

Executive Summary

Environmental Impact Assessment Report for LPG bottling plant (capacity 3 X 1450 MT Phase I&II each)at Rasayani with receipt by pipeline/Tank Lorries

Project Proponent

Bharat Petroleum Corporation Limited



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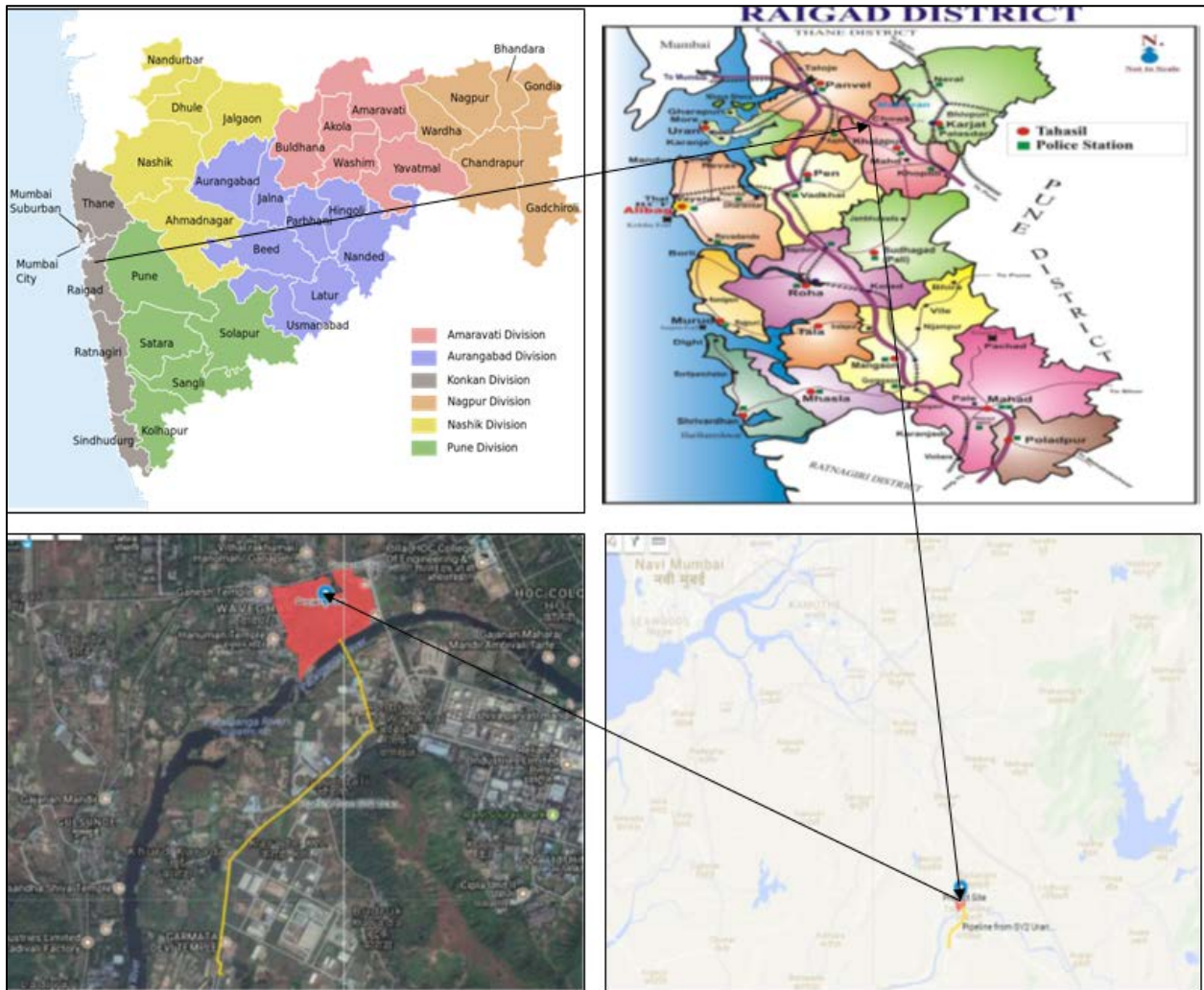


EXECUTIVE SUMMARY

1 INTRODUCTION

Bharat Petroleum Corporation limited (BPCL), the project proponent, is one of the highest ranked Indian Public sector under taking company, under Govt. of India (Ministry of Petroleum & Natural Gas). In the prestigious Fortune 'Global 500' listing, BPCL is having 358th position in year 2017. BPCL is one of the Maharatna Company of India. Company is engaged in refining and marketing of petroleum products across pan India with two major Refineries i.e. Mumbai Refinery and Kochi Refinery and one joint venture Bina Refinery & one subsidiary Numaligarh refinery. BPCL is India's one of the largest commercial enterprises in Oil and Gas sector.

