EXECUTIVE SUMMARY OF EIA REPORT

Proposed Manufacturing of Synthetic Organic Chemicals (Unsaturated Polyester Resin)

At

Plot No. 5 & 6, Survey No. 329, Wada Industrial Development Complex, Hamrapur, Taluka Wada, District Palghar, Maharashtra

By

M/s. Morex Industries Pvt. Ltd.

Environmental Consultant

Envirosphere
Consultant & Engineers

ENVIROSHPERE CONSULTANT AND ENGINEERS

NABET/EIA/23-26/SA 0246 Certified Organization

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Environmental Monitoring Laboratory

Ultratech Environmental Consultancy & Laboratory Pvt. Ltd.

(NABL certificate Number: TC-14909, Validity Date: 17-11-2028)

Baseline period – 1st October 2025 to 31st December 2025

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1. Introduction

Morex Industries Private Limited has proposed a Synthetic Organic Chemicals manufacturing project, specifically for the production of Unsaturated Polyester Resin (UPR), at Plot No. 5 & 6, Survey No. 329, Wada Industrial Development Complex, Hamrapur, Taluka Wada, District Palghar, Maharashtra.

This Executive Summary has been prepared as a concise overview of the Environmental Impact Assessment (EIA) Report developed in accordance with the EIA Notification, 2006 and its subsequent amendments. The summary presents brief information regarding the proposed project, existing environmental conditions of the surrounding area, anticipated environmental and social impacts, and the proposed mitigation measures.

As per Environmental Impact Assessment (EIA) Notification, September 14th, 2006 and amendments thereof, the proposed project falls under Activity 5(f) i.e., 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). Since the water requirement of the industry is more than 25 m3/day. Consequently, the project falls under Category A and will be appraised by the Expert Appraisal Committee (Industry – 3), MoEFCC, New Delhi.

To assess the existing environmental status of the study area, baseline environmental monitoring was conducted during the pre-monsoon season from 1st October 2025 to 31st December 2025. Eight monitoring locations each were selected within a 10 km radius of the project site for assessment of air quality, water quality, noise levels, and soil quality. Sample collection and analysis were carried out through NABL and NABET accredited laboratory facilities of Ultratech Environmental Consultancy and Laboratory Private Limited.

The proposed production capacity of Unsaturated Polyester Resin (UPR) is 50,000 TPA (Tons Per Annum). UPR is extensively used in Fiber Reinforced Plastics (FRP), construction materials, automobile components, sanitaryware, marine products, electrical equipment, and various industrial applications. The project is expected to contribute significantly to industrial growth, employment generation, and regional economic development.

The manufacturing process involves controlled-temperature polymerization reactions using various raw materials. Thermal Fluid Heaters will be used in the process, with Liquefied Petroleum Gas (LPG) proposed as fuel. The estimated LPG requirement is approximately 200 kg/hr.

The total water requirement for the project is estimated at 146.55 KLD, out of which 114 KLD will be fresh water sourced through Hamrapur Gram Panchayat, while 32.55 KLD of treated wastewater will be recycled and reused. Treated water from the ETP and MEE systems (30 KLD) will be reused for cooling tower makeup, while treated sewage from the STP (2.55 KLD) will be utilized for gardening purposes. The project proposes adoption of a Zero Liquid Discharge (ZLD) system.

Hazardous and non-hazardous waste generated from the project will be managed as per applicable environmental regulations and disposed through authorized CHWTSDF facilities and approved recyclers. The company is committed to compliance with all environmental norms and sustainable industrial development.

The total capital investment for the proposed project is estimated at INR 30 Crores. Under Corporate Environmental Responsibility (CER), an amount of INR 60 Lakhs has been proposed for various environmental and social development activities.

The project is expected to generate direct employment for approximately 50 persons during the construction phase and around 70 persons during the operational phase, apart from indirect employment opportunities in transportation, maintenance, supply chain, and allied services.

The total power requirement for the project is 600 kW, which will be supplied by Maharashtra State Electricity Distribution Company Limited. Approximately 10% of the total power demand is proposed to be met through solar energy.

The total plot area is 8,780 sq. m. The proposed built-up area is 8,394.13 sq. m., parking area is 805.52 sq. m., and internal road area is 1,559.58 sq. m. About 2,039.78 sq. m. (23.23%) of the total plot area is proposed to be developed as greenbelt.

The EIA Report prepared by Envirosphere Consultant and Engineers LLP includes a detailed assessment of the anticipated environmental impacts during construction and operation phases along with proposed mitigation measures, the summary of which is presented in this Executive Summary.

2. Objective of the Report

The present Environmental Impact Assessment (EIA) Report has been prepared for obtaining Environmental Clearance (EC) for the proposed Unsaturated Polyester Resin (UPR) manufacturing project in accordance with the provisions of the EIA Notification, 2006 and its subsequent amendments.

The primary objective of the report is to assess the potential environmental and socio-economic impacts arising from the proposed project activities, recommend suitable mitigation measures for minimizing such impacts, and formulate an appropriate Environmental Management Plan (EMP) to ensure environmentally sound and sustainable development of the project.

The report also aims to provide relevant information regarding the proposed project to the concerned government authorities, local communities, and other stakeholders, and to facilitate the Public Hearing process.

3. Introduction of the Project and Project Proponent

Morex Industries Private Limited has proposed an Unsaturated Polyester Resin (UPR) manufacturing project at Plot No. 5 & 6, Survey No. 329, Wada Industrial Development Complex, Hamrapur, Taluka Wada, District Palghar, Maharashtra. The proposed project falls

under the category of Synthetic Organic Chemical Industry and is covered under Schedule Activity 5(f) of the Environmental Impact Assessment (EIA) Notification, 2006. Therefore, obtaining Environmental Clearance (EC) for the proposed Unsaturated Polyester Resin manufacturing project is mandatory. Further, since the water requirement of the industry exceeds 25 cubic meters per day, the project will be appraised at the Central level by the Expert Appraisal Committee [EAC (IND-3)] under the Ministry of Environment, Forest and Climate Change (MoEFCC), as per the applicable provisions of the EIA Notification, 2006.

Mr. Sushil More is the Chief Executive Officer of the company. The registered corporate office of the company is located at 803, Ruby Crescent, Business Boulevard, Ashok Chakravarti Road, Ashok Nagar, Kandivali (East), Mumbai – 400101, India.

The proposed project envisages manufacturing of Unsaturated Polyester Resin (UPR) with a total production capacity of 50,000 Tons Per Annum (TPA). Unsaturated Polyester Resin is widely used in Fiber Reinforced Plastic (FRP), construction materials, automobile components, sanitaryware, marine products, and various industrial applications. The proposed project is expected to contribute towards industrial growth and enhance local as well as regional economic development.

The total plot area of the project is 8,780 sq. m., out of which 2,039.78 sq. m. area (approximately 23.23% of the total plot area) has been proposed for greenbelt development. The proposed built-up area will be 8,394.13 sq. m., parking area 805.52 sq. m., and internal road area 1,559.58 sq. m. The total capital investment proposed for the project is approximately INR 30 Crores.

The total power requirement for the project will be 600 kW, which will be sourced from Maharashtra State Electricity Distribution Company Limited (MSEDCL). Approximately 10% of the total power requirement is proposed to be met through solar energy. In case of power failure, two Diesel Generator (DG) sets of 320 kVA capacity each are proposed as backup power supply.

The total water requirement for the proposed project will be 146.55 KLD, out of which 114 KLD of fresh water will be sourced through Hamrapur Gram Panchayat, while 32.55 KLD of treated wastewater will be recycled and reused. The project will generate approximately 38.3 KLD of industrial effluent and 2.83 KLD of domestic sewage. For treatment of industrial effluent, an Effluent Treatment Plant (ETP) along with a Multiple Effect Evaporator (MEE) system has been proposed. A Sewage Treatment Plant (STP) of 5 KLD capacity has also been proposed for treatment of domestic sewage. About 30 KLD of treated water from the ETP and MEE system will be reused for cooling tower makeup, while 2.55 KLD of treated water from the STP will be utilized for gardening purposes. Thus, the project proposes to adopt a Zero Liquid Discharge (ZLD) system.

For control of air pollution, a wet scrubber system along with a 30-meter-high stack has been proposed. In addition, an activated carbon adsorption system has been proposed for control of Volatile Organic Compounds (VOCs). A 60 kW solar power system and rainwater harvesting

facility are also proposed within the project premises. Quarterly environmental monitoring will be carried out through NABL-accredited laboratories to ensure compliance with environmental standards.

The project will include manufacturing units, raw material and finished product storage facilities, utilities, wastewater treatment systems, and other supporting infrastructure. Approximately 50 persons will be employed during the construction phase, while around 70 persons will be employed during the operational phase. Additional indirect employment opportunities are also expected to be generated through transportation, maintenance, supply chain, and other ancillary services.

Further, a provision of INR 60 Lakhs has been earmarked under Corporate Environmental Responsibility (CER) for community-oriented developmental activities such as improvement of irrigation facilities, installation of solar street lights, and development of borewell facilities.

4. Project Location

The proposed project is located at Plot No. 5 & 6, Survey No. 329, Wada Industrial Development Complex, Hamrapur, Taluka Wada, District Palghar, Maharashtra. The said land parcel is owned by the company and designated for industrial use.

The proposed project site is well connected through road, rail, airport, and nearby industrial infrastructure. The site is accessible through the Manor–Wada Road, which is further connected to National Highway No. 48 (Mumbai–Ahmedabad Highway), thereby providing convenient connectivity to the State and National highway network. The nearest railway station is Palghar Railway Station, located approximately 20.18 km towards the west of the project site.

Several industrial establishments are operational in the vicinity of the proposed project site. Intexo Biochem Private Limited is adjoining the northern side of the project site. Vraj Mangal Factory is located towards the north-west, while Sharda Industrial Complex is situated towards the south-west. Glumex Pharmaceuticals Manufacturing Private Limited is located towards the west of the project site. The nearby settlement of Hamrapur is situated approximately 0.79 km towards the south-west direction, which provides availability of local manpower for the proposed project.

In terms of air connectivity, Chhatrapati Shivaji Maharaj International Airport is located at an aerial distance of approximately 68.88 km, while Navi Mumbai International Airport is located about 95 km from the project site. The nearest India Meteorological Department (IMD) station is situated at Dahanu, and the nearest major town is Manor. Owing to its strategic location, the proposed project site is favorable in terms of transportation facilities, supply chain management, and industrial coordination.

Table 1: Environmental Attributes from Project Site

Sr. No.	Environmental Sensitivity	Details	Distance & Direction
1.	Nearest Reserved/Protected forests	Kohoj Dongar RF Manpada RF Nandgaon RF Dabchari RF Navalachepada RF Haloli Dongar RF	780 m, S 7.50 km, NW 3.74 km, NW 4.63 km, N 8.50 km, WNW 4.05 km, SW
2.	Nearest Water Bodies	Dehrja River Vaitarna River Manor Dam Khindicha pada lake Lake in Ambhai Dhuktan Dam Dhekale Dam	1.40 km, NNW 2.86 km, W 7.73 km, WNW 2.37 km, SE 3.73 km, ESE 8.50 km, WSW 8.88 km, S
3.	Notified Eco-Sensitive Zone or Protected Area	None	---
4.	Notified Archaeological Sites/ Monuments	None	---
5.	Nearest Habitat/ Village	Hamrapur	760 m, S
6.	Densely Populated Area	Manor Wada	5.85 km WNW 18.75 km, ESE
7.	Interstate Boundary	None	--
8.	School	ZP Ucch Prathmik School, Hamrapur Z P School, Karalgaon Z P School, Amgaon	1.43 km, SW 1.73 km, NW 1.76 km, ENE
	Temple	Hanuman Temple, Khutal Shiva Temple Duttaguru Temple	630 m, NNW 720 m, NW 930 m, SW
	Hospital	Primary Health care center, Khutal Bhakti Vedanta Hospital, Hamrapur	560 m, N 1.38 km, SW
9.	Creek	None	--
10	Defence installations	None	--

Sr. No.	Infrastructure Sensitivity	Details	Distance & Direction
1.	Airport	Chhatrapati Shivaji Maharaj International Airport, Mumbai	68.88 km, SE
2.	Railway Station	Palghar Railway Station	20.12 km, W
3.	Town	Manor	5.85 km, WNW

4	State Highway	--	
5.	National Highway	Ahmedabad-Mumbai Highway (NH-48)	3.95 km, WNW
6.	Nearest State/National Boundary	None	
7.	Distance from sea coast	Shirgaon Beach	26.64 km, W
8.	Nearest IMD station	IMD Weather Station, Navi Mumbai	80.71km, S
9	Average Site elevation above mean sea level	56 m MSL	

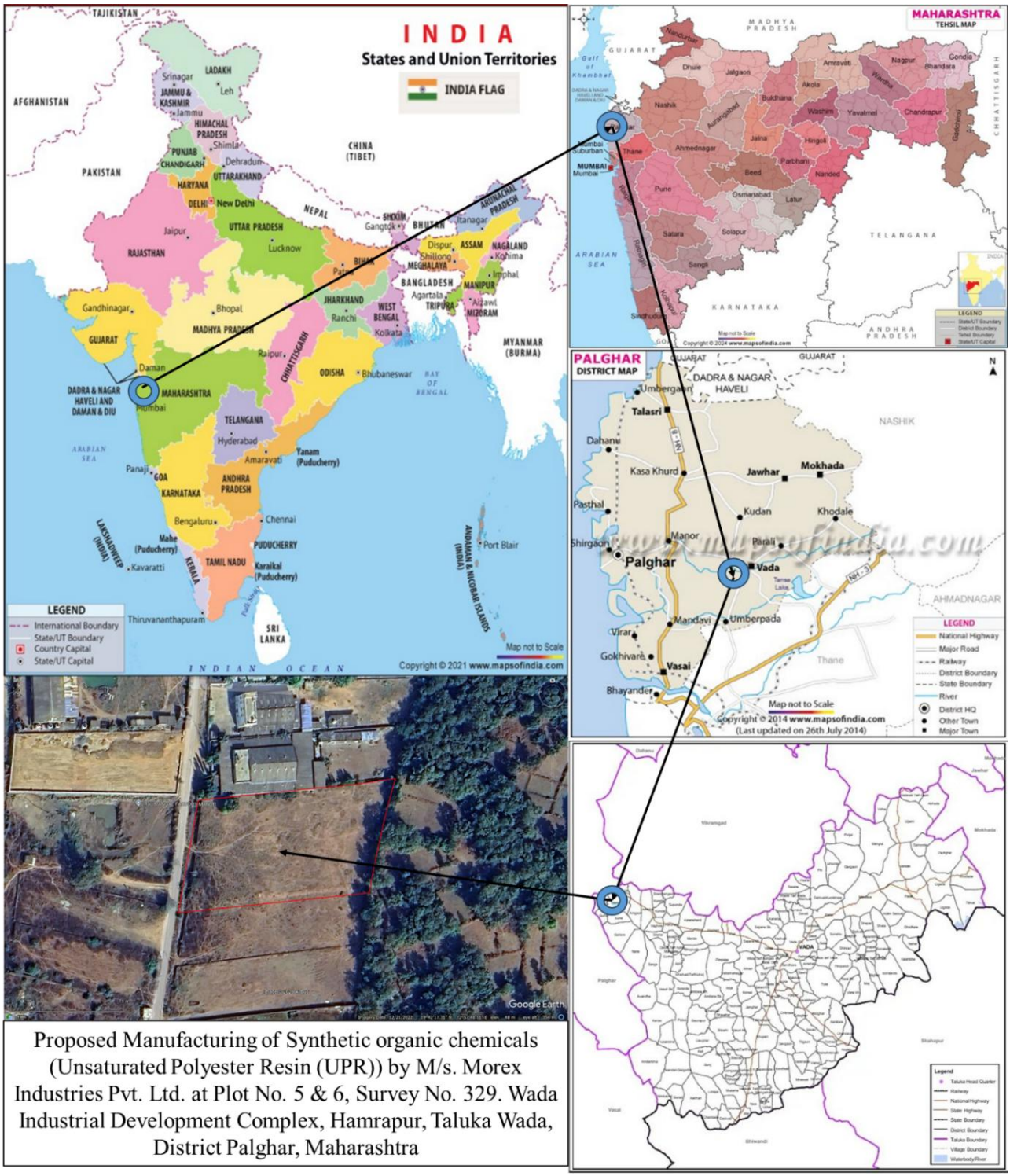


Figure 1: Index Map of Project Site

Point	Latitude	Longitude
A	19°42'15.34"N	72°57'51.74"E
B	19°42'13.10"N	72°57'51.31"E
C	19°42'13.54"N	72°57'55.45"E
D	19°42'15.76"N	72°57'56.34"E

