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EXECUTIVE SUMMARY
of
Environmental Impact Assessment Report
For
New Molasses Based 30 KLPD Distillery

M/s. THE KADWA SAHAKARI SAKHAR KARKHANA LTD

Materewadi, Tal. Dindori, Dist. Nashik, Maharashtra

Prepared by

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. The Kadwa Sahakari Sakhar Karkhana Ltd., (TKSSKL). is one of the progressive sugar factory in Maharashtra, a unit of 1650 TCD was established in the year 1978-79 under the leadership of Late Shri Rajaram Sakharam Wagh. Now the mill is growing under Chairman Shri Shriram Sahadu Shete. The registration number of the unit is NSK/PRG/(A)(3)(S) dated 15/10/1970. As a result of increase in sugar cane availability, the mill decided to increase the crushing capacity from 1650 to 2500 TCD resulting in increase of byproducts like molasses and bagasse. Considering this and to attain financial stability, the management of TKSSKL has decided to install a new 30 KLPD distillery. This project has also been selected for financial assistance from the Government of India under the scheme of 'Augmentation and Enhancement of Ethanol Production Capacity'.

The proposed plant will be based on latest technology of continuous / fed-batch fermentation and multi-pressure distillation with standalone multiple effect evaporation & molecular sieve dehydration (MSDH) system to produce rectified spirit or fuel (ethanol) alcohol. The management has also decided to install biogas plant (300 m^3/day spent wash feed) as a primary effluent treatment system, multiple effect evaporation plant (MEE) for concentration of biomethanated spent wash up to 30% total solids content as a secondary effluent treatment system.

1.1 Selection of Site:

The present site fulfills the industrial site selection criteria of MoEFCC. Molasess will be available from own sugar mill and supplementary from nearby sugar mills. Also, water, electricity, good infrastructure, support facilities and labouretc is also available in the area. Following Table 1 gives highlights of the project.

Table1: Highlights of the project

1.	**Project Proponent**	**M/s. The Kadwa Sahakari Sakhar Karkhana Ltd., (TKSSKL)**
2.	**Project**	New Molasses based 30 KLPD distillery unit
3.	**Location of the project**	Rajaramnagar, Materewadi, Tal. Dindori, Dist. Nashik, Maharashtra 422209
4.	**Working days**	270
5.	**Product**	Rectified Spirit OR ENA OR Ethanol: 30 KLPD; Impure spirit = ~5%
6.	**By-product/s**	Fusel oil: 120 L/day

		Biogas: 11700 m^3 /day Compost: 9969 TPA
7.	**Wastewater Treatment System (ZLD scheme)**	For spent wash: Biomethanation followed by multi-effect evaporation (MEE) followed by bio-composting For spent lees, condensate of MEE and other effluent – Condensate polishing unit – treated water will be reused for molasses dilution and/or cooling tower make and remaining for watering greenbelt plants
8.	**Air Pollution Control Systems**	Wet Scrubber
	INFRASTRUCTURE	
9.	**Land**	The factory has 237 acres land of which existing sugar unit has occupied approx. 50 acres Total Provision for Distillery Unit: **69887.35 sq. m. (~17.2 acres)** **Greenbelt: 23062.82 sq. m. (~5.6 acre)** Total area requirement for proposed unit with greenbelt: **92950.17 sq. m. (~23 acre)**
10.	**Main Raw Material**	Molasses: **111 TPD (C type)** OR **100 TPD (B heavy type) OR Sugarcane juice: 455 m3 /day** **(30,000 TPA-Considering 270 days per annum)**
11.	**Manufacturing technology**	Continuous /Fed-batch fermentation & Multi-pressure-vacuum distillation for the production of Rectified spirit or Extra Neutral Alcohol and Molecular Sieve De-Hydration (MSDH) plant for Anhydrous/Fuel ethanol
12.	**Steam**	**Total: Maximum 245 TPD** **Source:** Through proposed 12 TPH boiler **Steam utilization:** Distillery, MEE
13.	**Fuel**	**Bagasse: 112 TPD** **(When biogas is in operation: 11700 m^3 Biogas +88.6 TPD bagasse)** **Source: In-house (from own production)**
14.	**Boiler**	New boiler of 12 TPH with a pressure of 45 kg/cm^2

15.	**Stack**	Stack of 35 m height with an inner diameter of 1.5 m will be used
16.	**Power**	**Requirement:** 0.710 MW **Source:** Captive through proposed 1.0 MW steam turbine generator Alternate source: state electricity board.
17.	**Day-to-day Water Requirement**	**300 m^3/day** **Source:** Palkhed Dam
18.	**Manpower**	Direct employment to 115 persons (30-35 will be Skilled and others will be semi-skilled and unskilled)
	FINANCIAL ASPECTS	
19.	**Proposed Project Cost**	Rs. 5639.46 lakhs
20.	**Capital expenses for Environment management**	Rs. 1818.00 lakhs

TPD = Tons Per Day

2.0 MATERIAL AND INFRASTRUCTURE

2.1 Molasses

Molasses, a byproduct of the sugar industry, is a raw material in the proposed unit. Molasses availability is directly related availability of sugar cane. Presently, C-type molasses production of about 22,000 to 22,500 tons per annum is estimated. In case of B-heavy type molasses is produced, the estimated quantity will be 28800-30000 tons per annum.

However, requirement of molasses is about 30,000 tons per annum. The remaining molasses is about 7,000 to 9,000 MT will be procured from nearby sugar mills/market.

At present, the factory has one mild steel (MS) molasses storage tanks of the total storage capacity of 4,000 T. The TKSSKL has proposed to install one additional mild steel tank of 5,000 MT capacity in the distillery premises.

Proper care will be taken by the sugar mill to cool down molasses before it goes to the molasses storage tank, with a suitable pump for recirculation of molasses. Two months stored molasses is ideal for fermentation. The molasses will be pump through a pipeline, from storage tanks to the distillery day molasses tank.

