PRE FEASIBILITY REPORT

FOR

Proposed Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing Unit

Location: Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0)
Village-Jeetpur, Behra Road, Barwala, District- Panchkula, Haryana

Project Cost : Rs. 498.73 lakhs

PROMOTER

VIRGO LAMINATES LTD

Registered Address: Plot No. 3, Sec-18A, Madhya Marg, Chandigarh 160018

Chapter - 1

Executive Summary

1.1. INTRODUCTION

M/s Virgo Laminates Ltd proposes formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit coming up at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) Village-Jeetpur, Behra Road, Barwala, District- Panchkula, Haryana. The total land area for the project is 14,366.22 sq. m. (3.50 acres). The proposed product and capacities are given below:-

Table 1.1: Proposed Product and Capacity

S. No.	Product	Capacity
1.	Formaldehyde	300 TPD
2.	Melamine Formaldehyde Resin	25 TPD
3.	Cardanol phenol Formaldehyde Resin	75 TPD

Project Categorization

The project falls under category A (as the project is located outside the notified industrial area/estate), item 5(f) Synthetic organic chemicals industry ***(dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)*** of EIA Notification, 2006 & its subsequent amendments. Therefore, it requires prior Environmental Clearance from EAC, MoEF, GOI, New Delhi.

Table 1.2:-Salient Features of the Project

S No.	Description	Details
A.	Nature & Size of the Project	Proposed formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing Unit. Details as under :-

S. No	Product	Capacity

		1. Formaldehyde — 300 TPD **2.** Melamine Formaldehyde Resin — 25 TPD **3.** Cardanol phenol Formaldehyde Resin — 75 TPD
B.	**Category of the Project**	Category 'A', item 5(f) **Synthetic organic chemicals industry** (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)
C.	**Location Details**	
	Khasra no./Plot No.	Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0).
	Village	Jeetpur, Behra Road, Barwala
	Tehsil	Panchkula
	District	Panchkula
	State	Haryana
	Geographical Coordinates	As under:-

S. No.	Latitude	Longitude
1.	30°33'56.70"N	76°54'34.58"E
2.	30°33'55.15"N	76°54'33.98"E
3.	30°33'54.94"N	76°54'45.15"E
4.	30°33'56.60"N	76°54'45.24"E

D.	**Total Plot area**	14,366.22 sq. m. (3.50 acres)
E.	**Environmental Settings*(with approximate aerial distance and direction from the project site)***	
	Nearest Village	Behra : 0.87 Km towards SSW Barwala : 2.9 Km towards ESE
	Nearest Town/City	Ambala : 24.3 km towards SSW
	Nearest Airport	Chandigarh International Airport : 16.2 km towards NW
	Nearest Railway Station	Chandigarh Railways station : 17.3 km towards NNW Lalru Railways station : 14.6 km towards SW

Nearest National Highway/ State Highway/ Major Road

As under:-

S. No.	NH/SH	Distance (Km) (From the project Boundary)	Direction
1.	NH 22	6.9	WNW
2.	NH 64	13.6	WNW
3.	SH 1	7.3	ESE
4.	NH 73	2.8	E

National Park/ Wild Life Sanctuary/ Wildlife Corridors/ Eco-Sensitive Zone

None with in 10 km radius of proposed project site.

Interstate Boundary

Punjab-Haryana Interstate boundary 50 m towards W.

Reserve Forest (R.F), Protected Forest (P.F)

RF/PF found in 15 km radius of the project is as under:-

Forests	
Bhoj mataur P.F	12.4 km towards NNE
Rajpura P.F	14.7 km towards NE
Bir Hansala P.F	12.4 km towards WSW
Bir Barauli P.F	10.9 km towards W
Bir Kheri P.F	4.3 km towards W
Bir Baqarpura P.F	7.0 km towards WNW
Bir Dadrala P.F	5.2 km towards WNW
Bir Pir machhela R.F	9.9 km towards NNW
Kholhai Raitan R.F	12.8 km towards N

Water bodies in 15 km radius area

Are as under:-

Water bodies	
Medkhali Nala	5.8 km towards N
Mullawali Nadi	7.0 km towards NNE
Mattanwali Nadi	7.9 km towards NNE
Dudhgarh ki Nadi	3.9 km towards ENE
Dangri Nadi	5.6 km towards E
Ghagghar River	8.4 km towards NW
Mankn Nadi	7.4 km towards N

		Balaiali Nadi	10.3 km towards SE
		Balaiali Nala	11.7 km towards SE
		Dhanana Nala	14.3 km towards SE
		Nadlan Nadi	12.2 km towards N
	Defense installations	None	
F.	**Basic Requirements of the Project**		
	Water demand	Total water Requirement	: 155 KLD
		Fresh water demand	: 135.4 KLD
		Recycled water	: 19.6 KLD
		Source	: Ground Water Supply
	Power requirement & Source	Power Requirement	:125 KW
		Source	: State Electricity Board.
	Power Back up & Fuel	DG set	: 1 No.
		Capacity	:125KVA
		Fuel	: HSD
		Quantity	: 25 l/hr
	Employment potential	15 persons	
G.	**Project Cost**	Rs. 498.73 lakhs	

1.2. ENVIRONMENTAL MANAGEMENT PLAN

A summary of pollution control measures is proposed as follows and environment management plan will be proposed in the EIA report.

1.2.1. Air Pollution Control

- There will be no process emissions from the manufacturing of formaldehyde.
- The major source of air pollution will be emissions from Boiler and D.G set.
- Adequate stack height of 3.5 m will be provided for the D.G set as per the norms of CPCB.
- Boiler will be provided with adequate stack height of 30 m as per CPCB norms along with bag house.
- Low sulphur fuel will be used (HSD)
- Raw material will be stored in underground storage tanks.

- VOC controllers will be installed at appropriate locations.
- Scrubber will be installed to treat the residues of formaldehyde.
- Continuous monitoring devices (for fugitive emissions) will be installed.
- The control of all parameters on a continuous basis will be done by adequate control valves, pressure release valves and safety valves etc.
- Unit will install portable detection system for hazardous chemical like Phenol, and Formaldehyde in process area.

1.2.2. Water Pollution Control

- No waste water will be discharged outside the premises and zero liquid discharge will be maintained.
- Waste water generated from process and boiler blow down will be treated in the ETP.Max quantity of recyclable water will be reclaimed and used back into process.
- The domestic waste water will be routed to modular STP and the treated water will be used within the plant premises for raising the green belt/plantation.

1.2.3. Solid & Hazardous Waste Management

- Both industrial (Hazardous and non Hazardous) and domestic waste will be generated from the project.
- Raw materials and finished product are all in liquid form itself.
- As described in the present scheme, no process waste will be generated. In case any chemical solid waste is generated, the same will stored and disposed off through Treatment Storage and Disposal Facility (TSDF) approved by Haryana State Pollution Control Board.
- Used/spent Oil will be collected in drums and reused for low grade lubrication of machinery and for rust proofing or sold to registered recyclers.
- Packing Materials – discarded cardboards/ drums – Sold to authorize vendors.
- Municipal solid waste will be sent to district municipal corporation site for safe disposal.
- Hazardous waste generated from the industry will comprise of empty/used containers, spent oil etc.

- Hazardous waste storage room will be constructed as per the CPCB norms having display board in English & Hindi with quantity generated.
- Municipal solid waste generated will be collected, segregated using twin bin system and disposed off to municipal waste disposal site through third party contractor.

1.2.4. Noise Pollution Control

- Silent D.G set will be installed as per CPCB norms.
- All high noise generating equipment will be installed with a vibration damping foundation and provided with adequate enclosures.
- Periodical maintenance of machinery& vehicles will be done to reduce generation of noise.
- Use of PPE like earmuffs in high noise area will be ensured.
- Green Belt has been developed at plant boundary and plantation will be done within pant premises for noise attenuation.
- Noise monitoring will be done regularly at prominent places in the plant.

1.2.5. Green Belt Development/Plantation

- Approx 4740.85 sq.m area is under greenbelt & plantation which is 33% of the total land area.
- Local plant species with pollution abating characteristics will be selected for plantation programme and to improve aesthetic environment of the area.
- A total of 550 nos. of trees will be planted at suitable grid spacing to encourage proper growth.

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Chapter 2:

Introduction to the Project/Background information

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT:

2.1.1. Identification of Project

Virgo Laminates Ltd is an existing company and the company intends to implement the new unit of Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing on plot admeasuring 14,366.22 sq. m. (3.50 acres) at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt- Panchkula, Haryana.The total estimated investment for the project is estimated as Rs. 498.73 lakhs.

The project activity is covered under category A,(as the project is located outside the notified industrial area/estate), item 5(f) Synthetic organic chemicals industry(*dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates*), as per the EIA Notification, 2006 and subsequent amendments. Therefore, it requires prior Environmental Clearance from EAC. MoEF, GOI. New Delhi.

