

Details of Work Assigned to CSIR - Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar for Obtaining Environmental & CRZ Clearance for the proposal "Development of Setting up of Integrated ship building cluster at Deendayal Port Authority, Kandla".

Sr. No.	Details of Work Awarded to CSIR - Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar	Amount	Brief Reason
1	Obtaining Environmental & CRZ Clearance for the proposal "Development of Setting up of Integrated ship building cluster at Deendayal Port Authority, Kandla"	Rs. 450 Lakhs + GST  Work order issued vide letter no _____ Civil Engineering/EMC/4625/ECCRZfor megamarineshipyard/2024/59 Dated 04/04/2025	For obtaining EC & CRZ Clearance for the project, the Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar being a constituent laboratory of the Council of Scientific and Industrial Research (CSIR), under Ministry of Science & Technology and accredited in Category A in Ports, Harbours, Breakwaters, and Dredging [Sector 33, 7(e)], as per NABET/QCI list, the work has been assigned on Nomination Basis to CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar.

Details of Work Assigned to CSIR - CSMCRI, Bhavnagar for Obtaining Environmental & CRZ Clearance for the proposal "Development of Setting up of Integrated ship building cluster at Deendayal Port Authority, Kandla

# DEENDAYAL PORT AUTHORITY



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Civil Engineering/EMC/4625/ECCRZformegamarineshlyard/2024/59

Dated: 04/04/2025

To,  
CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI).

**Address:** Gijubhai Badheka Marg,  
Bhavnagar 364002, Gujarat (INDIA).  
E-mail: [shaldar@csmcres.in](mailto:shaldar@csmcres.in), [salt@csmcres.in](mailto:salt@csmcres.in)

**Kind Attention:** Dr. S. Haldar, Sr. Principal Scientist, CSIR-CSMCRI, Bhavnagar.

**Sub:** Obtaining Environmental & CRZ Clearance for the proposal "**Development of Setting up of Integrated ship building cluster at Deendayal Port Authority, Kandla**" reg.

**Ref.:** 1. DPA email dated 01/01/2025 to CSIR-CSMCRI.  
2. CSIR-CSMCRI, Bhavnagar techno commercial proposal vide communication dated 14/02/2025.

Sir,

Your offer for the subject work submitted vide above referred (ref. 2) communication dated 14/02/2025 amounting to Rs. 450 Lakhs + GST (Rupees Four Hundred and fifty lakhs plus GST) including all terms & conditions mentioned in the offer (**copy attached – Annexure A**), has been accepted by the competent authority in Deendayal Port Authority.

2. The CSIR- Central Salt and Marine Chemicals Research Institute (CSMCRI) shall have to perform work as per the scope of work mentioned in your techno commercial proposal dated 14/02/2025.

3. The Payment shall be made as per the payment schedule mentioned in the techno-commercial proposal dated 14/02/2025. The same is reproduced as under:

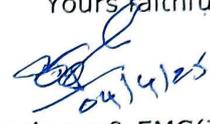
- i. 1<sup>st</sup> Installment: 50% of the total within 15 days after submission of inception report.
- ii. 2<sup>nd</sup> Installment: 10% of the total project cost within 30 days after grant of TOR.
- iii. 3<sup>rd</sup> Installment: 20% of the project cost within 30 days after GCZMA recommendation.
- iv. 4<sup>th</sup> Installment: 10% of the project cost within 30 days after public hearing
- v. 5<sup>th</sup> Installment: 10% of the project cost upon receipt of EC CRZ clearance.

**Note :** DPA will make above payments to CSIR- CSMCRI only.

.....Cont....

