EXECUTIVE SUMMARY OF EIA REPORT

Proposed Expansion of Unsaturated Polyester Resin (USPR) unit at Plot no 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal- Wada, Dist- Palghar, Maharashtra

By

M/s. Morex Industries (Pvt) Ltd.

Environmental Consultant

ENVIROSHPERE CONSULTANT AND ENGINEERS

NABET/EIA/23-26/IA 0130 Certified Organization

CORPORATE OFFICE: Envirosphere Consultant and Engineers,
Office No. 506, 5th Floor, Shree Ganesh Ace Arcade, Kokane Chowk, Dwarkadheesh Gardens, Rahatani, Pune, Pimpri-Chinchwad, Maharashtra 411017, INDIA
E-mail: info@envirosphere.co.in,
Contact: 9860220550, 9028513045
Website: www.envirosphere.co.in

Environmental Monitoring Laboratory
Umwelt Research Lab Private Ltd.

Baseline period –
1st October 2022 to 31st December 2022

Contents

1. Introduction

M/s. Morex Industries (Pvt) Ltd. (herein referred to as industry), an established manufacturer in the Adhesive and Synthetic resins industry, is situated at Plot No. 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal.-Wada, Dist.- Palghar, Maharashtra. The proposed expansion entails enhancing the plant capacity from 42 MT to 1200 MT of unsaturated Polyester Resin through the revamping and retrofitting of existing plant and machinery. No new construction is anticipated as part of the proposed expansion. The proposed expansion will be carried out in the existing factory.

Total Plot area of the industry is 3628 m^2 out of which ground coverage is around 1138.10 m^2 and total existing Built-up area of the industry is 2453.70 m^2. No additional construction is envisaged. Industry also has earmarked 1270.00 m^2 as green belt area which is 35% of the total plot area. Total open space is around 819.9 m^2 and constructed road in the industry occupies around 400 m^2 of the area. Existing capital expenditure was around ₹. 4.47 Cr and this capacity expansion would entail additional capital expenditure of around ₹. 3.41 Cr. Thus, the total expenditure after proposed expansion will be ₹. 7.88 Cr.

2. Purpose of the report

The major purpose of this Environmental Impact Assessment (EIA) report is to evaluate the potential environmental, social, and economic impacts associated with the expansion of Unsaturated Polyester Resin (USPR) unit by M/s. Morex Industries (Pvt) Ltd. located at Plot no 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal. - Wada, Dist. - Palghar, Maharashtra. The report provides detailed information about the project and its potential impacts due to expansion, as well as the measures that will be taken to mitigate any adverse effects.

The Environmental Impact Assessment (EIA) report functions as a valuable tool for facilitating decision-making processes, enabling various stakeholders such as the public, government agencies, and project proponents to make well-informed judgments regarding the proposed development. Furthermore, the report aids in the identification of possible environmental risks and concerns, thereby facilitating the implementation of suitable mitigation measures to address them effectively.

3. Identification of project and Project Proponent

M/s. Morex Industries (Pvt) Ltd. (herein referred to as industry) is an existing manufacturer of Adhesive and Synthetic resins. Existing consented manufacturing capacity of Polyster Resin is 42 MT/Month where as existing consented manufacturing capacity of Surface Mat Printing is 400 Mtrs/Month. In the view of growing market demand, industry has proposed expansion of existing plant capacity from 42 MT to 1200 MT of unsaturated Polyester Resin along with revamping and retrofitting of existing plant and machineries. The proposed expansion will be carried out in the existing factory.

M/s. Morex Industries (Pvt) Ltd. is a professionally-run, family managed business. It was initially promoted to serve Adhesive and Synthetic resin manufacturing small scale industries in eastern India by making available scarce imported raw materials/special chemicals at competitive price and expanded to all India service by 1996. The industry currently manufactures customized grades of Unsaturated Polyester Resin to customers based mainly in India.

Industry is guided by its goals to provide a quality product when it moved into manufacture of Polyester Resins. At Morex, we believe in Growth through Innovation. Following this belief, we have pursued a strategy of import-substitution. Towards this objective, we have an In-House R & D Centre, which is recognized by the Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India. The R&D activity is directed towards developing new and improved products/concepts in the composites industry. Also, by continuously working with the user industries, we have been successful in developing new applications for our products.

Industry also has a plant in Sri Lanka serving the local Sri Lankan market.

Mr. Santosh More is the Chief Executive Officer (CEO) of the industry having its registered corporate office at 803, Ruby Crescent, Business Boulevard, Ashok Chakarvarthy Road, Ashok Nagar, Kandivali (E), Mumbai - 400 101, India.

4. Location of the Project

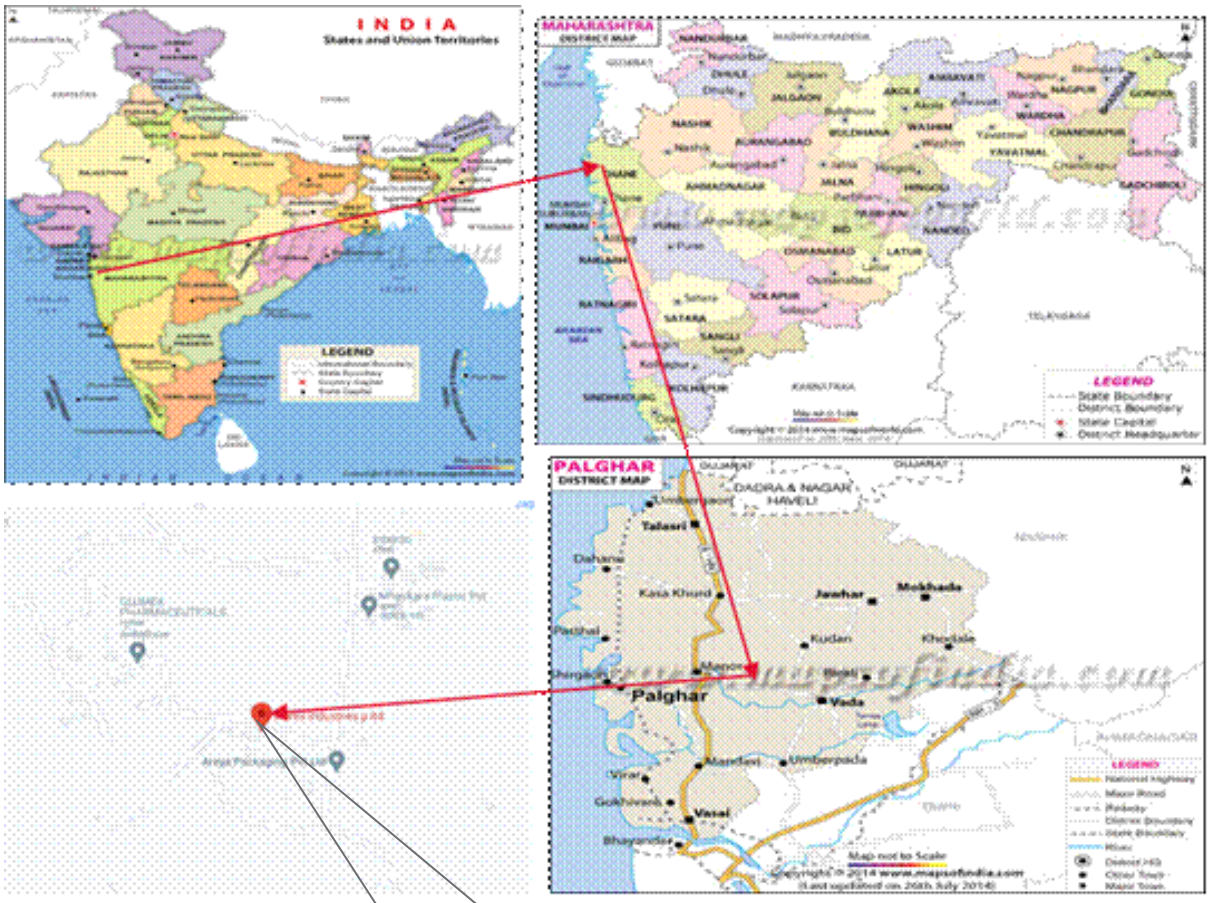
M/s. Morex Industry Pvt. Ltd. is an existing unsaturated polymer manufacturing industry located at Plot no 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal-Wada, Dist- Palghar. Geographical location of industry is 19°42'11.26"N 72°57'45.22"E. Major district place located near to the project site are Palghar and Thane at a distance of 20 km in West direction and 54 km in south direction respectively. The approach road for the industry is Palghar Manor Wada state highway road no 34 which is further connected to Mumbai Ahmedabad Road (NH – 48) at a distance of 3.2 km in north west direction.

