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EXECUTIVE SUMMARY
of
Environmental Impact Assessment Report For

New 30 KLPD Molasses Based Distillery Unit

M/s. SHIUR SAKHAR KARKHANA LIMITED

Village : Wakodi, Tal. : Kalamnuri, Dist. : Hingoli
Maharashtra - 431 702

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EXECUTIVE SUMMARY

1.0 Introduction

M/s. Shiur Sakhar Karkhana Ltd. (SSKL) located at village Wakodi in Kalamnuri taluka of Hingoli district in Maharashtra is planning to setup a new molasses based distillery unit of 30 KLPD capacity. SSKL is a private sugar mill registered under vide registration no. U15420/MH/2001/PTC/132602. The Mill has started its first crushing season in 2019 with crushing capacity of 2500 TCD. Considering the demand for ethanol and to attain financial stability, the management of SSKL has decided to install a new 30 KLPD distillery plant.

The purpose of this environmental impact assessment (EIA) study is to obtain Environmental Clearance for the proposed project. The notification no. S.O. 1533 promulgated on September 14, 2006 has covered distillery industry under activity 5(g). According to a notification no. S.O. 1960(E), dated June 13, 2019, molasses-based distilleries less than 100 KLPD capacity are placed under category 'B 1'.

1.1 The Site and its selection

SSSKL is located at village survey number 82, village Wakodi, Tal. Kalamnuri, Dist. Hingoli, Maharashtra. It has planned to setup the proposed distillery within its existing sugar unit premises. The project proponent is owning the land. The land is open hence no re-habilitation and resettlement issues involved in the project. The earlier land use was agricultural. The present site fulfills the industrial site selection criteria of MoEF&CC/CPCB/MPCB. There is no protected area such as sanctuary, national park, biosphere reserve within 10 km radius of the proposed site. There are no defense installations, recreation site, etc. within 25 km radius of the site. Proposed site is well connected by state/national highways. It is located approximately 1.2 km away from Kalamnuri-Pusad road and Kalamnuri-Nanded National Highway 161 is at 11 km from the proposed site. Reasonably good infrastructure, support facilities and labor etc. are available in the vicinity. Most importantly, nearness to raw material (molasses/juice) considered for site selection. Therefore, no alternative sites were searched for the project.

Table 1: Highlights of the Project

Working days	**year around**	
Land (Owned by the project proponent)	• Distillery, evaporation unit (MEE), storage lagoon, ETP/CPU, Incineration boiler, coal storage and convey, ash yard/pond or slurry pond etc. = ~ 9,093.3 m^2 • Green belt development = 13,900 m^2 **Total land allocated = 42,000 m^2**	
Main Raw Material	**Molasses**	
	C –type	111 TPD
	OR B heavy type	103 TPD
	Sugarcane (for juice/syrup)	455 m3 per day
Technology for Product Manufacturing	fermentation: Continuous /Fed-batch distillation: Multi-pressure Molecular Sieve Dehydration (MSDH) system will be adopted to produce fuel ethanol	
Steam	Total 255.60 TPD (Maximum estimated10.65 TPH)	
Fuel	Conc. Spentwash: 74.40 TPD + Coal 31.89 TPD **OR** Bagasse 56.88 TPD	
Boiler	Incineration boiler, 15 TPH (45 Kg/cm2)	
Power	0.89 MW/hr. source: captive from 1.5 MW turbine	
Water Req. and source	221 cu.m/day (considering recycle and reuse) Source: Isapur dam	
Manpower	55	
Project Capital Cost	Rs. 6,460.63 lakhs	
Capital expenses for EMP	RS. 2,272.00 lakhs	

2.0 Resources Requirement/Availability

Molasses: It is estimated that, approx. 19,000 TPA of C – type molasses will get available in-house OR 28,500 TPA of B-heavy molasses anticipated from own sugar unit. Thus, remaining quantity of molasses need to be purchased from the market/nearby sugar mills. Therefore, the management is planning to operate the unit on juice to ethanol mode during cane crushing season and during off-season of sugar mill following molasses to ethanol route. Average operation days of 330 per annum observed feasible through this route.

Water Requirement: Estimated daily requirement of fresh water for the proposed project is 221 m³. It will be sourced from Isapur dam. Summary of water balance is as follows.

Fresh water requirement	= Water input – water recycle
	= **980 –759** = 221
Net fresh requirement	= 221 m^3/day
Water requirement per lit of alcohol	= 7.3 lit
Net fresh water required over the year = 221 X 330 = 72,930 m^3 per annum	

In addition, the Management is also exploring the possibility of use of excess condensate of the sugar unit for distillery operations.

Fuel: For the proposed project, spent wash will be incinerated using Indian coal or bagasse. Indian coal will be sourced from nearby market and its estimated requirement is 31.89 TPD (1.33 TPH). Concentrated spent wash of 74.4 TPD or 3.1 TPH will be incinerated. Its calorific value observed approx. 1,800 cal/g and ash content is observed maximum up to 18%. Bagasse is planned as an alternate fuel when coal is not available. It will be sourced from own sugar unit. Its estimated requirement is 56.88 TPD (2.37 TPH).