4. You shall have to complete the entire assignment within a period of 36 months.
5. Kindly send the acknowledgement of this work order & start the work w.e.f. **07/04/2025.**

Yours faithfully,



Dy. Chief Engineer & EMC(I/c)  
Deendayal Port Authority



सीएसआईआर-केन्द्रीय नमक व समुद्री रसायन अनुसंधान संस्थान  
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)  
गिजुभाई बधेका मार्ग, भावनगर - ३६४ ००२, गुजरात, भारत  
**CSIR-CENTRAL SALT & MARINE CHEMICALS RESEARCH INSTITUTE**  
(Council of Scientific & Industrial Research)  
Gijubhai Badheka Marg, Bhavnagar 364 002, Gujarat, India

From,  
Dr. S. Haldar  
Senior Principal Scientist

14/02/25

To  
Deputy Chief Engineer & EMC (I/C)  
Deendayal Port Authority

Reference. No. Your letter dated 1<sup>st</sup> January, 2025 from Dy. Chief Engineer & EMC(I/c), Deendayal Port Authority

Sub: Submission of Techno commercial proposal for EC and CRZ clearance for Development and setting up of Integrated Ship Building Cluster

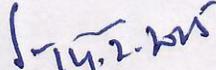
Sir,

In reference to above referred mail, we are planning to submit our techno commercial offer for the project titled "EC and CRZ clearance for Development and setting up of Integrated Ship Building Cluster" for your kind consideration.

As per your requirement, CSIR-CSMCRI fulfil all the required criterion as well as have NABET accreditation in Sector 33: Port, harbour, break water and dredging (Category A) and our laboratory is also accredited by NABT.

Price reliability certificate has also been attached for your consideration.

Yours sincerely,

  
Soumya Haldar

डॉ. एस. हलदर / Dr. S. Haldar  
वैज्ञानिक / Scientist  
वि.स.वि.वि.एवं के.उ.सु. / AESD & CIF  
सीएसआईआर-के.न.व.स.र.अ.सं. / CSIR-CSMCRI  
जी.बी. मार्ग, भावनगर / G. B. Marg, Bhavnagar-364 002

Encl.

- Techno commercial proposal
- Price reliability certificate

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**EC and CRZ clearance for Development and  
setting up of Integrated Ship Building Cluster**

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***Proposal***

***Submitted to***  
**Deendayal Port Authority**

***Submitted by***



**CSIR-Central Salt & Marine Chemicals  
Research Institute (CSIR-CSMCRI)  
Ministry of Science and Technology  
Govt. of India  
Bhavnagar-364002, Gujarat  
NABET and NABL accredited laboratory  
(Category A - Ports and Harbour , Break water , Dredging)**

**February, 2025**

**Preamble:**

The Kandla Marine Complex is proposed as a premier maritime facility, encompassing the needs of shipbuilding, ship repair, captive port, Marina and a fishing harbour cum build and repair, with associated Township set up. The fisheries complex will handle all needs of deep-sea trawlers. The ship building and repair facility and the Port will be capable of handling vessels up to 400 meters in length.

For the above mentioned development, as per prerequisite, it is statutory requirement to obtain Prior Environmental & CRZ Clearance from the MoEF&CC, Gol., (under EIA Notification, 2006 & its subsequent amendments and applicable CRZ Notification, 2011/2019) and hence, DPA needs to appoint NABET accredited EWEMP Consultant (Category A - Ports, Harbours, Break waters, Dredging).

CSIR-Central Salt and Marine Chemicals Research Institute (CSIR-CSMCRI) has accreditation from NABET in Category A in Ports, Harbours, Break waters, Dredging [Sector 33, 7(e)]. Therefore, DPA approached CSIR-CSMCRI to submit a techno commercial proposal to carry out the work.

**CSIR-CSMCRI competency:**

CSIR-CSMCRI with its persistent efforts and continued scientific excitement has achieved technological excellence in the core mandate it pursues and is one among the top performing national R&D laboratories in the country. As on January 2024, the Institute has around 214 staff with 170 S&T staff on its roll and around 200 research fellows and project assistants pursuing their doctoral programme and engaged in several projects.

The Marine Elements and Marine Environment Division is a centralized analytical infrastructure of CSIR-CSMCRI combine with the environment related activities to cater multifaceted characterization and quantitative analysis through advanced analytical instruments as well as environmental solution by dedicated skilled human resources.