Nearest suburban railway station is Palghar railway station which is at the distance of 20 km (Aerial) in west direction from the project site and nearest major railway station is Boisar railway station which is at the distance of 23 km (Aerial) in north west direction from the project site. Nearest Airport is Chhatrapati Shivaji Maharaj International Airport, Mumbai which is at the distance of 68 km (Aerial) in south west direction from the project site. Index map of project site is shown in **Figure 1**. Google Imagery of Project site along with co-ordinates of all corners is shown in **Figure 2**. Project Location marked on SOI Toposheet is shown in **Figure 3**. Site proximities are shown in **Table 1** whereas Detailed Area bifurcation is given in **Table 2**. Photographs of the existing industry are shown in **Photoplate 1**.

For proposed expansion no additional plot or construction activity will be required.

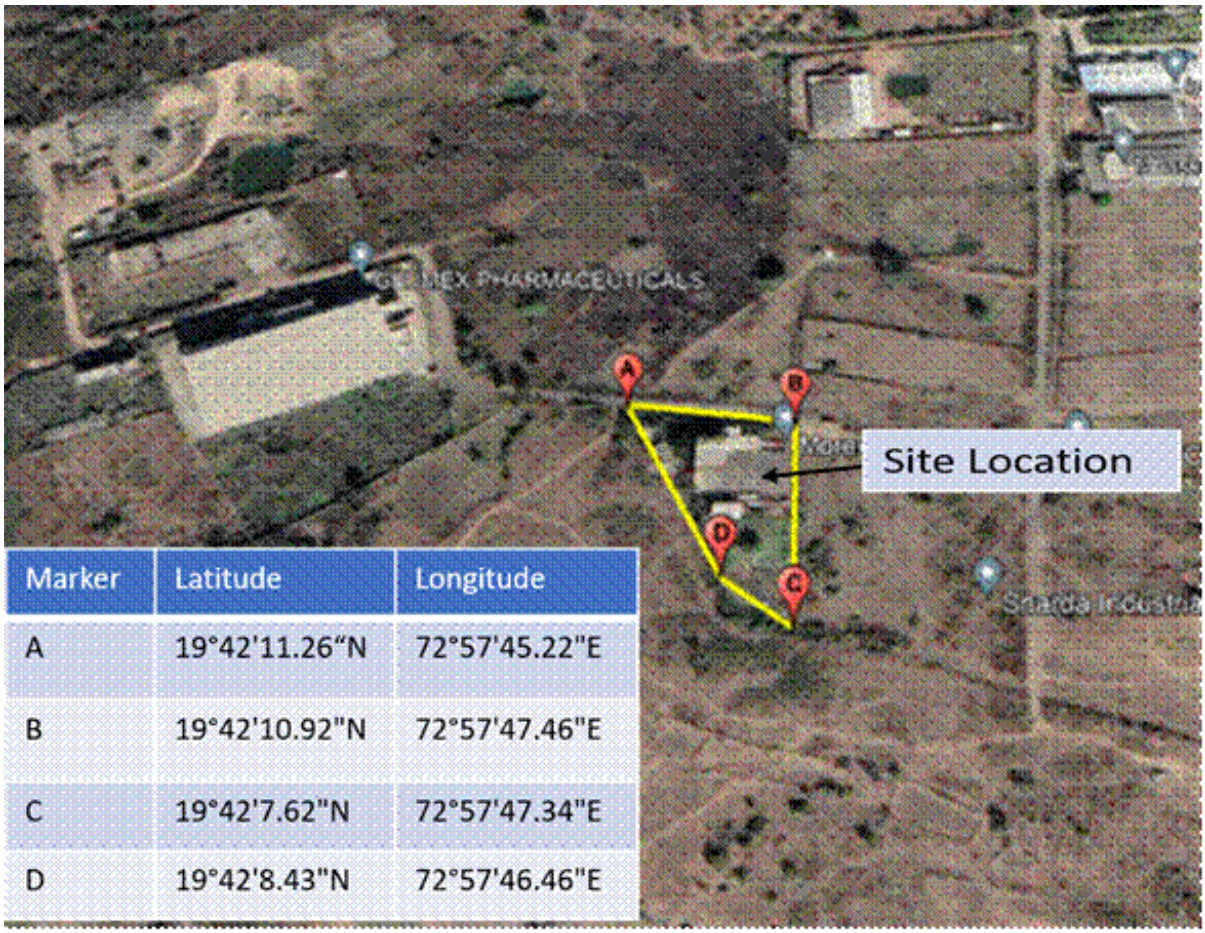
Table 2.1: Site Proximities

Sr. No	Particulars	Details
1	Project Location	Plot no 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal.- Wada, Dist.- Palghar, Maharashtra.
2	Geographical Coordinates	Latitude - 19° 9'2.35"N, Longitude - 73°14'32.57"E
3	Nearest Highway	National Highway 48 at 3.3 kms NW
4	Nearest City/ Market	Palghar at 20 kms west
5	Nearest Fire Station	**Fire Brigade Station and Emergency Services** PQ96 + 7M6, Palghar Taluka Industrial Co-operative Estate, Palghar, Maharashtra, 401404
6	Nearest Airport	Chhatrapati Shivaji Maharaj International Airport, Mumbai at 68.2 kms SE.
7	Nearest Railway Station	Palghar Railway Station at 20.1 kms west.
8	Water Supply	Tanker/ Local Authorised vendor
9	Water Body	Dehraja River – 1.6 km W Vaitarna River – 2.5 kms W
10	Nearest Habitation	Hamrapur at 520 m NNE.
11	Reserved Forest /Ecological Sensitive area	No eco-sensitive area is present within 10 kms of area. Many Patches of reserved forest are located in 10 km radius area from the project site.
12	Archeological monuments	No Archeological monument in 10 km radius



Morex Industries Pvt. Ltd.
Plot no 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal-Wada, Dist- Palghar.

Figure 1: Index Map of Project Site



Marker	Latitude	Longitude
A	19°42'11.26"N	72°57'45.22"E
B	19°42'10.92"N	72°57'47.46"E
C	19°42'7.62"N	72°57'47.34"E
D	19°42'8.43"N	72°57'46.46"E

Figure 2: Google Imagery of Project Site with Corner Co-Ordinates.

