EXECUTIVE SUMMARY

ESTABLISHMENT OF 120 KLPD GRAIN BASED DISTILLERY TO PRODUCE 120 KLPD RECTIFIED SPIRIT/120 KLPD EXTRA NEUTRAL ALCOHOL/125 KLPDETHANOL

AT

GAT NO.200, 199/1 (PART), AGHAR BK, AGHAR, MALEGAON, NASHIK MAHARASHTRA

BY

HIRE BIO ETHANOL AGRO INDUSTRIES PRIVATE LIMITED

PROPOSAL FOR

ENVIRONMENT CLEARANCE

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EXECUTIVE SUMMARY

1 INTRODUCTION

Hire Bio Ethanol Agro Industries Pvt. Ltd. (HBEAIPL**)** will be standalone Distillery unit registered under the Company Act 2013, and Rule of Companies (Incorporation) Rule 2014, having the Certificate of Incorporation Rule 2014, having Certificate of Incorporation no.U15400MH2021PTC368158 of 25 day of September 2021. Factory is located at GAT NO.200, 199/1 (Part) Village- Aghar bk., Aghar, Taluka- Malegaon, District- Nashik, Maharashtra, 423201. The company is promoted by Samadhan Sahebrao Hire & Sanjay Sahebrao Hire (Managing Director). Hire Bio Ethanol Agro Industries Pvt. Ltd. Proposes to manufacture RS/ ENA/ Ethanol, by procuring traders/ nearby farmers with its command area of 50 Km from the plant location

The proposed project will procure RS/ ENA/Ethanol from procured (Grain based) Distillery Unit. In the command area, the availability of Grains is abundant and as such Grains based distillery unit is proposed of the capacity of 120 KLPD for production of 120 KLPD RS/120 KLPD ENA/120 KLPD Ethanol as per demand. The main raw material is grain, which will be procure from the nearby farmers. This will help to maintainsocio economy in the region.

Distillery effluent i.e. Spentwash generated from the analyzer column during the operation, will be sent for concentrated in standalone Multi – Effect Evaporator (MEE). Spent wash will be used for DDGS which will be used for Byproduct. Distillery will be based on "ZERO EFFLUENT DISCHARGE".

The aggregated capital investment for the proposed 120 KLPD grain based distillery has been estimated at Rs. **105.16 Crores.**

The promoters have extensively and carefully analyzed the present and future scenario of centralGovt. policies for promotion of ethanol addition in the petroleum fuels. They have also studied the present and future irrigation facilities

1.1 PROJECT LOCATION

The salient features of the project site are

Table 1-1 Salient features of the project site

Sr. No.	Features	Description
1.	Latitude	Latitude: 20°32'28.59"N
2.	Longitude	Longitude: 74°23'33.52"E
3.	Elevation above MSL	584 m
4.	Nearest highway	NH 60
5.	Nearest railway station	Nandgoan Railway station – 37.38 Km
6.	Nearest air port	Nashik International Airport – 70.15 Km Gondur International Airport – 55.45 Km
7.	Nearest town	Town- Malegaon – 12.27, City Nashik – 87.09 Km
8.	Nearest human settlement	Aghar (1.75 km)

Sr. No.	Features	Description
9.	Nearest water body	Girana River (1.22 km)
10.	Protected Area	None within 10 km
11.	Reserved Forests	None within 10 km
12.	Wildlife Sanctuary	Falls within 10 km
13.	Archeological site	None within 10 km
14.	State boundary	None within 10 km
15.	Defense installations	None within 10 km
16.	Average Rainfall	1035 mm

2 PROJECT DESCRIPTION

The details about the maufacturing capacity of the proposed establishment are given in table below

Table 2-1 Proposed Products manufacturing quantities

Sr. no.	Description	Unit	Proposed Capacity	Remark
1.	**Distillery Unit**	KLPD	**120**	
	Rectified Spirit or	KLPD	120	Only one product at a time
	Extra Neutral Alcohol or		120	
	Ethanol		120	
	By-products			
1	**DDGS**	MT/Day	90	
2	**Fusel Oil**	KL/A	34	
3	**CO2**	MT/Day	45.3	

Table 2.2 Raw material Requirement of the proposed project

Raw Material	Quantity	Source	Mode of Transportation
Grain/Flour	Maize/Corn : 318 TPD @68 % Starch Content Broken Rice: 440-450 TPD @72 % Starch Content	Local	Trucks
Bagasse/Coal	Bagasse:288 TPD Coal : 144 TPD	Local	Trucks
Antifoam Agent	3 Kg/kl	Local Supplier	Tanker
NaOH (50%)	3 Kg/kl	Local Supplier	Mini Truck
Phosphoric Acid (75%)	1 Kg/kl	Local Supplier	Mini Truck
Enzymes like Amyloglucosidase,Alpha Amalyse,Viscozyme	1.70 Kg/kl	Local Supplier	Mini Truck

