

# EXECUTIVE SUMMARY OF EIA REPORT

Proposed Demo scale 2G Integrated Bioethanol Project

5 (g) Category – B1

At

Plot No. E- 14, Additional Kadegaon-Shivajinagar  
MIDC, Taluka- Kadegaon,  
District- Sangli, Maharashtra- 415304

By

M/s. Lignopura Agrotech Pvt. Ltd.

**Environmental Consultant**



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NABET/EIA/23-26/IA 0130 (Valid till Dec 08, 2026) Certified Organization

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**Environmental Monitoring Lab**

**EHS Matrix Pvt. Ltd.**

(NABL certificate Number:TC-9009, Validity Date:05-12-2024)

**Baseline period -**

**1<sup>st</sup> March 2024 to 31<sup>st</sup> May 2024**

## Contents

1. Introduction.....	1
2. Purpose of the report.....	1
3. Identification of Project and Project Proponent.....	2
4. Location of the Project.....	2
5. Nature and Size of the Project.....	6
6. Land Details.....	6
7. Project Description with Project Details.....	7
7.1 Process Details.....	9
8. Description of the Environment.....	13
9. Potential Impacts and Remedial Plans.....	16
9.1 Prediction of Impacts during Construction Phase.....	17
9.2 Prediction of impacts during operational phase.....	19
10. Site and Technology Alternative Analysis.....	20
11. Environment Monitoring Plan.....	21
12. Rehabilitation And Resettlement Plan.....	25
13. Project Benefits.....	25
14. Environment Management Plan.....	27
14.1 Environment Management Plan during Construction Phase.....	27
14.2 Environment Management Plan for Operation Phase.....	39
14.3 Implementation of EMP.....	58
14.4 EMP Review and Amendments.....	58
15. Environment Management Cost.....	59
16. Conclusion.....	60

## 1. Introduction

Lignopura Agrotech Pvt. Ltd. (herein referred to as industry) is a R&D driven company which has a major focus on the development of economically viable advanced green technologies for processing of renewable lignocellulosic biomass into value added products such as pulp, lignin, biofuel, and chemicals. Lignopura has developed indigenous non-catalytic patented Lignopura® technology for delignification of lignocellulosic biomass and effectively separated cellulose, lignin and hemicellulose in pure form. Lignopura® technology is capable of handling all types of lignocellulosic raw materials such as hardwood, softwood, agricultural, herbaceous & forestry biomass (e.g. bagasse, straw, corn stover, grasses, etc).

M/s. Lignopura Agrotech Pvt. Ltd. has proposed to install Demo Scale Integrated 2G Bioethanol plant at Additonal Kadegaon-Shivajinagar MIDC, Maharashtra- 415304. Lignopura has acquired around 8765.00 sq.m. plot from Maharashtra Industrial Development Corporation on long term lease in Additional Kadegaon-Shivajinagar Industrial Area. The estimated production capacity of the project is Bioethanol – 1.85 KLD, Lignin – 0.81 TPD and Carbon dioxide – 1.37 TPD and Bio- compost – 0.74 TPD. The total project cost for the Proposed Installation of Demo Scale Integrated 2G Bioethanol Plant is around Rs. 2660 Lakhs towards land cost, production blocks, facility for utility, ZLD system and working capital.

Lignopura technology is a patented, acid-base free, non-catalytic green technology with recyclable solvents, having highest efficiency to produce Sulphur-free, pure and native form of cellulose, lignin and hemicellulose from abundantly available renewable biomass, bagasse. These purest forms of products are easier to convert into value added chemicals at higher conversion with superior yield.

The proposed project will utilize 5 TPD bagasse for production of 1.85 KLD Ethanol, 0.81 TPD Lignin, 1.37 TPD Carbon dioxide, 0.74 TPD Bio-compost. The complete process is divided into three different sections based on the process steps as (1) Bagasse Pretreatment (2) Saccharification and Fermentation (3) Bioethanol separation and purification. Figure 6 represent the main process outline. Ancillary sections like utilities (thermic fluid/power/water/gases), Biogas system and finished product storage. Zero-liquid discharge is also designed for the proposed plant.

## 2. Purpose of the report

The main purpose of the Environmental Impact Assessment (EIA) Report for the proposed demo-scale 2G integrated bioethanol project by M/s. Lignopura Agrotech Pvt. Ltd. at Plot No. E-14, Additional Kadegaon-Shivajinagar MIDC, Taluka- Kadegaon, District- Sangli, Maharashtra-415304 is to provide a concise overview of the project's objectives, significance, and anticipated impacts. The report outlines how the project will utilize agricultural residues, such as sugarcane bagasse, to produce fuel-grade ethanol, thereby supporting national goals like the Ethanol Blending Petrol (EBP) Programme. It emphasizes the environmental benefits, including reduced greenhouse gas emissions and effective waste management, and underscores the project's role in enhancing energy security through the utilization of local biomass

resources. By summarizing these key aspects, the report aims to acquire support, facilitate informed decision-making, and showcase the project as a model for innovative, sustainable practices that can benefit both the economy and the environment.

As per the provisions of the Environmental Impact Assessment (EIA) Notification 2006 and its subsequent amendment, the project will be appraised for environmental clearance from MOEFCC under Activity 5(g) – Distilleries. The project falls under Category B1 and will be appraised by the State Expert Appraisal Committee, Maharashtra.

### 3. Identification of Project and Project Proponent

Lignopura Agrotech Pvt. Ltd. is a start-up company established in 2016. Researchers associated with this start-up have versatile backgrounds such as Chemical Engineering, Mechanical Engineering, Process Equipment Design, Modelling & Simulations, Process Scale-up and Development, Polymer Science, Plant Operations, etc. Agricultural background of every individual associated with this start-up has an ultimate goal to uplift the overall agricultural ecosystem with the help of technical and industrial know-how. Chief Executive Officer of the industry Dr. Lalaso V. Mohite and team has an average 15 years of experience in local as well as global R&D, chemical and mechanical industry, etc.

Lignopura Agrotech Pvt. Ltd. is a R&D driven company which has a major focus on the development of economically viable advanced green technologies for processing of renewable lignocellulosic biomass (bagasse type) into value added products such as biofuel, lignin, and chemicals. The company has developed indigenous, acid-base free, non-catalytic patented Lignopura® technology for delignification of lignocellulosic biomass and effectively separated cellulose, lignin and hemicellulose in pure form. These purest forms of products are easier to convert into value added chemicals such as Bioethanol, Lignin and Carbon dioxide at higher conversion with superior yield.

### 4. Location of the Project

Proposed project is located at Additional Kadegaon-Shivajinagar MIDC, Maharashtra-415304. The total plot area of the proposed project is 8765.00 Sq.m. Notably, the land is secured on lease, with a pre-existing shed from a former textile industry occupying a portion of the plot. Despite this, ample space is available for project development, with a generous six-meter side margin ensuring adequate buffer zones. On the northern and western side of the industry MIDC plot boundary is present, on the eastern side the industry is surrounded by Plot no E15/1 & E15/2, whereas on the southern side there is plot no E13 and rehabilitation land. Geographical coordinates of the industry are 17°18'30.43"N Latitude and 74°18'32.84"E Longitude. Shivajinagar Village is located at a distance of approximately 1.51 km in North East direction. Environmental setting around the site is summarized in **Table 1** which includes key details such as nearest IMD station which is Sangli Miraj Kupwad IMD station, the nearest town is Karad, and the nearest airport is Kolhapur Airport. Additionally, the area is characterized by the presence of water bodies including Nandani River, Tembhu canal, Shindenagar reservoir. **Figure 1** shows index map

of the project site whereas Google Imagery with corner co-ordinates is depicted in **Figure 2**. Topographical features of project site are presented in **Figure -3**.

**Table 1: Environmental Setting around the project site**

Sr. No.	Particulates	Description
1.	Project Location – Geographical Coordinates	Point 1- 17°18'31.38"N, 74°18'34.94"E Point 2- 17°18'28.79"N, 74°18'33.93"E Point 3- 17°18'29.77"N, 74°18'30.55"E Point 4- 17°18'31.44"N, 74°18'30.92"E
2.	Toposheet number	47K/03, 47K/04, 47K/07, 47K/08
3.	Nearest IMD station	Sangli Miraj Kupwad IMD at 57.46 km in South direction
4.	Nearest Town	Karad at 14 km in South west direction
5.	Nearest Airport	Kolhapur Airport at 73.52 km in South West Direction
6.	Nearest Railway station	Karad railway station at 9.90 km in West direction
7.	Nearest Highway	National Highway 166 E i.e., Karad-Atpadi Road
8.	Nearest Village	Shivajinagar at 1.51 km in North East direction
9.	Nearest densely populated area	Karad at 14 km in South west direction
10.	No. of Villages in 10 km	38
11.	Nearest Waterbody	1.Tembhu Canal 2.02 km in NW Direction 2.Water reservoir near Shivajinagar at 1.52 km in North West direction 3.Nandani River at 2.57 km in South East direction 4.Water reservoir near Shindenagar at 2.48 km in South East direction
12.	Eco-sensitive area	No Eco-sensitive Area is located within 10km of project site.
13.	Average Annual rainfall (mm)	701.8
14.	Temperature	13-40°C
15.	Humidity	07 - 97%
16.	Wind Direction	West and North West
17.	Soil Type	Medium black to deep black soil and Lateritic soil
18.	Reserve Forest	No Reserve Forest Area is located within 10km of project site.