2.1.2. Project Proponent

The Virgo Group of Companies ("the Group") currently manufactures markets and distributes a wide range of products such as plywood, boards, decorative laminates and aluminum sheets. The Group is headquartered in Chandigarh and corporate office at Delhi, and has more than 1 million square feet of manufacturing space, employing over 500 people, and delivering tons of high quality products every week to satisfied customers across India.The Virgo Group was established by Mr. R. P. Arora in 1975, when a rice mill was set up in Moga district (Punjab); the mill does not exist now. Since then, the Group has grown in strength and diversified into a multi-product businesses enterprise of great repute.

General Information

Company Name	: Virgo Laminates Ltd
Registered Address	: Plot No. 3, Sec-18A, Madhya Marg, Chandigarh 160018
Directors	: Mr. Bishamber Dass Arora
	: Mr. Surinder Pal Arora
	: Mr. Tilak Raj
	: Mr. Parveen Kumar
Authorized Signatory	: Mr. Ramesh Kumar (Manager Accounts)
Email	: vbl@virgolam.com
Contact No.	: 9815842344

2.2 Nature of the Project

The project falls under category A, (as the project is located outside the notified industrial area/estate), item 5(f) Synthetic organic chemicals industry ***(dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)*** and subsequent amendments. Therefore, the project requires Terms of Reference for obtaining prior Environmental Clearance from EAC, MoEF, GOI, New Delhi.

2.3 Need forthe Projectand its Importance to the Country and region

Formaldehyde (HCHO) is the simplest and a commercially important aldehyde. It is a colorless gas at room temperature and is soluble in water, alcohol and other polar solvents. It is commonly sold as aqueous solution. Formaldehyde is being used in the number of industries for various purposes such as for the manufacturing of building materials – like pressed wood products (mostly as an adhesive resin), fiber board, plywood, etc. Additional uses in household products include additive for permanent –press, an ingredient in glues, and as a preservative in medical laboratories – as embalming fluid and as a sterilizer. However, main formaldehyde application (about 70%) is for the production of formaldehyde based resins (i.e. urea formaldehyde, phenol & melamine formaldehyde based resins).

Virgo Laminates Ltd has already set up 6 units of manufacturing of decorative laminates and Formaldehyde is the main raw material to produce Plywood & Laminates in the industries as raw material. The Virgo Group producing 22,00,000 Sheets per month, hence required to consume itself in the industries as well to sale other industries. So there is a need to establish a new plant for manufacturing of Formaldehyde and resins. There are lots of Laminates and other industries who intend to purchase Formaldehyde from us.

2.4 Demand and Supply Gap

According to a Tech Sci Research report, "India Formaldehyde Market Study, 2011 – 2025", the market of formaldehyde in India is anticipated to grow at a CAGR of over 4% during 2016-2025. Flourishing furniture industry along with growing focus on infrastructure-based development are the major factors propelling the India formaldehyde market. In addition to this, various capacity expansion projects announced by formaldehyde derivatives producing companies in India are boosting the demand for formaldehyde in the country. Moreover, growing consumption of formaldehyde by multiple end user industries including construction, furniture, paints & coatings, textiles, fertilizers & pesticides, etc., is expected to drive the India formaldehyde market during forecast period. Moreover, the country's furniture market is projected to grow at a CAGR of around 26% during 2014-2019. Thus, increasing government expenditure on infrastructure-based development and growing furniture market are expected to drive India formaldehyde market during 2016 – 2025.

2.5 Imports versus Indigenous Production

This is indigenous production. Formaldehyde is being used for manufacturing of resins which will be used for manufacturing of, Decorative Laminates, Decorative hard board, Decorative Particle Board and will be sold in local market or used in their own industries.

2.6 Export Possibility

M/s Virgo Laminates Ltd proposing the Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit and the final product will be sold in

local market or used in their own industries. Hence there is no export of production envisages.

2.7 Domestic/Export Market

M/s. Virgo Laminates Ltd is already a leader in the domestic market of these products and laminated ply woods.

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

Project will provide employment to the 15 nos. of workers under various posts viz. management, supervisory, skilled workmen, semi-skilled workmen and unskilled workmen besides casual workmen.

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Chapter 3

Project Description

3.1 TYPE OF PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS, IF ANY

Virgo Laminates Ltd is an existing company and the company intends to implement the new unit of Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing on plot admeasuring 14,366.22 sq. m. (3.50 acres) at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt- Panchkula, Haryana.The total estimated investment for the project is estimated as Rs. 498.73 lakhs.

The project activity is covered under category A, item 5(f) Synthetic organic chemicals industry(*dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates*), as per the EIA Notification, 2006 its subsequent amendments. Therefore, it requires prior Environmental Clearance from EAC, MoEF, GOI, New Delhi.

3.2 LOCATION (MAP SHOWING GENERAL LOCATION, SPECIFIC LOCATION AND PROJECT BOUNDARY & PROJECT SITE LAYOUT) WITH COORDINATES

The Proposed project is coming up at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt- Panchkula, Haryana.

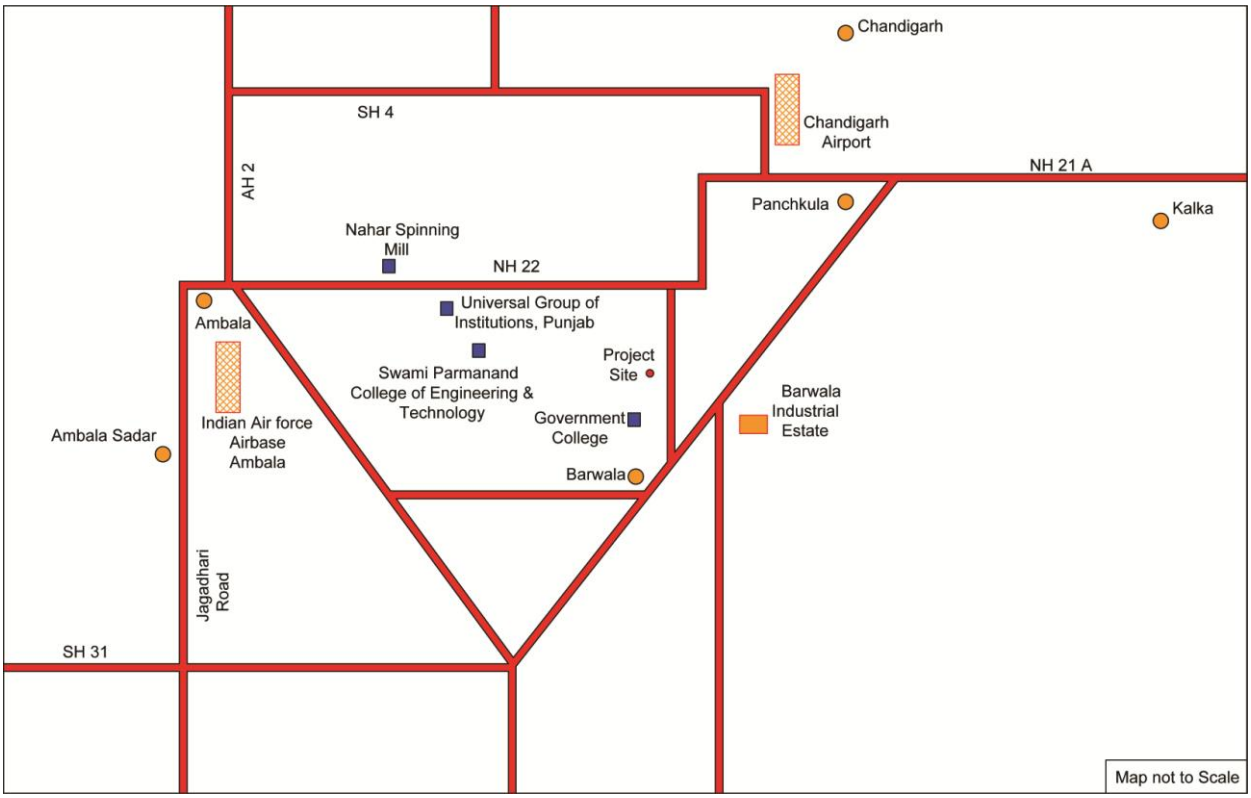


Figure-3.1: Road Location Map

Geographical Coordinates:-

1.Point 1 Latitude : 30°33'56.70"N Longitude : 76°54'34.58"E	**2.Point 2** Latitude : 30°33'55.15"N Longitude : 76°54'33.98"E
3.Point 3 Latitude :30°33'54.94"N Longitude : 76°54'45.15"E	**4.Point 4** Latitude : 30°33'56.60"N Longitude : 76°54'45.24"E

