



M/S. PETRONET LNG LIMITED

**Pre-feasibility Report: Proposed Expansion
of Regasification Capacity of Dahej
Terminal from 20 MMTPA to 25 MMTPA at
Plot No. 7–A, Dahej GIDC Estate, District
Bharuch, Gujarat**

JUNE 2022



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ACCREDITATION DETAILS

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M/S. PETRONET LNG LIMITED

Pre-feasibility Report: Proposed Expansion of Regasification Capacity of Dahej Terminal from 20 MMTPA to 25 MMTPA at Plot No. 7–A, Dahej GIDC Estate, District Bharuch, Gujarat

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1 EXECUTIVE SUMMARY

1.1 Introduction

1.1.1.1 Identification of project and project proponent

M/s PETRONET LNG LIMITED ("PLL"), is a Joint Venture Company (JVC) having 50% shareholding of leading four (4) Oil & Gas Maharatanas PSUs viz. Oil & Natural Gas Corporation (ONGC), Indian Oil Corporation Limited (IOCL), GAIL (INDIA) Limited (GAIL) and Bharat Petroleum Corporation Limited (BPCL) and balance 50% shareholding is being held by Public, FIIS, FPIS, Mutual Funds etc. The Company had set up South East Asia's first LNG Receiving and Re-gasification Terminal with a nameplate capacity of 5MMTPA, which was subsequently increased to 17.5 MMTPA in various stages. Capacity expansion upto 20 MMTPA is under progress.

The infrastructure was developed in the shortest possible time and at a benchmark cost. Dahej LNG terminal cater to the RLNG requirement by offering Re-gasification capacities at its terminal to its promoters and bulk consumers like GSPCL and Torrent.

The RLNG is consumed by the existing consumers falling in the States of Gujarat, Maharashtra, Rajasthan, Uttar Pradesh and various other states through GAIL's pipeline network consisting of Hazira-Bijaypur-Jagdishpur, Dahej-Uran, Dahej-Vijaipur along with GSPL, IOCL and Torrent pipelines.

The terminal is meeting around 40% of the total gas demand of the country. The Dahej LNG terminal is the first terminal to start loading of LNG in trucks for supply of LNG to the consumers which are not connected by gas pipelines and today has 4 truck loading bays.

The capacity expansion of Dahej LNG Terminal was taken up in different phases as given under:

Phase I: 5 MMTPA capacity (consisting of on shore LNG Storage tanks (2 no), Re-gasification facilities, and associated utilities).

Phase II: Additional 5 MMTPA capacity (consisting of on shore LNG Storage tanks(2no.), Re-gasification facilities and associated utilities).

Phase IIIA: Additional 5 MMTPA capacity (consisting of on shore LNG Storage tanks (2no), Re-gasification facilities and associated utilities) Truck loading facility with 4 bays installed in this project with space provisions for 4 bays in future. PLL has future plans to install 20 more truck loading bays.

Jetty: The terminal has two LNG Jetties.

The first jetty: (installed in Phase-1 Project) can handle berthing of up to Q-Flex vessels, the second jetty commissioned in 2014 can handle berthing of up to Q-Max vessels.

Part IIIB1: Re - gasification facilities to cater additional 2.5MMTPA capacity.

Future: Addition of new 3rd jetty for LNG, ethane and propane unloading.

Dahej LNG terminal has received more than 2900 cargoes. The terminal is also offering tolling services to Off-takers & Bulk customers. To cater the small customers who are not having gas pipeline connectivity, Dahej is supplying LNG to such customers which is transported through cryogenic trucks.

Proposed Expansion Project:

M/s PETRONET LNG LIMITED ("PLL") intend to expand the regasification capacity of the Dahej LNG Terminal from 20 MMTPA to 25 MMTPA.

1.2 Brief Description

LNG regasification facilities which involves pumping LNG to high pressure using High Pressure Cryogenic Centrifugal Pumps and convert it to Natural Gas (NG) using Shell & Tube Vaporizers (STV) and submerged combustion vaporizers (SCV) and transporting Re-gasified Liquid Natural Gas (RLNG) to existing NG network.

The Project is being executed in a phased manner. The terminal at present has a regas capacity of 17.5 MMTPA and is under expansion to increase the regas capacity to 20 MMTPA. In the terminal LNG is stored, regasified and sent out via pipeline to consumers. Truck loading facility with 4 TLF bays (and additional 4 bays are being installed) are there for transportation of LNG to consumers by road. PLL has future plans to install 20 more truck loading bays. Presently Dahej Terminal is having six (6) LNG storage tanks along with associated utilities and 2 tanks are under construction.

PLL now intends to expand the send out capacity of the Dahej LNG Terminal from 20 MMTPA to 25 MMTPA.

The Environment Clearance for send out capacity upto 20 MMTPA has been accorded by MOEF, F.No. 11-63/2021-1A-III dated 4/12/2020 and is valid upto 23/02/2024. Consent and Authorisation (CCA), AWH-98613 dated 08/01/2019 is also accorded by GPCB which is valid up to 23/02/2024.

The proposed project is Expansion project for increasing production capacity up to 25 MMTPA located at Plot No. 7/A, GIDC Industrial Estate, Dahej, Gujarat, India

Table 1-1: Production Capacity

Sr. No.	Product	Quantity, MMTPA		
		Existing	Proposed	Total
1	Regasified LNG (RLNG)	20	5	25

1.3 Water Requirement

PLL LNG terminal doesn't require industrial water for regasification. Existing water consumption for the terminal is 21.2 KLD and application has been submitted to GPCB for increase in water consumption from 21.2 to 170 KLD which is due to increase in phase wise expansion of terminal, increase in contractual manpower, for gardening and other CSR activities. However, for proposed expansion there is no additional water requirement.

Primary Source: Water is generated from air heaters due to condensation of moisture present in atmosphere during regasification process in shell and tube vaporizers (STV). This water is being collected, filtered and used to fulfil water requirement of the site.

Secondary Source: GIDC Water Supply System

1.4 Waste Water Generation

Existing wastewater generation is 17.2 KLD and an application has been submitted to GPCB for increase in waste water generation upto 100 KLD. However, for proposed expansion there will not be any increase in waste water generation. Process water generated during running of Submerged Combustion Vapourizers (SCV) will be pre-treated to maintain pH between 6-8 before being used for gardening purpose.

Details of Waste Water Treatment Plant

There is no generation of any liquid effluent from the process area. Existing STP of capacity 100 KLD is adequate to handle additional domestic waste water.

1.5 Power Requirement

Construction Phase: Existing Captive/Grid power shall be used for construction purposes.

Operational Phase: The source of power for the existing terminal is through captive power Plant (5 x 7.7 MW GTGs) and 30 MVA grid supply by Gujarat Electricity Board. Captive power plants are operated during power failure only. Also, two DG sets of 1000 KVA and 1500 KVA are installed for emergency power backup.

The existing power requirement of the terminal is 25.8 MW and after commissioning of proposed Regasification Expansion, the power requirement of the terminal will increase to approx. 30.5MW.

No additional GTG is proposed in the project.

Fuel: Natural Gas for GTGs and HSD for emergency power back is used as fuel.

1.6 Air Emissions

There are 16 nos. of flue gas stacks for existing unit. For proposed expansion, 1 flue gas stacks attached to Submerged Combustion Vaporizer (SCV) will be required. Adequate APCM and stack height is provided to all existing flue gas stacks and will be provided to proposed flue gas stacks also.

For existing facilities no continuous process vents are installed and no additional process vent will be required for proposed expansion project. However, flare and pressure safety valves/vents are provided for safety during emergency and maintenance. Adequate air pollution control measures are in place.

1.7 Solid and Hazardous Generation and Disposal

Hazardous Wastes will be generated at the proposed facility. Hazardous wastes like Used / spent oil, Waste residue containing oil, Industrial use of paints & ink waste, Insulation waste and Empty barrels, containers/liners contaminated with hazardous waste. These will be managed as per the Hazardous Wastes (Management, Transport and Transboundary) Rules 2016 as amended till date and will be disposed off as detailed in **Table 3-7**.

2 INTRODUCTION

2.1 Identification of project and project proponent

M/s Petronet LNG Limited (PLL) is an Indian natural gas company formed on the behest of Government of India (GoI) to import liquefied natural gas (LNG) and set up LNG terminals in the country. It is a joint venture company promoted by the Gas Authority of India Limited (GAIL), Oil and Natural Gas Corporation Limited (ONGC), Indian Oil Corporation Limited (IOC) and Bharat Petroleum Corporation Limited (BPCL). Each has 12.5% equity share totalling to 50%. The balance of the equity, 50%, is held by Public, FIIS, FPIS, Mutual Funds etc. The company had signed long term LNG sale and purchase agreement with Ras Laffan Liquefied Natural Gas Company Ltd., Qatar and Exxon Mobil, Australia for the supply of LNG to India.

PLL owns & operates LNG Terminal at Dahej in the state of Gujarat, India. The terminal at present has a regas capacity of regas 17.5 MMTPA. The regas capacity expansion to 20 MMTPA is under progress. In the terminal LNG is stored, regasified and sent out via pipeline to consumers. Truck loading facility with 4 TLF bays and additional 4 bays are being installed for transportation of LNG to consumers by road. PLL has future plans to install 20 more truck loading bays. Presently Dahej Terminal is having six (6) LNG storage tanks along with regasification facilities and associated utilities and 2 tanks are under construction.

Now, PLL intend to expand the send out capacity of the Dahej LNG Terminal from 20 MMTPA to 25 MMTPA.

2.2 Brief description of nature of the project

The proposed project is for expansion of Dahej LNG Terminal from 20 MMTPA to 25 MMTPA. The unit is having existing EC & CRZ Clearance for 20 MMTPA regasification facility vide EC letter No. 11-63/2011-IA-III dated 26th February 2014 and extension of validity of EC & CRZ clearance vide F. No. 11-63/2011-IA-III dated 4th December 2020 upto 23/02/2024. Consent and Authorisation (CCA), AWH-98613 dated 08/01/2019 is also accorded by GPCB which is valid up to 23/02/2024. Product details are given in **Table 2-1**.

Table 2-1: Production Capacity

Sr. No.	Product	Quantity, MMTPA		
		Existing	Proposed	Total
1	Regasified LNG (RLNG)	20	5	25

2.2.1 Existing Facility in PLL Dahej LNG Terminal

Phase-I:

5 MMTPA initial installed capacity.

Major facilities include are as follows:

- Jetty with LNG ship unloading facility
- 2 nos of LNG storage tanks
- LNG in tank pumps (6 nos ; 3 in each tank + 1 common warehouse spare)
- BOG handling system includes BOG compressors (3 nos) and Re-condenser
- HP LNG pumps (4W+1S) and vaporizers (7 nos of STV and 2 no. of SCV)
- Fuel gas handling system
- Metering system (3 fingers)

- 3 Gas Turbines of 7.7 MW @ ISO conditions

The send-out capacity corresponding to 5 MMTPA is 571 T/h; however, the peak send-out capacity considering 20% swing is 685 T/h.

North Jetty: LNG Unloading Arms: 3 + 1 NG Vapour Return Arm

Phase-II:

LNG Terminal Send-out capacity expansion from 5 MMTPA to 10 MMTPA. Major facilities include are as follows:

- Additional 2 nos of LNG storage tanks
- LNG in tank pumps (6 nos. 3 in each tank + 1 common warehouse spare)
- HP LNG pumps (4W+1S) and vaporizers (7 + 1 (co-gen) nos. of STV and 2 nos of SCV)
- Metering system (3 fingers)
- 2 Gas Turbines of 7.7 MW @ ISO conditions

The send-out capacity corresponding to 10 MMTPA is 1142 T/h; however, the peak send-out capacity considering 20% swing is 1370 T/h.

LNG corresponding to 5 MMTPA goes to C2-C3 extraction plant of ONGC. The C2-C3 extraction from this LNG is around of 1 MMTPA and returned lean LNG is volume is around 4 MMTPA. The lean lean LNG from ONGC is at high pressure and is vaporized in Phase-2 vaporizers.

South jetty: Addition of new jetty (2nd) for LNG unloading from cargo with 3 LNG

Unloading Arms and 1 NG Vapour Return Arm.

Phase-IIIA:

LNG Terminal Send-out capacity expansion from 10 MMTPA to 15 MMTPA.

Major facilities include are as follows:

- Additional 2 Nos. of LNG storage tanks
- LNG in tank pumps (6 nos 3 in each tank)
- BOG handling system includes BOG compressors (3 nos) and Re-condenser
- HP LNG pumps (4W+1S)and vaporizers (4 nos of STV and 1 No of SCV)
- Fuel gas handling system for SCV
- Metering system (3 fingers)
- Truck Loading Facility (4 bays + provision for 4 additional bays)

The send-out capacity corresponding to 15 MMTPA is 1713 T/h; however, the peak send-out capacity considering 20% swing is 2055 T/h.

Phase-IIIB1:

LNG Terminal Send-out capacity expansion from 15 MMTPA to 17.5 MMTPA.

Major facilities include are as follows:

- HP LNG pumps (2W+1S) and vaporizers (2 no.'s of STV)

The send-out capacity corresponding to 17.5 MMTPA is 1998 T/h; however, the peak send-out capacity considering 20% swing is 2398 T/h.

Phase-IIIB Two no. LNG Storage Tanks (under construction)

- Additional 2 Nos. of LNG storage tanks
- LNG In tank pumps (6 nos; 3 in each tank + 1 common warehouse spare)

Regas Expansion from 17.5 to 20 MMTPA (Stage-I), for which EC clearance has been taken (Under Construction).

