EXECUTIVE SUMMARY

Integrated project of sugar plant expansion (5000 to 7500 TCD), ethanol plant expansion (30 to 100 KLPD) with incineration boiler/TG /auxiliaries for ZLD& cogeneration power plant (44 MW)

Nagnathannanagar,Tal. Walwe, Dist. Sangli, Maharashtra

Padmabhushan Krantiveer Dr. Nagnathanna Nayakawadi Hutatma Kisan Ahir SSK Ltd.

31.07.2018

ENVIRONMENT CONSULTANT AND LABORATORY

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CONTENT

1.0 Introduction

Padmabhushan Krantiveer Dr. Nagnathanna Nayakawadi Hutatma Kisan Ahir SSK Ltd. (PKDNNHKASSKL) is operating an existing sugar factory with 5000 TCD capacity (operating at average cane crushing of 4000 TCD), along with 30 KLPD ethanol plant. PKDNNHKASSKL now proposes to expand the crushing capacity from 5000 TCD to 7500 TCD, ethanol plant from 30 to 100 KLPD, along with incineration boiler/TG & auxiliaries for achieving Zero Liquid Discharge (ZLD) along with proposed cogeneration power plant of 44 MW. Environmental clearance of the existing Sugar 3500 TCD to 5000 TCD and 24 MW Cogeneration is granted on file no. J-11011/197/2013-IA-II (I) dated 22.02.2017 and for Distillery 30 KLPD file no. J-11011/661/2007-IA-II (I) distillery dated 17.09.2007(Initial dated) and 12.10.2015 (Extension letter).

As per EIA Notification dated 14th September, 2006 and its amendment thereafter, proposed integrated project comes under Cat A. For sugar expansion project Category “B” Activity - 5(j), Cogeneration Category “B”, Activity-1(d) >15 MW plants based on biomass fuel Category “B”, Activity-1(d) and Distillery expansion Category “A”, Activity-5(g) All molasses based on distillery.

2. Project Location

The project site is located at Walwe village Nagnathannanagar, Taluka Walve, Dist. Sangli, Maharashtra. Site is geographically located at Latitude: 17° 1'5.22"N, Longitude 74°22'13.96"E and 564 m above MSL. The land requirement for proposed industry unit is already in possession. Proposed expansion will be within existing factory premises. Project site is connected to Sangli-Walwa Road adjacent to the factory, Walwa-Tasgaon Road 0.8 km in NE and NH4 (Mumbai - Pune - Kolhapur – Goa) is 12 m in SW. Nearest town Islampur is 12 km away and Sangli 27 km. There are no Tropical Forest, Biosphere Reserve, National Park, Wild Life Sanctuary and Coral Formation Reserves within 10 km Influence Zone. Krishna River is flowing at a distance of 2.2 km.