Neutrase	3 Kg/kl	Local Supplier	Mini Truck
Yeast	3 Kg/kl	Local Supplier	Mini Truck
H2SO4 (93%)	1 Kg/kl	Local Supplier	Tanker
Ca (OH)2(100%)	3. 7 Kg/kl	Local Supplier	Mini Truck

2.1 RESOURCE REQUIREMENT AND INFRASTURE FACILITIES

A) Land use Details

The total area available with the factory is **5.07 Hectares** Out of which, **1.67 Hectares will be** utilized for green belt development. A detailed area breakup is given below

Table 2-2 Landuse breakup

Sr. No.	Description	Area in Sq. m	% of Area
1	Built-Up Area	14035.53	27.67
2	Green Belt Area	16763.52	33.05
3	Area Under Open Space	7210.64	14.21
4	Parking Area	4624.02	9.12
5	Area Under Road	5068.27	9.99
6	Water reservoir	3024.8	5.96
	Total Plot Area	**50728.38**	**100%**

Traffic Management and Parking details

Total Plot area for the project is 50728.38 Sq.mt, out of which area required for Parking is 4624.02 sq.mt.

Parking details

Sr. No.	Tanker No.	Truck Nos.	2 Wheeler	4 Wheeler
1	8-10 Nos./day	10-12 Nos./day	40 Nos./day	15 Nos/.day

Raw material required for the project shall be obtained mainly from nearby farmers/ traders and other chemicals shall be obtained from nearby area. 10% parking of total plot area is provided for the proposed project. All the vehicles containing Raw material and final product shall be entered to the unit from existing 12 m Road, which is connected to Malegaon and Satana Road. Loading and unloading of the vehicles shall be done in day time only.

B) Power requirement

The power requirement for proposed distillery unit will be 4 MW and it shall be taken from 4 MW TG set.

C) Water Consumption details

Industrial Purpose:

The Girana River is the nearest water body of 1.22 km away from the factory site. Water is taken from irrigation department. The necessary permission from the irrigation department is already obtained.

Distillery Division – Total water requirement for distillery division shall be 2079 m3/day, out of which fresh water requirement shall be 493 M3/day only. Detailed water budget of the distillery unit is shown in **Table 2.3**

Water balance calculations:

Distillery division

I. Based on Grains

Table 2-3 Water Budget for Distillery Division (based on Grains)

Sr. No.	Details	Water Requirement (m3/day)	Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU/MEE	Solid waste generator
1	30 TPH Boiler	720	132	530	58	58	--
2	Process & dilute water	680	120	**In MEE**	**840 (Stillage)**	**Decanter where 56 MT/day Wet cake & 784 m3/day thin slops with 4.33% TDS to MEE**	56 TPD Wet Cake from Decanter
					160	**160 to MEE**	34 TPD Solid waste from MEE
3	Cooling water makeup	576	526	--	50	50	--
4	Washing Requirement	45	--	--	45	45	--
5	Evaporator Condensate	--	--	--	55	55	--
6	Condensate Polishing Unit	--	--	1118	--	--	--
	Total	**2021**	**778**	**1648**	**1208**	**1208**	**90**

Net Water Requirement: 2021-1648 = 373 m3/day.

Effluent Generation: 1208 m3/day out of which process and dilute wastewater -1000 m3/day, fermenter washing waste-45 m3/day, boiler blow-down wastewater-58 m3/day, and cooling tower wastewater generation – 50m3/day
Note: The DDGS shall be sold to purchaser as Cattle Feed, Poultry & Fisheries.

Table 2-4 Water Requirement and wastewater generation of the factory

Sr. No.	Water Requirement m3/day	Wastewater generation m3/day
1	**Distillery Division**	
A	Based on Grains	
	373	1208

D) Air Emission Management

Rice husk/ Briquette/Bagasse and coal will be used as fuel for 1*30 TPH Multifeed boiler. The fuel requirement of the proposed unit will be 288 MT/D or coal requirement of 144 MT/Day.

A stack of 60 meters height and electrostatic precipitator (ESP) as APC equipment shall be provided to control air emissions.