- Standby In-Tank Pumps (2 Nos.)
- SCV Package (2 Nos.)
- HP Pumps (2 Nos.)
- Send out custody metering (2+1)
- Fuel Gas Metering (1 no.)
- Air Heater for fuel gas (1+1)
- Electric Fuel gas heater (1 no.)
- Fuel Gas Surge Vessel (1 no.)

2.2.2 Proposed Facilities

Regas Expansion from 20 to 25 MMTPA (Stage-II)

- SCV Package (1 No.)
- HP Shell & Tube Vaporizers (2 Nos.)
- Expansion Drums on GW Loops (2 Nos.)
- GW Pumps for STVs x-E 113 C/D (2 Nos.)
- GW Drain Pump with GW Drain Drum (1 No.)
- Corosion Inhibitor/ Biocide (1 No.)
- Air Heaters for STV 4-x-E-113 C (28 Nos.)
- Air heaters for STV 4- x-E-113 D (28 Nos.)
- Air compressor package (1 No.)
- Liq. Nitrogen Buffer vessel (1 No.)

2.3 Need of the project and its importance to the country and or region

Dahej LNG Terminal is presently operating at around its full capacity of 17.5 Million Metric Tons Per Annum (MMTPA). The plant has two jetties, six LNG storage tanks, regasification facilities along with associated utilities which are sized for handling 17.5 MMTPA of LNG.

Looking at the market scenario and availability of domestic gas, it is felt that in order to meet the increased requirement, the storage and regasification capacity of Dahej LNG Terminal shall be further increased. Some major customers particularly GAIL and Gujarat State Petroleum Corporation Ltd. GSPC and Reliance have approached PLL to provide them storage and regas capacities and have also indicated the requirement on firm and long term basis. In view of the increase demand, PLL has planned to augment the capacity of Dahej LNG Terminal from 20 MMTPA to 25 MMTPA. The expansion facilities shall be designed to handle total 25 MMTPA capacity.

Due to the rapid economic growth, the lack of adequate fuel supply alternatives and also more recently for environmental reasons, the demand for natural gas in the country is increasing. The consumption of gas is primarily constrained by lack of supply and the shortfall in delivery infrastructure.

2.4 Demand-Supply Gap

The growth of Indian economy is one of the fastest in the world. The energy availability and consumption are the keys to sustain such economic growth. However, with the increasing awareness about the impact of carbon emission on the environment and its related effect on humanity, India in COP 26 held at Glasgow, has committed for reduction in carbon intensity to less than 45 % by 2030. To achieve this target, the primary energy mix of India is set to alter on account of the substitution of resources with lesser carbon footprint such as Natural Gas. With Hon'ble Prime Minister vision to increase the share of natural gas from current 6.3% to 15% in India's Energy basket by the year 2030, the consumption of the natural gas is set to increase three to four times the present volumes in the country. With the following reforms/ policy decisions by Government of India, the platform is set to increase the consumption of natural gas in energy mix of India:

- Addition of new pipeline network of 15,500 km to existing 20,200 km.
- Award of new City Gas Distribution (CGD) licenses to cover 70% of the population.
- 11th round of CGD bidding will cover almost every district of India.
- Promoting LNG as automotive fuel by setting up of 1000 LNG stations.
- Permitting sale of LNG in already awarded GA's.
- Unified tariff proposal to facilitate reach of natural gas to far flung areas at affordable rates

2.4.1 Importance of Project

In view of the above, it is expected that natural gas demand in 2030 is likely to increase by almost four-fold from the current levels. It converts to a demand of over 550 MMSCMD, which is equivalent to approx. 150 MMTPA. The expected domestic natural gas production would be around 33 MMTPA in 2030, which essentially means that the rest of the natural gas demand will be through LNG imports. With six operating LNG terminals in the country having combined capacity of 42.5 MMPTA and only four terminals under construction of capacity 19 MMTPA, there is huge gap between the desired regas capacity and the actual regas capacity available in the country, justifying the proposed expansion of Dahej LNG terminal.

2.5 Import vs. Indigenous Production

As indicated above the expected domestic natural gas production would be around 33 MMTPA in 2030, which essentially means that the rest of the natural gas demand will be through LNG imports.

2.5.1 Supply chain issues

LNG supply contracts are normally long term with back to back offtake arrangement at regasification terminal. The long term contracts have dedicated supply chain arrangement, hence for long term contract there are no issues w.r.t. supply chain. Short term contracts are also developing in LNG industry but the trade normally takes place when transportation of LNG from export to import terminal are fixed.

2.5.2 Customization of the product to local market needs

The LNG at the import terminal is pressurized and regasified LNG (RLNG) is supplied to the off takers through pipelines. Small quantity of LNG is sent to the customers through LNG trucks who are not connected through pipeline.

2.6 Export Possibility

Regasified Liquefied Natural Gas (RLNG) is sent to GAIL, GSPC , Torrent & IOCL dedicated pipeline network. It will be consumed domestically within INDIA in fertilizer, refinery, power plant etc. No export is envisaged.

2.7 Domestic / Export Markets

The entire market is domestic; no export is envisaged.

2.8 Employment Generation (Direct and Indirect) due to the project.

Construction workers will mostly be employed from local area.

The total manpower requirement will be as follows:

Construction Phase: 300 temporary employments will also be generated during installation phase through Contractor / Supplier during peak time of construction.

Operational Phase: The existing manpower of the terminal is 265 no.'s No additional manpower is required.

3 PROJECT DESCRIPTION

3.1 Type of Project including interlinked and interdependent projects, if any.

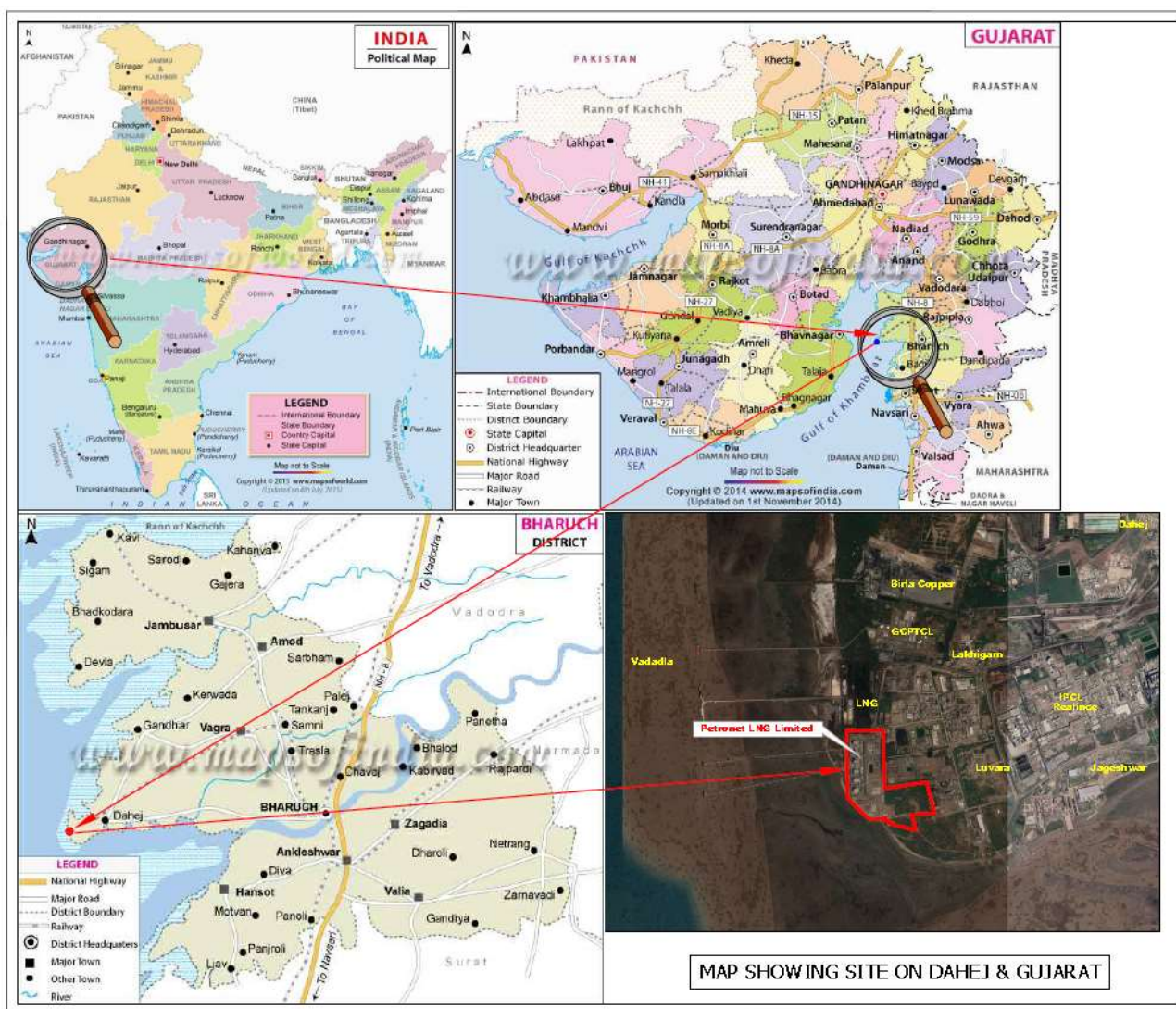
Not Applicable.

3.2 Location (map showing general location, specific location and project boundary & project lay out) with coordinates.

The site is located at GIDC, Dahej, Industrial Development Area; Plot 7-A. The total plot area of the unit is about 132.27 ha. Expansion will be done within the existing premises only.

The general location of the project is shown in **Map 3-1**. Location of site on google image is shown in **Map 3-2**. The latitudes and longitudes for pockets 1, 2 and 3 are listed in **Table 3-1**. Project Location on Toposheet / OSM is shown on **Map 3-3**.