Figure 1: General Location Map

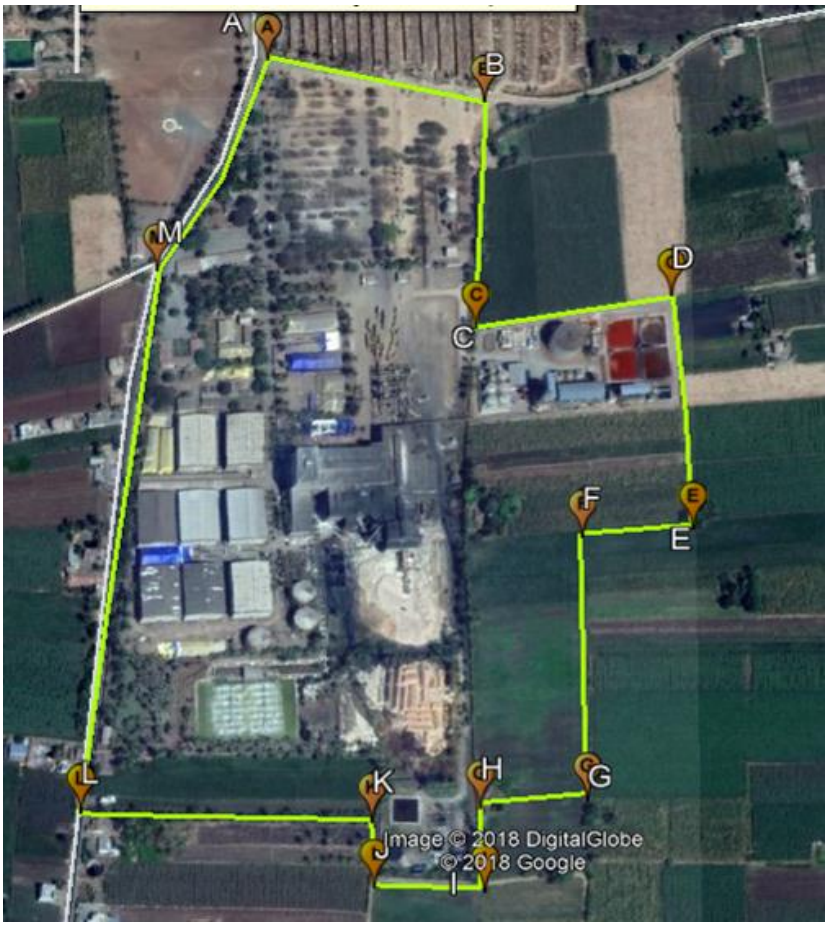

Figure 2: Google Image

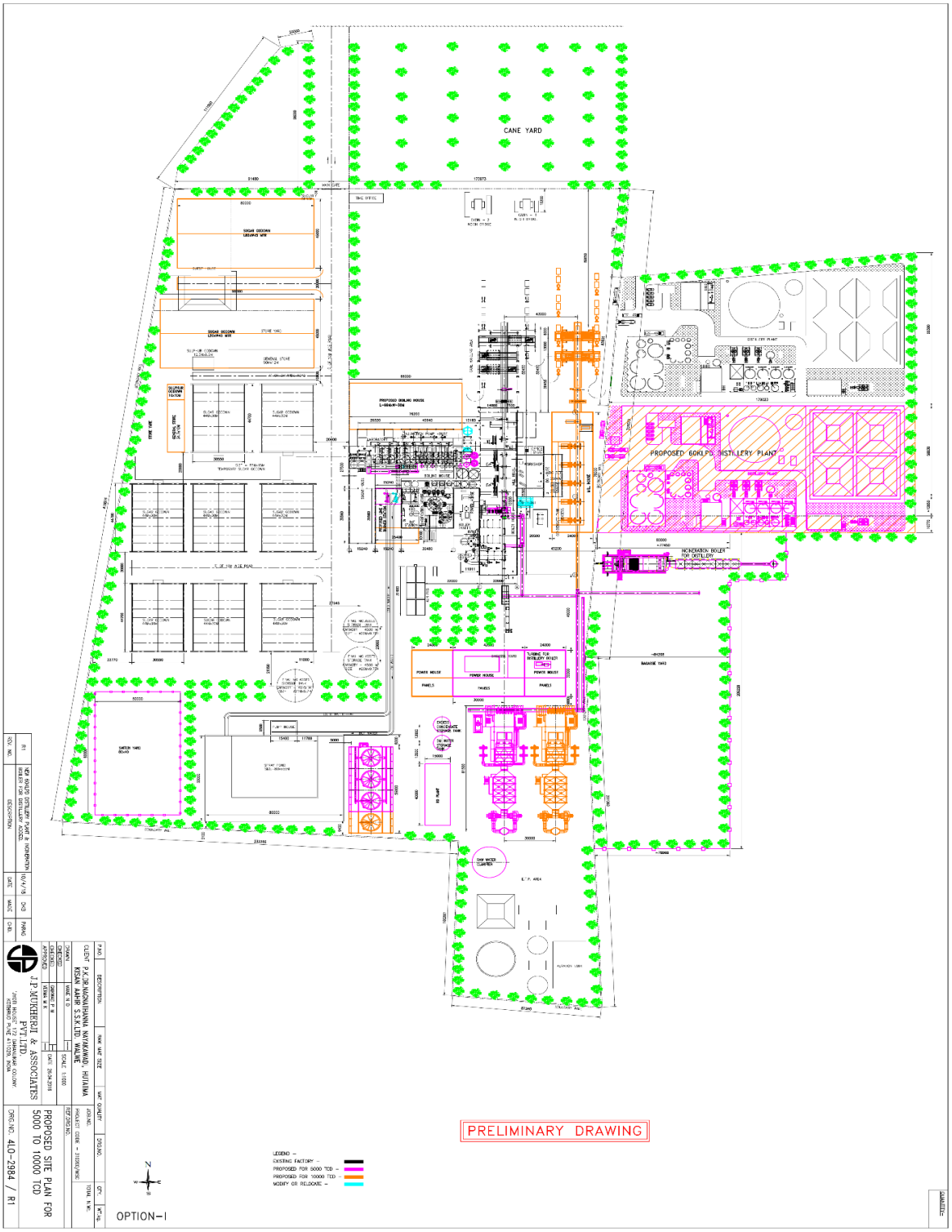

Figure 3: Plant Layout

Figure 4: Existing factory photographs

Figure 5: Existing Environmental infrastructure facilities

3.0 Salient features of integrated project

Table 1: Brief information of the project and environmental settings

Particulate	Description	
Project	Integrated Sugar Plant Expansion (5000 to 7500 TCD), Ethanol Plant Expansion (30 to 100 KLPD) With Incineration Boiler / TG / Auxiliaries For ZLD & Cogeneration Power Plant (24 to 44 MW) Project	
Project Location Geographical Coordinates	Latitude: 17° 1'5.22"N, Longitude 74°22'13.96"E Elevation: 564 m above MSL.	
Available land	Total plot area : 64 acres Green belt area: 20.7 acres Proposed Greenbelt: 1.36	
Product	Sugar Crushing capacity existing: 5000 TCD, Proposed: 7500 TCD Sugar production existing : 19500 MTM Proposed: 29250 MTM Cogeneration: Existing power generation 4.5 MW, Proposed 44 MW (Existing TG will be demolished) Distillery: ENA/RS/AA/Ethanol of 100 KLPD **(One at a time)**	
By products	**Existing 500 TCD**	**Proposed (7500 TCD)**
Sugar (TPD)	650	975
Bagasse (TPD)	1400	2100
Press mud (TPD)	200	300
Molasses(TPD)	48000	72000
Operation days	Sugar factory season: 160 day Cogeneration : 193 (Seasonal operational days 160 and off season operational days 33) Distillery: 300 days	
Sugarcane required	Existing: 5000 TCD Proposed :7500 TPD	
Molasses requirement	Existing required for 36000 T for 30 KLPD Proposed required for 120000 TPA for 100 KLPD (Molasses available with Factory is 54000 TPA remaining 66000 TPA molasses will be procured from the nearby factory). Molasses supply assurance letter is available with factory	
Water requirement	**Sugar and cogeneration** • Existing sugar 360 CMD • Proposed 150 CMD **Distillery** Existing 200 CMD Proposed 590 CMD	
Source of water	Water permission is available from Executive Engineer, Sangli Irrigation department.	
Boiler	Exiting sugar boiler: 50 TPHX1 and 28 TPHX 2	

<table>
<tr><td></td><td colspan="3">(Existing boiler shall be demolished)
Proposed Sugar Boiler: 220 TPH
(New incineration boiler for distillery 40 TPH</td></tr>
