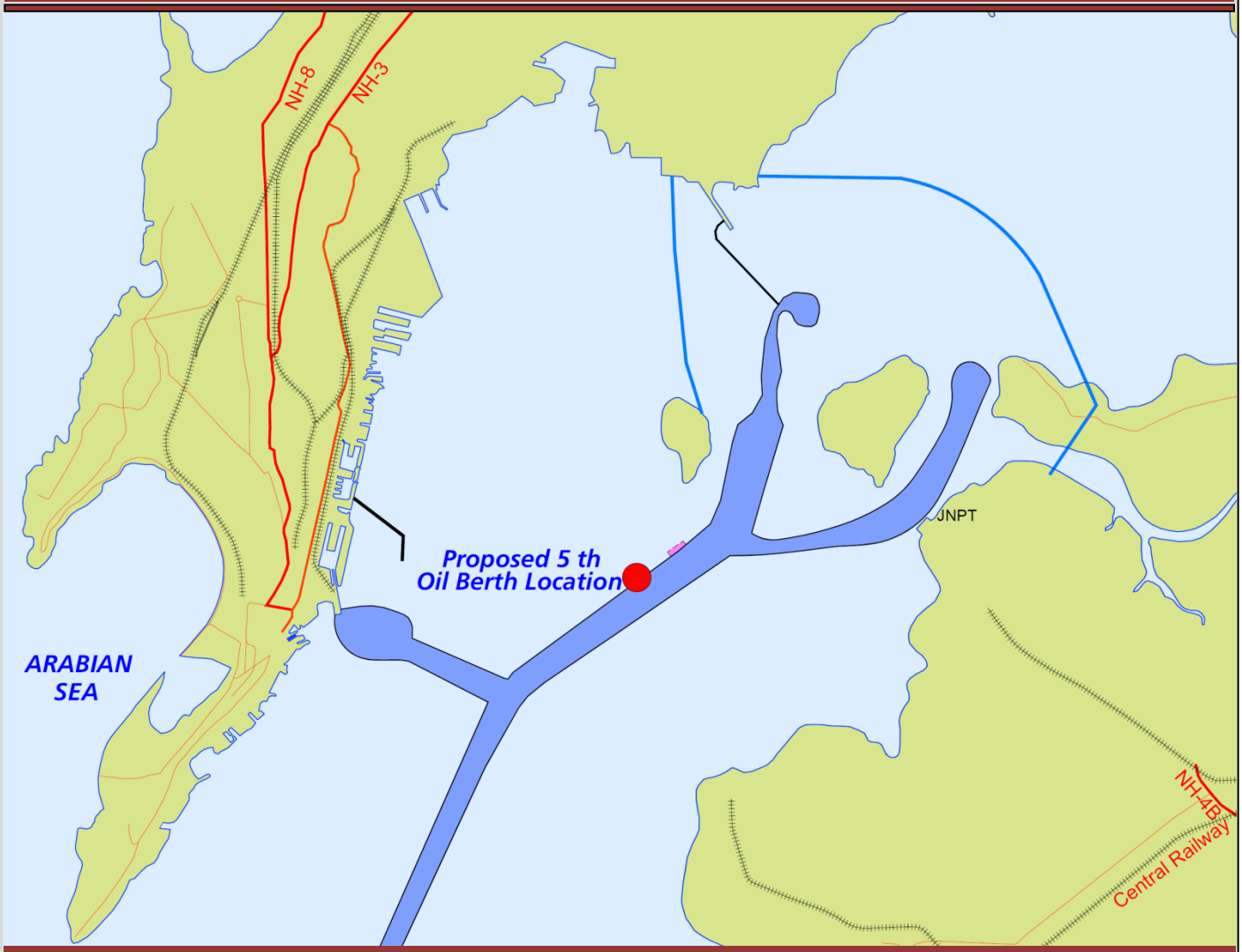
MUMBAI PORT TRUST

EIA/EMP & RA for Construction of 5th Oil Berth at Jawahar Dweep in Mumbai Harbour



EXECUTIVE SUMMARY

October - 2015

Prepared By

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L&T Infra Engineering

L&T Infrastructure Engineering Ltd.

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1 Introduction

Mumbai Port (Port) is one among the Twelve (12) Major Ports of India, established in 1873. The Port situated in the state of Maharashtra has long been the principal gateway to India and has played a pivotal role in the development of the national economy, trade & commerce and prosperity of this City for achieving "***economic capital of India***" status in particular. The Port has achieved this position through continuous endeavour to serve the changing needs of maritime trade. Though traditionally designed to handle general cargo, over the years, the Port has adapted to changing shipping trends and cargo packaging from break bulk to unitisation/palletisation and containerisation. Besides, it has also developed specialised berths for handling POL and chemicals. For several decades, Mumbai Port was India's premier port. Even today, with the development of several other ports, it caters to 10.7% of the country's seaborne trade in terms of volume and about 19.16% of POL traffic handled by Major Ports of the country.

Having weathered and survived many a change in maritime trade in its long history, Mumbai Port is today facing challenges posed by competition from adjoining ports and private ports, changing traffic patterns, inherent physical constraints and continuing labour intensive operations, etc. Even with such challenges, Mumbai Port is taking various measures to render cost effective and quality services to the trade.