Bharatgas from BPCL has dominated the LPG market in India for over three decades. To cater the LPG requirements of Mumbai, Thane, Palghar & Raigad districts BPCL proposes to construct a new LPG Bottling plant at Rasayani, Tehsil- Panvel/khalapur, District-Raigad, Maharashtra of bottling capacity 270 TMTA in phase-I which will be expanded in future to 540 TMTA in phase-II . LPG will be received by laying a new underground LPG pipeline of approx. 3-4 kilometers length from sectionalizing valve station(SV-2) of Uran Chakan LPG pipeline or otherwise by Bulk Lorries and will be stored in 6 no. (3 no. in phase -I & 3 no. in phase-II) Mounded Storage Vessels (MSV), each of capacity 1450 Metric Tons (MT). LPG will be pumped from Mounded Storage Vessels (MSV) to cylinder filling shed where 48 station electronic carousals will be used for LPG filling operation .This carousal will fill LPG into the LPG cylinders . Filled LPG cylinders after quality checks will be dispatched to the market by packed lorries.



Location of Proposed Project

2 DETAILS OF PROPOSED PROJECT

The proposed LPG bottling plant is covered under category 'B', project/activity 6(b) as per General Condition of the schedule of EIA notification 2006. However, since the project site is within 5 kilometer radius of Eco Sensitive Zone of Karnala Bird Sanctuary, general conditions are applicable. The proposed underground LPG receipt pipeline of around 3-4 kilometer of 0.6 MMTPA does not pass through any national park/sanctuaries/coral reefs/ecologically sensitive areas.

The proposed project is development of a new LPG Bottling Plant along with underground LPG receipt pipeline which will be a spur line from Uran Chakan LPG pipeline. LPG received will be

stored in Mounded Storage Vessels (MSV). From MSV product (LPG) will be pumped to filling shed into electronic carousals to fill LPG in cylinders. Filled LPG cylinders will be sent to market by using packed Lorries.

The details of the proposed facilities in phase-I & phase-II are given below;

1. The mode of receipt of LPG is through Uran-Chakan LPG pipeline.(A underground LPG spur line of 3-4 Km length of 10” dia , having 0.6 MMTPA capacity).
2. Phase -I :
 - 3 X 1450 MT Mounded Storage Vessels for LPG Storage.
 - 2X48 Station electronic cylinder filling Carousel.
3. Phase -II :
 - 3 X 1450 MT Mounded Storage Vessels for LPG Storage.
 - 2X48 Station electronic cylinder filling Carousel.

Table 1: Project Capacity

Type of Vessel	Nos	Capacity	Total Capacity
Mounded Storage Vessel- Phase 1	3	1450 MT	4350 MT
Mounded Storage Vessel - Phase 2	3	1450 MT	4350 MT

Detailed layout is attached as Annexure I

Technology and Acitivity (Process) Description

There is no manufacturing process involved in the LPG Bottling Plant. The operations can be divided into:

- Receipt of LPG Through Uran-Chakan LPG pipeline (3 kilometer , 0.6 MMTPA, 10” dia.)
Bulk Lorry Receipt: 8 bay loading /unloading gantry.
- Storage of LPG in mounded bullets fabricated as per international standards.
- Filling of LPG in cylinder by carousel in domestic/ commercial/ industrial cylinders.
- Dispatch of packed LPG cylinder (Through Packed cylinders Lorries) Bulk Lorry Dispatch: 8 bay loading/unloading gantry.

The entire operation of RECEIPT, STORAGE, FILLING AND DISPATCH of LPG is carried out in a closed system thereby eliminating risk of leakage of products and to achieve enhanced safety. There is no chance of mixing LPG with atmosphere outside.

Water Supply

Water Requirement for Project will be 70 m³ per day during construction phase and operation phase 55 m³/day and will be sourced from MIDC, alternatively water tankers will be made available.

Fire Fighting Facilities

Following Fire Fighting Facilities will be provided.

- Medium velocity Water Sprinkler system shall be provided in product pump house, TLD decantation Shed, Mounded bullet and all over the filling shed as per prevailing safety guidelines issued by OISD-144
- Fire fighting system on proposed LPG Mounded Bullets as per prevailing safety guidelines issued by OISD-150
- Provision of Fire hydrant piping network with intermittent deluge valves covering full licensed area
- The Fire Water tanks have been provided as shown in **Table 2** and Schedule of Fire Pumps have been provided in **Table 3**.

Table 2: Details of Fire Tanks

SN	Product	Type of Tank	Capacity	Diameter	Height
1	Fire Tank Water	Vertical Above ground cone roof	2 X 3415 KL	17 m	15 m

Table 3: Schedule of Fire Pumps

SN	Description	Capacity	Head m WC	Nos of Pumps	
				Operating	Standby
1	Main Pumps Diesel Engine Driven	750 KL/Hr	105	2	1
2	Jockey Pumps Electrical Driven	30 KL/Hr	115	1	1

Instrumentation and Automation

Instrumentation and Automation will be provided through the following:

- Tank Farm Management System: These shall comprise of automation of receipt of products.
- Valve Automation system: The tank body Valves shall be fitted with Electronumatic Remote Operated Valves (ROV) to be closed by bleeding air manually or by a safety PLC in case of emergency.
- Servo gauges on all tanks : The gauges shall function in remote for the tank inventory and tank shut down procedures
- Interlock Shutdown System shall be provided to stop the whole plant, if fire water is discharged anywhere manually or automatically as per the provision of OISD 144.
- Emergency shutdown system for filling activities in shed.
- Earthing system at grid.
- Gas Monitoring system having sensors all over the license area to pre-warn slightest of Leakage and MIMIC panel to communicate real time status
- Access Control System: The system shall permit only authorized personnel to enter Plant.
- Control Room with equipment: The control room shall monitor and log all events pertaining to the operation of the LPG Bottling Plant on real time basis.