Steam: Estimated maximum steam requirement is 10.65TPH. It will be sourced from 15 TPH incineration boiler.

Power: Estimated power requirement of 0.89 MW/hr. will be fulfilled from captive steam turbine of 1.5 MW.

Boiler: One new fluidized bed incineration boiler of 15 TPH capacity, having 45 kg/cm² (g) pressure & 400 ± 5^{0}C temperature, proposed for the project. Mechanized system for fuel and ash handling will be developed.

Manpower: The project will be generating direct employment to 55 persons out of which 25-30 will be skilled and others will be semi-skilled and unskilled.

3.0 Process Description

For the proposed project, the Management has planned to adopt the latest technology for process as well as for effluent disposal. Overall objective of this is to achieve high efficiency of operations, save energy and water and achieve Zero Liquid Discharge (ZLD). The characteristic of manufacturing process is given below and a schematic is shown in Fig. 1.

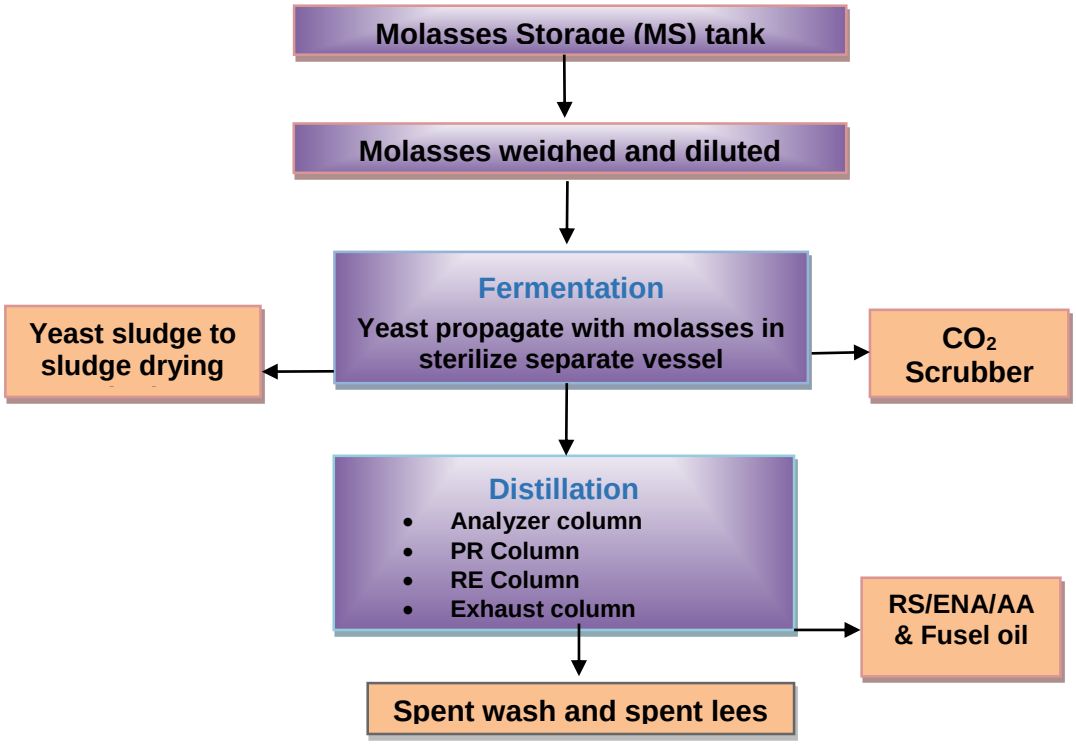

Figure 1: Schematic of Manufacturing Process

3.1 Manufacturing Process

The production process mainly involves fermentation and distillation process.

3.1.1 Fermentation

Molasses is the chief raw material used for production of alcohol. Molasses contains around 50% total sugars, of which 30 to 33 % are cane sugar and the rest are reducing sugar. During the fermentation, yeast strains of the species *Saccharomyces cerevisieae*, a living microorganism belonging to class fungi converts sugars such as sucrose or glucose present in the molasses in to alcohol. The continuous fermentation process has many advantages like continuity of operation, higher efficiency and ease of operation. Continuous fermentation also results into consistent performance over a long period as compared with batch fermentation. Most modern ethanol production plants adopt this continuous fermentation technology. Hence, continuous fermentation process will be adopted in the proposed unit. The yield of alcohol is ~270 liters/ ton of C type molasses and 300 to 330 liters for B-heavy type. One ton of sugar cane (juice) produces approx. 70 L of alcohol.

3.1.2 Distillation

After fermentation, the next stage in the manufacturing process is to separate alcohol

from fermented wash and to concentrate it to 95%. This is called Rectified Spirit (RS). For this purpose, method of multi- pressure distillation will be adopted. After separation of alcohol, the remaining part is the effluent of the process i.e. spent wash and spent lees.

3.1.2.1 Multi-pressure Distillation: Advantages

- Maximum heat integration is possible.
- Low steam consumption with reboiler (2.2 Kg/lit. of Rectified Spirit)
- Spent wash generation is less.