2.2 Water

Estimated daily requirement of fresh water for the proposed project is 300 m³. The sugar mill is having permission of Irrigation Department, Nashik to lift water from Palkhed dam. The permission is of 179,528 cubic meter per day. The fresh water requirement estimated as low as possible by considering all options of recycling and reuse of available water. Detailed water budget is given in Table 2.

Table 2: Water Balance: Distillery of 30 KLPD

A	**Fresh Water Requirement**	**Cum/day**
For molasses dilution		300
For cooling tower make up (Fermentation, Distillation, F.A. and Evaporation etc.)		270
Fermenter Washing		10
For vacuum pump		15
For air blower		10
For fusel oil decanter and alcohol scrubber		15
Boiler feed(@12 TPH)		288
DM water for ENA production for dilution of RS		60
Others (Domestic)		30
Total Water Input at Start-up		**998**
B	**Water output**	
Spent Lees (PR & Rect)		75
CT Evaporation & Drift Losses		200
Domestic Consumption		30
Water In Spent Wash (5% solids)		300
Pump Sealing / Purge		40
Steam condensate		288
Over all process loss		65
Total Water Output		**998**
C	**Recycle streams after treatment through CPU unit**	
Evaporation Process Condensate		250
Spent lees		75
For vacuum pump		15
For air blower		10

Steam condensate water return to boiler	288
others	60
Water recycle to process & non-process application after treatment through CPU (considering efficiency @90 %)	**698**
Total Daily Water requirement/Input (Total Water Input- Recycle streams after treatment through CPU unit) i.e. 998-698=300 m^3/day	**300.00**

Net fresh water requirement for distillery unit = 300 m^3/day

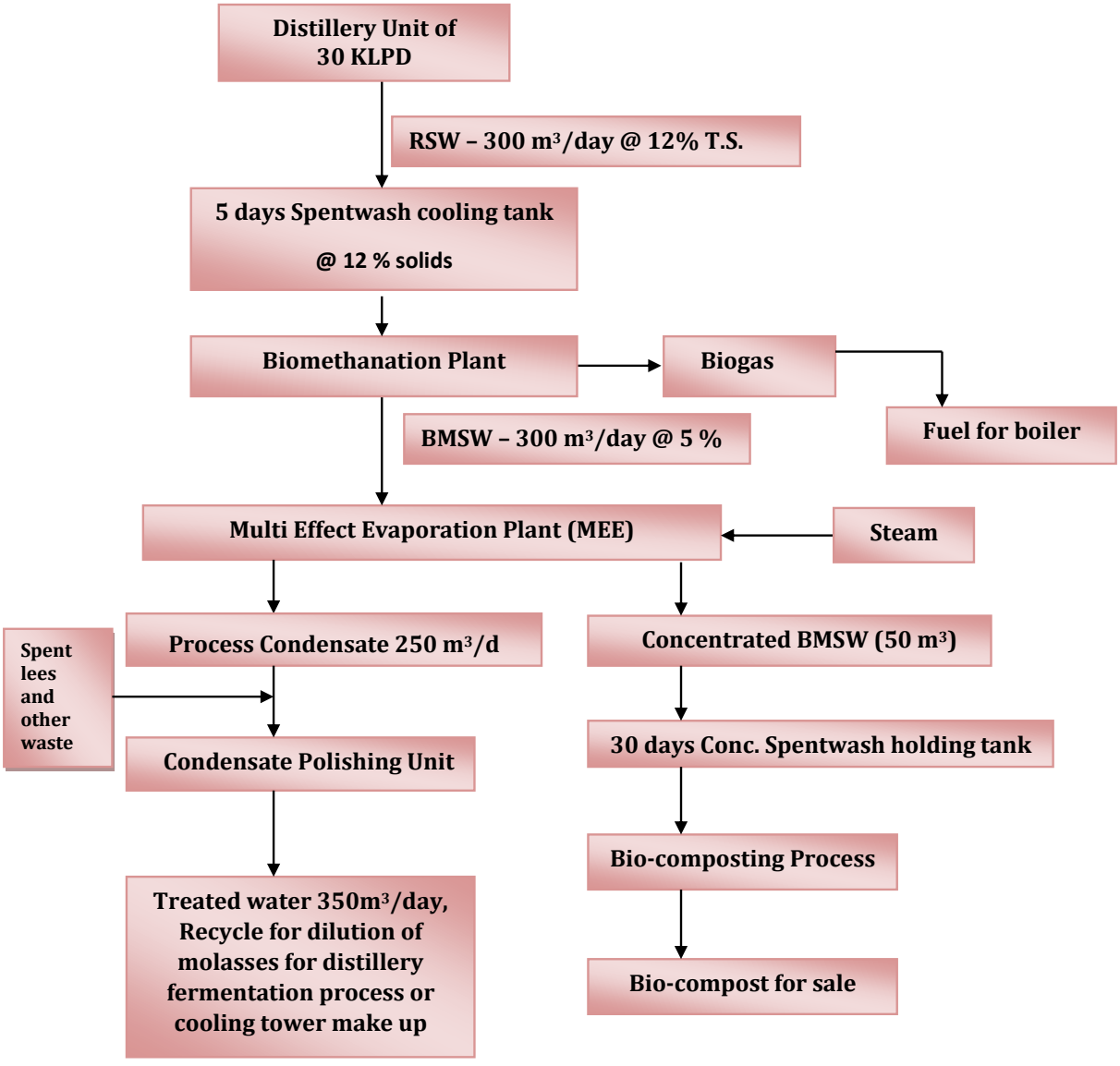

Figure 1: Schematic diagram of Water and Mass Balance with Zero Liquid Discharge of spent wash

2.3 Fuel

Presently, bagasse generation is observed at 29 % on cane crushed. Thus, estimated that the mill will produce bagasse of 725 TPD or 30.21 TPH. The requirement of bagasse for proposed distillery will be 112 TPD. However, biogas produced from spentwash will also be used as a fuel and in this case 11700 m3 Biogas +88.6 TPD bagasse will be used as fuel. Use of biogas will save 24 TPD of bagasse daily. Even after meeting the distillery requirement, the mill will have surplus bagasse available for distillery operations during off-season of sugar mill.

