

# EXECUTIVE SUMMARY

**MARINE ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR  
BERTHING JETTY, CONVEYOR CORRIDOR WITH BACKUP STORAGE  
FACILITIES AND APPROACH ROAD TO CEMENT GRINDING UNIT &  
FLY ASH/SLAG PROCESSING UNIT OF ADANI CEMENTATION LIMITED  
AT AMBA RIVER, SHAHBAJ & SHAHPUR VILLAGE, ALIBAG TALUKA,  
MAHARASHTRA**

PROJECT CODE: 606121718

For  
**adani**

ADANI CEMENTATION LIMITED  
AHMEDABAD

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EIA CONSULTANT



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## EXECUTIVE SUMMARY

### E.1. Introduction

Adani Cementation Limited (ACL), Ahmedabad is wholly owned subsidiary of Adani Enterprises Limited (AEL) created on 6<sup>th</sup> December 2016, Adani has grown to become a global integrated infrastructure player with businesses in key industry verticals - Resources, Logistics, Energy and Agro. Adani group has rich and extensive experience of liaison with government agencies, import, funding etc. With this track record of the organization in tying up finances, flow of funds will not pose any problem for implementation of the proposed project of its cement division. Adani Cementation Ltd., (ACL) has been formed for development of number of Cement Projects such as Integrated Cement Plant, Grinding Units, Bulk Terminals and Limestone Mine. ACL could reduce the gap in supply and to compete with current producers to increase the market share in these areas through its low cost of production and reduced transport cost.

Adani Cementation Limited (ACL) has proposed to setup Berthing Jetty, Conveyor Corridor and Approach Road to cater traffic load of 5 Million MTPA capacity proposed (Greenfield Cement Grinding Unit with Production Capacity of 4.5 Million Metric Tons per Annum (MMTPA) and 0.5 Million Metric Tons per Annum (MMTPA) Fly ash/ Slag Processing Unit) along Amba River at village Shahbaj and Shahpur, Taluka Alibag, District Raigad, Maharashtra. The proposed Jetty and its associated facilities is classified as Category 'A' Project under category 7(e) as per Environment Impact Assessment (EIA) Notification dated 14th September 2006, MoEF&CC. This project needs environment clearance from MoEF&CC. The estimated capital cost of the project is around Rs. 172 Crores.

As per the Coastal Regulation Zone (CRZ) Notification 2011, Section 1 (i) & (ii) and its subsequent amendments, setting up/expansion of any industry, operations or processes and manufacture or handling within 500 m on the landward side along the sea front from the High Tide Line (HTL) and land area between HTL to 100 m or width of the creek whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea and the distance up to which salinity concentration of 5 parts per thousand (ppt) measured during the driest period of the year requires prior CRZ clearance before commencing onsite activities.

As per Coastal Regulation Zone Notification, 2011 the project area falls under CRZ – IA (Mangroves and 50m Buffer from Mangroves), CRZ – III (Rural) and CRZ – IVB (Creek). The development of berthing jetty, conveyor corridor with its associated storage as well as backup facilities and approach road are permissible activity as per CRZ Notification 2011, Section 3 (i) (a).

The EIA study has been conducted according to the TOR obtained from MoEF&CC vide [Proposal No. IA/MH/MIS/81470/2018] [F.No. 10-77/2018-IA-III] dated, 13<sup>th</sup> December 2018 and amendment on 09.10.2019 (for inclusion of forest area) as well as on 06.12.2021 (for change in associated grinding unit project). The baseline data at the project region has been collected during Pre-monsoon (March – April 2018), Post monsoon (September – October 2018) and in November 2021. The EIA report comprises of baseline data on seawater, seabed sediment quality and marine ecology and biodiversity.