Map 3-1: Site Location Map



MAP SHOWING SITE ON DAHEJ & GUJARAT

Map 3-2: Google Image of Site Location with Site Boundary

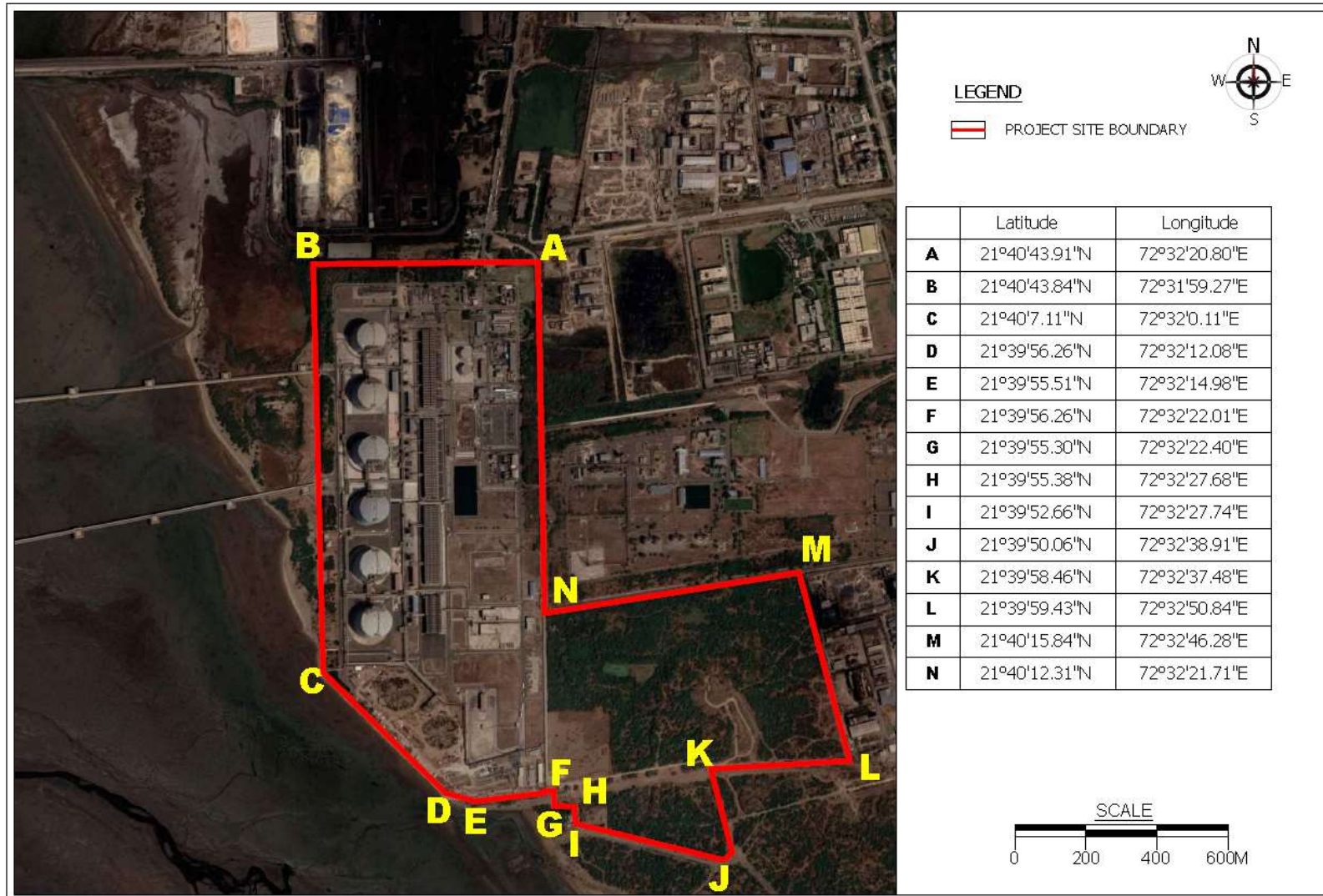
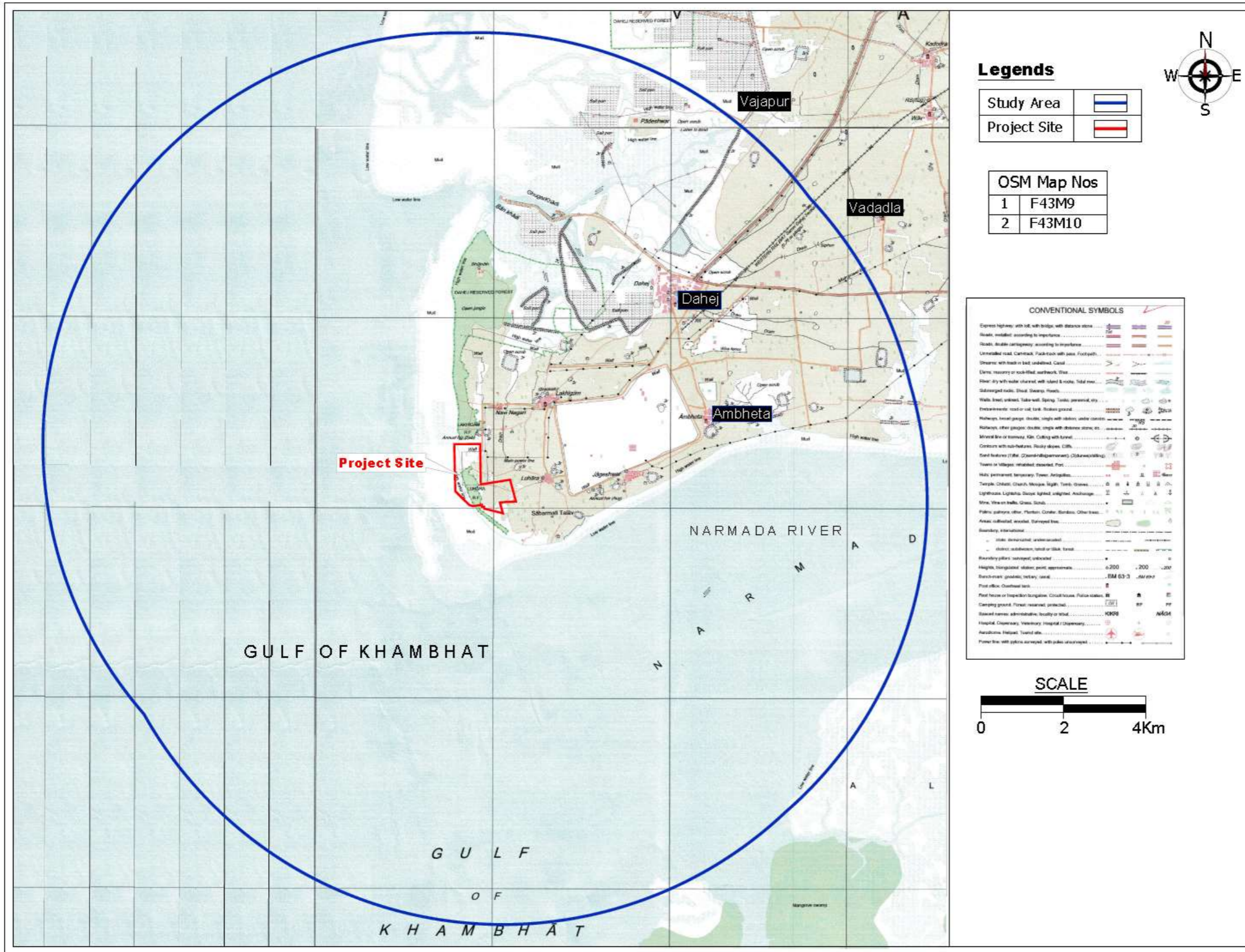


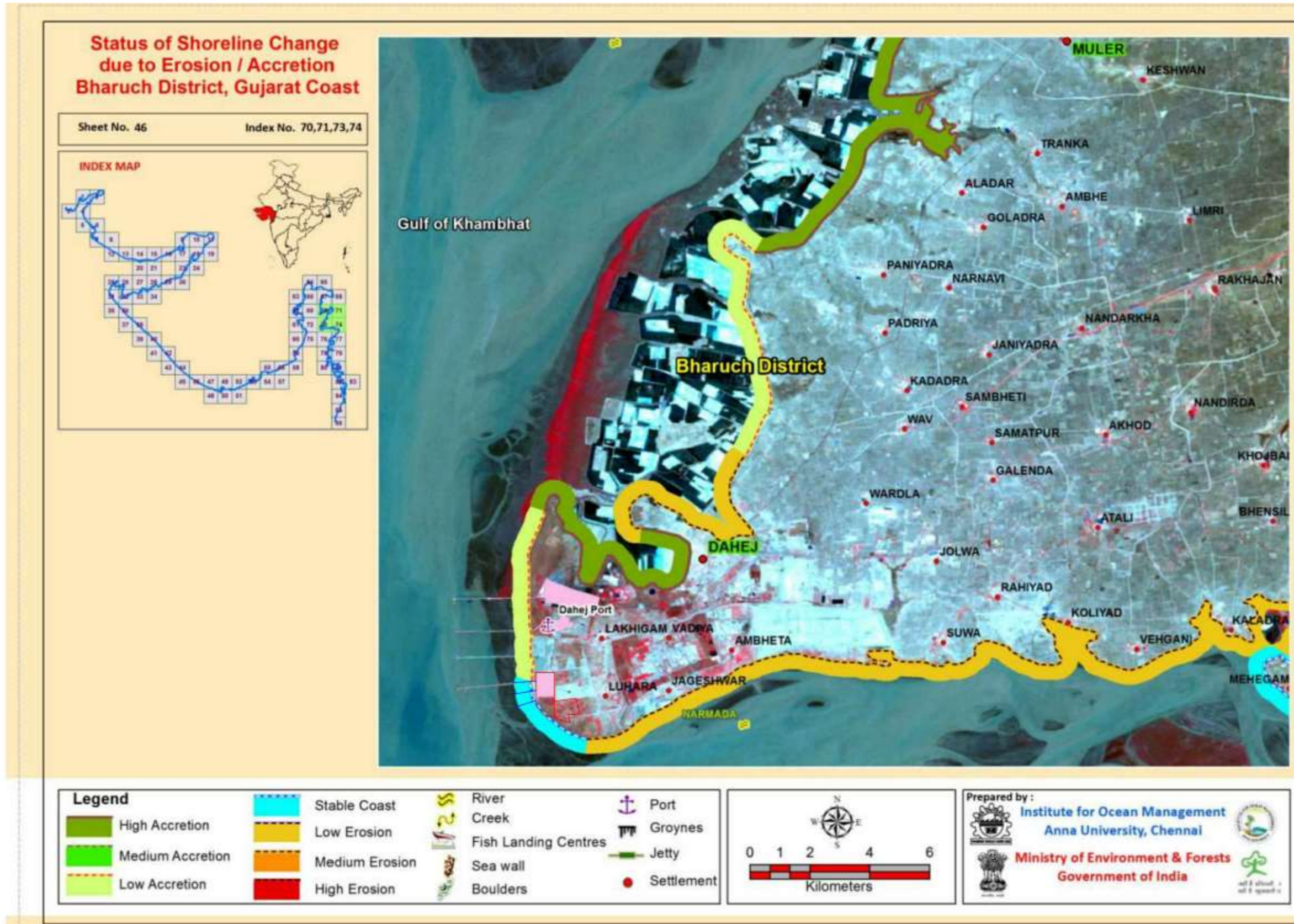
Table 3-1: Latitude and Longitude of Site Boundary

Legend	Latitude	Longitude
A	21°40'43.91"N	72°32'20.80"E
B	21°40'43.84"N	72°31'59.27"E
C	21°40'7.11"N	72°32'0.11"E
D	21°39'56.26"N	72°32'12.08"E
E	21°39'55.51"N	72°32'14.98"E
F	21°39'56.26"N	72°32'22.01"E
G	21°39'55.30"N	72°32'22.40"E
H	21°39'55.38"N	72°32'27.68"E
I	21°39'52.66"N	72°32'27.74"E
J	21°39'50.06"N	72°32'38.91"E
K	21°39'58.46"N	72°32'37.48"E
L	21°39'59.43"N	72°32'50.84"E
M	21°40'15.84"N	72°32'46.28"E
N	21°40'12.31"N	72°32'21.71"E

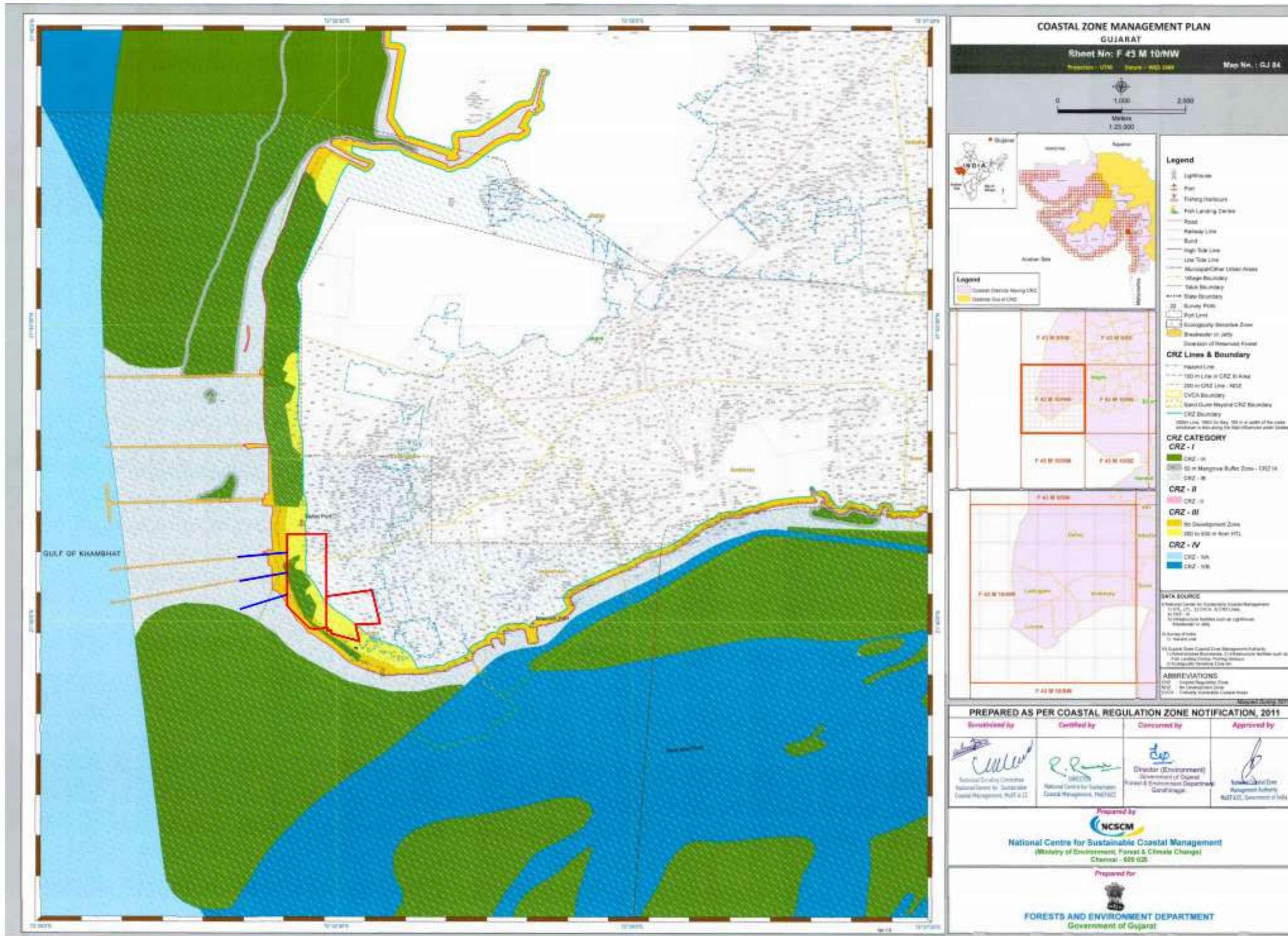
Map 3-3: Project Location on Toposheet / OSM



Map 3-4: Petronet LNG Site boundary superimposed on Shoreline change map prepared by Institute of Ocean Management, Anna University, Chennai



Map 3-5: Petronet LNG site boundary superimposed on CZMP, Gujarat prepared by NCSCM, Chennai



Note: As per NCSCM, project is falling in CRZ-III B (area between 200-500m from HTL)

3.3 Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.

Expansion will be carried out within the existing plant premises only.

3.4 Size or Magnitude of Operation

The proposed project i.e. increasing the regasification capacity from 20 to 25 MMTPA is expansion of existing facilities and will be done in existing site premises only. The total plot area of existing premises is 132.27 ha. The existing regasification capacity of the terminal is 17.5 MMTPA which is under expansion to 20 MMTPA, environmental clearance for which is available. Product list with production quantity is given in **Table 1-1**.

