Pre-Feasibility Report (PFR)

For

Proposed additional storage facilities 2X600 MT Mounded storage vessel
at
Fatuha Industrial Area, Mauza- Raipura, Fatuha, Patna, Bihar -803201

By
M/s Bharat Petroleum Corporation Limited

Submitted by

Bharat Petroleum
energising lives

Prepared by

ABC Techno Labs®
India Private Limited
(Accredited by NABL, NABET, MOEF)
(An ISO : 9001, ISO : 14001 & OHSAS : 18001 Certified Company)

PROJECT DETAILS

Name of Publication	***Proposed additional storage facilities 2X600 MT Mounded storage vessel atFatuha Industrial Area, Mauza- Raipura, Fatuha, Patna, Bihar.***

Project Number ***Version 1 Released July 2017***

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DISCLAIMER

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CHAPTER 1

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.1 PREAMBLE

Bharat Petroleum Corporation Limited (BPCL), the project proponent, is the highest ranked Indian public sector company in the prestigious Fortune 'Global 500' listing, having 280th position in 2016. BPCL is engaged in refining and marketing of petroleum products. The company is India's one of the largest commercial enterprises.

Oil marketing companies have projected an increase in demand of Liquefied Petroleum Gas (LPG) in future due to increase in its domestic use. The demand is likely to increase substantially over the years to come. Even in the present scenario, it is very difficult to meet the market demand of Patna region and adjoining areas by Bharat Petroleum Corporation Limited. As per directive of the Ministry of Petroleum and Natural Gas, Government of India, different Oil companies are required to augment / construct new facilities to meet the growing demand.

M/s. Bharat Petroleum Corporation Limited (BPCL) has set up LPG Plant at various strategic locations all over the country to cater to the need of consumers. BPCL has set up the Patna LPG Plant at Industrial Estate Mouza– Fatuha at Patna which is 1 km away from Fatuha Railway station of Bihar State. The Plant receives LPG by Bullet trucks which are unloaded & stored in mounded bullets. Its existing storage capacity is of 1500 MT (3x300 MT & 1 x600 MT Mounded Storage Vessels– MSV ongoing construction) & filling of cylinders through 2x24 station electronic carousal. It is located at Fatuha Industrial area, Mouza - Raipura, Fatuha at Patna which is 1 km away from Fatuha Railway station of Bihar State.

BPCL now proposes to install additional 2 no additional Mounded Storage Vessel of 600 MT capacity. Total storage capacities after implementation of the project will be 2700 MT.

Table 1.1: Salient Features of the Plant

Particulars	Details
Company Name	M/s. Bharat Petroleum Corporation Limited (BPCL)
Location	Village : Fatuha Industrial Area, Mauza- Raipura, Fatuha, Patna, Bihar- 803201
Latitude	25°30'7.57"N

Particulars	Details
Longitude	85°19'2.62"E
Category of the Project	As per EIA Notification dated 14th Sept., 2006 as amended from time to time, this project falls under S. No. 6 (Service sectors), Project activity ***"6 (b)"- Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000).***
Total Installed Capacity	Existing: 1500 MT (3x300 MT & 1x600 MT Mounded Storage Vessels – MSV- ongoing construction) & filling of cylinders through 2x24 station electronic carousal. Expansion: 2x600 MT Mounded Storage Vessels - MSV
Land required	21.28 Acres (Existing land area, no additional land required)
Greenbelt / Plantation Area (ha)	Nil
Estimated project cost	INR 3546 Lakhs
Manpower Requirement	Existing manpower: 134 Additional manpower after expansion: Nil Total Manpower:134
Nearest highway	The plant location is 1 km from National Highway NH-30.
Nearest railhead / Railway station	Nearest Railway Station is Fatuha about 1 km from project site.
Nearest airport	Nearest airport is Patna about 30 km from project site
Defence installations	None
Archaeological important places	None
Wild life sanctuaries	None
Nearest major city	Patna – 30 km (NW)
Rivers in 10-km radius	Ganges river – 1.0 km (N)
Hill ranges	None
Seismic zone	The proposed plant-site area falls in Seismic Zone IV as per IS 1893:2002 (Part-1), which is a highly sensitive seismic zone.

1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

LPG product is received through Bullet trucks from Bina & Bitoni. The proposed project envisages expansion of the storage capacity of LPG (Liquefied Petroleum Gas). The Plant has existing storage capacity of 1500 MT, which after implementation of the project will be increased to 2700 MT.

Bharat Petroleum Corporation Limited (BPCL) is a fortune 500 oil refining, exploration and marketing PSU with Navratna status. BPCL has multiple refinery units in Mumbai, Kochi, Numaligarh and Bina.

Bharat Petroleum's Mumbai Refinery is one of the most versatile Refineries in India. With successful implementation of various projects and de-bottlenecking, BPCL Refineries currently process about 12 Million Metric Tons of crude oil per annum. Kochi Refinery, a unit of Bharat Petroleum Corporation Limited, commissioned in 1966 with a capacity of 50,000 barrels per day. Formerly known as Cochin Refineries Limited and renamed as Kochi Refineries Limited, the refinery was originally established in collaboration with Phillips Petroleum Corporation, USA. Today it is a frontline entity as the unit of the Fortune 500 Company, BPCL.

Numaligarh Refinery Limited is a public sector oil company set up in the year 1993, with its 3 MMT refinery situated in Numaligarh, Assam. The Refinery is one of the most technologically advanced and environment friendly refineries in the country. BPCL is the major share holder with 61.65% of the Company's paid up equity capital.

Moreover, Bharat Oman Refineries Limited (BORL), a company promoted by Bharat Petroleum Corporation Limited (BPCL) and Oman Oil Company Limited (OOCL), has set up a 6 MMTPA grass root refinery at Bina, Madhya Pradesh along with crude supply system consisting of a Single Point Mooring system (SPM), Crude Oil Storage Terminal (COT) at Vadinar, District – Jamnagar, Gujarat and 935 Km long cross country crude pipeline from Vadinar to Bina.

The proposed project is an expansion project in the existing LPG Plant with storage Capacity 1500 MT. BPCL now proposes to expand the capacity by 1200 MT by installing 2 Mounded Storage Vessel of 600 MT. After implementation of the project, storage capacity will increase to 2700 MT.

The proposed expansion project at Patna LPG Plant in Bihar will improve supply position of the LPG which is vital for economic growth as well as improving the quality of life. The improved LPG supply will have strong logistical support for delivering the products to customers without interruption.

At present total 134 staffs (Company Employees & Contract labours) are available for the total operation of LPG Plant at Patna. Since the expansion work is not a major one, it is envisaged that the existing manpower will also cater to the proposed expansion. However, the proposed project has the potential of indirect employment generation.

1.3 NEED FOR THE PROJECT AND ITS IMPORTANCE

There is an urgent need for expansion of the capacity of the Plant to meet the increasing demand of LPG in the state of Bihar.

Importances of the project are identified as follows:

- ✓ Demand of LPG products has increased with willingness of people for use of alternative fuel for cooking.
- ✓ In order to meet the increasing demand, BPCL proposes to increase the storage & filling capacity of their existing Plant at Patna.
- ✓ The proposed project is meant for widening distribution network of LPG in Bihar.
- ✓ The project will directly generate some employment both during construction and operation phase and some indirect employment is also likely to be generated due to this project. This will help to enhance the economic condition of this region.
- ✓ The project will help for further development of infrastructure facilities in the region.

1.4 DEMAND & SUPPLY

❑ Past Consumption Pattern

LPG is largely used as a domestic fuel in India for cooking and to a lesser extent, as an industrial and commercial energy source. It is also a relatively cleaner alternative for automobiles compared to petrol and diesel. LPG consumption in India has more than doubled over the last decade.