Table 2-5 Details of boilers and its APC equipment for proposed unit

Sr. No.	Stack attached to		Types of Fuel	Height in meter	APC System
Proposed Installation					
1	1*30 TPH	Distillery Division	Rice Husk/Briquette/Bagasse/Coal	60	ESP

E) Solid waste Management

a) Non Hazardous solid wastes details

Table 2-6 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
	Bagasse as fuel for both the boilers		
1.	Fly/ Boiler Ash	30 TPH Boiler- 103.68 MT/M	Ash generated shall be sold to brick manufacturer
2	Bottom Ash	30 TPH Boiler- 25.92 MT/M	
	Coal as fuel for 30 TPH Distillery Boiler		
3	Fly/ Boiler Ash	518.4 MT/M	Ash generated shall be sold to brick manufacturer.
4	Bottom Ash	129.6 MT/M	
5	ETP Sludge	300 MT/A	ETP Sludge shall be sold as manure.
Other Solid Wastes			
1.	Paper waste	0.01 MT/M	Manually collected and stored in a designated area and sold to scrap vendors
2.	Plastic waste	0.01 MT/M	
	Municipal Solid waste		
	Non-Biodegradable	3 MT/M	Manually collected and sold to scrap vendors
	Bio-degradable	5 MT/M	Used as manure.

b. Hazardous Waste

Table 2-7 hazardous waste generated and its disposal

Sr. No.	Category	Description of waste	Quantity	Mode of Collection and Disposal
1.	5.1	Used Oil	100 Lit /A	Shall be burnt in boiler

3 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

Ambient air monitoring was carried out at 8 locations for 24 hours a day, twice a week at each location over/for a period of three months (December 2021 to February 2022) to determine background concentrations. The Maximum concentrations of each pollutant observed are considered as a background concentration of the respective location, the summary of the results is given below.

1. Particulate Matter (PM_{10})

The maximum, minimum, average and 98th percentile concentrations for PM_{10} were recorded in the study area in the range of 39.6 to 51 µg/ m^3. The maximum 98th Percentile concentration is 50.44 µg/ m^3 were recorded at Project Site (location 1). The concentrations of PM_{10} are well below the CPCB standard of 100µg/ m^3.

2.Particulate Matter ($PM_{2.5}$)

The maximum, minimum, average and 98th percentile concentrations for Particulate Matter ($PM_{2.5}$) monitored in the study area were 23.2– 32.6µg/m^3. Highest 98th percentile value is 32.18 µg/m^3 which was observed at Pimpalgaon (Location-2). The concentration of $PM_{2.5}$ is well below the prescribed limit of 60µg/m^3.

3. Sulfur Dioxide (SO_2)

The Minimum, maximum, average and 98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 12.6 – 19.4µg/ m^3. Maximum 98th Percentile value of Sulfur dioxide is 19.21 µg/ m^3obtained at Project Site (location 1). The concentration of SO_2 is well below the prescribed limit of 80µg/m3.

4.Oxides of Nitrogen (NOx)

The Minimum, maximum, average and 98th percentile value of Oxides of Nitrogen (NOx) in the study area from the monitored data was in the range of 16.3– 25.9 µg/ m^3. Maximum 98th Percentile value of Oxides of Nitrogen (NOx) is 25.8 µg/ m^3obtained at Project Site (location 1). The concentration of NOx is well below the prescribed limit of 80µg/m^3.

5. Carbon Monoxide (CO)

The maximum, minimum, average and 98th percentile concentrations for Carbon Monoxide (CO) monitored in the study area were 0.02-0.42 mg/m^3respectively. Highest 98th Percentile value is 0.28 mg/ m^3 was recorded at Project Site (location 1). The concentration of CO is well below the prescribed limit of 4 mg/ m^3.

The ambient air quality monitoring results indicates that the overall air quality in the study area is within permissible standards prescribed by NAAQ Standards.

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

For proposed establishment 1*30 TPH boiler shall be installed. Considered the boilers working at full load conditions to estimate the GLC of PM_{10}, $PM_{2.5}$, SO_2 and NO_x due to the proposed establishment of the industry under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for Hire Bio Ethanol Agro Industries Pvt. Ltd, Aghar, Taluka- Malegaon, Dist- Nashik. Incremental concentrations are worked out for 8 receptor locations, at which ambient air quality monitoring was carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed establishment. Results are compared with the Ambient Air Quality Standards (AAQS).

Table 3-1 Stack Inventory

Sr. No.	Particulars	Description
A. Point Source (Stack attached to boiler)		
1	Stack attached to	Distillery boiler
2	Capacity	30 TPH
3	Fuel type	Bagasse or Coal
4	Total fuel quantity requirement	Bagasse -288 MT/day or Coal-144 MT/day
5	Stack height	60 m.
6	Stack diameter	4.0 m.
7	Flue gas temp.	120^0 - 135^0C
8	Flue gas velocity	7.5 – 11.0 m/s
9	Controlling equipment	ESP – 99% removal efficiency
10	Emission rate	(g/sec)
	i. TPM	0.399
Based on Observed Conc.& Fuel		
	ii. NOx	based on observed concentrations – 7.6
	iii. SO_2	Based on Fuel - Bagasse - 0.02% or Coal – 0.6%
		based on observed concentrations – 7.121
		based on fuel characteristics - Bagasse – 1.33
		based on fuel characteristics - Coal – 20
11	Ash content	4.32 MT/day
12	Ash below grate	0.864 MT/day (20 % of the total ash)
13	Remaining Ash	3.456 MT/day (80 % of the total ash)
14	Ash going to stack, QPM (with ESP removal efficiency of 99%)	0.03456 MT/day (Consider 99% ESP Efficiency)
15	Ambient temperature	30^0C
B. Line Source (Vehicular emission)		
	Average time of movement of vehicle inside the premises	5 min
	Distance travelled by the vehicles inside premises	0.2 km
	Q_{PM} (g/sec)	0.1045
	Q_{NOx} (g/sec)	1.1349

