File No.IA-J-11011/256/2017-IA-II(I), Category 'A'

EXECUTIVE SUMMARY
of
Environmental Impact Assessment Report

New 30 KLPD Molasses based Distillery Unit

M/S. DWARKADHISH SAKHAR KARKHANA LIMITED

Sheware, Taluka Satana(Baglan), District Nashik, Maharashtra

Prepared by

VASANTDADA SUGAR INSTITUTE, PUNE

Manjari (Bk.), Tal. : Haveli, Dist. : Pune 412 307, Maharashtra, India

Telephone: (020) 2690 2100, 2690 2343/7 Fax (020) 26902244

Website: www.vsisugar.com

*Accredited by QCI/NABET for EIA consultancy services, (Certificate No. NABET/EIA/1417/SA 0014)
Recognized R & D Centre by Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India
Recognized Post Graduate & Research Centreof 'SavitribaiPhule Pune University'

December 2017

VSI/EIA/DSKL/DR-01/20171218

CONTENT: EXECUTIVE SUMMARY

LIST OF TABLE

LIST OF FIGURE

EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. Dwarkadhish Sakhar Karkhana Ltd. (DSKL) is a private sugar mill (limited company) located at village Sheware, Tal-Satana, Dist- Nashik, Maharashtra. It is registered under the Company Act 1956 vide registration No. 25-13345 dated 18/02/1999. The establishment of this sugar factory was in the interest of local sugarcane growers. According to industrial zone classification, this site is situated in D+ zone, which is industrially least developed. The industry was awarded with "**Vanshree Puraskar**" in 2008 by the Government of Maharashtra for regular tree plantation every year in industry campus and surrounding area.

1.1 Features of the Site

DSKL has approx. 19.2 acres of land, which will be utilized for distillery as well as ancillary units such as pollution control system, greenbelt, etc. The existing site meets the industrial sitting guidelines of the Ministry of Environment, Forest and Climate Change (MoEFCC). The project proponent also explored alternative site for the distillery unit on survey No. 265 towards the NW direction of sugar mill.

This site location map is shown in **Fig. 1**. The other important aspects are highlighted in the following table.

Table 1: Features of the Project site

Geographical Location of Distillery unit	1) 20°47'51"N, 74°07'14"E 2) 20°47'56"N, 74°07'16"E 3) 20°47'53"N, 74°07'21"E 4) 20°47'49"N, 74°07'21"E Altitude 678 m above MSL
Road Connectivity	SH-20 (Parshuramnagar-Manmad) and SH-16 (Aurangabad – Taharabad) approx. 2 and 3km away from the project site respectively NH-3 (Mumbai-Agra) is approx. 60 km away from the project site
Nearest Settlement /City/Town	Taharabad is approx. 3 km from the project site Satana (Taluka place)- 29 km Nashik (city & major market place of Maharashtra) – 119 km
Railway Station	Manmad railway station approx. 90 km from the project site
Air Port	Nashik (Ozar) airport is approx. 104 km from the project site
River	Mosam river is approx. 0.7 km and Haranbari dam is approx. 9km away from the project site