❑ **Future Demand – Supply Projections**

LPG will continue to remain a dominant fuel for cooking and heating for Indian households; with Government of India's ambitious Plans to increase use of LPG and reduction in quota of kerosene. It is expected that there will be a shift in fuel usage pattern in rural sector and dependence on conventional cooking fuels like biogas, wood and kerosene will go on reducing consistently.

1.5 LEGAL ASPECTS

The relevant NOC's and licenses will be obtained from the statutory agencies under the following Acts, Rules and amendments and BPCL will adhere to the guidelines specified in:

1. The Factories Act, 1948
2. The Explosive Act, 1884 and the Explosive Rules 1983
3. Manufacture, Storage and Import of Hazardous Chemical Rules 1989 amended in 2010.
4. The Hazardous Waste (Management and Handling) Rules 1989 under the Environment (Protection) Act – 1986 and its amendments to date
5. OISD Standard 144 Latest Revision
6. OISD Standard 150 Latest Revision
7. Static & Mobile Pressure Vessels (Unfired) Rules, 2016.
8. Gas Cylinder Rules – 2016
9. Explosives Act 1884
10. ASME / API / BIS Codes Pertaining To LPG
11. Factories Act – 1948
12. Electrical Installation Under Electricity Rules --1956

BPCL will comply with the prescribed limits laid down for air, effluent and noise emissions for protection of the environment under the following Acts, Rules and amendments:

1. The Water (Prevention and Control of Pollution) Act, 1974
2. The Water (Prevention and Control of Pollution) Cess Act, 1977
3. The Air (Prevention and Control of Pollution) Act, 1981

4. The Environment (Protection) Act, 1986 which is also called umbrella act or legislation
5. The Environment Impact Assessment, Notification, 2006 issued under Environment (Protection) Act 1986 and Environment (Protection) Rules 1986 and amendments thereafter to date.

Compliance to State Rules and Notifications will also be ensured.

CHAPTER 2

PROJECT DESCRIPTION

CHAPTER 2: PROJECT DESCRIPTION

2.1 PROJECT DESCRIPTION

I. Type of Project including interlinked and independent projects, if any

Bharat Petroleum Corporation Limited is proposing an expansion of its existing LPG Bottling facility by installing 2 No.s of Mounded Storage Vessels of 600 MT capacity at Fatuha Industrial Area, Mauza- Raipura, Fatuha, Patna, Bihar.

II. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates:

The location map of the area is shown in Fig 2.1. The study area of the proposed project falls in Survey of India Toposheet and is bounded by the following coordinates:

Latitude: 25°30'7.57"N

Longitude: 85°19'2.62"E

The general location of the project area is shown in Figure 2.1.