Sr. No.	Particulars	Description
	Q_{CO} (g/sec)	0.5857

3.1.1.1 Results of the AERMOD software for air quality predictions for proposed expansion of the factory

The AERMOD software was developed by US-EPA and American Meteorological Society (AMS) to compute dispersion of air pollutants in the ambient air due to the various sources. In this study, emissions from proposed stack are coupled with the subsequent meteorological data by using AERMOD 8.0.5 air quality model. Also, dispersion patterns are studied by the output of concentration isopleths plotted by the software. Incremental concentration values for selected receptors are added in the background concentration values.

From the results, it can say that,

- At the selected 8 receptor locations, surrounded in 10 km radius around Hire Bio Ethanol Agro Industries Pvt. Ltd, Aghar, Taluka- Malegaon, Dist- Nashik, GLCs are well within the limits of AAQS. Results of the Ambient Air monitoring are enclosed in the **Annexure II.**
- Under the working conditions of 1*30 TPH boilers, PM_{10}GLCs at all the 8 receptor locations are in the range of **46.45 µg/m3** to **50.44 µg/m3** which are within the limits of AAQS.
- Similarly, $PM_{2.5}$ GLCs for those receptors are in the range of **29.26 µg/m3** to **32.19 µg/m3** which is within the limits of AAQS.
- For SO_2, GLCs are in the range of **18.35 µg/m3** to **19.21 µg/m3**which is within the limits of AAQS.
- NO_x GLCs are in the range of **22.03 µg/m3** to **25.8 µg/m3**which is within the limits of AAQS.

It can be inferred that there.

3.2 WATER ENVIRONMENT

Water sampling and subsequent analysis was carried out to determine both the groundwater and surface water quality of the study area. Ground water & Surface water samples were collected at 8 locations & 7 locations respectively within study area. These samples were analyzed for physical and chemical parameters to ascertain the Baseline status in the existing surface water and ground water bodies.

Table 3-2 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water	
		Min	Max	Min	Max
1.	pH	7.10	7.50	7.10	7.40
2.	Dissolved Solids (mg/l)	382	472.30	302.4	378.20
3.	Total Hardness (mg/l)	133	184.24	121.3	151.00
4.	Chlorides (mg/l)	61.23	89.60	45.30	81.46
5.	Fluoride (mg/l)	<0.01	<0.01	<0.01	<0.01
6.	Sulphates (mg/l)	47.52	64.30	33.20	48.92

Ground water and surface water samples were collected and analyzed as per the Standard methods and the water quality of the study area is found within the permissible limits of IS: 10500- 2012. Except Fluoride concentrations observed are lower than the required concentration.

Groundwater quality is found to be good, which can be directly used for irrigation purpose. However, ground water used for drinking purpose after the appropriate treatment.

Surface water quality is found to be good, which can be directly used for irrigation purpose. However, for drinking purpose, conventional treatment suggested.

3.3 SOIL ENVIRONMENT

The soil monitoring was carried out at 8 locations in the study area, and analyzed for chemical and physical characteristics; the summary of the results is as under

- Soil in the area is mainly clayey in nature hence good water holding capacity.
- The finding of the study reveals that pH of soil in the range of 7.10 to 7.30,which is an indicative of the **neutral** to **slightly alkaline** soil.
- The values for Nitrogen at all locations varied between 224.60 to 301.24 kg/ha. Maximum concentration of nitrogen was observed at location S-6.
- The concentration of phosphorus was estimated to be between 41.65 to 86.42 kg/ha.
- It is important to note that the concentration of potassium was found to be at all locations ranging between 54.62 to 84.62 kg/ha.

Based on the above findings it can be concluded that the soil samples can be classified as per soil classification given by Tondon H.L.S. (2005). The samples fall under **medium to high** fertile soils.

3.4 NOISE ENVIRONMENT

In order to assess the noise levels in the study area, monitoring was carried out at eight different locations within 10 km radius of the study area.

Daytime Noise Levels $(Leq)_{day}$

Industrial Zone: The day time noise level at the Project site was found in the range of 50.48 dB (A), which is well below the permissible limit of 75 dB (A), due to industry is not working state presently.

Residential Zone: The daytime noise levels in all the residential locations were observed to be in the range of 49.20 dB (A) to 50.94 dB (A), which is well below the permissible limit of 55 dB (A).