3.5 Project description with process details (a schematic Diagram / flow chart showing project layout, components of the project etc. should be given)

Broad equipment list envisaged for stage-II capacity enhancement upto 25 MMTPA of Dahej LNG terminal includes:

- SCV Package (1 No.)
- HP Shell & Tube Vaporizers (2 Nos.)
- Expansion Drums on GW Loops (2 Nos.)
- GW Pumps for STVs x-E 113 C/D (2 Nos.)
- GW Drain Pump with GW Drain Drum (1 No.)
- Corosion Inhibitor/ Biocide (1 No.)
- Air Heaters for STV 4-x-E-113 C (28 Nos.)
- Air heaters for STV 4- x-E-113 D (28 Nos.)
- Air compressor package (1 No.)
- Liq. Nitrogen Buffer vessel (1 No.)

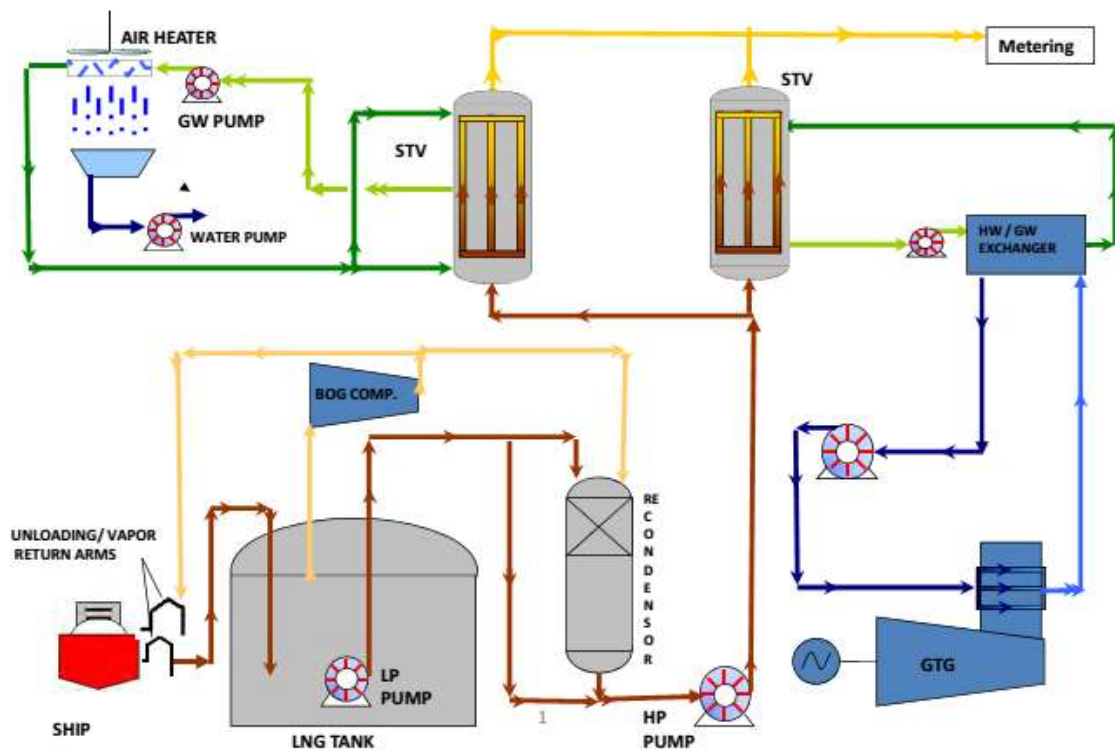
3.5.1 Process Description

LNG at atmospheric pressure and (-)162°C will be transported by sea from LNG exporter by means of specially designed LNG vessels of 80,000 to 2,66,000 m³ capacity. LNG will be unloaded from these vessels by using unloading arms at the dedicated LNG berth suitable for berthing these vessels. The unloaded LNG will be pumped through dedicated pipelines to the LNG storage area. Subsequently LNG will be gasified in the regasification area.

After regasification, Natural Gas (NG) will be made available to various NG consumers' e.g., power industry, fertilizer manufacturers, glass industries, steel industry, domestic consumer, as automotive fuel etc. It is to be noted that LNG provides the most economical and most environmental friendly option. As per optimization strategy existing facilities have closed loop waste heat recovery Shell & Tube LNG vaporizers, to recover waste heat from flue gases from gas turbine generator exhaust. Also cold energy from LNG is being utilized for air conditioning of buildings. Typical LNG unloading and regasification facilities process flow is shown in

Figure 3-1.

Figure 3-1: Process Flow Diagram – LNG Terminal



3.6 Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished product.

The major material handling with its source are given below in following tables.

Table 3-2: Storage Details of Raw Material

S. No.	Chemical	State	Means of Storage	Capacity of Storage Means	No. of Storage means	Total Net Capacity	Pressure, approx.	Temperature, approx.	Status
1	LNG	Liquid	On shore full containment cryogenic	148000 m ³	4	592000	130 mbarg	minus 160 degC	Installed

			storage tanks						
2	LNG	Liquid	On shore full containment cryogenic storage tanks	170000 m ³	2	340000	130 mbarg	minus 160 degC	Installed
3	LNG	Liquid	On shore full containment cryogenic storage tanks	170000 m ³	2	340000	130 mbarg	minus 160 degC	Under Construction

Table 3-3: Transportation Details

S. No.	Chemical	State	Means of Storage	Means of Transport
1	Raw Material: LNG	Liquid	Cryogen Tanks	Cryogen ships
2	Finished Product: Regassified LNG (RLNG)	Gas	On shore full containment cryogenic storage tanks	Pipeline

3.7 Resource optimization/ recycling and reuse envisaged in the project, if any, should be briefly outlined.

Water from STP, and water generated during regassification process is used for gardening and other purposes.

3.8 Availability of water, its source, energy/power requirement and source should be given

3.8.1 Water consumption

Primary Source: Water is generated from air heaters due to condensation of moisture present in atmosphere during regasification process in shell and tube vaporizers (STV). This water is being collected, filtered and used to fulfil water requirement of the site.

Secondary Source: GIDC Water Supply System

Table 3-4: Water Consumption Details

S. No.	Area of Consumption	Fresh Water Quantity, KLD		
		Existing	Proposed	Total
1	Domestic	21.2	93.8	115
2	Industrial	0	0	0
4	Others (Gardening, Fire water make up and CSR)	0	55	55
Total Water Requirement		21.2	148.8	170

Note: For proposed quantity of fresh water, separate application has been submitted to GPCB as amendment to existing CC&A no. AWH-98613 dated 16/04/2019. Addition of water quantity is required as the plant capacity has been increased in phase wise manner, due to increase in contractual manpower and as make-up for fire water.

Power

Construction Phase: Existing Captive/Grid power shall be used for construction purposes.

Operational Phase: The source of power for the existing terminal is through captive power Plant (5 x 7.7 MW GTGs) and 30 MVA grid line of Gujarat Electricity Board. Captive power plants are operated during power failure only. Also, two DG sets of 1000 KVA and 1500 KVA are installed for emergency power backup.

The existing power requirement of the terminal is 25.8 MW and. After commissioning of proposed Regasification Expansion, the power requirement of the terminal will increase to approx. 30.5 MW.

No additional GTG or DG set are proposed in the project.

Fuel Consumption

Natural Gas and HSD will be used as fuel.

Table 3-5: Fuel Consumption

Sr. No.	Fuel	Quantity
Existing Details		
In Gas Turbine Generators (5 Nos.)		
1.	Regasified LNG (RLNG)	4.5 MT/hr (each)
In Submerged Combustion Vaporizer (4 Nos.)		
2.	Regasified LNG (RLNG)	1.25 MT/hr (each)
In Submerged Combustion Vaporizer (1 Nos.)		
3.	Regasified LNG (RLNG)	2.5 MT/hr
In submerged Combustion Vaporizer (2 Nos.)		
4.	Regasified LNG (RLNG)	3 MT/hr/SCV (max)
For Emergency DG Sets (2 no.)		
6.	HSD	390 ltr/hr and 441 lt/hr (max)
Proposed Expansion		
In submerged Combustion Vaporizer (1 Nos.)		
5.	Regasified LNG (RLNG)	3 MT/hr (max)

3.9 Quantity of waste to be generated (liquid and solid) and scheme for their management /disposal

3.9.1 Waste Water Generation, Treatment and Disposal

Existing wastewater generation is 17.2 KLD and will be 100 KLD after proposed expansion.

Table 3-6: Waste Water Generation Details

S. No.	Activity	Waste Water Generation in KLD		
		Existing	Proposed	Total
1	Domestic	17.2	82.8	100
2	Industrial	0	0	0
	Total	17.2	82.8	100

Note: For proposed waste water generation, separate application has been submitted to GPCB as amendment to existing CC&A no. AWH-98613 dated 16/04/2019. Addition of waste water generation is required as the plant capacity has been increased in phase wise manner and due to increase in contractual manpower.

Details of Waste Water Treatment Plant

There is no generation of any liquid effluent from the process area. Existing STP of capacity 100 KLD is adequate to handle additional domestic waste water.

Details of STP

Capacity: 100 KLD

Design Basis:

S. No.	Parameter	Unit	Inlet Characteristics	Outlet Characteristics
1	pH	-	5.5-9.0	6.5-8.5
2	BOD (3 days at 20 degree C)	mg/l	350	<3
3	COD	mg/l	600	<30
4	Suspended Solids	mg/l	370	<10
5	Oil & Grease	mg/l	50	<1
6	Total Coliform	MPN/100ml	10000	<100
7	Faecal Coliform	MPN/100ml	5000	<100

Process Description

The sewage treatment plant is broadly classified into following sections, namely:

1. Primary Treatment
2. Biological Treatment
3. Polishing Unit
4. Dosing System
5. Sludge Handling

1. Primary Treatment

1.1. Stilling Chamber

The raw sewage is pumped to stilling chamber via the pumping station to reduce the turbulence of effluent.

1.2. Fine Screen

At downstream side of stilling chamber fine screen is provided for removal of fine particles which have escaped from pumping station.

1.3. Grit Chamber

Any remaining grit that may travel downstream is prevented in grit chamber which settles in the bottom of the tank. The solids can be removed over a period of time from the bottom of the tank.

1.4. Equalization Tank

The water from grit chamber is then collected in the equalization tank. This tank is provided for homogeneous mixing and storage of the incoming sewage for a period of 12 hours.

1.5. Biological Treatment

Biological treatment is used in degradation of the organic pollutants present in wastewater. In the MBR Technology has been considered for the following treatment scheme.

1.6. Anoxic Tank

The anoxic tank provided here is the first step of MBR technology. The nitrate is formed by nitrification process by the assistance of nitrogen removal biomass which is then sent to aerobic tank there by reducing oxygen load on the latter one. In anoxic tank slow speed agitator will be provided for keeping the biomass in suspension. In nitrification process excess air is not required for degradation of nitrogenous organic compound. To maintain biomass ratio in anoxic tank recirculation of MLSS was provided by recirculation pump.

1.7. Aeration Tank with Submerged Membrane Bio Reactor(MBR):

MBR (Membrane Bio Reactor) it is technology in which aeration and filtration is provide in the same tank, the aeration is provided to conduct biological process after which water passes through the submerged membrane present with in same tank. After anoxic process aeration takes place in this tank. The biological reaction is sustained by maintaining a required level of MLSS in the aeration tank. The generation of biomass reduces the incoming BOD and COD to greater than 95%. Oxygen transfer is achieved by means of fine bubble diffusers placed at the bottom of the tank. Suitable air blowers are provided to maintain an adequate flow of air through the aeration tank.

The membranes are made up of PVDF material. The membrane fibber consists of two outer layers with an inner support layer. This unique construction gives the membrane the high resistance towards physical damage and high chlorine resistance. The hydrophobic properties of the membrane help in fouling resistance. Permeate withdrawal is from both the ends of the membranes. This feature ensures that the uniform flux is maintained throughout the membrane fibber length.

2. Polishing Unit

In MBR technology, membrane filter acts like filter, therefore micro filter is not required. The activated carbon filter has been provided instead for any traces of solids that may be present in water, as well as for colour and odour removal.

2.1. ACF

Biologically treated and filtered water goes to Activated carbon filter for removing particle that may have present in water.

The filtration medium consists layer of activated carbon media which is supported by gravel. The filter will be operated manually. Filter Feed Pump is provided for generating necessary operating pressure in the filter. Raw water is passed through side stream of activated carbon filter to reduce the colour present in the raw water.

2.2. Treated Water Tank

The treated water after undergoing bio-logical process followed by filtration is stored in the treated water tank for a retention time of 30 min, where in the dosing of Hypo is given to the treated water in the tank.

3. Dosing System

3.1. Poly Dosing

The PE dosing system consists of 01 nos. dosing tanks (1W+0S) & 02 nos. Dosing pumps (1W+1S). The MOC of dosing tank is HDPE.

3.2. Hypo Dosing

The Hypo dosing system consists of 01 nos. dosing tanks (1W+0S) & 02 nos. Dosing pumps (1W+1S). The Hypo dosing rate consider 5 ppm to disinfect water.

4. Sludge Handling System

4.1. Bag Filter

The sludge from biological treatment is sent to sludge handling facility where excess water is removed with the help of Bag filter

5.4.2. Sludge Storage

The dewatered sludge from bag filter is stored in the sludge storage shed for disposal.

3.9.2 Solid and Hazardous Waste Generation and Disposal

Solid waste generation and its disposal details is given in **Table 3-7**.