To keep up with the operational needs of Mumbai Port, the Port has identified the need for construction of an additional Oil Berth. MbPT proposes to construct a Fifth Oil Berth at Jawahar Dweep in Mumbai Port area. This development is planned as a replacement to the existing Fourth Oil Berth. For construction of the proposed Oil Berth, MbPT needs to obtain prior Environmental/Coastal Regulation Zone (CRZ) Clearance after conducting an Environmental Impact Assessment (EIA).

2 Project Site Location

Mumbai Port is situated almost midway (Latitude $18^0$54' N, Longitude $72^0$49' E) on the west coast of India and is gifted with a natural deep water Harbour of about 400 square kilometres protected by the mainland of Konkan on its East and Island of Mumbai on its West. The deep waters in the Harbour provide ample shelter for shipping throughout the year.

The Mumbai Harbour houses the MbPT Jetties located in Jawahar Dweep (JD) Island and Pir Pau Jetties. The proposed construction of the Fifth Oil Berth is planned in the Mumbai Harbour near the Jawahar Dweep Island. Proposed location of JD5 is down stream of existing JD4 berth at a distance of approximately 600 m south west of JD4 along the main channel. **Figure 1** shows the location of proposed Fifth Oil Berth (JD5).

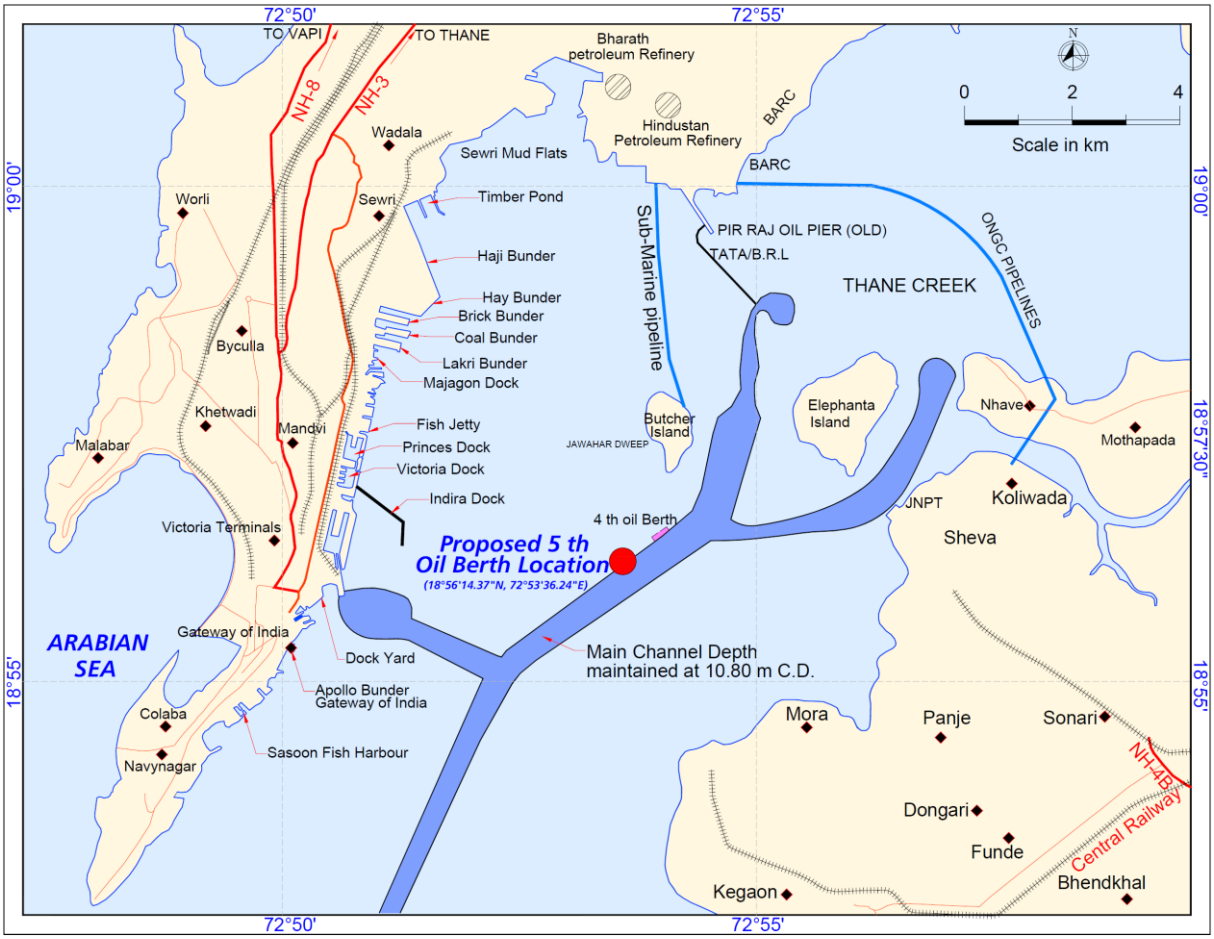

Figure 1: Project Location

3 Need and Justification of Project Development

Of the four oil handling berths at Jawahar Dweep (JD) i.e. berths JD1, JD2, JD3 and JD4, JD4 is the only berth which can handle larger vessels of Displacement Tonnage 125,000 T. The crude traffic through MbPT is primarily to cater the requirement of HPCL and BPCL. The oil companies have been insisting Mumbai Port that a facility to handle fully laden Suez Max Tankers for crude import to be created. The existing JD4 berth has deteriorated and expensive rehabilitation of structures are being carried out. However, this would enhance the life of the berth for another 8-10 years.

