



**JSW INFRASTRUCTURE LIMITED, MUMBAI**

*PROPOSED*

**CAPTIVE JETTY FACILITY AT VILLAGE  
KHARMACHELA, TALUKA PEN,  
DISTRICT RAIGAD, MAHARASHTRA IN  
DHARAMTAR CREEK**



**EXECUTIVE SUMMARY**

**(ENVIRONMENTAL)**

*Consultant*

**FINE ENVIROTECH ENGINEERS**

## EXECUTIVE SUMMARY

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### 1 INTRODUCTION AND BACKGROUND

JSW Steel Limited, is operating a steel plant at Dolvi, near Pen, in the Raigad District, Maharashtra. Spread over 4 villages the plant has a present capacity of 5 MTPA of crude steel going up to 10 MTPA in the next 8 to 10 months. This has necessitated additional land requirements. Therefore, it is proposed to relocate the existing 2.2 MTPA cement grinding unit from inside the steel plant premises to a new location 2.5 km south at Kharmachela village.

JSW Cement Limited the owner of the Cement Grinding Plant has proposed to relocate the unit at a new identified a location in village Kharmachela about 2.5 km south of the steel plant. The proposal is upgradation and capacity enhancement of the unit in phases, initially to 5 MTPA and finally to 8 MTPA based on the availability of the slag from the steel plant.

Presently the raw material required for the Cement grinding unit is imported through the operational JSW Jetty at Dharamtar or PNP Jetty on the opposite bank located 2.5 km and 3.5 km north from the unit. With the unit shifting further south, transportation from the existing facilities would pose difficulty due to long road transportation of increased demand of clinker.

JSW Infrastructure Limited, JSW Group company proposes to develop a 500m jetty with a superior material handling option in the proximity of the unit for alleviating the challenge of cargo transportation at village Kharmachela along Dharamtar creek. Handling of the finished steel product exports, viz. Hot Rolled Coil (HRC) and other bulk and commercial cargo is also considered for better planning of the facility and the optimization of the public resources

### 2. LOCATION OF THE PROJECT

The proposed location is on the right bank of the Amba River about 27 km from its mouth and about 5 km upstream of the existing JSW facility. The proposed facility is located between approximate geographical coordinates of 18° 40' 15.05" N, 73° 2' 37.37" E and 18° 39' 57.20" N, 73° 2' 46.68" E. The project location is depicted in the figure 1

The site could be reached through the creek by crossing 2 Road Bridges and one Railway bridge. The bridges have a minimum horizontal clearance of 26.60 m and vertical clearance of 13.35 m.

### 3.0 ABOUT THE PROJECT

JSW Infrastructure Limited, proposes to develop a 500m jetty facility along Dharamtar creek at Kharmachela village along the Dharamtar creek. The project would consist of receiving and despatching traffic to and from the Cement, Steel and the other associated facilities in the close environs of the facility. The Jetty would have facilities would have an unloading and handling facility, for loading and unloading materials in an environmental friendly manner. The development would be carried out in phases in tandem to the expansion of the cement unit for

cargo like Clinker, Limestone, Dolomite, Slag and other cargos like CBRM, IBRM, Fertilizer, Sulphur, Gypsum, Fly ash etc.

**Figure 1: Location of the proposed facility on the right bank of Dharamtar estuary**



The jetty on the 500m waterfront will have 3 approaches to the foreshore area. The approaches would carry the conveyors and the road transport for the unitises and small parcel cargos. There would be a storage yard that would consist of a Clinker Silo of about 80,000-ton capacity, Unitised cargo consisting of HRC, Slabs, Pallets, long sections etc., Cement Silo, Coal, Lime Stone, Sulphur, Fertiliser, MOP, Gypsum and other similar cargos. The traffic for the facility is estimated as shown in the table 1.