Figure 2: Google Image of the Project Site with Corner Co-ordinates

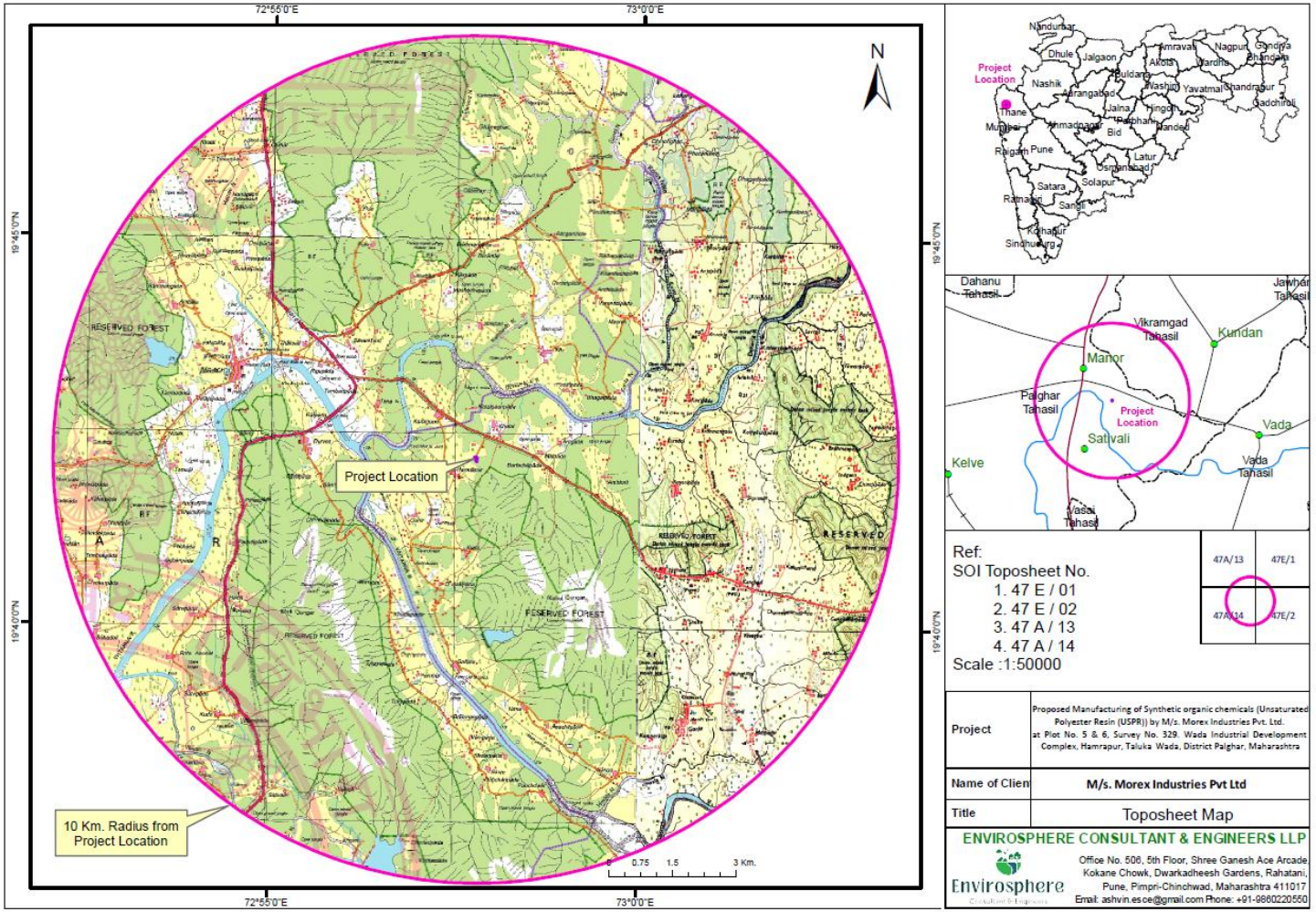


Figure 3: Project Location with 10 km radius study area shown on SOI Toposheet

5. Nature and Size of the Project

The proposed project falls under Schedule Item 5(f) of the Environmental Impact Assessment (EIA) Notification, 2006, and is categorized under the Synthetic Organic Chemicals Industry sector. This category includes industries manufacturing synthetic organic chemicals such as dyes and dye intermediates, bulk drugs and their intermediates (excluding drug formulations), synthetic rubber, basic organic chemicals, and other organic chemical products.

As per Environmental Impact Assessment (EIA) Notification, September 14th, 2006 and amendments thereof, the proposed project falls under Activity 5(f) i.e., 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). Since the water requirement of the industry is more than 25 m3/day. Consequently, the project falls under Category A and will be appraised by the Expert Appraisal Committee (Industry – 3), MoEFCC, New Delhi.

Table 2: Size and Magnitude of Operation

Sr. No.	Name Of Chemical	Proposed Production Details (TPA)
1	Unsaturated Polyester Resin	50000

The proposed production capacity of Unsaturated Polyester Resin (UPR) is 50,000 Tons Per Annum (TPA). The total plot area of the project is 8,780 sq. m., out of which the proposed built-up area is 8,394.13 sq. m., parking area is 805.52 sq. m., and internal road area is 1,559.58 sq. m. An area of 2,039.78 sq. m., constituting approximately 23.23% of the total plot area, has been proposed for greenbelt development.

The total power requirement for the project is estimated at 600 kW, of which approximately 10% is proposed to be met through solar energy. As backup power supply, two Diesel Generator (DG) sets of 320 kVA capacity each have been proposed. The Liquefied Petroleum Gas (LPG) requirement for the Thermic Fluid Heater is estimated to be approximately 200 kg/hr.

The total water requirement for the project will be 146.55 KLD, out of which 114 KLD will be fresh water requirement and 32.55 KLD will be fulfilled through reuse of treated wastewater.

The project is expected to generate direct employment for approximately 50 persons during the construction phase and around 70 persons during the operational phase. The total capital investment for the project is estimated at approximately INR 30 Crores, and a provision of INR 60 Lakhs has been proposed under Corporate Environmental Responsibility (CER).

6. Land Details

The proposed project has a total plot area of 8,780 sq. m. The land is owned by the company, and the relevant 7/12 land ownership extract is available. The project site is located at Wada

Industrial Development Complex, Hamrapur, Taluka Wada, District Palghar, Maharashtra, and falls within the notified industrial zone designated for industrial use.

The proposed project is a new Greenfield development project. The project will include manufacturing process units, raw material and finished product storage facilities, utility systems, wastewater treatment facilities, and other supporting infrastructure.

The proposed built-up area is 8,394.13 sq. m., while the parking area and internal road area are proposed to be 805.52 sq. m. and 1,559.58 sq. m., respectively. Out of the total plot area, 2,039.78 sq. m. area (approximately 23.23%) has been reserved for greenbelt development. The proposed land use distribution is illustrated in the Plant Layout presented in Figure No. 4 below.

No forest land is involved in the proposed project, and no rehabilitation and resettlement (R&R) issues are anticipated due to the project implementation. Since the project area is designated for industrial use, the proposed development is compatible with the prevailing land use planning of the area.

Table 3: Area Statement

SR.NO.	DESCRIPTION	SQ. M	%
1	Total Plot Area	8780.00	--
2	Built-Up Area	8394.139	--
3	Ground Coverage Area	2403.628	27.38
4	Parking Area	805.52	9.17
5	Internal Road Area	1559.58	17.76
6	Green Belt Area	2039.78	23.23

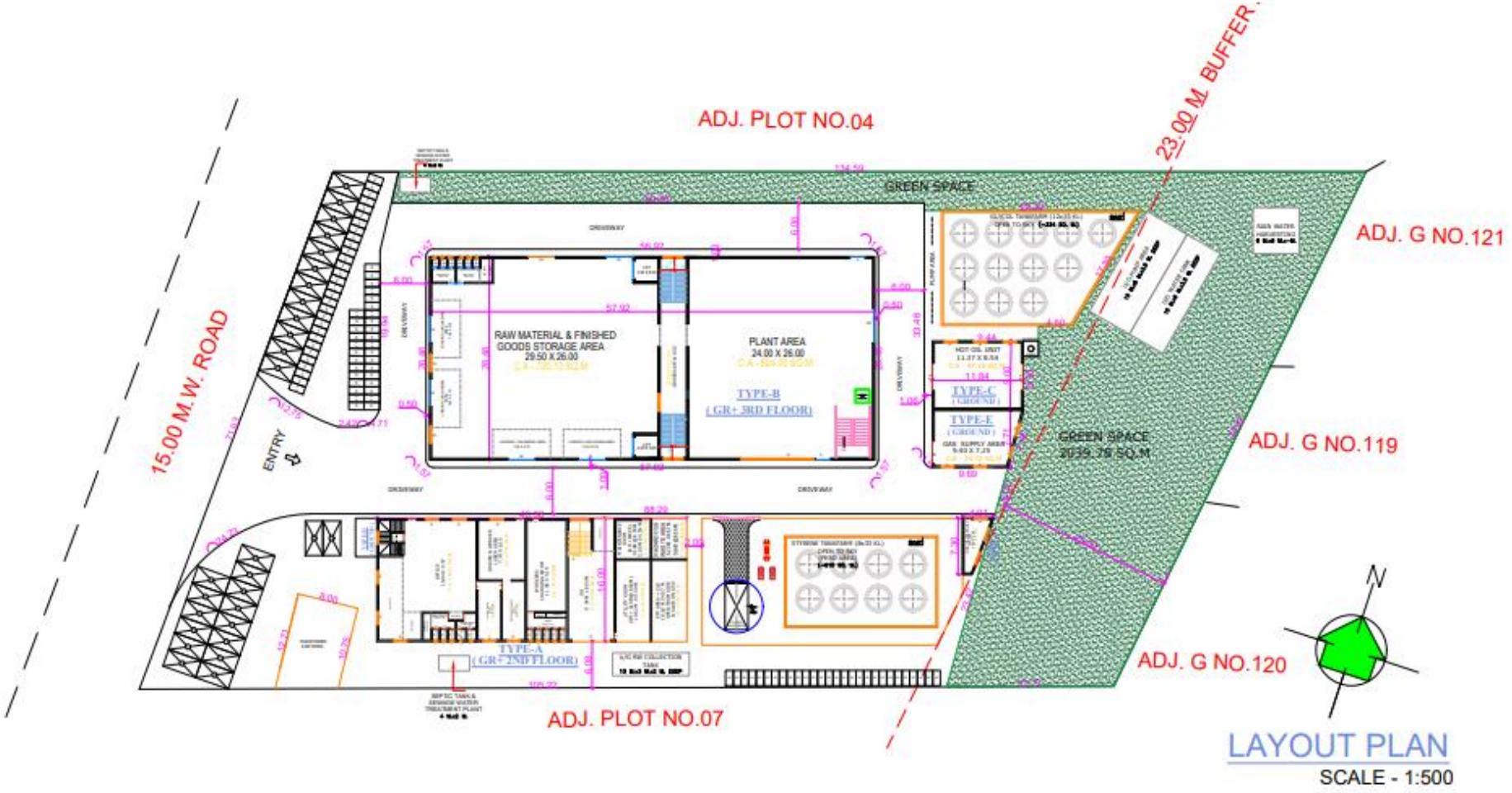


Figure 4: Master Layout Plan

7. Project Description and Project Details

The detailed technical description of the proposed project is presented in Table No. 4 below:

Table 4: Technical Details of the Proposed Project

<table>
<tr><th>Sr. No.</th><th>Particulars</th><th colspan="3">Details</th></tr>
<tr><td>1</td><td>Ownership of land</td><td colspan="3">The non-agricultural land is owned by M/s. Morex Industries Pvt Ltd. Land ownership document 7/12 has been attached as Annexure I</td></tr>
<tr><td>2</td><td>Type/Category</td><td colspan="3">5(f), Category “A”</td></tr>
<tr><td>3</td><td>Production details</td><td colspan="3"><table><tr><th>Sr. No.</th><th>Name Of Chemical</th><th>Proposed Production Details (TPA)</th></tr><tr><td>1</td><td>Unsaturated Polyester Resin</td><td>50000</td></tr></table></td></tr>
<tr><td>4</td><td>Water Consumption</td><td colspan="3">Construction Phase-
Water Requirement- 1.8 KLD
Operation Phase-
Total Water Demand– 146.55 KLD (Fresh-114 KLD + Recycle-32.55 KLD)
(Source – Hamrapur Gram Panchayat)</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Wastewater generation</td><td>Sewage</td><td colspan="2"><u>Construction Phase-</u> 2.02 KLD
<u>Operation Phase-</u> 2.83 KLD</td></tr>
<tr><td>Effluent</td><td colspan="2"><u>Operation Phase-</u>
Proposed – 38.3 KLD</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Wastewater Treatment Facility</td><td>Sewage</td><td colspan="2">Domestic sewage will be treated in Package STP of 5 KLD.</td></tr>
<tr><td>Effluent</td><td colspan="2">Trade effluent (38.3 KLD, operation phase) will be treated in a ETP (50 KLD) followed by Multi Effect Evaporator. Treated water is recycled for cooling tower makeup, achieving ZLD.</td></tr>
<tr><td>7</td><td>Thermic Fluid Heater</td><td colspan="3">Proposed – 1 x 15 Lakh Kcal and 1 x 20 Lakh Kcal</td></tr>
<tr><td>8</td><td>DG Set</td><td colspan="3">Proposed – 2 x 320 KVA</td></tr>
<tr><td rowspan="3">9</td><td rowspan="3">Stack Details</td><td>Stack Attached to</td><td colspan="2">Stack Height</td></tr>
<tr><td>1 x 15 Lakh Kcal and 1 x 20 Lakh Kcal Thermic Fluid Heaters</td><td colspan="2">Common stack of 30 m stack height will be provided.</td></tr>
<tr><td>DG Set</td><td colspan="2">8 m Each</td></tr>
<tr><td>10</td><td>Fuel</td><td colspan="3">For Thermic fluid heater -LPG- 200 kg/hr
For DG Set- HSD - 88 Lit/hr</td></tr>
<tr><td>11</td><td>Air Emissions</td><td colspan="3">Process emissions in the form of Volatile Organic Compound (VOCs) are envisaged from the manufacturing process & storage. PM and SO_2 emissions are envisaged from DG set. DG sets shall act as stand by source of electricity for the site.</td></tr>
</table>

		PM, NOx and SO_2 emissions are minimal from LPG based thermic fluid heater (1 x 15 Lakh Kcal and 1 x 20 Lakh Kcal) Common stack with height of 30m will be provided for thermic fluid heaters
12	Power Requirement	**Operation Phase**- 600 KW Renewable Energy –60 KW (10% of total power requirement)
13	Manpower	**Proposed** Construction Phase – 50 nos. Operation Phase –70 nos.
14	Project Cost	Rs.30 Cr.
15	EMP Cost	**Construction Phase:** Capital Cost- Rs. 6.78 Lakhs **Recurring Cost-** Rs. 2.88 lakhs/Annum **Operation Phase** – Capital Cost – Rs. 158.03Lakhs Recurring Cost – Rs 13.04 lakhs/Annum
16	CER Cost	Rs. 60 Lakhs

7.1 Process Details

Process Details few products have been given below-

1. Manufacturing process of Unsaturated Polyester Resin

I) Process Description

Esterification Reaction:

The acid anhydrides (Phthalic and Maleic) react with Glycol (Propylene, Mono-ethylene, Diethylene) in a reactor.

