

L&T SHIPBUILDING LIMITED



Joint Venture of L&T and TIDCO



DEVELOPMENT OF SHIPYARD CUM PORT COMPLEX AT KATTUPALLI, THIRUVALLUR DISTRICT, TAMIL NADU



EXECUTIVE SUMMARY

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT

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Executive Summary

1 Introduction

Tamilnadu Industrial Development Corporation Limited (TIDCO), a Government of Tamil Nadu Enterprise, is the nodal agency to identify and promote establishment of large and medium scale industries within the State of Tamil Nadu. TIDCO has commissioned seventy-five projects till date with a total equity investment of Rs. 250 Crores.

Considering potential for shipbuilding industry in the country, TIDCO is progressing with development of Shipyard cum Port Complex in Tamil Nadu. In view of availability of suitable waterfront with backup area and proximity to Chennai City, TIDCO has identified site at Kattupalli in Ponneri Taluk, Thiruvallur District for development of this complex. This site is already declared as a Minor Port under the jurisdiction of Tamil Nadu Maritime Board (TNMB) by Highways & Ports Department, Government of Tamil Nadu vide GO. Ms. No. 13 dated 13.01.1999.

TIDCO has identified the leading technology, engineering and construction conglomerate, Larsen & Toubro Limited (L&T), for developing the Shipyard cum Port Complex on a Joint Venture (JV) basis and submitted a proposal to Government of Tamil Nadu (GoTN). GoTN has approved TIDCO's proposal and allotted 1,200 acres of land at Kattupalli. L&T Shipbuilding Limited, a JV of L&T and TIDCO, was formed and the JV agreement was signed between the parties on April 15, 2008. L&T, a USD 7 billion company with global operations, is one of the largest and most respected companies in India's private sector. L&T has an existing shipyard at Hazira in Gujarat.

Ingenieurtechnik und Maschinenbau GmbH (IMG), Germany has carried out Site Assessment Study, and Detailed Yard Design and Production Planning for the Shipyard. L&T-RAMBØLL has carried out a Feasibility Study for the project. L&T Shipbuilding Limited appointed L&T-RAMBØLL to carry out an Environmental Impact Assessment (EIA) Study for the project.

1.1 Need for Shipbuilding and Repair Yard

The world shipping industries are venturing into areas of large vessels like VLCCs and specialised vessels such as super container liners, Pure Car and Truck Carriers (PCTC), advanced bulkers, tankers and gas carriers. The existing shipyards in public sector and private sector do not have sophisticated facilities to construct or repair vessels of these types. The facilities available in India, particularly the largest state owned shipyards, are inadequate to undertake construction of large vessels. Therefore, Indian shipping companies are placing orders for large vessels on foreign shipyards. Indian share in world new shipbuilding tonnage is less than 2%. The available repair dock days in India is about 50% of the actual requirement for servicing Indian fleet, forcing these ships to call on foreign shipyards for repairs. There will be a growing global demand for construction and repairs of large vessels and it is imperative for India to enter into this field on a major scale. The proximity to Singapore will be leveraged to attract customers for ship repair by offering prompt and cheaper service with highest quality. L&T intends to bridge this gap by developing a world-class shipyard in India. Heavy engineering works and offshore fabrication will also be undertaken as a part of shipyard.

1.1.1 Need for Port

Considering the potential for container traffic of 2.5 – 3 million TEUs in the vicinity of Chennai as well as from the proposed Ennore SEZ adjacent to the site, L&T is proposing to develop a port consisting of Container Terminal. The proximity to national and regional road-rail transport network is advantageous for development of port at Kattupalli.

1.2 Location and Description of Site Environment

Proposed Shipyard cum Port site is located north of existing Ennore Port and about 12 km south of Pulicat Lake near Kattupalli village, Ponneri Taluk, Thiruvallur District, Tamil Nadu. Location map is attached as **FD0101**.

The project site extends between Chennai Water Desalination Limited (CWDL) in the north, Ennore Port in the south, Bay of Bengal in the east and Buckingham Canal on the west. The site is predominantly sandy soil with Casuarina and Cashew plantations and patches of dense bushes. The extent of land and water front are 1,200 acres and 2.2 km, respectively. Kattupalli Kuppam hamlet (5.6 acres) is located close to the sea within project site.

2 Project Description

Based on review of area required for Shipyard and Port, the broad area allocation for shipyard and port is 850 acres and 350 acres, respectively. Shipyard area includes Heavy Engineering Works yard of 100 acres and Offshore Fabrication Yard of 100 acres.

Shipyard and Port activities planned on the landside are independent of each other and hence, facilities required should be identified separately to prepare layout. On marine side, facilities should be planned such that requirements of both Shipyard and Port are met. Facilities provided should be flexible to accommodate future development or expansion.

2.1 Common Facilities for Shipyard and Port

Common facilities required for Shipyard and Port are mentioned below and the Master Plan of Shipyard cum Port complex is attached as **Figure FD0201**.

- Breakwater
- Navigational facilities
 - ◆ Navigational channel
 - ◆ Manoeuvring and berthing area
 - ◆ Turning basin
 - ◆ Navigation aids
- Power and water supply
- Road connectivity.

Details of Master Plan development are as follows:

- Length of North Breakwater : 2,750 m
- Length of South Breakwater : 2,350 m
- Length of Approach Channel : 2,930 m
- Maximum possible length of berths : 1,600 m
- Dredging quantity : 22 million cum. (approximately)

2.2 Facilities for Shipyard

Facilities identified for Shipyard including Heavy Engineering Works (HEW) yard and Offshore Fabrication Yard (OFY) are as follows:

- Plate and profile reception and storage area
- Plate cutting area
- Profile cutting area
- Micro panel and beam fabrication area
- Flat panel fabrication area
- Curved panel fabrication and plate bending area
- Volume sections fabrication area
- Block sections fabrication area
- Blasting and painting / coating area
- Final assembly of hull and launching area
- Outfitting jetties
- Locksmith shop
- Dry docks and Shiplift
- Internal road network.

2.3 Facilities for Port

Facilities identified for Port are as follows:

- Manoeuvring area
- Berths
- Cargo handling equipment
- Tugs
- Storage area for containers.

2.4 Shipbuilding

Shipbuilding process includes all processes for ship construction beginning with the material receiving including pre-treatment operations up to the final assembly and launching of the ship. The number of ships to be constructed per year will be 29 consisting of Crude Oil Tanker VLCC, Crude Oil Tanker Handysize, Bulker Panamax, Chemical Tanker, and Container Ship. Ship lift, dry dock, repair dock and outfitting jetties will be constructed besides various shops. Annual steel processing capacity is about 450,000 T.