Environment group of this division is actively involved in marine environmental impact assessment (MEIA) studies for past many years. This group have diversified expertise such as marine biologist, environmental engineer, environmental scientists, analytical chemists etc. The work profile includes baseline data collection, Environmental Monitoring and Impact Assessment, preparation of environmental Management Plan (EMP) etc. Scientists are also involved in many critical projects assigned by state and central pollution control boards or other statutory bodies involved in environmental protections. CSIR-CSMCRI has also been accredited by NABET, Quality Council of India as master consultant to undertake EIA studies and preparation of EMP for following four sectors such as:

- a. Sector 22: Distilleries (Cat. A)
- b. Sector 30: All ship breaking yards including ship breaking units (Cat. A)
- c. Sector 33: Ports, harbours, break waters and dradging (Cat. A)
- d. Sector 36: Common Effluent Treatment Plants, CETPs (Cat. B)

This institute have a strong scientific pool of Functional area experts (FAEs) and all are

working as Scientist in the institute except “Meteorology, air quality modelling and prediction” for which we have empanelled FAE.

CSIR-CSMCRI has its in house NABL accredited laboratory for carrying out all the analysis.

### **Experience in handling EC and CRZ and environmental monitoring projects:**

1. Marine Environmental Monitoring and Impact Assessment studies in connection with effluent disposal in Gulf of Khambhat.
2. Assessment of impact on marine ecology off Mithapur due to release of treated effluents from Tata Chemicals Limited.
3. Marine environmental evaluation at Chhara Port, Diu, Gujarat for ecological studies at the proposed LPG and POL import- export plant for West Coast terminals Pvt. Ltd.
4. Marine Environmental evaluation for proposed LNG terminal at Hazira Gujarat.
5. CSIR-CSMCRI has successfully completed a project titled “Environment Monitoring at Alang & Sosia Ship Recycling Yard, Alang” sponsored by GMB.
6. Environmental impact assessment studies and selection of marine outfall for treated effluent disposal for proposed CETP at Bhimavaram, WG District, AP
7. Adequacy and stability study of treated effluent discharge point after resuming the discharge of treated effluent
8. CSIR-CSMCRI also carried out different environment related projects for different ship recycling yards and other agencies.
  - a. Environmental Monitoring of Priya Blue Industries (PBI) Pvt. Ltd., Alang.
  - b. Analysis of different environmental parameters (Air, water, soil, sediment and noise) and POP’s from water, sediments, fish etc for M/s Shree Ram Group of Industries, Alang. (Thus project was carried out for EU compliance).
  - c. Rapid marine environmental monitoring of Alang area with respect to water, sediments and ambient air for M/s Ship Recycling Industries Association
  - d. Ballast water and sediment analyses for M/s Leela Group of Industries and M/s Shreeram Group of industries.
  - e. Ambient air and noise monitoring of ship breaking plot of M/s Shreeram Group of Industries.

### **Project location and project overview:**

The proposed project is located in the land of Deendayal Port Authority, Kandla. The Indian economy is growing at a faster rate (GDP growth estimated at about 8% p.a.) and this will lead to a higher demand for sea-borne vessels in the medium to long term. This would benefit shipbuilders like KANDLA.

This, in itself presents a significant potential for shipyards like KANDLA to grow in the future, in addition to the investments in the oil/gas exploration by Indian and multinationals in the Indian coastal line and in the Middle East discussed below. KANDLA plans to create a modern integrated shipyard equipped with out sourced design and engineering capability reducing internal dependence and instead bringing to the fore, established industries actively

engaged in showcasing their prowess in their respective fields of operation. An opportunity will be afforded to these industries to integrate and cohesively function to yield a product, in the world's marketplace, that can effectively showcase brand India. The main areas that would be of prime focus in this Yard would be:

- OPTIMIZE                      the facilities and layout
- ECONOMISE                      capital expenditure
- MAXIMISE                      production efficiency
- MINIMISE                      the building cost (infrastructure and ships)