**Table 1: Cargo to be handled at the jetty facility**

Commodity	Annual Throughputs (Mtpa)	
	Phase - I	Phase - II
Clinker	1.5	1.5
Steel Products	1.0	1.5
Coal (CBRM)	0.0	2.0
Iron Ore (IBRM)	0.0	1.0
Lime Stone/Dolomite/Cement/Slag	0.5	2.0
Fertilizer/Sulphur/Gypsum/Fly Ash	0.0	1.0
<b>Total</b>	<b>3.0</b>	<b>9.0</b>

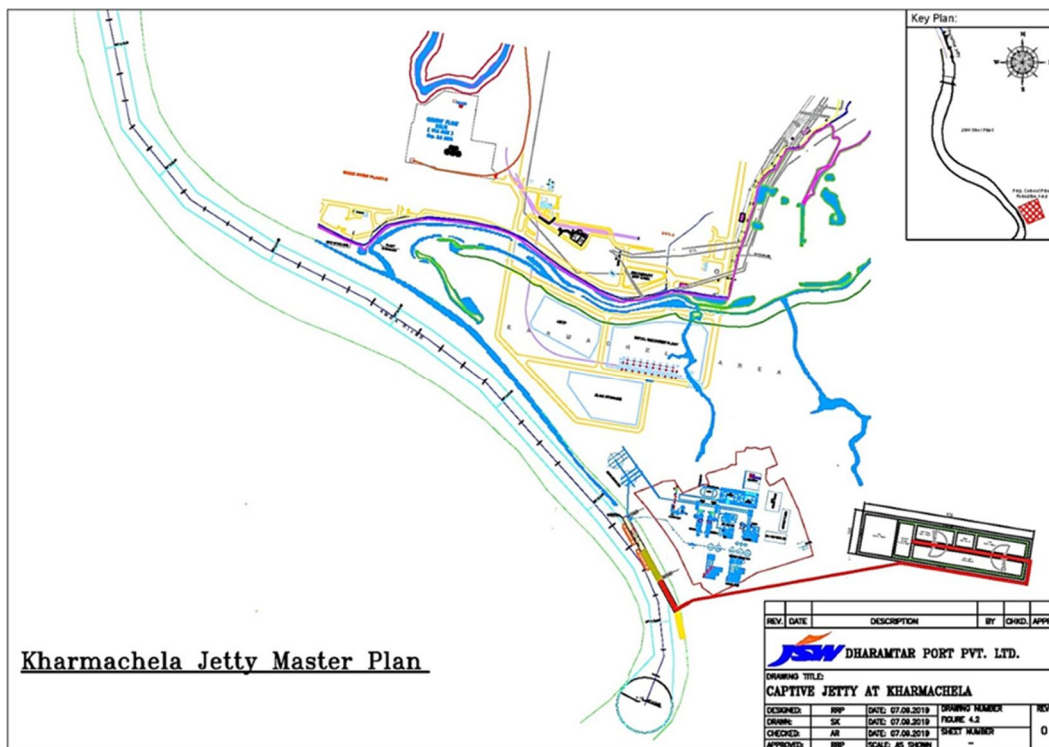
#### 4.0 SALIENT FEATURES OF THE PROPOSED JETTY

The development would be taken up in phases. The master plan for the terminal is depicted in figure 2. The location and the developmental sequence are as follows.

**Phase I:** 260 m long Jetty with two approaches on the North side. The Jetty will have the handling equipment in form of an MHC, a Jetty hopper, and conveyors to take the Clinker to the silos. The other berth in this phase would be used for sending out Cement, GGBS and Slag to the tune of 1.2 MTPA. Two approaches on either end shall be provided.

No stack yard is envisaged, except if the HRC are handled.

**Phase II:** 240 m Jetty and a 10 m wide approach at the southern extremities. One MHC for handling the HRC. The HRC will be brought from the Plant to the stack yard and from the stack yard to the berth using trailers.



**Figure 2 : Proposed Master Plan Terminal Layout along with Plant**

Type of Jetty	The proposed project is captive jetty for cargo handling for the Cement Plant and Steel plant
Existing features	New project
Breakwater	No Breakwater
Berths and Mooring Structures	New berths of about 500 m in phases would be developed. Open piled berths are proposed for berthing of the bulk carriers. The phase wise berth requirements and handling plan is as under: <ul style="list-style-type: none"> <li>•Phase I: 260 m Berth with two approaches</li> </ul>