2.5 Ship Repair

Ship repair includes maintenance and repair of approximately 60 ships per year such as Crude Oil Tanker VLCC, Crude Oil Tanker Handysize, Bulker Panamax, Chemical Tanker, and Container Ship. It covers both underwater and above water repair processes like hull and propulsion damage repairs, engine room repairs, electrical cabling and repair of electrical installations, deck house and indoor fitment repairs, insulation works, oil tank cleaning, etc.

2.6 Heavy Engineering Works and Offshore Fabrication

The products to be manufactured in HEW include heavy engineering equipment, pressure vessels, turbines, hydrocrackers, reactors and columns and heat exchangers etc. The

proposed OFY entails construction of process platforms, jackets, decks and modular products like floating products, storage and offloading structures (FPSO), SPAR, TLP, rigs, etc to serve oil & gas and other downstream petrochemical industries. Operations performed at HEW and OFY is to manufacture and fabricate structures as follows:

- Cutting / Pre-heating
- Welding Operation
- Surface Preparation by Shot/Grit Blasting
- Painting and Coating
- Repair of damaged Paint Sections
- Straightening of Steel Sections
- Fabrication Processes.

2.7 Port

An area of about 350 acres is allotted for development of port. A container terminal is proposed with a 1,710 m long berthing line. An approach trestle will be constructed to connect the berths with immediate back-up area. Unloaded containers as well as containers to be loaded will be stacked in the Container Stacking Area. A Truck and Trailer Parking area will be provided.

2.8 Utilities and Services

2.8.1 Water Supply

Water requirement during construction and operation of Shipyard cum Port is estimated as 0.5 MLD and 1.5 MLD, respectively. Water requirement will be met from Chennai Metro Water Supply and Sewerage Board (CMWSSB). Ground water will not be drawn during construction and operation phases.

2.8.2 Power Supply

Power requirement during construction would be around 2 MW and would be drawn from nearest sub-station. Power requirement during operation of Shipyard cum Port is estimated as 15 MW and will be sourced from Tamil Nadu Electricity Board (TNEB). DG sets of 2 x 1 MW capacity are proposed as a standby during power shutdowns.

2.8.3 Wastewater Management

Wastewater generation is estimated to be about 1 MLD. Sewage will be treated in proposed Sewage Treatment Plant (STP) and effluents will be treated in Effluent Treatment Plant (ETP). Storm water drainage system shall be provided for management of storm runoff.

2.8.4 Fire Fighting

Fire fighting and rescue facilities with adequate well-trained fire personnel will be provided within Shipyard cum Port. Fire-fighting facilities will include a fire station, efficient communication facilities, crash fire tenders, crash bell and fire siren alarm arrangements. A fire water storage and water supply network with fire hydrants will also be provided.

2.8.5 Buildings

Buildings such as administrative building, control tower, container freight station, customs area, electric substation, workshop, water storage tank, health centre, weigh bridge, fire station and entry gate and security complex will be provided.

2.9 Green Belt Development

A green belt of about 5% of the total area will be developed around Shipyard cum Port to contain noise pollution along with air pollution. Greenbelt development will commence along with construction.

2.10 Project Development Schedule

Shipyard cum Port will be developed in two phases as mentioned below:

- Phase I : 2010
- Phase II : 2013

Phase II construction is contiguous with Phase I completion.

2.11 Project Cost

Development cost of Shipyard cum Port is about Rs. 4,675 Crores.

3 Environmental Impact Assessment Study

Form I and Terms of Reference (ToR) for EIA Study was submitted to the Expert Appraisal Committee (EAC) on Infrastructure Development and Miscellaneous Projects, MoEF. Expert Committee reviewed and considered the project under CRZ provisions during its meeting on 29th November 2007. Committee approved ToR vide letter no. 10-130/2007-IA-III dated 6th December 2007 with suggestions on additional aspects to be considered in EIA study. Consultants carried out the study and outcome of the same is given below.

3.1 Study Area and Period

An area within 10 km radius with project site as centre has been earmarked for the study and study area map is attached as **FD0301**. The baseline environmental data was generated during February – March 2008.

3.2 Marine Environment

Marine Environmental Monitoring for representing the water quality, sediment quality and marine ecology in Kattupalli region covering the coast from Pulicat Lake to Ennore Port and also the Buckingham canal was carried out.

- Salinity is ranged between 23 ppt (Pulicat Lake) and 35 ppt (Kattupalli coast).
- The presence of a good plankton community structure, good benthic structure and higher Oxygen levels indicate that the waters are free from pollution and also support good aquatic life.

- Observations in terms of chemical and biological parameters reflects ambient coastal processes which are at normal levels coinciding the basic bio-geochemical process of the coastal environment. The levels of hydrocarbon (Oil & Grease) and heavy metals are found to be does not exceeding the permissible limits.

3.3 Terrestrial Environment

3.3.1 Baseline Environment Conditions

- Major landuse is land with scrub (41%) followed by land without scrub (20%). Other significant landuse patterns are agriculture (~10%) and salt pans (~6%). Rural residential landuse is about 2.5%.
- Predominant wind directions observed were from E (26.6%), SE (21.2%), ESE (12.3%). The wind speed varied between 7.5 and 12.9 kmph for most of time during study period.
- Ambient air quality parameters like Particulate Matter, Oxides of Sulphur (SO₂), Oxides of Nitrogen (NO_x), Hydrocarbons (HC) and Carbon Monoxide (CO) were monitored and found to be within limits prescribed by Central Pollution Control Board (CPCB) for rural and residential areas.
- Equivalent noise levels monitored during day and night times in study area were within the limits prescribed by CPCB for rural and residential areas.
- Inland water quality in study area was complying to IS:10500, 1991 drinking water standards.
- Soil in the study area represents red non-calcareous and coastal alluvial which is neutral to slightly alkaline in nature.
- There are no endemic or endangered species of flora or fauna in the study area.