### **Key objectives:**

- Construction of a state-of-the-art shipyard tailored to accommodate build and repair of VLCC & ULCC class vessels, Ships and submarines of the Armed Forces and off shore structures.
- Construction of Kandla Fisheries Complex having a 500 x 50 M dry dock will address the repairs and maintenance requirements of the fishing fleet and deep sea trawlers.
- Development of port with a self-contained complex for receiving the cleaned and preserved fish to be packaged and auctioned for the domestic and international market.
- Development of Marina with total site spread of over 391 Acres. It shall have extensive Berthing facilities, multi-level repair facilities, Passenger and Business amenities, 18-hole PGA Standard Golf Course spread across 350 Acres.
- Uplinks for networking to tourist destinations by Road, Rail & Air will be integral to the complex. It will also include Training Facilities for Scuba diving and Water Sports.
- Development of other facilities like
  - Setting up fabrication facility for ships/rigs/equipments
  - Building of two launching facilities
  - Installation of captive power plant
  - Commissioning of a desalination plants
  - Installation of cranes and build up of land berths
  - Limited township
- Off shore Platform for (i) semi submersible and jack up rigs, (ii) FPSOs (Floating Production Storage & Offloading)
- The self-contained Township to house personnel of the entire feature.

### **Scopes for consultant:**

General Scopes:

1. Submission of Form 1A to PARIVASH on behalf of KPA based on DPR and required data supplied by the KPA. Preparation of Pre-Feasibility Report (PFR) based on analysis and data supplied by KPA or consultant appointed by DPA.
2. Primary baseline data in the project area as well as in the area falling 5 km from the proposed project boundary and secondary data should be collected within 15 kms aerial distance from the project boundary, as specifically mentioned at column 9(iii) of Form I of EIA Notification 2006.

3. Meteorological data for at least a 10 year period should be presented from the nearest meteorological station, except for the history of cyclones and tidal surges for which 100 years data may be required.
4. Study the biological environment includes marine/coastal ecology, flora and fauna.
5. Air environment and noise environment study.
6. Study the existing solid waste disposal facility.
7. Socio-economic and Occupational Health Environments study.
8. Anticipated Environmental Impacts and Mitigation Measures
9. Proposed Environmental Monitoring Program during construction and operation phases.
10. Preparation of Environmental Management Plan (EMP).
11. Conducting public hearing along with project proponent.
12. Help in statutory clearance from different agencies.

### **Physical oceanography Scopes:**

Detailed physical oceanography studies includes:

1. Hydrodynamics
2. Dispersion modelling
3. Sediment transport
4. Backwater
5. Oil spill modelling
6. Quantification of dredging materials and identification of grudging sites
7. Preparation of CRZ map as per the CRZ notification

Preparation of final report and submission to competent authority for EC and CRZ clearance.

### **Detailed scope of work:**

#### **General Scopes:**

##### **Scope 1**

Form 1A will be filled up after consultation with KPA. Preparation of PFR.

##### **Scope 2**

#### **Study the land environment:**

Availability of land for earmarking for the port without causing a due hardship to local habitat and their socio cultural and economic aspects.

### **Topography:**

Baseline data to be given on description of existing situation of the land at the proposed project area including description of terrain hill slopes coastal and inland topography, coastal features (lowland, beaches, littoral areas, shoal areas), terrain features, slope and elevation. Study of land use pattern, habitation, cropping pattern, forest cover, environmentally sensitive places etc, by employing remote sensing techniques (if available) and also through secondary data sources.

### **Geology**

Baseline data to be provided on rock types, regional tectonic setting (reported fractures/faulting, folding, warping), and history of any volcanic activity, seismicity and associated hazards, mainly in the coastal area.

### **Soil**

Soil data including type, classification, characteristics, soil properties etc., are important from engineering considerations for design of structures, loading capacities of cargo stockpiles, green belt development etc.

### **Scope 3**

- Wind speed and direction
- Rainfall
- Relative humidity
- Temperature
- Barometric pressures
- History of cyclones

### **Scope 4**

Biological environment of coastal water

Baseline data of aquatic flora and fauna at the project area, including the coastal area is to be ascertained by proper surveys including mangroves and marshes and other coastal vegetation, sand dunes. Data on coastal stability, seismic characteristics, history of any endangered species, coastal erosion, shoreline changes, if any, is also necessary.