	<p>•Phase II: 240 m Berths 3 &amp; 4 with one more southern approach</p>
Channel	<p>Maharashtra Maritime Board (MMB), has designated and declared a navigation channel in the Dharamtar Creek, Amba River through a Notification, dated 16th January, 2001.</p> <p>It is proposed to deploy 3000 DWT vessels for cargo transportation. A turning circle is proposed 200m upstream from the jetty location.</p>
Dredging	<p>The dredging requirements would be designed for use of vessels up to 3500 DWT vessels with a loaded draft of 3.5 m. Hence, all depths beyond the bridge would be made suitable for this. The balance portion of the channel would be shared with the existing functions. About 0.5 million m<sup>3</sup> of soft dredging is estimated from the preliminary data. This volume is tentative and may vary</p>
Land/ Reclaimed Land	<p>No reclamation along the shore line is proposed. However, suitable dredged material may be used for grading the backup land.</p>
Navigation Aids	<p>There is a functional navigational channel duly marked currently in operation at Dharamtar. Barges mostly self-propelled ply regularly and dredging of the channel is achieved up to 3.3 m CD.</p> <p>The width of the channel as notified is 135 m up to the bridge and 50 m beyond. The channel near the proposed Jetty is about 50 m wide, which would be widened if need be by 15 m in order to comply to the PIANC conditions.</p>
Flotilla	<p>The Jetty is a material receipt facility and facility for industries would only include, receipt, stacking and handling of cargo in the stack yard area.</p>
Linkage	<p>Last mile rail connectivity of ~ 10km from project site through Kokan Railway facility</p>
Road Linkage	<p>Mumbai Goa Road</p>
Amenities	<p>The Jetty and the associated infrastructure created would have facilities for the officers as well as workers.</p> <p><i>Administration building</i></p> <p>The administration Building will have a footprint area of approximately 1000 m<sup>2</sup>. The ground floor will be staff</p>

	<p>canteen, changing room, shipping agencies offices and training rooms.</p> <p><i>Gate Complex</i></p> <p>A gate house complex will be provided for control point for vehicle movements. This complex will also house security offices and other common user facility.</p> <p><i>Workshop</i></p> <p>A small workshop with a floor area of 500 m<sup>2</sup> with through access will be constructed.</p> <p><i>Storage shed</i></p> <p>A covered storage shed of 15000m<sup>2</sup> is proposed to store third party cargo</p> <p>Facilities for relaxation and medical care also shall be provided.</p> <p>No residential area is proposed for the present facility</p>
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## 5.0 MAJOR COMPONENTS OF THE PROJECT

### 5.1 Water requirement

Total water requirement during operation phase will be 300 m<sup>3</sup>/ day, which will be met through existing JSW steel Plant water supply from Barrage KT Bhandara near Nagothane. Treated wastewater will also be reused. Total water requirement for domestic purpose of 250 persons as per 90 lpcd will be 22.50 m<sup>3</sup>/day. Water required for dust suppression generated at will be 15m<sup>3</sup>/day and 20 m<sup>3</sup>/day of water will be required for gardening / irrigation purpose.

### 5.2 Power requirement

The total power requirement of about 6MW for the proposed expansion is proposed to be supplied from the MSEDCL sources. Power supply for the proposed plant shall be made available from the 220 kV existing switchyard.

### 5.3 Wastewater generation, treatment & reuse

The wastewater from the administrative offices, transit sheds and all other buildings will be connected to the storm water drain. The waste water collected from the workshop will be treated in an oil skimmer before disposing off to the storm water drain.

### 5.4 Sewage and Solid waste management

There would be no waste generated except for the domestic sewage which would be sent to the Plant STP facility for treatment and disposal.

The solid waste generated at the jetty will be segregated. The recyclable solid waste will be disposed through authorised vendors. The municipal solid wastes will be segregated and as per the norms and guidelines of State Pollution Control Board.

### 5.5 Fire fighting



It is proposed to install Fire Hydrant System, which shall be designed to give adequate fire protection for the facility based on Indian Standard or equivalent and shall conform to the statutory requirements.

### **5.6 Dust Suppression System**

The dust suppression system is provided for suppressing the fugitive dust emission to the atmosphere as it is important for pollution mitigation. The dust suppression system would be needed in the coal stock pile, transfer tower, mobile hopper and stacker reclaimer. Either Sprinkler system, Plain water fog system, Dry Fog system will be provided at all yards, transfer points, stackers cum reclaimer to curtail the fugitive emissions.

Bulk Solid/Coal yard (temporary), transfer tower & mobile hopper

1. Bulk Coal yard - Sprinkler system
2. Bulk Lime Stone – Plain water fog system
3. Bulk Iron Ore – Plain water fog System
4. Transfer Towers - Dry fog system
5. Mobile Hoppers - Plain water fog system

### **5.7 Connectivity**

#### **5.7.1 Road Connectivity**

The National Highway NH 66 (Mumbai Goa) passes on the east side of the proposed location. State Highway connecting Pen to Alibaug passes on the north side.