### E.2. Project Description

**Location:** The proposed project site is about 17 km upstream from the mouth of Amba River. Amba River joins the sea between Revas on southern side and Karanja on the northern side. The proposed jetty, conveyor corridor with backup storage facilities and approach road falls at around 470 m north to proposed Cement Grinding Plant & Fly ash/ Slag Processing Unit and southern bank of Amba River at Shahbaj & Shahpur village, Alibag Taluka, Raigad District, Maharashtra. Pen is the nearest town located at a distance of 8 km from the proposed project site. The proposed plant site is adjacent to the backyard / stackyard of PNP Port and lies northwest of the PNP Maritime Services Pvt. Ltd., operating a multipurpose port.

The proposed berthing jetty, conveyor corridor with approach trestle and backup facilities will be on the northern side of the PNP Port. Dharamtar JSW Port located on the opposite bank of the Amba River. The JSW steel Ltd., is also located on the northern bank of Amba River about 1 km upstream of the proposed site.

The proposed project location is well connected by road and rail. It is accessible by road and is about 80 km south of Mumbai. The Pen – Alibag National Highway NH 166A passes at approximately 1.5 km on the south from the proposed location. The nearest railway station is Pen station located approximately 8 km northeast of the proposed location. The nearest major port is in Mumbai at a distance of 28 km northwest of the proposed location. The nearest airport is in Mumbai at 86 km northwest of the proposed location. The proposed berthing jetty, conveyor corridor with backup facility and approach road will have potential to handle up to 5 Million MTPA of Cement, Fly ash, slag, Clinker, Coal & AFR.

### **Proposed facilities**

It is proposed that the port facilities shall be developed commensurate with traffic growth. Salient features are described below:

- Berthing jetty (Trestle type) with related utilities and amenities
- Jetty will have four barge berths having total length of 620 m and 35 m wide with mechanized handling system
- Unloading mechanism at jetty: self-discharging vessel/ mechanised unloading
- Proposed berthing facilities are likely to handle various cargo
- Cargo handling capacity – 5 Million MTPA
- Type of vessel – Barges / small bulk carriers up to 8000 DWT
- Approx. 435 m long of conveyor corridor with service road and conveyor system laid over approach trestle connecting from jetty to cement grinding plant
- Dredging in berth pocket area
- Disposal of dredge spoil
- The depth in the channel will be about (-) 5.3 m after completion of dredging
- Approach road at entrance of the plant from the existing Zilla Parishad road
- Incremental supporting Infrastructure
- Backup storage facility area development
- Truck parking area
- Greenbelt / Plantation and open area
- Support backup infrastructure for operations and maintenance of the proposed facility (Water, Power, Buildings, utilities and amenities including Fire Fighting, safety and security systems and environment protection measures).

### **E.3. Description of Environment**

The marine environment of the project region has been studied for the evaluation of baseline information as per the norms stipulated in the EIA notification 2006. Based on the initial TOR obtained in 2018, the baseline data collection was carried out for two seasons during Pre-monsoon (March – April 2018) and Post monsoon (September – October 2018). However, with the subsequent amendment in TOR (2019 and 2021) and to meet the validity of baseline data as per MoEF&CC O.M. dated 29.08.2017, the field baseline data were once again collected in November 2021. The samples of seawater, seabed sediment samples and biological parameters were collected covering a stretch of 25 km in the Amba River at 10 stations: three at open sea / river mouth and seven at Amba River.

In addition, baseline data of other Environmental parameters (studied during post-monsoon season from October to December 2021) within 10km radius study area from proposed project sites discussed in EIA Report of interlinked adjoining “Cement Grinding Plant and Fly ash / Slag Processing Unit” project prepared by M/s J.M. Envirotech Pvt. Ltd., (JMEPL) Gurgaon as per TOR issued by MOEFCC vide letter no. IA-J-11011/261/2021-IA-II (I) dated 25<sup>th</sup> August, 2021 are also considered for analysis.

### **Marine EIA Study**

Water quality: Water samples were collected from 10 locations to understand the quality of water in the project region. Water quality parameters such as DO, BOD and nutrients indicate range pertaining to estuarine waters. Levels of heavy metals also indicate the water in the study area is free from pollution.