The mixture is heated to an elevated temperature of 200°C to 230°C to initiate and sustain the esterification reaction.

During the reaction, water is formed as a by-product and is continuously removed to drive the reaction forward.

Cooling:

After the desired molecular weight and viscosity of the polyester is reached, the reaction mass is gradually cooled down.

The temperature is brought down to around 120°C to 140°C, a safe range to prevent premature polymerization when styrene is added.

Styrene Monomer Addition:

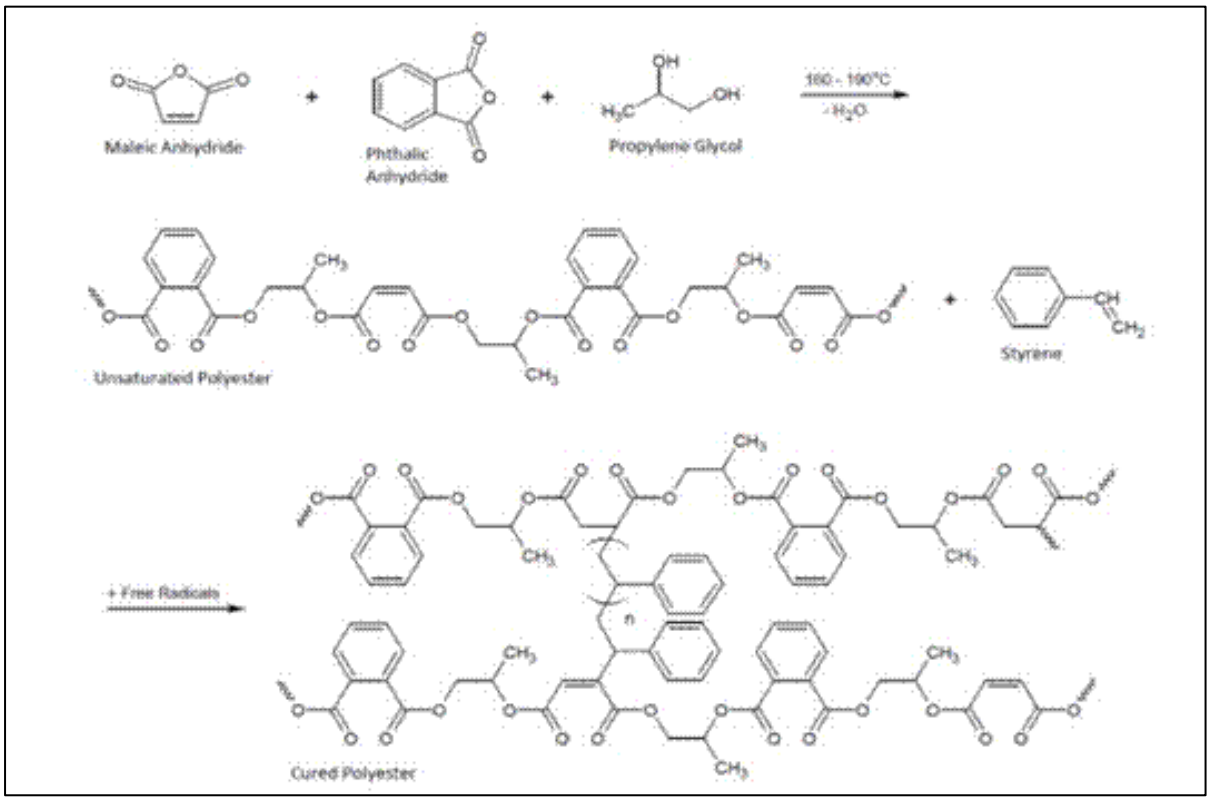
Once cooled, Styrene Monomer is added to the resin mass at below 140°C (typically around 120°C). Styrene acts as a reactive dilutant, reducing the viscosity of the resin

Finalization

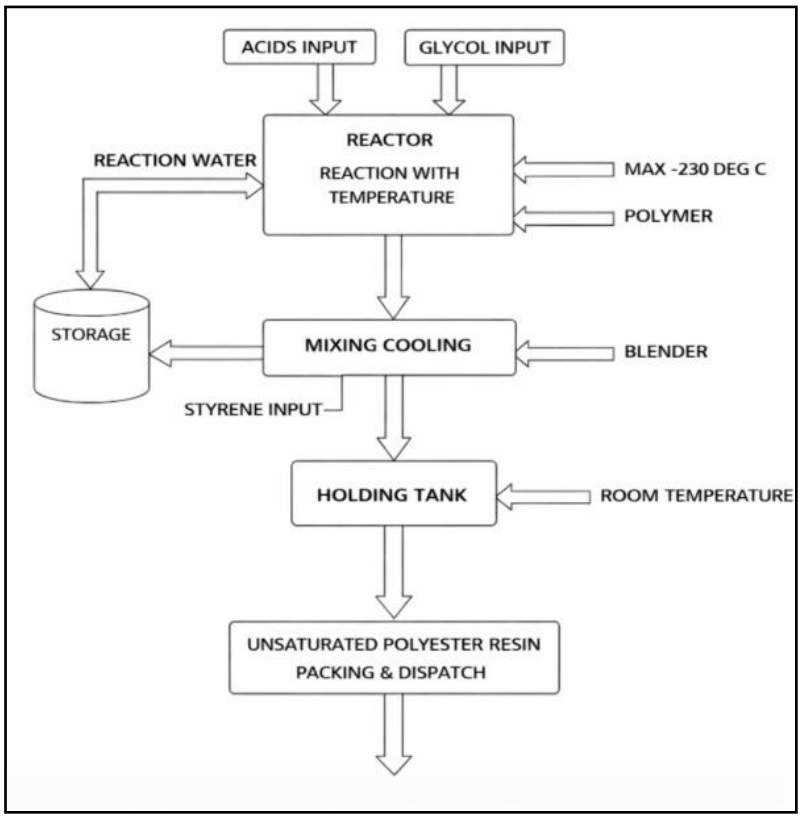
Check properties. Pack in drums at 30°C.

Major Equipment: Reactor, condenser, packed column, blender, pumps, storage tanks, drums, incinerator.

II) Chemical Reaction –



III) Process Flow Chart –



V) Material Balance

Input	Quantity (MT/Batch)	Output	Quantity (MT/Batch)
Phthalic Anhydride	17.5	Unsaturated Polyester Resin	55.0
Malic Anhydride	8.8	Effluent	3.4
Glycol PG	14.6		
Styrene monomer	14.6		
Additives & Catalysts	2.9		
Total Input	**58.4**	**Total Output**	**58.4**

8. Baseline Environmental Status

Baseline environmental monitoring was carried out to generate primary data on various environmental attributes including ambient air quality, water quality, soil quality, noise levels, traffic conditions, ecology and biodiversity, and socio-economic aspects of the study area. In addition, secondary data from reliable sources pertaining to micrometeorology, flora and fauna, socio-economic conditions, and traffic studies were referred to as supporting reference material and for guidance.

A comprehensive environmental dataset was developed through physical surveys, field observations, literature reviews, community consultations, and information collected from government agencies and various sectoral sources. The study of environmental attributes was initiated through site visits and reconnaissance surveys of the study area.

The baseline environmental study has been carried out in accordance with the guidelines prescribed in the EIA Manuals issued by the Ministry of Environment, Forest and Climate Change (MoEFCC) and the methodologies described in the Technical EIA Guidance Manual approved by MoEFCC and prepared by IL&FS Ecosmart Limited for industrial sectors.

The baseline environmental monitoring study was conducted during the pre-monsoon season from 1 March 2025 to 31 May 2025.

The frequency and summary of environmental monitoring results are presented in Table No. 5 below.

Table 5: Frequency of primary data collection and its results

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results
Meteorology	Microprocessor based Weather Monitoring Station Continuous hourly recording	Wind speed	9.2 m/s
		Wind direction	North and East
		Max. Temp.	30 °C - 33 °C
		Mini. Temp.	18°C - 24°C
		Relative Humidity	63.5 %- 72.5 %
		Precipitation	1.6 mm
Ambient Air Quality	8 Locations 24 hourly samples Twice a week for 3 months (in $\mu g/m^3$)	$PM_{2.5}$	26 $\mu g/m^3$ – 35.54 $\mu g/m^3$
		PM_{10}	56.54 $\mu g/m^3$ – 79.62 $\mu g/m^3$
		SO_2	9 $\mu g/m^3$ – 14.08 $\mu g/m^3$
		NO_x	14 $\mu g/m^3$ –18.54 $\mu g/m^3$
Water Quality (Ground water)	Once in season at 8 locations (Physical, chemical and biological parameters)	Colour	Within acceptable standards
		pH	Within the CPCB-prescribed range of 6.5 to 8.5
		TDS	TDS ranged from 228 to 724 mg/L. The IS: 10500:2018 standard of 500 mg/L
		COD	COD is BDL.
Water Quality (Surface Water)	Once in season at 8 locations (Physical, chemical and biological parameters)	Colour	Within acceptable standards
		pH	7.5 – 8.1 which is within the CPCB-prescribed range of 6.5 – 7.5
		TDS	TDS ranged from 170 - 350 mg/L. The IS: 10500:2018 standard of 500 mg/L
		COD	COD ranged from 12 to 32 mg/L.
Soil Quality	Once in season at 8 locations	Soil type and texture, Physico-	The soils are silty loam, slightly acidic to slightly alkaline, and non-saline.

		chemical properties, NPK	They have good structure, good water-holding capacity, and adequate organic matter. Nutrient levels are generally sufficient. Overall, the soils are fertile and suitable for cultivation.
Noise Quality	Once in season at 8 Locations (Noise levels in dB(A))	Max & Min Day	63.1 & 48.7 dB(A)
		Max & Min Night	53.8 & 39.5 dB(A)
Land use Pattern	One-time study during baseline period (using high-resolution satellite imagery and ground truthing)	Land use / land cover classification (industrial, agricultural, forest, built-up, water bodies, open land)	The study area is predominantly characterized by industrial and mixed land use, with patches of agricultural land and reserved forest areas. The project site falls within designated industrial (NA) land, with no forest land involved. Nearest waterbody is located at a safe distance (~1.8 km), and surrounding land use supports industrial development.
Geology and hydrogeology	Primary observation during visit and sec. data	Geology and hydrogeology of the study area	Palghar district has varied geology, including basaltic flows, fertile plains, and sedimentary rocks. It faces groundwater challenges due to semi-arid conditions and over-exploitation, necessitating effective water management.
Ecology	General in 10 km radial study area and data collected around the project site through field visits.	Flora	The Palghar district predominantly consists of deciduous vegetation. Species such as teak, ain, khair, kinjal, bamboo,

			grasses, and shrubs are commonly observed in the area. Due to the mixed industrial and rural land use pattern, both natural and plantation vegetation are present within the study area.
		Fauna	Various species of mammals, birds, reptiles, and common amphibians are observed in the Palghar district. The faunal diversity is mainly associated with rural areas, forest habitats, and nearby water bodies. Common local species were recorded within the study area.
Socioeconomic Data	Primary and sec data in 10 km radial study area and data collected around the project site through field visits	Socio-economic characteristics of the affected area	The study area, covering 70 villages within a 10 km radius, has 184,914 households and a population of 785,228. Scheduled Castes and Tribes make up 3.25% and 27.94% respectively. There are 97,636 children under six. The population is nearly balanced by gender, with 52.62% males and 47.38% females.

9. Anticipated Environmental Impacts and Mitigation Measures

Environmental impacts have been identified based on the various phases of the project as well as the type, scale, and location of the proposed activities. The proposed project may result in both positive and adverse impacts on different environmental attributes during the construction and operational phases.

Accordingly, the anticipated environmental impacts have been identified, assessed, and classified based on their significance. A summary of the potential environmental impacts and the proposed mitigation measures is presented in Table No. 6 below.

Table 6: Environmental Aspects and Anticipated Impacts of the Project

Sr. No.	Project Phase / Activity	Environmental Aspect	Anticipated Impact	Nature of Impact
1	Construction Phase	Dust generation from construction activities	Air Pollution	Temporary
		Consumption of water, energy, and construction materials	Stress on natural resources	Temporary
		Employment of manpower	Employment generation	Temporary
		Generation of hazardous and non-hazardous waste during construction activities	Land Pollution	Temporary
2	Operation / Production Phase	Operation of Diesel Generator Sets, Thermic Fluid Heater, and transportation of raw materials and finished products	Air Pollution	Permanent
		Handling and storage of hazardous chemicals	Land pollution, safety hazards, and occupational risks	Permanent
		Generation of industrial effluent and domestic sewage	Water pollution and land pollution	Permanent
		Generation and disposal of hazardous and non-hazardous waste	Land Pollution	Permanent
		Water consumption	Stress on natural resources	Permanent
		Employment of manpower	Employment generation	Permanent
		Manufacturing activities	Revenue generation	Permanent
		Operation of machinery and equipment	Noise Pollution	Permanent
3	Closure & Decommissioning Phase	Discontinuation of manufacturing activities	Reduction in revenue generation and employment opportunities	Permanent
		Dismantling of machinery and structures	Land Pollution	Permanent

9.1 Anticipated Impacts During Construction Phase and Mitigation Measures

Table No. 7 presents the anticipated environmental impacts that may arise during the construction phase of the proposed project along with the corresponding mitigation measures. The proposed mitigation measures include provisions to address issues related to land environment, ambient air quality, water environment, ecology, noise levels, occupational health, and socio-economic aspects.

The mitigation measures have also considered environmental concerns associated with small-scale construction activities to ensure that the construction phase impacts remain temporary, localized, and manageable.

