Executive Summary

PROJECT

DEVELOPMENT OF "DEEP WATER JETTY" FACILITY
ON KUNDALIKA RIVER,
VILLAGE-KORLAI, DITRICT-RAIGAD, MAHARASHTRA &
CAPACITY EXPANSION OF EXISTING INLAND WATER JETTY FACILITY,
ON KUNDALIKA RIVER,
VILLAGE-SANEGAON, DISTRICT-RAIGAD, MAHARASHTRA

PROJECT PROPONENT

INDO ENERGY INTERNATIONAL PVT. LTD.

Engineering Consultant: C-Borne Services, Navi Mumbai

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May 2016

EXECUTIVE SUMMARY

1. INTRODUCTION & BACKGROUND

The M/s Indo-Energy International Limited (IEIL), is presently engaged in transportation and trading of coal using lighterage facility at Sanegaon, located on the right bank of the Kundalika River, about 50 km south of Mumbai. IEIL intends to expand the facility to include the coal required for the proposed power plant planned to be located close to the riverine facility at Sanegaon. The existing Jetty is about 21 km upstream on the right bank of the river Kundalika and is about 200 m with a backup area of about 5 hectare for storage, handling and dispatch of material. The clear span between the intermediate bridge piers is 36 m.

IEIL proposes to develop Deep Water Jetty Facility on Kundalika River, village Korlai, ditrict Raigad, Maharashtra and capacity expansion at existing Inland Water Jetty Facility, on Kundalika River at village Sanegaon, district Raigad, Maharashtra. The proposed facility located between geographical co-ordinates of latitude 18° 32' 9.66"N, longitude 72° 54' 54.88"E and latitude 18° 32' 11.82"N, longitude 72° 55' 11.71"E, on the left bank of the Kundalika River, North East of Rat Island was made for developing as a direct berthing port for Panamax size vessels. The proposed port will be developed in 3 phases, at Korlai -Phase I – 9.25 MMT, Phase II – 16.75 MMT, Phase III 23.50 MMT, at Sanegaon 5-6 MMT (included in above projections)

2 SITE LOCATION

The proposed facility located between geographical co-ordinates of latitude 18° 32' 9.66"N, longitude 72° 54' 54.88"E and latitude 18° 32' 11.82"N, longitude 72° 55' 11.71"E, on the left bank of the Kundalika River, near Rat Island was made for developing as a direct berthing port for Panamax size vessels.

Fig 9-1: Revdanda Port off the mouth of the Kundalika River showing the Proposed Facility

3 DETAILS OF PROPOSED SITE

Site Coordinates	18° 32' 9.66"N, 72° 54' 54.88"E 18° 32' 11.82"N, 72° 55' 11.71"E
Villages near the Port	Korlai -1.8 km , Salav -2.2 km
Nearest Town	Alibaug - 15 km, Revdanda -2.8 km
Nearest Highway	NH 17-12 km
Nearest Rail Head	Roha Railway Station-40 km on KRCL route
Nearest Sea Port	JNPT- 45 km, & Barge facility 1 km upstream and 21 km inside River Kundalika (Presently in Use)
Nearest anchorage point	At the current location for the existing Inland water Terminal-12 km
Nearest Airport	Mumbai -130 km Proposed Navi Mumbai Airport – 90 km
Nearest Fishing Jetty/Fish Landing Port	Revdanda Fishing Jetty, Korlai is a fishing hamlet with no landing facility
Nearest freshwater surface water body	Boighar -*7* km, S

4 ABOUT THE PROJECT

The proposed project is a conventional marine project requiring new jetty of 525 m length, with one mooring dolphin 25 m from the jetty on the eastern side of the berth. The location and alignment to be decided through model studies & reclamation of about 50 ha for foreshore facilities at village Korlai, district Raigad, Maharashtra. The land use will be as per the existing laws & regulations and as per CRZ Notification, 2011. The capacity expansion at Sanegaon (lnland water facility) will be by upgrading the equipments and by operating throughout the year. The waterfront has a depth between 3 and 5 m and shallow region (‘0’ m contour) near the bank line. Hydrographic chart 2026 indicates that the 5 m contour is at about 2.5 km and 10 m contour at 5.0 km from the shore line. There is a channel for the existing lighterage operation.