Phytoplankton count, major genera and generic diversity (only in surface waters), Zooplankton count and group diversity (only in surface waters), Microbiological analysis, Total viable count, Total Coliforms, Faecal Coliform as well as its constituent organisms like *E. coli*, *Shigella*, *Salmonella*, *Proteus*, *Klebsiella*, *Vibrio cholerae*, *Vibrio parahaemolyticus* and other *Vibrio* sp., *Pseudomonas aeruginosa* and *Streptococcus faecalis* (only in surface waters).

Chlorophyll-a, phaeophytin, analysis

**Physico-chemical parameters:**

Seawater and air temperature, depth, turbidity, density of seawater, total suspended solids, salinity, pH, dissolved oxygen, biochemical oxygen demand (BOD), NH<sub>4</sub>-N, NO<sub>2</sub>-N, NO<sub>3</sub>-N, Total -N, PO<sub>4</sub>-P, Total -P, and Silicate.

Heavy metal contents (As, Cd, Co, Cu, Ni, Mn, Hg, Cr, Pb, Zn, Fe).

Biological environment for coastal sediment

Physico-chemical parameters: Texture, TOC, petroleum hydrocarbons etc and heavy metals (As, Al, Cd, Co, Cu, Ni, Mn, Fe, Cr, Pb, Zn)

Biological parameters: Numerical and biomass density per unit area, identification of species and species diversity of benthic fauna

Ground water environment

Following parameters will be analysed for ground water samples in 6-8 station selecting based on transect study

pH, Suspended Solids, Total Dissolved Solids, Fluoride, Salinity, Total hardness, Chlorides, DO, BOD, Heavy metals (Cu, Cd, Co, Ni, Zn, Hg, Pb and Cr), and Most probable number.

Sampling frequency:

All study will be carried out for three seasons (Pre monsoon, post monsoon and winter)

**Scope 5**

Ambient Air quality parameters within 5 km radius need to be studied

PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, Ozone, Ammonia

One season data should be monitored other than monsoon as per the CPCB Norms. One station should be in the up-wind/ non-impact/ non-polluting area as a control station.

Noise monitoring will be done at selected locations at 6 transects preferably at the ambient air quality monitoring stations. Day Time and Night time noise levels will be measured. Baseline data on noise pollution at the project area and the neighbourhood up to 1 km or nearest residential areas is to be monitored as per the CPCB norms.

Sampling frequency:

All study will be carried out for three seasons (Pre monsoon, post monsoon and winter)

**Scope 6**

Details of authorized municipal solid waste facilities, biomedical treatment facilities and hazardous waste disposal facilities in the area will be inventoried, in case if it is proposed to utilize the same.

### **Scope 7**

Baseline data at the project area shall include the demography, particularly on human settlements, health status of the communities, existing infrastructure facilities in the proposed area and area of impact due to the proposed activity. Present employment and livelihood of these populations, awareness of the population about the proposed activity shall also be included.

### **Scope 8**

Likely impact of the project on each of the environmental parameters, methods adopted for assessing the impact such as model studies, empirical methods, reference to existing similar situations, reference to previous studies, details of mitigation methods proposed to reduce adverse effects of the project, best environmental practices and conservation of natural resources. The identification of specific impacts followed with mitigation measures should be done for different stages i.e., location of the port, construction including dredging, ship traffic including discharges from vessels and cargo operations.

### **Scope 9**

Proposed Environmental Monitoring Program during construction and operation phases will be formulated. This will be done based on the generated baseline data.

### **Scope 10**

- Summary of potential impacts & recommended mitigation measures.
  - Allocation of resources and responsibilities for plan implementation
  - Administrative and technical setup for management of environment
  - Institutional arrangements proposed with other organizations/Govt. authorities for effective implementation of environmental measures proposed in the EIA
  - Safe guards/mechanism to continue the assumptions/field conditions made in the EIA
- Environmental specifications for contractors should cover the required safeguards during the design and construction stage

### **Scope 11**

Public hearing will be conducted after submission of draft report and consultation with the project proponent and local administration.