Resource Requirement

Manpower

Manpower requirement for the construction phase is approximately 250-300 nos. Local labourers shall be preferred. Total Manpower Requirement of the project will be around 200-225 nos. including company staff, contract staff/ laborers and the security personnel etc.

Water Requirement, Source

The total water requirement for mock drills, fire water make-up, process and domestic use will be around 55 m³/day. Water will be sourced from Maharashtra Industrial Development Corporation (MIDC).

Power Requirement

Total power requirement for operation of the for the proposed project has been worked out as around 1500 kVA. The same shall be obtained from MSEDCL. Backup power arrangement by providing 1x750 + 1x250 KVA stand by capacity of DG sets shall be provided.

Capital Investment and Implementation Schedule

The total project cost for the Proposed LPG bottling plant at Rasayani with receipt by pipeline/Tank Lorries is around Rs. 315 crores(including interest during construction). This includes the cost of land and its development, Mounded bullets, pipelines, Fire Detection and Protection facilities for ensuring safety of the proposed LPG Plant, etc.

The commercial operation date (COD) is envisaged in 24 months reckoned from the date of receipt of EC.

EMP Costs:

BPCL will provide EMP cost subsequently for environmental protection measures.

Description of Process

There is no manufacturing process involved in the LPG bottling plant. The process involved can be divided into below mentioned Stages.

i. Receipt & Storage of product:

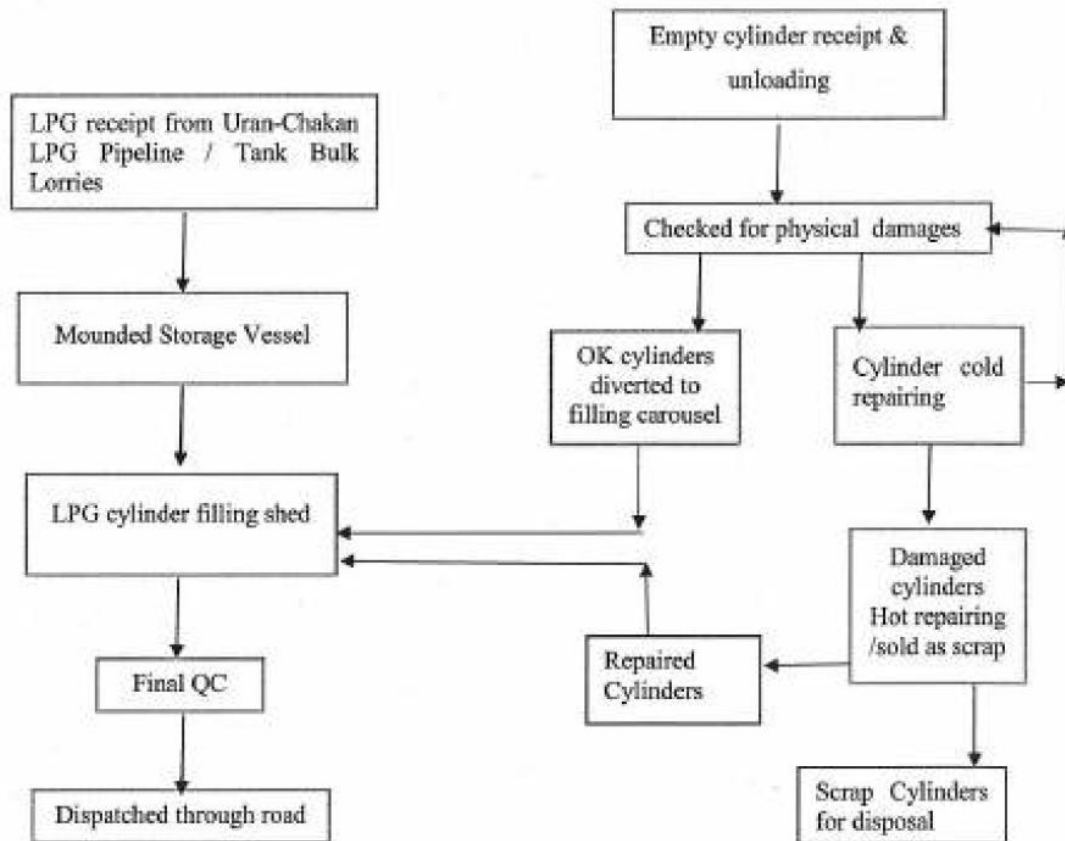
- A. Through Uran-Chakan LPG pipeline.
- B. Bulk Truck unloading.
- C. LPG storage into 6 X 1450MT Mounted Storage Vessels(MSV).

ii. Bottling:

- A. LPG pumping from MSV to 48 stn. Electronic carousals in filling shed.
- B. Bottling of LPG cylinders using 4X48 station electronic carousals.
- C. Quality check on filled cylinders
- D. Loading into Trucks

iii. Dispatch:

- A. Loading of quality checked filled LPG cylinders in trucks.
- B. Supply & distribution to markets.