Fig 9-2: Proposed Port Location – present site status

5 ADVANTAGES OF NEW PORT LOCATION

- Proposed location away from environmental sensitive zones and away from the wild life sanctuary.
- Fishing generally inside the creek, fisher men rely on deep sea fishing, so no rehabilitation issues. If any issues about it, these will be sorted out immediately.
- No new land to be acquired for port development.
- The Port would be of limited size and can handle up to 25 MMTPA.
- Environmental safe guard to maintain the ambient conditions.
- No Requirement of breakwater.
- A deep water port on the neighborhood of Mumbai.

6 SALIENT FEATURES OF PROPOSED PORT CONFIGURATION

The Jetty is aligned to the existing deep channel for barges. The size of the berth 525 m x 46 m + 2 approaches to the stack area. One mooring dolphin of size 8 m x 8 m on the east side of jetty will be provided. 125 acre (50 ha) reclaimed area for stacking and cargo handling will be provided. The port will be designed to handle Panamax sized vessels in the first phase and cape size carriers in the final phase. No breakwater protection is required, as the Korlai head land provides the required tranquility. A 17.5 km Channel consisting of 23 million cum of dredging would be required. The first phase channel will have a navigable depth of around 15 m and increased to 19.8 m in the final phase. The dredging spoils of the inner harbour would be used for reclamation of back up area. Refer Figure 2.2 for the concept Plan.

Type of Port	Open coast, Naturally protected, all weather, deep draft port (no breakwaters)
Existing features	Deep embayment with shallow area near shore, for creating reclaimed land, no trees, no mudflat, no mangroves, no creeklets
Breakwater	No Breakwater
Berths and Mooring Structures	One continuous berth of 525 m length with one mooring dolphins on the East side of the berth for handling bulk cargo, general cargo, container, palletized, unitized and liquid cargo.
Basin	Dredged uniform depth of (-) 11 m initially, 15.6 m in the second and 19.8 m in the final phase. All depths are with respect to CD
Channel	160/180/200 m wide, (-) 11 m deep initially and thereafter 14.6 m deep, 17.5 km long
Dredging	11 million cum for handymax vessels, 23 million cum for panamax vessels and 34 million cum for cape vessels About 1.5 million cum for inner channel from Korlai to Sanegaon for 4500 DWT barges
Land/ Reclaimed Land	Reclaimed land of 125 acres (50 Ha), to accommodate bulk cargo stockyard, hard stands, silos, covered transit sheds, container stack yard , ICD, CFS, railway yard etc.
Navigation Aids	Channel markers with solar lanterns.
Flotilla	Tugs with firefighting capability, pilot launch, utility crafts.
Linkage	Last mile rail connectivity of ~ 40 km from Roha BG trunk line.
Road Linkage	From Salav to Roha
Port Amenities	Marine terminal, fire fighting arrangement, STPs, workshop, canteen, administrative offices, offices of stewards/CF agents, security, ICD & CFS.

7 SALIENT FEATURES OF PROPOSED PORT FACILITY

- The Jetty will be provided with mobile harbour cranes in the first phase and with fixed ship unloaders in the final phase.
- The equipments will discharge in to hoppers and through covered conveyors to the covered stock yard.
- Dust suppression mechanisms would be in place.
- Palletised cargo and containers would be handed using mobile harbour cranes and taken to the yard by tractor-trailers.
- The cargo receipt and despatch would be fully mechanised.
- The barge loading system would be installed for emission free loading.

8 CRITERIA CONSIDERED FOR PLANNING DEVELOPMENT ON LAND & PORT

8.1 Cargo handling

The ship-shore & ship barge cargo handling rates are generally selected on cost optimization analysis, which takes into consideration reasonable ship time at berth, parcel size, the derived birth occupancy factor, relative cost of installing equipment of different rated capacity & ship time costs. The cargo handling rates considered for the berth 2000 TPH for coal & 3000 TPH iron ore for Phase I.

8.2 Berth requirement

The required number of berths depends mainly on the cargo volumes & the handling rates. While various general cargos including some low volumes of dry bulk can be handled at the same berth, major cargo would require dedicated facilities.