3.3.2 Baseline Socio-economic Conditions

- About 17 census villages fall within the study area with an overall population of 32,090.
- Almost all the villages in the study area have basic school facilities i.e. primary schools. Few villages have upper primary and high school facilities
- The main occupation of the people is agriculture. Cultivators, agricultural labourers, household industrial workers, construction workers, fishermen, etc represents the main and marginal workers.
- The fishing villages near the project site are Umamedu, Kalanji, Athipattu, Sepakam and Maradambedu. Fishing activity is observed in the sea as well as in backwaters located on the west of the project site. There is no intensive fishing activity within the immediate vicinity of the Project area.
- Protected water supply is available in almost all villages in the study area
- Most of the villages have power supply for domestic purposes, and agriculture through TNEB.
- Almost all villages in the study area are well connected by village or major district roads. These roads require upgradation.
- There are no notified archaeological or cultural monuments in the study area.

3.4 Environmental and Social Impact

The anticipated impacts on the environmental and social attributes, which are likely to arise due to construction and operation of Shipyard cum Port, have been identified, predicted and evaluated.

3.4.1 Construction Phase

Developmental activities such as capital dredging, dredge spoil disposal and development of offshore structures will result in disturbance to the marine environment. Site grading and development, civil construction and mechanical erection of facilities, onsite Infrastructure, environmental management facilities and back up area development are likely to cause impacts on the terrestrial environment.

3.4.1.1 Marine-side Impact

Capital Dredging and Disposal

Capital dredging is required to create inner navigation channel, outer navigation channel, turning circle and berthing areas. Total dredging volume is estimated to be about 22 million m³. About 11 million m³ will be used for reclamation and filling of port and shipyard back-up area. Remaining 11 million m³ will either be used for filling of low lying areas in the vicinity or disposed at a suitable location into sea.

Marine Water Quality

There would be impact on marine water quality from dredging, construction of breakwaters and berths. The direct impact on marine water quality from these activities would be increased turbidity due to suspended sediment and is predominant during dredging. Dredging would cause a short-term and localised impact on the marine water quality. Apart from turbidity, marine water quality can be affected due to aqueous discharge (oily wastes, sanitary wastes, etc.) from the dredgers, barges and workboats involved in the activities. Aqueous discharge will be controlled to minimise the impact.

Marine Ecology

Construction activities such as capital dredging, reclamation and construction of breakwaters will result in disturbance to the marine ecology. These impacts would be temporary in nature.

3.4.1.2 Landside Impact

Impact on Air Quality

During construction, the potential impact on air quality will be due to:

- Exhaust emissions from diesel run engines and construction machinery
- Fugitive dust suspension during construction.

The impact due to these activities would be short-term in nature and will cease on completion of construction. Further, to minimise impact from fugitive dust suspension, it is proposed to adopt sprinkling of water in susceptible areas and to reduce impact from exhausts, emission control norms will be enforced / adhered.

Due to material transportation, there is a possibility of impact on air quality along the route due to exhaust emissions, fugitive dust suspension and traffic congestion. This can contribute towards slight build-up of pollutant concentration over baseline levels, which would be minimised by suitable mitigation measures such as providing tarpaulin covers and water sprinkling.

Impact on Noise

During construction there would be impact on noise levels due to the following:

- Vehicles transporting construction material
- Diesel run engines of construction machinery
- Pile driving activities during construction of alongside berths.

The noise generated from the construction activities would be confined within the project area and are likely to impact the construction workers at site. The impact due to these activities would be short-term in nature and localised.

There will be an increase in vehicular movement due to transportation of materials which may result in traffic congestion and increase in noise levels near habitations located enroute.

Impact on Water Environment

Water requirement during construction is estimated to be about 0.5 MLD, which will be met from Chennai Metro Water Supply and Sewerage Board (CMWSSB). Ground water will not be drawn.

3.4.1.3 Social Impact

Land Acquisition

TIDCO allotted about 1,200 acres of land for the development of Shipyard cum Port Complex, which includes Kattupalli Kuppam habitation of 5.6 acres area. Project Affected Families (PAFs) of Kattupalli Kuppam will be resettled to a location near shore in Kalanji village near Kattupalli and rehabilitated. This site has been identified by TIDCO in joint consultation with the District Collector and PAFs. 110 houses will be constructed with all basic amenities like water supply, power supply and roads. Detailed Resettlement and Rehabilitation (R&R) Plan is being formulated. Hence, no significant impact is expected due to land acquisition.

Fishing Activity

Fishermen in the study area engage in deep-sea fishing activity, about 8 to 10 km offshore. Fishing activity was not noticed in the coast abutting the project site. Fishing activity is observed in Pulicat Lake, which is located at about 12 km towards north from the project site. Hence, no impact on fishing activity is anticipated due to the proposed project.

Severance to Road Access

There is an existing road across the project site in north-south direction, which is connected to existing WBM road along Ennore Port boundary. This road provides access to Kattupalli village and villages on north such as Kalanji. This access road will be re-routed for developing the project. It is proposed to construct a peripheral road along the boundary of project site, which will provide access to these villages and ensure that there is no severance.

3.4.1.4 Traffic Management

GoTN is promoting industrial developments in the region and will provide necessary connectivity. A 4 lane road is proposed along the western boundary within project site.

3.4.1.5 Impact on Ennore Port

Ennore Port lands are adjoining the project site on south. Northern breakwater of Ennore Port is located at a distance of about 2 km from the project site towards south. During the construction activities such as dredging and reclamation will be carried out within project site and water front allocated. Hence, there will not be any hindrance to vessel movement to / from Ennore Port. Further, the northern breakwater of Ennore Port would act as a physical barrier preventing turbidity induced by dredging and breakwater construction from reaching the Ennore Port harbour basin and approach channel.

3.4.2 Operation Phase

3.4.2.1 Impact on Marine Environment

Impact due to Shipyard cum Port Operations

During operation phase, there will be movement of container vessels, repair ships and tugs etc. Aqueous discharge from vessels and repair ships such as dumping of ship wastes (sullage / sewage), oil-contaminated bilge water, hold-cleaning and tank-cleaning residues (slop) and spillages upon refuelling or lubricating oil changes and disposal of solid wastes will be regulated to minimise impact on marine water and sediment quality.

Antifouling paints will be used on vessels and marine structures to control the growth and attachment of fouling organisms such as barnacles, seaweed and algae. However, some antifouling ingredients, such as Tributyltin (TBT) can effect species other than fouling organisms. Proper-management of TBT containing paint and while blasting vessels that have been painted with TBT paint is most important.

In addition, runoff from the berths, shipbuilding, repair and port operational areas, effluent and sewage will be collected, treated and disposed off. Sewage treated wastewater will be for recycling purpose.