Table 7: Summary of Impacts and Mitigation Measures during Construction phase

Sr. No.	Environmental Aspect	Potential Source of Impact	Proposed Mitigation Measures
1	Land Environment	Site clearing, excavation, land leveling, and removal of topsoil	• Topsoil will be separately stored and utilized for greenbelt development. • Major excavation and construction activities will be carried out during the dry season. • Proper segregation and disposal of construction waste will be ensured. • Materials such as glass, plastic, iron, and concrete will be reused wherever feasible. • Proper management of construction materials and waste will be carried out to prevent soil contamination.
2	Air Environment	Dust generation due to excavation, leveling, transportation of construction materials, and construction activities	• Regular water sprinkling will be carried out for dust suppression. • Construction materials will be covered wherever necessary. • Vehicles with valid PUC certificates will be used. • Dust screens/barricading will be provided around the construction area. • Large-scale excavation activities will be avoided during windy conditions.
3	Water Environment	Wastewater generated from construction activities and runoff carrying silt during rainfall	• Silt traps/silt fences will be provided for sediment control. • Safe drinking water facilities will be provided to workers. • Temporary sanitation facilities will be provided at the construction site. • Proper disposal of construction waste will be ensured to prevent water pollution. • Major earthwork activities will be avoided during the monsoon season.

4	Ecological and Biological Environment	Construction activities, vehicular movement, and transportation of materials	• Water sprinkling will be carried out for dust control. • Low-noise generating machinery will be used. Greenbelt development will be undertaken. • Care will be taken to avoid damage to surrounding vegetation. • Necessary precautions will be taken to avoid significant impacts on local biodiversity.
5	Noise and Vibration Environment	Construction machinery, excavation activities, vehicular movement, and piling activities	• Efficient and well-maintained machinery will be used. • Noise control covers/barriers will be provided wherever necessary. • Construction activities will be restricted to daytime hours. • Unnecessary honking will be avoided. • Noise mitigation measures will be implemented in sensitive areas. • Personal Protective Equipment (PPE) for hearing protection will be provided to workers.
6	Occupational Health and Safety	Working at heights, construction machinery, electrical equipment, and risk of workplace accidents	• Necessary Personal Protective Equipment (PPE) will be provided to workers. • Safety training and emergency response training will be conducted. • Safety signboards will be displayed at the construction site. • Risk assessment studies will be carried out and appropriate safety measures implemented. • Workplace hygiene and safety standards will be maintained.
7	Socio-economic Environment	Construction workforce, increased traffic movement, and temporary pressure on local infrastructure	• Preference will be given to local people for employment opportunities. • Opportunities will be provided to local suppliers and contractors. • Proper traffic management measures will be implemented. • Efforts will be made to minimize inconvenience to local communities during construction activities. • All applicable environmental regulations will be complied with.

9.2 Anticipated Impacts During Operational Phase and Mitigation Measures

A summary of the significant environmental impacts anticipated during the operational phase of the project along with the proposed mitigation measures is presented in Table No. 8 below.

Table 8: Summary of Operational Phase Impacts and Mitigation Measures

Sr. No.	Environmental Aspect	Potential Source of Impact	Proposed Mitigation Measure
1	Air Environment	Potential sources affecting ambient air quality during the operational phase include manufacturing processes, vehicular movement, handling of raw materials, operation of DG sets, and operation of the thermic fluid heater.	• The manufacturing process will be carried out in a closed loop system. • Nitrogen purging system and activated carbon adsorption system will be provided for control of Volatile Organic Compounds (VOCs). • Wet scrubber system will be installed for air pollution control. • A 30 m stack for the thermic fluid heater and 8 m stacks for DG sets will be provided as per CPCB guidelines. • Regular maintenance and inspection of vehicles will be ensured. • Only PUC-certified vehicles will be allowed within the premises. • A speed limit of 20 km/hr will be enforced within the project premises. • Internal roads will be asphalted and regular water sprinkling will be carried out for dust suppression. • Greenbelt development will be undertaken within the project premises. • Regular ambient air quality monitoring will be carried out. • Half-yearly health check-ups will be conducted for workers.
2	Water Environment	Potential sources impacting the water environment during operation include cooling tower blowdown, scrubber effluent, washing wastewater generated from the manufacturing process, domestic sewage, and storm water runoff.	• A 50 KLD Effluent Treatment Plant (ETP) and a 40 KLD Multiple Effect Evaporator (MEE) system will be installed for treatment of industrial effluent. • Treated water from the ETP and MEE system will be reused for cooling tower makeup. • A 5 KLD MBBR-based Sewage Treatment Plant (STP) will be installed for treatment of domestic sewage. • Treated sewage from the STP will be reused for gardening purposes.

			• Zero Liquid Discharge (ZLD) system will be implemented within the project. • Storm water drainage system will be developed for proper rainwater management. • Rainwater harvesting facilities will be developed within the project premises. • Regular monitoring of water quality will be carried out.
3	Land Environment	Handling of chemicals during manufacturing process; storage and transportation of raw materials, finished products, and hazardous waste; leakage of oil or chemicals from machinery and equipment; spillage during storage and handling of hazardous waste.	• Good housekeeping practices and operational guidelines will be implemented. • Impervious flooring will be provided in production areas, maintenance areas, and storage areas for raw materials, finished products, and hazardous waste. • Suitable spill control kits and emergency response procedures will be implemented to contain and clean accidental leakages/spillages. • Bund walls of adequate capacity will be provided for all storage tanks. • Hazardous waste management (collection, storage, transportation, and disposal) will be carried out in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. • Used oil generated from maintenance of machinery and DG sets will be collected in sealed drums, stored in a designated storage area, and handed over to MPCB-authorized recyclers/reprocessors. • Empty chemical drums will be decontaminated and reused or handed over to authorized vendors. • Hazardous waste transportation will be carried out through MPCB-authorized agencies using covered vehicles with necessary emergency response provisions. • Soil quality monitoring near hazardous waste storage areas will be conducted twice a year. • Hazardous wastes such as spent oil, chemical residues, contaminated containers/drums, sludge, and process

			residues will be disposed of at authorized Common Hazardous Waste Treatment, Storage and Disposal Facilities (CHWTSDF).
4	Noise Environment	Operation of machinery and equipment during manufacturing activities; rotating and stationary mechanical equipment such as pumps, motors, and blowers; handling of raw materials and finished products; internal vehicular movement; maintenance activities.	• Low-noise generating machinery and equipment will be used and process modifications will be adopted to minimize noise generation. • Hearing protection devices (earplugs/earmuffs) will be provided to workers exposed to noise levels above 75 dB(A). • Regular noise audits will be carried out to identify major noise-generating sources. • Regular lubrication and preventive maintenance of machinery will be undertaken to control noise levels. • Static and dynamic balancing of rotating equipment will be maintained through regular inspection. • Regular noise monitoring will be carried out as per the environmental monitoring plan. • Shift scheduling will be implemented to minimize prolonged exposure of workers to high noise levels and annual audiometric examinations will be conducted. • Workers showing hearing impairment will be reassigned to low-noise areas.
5	Ecological and Biological Environment	• Air emissions from manufacturing activities • Noise and light generated from machinery and vehicular movement • Human movement associated with industrial activities Infrastructure development and internal movement	• As per the air dispersion modeling carried out using the AERMOD model, the maximum impact zone of air pollutants is limited to approximately 300 meters from the project site. Hence, no significant adverse impact on the surrounding ecology and biodiversity is anticipated. • Low-noise generating equipment and proper lighting management practices will be adopted to minimize noise and light pollution. • Regular monitoring of air, noise, and water quality will be carried out as per environmental standards. • Greenbelt development using native species will be undertaken to mitigate dust, noise, and air pollution and to

			minimize potential impacts on biodiversity. • No notified Reserved Forest or major Wildlife Migration Corridor exists within the project area. • Flora and fauna recorded within the study area are not included under the Endangered or Critically Endangered categories of the IUCN Red List. Further, no Schedule-I species under the Wildlife Protection Act, 1972 were observed within the study area.
6	Socio-economic Environment	• Industrial activities during the operational phase • Local employment generation • Development of infrastructure and services • Community development initiatives undertaken by the project proponent	• The project will generate direct employment for approximately 70 persons and indirect employment opportunities in transportation, maintenance, supply, and service sectors. • During the construction phase, employment opportunities for approximately 50 persons will be generated. • A provision of Rs. 60 Lakhs has been allocated under Corporate Environmental Responsibility (CER) for community development activities such as local infrastructure development, water supply improvement, solar lighting, and agricultural/irrigation enhancement. • Preference will be given to local suppliers and contractors to promote the local economy. • Contribution will be made towards improvement of health, education, and basic infrastructure facilities in nearby communities. The project will also enhance opportunities for skill development and service sector growth in the region.
7	Occupational Health and Safety	• Handling of chemicals during manufacturing process • Working at heights and operation of machinery • Storage and transportation of	• An Occupational Health and Safety Policy will be implemented for all workers and Standard Operating Procedures (SOPs) will be established accordingly. • Safety harnesses, helmets, safety belts, and other necessary safety equipment will be provided to personnel working at heights.

		hazardous materials • Inadequate use of Personal Protective Equipment (PPE) Poor housekeeping and workplace management	• Standard operating procedures for storage, handling, and use of hazardous chemicals will be strictly implemented. Appropriate PPE will be provided to all workers as per job requirements and its use will be made mandatory. • Adequate sanitation facilities, drinking water, toilets, and rest areas will be provided at the workplace. • Regular medical check-ups, first aid facilities, and emergency medical arrangements will be provided. • Emergency response plans for fire, chemical leakage, and other emergency situations will be prepared and regular mock drills will be conducted. • All applicable Factory Act provisions, labour safety regulations, and statutory guidelines will be complied with.

10. Analysis of Alternatives (Project Site and Technology)

For the proposed Unsaturated Polyester Resin (UPR) manufacturing project, detailed consideration has been given to environmental, technical, infrastructural, and socio-economic factors while selecting the project site. The proposed project site is located at Plot Nos. 5 & 6, Survey No. 329, Wada Industrial Development Complex, Hamrapur, Taluka Wada, District Palghar, Maharashtra, which is designated for industrial use. The site is well connected with road networks and has access to essential infrastructure facilities such as electricity, water supply, transportation, and logistics. The project site also has good connectivity to the Mumbai–Ahmedabad National Highway (NH-48), facilitating efficient transportation of raw materials and finished products. In addition, nearby railway and airport facilities further enhance logistical convenience.

From an environmental perspective, no notified Reserved Forests, Wildlife Sanctuaries, or Wildlife Migration Corridors exist in the immediate vicinity of the proposed project site. Therefore, significant adverse impacts on biodiversity are not anticipated. Further, the surrounding area is already industrial in nature, making the location suitable for establishment of the proposed industrial activity. Adequate separation distance has been maintained from nearby residential areas, thereby minimizing potential environmental impacts on surrounding communities. Accordingly, the selected site is considered technically feasible and environmentally acceptable for the proposed development.

The major advantages of the selected project site are summarized below:

- The proposed site is located within the notified and developed industrial area of Wada Industrial Development Complex (WIDC), designated for industrial use.

- Availability of roads, electricity, water supply, and other essential infrastructure facilities facilitates smooth implementation of the project.
- Excellent transportation and logistics connectivity is available through the Mumbai–Ahmedabad National Highway (NH-48), railway network, and nearby airports. Proximity to industrial and commercial centers such as Mumbai, Palghar, and Gujarat provides easy access to raw material sources and markets for finished products.
- The surrounding area does not contain any notified Reserved Forests, Wildlife Sanctuaries, or Wildlife Migration Corridors, thereby reducing environmental sensitivity.
- Since the surrounding region is already industrialized, the additional environmental burden due to the proposed project is expected to remain limited.
- No rehabilitation and resettlement (R&R) issues are involved, as no affected population exists within the proposed project land.

Table 9: Matrix for Alternative Site Analysis

Sr. No.	Site Selection Criteria	Existing Site
1	Non-agricultural land	✓
2	No Rehabilitation and Resettlement (R&R) issues	✓
3	Flat topography	✓
4	Site connectivity / accessibility	✓
5	No notified Wildlife Sanctuary, National Park, Biosphere Reserve, etc. within 5 km radius	✓
6	No Critically Polluted Area as per Central Pollution Control Board (CPCB) within 5 km radius	✓
7	No archaeological monuments within 5 km radius	✓
8	Availability of electricity through Maharashtra State Electricity Distribution Company Limited (MSEDCL)	✓
9	Availability of raw materials	✓
10	Availability of manpower	✓
11	Availability of local markets for finished products	✓

Table 10: Analysis of Alternative Technologies

Sr. No.	Component	Available Alternatives	Selected Technology	Observation / Justification
1	Manufacturing Process	Continuous Process / Batch Process	Batch Process	Batch polyesterification process has been selected as it provides operational flexibility, enables effective control over reaction parameters, and is suitable for

				manufacturing different grades of UPR products.
2	Fuel for Thermic Fluid Heater	Coal / Furnace Oil / Light Diesel Oil (LDO) / PNG / LPG	LPG (Liquefied Petroleum Gas)	LPG results in lower air emissions (SOx and particulate matter), cleaner combustion, and improved operational efficiency.
3	Industrial Effluent Treatment	Direct Discharge / Effluent Treatment Plant / Zero Liquid Discharge System	Effluent Treatment Plant with Zero Liquid Discharge (ZLD) System	The ZLD system eliminates liquid discharge, enables reuse of treated water, and minimizes environmental impacts.
4	Domestic Sewage Treatment	Soak Pit / Septic Tank / Package STP	Package Sewage Treatment Plant (STP)	Approximately 2 KLD of sanitary wastewater will be treated in a 5 KLD capacity package STP, and the treated water will be reused for gardening purposes.
5	ETP Technology	Physico-chemical / Biological Treatment	Biological Treatment System	A 50 KLD biological effluent treatment system will effectively treat industrial effluent and ensure compliance with prescribed environmental standards.
6	Chemical Charging System	Manual / Automatic	Automatic Charging System	Automatic chemical charging minimizes accidental emissions, improves worker safety, and enhances environmental performance.
7	Power Source	MSEDCL / Solar Energy	MSEDCL + Solar Energy (10%)	Electrical power will primarily be sourced from Maharashtra State Electricity Distribution Company Limited (MSEDCL). In addition, approximately 10% of the power requirement will be met through solar energy, thereby reducing carbon emissions.

11. Rehabilitation and Resettlement (R&R) Plan

The proposed project is located within the existing industrial area of the Wada Industrial Development Corporation, and the land earmarked for the project is designated for industrial use. Therefore, implementation of the proposed project does not require displacement of any residential settlements, houses, or public structures. Further, no Rehabilitation or Resettlement (R&R) of any individual is envisaged due to the proposed project.

The study indicates that no unauthorized settlements, population dependent on traditional livelihoods, or socially sensitive areas will be affected within the project vicinity. Accordingly, a separate Rehabilitation and Resettlement (R&R) Plan is not applicable for the proposed project. However, the project proponent will undertake various Corporate Environmental

Responsibility (CER) initiatives for the social and economic development of the local community.

12. Environmental Monitoring Programme (EMP Monitoring Plan)

Regular monitoring of various environmental components is essential for accurate assessment of the existing environmental conditions as well as the potential impacts arising from the proposed project. A systematic and well-defined environmental monitoring programme is necessary to ensure effective implementation of the proposed mitigation measures.