8.3 Traffic

The traffic expected to be handled at the port are shown in the Table 9-1

Table 9-1: Total Traffic for the Proposed Facility at Korlai

In million tons

Traffic	Year 5	Year 10	Year 15	Year 25	Export/Import
Coal	5.00	10.00	12.00	12.00	Import
IBRM	1.0	2.0	2.5	3.0	Import
Lime Stone/Dolomite	0.5	1.0	1.5	1.5	Import
Iron and Steel	0.5	1.0	1.5	2.5	Export
Bauxite	0.25	05	0.5	0.5	Import
Cement	0.5	0.5	0.5	1.0	Import
Fertilizer	0.5	0.50	1.0	1.0	Import/Export
Containers	0.5	0.5	0.5	1.0	Import/Export
Liquid Cargos (Edible)	0.25	0.5	0.5	1.0	Import/Export

Molasses	0.25	0.25	0.25	0.5	Export
Transhipment Cargo	2.0	3.0	5.0	5.0	Transhipment
Total	**9.25**	**16.75**	**20.75**	**23.5**	

9 INFRASTRUCTURE FACILITIES

9.1 Inland water connectivity

The existing activity includes anchorage handling and barging to the inland terminal at Sanegaon The facility then transfers coal to the rail head at Roha.

9.2 Railways and rail linkage

The nearest railhead is near Roha which is located around 40 kms away on the Kokan railways network. A separate study shall be carried out to carry out the required rail connection from the existing Roha siding to the site.

9.3 Roads

The nearest two lane road is Revadanda-Murud road (Refer Figure 9.3). This road joins the Alibag-Revdanda Road which is much wider and busier. These roads are proposed to be widened by the Public works departments to serve the growing needs of the MIDC. A four-lane road would be planned from this road to connect the port. There will be outer peripheral road around the reclaimed area, to isolate the busy stacking area from traffic intrusion. This would act as the main arterial road of the port, with controlled access at both ends.

There will be internal roads which would be connecting the peripheral road based on requirement and alignment of the storage areas.

Fig. 9-3: Salav-Roha Road

10 MAJOR COMPONENTS OF THE PROJECT

10.1 Water requirement

Total water requirement during operation phase will be 76.5 m^3/day, which will be met through MIDC water supply as well as recycling of treated wastewater. Total water requirement for domestic purpose of 350 persons as per 90 lpcd will be 31.5 m^3/day. Water required for dust suppression generated at coal stack will be 25 m^3/day and 20 m^3/day of water will be required for gardening / irrigation purpose.

10.2 Power requirement

It is proposed that the incoming HT supply is taken from the nearest substation at voltage level of 33 KV. Single transformer of capacity of 33 KV/ 11 KV, 12 MVA oil filled out door type shall be installed. A 33 KV switch yard is to be set up near to the Port area from where three or four 11 KV feeders are taken to feed the port equipments. 33 KV and 1l KV control rooms are required near the yard. 11 KV supply will feed Transformers for Dry Bulk Terminal (Iron Ore), Dry Bulk Terminal (Coal) and common utility. Each Transformer size could be selected based on the individual total connected load.

10.3 Wastewater generation, treatment & reuse

Total wastewater generation during operation phase will be 38.5 m^3/day. Out of the total sewage generation 28.5 m^3/day will be generated from domestic usage and 10 m^3/day will be generated from coal dust suppression. The sewage generated from domestic usage will be treated in Sewage Treatment Plant of capacity 30 m^3/day with MBBR technology. The treated sewage will be used for gardening.

Water mixed with coal particles during sprinkling will be collected through channel along the storage into a clarifier system wherein water and coal dust will be separated. Clear water will be reused for dust suppression and gardening while the sludge containing the coal particles will be dried and send back to coal stock.

10.4 Solid waste management

The debris generated due to dredging will be majorly used for reclamation of backup area of the port and the balance is to be disposed in deep sea. The other solid waste will be segregated. Recyclable waste will be disposed of through approved vendors and remaining waste will be disposed off though approved facility.

10.5 Fire fighting

The area where it is required to spray water in order to quench the sparks in coal storage area, a sprinkler line will be provided with a spray of water. Smoke detectors and fire alarm system shall be provided at all operating control rooms, operating cabins. Fire fighting equipment such as foam and carbon dioxide extinguishers will also be provided for chemical and electrical fires at all vulnerable area of the port.

10.6 Rain Water Harvesting and Water Conservation

The average rainfall in the project location is about 2.2 m per annum. Out of which about 90% of the rain happens in the months of June, July, August, and September. Hence with this kind of rainfall getting concentrated within the four monsoon months, it would be prudent to collect the rain water and re-use the same in the lean period, at least for the horticulture and the pollution control measures, like dust suppression systems.