### **Scope 12**

All the liaising activities will be carried out by some of the professional organization hired by CSIR-CSMCRI, Bhavnagar.

### **Detailed scopes related to physical oceanography:**

#### **Objectives**

The primary objective of the study is to assess the environmental impact of the proposed port expansion through detailed numerical modeling and measurements. The specific goals include:

- Field Measurements: Obtain real-time data on currents, tides, and sediment characteristics.
- Hydrodynamic Modeling: Simulate water circulation and flow patterns to assess tidal dynamics.
- Sediment Transport Modeling: Analyse sediment dynamics and deposition patterns to predict the impact of dredging activities.
- Breakwater Design Modeling: Evaluate the effectiveness of the proposed breakwater structures on wave energy reduction and port protection.
- Oil Spill Simulations: Assess potential risks from oil spills and develop mitigation strategies.
- Dredging and Spoil Dispersion Modeling: Predict sediment plume dispersion resulting from dredging and dumping operations.
- Conduct a comprehensive Coastal Regulation Zone (CRZ) mapping in the project area.

#### **Scope of the Work**

The scope of the study includes both field measurements and numerical modeling using the MIKE21 software suite. The scope covers:

#### **Field Measurements**

Field measurements will be conducted to collect essential data for validating the numerical models and understanding the hydrodynamic environment at the proposed port location

##### a) Currents:

A single-point Recording Current Meter (RCM) will be deployed inside the proposed port location to measure current speed and direction at different depths. The RCM will record data over the entire spring-neap tidal cycle, covering both pre-monsoon and post-monsoon seasons to ensure comprehensive seasonal variability.

b) Tides:

A tide gauge will be deployed to collect tidal data continuously throughout the spring-neap tidal cycle for both seasons. This will provide detailed tidal elevation records, which are crucial for the calibration of the hydrodynamic model.

c) Sediment Sampling:

Collection of sediment samples from various locations to analyze grain size distribution and sediment properties

**Numerical Modeling:**

The numerical modeling component of the study will utilize the MIKE 21 modeling suite to simulate hydrodynamic conditions, sediment transport, oil spill trajectory, and breakwater effects. This suite is a well-established tool for coastal and marine environment modeling, widely used for Environmental Impact Assessments (EIA), coastal infrastructure design, and port development.

a) Hydrodynamic Modelling

Various modules of the MIKE21 modeling software will be employed for this study. Our team has conducted numerous Environmental Impact Assessment (EIA) projects concerning industrial developments, power plants, and tourism activities along India's coastal waters. In many of these projects, MIKE21 has been utilized to draw conclusions that support EIA efforts and promote the sustainable development of marine and coastal environments.

The setup of the numerical model will be conducted using the latest available data, ensuring a highly accurate representation of the project area. The model will incorporate key environmental and structural features relevant to the Deendayal Port expansion, and will be designed to simulate the complex interactions between hydrodynamic forces and existing/planned infrastructure. The Hydrodynamic Model (HD FM) simulates water levels and flow patterns in coastal areas. It uses a flexible mesh approach, making it suitable for complex geometries like port basins, creeks, and channels. The model setup will incorporate detailed bathymetry and boundary conditions, including tides, currents, and wind forces, to simulate the flow dynamics accurately. Calibration and validation will be performed using field data collected during the measurement phase.

b) MIKE 21 Sand Transport Model (ST FM):

The Sand Transport Model will be used to analyze the transport of non-cohesive sediments (sand) within the port area. This module considers the effects of hydrodynamic forces (currents and waves) to estimate potential sand accumulation or erosion near critical locations. It will assist in identifying areas that may require maintenance dredging and help optimize the layout of the port.

c) MIKE 21 Sediment Transport Module (ST):

The Sediment Transport Module simulates the transport and fate of cohesive and non-cohesive sediments (fine particles like silt and clay). This module will be used in conjunction with the HD FM module to assess sediment resuspension and deposition patterns during regular port operations and under extreme conditions (e.g., heavy rainfall or dredging activities).