GOOGLE SNAPSHOT SHOWING SITE & SURROUNDING FEATURES

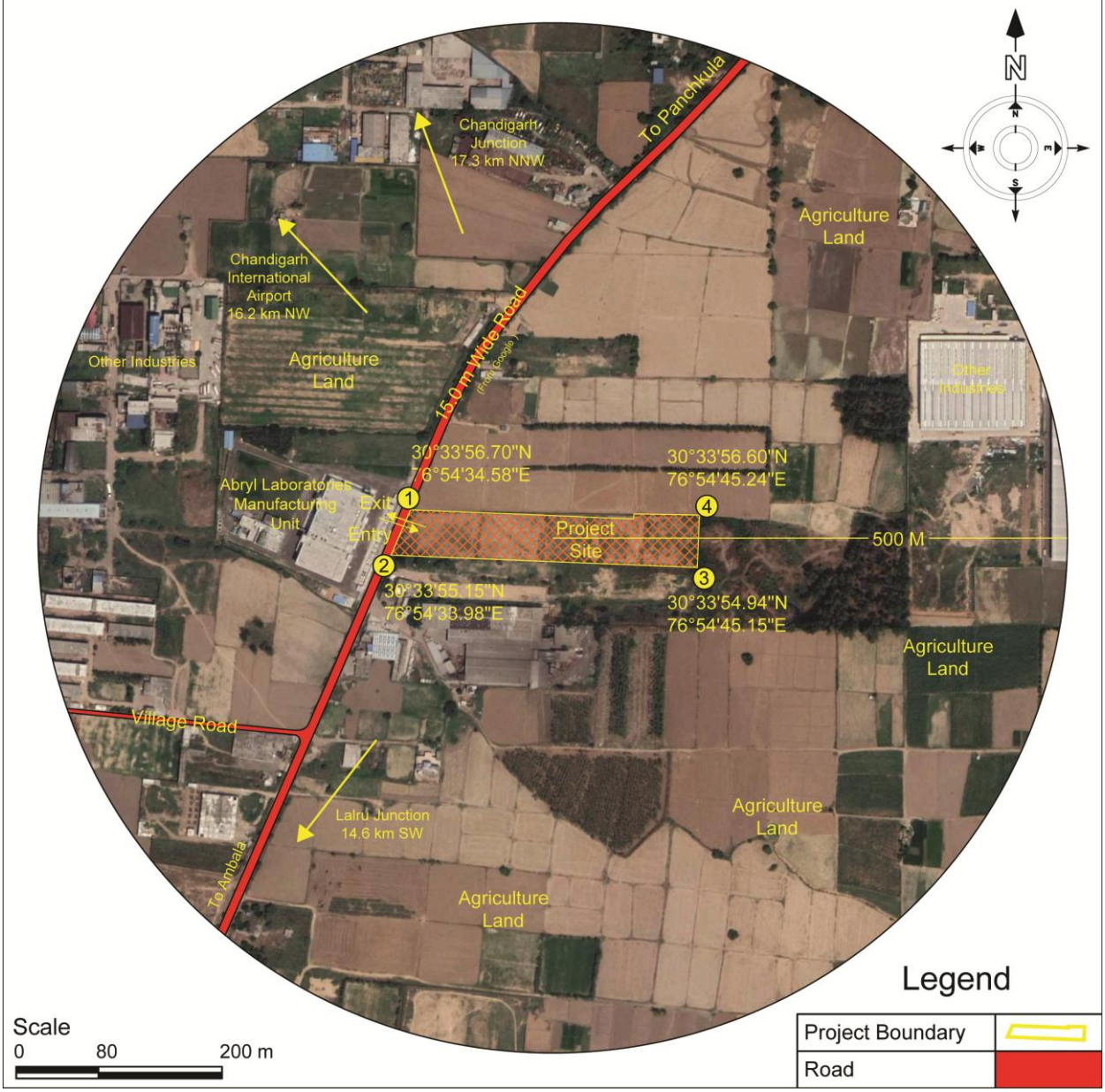


Figure 3.2: Google Map

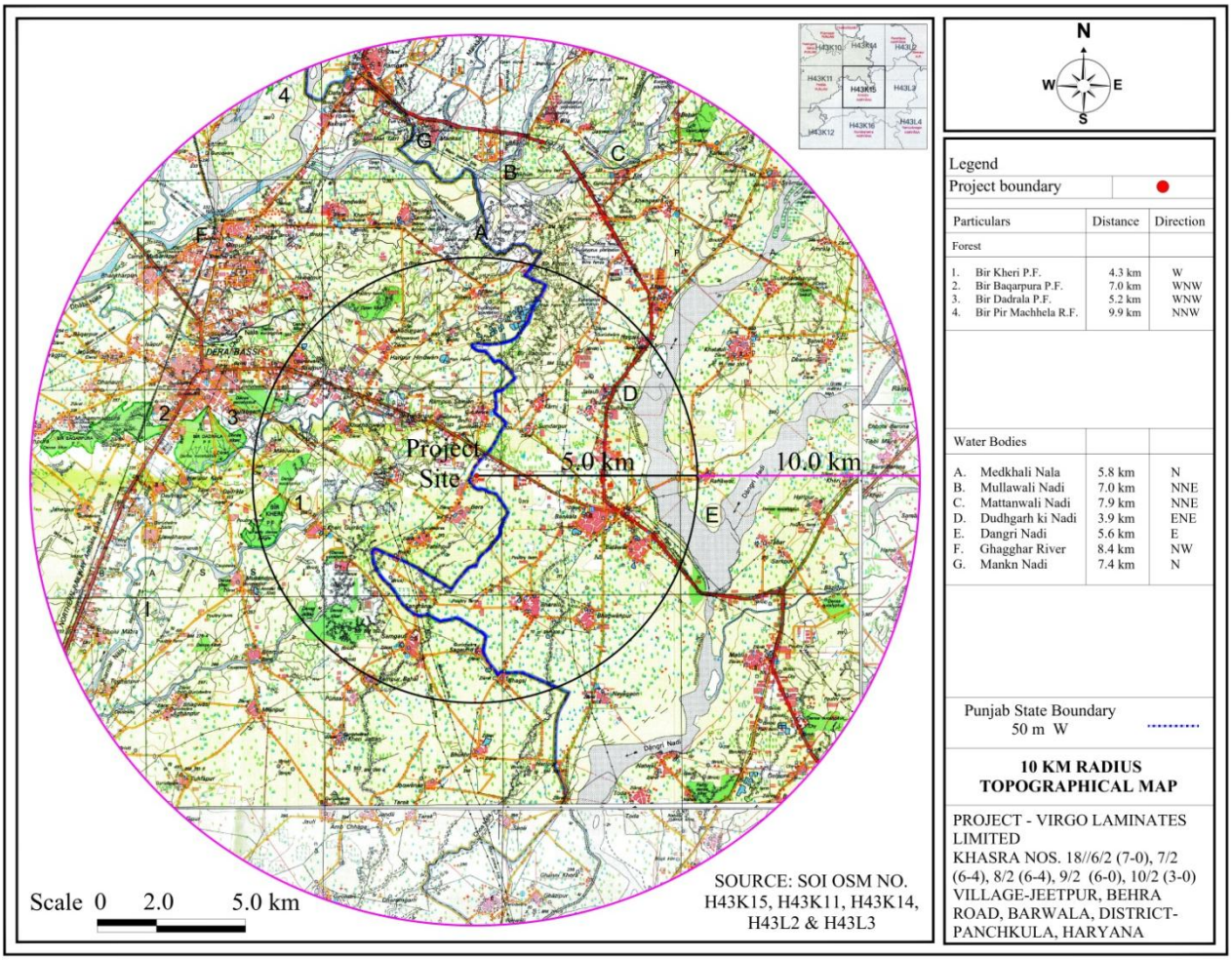


Figure 3.3: Project site marked on SOI Toposheet

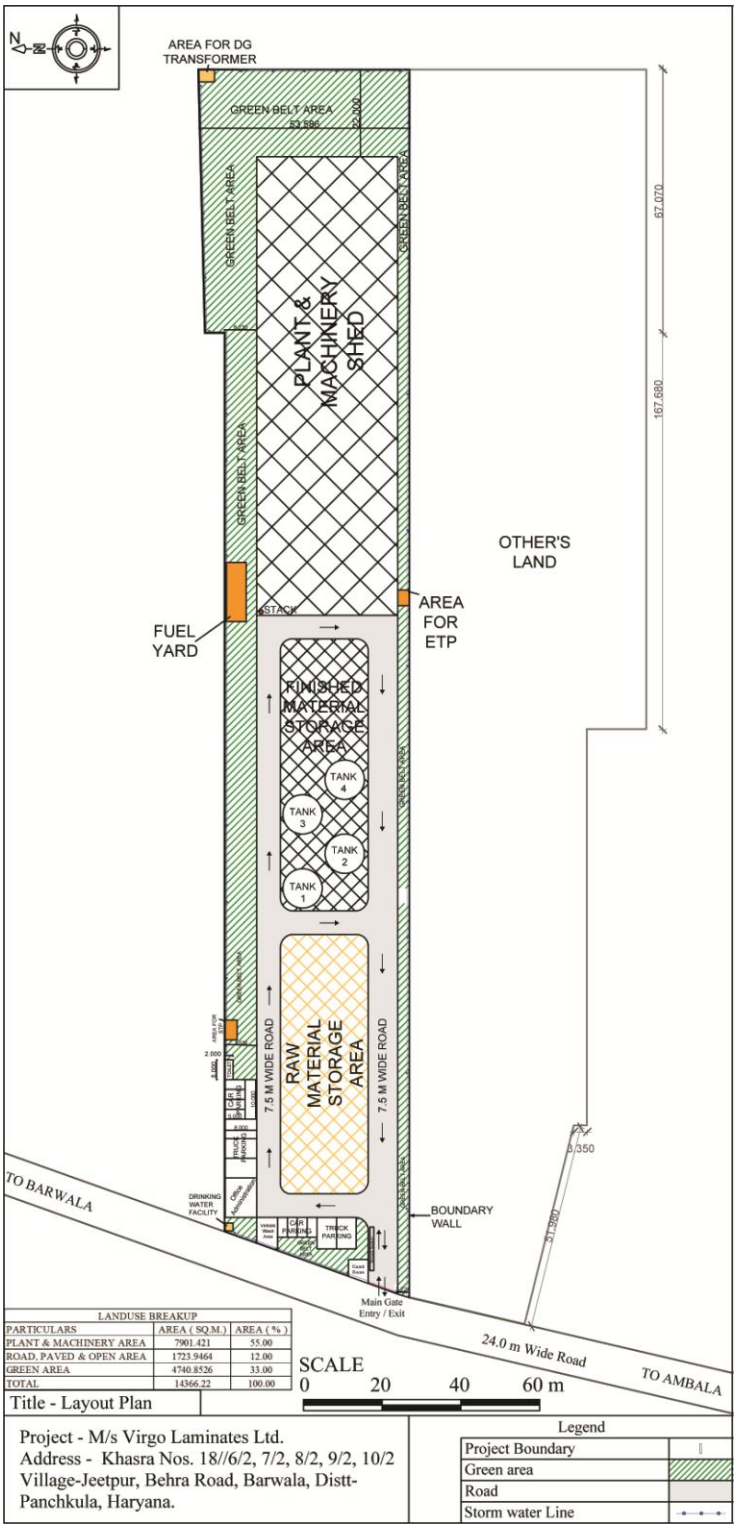


Figure 3.4: Project Layout

3.3 DETAILS OF ALTERNATE SITES CONSIDERED AND THE BASIS OF SELECTING THE PROPOSED SITE, PARTICULARLY THE ENVIRONMENTAL CONSIDERATIONS GONE INTO SHOULD BE HIGHLIGHTED

No alternative sites were considered for the establishment of this Proposed Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit. The site is considered based on the following parameters:

- No critically polluted area as notified by CPCB in 500 m radius of project site.
- No environmentally sensitive area in 500 m radius of project site.
- Availability of reliable power & water supply.
- Proximity to national and state highway to optimize transportation costs.
- Well connected by Road.
- No wildlife sanctuary, national park, biosphere reserve in 10 km radius study area.
- Availability of trained and skilled manpower nearby because of the proximity to various industrial areas and village & city.

The screening criteria set by the company are economic & social factors. Overall, no alternative site is examined.

3.4 SIZE / MAGNITUDE OF OPERATION

- **Land Requirement**

The total land area for the proposed unit is 14,366.22 sq. m. (3.50 acres) at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt- Panchkula, Haryana. Internal land use breakup is as under:-

S. No.	Particulars	Area	%
1.	Work Shed area	7901.42 sq. m	55
2.	Green area	4740.85 sq. m.	33
3.	Paved area (includes Parking and road)	1723.95 sq. m	12
	Total	**14,366.22 sq. m.**	**100%**

➢ Production details

M/s Virgo Laminates Ltd proposes Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit coming up at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt-Panchkula, Haryana. The total land area for the project is 14,366.22 sq. m. (3.50 acres). Details are as under:-

Table 3.1: Details of Production

S. No	Product	Capacity	Batch Size	No of batches	Batch time	No of working days
1.	Formaldehyde	300 TPD	75 MT	4	5 hr/batch	26
2.	Melamine Formaldehyde Resin	25 TPD	5 MT	5	4 hr/batch	26
3.	Cardanol phenol Formaldehyde Resin	75 TPD	15 MT	5	6 hr/batch	26

➢ Details of Machinery

S. No	Machinery
1.	Tanks
2.	Glue Kettle Phenol /Formaldehyde
3.	Glue Kettle Melamine /Formaldehyde
4.	Heat Exchanger
5.	Air Blower
6.	Pumps
7.	Boiler
8.	Cooling Tower
10.	Evaporator (with Re Boiler)
11.	DM Water Plant
12.	Absorption Column I, II & III

3.5 PROJECT DESCRIPTION WITH PROCESS DETAILS (A SCHEMATIC DIAGRAM/FLOW CHART SHOWING THE PROJECT LAYOUT, COMPONENTS OF THE PROJECT ETC

i. Project Description

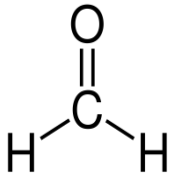