3.1.2.2 Re-Distillation to Manufacture Extra Neutral Alcohol (ENA)

ENA is prepared by re-distillation of the rectified spirit (RS) for the removal of impurities like higher alcohols, aldehydes and methyl alcohol. This is done by, remixing rectified spirit with soft water and distilling it in the ENA column.

3.1.2.3 Anhydrous Alcohol (AA)

Rectified spirit, is 94.68% alcohol. It is not possible to remove remaining water from rectified spirit by straight distillation as ethyl alcohol forms a constant boiling mixture with water at this concentration and is known as azeotrope. Therefore, a special process of molecular sieve de-hydration will be used for removal of water for manufacture of fuel ethanol i.e. anhydrous alcohol. Details of molasses and product storage tanks are given in Table 2.

Table 2: Details of Storage Tanks

SPECIFICATIONS FOR RECEIVERS & STORAGE TANKS – THICKNESS AS PER IS-803-1976:			
#	**Particulars**	**Quantity**	**Capacity (in m^3)**
1.	Rectified spirit receiver	03	40
2.	Impure spirit receiver	02	10
3.	RS storage tank	02	600
4.	Impure Spirit/Technical Alcohol Storage	01	200
5.	Fusel oil storage	01	10
6.	Rectified Spirit day storage tank for MSDH Plant	01	150
7.	Fuel Alcohol Receiver with moisture trap	03	40
8.	Fuel Alcohol storage with moisture trap	02	600
9.	Molasses Storage at distillery (Tons)	01	10,000

10.	Molasses storage at sugar mill (existing)	01	5,000

***** These will be provided with flame arrester & cooling vent condenser. The level indicators provided on all tanks. Receivers are also provided with flame arrester (SS-304).

4.0 Baseline Environmental Status

Primary data for the study was collected by sampling/monitoring air, water, soil and noise. Environmental monitoring work was carried out mainly during Jan to Mar 2020. Site is more or less flat having average elevation of 450 m above mean sea level. Isapur dam is the nearest surface water body at approx. 6 km towards north of the site and River Painganga ~ 3 km from the site. Due to availability of water from dam and river, land in the surrounding areas of the site mainly N, W and E is utilized for agriculture. There are no hills within 3 km radius of the project site. The site and surrounding area is covered in Survey of India (SOI) Toposheet no. E43F6 and latitudes and longitudes of corners of the site are as follows: 19°40'10.0"N, 77°25'24.5"E.

1. 19°40'16.23"N & 77°25'21.00"E
2. 19°40'16.14"N & 77°25'24.42"E
3. 19°40'08.19"N & 77°25'24.61"E
4. 19°40'09.77"N & 77°25'22.30"E

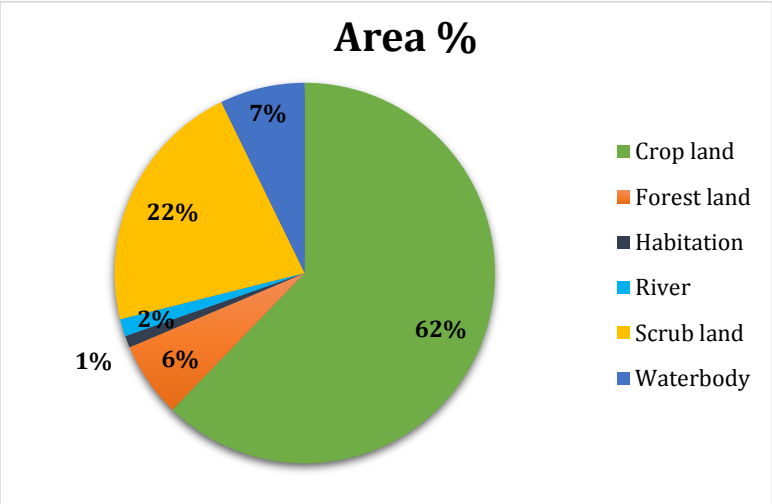

Figure 2: Landuse/ Landcover break-up for the 10 square km area

Table 3: Summary of Environmental features of study area

#	Facet	In brief
1.	General climate	Hot and dry
2.	Rainfall	An average annual approx. 946 mm

		Rains are received mainly during June-September months
3.	Temperature	The maximum average temperature in summer is around 41°C and minimum average temperature in winter is around 18°C
4.	Humidity	The maximum relative humidity was 60-80 percent. The mean relative humidity ranges between 30-40 percent
5.	Wind	Predominant wind direction was South west followed by North during the study period
6.	Land use	Crop land area 62 %, Scrub land 22 %, Forest 6%, Habitation area 1 %, river 2 % and water bodies 7%
7.	Air Quality	Complies NAAQ standards of Nov. 2009 at all monitored locations
8.	Noise	Complies the standard at all monitored locations
9.	Groundwater	As per District survey report 2019-20, The quality of ground water is Drinkable. However, localized fluoride contamination in aquifer and nitrate contamination in some parts of urban areas of Hingoli town and localized places in rural areas. In the study area, fluoride presence detected but within the limits of standard IS 10500.
10.	Soil	Medium and deep black, it is moderate to good fertile
11.	Nearest sanctuary	Karanja Sohol Wildlife Sanctuary at 81 km from the site Katepurna Wildlife Sanctuary at 91 km from the site