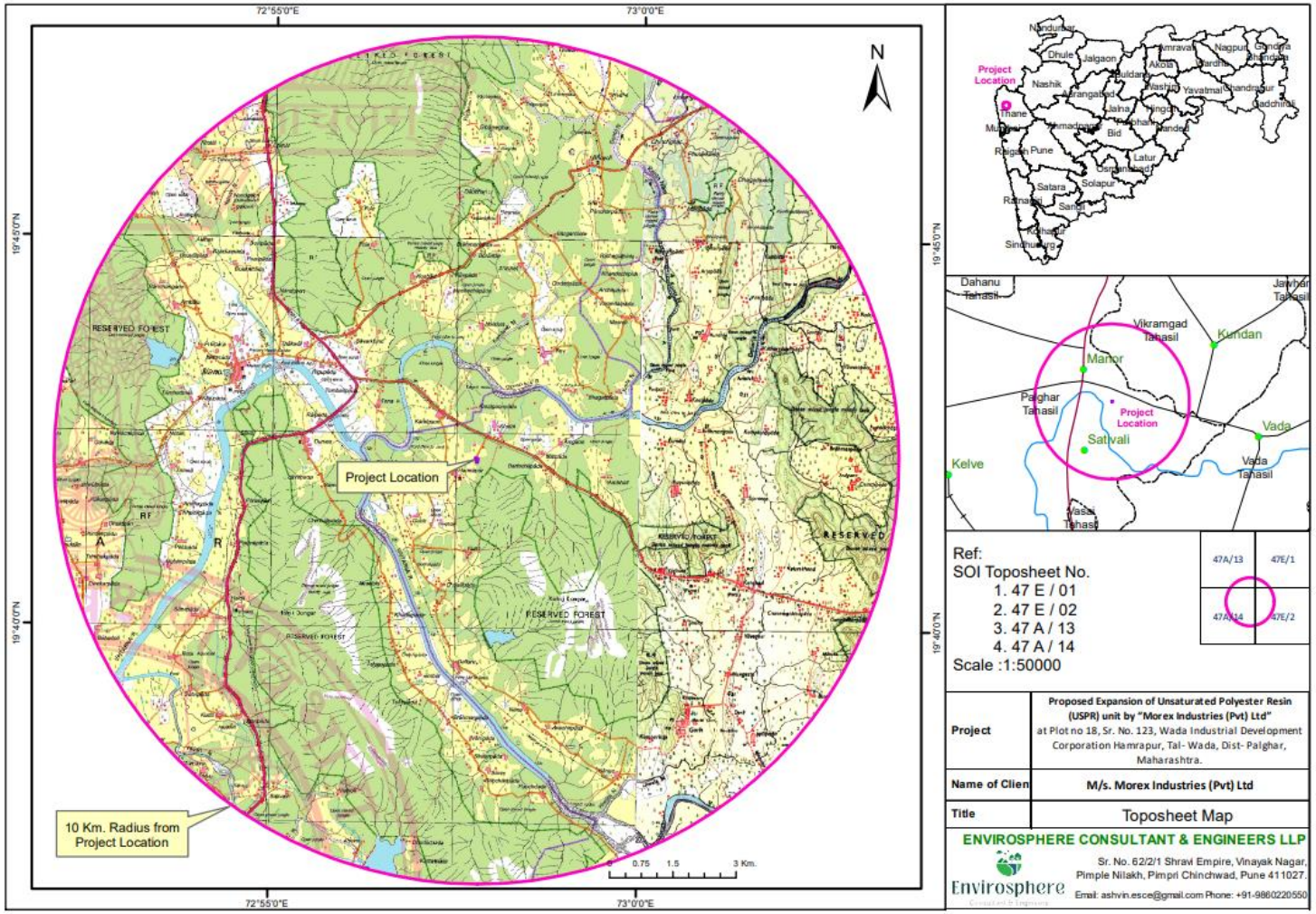


Figure 3: Project Location with 10 km radius study area shown on SOI Toposheet

5. Nature and Size of the Project

M/s. Morex Industries (Pvt) Ltd. has proposed expansion of plant capacity from 42 MT to 1200 MT of unsaturated Polyester Resin by revamping and retrofitting of existing plant and machineries. No additional construction is envisaged in proposed expansion.

The details of existing and proposed products are given in Table 2 below –

Table 2: Details of Existing and Proposed production

Sr. No.	Name Of Chemical	Existing Production Details	Proposed Production Details	Total Production Details
1.	Polyester Resin	42 (MT/M)	1158 (MT/M)	1200 (MT/M)
2.	Surface Mat Painting	400 (Mtrs/M)	00	400 (Mtrs/M)

As the company was founded and commenced production before the issuance of the EIA notification in 2006, it was not subject to the requirement of obtaining Environmental Clearance. However, industry is operating under Consent to Operate (CTO) from Maharashtra Pollution Control Board (MPCB) vide Consent No. Format 1.0/AS(T)/ UAN No. 0000100230/CR – 2108000802 dated 12/08/2021 valid upto 31/03/2025.

Now since the industry has proposed an expansion, the proposed project attracts EIA Notification 2006 & amendments thereof and the industry requires Environmental Clearance under the 5(f)-project activity. Though the project is located outside the notified area but as per amendment in EIA notification no. S.O. 1599 (E) dated 25th June, 2014, the industries having water consumption less than 25 m^3/day and fuel consumption less than 25 TPD will be considered as small units and will be appraised as Category B1 by State Environmental Impact Assessment Authority (SEIAA).

For the proposed expansion, the total fresh water consumption is 22.5 KLD and fuel requirement is 600 kg/day. Also, there is no ECO-Sensitive Area in the radius of 5 Km from the project site. Hence the project will be considered as category B1 and will be appraised by State Environment Impact Assessment Authority (SEIAA), Environment Department, Government of Maharashtra. Following studies are recommended such as Environment Impact Assessment (EIA), Environment Management Plan (EMP), Disaster Management Plan (DMP), Risk & Hazards study, Solid waste management, Hazardous waste storage, disposal.

6. Land Details

Proposed project is an expansion of the existing Unsaturated Polyester Resin manufacturing industry located in Wada Industrial Development Corporation Hamrapur, Tal- Wada, Dist- Palghar, Maharashtra. Total plot area is 3628.2 sq.m. Existing built-up area is 2453.70 sq.m. No additional construction is envisaged in proposed expansion. Proponent has already provided 1270 sqm. Green belt area and which will be strengthened in the proposed expansion. The

master layout plan has been shown in **Figure 3** whereas the detailed area bifurcation, is shown in **Table 3** below:

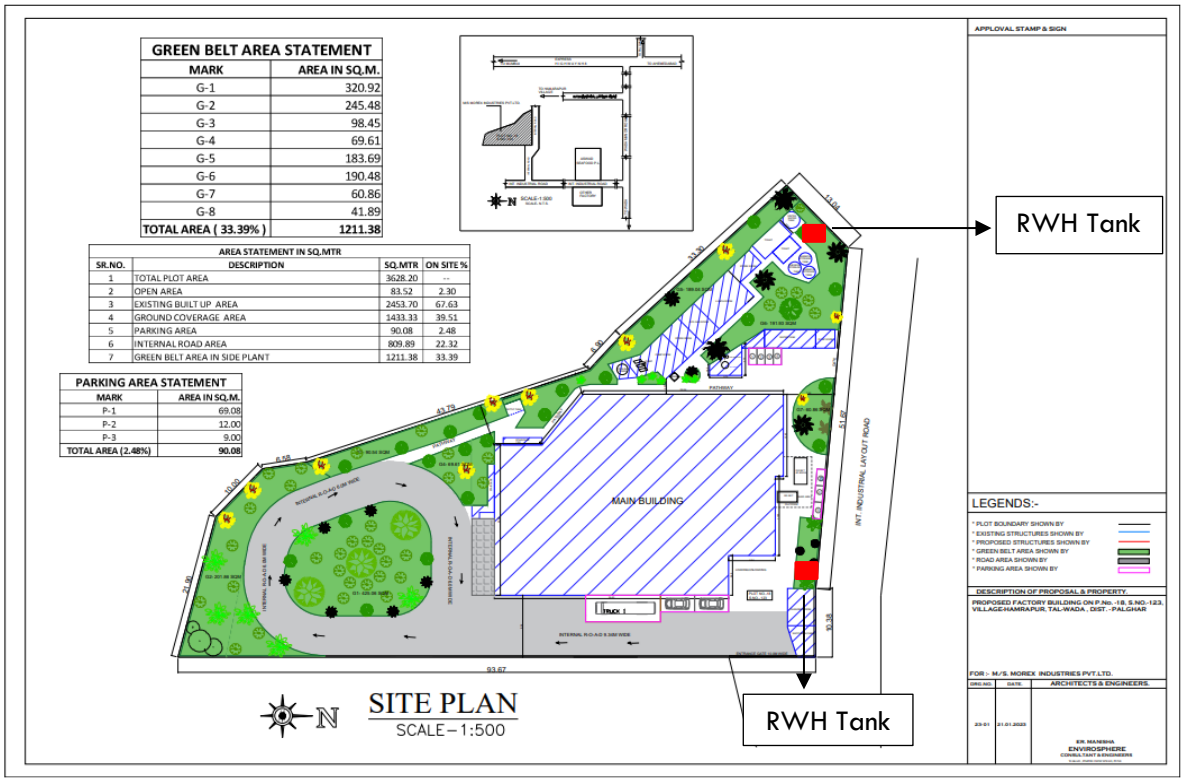


Figure 4: Master Layout Plan

Table 3: Area Statement

Sr. No	Particulars	Area (m^2)
1.	Existing Ground FLR Area	1138.10
2.	Existing First FLR Area	657.80
3.	Existing Second FLR Area	657.80
4.	Existing BUA Area	2453.70
5.	Total BUA	2453.70
6.	Total PLOT Area	3628.2
7.	Total Green belt Area	1270
8.	Road and Parking open space	1219.9