Sediment quality: Sediments in the project region is dominated by clay. The heavy metal concentration in the sediment showed low values in the study area. It indicates that there is no accumulation of pollutants in the sediment samples. The proposed site is free from any sediment pollution.

Phytoplankton: The average primary productivity in the study area was 381 mgC/m<sup>3</sup>/day and number of phytoplankton taxa recorded varied from 26 to 37 species.

Zooplankton: Zooplankton population analysis at various stations showed that their numerical abundance varied from 64178 to 98039 nos./100 m<sup>3</sup>. The species composition fluctuated from 26 to 31 species.

Benthos: The numerical abundance of the subtidal benthic fauna varied between 225 to 1040 nos./m<sup>2</sup>. The intertidal faunal population mainly consisted of Polychaete worms, crustaceans, and molluscan.

Fisheries: There are 34 fishing villages with 4588 fishing families in Alibag Taluka. The total population engaged in fishing is 7732. All these fishing villages are placed at more or less equal distance from each other, along the coast of Alibag. The fishing is the major activity of villagers living along the banks of the Amba River. It is reported that majority of the fishes captured are the major carps *Cirrhina mrigala*, *Catla catla*, *Labeo rohita* and catfishes, murrels, *Barbus*, *Hilsa ilisha*, Mulletts, crabs, prawns, and shrimps.

Mangroves: Dharamtar Creek is the confluence of Amba River, Patalganga River and Karanja Creek with an opening at the southern side of Mumbai harbour. The creek is substantially crisscrossed with many sub-creeks and channels. The Amba River forms a major estuarine system of Dharamtar creek. The Amba Estuary opens into Dharamtar Creek and latter joins the Thane Creek-Mumbai harbour complex. Based on the study conducted at the project site, the dominant mangrove species identified are: *Avicennia marina*, *Rhizophora mucronate*, *Sonneratia alba* and *Acanthus ilicifolius*. The likely mangrove area to be affected due to the proposed development of approach trestle with service road is 320 m<sup>2</sup>. However, compensatory mangrove afforestation will be taken up in consultation with the Forest Department, Government of Maharashtra.

### **Terrestrial EIA Study**

Ambient Air Quality: It has monitored at eight locations in the study area on 24 hourly bases. The concentration of PM<sub>2.5</sub> varies between 27.1 µg/m<sup>3</sup> (at Village Vadkhale Naka) to 55.2 µg/m<sup>3</sup> (at Sampling Location – 1 & Near JSW Plant Site) and the concentration of PM<sub>10</sub> varied between 51.3 µg/m<sup>3</sup> (at Village Devali) to 91.9 µg/m<sup>3</sup> (at Near JSW Plant Site), the concentrations of NO<sub>x</sub> and SO<sub>2</sub> were found to be in range of 12.4 µg/m<sup>3</sup> (at Village Devali) to 32.5 µg/m<sup>3</sup> (at Near JSW Plant Site) and 6.33 µg/m<sup>3</sup> (at Village Vadkhale Naka) to 13.9 µg/m<sup>3</sup> (at Near JSW Plant Site) respectively. CO concentration was found to be maximum 0.93 mg/m<sup>3</sup> (at Near JSW Plant Site) & minimum 0.52 mg/m<sup>3</sup> (at Village Devali).

Ambient Noise Levels: It is measured at eight locations around the project site. Noise levels vary from 51.1 Leq dB to 65.4 Leq dB (A) during daytime and from 42.0 Leq dB to 61.2 Leq dB (A) during nighttime.

**Water Quality:** There are two surface water bodies present in the study area, where pH varies from 7.16 to 7.95, Total hardness (79.20 to 985.05 mg/l), Total dissolved solids (168.0 to 3882mg/l), total alkalinity (66.50 to 641.25 mg/l) and conductivity (274 to 6054 µS/cm). The ground water analysis for all the eight sampling stations shows that pH varies from 6.61 to 7.39, Total hardness varies from 55.55 mg/l to 584.10 mg/l, Total dissolved solids vary from 86 mg/l to 936 mg/l.