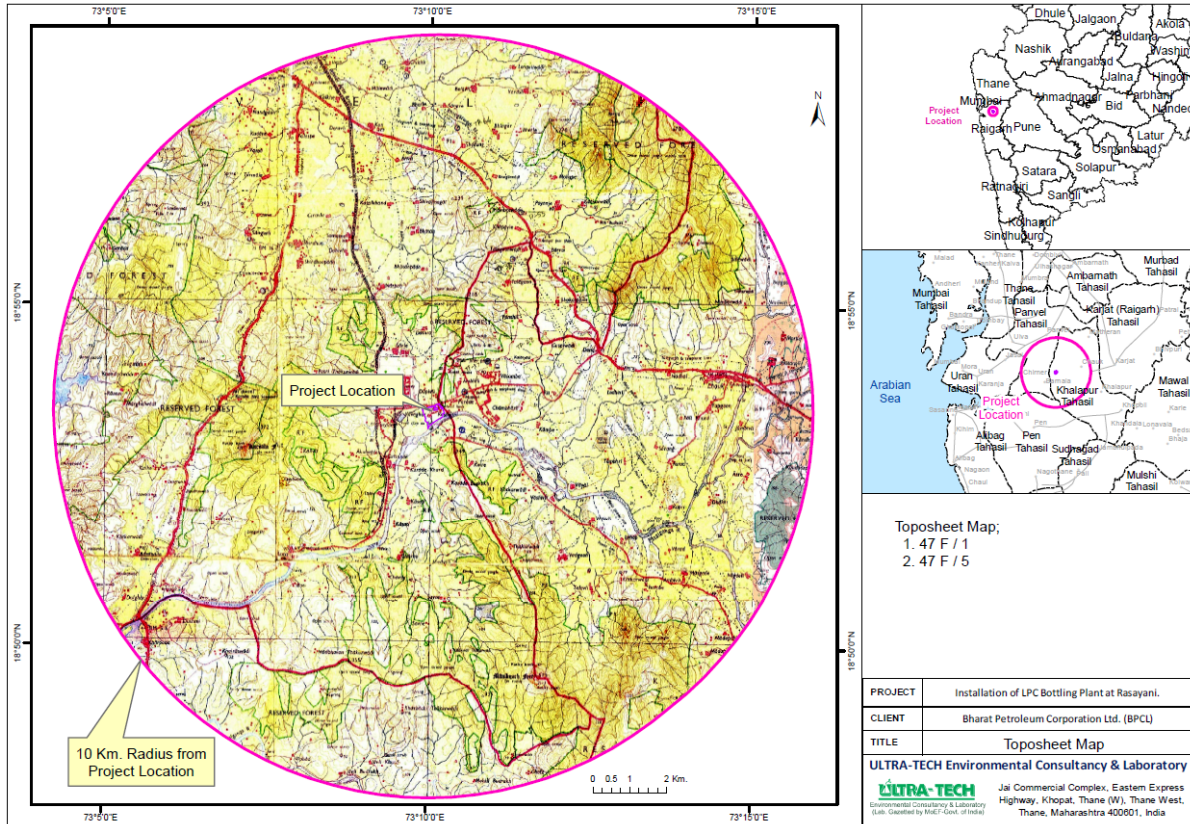
3 ENVIRONMENTAL SETTING OF PROJECT AREA

Project site is located at Village Rasayani, Taluka Khalapur, Dist- Raigad, in Maharashtra. As per guidelines of MoEF for Environmental Impact Assessment study area is restricted up to 10 km periphery from the project site. All observations were undertaken in March 2018 within 10 km . The climatic conditions in the study area are severe with hot climate and moderate rainfall. The proposed project site is purchased from M/s HOCL at Rasayani. Further, the proposed LPG bottling plant at Rasayani, District: Raigad, Maharashtra by M/s Bharat Petroleum Corporation Ltd .Total plot area of the proposed bottling plant is 19.55 Ha (48.3 Acres).

The nearest highway to the project site is NH4- Mumbai pune expressway about 2.5 km (E), NH66 is about 5 km (W) and NH(4)- Mumbai Pune Old Highway about 4.3 km (E) . The nearest railway station Rasayani – about 1.5 Km (W) and the Main Railway Station: Panvel about 8 Km (NW).