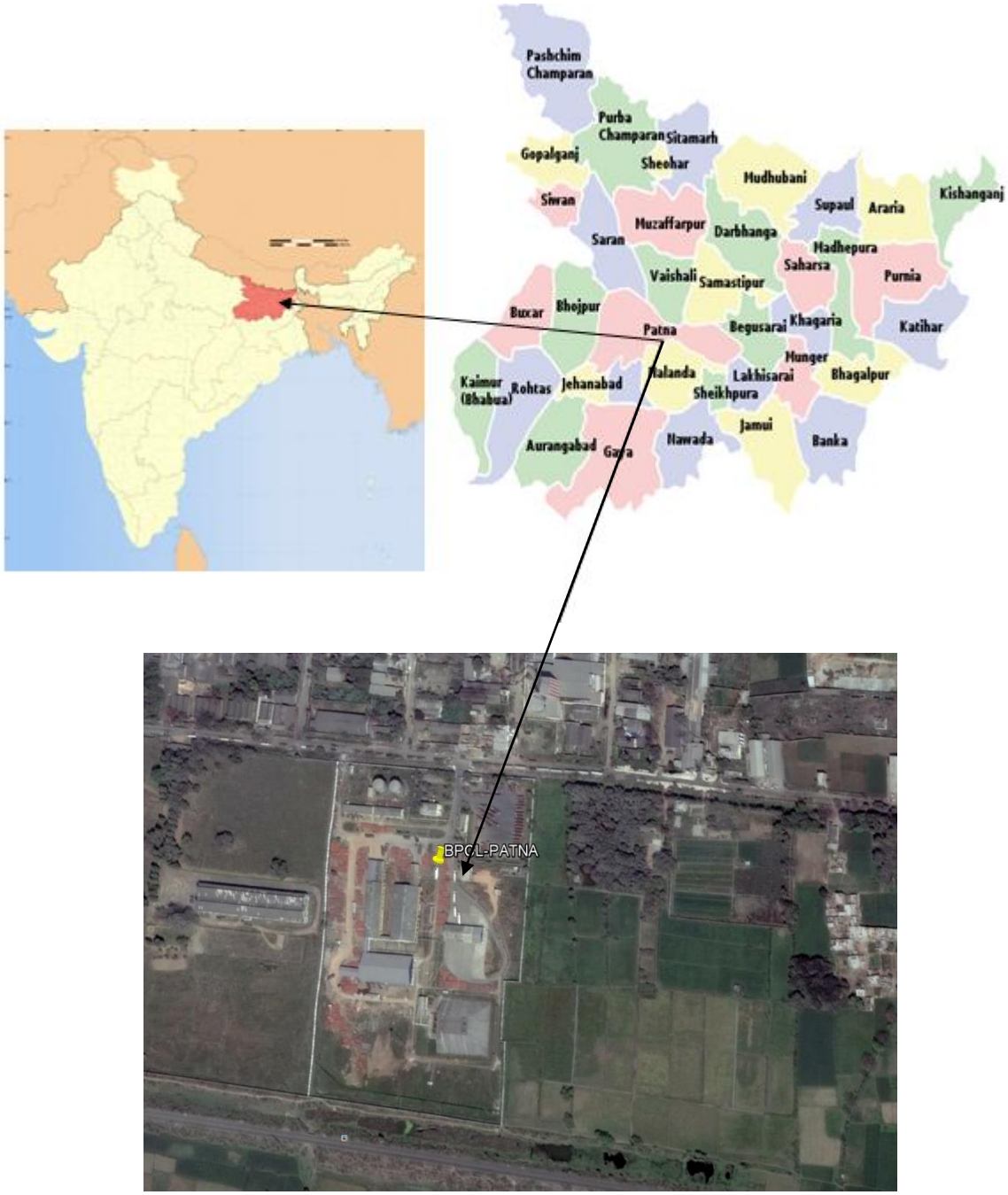


Figure 2.1: Location map of Project site

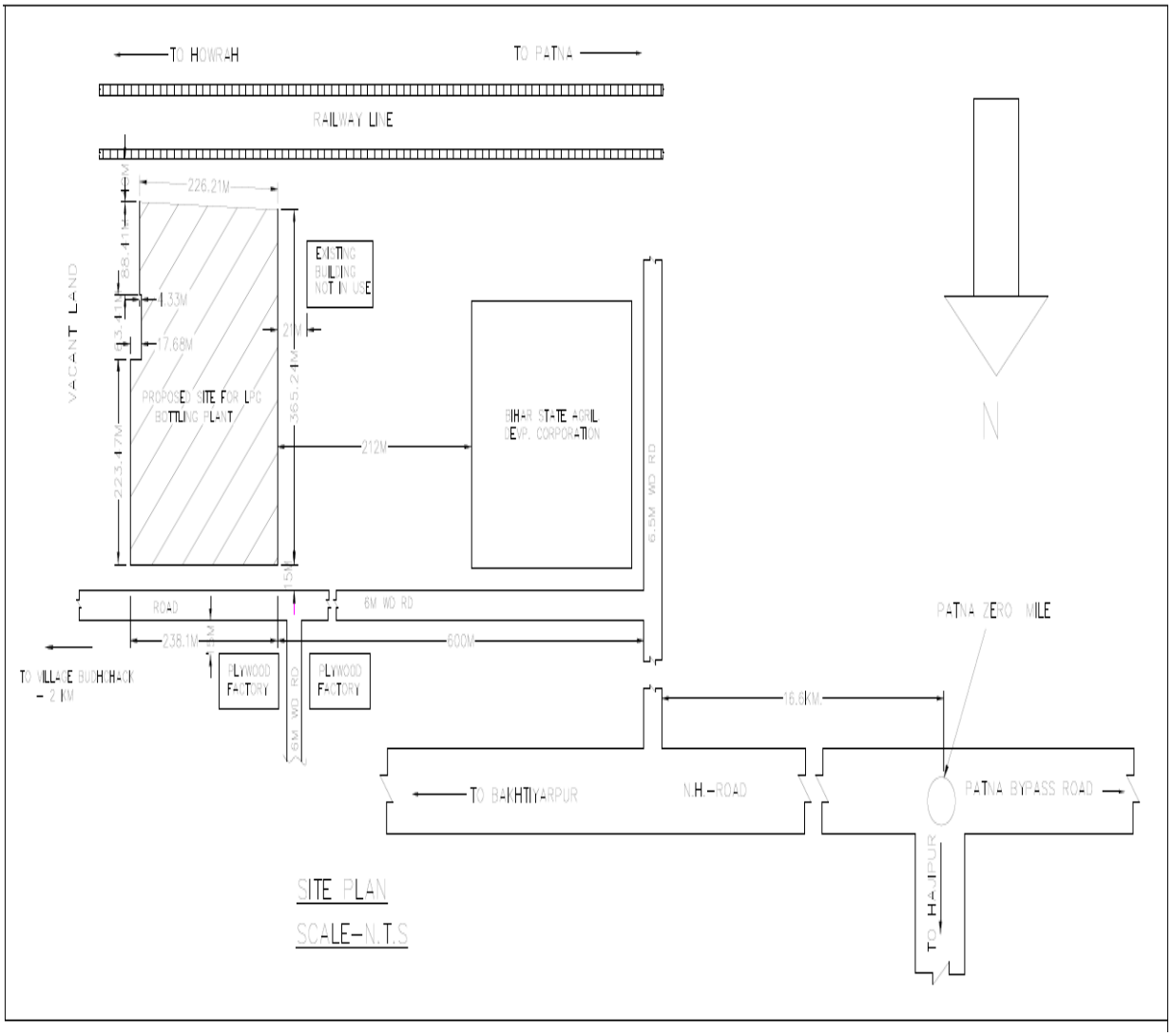
❑ Communication

Road Link: The plant site is at a distance of about 1 km from NH-30, the site is connected to all the states of east region through a Network of National and State Highways. The distances of major towns from the proposed project site are as under:

Patna: 30 km

Rail Link: The nearest railway station is at Fatuha Station which is at about 1 km from the plant site by the road.

Air Link: The nearest airport is at Lok Nayak Jayaprakash Airport (Patna) which is at about 30 km fromthe plant site which is connected to all the major cities.



III. Key Plan

The layout paln for expansion project attached as Annexure 1.

IV. Details of alternative site consideration and basis of selecting the proposed site particularly the environmental considerations gone sound be highlighted.

The proposed expansion will be done out within the existing plant premises, hence, no alternative site has been considered.

V. Size or magnitude of operation

The proposed project is an expansion project in the existing LPG Plant with existing storage Capacity 1500 MT. BPCL now proposes to expand the capacity by 1200 MT by installing 2 No.s of Mounded Storage Vessel of 600 MT each.

As per EIA Notification dated 14th Sept., 2006 as amended from time to time, this project falls under S. No. 6 (Service sectors), Project activity ***"6 (b)"- Isolated storage & handling of hazardous chemicals*** (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000).

The process includes basic storage and bottling facility of LPG, utilities & services, infrastructure facilities & sources of waste generation, their quantity, treatment & safe disposal of the waste.

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

Table 2.1: Details of Capaity

Sl No	Product Storred	Position	Capacity
1	LPG	Mounded Storage Vessel	300 MT x 3 (Existing) 600 MT x 1 (Existing ongoing construction) 600 MT x 2 (Proposed)

The Patna LPG Plant at Fatuha industrial area near Fatuha Railway Station is operated by BPCL. The proposed expansion of bulk LPG storage & bottling facility at Patna LPG Plant at Fatuha will be part of existing plant. The plant is functioning primarily as LPG receipt, storage & bottling unit for filling various size cylinders. The plant operations are categorized as:

- ✓ Receipt
- ✓ Storage
- ✓ Filling
- ✓ Dispatch

1. **Receipt of product**
   a. Transfer of LPG from M/s Bharat Petroleum Corporation Limited (M/s BPCL) through tank trucks duly approved by PESO
   b. Bullet Trucks unloading
   c. LPG transfer to Mounded Storage Vessel duly approved by PESO
   d. Storage of LPG in Mounded Storage Vessel
2. **Receipt of empty LPG cylinders & segregation**

A. Bottling

   a. Pumping of LPG to filling shed
   b. Bottling of LPG cylinders
   c. Quality check on filled cylinders
   d. Loading into Trucks

B. Dispatch

   a. Loading of packed cylinders in trucks
   b. Supply & distribution to markets (through Authorized Vendors)

The LPG cylinders of various capacities i.e. 5 kg, 14.2 kg (domestic purpose), 19 kg (commercial purpose), 35 kg & 47.5 kg (industrial purpose) will be bottled at the proposed plant and then finally dispatched for consumers.

1. RECEIPT OF PRODUCT

Existing LPG storage is 1500 MT (3 Nos. Mounded Storage Vessels of 300 MT each & 1 Nos. Mounded Storage Vessel of 600 MT each). Two additional Mounded Storage Vessel of 600 MT capacity is proposed to be installed. LPG dosed with mercaptan will receive from M/s BPCL through tank trucks. Bulk petroleum LPG received by bullet tanker and bullet tankers are received mainly from BORL BinaRefinary, Indian Oil Petronas Pvt. Ltd, Haldia and IOCL, Barauni refinery. There are 8Bay TLD gantry of size 16 M X 5.5 M(EA bay) for Unloading of bullet tankers at same time throughcommon header and the product will be stored in mounded vessels (2 x 600MT storage capacity).

2. RECEIPT OF EMPTY LPG CYLINDERS & SEGREGATION

Empty LPG cylinders received from vendor trucks & faulty cylinders are segregated at the point of receipt and diverted towards the valve refitting section.

3. BOTTLING

LPG from Bullet is pumped to the filling plant for bottling through 24 station electronic carousel machine with 24 filling points. One electronic carousal with 24 filling stations has already been installed and commissioned. Cylinder bottling will be the primary process carried out. After filling, each cylinder is subjected to quality check i.e. to check for leaks.

4. DISPATCH

Supply & distribution to consumers through Authorized Distributors.