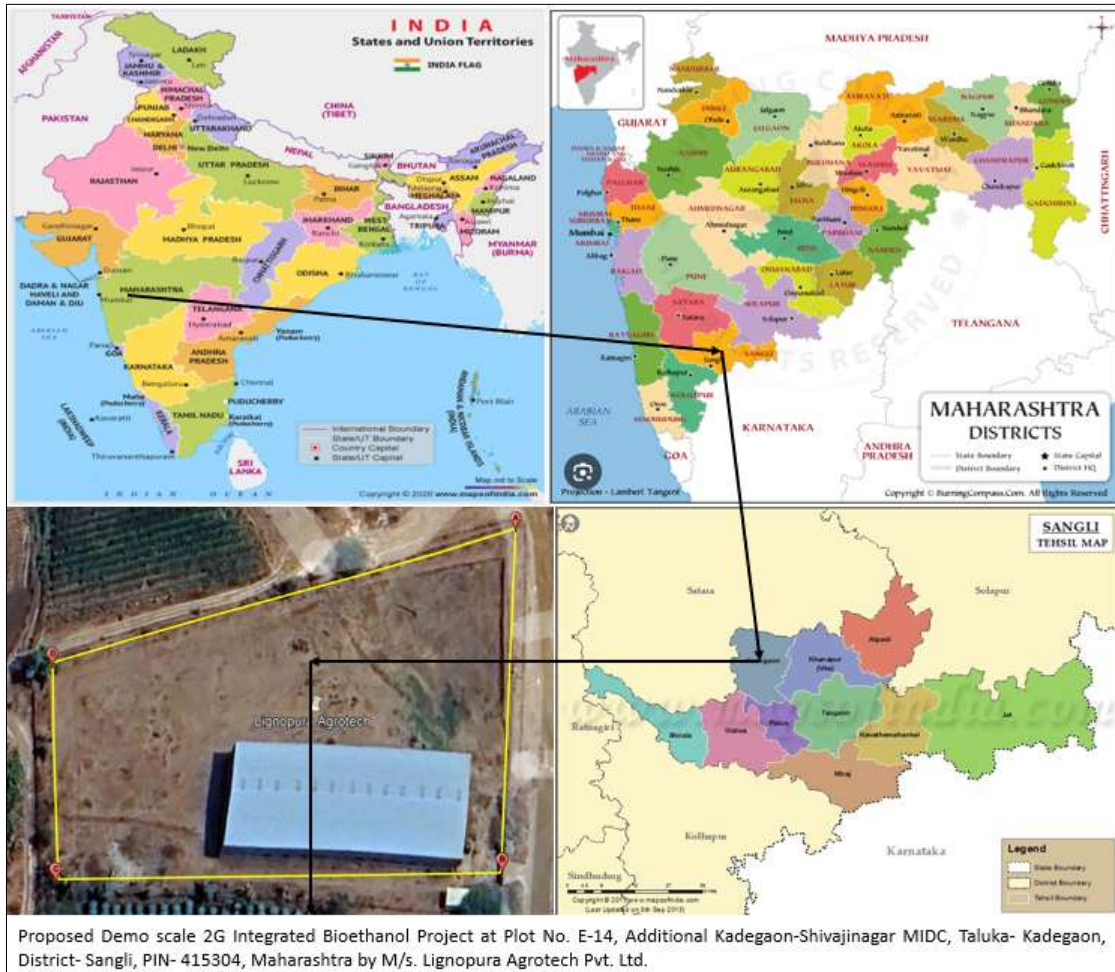


Figure 1: Index Map of Project Site



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



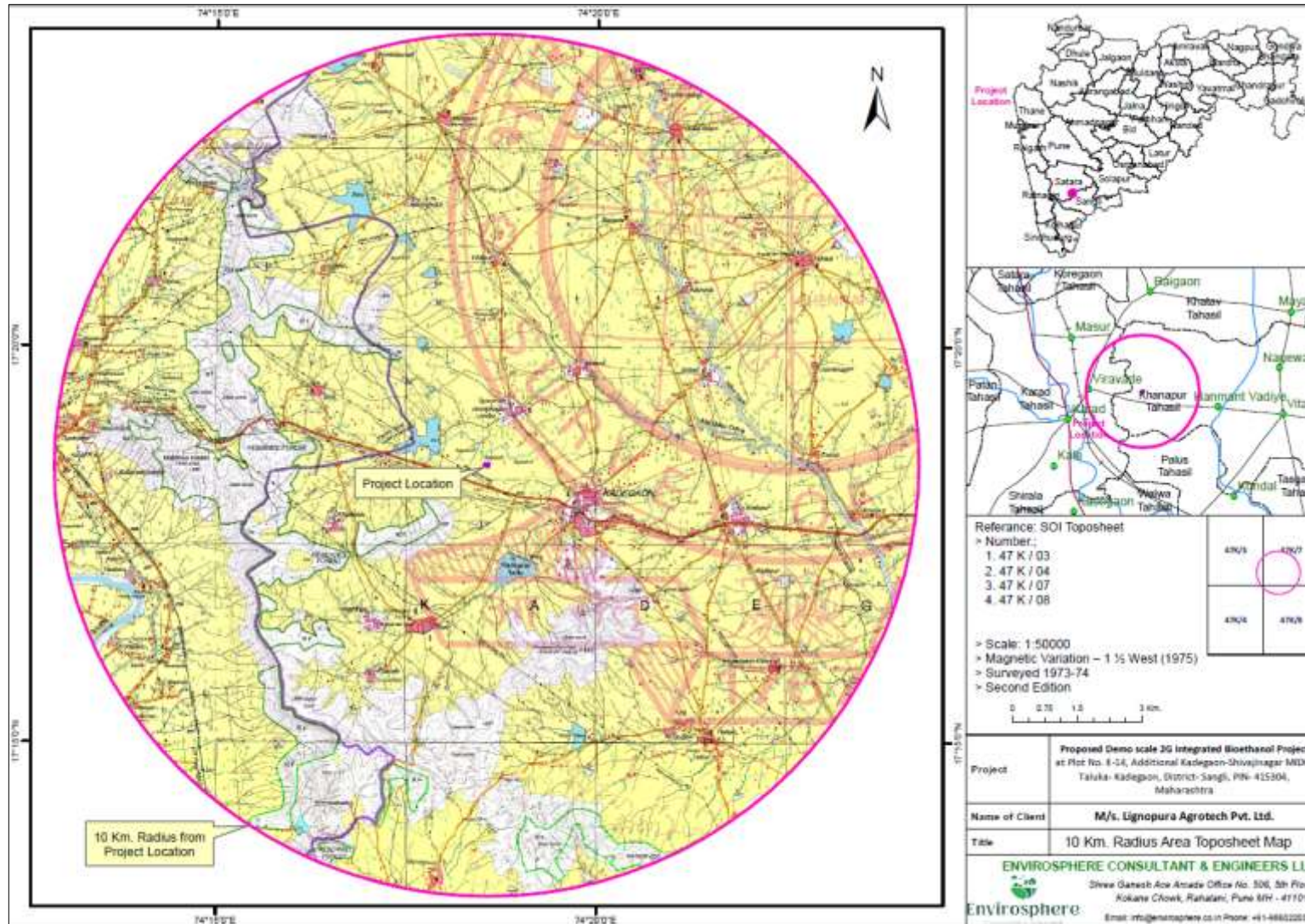


Figure 3: Project Location with 10 km radius study area shown on SOI Toposheet

## 5. Nature and Size of the Project

As per Environmental Impact Assessment (EIA) Notification 2006 and its subsequent amendment, the project will be appraised for environmental clearance from MOEFCC under Activity 5(g) – Distilleries. The project falls under Category B1 and will be appraised by the State Expert Appraisal Committee.

M/s. Lignopura Agrotech Pvt. Ltd. has proposed to install Demo Scale Integrated 2G Bioethanol plant at Additional Kadegaon-Shivajinagar MIDC, Maharashtra- 415304. Lignopura has acquired around 8765 sq.m. plot from Maharashtra Industrial Development Corporation on long term lease in Additional Kadegaon-Shivajinagar Industrial Area. The estimated production capacity of the project is Bioethanol – 1.85 KLD, Lignin – 0.81 TPD and Carbon dioxide – 1.37 TPD and Bio- compost – 0.74 TPD. The total project cost for the Proposed Installation of Demo Scale Integrated 2G Bioethanol Plant is around Rs. 2660 Lakhs towards land cost, production blocks, facility for utility, ZLD system and working capital.

**Table 2: List of Products**

Sr. No	Name of Product	Production Quantity
1	Ethanol	1.85 KLD
2	Lignin	0.81 TPD
3	Carbon Dioxide	1.37 TPD
4	Bio Compost	0.74 TPD

## 6. Land Details

Proposed project is located at Additional Kadegaon-Shivajinagar MIDC, Maharashtra-415304. The total plot area of the proposed project is 8765.00 Sq.M. Detailed area bifurcation is given in **Table 3**. The plant layout with production area, utilities, green belt area has been shown in **Figure 4** below-

**Table 3: Project Area Details**

Sr. No.	Particulars	Area in Sq. M.	On Site %
1	Area of Plot	8765.00	--
2	Existing Shed built up area	2133.00	--
3	Proposed built up area	2663.00	--
4	Total BUA Area	4796.00	--
5	Total Green Belt Area	3040.00	34.68%
6	Parking Area	580.00	6.62%
7	Open Area	565.00	6.45%
8	Internal Road Area	1447.00	16.51%
9	Ground Coverage Area	3133.00	35.74%





Figure 4: Master Layout Plan

### 7. Project Description with Project Details

Project information brief is given in Table 4 below –

Table 4: Project Details

Sr. No.	Particulars	Details																	
1	Ownership of land	The non-agricultural land is owned by M/s. Lignopura Agrotech Pvt. Ltd.																	
2	Type/Category	5(g), Category “B1”																	
3	Production details	Bioethanol – 1.85 KLD, Lignin – 0.81 TPD and Carbon dioxide – 1.37 TPD and Bio- compost – 0.74 TPD.																	
4	Water Consumption	63.1 CMD (Fresh 26.1 CMD + Recycled 37.0 CMD) Source - MIDC <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Sr. No.</th> <th rowspan="2">Particulars</th> <th colspan="3">Water Requirement – (CMD)</th> <th rowspan="2">Loss (CMD)</th> <th rowspan="2">Effluent Generation (CMD)</th> </tr> <tr> <th>Fresh</th> <th>Recycle</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Process</td> <td>12.0</td> <td>20.8</td> <td>32.8</td> <td>0</td> <td>17.6</td> </tr> </tbody> </table>	Sr. No.	Particulars	Water Requirement – (CMD)			Loss (CMD)	Effluent Generation (CMD)	Fresh	Recycle	Total	1	Process	12.0	20.8	32.8	0	17.6
Sr. No.	Particulars	Water Requirement – (CMD)			Loss (CMD)	Effluent Generation (CMD)													
		Fresh	Recycle	Total															
1	Process	12.0	20.8	32.8	0	17.6													

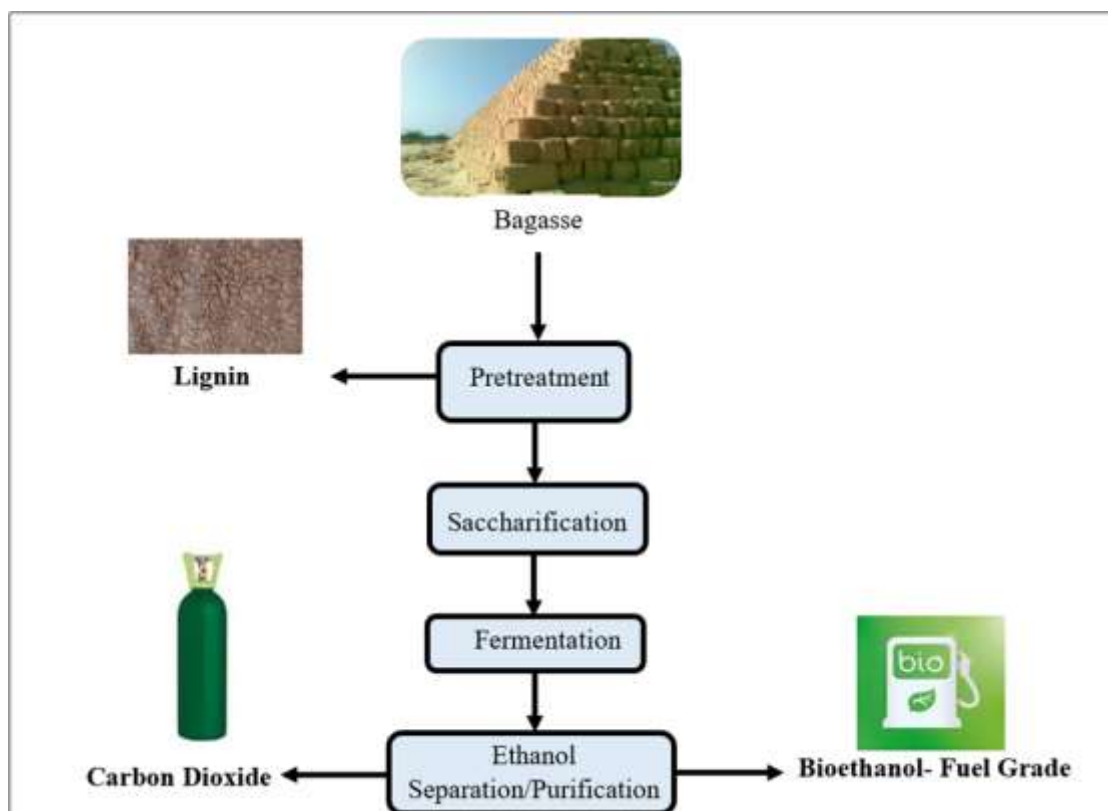
		2	Cooling towers	2.4	15.0	17.4	14.4	3.0
		3	Domestic	1.6	0	1.6	0.2	1.4
		4	Gardening	10.1	1.2	11.3	11.3	0
			<b>Gross Total</b>	<b>26.1</b>	<b>37.0</b>	<b>63.1</b>	<b>25.9</b>	<b>22.0</b>
5	Wastewater generation	Sewage		0.8 CMD - Construction Phase 1.4 CMD – Operation Phase.				
		Effluent		20.6 CMD				
6	Wastewater Treatment Facility	Sewage		Construction Phase - Package STP of 1 CMD Operation Phase- Generated wastewater of 1.4 CMD will be stored in a septic tank before undergoing further treatment in an Effluent Treatment Plant (ETP).				
		Effluent		Operation Phase - The total trade effluent generated will be of 20.6 CMD which will be treated in Biological ETP of capacity 25 CMD. The trade effluent will be treated by Primary, Secondary & tertiary treatment followed by MEE to adopt ZLD. The 15 CMD of recycled water from the ETP will be used in the cooling tower, and the remaining 5.6 CMD recycle reject with ETP sludge will be treated in biogas digester.				
7	Stack Details	Stack Attached to		Stack height				
		1 no. of DG set of 75 KVA		8 m				
		1 No. Thermic Fluid Heater		30 m				
8	Fuel	HSD / CNG – 19 lit/hr (75 KVA DG set) CNG – 42 m <sup>3</sup> /hr (Thermic Fluid Heater 3,00,000 kcal/hr)						
9	Air Emissions	DG sets are expected to emit PM, SO <sub>2</sub> , and NO <sub>x</sub> , and will be provided with an 8m stack height for dilution and dispersion. CNG will be utilized as fuel for the thermic fluid heater, resulting in minimal emissions. However, to ensure effective dispersion of exhaust gases, a stack height of 30 meters is planned.						
10	Power Requirement	Construction Phase- 10 kW Operation Phase-Demand Load- 200 kW						
11	Manpower	During Construction Phase – 20 nos. Operation Phase – 35 nos.						
12	Project Cost	Rs. 2660 Lakhs						
13	EMP Cost	<b>Construction Phase – Capital Cost - Rs. 7.68 Lakhs</b>						