Karnala Bird Sanctuary is located at a distance of approximately 2.5(W) km from the project site. In Maharashtra it is the only declared Bird Sanctuary. In this Sanctuary there is Karnala fort since ancient times. The surroundings of Karnala fort shows the presence of numerous and

different varieties of flora and fauna. Keeping in view the importance of such rich biodiversity, Government declared the Karnala frt along with its surrounding area upto 4.48 Sq.km, as Bird Sanctuary in 1968. Botanical Survey of India (BSI) had studied the Karnala sanctuary area in 1980 and recorded 642 floral species. In this sanctuary, around 134 resident birds and 38 non-resident birds have been recorded by bird watchers. A large number of various plant species have been recorded.



Study Area Covering 10 km Radius from Project Site

4 OBJECTIVE OF ENVIRONMENT IMPACT ASSESSMENT

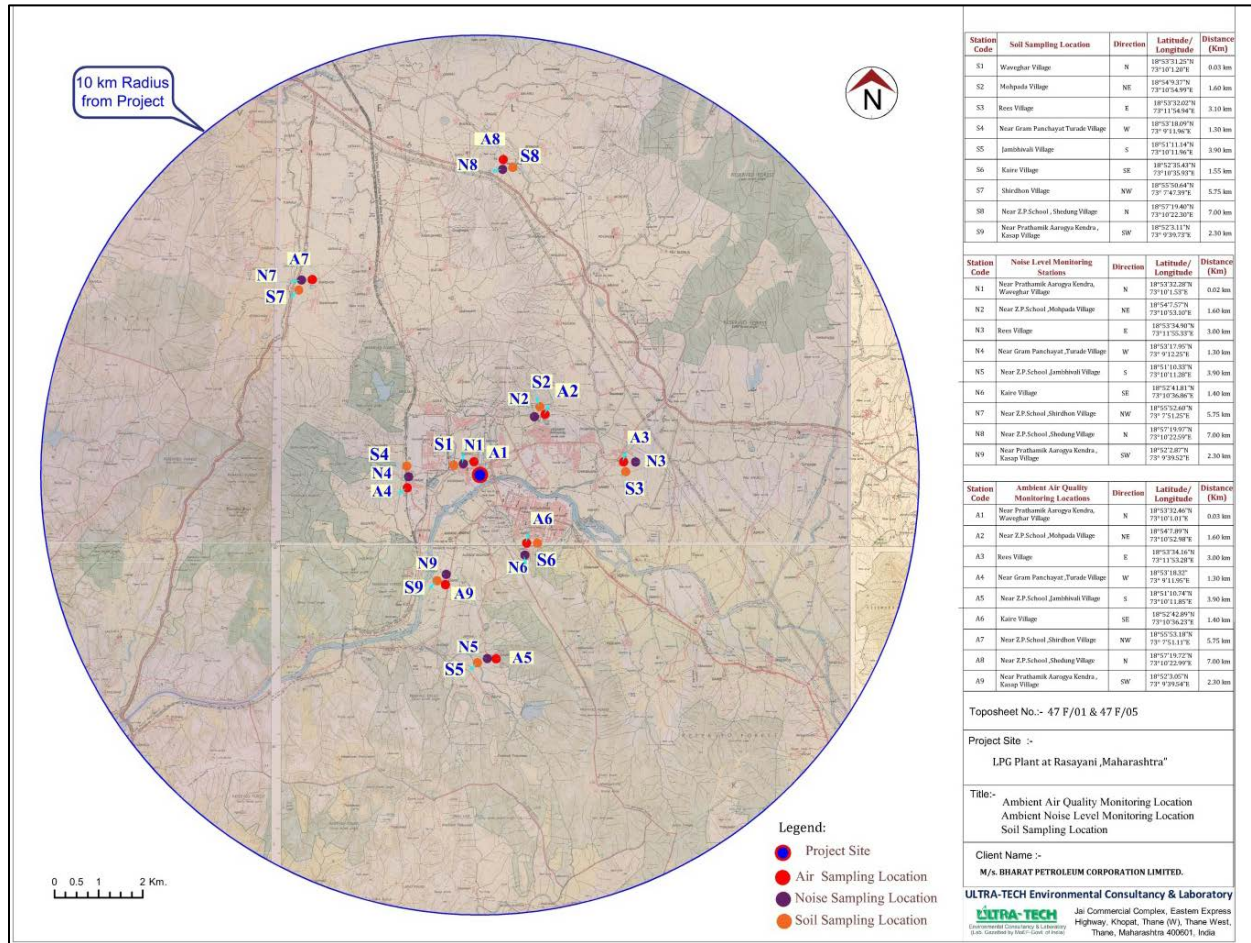
The principal Environmental Regulatory Agency in India is the Ministry of Environment Forests and Climate Change (MoEF&CC), Government of India. MoEF&CC formulates environmental policies and accords environmental clearance for the projects which attracts EIA notification. The State Pollution Control Board (SPCB) accords No Objection Certificate (NOC) Consent for Establishment and Consent for Operation for the projects. As per EIA notification 2006, though the project is classified under category B under activity schedule no. 6(b) of EIA notification 2006, however is considered as category A project, since it is located within 5 kilometer from the boundary of Karnala Wildlife Sanctuary (Protected area notified under Wildlife Protection Act 1972). In this connection Form I along with PFR was submitted to MoEF&CC online and Standard TOR has been granted on MoEF&CC website dated 20th August 2018.