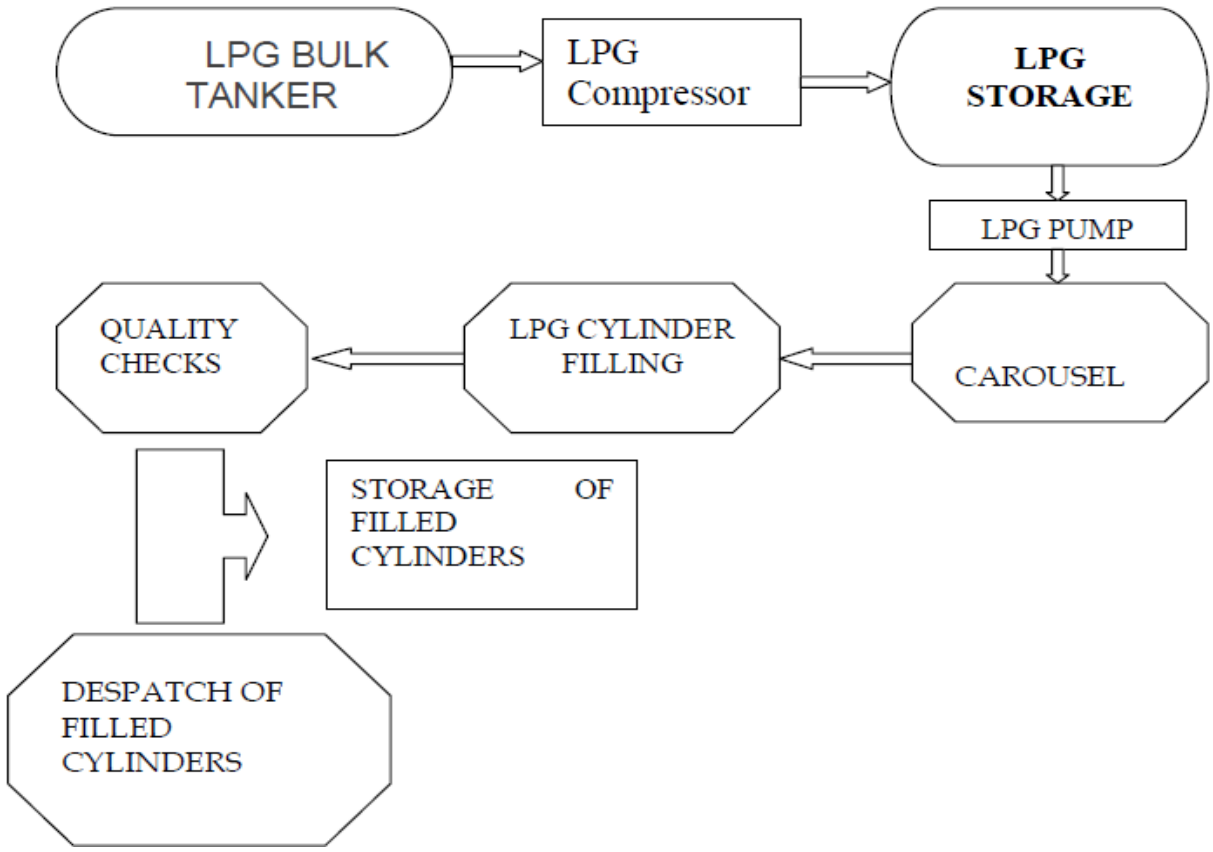


Figure 2.2: Process Flow Chart

Table 2.2: List of Equipments/ Facilities

Sl. No	Equipment	Total Number	Capacity
1	Mounded Storage Vessels(existing)	3 1	300 MT 600 MT
2	Mounded Bullet (Proposed)	2	600 MT
3	LPG Unloading Bay	8Nos existing	
4	LPG pump	2+1	45M3/hr
5	LPG Compressor	2+1	150 cfm

Sl. No	Equipment	Total Number	Capacity
6	Air Compressor	2+1	200CFM
7	Filling Carousal	2No.s existing	24 Point each
8	DG Set-1	2	500 KVA
9	DG Set-2	1	125 KVA
10	DG Set-3	1	62.5 KVA
11	Fire water pumps	2+1	424 kl/hr
12	Jockey Pumps	2	10 cum/hr
13	Fire water tanks	2	1850 kl
14	Filling shed	2No.s	60 M x 29 M

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

This is only Storage and Distribution Plant of LPG and no processing is carried out, hence no Raw material is required. LPG will be the only input & output for the entire bottling process. LPG will receive from M/s BPCL through bullet trucks. The mass balance for the proposed bottling capacity hasbeen detailed below:

Table 2.3: Mass balance for LPG bottling throughput

Flow Rate (Cum/HR)	Hours of operation (day^{-1})	LPG bottling (Tons /day)	Number of days working ($month^{-1}$)	Total throughput (MMTPA)
50	16	650	26	200

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

- ✓ Water used for washing is being recycling for development of green belt, and hence, no wastewater is discharged from the plant premises.
- ✓ Domestic wastewater (3 KLD) generated from the plant treated in septic tanks and soak pits.
- ✓ No industrial solid waste generated during the bottling process. Damaged cylinders segregated & stored on site prior to disposal as scrap metal.
- ✓ Hazardous waste generated from D.G set operation disposed to BSPCB Authorized Recyclers.

- ✓ Storm water drains available along all sides of sheds and other Annex buildings in the plant. All drains are connected through vapour trap before releasing any waste water from the plant
- ✓ There will be no discharge outside the project premises after capacity expansion.

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

❑ **Water requirement**

The estimated requirement of water for industrial activities and domestic activity after expansion would be around 5 KLD. Good quality potable water is available at the proposed site. The Groundwater is proposed to be used.

Table 2.4: Water Consumption Details (KLD)

Sl. No.	Domestic water requirement (KLD)	Industrial water requirement (KLD)	Green belt Development (KLD)	Domestic sewage generation (KLD)	Wastewater from process/cylinder washing (KLD)*
1	3	1	1	2.4	0.8 (reused for Greenery)
Total	5			3.2	

**** Note – Wastewater generated from tank farm washing will be primarily oily water with suspended solids. After flow through OWS, this water reused for gardening. There is no process / trade effluent generated during operations***

❑ **Power Requirement**

The power requirement for Plant operations is 225 KVA. Power is drawn from the nearest substation of Bihar State Electricity Board. Details of stand by DG sets are given in Table 2.5:

Table 2.5: Details of D.G sets

Sl. No.	Capacity (KVA)	Number	Fuel used	Stack diameter (in)
1	500	2	HSD BS III	12
2	125	1	HSD BS III	12
3	62.5	1	HSD BS III	12

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

- ✓ Water used for washing is being recycling for development of green belt, and hence, no wastewater will be discharged from the plant premises.
- ✓ Domestic wastewater (3 KLD) generated from the plant treated in septic tanks and soak pits.
- ✓ No industrial solid waste generated during the bottling process. Damaged cylinders segregated & stored on site prior to disposal as scrap metal.
- ✓ Hazardous waste generated from D.G set operation is disposed to BSPCB Authorized Recyclers.

CHAPTER3

SITE ANALYSIS

CHAPTER 3: SITE ANALYSIS

3.1 CONNECTIVITY

The project site is well connected by road through NH-30 and by rail network. The project site is located at Industrial Estate at Fatuha near Patna in the state of Bihar. The project site is 1 km away from Fatuha Railway station on Mainline Railway between Howrah & Patna. LokNayakJayaprakash Airport at Patna is located at the distance of 30 km. The map showing the road network around the site is given in Figure 3.1.