2.4 Steam

Maximum steam requirement will be 10 TPH at 3.5 Kg/cm2 (g) pressure. TKSSKL is having two boilers of 20 MT/hr at 21 Kg/cm2(g) each. Thus, total steam generation capacity is 40 MT/hr. Thus, excess steam which can be supplied to the proposed distillery either in season or during off season is not available. It is therefore planned to install a new 12 TPH boiler of 45 Kg/cm2 (g) pressure and this new boiler will supply steam to proposed 1 MW turbo-alternator. Therefore, required steam and power will be made available for distillery plant from proposed boiler and T. G. set.

2.5 Power

The estimated power requirement for proposed 30 KLPD distillery, boiler and ETP will be 0.7 MW. The cost of electricity has been assumed @ Rs. 0.50/unit during working days and the electricity for idle days will be purchased from MSEDCL.

2.6 Boiler

One new fluidized bed boiler of 12 TPH capacity, having 45 kg/cm² (g) pressure & 400 ± 50C temperature, proposed for the project.

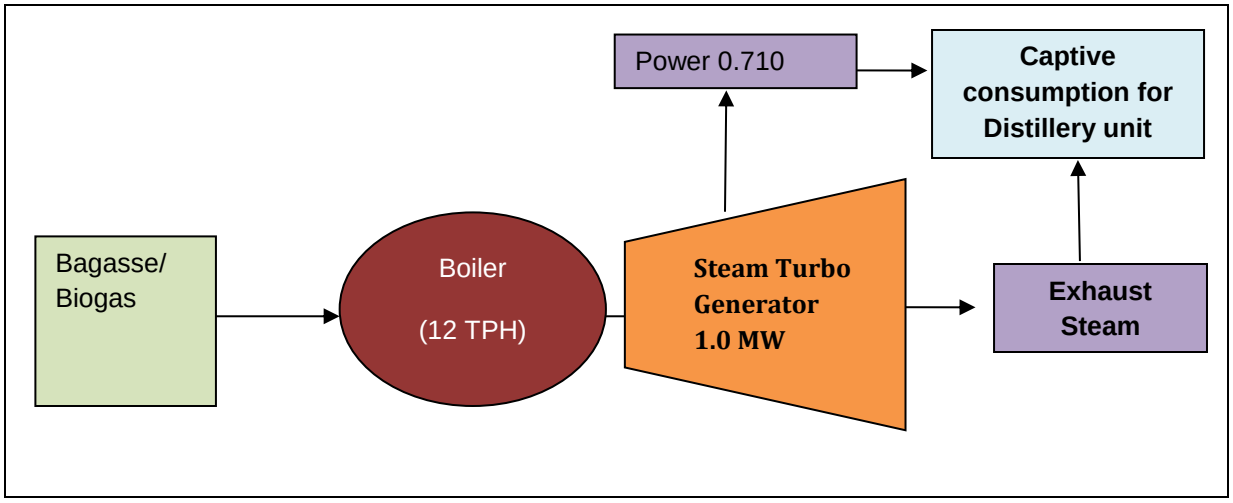

Figure 2: Schematic of steam and power generation

2.7 Fuel Handling System

The bagasse generated will be used as fuel in boiler. Hence, the bagasse will be supplied to boiler from elevated carriers and belt conveyors. Provision will be made for conveying excess bagasse (not used in the boiler) to a storage area by conveyor belt.

2.8 Ash Handling System

Mechanical ash handling system will be used. The fly ash will be extracted in wet form from the wet scrubber and transported to compost yard.

2.9 Land

Master layout of TSSKL has been given in figure 2.2, distillery layout in figure 2.3 and unit wise land breakup of table 2.3 of chapter II of main EIA report.

2.10 Manpower

The project will be generating direct employment to 115 persons out of which 40-45 will be Skilled/highly skilled and others will be semi-skilled and unskilled. Apart from this, anticipated indirect employment opportunities will be from transportation, local service providers, shopkeeper and various facility providers such as schools, medical facilities, etc.

3.0 PROCESS DESCRIPTION

For the proposed project, the Management has planned to adopt the latest technology for process. 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. 3.

3.1 Manufacturing Process

The production process mainly involves fermentation and distillation process.

3.1.1 Fermentation

During the fermentation, yeast strains of the species Saccharomyces cerevisiae, 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 involves addition of fresh nutrients medium either continuously or intermittent withdrawal of portion of nutrient for recovery of fermentation products. In continuous process, fermenter is in constant usage with little shut down and after initial inoculation of yeast culture, further inoculation is not necessary.

It 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 litres/ ton of C type molasses and 300 to 330 litres for B-heavy type.

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.

3.1.3 Multi-Pressure Distillation Technology

After fermentation to separate alcohol from fermented wash, distillation is employed. The distillation columns consist of number of bubble cap /Rh grid plates where wash is boiled and alcoholic vapours are separated and concentrated on each plate stage by stage. Rectified spirit of 95% purity is manufactured in the process.

3.1.3.1 Advantages of Multi-Pressure Distillation

1) Few columns operate under vacuum, few under pressure and few under atmospheric pressure; Maximum heat integration is possible.

2) Low steam consumption with reboiler (2.2 Kg/lit. of Rectified Spirit & 3.2 Kg/lit. of ENA)

3) Spentwash generation is less.