<tr><td>TG</td><td colspan="3">Exiting TG : 4.5 MW (It will be demolished)
Proposed TG: 44 MW, Proposed distillery incineration boiler 4 MW</td></tr>
<tr><td>DG</td><td colspan="3">1 No. D.G. Set Of 1000 KVA Exist. & 2 Nos. Set Of 1000 KVA Prop.</td></tr>
<tr><td>Electricity requirement</td><td>Particulates
Electricity generation
Electricity consumption
Electricity Export</td><td>Existing
4.5 MW
4.5 MW
00 MW</td><td>Proposed
44 MW
9.3 MW
34.7 MW</td></tr>
<tr><td>Fuel- Bagasse</td><td>Particulates
Bagasse production (27.5% on cane TPD)
Required for boiler
Bagasse save</td><td>Existing
1375
1150
56.25</td><td>Proposed
2062
1684
84.38</td></tr>
<tr><td>Fuel Biogas</td><td colspan="3">14000 CMD
586 m3/hr</td></tr>
<tr><td>Fuel Coal</td><td colspan="3">For incineration boiler 20% of total fuel 384 MT / DAY</td></tr>
<tr><td>Steam</td><td colspan="3">Existing steam generation 100 TPH
Steam Generation from proposed boiler220 TPH boiler is 200 TPH</td></tr>
<tr><td>Total effluent generation</td><td colspan="3">Existing from sugar unit: 459 CMD
Proposed from Sugar unit: 799.46 CMD
Existing Distillery effluent generation: spent wash 240 CMD, spent lees 53 CMD, process condensate 186 CMD
Proposed 100 KLPD distillery effluent: Spent wash 600 CMD, spent lees 253 CMD , Process condensate 430 CMD</td></tr>
<tr><td>Effluent treatment system</td><td colspan="3">Existing 500 CMD ETP from sugar unit
For proposed expansion ETP capacity will be upgraded to 800 CMD. Treated water is recycled/reused in green belt development and ferti-irrigation.
Total Spent wash generation will be 600 CMD. For existing unit spent wash is treated trough Biogas unit followed by Multi effect evaporator (MEE) followed by Bio composting. For Proposed 70 KLPD expansion spent wash will be treated through generated spent wash will be concentrated in MEE and then burn in proposed 40 TPH spent wash fired boiler.</td></tr>
<tr><td>Ash</td><td colspan="3">Sugar
• Existing bagasse ash generation: 25 TPD
• Proposed bagasse ash generation: 42 TPD
Distillery
• Coal ash from proposed distillery: 134.4 TPD
• Spent wash ash from proposed distillery: 22-23 TPD
Bagasse and spent wash ash collected from the furnace bottom hoppers and high potash content in the bagasse ash</td></tr>
</table>