Both the oil companies have informed that due to lack of berthing facilities for handling Suez Max and VLCC vessels, they have been incurring cost of Rs. 150 to 170 Crores every year towards additional freights / demurrage to the vessels.

The issue of infrastructural constraints at Jawahar Dweep was discussed by the Parliamentary Committee for Petroleum and Natural Gas, during their visit in November 2014. The Committee has recommended for the early construction of JD5 to avoid incurring additional freight.

Considering the limited life of the existing Fourth Oil Berth and no other berths can cater to larger vessels, it is necessary to construct the 5th Oil Berth catering to the fully laden Suez Max Vessels and Light Drafted VLCC, with sharing of cost of construction by Oil PSUs.

Mumbai Port had appointed consultants for the Preparation of Detailed Project Report (DPR) for Construction of Fifth Oil Berth catering to fully laden Suez Max tankers and light drafted VLCC. The DPR has since been prepared and submitted to MbPT.

4 EIA/EMP & RA Study

ToR for the proposed project was obtained from EAC, MoEF vide MoEF & CC letter *F.No.10-4/2015-IA.III, dated June 19, 2015.* EIA study has been carried out as per the approved ToR. MbPT has appointed L&T Infrastructure Engineering Ltd. for the task for providing consultancy services for conducting the EIA/EMP and RA for obtaining Environmental/CRZ Clearance for proposed construction of Fifth Oil Berth at Mumbai Harbour.

5 Analysis of Alternatives

Proposed development is planned in the vicinity of the other existing oil berths at Jawahar Dweep. The proposed area is located near to the Approach Channel in line with the existing JD4 berth. JD5 is planned as an eventual replacement of JD4. Also, proposed reclamation is planned as an extension to the land available at Jawahar Dweep.

As such, location of the proposed development activities as planned is considered as the best and only alternative for the location. Hence, proposed development does not result in an analysis of alternative sites.

6 Proposed Development

Proposed development plan includes the following:

- Unloading Platform
- Four berthing dolphins
- Six mooring dolphins
- Boat Landing and Helicopter Landing Platform including Control Tower Building
- Link Bridge to Existing JD4 Unloading Platform
- Link Bridge to Existing Pump House
- Link Walkways
- New Pump House
- Approach Bund
- Approach Trestle
- Submarine pipeline
- Capital Dredging for berth, channel, and anchorage
- Reclamation at Jawahar Dweep reef for tankages and buffer stock to meet exigencies

Considering constraints of space availability for the oil companies/refineries for augmentation of their storage capacities and buffer stock to meet exigencies, it is proposed to reclaim about 13 hectare of area for development of tank farms on the south side of Jawahar Dweep reef area, abutting the existing approach trestle to JD4 berth. Necessary Environmental/CRZ clearances for setting up of the tank farms will be taken up separately by the respective oil companies.

6.1 Utility Services

6.1.1 Water Supply

The Port receives its water supply from the Municipal Corporation of Greater Mumbai (MCGM). It is estimated that the water requirement shall be ~ 200 KLD during the

construction stage and ~150 KLD during the operation stage of the Fifth Oil Berth. Proposed development is planned as replacement of the existing Fourth Oil Berth. Hence, it may be noted that **no additional allotment of water from MCGM is required**.

6.1.2 Power

Power supply is envisaged to be in the range of 0.525 to 0.92 MVA which will be obtained from existing source of MbPT at Jawahar Dweep. Power requirement during construction stage will be met from existing MbPT network or the construction agencies will use their own power generator during the construction period if required. It may be noted that **no additional power requirement is envisaged for the new development.**

6.1.3 Solid Waste/Wastewater Management

The cargo to be handled at proposed Fifth Oil Berth shall be only in liquid form and is only handled/transported through pipelines. As such, cargo operations are not envisaged to generate solid waste. Use of the berth/office facilities at the berth may however lead to small amounts of solid waste generation. The total solid waste generated is about 20 to 30 kg/day. Since proposed 5th Oil Berth (JD5) is a replacement of existing 4th Oil Berth (JD4), no additional solid waste/wastewater generation is envisaged. Existing facilities for handling solid waste shall continue to be used. Adequate facilities for collection and conveyance of municipal wastes are provided.

Sewage disposal at Jawahar Dweep Island is managed through septic tanks provided on the Island. Present proposal (JD5) will continue to use existing sewage handling facilities available at JD Island. There will be no additional sewage generation since the proposed berth is replacement to the existing JD4 and will be maintained by the existing staff/existing employees will be redeployed to 5th Oil Berth.

7 Description of Environment

An area within 15 km radius from project boundary has been earmarked for the study as the PIA/study area. Four districts are falling within the study area, namely: Mumbai Suburban, Mumbai Central, Thane and Raigad districts of Maharashtra.

The baseline environmental status of the study area was established/understood by generating primary data for the marine component and valid secondary terrestrial data is used for conducting this EIA study. Primary survey for ecology (flora and fauna) was carried out as part of this EIA study.

7.1 Environmentally/Ecologically Sensitive Areas

The environmental sensitive areas covering an aerial distance of 15 km from Project boundary along with aerial distances are given in **Table 1**.

Table 1: Environmentally Sensitive Areas

S. No.	Areas	Name/ Identity	Aerial distance (Within 15 km.)[1]
1.	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	• Elephanta Caves • Gateway of India • Sewri Fort • Monolithic Bass Relief, Parel VillageAugust Kranti Maidan	• 4.9 NE • 6.4 WSW • 7.8 NW • 8.5 NW • 9.2 WNW

[1] Distances are aerial distances measured from the centre of project site.