Impact due to Maintenance Dredging

During the operation phase, maintenance dredging quantity is estimated to be around 0.3 million cum. It is proposed to use the dredged material for beach nourishment on north.

Impact on Littoral Drift

A net transport of approximately 0.3 million m³/year is expected at the proposed project site. Sand by passing arrangement is proposed to minimise the likely impact on marine environment due to the littoral drift and sediment transport. A sand trap of about 0.5 million m³ will be provided near south breakwater.

3.4.2.2 Shoreline Changes due to Shipyard cum Port

Shoreline behaviour due to construction of proposed shipyard breakwaters is studied by using a site-specific shoreline change model for the coastline of approximately 16 km. The one-year prediction based on 13 years average wave climate reveals that, the shore oscillates with alternatively erosion/deposition trend depending on the locally wave breaking generated current. It is seen that in existing situation, the adjacent shore of Northern Ennore breakwater shows an erosive trend of the order of 50 m/year and the southern breakwater shows a depositive trend of the order of 50 m/year. The construction of proposed Shipyard cum Port breakwaters does not alter this trend of accretion / erosion of Ennore breakwaters. The response of shoreline due to new breakwater shows a different trend. The shore at root of proposed south breakwater shows significant erosive trend and the shore adjacent to proposed north breakwater shows a minor accretion. Also it is noticed that the 2 km shoreline sandwiched between the north breakwater of Ennore port and south breakwater of shipyard seems to be act like a groyne.

The erosive trend indicated from the simulations at the root of the proposed southern breakwater will be observed at the site for a year and after the construction of breakwaters, suitable soft shore protection measures like beach-fill will be undertaken.

3.4.2.3 Ambient Air Quality

The sources of air emissions in shipbuilding and repair operations include abrasive blasting, painting, metal plating and surface finishing, machining and metal working and solvent cleaning and degreasing. Probable sources of emissions to air are in the form of VOCs from the shipbuilding and repair process operations; Particulate Matter, SO₂ and NO_x from utilities like boilers; and SO₂, NO_x, HC and CO from vehicular traffic coming in and going out from the Shipyard cum Port. In order to minimise these impacts, vacuum floor cleaners for abrasive material recovery, use of airless high pressure equipment for painting in closed painting shops, drying the metal plates to control fugitive emissions from surfaces, use of water-soluble fluids instead of oil-based fluids shall be practised within the complex.

Based on mitigation measures proposed, the build up of air pollutants is not expected to result in significant impact on neighbouring habitations.

3.4.2.4 Ambient Noise

Shipyard Operation

Noise generating sources are abrasive blasting, chemical paint removals, mechanical paint removals, metal working, equipment handling and vehicular movement. Major noise generating equipment shall be designed with 85 dB(A) ensuring cumulative noise at a distance of 1 m remains at 85 dB(A) . The occupational noise exposure to the workers in the form of 8 hourly time weighted average will be maintained within the prescribed OSHA standard limits.

Workers exposed to excessive noise will use appropriate PPE including ear plugs, muffs, or both when engineering or administrative controls are not feasible to reduce exposure. Hence, it is anticipated that there would not be significant impact of noise on the work personnel.

Port Operation

During operation, truck movements would be of the order of 1,000 per day for transport of containers and other cargo. These truck movements will cause noise pollution in the Port and also along the access road.

3.4.2.5 Water

Water Resources

Water requirement during operation is estimated to be about 1.5 MLD, which will be met from Chennai Metro Water Supply and Sewerage Board (CMWSSB). Ground water will not be drawn.

Wastewater Discharge

A storm water drainage system will be developed for the entire project site. It is proposed to provide settlement traps / collection pits along the drain to collect metal scrap etc., which will be removed periodically. The metal scrap would be sent for recycling to an approved scrap dealer while the water would be directed to Effluent Treatment Plant (ETP). The wastewater generated will be properly collected and treated in ETP and treated effluents will be disposed as per the CPCB norms. Sewage generated in the shipyard and repair operations will be treated in sewage treatment plant and treated effluent will be used for green belt development and utilities. Sludge will be dried into cakes and will be used as manure for greenbelt.

3.4.2.6 Land and Soil

Primary residual waste generated in shipyard and repair building is a mixture of paint chips and used abrasives. Solid wastes generated on-site will be subjected to treatment depending on their characteristics. Waste cutting oils, lube oils and degreasing oils shall be recycled. It is proposed to utilise the rest material and recirculation in the production processes. The estimated quantity of hazardous wastes likely to be generated are paint and pigment wastes of 150 T/annum, insulation wastes of 25 T/annum and used oils and coolants of 25,000 litres/annum. Wastes generated in Shipyard cum Port will be disposed off at nearby Treatment, Storage and Disposal Facility (TSDF) and also to the approved vendors of Tamil Nadu Pollution Control Board (TNPCB) and CPCB.

3.4.2.7 Social Impacts

Fishing Activity

Fishermen in the study area engage in deep-sea fishing activity, about 8 to 10 km offshore. Activities involved in operation phase are confined to project area and hence, no hindrance to fishing is anticipated.

Employment Potential

Shipyard cum Port Complex is likely to create direct and indirect employment potential for 10,000 persons in the region. For PAFs, job assurance for 140 persons has been provided based on skills.

3.4.2.8 Impacts on Ennore Port during Operation

Ennore Port is located about 2 km towards south of project site. Orientation of approach channel of Shipyard cum Port is towards east and that of Ennore Port is south-east. Distances between navigation channels of Shipyard cum Port and Ennore Port is approximately 5 km. Hence, ship movements to Ennore Port will not be hindered due to the proposed development.

3.4.2.9 Traffic Management during Operation

During operation, truck movements would be of the order of 1,000 per day for transport of containers and other cargo. GoTN is promoting industrial developments in the region and will provide necessary connectivity. This will facilitate traffic management in project region both during operation.

3.4.2.10 Impact on Intake and Outfall Structures

Relocation of CPCL Intake and Outfall

There is an existing CPCL intake and outfall structure within the waterfront allotted for Shipyard cum Port. It is proposed to construct an intake within the harbour basin of Shipyard cum Port near the southern breakwater. A silt screen will be provided at the intake and also near source of pollution during construction. Based on model study carried out by M/s. Indomer Coastal Hydraulics Pvt. Ltd, it is proposed to construct the outfall structure at 8 m depth contour towards south of south breakwater.