M/s Virgo Laminates Ltd Proposed Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit coming up at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt-Panchkula, Haryana.The total land area for the project is 14,366.22 sq. m. (3.5 acres).Production details are as under:-

Table: Production details

S. No.	Product	Capacity
1.	Formaldehyde	300 TPD
2.	Melamine Formaldehyde Resin	25 TPD
3.	Cardanol phenol Formaldehyde Resin	75 TPD

ii. Manufacturing Process

1. Formaldehyde Manufacturing Process

CAS Number	50-00-0
Molecular Formula	HCHO
Structural Formula	

Formaldehyde is the oxidation/dehydrogenation product of methanol with oxygen in the presence of Silver catalyst. A fixed quantity of methanol and water is introduced in to a mixing vessel from where this mixture is taken into an evaporator. Air is also introduced into the evaporator. A temperature of 70° C is maintained which facilitates the evaporation of methanol. The air and methanol vapour mixture is then further heated to 100 deg in the super heater and then introduced into the reactor where in presence of silver catalyst maintained at

temperature of 650°C.The oxidation/Dehydrogenation reaction takes place as per the following chemistry:-

CH_3OH = HCHO+ H2 (Endothermic Reaction)

$H_2 + 1/2\ O_2$ = H_2O (Exothermic Reaction)

$CH_3OH + 1/2\ O_2$ = HCHO+ H_2O (Net Exothermic Reaction)

ABSORPTION

The Reaction is net Exothermic. In the Reaction 3 itself which is also a waste heat boiler the temperature of the product gasses is brought down to 180°Cand then further to cooled to about 95°Cin the re-boiler. This is achieved by circulating the Solution in the Evaporator in the Reboiler which cools down the Product gasses to about 95°Cand itself is heated up to 70°Cthus saving on energy. The product gasses are further cooled to about 75°Cin the condenser by circulation of cooling water from the cooling tower. The reaction gas containing Formaldehyde, un-reacted Methanol and water vapour is then directed to Absorption column I and escaping Formaldehyde gases are absorbed by circulating and cooling the Formaldehyde solution in Plate Heat Exchanger from the absorber sump. The part of the circulation is taken out as product.

Mostly the absorber is packed with pall rings. If proper packing size and cooling is maintained more than 95% absorption is completed in the absorption column-I.

The unabsorbed gas from the absorption column - 1 is absorbed in the absorption column-II and subsequently in Column III by circulating and cooling absorber sump dilute Formaldehyde solution in Plate Heat Exchanger. Finally, the gas is washed with pure Chilled DM water at the upper part of the column - III, provided with bubble cap trays, and then exhausted as tail gas to the atmosphere.

The Exhaust gasses contain only Nitrogen, Carbon dioxide, Carbon Monoxide and traces of Formaldehyde and Methanol.