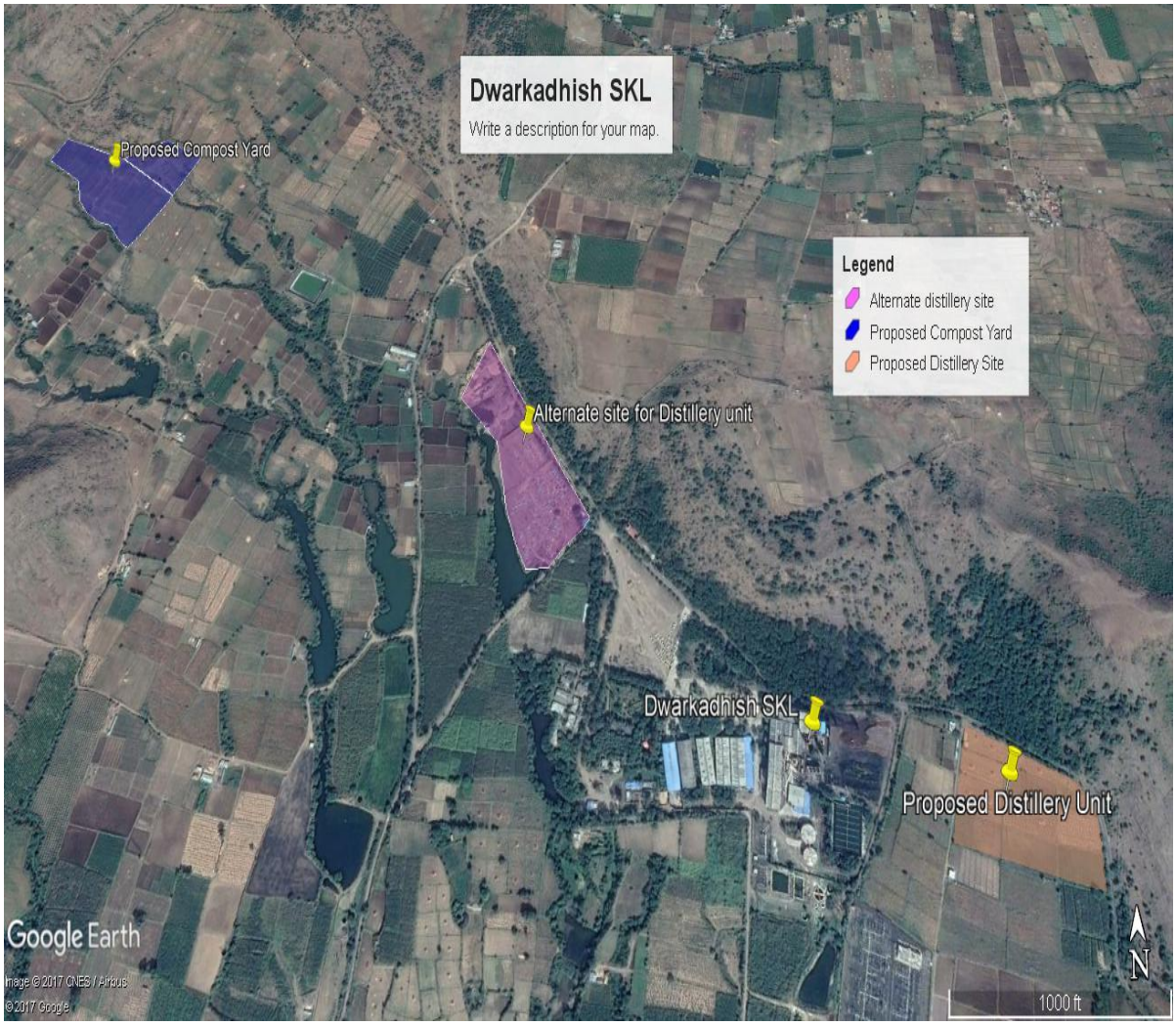

Figure 1: Satellite image of proposed distillery unit alongwith alternative site

1.2 Project Information at a Glance

1.	**Project Proponent**	M/s. Dwarkadhish Sakhar Karkhana Limited (DSKL)	
2.	**Project**	New 30 KLPD molasses based distillery	
3.	**Location of the project**	Survey No.276, 216 (Compost yard) 265 (Alternate distillery site) At village Sheware, Tal. Baglan (Satana), Dist.-Nashik, Maharashtra-423301	
4.	**Project categorization**	Category A [item 5g] as per EIA Notification, Sep 2006	
	PROJECT DETAILS		
4.	**Working days per annum**	270	
5.	**Product KLPD**	**Rectified spirit**	28.50 (ISI Grade - I, 323, 2009)
		Impure spirit (5%) OR	1.50
		ENA	28.20 (IS: 6613 – 2002)
		Impure spirit (6 %) OR	1.80
		Anhydrous Alcohol	27.14 (IS:321–1964 & IS:15464 – 2004)

		Impure spirit (5%)	1.50	
6.	**By products**	**Fusel oil**	120 lit/day	
		Biogas	~11,700m^3/day	
		Bio-compost	~8,775 ton per annum	
6.	**Effluent Treatment System**	For Spentwash: Biomethanation followed by multi-effect evaporation (MEE) followed by bio-composting For Spent lees and condensate and other effluent – CPU		
7.	**Air Pollution Control Systems for flue gases**	Wet Scrubber will be used as air pollution control device		
	INFRASTRUCTURE			
8.	**Land**	• Distillery, evaporation unit (MEE), storage lagoon = 3.0 acres • Biomethanation=1.0acre • Finished product storage = 1.0 acre • Bio-composting yard and storage of PMC/ compost= 9.2 acres • Green belt development= 5.0 acres **TOTAL LAND ALLOCATED =19.2 acres**		
9.	**Main Raw Material**	**Material**	**Quantity**	**Source**
		Molasses	111 MT/d	Own sugar unit
		Nutrient N,P	100 kg/d	Market at Taharabad, Nashik, etc.
		Turkey Red Oil (TRO)	150 kg/d	Market at Taharabad, Nashik, etc.
		Press mud	57.4 T/d	Own sugar unit
			2700 T per cycle of 60 days	
10.	**Fuel**	Bagasse (as a fuel for boiler F/S ratio of 2.2): 109 TPD **Source:** Own sugar factory Biogas: ~ 11,700 cum/day **Source:** Distillery biomethanation unit		
11.	**Boiler**	New boiler of 12 TPH with working @~85% efficiency & pressure of 3.5 Kg/cm^2 will be installed		
12.	**Stack height and Inner diameter**	Existing 60 m height and 3.5 m inner diameter (during season) Proposed 45 m height and 1.3 m inner diameter (during off-season)		
13.	**Steam requirement**	Maximum 240 TPD **Source:** Own sugar mill boiler – low pressure exhaust steam from turbine will be used for distillery unit during season Off-season: From proposed 12TPH boiler		
14.	**Power**	710kwh – Source: from own cogeneration unit during season 710kwh- Source: will be purchase from MSEDCL during off-season		
15.	**Total Water Requirement**	1,128 cu.m/day (initial input) 543 cu.m/day (considering recycle and reuse) **Source:** From the bunds constructed for storage of runoff of rainwater from the surrounding areas (There are seven reservoirs having		

		collective capacity of 9 million CFT = 254851.6 m^3)
16.	**Manpower**	117: Out of which 80 will be skilled and 37 will be unskilled persons
17.	**Green belt**	Proposed ~4.0 acre
	FINANCIAL ASPECT	
18.	**Total Project Cost**	Rs. 5,746.15 lakhs
19.	**Capital expenses for Environment management**	Rs. 1,700.5 lakhs

1.3 RESOURCES

1.3.1 Molasses

Molasses is the chief raw material for the proposed project. It will mostly be available in-house. The requirement of molasses will be 111 MT/day or 30,000 MT/annum. The factory is having its own molasses to the extent of 25,200 MT, which will be utilized for production of RS or ENA or fuel alcohol. The remaining quantity i.e. 4,800MT of molasses will be purchased from nearby sugar mills.

1.3.2 Press mud

The pressmud generation is approx. 17,920 per annum (@3.2% on cane). The pressmud will be mixed with the concentrated spentwash in the ratio of 1:1 and will be converted to biocompost by the process of biocomposting.

1.3.3 Land

The land required for the proposed project is ~19.2 acres. The proposed land purchasing is in process. The land is flat, open and soon will be under the possession of the industry. The survey No. of proposed land for distillery unit is 276 (part of it) having area of approx. 6.7acres and is on the east side of sugar mill. Out of available land, approximately 3 acres has been provided for the proposed distillery and ancillary units thereof such as boiler house, distillery plant etc.9.2-acre land will be allotted for compost yard and total~5.0 acres of land will be allocated for proposed green belt development.

1.3.4 Water

The water requirement for the proposed project will be met from the bunds constructed for storage of runoff of rainwater from the surrounding areas. There are about seven reservoirs constructed by the mill having a collective capacity of approx. nine million cubic feet (254851.6 cubic meter). Water will be required for domestic, process and utility purpose. Daily fresh water requirement for the proposed distillery unit will be around 543 m^3/d. The water –mass balance is shown in **Fig. 2.** (The water balance is given in **Chapter 2; Table 2.5)**

1.3.5 Steam & Power

Steam requirement for proposed distillery, multi effect evaporation system, boiler, steam coil air pre-heater (SCAPH), de-aerator including pipeline losses is 10 TPH at 3.5 Kg/cm^2 (g). DSKL is having two boilers of capacity 40 TPH/hr at 32 Kg/cm^2 (g) and 55 TPH/hr at 72 Kg/cm^2 (g). Steam from existing sugar unit will be used during crushing season and a new boiler of capacity 12 TPH @ 83.3% efficiency with 3.5 Kg/cm^2 (g) pressure will be installed to fulfil the steam requirement during off season of the proposed distillery. The power requirement for distillery, boiler and ETP will be approximately 0.71 MW. The electricity for idle days will be purchased from MSEDCL.