Table 3-7: Hazardous Waste Generation and disposal Details

S. No.	Type of Waste	Hazardous Waste Category	Hazardous Waste Generation in MT/Month			Treatment / Disposal
			Existing	Proposed	Total After Proposed Expansion	
1	Used/Spent oil	5.1	9 KL/Year	6 KL/Year	15 KL/Year	Collection, Storage, Transportation, disposed by selling to registered Rerefiner
2	Waste Residue containing Oil	5.2	500 Kg/Year	8500 Kg/year	9000 Kg/year	Collection, Storage, Transportation & Disposal at TSDF for incineration
3	Industrial use of paints & ink waste	21.1	500 Kg/Year	8500 Kg/year	9000 Kg/year	Collection, Storage, Transportation & Disposal at TSDF for incineration
4	Insulation waste	33.1	500 Kg/Year	8500 Kg/year	9000 Kg/year	Collection, Storage, Transportation & Disposal at TSDF for land filling
5	Empty barrels, containers/liners contaminated with hazardous waste	33.1	4.5 MT/year	–	4.5 MT/year Or 500 nos	Collection, Storage, Transportation & Disposal by sending to approved decontamination facility
6	Spent Carbon or filter medium	36.2	--	2 MT/YEAR	2 MT/YEAR	Collections, storage, transportation to approved TSDF for landfilling.

Note: For proposed quantity of hazardous waste generation, separate application has been submitted to GPCB as amendment to existing CC&A no. AWH-98613 dated 16/04/2019 Addition of hazardous waste categories and quantities are required as the plant capacity has been increased in phase wise manner and secondly due to ageing of plant frequency of preventive maintenance of equipment (generating oil waste, oil containing cotton/cloth, paint waste, insulation waste, etc.) is higher.

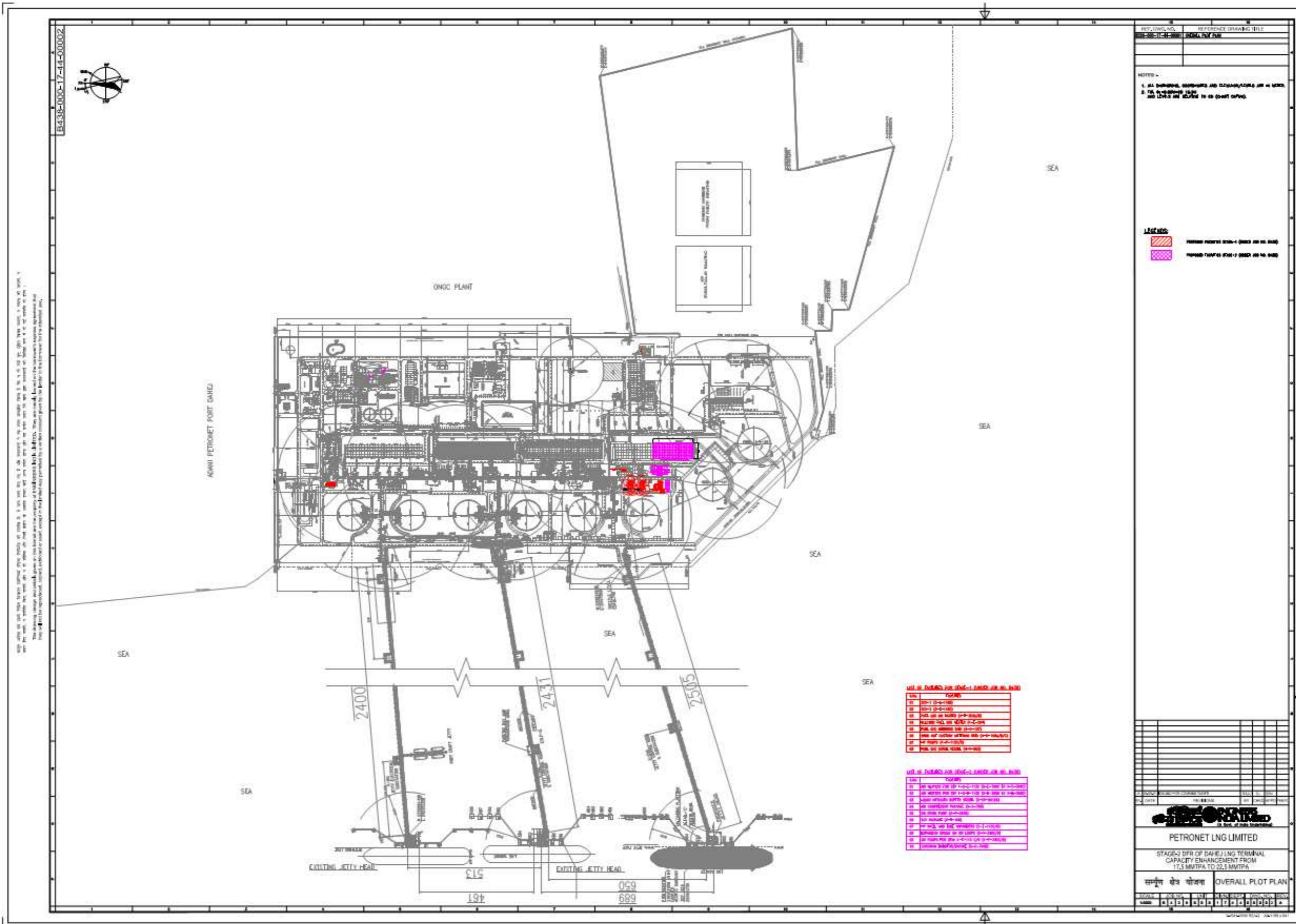
3.10 Schematic representations of the feasibility drawing which give information of EIA purpose.

A drawing (i.e. Site Layout Plan) explaining the salient project features is shown in **Figure 3-2**. Area break up at site is given in **Table 3-8**.

Table 3-8: Area Break Up at Site

S. No.	Title	Area, m ²			% of total Area
		Existing	Additional	Total	
1	Process Area	92475	5350	97825	7
2	Storage Area	37875	-	37875	2.9
3	Green Belt	196000	-	196000	14.8
4	Road and Open area	996422	-5350	991072	75.3
	Total	1322772	0	1322772	100

Figure 3-2: Site Layout Map



4 SITE ANALYSIS

4.1 Connectivity

Most of the industries in Dahej are located in GIDC Industrial Area. The study area is well connected by roads to Bharuch. All the areas in the study area linked either by 4 lane roads.

Nearest Railway station available from the site is Bharuch (~50Km, E).

4.2 Land Form, Land Use and Land ownership

The total plot area of the existing unit is 132.27 ha. As the project is located in notified industrial estate, the land use of the project site is industrial. The plot has been allotted by GIDC, Forest department and Gujarat Maritime Board (GMB) for LNG terminal. No additional land is required for proposed construction.

4.3 Topography (along with map)

Detailed Land Use / Land cover study will also be carried out as part of study.

4.4 Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ)), shortest distances from the periphery of the project to periphery of the forests, national park, wildlife sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the gazette notification should be given.

Land use pattern: Land use is for industrial purpose.

Table 4-1: Distance of Project Site from Sensitive Areas

Description	Approx. Distance from the Project Site (km)	Direction
Lakhigam RF	0.437	N
Dahej RF	2.80	N

Table 4-2: Distance of Project site from Water Bodies

Water body	Approx. Distance from the Project Site (km)	Direction
Gulf of Khambhat	0	W
Narmada River	1.36	SE
Ban Khadi	5.53	N
Ghughar Khadi	6.53	N

4.5 Existing Infrastructure

The project site is located in Dahej Industrial Area developed by GIDC. The area is well equipped with supporting infrastructure including approach roads, bypass roads, over bridge, drainage, parking facility, water pipeline, electricity etc.

4.6 Soil Classification

Not required

4.7 Climatic data from secondary sources

The general agro-climatic zone of the study area is Semi-Arid.

Information presented in subsequent paragraphs is from the Indian Meteorological Department (IMD), Long Term Climatological Tables, 1981-2010, Surat. These tables give useful information about a region's weather, since they are collected over a 30-year period.

Temperature

- Mean daily maximum temperature is recorded in the month of April at 36.7°C.
- January is generally the coldest month, with a minimum temperature of 15.2 °C.
- During the post-monsoon months of October and November, day temperatures remain between 18.9 - 23.2 °C. In winters, i.e. December, January and February, average day temperatures remain between 14.3- 15.6 °C.

Wind

Table 4-3: Predominant Wind Direction

Month	Predominant Wind					
	First		Second		Third	
	Morning	Evening	Morning	Evening	Morning	Evening
January	CALM	NW	N	N	NE	NE
February	CALM	NW	N	N	NE	W
March	CALM	NW	N	W	NE	N
April	CALM	SW	SW	W	S	NW
May	SW	SW	CALM	W	W	S
June	SW	SW	W	S	S	W
July	SW	SW	W	W	S	S
August	SW	SW	CALM	W	W	S
September	CALM	SW	SW	W	W	CALM
October	CALM	CALM	SE	NW	NE	SW
November	CALM	CALM	NE	NW	E	NE
December	CALM	NW	NE	N	N	CALM

Rainfall

The total rainfall in year is observed to be 1202.8 mm. Distribution of rainfall by season is 2.4 mm in winter (December, January, February), 4.5 mm in summer (March, April, May), 1147.1 mm in monsoons (June, July, August, September) and 49.5mm in post-monsoons (October, November, December).

Cloud Cover

The area remains cloudy between July-August, which is the active period of the monsoon season. Generally, cloud cover ranges up-to 6-7 OKTAS during this monsoon season. During post-monsoon season, cloud cover almost becomes 0 OKTAS. In the summer season cloud cover is predominantly 0 OKTAS occasionally going to 3-5 OKTAS.

Humidity

Most humid conditions are found in the monsoons, followed by summer, post-monsoons, and winter in that order. Mornings are more humid than evenings and humidity ranges from a high of 78-86% in monsoon mornings to

alow of 34-43% in winter evenings. During post-monsoon season, in morning humidity remains between 65-73 % and in the evening it remains between 43-52%.

4.8 Social infrastructure available

Being a small to medium scale investment, provision of additional social infrastructure such as schools, health centers, drinking water facilities etc are not envisaged. However, these facilities are adequately available in the Jhagadia and Bharuch Region. Where feasible and required, such infrastructure will be augmented, if required.

5 PLANNING BRIEF

5.1 Planning concept (type of industries, facilities, transportation, etc.) Town and Country Planning / Development Authority Classification

The tentative chart for the plant commissioning is as follows:

Table 5-1: Tentative Planning of Project

Activity	Planned Completion Date
Pre Study, DFR	Completed
Basic engineering	October 2022
Detail engineering & Procurement with Mechanical Completion	January 2025
Testing/commission and commercial production	March 2025

Note: All dates are tentative

5.2 Population Projection

Construction workers will mostly be employed from local area.

The total manpower requirement will be as follows:

Construction Phase: 300 temporary employments will also be generated during installation phase through Contractor / Supplier during peak time of construction.

Operational Phase: The existing manpower of the terminal is 265 nos. No additional manpower is required.

5.3 Landuse planning (breakup along with greenbelt, etc.)

The proposed Landuse at project site will be as given in **Table 5-2**.

Table 5-2: Proposed landuse at project site

S. No.	Title	Area, m ²			% of Total Area
		Existing	Proposed	Total	
1	Process Area	92475	5350	97825	7
2	Storage Area	37875	-	37875	2.9
3	Green Belt	196000	-	196000	14.8
4	Road and Open area	996422	-5350	991072	75.3
	Total	1322772	0	1322772	100

5.4 Assessment of infrastructure demand (Physical & Social)

It is expansion in the existing plant. Specified first-aid box with all necessary facilities will be maintained at site office. Medical facilities, primary health centers are available in nearby villages for advance medical facilities. Communication services like post office, telephone, mobiles are available in nearby villages.

5.4.1 Physical Infrastructure needs

Water: Water demand will be met from GIDC water supply system; construction water demand will be met by condensate water collected in pond which is generated from condensation of moisture present in atmosphere during regassification process

Electricity: Additional 3.0 MW will be met through existing 30kVA GRID line

Equipment:

- SCV Package (1 No.)
- HP Shell & Tube Vaporizers (2 Nos.)
- Expansion Drums on GW Loops (2 Nos.)
- GW Pumps for STVs x-E 113 C/D (2 Nos.)
- GW Drain Pump with GW Drain Drum (1 No.)
- Corosion Inhibitor/ Biocide (1 No.)
- Air Heaters for STV 4-x-E-113 C (28 Nos.)
- Air heaters for STV 4- x-E-113 D (28 Nos.)
- Air compressor package (1 No.)
- Liq. Nitrogen Buffer vessel (1 No.)

5.5 Amenities / Facilities

5.5.1 Greenbelt Development

Green belt of 1,96,000 m² has been developed which is 14.8% area of site.

5.5.2 Safety system

Different safety measures provided at PLL is given in **Annexure 3**.

5.5.3 Storm water management plan

Storm water drains are provided and Storm water from the entire plot is collected through network of storm drains and routed to sea.

5.5.4 Rainwater harvesting system

No rainwater harvesting is done as there is continuous water generation, during regassification process of LNG (water gets condensed from moisture present in atmosphere in air heaters).

6 PROPOSED INFRASTRUCTURE

6.1 Industrial Area (processing area)

The Project Unit is located at Plot 7/A, Gujarat. It is notified as Industrial Zone. Total Plot Area is of 132.27 ha.

6.2 Residential Area (non-processing area)

Not applicable

6.3 Green belt

1,96,000m² (14.8%) area is already developed as greenbelt.

6.4 Social Infrastructure

Kindly read section 4.8.

6.5 Connectivity (Traffic and transportation road/ rail/metro/water ways etc.)

- **Nearest Railway Station:**
Bharuch Railway Station (47.6 Km, E)
- **Nearest Highway:**
State Highway -206 (adjacent to the site, North)
State Highway-6 (8.3 Km, NE)
- **Nearest Airport:**
Vadodara Airport (130, Km, NE)
- **Nearest Port:**
Hazira Port (64 Km, S).