S. No.	Areas	Name/ Identity	Aerial distance (Within 15 km.)[1]
		• Banganga Tank • Sion Fort • Dharavi Fort/ Kala killa • Mahim Fort • Bandra Fort	• 10.5 W • 12.4 N • 12.8 NNW • 13.0 NNW • 14.0 NW
2.	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	There are no Reserve forests (open jungle, casuarinas, mixed jungles, open mixed jungle, etc.). Some mangrove areas are located within 15 km radius of the project location boundary. However, proposed project developments will not affect the mangrove area.	
3.	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Proposed Flemingo sanctuary in Thane Creek	15.5 NE[2]
4.	Inland, coastal, marine or underground waters	• Arabian Sea • Nhave Creek • Mahul Creek • Banganga Tank • Dharamtar Creek • Thane Creek (opening) • Mahim Creek • Mithi River • Panvel Creek • Mandwa Beach	• Adjacent to port site • 8.0 E • 9.0 N • 10.6 W • 12.4 SSE • 13.5 NE • 14 NNW • 14.5 N • 14.5 NE • 15.1 SSW
5.	State, National boundaries	-	-
6.	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	• NH 4B • NH 3 • NH 8	• 10.3 SE • 13 N • 14 NNW
7.	Defence installations	• Mumbai Naval base and Dockyard • Defence Station Colaba • BARC	• 5.3 W • 9.0 WSE • 10.0 NNE
8.	Densely populated or built-up area	• MCGM • NMMC	• 5.3 WNW • 13.6 NE
9.	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	• Monolithic Bass Relief, Parel Village • Haji Ali Dargah • Walkeshwar Temple • Mount Marry Church	• 8.5 NW • 10.2 NW • 10.5 W • 14.2 NNW
10.	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	-	-
11.	Areas susceptible to natural hazard which could cause the project to present environmental problems, (earthquakes, subsidence, landslides, erosion or extreme or adverse climatic conditions)	The proposed project falls under seismic zone III (moderate earthquake zone) as per IS 1893 (Part I) 2002 of Indian Seismic map. The project area is not influenced by high frequency of cyclonic disturbances	During the design stage, the effects from natural disasters will be considered and necessary precautionary measures would be built in/ implemented.

7.2 Marine Environment

The marine environment baseline survey observations are provided below:

[2] On 6th August, 2015, the Maharashtra Revenue and Forest Department notified the northern part of the creek as a wildlife sanctuary under Section 18 of the Wildlife (Protection Act), 1972.

- Temperature ranged between 26.7 ^{0}C at MSL-7 during high tide and 37.9 ^{0}C at MSL-5 during high tide
- pH value ranged in between 7.7 to 8.5
- Salinity ranged between 33.5 ppt at MSL-4 during low tide to 40.6 ppt at MSL-4 during high tide
- Turbidity ranged between 17.0 NTU at MSL-1 during low tide and 24.1 NTU during MSL-4 during high tide
- Dissolved Oxygen ranged between 5.0 mg/l at MSL-5 during low tide to 7.5 mg/l at MSL-4 during low tide
- Biochemical Oxygen Demand ranged between 2.1 mg/l at MSL-1 and MSL-4 during high tide and low tide respectively and 3.0 mg/l at MSL-5 during high tide
- Ammonia concentrations varied between 0.058 µmol/l at MSL-7 during high tide and 0.085 at MSL-5 and MSL-7 during low tide respectively
- Total Nitrogen concentration varied between 20.89 µmol/l at MSL-6 during low tide and 26.32 µmol/l at MSL-1 during high tide
- Total Phosphorous concentration ranged between 1.84 µmol/l at MSL-3 during low tide to 4.15 µmol/l at MSL-5 during high tide
- Particulate Organic Carbon ranged between 111.13 µgC/l at MSL-5 during low tide and 125.28 µgC/l at MSL-5 during high tide
- Petroleum hydrocarbons ranged between 0.391 µg/l at MSL-5 during low tide and 0.683 µg/l at MSL-6 during high tide.
- Cadmium (Cd): The cadmium concentration in marine waters varied between 1.296 µg/l at MSL-1 during low tide to 2.064 µg/l at MSL-5 during high tide.
- Lead (Pb): The lead concentration in marine waters varied between 3.60 µg/l at MSL-3 during low tide to 5.12 µg/l at MSL-7 during high tide.
- Zinc (Zn): The zinc concentration in marine waters varied between 24.35 µg/l at MSL-7 during low tide to 36.09 µg/l at MSL-3 during low tide.
- Mercury (Hg): The mercury Concentration in marine waters varied between 0.05 µg/l at MSL-1 and MSL-5 during low tide respectively to 1.76 µg/l at MSL-8 during high tide.
- Primary Productivity: Primary Productivity ranged between 170.3 mgC/m^3/day at MSL-2 during high tide and 298.9 mgC/m^3/day at MSL-1 during low tide.
- Total Biomass: Total Biomass ranged between 18.38 ml/100m^3 at MSL-4 during low tide and 48.42 ml/100m^3 at MSL-7 during high tide.
- Total Viable Count -Total Heterotrophic Bacteria (TVC): The TVC population varied between 43 x10^4 CFU/ml at MSL-2 during high tide and 60 x10^5 CFU/ml at MSL-6 during low tide.
- Total Coliform (TC): The Total Coliform population ranged between 24 x10^4 CFU/ml at MSL-2 during high tide and 39 x10^5 CFU/ml at MSL-5 during low tide.