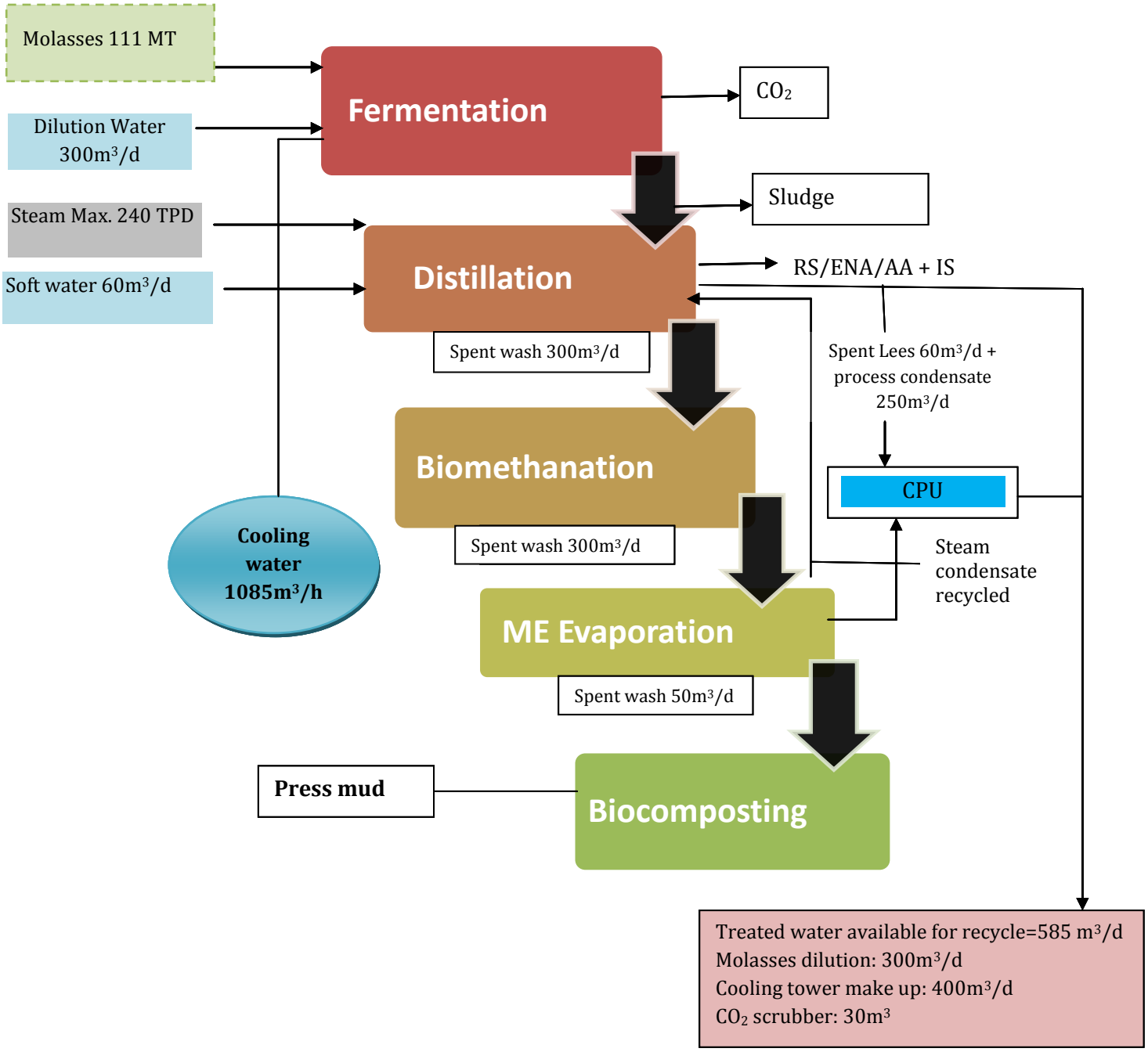

Figure 2: Water and Mass Balance

1.3.6 Fuel

Bagasse and biogas will be used as a fuel for the steam generation activity of the proposed distillery unit. Bagasse generation is 28.5% on cane crushing. Thus, the mill produces bagasse of 997.5TPD or 41.56TPH. The requirement of bagasse for proposed distillery will be 109 TPD. Even after meeting the distillery requirement, the mill will have surplus bagasse available for distillery operations during off-season of sugar mill (**Refer Chapter 2; Table 2.6** for Bagasse balance during season and off-season).

2.0 MANUFACTURING PROCESS

The manufacturing of alcohol/spirit takes place in two stages; 1) fermentation and 2) distillation. In the process, molasses is diluted with water and sent to fermenters where yeast strains of species *Saccharomyces cerevisieae*, converts reducing sugar present in the molasses in to alcohol. The fermentation of molasses in fermenters take about 24 to 30 hours for completely exhausting the sugars in molasses. Due to technology development in the field of fermentation, yield of 265 to 280 liters of alcohol is generally produced per MT of molasses. In the proposed project, continuous fermentation process will be used. In this processes fermenters are in constant usage with little shut down and after initial inoculation of yeast culture, further inoculation is not necessary. Another advantage of the technology is it generates less volume of spentwash compared to batch process.

2.1 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.

2.1.1 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 DSKL has planned to select molecular sieve dehydration (MSDH) technology.