**Soil Quality:** Samples collected from eight locations and the analysis results show that soil is neutral to slightly alkaline in nature; pH ranging from 6.80 to 7.92 with organic matter from 0.6 % to 1.5 % and Organic carbon varies from 0.34 % to 0.87%. Soil texture is Clay loam to silt loam. Total nitrogen ranges from 112.5 kg/ha to 205.5 kg/ha, indicates that nitrogen is in better amount in this soil; Phosphorous is present in the range of 38.80 kg/ha to 256.6 kg/ha which is in more than sufficient amount. Also, Potassium is found to be ranging from 161.6 kg/ha to 392 kg/ha which is present in more than sufficient amount in soil.

### Biological Environment (Flora & Fauna)

**Floral Diversity:** Total of 60 species of trees, 30 species of shrubs, 38 species of Herbs & 23 types of climbers and 23 mangrove & mangrove associates were recorded based on primary observation as well as based on information collected from the secondary data within the 10 Km study area.

**Faunal Diversity:** Among fauna, total of 14 species of mammals, 13 species of Reptiles, 4 species of amphibians and 66 avifaunal species were recorded in the 10 km study area.

**Socio-Economic Environment:** The population as per 2011 Census records is 163447 (for 10 km radius). Scheduled Caste population of the study area is 3619 and Scheduled Tribe is 14481. Literacy rate of the area is 61.55% & sex ratio of the area is 980 (females per 1000 males). Population of the workers engaged in occupation is 73855. Out of the total population; 55036 persons are main workers, 18819 persons are marginal workers and remaining 89592 persons are considered as non-workers.

### E.4. Impact Assessment and Mitigation Measures

The proposed project is the construction of berthing jetty with conveyor corridor and backup facilities at Shahbaj and Shahpur village, Alibag Taluka in Raigad district, Maharashtra. Anticipated impacts due to the activities during construction and operation phases of the Jetty will have moderate and marginal impacts on marine & terrestrial environment. The magnitude of adverse impact will be minimum if appropriate mitigation measures are implemented. Overall, there are no negative impacts on historic/ cultural heritage. Nevertheless, the proposed project would bring positive impact on land use, people, their living and the economic development of the state.

Sl. No.	Activity	Impact	Mitigation
1	Construction of jetty	<p>Construction of piles may cause minimal obstruction to the water flow in the site.</p> <p>Impact on water quality will be negligible though some turbidity will be created. However, bottom fauna will be affected to some extent.</p> <p>Fisheries: The project area is a low intensity fishing zone.</p>	<p>The clean, efficient, and aesthetic construction techniques have to be adopted for the construction of piles. The technique adopted should not stir up the bed material in the water body.</p> <p>Measures will be taken to avoid dropping or dumping any material including the excavated material in the water body or mangrove area. Movement of men, materials and machinery and other construction activities shall not cause damage to the mangroves in the vicinity.</p>