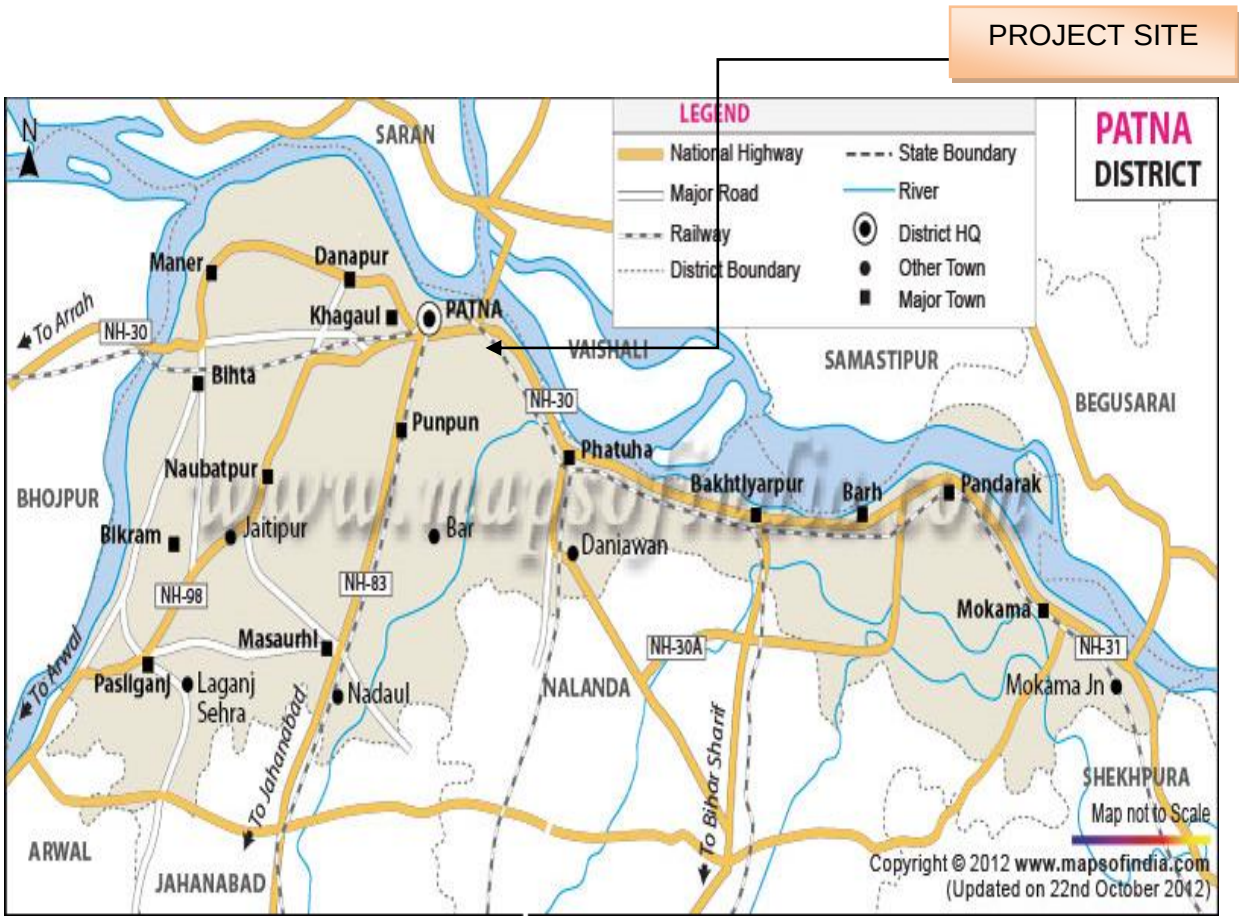


Figure 3.1: Connectivity shows in the map

3.2 LAND FROM LAND USE AND LAND OWNERSHIP

Total project area is 21.28 Acres which is already under the possession of BPCL, hence, no additional land is required for the proposed expansion project. Land use of the existing land area is already industrial. Topography of the land is almost flat with minor undulation. The elevation of plant area is 60 m RL.

Table 3.1: Plant area break up

Particulars	Existing Area (Acres)
Buildings	0.059
Approach Road	1.547
Operational Area	8.067
Green belt development area	7.029
Open area	4.583
Total	**21.28**

3.3 TOPOGRAPHY

The topography of the area is undulating. The general drainage is parallel to sub parallel. The drainage in surrounding area is dendritic in nature and the drainage density depicts a low drainage density.

3.4 ENVIRONMENTAL SETTINGS

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, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. Incase of notified industrial area, a copy of the Gazette notification should be given

Table 3.2: Environmental Settings of the Area

Particulars	Details
Nearest Town/City	Patna – 30 km (NW)
Nearest highway	The plant location is 1 km from National Highway NH-30.
Nearest railhead / Railway station	Fatuha Station – 01 km (WNW)
Nearest airport	Lok Nayak Jayaprakash Airport (Patna) – 30 km
Defence installations	None
Archaeological important places	None
Wild life sanctuaries	None
Rivers in 10-km radius	Ganges river – 1.0 km (N)
Hill ranges	None
Seismic zone	The proposed plant-site area falls in Seismic Zone IV as per IS 1893:2002 (Part-1), which is a highly sensitive seismic zone.

3.5 EXISTING INFRASTRUCTURE

Total plant area is 21.28 Acres and the proposed expansion will be done within the existing plant premises area.

❑ Compound Wall, Gates and Fencing

A 3m high compound wall with 0.6 m high concertina wire fencing on top of the wall is available. One no. of 8 m wide main gate with 1.2m wicket gate for plant with security office and emergency gate of 6 m wide is present.

❑ Kerb Wall Fencing

To segregate the licensed area, 1.0 m height kerb wall with 1.2 meter high chain link fence has been provided at appropriate places.

❑ Storage Vessel

2 x 600 MT capacity Mounded Storage Vessels have been considered for expansion. The MSV's will be of 6.0 m diameter and 48.20 m length. However, actual dimensions will be as per approved design of the successful vendor. CCOE approval will be obtained for the proposed bullets. Also calibration of Mounded Storage Vessels will be got approved from approved calibration agencies by the vendor.

❑ Filling Cum Empty Cylinder Shed

Shed size of 60 m x 29 m has been provided for stacking empty cylinders and filling facilities. Filling of LPG Cylinders is being done by 2x 24 station electronic carousel which have all the required upstream and downstream facilities (like cylinder washing/drying m/c, in-line check scales, GD/PT units, correction units, cap hammering unit, washer replacement loop etc) complying with all guidelines and statutory norms. Additionally, adequate number of on-line valve change machines (without evacuation) has been installed to take care of the valve leak detected cylinders.

One number electronic check scale (platform type) of 50 kg capacity has been provided at unloading bay for random checking of new & pressure tested cylinders as per QAP Manual.

❑ LPG Filling Facility

One conveyor line has been provided for filling of 35 and 47.5 Kg cylinders with facility for Online dosing for BMCG. In the above line a separate inline filling station provided to

fill 19.35 kg cylinders, with scale accuracy of 10 gm. Special type heavy duty reversible conveyer provided for safe and easy handling of these cylinders. Online cylinder purging facility provided with capacity 750 cylinder/hr.

The list of equipments is as under.

- ✓ 2 x 24 Station Electronic Carousel with Dynamic check scale, WCU, VLD & OLD.
- ✓ Cylinder washing unit to wash empty cylinders
- ✓ Automatic valve changing machine
- ✓ Purging unit
- ✓ Chain / roller conveyor system with drive units
- ✓ One hot air sealing system
- ✓ Vapour extraction system
- ✓ CVT
- ✓ Test Bath

❑ **Filled Cylinder Storage Shed**

Shed of size 60 m x 29 m with 15 m x 8 m finger loading platform (to accommodate 2 lorries at a time) has been provided. Filling shed & filled cylinder shed are interconnected by 3.0 m widepassage for conveyors. Statistical quality control loop (SQC) with roller conveyor has been provided with an inline check scale and CVT. All the loading/unloading fingers and passage are provided with sprinkler coverage.

❑ **Inhouse Pressure Testing Facility**

Separate shed of 25 m x 10 m size has been provided to house PT facility with LPG vent pipe from 2 x 10 head test bench extending to a point having 30 m clear distance all around. PT shed to be located adjacent to Valve Change Shed. Adequate provision of conveyors considered for movement of cylinders.

The following equipments will be integral to the PT facilities:

- ✓ Cylinder Washing tank
- ✓ Valve screwing & unscrewing machine
- ✓ Tilting type 2 x 10 head test bench with closed air and water vessels of suitable capacity

- ✓ Pneumatic testing facility with air compressor capable of providing 12 kg/cm2 air pressure
- ✓ Painting booth with blower
- ✓ Flameproof/Intrinsically safe platform type electronic weighing scale of upto 50 kg capacity.
- ✓ Ultrasonic cleaning and valve salvaging machines shall be provided.

The above system is semi automatic. In addition to the above, open hard standing provided for stacking the cylinders.