		<b>Operation Phase –</b> Capital Cost – Rs. 396.2 lakhs Recurring Cost – Rs. 93.8 lakhs/Year
14	CER Cost	Rs. 53.20 Lakhs (2% of total project cost)

## 7.1 Process Details

Lignopura technology is a patented, acid-base free, non-catalytic green technology with recyclable solvents, having highest efficiency to produce Sulphur-free, pure and native form of cellulose, lignin and hemicellulose from abundantly available renewable biomass, bagasse. These purest forms of products are easier to convert into value added chemicals at higher conversion with superior yield.

The proposed project is demo scale plant of 5 TPD bagasse processing for production of 1.85 KLD Ethanol, 0.81 TPD Lignin, 1.37 TPD Carbon dioxide and 0.74 TPD Bio-compost. The complete process is divided into three different sections based on the process steps as Bagasse Pretreatment, Saccharification and Fermentation, Bioethanol separation and purification. **Figure 5** represent the main process outline. Ancillary sections like utilities (thermic fluid/power/water/gases), Biogas system and finished product storage. Zero-liquid discharge is also designed for the proposed plant.



**Figure 5: Process Flowchart**

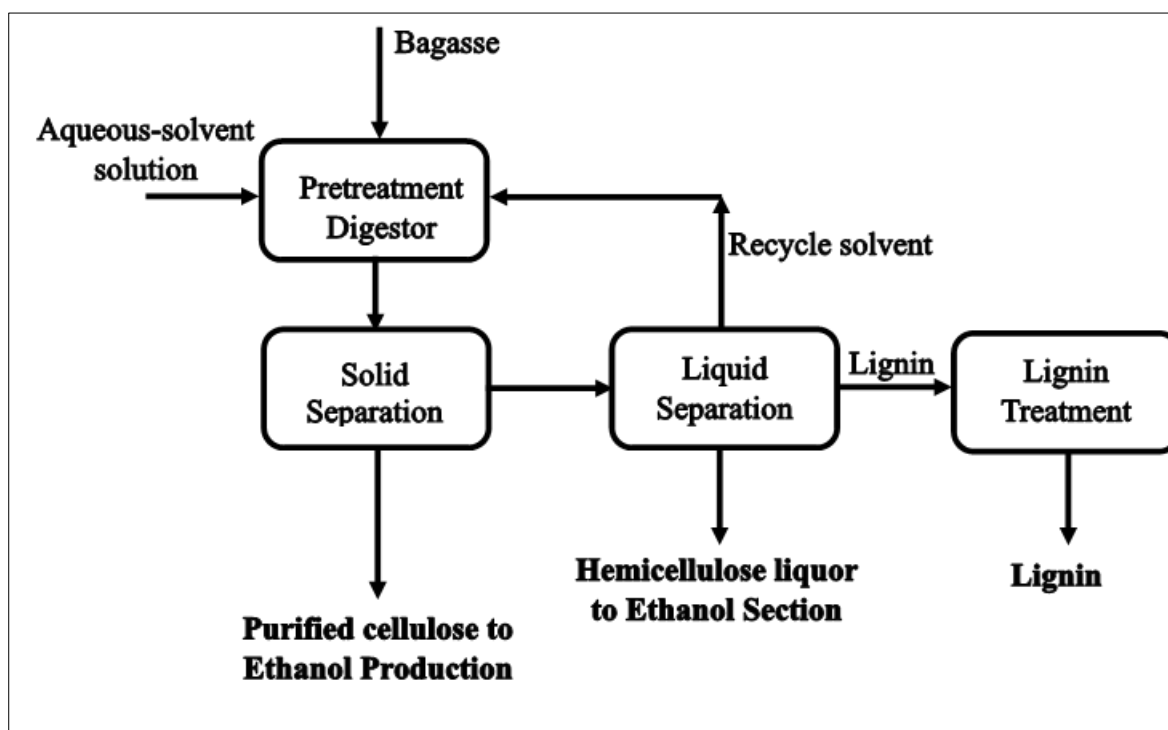
## Manufacturing Process Steps

The detailed process steps of demo scale integrated bioethanol plant operate continuously on 24-hour basis at proposed site are given below.

### Bagasse Pretreatment

The bagasse obtained in the form of bales is first pretreated using Lignopura® Technology with aqueous organic solvent solution. The treated solid material as cellulosic pulp is filtered from aqueous-solvent liquor and used for production of ethanol. Aqueous-solvent liquor diluted with water and then separated into three fractions –solvent rich stream which is recycled back to the process, lignin and hemicellulose rich stream. Lignin is purified and used as pure lignin product whereas hemicellulose rich stream is used for production of ethanol.

The process flow diagram of bagasse fractionation process is presented in **Figure 6**



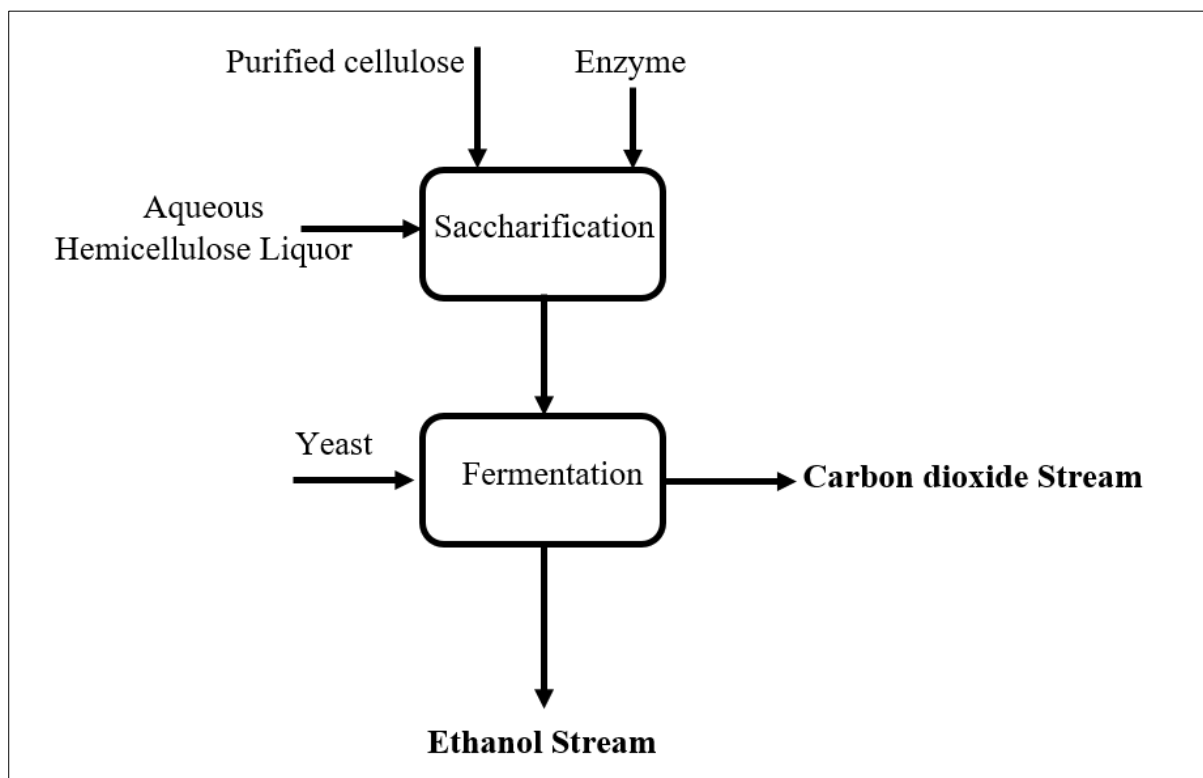
**Figure 6: Bagasse Fractionation Process**

### Ethanol Production: Saccharification and Fermentation

Ethanol is produced conventionally by separate saccharification & fermentation (SSF) of cellulose-rich pulp and hemicellulose. Cellulose-rich pulp in aqueous hemicellulose solution obtained in process step-1 are converted into sugars using conventional enzymatic saccharification (hydrolysis) process. This process with Lignopura treated biomass streams resulted 80% conversion of Cellulose into glucose and hemicellulose into other reducing sugars (xylose, arabinose, galactose, etc.). Afterwards, the stream is fermented using yeast. Yield of fermentation process for ethanol production from total reducing sugar is 95%.

Carbon dioxide from fermentation process is collected and sent to scrubber. Fermented stream is sent to alcohol vessel for further purification to separate ethanol and non-digested materials

in Process step-3 section. The process flow diagram for production of Ethanol from pre-treated bagasse is presented in **Figure 7**.



**Figure 7: Manufacturing process of Ethanol**

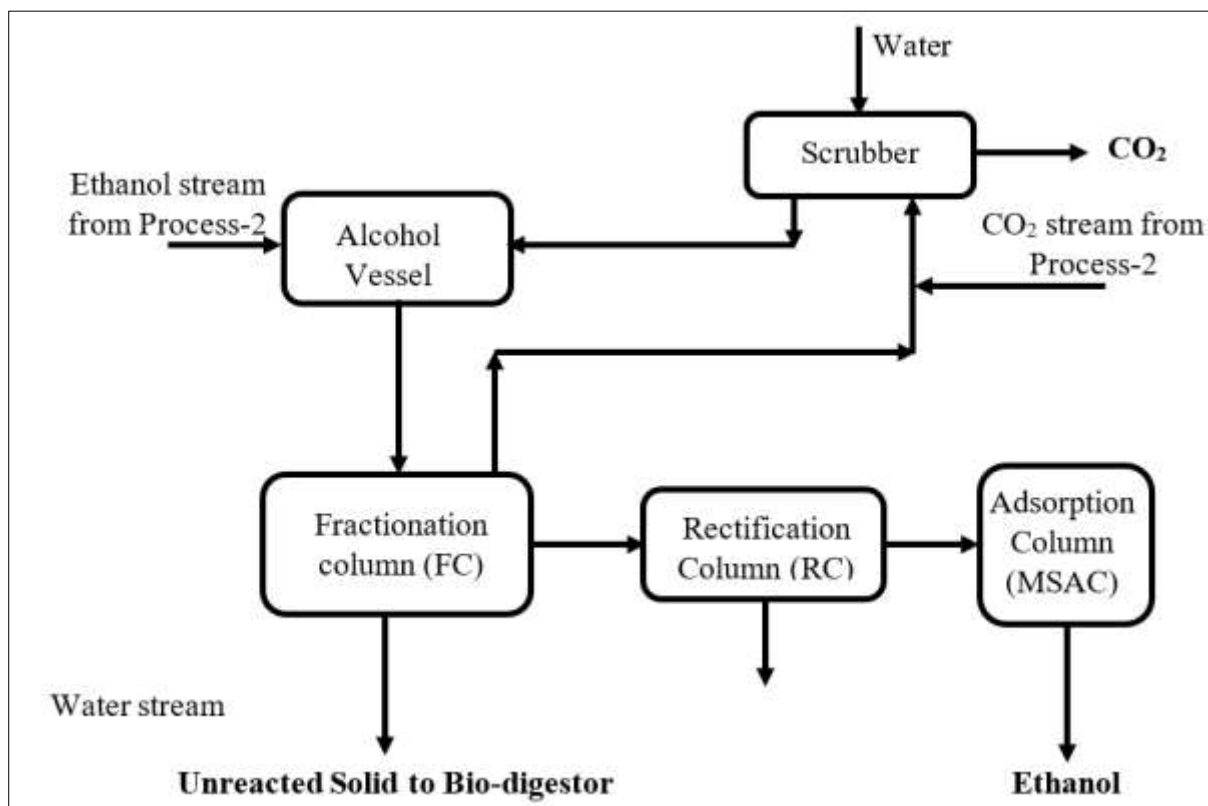
#### **Bioethanol Separation and Purification:**