7. Project Description with Process Details

Project information brief is given in **Table 4** below –

Table 4: Size and Magnitude of the project

Sr. No	Particulars	Details	
1	Ownership of land	The industry is existing on the land owned by M/s Morex Industries (Pvt) Ltd.	
2	Type/Category	5(f); Category B1	
3	Production details	**Existing –** Polyester Resin – 42 MT/M Surface Mat Painting – 400 Mtrs/M **Proposed –** Polyester Resin – 1158 MT/M **Total (After Expansion) –** Polyester Resin – 1200 MT/M Surface Mat Painting – 400 Mtrs/M	
4	Water Consumption	**Existing-** 11.2 KLD **Proposed-** Operation Phase- 11.3 KLD **Total –** 22.5 KLD Source – Tankers/ Local Authorised vendor	
5	Waste water generation	Sewage	**Construction Phase –** 0.4 KLD **Operation Phase -** **Existing** – 0.5 KLD **Proposed -** 0.2 KLD – Operation Phase. **Total** – 0.7 KLD
		Effluent	Existing – 2.8 KLD Proposed – 11.8 KLD Total – 14.6 KLD
6	Waste Water Treatment Facility	Sewage	Construction Phase sewage will be led down to existing Septic Tank followed by Soak Pit. During Operation Phase, total 0.7 KLD of Generated effluent during operation phase will be treated in Package modular STP of 1 KLD.
		Effluent	Total trade effluent generated will be 14.6 KLD which will be treated in collection tank, primary treatment followed by evaporator to achieve Zero Liquid Discharge.
7	Thermic Fluid Heater	2 nos.	1 no. of 4 lakh Kcal/hr 1 no. of 2 lakh Kcal/hr
8	Stack Details	**Stack Attached to**	**Stack Height**

		Thermic Fluid Heaters (2 nos.)	Existing Common Stack of 30 m
		DG set	4 m above roof top of the building
9	Fuel	LPG – 600 kg/day Diesel – 100 Liters/day	
10	Air Emissions	No Air emissions are envisaged from Thermic Fluid Heaters as the fuel used in LPG. However, adequate stack height of 30 m has been provided. SO_2, PM and NO_X are envisaged from DG set. Stack height of 4 m above roof has been provided for better dilution and dispersion of pollutants. DG sets shall act as stand by source of electricity for the site. There will be no process emissions from the proposed process.	
11	Power Requirement	102 KVA HT Power Supply by MSEDCL	
12	DG set	2 nos. x 125 kVA	
13	Manpower	Construction Phase (retrofitting & revamping of machinery) – 5 to 10 nos. Operation Phase – Existing – 30 nos. Proposed – 10 nos. Total – 40 nos.	
14	Project Cost	Existing – ₹. 4.47 Cr. Proposed - ₹. 3.41 Cr. Total – 7.88 Cr.	
15	EMP Cost	**Construction Phase** - ₹ 1 Lakh per month **Operation Phase** - Capital Cost - ₹ 100 Lakh Recurring Cost - ₹. 30 Lakh per Annum	
16	CER Cost	₹ 3.5 Lakh	

7.1 Process Description

The unsaturated Polyester resin is manufactured by condensation polymerization method. The process involves following stage.

- Esterification
- Blending

Require batch quantity of Mono-ethylene Glycol is charged in the Reactor by pump. Then required batch quantity of Propylene Glycol is charged in the Reactor by pump. The required batch quantity of Di-ethylene Glycol is charged in the Reactor by pump. Then stirrer is started. The anti-oxidation agent Tri Phenyl Phosphate is charged through the man-hole.

The stirring continues and heating is started. Then anti gelling/retarder Hydroquinone is added through the man-hole. Then the required batch quantity of Malic Anhydride is charged through man-hole.

Then the required batch quantity of Phthalic Anhydride is charged through the man-hole. Distillation starts between 150°C to 175°C. During distillation the by-product vapours are passed through packed column abs condenser, the condensate is collected in the receiver.

The condensate collected for recovery of Glycol to be used for fresh batches through evaporation of water at maximum temperature of 120°C. First sample of the reaction mix is removed once the temperature is about 205 to 210°C. The Esterification is continued till the set acid value is achieved but the maximum temperature is 230°C. When the required result of Acid Value is obtained, the heating is stopped. The reaction is allowed to continue till the reactor temperature drops by itself to 226-228°C. Then vacuum is applied to the receiver to remove excess water.

Then the vacuum is released by releasing the air in to the receiver by opening the valve on receiver. Then the cooling of the reactor is started. Once the reactor temperature is below 200°C second quantity of Hydroquinone and any other additive if required is added according to the requirement of properties depending on application.

Once the reactor temperature is between 170–175°C slow draining of reacted mass stared into the blender which has styrene inhibited with Tertiary Butyl Hydroquinone. It is important that the stirring is continuous and cooling at no time is stopped. After the draining is completed, cooling is continuing till the polymer is blender is at temperature between 30-35°C. All properties are checked and there after packing is done at 30°C in drums. Process flow diagram is shown in **Figure 5** below -

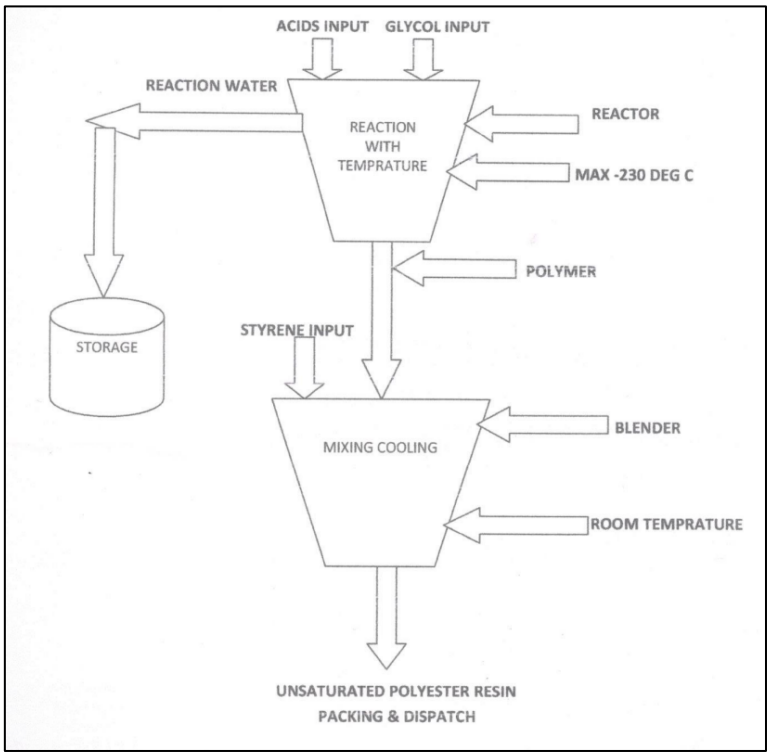


Figure 5: Process Flow Diagram

8. Description of the Environment

Field monitoring was done for primary data collection of various environment components such as air quality, water quality, soil quality, noise, traffic, ecology & biodiversity and socio-economics. Also, secondary data such as micrometeorology, flora and fauna, socio-economic, hydro-geological study, traffic study etc. from authenticated sources was used as a guideline and reference material. The entire data has been collected through actual physical surveys and observations, literature surveys, interaction with locals, government agencies, and departments. The baseline study begins with site visits and reconnaissance survey in the study area.

The guiding factors for the present baseline study are the requirements prescribed by the guidelines given in the EIA Manual of the MoEFCC and methodologies mentioned in Technical EIA Guidelines Manual for Synthetic Organic Industries by IL&FS Ecosmart Ltd., approved by MoEFCC.

The studies were conducted during winter season for the period of 1st October 2022 to 31st December 2022.

Frequency and summary of results of environment monitoring is given in **Table 5**

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,	9.4m/s
		Wind direction	North-West South-West
		Max. Temp.	37.6
		Mini. Temp.	13.4
		Relative Humidity	73%
		Precipitation	2320.7
Ambient Air Quality	8 Locations 24 hourly samples Twice a week for 3 months (in µg/m^3)	PM10	26.3-38.5
		PM2.5	13.7-21.9
		SO_2	10.3-19.8
		NO_x	8.3-18.3
Water Quality (Ground and Surface)	Once in season at 10 locations (Physical, chemical and biological parameters)	Colour	All parameters are within limit.
		pH	
		TDS	
		COD	
		E-Coli	
Soil Quality	Once in season at 8 locations	Soil type and texture, Physico-chemical properties, NPK	Dark brown to black, clay loam, soil is medium in fertility, good water holding capacity, heavy metal contamination signs not seen.
Noise Quality	Once in season at 8 Locations (Noise levels in dB(A))	Average Day	53.4
		Average Night	48.5

Land use Pattern	One time visit of the study area for ground truthing	Identification and classification of land use	Most of the land is Barren land.
Geology and hydrogeology	Primary observation during visit and sec. data	Geology and hydrogeology of the study area	Basaltic lava flows, the ground water in deccan trap basalt occurs mostly in the upper weathered and fractured parts down to 20-25 m depth, alluvium occurs in small areas.
Ecology	General in 10 km radial study area and data collected around the project site through field visits.	Flora	*Alstonia scholaris*, *Cassia tora*, *Senna siamea* etc.
		Fauna	Common mormon, Lemon pansy, green bee-eater, drongo etc.
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	Sanitation facilities are unsatisfactory, Power supply facility is available in almost villages and town, Drinking water sources is mostly from PWD water supply, Medical facilities in terms of primary health center and primary health sub centers in the rural areas are good.