4.1 Methodology for EIA Study

Detailed review of the feasibility report for the proposed project has been carried out. 10 km radius of study area was marked using latitudes and longitudes of the project site. For all major environmental components, primary data was generated and compared with available historical/published information for assessment of various environmental components to develop EMP.

Land use pattern was mapped within 10 km radius from the proposed site using GIS II remote sensing maps followed by ground truth verification. The baseline monitoring program was undertaken for Pre monsoon season (**March 2018 to May 2018**) to establish the background air quality, ground and surface water qualities, soil quality and noise levels in the study area. Meteorological data pertaining to Rasayani was collected from IMD. Ecology and biodiversity studies were carried out for terrestrial components of the study area. Field Survey was undertaken to develop socio-economic profile of the study area and was compared with published census data. A detailed review on the possible environmental pollutants such as liquid and solid wastes was undertaken. Impact Assessment of various environmental components have been carried out using standard EIA tools and techniques with appropriate input of primary and secondary baseline data to determine the significance of the impact. Various activities those are envisaged during construction and operation phases of the proposed project were evaluated for

its significance. Based on the impact, suitable EMP was developed to mitigate the pollution. Risk assessment study, emergency response plan were also prepared for the proposed project



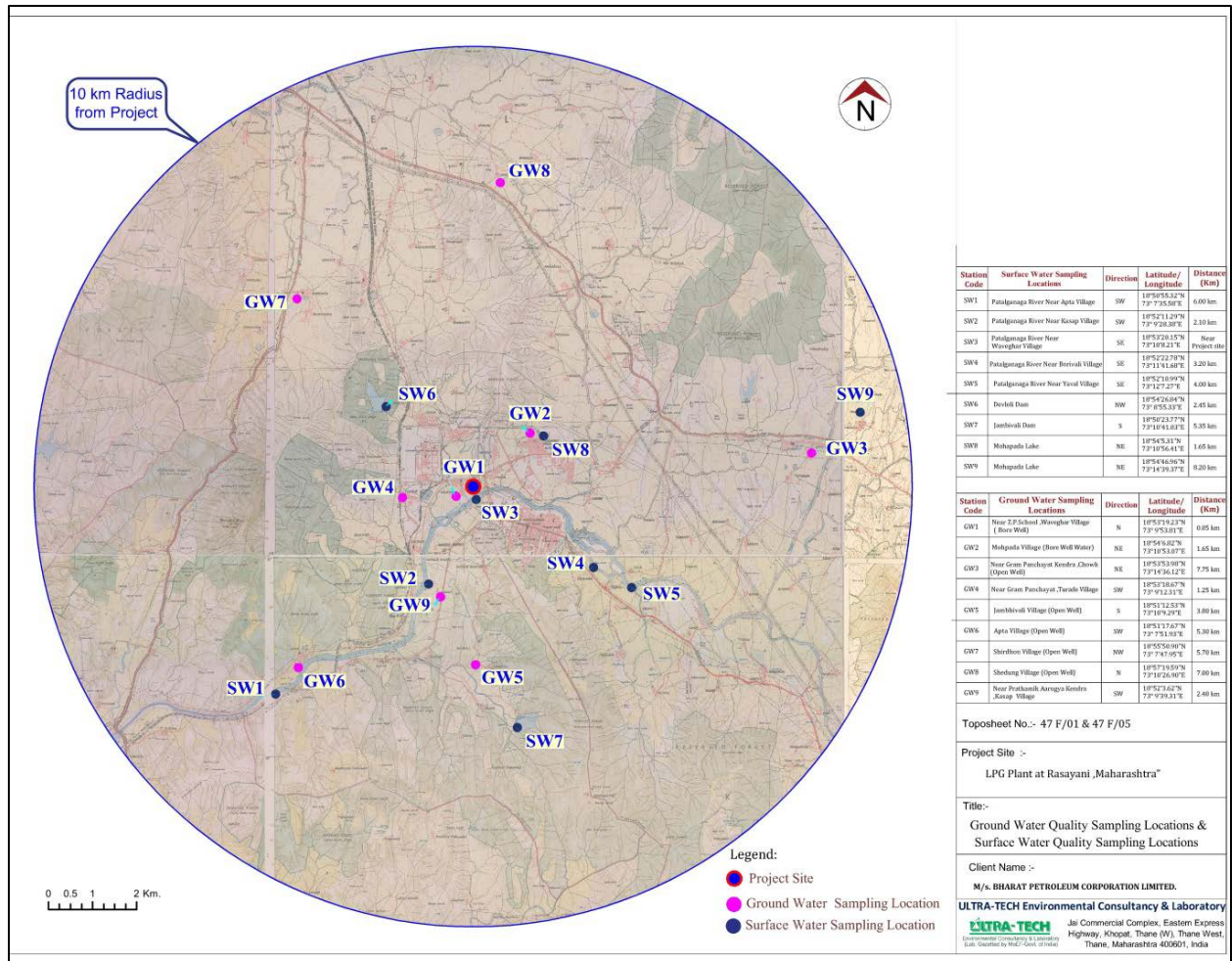
Map Showing Baseline Monitoring Locations- Air, Noise and Soil