7.3 Terrestrial Environment

The terrestrial environment baseline survey observations are provided below:

- The total area considered for land use study is 70682 ha (~15 km radius). Of this, 57.9 % is sea, 21.6% is Urban land, 5.9% is Mangrove Swamp, 3.3% is Coastal Wetlands, 3.2% is Scrub land, 2.8% is Crop land, 1.7% is Fallow land, 1.3% is plantation and 1% is Deciduous lands. The rest is distributed among built-up land, coastal sand and others.
- Daily maximum temperature is 33.6^{0}C and the minimum temperature is 19.3^{0}C
- Relative humidity is moderate to high all-round the year
- Maximum and minimum rainfall of 707.2 mm and 0.1 mm.
- Maximum mean wind speed 10.4 Kilometre per hour

- As per the Flora and Fauna study and analysis no rare or endangered or endemic or threatened (REET)/Endangered IUCN criteria plants and animal species are observed in the core area
- Ambient Air Quality monitoring is carried out regularly by MbPT's Pollution Control Cell. Data collected (RSPM-PM_{10}, RSPM-$PM_{2.5}$, SO_2, NO_X, CO, NH_3) for the period of January 2015 to June 2015 is used in this EIA report to understand the baseline quality. Results indicate that all monitoring parameters are within the prescribed standards.
- Secondary data from the study area was collected and analysed to understand baseline conditions for terrestrial components of soil and surface water quality. Results available within the 15 km radius of present proposal indicate:
  - Soil texture is sandy loam
  - Soil pH ranged between 7.8 to 8.4, soil in the region is moderately alkaline in nature
  - Surface water pH ranged between 7.2 to 7.6 and is neutral to moderately alkaline in nature
  - Dissolved Oxygen ranged between 5.5 mg/l to 6.2 mg/l

7.4 Socio-economic Conditions

Study area for socio-economic baseline description consists of 15 km radius around the Project stretch. Four districts i.e., Mumbai Suburban, Mumbai City, Thane and Raigad covering a total of 25 villages, 3 Municipal Corporations (M Corp.) and 4 Commercial Towns (CT) are falling in the study area. Municipal Corporation of Greater Mumbai (MCGM) is partly falling under Mumbai Suburban and partly under Mumbai City district. These districts consist of only urban population under MCGM. Thane taluk is falling under Thane district and Uran, Panvel and Alibag taluks are getting covered under Raigad district within the study area.

The study area has a population of 65,98,117 persons with a sex ratio of 841 females to 1000 males. Male population comprises of 54.31% and female population comprises of 45.68% of the total population in the study area. The ST population in the study area is very low and is only 1% of the total population in the 15 km radius. The SC population comprises of 8% and other castes comprises of 91% of the total population in the study area. Total workforce in the study area consists of 39.98% of the total population. Main workers comprises of 93.67% whereas marginal workers comprises of 6.32% of the total workforce. 60.01% consists of non-workers from the total population in the study area. 79.88% is the literacy rate in the study area. As the study area is covering Municipal Corporations and Commercial Towns government and private medical, educational facilities are available to meet the requirements of the local population.

8 CRZ Compatibility

Physical demarcation of HTL, LTL and delineation of CRZ boundaries for the project site were carried out by Institute of Remote Sensing, Anna University, Chennai, which is one of the MoEF authorized agencies for conducting this study. The summary of the CRZ demarcation is as follows:

- The proposed development is a complete offshore development in the water area of Mumbai Harbour within the Mumbai Port Water Limits.
- This area falls in the classification of CRZ IV category - the water area from the Low Tide Line to Twelve Nautical Miles on the seaward side
- Proposed development includes dredging, reclamation, offshore berth, boat landing and helipad structures, approach trestle and submarine pipeline; there are no mangroves in the area of proposed development.

- Proposed development being in CRZ IV area, is a permissible activity as it requires waterfront and foreshore facilities.

9 Environmental Monitoring Programme

Environmental Monitoring Programme for construction and operation phases of project has been presented as part of the EIA Study. The Environmental Monitoring Programme for both Terrestrial and Marine environment covers the technical and network design of monitoring including measurement methodologies, frequency, location, etc., and budgetary estimates. The budgetary estimate for Environmental Management during construction phase is ***INR 6.03 Million (INR 0.603 Crores)*** and the Annual Recurring cost estimate is ***INR 5.92 Million (INR 0.59 Crores)***.

MbPT has an inhouse Pollution Control Cell which is responsible to look into aspects of environmental protection and safety aspects. **MbPT expends about Rs. 1 crore every year specifically on environmental aspects**.

10 Anticipated Environmental Impacts with Mitigation Measures

10.1 Construction Phase

Project developmental activities such as site development, civil construction and mechanical erection works, material transport & other construction activities, dredging, reclamation, dredge spoil disposal, development of offshore structures, etc. will result in disturbance to predominantly the marine environment and to some extent the terrestrial environment. Most of impacts during construction are short-term in nature and will cease on completion of construction activities.

10.2 Operation Phase

Likely impacts due to the project will mostly be on the marine environment. In addition, proposed development is a replacement to existing Fourth Oil berth; as such no additional/new impacts are envisaged due to operation of the Fifth Oil Berth.

Anticipated impacts on the environmental and social attributes, which are likely to arise due to construction and operation of proposed project have been identified, predicted and evaluated. Summary of such impacts and proposed mitigation measures are presented in **Table 2**.