d) MIKE 21 Oil Spill Module (OS):

The Oil Spill Module will be used to predict the trajectory and fate of potential oil spills in the port vicinity. It includes advanced algorithms to simulate oil slick movement, weathering (evaporation, emulsification), and degradation over time. Simulations will be run for different scenarios, considering varying spill volumes and seasonal hydrodynamic conditions.

e) MIKE 21 Dredge and Dumping Module (ST FM):

The Dredging and Dredge Spoil Dispersion Module simulates the dispersion patterns of sediments during dredging operations and the subsequent dumping of dredge spoils in designated areas. This module will provide insights into potential sediment plumes, helping mitigate adverse effects on nearby sensitive areas (e.g., coral reefs, marine habitats).

f) Breakwater Design:

Simulation will be carried out for existing and with port structures. Results will be used to optimize breakwater designs, ensuring the protection of port facilities from wave action and minimizing impacts on sediment transport.

### **Data Requirement**

To ensure accurate and reliable numerical modeling and simulations for the Deendayal Port Development Project, a comprehensive set of data will be required. The following data inputs are essential to setting up and running the models:

a) Bathymetric Data

Client should provide detailed bathymetry of the project area and its surroundings is crucial for constructing the model's seabed elevation. The data should include high-resolution digital elevation models (DEMs) of the seabed, extending from the shallow waters around the port to

the deeper offshore areas. Bathymetric surveys must capture recent changes due to natural processes (sediment deposition, erosion) or human activities (dredging).

b) Tidal Data

Historical port tide data if available. Tidal elevations and tidal currents at various points within and around the project area are required if available. This data should include both spring and neap tide cycles, measured over at least one month to capture variations in water levels.

Tide gauge data from existing stations near the port or from newly deployed tide recorders will be used for model calibration and validation.

c) Current Data

In-situ current measurements using RCM current meters will be collected inside the proposed port area, capturing both near-surface and bottom currents. These measurements should cover both monsoon and non-monsoon seasons to account for seasonal variations in current speed and direction.

d) Wind Data

Wind speed and direction data over the project area is necessary to understand its influence on currents, waves, and oil spill trajectories. Wind data should cover several years to represent different meteorological conditions, particularly during cyclonic events.

e) Sediment Characteristics

Sediment sample data from the seabed at different locations within the port area is required to define the grain size distribution and sediment composition (cohesive or non-cohesive sediments). This data will be crucial for the sediment transport modeling and dredge spoil dispersion analysis. Suspended sediment concentration (SSC) measurements in the water column will also be needed to simulate the sediment plume behavior.

f) River and Freshwater Inflow Data

Information on river discharges and freshwater inflows into the study area is needed to simulate the influence of salinity gradients and nutrient load on water circulation patterns. Seasonal variability in river flow, particularly during the monsoon, must be included. This data can be sourced from local river gauging stations or hydrological models.

g) Port Alignment and Structural Data

Detailed port infrastructure layouts including existing jetties, berths, breakwaters, and planned new structures are needed to simulate their influence on hydrodynamic and sediment processes. This includes the location and alignment of tanker routes, navigation channels, and dredged areas. Data on the location of any sensitive marine ecosystems (coral reefs, mangroves) or protected areas within the region should also be provided.

h) Dredging and Spoil Disposal Data

Details on the dredging plans (e.g., dredged area boundaries, dredging depth, volume to be removed) and the proposed dredge spoil disposal sites are required. Information on the dredging methodology (cutter suction, trailing suction, etc.) and estimated sediment plume release rates will be important for the dredge spoil dispersion modeling.

i) Oil Spill Data

Oil spill scenarios (e.g., spill locations, volumes, types of oil, and seasonal occurrence) are needed for the oil spill modeling. Historical data on previous spills in the area, if available, would help in scenario planning. Information on response measures (e.g., oil spill containment booms) will be useful for planning mitigation strategies.

j) Pipeline, Tanker Routes, and Navigational Data

The project area's tanker traffic routes, pipeline locations, and other navigational features (e.g., anchorage zones, mooring points) need to be incorporated into the model setup to accurately reflect ship movements and potential risk areas.