The broth from alcohol vessel is sent to first fractionation column (FC) where three product streams are separated. The top stream contains CO<sub>2</sub> (remaining from fermenter) with carry-over of ethanol. This gas stream is mixed with fermentation vent and sent to vent scrubber to recover carryover of ethanol. Counter current flow of water from top stage and the gas in the bottom stage are used in vent scrubber. The gas product of CO<sub>2</sub> is sent to bottling section where the water containing recovered ethanol is sent back to alcohol tank. The bottom product from FC is rich in non-reacted solids. This stream is sent to multiple-effect evaporator to recover water and solid-rich fraction further digested in Bio-digester. Biogas produced in the bio-digester is compressed and used for heating purpose, whereas solid residues of Bio-digester will be sold as Bio-compost to farmers which has good soil conditioner.

From FC, a side stream rich in ethanol is drawn and sent to the rectification column (RC). The ethanol is concentrated in RC to a near azeotropic composition. This azeotropic mixture is then sent to adsorption column containing molecular sieve (MSAC) for selectively adsorption of water from the vapour product of RC in order to produce the fuel grade ethanol. The pair of MSAC operate on offset cycles that one column adsorb water, the other one is regenerating which allow continuous production operation. The low purity ethanol from MSAC is recycled back to alcohol tank.



The process flow diagram for separation and purification of Ethanol in Process-3 is presented in **Figure 8**.



**Figure 8: Separation and Purification of Ethanol**

The plant and Machinery have been designed with required specification considering material of construction, volume of reaction and are located at appropriate positions. Zero-liquid discharge system, bio-digester, CNG based thermic fluid system, adequate ventilation and air filtration systems have been planned to prevent environmental hazards.

The main features of the plant are as follows:

- Non-catalytic process, free of extreme acidic/alkaline conditions
- Ensure >99% solvent recyclability
- Combined production of C5 and C6 sugar and then converted to ethanol
- Produce Biogas from fermented solid stream
- Procurement of enzyme, yeast and chemicals from recommended suppliers
- Use CNG based thermic heating system
- Not produce and create liquid effluent
- Supported by an equipped QC/QA laboratory

The expected plant performance is mentioned below:

- Lignin yield based on bagasse (dry): 90% of maximum
- C6 sugar yield based on bagasse (dry): 80% of maximum
- C5 sugar yield based on bagasse (dry): 80% of maximum
- Ethanol yield based on C6 sugar: 0.5 kg/kg

- Ethanol yield based on C5 sugar: 0.45 kg/kg
- Ethanol production per day: 0.475 kg/kg total sugar
- Overall maximum possible yield of ethanol on dry bagasse: 370L/ton biomass.

## 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 Distilleries by IL&FS Ecosmart Ltd., approved by MoEFCC.

The studies were conducted during pre-monsoon season for the period of 1<sup>st</sup> March 2024 to 31<sup>st</sup> May 2024.

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	2.8 m/s
		Wind direction	West
		Max. Temp.	39°C
		Mini. Temp.	17°C
		Relative Humidity	32 to 72%
		Precipitation	0.55 mm
Ambient Air Quality	8 Locations 24 hourly samples Twice a week for 3 months (in µg/m <sup>3</sup> )	PM 10	42 µg/m <sup>3</sup> – 67 µg/m <sup>3</sup>
		PM 2.5	14 µg/m <sup>3</sup> – 30 µg/m <sup>3</sup>
		SO <sub>2</sub>	7 µg/m <sup>3</sup> – 17 µg/m <sup>3</sup>
		NO <sub>x</sub>	12 µg/m <sup>3</sup> – 26 µg/m <sup>3</sup>
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
		TDS	TDS ranged from 208 to 871 mg/L, TDS levels exceed the permissible limit in two samples, with GW4 having the highest concentration of 871 mg/L and GW2

			with 578mg/L above the IS: 10500:2018 standard of 500 mg/L
		COD	The COD values ranged between 20 to 72.7 mg/l.
Water Quality (Surface Water)	Once in season at 8 locations (Physical, chemical and biological parameters)	Colour	Within acceptable standards
		pH	Within the CPCB-prescribed range
		TDS	TDS ranged from 208 to 871 mg/L, TDS levels exceed the permissible limit in two samples, with GW4 having the highest concentration of 871 mg/L and GW2 with 578mg/L above the IS: 10500:2018 standard of 500 mg/L
		COD	The COD values ranged between 20 to 72.7 mg/l.
Soil Quality	Once in season at 8 locations	Soil type and texture, Physico-chemical properties, NPK	The soils are predominantly clayey, with clay content ranging from 49% to 54%. This high clay content suggests good water and nutrient retention capabilities.
Noise Quality	Once in season at 8 Locations (Noise levels in dB(A))	Max & Min Day	58.7 & 40.7 dB(A)
		Max & Min Night	33.9 & 30.3 dB(A)
Land use Pattern	One time visit of the study area for ground truthing	Identification and classification of land use	Most of the land is Non- Agricultural Industrial land.
Geology and hydrogeology	Primary observation during visit and sec. data	Geology and hydrogeology of the study area	The area is geologically divided into Deccan Trap Basalt and Older Alluvium formations.  Older Alluvium: Dating back to the Quaternary period, it forms a productive

			<p>aquifer in narrow belts along major river banks and in patches in paleo depressions. Comprising loose to semi-consolidated sands, gravels, silt, and clay, it rests on basaltic lava flows. The district is primarily composed of Deccan Trap Basalt, dating from the upper Cretaceous to lower Eocene periods, with a narrow belt along riverbanks consisting of Recent Alluvium. This alluvial region, characterized by sand and gravel, holds significant potential as a groundwater reservoir due to its high porosity and permeability.</p>
Ecology	General in 10 km radial study area and data collected around the project site through field visits.	Flora	<p>Flora: Floral research was undertaken in the study area surrounding (within 10km) the project site. During the study, total 335 species were observed in the study area, which were distributed among various families. Out of the total observed species, 143 species were found to be tree, which is found to be the highest amongst all growth form. Beside trees, 108 species of Herb, 41 species of shrub, 26 species of climbers and 17 species of grass have</p>

			been recorded during the study period.
		Fauna	A total of 76 bird species, representing 40 genera and 22 families, were documented within the study area. 15 reptile species from 8 families were identified. The survey identified 7 amphibian species from 4 families. The survey recorded 38 insect species across 13 families. There are no Schedule I species observed during the study period.
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 average. Power supply facility is available in almost villages and town. The water supply in the region is mostly through wells and Gram panchayat. For drinking purpose people are using only ground water supply, but very few hand pumps are available for drinking water, 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

Environmental impact identification is based on stage of project and the type, scale and location of proposed project activity. Environmental components that may be affected negatively and positively due to proposed activity are identified for construction and operation phase are presented in **Table 6**.



**Table 6: Environmental aspects and impacts of Project**

Sr. No	Step/ Activity	Environmental Aspect	Impact	
			Description	Severity
1	Construction of buildings and Erection of Plant	Emission to air (dust)	Air Pollution	Temporary
		Use of water, energy and materials.	Natural resources, conservation	Temporary
		Use of manpower	Employment	Temporary
		Hazardous and non-hazardous waste disposal on land.	Land pollution	Permanent
2	Commissioning	Use of DG Set, Raw material and Finished product Transportation	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 Ethanol	Revenue Generation	Permanent
		Operation of Plant and machinery	Noise Pollution	Permanent
		3	Closure and Decommissioning	Stoppage of New product
Decommissioning	Land pollution			Permanent

### 9.1 Prediction of Impacts during Construction Phase

The potential impacts and mitigation measures during construction phase is shown in **Table 7** below

**Table 7: Summary of Impacts and Mitigation measures during Construction Phase**

<b>Sr. No.</b>	<b>Environmental Aspects</b>	<b>Potential Source of Impact</b>	<b>Proposed Mitigation Measures</b>
1.	Land Environment	Site clearing, earthwork, topsoil removal, and disturbance to the soil surfaces	<ul style="list-style-type: none"> <li>• Store top soil for green belt development</li> <li>• Plan major excavation activities during dry seasons</li> <li>• No labour camp at the site during construction</li> <li>• Treat sewage in septic tank and soak pit</li> <li>• Use sand and gravel for road construction</li> <li>• Recycle waste materials like concrete, glass, and plastic</li> </ul>
2.	Air Quality	Levelling, grading, excavation, and transportation activities	<ul style="list-style-type: none"> <li>• Prohibit excavation in windy conditions</li> <li>• Use PUC holder trucks</li> <li>• Regularly sprinkle water to suppress dust</li> <li>• Cover loose materials, construction debris</li> <li>• Separate excavation areas with barriers</li> </ul>
3.	Water Environment	Sewage generation, runoff from construction activities, and stagnant construction wastewater	<ul style="list-style-type: none"> <li>• Install silt fences and sediment barriers</li> <li>• Implement construction phasing</li> <li>• Provide clean drinking water and proper sewage treatment for workers</li> <li>• Avoid earthwork during the rainy season</li> </ul>
4.	Ecological & Biological Environment	Site preparation, excavation, transportation, and construction activities	<ul style="list-style-type: none"> <li>• Prioritize utilization of low noise-generating equipment</li> <li>• Provide barriers and water sprinkling to reduce dust and noise</li> <li>• Develop a green belt area</li> <li>• Ensure no significant impact on fauna and flora</li> </ul>
5.	Noise and Vibration Environment	Construction traffic, digging, piling, blowing horns, noise from equipment	<ul style="list-style-type: none"> <li>• Use low noise-generating equipment</li> <li>• Provide PPE for workers</li> <li>• Use barriers to prevent noise propagation</li> <li>• Conduct weekly noise level monitoring</li> </ul>

6.	Occupational Health and Safety	Working at risk height, storage of hazardous material/chemicals, work without protective equipment, site sanitation	<ul style="list-style-type: none"> <li>• Design proper safety plans for workers</li> <li>• Provide internal safety training</li> <li>• Provide adequate PPE for workers</li> <li>• Implement emergency preparedness plan</li> <li>• Segregate and recycle generated solid waste</li> </ul>
7.	Socio-Economic Environment	Increased strain on civic amenities, temporary employment, business opportunities	<ul style="list-style-type: none"> <li>• Prioritize hiring local residents for construction jobs</li> <li>• Adhere to environmental regulations</li> <li>• Provide employment opportunities and resources to local communities</li> <li>• Create business opportunities for local suppliers and contractors.</li> </ul>