4) Pre-rectification column ensure removal of sulfur compounds /mercaptants, reduces load of lower boiling volatile compounds

Fuel ethanol is an important product. As per IS specification, it is nearly 100% pure i.e. water free alcohol. Alcohol as manufactured by Indian distilleries is rectified spirit, which is 94.68% alcohol and rest is water. Therefore, special process for removal of water is required for manufacture of fuel (anhydrous) alcohol. The various processes used for dehydration of alcohol are as follows

I) Azeotropic Distillation

II) Molecular Sieve Dehydration (MSDH)

III) Pervaporation / Vapour permeation system.

From these, the TKSSKL has planned to select molecular sieve dehydration (MSDH) technology.

Table 3: Details of Storage Tanks

SPECIFICATIONS FOR RECEIVERS & STORAGE TANKS – THICKNESS AS PER IS-803-1976:			
#	Particulars	Quantity	Capacity (in m^3)
1.	Rectified spirit receivers	3	60
2.	Impure spirit receivers	3	10
3.	* Rectified spirit storage tanks	2	800
4.	* Impure spirit storage tank	1	200
5.	Fusel oil storage tank	1	10
6.	Molasses storage at distillery (Tons) –		
	1. Existing	1	4,000 T
	2. Proposed	1	5,000 T

***** 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).

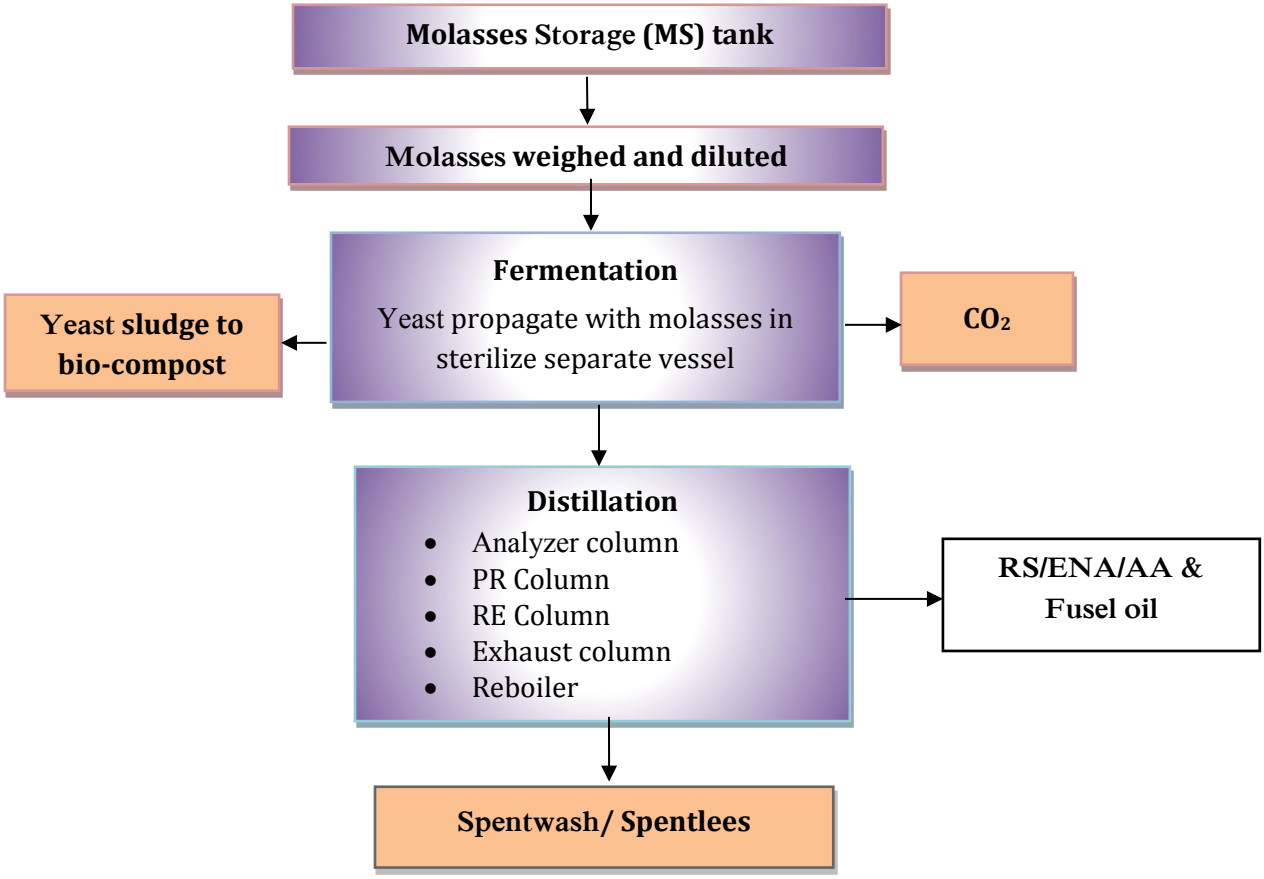

Figure 3: Schematic of RS/ENA/AA manufacturing process

4.0 BASELINE ENVIRONMENTAL CONDITIONS

The guiding factors for the present baseline study are the requirements prescribed by the Ministry of Environment, Forestry and Climate Change (MoEFCC) for conducting Environmental Impact Assessment study published in the EIA notification 2006 and its subsequent amendments. Apart from this, the terms of reference for the EIA were also considered while planning and executing the monitoring. For baseline data collection sampling of air, water and soil was carried out from November 2018 to January 2019.

The baseline study begins with site visits and reconnaissance survey in the study area. During these visit the locations were fixed for the monitoring and collection of primary data.