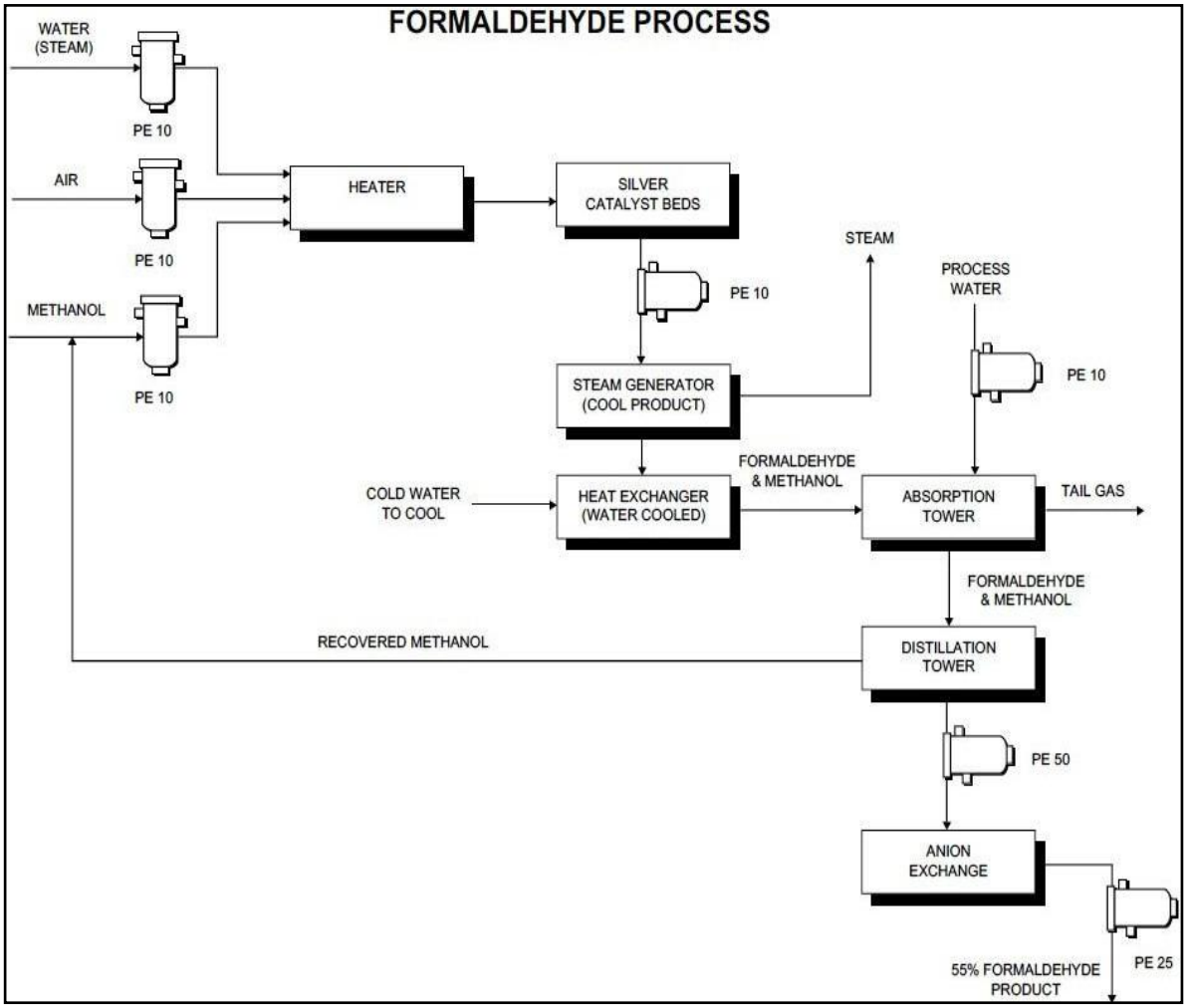
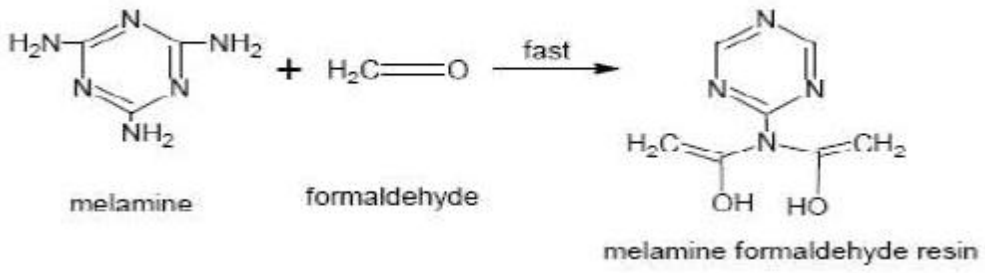


Fig 3.5: Process of Formaldehyde Manufacturing

2. Melamine Formaldehyde Resin

- ✓ All the raw materials like Melamine, Formaldehyde and Caustic Soda will be added in the Reaction Vessel.
- ✓ Adjust pH to approximately 9.0 to 9.5 by using caustic soda solution 50%.
- ✓ Add Melamine Powder and Open the steam valve & continue stirring the rector.
- ✓ Start heating and raise the temperature to 90± 5°C in approximately 45-55 Min.
- ✓ Digest/Reflux the batch at above temperature for 5 Min draw the sample to check clarity of solution.
- ✓ Start checking turbidity after every 5 min interval, when the turbidity appears, record the timing and temp.

✓ Continue checking water tolerance after every 5 minutes interval, when water tolerance reaches 1:6 to 1:6.5, cooling valve on, the Resin batch reach to 35°C then Transfer the resin in storage tank.



3. Cardanol Phenol Formaldehyde Resin

- Charge Phenol, Cardanol and Formaldehyde as per Std.Charging given formulation.
- Add caustic solution (make caustic solution by dissolving caustic in water).
- Open The Steam Valve, Start heating continues and raise the temperature up to 50° to 60°C in approximately 30-35 Minutes.Stop Heating Closed the Steam Valve.
- Let the temperature rise at its own to 95± 5°C till reflux
- After 10 to 15 Minutes of reflux draw a sample for Water Tolerance. Continue checking water Tolerance after approximately every 05 Minutes interval. Record the time when tolerance Reaches 1:0.7-1:0.6and Switch On the vacuum pump and start distillation under vacuum.
- Remove required quantity reaction of water.
- After distillation cooling the batch to 35° to 45°C.
- Check resin properties.
- Transfer the resin in storage tank.

3.6 RAW MATERIAL REQUIRED ALONG WITH LIKELY SOURCE, MARKETING AREA OF FINAL PRODUCTS, MODE OF TRANSPORT OF RAW MATERIAL AND FINISHED PRODUCT.

S. No	Product	Raw Material	Quantity used Kg/ Tonne of HCHO	Source	Mode of Transport
1.	Formaldehyde	Methanol	1725	Local Market	Road
2.		Water(D.M water)	1875		
3.		Air	33750		
4.		Silver catalyst	225		
			WT. IN Kg per batch		
1.	Melamine Formaldehyde Resin	Formaldehyde	1125	Local Market	Road
2.		Melamine	750		
3.		Caustic soda	0.55		
4.		Water	315		
1.	Cardanol phenol Formaldehyde Resin	Formaldehyde	3255	Local Market	Road
2.		Phenol	2563		
3.		Cardinol	358		
4.		Caustic soda	23		
5.		Water	61		

3.7 RESOURCE OPTIMIZATON/RECYCLING AND REUSE ENVISAGED IN THE PROJECT, IF ANY, SHOULD BE BRIEFLY OUTLINED

Treated wastewater from ETP to the tune of 19 KLD will be used in cooling towers and approx .0.6 KLD STP treated water will be used for landscaping.

3.8 AVAILABILITY OF WATER ITS SOURCE, ENERGY/POWER REQUIREMENT AND SOURCE SHOULD BE GIVEN

i. Water Requirement

The total water requirement for the project is 155 KLD out of which 135.4 KLD is fresh water which is sourced from Ground water supply and treated/recycled water 19.6 KLD (19 KLD from ETP and 0.6 KLD from STP) will be used for cooling tower and landscaping. The details of water requirement are as follows:

S. No	Particulars	Fresh water	Treated/Recycle water	Waste water generation	Mode of Treatment
1.	*Industrial*	125 KLD	19 KLD	21.44 KLD	ETP of capacity 25 KLD
a.	Process	2 KLD		-	
Formaldehyde		Nil	Nil	-	
Melamine Formaldehyde Resin		1.5 KLD	-	1.2 KLD	
Cardanol phenol Formaldehyde Resin		0.3 KLD	-	0.24 KLD	
b.	Boiler	120 KLD	-	15 KLD	
c.	Cooling Tower	1 KLD	19 KLD	2 KLD	
d.	Washing	2 KLD	-	2KLD	
2.	*Domestic*	*1 KLD*	-	0.8 KLD	Modular STP of capacity 1 KLD
3.	*Landscaping*	9.4 KLD	0.6 KLD	-	
	Total	**135.4KLD**	**19.6 KLD**	**22.24 KLD**	