Most of the open wells and tube wells in the coastal areas contain salty water. Rainwater harvesting is a viable option for solving this problem of edible water. Construction of rainwater overhead tanks is a costly affair. Moreover the tank has limited capacity for storing water. Rainwater will be collected from the roof tops of houses or paved areas and stored in a pressure tank in the ground and with the help of PVC pipes; water will be lowered below sea level (up to 16 - 24 feet). The water will be retained in the underground water column and this harvested water will be subsequently collected by a simple piston pump or motor by constructing a tube well in the vicinity before mixing with saline water. The water thus harvested will be used for both drinking and horticulture.

10.7 Cost of the project

The total cost of the project is **INR 2000 Crores**. For Phase I – **INR 1160.83 Cr**, For Phase II- **INR 408.70 Cr**, For Phase III- **INR 430.70 Cr**

11 BASELINE ENVIRONMENT STUDY

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

11.1 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.

11.2 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.

11.2.1 Ambient Air Quality

The parameters like $PM_{2.5}$, PM_{10}, SO_2, NOx, CO, NH_3, As etc. were studied at 8 locations. The levels of Lead, Arsenic, Nickel was also measured as a part of the study. The results are presented in the Table 9-2.

Table 9-2: Air quality in the study area

Sr. No.	Parameter	Units	Locations								Permissible limits
			Project site	Bagmala	Walke	Mandala	Vave	Talekhar	Salav	Korlai	
1	$PM_{2.5}$	$\mu g/m^3$	14.60	16.51	18.25	18.59	18.15	17.93	16.29	15.89	60.0
2	PM_{10}	$\mu g/m^3$	42.78	48.14	49.86	51.20	49.98	49.44	47.61	47.3	100.0
3	SO_2	$\mu g/m^3$	6.88	8.10	8.00	8.61	8.53	8.35	7.98	7.9	80.0
4	NO_X	$\mu g/m^3$	13.48	15.93	15.81	16.94	16.75	16.39	15.86	16.0	80.0
5	Pb	$\mu g/m^3$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
6	NH_3	$\mu g/m^3$	9.60	9.68	9.98	9.58	10.03	9.71	9.44	9.49	400.0
7	C_6H_6	$\mu g/m^3$	<1.0	<1.0	1.10	1.03	<0.1	1.08	<0.1	<0.1	5.0
8	O_3	$\mu g/m^3$	5.49	5.43	5.98	5.59	5.68	5.88	5.43	5.37	100.0
9	As	ng/m^3	<1.0	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.0
10	Ni	ng/m^3	<1.0	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.0
11	B-(a)-P	$\mu g/m^3$	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.0
12	CO	mg/m^3	0.63	0.75	0.66	0.62	0.75	0.73	0.75	0.74	2.0

11.2.2 Noise Level

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. Equivalent noise levels calculated for various locations are given in Table 9-3

Table 9-3: Noise level at all locations in the study area

Location	**L_{eq}**	
	Day	**Night**
Project site	45.6	39.6
Bagmala	50.7	41.9
Walke	49.6	40.5
Mandala	49.8	40.9
Vave	50.8	40.7
Talekhar	50.0	40.2
Salav	51.3	50.4
Korlai	38.7	37.7

11.2.3 Water quality

In order to study baseline water quality in the study area surface water samples were collected from four locations namely Project Site (sea water) and Kundalika River. The results are presented in the Table 9-4.


Fig. 9-4: Water Sampling

Table 9-4: Water quality in the study area

Sr. No	Parameter	Unit	Surface Water			
			Project Site Sea water	Upstream	Down-stream	Kundalika River
1	Temperature	^{O}C	30	30	30	25
2	Aluminium	mg/l	0.063	0.046	0.043	<0.01
3	Total Carbon	ppm	31.98	33.57	31.18	30.41
4	Free Ammonia as N	mg/l	3.99	4.25	3.69	<0.4
5	Boron	mg/l	2.59	2.56	2.51	6.94
6	Silicon as SiO2	mg/l	0.16	0.23	0.77	0.19
7	SAR	-	5.06	5.18	5.75	1.52
8	pH	-	7.31	7.59	7.40	7.81
9	TSS	mg/l	71	67	75	144
10	Electrical Conductivity	µS/cm	47000	46100	43800	56.7
11	Nitrite	mg/l	0.08	0.048	0.21	0.25
12	Oil & grease	mg/l	<0.5	<0.5	<0.5	2.0
13	Colour	Hazen	1	1	1	6.1
14	Turbidity	NTU	213	151	97	0.5
15	TDS	mg/l	25950	28797	23850	29633
16	Total Hardness	mg/l	116	132	134	6844
17	Sulphate	mg/l	150	142	139	1864.0
18	Fluoride	mg/l	0.08	<0.1	0.21	1.41
19	Nitrate	mg/l	20	18.32	18.19	0.81
20	Iron	mg/l	<0.01	<0.01	<0.01	0.71
21	Manganese	mg/l	<0.01	<0.01	<0.01	0.10
22	Zinc	mg/l	<0.01	<0.01	<0.01	<0.01
23	Mercury	mg/l	<0.001	<0.001	<0.001	<0.001
24	Cadmium	mg/l	<0.002	<0.002	<0.002	0.12