Table 4: Summary of Environmental features of study area

#	Facet	In brief
1	General characteristics	Hot and dry
2	Rainfall	An average annual rainfall of 792 mm Rains are received mainly during June-September months
3	Temperature	The average maximum temperature in summer is around 38°C and average minimum temperature in winter is around 17°C.
4	Humidity	The relative maximum humidity ranges between 58 - 62% and minimum humidity ranges from 43-48%.
5	Wind	Predominantly wind direction North East and North West during study period
6	Land use	Agricultural Land area 79.96 %, Built up area 2.43 %, Mining/industrial area 0.82 %, Lakes/Ponds 0.30%, Scrub 7.70 %, River 1.14 %, canal 0.21 %, Forest 3.50 %, Reservoir 3.94 %
7	Air Quality	Complies NAAQ standards of Nov. 2009 at all monitored locations
8	Noise	Complies the standard
9	Ground water	As per Central Ground Water Board report 2012 - Slightly alkaline, good for irrigation purposes throughout the district.
10	Soil	The soils of the district are the weathering products of Basalt and have various shades from gray to black, red and pink color.
11	Nearest sanctuary	Nandur Madhyameshwar Bird Sanctuary at 46 km from the project site

4.1 Land use

The existing site is located at village Materewadi, Tal-Dindori, Dist- Nashik is covered in survey of India Toposheet no. E43U06 and E43U07 and lies within latitudes of 20°13'44.41"N to 20°13'31.01"N and longitudes of 73°55'8.16"E to 73°54'55.42"E.

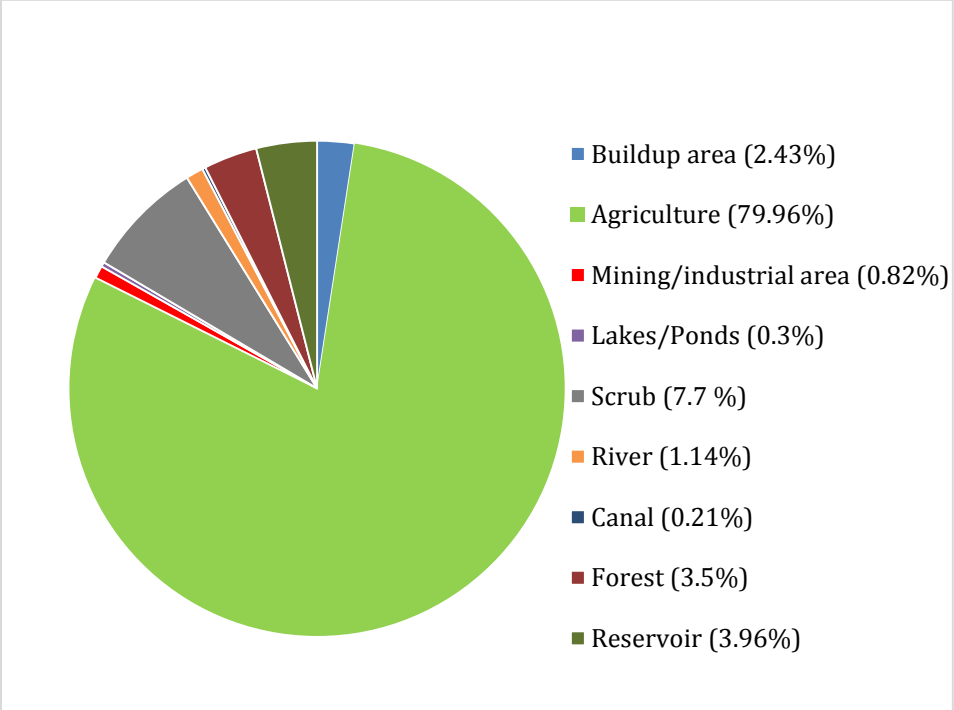

Figure 4: Details of Land use

5.0 IMPACT ASSESSMENT

5.1 Air Environment

Ambient air quality of the study area was assessed through a network of eight air monitoring stations, considering the wind pattern for the study area. Methods used for AAQ analysis:$PM_{2.5}$ & PM_{10}: CPCB, NOx: IS- 5182 (Part vi) 2006, SO_2: IS- 5182 (Part ii) 2001.

The values for PM_{10}, $PM_{2.5}$, SO_2 and NOx for all monitored locations were well within National Ambient Air Quality (NAAQ) Standard limits.

5.1.1 Impact causing factors

1) Emissions from process: It will be due to burning of bagasse in boiler.

2) Transportation: Vehicular pollution due to transportation activity, dust from roads, loading unloading of material and transportation of material. Considering the gross collective capacity of storage tanks (two in numbers) 800 m^3 it will require about 80 tankers (considering each tanker of 20 m^3 capacity). Apart from finished product, the molasses required (~8000 m3) will be transported

through 400 tankers. Hence, this could cause minor increase mainly in NOx, particulate matter and HC.

5.1.2 Impact Assessment: Estimated incremental concentrations of PM and SO_x in the downwind direction of the site are minor, considering the baseline value. The baseline concentrations of these pollutants are well within the NAAQS. Therefore, after adding the incremental concentration to the baseline value at nearest downwind site will not exceed the NAAQS. So, it is anticipated that, the increase in the concentration of these air pollutants due to the burning of fuel, likely to cause minor negative impact on air environment.

5.1.3 Preventive, control and mitigation measures

- Provision of asphalted roads inside the premises and approach road is available up to state highway
- Provision of adequate parking for goods as well as staff vehicles
- Engage authorized transport agency for goods transport on the term to use well maintained vehicles for all transportation activities
- While bulk transportation of raw material/finished product, manage the vehicles in such a way that waiting period for vehicles will be minimum. This will help in reducing the risks of traffic congestion and minor accidents, and over all air pollution.
- Provision of separate entrance and exit lanes/gates for vehicles
- 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
- Main gate/s with 24x7 security arrangements

5.1.3.1 Air Pollutant Dispersion Modeling

Prediction of impacts on air environment has been carried out employing mathematical model - AERMOD view dispersion model 9.2 software developed by Lakes Environment Software, Canada.