#### **5.7.2 Rail Connectivity**

The nearest railway station Pen is about 8 km from the site. The existing Konkan Railway Mumbai - Mangalore main line is about 2 km, while Kasu Railway station on the line is at about 5 km.

#### **5.7.3 Air Connectivity**

The nearest Mumbai airport is 80km away and is connected through major road. The proposed Navi Mumbai airport International Airport is at a distance of 40km.

### **5.8 Project Cost**

The cost of the project is Rs 514 crores only.

## **6.0 BASELINE ENVIRONMENT STUDY**

The baseline environment studies have been carried out using primary and secondary data required for the project.

### **6.1 Secondary data**

The secondary data is obtained from various government authorities and literature survey. The data includes studies on temperature, rainfall, relative humidity, wind, waves, tides, currents, cyclones.

## **6.2 Primary data**

The primary data collection has been carried out as per EIA notification. The studies for air quality, noise quality, water quality & terrestrial ecology were carried out in an area of 10 km from the project site.

### **6.2.1 Ambient Air Quality**

The parameters like PM2.5, PM10, SO<sub>2</sub>, NO<sub>x</sub>, CO, NH<sub>3</sub>, As etc. were studied at 8 locations. The levels of Lead, Arsenic, Nickel was also measured as a part of the study. It can be concluded that, all average values of the parameters are within the National Ambient Air Quality Standards (NAAQS) of Central Pollution Control Board (CPCB) for “Industrial Areas”.

### **6.2.2 Noise Levels**

Hourly noise meter readings for the day time & night time noise levels were estimated at 8 locations. The studies show that the values are below the permissible limit of 65 dB (A) & 55 dB (A) for the day & night time respectively as specified for commercial area as prescribed by CPCB.

### **6.2.3 Water quality**

In order to study baseline water quality in the study area Ground water and surface water samples were collected from different locations including Project Site The present study of ground water and surface water indicates that all the parameters at all the locations are well within the respective norms and that the ground water does not have any impact due to contamination. Also the surface waters do not show any impact of contamination.

### **6.2.4 Soil quality**

Soil pH plays a very important role in the availability of nutrients. The composition of the soil microbial community is also dependent on the soil pH. In the study area, the soil pH is near to neutral and varied from 6.8 to 7.9. The test results of pH from different locations indicate that there is no acidic impact on soil due to the industrial activity.

In the collected soil samples the electrical conductivity ranged from 0.22 to 2.9 ms/cm

### **6.2.5 Marine Water Quality**

The water quality of the Dharamtar creek/ Amba estuary is largely influenced by tides entering the system. The sampling stations were selected such that the river upstream and downstream locations are covered.

Surface and Bottom waters were collected and analysed for the physico chemical properties

#### **Temperature**

There was marginal difference in the water temperature in surface and bottom waters at different locations can be attributed to the different time of observations. Surface water temperature ranged between 23.5.2 to 27.0 The bottom water temperature was found to be slightly lower than the surface water temperature. The bottom water temperature ranged from 23 to 26.0 °C



## **pH**

The pH values is stable and do not show a significant difference in the surface and bottom values. pH recorded in surface waters varied between 7.0 and 8.1 while in bottom waters it ranged from 7.9 to 8.1. The decrease of pH in the upstream region, indicates influence of freshwater

## **Salinity**

The salinity of the water increased towards the sea ward side. The minimum salinity was observed at station 1 both in surface (35.1 ppt) as well as bottom water (35.4 ppt). The upper estuary influenced by fresh water inflow has the salinity of 13.0 ppt in surface waters and 13.5 ppt in the bottom waters. There is no salinity stratification and water in the estuary is well mixed.

## **Dissolved Oxygen and Biological Oxygen Demand**

Dissolved Oxygen (DO) content of the surface water ranged from 4.3 mg/l to 6.1mg/l in the surface water and from 5.2 mg/l to 6.3 mg/l in the bottom water.

The biological oxygen demand (BOD) level in the surface water varied from 4.3 to 6.1 mg/l while in bottom water it varied from 1.3 to 4.2 mg/l during the study period.

## **Nutrient content**

The Phosphorus as Phosphate content varied from 1.2 to 2.9  $\mu\text{mol/l}$  in surface water and 1.5 to 3.2  $\mu\text{mol/l}$  in the bottom waters.