CWDL Intake

Chennai Water Desalination Limited will construct an intake structure which is falling within the allotted waterfront for Shipyard cum Port. Based on results of model study carried out by M/s. Indomer Coastal Hydraulics Pvt. Ltd., it is inferred that there will be no significant impact on the intake structure if it is located 100 m away from the northern breakwater. Hence, it is proposed to orient the northern breakwater 100 m away from the intake. A silt screen will be provided at the intake and also near source of pollution during construction.

3.4.2.11 Coastal Flooding

Flooding of the coast could be due to water level fluctuations. In coastal zones, water level variations are due to influence of number of distinct causes viz. Storm surge, Wind set-up, Wave set-up, Wave crest level, Tide and Seiches etc. It is seen from the site-specific data that, highest high water level at Ennore is +1.5 m CD, the storm surge level at Ennore based on past 30 years data is 1.0 m. Although the joint occurrence of all these phenomenon are rare in nature, still considering these parameters, it is planned to raise the level of site to +5 m CD to avoid flooding.

3.5 Environment Management Plan

Based on the identification, prediction and evaluation of environmental and social impacts due to the project, an Environmental Management Plan has been formulated to mitigate the impacts during construction as well as operation phase.

3.5.1 Construction Phase – Mitigation Measures

The environmental impacts associated with the development phase are mainly related to backup area development, development of external infrastructure, construction of breakwaters, construction of berths and installation of equipment, capital dredging, induced development, etc. The mitigation measures for negating the impacts on environment resulting due the construction activities are presented below.

3.5.1.1 Marine Environment

- Dredge management programme for capital dredging
 - ◆ Disposal of dredge spoils for the backup area development and disposal at designated sites in deep sea.
 - ◆ Preventing aqueous discharges into the sea during dredging.
 - ◆ Marine water quality monitoring programme will be initiated one week prior to commencement of dredging and will continue throughout the dredging period.
- No disposal of sewage from the construction work camps into marine water.

3.5.1.2 Air Environment

- Dust suppression measures to curtail fugitive emissions during the back up area development.
- Enclosures will be provided at places where dusty materials are being discharged to vehicles.
- Speed regulations shall be imposed for automobiles and the haulage and delivery vehicles shall be confined to designated roadways inside the site.
- Transportation Management Plan will be prepared by Shipyard cum Port and the transportation of construction materials will be planned in line with the same.

3.5.1.3 Noise Environment

- Procurement of machinery / construction equipment will generally be done in accordance with specifications conforming to source noise levels of 85 dB (A).
- Noise attenuation will be practised for noisy equipment by employing suitable techniques
- Prolonged operation of noisy equipment close to dwellings shall be avoided.
- Noise generating activities shall be scheduled to minimise exposure to high levels of construction noise. Such activities shall be scheduled for midday, or at times coinciding with periods of high background noise.
- Periodic maintenance of equipment for diesel generators units, air compressors, engines, etc. to maintain efficiencies by replacing worn out parts and lubricating rotating parts.

3.5.1.4 Water Environment

- The construction equipment and transport vehicle washing will be carried out in designated areas only and the wash water will be collected into a sedimentation tank for removing grit, oil and grease.
- Suspended solids in run-off shall be reduced by the provision of a good surface drainage system with suitably designed catch-pits to retain sediments.
- Construction material storage areas shall be covered during wet season to avoid contamination of runoff.
- Site cleanliness and immediate clean-up in case of oil spill to minimise water quality impacts from general site run-off and shall be adhered to during construction phase

- Adequate sanitary facilities for workers onsite shall be provided to prevent contamination of groundwater.

3.5.1.5 Land Environment

- Excavated soil will be stockpiled in a corner of the site in bunded area to avoid run off with storm water.
- General refuse generated on-site will be collected in waste skips and separated from construction and chemical waste.
- A local authorised waste handler will be employed to remove general refuse from the site, separately from construction waste and hazardous wastes, on regular basis to minimise odour, pest and litter impacts.
- The burning of refuse on construction sites will be prohibited.
- Efforts will be made to prevent accidental spillage of any oil/grease from construction equipment maintenance activities.
- Unauthorised dumping of waste oil and grease (spent lubricants) and empty containers, rubber & plastic materials etc., will be strictly prohibited.
- Other solid wastes will be disposed off through environmentally compatible methods.

3.5.2 Operation Phase

3.5.2.1 Marine Environment

- A wastewater management system for the berthing, ship building, repair, heavy engineering, offshore and the backup area will be planned comprising storm water, effluent and sewage collection pipeline networks.
- Ships / vessels coming for repair/ maintenance to the shipyard will not be permitted dump the wastes / bilge water during the berthing time.
- Oil spill contingency plan.

3.5.2.2 Air Environment

- Dust collectors for collecting the dust-laden air from blasting process.
- Dust suppression measures for fugitive dust emissions.
- Vehicles involved in the material transportation will be subjected to periodic maintenance and emission checks.
- MSDS shall be reviewed to identify potential emissions.
- Separate storage facilities for volatile organic chemicals and textile products to prevent the release of VOCs and odours.

3.5.2.3 Noise Environment

- Acoustic silencers will be provided in equipment wherever necessary.
- Acoustic design with sound proof glass panelling will be provided for critical operator cabins / control rooms of individual modules as well as central control facilities.
- Use of personal protective devices such as ear-muffs, ear plugs etc., will be strictly enforced for the workers engaged in high noise areas.
- Implementation of greenbelt (shrub plantation), landscaping with horticulture (noise barriers) etc, are expected to reduce noise impacts within the plant premises.
- Tree plantation at vehicle parking areas and along approach roads are recommended within the project premises.

3.5.2.4 Water Environment

The wastewater generated during operation phase will be treated in ETP and STP located in the project premises. The effluent treated water from ETP will be disposed to CPCB approved vendors. STP treated water will be reused in the system.

3.5.2.5 Land Environment

- Disposal of Hazardous waste at nearby TSDF and also to the approved vendors of TNPCB / CPCB.
- Domestic wastes will be segregated and will be either recycled or sent to composting.

3.5.2.6 Operation-specific Mitigation Measures

In addition to the above, shipyard operation specific mitigation measures will be followed for operations like Surface Preparation, Blasting, Paint Removal and Sanding Areas, painting, pressure washing areas, dry dock activities, engine repair and maintenance etc.