Sl. No.	Activity	Impact	Mitigation
2	Dredging	Dredging in the jetty pocket area may cause some loss of the benthic fauna. But it will be a temporary feature. Recolonization will take place rapidly .	<p>Appropriate dredging scheme causing least disturbance must be adopted to minimise the impact.</p> <p>The dredged material either will be utilized for the reclamation on the plant site or properly disposed offshore beyond 30 m water depth in the open sea.</p>
3	Conveyor corridor with approach trestle for service road & conveyor system from the jetty to the storage site & Plant	Some mangroves in the conveyor corridor and approach road area will be affected.	<p>It is suggested to undertake a compensatory mangrove afforestation programme in association with the Forest Department on a suitable location near to the proposed project area in the intertidal region.</p> <p>Movement of men, materials and machinery and other construction activities shall not cause damage to the mangroves in the surrounding area.</p> <p>A comprehensive mangrove management plan will be in place.</p> <p>All safety standards and code of practice should be followed in selection and design of the conveyors (IS 11592: 2000 or any other) as well as during construction.</p>
4	Operation Phase	<p>Since the jetty is a trestle jetty, the water flow will not be obstructed or diverted.</p> <p>The jetty after construction can cause some alterations in the existing pattern of water flow around it.</p> <p>No impact on aquatic biological environment is anticipated. However, if the cargo while unloading /transferring is dropped /spilled in the water body, it may cause some impact on the water quality and biological environment.</p> <p>Jetty area will not be available as fishing area.</p> <p>Conveyor system can cause safety problems. If any material moved is dropped or spilled from the conveyor</p>	<p>Proper technology should be adopted, and utmost care must be taken to avoid dropping or releasing the material /cargo in the water body and mangrove areas while unloading / transferring /moving.</p> <p>No waste of any kind will be dumped in the water body or mangrove area either from the onshore facilities or the vessels.</p> <p>An oil spill contingency plan with necessary equipment will be in place.</p> <p>Necessary safety procedures should be followed to minimize the impact of risk involved during the operational stage.</p> <p>Conveyor track should be enclosed to avoid any spill of material and to cover the material from the disturbance due to wind and rain.</p> <p>All conveyor safety standards (IS 14188, 1994 and any other) should be followed in the facilities for maintenance of the conveyor system.</p>

Sl. No.	Activity	Impact	Mitigation
		system can impact the ground flora especially the mangroves underneath.	
5	All activities	<p><i>Mangroves:</i> Mangroves exist in the intertidal region of the project area.</p> <p>Some mangroves in the areas of the conveyor corridor and approach road will be affected by the construction.</p>	Stage I forest clearance for diversion of Mangrove Forest has been obtained. It is suggested to undertake compensatory afforestation in association with the Maharashtra Forest Department on a suitable place near the project area. A comprehensive mangrove management plan will be in place for conservation and protection of mangroves.
6	Ecologically Sensitive Areas / Protected Areas / Endangered Species		
	<ul style="list-style-type: none"> <li>• There are no Ecologically Sensitive Areas in the project region other than the mangroves.</li> <li>• There are no seaweeds, seagrass, corals, turtle nesting, found or reported in the area.</li> <li>• There are no specific endangered species in the Amba River.</li> <li>• There are no protected areas in the project region within 15 km radius.</li> </ul>		
7	Transportation of Clinker and other raw materials by road	Increase in the fugitive dust concentration in the ambient air which will affect the biotic environment	<ul style="list-style-type: none"> <li>• Use of PUC Certified vehicles</li> <li>• Vehicles to be covered with tarpaulin and not overloaded</li> <li>• Speed limit to be maintained</li> <li>• Paved road in plant premises.</li> </ul>
8	Material storage and handling	<ul style="list-style-type: none"> <li>▪ Increase in the fugitive dust concentration in the ambient air</li> <li>▪ Workers affected by respiratory diseases due to working in the high dust-zone area</li> </ul>	<ul style="list-style-type: none"> <li>• Clinker, Cement and Fly Ash stored in silos.</li> <li>• Covered yard for storage of Gypsum.</li> <li>• Fly ash received through closed bulkers &amp; fed into Silo through pneumatic system.</li> <li>• Personal Protective Equipment to the workers.</li> </ul>
9	Cement Mill	<ul style="list-style-type: none"> <li>▪ Increase in Particulate Matter and fugitive dust concentration in air environment</li> <li>▪ Increase in noise levels near source generation</li> <li>▪ Hearing impairments</li> <li>▪ Other health effects</li> </ul>	<ul style="list-style-type: none"> <li>• Installation of Bag House with cement mill stack.</li> <li>• Better maintenance of pollution control equipment like Bag Filters and Bag House etc.</li> <li>• Development of greenbelt / plantation all along the plant boundary.</li> <li>• Earmuffs/ Earplugs to persons working in high noise zone.</li> <li>• Proper lubrication &amp; maintenance of machinery</li> <li>• Development of greenbelt / plantation within the plant premises</li> <li>• Periodic Occupational Health Surveillance of worker.</li> </ul>
10	Cement Packing & Dispatch	<ul style="list-style-type: none"> <li>▪ Area source - Increase in fugitive dust concentration in air environment</li> <li>▪ Respiratory Diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Dust extraction arrangement</li> <li>• Spilled cement collected and recycled</li> <li>• Installation of Bag Filters at transfer points</li> <li>• Development of greenbelt</li> </ul>