6.6 Drinking water management (source & supply of water)

Water is being generated due to humidity of atmosphere during regassification process from air coolers. This water is being collected, filtered and used for gardening. The same water is treated in potable water plant and being used for domestic purpose.

6.7 Domestic water requirement is 21.2 KLD . To increase water requirement to 170 kLD, separate application has been submitted to GPCB as amendment to existing CC&A no. AWH-98613 dated 16/04/2019. It is to be noted that there is no additional water requirement for the proposed expansion. Sewage system

Domestic waste water is treated in 100 KLD STP and treated water from STP is used for further gardening/ horticulture purpose. Domestic sewage is also disposed off through septic tank/soak pit in some of buildings.

6.8 Industrial waste management

6.8.1 Air Emission Management

There are 16 nos. of flue gas stacks for existing unit. For proposed expansion, 1 flue stacks are required. Adequate APCMs and stack height are provided to all existing flue gas stacks.

Table 6-1: Flue Gas Stacks

S. No.	Stack No.	Stack Attached to	Type of Fuel used	Fuel consumption per Hr	Stack Height (Please provide the units)	APCM
Existing						
1	VS-01 (Phase-I)	Gas Turbine Generator (GTG) (G-301 A)	Regasified LNG (RLNG)	4.5 MT/hr	30	Low NOx burners
2	VS-02 (Phase-I)	Gas Turbine Generator (GTG) (G-301 B)	Regasified LNG (RLNG)	4.5 MT/hr	30	Low NOx burners
3	VS-03 (Phase-I)	Gas Turbine Generator (GTG) (G-301 C)	Regasified LNG (RLNG)	4.5 MT/hr	30	Low NOx burners
4	VS-04 (Phase-I)	Submerged Combustion Vaporizer (SCV) (E-106 A)	Regasified LNG (RLNG)	1.25 MT/hr	10	Water injection system
5	VS-05 (Phase-I)	Submerged Combustion Vaporizer (SCV) (E-106 B)	Regasified LNG (RLNG)	1.25 MT/hr	10	Water injection system
6	VS-06 (Phase-II)	Gas Turbine Generator (GTG) (G-301 D)	Regasified LNG (RLNG)	4.5 MT/hr	30	Low NOx burners
7	VS-07 (Phase-II)	Gas Turbine Generator (GTG) (G-301 E)	Regasified LNG (RLNG)	4.5 MT/hr	30	Low NOx burners
8	VS-08 (Phase-II)	Submerged Combustion Vaporizer (SCV) (E-107 A)	Regasified LNG (RLNG)	1.25 MT/hr	10	Water injection system
9	VS-09 (Phase-II)	Submerged Combustion Vaporizer (SCV) (E-107 B)	Regasified LNG (RLNG)	1.25 MT/hr	10	Water injection system
10	FS - 01	Flare	-	-	40	-
11	FS - 02	Flare	-	-	80	-
12	VS-10 (Phase-III)	Submerged Combustion Vaporizer (SCV) (3E-118)	Regasified LNG (RLNG)	2.5 MT/hr	12	Low NOx burners
13	VS - 16	Emergency Diesel Generator (EDG) (G-302) 1875 KVA	HSD	390 ltr/hr (max)	17	Adequate Stack Height
14	VS - 17	Emergency Diesel Generator (EDG) (G-303) 2500 KVA	HSD	441 Ltr/hr (max)	30	Adequate Stack Height
15	VS-18	Submerged Combustion Vaporizer (SCV)	Regasified LNG (RLNG)	3 MT/hr	12	Water injection system
16	VS-19	Submerged Combustion Vaporizer (SCV)	Regasified LNG (RLNG)	3 MT/hr	12	Water injection system
Proposed						
17	VS-20	Submerged Combustion Vaporizer (SCV)	Regasified LNG (RLNG)	3 MT/hr	12	Water injection system

Table 6-2: Process Vents

Stack Attached to	Nos. of Stacks	Stack Height in m	Pollutants Emitted	Air Pollution Control Measures Attached
Existing				
No existing process vents				
Proposed				
No additional proposed				

Note: there are no continuous process vents. However, vents are provided for emergency and maintenance purpose.

6.8.2 Waste Water Management

From the existing facility 21.2 KLD domestic waste water is being generated. Domestic Waste water generated is treated in to STP and treated sewage is being used for gardening. Separate application has been submitted to GPCB as amendment to existing CC&A no. AWH-98613 dated 16/04/2019 for additional 82.2 KLD sewage which will be treated in existing STP and treated water will be used for gardening/horticulture within the premises. It is to be noted that there is no additional waste water generation from the proposed expansion.

6.9 Solid waste management

The solid wastes generated from the plant operations will be disposed off in nearby Waste Management landfill facility.

6.10 Power requirement & supply/ source

Construction Phase: Existing Captive/Grid power shall be used for construction purposes.

Operational Phase: The source of power for the existing terminal is through captive power Plant (5 x 7.7 MW GTGs) and 30 MVA grid line of Gujarat Electricity Board. Captive power plants are operated during power failure only. Also, two DG sets of 2500 KVA and 1875 KVA are installed for emergency power backup.

The existing power requirement of the terminal is 25.8 MW and. After commissioning of proposed Regasification Expansion, the power requirement of the terminal will increase to approx. 30.5 MW.

Fuel: Natural Gas for GTGs & HSD for emergency DG sets is used as fuel.

7 REHABILITATION AND RESETTLEMENTS (R& R) PLAN

7.1 Policy to be adopted (central/state) in respect of the project affected persons including home oustees, land oustees and landless labourers (a brief outline to be given)

Not applicable as rehabilitation and resettlement will not be required, since the project lies in a Notified Industrial Area, with land acquisition procedures completed by the GIDC.

8 PROJECT SCHEDULE AND COST ESTIMATE

8.1 Likely date of start of construction and likely data of completion (time schedule for the project to be given)

Project execution is estimated to be 35months (Site visit and FEED Document-05 months+ Tendering stage (from sale till award)-03 months+ Post Award EPC Works including commissioning -27 months).

8.2 Estimated project cost along with analysis in terms of economic viability of the project.

Cost of the proposed project will be Approx. Rs. 271.86 Crores

9 ANALYSIS OF PROPOSAL

9.1 Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.

The proposed project would generate direct and indirect employment opportunities, which will benefit the local people during construction period. These people also include Scheduled Tribes (ST).

Employment will be generated for Workers in skilled or unskilled category.

Business opportunities to the local people shall be available during the construction phase.

It will improve the economy of the local nearby vendors and residents.

The plant site area will be equipped with sufficient infrastructural facilities including drinking water, toilets, sanitation facilities, health centers etc.

The Project shall contribute towards local training and employment programmes.

There will be some boost to the state's business sector, including construction, transport, engineering, and related consultancies.

ANNEXURE

Annexure 1: Copy of Existing EC

F.No.11-63/2011-IA-III
Government of India
Ministry of Environment & Forests
(IA Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.

Dated: 26th February, 2014

To,
The President (Technical),
M/s Petronet LNG Ltd.,
World Trade Centre, 1st Floor,
Babar Road, Barakhamba Lane,
New Delhi - 110 001

Contact Person Details:
Shri M.M. Ahuja,
Tel: 23411411, 23472525,
Fax: 23472550

Subject: Environmental and CRZ Clearance for installation of terminal facilities to handle 10 MMTPA of additional LNG at PLL, Dahej, Gujarat by M/s Petronet LNG Limited - Reg.

This has reference to your letter No: PLL/DAHEJ/MOEF/2013 dated 23.09.2013 seeking prior Environmental and CRZ Clearance for the above project under the EIA Notification - 2006 and Coastal Regulation Zone (CRZ) Notification, 2011. The proposal has been appraised as per prescribed procedure in the light of provisions under the EIA Notification - 2006 and Coastal Regulation Zone Notification, 2011 on the basis of the mandatory documents enclosed with the application viz., the Questionnaire, recommendation of State Coastal Zone Management Authority, EIA, EMP and the additional clarifications furnished in response to the observations of the Expert Appraisal Committee constituted by the competent authority in its meeting held on 26th - 28th December, 2013.

2. It is interalia, noted that the proposal involves installation of terminal facilities to handle 10 MMTPA of additional LNG at Petronet LNG Ltd, Taluka Vagra, District, Bharuch Dahej, Gujarat. Dahej LNG Terminal is presently operating at its full capacity of 10 Million Tonnes Per Annum (MMTPA). The plant has one jetty, four LNG tanks (each having a gross capacity of 160,000 cubic meter) and regasification facilities along with associated utilities (sized for handling 10 MMTPA of LNG). In view of the market scenario and availability of domestic gas and to meet the increased requirement, PLL has planned to augment the capacity of Dahej LNG Terminal from 10 MMTPA to 20 MMTPA (Phase III expansion). Total installed capacity shall be 20 MMTPA after expansion, with provisions to carry out the same in a phased manner, Phase-III(A) (10 to 15 MMTPA) estimated to be completed by end 2016 and Phase-III(B) (15 to 20 MMTPA) by end 2020. Utilities and other associated

1



facilities shall be installed for 20 MMTPA capacity in Phase-III(A) itself. The land requirement for the proposed expansion is 58.62 ha. The total cost of the project for Phase-III(A) is Rs. 2950 crores and for Phase-III(B) is Rs. 2700 crores.

3. The Major additional equipment/facilities proposed are LNG Storage Tanks (each of 180,000 cbm gross capacity), In-Tank Pumps, BOG Compressors, BOG recondensor, HP Pumps, STV, STV (cogen), Send out metering, Fuel gas station, Air heaters, Glycol Water pumps, Hot water pumps, GW expansion vessel, GTG, Nitrogen unit etc. According to Project Proponent, proposed expansion will be constructed in accordance with the NFPA 59 A- Standard for the Production, storage and handling of liquefied Natural gas, IOSD-194- Standard for Storage and handling of LNG, EN 1473- Installation and equipment for LNG- Design of onshore installations. Existing facilities are in compliance with M.B. Lal Committee report and same will be followed for the proposed project. The Risk Assessment/Hazard analysis has been done for various scenarios of associated risks and the local meteorology. LNG release modelled for gaseous dispersion using the model ALOHA- Area Locations of Hazardous Atmospheres developed by National Ocean Atmospheric Administration - USA (NOAA) and US Environmental Protection Agency (USEPA). In all scenario, the risk contours will remain well within the plant boundary limit. The modelling suggested that maximum vulnerable heat radiation will not spread beyond 181 m, nearest village is at 1.5 km from the proposed expansion facility. Hence, human habitation will not be affected.

4. The ToRs were finalised by EAC in its 108th meeting held on 10th - 11th January, 2012 including conduct of Public Hearing. Public Hearing was conducted on 19.06.2013 at the site. In general, the public welcomed the project. The issues raised during the Public Hearing were infrastructure facilities such as Schools, roads for the nearby villages and employment for the educated and skilled persons. The responses provided by the Project Proponent were examined by the EAC. The Committee was satisfied with the response. The Project Proponent informed that compliance of EC, are being regularly submitted to the RO, MoEF. The inspection report submitted by the Gujarat Pollution Control Board dated 24.05.2013, shows compliance with the consent conditions. 10m width of green belt on sea side and 50m on other three sides will be developed. The Project Proponent committed to plant mangroves in 1050 ha by 2015 and already plantation in an area of 650 ha has been developed in consultation with State Forests Department/ Gujarat Ecological Commission.

5. HTL/LTL demarcation has been carried out by IRS, Anna University and according to the demarcation, there is no eco-sensitive area in the study area. The Forests and Environment Department, Government of Gujarat has granted approval on 30.10.2013 for diversion of 22.62 ha forests land based on the formal approval of MoEF, RO, Bhopal dated 05.08.2013. The Gujarat Coastal Zone Management Authority has recommended the project vide letter no. ENV-10-2013-71-E dated 13.01.2014.

6. The details presented by the Project Proponent were examined by the EAC in its 129th EAC in December, 2013. The Expert Appraisal Committee, after due consideration of the relevant documents submitted by the project proponent and additional clarifications furnished in response to its observations, have recommended for the grant of Environmental and CRZ Clearance for the project. Accordingly, the Ministry hereby accord necessary Environmental and CRZ Clearance for the above project as per the provisions of Environmental Impact Assessment Notification - 2006 and Coastal Regulation Zone Notification, 2011, subject to strict compliance of the terms and conditions as follows:

7. SPECIFIC CONDITIONS:

- (i) "Consent for Establishment" shall be obtained from State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.
- (ii) All the recommendations and conditions stipulated by the Gujarat Coastal Zone Management Authority vide letter no. ENV-10-2013-71-E dated 13.01.2014, shall be strictly complied with.
- (iii) The facility shall be constructed in accordance with the NFPA 59 A- Standard for the Production, storage and handling of liquefied Natural gas, IOSD-194- Standard for Storage and handling of LNG, EN 1473 - Installation and equipment for LNG - Design of onshore installations and M.B.Lal Committee report.
- (iv) Precautionary measures shall be put in place to prevent leakage of LNG due to any disasters including tidal/tsunami wave, seismic and other natural calamities. Disaster Management Plan shall put in place to manage emergencies.
- (v) Oil Spill Contingency Management Plan shall be put in place.
- (vi) Online sensor for load monitoring shall be provided, as committed.
- (vii) Temperature sensors, gas detectors, spill detectors shall be installed to take care of any type of spillage or leakage of the gas from the plant and the trucks.
- (viii) Project proponent shall explore training the local population with the help of training institutes like ITI etc, to make them suitable for employment in the facility.
- (ix) All the recommendation of the EMP, Risk Assessment and Disaster Management Plan shall be complied within letter and spirit. All the mitigation measures submitted in the EMP/DMP report shall be prepared in a matrix format and the compliance



for each mitigation plan shall be submitted to MoEF along with half yearly compliance report to MoEF-RO.