Environmental monitoring helps in evaluating the effectiveness of mitigation measures, tracking potential changes in environmental quality, and identifying the need for additional preventive or corrective measures, wherever required. The Environmental Monitoring Programme proposed for the construction phase is presented in Table 11, while the Environmental Monitoring Programme for the operational phase is presented in Table 12.

Table 11: Environmental Monitoring Programme during Construction Phase of the Project

Sr. No.	Potential Impact / Component	Compliance / Follow-up Action	Parameters for Monitoring	Monitoring Frequency
1	Air Environment	All equipment shall be operated within prescribed standards.	Random inspection of equipment records/manuals	Weekly
		Vehicle trips shall be minimized as far as practicable.	Vehicle movement logs	Weekly / During construction period
		Regular maintenance of DG sets shall be carried out to control emissions.	Air emissions: Nitrogen Oxides (NOx), Carbon Monoxide (CO), and Sulphur Dioxide (SO_2)	Quarterly
		Ambient air quality monitoring within the project premises.	Ambient air quality parameters such as PM_{10}, $PM_{2.5}$, NOx, and SO_2 shall comply with CPCB/SPCB standards.	As per CPCB/SPCB requirements or monthly, whichever is earlier
2	Noise Environment	Preparation of inventory of all noise-generating equipment along with maintenance of machinery in good condition.	Equipment records and noise monitoring records	Weekly during construction activities

		Night-time construction activities shall be minimized.	Working hour records	Daily records
		Control of vehicular noise emissions.	Vehicle maintenance records	Daily records
		Noise monitoring within and around the project premises.	On-site noise level measurements	As per CPCB/SPCB requirements or monthly, whichever is earlier
3	Wastewater Discharge	Untreated wastewater shall not be discharged into land, groundwater, or surface water bodies.	Visual inspection of surrounding water bodies	Monthly during construction period
4	Soil Quality	Topsoil, wherever feasible, shall be preserved and stored along the periphery of the project site.	Verification of protective measures for topsoil storage and stability inspection	Regular monitoring during construction period
5	Drainage Management	Ensure that drainage arrangements and specific design measures are functioning effectively without disturbing existing drainage patterns.	Visual inspection and records of drainage systems	Monthly during construction activities
6	Waste Management	Implementation of waste management plan for all types of wastes generated.	Comprehensive waste management plan and compliance with Solid Waste Management Rules, 1998 and Hazardous Waste (Management & Handling) Rules, 2003	Fortnightly during construction activities
7	Abnormal Events and Accidental Spills	Preparation of emergency preparedness plan to prevent and minimize potential emergency situations and impacts.	Records of emergency training and mock drills	Monthly during construction period
8	Occupational Health	Health check-up of construction workers and labourers.	Monitoring of all relevant health parameters including HIV	Quarterly health check-up
9	Environmental Management Cell / Unit	Establishment of Environmental Management Cell/Unit for	Assignment of responsibilities and roles before	During construction phase

		implementation and monitoring of environmental safety measures.	commencement of work	
10	Damage to Flora and Fauna	Re-vegetation measures in accordance with applicable forest guidelines.	Species	

Table 12: Environmental Monitoring Programme during Operation Phase of the Project

Sr. No.	Component	Parameters	Number of Monitoring Locations	Frequency
Air Environment				
1	Ambient Air Quality	Particulate Matter (PM_{10}, $PM_{2.5}$), Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Hydrocarbons (HC)	Minimum 3 locations: 1 within project premises, 1 in upwind direction, and 1 in downwind direction	Monthly
2	Thermic Fluid Heater Emissions	Particulate Matter (PM), SO_2, CO, NO_x	Common stack connected to one 15 lakh kcal/hr capacity unit and one 20 lakh kcal/hr capacity unit	Monthly
3	DG Set Emissions	Particulate Matter (PM), SO_2, NO_x	2 × 320 KVA DG set stacks	Quarterly
Water Environment				
4	Effluent Quality	pH, Electrical Conductivity (EC), Suspended Solids (SS), Total Dissolved Solids (TDS), Oil & Grease (O&G), Ammoniacal Nitrogen, Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Chlorides, Sulphides, etc.	Inlet and outlet of ETP and Multiple Effect Evaporator (MEE) system	Quarterly
5	Drinking Water Quality	Parameters as per IS 10500:2012 (Revision 02)	At all drinking water points	Quarterly
Noise Environment				
6	Noise Levels	Equivalent Noise Level [Leq – Day/Night]	3 locations along plant boundary and 1 nearby habitation location (if any)	Quarterly

Soil Environment				
7	Soil Quality	Texture, pH, Electrical Conductivity (EC), Cation Exchange Capacity (CEC), Alkali Metals, Sodium Absorption Ratio (SAR), Permeability, Porosity	1 location – Hazardous Waste Storage Area; 1 location – Process/Plant Operational Area; 1 location – Green Belt Area	Half-yearly
Biological Environment				
8	Green Belt Development	Number of Trees Planted, Survival Rate, Poor/Weak Plants and Trees	Within project premises and designated green belt area	Half-yearly

13. Benefits of the Project

- The proposed project will generate direct employment (approximately 50 persons during the construction phase and 70 persons during the operational phase), along with indirect employment opportunities.
- It will promote small-scale local businesses such as transport, maintenance, supply services, hotels, grocery shops, tea stalls, and vehicle repair services.
- The project will generate additional revenue for local Gram Panchayats as well as the Government of Maharashtra in the form of taxes and duties.
- It will contribute to improvements in physical infrastructure such as roads, transportation facilities, and overall connectivity.
- It will support long-term enhancement of social infrastructure, including healthcare, education, and basic amenities.
- Increased demand for local products and ancillary industries will stimulate economic activities in the region.
- Development of trade and service sectors in the project area will strengthen the local economy.
- It is expected to improve the quality of life of the local community through better access to healthcare, education, and living standards.
- Through proposed CER (Corporate Environmental Responsibility) activities, facilities such as drinking water supply, irrigation systems, solar lighting, and other basic infrastructure will be developed.
- Industrial development will attract investments in the region, thereby promoting economic growth.
- The project will ensure sustainable industrial development through the implementation of modern environmental management systems such as ZLD (Zero Liquid Discharge) and VOC control systems.
- It will encourage the development of regional industrial clusters and strengthen the supply chain network.

Under Corporate Environmental Responsibility (CER), as per the Ministry's Office Memorandum No. 22-65/2017-IA.II (M) dated 1st May 2018, an allocation of ₹60 lakh (2% of the project cost) has been made for the improvement of physical infrastructure. The objective of these initiatives is to promote sustainable development and enhance the welfare of the local community. The details are provided in Table No. 13.

Table 13: Details of Corporate Environmental Responsibility (CER) Activities

Sr. No.	CER Activity	Details	Year 1 (₹ lakh)	Year 2 (₹ lakh)	Total (₹ lakh)
1	Avenue Plantation	Approximately 3,000 trees will be planted along roadsides in nearby villages of the project area (avenue plantation). Proper maintenance and conservation measures will also be ensured.	5	10	15
2	Electrification (Including Solar Energy)	Installation of 40 solar street lights (each of 80 W capacity) at public places in Hamrapur, Khutal, Amgaon, and Kev villages. Proper operation and maintenance will be ensured.	10	5	15
3	Improvement of Irrigation Facilities	Irrigation facilities will be developed for the green belt in the Wada Industrial Development Corporation area, along with proper maintenance, repair, and improvement works.	10	10	20
4	Borewell Facility for Green Belt Irrigation	Borewell facilities will be provided for watering avenue plantation trees along roads in the Wada Industrial Development Corporation area.	5	5	10
	Total		**30**	**30**	**60**

14. Environmental Management Plan

- The plan will be prepared in accordance with the rules and requirements of the Ministry of Environment, Forest and Climate Change (MoEFCC) and the State Pollution Control Board.
- It will ensure that all facility components are properly implemented and function as per the design specifications.
- A structured mechanism for supervision and monitoring will be established to ensure proper direction, implementation, and compliance.
- An efficient system will be developed to address and resolve public grievances during both the construction and operational phases of the project.

- A mechanism will be put in place to ensure that mitigation measures are implemented promptly and effectively.

Key Benefits of the Environmental Management Plan:

- It provides the organization with a structured tool to manage its environmental performance, leading to improved environmental quality.
- It ensures effective cost control.
- It helps maintain improved relationships with stakeholders.

The Environmental Management Plan comprises four major components:

1. Commitment and Policy:
   The proposed project will be committed to the implementation of the Environmental Management Plan, which will cover all environmental aspects related to air, land, and water.
2. Planning:
   This includes identification of environmental impacts, determination of legal requirements, and setting of environmental objectives.
3. Implementation:
   This involves allocation of resources for developers, defining contractor responsibilities, training of personnel associated with environmental control facilities, and documentation of necessary mitigation measures.
4. Measurement and Evaluation:
   This includes monitoring, corrective actions, and record keeping.

14.1 Implementation of the Environmental Management Plan

The construction activities of the proposed unit will have probable adverse impacts on the surrounding environment with respect to air, noise, land, ecology & biodiversity, water, etc. Detailed EMP for construction phase is described below for various environmental parameters in **Table No. 14**

Table 14: EMP for Construction Phase

S. N.	Activity	Aspect	Impact	Mitigation Measures	Approximate Budget (₹)	Timeframe	Responsibility
1	Site levelling, excavation, material handling. Use of machineries (crowbars, excavators, dumpers, cranes, welding, cutting tools). Equipment installation (TFH, Cooling Tower, DG Set). Transportation of construction materials.	Fugitive dust emissions (PM10, PM2.5). Exhaust emissions from machinery and vehicles (CO, NOX, CO2). Dust deposition on vegetation	1. Excavation, levelling, earthwork, vehicle movement, and material unloading will generate fugitive dust (PM_{10} and $PM_{2.5}$), causing temporary localized reduction in air quality. 2. Combustion emissions (NO_X, CO, SO_2) from diesel equipment (excavators, cranes, tippers) may slightly elevate localized pollutant concentrations near the worksite. 3. Dust settling on vegetation may cause temporary reduction in photosynthetic efficiency. 4. Workers near dust-generating activities	1. Water sprinkling shall be conducted 2–3 times per day on unpaved roads, excavation zones, and material handling areas to reduce dust emissions. 2. All fine materials (cement, sand, fly ash) shall be stored in covered sheds and transported only in fully tarpaulin-covered trucks. 3.5-meter-high barricading shall be installed around the site boundary to minimize dust dispersion. 3. Construction vehicles and machinery shall undergo regular preventive maintenance to reduce exhaust emissions. 4. Workers shall be equipped with N95 dust masks, safety goggles, and face shields during high-dust activities.	**Capital Cost:** ₹ 1,40,000 **Recurring Cost:** ₹ 45,000	Entire Construction Phase	Contractor / EHS Team / Site Supervisor

			may experience respiratory discomfort, eye irritation, and reduced visibility.	Stockpiles of loose soil shall be compacted or covered to prevent wind-blown dust. 5. Vehicle speeds shall be restricted to 10 km/h inside the site to minimize dust lift-off.			
2	Operation of excavators, cranes, cutting/welding tools. Vehicle movement and equipment installation	Noise emission 70–85 dB(A). Vibration from equipment.	1. Construction machinery will generate noise in the range of: • **Excavators:** 80–85 dB(A) • **Concrete mixers:** 75–80 dB(A) • **Cranes:** 72–78 dB(A) • **Welding/cutting:** 70–75 dB(A) • **DG set (with enclosure):** 75 dB(A) at 1 meter. 2. Workers in close proximity may experience short-term hearing discomfort or irritation. 3. Noise and vibration during activities like	1. Restrict high-noise activities to daytime working hours (08:00–18:00 hrs). 2. Provide noise barriers or metal sheet barricades around areas with high noise generation. 3. Use low-noise equipment fitted with silencers wherever possible. 4. Provide workers with earplugs or earmuffs in noise-prone areas. 5. Conduct monthly noise monitoring during construction to ensure compliance with CPCB norms. 6. Maintain equipment regularly to minimize noise output.	**Capital Cost:** ₹ 1,50,000 **Recurring Cost:** ₹ 0	Entire Construction Phase	Contractor / EHS Team

			hammering or excavation may cause temporary disturbance to nearby structures and receptors.				
3	Water usage for dust suppression. Equipment installation at tank farm. Domestic activities of workers.	Runoff with sediment. Possible leakage of oil or fuel. Domestic wastewater generation.	1. Construction runoff may carry sediments, soil particles, and suspended solids, potentially affect the quality of nearby soil or drainage channels if not control. 2. Improper storage of fuel and lubricants may lead to localized oil or grease contamination of soil. 3. Approx. 2.5–3.0 KLD of Domestic wastewater from onsite workers may lead to localized organic loading and odour issues if untreated. 4. Excess use of water for dust suppression	1. Provide temporary silt traps, berms, and sediment barriers at locations prone to runoff. 2. Store fuels, oils, and chemicals in bunded, impervious platforms to avoid soil or groundwater contamination. 3. Ensure domestic wastewater is collected and treated in a Package STP before disposal or reuse. 4. Implement strict controls to avoid overuse of water for dust suppression. 5. Prevent direct discharge of any construction or domestic wastewater into surrounding soil or drains. 6. Conduct routine inspection of storage areas to detect leaks or seepage early.	**Capital Cost:** ₹ 1,07,000 **Recurring Cost:** ₹ 48,000	Construction Phase	EHS Team / Site Supervisor

			may result in unnecessary wastage of freshwater resources.				
4	Debris generation (concrete, brick, steel, plaster). Welding & cutting scraps. Packaging waste (wood, plastics, cardboard). Domestic waste from 50 workers. Hazardous waste from fuels, oils.	Solid waste, debris, scraps. Domestic wet waste. Hazardous spills.	1. Construction activities will generate 233.08 TPA of C&D waste, including concrete, bricks, plaster, and stones. Excavation will generate 85.16 TPA of soil, which can be reused onsite. 2. Packaging waste such as plastic, cardboard, and wood will generate 58.27 TPA of waste. 3. Domestic activities by 50 workers will generate 4.5 kg/day of dry waste and 3.0 kg/day of wet waste. 4. Improper waste management may cause clogged drains, pest attraction, odour,	1. All waste shall be segregated onsite into recyclable, reusable, and disposable categories. 2. C&D waste shall be reused for backfilling or levelling wherever feasible; remaining waste shall be sent to authorized recyclers. 3. Metal scraps, wood, plastics, and packaging waste shall be handed over to authorized scrap dealers. 4. Domestic waste shall be collected in color-coded bins and handed over to municipal collection services. 5. Hazardous waste (oily rags, waste oil) shall be stored in bunded hazardous waste storage areas and disposed of through authorized CHWTSDF. 6. Spill kits shall be provided at fuel storage and	**Capital Cost:** ₹ 55,500 **Recurring Cost:** ₹ 40,000	Entire Construction Period	Contractor / EHS Team