The  $\text{NO}_3^-$ -N content varied over a wide range 14.5 in bottom waters at station 6 to 55.9  $\mu\text{mol/l}$  in surface waters at station 4.

The nitrite content showed a small variation with the 0.6  $\mu\text{mol/l}$  to 2.8  $\mu\text{mol/l}$  in surface waters and 0.6 to 2.6  $\mu\text{mol/l}$  in bottom waters while ammonia content varied from 2.0  $\mu\text{mol/l}$  To 7  $\mu\text{mol/l}$  in bottom waters.

## **Petroleum Hydrocarbons (PHc) and Phenols**

PHc ranged from 3.8  $\mu\text{g/l}$  to 9.5 $\mu\text{g/l}$  in the creek while the concentration of Phenols varied in the range of 28  $\mu\text{g/l}$  and 72.8  $\mu\text{g/l}$ .

### **6.2.6 Marine Sediments**

Sediment samples from various marine water sampling stations were also collected and their physico-chemical characteristics were analyzed.

The sediment texture in the estuary is heterogenous with silt being dominant.

The concentration of metals during the the present study varied in the range Al (4.2- 6.9 %), Cr (166- 307  $\mu\text{g/g}$ ), Mn (721-1517  $\mu\text{g/g}$ ), Fe (6.6-8.8 %), Co (33-48  $\mu\text{g/g}$ ), Ni (63-80  $\mu\text{g/g}$ ), Cu (56-106  $\mu\text{g/g}$ ), Zn (84-124  $\mu\text{g/g}$ ) and Hg (0.12-0.18  $\mu\text{g/g}$ ) in the sub tidal sediment of Amba

Estuary. The concentration of Cr was high, especially at Amba and Patalganga mouth. This may be attributed to the industrial effluent discharged in the Patalganga Estuary.

The concentration of phosphorus in the sediment ranged from 943 to 1388 ug/g.

The concentration of **Corg** varied in the range (1.6- 2.2 %, dry wt) in the sub tidal sediment. They are in the range expected for estuarine sediments in which accumulation of pollutants is low.

### 6.2.7 Marine Ecology

Study of phytoplankton, zooplankton and fish with respect to their diversity, population density and standing crop biomass was carried out in the study area.

Parameter	Observation
<b>Phytoplankton</b>	A total of 41 species of diatoms and 8 species of dinoflagellates were recorded during study. Phytoplankton population in the terms of cell count varied from $21.8 \times 10^3$ cell/l to $1128.0 \times 10^3$ cell/l. <i>Skeletonema</i> , <i>Thalassiosira</i> , <i>Pleurosigma</i> and <i>Nitzschia</i> species dominated the phytoplankton population in the estuary. Species namely; <i>Coscinidiscus</i> , <i>Navicula</i> , <i>Pluerosigma</i> , <i>Thalassiothrix</i> and <i>Gyrodinium</i> were recorded at all stations. Presence of <i>Chaetoceros</i> spp was seen only at the estuary mouth while <i>Psuedonitzschia</i> spp observed at the stations selected in the upstream stretch
<b>Chlorophylla and phaeophytin</b>	Phytoplankton pigments in terms of chlorophyll <i>a</i> and phaeophytin varied from 0.3 to 11.8 mg/m <sup>3</sup> (av.1.8 mg/m <sup>3</sup> ) and 0.4 to 4.8 mg/m <sup>3</sup> (av.1.8 mg/m <sup>3</sup> ) respectively during the present study.
<b>Zooplankton</b>	The zooplankton standing stock do not reveal any particular trend. Copepods, were present at all the stations and is a dominant group followed by decapod larvae. The standing stock of zooplankton varied largely in terms of biomass (0.1 – 1.2 ml/100 m <sup>3</sup> , av.0.3 ml/100 m <sup>3</sup> ), population ( $4.1 \times 10^3/100$ m <sup>3</sup> – $68.0 \times 10^3/100$ m <sup>3</sup> , av.23.5 x 10 <sup>3</sup> /100 m <sup>3</sup> ) and total groups (6 – 14, av.11) during the study
<b>Benthos</b>	Sediments samples were collected from various stations using Petersons dredger and each group of organisms were individually identified and a quantitative qualitative analysis has been done. The biomass of the macro benthos and meio-benthos ranges from 0.1 to 9.2 and 33.7 to 95.8 respectively.