5.0 Anticipated Impact, Preventive, Control and Mitigation Measures and Impact Assessment

5.1 Construction phase: During construction phase of the project, negative impact mainly anticipated are as follows.

- Conversion of existing open plot into built up area – anticipated as permanent, non-reversible impact
- Fertile soil layer of the project site – anticipated to get affected
- Air pollution anticipated due to dust from construction work, loading/unloading of material and transportation activity
- Noise levels anticipated to increase mainly at the site – due to construction work

- Contamination of waterbodies in the immediate/close surrounding due to run-off from construction site and wastewater from labour housing
- Minor negative impact on local biodiversity anticipated due to construction
- Positive impact anticipated on local socio-economy due to generation of employment due to construction work

Preventive, Control and Mitigation Measures

In case of construction on open area/s, upper fertile layer of soil will be kept separate. It will be reused for greenbelt.

- Construction waste, debris will be disposed according to its characteristics; Recyclable material such as gunny bags, steel rods/pieces, drums, etc. will be sold to recycling agents
- Construction waste will not be dumped/disposed outside the factory premises, particularly into any water body.
- The runoff from the construction site will be controlled by ditches and will not allowed to enter into any water bodies
- Barricading the dust generating or high noise generating areas
- Sprinkling of water on *kucha* / unpaved roads
- Noise producing activities to be permitted only during daytime and within permissible limits
- Wherever feasible use ETP treated water for construction, E.g. curing activity - to reduce freshwater requirement
- Totally avoid/minimize wastage of water
- Proper precaution to prevent the runoff from construction site from mixing into the nearby surface and/or ground water resource
- Total prohibition on dumping/throwing any solid waste, excavated material from construction activity into any of the nearby water bodies
- Maintaining natural drainages in proper condition

There are no rehabilitation and restoration issues involved in the project

5.2 Operation Phase

5.2.1 Air Environment

Impact on ambient air quality during the operation phase of the project are likely due to vehicular and process emissions. Process related emissions can further be divided into

two categories i) from burning of fuel to generate steam and ii) from fermentation process.

5.2.1.1 Transportation: Transportation of molasses anticipated to increase approx. 3 tankers per day and more or less same number of tankers will be required for transportation of ethanol. In additional approx. 40 two wheelers and 10-15 passenger cars expected to get added in the existing vehicle load.

Preventive, control and mitigation measures

- Provision of asphalted roads inside the premises
- Provision of separate entrance and exit lanes/gates for vehicles
- Provision of adequate parking for goods vehicles
- Engage authorized transport agency for goods transport on the term to use well maintained vehicles for all transportation activities
- Strict prohibition on washing and maintenance of vehicles on site or in parking area
- All roads with street light and proper signage at strategic locations

5.2.1.2 Manufacturing process: fermentation

The expected generation of CO_2 from a 30 KLPD distillery is 22.2 TPD. This will contribute to greenhouse effect.

Mitigation Measures

- In the proposed project use of a CO_2 scrubber is planned for removal of the gas from alcohol stream. The greenbelt developed by the industry will help to absorb some of the generated CO_2 and the project proponent is exploring ways to mitigate this in an environmentally and economically feasible way.

5.2.1.3 Manufacturing process: emissions due to incineration (from boiler furnace)

- Estimated air pollutants (PM and SOx) emissions from the point source of the proposed project is as follows.

Fuel conc. Spentwash 74.4 TPD + coal 31.89 TPD	**= 106.29 TPD**
Total ash = Ash content of spentwash (@18%): 13.39 TPD + Coal (@35%): 11.16 TPD	= 24.552TPD or 1.023 TPH
Fly ash generation	= 113.61 g/s
Fly ash controlled by ESP (considered 98% efficiency)	= 111.33 g/s
Fly ash emission	= 2.27 g/s

Sulphur Dioxide (SO2): (Fuel Conc. Spent wash and coal)	
Sulfur content in conc. Spent wash + coal @0.49% Sulphur loss in ash as sulphate @ 15% Total Sulphur	= 21.7 Kg/hr. = 3.255 kg/hr. = 18.445 kg/hr. = 5.12 g/s
Sulphur dioxide (SO2) emissions	= 10.25 g/sec
Stack Height requirement based theoretical calculation for SO2 emission	= 43.39 meter Proposed 45 meter

Air Dispersion Modeling

Table 4: Dispersion Model Input Data

Parameters	Unit	Stack Attached to Boiler
Stack height	m	45
Stack diameter at exit/top	m	2.5
Stack exit gas velocity (Avg)	m/s	8
Stack gas temperature at exit	Deg. C	150
Fuel (coal) requirement	TPH	1.33
Spent wash for incineration	TPH	3.1
Ash content of Coal	%	35
Ash content of spent wash	%	18
Emission rate of SPM*	g/s	2.27
Emission rate of SO_2#	g/s	10.25

* After fly ash removal efficiency of pollution control equipment (ESP) 98%

Sulphur, considered 0.49% of fuel as a worst case scenario

Comparatively low Sulphur (<0.02%) and ash (2%) content observed in bagasse. The above input data considers worst case scenario. Modeling has been done considering stack as source and is center of grid for prediction. Hourly meteorological data for summer season (Jan 2020 to March 2020) of wind speed, direction, humidity, rainfall, and temperature was used as an input.