3.5.2.7 Hazardous and Solid Waste Disposal

Hazardous wastes generated in Shipyard cum Port will be disposed at nearby TSDF through approved vendors of TNPCB and CPCB. Solid waste (sludge generated in STP) will be dried into cakes and will be used as manure for greenbelt.

3.5.2.8 Hazardous Material Management

Paints will be stocked with approved vendors. An inventory of 2 weeks, approximately 56 KL, will be maintained in the shipyard with requisite safety and fire-fighting measures.

3.5.3 Environmental Monitoring

Environmental monitoring will be carried out to list changes in the marine and terrestrial environmental attributes during the construction and operation phase of shipyard cum port and use the results in planning the respective operations.

3.5.4 Budgetary Estimates

Total estimated capital cost of implementing Environment Management Plan during construction phase is estimated to be Rs. 10 Crores. Annual recurring cost during operation phase is estimated to be Rs. 2 Crores. A budget of Rs. 6 Crores is allotted for Resettlement and Rehabilitation expenses of Kattupalli Kuppam hamlet.

3.6 Preliminary Risk Analysis and Disaster Management Plan

Preliminary risk analysis is carried out to identify the potential hazards that may occur during construction and operation of Shipyard cum Port. Based on the analysis, safety measures were proposed.

The broad Disaster Management Plan is prepared in conjunction with and taking into consideration all technical reviews and suggestions as per acceptable norms. These details shall be considered as guidelines to the DMP based on the detailed risk analysis, which will be prepared by the project proponent.