- (x) A separate Environment Monitoring Cell shall be set up especially for this plant and details shall be submitted to the Ministry prior to the commencement of operation.
- (xi) Construction activity shall be carried out strictly as per the provisions of CRZ Notification, 2011. No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.
- (xii) No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.
- (xiii) The project proponent shall set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive.
- (xiv) The funds earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes.

8. GENERAL CONDITIONS:

- (i) Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality.
- (ii) Full support shall be extended to the officers of this Ministry/Regional Office at Bhopal by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities.
- (iii) A six-Monthly monitoring report shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bhopal regarding the implementation of the stipulated conditions.
- (iv) Ministry of Environment & Forests or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environment and the same shall be complied with.
- (v) The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry.



- (vi) In the event of a change in project profile or change in the implementation agency, a fresh reference shall be made to the Ministry of Environment and Forests.
- (vii) The project proponents shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of land development work.
- (viii) A copy of the clearance letter shall be marked to concerned Panchayat/local NGO, if any, from whom any suggestion/representation has been made received while processing the proposal.
- (ix) State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industries Center and Collector's Office/Tehsildar's office for 30 days.

9. These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification 1994, including the amendments and rules made thereafter.

10. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

11. The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental and CRZ Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at <http://www.envfor.nic.in>. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bhopal.

12. This Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

13. Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

14. Status of compliance to the various stipulated environmental conditions and environmental safeguards will be uploaded by the project proponent in its website.



15. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, ZillaParisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

16. The proponent shall upload the status of compliance of the stipulated Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

17. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of Clearance conditions and shall also be sent to the respective Regional Offices of MoEF by e-mail.


(Lalit Kapur)
Director (IA-III)

Copy to:

1. The Principal Secretary, Department of Forests & Environment and Chairman, GCZMA, Govt. of Gujarat, Sachivalaya, Gandhinagar, Gujarat.
2. The Director, Forests & Environment Department, Govt. of Gujarat, Block No.14, 8th Floor, Sachivalaya, Gandhinagar - 382 010.
3. The Chairman, CPCB, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 32.
4. The Chairman, Gujarat State Pollution Control Board, Paryavaran Bhawan, Sector 10 A, Gandhinagar-382 010.
5. The Chief Conservator of Forests, Ministry of Environment and Forests, Regional Office, Western Region, Kendriya Paryavaran Bhavan, Link Road No. 3, Ravishankar Nagar, Bhopal-462016 (M.P.)
6. Guard File.
7. Monitoring Cell, MoEF.


(Lalit Kapur)
Director (IA-III)

F. No. 11-63/2011-IA-III
Proposal No. : IA/GJ/IND2/165726/2020
Government of India
Ministry of Environment, Forests and Climate Change
(L.A. Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Ali Ganj,
New Delhi - 110003
E-mail: adraju@gmail.com
Tele fax: 011: 24695236

Dated: 4th December, 2020

To
The President (Technical)
M/s Petronet LNG Limited
World Trade Centre, 1st Floor, Babar Road,
Barakhamba Lane, New Delhi - 110001

Subject: Installation of terminal facilities to handle 10 MMTPA of additional LNG at M/s Petronet LNG Limited (PLL), Dahej, Gujarat by M/s Petronet LNG Limited - Extension of validity of Environmental and CRZ Clearance

Ref.: (i) MoEF EC letter No. 11-63/2011-IA-III dated 26th February 2014
(ii) Your letter No. PLL/DAHEJ/MOEF/2020, dated 16th October 2020

Sir,

This is in continuation of this Ministry's letter referred above and your letter under reference, wherein you have requested the Ministry for Extension of Validity of the aforesaid proposal.

2. The Project is being executed in phased manner. M/s Petronet LNG Limited (PLL) currently owns and operates two LNG Regasification Terminals in India, one of them is located at Dahej, state of Gujarat, having a capacity of 17.5 MMTPA and another regasification terminal at Kochi, state of Kerala, having capacity of 5 MMTPA. The project was accorded Environmental clearance for 10 MMTPA (Phase-I) and 10 MMTPA to 20 MMTPA vide Ministry's letter No. J-17011/11/2000-IA-III dated 27.12.2000 and Letter No. 11-63/2011-IA-III, dated 26th February, 2014, respectively. Expansion from 10 to 15 MMTPA under project Phase-III A – comprising of addition of two LNG storage tanks (each of 180,000 cum gross capacity) and 5 MMTPA of LNG Regasification facilities and the project was completed in the year 2016. Expansion from 15 to 17.5 MMTPA under project Phase-III B1 – comprising of addition of 2.5 MMTPA of LNG Regasification facilities and the project was completed in the year 2019. It was also apprised that the validity of current Consent to Establish (CTE), CTE-104396, issued vide Gujarat Pollution Control Board letter no. GPCB/BRC11-B/CCA-611(4)/ID-15479/551243 dated 15/01/2020 is upto the Environment Clearance date i.e. 26/02/2021.

3. Details of the EC granted are as under:

i. 10 MMTPA (Phase-I): EC letter No. J-17011/11/2000-IA-III dated 27.12.2000

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ii. 1st Expansion from 10 MMTPA to 20 MMTPA: Letter No. 11-63/2011-IA-III, dated 26th February, 2014

- (i) Expansion from 10 to 15 MMTPA (Phase-IIIA)- Completer in year 2016
- (ii) Expansion from 15 to 17.5 MMTPA (Phase-IIIB1) – Completed in year 2019
- (iii) Expansion from 17.5 to 20 MMTPA (Phase-IIIB2) – yet to be completed

4. Proposed employment generation from expansion in Phase-IIIB2 is 2500 employments during construction phase and 30 employments during operation phase. All utilities were designed & constructed for 20 MMTPA capacities during Ph-IIIA project. There is no court case or violation under EIA Notification to the project or related activity.

5. The proponent vide letter No. PLL/DAHEJ/MOEF/2020 dated 22nd May, 2020 requested to extend the validity of Environmental Clearance granted by the Ministry vide letter No. 11-63/2011-IA-III, dated 26th February, 2014 for further period of 40 Months (3 years 4 months)

6. The EAC, taking into account the submission made by the project proponent for the current proposal for "Installation of terminal facilities to handle 10 MMTPA of additional LNG at PLL, Dahej, Gujarat by M/s Petronet LNG Limited" had a detailed deliberation during its 246th meeting on 20th-21st October, 2020 and recommended the proposal for extension of validity of the Environmental and CRZ Clearance granted by the Ministry vide letter No. 11-63/2011-IA-III, dated 26th February, 2014 for a period of three years, i.e. up to 25th February, 2024 with conditions as specified in the same Environmental Clearance letter and following additional condition.

i. Marine ecological monitoring and its mitigation measures for protection of phytoplankton, zooplanktons, macrobenthos, estuaries, sea-grass, algae, sea weeds, crustaceans, fishes mangroves and migratory birds etc. shall be undertaken through a reputed university/institute with financial support as desired. Six monthly report of the studies to be provided to the regional office of MoEFCC

7. The Ministry of Environment, Forest and Climate Change has considered the proposal based on the recommendations of the Expert Appraisal Committee (Infrastructure, CRZ and other Miscellaneous projects) and hereby decided to accord extension of validity of EC of aforementioned project, issued by the Ministry vide letter No. 11-63/2011-IA-III, dated 26th February, 2014 for a period of three years, i.e. up to 25th February, 2024 under the EIA Notification, 2006 as amended, subject to strict compliance of the all conditions specified in the EC letter and in addition to additional condition prescribed by the EAC.

This issue with the approval of the competent Authority


(Amardeep Raju)
Scientist-E

Copy to:

1. The Principal Secretary, Department of Forests & Environment and Chairman, GCZMA, Govt. of Gujarat, Sachivalaya, Gandhinagar, Gujarat
2. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi – 32

3. The Member Secretary, Gujarat Pollution Control Board, Sector 10-A, Gandhi Nagar – 382043, Gujarat.
4. The APCCF (C), MoEF& CC, RO (WZ), E-5, Kendriya Paryavaran Bhawan, Arera Colony, Link Road No.3, Ravishankar Nagar, Bhopal –16
5. Monitoring Cell, MoEF&CC, Indira Paryavaran Bhavan, New Delhi.
6. Guard File/Record File
7. Notice Board.


(Amardip Raju)
Scientist-E

Annexure 2: Copy of Existing Consent**GUJARAT POLLUTION CONTROL BOARD**

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

BY R.P.A.D

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution) Act-1981 and Authorization under "Hazardous Waste (Management & Trans boundary Movement) Rule-2016." framed under E (P) Act- 1986.

And whereas Board has received consolidated application vide Inward no: 145577 dated: 12/11/2018 for the consolidated consent and authorization (CC&A) of this board under the provisions/ rules of the aforesaid Acts consent & Authorization is hereby granted as under:

CONSENT AND AUTHORISATION:
(Under the provisions / rules of the aforesaid environmental acts)

To,
M/S. PETRONET LNG LTD.
PLOT NO: 7-A,
GIDC ESTATE DAHEJ,
TAL: VAGRA, DIST: BHARUCH.

- Consent order No: AWH-98613 Date of Issue-08/01/2019.
- The consent under Water Act 1974 shall be valid up to 23/02/2024. The consent under Air Act - 1981, Authorization under Environment (Protection) Act. 1986 shall be valid up to 23/02/2024 to operate industrial plan for manufacture of the following products:-

Sr. No.	Name of Product	Quantity
1	Regasified LNG(RLNG)	417000 MT/Month (Phase-I)
2	Regasified LNG(RLNG)	417000 MT/Month (Phase-II)
3	Regasified LNG(RLNG)	417000 MT/Month (Phase-III A)
4	Regasified LNG(RLNG)	417000 MT/Month (Phase-III B)

- SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS RELATED TO ENVIRONMENT CLEARANCE (EC):-**

- The applicant shall not produce any products as well as not carry out any activities for products/process listed in the EIA Notification dated 14/09/2006 as amended from time to time, requiring prior Environmental Clearance from competent authority.
- Applicant shall strictly comply/fulfill with all the conditions stipulated by competent authority in the order of Environmental Clearance & CRZ clearance issued vide letter no. J-17011/11/2000-IA-III, dated: 27/12/2000.
- Applicant shall strictly comply/fulfill with all the conditions stipulated by competent authority in the order of Environmental Clearance & CRZ clearance issued vide letter no. J-17011/11/2000-IA-III, dated: 28/11/2005.
- Applicant shall strictly comply the CRZ Clearance condition ref no. EVN-10-2000-181-P1, dated: 15/11/2000.
- Applicant shall strictly comply the CRZ Clearance condition ref no: EVN-10-2004-117-P, dated: 28/12/2005.
- Applicant shall strictly comply the Clearance ref no. J-1711/11/2000-IA-III dated: 14/11/2008.

Page 1 of 6

Clean Gujarat Green Gujarat
ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

- 3.7. Applicant shall strictly comply/fulfill with all the conditions stipulated by competent authority in the order of Environmental Clearance & CRZ clearance issued vide letter no. F. No. 11-63/2011-IA-III dated: 26/02/2014.

4. CONDITIONS UNDER WATER ACT:-

- 4.1 The quantity of total water consumption shall not exceed 21.2 KL/day. (Break up as below)
(a) Domestic – 21.2 KL/ day.
(b) Industrial – NIL
- 4.2 The quantity of total waste water generation shall not exceed 17.2 KL/day. (Break up as Below)
(a) Domestic: - 17.2 KL/day.
(b) Industrial: - NIL
- 4.3 There shall be no generation/discharge of the industrial effluent from the manufacturing process and other ancillary industrial operations.
- 4.4 Unit shall maintain Zero Liquid Discharge (ZLD) status.
- 4.5 Sewage shall be discharged into septic tank/ soak pit system.
- 4.6 The unit shall affix water meters and shall keep it operational for the purpose of measuring and recording the quantity of water consumed at such places as may be required and it shall be presumed that the quantity indicated by the meter has been consumed by the industry until the contrary is proved.
- 4.7 Applicant shall ensure & undertake on Rs. 100 stamp paper that it has no outlet in GIDC U/G drain.