Table 2: Project Activities, Associated Impacts and Mitigation Measures

S. No.	Activity	Relevant Environmental components likely to be impacted	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsible Agency for Implementation
			Construction Phase		
1.	Capital Dredging/ Trenching for laying of subsea pipelines/ Reclamation	Marine water quality	– Increase in turbidity – Change in marine water quality due to aqueous discharges (oily waste, sanitary wastes) from dredgers, barges and workboats – Spill of Bentonite Clay during pile driving	– Check turbidity levels with baseline levels as reference during entire monitoring programme – Dredge Management Programme – Dredge material will be dumped in approved dumping ground – Ensure dumping of excess/unusable dredge material would be uniform – Discharge of waste into sea will be prohibited – Oil Spill control measures will be adopted – Ensure that slop tanks will be provided to barges/ workboats for collection of liquid/ solid waste – Recirculation/Reuse of Bentonite clay and adoption of better construction methods to minimise the spill on marine environment. – Adoption Proper Reclamation methods such as containment system to retain the solid inside the reclamation area – Marine environmental monitoring as per environmental monitoring programme	Construction Contractor/ MbPT
		Marine ecology	– Decrease in DO levels – Increase in noise levels – Removal of benthic communities – Increase in species diversity and density in areas adjoining dredging site – Smothering or blanketing of sub-tidal communities		
		Mangrove area	– Impact on nearby mangrove	– No mangroves were observed at the proposed project site (i.e. proposed reclamation area). Mangrove patches were observed at ~1.5 km towards the North side of the proposed oil berth site. – No impacts on the mangroves are envisaged during construction and operation Phase of the oil berth. However, water quality near the mangrove area shall be ensured by regular monitoring.	

S. No.	Activity	Relevant Environmental components likely to be impacted	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsible Agency for Implementation
2	Construction of new jetty and other offshore structures	Air Quality	– Emissions from DG Sets	– To reduce impacts from exhausts, emission control norms will be enforced /adhered. – No dust emission is anticipated due to the proposed oil berth facility. – Environmental awareness program will be provided to the personnel involved in developmental works.	Construction Contractor/ MbPT
		Noise	Noise from following activities – Diesel run engines of construction machinery and dredgers – Pile driving activities during construction of Approach trestle/cargo berth	– Noise levels will be maintained below threshold levels stipulated by CPCB/MPCB – Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) – Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used – Noise attenuation will be practised for noisy equipment by employing suitable techniques such as acoustic controls, insulation, etc. – Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. – Ambient noise levels will be monitored at regular intervals.	
3.	Solid Waste Management	Soil quality	– Impacts due to disposal of solid waste	– Most of the facilities are planned on offshore and as per the geotechnical investigations, most of the dredged material will be disposed in sea. – General refuse generated on-site will be collected in waste skips and disposed as per prescribed/approved norms.	MbPT/Construction Contractor
4.	Handling of hazardous wastes	Human safety and property loss	– Fire accidents due to hazardous material handling	– Adequate safety measures as per OSHA standards will be adopted – Hazardous materials such as lubricants, paints, compressed gases, and varnishes	MbPT

S. No.	Activity	Relevant Environmental components likely to be impacted	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsible Agency for Implementation
				etc., will be stored as per the prescribed/approved safety norms. – Medical facilities including first aid will be made available for attending to injured workers. – Handling and storage as per statutory guidelines. – Positive isolation procedures will be adhered – Hazardous wastes will be disposed through approved MPCB/CPCB vendors.	
5.	Fishing	Fishermen and fishing travellers	– Impact on fishing due to Construction works	– Proposed construction is planned within the Mumbai Harbour areas near the Approach Channel where fishing activities are not permitted; however, following measures are yet suggested: – Signboards will be placed at the construction site in order to make fishermen aware of the ongoing activities – Necessary marker buoys will be installed – Interactions will be initiated with the fishing community before commencement of construction works – Construction shall be limited to as per development plan. – Proper Planning execution of offshore construction activities to ensure the completion of construction as per schedule – Ensure that slop tanks will be provided to barges/ workboats for collection of liquid/ solid waste	MbPT
Operation Phase					
1.	Liquid cargo handling facility on offshore	Air Quality	– The proposed project consists of only a liquid handling facility. – No dust emission is anticipated from the oil handling facility	– Vessels visiting the facility shall meet emission standards as per MARPOL.	MbPT

S. No.	Activity	Relevant Environmental components likely to be impacted	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsible Agency for Implementation
		Noise Quality	– Due to loading and unloading of liquid cargo	– 100% of the cargo is expected to be shipped through the dedicated pipelines from the oil terminal and refinery. – Personal Protecting Equipment (PPE)	
2.	Aqueous discharges in Oil berth facility	Marine water quality and ecology	– Change in marine water quality/ecology due to discharge ship wastes (silage), sewage, bilge water, solid waste etc.	– Ships are prohibited from discharging wastewater, bilge, oil wastes, etc. into the near-shore as well as harbour waters. – Ships would comply with the MARPOL convention. – Oil Spill Contingency Plan shall be prepared and will be implemented. – Provision of waste reception facility during emergency	MbPT to provide regulations to vessel operators
3.	Cargo and Oil spills (Accidental)	Marine water quality and ecology	– Change in marine water quality	– All the cargo will be evacuated through pipelines and there will be no handling of hazardous liquid. – No portion of the proposed facility will cross the inhabited area. – Separate de-ballasting pipeline is provided to receive the washing from the ships. – The leakage and spillage is expected due to rupture of pipeline etc. for which contingency plans already in existence to combat such situations – There are existing facilities available to cater to such leakage and spillage – Oil containments booms and oil skimmers are proposed to control the accidental leakage of oil. – Response time for shutting down the fuelling, containment and recovery will be quicker.	MbPT
4.	Handling of hazardous liquids	Fire accidents due to products handling and other health hazards.	– Human life and loss of property	– All the liquid cargo will be evacuated through pipelines and there will be no handling of hazardous liquid.	MbPT