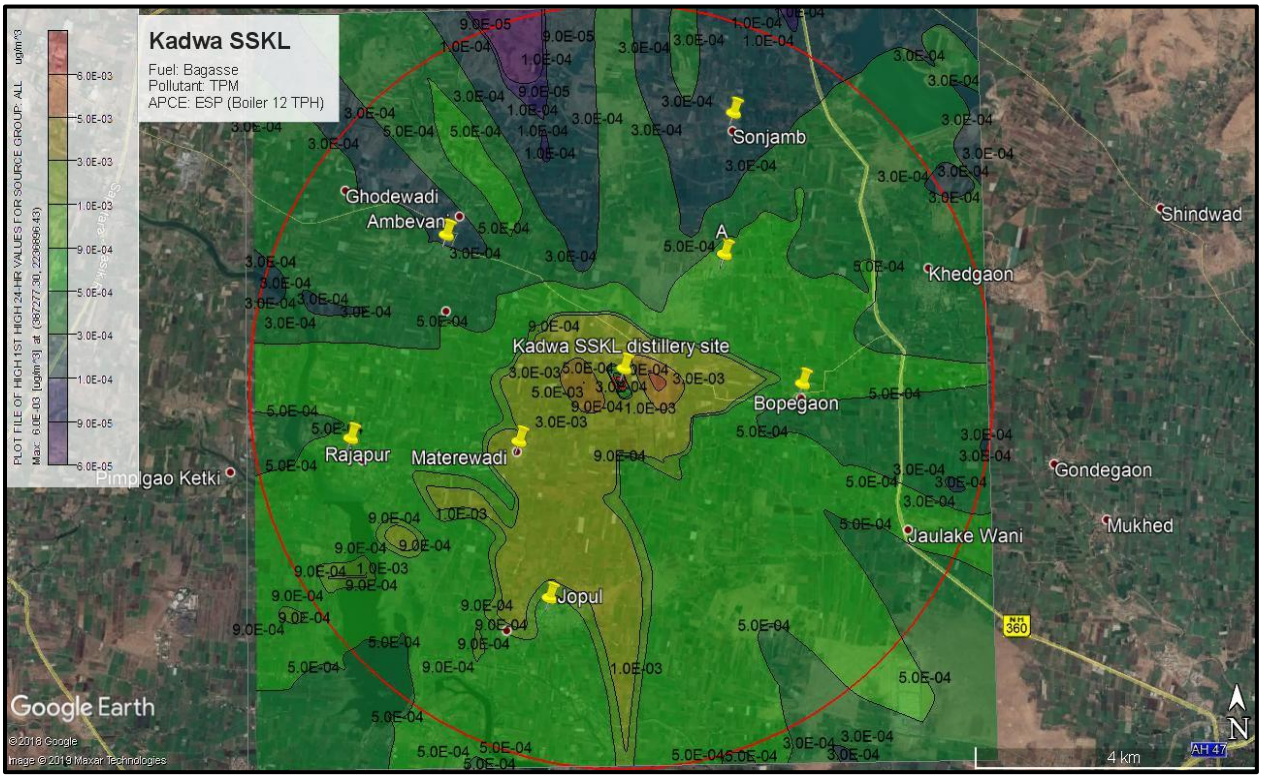

Figure 5: Short term 24 hourly GLCs of PM

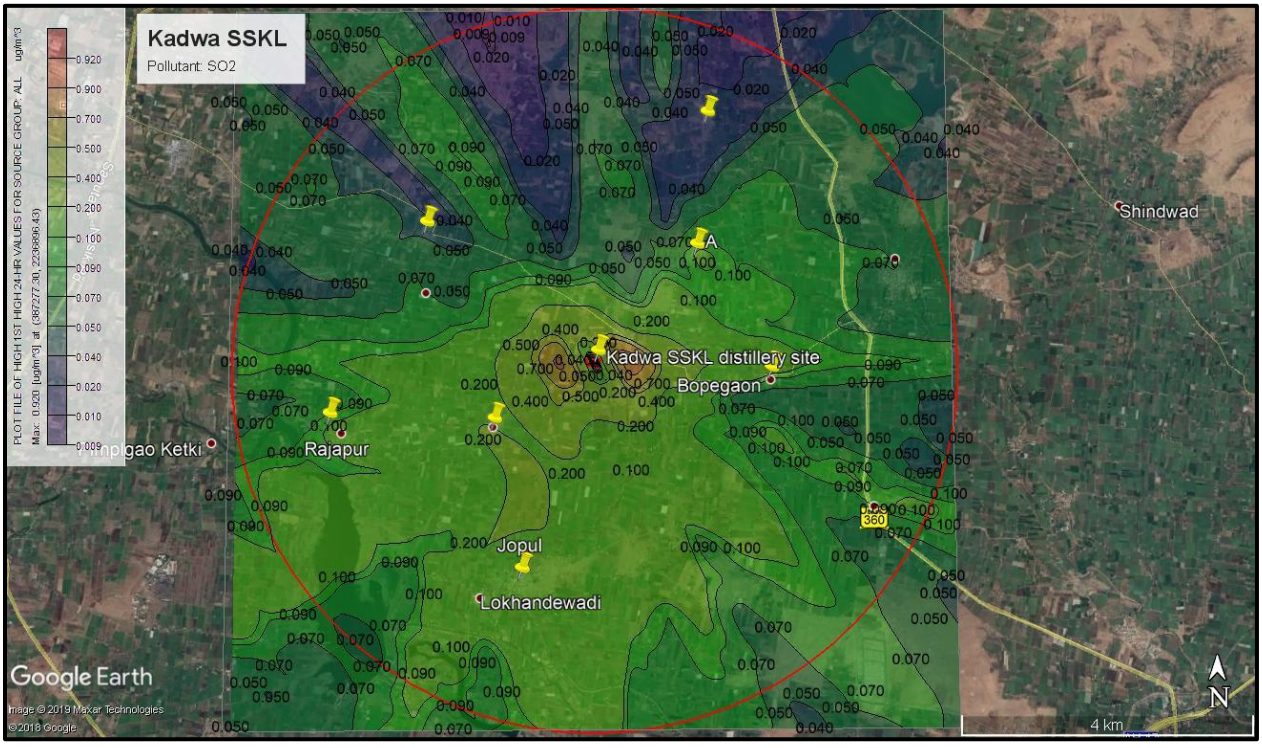

Figure 6: Short term 24 hourly GLCs of SO_2

Observation

The results of mathematical modeling of air pollutant dispersion (for particulate matter and SO_2) indicate that incremental concentration at ground level of these pollutants will be within the prescribed National Ambient Air Quality Standards (NAAQS) for residential & rural areas. Other major observations of dispersion modeling study are as follows.