## 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 during Operation Phase**

Sr. No.	Environment Aspects	Potential source of Impact	Proposed mitigation measures
1	Air Environment	Production Process, vehicular movement, raw material handling, Operation of DG Set, operation of Boiler.	<ul style="list-style-type: none"> <li>• No Process emissions will be envisaged from production process</li> <li>• DG sets are expected to emit PM, SO<sub>2</sub>, and NO<sub>x</sub>, and will be provided with an 8m stack height for dilution and dispersion.</li> <li>• CNG will be used as a Thermic Fluid Heater fuel, with a 30m stack height planned for exhaust gas dispersion.</li> <li>• PUC of the vehicles shall be checked periodically.</li> <li>• Periodical maintenance of vehicles.</li> <li>• If required spraying of water on the road to suppress the dust emission.</li> </ul>
2	Water Environment	Exploitation of surface water and disposal of waste water on land	The total water requirement is about 63.1 CMD (Fresh- 26.1 CMD + Recycle- 37.0 CMD) for domestic, process, cooling and gardening purpose. It will be sourced from MIDC which is

			available at site. The project will implement ZLD.
3	Land	Land use	Land is in MIDC area. It is under Industrial use.
4	Soil	Disposal of waste on the land	Industry has proposed to disposed off Hazardous waste to authorized CHWTSDF facility.  All the waste will be disposed of as per Solid and hazardous waste management and handling rule 2016.
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 and loss of vegetation during construction	No major vegetation clearance is required. All required pollution control equipment will be provided to ensures the control of pollution.
7	Socioeconomic	Influx of people, settlement and resource utilization	Over all positive impact is envisaged. CSR activities by proponent will be beneficial to local people
8	Occupational Health and safety	Exposure to the chemicals, Operation of machines, Fire hazardous	All safety measures and safety equipment's will be placed. PPE's will be provided to workers and associated staff

## 10. Site and Technology Alternative Analysis

As M/s. Lignopura Agrotech Pvt. Ltd. has intended to set up a Demo Scale 2G Integrated Bioethanol Project at Plot No. E-14, Additional Kadegaon-Shivajinagar MIDC, Taluka- Kadegaon, District- Sangli, Maharashtra-415304. Required infrastructure such as Water, Electricity, Roads, Solid Waste Disposal Facility, etc. will be provided by MIDC. Site can be approached by internal MIDC road which is further connected to National Highway 166E i.e., Karad-Atpadi Road. Nearest Railway station is Karad railway station located at a distance of 9.90 km(aerial) in West direction. The site selected also has the following merits –

- Project site is located in Kadegaon-Shivajinagar MIDC area and required infrastructure necessities such as water, electricity, roads, solid waste disposal facility will be provided by MIDC.
- Land use of the site is already earmarked as industrial use.
- No resettlement & rehabilitation is involved.
- Site is easily accessible to local markets.

Matrix of Alternative site Analysis is given in **Table 9** below

**Table 9: Matrix of Alternative Site Analysis**

Sr. No.	Site Selection Criteria	Existing Site
1	Non-Agricultural Land	✓
2	No R & R Issue	✓
3	Topography (Slope)	✓
4	Site Connectivity (Approach Road)	✓
5	No Notified Critically Polluted Area as per CPCB within 5 km radius	✓
6	No Archaeological Monuments within 5 km radius	✓
7	Availability of Electricity (MSEDCL)	✓
8	Availability of Raw Material	✓
9	Availability of labour force	✓
10	Availability of Local Market for finished products	✓

The proposed project technology for the demo-scale 2G integrated bioethanol initiative is specifically chosen due to its efficiency, innovation, and uniqueness in utilizing non-food biomass, such as sugarcane bagasse, for ethanol production. Unlike other alternative technologies that may rely on food crops or less sustainable methods, this project employs advanced processes that convert agricultural residues into value-added biofuels, effectively addressing both energy needs and waste management challenges.

This innovative approach not only minimizes the environmental impact associated with traditional fossil fuels but also positions the project as a leader in sustainable energy solutions. By focusing on agricultural waste, the technology maximizes resource utilization and contributes to rural development by creating jobs and stimulating local economies. The efficiency of this method ensures optimal conversion rates, making it a viable option for meeting the country's Ethanol Blending Petrol (EBP) Programme requirements while promoting a circular economy. Thus, the decision to exclusively adopt this technology underscores a commitment to sustainable practices that prioritize environmental health and energy security. Hence no other alternative analysis is carried out as the proposed project technology is efficient, innovative and unique.

### 11. Environment Monitoring Plan

The regular monitoring of different environmental parameters is of immense importance to assess the present environment conditions as well as impacts of the proposed project on the environment. A proper monitoring program will be required 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 for Construction Phase is given in **Table 10** whereas Environmental Monitoring program for operation phase is given in **Table 11** below –



**Table 10: Environmental Monitoring during Project – Construction 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 <sub>2</sub> , CO, NO <sub>x</sub> )	Three Monthly emission monitoring
		Ambient air quality within the premises of the proposed unit to be monitored.	The ambient air quality will conform to the standards for PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub>	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 to be maintained in good working order.	Equipment logs, noise readings.	Monthly during construction activities
		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 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 Erosion	Protect top soil stockpile where possible at the edge of the site.	Ensure protective measures for topsoil stockpiles are in place, with regular inspection to verify stability and effectiveness in preventing erosion.	The period during construction activities

5.	Drainage Management	Ensure that the drainage system and specific design measures are functioning effectively. The design should incorporate the existing drainage patterns and prevent any disruption to them.	Visual inspection of drainage and record thereof.	Three monthly 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.	Three 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.
10.	Loss of flora and fauna	Re-vegetation as per Forest guidelines	No. of plants, species.	During site clearance Phase.

**Table 11: Environmental Monitoring Schedule during Operation Phase**

Sr. No.	Particulate	Parameters	Number of locations	Frequency
1.	Ambient air quality	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO, and HC	Ambient air quality at minimum 8 locations. 1 location within the plant premises, 2 locations in upwind, 3 locations in downwind direction, and 2 locations in crosswind direction.	Quarterly
2.	Stack gas	PM, SO <sub>2</sub> , and NO <sub>x</sub>	Stack monitoring at thermic fluid heater and DG Set stacks.	Quarterly
3.	Workplace	PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Quarterly
4.	Wastewater	pH, EC, SS, TDS, O & G, Ammoniacal Nitrogen, COD, BOD, Chloride, Sulphides, etc.	Wastewater from all sources. Inlet and outlet of ETP	Quarterly
5.	Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) and <i>E.Coli</i>	8 location of Ground as well as Surface water	Half yearly
6.	Solid waste	ETP sludge, 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 sensitive receptors in the vicinity	Minimum 2 locations within plant premises, especially at high noise-generating areas and sensitive receptors.	Quarterly
8.	Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plants/ trees.	In and around the plant site and designated green belt area.	Six Monthly
9.	Soil	Texture, pH, electrical conductivity, cation	2 near Solid/ hazardous waste storage.	Six Monthly

		exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	At least Two locations from Greenbelt and area where manure of biological waste is applied.	
10.	Occupational health	Health and fitness check-up of employees getting exposed to various hazards and all other staff	All employees	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 Plan

Proposed project is located at Additional Kadegaon-Shivajinagar MIDC, Maharashtra-415304. 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 existing physical infrastructure
- Enhancement of social infrastructure
- The project strengthens the existing facilities and contributes additional revenue to the local Gram Panchayat.
- Additional taxes will be paid to the Government of Maharashtra.
- The industry is expected to provide employment opportunities for 20 workers, and during the operation phase, this number is expected to be around 15 skilled and 20 semiskilled or unskilled workers.
- Encouragement of small businesses such as mess facilities, hotels, tea stalls, grocery stores, vegetable markets, and automobile workshops in the vicinity.
- Gradual upliftment of the living standards of the villagers.
- Added revenue for local transporters based on the ongoing requirements.

As per the ministry's O.M No 22-65/2017-IA. II (M) dated 1<sup>st</sup> May, 2018, 2% of the total project investment, Rs. 53.20 Lakhs has been earmarked for Corporate Environmental Responsibility (CER) Activities. Details of budget is presented in **Table No. 12.**

**Table 12: Details of CER Activity**

Sr. No.	CER Activity	Details	Total Budget (Lakhs)
1.	Gram Panchayat Khambale Aundh	a. Common area Drinking Water facility with Water pipeline and RO b. Construction of Toilet block with water tank or plantation	<b>53.2 Lakhs</b>
2.	Shri. Shiv Chatrapati Vidyalay Shivajinagar	a. Drinking Water facility with Water pipeline and RO b. Construction of toilet block with water tank	
3	Mahatam Gandhi Vidyalay kadegaon	a. Drinking Water facility with Water pipeline and RO b. Construction of toilet block with water tank	
4.	Gram Panchayat Shivajinagar (Nahavi)	a. Common area Drinking Water facility with Water pipeline and RO b. Construction of Toilet block with water tank or plantation	
5.	Bharati Vidyapeeth New Secondary School Nerli	a. Drinking Water facility with Water pipeline and RO b. Construction of toilet block with water tank	
6.	Public Health Center Kadegaon	a. Drinking Water facility with Water Pipeline and RO	

## 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

Construction having built up area of 4796 sq.m is envisaged. However, some of the mitigation measures which will be implemented during the construction are –

- 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
- 2 Nos Toilets will be provided for workers
- Generated sewage of 0.8 CMD will be treated in Package STP of 1 CMD.
- Provision of PPE (dust masks, goggles) for onsite workers.
- Periodic water sprinkling in dust prone areas.

**Table 13: EMP for Construction Phase**

Sr. No.	Aspects	Source & Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Audit/ Monitoring/ External Reporting	Cost per month
1.	Site Clearing						
i)	Topography and Drainage	Source: Excavation, levelling, site clearance Impact: Change of topography and disturbance to drainage pattern.	<ul style="list-style-type: none"> <li>✓ Drains and slopes to be laid across the proposed project prior to start of excavation work to ensure adequate cross drainage</li> <li>✓ During rainy season major construction would be stopped.</li> <li>✓ Before starting construction, affected area like adjacent land, connecting road from Kadegaon-Shivajinagar and others will be identified and restoration plan will be implemented with the help of Construction Contractor</li> <li>✓ Construction footprint to be well defined and construction work to be carried out within the footprints only.</li> </ul>	Review of implementation of mitigation measures	Construction contractor  Overall supervision by Project Management Consultant (PMC)	Audit by Team (Indian, Construction Contractor & PMC) Fortnightly	--
ii)	Landuse, vegetation and	There are no negative	<ul style="list-style-type: none"> <li>✓ Present dry grassland is found on proposed</li> </ul>	Review of implementation	Construction contractor	Audit by Team (Indian,	--

	landscaping	impacts on land use because land is already developed for industrial use. Marginal loss of dry vegetation	development land. Hence, loss of flora will be negligible. ✓ Implementation of overall architecture and landscaping design of the proposed project ✓ In the proposed development 3040Sq.M. of area will be developed as green area.	of mitigation measures	Overall supervision by Project Management Consultant	Construction Contractor & PMC) Fortnightly	
2.	Other Activities						
i)	Air quality	Source: Dust from loose soil Construction material and movement of vehicle  Impact: Higher particulate matter within the site affects air quality. Increased carbon monoxide from machinery can harm air quality. Dust reduces	<ul style="list-style-type: none"> <li>✓ Avoid dust-generating activities on windy days (May-June), and cover loose materials on site.</li> <li>✓ Limit vehicle speed to 20 km/h on-site and cover trucks with tarpaulin during transportation.</li> <li>✓ Regularly sprinkle water on unpaved roads to reduce dust.</li> <li>✓ Ensure diesel generators and construction equipment are well-maintained to control emissions; maintain 3-meter stack height for generators.</li> <li>✓ Turn off machinery when not in use to minimize emissions.</li> <li>✓ Keep the site clean daily to</li> </ul>	Review of status of implementation of suggested mitigation measures.  Carryout vehicle pollution check program  Arrange quarterly Ambient Air Quality monitoring at project site for PM <sub>10</sub> , PM <sub>2.5</sub> ,	Construction Contractor  Overall supervision by Project Management Consultant.	Six monthly ambient air monitoring and pollution under control check – PMC	Water Sprinkling ₹. 1,50,000/-  Air Monitoring ₹. 50,000/-