4 Project Benefits

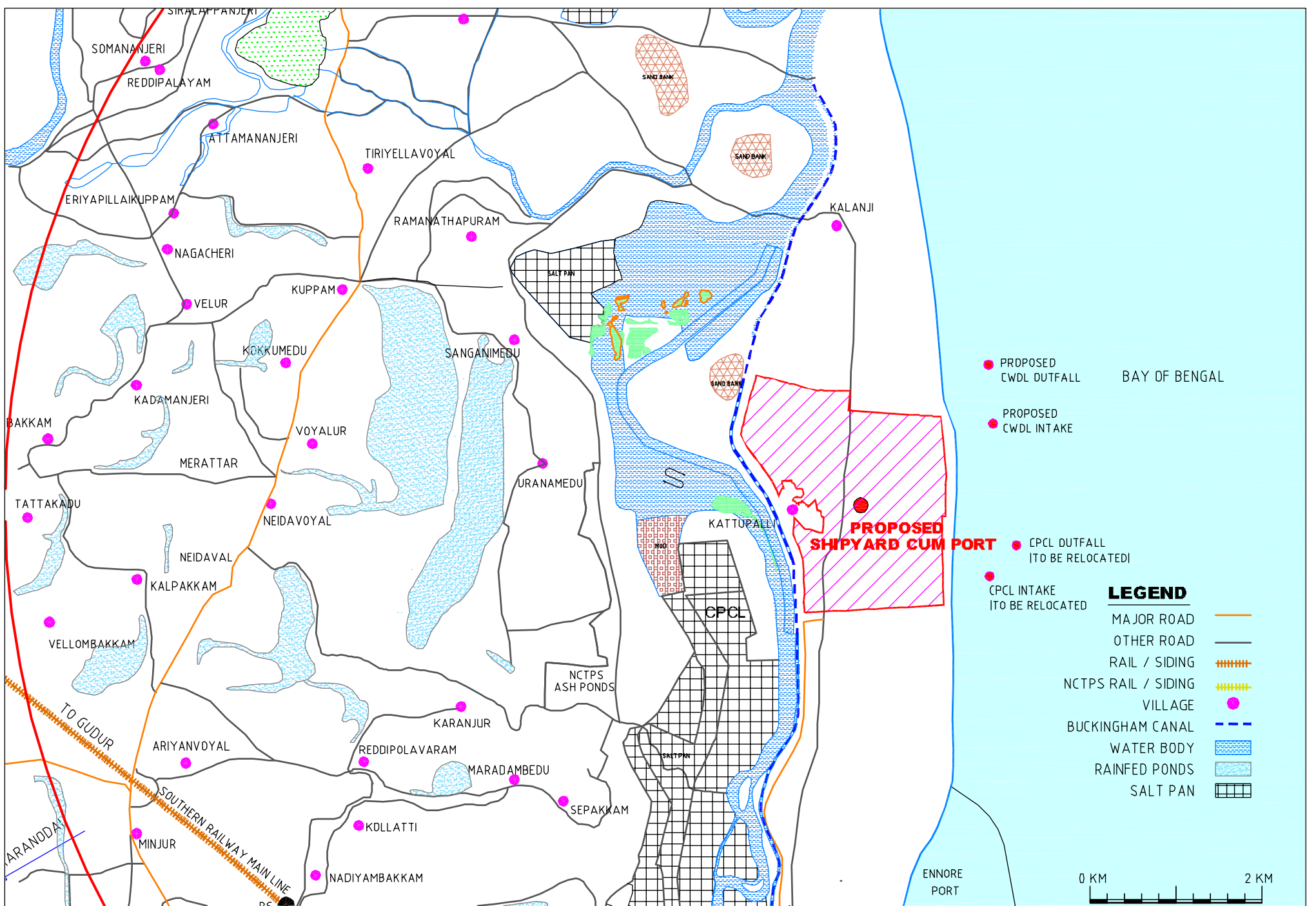
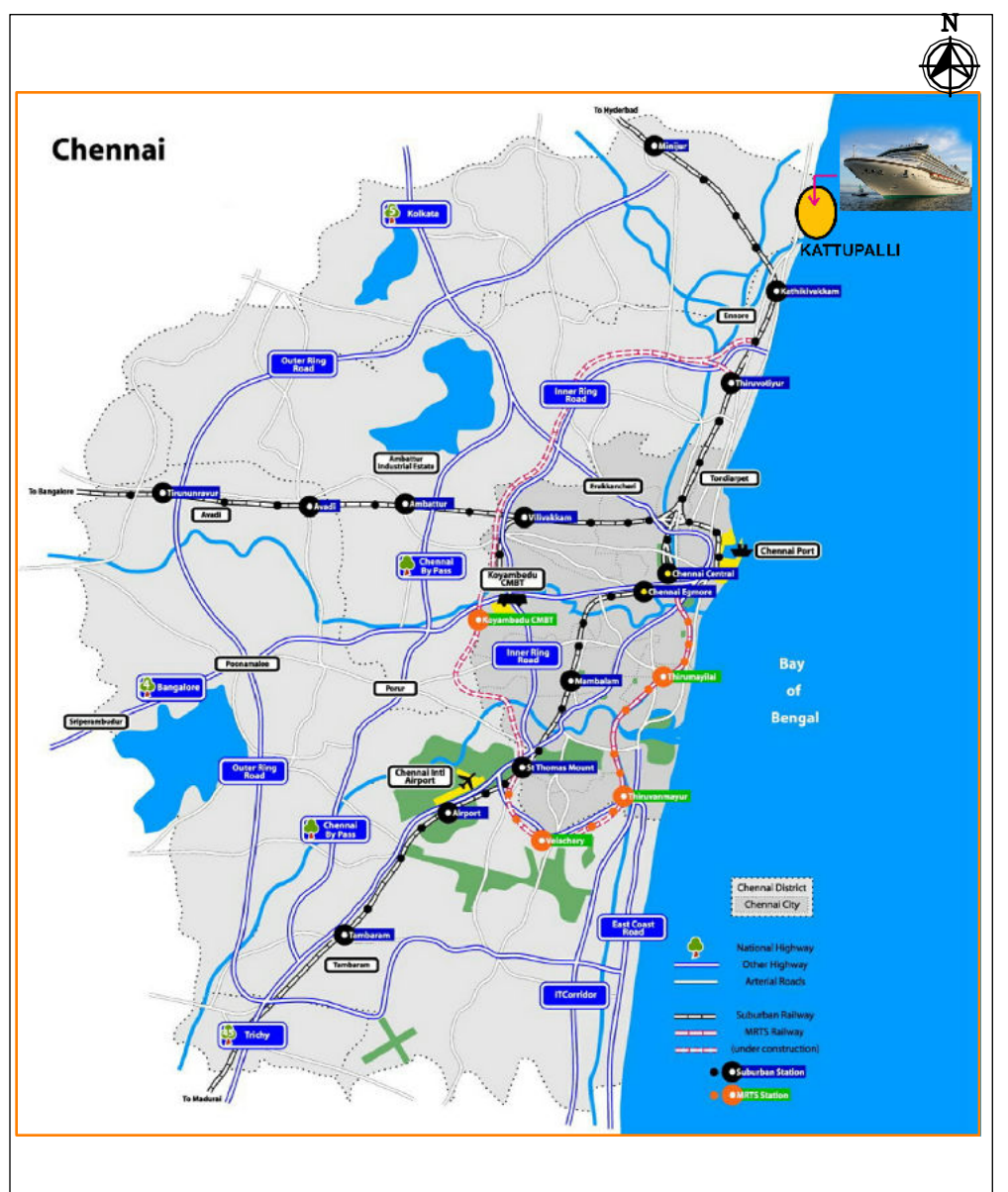
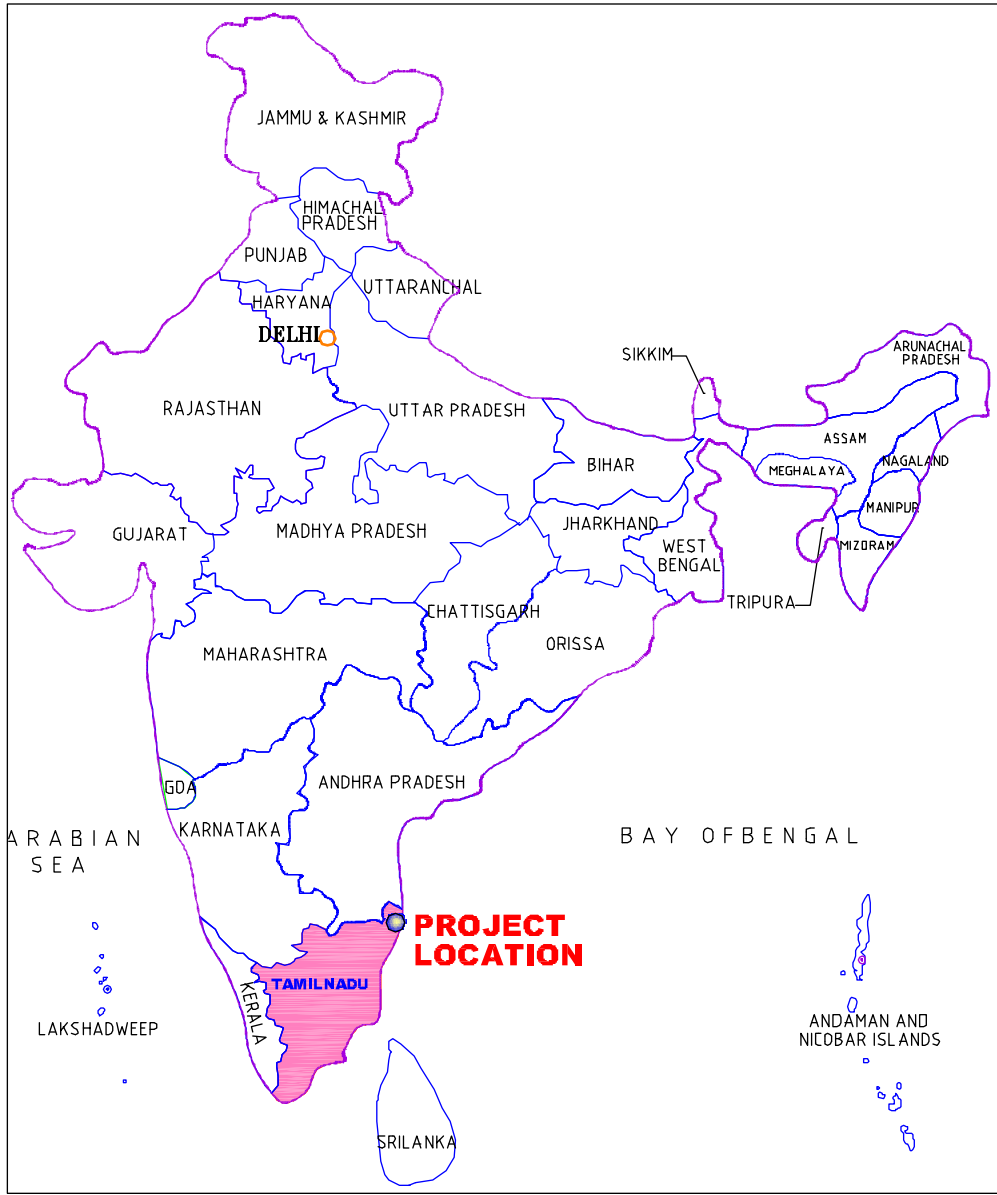
Proposed Shipyard cum Port will bring significant benefits like:

- Enhancement in economy of Tamil Nadu.
- Substantial positive impact on socio-economic profile of Thiruvallur region, in particular, and Tamil Nadu, 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 and other basic facilities.
- Civil amenities like medical facilities, education, sports/ cultural activities are likely to improve in the surrounding villages through Corporate Social Responsibility (CSR) initiatives.