From the results above it can be said that the Phytoplankton, zooplankton, and benthic standing stock indicate a considerable variability with normal generic/faunal diversity.

### 6.2.8 Terrestrial Ecology

Ecology has been studied for flora and fauna present in the study area. Most of the ecology consists of tree community. The plant community around the site is show presence of sparse & stunted mangrove ecosystem dominated by *Avicennia sp.* followed by *Sonneretia sp.*

The dominant vegetation in the forests in the buffer region can be broadly categorized as mix of southern tropical mix deciduous forests and southern and mangrove forest. In the forested landscapes the floristic diversity is composed of *Pongamia pinnata* (Karanj), *Terminalia belerica* (Behada), *Garuga pinnata* (Kakad), *Lannea coromandalica* (Shemat), *Wrightia tinctoria* (Kuda), *Lagerstromia indica* (Tamhan), *Morina tinctoria* (Baratondi), *Butea monospera*, *Erythrina indica* (Pangara) and related species. There are no endangered flora and fauna in the study area of 10 km.

The existing flora and fauna will not be adversely affected as the said project does not envisage any kind of air emissions, ground water pollution and noise pollution due to the project activities.

The major faunal population belongs to the species of mammals, reptiles, and avi-fauna. Variations in floral composition and quality of crop are observed. These variations are due to the edaphic factor in some cases but in majority of them, the other factor like topography, biotic influences, and past treatment are responsible for such variations. The area is exposed to strong winds with the result that the height growth of the trees is poor except in the valleys. It is a semi evergreen type of forest with many evergreen species in the over wood and with Underwood and under growth almost exclusively of evergreen species. There is no ecosystem present in and around port project area, other than sparse and stunted mangrove, which will be disturbed during construction phase and operation phase.

## 7.0 ENVIRONMENTAL MANAGEMENT SYSTEM

*M/S JSW Infrastructure Limited* is conscious about sustainable development keeping environment at the helm. Accordingly, construction of the port engineering will have environmental management system properly incorporated. JSW proposes to develop Environment management team as a part of Environmental Management Cell (EMC) who will be responsible for the management of the environment of all environment related activities. The team will be headed by a senior management executive and will constitute environmental engineers, chemists and horticulture supervisors.

## 8.0 ENVIRONMENTAL IMPACTS ASSESSMENT & MITIGATIVE MEASURES

### 8.1 During construction phase

Sr. No.	Environmental Parameters	Impact Attributes	Degree of Impacts	Mitigation Measures	Implementing Organization
1	Physiography	Disturbance in relief feature	Mild	Will be achieved by systematic planning and designing of the project activities.	Promoter, Client, etc.
2	Land resources	Change in land-use	Mild	Will be achieved by systematic planning and implementation.	Promoter, Client, etc.
3	Human resources	No adverse impact	Negligible	Will be achieved by systematic planning and resources.	Promoter, Client, etc.
4	Ecological resources - Flora & Fauna	No impact anticipated to threatened or endangered plant species. Negligible impact on marine species which will be mitigated.	Negligible	Cutting of larger girth size trees are avoided by suitably adjusting the road alignment, if required. Plantation of trees (at 1:2 ratio) will be done with the indigenous plant species. Mangroves species if present on site will not be destroyed or removed. The layout is planned such that construction over mangrove is avoided. Greenbelt shall be developed around the site.	Promoter, Forestry Dept. involving NGOs and local people.
5	Environmental aesthetics values	Removal of trees & mangroves if any shall have impacts on landscape & aesthetic values of the area	Moderate	Loss of vegetation will be kept minimum. Cutting of mangrove is avoided. Layout will be designed such that mangrove are not disturbed.	Promoter through prospective contractor
6	Utility & infrastructural facilities	Removal of utility line like electrical poles, telephone poles, transformer, HT & LT lines, if any	Moderate	Shifting and elevation of utility lines will be done in consultation with concerned Government Organizations, if any.	Promoter, telecommunication dept. & line dept. of GoM.
7	Sub-surface hydrology	No wells and hand pumps are existing in project area	Negligible	Whenever possible, care is taken to avoid its relocation by judicious engineering road design. Temporary alternative water sources will be provided in case drinking water means are affected.	Promoter through prospective contractor