9. Potential Impacts and Remedial Plans

A simple ranking method was used to determine the severity of the potential impact of the proposed project in which the duration of the potential impact is categorized into short term and long term. The potential impact of the proposed project has been measured in two phases i.e. construction and operation. As no construction is involved in the proposed expansion, the impacts from construction phase activities such as land levelling, mining, transportation of construction materials, construction waste, excavated soil, domestic sewage, etc. were found to be negligible. However, expansion involves revamping and retrofitting of the existing plant machineries. Thus, minimalistic impacts are envisaged during retrofitting and revamping phase. The details of impacts during retrofitting and revamping phase and operation phase are given in **Table 6** below –

Table 6: Environmental Aspects and Impacts of the Project

Sr. No	Step/ Activity	Environmental Aspect	Impact	
			Type	Severity
1	Retrofitting and Revamping of Machinery	Use of manpower	Employment	Temporary
		Hazardous and non-hazardous waste disposal on land.	Land pollution	Permanent
2	Commissioning	Use of energy and materials	Air Pollution	Permanent
		Use & storage of hazardous chemicals	Land Pollution Safety, Occupational Hazards	Permanent
		Waste Water discharge	Water Pollution Land Pollution	Permanent
		Hazardous and Non-hazardous Waste Disposal on land	Land Pollution	Permanent
		Use of Water	Natural resources/ conservation	Permanent
		Use of manpower	Employment	Permanent
		Production of goods	Revenue Generation	Permanent
		Operation of Plant and machinery	Noise Pollution	Permanent
3	Closure and Decommissioning	Stoppage of New product	Revenue & employment loss	Permanent
		Decommissioning	Land pollution	Permanent

9.1 Prediction of Impacts during Construction Phase (Revamping and retrofitting) and Mitigation Measures

No additional construction is envisaged in the proposed expansion. Proposed expansion involves revamping and retrofitting of existing machineries and increasing the production quantity. Hence no significant major impacts are envisaged. Table 7 shows potential impacts and mitigation measures during retrofitting and revamping phase.

Table 7: Summary of Impacts and Mitigation Measures during Construction phase (Revamping and Retrofitting phase)

Sr No	Environment Aspects	Potential source of Impact	Proposed mitigation measures
1	Air Environment	Dust emission due to Trucks carrying machineries.	• All the internal roads are tarred. • Water sprinkling if required will be done in the dust prone areas • Avenue plantation has been done • Provision of PPE (dust masks, goggles) for onsite workers
2	Water Environment	Additional sewage generation due to manpower.	• Existing toilet facilities are adequate to cater the additional manpower load. • Temporary arrangement of clean drinking water will be provided for workers. • Generated sewage of 0.4 KLD will be led down to existing Septic Tank and Soak Pit
3	Land / Soil	Oil spillage during retrofitting and revamping	• Retrofitting and revamping will be carried out on concrete impervious surface to avoid seepage of oil or lubricant in the soil. • Separate area will be earmarked for storage of solid wastes generated while hazardous wastes will be stored in existing covered area earmarked for the purpose. • PPE's will be provided to workers
4	Noise	Noise and vibrations will be generated due to retrofitting and revamping of machinery, however it will be confined within the industry area only	• Adequate PPE (ear muffs, ear plugs) for workers. • Vibration pads will be provided for machineries.
5	Ecology	No impacts are envisaged as the proposed expansion will be carried out by retrofitting and revamping of machineries located in the existing industry premises. No additional construction is envisaged	

6	Socioeconomic	Manpower Requirement	• Positive Impacts on socio-economic environment will be envisaged due to proposed project during construction phase due to direct and indirect employment. • There will be temporary employment for about 7-10 persons for the retrofitting and revamping of machinery. It will create business opportunities to suppliers of fabricators, manpower suppliers, etc. • Local labours will be employed during construction phase
7	Occupational Health and safety	Health of the workers may be affected due to noise and possibility of accidents	• Adequate provision of PPE (helmets, safety shoes, harness, ear plugs, muffs, dust masks) for workers. • Insurance for workers and extending medical facilities to all concerned.

9.2 Prediction of impacts during operational phase

Significant Impacts from the project activities and its mitigation measures are summarized in **Table 8** below –

Table 8: Summary of Impacts and Mitigation Measures

Sr No	Environment Aspects	Potential source of Impact	Proposed mitigation measures
1	Air Environment	DG Set Stack emissions, vehicular movement	• Effective stack height of 4 m above roof for DG Set • No emissions are envisaged from Thermic fluid heater and evaporator as fuel proposed is LPG. However, common stack of height 30 m is provided. • PUC of the vehicles shall be checked periodically • Periodical maintenance of vehicles

			• VOC Sensors will be installed to check fugitive emissions if any.
2	Water Environment	Waste water from process, cooling tower and domestic source.	• The total effluent generated is 15.6 (Existing 2.8 KLD + Proposed 12.8 KLD) which will be treated collection tank, primary treatment followed by evaporator to achieve Zero Liquid Discharge. • 0.7 KLD (Existing 0.5 KLD + Proposed 0.2 KLD) of sewage will be generated from proposed activity. Generated sewage will be treated in package modular STP of 1 KLD. The treated water will be used for gardening purpose.
3	Land	Land use	Land is in Industrial Development area. It is under Industrial use.
4	Soil	Disposal of waste on the land Disposal of effluent on land	• All the solid waste will be disposed appropriately to avoid any soil contamination • Effluent will be treated and reused. • Industry shall adopt ZLD.
5	Noise	During Operation	Acoustic enclosure will be provided. Sound from the machineries or from other operation shall be restricted within plant boundary.
6	Ecology	Release of pollutant in environment	No impact on flora and fauna is envisaged.
7	Socioeconomic	Influx of people, settlement and resource utilization	Over all positive impact is envisaged. The Corporate Social Responsibility (CSR) activity by proponent will benefit the local people. Corporate Environment Responsibility (CER) Activity will be implemented

			during the construction phase (retrofitting and revamping).
8	Occupational Health and safety	Exposure to the Incinerator, Fire hazards and others	All safety measures and safety equipment's will be placed. PPEs will be provided to workers and associated staff

10. Site and Technology alternative Analysis

As the project is an expansion of existing industry, no alternatives have been considered. The existing site is located in the Wada Industrial Development Corporation, Hamrapur. Required infrastructure such as Water, Electricity, Roads, Solid Waste Disposal Facility, etc. are already provided by Corporation. Site is well connected to Palghar Manor Wada State Highway, Chhatrapati Shivaji Maharaj International Airport, Mumbai is within 68 km from site, Palghar Railway Station located at 20 kms away from project site. The site selected also has the following merits –

- Project site is already developed and the existing area is sufficient for the proposed expansion.
- Land use of the site is already earmarked as industrial use.
- Required infrastructure like road, transport, water, electricity, etc. are already available in the area.
- No resettlement & rehabilitation is involved.
- Site is easily accessible to local markets.

Matrix of Alternative site Analysis is given inn **Table 9** below whereas Technology alternatives is given in **Table 10** below.

Table 9: Matrix of Alternative Site Analysis.