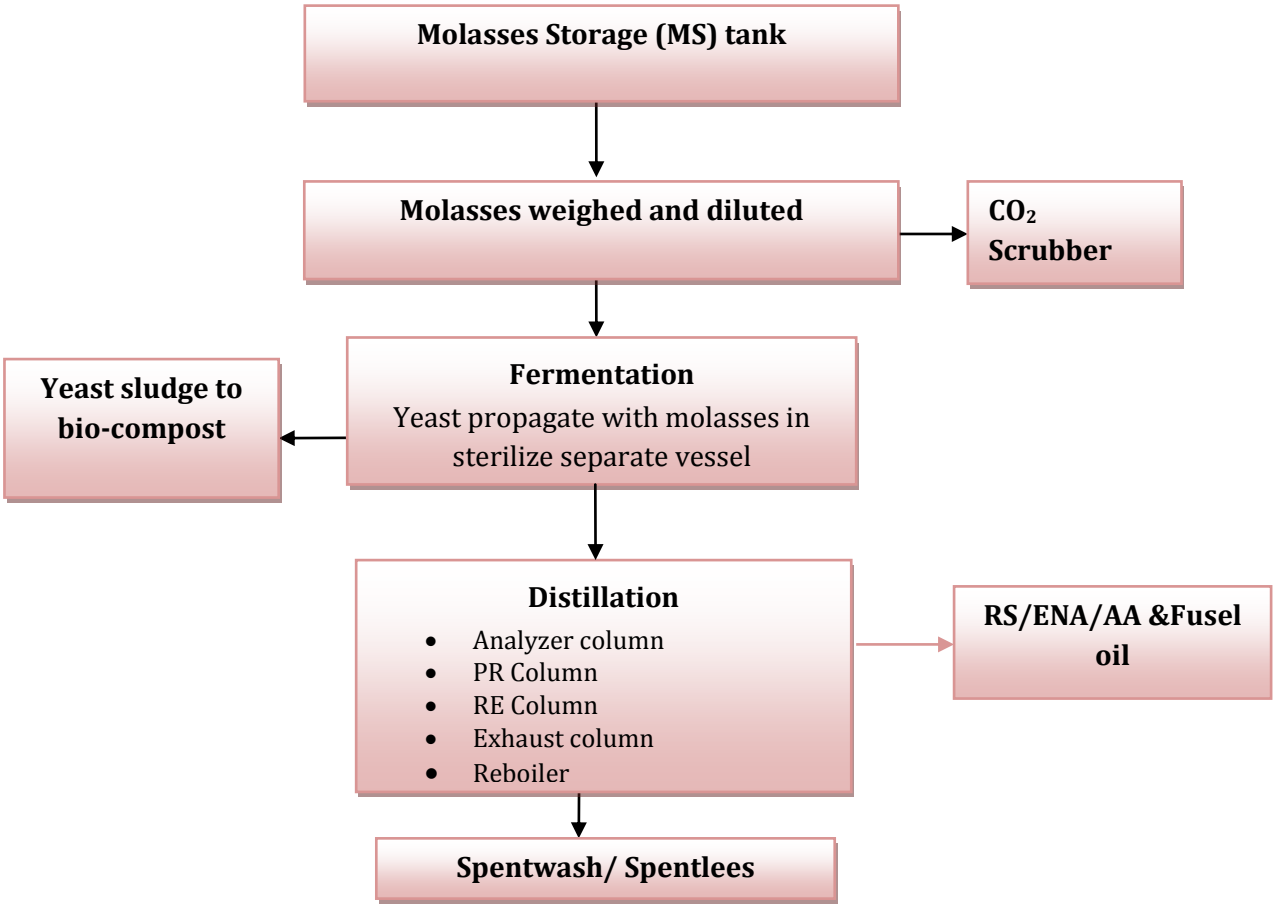

Fig. 3: Schematic of RS/ENA/AA manufacturing process

2.2 Details of Storage tanks

At present, the factory is having 2 Nos. of mild steel tank having total molasses storage capacity of 9,000MT. Hence, it is proposed to install one additional mild steel tank of 5,000MT capacity in the distillery premises. The details of storage and receiver tank are given below in **Table 2.**

Table 2: Details of storage and receiving tanks

Sr. No.	Particulars	Receiver tank capacity (cu.m.)	Storage tank capacity (cu.m.)
1.	Rectified Spirit	40x3	600x2
	Impure Spirit	10x3	200x1
2.	ENA	40x3	600x1
3.	Anhydrous Alcohol	40x3	600x2
	Impure spirit	10x3	200x1

2.3 Cost of the Project

The proposed activity of distillery unit will required about Rs. 5,746.15 lakhs investments. Out of which Rs. 1,700.5 lakhs will be allocated for Environment management. The details of cost for proposed activity and EMP (Capital & Recurring) are mentioned in **Table 3& 4.**

Table 3: Project Cost Details

Sr. No.	Particulars	Amount (Rs. in Lakhs)
1.	Land development and internal roads, drains, compound wall & gate	28.00
2.	Civil work and building	970.00
3.	Plant and machinery including taxes and duties	3936.97
4.	Miscellaneous fixed assets	220.26
5.	Preliminary & Pre-operative and other expenses	256.75
6.	Contingencies @ 2%	256.75
7.	Margin Money	77.42
	Total	**5,746.15**

Table 4: Estimated Capital & Recurring Expenses for Environment Management

#	Particulars	Amount (Rs. in Lakhs)
1.	Spent wash cooling and holding tank	190.00
2.	Compost yard with PCC top finish	300.00
3.	Civil work at ETP (Foundation for Evaporation, Biogas unit, polishing unit etc.)	80.00
4.	Leachate management system	30.00
5.	Laboratory shed and its glassware, equipments, etc.	12.50
6.	Treatment units for condensate and other effluent	40.00
7.	Bio-methanation Unit	275.00
8.	Stand alone Multi Effect Evaporator (Civil+ Machinery)	450.00
9.	Spraying pumps, spentwash pumps and pipings, HDPE piping, valves and fitting	30.00
10.	Bio-composting machinery, pipeline and other	55.00
11.	DG set for ETP	10.00
12.	Chimney	60.00
13.	Wet Scrubber	80.00
14.	Wire fencing around Compost yard	5.00

15.	Electrification at compost site	3.00
16.	Fire fighting equipments and other	70.0
17.	Tree plantation and bore well for composting	10.00
	TOTAL	**1,700.50**
Recurring Expenses/Annum		
1.	Salaries and wages	89.80
2.	Operation and maintenance of all pollution control devices, motors, pumps, pipelines, etc. (@ 5% on capital investment)	77.87
3.	Fuel (composting activity) and Electricity (in case of diesel generator operation)	1.25
4.	Transportation	4.0
	TOTAL	**172.92**

