted with following specific conditions.

13. This issues with the approval of the Competent Authority.

Copy To

1. The Principal Secretary, Environment Department, Government of Kerala, Government Secretariat, Thiruvananthapuram–695 001, Kerala.
2. The Regional Officer, Ministry of Environment, Forest and Climate Change (MoEF&CC), Integrated Regional Office Bangalore, Kendriya Sadan, 4th Floor, E&F Wings, 17th Main Road, Koramangala II Block, Bangalore–560 034, Karnataka.
3. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi – 32.
4. The Member Secretary, Kerala State Pollution Control Board (KSPCB), Pattom PO, Thiruvananthapuram–695 004, Kerala.
5. Compliance and Monitoring Division, Ministry of Environment, Forest and Climate Change (MoEF&CC), Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110 003.
6. Parivesh Portal.
7. Guard File/ Monitoring File/ Record File.

Annexure 1

Specific EC Conditions for (Ports, Harbors, Breakwaters, Dredging)

1. Specific Conditions

S. No	EC Conditions
1.1	PP shall submit six-monthly Certified Compliance Report w.r.t. Earlier EC from the Regional Office of MoEFCC.
1.2	All the specific conditions and general conditions mentioned in the EC/CRZ letter F.No.11-122/2011-IA.III, dated 3rd January, 2014 shall remain the same.
1.3	The directions issued in the Pending Court Cases shall be complied with letter and spirit.

Annexure XIII

Email Submission of HYCR for the Period April 2024 to September 2024

From:	PRASAD KURIEN
To:	rosz.bng-mef@nic.in; rosz.bng-mefcc@gov.in
Cc:	Ssuresh.cpcb@nic.in; tvpmro@gmail.com; Kushal.vashist@gov.in; MS KCZMA; zobangalore.cpcb@nic.in; pamidisuneel; Pradeep Jayaraman; Hebin Chenthamarakshan; Jesse Benjamin Fullonton; ceo@vizhinjamport.in; MD VISL
Subject:	EC_F. No. 11-1222011-IA.III dated 03.01.2014-HYCR-Apr2024-Sep2024_29.11.2024 - Half Yearly EC Compliance Report (HYCR) - Apr 2024 to Sep 2024 reg.
Date:	Friday, November 29, 2024 2:29:15 PM

Dear Sir/Madam,

MoEF&CC had issued Environmental Clearance and CRZ Clearance (EC) on 3rd January 2014 to the proposed Vizhinjam International Multipurpose Deepwater Seaport at Vizhinjam in Thiruvananthapuram District of Kerala State. (EC No. F.No.11 - 122/2011 - IA. III) and subsequently extended the EC validity up to 2nd January 2024 (An additional validity due to Covid is also availed and hence the validity is applicable up to 2nd January 2025) with the same terms and conditions.

Kindly find attached the Half Yearly Compliance Report (HYCR) for the period from Apr 2024 to September 2024 for records and reference.

EC_F. No. 11-1222011-IA.III dated 03.01.2014-HYCR-Apr2024-Sep2024_28.11.2024.pdf

With Regards,

--

Prasad Kurien
General Manager-Environment
Vizhinjam International Seaport Limited
Thiruvananthapuram

VIZHINJAM INTERNATIONAL SEAPORT LIMITED

(A Government of Kerala Undertaking)

Vizhinjam International Seaport Thiruvananthapuram

Vizhinjam International Deepwater Multipurpose Seaport

Half Yearly Compliance Report (HYCR) of Conditions of Environmental and CRZ Clearance for the Period October 2024 to March 2025

May 2025