Sl. No.	Activity	Impact	Mitigation
			<ul style="list-style-type: none"> <li>Personal Protective Equipment (Goggles, Mask etc.) to worker.</li> <li>Periodic Occupational Health Surveillance.</li> </ul>

### E.5. Analysis of Alternatives

To find an ideal location for berthing of barges in Amba River analysis of alternatives has been carried out. Amba River is being used as a national water way no. 10 for a total length of 45 km. In line with compliance to MCZMA suggestion, ACL had assessed six alternative sites along Amba River to minimize impact of proposed project on Mangroves, Marine ecology & biodiversity.

### E.6. Post Project Monitoring

Post project monitoring will be undertaken to find the variation in baseline environment in the project area. Main pollutant/ parameters which likely to alter during construction and operational period will be monitored. The monitoring plan for the proposed project is given below.

Purpose	Parameters	No. of stations	Frequency during construction	Frequency during Operation
<b>Seawater &amp; Sediment Quality</b>				
To monitor impacts on seawater and sediment quality	Turbidity, nutrients and heavy metals in water and sediment	3	Quarterly	Half yearly
<b>Marine Ecology</b>				
To determine whether the habitat and community structure, have been altered	Measurements of various parameters: primary production, phytoplankton, zooplankton, benthos, bacteria, in the marine environment	3	Quarterly	Half yearly
<b>Intertidal Benthos</b>				
To determine the composition and distribution of major groups of inter tidal fauna	Benthic faunal composition in the water and sediment of the port basin and channel.	3	Quarterly	Half yearly

### E.7. Additional Studies

Hydrodynamic model – MIKE 21 HD: The tide and wind induced flow fields over the project area are determined using MIKE 21 HD (Hydrodynamic) module. The flow filed in the Amba River has been simulated over a period of one lunar cycle covering spring tide and neap tide. The variation of current speed and direction in Amba River during spring and neap tidal phase were studied along the proposed project site.

Sediment transport model - MIKE 21 ST: The bed level changes in Amba Rive due to the implementation of proposed berthing jetty were studied using MIKE 21 ST (Sediment Transport). The bed shows negligible changes in the vicinity of proposed project region indicating the riverbed remains uniform. Hence, it is noticed that there will not be any impact on the river environment with the proposed development.



Dredge disposal model – MIKE 21 PA: Capital dredging of 60,000 m<sup>3</sup> is anticipated in the vicinity of the berthing area. Dispersal of dredge spoil has been carried out using MIKE 21 PA (Particle Analysis) model to assess the change in seabed level due to dumping and impact on marine environment.

Oil spill model – MIKE 21 SA: Accidental oil spill and leakage of oil spill has been studied MIKE 21 SA (Spill Analysis) and appropriate contingency plan is outlined.

Vessel traffic study: In the year 2019-20, there were 851 ship calls at the ports including one foreign vessel and the rest coastal vessels. Apart from the ships, 36 barges operate in these ports bringing bulk cargo from the mother ships anchored offshore at the Mumbai Port. About 20-30 barges operate daily in the area. In addition, small fishing crafts also operate in the area for fishing purpose. These country crafts include 122 mechanised and 282 non-mechanised boats (Dept. of Fisheries, Alibag, Govt. of Maharashtra) and there are RO - RO services between Rewas & Mandwa in Amba River and Gateway of India, Mumbai.