Sr. No.	Environmental Parameters	Impact Attributes	Degree of Impacts	Mitigation Measures	Implementing Organization
8	Geology	Not much affected	Negligible	Systematic planning and implementation during the construction and dredging. No reclamation is proposed in the project.	Promoter through contractor
9	Surface of water	Contamination from solid wastes and sewage generated due to construction labour camp Surface runoff from the ship terminal and parking facility.	Mild	Installations of lavatory for construction workers at a minimum distance of 200 m from water bodies and provision for composting the domestic refuse. There will be no construction camp at the site.	Promoter through contractor
10	Air quality	Short-term deterioration of air quality due to generation of fugitive dust.  Dredging activities and other construction activities leading to fugitive emission.	Moderate	Trucks carrying soil, sand, stone, will be covered to avoid spilling. Fugitive dust sources will be sprayed with water to suppress dust. Emissions from vehicles & machinery will be checked regularly & maintained properly to conform to National and State Emission Standards Barriers during construction activities such as dredging will be installed. Green belt will be developed around the boundary to curtail fugitive emission.	Promoter through Contractor (PC)
11	Noise level	Increased noise levels due to project activities	Mild	All the equipments will be duly lubricated, maintained in good working condition to minimize noise levels. Stationary construction equipments will be placed as far as possible from dense habitation. Green belt barrier. Provision of protection devices (ear plugs) to be provided to the workers operating in the vicinity of high noise generating machineries.	Promoter through Contractor (PC)
12	Ecological resources – Flora & Fauna	No endangered species found	Negligible	Proper care will be taken to maintain eco-balance.	Promoter through Contractor (PC)



Sr. No.	Environmental Parameters	Impact Attributes	Degree of Impacts	Mitigation Measures	Implementing Organization
13	Land use	Land acquisition is as per the government regulation and policy. Mild impacts on local land use may be visualized	Mild	Proper management planning will be achieved.	Promoter through Contractor (PC)
14	Construction workers camp	Impacts on community health	Mild	Supply of safe drinking water to the construction camp. Provision of adequate drainage system to avoid undesirable water logging. Provision of hygienic facilities to construction workers camp is made. A system of regular disposal of domestic waste & sewage.	Promoter through contractor (PC)
15	Accident hazards and safety	Short term impacts from road accidents during handling and use of Construction machinery.	Mild	Proper traffic diversion and management during construction. Construction Safety measures will be employed. Proper warning signs will be used at construction site.	Promoter through contractor (PC)

### 8.2 During Operational phase

Sr. No.	Project Related Issues	Actions to be Taken	Responsible Organization
1	Road Safety and Traffic Management	Adequate number of proper & legible signs will be installed along the road. Prepare and administer a monitoring system on road/ accidents.	P & C in consultation with Public Works Department and State Traffic Police.
2	Air Quality	Monitor periodically ambient air quality at selected sites. Confinement and absorption of the pollutants at source by creating vegetation along the length. Enforcing different control measures to check pollution (e.g. catalytic converters, unleaded petrol, proper serving etc.)	P & C in consultation with MPCB
3	Noise level	Monitor periodically ambient noise level at selected sites.	P & C in consultation with MPCB





Sr. No.	Project Related Issues	Actions to be Taken	Responsible Organization
		Minimization of use of horns near sensitive locations/ silence zones with the help of sign boards at proper places. Provide noise barriers with roadside plantation.	
4	Water Quality	Monitor periodically water quality for establishing the change of water quality, if any, and assessing its potentiality of surviving aquatic flora and fauna and for irrigation use.	P & C and MPCB
5	Soil Characteristics	Periodic monitoring of soil quality at specified distance for assessing contamination by vehicular emissions. Checking the overflow of spillage from the carriageway by promoting growth of vegetation cover along the road shoulders and preventing overflow to green belt.	P & C in consultation with Public Works Department (PWD).
6	Maintenance of Avenue trees	Plantation will be undertaken by the concession company on an aggressive note along the whole stretches on the both sides of the road. Restoration of Mangroves if any will be done adequately with proper technology.	P & C in consultation with authorities and State forest Department
7	Human Health and Safety	Vulnerable stretches, which are prone to accidents, will be identified. Adopt Safety measures and other control measure during Operation of the facility. Installing proper road signs, marking along the whole stretch of the tolled highway in the form of cautioning, informative and mandatory signs of gantry mounted overhead sizes. Installing fire safety measures, electrical safety measures, Personal protective Equipments and other work-safety measures. Incorporation of On-site Emergency Preparedness, Off-site Emergency Plan, Disaster Management Plan	P & C in consultation with MPCB. State Public Health Works Department (PWD)

## 9.0 ENVIRONMENT MANAGEMENT PLAN AND MONITORING PLAN

The aim of the Environmental Management Plan (EMP) is to ensure that the stress/load on the ecosystem is kept within its carrying capacity. The most reliable way to achieve this is to incorporate the management plan into the overall planning and implementation of the project.