4.2. Air Environment

9 ambient air quality monitoring stations were selected in and around the project site and studies were carried out as per CPCB standards. Levels of PM10 and PM2.5 are found to exist in the range of 53 to 79 $\mu\text{g}/\text{m}^3$ and 25 to 46 $\mu\text{g}/\text{m}^3$ respectively. Sulphur dioxide and Oxides of Nitrogen are observed in the range of 12 to 19 $\mu\text{g}/\text{m}^3$ and 21 to 29 $\mu\text{g}/\text{m}^3$ respectively, the level of CO ranges from 0.5 to 1.6 $\mu\text{g}/\text{m}^3$ which are well within limits as per National Ambient Air Quality standards 2009.

4.3. Noise Environment

The noise monitoring has been conducted for determination of noise levels at 9 locations in the study area. Day and night noise level at the industrial zone is 53.4 dB(A) and 46.7 dB(A) respectively and for residential zone is 44.2 to 54.6 dB(A) respectively, which are well within the limits as per ambient noise standards.



Map Showing Baseline Monitoring Locations- Ground water & Surface water

4.4. Water Environment

Ground Water Quality

- The analysis results indicate that the pH ranges in between 6.6 to 8.2, which is well within the specified standard of 6.5 to 8.5. The minimum pH of 6.6 was observed at GW3 and the maximum pH of 8.2 was observed at GW1.

- Chlorides were found to be in the range of 19 to 110 mg/l, the minimum concentration of chlorides (19 mg/l) was observed at GW5, whereas the maximum value of 110 mg/l was observed at GW1.
- Sulphates were found to be in the range of 11 to 92 mg/l. The minimum value observed at GW5 (11 mg/l) whereas the maximum value observed at GW1 (92 mg/l).
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 140 to 612 mg/l, the minimum TDS observed at GW5 (140 mg/l) and maximum concentration of TDS observed at GW9 (612 mg/l)

Surface Water Quality

- The analysis results indicate that the pH values in the range of 7 to 8.2, the minimum value was observed at SW3 and maximum value was observed at SW7
- DO was observed to be in the range of 1 to 6.1 mg/l. The TDS was observed in the range of 68 to 332 mg/l, the minimum TDS value was observed at SW5, and where as maximum value was observed at SW8.
- The chlorides and Sulphates were found to be in the range of 8 to 41 mg/l and 4 to 8 mg/l, respectively.
- The calcium & magnesium were found to be in the range of 7 to 50 mg/l and 2 to 15 mg/l, respectively.

4.5. Soil Quality

A total of nine samples within the study area were collected and analysed. It has been observed that the texture of soil is mostly fertile in the study area. It has been observed that th The pH of the soil in the study area is slightly acidic to slightly alkaline in reaction having pH is in the range of 6.3-7.4

4.6. Ecology and Biodiversity

As per records of the forest Department there are is Karnala Bird Sanctuary 2.5 km away from the proposed project site, as per the records of the Botanical Survey of India there.

4.7. Socio Economics

The total population of the study area as per the Census of 2011 is 135522 in 30720 households. There are 30720 households in the study area and the average size of household is 4 members

per household in the study area. The dependent population below 6 years is 16091 (11.9% of the total population) in the study area. The sex ratio of the study area is 928 females per 1000 males. The sex ratio of the study area is poor, as compare to district sex ration of Raigad (959)

5. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.2.Land/Soil Environment Impact Mitigation

During construction phase the top soil will be stored carefully and will be used again after construction/installation phase is over so as to restore the fertility of project site. During operation phase, as the complete system shall be closed loop, no impact is envisaged on the topography during operation phase.

5.3.Air Impact Mitigation

The emission anticipated during construction period will include fugitive dust due to excavation of soil, leveling of soil, use of DG sets, movement of heavy construction equipments/vehicles, site clearing and other activities. Also water sprinkling shall be carried out to suppress fugitive dust during earthworks and along unpaved sections of access roads.

During operational phase the storage facilities shall be equipped with leak detection systems. The air environment may have minimal impact due to truck movement for receipt and dispatch.

5.4.Noise Impact Mitigation

Noise is generated from operation of pumps, blowers and DG sets and during vehicular movement. The mitigation measures include acoustic enclosures for DG Sets will be provided as per CPCB guidelines. Provision of ear plugs for labour in high noise area, also green belts and landscaping shall act as noise buffer.