- Maximum increase in the concentration of PM will be by 0.006 µg/m^3 and SOx by 0.92 µg/m^3 towards East at approx. 0.49 km distance from stack; This area is predominantly occupied by agricultural vegetation
- Nearest residential area is Materewadi towards south-west at 1.8 km from site
- From the results derived from the mathematical modeling study, it is observed that resultant concentration of these air pollutants in downwind direction will be well within the national ambient air quality standards prescribed by CPCB in Nov. 2009.

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

Description	**Concentration µg/m^3**	
	PM	**SO_2**
Maximum rise in GLC	0.006	0.92
Direction of Occurrence and distance	North (0.49 km)	North (0.49 km)
Coordinates of maximum GLC	Lat: 20^0 13' 35" N Long: 73^0 55' 15"	Lat: 20^0 13' 35" N Long: 73^0 55' 15"
Baseline Concentration reported nearby GLC (at village Materewadi 1.8 km)	64.54	24.86
Total Concentration (Post project scenario)	64.546	25.78
NAAQS	**(PM_{10}) 100**	**80**
*The distance is measured from stack to the receptor of maximum GLC		

5.2 Water Environment

5.2.1 Impact causing factors: Drawal of fresh water in large quantity and its usage, water pollution, disposal of polluted water into nearby water bodies.

5.2.2 Impact Assessment: No negative impact on water environment and aquatic ecosystem is envisaged due to the proposed project. Minor negative impact is envisaged on soil within the premises. The project proponent has water drawl permission from Irrigation Department to lift the

water from Palkhed reservoir. Thus, water used in the project will be exclusively allocated for industrial activities.

5.2.3 Environment management plan: In order to reduce the fresh water intake, the management has planned to reuse of waste water after proper treatment. Wastewater from various sources will be collected and properly treated so as to reutilize it and thus conserve the fresh water resource. The treated water shall be mainly reused in the sugar unit for auxiliary requirements and/or for gardening activity. The sanitary wastewater will be treated in sugar ETP Plant. Thus, zero liquid discharge will be achieved. Boiler blow down and water from cooling tower will be stored in ponds and recycled thereafter. The management also proposed to install rainwater harvesting system to recharge the aquifer and partly fulfill the requirement during startup.

5.3 Land Environment

a) Impact of effluent discharge

As discussed earlier, highly polluted wastewater i.e. spent wash will be disposed by incineration process. It will be stored in impervious lagoons as per CPCB guidelines. Other polluted water will be treated in CPU and reused.

b) Solid waste

Table 6: Solid waste generation and disposal

#	Waste	Quantity (TPD)	Treatment	Disposal	Remark
1.	Yeast sludge	1-1.5	Compost	Used as manure and land filling	Organic
2.	Ash	2.24	-	Mixed into composting	Inorganic
3.	Biodigester sludge	1-1.5	Compost	Used as manure	Organic
4.	Distillery CPU sludge	2.5	Compost	Used as manure and for land filling	Organic

5.3.1 Impact causing factors: Disposal of solid and hazardous waste, disposal of effluent, change in topography

5.3.2 Impact Assessment: The project is not going to generate any hazardous waste except scrap oil. Since, the solid waste is non-toxic and non-hazardous, it is anticipated that the solid waste will have no negative impact on land.

5.3.3 Environmental management plan: The solid waste viz. ash will be generated due to burning of bagasse in the boiler. Ash is estimated to be about 2.24 TPD during seasonal operation.

Sludge from CPU this sludge is usually bio-degradable, organic and nearly neutral in nature. It doesn't contain any toxic or hazardous elements. Therefore, this will be safely disposed by mixing into soil. As an option, ash may be sold to the local bricks manufacturer.

5.4 Ecology

In case of proposed project, no tree cutting or habitat destruction is involved. There is no any national park or sanctuary or biosphere reserve in 10km as well as 25 km radius of the site. Status of occurrence of IUCN red listed species & Wildlife (P) Act scheduled –I to IV species given chapter III of the report & Annexure XI i.e. flora & fauna.

Generally, an impact of industrial activity on ecology and biodiversity is observed due to following major reasons.

- Tree cutting/ removal of vegetation
- Habitat destruction, alteration or fragmentation
- Threat to rare, endangered flora and fauna
- Disturbance to wildlife
- Pollution

Therefore, these factors were preliminarily examined while assessing the impact of the project. Based on this criteria the project anticipated to cause minor negative impact on ecological biodiversity.

5.5 Socio- economic environment

5.5.1 Impact Causing Factors: issues of rehabilitation; restoration; population flux; pressure on available resources and infrastructure.

5.5.2 Impact Assessment: Considering the long-term benefits to the locals, direct & indirect employment opportunities, revenue for government etc., will have positive impact on socio-economic environment.