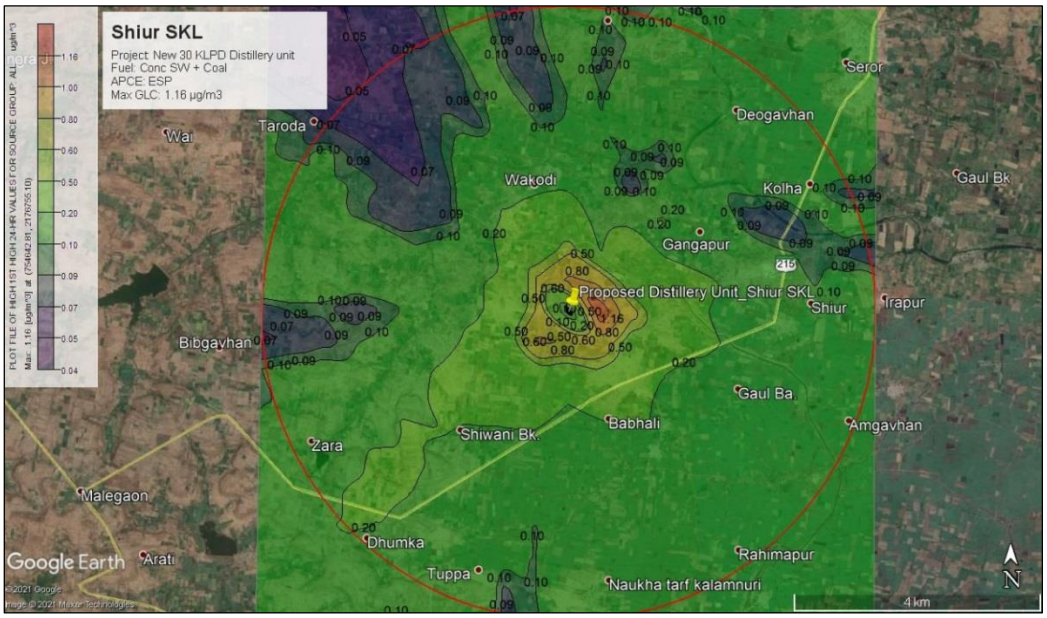

Figure 3: Isopleath showing GLC location and distance for PM (Short term 24 hourly)

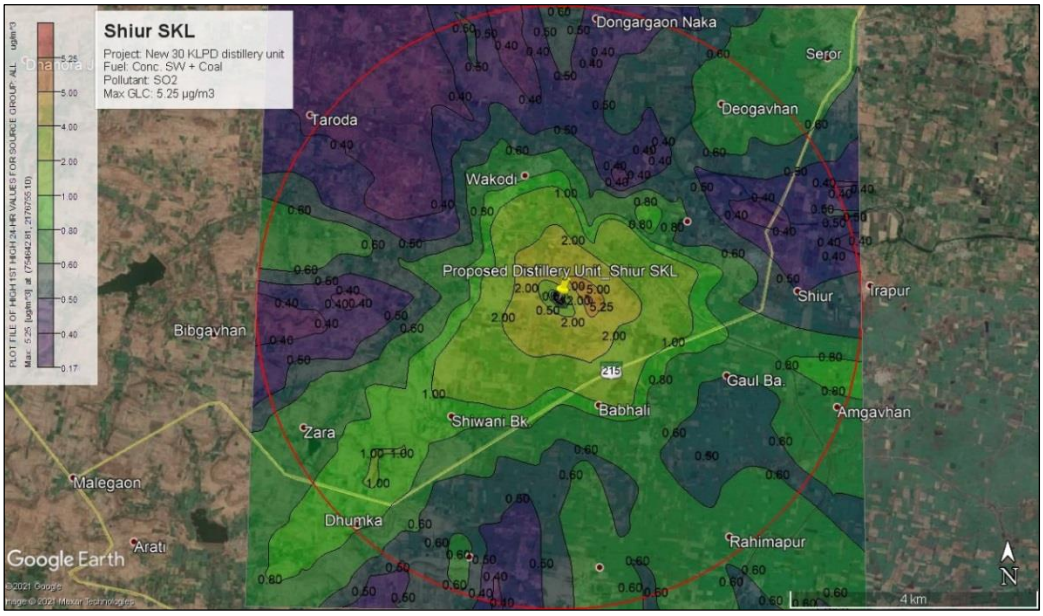

Figure 4: Isopleath showing GLC location and distance for SO_2 (Short term 24 hourly)

a. Observation

From the mathematical modeling of air pollutant dispersion study, it is observed that -

- There will be an increase in the concentration of PM and SOx mainly towards east at approx. 500 m (0.5 km) from the stack
- The maximum incremental load at this point will be 1.16 µg/m^3 for particulate matter (PM_{10}) and 5.25 µg/m^3 for SO_2. Barren land is observed at this distance