❑ **Chain Conveyor System**

As per the requirement of Electronic carousel, the speed of chain conveyor system is between 12 – 22 m/min. On the Introduction line and Ejection line, the speed should be minimum 22 m/min and 18 m/min up to the test bath. A layout developed showing the position of OLD/VLD and the location of test bath and HAS. The ratings & numbers of Drive Units provided commensurate with the new electronic carousel. One telescopic chain conveyors and one manual chain Conveyor each for loading and unloading Fingers already provided. This is adequate to cater to the requirement of 24 stations.

❑ **Electronic Carousel**

Carefull design has been planned on floor keeping operational and aesthetics aspects in mind. Further, conveyors have been designed to offer high efficiency at designed load with help of high efficiency motors/helical or direct mount gear boxes etc. Auto on-off operation of loop conveyers at correction, valve & O-ring change and evacuation conveyors to be provided. Telescopic conveyors provided for unloading/loading of empty/filled cylinders to and from box lorry with photoelectrical type auto sensing/tripping system. All electric motors are of high efficiency “Eff 1 “grade.

❑ **LPG Pump / Compressor Shed**

The pump house is of size 12 m x 8 m, housing LPG pumps (50 Cu.m / hr, 160 m Head), and LPG compressor of 150 CFM provided for loading bulk LPG.

- **Admin. / AmenityBuilding / Planning Room**

240 Sq.m building present to accommodate office space, conference rooms, canteen, amenities etc with internal partitions / furniture, planning room including dress change room/toilet.

- **Security Cabin**

3 m x 3 m security office present at the main gate. The time office at second gate to license premise is present.

- **Engineering/Consumables Stores**

Engineering cum consumables store of 16 m x 8 m has been provided. This is a shed with false ceiling for store keeper. A field toilet of 5 m x 10 m with emergency eye wash facility is also available adjacent to the stores.

- **MCC & HT Room**

16 m x 8 m Room provided to house HT (Vacuum type) Breaker / LT panel etc. meeting operational and statutory requirements.

Transformer is of outdoor type located behind the MCC Room in a 10 m x 10 m enclosure with minimum safety distance as per IE Rules. Transformer has been provided with AVR on HT side, in case necessary to eliminate unwanted power consumption due to voltage fluctuation. Suitable APFC panel to maintain plant power factor above 0.95 is ensured. Separate arrangement bypassing main HT breaker provided to maintain power supply to critical areas (i.e. plant lighting, siren, fire control panel & road barriers etc) in case of emergency shutdown of plant.

- **DG Set Shed**

DG Sets having acoustic enclosures provided adjoining to MCC room in 10 m X 8 m & 10 m X 5 m shed. 250 KVA set will be used for full load plant operation while 125 KVA unit will take care of light load and emergency power requirement. Provision of Diesel Tanks for supply of Diesel to the DG sets will be made outside the shed.

- **VCB Room**

VCB room of 4 m x 5 m has been provided near 2 pole structure.

- **Cycle /Car Shed**

Shed of size 20 m x 8m has been provided.

- **Inspection Platform**

1 m wide and 6m long inspection cum counting platforms is provided in front of security gate, to check LPG packed Lorries.

- **Weighbridge**

50 MT capacity electronic way bridge (16 m X 3 m) with SAP interface provided. ¼th capacity dead weights provided for calibration/testing.

- **Tank Lorry Gantry**

TLD gantry of size 16 m x 5.5 m for Unloading of tank lorry with MFM on common header to facilitate automation. All unloading bays provided with suitable loading arms with break-away type coupling and earthing interlocks. Additionally, provision of bulk loading is available in two bays.

- **Truck Parking Area/Drainage System**

Approximately 6900 sq.m area developed inside the plant boundary for parking of 48 no's trucks/lorries. Provision of Solar powered illumination provided to illuminate the area as part of BPCL's RE policy. Open Drainage system provided covering admin/tank lorry parking area.

- **PCVO Crew Rest Room/Barrier Gate**

A room of sizes 4 m x 10m provided nearer to tank lorry parking area for the use of PCVO crew. Toilet / Wash room provided as per requirement. Suitable broadcast arrangement made for relaying safety messages/films for enhancing PCVO crew awareness. Solar powered systems available to illuminate the area as part of BPCL's RE policy. Total 4 nos. of lifting barrier gate provided, out of which 2 nos near to the time office, 1 no at emergency gate and 1 no at tank lorry parking area.

- **Mounded Storage For LPG**

LPG is normally stored in above ground storage mainly spheres and cylindrical bullets, namely, bullets & Horton spheres, the advantage being their accessibility for regular inspection and maintenance which is important for such storage for hazardous service. But these storages are susceptible to fire impingement and can give rise to Boiling Liquid Expanding Vapour Explosions (BLEVE).

The reason for selecting mounded or buried bullets for LPG storage is to protect them from direct flame impingement caused by any eventual fire in the surroundings and thus prevent initiation of the sequence of events leading to an occurrence of BLEVE.

The mounded storage concept basically originated from Europe and specialized codes exist in Germany such as:

DIN 4681 Tl: Statutory Steel Pressure Vessels for Liquified Petroleum Gases for Earth Covered Installations, Dimensions and Equipment. During construction phase, a slight increase in the ambient noise levels is anticipated. This impact will be temporary and limited to the construction phase. Hence, no permanent impact on this account is expected. During the operational phase, no major social impact in the general area is expected. There will be no change in the occupational structure of the workforce. As there will be no emissions into air, no liquid effluents and no solid wastes no negative impact on the health of the inhabitants in and around the project site is expected.

❑ Safety Buffer Zone for above ground storage & LPG Bottling Plant

The distance between LPG storage vessels (41 to 350 cum) and boundary /group of buildings not associated with LPG plant is more than 30 m. The inter distances for LPG facilities as per OISD – 144 standard are given in Table 3.3.

Table 3.3: Inter distances For LPG Facilities

Sl.No.	Particulars	1	2	3	4	5	6	7
1.	LPG Storage Vessels	*	30	30	30	30	15	60
2.	Boundary/group of building not associated with LPG plant	30	-	30	30	30	30	-
3.	Shed-LPG	30	30	15	30	30	15	60
4.	Tank truck gantry-LPG	30	30	30	50	50	30	60
5.	LPG/other rail spurs	30	30	30	50	50	30	60
6.	Pump House/Comp.House (LPG)	15	30	15	30	30	-	60
7.	Fire Pump House	60	**	60	60	60	60	-

Notes: All distances are in metres.

** 1/4 of sum of diameters of adjacent vessels OR Half the diameter of the larger of the two adjacent vessels, whichever is greater.*

*** Any distance for operational convenience.*

❑ Details on Fire Protection System

- 2 Nos. of above ground vertical water tanks for fire water storage, each of capacity 1850 KL as per OISD requirement provided. (Actual FW calculation attached).

- Fire water pump house (shed): - Pumphouse of size 12 m X 8 m (96sq.m) provided to accommodate 3 Nos. diesel driven fire water pump sets of 682 KL/Hr and two no. electric motor driven jockey pumps of 10 KL capacityprovided. The room provided with OHT (Overhead trolley) suitable to handle the load of the equipment.
- Fire hydrant system: - Fire hydrant ring main covering all facilities provided as per the OISD requirements. Double hydrants (with hose boxes, hoses & nozzles) and fire water monitors as per the stipulations in the OISD-144 will be provided. Long range Fire Monitors already provided in critical areas with remote operation.
- MV Spray system: As per OISD norms for Fire Protection System.
- Fire Extinguishers: Already provided as per OISD norms
- Deluge Valves: Auto reset type deluge valves having manual quick bypass system as per OISD norms provided with fire protection wall. Provision for activation of DV for auto and manual modes (local & remote panel) as per OISD-144.
- All the isolation valves used in firefighting system are of rising stem type.
- MCP: Manual Call Points at strategic locations as enumerated in OISD-144 provided to raise the alarm (siren) and also shut down LPG operations, in thecase of emergency with suitable hooter on annunciation panel at fire water pump house.