S. No.	Activity	Relevant Environmental components likely to be impacted	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsible Agency for Implementation
				– Medical facilities including first aid will be available for attending to injured workers	
5.	Fishing activity	Fishermen livelihood	– Impact on fishing due to vessel movement etc.,	– Educate the fishermen about the orientation of approach channel and ships visits etc., – Regular interactions will be initiated with the fishing community – Conflicts, if any, with fishing community will be amicably resolved in all cases.	MbPT
6.	Operation of oil berth	Fire Fighting	A dedicated fire fighting system is proposed for the new jetty. The system consist of water/foam monitor system, ground monitor, jumbo curtain system, hydrants, foam induction system, fire alarm, public address and fixed fire extinguishers, gas detection system; existing main and standby pumps will be used to maintain the water demand at required pressures in 5th oil berth. MbPT has in place an approved Oil Spill Response plan and equipment's to contain/remove/disperse oil spills in sea water. An integrated fire protection system has been designed as per guideline of Oil Industry safety Directorate (OISD) to combat fire under various possible risks.		
		Ship loading and Unloading	The fixed unloading arm will be deployed for unloading and loading of crude with ships pumping gears. These arms have inbuilt fail safe devices to prevent spillage of oil in case of the outboard end of arm is separated from the tanker manifolds.		
		Socio-economic Impacts	Proposed development is only envisaged to have positive socio-economic impacts. There is no land acquisition/R&R due to this project. During the construction phase of proposed development, expected for a period of about 30 months, the proposed activity is expected to bring an employment of about 12000 man-days. The proposed activity is planned as a replacement to the existing Fourth Oil Berth wherein existing employees will be redployed to the new facility. Approximately 50-80 existing employees will be redeployed during operation phase of 5th Oil Berth.		
		Natural Hazards	A Coast guard approved Disaster Management Plan (DMP) is already in place. Manager (EHS) will act as the overall in-charge of the control of educative, protective and rehabilitation activities to ensure least damage to life and property.		

11 Additional Studies

11.1 Risk Assessment

Risk analysis study was carried out to assess risks associated with operation of the proposed offshore oil berth at Jawahar Dweep. PHAST/PHAST RISK MICRO 6.7 software was used for detail damage distances calculation. The Risk Analysis covered the following.

- Hazard Identification including potential release events and Failure Frequency
- Consequence modelling of release rate and damage distances

11.2 Disaster Management Plan

MbPT has in place an approved Oil Spill Response Plan and equipment's to contain/remove/disperse oil spills in sea water. An integrated fire protection system has been designed as per guideline of Oil Industry Safety Directorate (OISD) to combat fire under various possible risks. MbPT also has in place a Disaster Management Plan (DMP).

The DMP is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in the same order of priorities. For effective implementation of DMP, it should be widely circulated and personnel training is to be provided through rehearsals/drills.

An institutional framework with assignment of roles and responsibilities was broadly prepared with which location of Emergency Control Centre and Assembly Points is identified. Communication system and alarm systems for effective communication in the event of a disaster are broadly identified. DMP for natural hazards such as cyclones was prepared. Mutual aid scheme and aspects relating to community involvement for dealing with off-site disasters is broadly discussed.

11.3 Social Impact Assessment

11.3.1 Social Impacts during Construction Phase

11.3.1.1 Land Acquisition

The proposed Fifth Oil Berth is planned to be constructed near Jawahar Dweep in Mumbai Harbour, Mumbai Port. This will fall in the offshore area which is about 5 km away from the landward side. Proposed developments are planned within existing Mumbai Port Trust area and hence do not involve acquisition of any private land. As such the proposed activity does not attract any rehabilitation or resettlement issues.

11.3.1.2 Impact on Nearby Settlements

The impact on nearby settlements during construction phase will be due to air pollution and the noise generating activities. The 5 km radius of the proposed activity is covering minimal habitations. However, the activities are limited to the construction phase and will cease upon completion of the construction. Hence, this impact is considered to be negligible and therefore can be classified as insignificant.

11.3.1.3 Impact on Fishing Activity

There are total 28 fishing villages falling within the 15 km radius of Mumbai Port. As per the CMFRI Marine Fisheries Census 2010, total population of fishermen in the study area is 41490 having 15119 males, 14506 females and 11865 children.

The main navigational channel is currently being used by all users like MbPT, JNPT, Tourism Board, Navy and as well as Fishermen for venturing into the open sea for fishing. **Fishing in Port limit is prohibited by law due to security reasons as well as safety reasons.** As such the proposed facility is not envisaged to bring any negative impacts or hindrance in the movement of boats and carrying out fishing activities.