25	Phosphate	mg/l	27.01	33.55	24.92	4.01
26	BOD	mg/l	10	13	17	11.9
27	COD	mg/l	40	56	64	1044.48
28	Ammonical Nitrogen	mg/l	3.99	4.25	3.69	0.69
29	Dissolved Oxygen	mg/l	5.6	6.4	6	5.40
30	Chloride	mg/l	23078	27297	22879	17438.5
31	Coliform count	MPN/100ml	9	9	12	8
32	Faecal Coliform	–	Present	Present	Present	Present

11.2.4 Soil quality

Soil samples were collected from three locations in the study area during both seasons. The result shows, the soil is slightly alkaline with high chloride content. The soil is less productive with lower level of potassium, sodium and organic matter.

- Data on soil characteristics are available from earlier studies.
- 8 boreholes were drilled for determining the Dredgeability and Jetty construction.
- The generalised soil profile is as follows-

Sr. No.	Soil Description	Thickness Encountered in the Boreholes (m)		
		Max.	Min.	Average
1.	Medium Dense SAND	8.00	3.00	5.85
2.	Soft to Firm CLAY	14.00	3.00	6.66
3	Dense to Very Dense SAND	7.50	6.00	6.75
4	Hard CLAY	1.50	1.50	1.50
5	Residual SOIL	1.50	1.00	1.41
6	BASALT	1.50	1.50	1.50

Fig. 9-5: Sediment Sampling

In order to study the sediment quality samples were collected from 4 locations. The results of sediment analysis are given in Table 9-5

Table 9-5: Sediment Analysis Report

Sr. No	Parameter	Unit	Surface Water			
			Project Site Sea water	Upstream	Down-stream	Kundalika River
1	Organic content	%	2.86	1.89	1.93	1.77
2	Moisture content	%	39.7	22.1	27.4	20.9
3	Textural Class	--	Silty	Silty	Silty	Silty
4	pH of 10% solution	--	7.22	7.28	7.40	7.23
5	Conductivity of 10% solution	µS/cm	3340	2140	2046	2159
6	Chloride	mg/kg	13130	9684	9351	9598
7	Sulphate	mg/kg	1566	1268	879	1203
8	Boron	mg/kg	5.80	7.29	5.83	7.37
9	Calcium	mg/kg	323	232	76.5	266
10	Magnesium	mg/kg	245	227	75.3	243
11	Sodium	mg/kg	503	324	333	315
12	Potassium	mg/kg	106	72.7	61.8	71.8
13	Total Phosphate	%	0.19	0.17	0.20	0.19
14	TKN	%	<0.0001	<0.0001	<0.0001	<0.0001
15	SAR	--	5.13	3.60	6.44	3.44
16	Water retaining capacity	%	57.7	46.1	45.4	45.9
17	Copper	mg/kg	<0.50	<0.50	<0.50	<0.50
18	Nickel	mg/kg	0.635	<0.50	<0.50	<0.50
19	Zinc	mg/kg	2.06	1.47	0.807	1.25
20	Chromium	mg/kg	<0.50	<0.50	<0.50	<0.50
21	Cadmium	mg/kg	<0.50	<0.50	<0.50	<0.50
22	Lead	mg/kg	<0.50	<0.50	<0.50	<0.50
23	Mercury	mg/kg	<0.50	<0.50	<0.50	<0.50

11.2.5 Tide Data at Existing Jetty

As per the Tidal data collected for tidal cycle of 15 days at existing JSW jetty situated near mouth of Kundlika River indicated that the tides are semi-diurnal. The highest recorded tide level reduced to chart datum is 3.90 m while lowest tide level was 0.23 m.