Table 5: Summary of Maximum 24-hour GLC due to proposed project

Description	Concentration µg/m³	
	PM	SO_2
Maximum rise in GLC	1.16	5.25
Direction of Occurrence and distance	E (0.5 Km)*	E(0.5 Km)*
Coordinates of maximum GLC	19⁰40'11" N 77⁰25'43" E	19⁰40'11" N 77⁰25'43" E
Baseline Concentration reported nearby Predicted GLC (at 2.8 km NE)	76.9 (Shiur 0.2)	25.2 (Shiur 0.6)
Total Concentration (Post project scenario)	77.1	25.8
NAAQS	PM_{10} 100	80
*The distance is measured from stack to the receptor of maximum GLC		

*The distance is measured from stack to the receptor of maximum GLC

Preventive, control and mitigation measures

- Round stack with 45 m height
- Use of Indian coal/bagasse as a fuel having comparatively low sulfur
- Air pollution control (APC) system ESP to control particulate matter from flue gasses
- In case of abnormal functioning of ESP or its failure, distillery operations will be shutdown systematically and resumed only after resolving the problem
- Greenbelt development around the plant boundary
- Greenbelt will be helpful in controlling odour to some extent
- Installation of online emission monitoring system as per CPCB guidelines

5.2.1.4 Non-Point and Fugitive Sources

Fuel coal or bagasse as well as ash will be handling anticipated as a major source of non-point dust source.

Impact assessment: PM anticipated to be one of the major issue for work place air environment. Negative impact of coal/bagasse and ash handling on outside (premises) environment anticipated to be minor – maximum up to 0.5 to 1 km extent.

Preventive, control and mitigation measures

- Mechanized handling of coal or bagasse and ash – use of closed conveyor system
- System for suppression of dust from handling of coal and ash
- Green belt development on 1.2 acres for the proposed unit

- Wind breaks will be developed to control PM generation from ash storage yard
- PPE will be provided to workers, working in dust prone areas
- Job rotation for workers, working in dust prone areas
- Use of economical techniques for suppression of dust from handling and storage area
- Ash will be transported in closed/covered vehicles to the brick manufacturing unit

5.2.1.5 Odour pollution: spent wash and molasses are considered as a source of odour in the project.

5.2.2 Water Environment

The impact of a distillery project on water environment is crucial from two aspects viz. the consumption of water in process and the generation of wastewater.

5.2.2.1 Anticipated impact: Daily fresh water requirement for the project is 221 m^3 i.e. 7.4 lit/lit of alcohol produced. The water requirement has been minimized by planning maximum recycling and reuse. However, negative impact is anticipated for availability of water to other users particularly in drought situation or water scarcity at local level.

From the general characteristics of spent wash, its high potential of water and soil pollution is evident. If it is released untreated/partially treated in any water body, its acidic nature, dark brown colour, high organic content and COD/BOD severely pollutes the receiving water body. Land application may lead to soil pollution and the run-off from land where spent wash is disposed indiscriminately, causes pollution of neighboring ground and surface water bodies. Similarly, spent lees, MEE condensate and other wastewater if released untreated it likely to cause pollution of nearby dug wells, lake/ponds or river. Whereas if the water is treated properly, it gives an opportunity to recycle the treated water and save fresh water resource.

5.2.2.2 Preventive, control and mitigation measures: Raw spent wash of 240 m^3/day will be sent to multi effect evaporation (MEE) unit to reduce its volume up to 60 m^3 having approx. 60% solids. Concentrated spent wash will be sent to incineration boiler. Here, coal will be used as a fuel for incineration boiler. Bagasse is planned as alternate if coal not available. 'Zero liquid discharge' for spent wash will be achieved by this method. Spentwash storage tanks will be constructed as per CREP guidelines (figure 2.9). These tanks will be designed suitably so as to meet the EC conditions and/or norms of regulatory authority.

Spentlees will be recycled to process after treatment to maximum extent. However, its

generation rate is considered as 1:1.5 i.e. 1 L of alcohol will produce max 1.5 L of spent lees. Thus, 45 m^3 of spent lees generation is estimated from the proposed project. Spent lees along with other wastewater due to cleaning and washing, and condensate water will be treated in CPU.

Reuse of water (after proper treatment): Treated water from CPU of 250 m^3/day will be used for dilution of molasses, cooling tower make up, irrigation (on own plots), watering greenbelt, or cleaning activities, etc.

Recycle of water: Blow down water from boiler and cooling tower will be cooled in ponds and recycled.

Conservation of water: Rain water harvesting to improve the ground water aquifer and partially fulfill the requirement of distillery/sugar unit.

Monitoring mechanism: Installation of online effluent quality monitoring system at the outlet of the identified units for the measurement of the parameters

Installation of piezometer in the downstream of spent wash storage tanks.

5.2.2.3 Impact assessment

Water/aquatic environment: Considering the option/s planned for ZLD in the proposed project, no negative impact envisaged on water environment as well as aquatic ecosystems of the surrounding area. Negative impact envisaged in case of accidental leakages and/or spillage of spent wash (raw/concentrated). Foul smell of the waterbody may increase the severity of the impact.