		photosynthesis, slowing plant growth. Dust exposure causes eye irritation, coughing, and respiratory issues. Prolonged exposure may lead to respiratory diseases.	<ul style="list-style-type: none"> <li>✓ reduce dust and pollutants.</li> <li>✓ Use paints, polishes, and fittings with low VOC emissions.</li> <li>✓ Ensure all vehicles entering the site have valid PUC certificates.</li> <li>✓ Conduct regular air quality monitoring through a MoEF NABL accredited agency.</li> <li>✓ Use water sprinkling, PPE for workers, and follow proper transportation and vehicle maintenance procedures to limit emissions.</li> </ul>	SO <sub>2</sub> , NO <sub>x</sub> , CO			
ii)	Water Quality	<p>Source: Sewage generated by workers Surface run-off to downstream areas</p> <p>Impact: Can contaminate water, affecting pH, EC, BOD, and COD levels. Carries</p>	<ul style="list-style-type: none"> <li>✓ Store construction materials on tarpaulin sheets to prevent contamination.</li> <li>✓ Prevent leachate runoff by using separate drainage systems and keeping storage areas away from natural water bodies.</li> <li>✓ Use bunds around excavated soil and loose materials to prevent runoff; store materials away from stormwater areas.</li> <li>✓ Regularly clear construction debris to avoid water</li> </ul>	<p>Review of status of implementation of suggested mitigation measures.</p> <p>Six monthly monitoring of ground water quality at project site. (to check any contamination)</p>	Overall supervision by Project Management Consultant.	<p>Daily inspection by PMC</p> <p>Six monthly monitoring of groundwater quality - PMC</p>	<p>₹.85,000/- for Package STP</p> <p>₹. 30,000 for Water Monitoring</p>

		pollutants, degrading nearby water bodies. Pollutes groundwater, altering water quality indicators.	<p>pollution from runoff.</p> <ul style="list-style-type: none"> <li>✓ A package STP of 1 CMD will be provided to treat sewage and ensure proper hygiene for workers during construction.</li> </ul>	for parameters like SS, coliforms, total nitrogen, oil and grease and heavy metals.			
iii)	Land, Soil & Solid Waste	<p>Source: Excavation Construction waste Disposal of debris</p> <p>Impact: Construction may reduce soil fertility and alter the terrain, affecting habitats. 6,040 m<sup>3</sup> of excavated soil will be reused for backfilling and green areas. The site has scrubby vegetation, so no trees will be</p>	<ul style="list-style-type: none"> <li>✓ Excavated soil will be reused for backfilling and landscape development to minimize soil loss.</li> <li>✓ Implement a well-lined or paved area for potential fuel or material spills to prevent soil contamination.</li> <li>✓ The expected sewage generation is minimal and will not adversely affect land as package STP of 1 CMD will be provided.</li> <li>✓ Packaging materials, such as wooden boxes and jute wrappers, will be properly stored and disposed of.</li> <li>✓ Stack excavated soil in designated areas and take measures to prevent soil erosion.</li> <li>✓ Complete earthworks will be</li> </ul>	Review of status of implementation of suggested mitigation measures.	<p>Construction Contractor</p> <p>Overall supervision by Project Management Consultant.</p>	Daily inspection by PMC	₹. 50,000/- for Solid Waste Disposal

		removed. Construction debris and fuel spills can degrade soil and pollute runoff. Improper disposal of sewage or garbage may promote pathogen growth and harm soil quality.	sealed and/or revegetated promptly with the help of landscaping experts. ✓ Construct retention walls or bunds around storage areas to control runoff during rain. ✓ Implement a Construction Waste Management Plan to handle waste generated during the construction phase. ✓ Return drums and packaging materials to suppliers for reuse when possible. ✓ Sell waste steel to scrap dealers for recycling and separate unsuitable metals for transport to licensed recycling facilities.				
iv)	Hazardous Waste	Source: Waste oil from machinery spills from machinery Discarded Containers  Impact: Soil Contamination Ground water pollution	✓ Construction hazardous wastes to be sold to authorized recycler; ✓ Ensure proper covered shed provided with impervious floor for storage of used oil and any other identified hazardous wastes to avoid any soil contamination; ✓ All the hazardous waste to be disposed off as per the requirement and guidelines	Review of status of implementation of suggested mitigation measures.	Construction Contractor  Overall supervision by Project Management Consultant.	Daily inspection by PMC	--

			<p>of MPCB;</p> <ul style="list-style-type: none"> <li>✓ During servicing/repair of equipment's or vehicles, a suitable drip tray shall be used to prevent oil/grease spills onto the soil, especially in case of emergency repairs;</li> <li>✓ Leaking equipment shall be repaired immediately or be removed from the site to facilitate repair.</li> </ul>				
v)	Traffic, Transport and Access	<p>Source: Traffic congestion due to movement vehicles from approach road to site</p> <p>Impact: Daily 1-2 nos. of construction material carrying truck will comply from local market to site hence no major impact on existing traffic will be envisaged</p>	<ul style="list-style-type: none"> <li>✓ Heavy Vehicle like plant machinery will try to reach site before peak hour of traffic</li> <li>✓ Vehicle movement and parking within the premises shall be manage properly to avoid accidents;</li> <li>✓ Routes for use by construction traffic to be planned to minimize impact on residential areas and unsuitable parts of the road network;</li> <li>✓ Providing dedicated path within the site for entry and exit of the construction vehicles;</li> <li>✓ Necessary training to the driver of construction</li> </ul>	Review of status of implementation of suggested mitigation measures.	<p>Construction Contractor</p> <p>Overall supervision by Project Management Consultant.</p>	Daily inspection by PMC	--

			vehicles for speed restrictions and to construction workers on do's and don'ts during construction vehicles movements; ✓ The contractor shall properly mark all access roads with proper signage.				
vi)	Ambient Noise and Vibrations	Source: Construction activity such as cutting, digging, filling etc.	✓ Nearest habitation from project site is Kadegaon which is 2.35 km from site and construction noise impact would be confined within site area only hence no negative impact on habitat is envisaged.	Review of status of implementation of suggested mitigation measures	Construction Contractor	Daily inspection by PMC	₹. 2,50,000/-
		Impact: Disturbance to nearby habitants and occupational health hazard. Disturbance to Faunal Species	✓ Excavation will be done by using dozer whose noise level will be confined within plant boundary. Similarly cranes, earth moving equipment and heavy vehicles to be routed in such a way that there is minimum disturbance to receptors along the route; ✓ Avoid loud, sudden noises wherever possible. Construction site will be isolated by 10 feet high metal	Ambient noise (Leq day & Leq night) monitoring to be done on six monthly basis.	Overall supervision by Project Management Consultant.		

			<p>sheets which will also help in reduction in noise</p> <ul style="list-style-type: none"><li>✓ Integral noise shielding to be used where practicable and fixed noise sources to be acoustically treated, for example with silencers, acoustic louvers and enclosures.</li><li>✓ Diesel generator to be installed in conformance with the statutory requirement of acoustic enclosure to achieve the required norm 75 dB(A) level at 1 m from its enclosure;</li><li>✓ Provision of rubber paddings/ noise isolators at equipment/machinery used for construction; Noise prone activities need to be restricted to the extent possible during night to reduce the noise impact.</li><li>✓ There is also requirement of providing make shift noise barriers surrounding the high noise generating construction equipment;</li><li>✓ Site workers working near</li></ul>				
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			<p>high noise equipment to use personal protective devices to minimize their exposure to high noise levels;</p> <ul style="list-style-type: none"> <li>✓ Construction vehicles to be well maintained and idling of equipment to be avoided when vehicles not in use; and Regular maintenance of vehicles to be taken up.</li> </ul>				
vii)	Energy	<p>Source: Energy Consumption during construction</p> <p>Impact: Additional energy load; Heat gain in the building.</p>	<ul style="list-style-type: none"> <li>✓ All buildings to be constructed with up-to-date standards for energy efficient design;</li> <li>✓ Provision of renewable energy to be used for street lighting;</li> <li>✓ Adoption of measures such as low embedded energy building materials, passive heating and ventilation systems, site layout and building orientation to minimize energy use;</li> <li>✓ Proper ventilation system to be provided to all part of the building;</li> <li>✓ Energy Conservation Building Code 2009 to be followed.</li> </ul>	Review of status of implementation of suggested mitigation measures	Construction Contractor	Monthly review by PMC	--
viii)	Socio –	There will be	✓ To the extent possible	Review of	Construction	Monthly	--

	Economic	<p>positive impact due to proposed development</p> <p>Creation of new 20 nos. job Opportunity</p>	<p>sourcing of construction labor from local region;</p> <ul style="list-style-type: none"> <li>✓ Encourage purchase of goods and services for construction related activities to be sourced from local market;</li> <li>✓ Preference based on skill set available in the area shall be given to local people in recruitment up to possible extent by the construction contractor.</li> <li>✓ The employment offered by construction contractor would ensure considerable opportunity for the local economy.</li> </ul>	status of implementation of suggested mitigation measures	Contractor	review by PMC	
ix)	Housekeeping and Health and Safety	<p>Source: Domestic &amp; Construction waste generation</p> <p>Impact: Aesthetics Accident risk</p>	<ul style="list-style-type: none"> <li>✓ Waste Management Plan for construction phase to be implemented;</li> <li>✓ Regular inspection is required for housekeeping and EHS issue;</li> <li>✓ Unauthorized dumping of used oil and other hazardous wastes to be prohibited;</li> <li>✓ All the required safety measures based on individual job profile will be provided (as per working</li> </ul>	Review of status of implementation of suggested mitigation measures	Construction Contractor	Monthly review by PMC	<p>Occupational Health &amp; Safety of workers – ₹. 35,000/-</p> <p>PPE's – ₹.58,000/-</p>



			<p>guidelines, use of personal protective equipment's like gloves, helmets, ear muffs, safety harness etc.) for construction labour through the contractors.</p> <ul style="list-style-type: none"> <li>✓ Personal protective equipment for everybody present at site to be made available; For safety of people occupying the site, regulations concerning fire safety to be followed. Some of the requirements include:</li> <li>✓ Installation of fire extinguishers; Emergency exit;</li> <li>✓ Proper labelling of exit and place of fire</li> <li>✓ protective system installation;</li> <li>✓ Trained personnel to use fire control systems; and Display of phone numbers of the city/ local fire services, etc.</li> <li>✓ Construction contractors to provide first aid as well as generate awareness programs on health and communicable diseases</li> </ul>				
x)	Demobilization	Source:	✓ To prepare site restoration	Review of	Construction	Daily	--

	of construction material temporary sheds etc.	Demobilization of construction activity	<p>prior to demobilization.</p> <ul style="list-style-type: none"> <li>✓ On completion of the works, all temporary structures will be cleared away, all rubbish disposed or trenches filled in and effectively sealed off and the site left clean and tidy.</li> <li>✓ Remove all construction equipment from construction site with due care on health, safety and environment;</li> <li>✓ Remove all demobilization waste from the construction site by contractor, while any hazardous waste is to be disposed as the requirement of MPCB;</li> <li>✓ Re-vegetate bare area as per the landscape development plan.</li> </ul>	status of implementation of suggested mitigation measures	Contractor Overall supervision by Project Management Consultant	inspection and Audit at start and end of demobilization of construction equipment by Team	
		Impact: Aesthetics					