3.0 ENVIRONMENTAL ASPECTS

Table 5: Overview of Environment Management Processes

Sr. No	Waste product and source	Treatment and disposal
1.	**Effluent/Wastewater**	
	Spentwash	Biomethanation followed by multi effect evaporation followed by bio-composting
	Spent lees, condensate from MEE and Other effluent	Hot water recycled after cooling Treated in CPU; comprised of primary treatment of effluent followed by aeration as secondary treatment and tertiary treatment
	Sewage: Domestic wastewater	As local acceptable practice, by septic tank and soak pit system
2.	**Gaseous 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 chimney of height 60m Bagasse is carbon neutral fuel, contains sulfur in trace amount Biogas content H_2S gas which will responsible for emission of max. 3.9 g/s of SO_2 Bagasse transfer will be through closed conveyers hence fugitive dust will get controlled

Sr. No	Waste product and source	Treatment and disposal
		Handling and transportation of various materials will be minimal. Proposed greenbelt plot area is 5.0 acres
	Bio-composting (CH_4)	Fully auto spraying and aerobic composting
	Diesel generators	It will be operational only when captive power supply failure, hence emissions anticipated to be less frequent and minor
	Fermentation unit: (CO_2)	Fermenters are covered, CO_2 scrubbed in water
3	**Solid waste**	
	Boiler ash	Bagasse ash contains soil nutrients such as potash and phosphates. It will be mixed with bio-compost and sold to farmers (for use in agriculture lands) or to brick manufacturer.
	Fermented sludge: Yeast sludge, Polishing unit sludge	The sludge from fermenter will be degradable, containing organic nutrient and micro elements. It will be mixed with bio-compost.

4.0 BASELINE ENVIRONMENTAL CONDITIONS

Table 6: Summary of Environmental features of study area

#	Facet	In brief
1.	**General characteristics**	Mostly hot and dry
2.	**Rainfall**	An average annual rainfall of 672 mm Most of the rains received from June to September months, July being the month with highest rainfall
3.	**Temperature**	Average maximum temperature in summer is around 36°C and average minimum temperature in winter is around 12.5°C.
4.	**Humidity**	The relative humidity ranges between 40-60%
5.	**Wind**	Predominant wind direction was West followed by North West and the average wind speed was 1.37 m/s during the study period
6.	**Land use/Land cover**	River/Stream 0.65%; Lake/Pond 0.7%; Settlement 17.5%; Open Scrub 1.45%; Dense scrub 5.4%; Crop land 74.5%
7.	**Air Quality**	Complies NAAQ standards of Nov., 2009 at all monitored

<table>
<tr><td></td><td></td><td colspan="4">locations and incremental GLC</td></tr>
<tr><td>8.</td><td>Noise Quality</td><td colspan="4">Complies the standards of CPCB</td></tr>
<tr><td>9.</td><td>Ground water Quality</td><td colspan="4">As per Central Ground Water Board report 2014, the groundwater quality in the district is affected because of high NO_3 concentrations</td></tr>
<tr><td>10.</td><td>Soil Quality</td><td colspan="4">Moderate and light brownish black</td></tr>
<tr><td>11</td><td>Important Feature/sensitive areas (distance in km)</td><td colspan="4">
<table>
<tr><td>1.</td><td colspan="3">Nearest Water Bodies</td></tr>
<tr><td></td><td>River Mausam</td><td>S</td><td>0.740</td></tr>
<tr><td></td><td>Haranbari dam</td><td>W</td><td>9</td></tr>
<tr><td>2.</td><td colspan="3">Nearest National Park/ Sanctuary</td></tr>
<tr><td></td><td>Nandurmadhmeshwar Bird Sanctuary</td><td>S</td><td>89</td></tr>
<tr><td></td><td>Aner Dam Sanctuary, Dhule</td><td>NE</td><td>124</td></tr>
<tr><td></td><td>Yawal Sanctuary, Jalgaon</td><td>NE</td><td>184</td></tr>
<tr><td></td><td>Purna Wildlife sanctuary</td><td>NW</td><td>44</td></tr>
<tr><td>3.</td><td colspan="3">Religiously Important places</td></tr>
<tr><td></td><td>Mangi-Tungi</td><td>NW</td><td>6.13</td></tr>
<tr><td>4.</td><td colspan="3">Historic Monuments</td></tr>
<tr><td></td><td>Salher Fort</td><td>WSW</td><td>20</td></tr>
<tr><td></td><td>Mulher Fort</td><td>SW</td><td>7.4</td></tr>
<tr><td>5.</td><td colspan="3">Archeological Monuments</td></tr>
<tr><td></td><td>Ellora caves</td><td>SE</td><td>140</td></tr>
<tr><td>6.</td><td colspan="3">Nearest Settlements</td></tr>
<tr><td></td><td>Taharabad</td><td>ESE</td><td>3</td></tr>
<tr><td colspan="4">*Note: All distance are approximate aerial distances from the project site</td></tr>
</table>
</td></tr>
</table>

5.0 IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

5.1 Air Environment

1) Emissions from process: It will be due to burning of bagasse and biogas as a main fuel. Bagasse contain 2% of ash and <0.02% sulfur. Biogas contains 2% H_2S which will generate maximum 3.9 g/s of SO_2

2) Transportation: Vehicles of employees and visitors are anticipated as the only source. Hence, thiscould cause negligible increase mainly in NOx, particulate matter and HC.

3) Fugitive and other sources of air pollution: Fugitive emissions will be mainly from Bagasse anddust particles. Since, fly ash will be collected through wet-scrubber hence the fugitive emission will be very less during collection and transport to the compost site, thus, ash is assumed to be negligible source of fugitiveemissions.

5.1.1 Impact Assessment

Air quality: Minor negative impact is anticipated mainly due to stack gas emissions and transportation activities of the proposed project;

Ecology and biodiversity: Minor negative impact is anticipated on avi-fauna due to stack gas exit temperature (approx 80-90°C), and on flora/plants in close vicinity of the project due to dust (particulate matter)

5.1.2 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.