<table>
<tr><td></td><td></td><td></td><td>dust generation, and visual pollution.
5. Fuel/oil spills from machinery may cause localized soil contamination if unmanaged.</td><td>equipment maintenance areas.</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="6">The construction waste will be segregated as
<table>
<tr><th>S. N.</th><th>Type of Waste</th><th>Quantity (TPA)</th><th>Mode of disposal</th></tr>
<tr><td>1</td><td>C&D Waste</td><td>233.08</td><td>Concrete, bricks, plaster, & stone will be reused on site; wood & Metal to authorized vendor</td></tr>
<tr><td>2</td><td>Excavated Soil</td><td>85.16</td><td>Reuse for gardening within plot. Other soil- reuse for on-site levelling/road construction.</td></tr>
<tr><td>3</td><td>Packaging Waste</td><td>58.27</td><td>Plastic / Cardboard: Recycle via authorized facilities. Wood: Reuse or send to authorized vendor.</td></tr>
</table></td></tr>
<tr><td>5</td><td>Overall construction-phase environmental management</td><td>Need for systematic monitoring, documentation, compliance verification, and corrective action implementation</td><td>1. Construction activities may temporarily influence air quality, noise levels, soil characteristics, and water quality if not continually monitored.
2. Lack of monitoring may result in regulatory non-compliance.</td><td>1. Air quality monitoring (PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO) shall be carried out quarterly by NABL/MoEFCC-accredited laboratories.
2. Ambient noise monitoring shall be conducted quarterly during daytime and nighttime.
3. Drinking water quality shall be tested quarterly as per IS 10500:2012.</td><td>Capital Cost: ₹ 0
Recurring Cost: ₹ 64,800</td><td>During Construction Period</td><td>EHS Manager / External Laboratory</td></tr>
</table>

				4. Soil quality shall be tested once every six months for heavy metals, pH, and oil & grease. 5. All monitoring data shall be recorded, analyzed, and submitted to regulatory authorities where required.			
6	Welding, gas cutting, equipment installation. Storage of oils, fuels, chemicals.	Presence of flammable materials. Sparks from welding.	1. Welding, cutting, grinding, fuel storage, and electrical installations may pose a risk of fire ignition. 2. Fire incidents may cause property damage, worker injury, and operational delays.	1. All flammable materials shall be stored in bunded, ventilated, marked fire-safe enclosures. 2. Fire extinguishers (ABC, CO_2) shall be installed at strategic locations near welding and fuel storage areas. 3. Welding and gas-cutting operations shall be carried out with fire blankets, spark arresters, and hot-work permits. 4. Regular mock fire drills, evacuation drills, and emergency response training shall be conducted. 5. Only trained workers shall be permitted to carry out hot work.	**Capital Cost:** ₹ 92,400 **Recurring Cost:** ₹ 25,000	During Construction Period	Contractor / EHS Manager / Safety Officer

7	Manual handling, machinery operation, welding, working at height.	Exposure to dust, noise. Use of sharp tools & heavy materials.	1. Workers are exposed to dust, noise (up to 85 dB(A)), heat, sharp objects, manual lifting, and equipment movement, creating risks of injury, respiratory discomfort, and fatigue. 2. Lack of safety awareness increases the potential for accidents and near-miss incidents.	1. Mandatory PPE shall include N95 masks, helmets, gloves, safety boots, reflective jackets, ear protection, welding shields, and harnesses. 2. Pre-employment and periodic medical examinations shall be conducted for all workers. 3. Toolbox talks and monthly safety training shall be organized covering site hazards, fall protection, and equipment handling. 4. A Permit-to-Work (PTW) system shall be implemented for high-risk activities (hot work, confined space, working at height). 5. A well-equipped first aid station shall be maintained with trained first-aid responders.	**Capital Cost:** ₹ 1,33,500 **Recurring Cost:** ₹ 20,000	During Construction Period	Contractor / EHS Team / Site Supervisor

14.2 Implementation of the Environmental Management Plan

Factory proposes comprehensive environment management plan to combat pollution arising from the project activities. Detailed EMP is described below for various environmental parameters in **Table No. 15.**

Table 15: EMP for Operation Phase

S. N.	Activity	Aspects	Impact	Mitigation Measures	Budget	Timeframe	Responsibility
1	- Operation of 1 x 15 Lakh Kcal and 1 x 20 Lakh Kcal LPG Fired Thermic Fluid Heaters. - Operation of 320 kVA DG Set. - UPR manufacturing process involving esterification, condensation, and dilution with styrene. - Resin blending, finishing and packaging. - Storage and Handling of solvent & Chemicals. - Truck (3-4 Nos.) & Tempo	- Stack emissions from fuel combustion (CO_2, NO_x, SO_2, PM). - VOC emissions (styrene and solvent vapors) from reactors, storage tanks, and handling operations. - Fugitive emissions from pumps, flanges, valves, and tank vents. - Odour emissions characteristic of styrene. - Vehicular exhaust emissions. - Indirect transport-related emissions.	- **Combustion Emissions (TFH & DG Set):** Stack emissions from LPG-fired TFHs and DG set may cause localized incremental contribution to PM, NOx, SO_2, and CO levels within the plant boundary. - **Greenhouse Gas (GHG) Emissions:** GHG emissions from fuel combustion in thermic fluid heaters, process heating, and DG set operation will contribute to regional and global climate change impacts. - **VOC & Styrene Emissions:** UPR	**Thermic Fluid Heater (TFH):** - Commercial LPG conforming to IS 4576 with very low sulphur content (<10 ppm) shall be used. - A common 30 m stack shall be provided for both TFHs to ensure adequate flue gas dispersion. - Low-NOx burners and optimized air–fuel ratios shall be maintained. - Preventive maintenance and combustion efficiency checks shall be conducted quarterly. **DG Set:** - Provide 8 m stack height as per CPCB guidelines. - Use low-sulfur HSD; perform routine maintenance and operate DG only during power failure or emergency	**Capital Cost:** ₹. 9,20,000/- **Recurring Cost:** ₹. 70,000/-	Continuous operation; quarterly maintenance of stacks, scrubbers, LEV; daily checks for combustion efficiency	Plant Environmental Officer (PEO) Maintenance In-charge Shift-in-charge

	(2-3 No) Transportation for movement of Raw Material and Finished Good.		manufacturing involves styrene, which may lead to process-related VOC emissions if uncontrolled. - **Storage & Handling of Chemicals:** Fugitive emissions from storage tanks, pumps, and valves may increase on-site VOC concentrations relative to baseline ND levels. - **Vehicular Movement & Transportation:** Additional truck, tempo, and employee vehicle movement may cause marginal increase in exhaust emissions and dust resuspension within the premises.	situations. **Process Reaction (VOC/HAP Control):** - Reactors shall be provided with chilled condensers to recover styrene and solvent vapors. - Closed reactor charging and closed-loop transfer systems shall be implemented to minimize fugitive VOC emissions. - Nitrogen blanketing shall be provided for styrene storage tanks to suppress vapor release and reduce oxidation. - Local Exhaust Ventilation (LEV) with activated carbon adsorption shall be installed at high-risk emission points. - Exhaust streams containing styrene shall be routed through condensers followed by adsorption systems.			

				Storage & Handling of Chemicals: - Styrene shall be stored in fixed roof tanks with vapor-tight fittings. - Storage tanks shall be equipped with breather valves with carbon filters. - Mechanical seals shall be provided for pumps handling styrene and solvents. - Routine Leak Detection and Repair (LDAR) inspections shall be carried out. **Odour Control:** - Good housekeeping practices shall be maintained to prevent spillage and open handling. - Prompt collection and neutralization of resin spills shall be ensured. - Activated carbon filters shall be replaced periodically to maintain odour control efficiency.			

<table>
<tr><td></td><td></td><td></td><td></td><td>Vehicular Movement & Transportation:
- Only PUC-certified and BS-VI compliant vehicles shall be permitted inside the premises.
- Speed limits shall be enforced to reduce emissions and dust re-suspension.
- Vehicle idling within the premises shall be discouraged.
- Delivery schedules shall be optimized to avoid congestion.</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="6">Details of point sources of flue emission (stack) with APCM
<table>
<tr><th rowspan="2">Usage of Fuel</th><th rowspan="2">Fuel</th><th rowspan="2">Quantity</th><th rowspan="2">Storage</th><th colspan="3">Fuel Characteristics</th><th rowspan="2">Storage</th></tr>
<tr><th>GCV (kCal/kg)</th><th>Sulphur</th><th>Ash</th></tr>
<tr><td>Thermic Fluid Heater (1 x 15 L Kcal, 1 x 20 L Kcal)</td><td>LPG</td><td>200kg/hr</td><td>Tanks</td><td>11,000</td><td><2ppm</td><td>Nil</td><td>Thermic Fluid Heater Area</td></tr>
<tr><td>D. G. Set (2 x 320 kVA)</td><td>HSD</td><td>88 Lit/Hr</td><td>Tanks</td><td>10,700 kcal/kg</td><td><0.25% (---ppm)</td><td><0.1%</td><td>Inbuilt in D.G. Set</td></tr>
</table></td><td></td></tr>
<tr><td>2</td><td>- Water consumption for</td><td>- Freshwater abstraction</td><td>Freshwater Consumption:</td><td>Water conservation & reuse:</td><td>Capital Cost: ₹. 49,30,000/-</td><td>Continuous during operation;</td><td>Plant Environmental Officer (PEO)</td></tr>
</table>

	process operations, cooling tower make-up, washing, scrubber operation, domestic use, and gardening - Effluent generation from cooling tower blowdown, process washing, scrubber bleed - Sewage generation from domestic activities - Collection of roof-top rainwater and surface runoff.	- Effluent generation with dissolved solids, organics, and chemical residues - Domestic sewage generation with organic load - Stormwater runoff from roofs and paved areas - Risk of soil and groundwater contamination from leaks or improper handling	- Withdrawal of 114 KLD of freshwater may exert localized pressure on regional water resources, particularly during lean seasons, if reuse is not maximized. **Industrial Effluent Generation:** - Generation of 38.3 KLD of industrial effluent containing dissolved salts, process chemicals, and residual organics poses a risk of surface water and groundwater contamination if discharged untreated. - Cooling tower blowdown may increase salinity and TDS loading,	- 30 KLD water from MEE shall be reused for cooling tower make-up. - 2.55 KLD of STP-treated sewage shall be reused for greenbelt development. - These measures reduce freshwater abstraction and improve water-use efficiency. **Effluent treatment & recycling:** - Entire 38.3 KLD industrial effluent shall be routed to a packaged ETP comprising- primary, secondary and tertiary treatment followed by evaporator. - Treated effluent shall be fully reused for cooling tower make-up. - Zero Liquid Discharge (ZLD) approach shall be maintained (no effluent discharge outside premises). **Domestic Sewage Management:**	**Recurring Cost:** ₹. 1,20,000/-	weekly checks for water recycling systems; monthly checks for ETP/STP operations	Shift-in-charge for water systems

			while process wastewater may contribute chemical oxygen demand (COD). **Domestic Sewage:** - Generation of 2.83 KLD of domestic sewage, if untreated, can cause organic pollution and nutrient enrichment, potentially leading to eutrophication in receiving environments. **Stormwater & Rainwater:** - Roof-top runoff of up to 52.19 m^3/day during peak rainfall represents a resource recovery opportunity. - Mixing of stormwater with effluent or chemical spills could degrade	- Install 5 KLD MBBR / packaged STP for treatment of domestic sewage. - Treated sewage shall comply with reuse standards and be utilized for gardening (2.55 KLD). **Stormwater & Rainwater Management:** - Provide separate stormwater drainage network with no interconnection to effluent lines. Construct: Two underground RCC rainwater harvesting tanks (total 80 m^3) & Surface runoff collection reservoir (lined). - Harvested rainwater shall be reused for cooling tower make-up, & washing. **Oil/sediment control:**			

			water quality and cause off-site contamination. **Soil & Groundwater Risk:** **-** Leakage or spillage from chemical storage, tank farms, or pipelines may lead to localized soil and groundwater contamination if preventive controls are absent.	- Install silt traps and oil interceptors at yard drains and tank farm areas. - Interceptor effluent shall be routed to ETP. - Provide bunded, impervious platforms for chemical and oil storage. **Operation, Maintenance & Administrative Controls:** - Regular desludging and maintenance of ETP/STP units. - Periodic cleaning of rainwater tanks and drains. - SOPs for reactor and equipment washing to minimize water and solvent use. - Training on spill response and recordkeeping of water consumption and reuse volumes.			
		Water Consumption, Waste Water Generation and Management During Non-monsoon –					

Sr. No.	Particulars	Water Requirement – Make up (KLD)			Loss (KLD)	Effluent Generation (KLD)
		Fresh	Recycle	Total		
1	Process	0	0	0	0	8.3
2	Washing	2	0	2	0	2
3	CT Makeup	105	30	135	108	27
4	Scrubber	1	0	1	0	1
5	Domestic	3.15	0	3.15	0.32	2.83
6	Gardening	2.85	2.55	5.4	5.4	0
	Total	**114**	**32.55**	**146.55**	**113.72**	**41.13**

Water Consumption, Waste Water Generation and Management During Monsoon –

Sr. No.	Particulars	Water Requirement – Make up (KLD)				Loss (KLD)	Effluent Generation (KLD)
		Harvested water	Fresh	Recycle	Total		
1	Process	0	0	0	0	0	8.3
2	Washing	2	0	0	2	0	2
3	CT Makeup	27	78	30	135	108	27
4	Scrubber	1	0	0	1	0	1
5	Domestic	0	3.15	0	3.15	0.32	2.83
6	Gardening	0	0	2.55	2.55	2.55	0
	Total	**30**	**81.15**	**32.55**	**143.7**	**110.87**	**41.13**

Characteristic of Domestic Waste Water – STP Technology (MBBR)

Sr. No.	Parameter	Unit	Inlet	Outlet
			(mg/l, except pH)	
Quantity (KLD)			**2.83**	**2.55**
1	pH	--	6.5-8.5	6.5-8.5
2	TSS	mg/L	100-500	<50
3	BOD	mg/L	150-400	<10
4	COD	mg/L	250-600	<30
5	Total Coliform	CFU/100ml	10^6-10^8	<1000CFU/100 ML

Characteristic of Effluent-ETP

Parameters	Inlet ETP	Outlet ETP	Outlet from SEE
pH	5.5-9.0	6.5- 8.5	6.5-8.5
TSS mg/l	200-300	<50	<20
TDS mg/l	2000-3500	<2100	<2100
BOD mg/l	200- 300	<30	<10
COD mg/l	800-1,200	<250	<50

Rain Water Harvesting Details:

Parameter	Value
Peak Rainfall Intensity	130 mm/hr (0.13 m/hr)
Peak Rainfall Duration	15 minutes
Total Catchment Area	6808.51 m²
Peak Hourly Runoff (Q)	505.23 m³/hr
Runoff Volume (15 min)	126.30m³
Annual Rainfall	2708 mm (2.708 m/year)
Annual Harvesting Potential	10524.28 m³/year