Sr. No.	Site Selection Criteria	Existing Site
1	Non-Agricultural Land	✓
2	Project Approval by DISH	✓
3	Project Approval by State Pollution Control Board	✓
4	Project Approval by Local Body	✓
5	No R & R Issue	✓
6	Surrounding Industrial Development	✓
7	No Human Settlement- 500 meter	✓
8	Topography (Flat)	✓
9	Site Connectivity (Approach Road)	✓

10	Availability of Water (MIDC pipeline)	✓
11	No Notified Critically Polluted Area as per CPCB within 5 km radius	✓
12	No Archaeological Monuments within 7 km radius	✓
13	Availability of Electricity (MSEDCL)	✓
14	Availability of labour Force	✓
15	Availability of Local Market for finished products	✓

Table 10: Analysis of alternative technology

Sr. No.	Parameters	Indicator	Executed	Remark
i.	Process	Continuous / Batch	Batch	Batch is more suitable in terms continuous process. Because in batch process easy to control of water requirement, temperature, steam, reaction time. In continuous process there is peculiarity of maintaining all parameters continuously otherwise whole production will get disturbed.
ii.	Boiler Fuel Requirement	Less polluting	LPG / HSD	Conventional fuel like Coal contains 13.99 % ash and sulphur 0.5-8 % Hence use of coal put additional load on environment LPG contains negligible % ash, NOx & sulphur, as compared to coal it is cleaner fuel.
iii.	Cooling Tower	Natural Draft/ Forced Draft	Forced Draft	Site is having annual wind speed 8-12 m/s hence Induced draft square counter flow type cooling tower is proposed.
iv.	Waste Water Treatment Technology	Conventional/ ZLD	ZLD	Usually in synthetic organic industry, treated effluent by using conventional method; can't be used for irrigation/ gardening purpose. Hence, during expansion industry will be proposing ZLD scheme in which effluent will be treated in collection tank, primary treatment followed by evaporator to achieve Zero Liquid Discharge.

v.	Charging of Chemicals	Manually/ Automatic	Automatic	Manual charging of chemicals results in fugitive emission and it will be uncontrolled. Automatic charging from tank reduces fugitive emission loss.
vi.	Electrical Power	Conventional/ Solar	Solar	Solar power is selected for common area lights to reduce load on conventional source.

11. Environment Monitoring Plan

The regular monitoring of different environmental parameters is of immense importance in order to assess the present environment conditions as well as impacts of the proposed expansion on the environment. A proper monitoring program will be required in order to ensure effectiveness of implementation of suggested mitigation measures. The environmental monitoring will help in assessing the changes in environmental conditions by monitoring the effective implementation of mitigation measures, and measuring deteriorations in environmental quality for further preventive actions. Environmental Monitoring program during revamping and retrofitting phase is given in **Table 11** whereas Environmental Monitoring program for operation phase is given in **Table 12** below –

Table 11: Environmental Monitoring during Project – Construction Phase (Revamping and Retrofitting Phase)

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1.	Air	All equipment's to be operated within specified design Parameters.	Random checks of equipment's logs/manuals	Weekly
		Vehicle trips to be minimized to the extent possible	Vehicle logs	Weekly during site clearance and construction activities
		Maintenance of DG set emissions to meet stipulated standards	Gaseous emissions (SO_2, CO, NO_X)	Quarterly emission monitoring
		Ambient air quality within the premises of the unit to be monitored.	The ambient air quality will conform to the standards for PM_{10}, $PM_{2.5}$, SO_2, NO_X	As per CPCB/SPCB requirement or on monthly basis whichever is earlier
2.	Noise	List of all noise generating machinery onsite along with age to be prepared.	Equipment logs, noise readings.	Weekly during construction activities

		Equipment to be maintained in good working order.		
		Night working is to be minimized.	Working hour records.	Daily records
		Generation of vehicular noise	Maintenance of record of vehicles.	Daily records
		Noise to be monitored in outside as well as within the plant premises.	Spot noise recording.	As per CPCB/ SPCB requirement or on monthly basis whichever is earlier
3.	Wastewater Discharge	No untreated discharge is to be made to surface water, groundwater, or soil.	No discharge hoses shall be in the vicinity of the watercourse.	Monthly during construction activities.
4.	Soil	Soil sample to be taken near the area where retrofitting and revamping will be carried out.	Physical and chemical properties of soil	Monthly
5.	Drainage and Management	Ensure drainage system and specific design measures are working effectively. The design to incorporate existing drainage patterns and avoid disturbing the same.	Visual inspection of drainage and record thereof.	Weekly during construction activities
6.	Waste Management	Implement a waste management plan that identifies and characterizes every waste arising associated with proposed activities and which identifies the procedure for collection, handling, and disposal of each waste arising.	A comprehensive Waste Management plan should be in place and available for inspection on site. Compliance with MSW Rules,1998 and Hazardous Wastes (Management and Handling Rule)2003.	Fortnightly check during construction activities
7.	Non-routine events and accidental releases	Plan to be drawn up, considering likely emergencies and steps required to prevent/limit consequences.	Mock drills and records of the same.	Monthly during construction activities.

8.	Health	Employees and migrant labour health check-up.	All relevant parameters including HIV.	Six monthly check-ups.
9.	Environmental Management Cell/Unit	The Environmental Management Cell/Unit is to ensure implementation and monitoring of environmental safeguards.	Responsibilities and roles will be decided before the commencement of work.	During construction phase.

Table 12: Environmental Monitoring Schedule during Operation Phase

Sr. No.	Particulate	Parameters	Number of locations	Frequency
1.	Ambient air quality	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, VOC and HC	Ambient air quality at minimum 3 locations. 1 location within the plant premises, 1 location in upwind, 1 location in downwind direction, and 1 location in crosswind direction.	Monthly
2.	Stack	PM, SO_2, and NOx	Number of stacks	Monthly
3.	Workplace	$PM_{2.5}$, SO_2, NOx, CO, VOC	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
4.	Wastewater	pH, EC, SS, TDS, O & G, Ammoniacal Nitrogen, COD, BOD, Chloride, Sulphides, etc.	Wastewater from all sources. Inlet and outlet of primary treatment.	Monthly
5.	Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) and *E.Coli*	3-5 location Ground as well as Surface water in 1 km vicinity.	Half yearly
6.	Solid waste	Sludge from primary treatment, process sludge	Process dust generated sludge.	Monthly
7.	Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as	5 locations At all sources and outside the Plant area.	Monthly

		sensitive receptors in the vicinity		
8.	Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plants/ trees.	In and around the plant site.	Monthly
9.	Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	2-3 near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied.	Quarterly
10.	Occupational health	Health and fitness check-up of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year
11.	Drainage and effluent Management	Design to incorporate Existing drainage pattern and avoid disturbing the same.	Ensure drainage system and specific design measures are working effectively.	Periodic during operation phase
12.	Emergency preparedness, such as fire fighting	Mock drill records, on site emergency plan, evacuation plan	Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention.	Monthly during operation phase

12. Rehabilitation and resettlement plant

The proposed expansion is planned in the existing area at Plot No – 18, Sr. No. 123, Wada Industrial Development Corporation Hamrapur, Tal.- Wada, Dist.- Palghar, Maharashtra.

This project does not require the acquisition of other land relating to social settlement and will not affect any kind of social settlement, infrastructure, and establishment of society. Hence, there is no applicability of rehabilitation and resettlement.

13. Project Benefits

- Improvement in Physical infrastructure
- Improvement in Social infrastructure
- Employment generation
- Likely indirect employment opportunities
- The proposed project will generate an additional revenue to the local Gram panchayat.
- Additional taxes shall be paid to Government of Maharashtra.

- Availability of raw material to local manufacturing industry at reasonable costs which results in reduction of the cost of finished products.
- Increase in direct 15 nos. of employment indirect opportunities for development of ancillary business in the vicinity of the project.
- Many small businesses will induce such as Mess, Hotels, Tea Stall, Grocery Market, Vegetable Market, Automobile workshop etc.
- Marginal upliftment of living status will improve for villagers.
- Add on revenue to local transporter as per requirement.

As per the ministry's O.M No 22-65/2017-IA. II (M) dated 1st May, 2018, 1% of the expansion project investment, Rs. 3.41 Lakhs has been earmarked for Corporate Environmental Responsibility (CER) Activities. Details of budget is presented in Table 13 below -

Table 13: Details of CER Activity

Sr No.	CER activity	Details	Amount (Rs. In Lakh)
1	Solar Street Lights	20 nos. of Solar Street lights on the approach road to the industry at Rs. 10,000/- each	2
2	Free health camp	Health Camp at Hamrapur	0.5
3	RO Water filters	Providing 1 no. of RO Filters to High School, Hamrapur & ZP School, Khutall	1
	Total		**3.5**

14. Environment Management Plan

The EMP is,

- Prepared in accordance with rules and requirements of the MoEFCC and the State Pollution Control Board.
- Prepared to ensure that the component of facility is operated in accordance with the design.
- A process that confirms proper orientation through supervision and monitoring.
- A system that addresses public complaints during construction and operation phase.
- A plan that ensures remedial measures are implemented immediately.