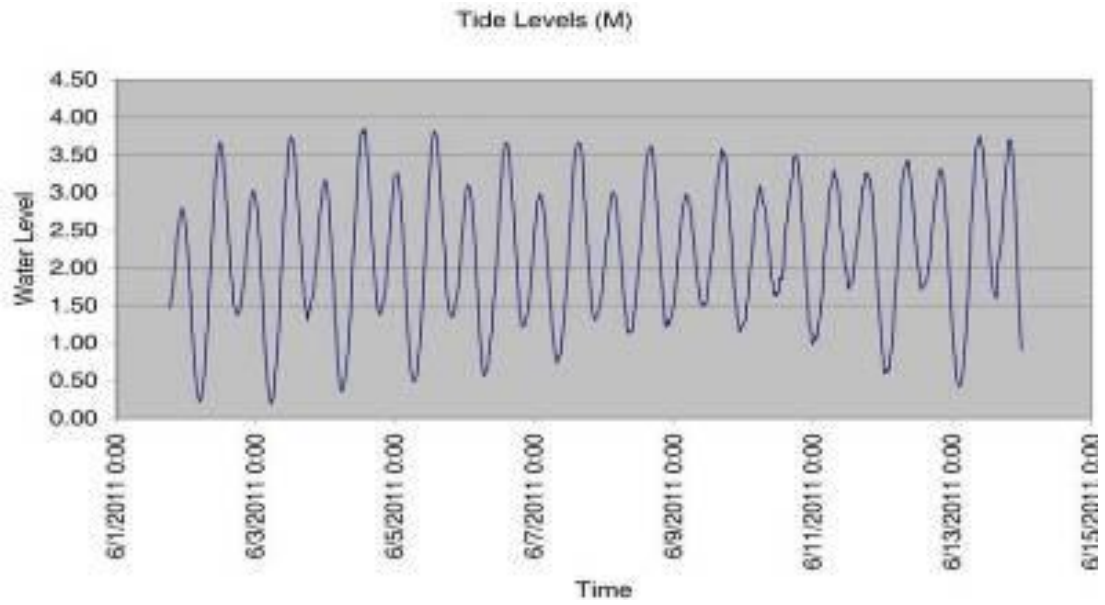


Fig. 9-6: Tidal Data at Existing Jetty

9-6 Tidal Levels at the Existing Berth

Place	**Heights in Meters above chart datum**				
	MHHW	MLHW	MHLW	MLLW	MSL
Revadanda Port	3.60	3.30	1.70	1.00	2.40

11.2.6 Ecology

Ecology has been studied for flora and fauna present in the study area. Most of the ecology consists of tree community in the areas around the proposed project dominated by Avicennia followed by Sonneretia both of which are a sparse & stunted mangrove species. The plant community in and around the core is typical of sparse & stunted mangrove ecosystem. 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.

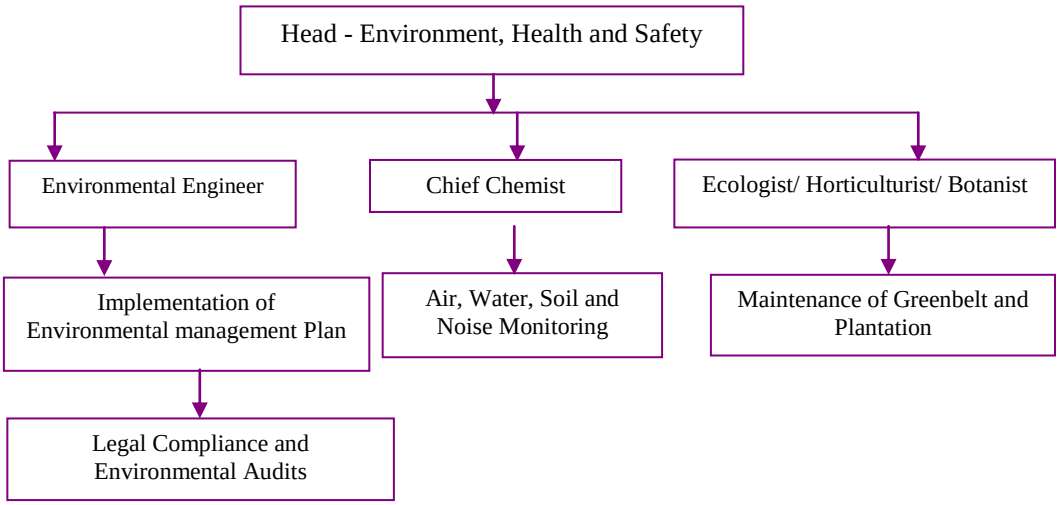
The existing flora and fauna will not be adversely affected as the said project does not envisage any kind of air emissions, ground water pollution and noise pollution due to the project activities.