Soil Environment: Due to construction of impervious tanks for storage of spent wash, probability of soil pollution/contamination due to percolation of spent wash becomes very low. Hence, no change in the qualitative characteristics of soil (from the project area and surrounding) anticipated and thereby no negative impact.

Sludge from spent wash storage tanks will be sent to sludge drying beds. It is organic in nature. Thus mixing of sludge, help in recycling of nutrients – considered as a positive impact.

Ecology and biodiversity: In normal operational conditions, no change in the aquatic or terrestrial flora/fauna anticipated due to the wastewater from the proposed project. Hence, no negative impact anticipated on ecology and biodiversity of the surrounding area.

Negative impact in case of accidental release of spent wash into aquatic ecosystem or on soil is already explained above. This impact anticipated reversible to some extent.

Odour of spent wash likely to attract insects and fungus, particularly in sludge drying

beds. It usually attracts avi fauna due to availability of food. Thus, food chain likely to be stronger in the surrounding area (particularly for birds).

5.2.3 Soil Environment

Table 6: Solid Waste and Management

Waste Material	Quantity	Disposal
Ash (from spent wash + Coal/bagasse)	TPA max	Sold to brick manufacturers
Yeast Sludge (Dry)	40-50 TPA	It will be sent to sludge drying bed. Dried sludge will be used as soil conditioner
Sludge from CPU and spent wash storage tanks	90-100 TPA	

5.2.3.1 Preventive, control and mitigation measures

Boiler Ash: Ash due to burning of spent wash and coal will be given to bricks manufacturing unit in the nearby areas. However, if bagasse is used, ash will be mixed into the soil as enriching material.

Sludge from CPU, spent wash storage tanks and Yeast sludge: This sludge is usually bio-degradable, organic and nearly neutral in nature. It doesn't contain any toxic or hazardous elements. Therefore, it will be dried in sludge drying beds and safely disposed by mixing into soil.

Hazardous Waste: The only hazardous waste likely from the project is the scrap oil mainly from DG set and machines. Its quantity assumed very minor. This waste oil can be disposed-off safely by giving it to authorized hazardous waste oil dealer.

5.2.4 Impact on Ecology and Biodiversity

Probability of negative impact anticipated low, due to following.

a. No tree cutting involved for the construction of the project
b. There is no any sanctuary or national park or biosphere reserve in 10 km radius of the site
c. Threatened and/or protected species are not observed in the study area and there is no any direct impact causing factors observed from the project on the surrounding wildlife

Greenbelt development anticipated to provide food and shelter to many faunal elements. It will also help in improving the aesthetics. This is another positive impact anticipated due to the project.

5.2.5 Impact on Socio-economic environment

Positive impact of the project anticipated w.r.t. following

- The proposed project is agro-based. It is based on molasses/cane juice or sugar syrup which is a by-product of sugar mill.
- Therefore, local sugar cane cultivators (Estimated around 6,000 to 7,000), labour (estimated around 800 to 1000), harvesters and transporters (400 to 500) of approx. 7200 to 8500 expected to get benefitted from the project.
- The project involves transportation of molasses as well as finished products. Thus, it is going to generate additional indirect employment for drivers and transportation related service providers
- The product fuel ethanol is very important to the country and having good market demand. Therefore, by installing proposed unit, the sugar mill would able to generate additional income by using its land and molasses (resource use optimization)

Measures

- Implementation of CER plan based on the needs and requirements of locals
- Local candidates will be preferred for jobs; skill development will be undertaken
- Available public resources, infrastructure and/or facilities will be utilized without causing any pressure

Table 7: Proposed Environmental Monitoring plan

#	Particulars	Parameter	Frequency#
1	Stack Emissions	Particulate matter, SO_2, NO_x	Continuous monitoring
2	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_x	Monthly
3	Inlet and outlet of CPU	pH, BOD, COD, SS, TDS, Oil & Grease etc.	Continuous monitoring
4	Bore well /ground water sample from Piezometer nearer to spent wash storage tanks	pH, COD, BOD, Total solids, Chlorides, Sulphate, Phosphates, and Calcium	Quarterly/Monthly
5	Noise monitoring	At high noise generating places as well as sensitive receptors in the vicinity	Monthly
7	Occupational health	Health and fitness checkup of employees get exposed to various	six monthly

#	Particulars	Parameter	Frequency#
		hazards All other staff (except above) including contract and casual labour	Once a year

6.0 Fire and Safety

6.1 Fire protection system: Fire protection system shall be provided in accordance to PESO, OISD-117 and LPA regulations.

6.2 Safety Aspects: All design will be as per ISI standard specification and drawings are to be approved by factory/electrical inspectorate /safety inspectorate weights & measurement inspectorate etc.

6.2.1 Plant Lighting: Plant building lighting will be as per norms & as per Electrical inspectorate / factory inspectorate norms. Flameproof light fittings conforming to IS 2148 shall be provided for hazardous areas, particularly in distillation & storage section, while non-flame proof fittings in other areas.