#### 14.2 Environment Management Plan for Operation Phase

Industry proposes comprehensive environment management plan to combat pollution arising from the project activities. Detailed EMP is described below for various environmental parameters 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	<p>Ambient Air Quality –</p> <p>Activities: Manufacturing process. DG set for emergency power failure. Operation of the thermic fluid heater. Vehicular movement, fugitive emissions from raw material storage.</p>	<p>Impact: Manufacturing processes will not directly contribute to emissions. DG set emissions will release PM, SO<sub>2</sub>, and NO<sub>x</sub>, contributing to air pollution. Thermic fluid heater, powered by CNG, will not generate significant air pollutants like PM, SO<sub>2</sub>, or NO<sub>x</sub>. Vehicular emissions during operations may increase PM, SO<sub>2</sub>, and NO<sub>x</sub> levels. Fugitive emissions from handling and storage of materials, if not properly managed, could affect air quality.</p>	<p>DG Set: One DG set will be installed with an 8-meter-high stack to ensure the dispersion of emissions like PM, SO<sub>2</sub>, and NO<sub>x</sub>, reducing their impact on ambient air quality. Thermic Fluid Heater: Since CNG is the fuel, emissions from the thermic fluid heater will be minimal, with no significant PM, SO<sub>2</sub>, or NO<sub>x</sub> emissions expected. Vehicular Emission Control: Only PUC-certified vehicles will be allowed on-site, and vehicle speed will be limited to 20 KMPH within the plant. Regular maintenance of vehicles will be conducted to minimize emissions.</p>	<p>Regularly review emission results from stack monitoring and external lab reports. Monitor and ensure compliance with Consent to Operate (CTO) conditions under the Air Act. Manage annual CTO renewals and timely submissions to authorities. Submit emission reports and compliance updates to the</p>	EHS Manager & Safety Officer	<p>Review of status of implementation of suggested mitigation measures Monitoring provision for Quarterly / as per Consent condition requirement for monitoring of stack emissions through MoEF recognized external laboratory</p>	5.5

			<p>Material Handling and Storage: Periodic maintenance of the material storage area will be done to minimize fugitive emissions. Proper covers and containment will be ensured to prevent dust and odor release.</p> <p>Dust Control: All internal roads will be asphalted to reduce dust. Water sprinkling will be carried out on roads during dusty conditions to control particulate emissions.</p> <p>Workplace Monitoring: Regular workplace monitoring will be carried out to ensure air quality standards are maintained, and corrective actions will be taken as necessary.</p> <p>Health and Safety: Half-yearly health check-ups will be provided for workers to monitor any potential impacts on health due to air quality.</p>	<p>Pollution Control Board. Facilitate audits and inspections. Train staff on air pollution controls and CTO requirements. Conduct internal audits to ensure compliance with air quality regulations.</p>			
2	Water Quality	Impact: Competing demand for	1.4 CMD of sewage will be stored in septic tank for	Facility Manager to	EHS officer & Facility	Review of status of	81

<p>Activities: Use of Fresh water from MIDC Discharge of untreated 1.4 CMD of sewage on land Discharge of untreated 20.6 CMD of effluent Runoff storm water. Discharge of spent wash on land or nearby surface waterbody.</p>	<p>fresh water usage will rise, putting pressure on local water resources. Discharge of untreated sewage or effluent may pollute nearby water bodies, contaminating them with residual solvents and reagents. Wastewater discharge within and outside the plant boundary can lead to groundwater pollution. Effluent and spent wash discharge may reduce soil fertility and deteriorate soil quality. High organic and inorganic load effluent in surface water can lead to eutrophication and block sunlight, hindering aquatic photosynthesis. Failures in effluent treatment or storage systems can cause undesirable environmental changes, leading to health impacts and overall environmental degradation. However, chances of occurring such situation</p>	<p>the further treatment in ETP 20.6 CMD of trade effluent will be treated in a 25 CMD Biological ETP using primary, secondary, and tertiary treatments. Recycled 15.0 CMD ETP-treated water will be reused in the cooling tower, and the remaining 5.6 CMD recycle reject with ETP sludge will be treated in the Biogas Digester, ensuring no effluent discharge. A well-designed storm water network will be implemented from the construction phase. One rainwater harvesting storage tank will be provided to collect and store rainwater for use within the plant, enhancing water conservation efforts. Industry shall adopt ZLD. Efforts should be taken towards treated wastewater quality to achieve land irrigation parameters prescribed in SCHEDULE -VI, The</p>	<p>Daily review of ETP 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; Quarterly monitoring of treated effluent.</p>	<p>Manager</p>	<p>implementation of suggested mitigation measures  Daily monitoring of essential parameters to be done in house.  Quarterly monitoring of treated effluent quality through external laboratory</p>	
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		are very rare, if occurs plant will be shut down immediately.	Environment (Protection) Rules, 1986. Online Monitoring system will be installed to check the inlet and outlet parameters of ETP. Maintaining good housekeeping in all the units so that wastewater generation is minimized; Regular maintenance of ETP to avoid clogging. Treated waste water monitoring will be carried out to ensure compliance.				
3	Soil/Land Environment  Activities: Changes in soil characteristics due to Hazardous/ Solid waste storage. Disposal of spent wash, yeast sludge, and hazardous waste on land.	Impact: Direct discharge of spent wash onto land can severely damage soil characteristics, including porosity and fertility, leading to germination disorders in planted seeds. Changes in soil characteristics may occur due to the presence of residual solvents and reagents in the effluent, negatively impacting soil health and functionality. Heavy machinery and equipment used in industrial activities can	Conduct regular maintenance of plants and machinery to ensure optimal performance and reduce the risk of leaks or spills. Careful practices during loading, unloading, and material transfer will be implemented to prevent soil contamination. Construct concrete flooring throughout the entire plant area, except in designated areas for greenbelt development. This will minimize seepage and leakage into the subsoil, protecting the underlying soil layers	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.  Maintain records on disposal of hazardous	Facility Manager	Review of status of implementation of suggested mitigation measures  Monthly review of non-hazardous and hazardous waste generated from the project	--

		<p>cause soil compaction, reducing porosity and disrupting the natural soil structure, which is essential for water infiltration and root growth. During the operational phase, there is a risk of chemical runoff due to accidental spills during material handling, effluent management, or hazardous waste storage, leading to soil contamination and potential long-term environmental damage.</p>	<p>from contamination. Ensure proper collection, handling, and transfer of industrial effluent directly to the Effluent Treatment Plant (ETP) to prevent any discharge into the environment without treatment. Domestic wastewater will be stored in septic tank for further treatment in ETP to avoid direct discharge into the soil or nearby water bodies. Designate an adequate area for hazardous waste storage within the premises, featuring an impervious floor and a roof cover equipped with a leachate collection system. In the event of accidental spillage, the waste will be collected and treated in the ETP, minimizing soil contamination risks. Handle and store hazardous waste according to the Hazardous and Other Wastes (Management and Transboundary</p>	<p>wastes</p> <p>Review conditions of storage location and records related to hazardous wastes as per the conditions of authorization.</p>			
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			<p>Movement) Rules, 2016, ensuring compliance with regulatory standards to protect soil health. Implement a zero liquid discharge system, ensuring that no spent wash is disposed of on land without prior treatment. This approach will significantly reduce the risk of soil contamination. Ensure that all solid and hazardous wastes generated from the distillery unit are properly collected, stored, and disposed of. Spent oil will be sent to authorized recyclers for appropriate processing. Non-hazardous solid waste, such as CPU sludge, will be utilized as manure, contributing to soil health and promoting sustainable agricultural practices.</p>				
4	<p>Noise Environment</p> <p>Activities: Operation of Cooling Tower &amp; Thermic fluid</p>	<p>Impact: Elevated noise levels can lead to hearing impairment and contribute to</p>	<p>Vibrating pads and acoustic enclosures will be installed around equipment to dampen vibrations and sound.</p>	<p>Review of status of implementation of suggested mitigation</p>	<p>EHS Manager</p>	<p>Quarterly monitoring of ambient noise</p>	<p>0.50</p>



	<p>heaters Operation of bagasse conveyors and hoppers. Operation of process pumps and vacuum pumps. Blowing horns from traffic Operation of DG set Vehicular Movements</p>	<p>hypertension and ischemic heart disease in workers exposed to prolonged sound levels. Continuous exposure to noise from conveyors and hoppers may cause tinnitus in workers, resulting in long-term hearing issues. High noise levels can hinder communication, making it difficult for workers to hear and understand instructions accurately, potentially leading to operational errors. The noise generated by DG sets can disrupt the work environment, leading to sleep disturbances and increased annoyance, which may affect productivity. Frequent vehicular movements can result in elevated noise levels, leading to irritation among workers and the potential for human errors due to reduced concentration and focus.</p>	<p>Regular lubrication of moving and rotating parts of machinery will be conducted to minimize operational noise and reduce wear and tear. Personal protective equipment (PPE) such as ear-muffs or ear plugs will be provided to all workers operating in high-noise areas to protect against hearing damage. The design and layout of the facility will be optimized to minimize noise transmission. This will include the segregation of noisy operations from quieter areas to limit noise exposure to sensitive workspaces. Acoustic enclosures and silencers will be added to equipment wherever necessary to reduce noise emissions during operation. Diesel generators (DG sets) will be used only in the event of power failure and will be installed in acoustic enclosures to</p>	<p>measures  Quarterly review by EHS Manager  Ambient noise monitoring along the plant periphery to be done through external laboratory on quarterly basis.</p>			
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			<p>minimize their noise impact.</p> <p>A policy of minimum honking within industry premises will be enforced to reduce unnecessary noise from vehicular traffic.</p> <p>A proper green belt will be developed around the facility to act as a natural sound barrier, reducing noise levels in the surrounding environment.</p>				
5	<p>Socio – Economic</p> <p>Activities: Establishment of distillery unit Creation of Job opportunity CER activity</p>	<p>Impact: Increased noise from equipment operations and traffic can lead to irritation and disturbance for local residents, affecting their quality of life.</p> <p>Potential hazardous effects on the public may arise if there is contact with hazardous materials during a spill, posing safety concerns for the surrounding community.</p> <p>The project may lead to congestion on local roads due to increased traffic, resulting in delays and impacting the</p>	<p>Acoustic enclosures will be installed around the Diesel Generator (D.G.) set to minimize noise pollution and reduce disturbances to local residents.</p> <p>Any hazardous waste, primarily in the form of spent oil, will be managed responsibly. It will be stored in closed containers and sent to authorized recyclers on a regular basis to mitigate any risks to public health.</p> <p>The project is expected to have a positive impact on local employment by providing direct 35-40 job</p>	<p>Review status of implementation of planned CSR, CER activities</p>	<p>HR Head</p>	<p>Quarterly as per requirement</p>	<p>--</p>

		<p>accessibility of the area for residents. The distillery project is expected to have a positive impact by generating income and creating job opportunities for local residents, enhancing their economic stability. The utilization of bagasse promotes sustainable resource management, reducing reliance on external raw materials and maximizing the use of by-products from sugar production. Surrounding villages may experience development and improved facilities as a result of the project, leading to an overall enhancement in local infrastructure.</p>	<p>opportunities for community members, enhancing their economic prospects. The proposed activities will generate indirect employment in the region, creating demand for workers in various roles, including the supply of raw materials and auxiliary services. This will contribute to the economic improvement of local residents. The project will facilitate an increase in local skill levels by providing workers with exposure to new technologies and operational activities, thereby enhancing their employability. The project will offer financial stability to the existing sugar factory by introducing a new methodology for utilizing bagasse, a by-product from sugar production, ultimately benefiting farmers and employees in the agricultural sector. The industry will allocate</p>				
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			53.2 lakhs for various community development activities in surrounding villages under Corporate Environmental Responsibility (CER) initiatives, fostering positive relationships with local communities.				
6	House Keeping	Source: Operational activity Impact: Aesthetics blockage of storm water drain Rain Water Storage 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	0.50
7	Energy	Excessive energy use can lead to the depletion of local natural resources, such as fossil fuels or water, particularly if energy sources are not sustainably managed. High energy consumption can lead to excess heat generation, potentially causing thermal pollution and negatively affecting	Invest in renewable energy sources, such as solar, LED to reduce reliance on fossil fuels and lower greenhouse gas emissions. Develop and implement energy management systems to monitor and optimize energy use across all operations. Invest in energy-efficient	Review of status of implementation of suggested mitigation measures	Facility Manager	Six monthly review by Facility Manager	0.35

		local ecosystems. Dependence on energy supply can result in operational downtime during power outages, impacting production and financial performance.	equipment and technologies that consume less energy while providing the same or improved performance.				
8	EHS including associated risks of flammables  Activities: Fire Explosion Accident	Impact: The presence of flammable materials, such as alcohol and solvents, heightens the risk of fire incidents, which can lead to property damage, loss of life, and disruptions to operations. In the event of a fire or explosion, hazardous materials may be released into the environment, contaminating soil and water resources and impacting local ecosystems. Exposure to fire hazards can pose serious health risks to employees, including injuries from burns, smoke inhalation, and other fire-related incidents. Fire and explosion risks can have a direct impact	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	Review of status of implementation of suggested mitigation measures	EHS Manager	Monthly review by EHS Manager	3