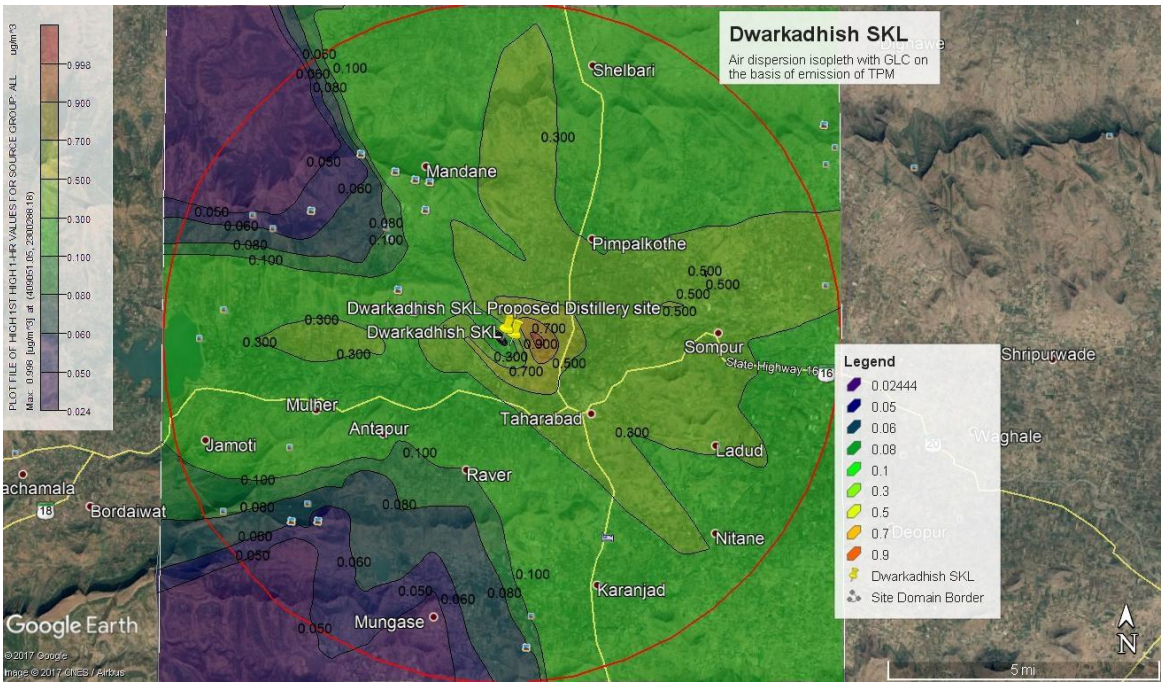

Figure 4: Isopleths showing incremental ground level concentration of particulate matter (Short Term 24 Hourly) during cane crushing season

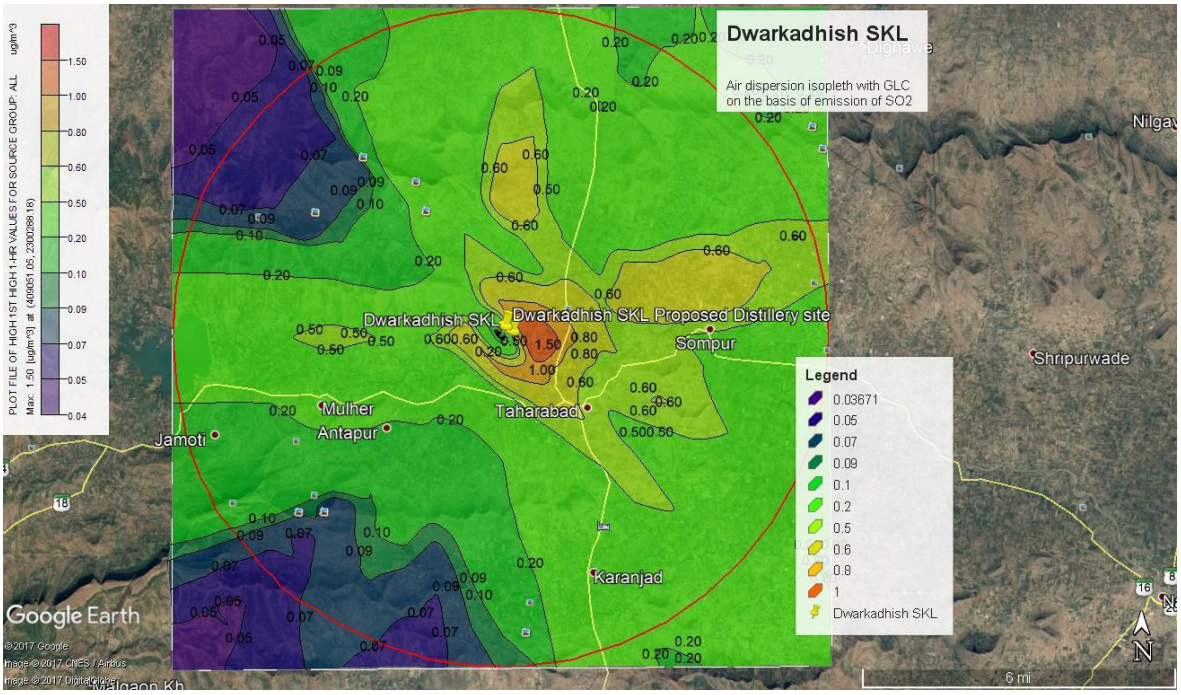

Figure 5: Isopleths showing incremental ground level concentration of SO_2 (Short Term 24 Hourly) during cane crushing season