Night time Noise Levels $(Leq)_{night}$

Industrial Zone: The night time noise level in the Project site was observed in the range of 42.40 dB (A), which is well below the permissible limit of 70 dB (A), due to industry is not working state presently.

Residential Zone: The night time noise levels in all the residential locations were observed to be in the range of 41.04 dB (A) to 41.58 dB (A), which is well below the permissible limit of 45 dB (A).

The industry is making all efforts to control the noise levels within the limits by providing acoustic measures and silencer pads etc. all the employees in these work places **shall be** provided with ear plugs / muffs.

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 3-3 Change in General Land use/ Land cover of Study Area (2008 to 2018)

Landuse	Area in km2		% of Study Area	
	2008	2018	2008	2018
Water Bodies	4.77	5.07	1.19	1.27
Settlement	16.43	18.08	4.11	4.52
Open Scrub	2.13	1.56	0.53	0.39
Agriculture	313.54	322.66	78.39	80.67
Barren Land	63.13	52.64	15.78	13.16
Total	400	400.01	100.00	100.00

- In the year 2008 water body area is about 4.77 km^2, whereas in the year 2018 is increased and it is 5.07 km^2.
- It can be inferred that there is an increase in area of 2.77 % under water body, settlement; agricultural land whereas a decrease in area under open scrub and barren land is 2.77 %.
- Increase in agricultural land due to improved irrigation facilities like drip/trickle irrigation instead of surface and subsurface irrigation techniques. Therefore barren land is converted into agricultural land.
- Increase in settlement due to an increase in industrial growth and migration of the people.

3.6 ECOLOGY AND BIODIVERSITY

Based on field survey, total 148 plants species have been recorded, out of which 61 Tree species, 21 Shrubs species and 53 Herbs and 13 Climber species are identified in entire study area. Total 5 species of odonates, 13 species of insects have been reported during entire field visit from different habitats on project site. 16 species of butterflies found during the field survey which shows greater diversity of butterflies. 46 bird species were recorded in the study area, most of them around the water bodies and grassland. Mammals observed during field survey were eight species which are mostly common, no threatened taxa have been reported from proposed project site

3.7 DEMOGRAPHIC OR SOCIO-ECONOMIC PROFILE

The proposed project has a positive response from the public. The willingness to pay and the willingness to accept the project has positive outcome. The losses due to the polluting agents can be diluted through various methods. The unit has recycled waste water after treatment. The social and cultural vulnerability

index responds a very less and level of resilience is at the higher side. The families dwelling around could get more facilities due to the industry during the corresponding period.

4 IDENTIFICATION, PREDICTION AND MITIGATION MEASURES

Approx. 130 nos. of labors shall be employed during installation phase for the project which includes installing new machinery and units of the plant.

Table 4-1 Anticipated environment impacts its effect and mitigation measures during construction phase

Sr. No.	Impacts	Effects	Mitigation Measures
1	Dust	Respiratory diseases	All the internal Roads are tar felted Dust separation sprinkling water, use machinery meeting
2	Noise	Impairing, Hearing, Fatigue related Health issues	Provide acoustic measures and silencer pads to reduce noise level. Provide personal protective equipment to the workers.
3	Land	Reduction of vacant land	Utilize the existing infrastructures and adopt vertical expansion and maximize the operation schedules.
4	Top soil	Loss of fertility	Utilize for Green belt development.
5	Water	Additional water is required for construction activities and Drinking	Minimize the water requirements by adopting mechanical mixing and Drinking water in Bottles instead of Taps.
6	Wastewater	Improper disposal of waste water leads to contamination of water sources and soil	Domestic wastewater shall be treated in aeration tank of proposed distillery CPU and treated wastewater shall be used for gardening.

Anticipated environment impacts its effect and mitigation measures during operational phase is given in chapter 4.

5 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

Hire Bio Ethanol Agro Industries Pvt. Ltd. (HBEAIPL**)** will be standalone Distillery unit registered under the Company Act 2013, and Rule of Companies (Incorporation) Rule 2014, having the Certificate of Incorporation Rule 2014, having Certificate of Incorporation no.U15400MH2021PTC368158 of 25 day of September 2021. Factory is located at GAT NO.200, 199/1 (Part) Village- Aghar bk., Aghar, Taluka- Malegaon, District- Nashik, Maharashtra, 423201. The company is promoted by Samadhan Sahebrao Hire & Sanjay Sahebrao Hire (Managing Director). Hire Bio Ethanol Agro Industries Pvt. Ltd. Proposes to manufacture RS/ ENA/ Ethanol, by procuring traders/ nearby farmers with its command area of 50 Km from the plant location

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The Project Site is conveniently located for development of the Project.