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.

12 ENVIRONMENTAL MANAGEMENT SYSTEM

M/s Indo-Energy International Limited is very much conscious about sustainable development keeping environment at the helm. Accordingly construction of the port engineering will have environmental management system properly incorporated. IEIL 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.



Organization structure for Environmental Management Cell (EMC)

13 ENVIRONMENTAL IMPACTS ASSESSMENT & MITIGATIVE MEASURES

13.1 Impacts during construction phase

Environmental Parameters	Impact Attributes	Mitigation Measures
Physiography	Disturbance in relief feature	➢ The proposed project is of development of port. Materials shall be obtained from dredging and from local quarries only.
Human resources	No adverse impact	➢ Will be achieved by systematic planning and resources. Construction labour camps will be provided from nearby areas.
Geology	Not much affected	➢ Systematic planning and implementation
Surface of water	Contamination from solid wastes	➢ Installations of lavatory for construction workers at a minimum distance of 200 m from

Environmental Parameters	Impact Attributes	Mitigation Measures
	Impacts due to dredging activities	water bodies. ➢ Provision of oil and grease traps will entrap oil & grease from the run-off water in order to preserve the Water Quality of the Surface waters. ➢ Proper techniques for dredging shall be implemented so as to have minimum effect on the marine water due to turbidity
Air quality	Short-term deterioration of air quality due to generation of fugitive dust.	➢ Trucks carrying soil, sand, stone and other construction material 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 confirm to National and State Emission Standards.
Noise level	Increased noise levels due to project activities	➢ 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 will be provided on either side of the road. ➢ Provision of protection devices (ear plugs) to be provided to the workers operating in the vicinity of high noise generating machineries. ➢ All the vehicles used for construction materials will be fitted with EURO-I & II engines. ➢ Speed breakers and toll gate shall prove helpful in controlling the congestion of vehicles leading to less Noise pollution.
Land use	No Impacts	➢ Proper management planning will be achieved
Construction workers sanitation	Impacts on community health	➢ Supply of safe drinking water to the construction camp. ➢ Provision of Septic Tank system and mobile sanitation. Provision of hygienic facilities to construction workers.

13.2 Impacts during Operational phase

Environmental Parameters	Impact Attributes	Mitigation Measures
Physiography	No adverse impacts	➢ Clearing, stripping and leveling the site and construction of bunds from flooding, earth filling and excavation will improve the site.
Human resources	No adverse impact	➢ Will be achieved by systematic planning and resources. Construction labour camps will be provided from nearby areas.
Ecological resources –Flora & Fauna	No impact anticipated to the flora and fauna due to project activities	➢ Trees shall be planted to enhance the green belt
Surface of water	Sewage generated at the port and township Accidental oil spill Release/ leak of ballast water Escapement of solid cargo	➢ The sewage from worker camps will be treated in and disposed off as per norms. ➢ Oil spill contingency plan shall be provided. ➢ No release of ballast water shall be permitted in the port area
Air quality	Fugitive emissions and dust from the cargo loading and unloading activities and also from trucks used for transportation. Also emissions from DG sets, navigational equipment/machinery,	➢ Proper sprinkling of water during loading unloading activity and House-keeping to reduce the fugitive dust emission. ➢ The exhaust emissions from ships/vessels shall be controlled on the ship itself by providing long stacks with air emission control option such as sea-water scrubbing and fuel substitution. ➢ D.G Set will be used only in case of emergency with proper enclosures to reduce the impact of air emissions. ➢ The vegetation cover will also act as a barrier for any penetration of air quality and odour in the nearby area. ➢ Signboards will be put along the approach roads and at project building requesting motorists to avoid idling or/and stoppage of the vehicles at non-designated places. ➢ Day to day management and maintenance of the facility and the ancillary structures. Trucks carrying soil, sand, stone and other construction material will be covered to avoid spilling. Emissions from vehicles &

Environmental Parameters	Impact Attributes	Mitigation Measures
		machinery will be checked regularly & maintained properly to confirm to National and State Emission Standards.
Noise level	Increased noise levels due to project activities	➢ All the equipments will be duly lubricated, maintained in good working condition to minimize noise levels. ➢ Green belt barrier will be provided on either side of the road. ➢ Provision of protection devices (ear plugs) to be provided to the workers operating in the vicinity of high noise generating machineries. ➢ The occupational noise exposures to the workers in the form of 8 hourly time weighted average will be maintained within the prescribed OSHA standard limits. ➢ All the vehicles used for transportation will be fitted with EURO-III engines.