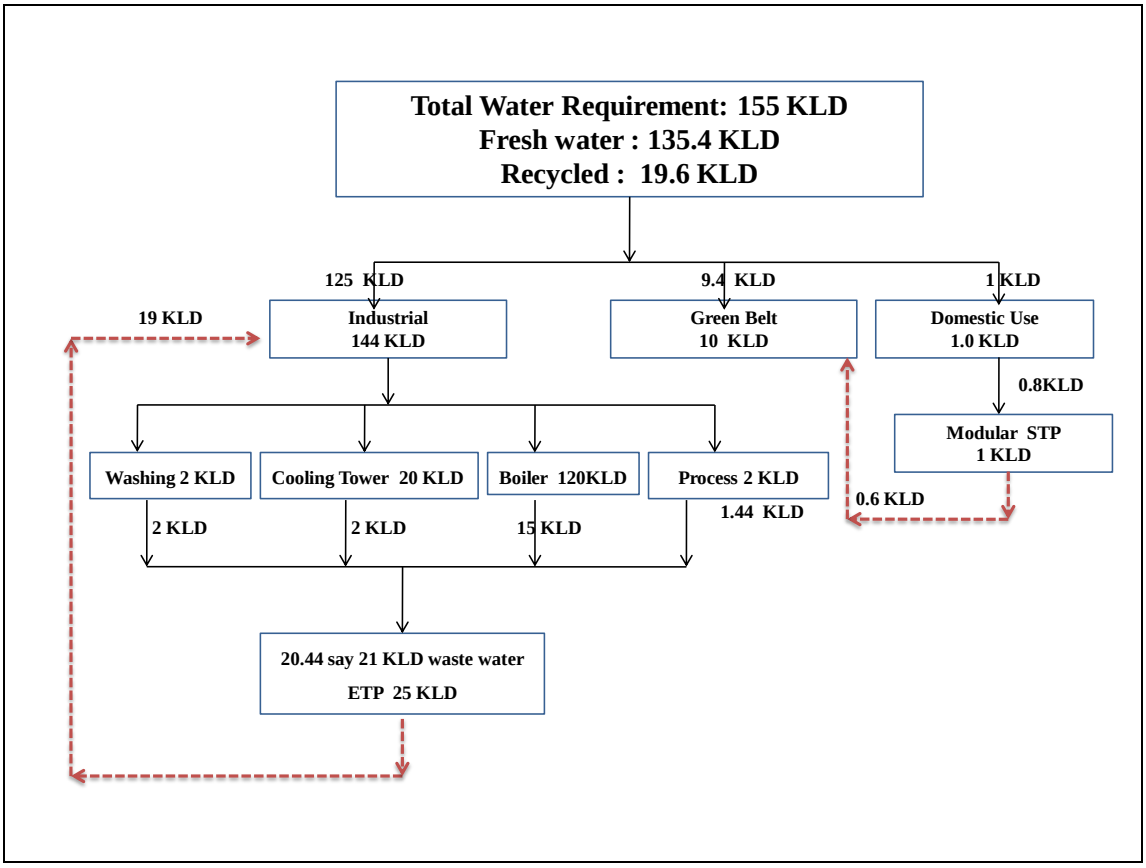


Fig 3.6: Water Balance

ii. Power Requirement

S. No	Particulars	Details
1.	Electrical Load	125 KW
2.	Source	State Electricity Board
3.	Power back up	D. G set : 1 No. Capacity :125 KVA Fuel :HSD Quantity : 25 l/hr(28.6 Lt/Hr.)

iii. Fuel Requirement

S. No	Particulars	Capacity	Type of fuel	Quantity
1.	D.G set	125 kVA	HSD	25 l/hr
2.	Boiler	6 TPH	Bio Mass Briquettes	10 MT/day

3.9 QUANTITY OF WASTE TO BE GENERATED (LIQUID AND SOLID) AND SCHEME FOR THEIR MANAGEMENT /DISPOSAL

(A) Quantity of Liquid Waste to be Generated & Its Management / Disposal:

- **Domestic waste water**

  Approx 0.8 KLD domestic waster will be generated from the project and the same will be routed to modular STP of capacity 1 KLD.

- **Industrial Waste Water**

  Approx 21.44 KLD waste water will be generated from the industrial activities and the same will be routed to ETP of capacity 25 KLD for effective management.

(B) Quantity of Solid Waste to be Generated & Its Management / Disposal:

Both industrial (hazardous and non hazardous) and domestic solid waste will be generated from the project. Details are as under:

- **Domestic Solid Waste (Municipal Solid waste)**

Particulars	Details	Basis	Waste generated kg/day	Management
Domestic workers	15	@0.4 kg/ person/day	6	Color coded bins will be provided for the segregation of the waste and the same will be sent to municipal disposal site.
Landscaping waste	1.17acres	@0.2kg/acre/day	0.234	
		Total	**6.23 say 7 kg/day**	

- **Industrial Solid Waste**

Both industrial hazardous and non hazardous will be generated from the project. Details are as under:-

Table 3.5: Hazardous waste

As per HOWR rule 2016, the following waste will be generated:-

Particulars	Category	Management
Spent Oil	5.1	The same will be sent to nearest TSDF Site.
Chemical sludge from ETP	34.3	
Discarded Plastic Bags/ Drums/ Barrels	33.1	Collection, storage & sold to authorized vendor.
Hazardous and other waste		
Formaldehyde Sediments	B3010	Formaldehyde sediment shall be stored and disposed off at TSDF approved by State Pollution Control Board.

Table 3.6: Non Hazardous waste

Particulars	Management
Cardboard boxes (Cartons)	Will be sold to registered recyclers.
Polythene bags	Will be sold to registered recyclers
Boiler Ash	Will be Sold to fly ash bricks manufacturing plants

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

The project layout showing various features as proposed land is given as under:

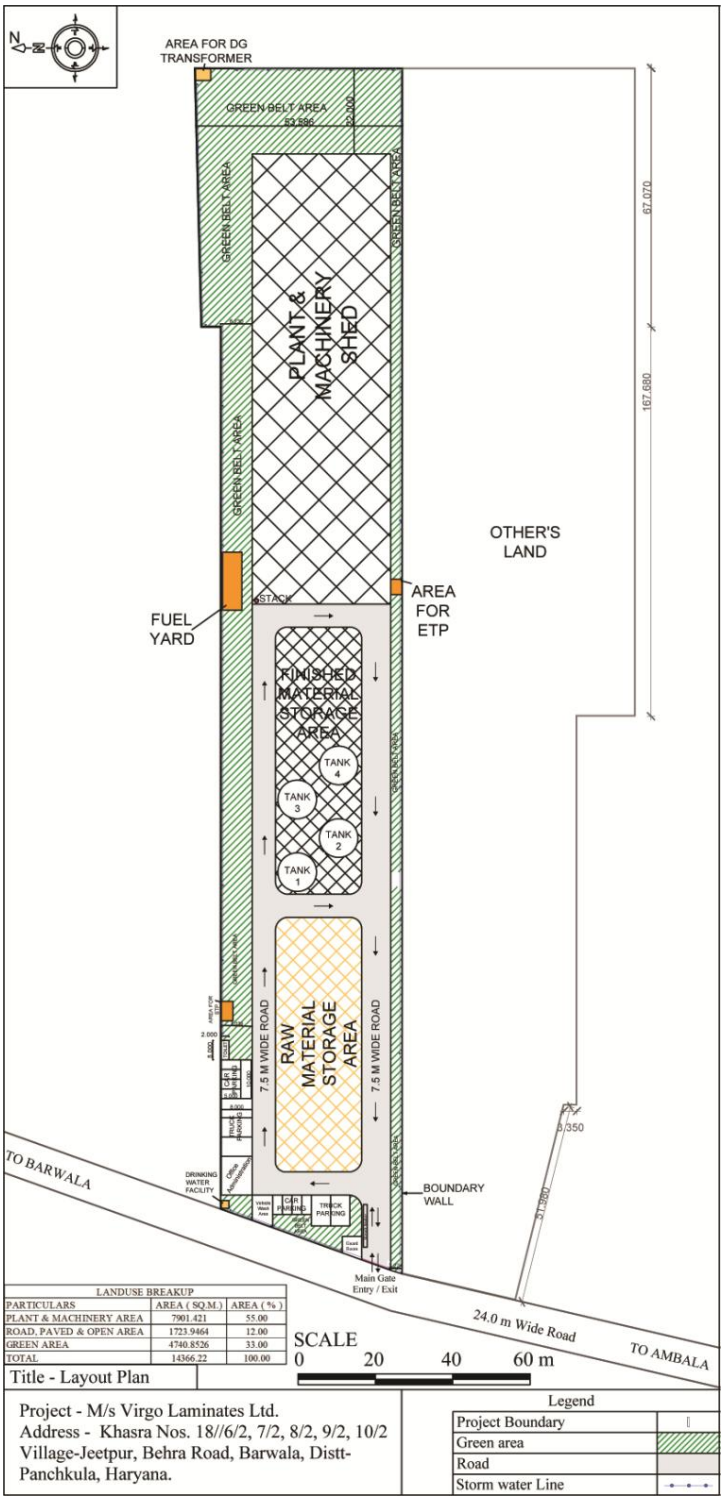


Figure 3.7: Plant Layout

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SECTION 4: SITE ANALYSIS

4.1 CONNECTIVITY:

Virgo Laminates Ltd is an existing company and now proposes to set up Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit. The Company intends to implement the new unit on plot of land measuring 3.50 acres (14,366.22 sq. m) at Village-Jeetpur, Behra Road, Barwala, district-Panchkula Haryana. Site connectivity is as under:-

S. No.	Distance & Direction	
1.	Nearest National Highway	• NH 73 : 2.8 km towards E • NH 22 : 6.9 km towards WNW • SH 1 : 7.3 km towards ESE • NH 64 : 13.6 km towards WNW
2.	Nearest Railway Station	• Lalru Railways station : 14.6 km towards SW • Chandigarh Railways station : 17.3 km towards NNW
3.	Nearest Airport	Chandigarh International Airport : 16.2 km towards NW
4.	Nearest water bodies	As under:-
5.	Ecologically Sensitive Area	None with in 10 km radius of proposed project site.