❑ **Gas Monitoring System**

Gas monitoring system with infra red / Catalytic type sensors provided as per revised OISD standard-144. Mimic & repeater panels provided at Fire Water Pump House /Control room and security gate.

❑ **Plant Security System**

The provisions of following security systems are ensured:

- Handheld metal detector for frisking
- Door Frame Metal detector
- Mirror trolley
- Integrated Biometric Access Control System

- Digital Surveillance through CCTV cameras with memory back-up for 30 days. All critical areas i.e. Admin Bldg, Filling shed, LPG Pump House, Tank Farm, TLD Gantry, Parking and Gate areas covered under constant surveillance.
- Perimeter surveillance
- Sufficient High mast illumination in parking as well as for plant.

❑ **Communication System**

The following communication systems available at the existing LPG Plant:

- Intrinsically Safe Paging System
- PA System for announcement at gate
- Inter-com at all working stations/points as per advice
- Walkie-talkie for designated staff (VHF/UHF)
- Display of carousel performance at TC cabin & Planning

3.6 SOIL CLASSIFICATION

Soils are predominantly sandy loam with clay loam at places with low to medium nutrient status. It is generally alkaline with pH value ranging from 6.3 to 8.2. Traditionally, soils in an area are classified on the basis of mode of deposition.

3.7 CLIMATIC DATA FROM SECONDARY SOURCES

The project area has humid subtropical climate with extremely hot summers from March to mid-June, monsoons from mid-July to late September and chilly winter nights, foggy or sunny days from November to February. The highest recorded temperature is 46.6 degree Celsius (°C) and the lowest is 2.3°C. The temperature during the summer season ranges between 18°C and 32°C and between 9°C and 29°C during the winter season. The average annual rainfall is 1130 mm. There is heavy rainfall in the months of mid-June, July, August and mid-September. During the other months of the year there is little or no rainfall.

3.8 SOCIAL INFRASTRUCTURE AVAILABLE

Social Infrastructure facilities (both public and private) such as schools, hospitals, community halls, markets, colleges, railway station and religious buildings are located at Patna, which is located at a distance of 4 km from the site Telephone and medical facilities are available in the nearby areas.

CHAPTER 4

PLANNING BRIEF

CHAPTER 4: PLANNING BRIEF

4.1 PLANNING CONCEPT

Facilities required for the proposed expansion project will be provided as per requirement. Transportation of LPG and filled cylinders after expansion will be done via existing road and rail network and cement concrete road has been developed within the existing plant premises.

4.2 POPULATION PROJECTION

Direct and indirect employment will be created due to project. Temporary influx of people will be there as the managerial and supervisory staff will generally be outsider.

4.3 LAND USE PLANNING

Since, the proposed expansion will be done within existing plant premises, thus no additional land will be required. Out of the total plant area; 7.029 Acres (approx. 33 % of the total plant area) is covered under greenbelt/ plantation in order to reduce dust and noise pollution levels and to increase aesthetic beauty of the area.

4.4 ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL)

BPCL has assessed the demand of infrastructure (Physical & Social) in nearby area of the plant site and development activities are being undertaken under corporate social responsibilities program for rural development initiatives for the upliftment of the nearby communities from time to time. The existing infrastructure facilities available at the bottling plant will be utilized for the proposed expansion project. Same will be expanded as per requirement.

4.5 AMENITIES/FACILITIES

BPCL has constructed hospital, school, canteen and club etc. for the permanent and contract employees. It is proposed to develop the amenities / facilities in nearby area of the plant site as per requirement of local people of the nearby area under corporate social responsibilities programme.

CHAPTER 5

REHABILITATION AND RESETTLEMENT (R & R) PLAN

CHAPTER 5: REHABILITATION AND RESETTLEMENT (R & R) PLAN

I. Policy to be adopted (Central/State) in respect of the project affected persons including home oustees, land oustees and landless labourers

The proposed expansion of LPG bottling plant will be located within the existing BPCL plant. There is no displacement of people or property for proposed expansion of LPG bottling plant. Therefore, rehabilitation and resettlement is not an issue in the proposed expansion project.

CHAPTER 6

PROJECT SCHEDULE AND COST ESTIMATES

CHAPTER 6: PROJECT SCHEDULE AND COST ESTIMATES

6.1 PLANNING OF ACTIVITIES

Careful planning of all the activities is one of the pre-requisite for timely completion of the project. Following activities will be given special attention.

6.2 PRE PROJECT ACTIVITIES

- ✓ Management Approvals.
- ✓ Selection of location
- ✓ Statutory Clearances
- ✓ Financial Approvals
- ✓ Conceptual Design
- ✓ Preparation of main machinery tender
- ✓ Evaluation of tenders

6.3 PROJECT ACTIVITIES (IMPLEMENTATION STAGE)

- ✓ Firm up basic design
- ✓ Main Machinery Order placement
- ✓ Detailed engineering of the project
- ✓ Statutory approvals of Layout Plans.
- ✓ Preparation of tender, evaluation of tenders received and order placement for balance machinery
- ✓ Completion of procurement activities on time
- ✓ Release of civil drawing for civil construction
- ✓ Civil construction
- ✓ Supply of mechanical & electrical equipment
- ✓ Inspection of major machinery at supplier's works
- ✓ Erection of all plant & machinery
- ✓ Commissioning of the plant

6.4 STATUTORY CLEARANCES

The proposed expansion project will require various statutory approvals and clearances from various authorities of the State and Central Government.

6.5 TIME SCHEDULE FOR THE PROJECT

The total project implementation schedule is 15 months from zero date. The external agencies such as consultant, machinery suppliers, contractors of civil construction and equipment will be selected carefully well in advance. An effective project team has been formulated with an experienced project manager as its leader.

6.6 STRATEGIES FOR TIMELY EXECUTION OF THE PROJECT

The following strategies would be adopted for smooth functioning as well as timely execution of the project:

- ✓ The task of implementing the project in time will be achieved by ensuring a well coordinated project implementation task force in-house and from external agencies
- ✓ A well chosen team of experienced personnel for project execution will coordinate the implementation of the project from in-house
- ✓ Experienced engineering consultants with proven track records will be selected for detailed engineering of the project.
- ✓ Reputed and experienced contractors with adequate resources of finance, men, material and tools and tackles, will be engaged for execution of the construction and erection work.
- ✓ Effective project monitoring including project planning schedule and monitoring will be employed in this project. Timely execution and resources will be monitored using computer based project monitoring tools. In case of deviations in project progress, all possible corrective actions such as crashing of network etc. will be carried out.

6.7 PROJECT COST

- ❑ **Estimated project cost along with analysis in term of economic viability of the project**

The total investment for the proposed project works out to approximately INR 3546 Lakhs. The estimated Investment Cost for the project is based on the requirement of fixed and non fixed assets.

CHAPTER 7

ANALYSIS OF PROPOSAL

CHAPTER 7: ANALYSIS OF PROPOSAL

7.1 FINANCIAL AND SOCIAL BENEFITS

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

Proposed expansion of LPG bottling plant will result in growth of the surrounding areas by increasing direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Special emphasis on financial and social benefits is being given to the local people in the area.

Development of social amenities will be in the form of medical facilities, education to under privileged and creation of self-help groups.

Medical facilities: Medical facilities will be provided for employee aswell as people of nearby villages through medical camps.

Bihar state will get revenues in terms of taxes and local people will get direct &indirect employment. Business opportunities for local community will be available liketransport of materials during construction, house-keeping contract work, supplying goods, food to people etc. In addition, lots of CSR activities are being carried out by the BPCL.

7.2 ENVIRONMENT FRIENDLY PROJECT

As can be seen for this project that no additional land is required nor there is any major increase in water consumption.

- **Air Pollution Control**

No emissions will be generated during the operations as the entire bottling process is carried out through pipelines from Storage Area to Filling Shed. The only point sources ofemissions will be D.G sets & Fire Engines. They have been fitted with stacks of adequate height to disperse the pollutants.