4.1 Corporate Social Responsibility

L&T is strongly committed towards fulfilling its social obligations of conducting business. The following are the L&T's initiatives towards CSR.

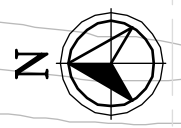
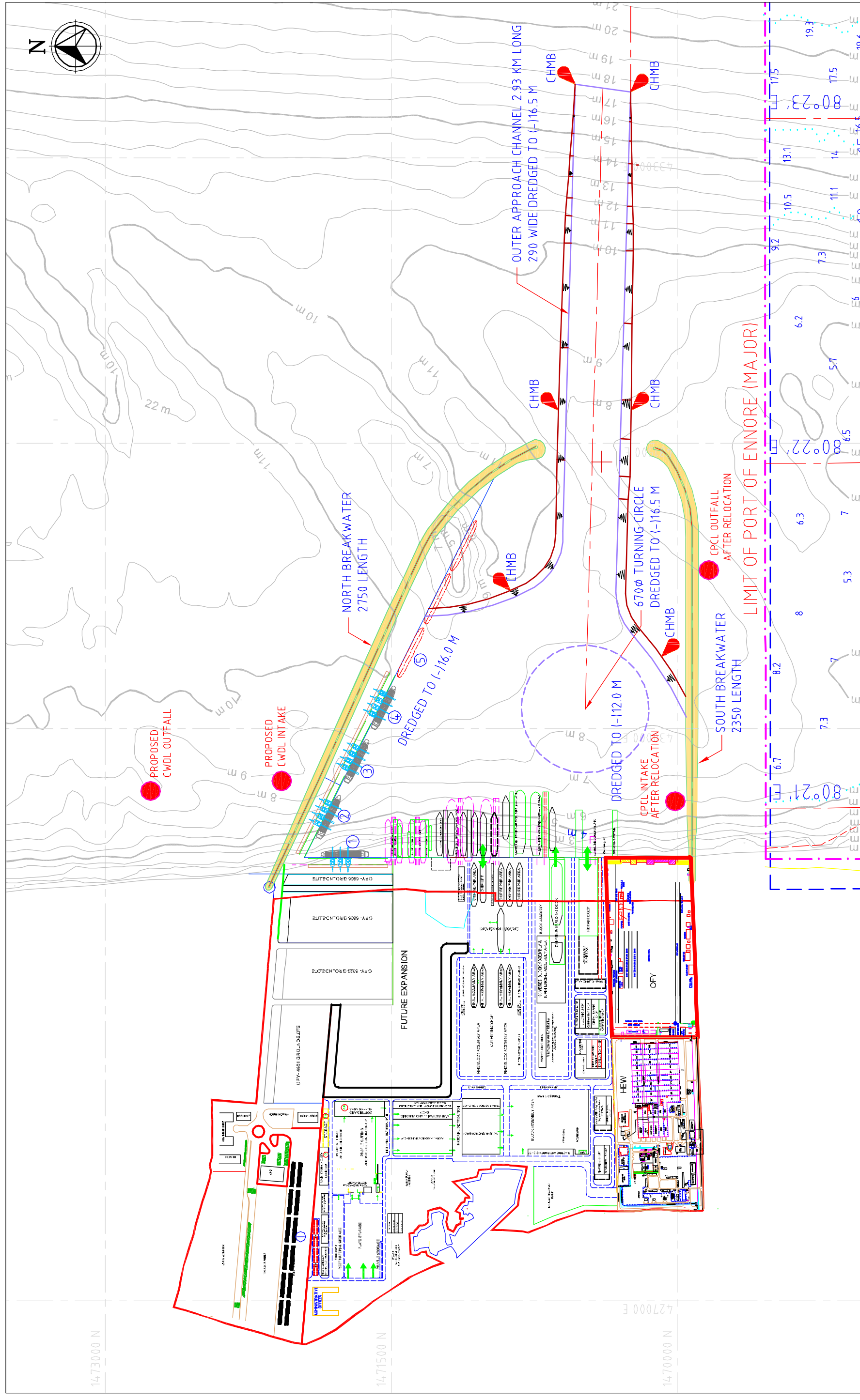
- Public health centres and conducting medical camps
- Educational facilities for the Children of Employees
- Vocational training institutes for building up of skill force
- Rural electricians programme
- Build India scholarship programme for furthering studies in Construction Technology and Management.



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PROJECT: DRAFT EIA FOR SHIPYARD CUM PORT COMPLEX AT KATTUPALLI
TITLE: LOCATION MAP

PROJECT NO:	C1081302
DATE:	04.06.08
MADE:	ASN
FIGURE NO:	FD0101
REV:	0



LEGEND :	BERTH LENGTH	SHIP SIZE	
FWB -- FAIRWAY BOUY	CONTAINER-①&②	700	4000 TEU
CHMB --- CHANNEL MARKER BOUY	CONTAINER-③	330	6000 TEU
	CONTAINER-④	370	8000 TEU
	GENERAL CARGO-⑤	200	30000 DWT

LEGEND :

FWB -- FAIRWAY BOUY

CHMB --- CHANNEL MARKER BOUY

PROJECT: **DRAFT EIA FOR SHIPYARD CUM PORT COMPLEX AT KATTUPALLI**

TITLE: **MASTER PLAN**

PROJECT NO: **C1081302**

DATE: 04/06/08

MADE: BNK

FIGURE NO: **FD0201**

REV: **0**

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AUTO PATH: \\FILE EXCHANGE\NEW FOLDER\121002\SUMMARY - 101-R1-ASH-STUDY AREA.DWG

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PROJECT: DRAFT EIA FOR SHIPYARD CUM PORT COMPLEX AT KATTUPALLI

TITLE: STUDY AREA - 10 KM RADIUS

PROJECT NO: C1081302

DATE: 04.16.18

MADE: ASN



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FIGURE NO: FD0301

REV: 0



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