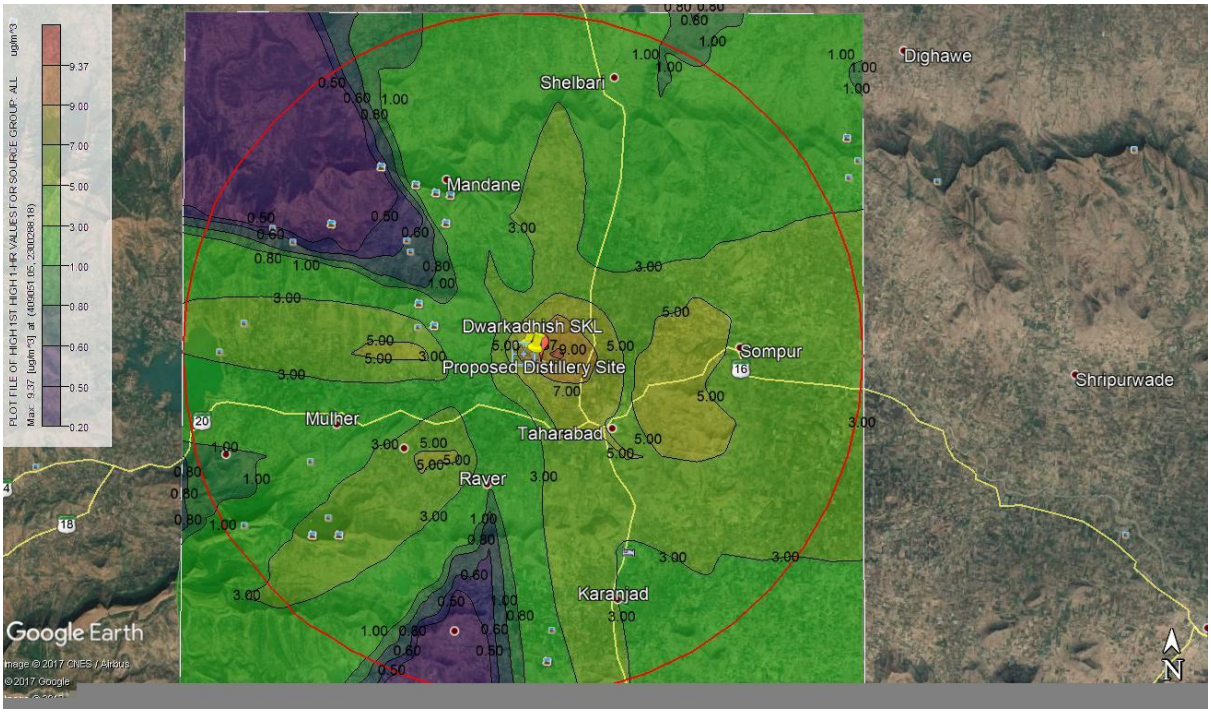

Figure 6: Isopleths showing incremental ground level concentration of SO_2 (Short Term 24 Hourly) during off-season – bagasse + biogas as a fuel

Prediction

The predicted results with baseline concentrations are tabulated below in **Table 7** while incremental dispersion trend is shown as isopleths in **Fig. 4-6**.

Table 7: Resultant Concentrations due to Incremental GLC's

Description	Concentration µg/m³	
	PM	**SO_2**
Maximum rise in GLC	0.9	1.0 during season 9.37 during off-season
Direction of Occurrence and distance	East (0.52 Km)*	East (0.52 Km)*
Coordinates of maximum GLC	20⁰48'01 N 74⁰07'34 E	20⁰48'01 N 74⁰07'34 E
Baseline Concentration reported nearby GLC (at 2.3km SE)	59.78 (Taharabad)	13.90 (Taharabad)
Total Concentration (Post project scenario)	60.68	23.27
NAAQS	**PM_{10}100**	**80**

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

∗ The baseline concentration (98th percentile) recorded at station Taharabad at 2.3 km East-south-East, is the nearest to the incremental GLC

5.1.3 Environmental Management Plan

- Wet-scrubber will be used as air pollution control equipment (98% efficiency)
- Use of bagasse as a fuel, transported to boiler through closed conveyer
- Remaining bagasse will be belled and stored in yard
- Fly or bottom ash will be mix in soil, since it is rich in potash
- Provision of separate parking for goods and general vehicles, wide asphalted internal roads,
  approach road to state highway is also asphalted
- Green belt of 4.0 acre proposed around the project area
- Strict prohibition on washing and maintenance of vehicles on site or in parking area

5.2 Noise

The project activities do not involve high noise sources. Anticipated noise sources are operations of boiler, pumps, motors, distillation columns, etc.

5.2.1 Impact assessment

Ambient Noise: Noise related hazards/ailments are anticipated on persons working close to noise/vibration source. Minor negative impact is anticipated

Ecology and biodiversity: Minor negative impact of noise from transportation activity is anticipated on particularly human population and fauna, along the approach road (approx. 3km length) that connects site with state highway.

5.2.2 Environment management plan

- Use motors, pumps and other machines which comply national/international standards.
- Noise generating activities will be under roof
- Preventive as well as regular maintenance
- Provision of personal protective equipment's as per requirement will made
- Rotation of duties at high noise generating areas
- Leveled and wide internal roads

5.3 Water Environment

Following wastewater sources have been identified for the proposed project

- Spent wash: major source –highly polluting in nature
- Spent lees: second major source; moderately polluting compared to spentwash
- Condensate water of MEE, Wastewater from washing/cleaning: mild to moderately polluted
- Blow down from boiler/cooling tower: water having high temperature and requires only cooling treatment

5.3.1 Impact Assessment:

- Water availability: Water requirement will be met from the bunds constructed for storage of rainwater run-off from the surrounding areas; reuse, recycle of water will save significant of freshwater intake.
- Water/aquatic environment: No negative impact envisaged on water environment as well as aquatic ecosystems of the surrounding area since 'zero liquid discharge' scheme is adequate and efficient
- Air environment: Minor negative impact is envisaged due to odour of spentwash and due to generation of methane and CO_2 from composting process
- Soil Environment: Due to impervious lagoons as well as compost yard, probability of soil pollution could get reduced to zero percent. Hence, no negative impact is anticipated. The compost prepared from spentwash, pressmud and solid waste filler material will help to recycle the soil nutrients, thus positive impact is anticipated
- Ecology and biodiversity: No negative impact, food chain/web may get strengthened due to composting process as usually it attracts avifauna.

5.3.1.1 Reuse of water (after proper treatment)

Wastewater generated due to cleaning and washing, Spentlees and condensate water will be treated in CPU. This unit will comprised of primary treatment followed by aeration followed by

filtration treatment in CPU unit (discussed in Chapter II); treated water will be used for dilution of molasses, cooling tower make up, irrigation, or cleaning activities, etc.

5.3.1.2 Conservation of water

Rainwater harvesting system will be installed to improve the ground water aquifer and tofulfill the requirement of the proposed unit during startup.

5.3.2 Environment Management Plan

Spentwash of 300 m^3/day will first treated in biodigesters to produce biogas. Followed by biodigestion, spentwash will be sent to multi effect evaporation unit to reduce its volume from 300$m^3$to 50m^3. Then, it will be sent to biocomposting process where it will be mixed into pressmud (a solid waste from sugar mill) to produce compost; spentlees, condensate from MEE and other wastewater will be treated in CPU and reused; thus achieving 'zero liquid discharge'.Spentwash storage lagoons and the compost yard will be constructed as per CREP guidelines.