- Aghar at a distance of 1.57 km
- Town- Malegaon, at a distance of 12.27 km and Nashik at a distance of 87.09
- Nandgaoni is nearest Railway station 37.38 km away from factory site.
- Gondur International airport is nearest Airport 55.45 Km away from factory site and Nashik airport at a distance of 70.15 km from factory site

➢ Environmental Setting-

- Location –20°32'28.59"N and 74°23'33.52"E
- Nearest State Highway – NH60
- Nearest river –Girana River- 1.22 km
- Seismicity – Seismic Zone III as per IS:1893 (Part-I):2002

The industry has sufficient land for proposed establishment. The minimum quantity of water is required, which can be obtained from the irrigation department. There are no negative impacts due the proposed establishment. Thus, the existing site is suitable for the proposed establishment.

6 ENVIRONMENT MONITORING PROGRAMME

Table 6-1 Environment management programme

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
1.	Ambient Air quality at appropriate location for PM_{10}, $PM_{2.5}$, SO_2,andNO_x,	PM_{10}, $PM_{2.5}$, SO_2,andNO_x	24 hourly, Quarterly	8 Locations 1 @ Upwind and 2@ downwind directions from stack @ 120^0 to each other Near entry and exit gates
2.	Stationary Emission from Stack PM, SO_2, NOx	PM, SO_2, NOx	Monthly	1 DG set Stack, 2 Boiler Stack
3.	Water	Water quality parameters as per 10500:2012	Monthly	Drinking water locations
	Waste water quality (treated and Untreated)	pH, BOD, COD, TSS, Flow, TDS etc.	Monthly	ETP inlet and Outlet
4.	Noise	Day and Night levels Equivalent noise level- dB (A)	Quarterly or as often as required	8 Locations Upwind and downwind directions Near boilers and near main gate and ETP.
5.	Soil (Qualitative and quantitative testing/analysis to check the soil fertility,)	pH, Cation Exchange Capacity, Total Nitrogen, Phosphorous, Potassium, moisture, Permeability, Conductivity, Texture & structure, Organic carbon	Quarterly or as often as required	1 near Greenbelt 1 near ETP Composite sample shall be taken at each location
6.	Solid waste generation monitoring / Record Keeping	Manual record keeping	To be updated daily	
7	Greenbelt and plantation monitoring	Type of species shall be decided based on soil & climatic conditions. The number of trees would be 1500 per hectare, however; the number of trees would	Six Monthly	

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
		vary depending on the typeof soil		
8	Carbon and Water foot Print Monitoring	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery	Daily and Monthly	

7 ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

HAZOP and Quantitative Risk Assessment studies are carried out for each product, disasters management plan, onsite and offsite emergency plan are prepared and given in Chapter 7 of the EIA Report

Consequence analysis of ethanol due to storage facility

Scenario of Ethanol in different forms

SITE DATA:

Location : HIRE BIOETHANOL AGRO INDUSTRIES PVT LTD , INDIA

Building Air Exchanges Per Hour: 0.44 (unsheltered single storied)

Time: March 9, 2022 1515 hours ST (using computer's clock))

CHEMICAL DATA:

Chemical Name: ETHANOL

CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol

ERPG-1: 1800 ppm ERPG-2: 3300 ppm ERPG-3: N/A

IDLH: 3300 ppm LEL: 33000 ppm UEL: 190000 ppm

Ambient Boiling Point: 170.5° F

Vapor Pressure at Ambient Temperature: 0.11 atm

Ambient Saturation Concentration: 116,005 ppm or 11.6%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 1.3 meters/second from 129° true at 3 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 31° C Stability Class: F

No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 12 feet Tank Length: 10.6 feet

Tank Volume: 1200 cubic feet

Tank contains liquid Internal Temperature: 31° C

Chemical Mass in Tank: 19,881 kilograms

Tank is 75% full

Circular Opening Diameter: 2 inches

Opening is 10 centimeters from tank bottom

Ground Type: Default soil

Ground Temperature: equal to ambient

Max Puddle Diameter: Unknown

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 69.2 pounds/min

(Averaged over a minute or more)

Total Amount Released: 2,580 pounds

Note: The chemical escaped as a liquid and formed an evaporating puddle.

The puddle spread to a diameter of 41 yards.

Type of Tank Failure: BLEVE tank explodes and chemical burns in afire ball

Potential hazards from BLEVE:

- Thermal radiation from fireball and poolfire
- Hazards fragments and blast force from explosion

- Downwind toxic effects of fireby-products

BLEVE/Fire ball Scenario: The higher the internal tank pressure/temperature at the time of tank failure, the larger the fire ball. Any liquid not consumed by the fire ball will form a pool fire.

SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank

Tank Diameter: 12 feet Tank Length: 10.6 feet

Tank Volume: 1200 cubic feet

Tank contains liquid

Internal Storage Temperature: 31° C

Chemical Mass in Tank: 19,881 kilograms

Tank is 75% full

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 172 yards Burn Duration: 11 seconds

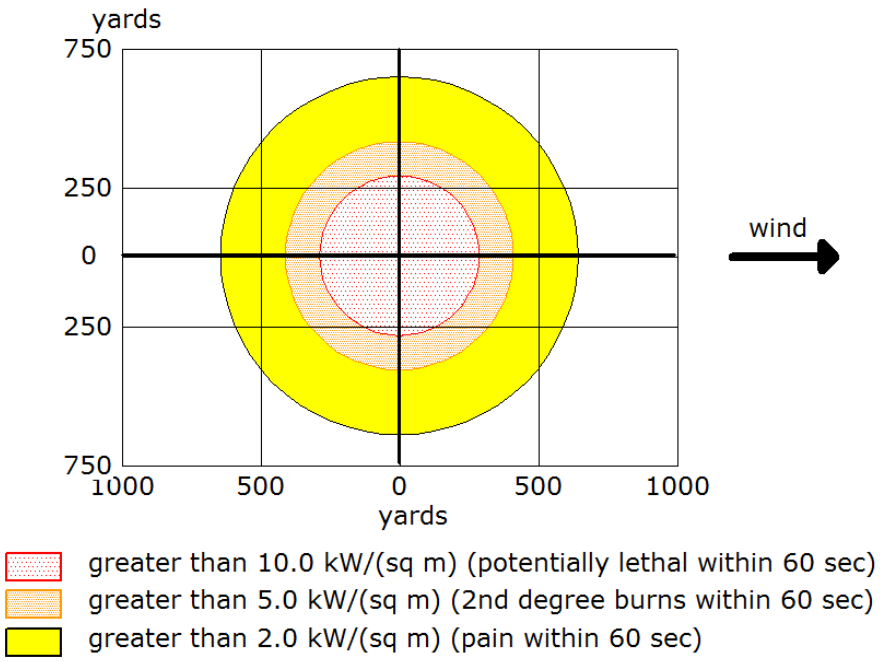
THREAT ZONE:

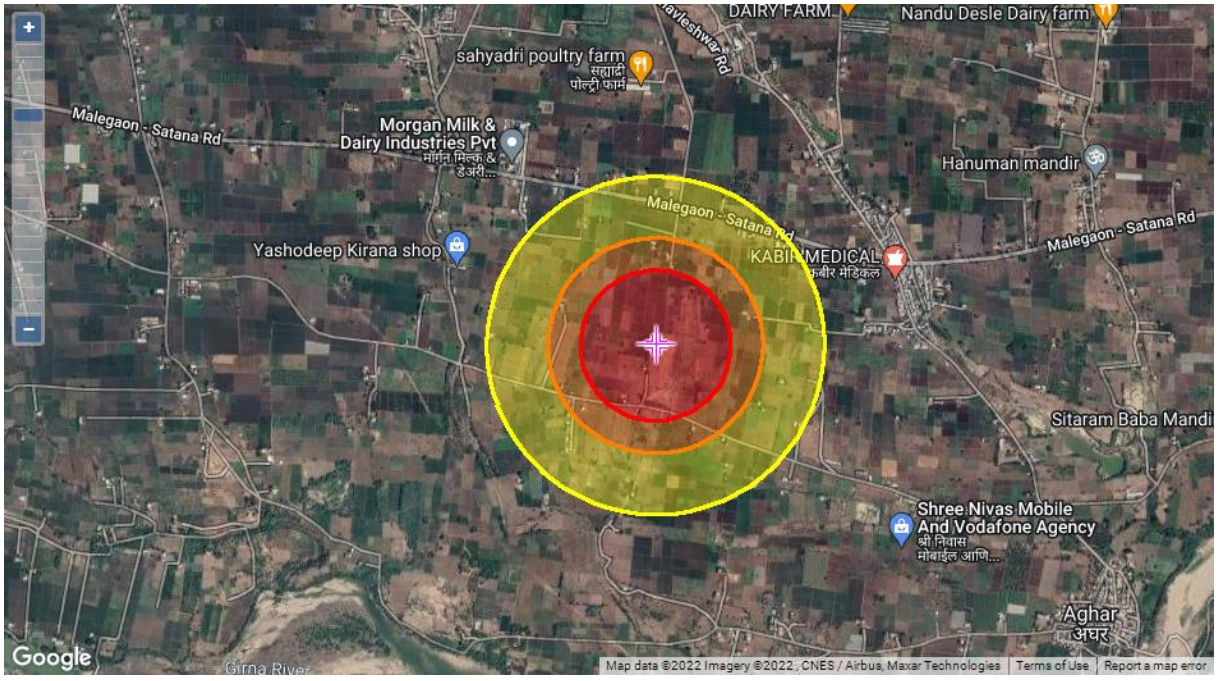
Threat Modeled: Thermal radiation from fireball

Red : 287 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 411 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 644 yards --- (2.0 kW/(sq m) = pain within 60 sec)





The Thermal radiation from fireball of Ethanol having value of 5 kw/sqm is Vulnerable for second degree burns to all the plant personnel in the radius of 1.1 mile

The fire due to leakage of Ethyl alcohol in the storage shed and its consequence considered as Major and its likelihood is unlikely

Significance = Likelihood X Consequence

=3*4=12

As defined in Risk Criteria and action requirements

The risk significance is Medium.