Dudhgarh ki Nadi	3.9 km towards ENE
Dangri Nadi	5.6 km towards E
Medkhali Nala	5.8 km towards N
Mullawali nadi	7.0 km towards NNE
Mattanwali Nadi	7.9 km towards NNE
Mankn Nadi	7.4 km towards N
Ghagghar River	8.4 km towards NW
Balaiali Nadi	10.3 km towards SE
Balaiali Nala	11.7 km towards SE
Nadlan Nadi	12.2 km towards N
Dhanana Nala	14.3 km towards SE

4.2 LAND FORM, LAND USE AND LAND OWNERSHIP:

- **Land Form**

  The landform for the proposed manufacturing unit is plain with slight elevation of approx 2 m.

- **Land Use**

  The proposed manufacturing unit is coming up on a land duly converted for industrial purpose.

- **Land Ownership**

  The land was purchased from Virgo boards Limited in the name of Virgo Laminates Ltd admeasuring an area of 3.5 acres (14,366.22 sq. m.). Sale deed was executed on 21.11.2018 between Virgo boards Limited and Virgo Laminates Ltd.

4.3 TOPOGRAPHY

The Unit is coming up on a land duly converted for industrial use at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt-Panchkula, Haryana. The topography of the site is plain with slight elevation of 2 m and the contour levels ranges from 318 to 320 east to west.

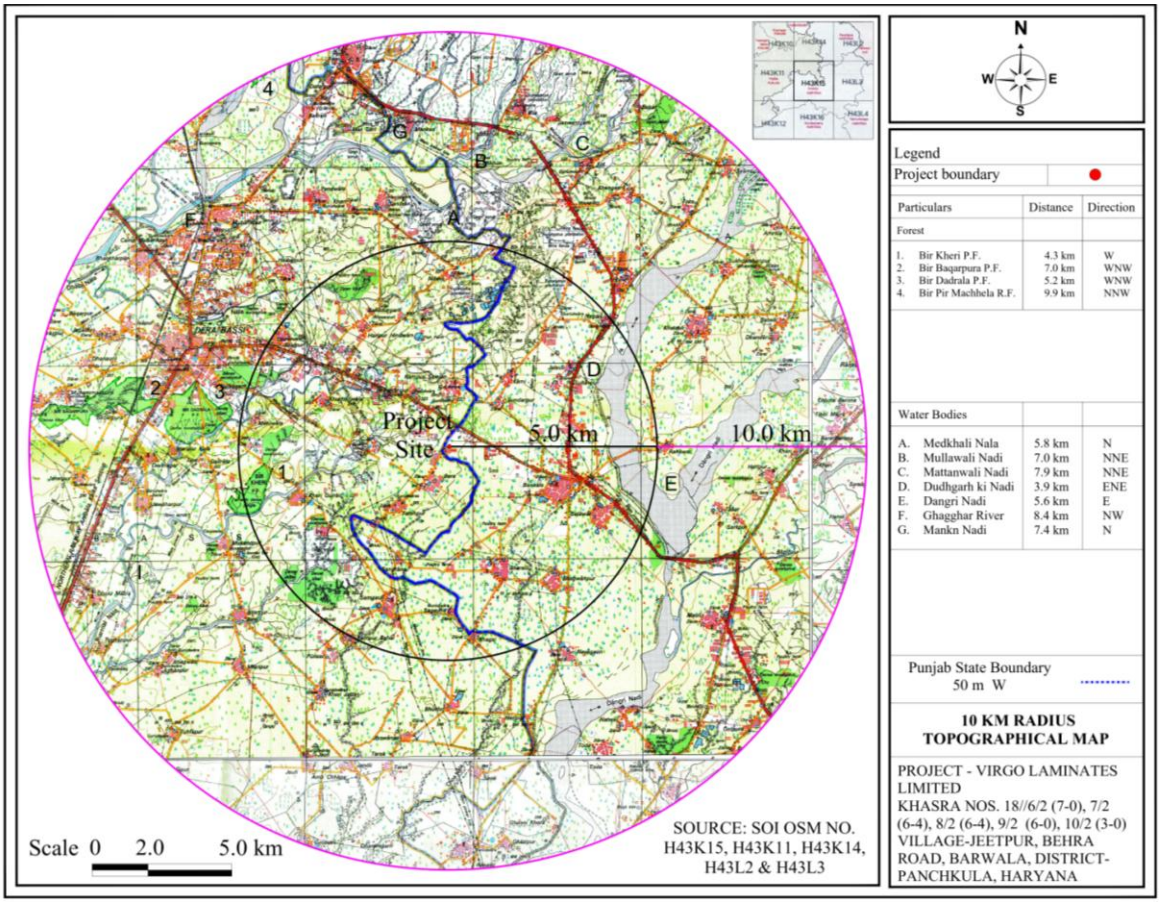

Fig 4.1: Topographical Map (Within 15 km Radius)

4.4 Existing Land Use Pattern, Shortest Distance from the Periphery of the Project to Periphery of the Forest, National Park, Wild Life Sanctuary, Eco Sensitive Area, Water Bodies (Distance from the HFL of the River), CRZ:

The project is coming up at Khasra Nos. 18//6/2 (7-0), 7/2 (6-4), 8/2 (6-4), 9/2 (6-0), 10/2 (3-0) village-Jeetpur, Behra Road, Barwala, Distt- Panchkula, Haryana. The details of water bodies and PF/RF within 15 kms area are mentioned below:

Name	Distance from Project Site
Forests	
Bir Kheri P.F	4.3 km towards W
Bir Dadrala P.F	5.2 km towards WNW
Bir Baqarpura P.F	7.0 km towards WNW
Bir Pir machhela R.F	9.9 km towards NNW
Bir Barauli P.F	10.9 km towards W
Bhoj mataur P.F	12.4 km towards NNE
Bir Hansala P.F	12.4 km towards WSW
Kholhai Raitan R.F	12.8 km towards N
Rajpura P.F	14.7 km towards NE
Water bodies	
Dudhgarh ki Nadi	3.9 km towards ENE
Dangri Nadi	5.6 km towards E
Medkhali Nala	5.8 km towards N
Mullawali nadi	7.0 km towards NNE
Mattanwali Nadi	7.9 km towards NNE
Mankn Nadi	7.4 km towards N
Ghagghar River	8.4 km towards NW
Balaiali Nadi	10.3 km towards SE
Balaiali Nala	11.7 km towards SE
Nadlan Nadi	12.2 km towards N
Dhanana Nala	14.3 km towards SE

4.5 Existing Infrastructure:

The total land area acquired by the unit is 14,366.22 sq. m. (3.50 acres). The entire land is vacant and will be utilized for the purpose of Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit.

Infrastructures available near site are as under:-

S. No	Infrastructure Available	Distance & directions
1.	Nearest National / State Highway	• NH 73 : 2.8 km towards E • NH 22 : 6.9 km towards WNW • SH 1 : 7.3 km towards ESE • NH 64 : 13.6 km towards WNW
2.	Nearest Railway Station	• Lalru Railways station : 14.6 km towards SW • Chandigarh Railways station : 17.3 km towards NNW
3.	Nearest Airport	Chandigarh International Airport : 16.2 km towards NW
4.	Educational Facilities	• Government primary School Barwala : 2.4 km towards ESE • Government Primary School, Sultanpur :3.0 km towards NE • Shahid Rohit Kauhal Govt. High School : 3.6 km towards NE
5.	Medical Facilities	• Government Dispensary :1.2 km towards NNE • Govt.PHC Barwala :2.6 km towards ESE • Govt. Health Centre ,Bhareli :2.9 km towards SE
6.	Temples	• Shiv Temple : 1.0 km towards NNE • Shiv Mandir :1.3 km towards ENE • Shiv temple, Barwala :2.96 km towards ESE

4.6 Soil Classification:

Eurtrochrepts/ Udorthents- These are shallow and loamy sands to fine sandy loams, except in depressions, well-drained, non-saline, non-alkali, non-calcareous, mostly base saturated and are classified as loamy skeletal typic, lithyhic, eurtrochrepts/ udorthents.