14 ENVIRONMENT MANAGEMENT PLAN

The aim of the Environmental Management Plan (EMP) is to ensure that the stress/load on the ecosystem, if any is within its carrying capacity. The most reliable way to achieve the above objective is to incorporate the management plan into the overall planning and implementation of the project. The Environmental Management Plan (EMP) for the proposed project is classified into the following categories:

- EMP during project construction phase- land, air, water, noise, green belt and socio economics
- EMP during project operation phase- land, air, water, noise, green belt and socio economics

The cost estimates for implementing EMP shall be **INR 1.5 Cr.** The cost includes solid waste management, installation of sanitary facilities, STP, ETP, noise meters green belt development etc. The cost required for implementation of Environmental Monitoring Programme for marine ecology and ambient air quality during construction phase is **INR 35 lacs.**

The cost required for implementation of Environmental Monitoring Programme for marine water quality, ambient air quality monitoring and effluent management from coal stack yard during operation phase is **INR 75 lacs** per annum

15 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN (DMP)

The disaster Management Plan consist of various accidents, hazards and manmade as well as natural disaster that can occur during the construction as well as operation phase of the proposed developmental project. The DMP includes identification of probable hazards, the mitigation,

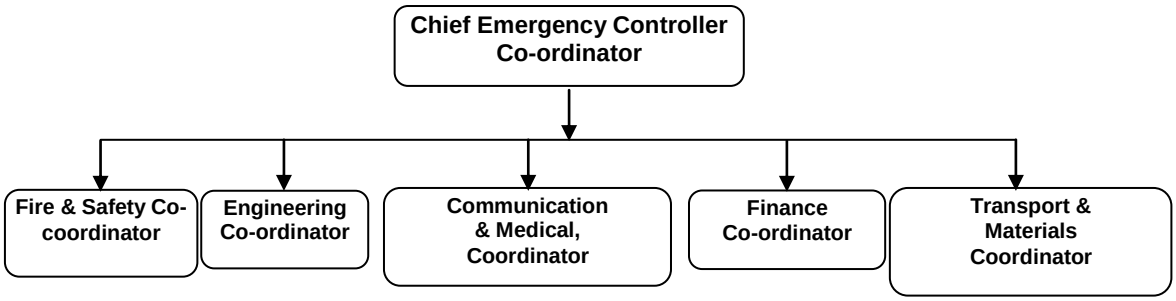
preparedness and Management for the same. The DMP is prepared with a modern approach to disaster management involves the following two steps;

- Risk Identification
- Risk Evaluation

The Action plan preparedness depends largely on results of risk assessment data and includes:

- Plan for preventive as well as predictive maintenance.
- Augment facilities for safety, fire fighting, medical (both equipment and manpower) as per requirements of risk analysis.
- Evolve emergency handling procedure both onsite and offsite.
- Practice mock drill for ascertaining preparedness for tackling hazards/emergencies at any time of the day.

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



Organization Chart for Onsite Emergency Management Team

16 CSR PLAN

As a responsible corporate, M/s Indo-Energy International Limited would integrate its environment, HR and ethical business policies with appropriate community engagement and gender equity. The major social sectors IEIL would emphasize for the local community developments are Education, Water Sanitation, Health, Livelihood and Empowerment, Sports, Environment, and Infrastructure Development. INR 5 Crores will be earmarked for CSR.

17 CONCLUSIONS

The proposed project is Development of Deep Water Jetty Facility on Kundalika River, village: Korlai, district: Raigad, Maharashtra and capacity expansion at existing Inland Water Jetty Facility, on Kundalika River at village: Sanegaon, district: Raigad, Maharashtra. The proposed project activities envisage berthing, loading and unloading of vessels. This activity envisages generation of negligible air pollution as well as water pollution; however the same shall be managed through Mitigation measures for air and water pollution. The Sewage Treatment Plan and strong channelized drainage system shall provide the minimum impact on the environment caused due to the proposed project. The green belt development near the site will act in the abatement of pollution.

The baseline environmental status of the project area has been collected. Proper mitigation plans has been framed so that there is no or minimum effect on the existing environmental status.

In conclusion it can be said that the proposed project shall not have any major impact on the environment.