Ship navigation & tranquility study: The proposed Jetty in Amba River is about 32 km from open sea and 17 km from the Dharamtar creek mouth. The waves from open sea propagate into Dharamtar creek and Amba River in the east. The offshore wave data have been compiled from NIOT Wave Atlas, 2014. The wave height varies from 2 m to 4 m during southwest monsoon, between 1 m and 2 m during northeast monsoon and between 0.5 m and 1 m during fair weather. The predominant wave direction remains between the sector 240° N and 270° N throughout the year. Due to refraction, the wave height reduces to 1.5 to 3 the m during monsoon close to Dharamtar creek mouth. The waves at the mouth of the creek then will tend to enter the Amba River. There will be more than 50% attenuation when it reaches the Amba River. The course of Amba River totally takes 180° turn (towards south) and with a narrow gorge. So, the penetration of wave further into Amba River is very much restricted and it is found to be absent after Narwel. So, there will be tranquility at the jetty location throughout the year.

To substantiate the nil wave effect and to assess the safe navigation of vessels in Amba River, ship navigation studies have been carried out using SHIPMA (SHIP Maneuvering) software and the findings are outlined.

Disaster Management Plan (DMP): DMP including the onsite & offsite emergency plans has also been prepared and included in the report. Necessary safety procedures should be followed to minimize the impact of risk involved during the operational stage.

As project area is located near to coast, the area is also vulnerable to natural disasters. Although, these are rare events, coordination with national agencies and Govt. bodies will be the key to manage such events. Necessary facilities for emergency management will be provided to the workers. Emergency facilities include lifesaving jackets, ropes, Assembly points, Evacuation Route, and Medical Facilities. An Emergency Disaster Management Cell should be formed to deal with emergency situations.

Oil spills may occur from ships either accidentally or due to illegal operational discharges. Accidental discharges may involve the escape of bunker fuel or oil cargo. An oil spill contingency plan is prepared to deal with the spill.

## **E.8. Project Benefits**

Development of proposed project will have direct benefit for the local people immensely in terms of continuous economic benefits. Improvements in Physical Infrastructure, Social Infrastructure, Employment Potential and Other Tangible Benefits through CSR & CER activities are the key benefits expected from the project.

### **E.9. Environmental Management Plan**

The proposed activities will have the impacts on the environment and hence a proper Environmental Management Plan is necessary. This Environment Management Plan addresses the management of environmental impacts and implementation of the mitigation measures associated with the project. The impacts include potential effects to the water quality, sediment quality, pelagic and benthic organisms, and the ecosystem integrity. The Environment Management Plan has been prepared with the guidelines on proper locations of the marine facilities, appropriate design, regulation of vessel movements, and preservation of nearshore ecology.

Information with respect to any untoward incidences during the construction and operation of the Jetty shall be communicated to local Gram Panchayat, local village workers, employees and other project-related individuals. Environmental issues should be communicated to the concerned Govt. agencies such as State Pollution Control Board (SPCB), Forest and Environment Department, District Collector etc. Information on the vessel movement and associated port activities should be communicated to the Maharashtra Maritime Board (MMB).

Environmental monitoring and compliance report shall be submitted to the concerned authority as stipulated in the Environmental / CRZ Clearance approval. Rs. 2.5 Crores and Rs. 1.0 Crores has been estimated as Capital Budget and Annual Budget for EMP.

### **E.10. Conclusion**

The baseline study carried out for the study area indicates that all the physical, chemical and biological characteristics of the project area are well within the permissible limits. Based on this environmental assessment, the anticipated impacts during both construction and operation phase are assessed and the adequate mitigation measures are formulated to meet the statutory compliances. With minimal negative impacts, the project will lead to reduction in supply gap of cement, commercial business opportunities, employment opportunities, and infrastructural development. The implementation of suggested mitigation measures, regular environmental monitoring and environment management plan will ensure the anticipated impacts to minimum and baseline environment status without any significant change.