6.3 Energy and Water Saving Measures: High alcohol % in fermented wash can result in substantial reduction in steam consumption (integrated evaporation system). It is possible to recycle of low strength waste generated i.e. process condensate, spent lees and other streams in distillery after treating through condensate polishing unit. It will help to reduce the consumption of fresh water for process and non-process applications.

7.0 Environment Management Plan

Table 8: Summary of Environment Management Plan

Aspect	Impact causing factor	Control/Mitigation Measures
Air Environment	Generation of Particulate Matter (PM), SO_2, NO_x during incineration Generation of Carbon dioxide from fermentation, Odour from spent	• ESP to control ash emission through stack with height 45 m • Mechanized system for coal and ash handling • Fugitive dust control/suppression for coal yard will be done properly • Provision of CO_2 scrubber • Wind breaks for ash storage area

Aspect	Impact causing factor	Control/Mitigation Measures
	wash storage Handling of coal and ash	• Development of greenbelt for air pollution and odour control • Continuous online monitoring system will be installed as per CPCB guidelines
Water Environment	Effluent generation from processes, cleaning, blow down water & condensate. Storage of spentwash, its treatment and disposal	'Zero liquid discharge' will be achieved by implementing - • stand-alone evaporation (using MEE) as a primary treatment to reduce the spentwash volume • Incineration of concentrated spentwash • Spentlees, condensate of MEE and other effluents will be treated in condensate polishing unit (CPU) and treated water will be reused in distillery. • All the effluent will be properly treated/ utilized/disposed within the premises (ZLD will be achieved) • Separate impervious tanks for storage of raw and concentrated spentwash. • Spent wash transportation through HDPE pipeline • Spent wash storage tanks will be made impervious as per CREP guidelines • Fresh water requirement will be reduced by recycling and reuse of water (treated water), as well as using harvested rain water • Piezometric well, in downstream area of spentwash storage • Continuous online monitoring system will be installed as per CPCB guidelines

Aspect	Impact causing factor	Control/Mitigation Measures
Soil Environment	Incineration Boiler Ash	• Given to nearby brick manufacturing unit • Covered vehicles will be used for ash transport
	Sludge from Fermentation unit, CPU, spent wash storage tanks	• Sludge is degradable, organic in nature hence, mixed into soil
	Excavated fertile soil	• Stacked separately and reused for greenbelt development • Stones and excess soil will be used for foundation or internal roads or leveling purpose within premises
Noise	Increase in noise level due to operation of machines, motors, vehicular movement, DG set etc.	• Regular maintenance of machines and factory vehicles • provisions of separate parking for goods and other vehicles • Internal roads will be asphalted, leveled, illuminated and will be maintained • Safety sign boards will be placed at strategic locations within premises • Provision of adequate personal protective equipment for workers • Job rotation for high noise level work places, if required • Regular health checkup for workers (including contract labour) • Acoustic enclosure for DG set
Ecology and Biodiversity	Air, water, soil and noise pollution Tree cutting failing, disturbance to wildlife	• Adequate preventive, control and mitigation measures for air, water and soil pollutants

Aspect	Impact causing factor	Control/Mitigation Measures
	due to project	• No tree cutting/ felling involved since project is on barren land • Development of greenbelt will help to enhance the biodiversity • Nigh time light arrangements in the unit, to be made non-intense, non-glary; it should not disturb the wild animals
Socio-economic Environment	Rehabilitation and Restoration (RR), pressure on available manmade infrastructure/resource due to population flux	• No rehabilitation and restoration issue involved since site is already under the possession of project proponent • Local candidates will be preferred for employment. Skilled work force is available at nearby towns and cities • Existing road, medical, transportation and other infrastructure will be used without causing any negative impact
Safety and Occupational health	Accidents, improper work practices	• Safety officer and safety committee will be formulated • Provision of adequate safety gears • Insurance policy for workers • Regular health check-up
Risk and disaster management	Fire, accidents, earthquake, etc.	• The entire premises will be declared as 'no smoking zone' • Lightening arresting system will be installed • Ethanol vapor condensing system will be installed at storage area • Proper storage of molasses, ethanol and coal or bagasse • Ethanol storage as per PESO guidelines • Firefighting system as per OISD and local authority guidelines

Aspect	Impact causing factor	Control/Mitigation Measures
		• Earthquake resistant construction

8.0 Conclusion and Justification for Project Implementation

The project is proposed in economically and industrially backward region of the Maharashtra. It is an agro based project. Hence, it will be beneficial to local cane growers. The potential environmental, social and economic impacts of the above project have been assessed during the environmental impact assessment study and described in this EIA report. The proposed distillery unit will have certain levels of negative impacts on the local environment. It has been endeavored to minimize the negative impacts by addressing them through environmental management plan. Necessary control measures have been suggested to meet with the norms and safeguard the environment. The implementation of this project will definitely improve the physical and social infrastructure of the surrounding area. Adequate financial provision is made by the project proponent for EMP and CSR activities (i.e. for upliftment of the local people). The proposed project will contribute to economic growth and help in generating Government revenue.