		<p>on surrounding communities, leading to potential evacuations, property damage, and loss of livelihood for local residents.</p>	<p>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. 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</p>				
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			<p>deal with an on-site emergency such as fire, explosion, gas leak, odour or other incident threatening safety &amp; 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.</p> <p>The Site Operations Manager shall carry out exercises of part of the Emergency Response Plan at a regular interval as deemed necessary.</p> <p>The lesson learnt from these exercises shall be documented and used during the updating of the Emergency Response Plan.</p> <p>Provision of water hydrants in operative conditions.</p> <p>Emergency exit.</p> <p>Proper labelling of exit and place of the protective system installation.</p> <p>Conducting mock drills.</p> <p>Trained personnel to use the fire control systems.</p>				
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			<p>Display of emergency evacuation maps in each floor.</p> <p>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</p>				
9	<p>Disaster Management</p> <p>Activities: Chemical spills Workplace accidents Explosion risk</p>	<p>Impact: Leaks or spills of hazardous chemicals during storage, handling, or transportation can contaminate soil and water, posing risks to human health and the environment.</p> <p>Flammable materials like alcohol and solvents increase the risk of fires, leading to injuries, property damage, and operational disruptions.</p> <p>Equipment failures or improper machinery handling can lead to injuries or fatalities, affecting worker safety and morale.</p> <p>Accidental discharges of</p>	<p>Conduct thorough risk assessments to identify potential hazards and vulnerabilities within the distillery operations, focusing on chemical storage, handling, and processing areas.</p> <p>Develop and implement a comprehensive emergency response plan that outlines procedures for handling chemical spills, fires, and other emergencies, including evacuation routes and assembly points.</p> <p>These risks will be minimized by periodical operation and maintenance of equipment and periodical supervision</p>	<p>Review of status of implementation of suggested mitigation measures</p>	<p>EHS Manager Security In charge</p>	<p>Monthly reviews by EHS Manager and Security In charge</p>	--



		<p>effluents or hazardous waste can cause long-term environmental harm, impacting local ecosystems and biodiversity. Disasters may necessitate evacuations, disrupt livelihoods, and damage infrastructure, resulting in social and economic challenges for nearby residents.</p>	<p>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 &amp; alarm System Fire Fighting System and devices Annually, update Emergency Response Plan and ensure organization available for its implementation. Ensure compliance with all relevant regulations and industry standards related to safety, health, and environmental protection.</p>				
10	<p>Project Related Traffic</p> <p>Activities: Transport, Pollution</p>	<p>The project will raise vehicular movement, potentially causing road congestion in nearby villages. More vehicles will lead to fugitive emissions and noise pollution, affecting both humans and animals</p>	<p>The site is well connected to the Karad-Atpadi National Highway 166E via internal MIDC roads, ensuring smooth transport access. During operation, an additional 44 PCUs daily will be managed on the</p>	<p>Review of status of implementation of suggested mitigation measures</p>	<p>Facility Manager</p>	<p>Weekly review and reporting by PMC and Monthly review by the staff related to function.</p>	--

		<p>in the area. Increased traffic, especially heavy vehicles, may heighten the risk of accidents and road safety concerns for local communities. Higher traffic volumes could result in wear and tear of local roads, leading to faster deterioration.</p>	<p>roads, which are in good condition and have sufficient capacity to handle the increase. Covered transportation will be used for raw materials, fuel, and products to prevent fugitive dust generation during transit. A comprehensive traffic management system will be implemented to avoid congestion on public roads and ensure smooth vehicle movement. A 580 sq. m. area within the plant premises is designated for parking, reducing the risk of vehicles queuing outside. Entry into the plant will be properly managed to avoid queuing on public roads and ensure smooth vehicle flow. All drivers will undergo suitable training in traffic management and safety procedures to ensure safe vehicle operations. Only PUC-certified vehicles will be allowed on-site to minimize</p>				
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			vehicular emissions. Trucks carrying bagasse will be covered, and alcohol will be transported in tankers, preventing fugitive dust or VOC emissions during the transport of raw materials, fuel, and products.				
11	Ecology and Biodiversity  Activities: Pollution Soil Degradation Noise & Air Pollution	Impact Dust from material handling and transport can settle on nearby vegetation, reducing plant growth and agricultural productivity. Improper disposal of solid/hazardous waste can contaminate soil, harming local vegetation and disrupting habitats of microflora and fauna. Accidental wastewater leaks can affect terrestrial flora and reduce crop productivity due to chemical runoff. Fugitive emissions may irritate animals' eyes, while noise from operations could cause hearing loss or behavioral disturbances in wildlife. Contaminated soil from	Implement water sprinkling and use of dust suppression systems during material handling and transportation to minimize dust emissions affecting nearby vegetation. Ensure proper collection, storage, and disposal of solid and hazardous waste in designated areas with impervious flooring and leachate collection systems to prevent soil contamination. Treat all effluents through ETP (Effluent Treatment Plant) and ensure a zero liquid discharge (ZLD) system to prevent wastewater from contaminating land or water bodies. Use acoustic enclosures	Greenbelt development- Gradually during construction & operation	EHS manager/Safety officer	Record of no of Plants to be planted, supervision on irrigation facility and survival rate ensuring healthy and dense greenbelt	6.4

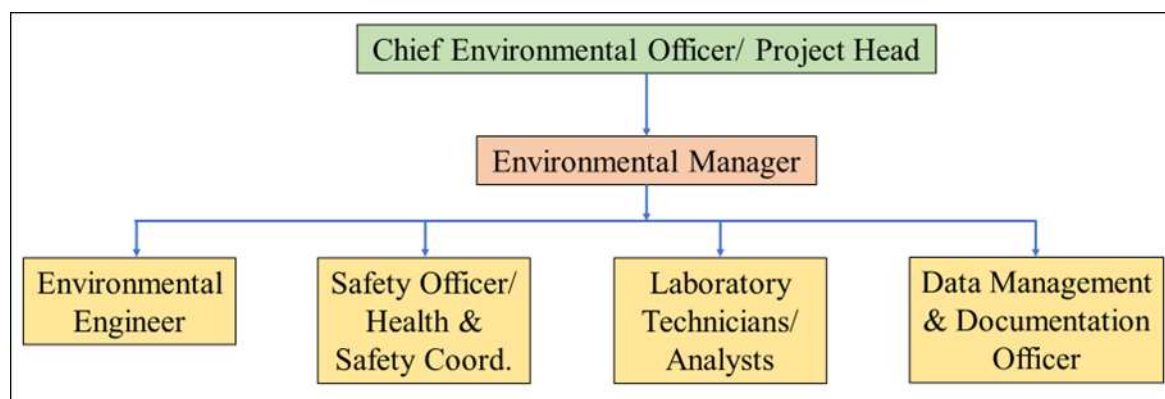
		<p>chemical waste may stifle plant growth and reduce biodiversity. Heavy machinery can compact soil, disrupting its structure and harming plant life. Elevated noise levels and light pollution can disturb local wildlife, affecting their behavior and habitat use.</p>	<p>for noise-generating equipment like cooling towers, thermic fluid heaters, and DG sets. Limit vehicular movement to designated routes and maintain speed limits to reduce noise impacts on local wildlife. Develop a dense greenbelt with native plant species to serve as a buffer zone, enhancing local biodiversity and providing habitat for small fauna. Restrict night-time operations to minimize the impact of light pollution on nocturnal wildlife. Use downward-facing lighting with controlled intensity to prevent light pollution, ensuring minimal disturbance to nocturnal species. Restore disturbed land after construction with native vegetation to prevent habitat loss and improve soil quality.</p>				
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### 14.3 Implementation of EMP

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 9**.



**Figure 9: Environment Monitoring Cell**

### 14.4 EMP Review and Amendments

The EMP serves as a vital tool for environmental management and must be reviewed periodically to accommodate changes in the organization, processes, or regulatory requirements. After each review, the EHS Manager will be responsible for updating the EMP and obtaining approval from senior management. The revised EMP will then be communicated to all relevant staff.

The EHS Manager will identify and conduct training needs based on the specific requirements of the EMP and the capability of site and project personnel to implement the necessary management actions and monitoring activities. Additionally, general environmental awareness will be promoted among the project team to foster the adoption of environmentally sound practices and ensure compliance with project activities. This approach will help minimize

adverse environmental impacts, ensure adherence to applicable regulations and standards, and achieve performance that exceeds compliance requirements.

An environmental management training program will be conducted for project related activities. This will ensure capacity building for effective implementation of the management and control measures on various project activities. The training program will ensure that all concerned members of the team understand the following aspects:

- Purpose of management plan for the project activities;
- Requirements of the management plan and specific Action Plans;
- Understanding of the sensitive environmental and social features in the immediate vicinity of the Project site.; and Awareness of the potential risks from the Project activities.

### 15. Environment Management Cost

The total cost of the project is estimated about Rs. 2660 Lakhs. 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. During the construction phase, the environmental management cost will amount to approximately Rs. 7.68 lakhs per for capital expenses. For the operational phase, the capital cost will be around Rs. 396.2 lakhs, with recurring costs at Rs. 93.8 Lakhs per year. The details of EMP cost for construction and operation phase are given in **Table 15 and Table 16**.

**Table 15: Environment Management Cost during Construction Phase**

Sr. No.	Component	Description	Capital Cost
1	Air Pollution Control	Dust Suppression by sprinkling water	1,50,000
2	Water Pollution Control	Tarpaulin Sheets, Leachate runoff prevention, Stormwater Management, Package STP	1,75,000
3	Noise pollution Control	Noise Level Monitoring, isolating the construction site with metal sheets	2,50,000
4	Environmental Monitoring and Management	Ambient air monitoring, work place monitoring from MoEF approved lab on monthly basis.	50,000
5	Occupational Health and Others.	Medical check of staff from certified doctor	35,000
6	Solid & Hazardous Waste Management.	Disposal of Solid Waste and Industrial Construction Waste	50,000
7	PPE'S	Personal Protective Equipment's	58,000
<b>Total</b>			<b>7,68,000</b>

**Table 16: Environment Management Cost during Operation Phase**

Sr. No.	Component	Description	Capital cost Rs. In lacs	Operational & Maintenance cost (Rs. In Lacs/year)
1	Air Pollution Control	Stack, Bagasse covered storage, bag filter	51.0	5.5
2	Water Pollution	Distillation unit, MEE, Effluent treatment through primary, secondary & tertiary system	290	81
3	Noise pollution control	Noise Level Monitoring	0	0.50
4	Environmental Monitoring and Management	Ambient air monitoring, stack emission monitoring, workplace monitoring from MoEF approved lab on monthly basis.	0	2
5	Occupational Health and Others	Medical check of staff from certified doctor and providing health cover	2.0	0.50
6	Green Belt	Green belt development & maintenance	6.4	0.50
7	Solid & Hazardous Waste Management	Hazardous waste Disposal to CHWTSDF Site	0	3
8	PPE'S	Personal Protective Equipment's	1.50	0.40
9	Renewable Energy	Installation of Solar Pannels	45	0.35
10	Rain Water Storage	Rain Water Storage	0.3	0.05
<b>Total</b>			<b>396.2</b>	<b>93.8</b>

## 16. Conclusion

Considering the potential impacts of the proposed project, Lignopura Agrotech has prepared adequate remedial measures and an Environmental Management Plan for their implementation. The proposed project technology for the demo-scale 2G integrated bioethanol initiative is specifically chosen due to its efficiency, innovation, and uniqueness in utilizing non-food biomass, such as sugarcane bagasse, for ethanol production, this project employs advanced processes that convert agricultural residues into value-added biofuels, effectively addressing both energy needs and waste management challenges. Overall, the proposed project will generate direct and indirect employment opportunities as well as increase in physical resources. Similarly, Lignopura Agrotech 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.