These soils are found in the Siwalik range.

- Udipsamments/ udorthents - These are loamy sand to sandy loam deep, excessively or well-drained, non-saline, non-alkali. These are placed under the associations of transitional tract between Siwaiks hills and alluvial plains.
- Psammaquents and Haplaquepts - These soils are found in Yamuna Plains
- Haplaquept - These soils are non saline, alkalinity hazards are classified as typicustochrepts but water logged soils with loam to clay loam texture showing the effect of glazing, are classified as aeric/ typic Haplaquepts. Areas as aeridic soil moisture, moisture have soils classified as camborthics and torropsamments.

4.7 Climatic Data From Secondary Sources:

The proposed project is coming up at Barwala in Panchkula district of Haryana State.The climate of Panchkula can be classified as subtropical monsoon, mild & dry winter, hot summer and sub-humid which is mainly dry with hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. There are four seasons in a year. The hot weather season starts from mid March to last week of the June followed by the southwest monsoon, which lasts up to September. Thetransition period from September to November forms the post monsoon season. The winter season starts late in November and remains up to first week of March.

Rainfall

The normal annual rainfall of the district is 1057 mm, which is unevenly distributed over the area in 49 days. The southwest monsoon sets in from last week of June and withdraws in end of September, contributed about 86% of annual rainfall. July and

August are the wettest months. Rest 14% rainfall is received during non-monsoon period in the wake of western disturbances and thunderstorms.

4.8 Social Infrastructure Available:

Primary and secondary Schools, Community Health Centre, Public Health Centre, Clinics are available.Details of facilities nearby the project is as under:

Particulars	Distance & Direction	
Nearest Railway Station	Lalru Railways station	: 14.6 km towards SW
	Chandigarh Railways station	: 17.3 km towards NNW
Nearest Airport	Chandigarh International Airport	: 16.2 km towards NW
Educational facility	Government primary School Barwala	: 2.4 km towards ESE
	Government Primary School, Sultanpur	:3.0 km towards NE
	Shahid Rohit Kauhal Govt. High School	: 3.6 km towards NE
Medical facility	Government Dispensary	: 1.2 km towards NNE
	Govt.PHC Barwala	:2.6 km towards ESE
	Govt. Health Centre ,Bhareli	:2.9 km towards SE
Place of Worship	Shiv Temple	: 1.0 km towards NNE
	Shiv Mandir	:1.3 km towards ENE
	Shiv temple, Barwala	:2.96 km towards ESE

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CHAPTER 5

PLANNING BRIEF

5.1 PLANNING CONCEPT (TYPE OF INDUSTRIES, FACILITIES, TRANSPORTATION ETC) TOWN AND COUNTRY PLANNING/DEVELOPMENT AUTHORITY CLASSIFICATION

Proposed Industry is Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit. Transportation of Raw Material and finished product will be done through road only as it's well-connected and in the centre of neighboring states. The proposed project is coming up at village-Jeetpur, Behra Road, Barwala, Distt- Panchkula, Haryana.

5.2 POPULATION PROJECTION

The proposed project is formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit and the population projection envisaged due to the proposed project will be workers only. There will be direct generation of employment for 15 peoples. Local peoples will be given preference for employment based on their skills. The proposed project will also generate indirect employment opportunities.

5.3 LAND USE PLANNING:

The proposed project is formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit coming up on a land admeasuring 3.50 acres (14,366.22 sq. m.) The landuse break up (internal) is summarized as under:

Table 5.2: Land use break up

S. No.	Particulars	Areas	%
1.	Work Shed area	7901.42 sq.m	55
2.	Green area	4740.85 sq. m.	33
3.	Paved area (includes Parking and road)	1723.95 sq.m	12
	Total	**14,366.22 sq. m.**	**100%**

5.4 ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL)

The project site is well connected with all the infrastructure facilities. No major new infrastructure will be required. Local people will be hired and they will be trained within unit.

5.5 AMENITIES / FACILITIES

All the basic facility like sanitation & drinking water, dining areas will be provided within premises. First aid box, free medicines & professional medical assistance/ service (on call basis) will be provided. Adequate PPE's will be provided to all workers.

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Chapter 6: Proposed Infrastructure

6.1. INDUSTRIAL AREA

Proposed Formaldehyde, Melamine formaldehyde resin and Cardanol Phenol Formaldehyde resin manufacturing unit will be installed within 3.50 acres (14,366.22 sq.m.) of land. Following infrastructure facilities will be proposed for the unit:

1. Factory Shed
2. Raw material storage area
3. Finished product storage area
4. Office Building
5. Waste water treatment Plant
6. Gate/Time Office etc.

6.2. RESIDENTIAL AREA (Non Processing Area)

No residential facilities have been proposed in the proposed manufacturing unit, residents will be employed in the factory for smooth operation from nearby villages.

6.3. GREEN BELT

Greenbelt/plantation will be done in about 33% i.e. 4740.85 sq. m of the total project area. Increasing vegetation in the form of greenbelt is one of the preferred methods to mitigate air pollution. Plants serve as a sink for pollutants, act as a barrier to break the wind speed as well allow the dust and other particulates to settle out there. It also helps to reduce the noise level to some extent.

6.4. SOCIAL INFRASTRUCTURE

Proposed project will result in growth of the surrounding areas by increasing livelihood through direct and indirect employment opportunities in the village/tehsil including ancillary development and supporting infrastructure. The installation of proposed plant will lead to the

development of certain local ancillary facilities and consequent employment opportunities. Further the proposed project will also lead to the development of market activities etc.

6.5. CONNECTIVITY

The proposed project is well connected and existing infrastructure is adequate. No new transportation infrastructure is required.

6.6. DRINKING WATER MANAGEMENT (SOURCE AND SUPPLY OF WATER)

Approx 1 KLD fresh water will be required for the domestic purpose. Water would be required for human consumption and for general purposes only and will be sourced through Ground water supply.

6.7. SEWERAGE SYSTEM

Approx 0.8 KLD wastewater will be generated from the domestic use which will be routed to modular STP of capacity 1 KLD.

6.8. INDUSTRIAL WASTE MANAGEMENT

Both Liquid and solid waste will be generating from the unit. Hazardous wastes will be sent to TSDF site while other solid wastes will be segregated and disposed off as per the applicable rules.

- **Liquid waste:**

  Approx 20.44 say 21 KLD waste water will be generated from the unit and the same will be treated in the ETP of capacity 25 KLD.

- **Hazardous waste**

Table 3.5: Hazardous waste

As per HOWR rule 2016, the following waste will be generated:-

Particulars	Category	Management

Spent Oil	5.1	The same will be sent to nearest TSDF Site.
Chemical sludge from ETP	34.3	
Discarded Plastic Bags/ Drums/ Barrels	33.1	Collection, storage & sold to authorized vendor.
Hazardous and other waste		
Formaldehyde Sediments	B3010	Formaldehyde sediment shall be stored and disposed off at TSDF approved by State Pollution Control Board.

- **Non Hazardous waste**

Table 3.6: Non Hazardous waste

Particulars	Management
Cardboard boxes (Cartons)	Will be sold to registered recyclers.
Polythene bags	Will be sold to registered recyclers
Boiler Ash	Will be Sold to fly ash bricks manufacturing plants

6.9. SOLID WASTE MANAGEMENT

Approx 7 Kg/day municipal solid waste will be generated from the project which will be managed as per the applicable rules.

Particulars	Details	Basis	Waste generated kg/day	Management
Domestic workers	15	@0.4 kg/ person/day	6	Color coded bins will be provided for the segregation of the waste and the same will be sent to municipal disposal site.
Landscaping waste	1.17acres	@0.2kg/acre/day	0.234	
		Total	**6.23 say 7 kg/day**	

6.10. POWER REQUIREMENT & SUPPLY / SOURCE

S. No	Particulars	Details
1.	Electrical Load	Power Requirement :125 KW

		Source	: State Electricity Board.
2.	Power back up	DG set Capacity	: 1 No. :125 KVA
3.	Fuel Used	Fuel HSD Quantity	: HSD :25l/hr

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Chapter 7: Rehabilitation and Resettlement (R & R) Plan

There are no R&R implications of proposed project.

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Chapter 8: Project Schedule & Cost Estimates

8.1 Likely Date of Start of Construction and Likely Date of Completion

Production shall be started within one year of getting Environmental Clearance from EAC, MoEF&CC, GOI New Delhi and consents from HSPCB.

8.2 Project Cost Estimation

The total investment for the proposed project is estimated as Rs. 498.73 lakhs

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Chapter 9: Analysis of Proposal

9.1 Financial and Social Benefits with Special Emphasis on theBenefit to the Local People Including Tribal Population, ifany, in the Area

There will be direct generation of employment for 15 peoples. Local peoples will be given preference for employment.

Due to green belt development, aesthetic value of local environment will improve.

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