### **CRZ Scope**

a) CRZ studies as per the CRZ 2011 Notification to be undertaken for the project of development of integrated ship building cluster at Deendayal Port Authority, Kandla, Gujarat. CRZ map Indicating HTL, LTL and CRZ boundaries and other ecological Sensitive areas covering 7 km Radius around the Project site, and Superimposing Project layout on the CRZ map in the scale of 1:4000 (project site) & 1:25000 (7 km radius)

b) For CRZ studies base map of Approved Coastal Zone Management Plan of Gujarat State prepared by National Centre for Sustainable Coastal Management will be used (e.g High tide line, low tide line, CRZ boundaries & its classification, Ecological Sensitive Area and other Critical Vulnerable Coastal Areas).

c) Submission of Final report along with the CRZ map.

d) Only Technical support will be provided to the client.

### **Assistance required from DPA:**

- Assist in arranging suitable boat for marine sampling.
- Local hospitality and guidance whenever possible and required by CSIR-CSMCRI.
- Obtaining all the required permission required for field sampling.
- Supply of data required for physical oceanography study and interpretation.
- Supplying previous reports available with DPA for report preparation and data interpretation.

## Time scale of the project

Time scale (in months)	0-3	4-6	5-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
Project initiation and mobilization, PFR finalization												
Submission of required form to PARIVESH												
Issue of ToR by MoEF & CC												
Baseline data for three seasons												
Physical oceanography study												
Draft report preparation and submission for CRZ clearance and subsequent meeting at GCZMA												
Necessary clearance from all the statutory bodies like GPCB, Forest department, Wild life (if require) etc.												
Public hearing												
Incorporation of suggestion and preparation of final report and subsequent meeting at MoEF & CC												
Buffer time												

**Financial quote**

Total project cost: 450 lakhs + GST

**Payment schedules:**

1<sup>st</sup> Installment: 50% of the total project cost within 15 days after submission of inception report.

2<sup>nd</sup> Installment: 10% of the total project cost within 30 days after grant of TOR.

3<sup>rd</sup> Installment: 20% of the project cost within 30 days after GCZMA recommendation

4<sup>th</sup> Installment: 10% of the project cost within 30 days after public hearing

5<sup>th</sup> Installment: 10% of the project cost upon receipt of EC CRZ clearance



**National Accreditation Board  
for Education and Training**



**Certificate of Accreditation**

**CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar**

GB Marg, Bhavnagar, Gujarat- 364002

*The organization is accredited as Category-A under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –*

S.No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Distilleries	22	5 (g)	A
2	All ship breaking yards including ship breaking units	30	7 (b)	A
3	Ports, harbours, break waters and dredging	33	7 (e)	A
4	Common effluent treatment plants (CETPs)	36	7 (h)	B

*Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated September 15, 2023 posted on QCI-NABET website.*

*The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/2943 dated October 11, 2023. The accreditation needs to be renewed before the expiry date by CSIR-CSMCRI, Bhavnagar following due process of assessment.*

Sr. Director, NABET  
Dated: October 11, 2023

Certificate No.  
NABET/EIA/2326/RA 0304

Valid up to  
July 15, 2026

*For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to the QCI-NABET website.*



National Accreditation Board for  
Testing and Calibration Laboratories

**CERTIFICATE OF ACCREDITATION**

**CSMCRI - ANALYTICAL TESTING AND EVALUATION  
LABORATORY**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing &  
Calibration Laboratories"**

for its facilities at

CSIR - CENTRAL SALT & MARINE CHEMICALS RESEARCH INSTITUTE, GUJUBHAI BADHEKA MARG,  
BHAVNAGAR, GUJARAT, INDIA

in the field of  
**TESTING**

Certificate Number: TC-14732

Issue Date: 21/10/2024

Valid Until:

20/10/2028

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.  
(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Name of Legal Entity: CSIR - Central Salt & Marine Chemicals Research Institute

Signed for and on behalf of NABL



N. Venkateswaran  
Chief Executive Officer