5.5.Water Impact Mitigation

Avoid unwanted wastage of water and use of tanker water for construction activity. Wastewater generated will be recycled/ reused during operation of the LPG Plant and rain water harvesting shall be promoted, also the rainwater from the landscape area will be used to recharge the ground water sources through recharge pit

5.6. Ecology and Biodiversity Impact Mitigation

The proponent shall have an extensive green belt encompassing minimum 33% of plot area. The probability and consequences of significant ecological impacts occurring as a result of the operation of the facility are considered to be almost negligible.

Municipal solid waste will be disposed through local bodies. Spent lube oil from D.G. set will be sold to SPCB Authorized recyclers. Hence no impact on flora and fauna is envisaged. There will be no effluent discharge in the water body. Thus there is no impact on the aquatic biota present in vicinity of proposed project.

5.7. Socio-Economic Environment Impact Mitigation

The construction of the proposed project is expected to provide temporary indirect employment to a good number of skilled and unskilled workers. The project will contribute to the socio-economic development of the area at the local level in turn reducing migration for employment. Hence the proposed project will have positive impact on the socio-economic environment.

5.8. Environmental Monitoring Programme

It is imperative that the BPCL will follow Environment Monitoring programme in line with the laid down guidelines .

- It helps to verify the predictions on environmental impacts presented in this study.
- It helps to indicate warnings of the development of any alarming environmental situations, and thus, provides opportunities for adopting appropriate control measures in advance.

6. ADDITIONAL STUDIES

6.2. Hazard Identification and Consequence Assessment

Quantitative Risk Study has been done to determine the potential risks of major disasters having damage potential to life and property and provide a scientific basis using PHASTRISK (Version 6.7) software developed by DNV GL. Disaster Management Plan is prepared for identification of various hazards addressed qualitatively and included in onsite- emergency plan. Details of risk assessment are given in the EIA report.

Consequence analysis of all possible containment scenarios was carried out. **No domino effect envisaged as all Mounded bullets are adequately spaced and heat or pressure wave is limited to dyke area.**

7. PROJECT BENEFITS

To cater the domestic as well as non-domestic LPG demand, Bulk LPG and Auto LPG demand near surrounding districts. The proposed project by BPCL LPG Bottling plant of capacity 540 TMTPA at Rasayani will supply domestic/commercial cylinders mainly at Mumbai, Thane, Palghar & Raigad districts. Further, this project will produce indirect job /business opportunity to the local people. The plant activities is expected to be completed in a period of 24 months from the date of receipt of Environment Clearance

8. ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) provides an essential link between predicted impacts and mitigation measures during implementation and operational activities. EMP outlines the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or mitigate adverse environmental impacts, and the actions needed to implement these measures.

The likely impacts on various components of environment due to the project during developmental activities have been identified and measures for their mitigation are suggested.

The EMP lists all the requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified in the EIA. For each attribute, or operation, which could otherwise give rise to impact, the following information is presented:

- A comprehensive listing of the mitigation measures
- Parameters that will be monitored to ensure effective implementation of the action
- Timing for implementation of the action to ensure that the objectives of mitigation are fully met

The EMP comprises a series of components covering direct mitigation and environmental monitoring, an outline waste management plan and a project site restoration plan. Therefore, environmental management plan has been prepared for each of the above developmental activities.

During construction phase, all precautionary measures shall be taken for dust suppression, prevention of soil erosion and noise reduction. The effect on environment during construction phase will be localized, temporary and reversible in nature. Further Operation of the Plant

usually does not involve any chemical or manufacturing process, which may lead to process specific emission of air pollutants into atmosphere.

Air Pollution Management

- There is no continuous source of air pollutant from the operation of proposed LPG bottling Plan project. The sources of air pollutants are limited to the DG Sets and diesel engine driven Fire water pumps. These sources of air pollutants are intermittent. During operation, these sources would emit the exhaust gases.
- Adequate stack height will be provided for D.G. sets.
- There will be no continuous source of fugitive emission from the process.

Noise Pollution Management

- Regular condition monitoring e.g. speed, vibration and regular preventive maintenance including schedule lubrication will be done for the moving machines to keep them in good condition and also to reduce noise and vibration.

Water Pollution Management

- The waste water generated from during mock drill will be passed through Oil Water Separator (OWS) arresting the oil content. The oil free waste water shall be used in gardening/plantation
- There is no waste water generation from operation of proposed project. The wastewater arising due to washing of cylinders will be treated by OWS/ETP and reused.
- Sanitary waste water from toilets, canteen and wash rooms will be disposed into septic tank and soak pit.
- The storm water will be collected in the collection tank where in the oil will be separated.
- The wastewater management philosophy is based on “Zero Discharge” concept.

Solid Waste Management

Bottom sludge of MSV will be generated while cleaning of MSV. The cleaning of MSV will be done once in five years as per OISD. Any sludge thus generated will be kept secured, covered impermeable sludge pit located within the project site at a central place earmarked for the purpose prior to safe disposal through MoEF&CC/ State PCB approved registered recycler.