The key benefits of the EMP are that, it provides the organization with means of managing its environmental performance thereby allowing it to contribute to improved environment quality. The other benefits include cost control and improved relation to stakeholders.

EMP includes four major element –

- Commitment and Policy: of proposed project will strive to provide and implement the Environmental Management Plan that incorporates all issues related to air, land and water.
- Planning: This includes identification of environmental impacts, legal requirements and setting environmental objectives.

- Implementation: This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken
- Measurement and Evaluation: This includes monitoring, corrective actions, and record keeping.

During study of the environmental attributes, it was seen that all the aspects would be considered to promote the better development in case of future aspects of project as well as environmental aspects.

14.1 Environment Management Plan during Construction Phase (Retrofitting and Revamping)

The expansion involves revamping and retrofitting of the existing industries. No additional construction is envisaged. Hence no major impacts are predicted. However, some of the mitigation measures which will be implemented during the retrofitting and revamping of machinery are –

- Retrofitting and revamping will be carried out on concrete impervious surface to avoid seepage of oil or lubricant in the soil.
- Separate area will be earmarked for storage of solid wastes generated while hazardous wastes will be stored in existing covered area earmarked for the purpose.
- PPE's will be provided to workers.
- Temporary arrangement of clean drinking water will be provided for workers
- Toilet facility is already existing which will be used by the construction personnel.
- Generated sewage of 0.4 KLD will be led down to existing Septic Tank and Soak Pit.
- Provision of PPE (dust masks, goggles) for onsite workers.
- Periodic water sprinkling in dust prone areas.

14.2 Environment Management Plan for Operation Phase

Factory proposes comprehensive environment management plan to combat pollution arising from the project activities. Detailed EMP is described below for various environmental parameters. EMP for operation phase is given in Table 14 below –

Table 14: EMP during Operation Phase

Sr. No	Aspects	Source & Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Audit/ Monitoring/ External Reporting	Cost (Rs. In Lakh)
1.	Air Emission	Source: Fugitive emission from production process Emission from hot oil unit Emergency operation of DG Sets Emission from vehicular movement Dust emission from dusty road Impact: Increase in NOx, Sox, PM concentration	• No emissions are envisaged from 2 nos. of Thermic Fluid heater of capacity 4lakh kCal/hr and 2 Lakh kCal/hr are fuel used will be LPG. However, thermic fluid heaters will be provided with one common stack of height 30 m for better dilution and dispersion of pollutants. • DG Set will be provided with stack height of 4 m above roof for better dilution and dispersion of pollutants. • Good housekeeping will be maintained within plant premises. • All vehicles shall be maintained in good working condition with PUC. • Internal Tar Roads are already constructed. • Existing Green Belt will be strengthened in and along the plant boundary.	Review of status of implementation of suggested mitigation measures Monitoring provision for flue gases emitting from process & Utilities. Six monthly/as per Consent condition requirement for monitoring of stack emissions through MoEF recognized external laboratory	EHS	EHS Manager to review Emission results of monitoring Results of manual samples collected from process emissions stack by external laboratory Ensure compliance of conditions of Consent to Operate issued under Air Act; Annual renewals of CTO;	1
2.	Water Use	Source:					20

		Run off storm water Runoff water from toilets Impact: Impact on ground water	• Project has planned use of water from local authorised vendors • Provision of 2 no. of rainwater harvesting tanks together with storage of water for re-use. • Sufficient recharge to be made annually to minimize impact on groundwater.	Review of status of implementation of suggested mitigation measures	Facility Manager	Six monthly reviews of reporting by Facility Manager	
3.	Wastewater generation	Source: Discharge of untreated sewage & effluent Impact: Ground water pollution and increase in soil alkalinity	• 0.7 KLD (Existing 0.5 KLD + Proposed 0.2 KLD) of sewage will be generated from proposed activity. Generated sewage will be treated in package modular STP of 1 KLD. The treated water will be used for gardening purpose. • The total effluent generated is 15.6 (Existing 2.8 KLD + Proposed 12.8 KLD) which will be treated collection tank, primary treatment followed by evaporator to achieve Zero Liquid Discharge. • Efforts should be taken towards treated wastewater quality to achieve land irrigation parameters prescribed in SCHEDULE –VI, The Environment (Protection) Rules, 1986 • Online Monitoring system will be installed to check the inlet and outlet parameters of primary treatment.	Review of status of implementation of suggested mitigation measures Daily monitoring of essential parameters to be done in house. Six monthly monitoring of treated effluent quality through external laboratory	EHS officer & Facility Manager	Facility Manager to Daily review of log books Review of results of essential parameters and results of monthly collected treated water samples by external laboratory Ensure compliance of conditions of Consent to Operate issued under Water Act Annual renewals of CTO; Six monthly monitoring of treated effluent.	50

			• Maintaining good housekeeping in all the units so that wastewater generation is minimized; • Regular maintenance of primary treatment system to avoid clogging • Treated waste water monitoring will be carried out to ensure compliance.				
4.	Solid Waste generation (Hazardous & Non-hazardous)	Source: Hazardous waste generation from chemical product manufacturing Sludge from primary treatment Salts from Evaporator Non-hazardous waste from industrial & dometisc activity Impact: Ground water pollution Soil contamination	• Demarcated area is provided for hazardous as well as no-hazardous solid waste • Hazardous waste mainly Chemical residue, discarded containers, etc. will be sent to the CHWTSDF. • Other hazardous waste like Spent Oil/ used waste, Spent Solvents will be disposed off through authorized recycler/reprocessor. • Implementing waste management plan delineated for Operation Phase • Non-hazardous waste wooden material, Glass scrap, Plastic scrap & Kachra, paper wastes, e-waste is sold to authorized vendor. • Waste bins 15 nos. to be provided all across the project site; • Arrangement for regular collection of waste.	Review of status of implementation of suggested mitigation measures Monthly review of non-hazardous and hazardous waste generated from the project Review conditions of storage location and records related to hazardous wastes as per the conditions of authorization Maintain records on disposal of hazardous wastes	Facility Manager	Facility Manager to monthly review of waste logs Also, EHS Manager to ensure compliance of conditions of authorization or annual filing of hazardous wastes returns.	5

		Sanitation and Hygiene problem plant processes and	• The sheds and all the contents of the storage bins/drums are clearly marked and identified for their hazards. • Hazardous material, will be kept in isolated area located away from the active working zone. • Regular maintenance of machineries will be carried out and proper care will be taken while loading, unloading and transfer of materials to avoid any soil contamination. • The entire plant area flooring will be made up of concrete except open ground cover for greenbelt development. It will prevent any seepage and leakage into sub soil surface. • Proper collection, handling and transfer of effluent will be done to prevent / avoid any seepages and leakages. • The unit will provide an adequate designated area for the hazardous waste storage within premises having impervious floor and roof cover with leachate collection system. In case of any accidental spillage, it will be collected and sent to CHWTSDF. Thus, chances				

			of contamination of soil due to the storage of hazardous waste will be minimized and prevented. • The hazardous waste generated will be stored and handled as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.				
5.	Ambient Noise	Source: Increase in noise from process reactor, cooling tower, transfer pumps, DG set etc. Movement of vehicles inside the project site Impact: It will affect occupational Health & Safety	• Low noise generating equipment and working methods for the production unit shall be selected to reduce noise generation in plant areas. • Acoustic enclosures will be provided for high noise generating machineries • Provision of ear protection equipment (earplug/ earmuff) for activities that are likely to create noise in excess of 75 dB (A) to protect workers' health and safety. • Undertake in-plant audit to identify high noise level generating equipment • Preventive maintenance including regular lubrication of machineries and equipment to reduce noise level. • Regular noise monitoring shall be done as per environment monitoring plan chapter 6	Review of status of implementation of suggested mitigation measures Ambient noise monitoring along the plant periphery to be done through external laboratory on six monthly basis.	EHS	Six monthly review by EHS Manager Six monthly monitoring of ambient noise	1