Budgetary allocation for implementing the Environment Management Plan will be 4.5 crores.

The cost includes installation of STP, sanitary facilities, waste management systems, noise meters, air pollution mitigation equipments and green belt development.

The environment monitoring plan during the Construction phase and Operational phase has been planned. The breakup of the cost as follows:

**Table 2 : Budget for Environment Monitoring Plan**

Parameter	EMP Cost (in lakhs)	
	Construction Phase	Operational Phase (annual expense)
Air pollution	5.0	3.0
Water pollution	4.5	2.5
Waste Management	3.5	3.0
Marine ecology	2.5	2.5
Green belt development	3.0	2.5
<b>Total</b>	<b>18.5</b>	<b>13.2</b>

## 10.0 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN (DMP)

- Identification of potential physical hazards which could trigger loss causing events such as fire and explosion, leakage of flammable materials etc. from the proposed facility.
- Identifying the Maximum Credible Loss Scenarios (MCLS) for the vulnerable areas in the storage areas in the facility for assessing the magnitude and severity of the impact of various failure scenarios in terms of damage to property and injury to personnel.
- Recommendations for risk reduction shall be made on the basis of the above for minimizing, if not eliminating various hazards and providing information on improvement of safety systems, where necessary.
- The major risk is envisaged from the storage yards, The leakage in piping, pumps and electrical fault can lead to hazardous event.
- A complete Risk Assessment will be done and the mitigate measures as well as safety measures will be proposed for the same.
- An onsite and offsite action plan and the team responsible for the actions are well identified. Organization structure for implementing the Disaster Management Plan is shown in the following chart

## 11.0 CORPORATE ENVIRONMENT RESPONSIBILITY

As specified under Ministry's OM vide F. No. 22-65/2017-IA.III dated 01.05.2018, the applicable Corporate Environment Responsibility (CER) for the proposed project would be Rs 5.14 crores. This is as per the OM, as the project is in the Greenfield with a Capital Investment of Rs 514 crores and thus falls in the category of  $> 500$  crores to  $\leq 1000$  crores.

**Table 3: Budget Allocated for Corporate Environment Responsibility**

Sr no.	Parameter	Cost (Rs in crores)
1	Infrastructure developments	1.25
2	Promoting social development	1.75
3	Education	1.00
4	Health facilities	0.85
5	Cultural activities	0.35
	<b>Total</b>	<b>5.20</b>

The activities proposed for CER broadly include development of facilities for drinking water, sanitation and health, skill development, education, developing/ strengthening roads, drains, electrification, plantation etc. However, the detailed work out will be done based on the issues raised during the public hearing and assessing the social need.

## 12.0 PROJECT BENEFITS

- The development is envisaged to play a significant role in strengthening connectivity along the Maharashtra coastline.
- Enhancement in economy of Maharashtra.
- Substantial positive impact on socio-economic profile of the surrounding villages and Raigad, in general, both in terms of overall employment and skill development of local workforce.
- Direct as well as indirect employment potential is envisaged.
- Probable augmentation in infrastructure resources such as transport, Communication, health facilities & other basic facilities.

### Socio-Economic Benefits

The socio-economic scenario in the region will certainly change with positive impact on the existing regional socio-economic pattern. There will be change in employment pattern with local residents will be given preference for jobs opportunities and/or self-employment. The economic growth will have positive impact; it will also help in increase in living standards of the local residents. Due to enhancement in infrastructure facilities and utilities in living condition will also improve. During the construction phase of the project, many persons are expected to be employed whereas during operation phase there will be lots of job openings. Most of these workers/staff are likely to be from the study area. Hence there shall be temporary minor positive impact on the employment.

### Environmental Benefits

- It is proposed to develop greenbelt around the plant, which will go a long way to achieve environmental protection as well as aesthetics of the area.

- A vegetative cover at both ends of the project and also along internal roads will certainly reduce the air pollution.
- This vegetation cover will also act as a barrier for any penetration of air quality and odour in the nearby area.
- Approach roads will be covered with green belt on both the sides to avoid any air quality problems to the nearby residents.