		Tank Capacity & Requirement **Parameter** / **Value** Proposed Tank Size: 10 m × 3 m × 2 m = 60 m³ & 6m x 6m x 3m = 108 m³ Number of Tanks Required: 126.3.30/168=0.751.33 ≈ **12** 3-Day Roof-top Storage: 156.58 m^3 Tanks for 3-Day Storage: 156.58/168 = 0.88 93 ≈ **1**					
3	- Operation of 2 nos. of 8 Lakh Kcal. - Operation of HSD fired DG Sets (320 KVA) during power failure to supply electricity. - Truck (5-6 Nos.) & Tempo (2-3 No) Transportation for movement of Raw Material and Finished Good	- Noise generated during Thermic Fluid Heater operation. - ID/FD Fans, Blowers, Air Compressors. - Steam Venting & Safety Valve Testing. - Noise Pollution (DG Set & Exhaust System). - Noise Pollution: Due to engine operation and honking horns	- Continuous exposure to 80–100 dB(A) may cause hearing loss, fatigue, and discomfort among workers near equipment. - Vibrations may affect structural stability and worker comfort. - Ambient noise at site boundary may exceed CPCB industrial area limits (75 dB(A) day, 70 dB(A) night). - Transport noise can disturb nearby	**Engineering Controls:** - Install acoustic enclosures for Thermic Fluid Heater and DG sets to achieve <75 dB(A) at 1 m from source and <70 dB(A) at boundary. - Use sound-absorbing panels (mineral wool or perforated GI) inside TFH and compressor rooms. - Mount ID/FD fans, blowers, compressors on anti-vibration pads/isolation mounts to reduce vibration transmission. - Install silencers / mufflers at air intake & exhaust points.	**Capital Cost:** ₹. 4,00,000/- **Recurring Cost:** ₹. 80,000/-	Continuous operation; quarterly noise monitoring; daily operational checks	Maintenance In-charge PEO / Safety Officer

			receptors and increase occupational stress.	**Administrative Controls:** - Schedule steam venting and valve testing during daytime only. - Restrict DG operation to power failure hours only and ensure proper maintenance. - Restrict truck/tempo movement to daytime (8 AM–8 PM) and maintain PUC certification. - Maintain boundary noise within CPCB norms: 75 dB(A) day / 70 dB(A) night. **Occupational Safety Controls:** - Ensure workplace noise exposure <85 dB(A) for 8-hour shift (OSHA/CPCB). - Provide ear protection (earplugs / muffs) for workers near high-noise equipment. **Maintenance:** - Lubricate moving parts, maintain fan balance,			

				check acoustic panels quarterly. - Conduct quarterly ambient noise monitoring at strategic points (near DG, TFH, unloading area).			
4	Manufacturing process, Maintenance activity, Raw Material and Packaging, ETP Operation, STP Operation, Domestic Activity	- Generation of Hazardous waste such as- Used Oil/Spent Oil, ETP Sludge, Process Residue and Distillation bottoms Discarded Plastic Bags and Drums, Filters and Filter Material Containing Organic Liquids, and Off-Specification Products. - Generation of non-hazardous waste such as- Metal and Paper Scrap, STP Sludge, Waste Paper Boxes and Polyethylene Bags, Paper, Cartons, and	- Soil and groundwater contamination if improperly disposed. - Odor and vector nuisance if not disposed properly. - Solid waste can become attraction of rodents and pests.	- Hazardous Waste Management as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and amendment thereof. - Ensure proper labelling, leak-proof containers, and disposal at authorized reprocessor as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and amendment thereof.	**Capital Cost:** ₹. 2,63,000/- **Recurring Cost:** ₹. 2,03,000/-	During Operation Phase	Maintenance Department, Environmental Officer, Operation Manager, Waste Management Team, Horticulture Team

		Non-Contaminated Bags, as well as Wooden Waste- Generation of Domestic Solid Waste					

Operation Phase – Hazardous Waste

Sr. No.	Type of Waste	Sch/ Cat.	Quantity	Mode of Disposal
1	Used or spent oil	Sch I / 5.1	128 Lit/A	Generation, Collection, Storage, Transportation and Disposal at Authorized decontamination facility or Disposal to Authorized recycler under Rule-9.
2	Residues containing oil	Sch I / 5.2	1.04 MT/M	Generation, Collection, Storage, Transportation and Disposal at Authorized decontamination facility or Disposal to Authorized recycler under Rule-9.
3	Distillation residues	Sch I / 20.3	3.47 MT/M	Generation, Collection, Storage, Transportation and Disposal at Authorized Distillatory facility under Rule-**9**
4	ETP Sludge	Sch I / 35.3	7.5 MT/M	Generation, Collection, Storage, Transportation and Disposal at Authorized TSDF
5	Empty barrels / containers / liners contaminated with hazardous chemicals / wastes	Sch I / 33.1	17.36 MT/M	Generation, Collection, Storage, Transportation and Disposal at Authorized decontamination

				facility and Disposal to Authorized recycler under Rule-9.
6	Evaporator Salts	Sch I / 35.3	50 MT/M	Generation, Collection, Storage, Transportation and Disposal at Authorized TSDF

Operation Phase -Non-Hazardous Waste

Sr. No	Type of Waste	Quantity	UOM	Disposal
1	Wooden Scrap	1.04	MT/M	Disposal to authorized vendor
2	Glass scrap	0.69	MT/M	Disposal to authorized vendor
3	Plastic scrap & other non-biodegradable waste	3.47	MT/M	Disposal to authorized vendor
4	Paper waste	0.35	MT/M	Disposal to authorized vendor
5	STP Sludge	8490	Kg/M	Used as manure for greenbelt development

Domestic Solid Waste

Manpower	70	Type	Quantity (Kg/Day)	Treatment
Total Solid Waste	10.5	**Wet waste**	4.2	Wet Waste will be treated in composting machine within plant premises and used as organic manure for gardening.
		Dry Waste	6.3	Dry waste will be sent to authorized recyclers.

E-Waste Generation & Management

Sr. No.	Description	Total	UOM	Treatment
1.	E-waste	0.18	TPA	Segregate and disposal as per E-Waste Management Rules, 2022 and amendment thereof.

Bio-Medical Generation & Management

Sr. No.	Description	Total	UOM	Treatment
1.	Contaminated materials like bandages, Cotton swabs, Expired medications and gloves	14	Kg/year	Segregation of contaminated materials should be done in color-coded bags, followed by disposal to an authorized biomedical waste management facility as prescribed under Schedule-I of BMWM Rules, 2016

Battery Waste Management

Sr. No.	Description	Source	Qty (TPA)	Treatment
1.	Used Lead-Acid Batteries	UPS/Inverter banks for DCS/IT; DG set starter batteries	0.85	Return to CPCB-registered recycler
2.	Used Portable Batteries (Li-ion/NiMH/NiCd)	Handheld radios, safety devices, tools, emergency lights	0.01	Return to CPCB-registered recycler
3	Used Forklift Traction Battery	Battery-powered forklift(s) in material handling	0.2	Return to forklift supplier under buy-back or send to CPCB-registered recycler

5	Combustion process of, thermic fluid heaters and DG set operations.	Environment monitoring and management	- Air pollution: releases particulates, gases (SO2, NOx, CO), VOCs, harmful fumes impacting air	- Ensure regular Ambient air quarterly sampling at minimum 4 locations using NABL-accredited labs. - Conduct quarterly monitoring of stacks (2	**Capital Cost:** ₹. 0/- **Recurring Cost:** ₹. 2,83,200/-	As per monitoring schedule (monthly, quarterly, half-yearly)	PEO / External NABL-accredited Labs EHS Officer

	Chemical reactions and processing operations. Noise from machinery and operations. Effluent generation and wastewater discharge. Chemical storage and handling		quality and public health. -Noise pollution: affects human health - Water pollution: contamination from effluents, chemicals, and wastewater affecting aquatic ecosystems, soil, and groundwater. - Soil contamination: leaks, spills of chemicals, hazardous wastes affecting land health.	nos. of DG set and 1 no. of common stack of thermic fluid heaters and Process vent Stack). - Monthly monitoring of Indoor Air Quality. - Quarterly noise monitoring at plant boundary, DG set, and nearby habitats. - Monthly monitoring of ETP inlet/outlet and STP outlet. - Perform half-yearly Ground Water and quarterly Surface Water monitoring respectively to detect any contamination. - Quarterly monitoring of drinking water sources. - Half-yearly soil sampling near hazardous waste storage. - Install real-time leak detection sensors (ultrasonic/VOC). - Maintain logbooks and incident records for spills and corrective actions.			

6	Development & Maintenance of Greenbelt in an area of 2039.78 sq. m.	- Air Pollution Control - Noise Reduction - Soil Conservation - Water Management - Biodiversity Enhancement	- Green belt acts as a sink for air pollutants by trapping particulate matter and absorbing gaseous pollutants like CO2, SO2, and NOx. This improves overall local air quality. - Trees and shrubs reduce noise levels by deflecting, refracting, and absorbing sound waves, lowering ambient noise pollution around the plant.	- Plant native, pollution-tolerant tree species in a tier arrangement; maintain healthy vegetation cover; regular watering and care to ensure plant survival. - Green Belt to be developed within 1 Year. - Develop a green belt with a density of 2500 trees per hectare. - Planting saplings with a height above 6 ft. - Maintain dense greenbelt around plant boundary to act as a natural barrier for fugitive emissions.	**Capital Cost:** ₹. 4,99,800/- **Recurring Cost:** ₹. 2,60,920/-	Planting: first 12 months; maintenance: continuous, monthly inspections	PEO / Greenbelt In-charge Gardening Staff / Shift-in-charge
		❖ Plant Species Selection for Green Belt Development ❖ Total Green Belt Area – 2039.78 Sq.m. (23.23 % of total plot area) ❖ No. of Plant species to be planted – 638 nos. ❖ Tree density per/ha – 2500 nos. ❖ Survival Rate – 80% ❖ Sapling Height- 5-6 ft. **Green Belt Development Approach** ❖ Planting Process Spacing:					

Trees: 2x2 meters apart
Shrubs: 1.5-2 meters apart
Ground Covers: 0.5-1 meter apart

Pitting: Prepare pits of appropriate size based on plant root structure. For trees, dig 60x60x60 cm pits, and for shrubs, 30x30x30 cm pits.

Mulching: Apply organic mulch around the plants to retain soil moisture, reduce weed growth, and improve soil fertility.

Irrigation and Soil Management
Establish a drip irrigation system for efficient water use, especially during the initial growth phase.
Enhance soil quality by adding organic manure, compost, and bio-fertilizers, which are well-suited to medium black and shallow black soils

Planned schedule for 1 Year

Sr. No	Activity	Timeline	Details
1	Site Preparation	1st Month	Clear the area, prepare the soil, and create planting pits.
2	Planting	2nd Month	Plant 638 saplings with proper spacing (2X2 meters apart).
3	Irrigation	Weekly (1st to 12th Month)	Ensure regular watering, especially during dry months.
4	Weeding and Mulching	Every 2 months	Remove weeds, apply mulch to retain moisture.
5	Fertilization	4th and 8th Month	Apply organic manure for healthy growth.
6	Pruning and Trimming	6th and 12th Month	Remove dead or damaged branches to promote healthy growth.
7	Survival Monitoring	End of each quarter	Record survival rate, growth, and health of the saplings.

Capital Budget allocation for Greenbelt development

Estimated Time for Plantation: 1 year (2026-2027)			
Total greenbelt area: 2039.78 sq.m. Trees for Plantation: 638 (510+ 80% survival rate) Height of Saplings: 5-6 ft.			
Sr. No.	**Items**	**Cost per plan (Rs.)**	**Total Cost (Rs.)**
Capital Budget			
1	Pit digging & alignment	50	53850
2	Sapling purchase (avg. 5–6 ft)	650	700050
3	Tree planting cost	50	53850
4	Miscellaneous	300	323100
Total		**1050**	**1130850**
Recurring Budget			
1	Watering cost (drip O & M)	45	48465
2	Manure/pesticide (per year)/tree	55	59235
3	Weeding/Mulching/tree	20	21540
4	Misc. cost /tree	50	53850
5	Labour (1 person)	15,000/Person	180000
Total		**15170**	**363090**

Maintenance and Monitoring

Watering

Water the plants regularly during the first two years to ensure proper establishment, especially in dry months.

Fertilization

Apply organic compost or vermicompost every 6 months to maintain soil fertility.

Pruning and Weeding

Prune dead or damaged branches regularly and remove weeds to avoid competition for nutrients

7	Storage and Handling of Chemicals (Benzene, Methanol, Styrene Monomer, Methyl Metha Acrylate, Methyl Ethyl Ketone Peroxide.)	- Fire/explosion risk (pool fire, thermal radiation up to 47.8 m)	- Fire / explosion risk (pool fire, thermal radiation up to 47.8 m) causing damage to property, workers, and environment - Corrosion/leakage causing environmental contamination. - Odor from hazardous chemicals.	**Storage & Handling:** - Follow PESO guidelines for storage of Hazardous chemicals. - Store chemicals in MS drums, HDPE bags and Canes per MSDS - Tanks fabricated as per IS 10987 - Dip sticks of brass with dip pipe. - Hydrostatic testing: water at 0.25 kg/cm² pressure - Tanks painted with anticorrosive paint and properly earthed as per relevant Indian standards - All fittings flameproof, suitable for Group II gases as per IS 2148 - Maintain safe distance from ignition sources (MSIHC Rules 1989) - Grounding / bonding of drums / tanks during transfer to prevent static sparks - Use flameproof equipment for solvent /	**Capital Cost:** ₹. 4,23,500/- **Recurring Cost:** ₹. 4,03,500/-	Continuous maintenance; monthly inspections; 6-monthly major drills	Safety Officer / EHS Officer Shift-in-charge

				amine storage **Fire Protection Systems:** - Maintain 200 m^3 firewater tank with fire hydrant system; test monthly. - Class B & C fire extinguishers: 1) Dry Chemical Powder / ABC 2) CO_2 3) Mechanical foam. - Extinguishers inspected quarterly **VOC & Leak Controls:** - Install LEV with activated carbon adsorption (>95% VOC removal) - Install real-time VOC/leak sensors with alarms **Training & Emergency Preparedness:** - Monthly fire drills and safety training - Maintain SOPs, logbooks, and incident records. - Provide No Smoking			

				and Danger sign boards. - PPE for chemical handling and fire hazards.			
8	**Occupational Exposure of workers** - Chemical manufacturing and handling - Loading / unloading of raw materials - Operation of heavy machinery (pumps, compressors, generators). - Material handling and transportation in plant areas. - Cleaning and maintenance of chemical tanks and pipelines. - Working near hot reactors.	Worker exposure to airborne hazards such as dust, fumes, VOCs, toxic gases Noise exposure affecting hearing and overall health. Chemical exposure risks through inhalation, dermal contact, or ingestion Physical hazards including heat, radiation, and vibration impacting worker well-being. Biological hazards from infectious agents Ergonomic stressors from repetitive or strenuous tasks. Psychological stress due to workplace conditions and workload.	- Respiratory / dermal exposure to chemicals during reactions, cleaning, or maintenance, causing acute irritation or chronic health effects; indoor air pollution from fugitive VOCs affecting worker health. -Spill/fire hazards. - Worker exposure to toxic fumes or skin burns.	**Engineering & Administrative Controls:** - Automated handling systems (pumps, conveyors, mechanical drum handlers) to minimize manual exposure. - Safety signages and SOPs for high-risk activities - Emergency spill response plan as per HWM Rules 2016. - Monthly inspections for leaks, corrosion, and hazards. - Disaster Management Plan (DMP) with 6-monthly mock drills for spills/fires. **Personal Protective Equipment (PPE):** - Chemical-resistant gloves, suits, aprons,	**Capital Cost:** ₹. 2,67,190/- **Recurring Cost:** ₹. 1,04,119/-	Continuous PPE use; weekly safety checks; quarterly medical tests and drills; biannual health check-ups	OHS Officer / EHS Officer Shift-in-charge

	- Handling wastewater from ETP / STP. - Manual lifting and carrying of chemical drums.			boots, face shields, goggles, helmets. - Respirators for VOCs, half-mask or full-face, P100 cartridges). - Hearing protection (earplugs/earmuffs). - Heat-resistant gloves and flame-retardant clothing near hot surfaces. - Cut-resistant gloves for manual handling. - High-visibility vests for plant movement areas. - Fall protection harnesses and lanyards for work at height. **Safety Infrastructure:** - Safety showers and eyewash stations at chemical handling, mixing, and reactor zones; ANSI/IS compliant; tested weekly. - First aid boxes at production floor, storage, loading/unloading, lab, admin, control rooms, and emergency assembly points.			