5. CONDITIONS UNDER AIR ACT:-

- 5.1 The following shall be used as fuel:

Sr. No.	Fuel	Quantity
In Gas Turbine Generators(5 Nos)		
1.	Regasified LNG (RLNG)	4.5 MT/ hr (each)
In Submerged Combustion Vaporizer(4 Nos)		
2.	Regasified LNG (RLNG)	1.25 MT/ hr (each)
In Submerged Combustion Vaporizer(1 Nos)		
3.	Regasified LNG (RLNG)	2.5 MT/ hr

- 5.2 The flue gas emission through stack attached to various stacks/ vents shall conform to the following standards:

Sr. No.	Stack No.	Stack Attached To	Height (M)	APCM	Parameter	Permissible Limit
1.	VS-01 (Phase-I)	Gas turbine Generator (GTG) G-301 A	30	Low NOx Burners	Particulate Matter SO ₂	150 mg/NM ³ 100 ppm
2.	VS-02 (Phase-I)	G-301 B	30	Low NOx Burners	NOx	50 ppm

**GUJARAT POLLUTION CONTROL BOARD**

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

3.	VS-03 (Phase-I)	G-301 C	30	Low NOx Burners
4.	VS-04 (Phase-I)	Submerged Combustion Vaporizer (SCV) E-106 A	10	Water injection System
5.	VS-05 (Phase-I)	E-106 B	10	Water injection System
6.	VS-06 (Phase-II)	G-301 D	30	Low NOx Burners
7.	VS-07 (Phase-II)	G-301 E	30	Low NOx Burners
8.	VS-08 (Phase-II)	E-107 A	10	Water injection System
9.	VS-09 (Phase-II)	E-107 B	10	Water injection System
10.	FS-01	Flare	40	-
11	FS-02	Flare	80	-
12	VS-10 (Phase-III)	3 E-118	12	Low NOx Burners

- 5.3 There shall be no process emission from the manufacturing process and other ancillary industrial operation.
- 5.4 The applicant shall install & operate a comprehensive adequate air pollution control measures in order to achieve prescribed below.
- 5.5 Stack monitoring facilities like port hole, platform/ladder etc, shall be provided with stacks/vents chimney in order to facilitate sampling of gases being emitted into the atmosphere.
- 5.6 Ambient air quality within and outside the premises of the unit shall conform National Ambient Air Quality standards notified by MOEF vide notification dated 16/11/2009 and mainly to the following standards:-

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient air
1.	Sulphur Dioxide (SO ₂), µg/ m ³	Annual 24 Hours	50 80
2.	Nitrogen Dioxide (NO ₂), µg/ m ³	Annual 24 Hours	40 80
3.	Particulate Matter (Size less than 10 µm) OR PM ₁₀ µg/ m ³	Annual 24 Hours	60 100
4.	Particulate Matter (Size less than 2.5 µm) OR PM _{2.5} µg/ m ³	Annual 24 Hours	40 60

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Clean Gujarat Green Gujarat
ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

*Annual arithmetic mean of minimum of 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 Hourly or 08 Hourly or 01 Hourly monitored values as applicable, shall be complied with 98 % of the time in a year, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: - Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

- 5.7 The applicant shall operate industrial plant / air pollution control equipment very efficiently and continuously so that the gaseous emission always conforms to the given standards.
- 5.8 The consent to operate the industrial plant shall lapse if at any time the parameters of the gaseous emission are not within the tolerance limits specified in the conditions.
- 5.9 The applicant shall provide portholes, ladder, platform etc. at chimney(s) for monitoring the air emissions and the same shall be open for inspection to / and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted /displayed to facilitate identification.
- 5.10 All measures for the control of environmental pollution shall be provided before commencing production.
- 5.11 SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS UNDER AIR ACT:-
- 5.11.1 Total control of odour nuisance from the plant premises, shall be achieved & maintained by the applicant continuously.
- 5.11.2 The applicant shall install continuous /online monitoring system on the stacks for the parameters such as SO₂, NO_x, PM, etc.

6. **AUTHORISATION FOR THE MANGEMENT & HANDLING OF HAZARDOUS WASTES**
Form-2 (See rule 6(2)).

- 6.1 Number of authorization: AWH-98613 Date of Issue-08/01/2019.
- 6.2 M/S. PETRONET LNG LTD, is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at Plot No: 7-A, GIDC Estate Dahej, Tal: Vagra, Dist: Bharuch.

Sr. No.	Type of Waste	Category	Quantity	Disposal
1	Used Oil	5.1	9 KL/Year	Collection, Storage, Transportation and Disposal by selling to registered refiners.
2	Waste Residue containing oil	5.2	500 KG/ Year	Collection, Storage, Transportation and Disposal at TSDF for incineration.
3	Industrial use of paints & ink waste	21.1	500 KG/Year	Collection, Storage, Transportation and Disposal at TSDF for incineration.
4	Insulation waste	33.1	500 KG/ Year	Collection, Storage, Transportation and Disposal at TSDF for land filling.



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

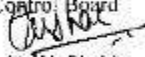
Fax : (079) 23232156

Website : www.gpcb.gov.in

Sr. Nu.	Type of Waste	Category	Quantity	Disposal
5	Empty barrels, containers/ liners contaminated with hazardous waste	33.1	4.5 MT/Year	Collection, Storage, Transportation and Disposal by sending to approved decontamination facility.

- 6.3 The authorization is granted to operate facility for collection, storage, within the factory premises, transportation and ultimate disposal of Hazardous wastes as mentioned in above condition no. 6.2.
- 6.4 The authorization shall be in force for a period up to 23/02/2024.
- 6.5 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.
- 6.6 Unit shall provide separate, adequate storage areas for raw materials, products, each type of hazardous wastes, including for containers containing fresh/used/waste etc.
- 6.7 Unit shall cover the open portion on both sides of the hazardous waste storage area by Providing GI Sheets from the top to the bottom as well as provide slanted sheets in the front Portion, to Prevent ingress of water from outside.
- 7 **TERMS AND CONDITIONS OF AUTHORIZATION:**
- 7.1 The authorized person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.
- 7.2 The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the State Pollution Control Board.
- 7.3 The person authorized shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorization.
- 7.4 Any unauthorized change in personnel, equipment or working conditions as mentioned in this authorization, is being granted constitute a breach of his authorization.
- 7.5 The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;
- 7.6 The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities for Environment Damages due to Handling and Disposal of Hazardous Waste and Penalty".
- 7.7 It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close down the facility.
- 7.8 The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
- 7.9 The record of consumption and fate of the imported hazardous and other wastes shall be maintained.

- 7.10 The hazardous and other waste which gets generated during recycling or reuse or recovery or pre-processing or utilization of imported hazardous or other waste shall be treated and disposed of as per specific conditions of authorization.
- 7.11 The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
- 7.12 An application for the renewal of an authorization shall be made as laid down under these Rules.
- 7.13 Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.
- 7.14 Annual return shall be filed by June 30th for the period ensuing 31st March of the year.
8. GENERAL CONDITIONS:-
- 8.1 Any change in personnel, equipment or working conditions as mentioned in the consents form/order should immediately be intimated to this Board.
- 8.2 Applicant shall also comply with the general conditions given in annexure I attached herewith (No: 1 to 38).
- 8.3 The applicant shall not carry out any activities for which required clearances are not obtained.
- 8.4 If it is established by any competent authority that the damages caused due to their industrial activities to any person or his property, in that case they are obliged to pay the compensation as determined by competent authority.
- 8.5 Regular maintenance of the pipeline shall be carried out to avoid any spillage or leakage during conveyance of the effluent.
- 8.6 Unit shall keep accurate records of their water consumption and wastewater generation, discharge, quantity of each product manufactured, and consumption of electricity on day-to-day basis and shall be required to submit the compiled record for each month to GPCB on or before seventh day of the succeeding month. Separate logbooks shall be maintained for recording all the necessary data.
- 8.7 Magnetic flow meters shall be installed at the various stages of inlet & outlet of pipeline to measure the quantity of effluent at each stage of conveyance.

For and on behalf of
Gujarat Pollution Control Board

(A. V. Shah)
Sr. Environmental engineer

NO:-GPCB/BRCH-B/CCA-611(4)ID-15479/

ISSUED To:-
M/S. PETRONET LNG LTD.
PLOT NO: 7-A,
GIDC ESTATE DAHEJ,
TAL.: VAGRA, DIST: BHARUCH.

Outward No: 50245-1104/2019

Annexure 3: Safety Measures Adopted at Dahej Terminal

1. LNG terminal is constructed according to National and International standards EN-1473, NFPA- 59A, BS- 7777, OISD- 194, etc.
2. Following Safety Studies Carried out during design stages
 - a. Coarse and Detailed Quantitative Risk Assessment (QRA)
 - b. Hazard and Operability (HAZOP) study II
3. Full containment type of LNG Storage tanks with 9% Nickel inner storage tank.
4. Level alarms, Pressure and temperature transmitters, Density meters are installed in LNG storage tanks to continue monitor process parameters.
5. Pressure Safety valve, Vacuum safety valve are installed on LNG storage tanks.
6. Sufficient Portable and continue LEL meters are available.
7. FGS (Fire, Gas leak, Spill detection) System installed in plant area.
8. Motor Operated Valve Pneumatic (MOV), Motor Operated Valve Electrical (MOVE), PERC System installed in unloading Arm (Powered Emergency Release Coupler) etc.
9. Deluge operated Water spray System (Automatic / Manual) installed at all process equipment.
10. Fire hydrant system, Water tower monitors, fire extinguisher system, Inergen extinguishing System, Carbon dioxide flooding system etc. installed as per OISD 194, 116,117,156 and NFPA -13, 59A etc
11. Five nos. Fire Tenders are available with trained fire staff.
12. Two fire water storage tanks of total capacity of 18000 M3 with 4 no. diesel operated and two no. electric operated fire water pumps with pumping capacity of 1050 m3/hr each. Fire water system is suitable to handle worst case fire for 4 hrs.
13. One number Trauma care Ambulance is available all the time
14. Personal Protective Equipment / Respiratory Protective equipment
 - a. Self-Contained Breathing Apparatus
 - b. Air Line respirator
 - c. Canister Mask
 - d. Cryogenic Suit/Apron and Hand Gloves for LNG handling

Safety and Security Management System

1. Separate security access system to enter into operation area (Gas processing Unit) for all employees and contract workmen.
2. X- Ray scanning of all material intakes by visitor / staff / contract worker
3. Contractor/visitor Safety Training through video film and safety instruction cards and safety presentation by HSE department.
4. Following work permit system are strictly followed
 - a. Hot work at height permit
 - b. Cold work permit
 - c. Electrical Lockout / Fluid Lockout permit
 - d. Excavation permit
 - e. Confined space entry permit
 - f. Vehicle Entry permit
 - g. Camera Usage permit
 - h. Working at Height permit
 - i. Scaffold inspection by HSE staff before taking into use
 - j. Suraksha Setu Software used to report and analyse for Unsafe act, Unsafe condition, Near miss, injury and accident
5. The plant Safety Audit is carried out once in a year by LNG terminal experts from Gaz De France Suez, France for enhancing the Safety System and once in a year by National Safety Council.

6. Internal plant audit by trained employees.
7. Dynamic monthly Safety Index Assessment System by third party.
8. Management of Change procedure is strictly followed for any modification inside the plant.
9. Mock drill is conducted at every quarter to check for emergency preparedness.
10. Mutual aid agreement with nearby industries
11. Emergency Response and Disaster plan prepared and accessible to all employees.
12. HSE safety portal on intranet site for HSE communications to employees.
13. Weekly safety alert circulated in every Monday and discussed in management morning meeting.

Portable Fire Extinguisher

DCP	75 kg	50 kg	25 kg	9 kg
	17	18	22	308
CO2	22.5 kg	6.5 kg	4.5 kg	
	17	18	22	
Mechanical Foam	22.5 kg	6.5 kg	4.5 kg	
	17	18	22	

Fire Fighting Facility Details

Name of the System	Total Number	Name of the System	Total Number
Double Hydrant	274	CO2 Flooding System	5
Tower Monitors	4	Inergen System	2
Ground Monitors	11	Nitrogen System	3
Fire Escape Hydrant	9	Deluge Valve	64
Field Hose Reel	22	FM 200	1
Fixed Foam System	9	DCP Skid	1

Fire Alarm and detection

Detector	Total Number	Detector	Total Number
Fire Alarm Panel	19	Flame detector	104
MCP/SPB	70	Spill detector	120
Gas Detector	255		

Medium velocity fixed water facilities are installed which are automatically activated on the detection of a fire by two separate sensors or manually from the FGS PANEL in the Main Control Room (MCR) which are installed at the following locations in plant area:

- LNG TANKS T-101 to T-106
- BOG COMPRESSOR SUCTION DRUM
- BOG COMPRESSORS
- RECONDENSERS
- HP LNG SEND OUT PUMPS

SEND-OUT METERING

- Fuel Gas Electric & Ambient Heater
- Stv Structure
- Scv Area
- LNG MANIFOLD (JETTY AREA)
- LNG drain drum

- Diesel tank area
- Electrical transformers

DENSE WATER CURTAINS ARE ALSO PROVIDED FOR:

- Jetty head & personal access route
- HP LNG pumps shed
- BOG compressor shed
- Truck Loading Facility (TLF)

Annexure 4: Mitigation Measures for Handling

The project envisages handling of natural gas in liquid and gas form. The existing terminal is having state of art advance facility and using full containment LNG storage tanks with one-meter outer concrete wall to hold all the LNG in case of leakage from inner tank. The flange connection in the process piping are minimized to avoid any leakages. However suitable mitigation measures are in place as under:

- Preventive measures like SOP, Work Permit System, and Physical Monitoring are taken to eliminate the chance of accident on account of explosion, spillages, fire or hazardous substances etc.
- Proper maintenance, operation and leak proof condition of machinery on regular basis are taken.
- Sensors and detectors are provided at strategic locations for early detection of any leak.
- Fire hydrant system is provided as per defined guidelines to fight any emergency.
- Fire tenders are made available at designated place to handle any emergency.
- Emergency vehicle are made available at the site to provide transportation to hospital in case of any eventuality.
- Fire extinguishers are made available near all machines and all persons are properly trained to extinguish the fire at source itself.
- Oil spill contingency plan & OHS plan is in place in the terminal.
- Proper risk assessments have been carried out for worst case scenarios and adequate control measures are in place to avoid the leakages and timely detection of leakages, if any.
- OISD/PESO guidelines are followed.
- Mutual aid pact with nearby industries.
- Scheduled Safety Audits are performed
- Regular safety trainings are conducted for all associated manpower.
- ERDMP (Emergency Response and Disaster Management Plan) is place and schedule drills are conducted as per applicable regulations.



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Environment *for* Development

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