			• The impacts of noise on occupational health would be mitigated by proper shift timing & annual audiological check-up of concern employees. Workers showing hearing loss, if any, will be shifted to other less noisy areas. • Existing Greenbelt development along the boundary of premises shall be strengthened.				
6.	Socio – Economic	Source: Employment Impact: There will be positive impact	Preference to be given to the local candidate as per educational qualification during recruitment	Review status of implementation of planned CSR activities	HR Head	Quarterly as per requirement	--
7.	House Keeping	Source: Operational activity Impact: Aesthetics blockage of storm water drain & Rain Water harvesting tank	• System to upkeep housekeeping and general cleanliness by providing adequate manpower. • Maintain clean curb cuts to avoid soil and vegetation build up, Green belt and landscape maintenance. • Inspections of drains and area surrounding cooling tower to check any water logging situation.	Review of status of implementation of suggested mitigation measures	Facility Manager	Fortnightly review of by Facility Manager	--
8.	Energy	Utilization of non-renewal resources Heat gain in the building	• Provision of renewable energy to be used for street lighting. • LED have been used for internal lighting which helps save energy.	Review of status of implementation of suggested mitigation measures	Facility Manager	Six monthly review by Facility Manager	20

9.	EHS including associated risks of flammables	Source: Fire, Explosion, accident Impact: Health hazards, Damage to property	• The industry will adopt high standards, controls, mitigation measures to control risks associated with fire. • The industry will adopt stringent world class emission standards employed and equipment's installed which would ensure that any additional risks of are mitigated. • Following risk mitigation measures are adopted: • Proper marking is made for identification of locations of flammable storages; • Proper system for collection and disposal of domestic and hazardous waste; • All the required safety measures (working guideline, use of personal protective equipment like gloves, helmets, earmuffs, safety belts etc. for any repair and maintenance work within the proposed facility have been provided; • For safety of people occupying the building, regulations concerning fire safety are followed.	Review of status of implementation of suggested mitigation measures	EHS Manager	Six monthly review by EHS Manager	5

			• Earthing has been done in Hazardous Waste Storage area as well as Raw Material Storage area. • Some of the requirements are: • Installation of fire extinguishers all over the building, • Risk assessment study will be carried out to minimize potential risks by implementing suggested risk mitigation measures • Flammable gas detector – for high pressure cylinders and liquefied/dissolved gases • Emergency Response Plan will be periodically updated. The Plan will set out procedures and measures to be taken to deal with an on-site emergency such as fire, explosion, gas leak, odour or other incident threatening safety & integrity of the company. • This plan will be reviewed and amended when needed to ensure that all parties concerned are informed with up-to-date information. • The Site Operations Manager shall carry out exercises of part of the Emergency Response Plan at a regular interval as deemed necessary.				

			• The lesson learnt from these exercises shall be documented and used during the updating of the Emergency Response Plan. • Provision of water hydrants in operative conditions. • Emergency exit. • Proper labelling of exit and place of the protective system installation. • Conducting mock drills. • Trained personnel to use the fire control systems. • Display of emergency evacuation maps in each floor. • Regular training and awareness programs to be conducted for people as per training modules formulated by the management for efficient control and management of environmental, safety and health related issues.				
10.	Disaster Management	Source: Risk of damage due to fire, natural disaster and other emergency situations	• During operation phase, potential risks include accidental fire, electrical shock, fall hazards by working at height, physical injury, mechanical failure, vehicular hazards etc.	Review of status of implementation of suggested mitigation measures	EHS Manager Security In charge	Six monthly reviews by EHS Manager and Security In charge	

		Impact: Loss of life, damage to property, financial loss to company	• These risks will be minimised by periodical operation and maintenance of equipment and periodical supervision by operation team. • Ensure adequate Fire Fighting system • established onsite prior to commissioning of the Project as per the Fire Fighting Plan covering following aspects: • Fire Prevention Measure and Systems Signage • Fire Detection & alarm System • Fire Fighting System and devices • Annually, update Emergency Response Plan and ensure organization available for its implementation.				
11.	Project Related Traffic	Potential Congestion on the approach roads	• The company has provided a separate area for parking space. • Drop off zone for the people coming by buses, clearly identified for easy accesses to respective work areas will be provided. • The vehicles bringing utility raw materials are regulated and managed by the project in such a way that the impact during peak hours of traffic remains minimum.	Review of status of implementation of suggested mitigation measures	Facility Manager	Weekly review and reporting by PMC and Monthly review by the staff related to function.	

			• Ensure well defined follow up of Vehicle Circulation Plan. • Internal roads are provided with adequate signage to maintain smooth flow of different type of Project related traffic. • Separate pedestrian pathways. • Employees will be encouraged to pool their vehicles plying on roads.				

14.3 Implementation of EMP

Environmental Health and Safety (EHS) Department of M/s Morex Industries (Pvt) Ltd. will take the overall responsibility for co-ordination of the actions required for environmental management and mitigation and for monitoring the progress of the proposed management plans and actions to be implemented for the project. An Environment Management System (EMS) would be set-up which identifies legal requirement, analyses aspect-impact, sets objective, targets and programs, prepares action plans, roles & responsibilities, monitors the progress of these plans and incorporates corrective action required if any.

The implementation mainly comprises of resources available to the project proponent, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken. It is proposed to create Environment Management Cell under EHS Manager for effective implementation of EMP. The Cell will have following functions:

- To implement the environmental management plan,
- To assure regulatory compliance with all relevant rules and regulations,
- To ensure regular operation and maintenance of pollution control devices,
- To minimize environmental impacts of operations as by strict adherence to the EMP,
- To initiate environmental monitoring as per approved schedule.
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit.
- Maintain environmental related records; and
- Coordination with regulatory agencies, external consultants, monitoring laboratories.

The schematic organizational set up of Environment Management Cell for operation phase is given in **Figure 6.**

Figure 6: Environment Monitoring Cell

14.4 EMP Review and Amendments

The EMP acts as an environmental management tool that needs to be reviewed periodically to address changes in the organization, process, or regulatory requirements. Following a review, EHS Manager will be responsible for making the amendments in the EMP and seeking approval from the senior management. The amended EMP will be communicated to all related staff. EHS Manager will ensure that the training needs are identified and conducted.

Training needs will be identified based on the specific requirements of EMP and the capacity of site and project personnel to undertake the required EMP management actions and monitoring activities. Also, general environmental awareness will be created among the project's team to encourage the implementation of environmentally sound practices and compliance requirements of the project activities. This will help in minimizing adverse environmental impacts, compliance with the applicable regulations and standards, and achieving performance beyond compliance.

15. Environment Management Cost

The total cost of the project is estimated about Rs. 7.88 Cr. The project cost estimates include land and land development, civil, building structure, plant and machinery, other expenses, contingencies @2% on building, plant and machinery, margin money of working capital. Environment management cost for construction phase will be Rs.1 Lakh per month whereas for operation phase capital cost will be around Rs. 100 Lakhs per year and recurring cost will be Rs 30 Lakhs per year. The details of EMP cost are given in Table 15 and Table 16 below –

Table 15: Environment Management Cost during Construction Phase

Sr. No.	Component	Description	Cost Rs. Per month
1.	Noise pollution control	Noise Level Monitoring	₹. 10,000
2.	Environmental Monitoring and Management	Ambient air monitoring, work place monitoring from MoEF approved lab on monthly basis.	₹. 20,000
3.	Occupational Health and Others	Medical check of staff from certified surgeon	₹. 20,000
4.	Solid & Hazardous Waste Management	Disposal of Municipal Solid Waste and Industrial Construction Waste	₹. 30,000
5.	PPE'S	Personal Protective Equipment's	₹. 20,000
Total			**₹. 1,00,000**

Table 12: Environment Management Cost during Operation Phase

Sr. No.	Operation Phase (with Break-up)	Capital Cost (Amount in lakhs)	O&M (Annual) (Amount in lakhs)
1	Evaporator	45	2
2	Modular STP of 1 KLD	5	2
3	Environmental Monitoring (Air, water, waste water, Soil, Solid waste, Noise)	0	5
4	Occupation health	5	3
5	Green belt (Already Existing; Strengthening will be done)	5	3
6	Solid waste Management	0	5
7	Rain water harvesting	20	5
8	Solar Power	20	5
	Total	**100**	**30**

16. Conclusion

Considering the potential impacts of the proposed project, Morex Industries has prepared adequate remedial measures and an Environmental Management Plan for their implementation. Overall, the proposed project will generate direct and indirect employment opportunities as well as increase in physical resources. Similarly, Morex Industries has planned to implement various activities under the Companies Act such as rain water harvesting, solar lights, green belt development etc. which will result in positive effects from the project site to the surrounding area and create a thriving environment. It can be concluded that strict adherence to mitigation measures during the construction and operational phases will result in negligible impact on the environment.