				- Spill kits (absorbent pads, neutralizers, booms). - Fire extinguishers, fire blankets, hydrants, firewater tank as per fire EMP. **Medical Monitoring & Health Check-ups:** - Pre-employment and biannual health check-ups: lung function, pulmonary function, radiology, audiometric, general clinical examination. - Quarterly health tests at PHC, Khutal for all 70 employees **Training & Awareness:** - Training on chemical handling, PPE usage, emergency spill/fire response, ergonomics, and stress management. - Regular drills for fire, spill, and chemical emergencies.			

Medical Facilities

The following quarterly tests will be conducted for each worker:

Sr. No.	Test	Venue
1	Lung Function Test	**Primary Health Centre, Khutal** - Government hospital PX59+H24, Hamrapur Road, Khutal, Maharashtra
2	Radiology – X-ray	
3	Pulmonary Function Test	
4	Audiometric Test	
5	General clinical examination with emphasis on respiratory system	
6	Pre-employment examinations	

Details of First Aid Box to be provided:

Sr. No.	Equipment's	Placement
1	Sterile adhesive bandages (various sizes)	Production Floor, Storage Area, Loading/Unloading Zone, Laboratory, Admin office and control rooms, Emergency assembly point
2	Sterile gauze pads and rolls	
3	Adhesive tape	
4	Antiseptic wipes and solution	
5	Antibiotic ointment/burnt ointments	
6	Scissors (blunt-tipped)	
7	Tweezers	
8	Disposable gloves	
9	Cotton balls and swabs	
10	Pain relievers	

9	CER activity	Providing Solar lights, maintaining greenery in the nearby villages, and irrigation system for green belt.	- Potential impacts on local environment and community due to inadequate environmental infrastructure or	- Implementation of CER initiatives as per Ministry of Environment, Forest and Climate Change O.M. No. 22-65/2017-IA II(M) dated 01.05.2018.	**Capital Cost:** ₹. 60,00,000/- **Recurring Cost:** ₹. 0/-	Within the first 2 years of project commissioning	Project Proponent / CSR/CER Team in coordination with local Gram Panchayat /

			lack of sustainable practices.				school authorities
10	Energy Utilization (600 kW) for manufacturing processes, utilities (Thermic Fluid Heaters, cooling towers), lighting, and other electrical systems.	High electrical load.	- Increased electricity demand. - Higher operational costs. - Consumption of 600 kW of electricity is estimated to generate tCO_2 e, contributing significantly to the facility's carbon footprint and climate change.	- Industry has proposed the installation of 60 kW of solar PV, which will lead to an emissions saving of tCO_2e/day, reducing reliance on fossil fuels. - Implementation of energy-efficient lighting (LEDs) and appliances to reduce power consumption. - Maintain PF above 0.95 using capacitor banks. - Install SCADA-based real-time energy tracking system.	**Capital Cost:** ₹. 21,00,000/- **Recurring Cost:** ₹. 63,000/-	During Operation Phase	Plant Manager, Maintenance Team

14.3 Implementation of the Environmental Management Plan

Environmental protection, mitigation, and management will be the primary responsibility of the Environmental Health and Safety (EHS) Department of M/s Morex Industries Private Limited. This department will ensure proper implementation of all recommended environmental management plans and actions for the project and will also coordinate with all concerned departments.

For this project, it is necessary to establish an Environmental Management System (EMS). This system will include identification of all applicable environmental laws, assessment of project impacts, setting of objectives and targets, preparation of programmes and action plans, definition of roles and responsibilities for implementation, and continuous monitoring of progress along with corrective actions wherever required.

The implementation process will primarily involve optimal utilization of resources available with the project proponent, clear definition of contractor responsibilities, training of personnel operating environmental control facilities, and proper documentation of all mitigation measures.

For effective implementation of the Environmental Management Plan (EMP), it is proposed to establish an independent Environmental Management Cell (EMC) under the supervision of the EHS Manager.

The EMC will be responsible for the following key functions:

- Effective implementation of the Environmental Management Plan (EMP) and ensuring its compliance.
- Ensuring regulatory compliance with all applicable environmental laws, rules, and statutory requirements.
- Regular operation, inspection, and maintenance of pollution control systems and equipment.
- Minimizing environmental impacts during the operational phase of the project through strict adherence to the EMP.
- Conducting regular environmental monitoring as per the approved monitoring schedule.
- Reviewing and technically analyzing monitoring results, and taking immediate corrective actions if any parameter exceeds permissible limits.
- Maintaining all environmental records, reports, and documentation in a systematic manner.
- Maintaining effective coordination with regulatory authorities, accredited laboratories, external consultants, and other concerned agencies.

The proposed organizational structure of the Environmental Management Cell for the operational phase is given in Figure 6.

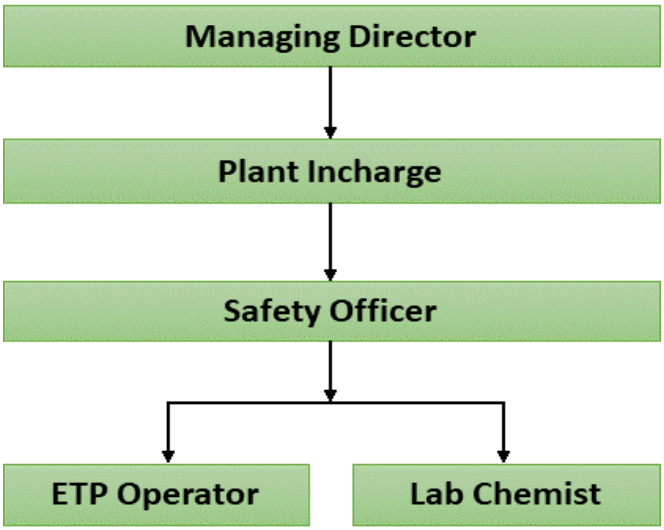


Figure No. 6: Environmental Monitoring Cell

14.4 EMP Review and Amendments

The Environmental Management Plan (EMP) is a crucial tool for environmental management. It is necessary to periodically review the EMP in light of organizational changes, process improvements, or new regulatory requirements. After each review, the EHS Manager will update the EMP with necessary modifications and obtain approval from senior management. The updated EMP will then be formally communicated to all concerned personnel.

The EHS Manager will identify training needs based on the skills and capabilities of site and project personnel and will organize appropriate training programmes to ensure effective implementation of all management and monitoring activities outlined in the EMP. In addition, the objective is to enhance environmental awareness among all project team members and ensure compliance of all project activities with environmental regulations.

This approach will help in minimizing adverse environmental impacts, ensuring strict compliance with applicable laws and standards, and in many cases achieving performance that exceeds regulatory expectations. The training programmes will ensure that all team members associated with the project have a clear understanding of the following aspects:

- The purpose of the management plan for project activities;
- Requirements of the management plan and specific action plans;
- Understanding of sensitive environmental and social features in the vicinity of the project site; and
- Awareness of potential risks associated with project activities.

15. Environmental Management Cost

Capital and recurring expenditure provisions have been made to effectively implement the Environmental Management measures for the proposed project. This expenditure has been planned for both the construction phase and the operational phase of the project.

The total estimated project cost is approximately ₹30 crore. This includes project establishment, machinery, infrastructure, and environmental control systems.

For environmental management, an estimated capital cost of ₹6.78 lakh and a recurring cost of ₹2.87 lakh per annum are expected during the construction phase. During the operational phase, an estimated capital cost of ₹158.04 lakh and a recurring cost of ₹13.05 lakh per annum will be incurred for environmental management.

All these expenditures are necessary to ensure environmental compliance, pollution control, occupational health and safety, and sustainable industrial practices. The detailed breakdown of these costs is provided in Table No. 16 and Table No. 17.

Table 16: Environmental Management Cost during Construction Phase

Sr. No.	Component	Description	Capital Cost (₹)	Recurring Cost (₹/year)
1	Air Pollution Control	During the construction phase, water sprinkling will be carried out regularly for dust suppression. Construction materials and vehicles will be covered with tarpaulins. Workers will be provided with dust masks and safety goggles. Preventive maintenance of construction equipment will be carried out regularly. Temporary dust control measures and barricading will be provided at site.	4,40,000	1,90,000
2	Water Pollution Control	During construction, silt traps and sediment barriers will be provided to prevent runoff of soil and fine particles. Bunded areas with impervious flooring will be provided for fuel and oil storage. Portable toilets will be provided for workers. Spill prevention and control materials will be kept available.	1,07,000	48,000
3	Noise Pollution Control	Temporary metal sheet barricading will be provided around high noise-generating areas to reduce noise dispersion. Regular maintenance and lubrication of machinery will be carried out. Workers will be provided with ear protection devices such as earplugs and earmuffs.	1,50,000	0
4	Solid & Hazardous Waste Management	Color-coded bins will be provided for waste segregation at source. Temporary waste storage areas will be developed at site. Proper handling and transportation of construction waste will be ensured. Recyclable waste will be segregated for	55,500	40,000

		proper disposal. Spill kits will be provided for hazardous waste handling.		
5	Environmental Monitoring & Management	During construction, quarterly monitoring of ambient air quality, noise levels, and drinking water quality will be carried out. Soil quality will be monitored half-yearly through MoEFCC/NABL accredited laboratories. Records will be maintained and corrective actions will be implemented wherever required.	0	64,800
6	Fire Safety & Emergency Measures	Fire extinguishers, fire blankets, sand buckets, and safety signage will be provided during construction. Emergency preparedness measures will be implemented. Regular fire safety training and mock drills will be conducted to ensure worker safety.	92,400	25,000
7	Occupational Health & Safety	PPE such as helmets, safety shoes, gloves, safety jackets, and safety harnesses will be provided to workers. First-aid facilities will be available at site. Regular safety training and periodic health check-ups of workers will be conducted.	1,33,500	20,000
		Total	**9,78,400**	**3,87,800**

Table 15: Environmental Management Cost during Operation Phase

Sr. No.	Component	Description	Capital Cost (₹)	Recurring Cost (₹/year)
1	Air Pollution Control	30 m stack for Thermic Fluid Heaters and 8 m stack for 320 kVA DG set will be provided. Local Exhaust Ventilation (LEV) with Activated Carbon Adsorption system will be installed in process areas. The process will be operated in a closed loop system with nitrogen purging for VOC control. Regular maintenance of machinery, use of PUC-certified vehicles, internal road paving, water sprinkling for dust control, and green belt development will be implemented.	9,20,000	70,000
2	Water Pollution Control	A 50 KLD Effluent Treatment Plant (ETP) with primary, secondary, tertiary treatment and evaporator will be installed. A 5 KLD STP will treat domestic wastewater. A solvent recovery distillation system will be provided. Rainwater harvesting will include 168 m^3 underground RCC tanks and a separate lined stormwater collection system.	49,30,000	1,20,000
3	Noise Pollution Control	Acoustic enclosures, sound absorbing panels, vibration isolators, silencers, mufflers, and anti-vibration pads will be provided for Thermic Fluid Heaters and DG sets. Regular maintenance of	4,00,000	80,000

		equipment will be carried out. PPE such as earplugs and earmuffs will be provided to workers.		
4	Solid & Hazardous Waste Management	Segregation bins, leak-proof containers, and an Organic Waste Composter (OWC) will be provided. Waste such as process waste, used oil, solvents, ETP sludge, contaminated containers, STP sludge, e-waste, biomedical waste, and battery waste will be handled and disposed of through authorized agencies as per applicable rules (HWM Rules 2016, E-Waste Rules, Biomedical Waste Rules).	2,63,000	2,03,000
5	Environmental Monitoring & Management	Real-time VOC and leak sensors will be installed. Ambient air quality monitoring (PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, HC) will be conducted quarterly at 4 locations. Stack monitoring for heaters, boiler, vents, and DG set will be carried out. Indoor air quality will be monitored at 1 location. Effluent monitoring will be done monthly. Drinking water quality (IS 10500:2012) will be tested. Noise monitoring will be conducted at 3 boundary locations. Soil monitoring will be done semi-annually.	0	2,83,200
6	Green Belt Development	About 2039.78 sq.m (23.23%) area is allocated for green belt. Approximately 638 saplings will be planted considering survival rate. Plantation density will follow 2500 trees/ha norms. Healthy saplings of ~6 ft height will be planted for better survival and environmental effectiveness.	11,30,850	3,63,090
7	Fire Safety & Emergency Measures	200 m^3 fire water tank, CO_2 and DCP extinguishers, flameproof electrical systems, MS/SS316L/HDPE storage tanks, grounding & bonding systems, spill containment kits, VOC and leak sensors, monthly mock drills, and Disaster Management Plan (DMP) implementation will be provided.	4,23,500	4,03,500
8	Occupational Health & Safety	First aid kits, safety signage, SOPs, quarterly safety training, pre-employment and half-yearly health check-ups for ~70 employees, and PPEs including respirators (N95/P100), chemical-resistant gloves, goggles, protective suits, earplugs/earmuffs will be provided.	2,67,190	1,04,119
9	Corporate Environmental Responsibility	CER activities include avenue plantation and maintenance, solar street lights, irrigation facilities for green belt, and borewell facility for water supply to plantations in Wada MIDC area.	60,00,000	0
10	Renewable Energy	Solar power system will be installed to meet about 10% of total electricity demand of the project, contributing to energy conservation and reduction in carbon emissions.	21,00,000	63,000
		Total	**1,58,03,490**	**13,04,539**

16. Conclusion

The proposed project will be established in the Wada Industrial Development Corporation (MIDC) area, and adequate environmental management measures along with pollution control systems have been provided. The project incorporates modern production technology, closed-loop systems, VOC control systems, Effluent Treatment Plant (ETP), Zero Liquid Discharge (ZLD) system, and green belt development measures.

An assessment of potential environmental impacts during both the construction and operational phases has been carried out. It is observed that with the proposed mitigation measures, impacts on air, water, soil, noise, as well as biological and social environments will remain under control. An effective Environmental Management Plan (EMP), a regular environmental monitoring programme, and occupational health and safety measures will be implemented.

The project will also contribute to direct and indirect employment generation at the local level, promotion of local businesses, improvement in infrastructure facilities, and overall socio-economic development. Under Corporate Environmental Responsibility (CER), initiatives such as tree plantation, solar street lighting, irrigation facilities, and other community development activities will be undertaken.

The study concludes that no significant adverse environmental impacts are anticipated from the proposed project. If implemented in compliance with all statutory requirements and environmental standards, the project will be environmentally acceptable and supportive of sustainable industrial development.