"Risk is tolerable" –
Mitigation measure: It is highly flammable liquid in presence of open flames and spark. Storage drums should be checked at regular intervals for any leaks for its safe storage. Check regularly earth pit resistance. At any point of time do not place any ignition source near by the storage drums.
In case of fire, use fire hydrant system and fire extinguisher -alcohol foam to extinguish the fire in order to minimize the risk level and avoid fire spread to other areas of the plant.
Inform plant head for emergency preparedness. Put water curtain on the storage shed to avoid heat radiation to the other areas.

Conclusions

When tank explodes and ethanol in a fireball due to BLEVE;

The thermal radiation for the Ethanol tank confined to the maximum at 287 yards that means the thermal radiation intensity of 10kW/m^2 is potentially lethal within 60 seconds. Similarly, the other threat zone of 5.0 kW/m^2 causes 2nd degree burns within 60 seconds at 411 yards and the rest is 2.0 kW/m^2 subjected to within the unit at 644 yards, which causes pain within 60 seconds.

Project proponent will implement all preventive measures to tackle all type of emergencies arising out of operation or malfunction of individual unit's. The required resources for Onsite and Offsite emergency management plan will be properly planned and provided to implement the plan effectively. The factory shall give highest priority towards Health and safety of the employees and people residing nearby areas. Management shall conduct the training to the nearby villagers to appraise them about their role during emergency. All nearby people shall be given training on do's and don'ts during emergency situation.
Unfortunately, if there is any emergency onsite of offsite, it will be tackled effectively due to availability of required resources at the site. Similarly, all the concern staff and members of the Teams shall be trained appropriately to tackle the emergencies in the plant. By knowing the type of emergency situation that may arise during operation of the plant, appropriate control measures will be implemented to reduce the gravity of the emergencies. Similarly, to avoid the emergency situation, all required mitigation measures will be implemented as recommended.

8 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN:

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The capital cost for the EMP will be Rs.1300 Lakhs. And recurring cost will be Rs. 45 Lakhs. The detailed EMP budget is given in table below

Table 8-1EMP Budget

SR. NO.	COMPONENT	PARTICULARS		CAPITAL INVESTMENT (IN LAKHS)	RECURRING INVESTMENT (IN LAKHS)
1.	Air	Construction of new stack, boiler and ESP		1000	10
2.	Water	• Distillery CPU • MEE		200	7
3.	Noise	Acoustic enclosures, Silencer pads, ear plugs etc		20	5
4.	Environment monitoring and Management	Quarterly Environment Monitoring (Per Year)		--	6
		Ambient air monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx		
		Boiler & DG Set Monitoring	TPM, SO_2, NOx		
		Effluent (Treated &Untreated)	pH, COD, BOD, TSS, TDS, Oil & Grease		
5.	Occupational Health	Gloves, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		25	5
6.	Greenbelt	Green belt development activity		15	
		Maintenance of green belt		--	2
7.	Solid Waste Management	Solid Waste Management		20	4
8.	Rain water harvesting	Rain water harvesting		20	2
9.	Carbon and Water Foot Print	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery		--	4
		TOTAL COST (INR, LAKHS)		**1300**	**45**

9 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The capital cost of the proposed establishment project is Rs. 105.16 Crores. The industry has reserved **Rs. 1.5774 Crores** (1.5% of the cost of the project as per Office Memorandum Vide F. No. 22-65/2017-IA.III Dated 01.05.2018) which will be spent on the activities like sanitation and health, education, and educational facilities as a cost towards corporate environment responsibility (CER).

10 RAINWATER AND STORMWATER HARVESTING PLAN

The industry is making efforts to conserve natural resources by adopting green technologies and as such industry proposes to adopt rain water harvesting system. With the annual rainfall of 1050 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about 7865.88 m^3 per year water is harvested. This harvested water shall be utilized for greenbelt development/ irrigation facility.

Storm water management system is also adopted by the industry. Separate drains of minimum 0.45 m * 0.60 m are provided for the collection and disposal of storm water from the industry premises. The rainwater harvesting design details are given in Annexure-III of the EIA Report.

11 CONCLUSIONS

As the industry has provided all the necessary pollution control measures for water, Air and Solid and hazardous waste disposal, the negative impacts on the environment would be minimal/ negligible. The establishment programme would help the farmers to buy their grains produce in time which would help to minimize the loss of weight and yield maximum financial benefits.