5.4 Soil Environment

Soil is likely to get affected due to following-

a. Percolation of spentwash, disposal of untreated solid (ash, sludge, etc) and/or hazardous waste (spent oil, etc) in soil

b. Removal of top soil layer which is usually more fertile

c. Excavation activity – particularly for spentwash storage lagoons and compost yard

5.4.1 Impact Assessment

Soil environment: No negative impact of solid waste; The bio-compost produced from spentwash-pressmud and mixing of degradable solid waste will have positive impact on soil since organic carbon and soil nutrients are likely get recycled by the process

Ecology and Biodiversity: No negative impact envisaged due to solid waste; enhancement in micro-flora due to compost

Water environment: No negative impact envisaged due to solid waste

5.4.2 Environment management plan

Sr. No.	Waste Material	Quantity (TPD)	Nature	Upshot
1.	Yeast Sludge	1-1.5	Organic	Used as manure and for land conditioner
2.	Ash	2.33	Inorganic	Sold to the brick manufacturer
3.	Sludge from CPU digester	2.5	Organic	Used as manure and for land conditioner

- Top soil layer of 15-20cm to be kept separate and use for greenbelt development
- Disposal of excavated material safely for construction of spentwash storage lagoons, compost yard, leveling of roads, etc.

5.5 Ecology and Biodiversity

Probable sources of impact identified for the project are

a) Disturbance to wild life due to project activities

b) Pollution

5.5.1 Impact assessment

Minor negative impact on flora in the close vicinity of the site, due to particulate matter and avi-fauna due to thermal pollution from flue gases; no negative impacts from other activities are anticipated; Increase in the greenbelt will help to maintain and enhance the biodiversity

5.5.2 Environmental management plan

- Greenbelt development
- Zero Liquid discharge will be achieved
- Safe disposal of solid waste
- Adequate measures to prevent, control and mitigate air and noise pollution

5.6 Socio-economic Environment

Probable Impact causing factors	Situation for proposed project	Environment Management Plan	Impacts
Population flux	Project will provide 117 new employment opportunities	Local candidates will be preferred	No negative impact
Pressure on infrastructure such as electricity, water, road etc.	Captive power Water requirement will be met from own reservoirs Minor increase in vehicle number Adequate school, college, medical facilities are available Public transport, telecommunication banks and other infrastructure already exist and adequate to support minor increase in population	Emphasis will be given on water conservation by recycling and reuse/ Rain water harvesting. Public transport facilities likely to get improved due to project. Improvement envisaged for primary school, health services and commodity market Similarly, improvement in daily utility services are also anticipated Maintenance of internal road and approach road	No negative impact

Employment	Direct employment to 117 people	Local candidates will be preferred Indirect employment to plenty of locals	Positive Impacts

5.7 Land Use, Geology and Hydrogeology/Drainage

5.7.1 Impact Assessment

Most of the land selected for proposed project is under rain fed agriculture and barren land. Therefore, the impact on LU is positive i.e. barren land is getting converted into future built up class which is beneficial for local population.

If we consider drainage map of the study area there is no any disturbance of natural drainage. No impact envisaged on geology and hydrogeology of the site due to the proposed project.

5.7.2 Environment management plan

- Precautions need to be taken to preserve or maintain these streams in their natural form or need to be considered while landscape development.
- Earthquake resistant construction as per national building code for seismic zone IV
- Well defined disaster management plan and proper implementation of it
- Training to the personnel for disaster situation, mock drills at periodic interval

6.0 GREENBELT DEVELOPMENT

Greenbelt will be developed on 5 acres of land (33% of the proposed activity plot) in and around an industrial complex. Therefore, approx. 4,000 plants (including trees and shrubs) are proposed for the greenbelt development. It will require approx. 80$m^3$of water.

7.0 SAFETY, OCCUPATIONAL HEALTH MANAGEMENT

- Use of flame proof electric equipment's
- Provision of lightening arresting system, alcohol vapor condensation system
- Adequate fire fighting measures and provision of safety gears to workers
- Workers working in high noise/ high risk areas must be rotated to other areas
- Smoking and other igniting activities should be strictly prohibited in the distillery, biogas as well as bio-compost area
- Provision of a flare unit for unutilized biogas
- The plant and buildings meet the corresponding provisions of statutes regarding inter-distances, exits, ventilation, illumination, etc. Fire fighting arrangements shall be provided as per the required statutes as well as corresponding standards.

8.0 ENVIRONMENTAL MONITORING PROGRAMME

The Environmental monitoring program given below-

Table 8: Summarized environmental monitoring programme

S. No.	Particulars	Parameter	Frequency#
1.	Stack Emissions	Particulate matter, SO_2, NO_x	Monthly
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.	Monthly
4.	Bore well /ground water sample nearer to compost yard	pH, COD, BOD, Total solids, Chlorides, Sulphate, Phosphates, and Calcium	Quarterly/Monthly
5.	Noise monitoring	Noise levels measurement at high noise generating places as well as sensitive receptors in the vicinity	Monthly
6.	Analysis of ready bio-compost	Moisture, Organic Carbon, and C:N ratio, Nitrogen, Phosphorous, Potassium, etc.	Each batch of compost
7.	Occupational health	Health and fitness checkup of employees get exposed to various hazards	Quarterly
		All other staff (except above) including contract and casual labours	Once a year

9.0 PROJECT BENEFITS

- Efficient use of available resources such as bagasse to produce surplus power
- The proposed project on implementation will generate 117 direct employment opportunities
- The project is agro based, hence there will be plenty of indirect employments to locals
- No rehabilitation/resettlement issues are involved
- Factory is already implementing several schemes/activities for the benefit of local farmers, employees and those schemes/activities will be continued
- Compost produced from the spentwash, press mud and other filler material will be sold to farmers; it will help in recycling of soil nutrients and thus soil quality
- Technology for the project and pollution control are available indigenous

10.0 CONCLUSION

Proper implementation of Environmental Management Plan, risk and disaster management plan will help to prevent, control and mitigate the negative impact of the project and allied activities. At the same time, it will help to enhance positive impact. Overall, social and economic benefits of the project envisaged being profound and therefore, the project will be beneficial to the society and overall development of the region.