The most important impact that can be envisaged on the fishes is due to the suspended solids or changes in the food chain due to dredging in the construction phase and oil spillage in case of handling/storage of oil/product, accidents and vessel movements during operation phase. This might result in clogging of gills of fishes and cause asphyxiation. But as fishes are free swimmers, they can sense the changes and can move to safer areas during this period and come back once the turbidity levels have stabilised/improved. Due to this capability of fishes there shall be no significant adverse impacts. In the proposed area due to dredging and presence of heavy traffic, abundance of fishery resources is also not envisaged. **Moreover fishing is not a permissible activity within port limits.** Hence unfavourable impacts are not anticipated.

However necessary steps shall be taken in order to address minimize and address the adverse impacts on the fishermen community as a result of the proposed activity. Necessary sign boards and marker buoys along with interaction with the fishermen will be initiated so that there is no hindrance in the movement of fishing boats and carrying out fishing activities. Oil containment booms and oil skimmers are proposed to control the accidental leakage of oil. The leakage and spillage is expected due to rupture of pipeline, etc. for which contingency plans already in existence to combat in the port. There are existing facilities available to cater to such leakage and spillage.

11.3.1.4 Employment Potential

During the construction phase of proposed development, expected for a period of about 30 months, the proposed activity is expected to bring an employment of about 12000 man-days.

11.3.2 Social Impacts during Operation Phase

11.3.2.1 Impact on Fishing Activity

Necessary steps shall be taken in order to address the issues and negative impacts on the fishermen community as a result of the proposed project activity.

11.3.2.2 Employment Potential

The proposed activity is planned as a replacement to the existing Fourth Oil Berth wherein existing employees will be redeployed to the new facility. Approximately 50-80 existing employees will be redeployed during operation phase of the Fifth Oil Berth.

11.3.2.3 Public Health and Safety

Since the proposed project consists of only a liquid handling facility through pipelines and not a processing plant or industrial unit as such, the usual sources of environmental pollution such as emission of smoke and toxic chemical, effluent discharge, spoilt disposal, etc. will

not happen. However essential steps shall be taken to handle any mishap in case of emergencies such as use of number of unloading arms with latest technology, etc. The cargo will be evacuated through pipelines. No portion of the proposed facility will cross the inhabited area. Separate de-ballasting pipeline shall be provided to receive the washing from the ships. Also, proposed development is a replacement of existing Fourth Oil Berth. As such no new/additional impacts due to the operation of the Fifth Oil Berth are envisaged.

MbPT has in place an approved Oil Spill Response Plan, an integrated fire protection system and a Disaster Management Plan. All these will help minimize/avoid the probability of occurrence of emergency situations and mitigate the impacts.

12 Project Benefits

12.1.1 Induced Development

Crude oil and its by-products are used in the production of variety of products in industries. There are a number of items that rely on petroleum as part of their production. The proposed development is planned with the aim to increase crude handling at MbPT. This facility will help supply additional oil to the refineries in the region. This will help indirectly promote opportunities for further industrial growth of the region. It will indirectly assist in creation of many industries and provide employment to local population. This in turn will lead to employment generation/meeting occupational requirements of local population.

12.1.2 Improved Socio-Economic Conditions

The project will have overall positive impact on the socio-economic conditions of the region. Crude oil will be utilised in the industries for the manufacture of various products. Their production capacity will increase thereby leading to the creation of more job opportunities and avenues for income generation. As, a result it will lead to various indirect employment opportunities. People will have higher earning and buying capacities and their standard of living will increase. Additional employment opportunities will result in having more than one earning member in a family and reduce the dependency on a single earner and enable them with better economic freedom.

13 Corporate Social Responsibility (CSR)

As a gesture towards CSR, MbPT is contributing in a large manner towards community development and environmental management. Detailed below are the various activities which are being undertaken by MbPT as a step towards community development. These shall also be extended as a part of the proposed development.

Botanical garden

As a part of CSR, MbPT has created a small Botanical garden named "*Sagar Upvan"* near Colaba Bus Station, Colaba Mumbai. The garden is a boon to the citizens of Mumbai in general & South Mumbai in particular. The 800m long pathway enables morning and evening walks. The Garden is presently being maintained by AIAI (All India Association of Industries). The Garden has won 1st prize number of times in the competitions organised by the "Friends of Tress" (an NGO). A Sewage treatment plant caters to the watering needs of Garden.

Central Kitchen Garden

The Central Kitchen situated in the Victoria Dock caters about 2000 MbPT employees through departmental Canteens. This kitchen generates about 1820 kg of kitchen waste

daily. As a step towards a green initiative, this waste is recycled on the terrace of this kitchen building admeasuring about 3000 sq. ft. area. This has reduced their dependence on local resources.

Support to Exhibition

MbPT also supports organisations in carrying out exhibitions as a part of creating awareness and sensitivity towards heritage for the purposes of education, study and enjoyment of the public. It also sponsors educational programmes directed towards children of aided schools and economically weaker sections of the society.

Development Of Kanhoji Angre Lighthouse as a Tourist Destination

This project is to be developed in PPP mode and is supported by a grant of Rs.15 crores from the Ministry of Tourism, GoI and grants from Mumbai and Jawaharlal Nehru Ports under their CSR programmes. This plan includes refurbishing the existing lighthouse building, restoration/conservation of existing fort wall, landscape enhancement of the Island, regular motor boat/ferry services from Thal/Ali Bagh and Gateway of India.

Tree Plantation and E-Waste Disposal

MbPT regularly undertakes tree plantation programmes throughout its estates and does its bit to add Green Cover to the City. As a responsible authority, they are also maintaining the cleanliness in the environment and are disposing their e-waste through CPCB shortlisted vendor.

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