5.5.3 Environment Management Plan: Project is agro-based – therefore, indirectly beneficial to local farmers; no issues of rehabilitation or restoration; local candidates will be employed – thus, migration of population to the site surrounding area and pressure on infrastructure and resources is anticipated to be negligible**.**

5.6 Other impact: Traffic

In the project, the transportation activity will take place mainly during the construction phase. Considering the availability of NH-60 approx. 12 km from project site. The nominal increase in vehicles during construction phase may not cause any traffic congestion.

During operation phase, the transportation activity will be very negligible; hence, the probability of traffic congestion is insignificant.

6.0 FIRE PROTECTION SYSTEM

Fire protection system shall be provided in accordance to PESO, OISD-117 and LPA regulations. The fire-fighting system will consist of a hydrant network, piping etc. Fire protection system will also include one electric driven pump, one diesel engine driven pump, one jockey pump, piping, basin etc. Water hydrants will be provided at all strategic points. A suitable Fire ring system as per the guidelines of TAC will be incorporated. Non-flame proof and flame proof area will be separated by minimum distance of 15 meters. Portable fire extinguishers will also be provided in strategic locations viz., power house, control rooms, storage yard.

Automatic fire Sprinkler System (Water Hydrant) – Electro-magnetic dehydration system uses an electric fire detection system installed in the area as open sprinklers /spray nozzles. Upon sensing a hazard, the Electromagnetic valve opens.

6.1 Safety Aspects through Design and Engineering

- 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.
- All distillation columns accessed from flooring (grating)
- The roof of the structures (fermentation, distillation, receivers) must be covered totally by pre-coated sheets (Pre-painted galvano loom sheet i.e. PPGL sheets) of 0.5 mm thickness.
- For anhydrous ethanol receivers & storage tanks PESO (Petroleum and Explosive Safety Organizations) guidelines
- Distance between flameproof and non-flame proof area min. 15 m
- The layout will take into account the working space & safety requirement of Factory Inspectorate, Govt. of Maharashtra State.

6.2 Plant Lighting

Plant building lighting will be as per norms & as per Electrical inspectorate / factory inspectorate norms.

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 7: Overview of Environment management processes

#	Waste product and source	Treatment and disposal
1.	**Effluent/Wastewater**	
	Spent wash	Bio-methanation followed by multi effect evaporation followed by bio-composting
	Spent lees, condensate from MEE and Other effluent (e.g. blow down water)	Treated in CPU; comprised of primary treatment of effluent followed by aeration as secondary treatment and tertiary treatment Hot water recycled after cooling
	Sewage: Domestic wastewater	Will be treated in sugar ETP
2.	**Gaseous and dust emission**	
	Flue gasses from boilers Due to burning of bagasse and biogas	Particulate emissions will be controlled by Wet scrubber and then vented through a stack of height 35 m Bagasse as well as biogas are renewable energy sources and carbon neutral in nature Bagasse transfer will be through closed conveyers to control fugitive dust Handling and transportation of various materials will be minimal. Provision of flare unit if biogas not used in boiler Greenbelt area proposed is 5.6 acres
	Bio-composting	Fully auto spraying and aerobic composting Provision of flare unit if biogas is not used in boiler
	Diesel generators	Complying to CPCB criteria; DG stack as per guidelines

		It will be operational only when captive power supply failure, hence emissions anticipated to be less frequent and minor
	Fermentation unit: (CO_2)	Fermenters will be covered
3	**Solid waste**	
	Boiler ash	Bagasse ash contains soil nutrients such as potash and phosphates. It will be mixed with bio-compost as enriching material and sold to farmers (for use in agriculture lands).
	Fermented sludge: Yeast sludge, CPU sludge	The sludge from fermenter will be degradable, containing organic nutrient and micro elements. It will be mixed with bio-compost

8.0 SAFETY, OCCUPATIONAL HEALTH MANAGEMENT

The goal of all occupational health and safety programs is to foster a safe work environment. In this project, aspects of Safety and Occupational Health are given with the due consideration, over and above applicable legislations such as Factories Act 1948. Extra attention will be paid to provide measures for ensuring safety and health of workers and as well integrity of plant. This will be done by applying following national or international standards.

- Standard operating procedures (SOP) will be developed as per the manual of respective equipment and machines. These SOP will be strictly implemented to ensure safety, health and environment throughout the premises
- Smoking and igniting activities will be strictly prohibited in the entire unit
- Regular medical checkup of workers, contractual workers and employees

Facilities at existing sugar unit such as drinking water facility, canteen, toilet and bathrooms, petrol pump, first aid facility, safety gears and PPE will be made available to workers, as well as to the visitors and transporters.

8.1 Schedule of medical check-up during operational phase

- Comprehensive pre-employment medical checkup for all employees
- General checkup of all employees (including contractual employees and casual labour) once every year (the industry is doing it for existing unit).
- Local hospitals and Govt. health monitoring system will be engaged

- Dispensary and ESI facility will be provided to all workers as applicable

9.0 COST OF THE PROJECT

The proposed activity of distillery unit will require about Rs. 5639.46 lakhs investments. Out of which, Rs. 1818.00 lakhs will be allocated for Environment management. The cost for proposed activity and environment management are mentioned in **Table 8.**

Table 8: Project Cost Details

#	Particulars	Amount (Rs. in Lakhs)
1.	Land development and internal roads, drains, compound wall & gate	28.00
2.	Civil work and building	1141.06
3.	Plant and machinery including taxes and duties	3670.92
4.	Miscellaneous fixed assets	162.25
5.	Preliminary & Pre-operative and other expenses	307.32
6.	Contingencies @ 2%	114.33
7.	Margin Money	25.00
8.	Provision for environmental management, green belt and rainwater harvesting	80.00
Total		**5528.88**
Additional provision towards CSR/CER (2% of capital)		110.58
Total project cost		**5639.46**

10.0 CONCLUSION

During environmental impact assessment study, the potential environmental, social and economic impacts of the above project have been assessed and given in EIA report. The proposed distillery unit will have certain levels of marginal 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 management of TKSSKL 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.