Table 7.1: Details of APCs

Sl. No.	Capacity (KVA)	Number	Fuel used	Stack diameter (in)
1	500	2	HSD BS III	12
2	125	1	HSD BS III	12
3	62.5	1	HSD BS III	12

❑ **Solid and Hazardous Waste Generation**

✓ No industrial solid waste generated during the bottling process. Damaged cylinders are segregated & stored on site prior to disposal as scrap metal.

✓ Hazardous waste generated from D.G set operation disposed to BSPCB Authorized Recyclers.

❑ **Waste Water Management**

✓ No industrial waste water generated from the bottling Plant.

✓ Water used for washing is being recycling for development of green belt, and hence, no wastewater discharged from the plant premises.

✓ Domestic wastewater (3 KLD) generated from the plant treated in septic tanks and soak pits. Sewage is disposed through septic tanks & soak pits (1 nos.) of dimensions 2m x 1.5m x 1.5m.

❑ **Noise Pollution Control**

✓ The major sources of noise pollution from the LPG plant are the DG set for which acoustic enclosure is installed.

✓ Also ambient noise levels ensured within the ambient standards by inbuilt design of mechanical equipment and building apart from vegetation (tree plantations) along the periphery and at various locations within the existing LPG plant premises.

❑ **Green Belt Development**

✓ Out of the total plant area; 7.029 Acres (approx. 33 % of the total plant area) is covered under greenbelt/ plantation in order to reduce dust and noise pollution levels and to increase aesthetic beauty of the area.

✓ Green belt along with the road & plant boundary already developed.

✓ Local species planted as per CPCB guidelines.

❑ **Rainwater & Storm Water Drainage Network**

Storm water drains are placed along all sides of sheds and other Annex buildings in the plant. All drains are connected through vapour trap before releasing any waste water from the plant.

❑ **Safety Philosophy**

LPG is a common clean fuel used extensively in households as well as industry. If its characteristics are understood well and proper precautions as stipulated in various codes

and standards are followed, it is an easy and safe fuel to handle. Accordingly, in most of the developed /developing countries, where LPG is consumed in million tons / year, specific codes and standards are available for storing and handling of LPG.

LPG Installations - Codes & Standards

Codes and standards which are generally followed for LPG installations are as follows:

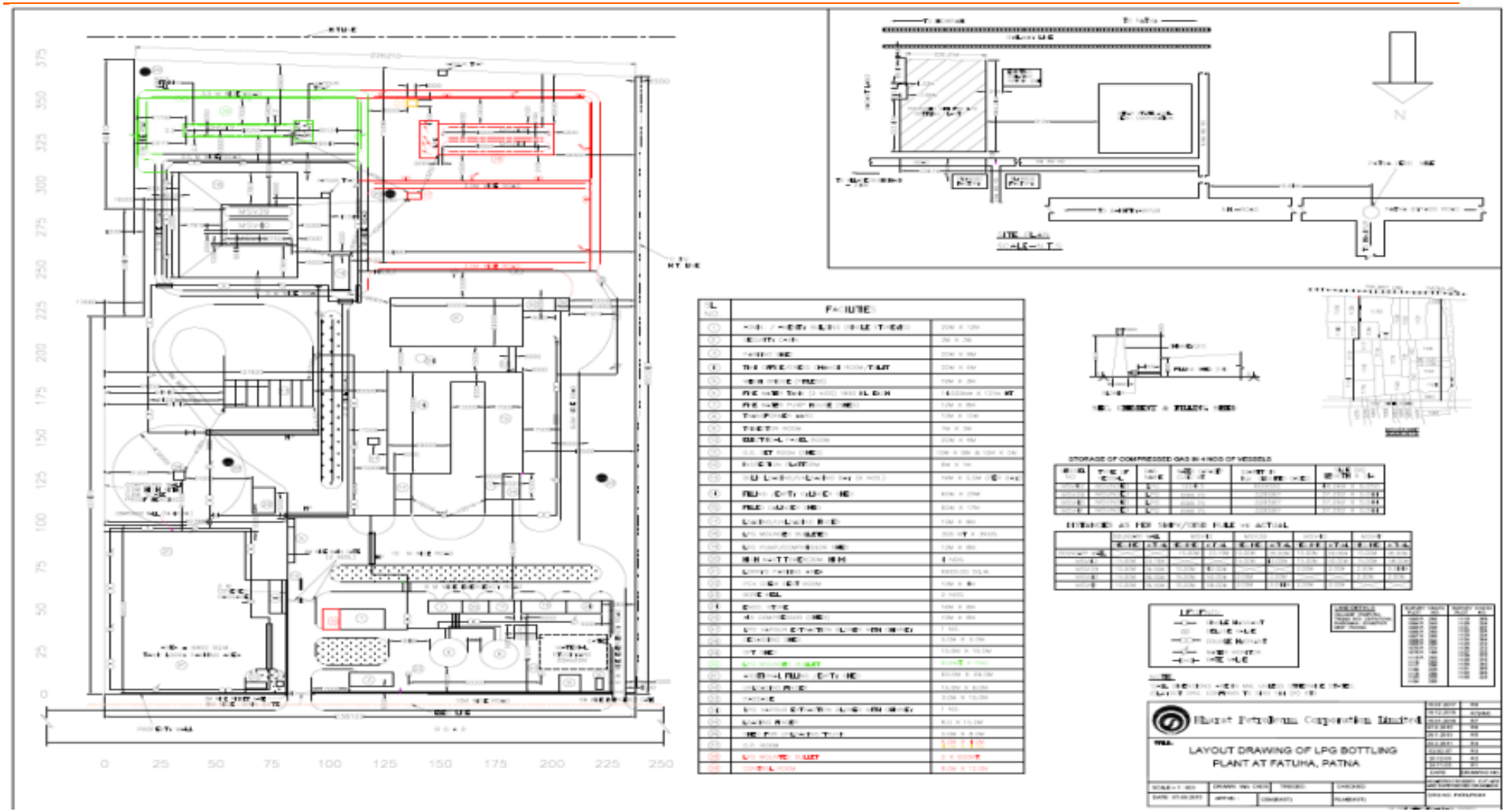
- NPPA (National Fire Protection Association of USA) Standards - NFPA-58: Standard for the Storage and Handling of Liquefied Petroleum Gases - NFPA-59: LP-Gases at Utility Gas Plants
- API (American Petroleum Institute) Standards - API-2510: Design & Construction of LPG installations
- IP (Institute of Petroleum) Standards - IP-9: Liquefied Petroleum Gas - Large Bulk Storage of Pressurized and Refrigerated LPG
- The Static and Mobile Pressure Vessels (Unfired) Rules, 2016 of India (SMPV Rules).
- OISD (Oil Industry Safety Directorate) Guidelines - OISD RP - 158: Recommended Practices on Storage and Handling of Bulk Liquefied Petroleum Gas (LPG), 1997. (This is being followed by Public Sector Refineries and Oil Industry in India. It is currently a guide and not a mandatory code or standard). LPG storage tanks take any other pressurized vessels may be designed as per any of the following well known international or local codes / standards:
  - ✓ ASME, Section VIII, Division I
  - ✓ ASME, Section VIII, Division II
  - ✓ BS 5500
  - ✓ IS 2825

❑ **Conclusion**

This project is a public utility project that is aimed at ensuring regular supply of Petroleum Products in the surrounding area of Patna town and other far away places of Patna district.

Thus, the proposed expansion of bottling plant will usher in the social and economic up-liftment of the persons living in the vicinity of the plant i.e. of society at large, the expansion project being development and public utility. No adverse effect on environment is envisaged as proper mitigation measure already taken up for the same.

ANNEXURE 1: LAYOUT OF THE PLANT



ANNEXURE 2: TOPO MAP

ANNEXURE 3: SITE PHOTOGRAPHS

Photograph of Mounded Bullet

Photograph of Mounded Bullet from Side