	will be used as manure. Coal ash will be sold to the brick manufacturer.
ETP sludge	The sludge from primary clarifies, settling tank and secondary clarifier will be sent to sludge drying beds. Sludge will be dried in natural heat of sunlight. The dried cakes will be scrapped off periodically and can be utilized for as manure.
Air pollution control measures	Proposed: Electrostatic precipitator Existing: Wet scrubber (It will be demolished and new ESP will be installed) Proposed Stack height: 72 m Existing stack height: 30 m and 40 m will be demolished and new stack of 72 m will be installed.
Man-power	Existing manpower sugar 80 skilled and unskilled 400 For proposed expansion & Cogeneration Skilled 40 and unskilled 100 Existing Distillery skilled 10 & Unskilled 25 Proposed expansion of distillery skilled 15 & unskilled 75
Total project cost	Sugar expansion: Rs. 20722 Lakhs Cogeneration: Rs.22101 Lakhs Project cost of the distillery: Rs. 14615 Lakhs Total: Rs. 57438 Lakhs
Total EMP capital cost	Total 10.5 cr.
Environmental setting	
Toposheet number	47 K/8 and 47L/5,
Nearest IMD station	Miraj (Sangali) 43158
No. of Villages in 10 km	26
Bio-geographical zone	Semi-Arid
Nearest Village	Walwe at 500 m
Nearest Town / City	Islampur is 12 km away and Sangli 27 km.
Nearest National Highway	NH4 (Mumbai - Pune - Kolhapur – Goa) is 12 m in SW.
Nearest Railway station	Kirloskarvadi railway station 8.82 km in NE, Sangli Railway station 26.67 km in SE
Nearest Airport	Kolhapur airport (IXU) 42 km Pune international airport 178 km
National Parks, Reserved Forests (RF) / Protected Forests (PF), Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	No any in within 10 km of project area Chandoli National Park 55 km Radhanagari wildlife sanctuary 79 km
River / Water Body (within 10 km radius)	Krishna river : 2.2 km in West

Precipitation	681.8 mm
Temperature	Highest recorded: 43^0C Lowest record: 6.5^0C
Humidity	Annual mean Relative humidity: 51-78
Wind Direction	Dominant wind from West
Soil Type	Medium black and deep black soil Clay Loam
Defence installation	None within 10 km radius of the project site
Nearest CRZ	None within 10 km radius of the project site
Nearest Historical site	Dandoba Hills 40 km in SE, Sangli Fort 30 km
Nearest Archaeological site	Agashiv Buddhist Caves, Bhairav Buddhist Caves, (at 33.25 km in North-west direction)
Seismic Zone	Zone III, Moderate

3.1 Resources required for Project

Table 2: Raw material requirement

Sr. No.	Raw material	Existing	Proposed	Storage	Source	Mode of Transport
1.	Sugarcane (TPD)	5000	7500	Cane yard	Nearby Market	Trucks, TRACTOR
2.	Molasses (TPD) requirement	120	400	Steel Tank	Own Factory	Thr. pipeline
3.	Coal(TPH)	Nil	16.00		Nearby Market	Truck
4.	Lime (TPD)	8.00	12.00	Godown	-do-	-do-
5.	Sulphur(TPD)	2.5	3.75	Godown	-do-	-do-
6.	Hydrochloric acid kg/day	15.00	30.00	Carboys	-do-	-do-
7.	Sodium chloride	-	-	-	-do-	-do-
8.	Phosphoric acid kg/d	50	80	carboys	-do-	-do-
9.	Lubricant Oil L/d	150	225	drums	-do-	-do-

4.0 Process description

Sugar

The major units of operations of sugar factory are, Extraction of Juice, Clarification, Evaporation, Crystallization, and Centrifugation.

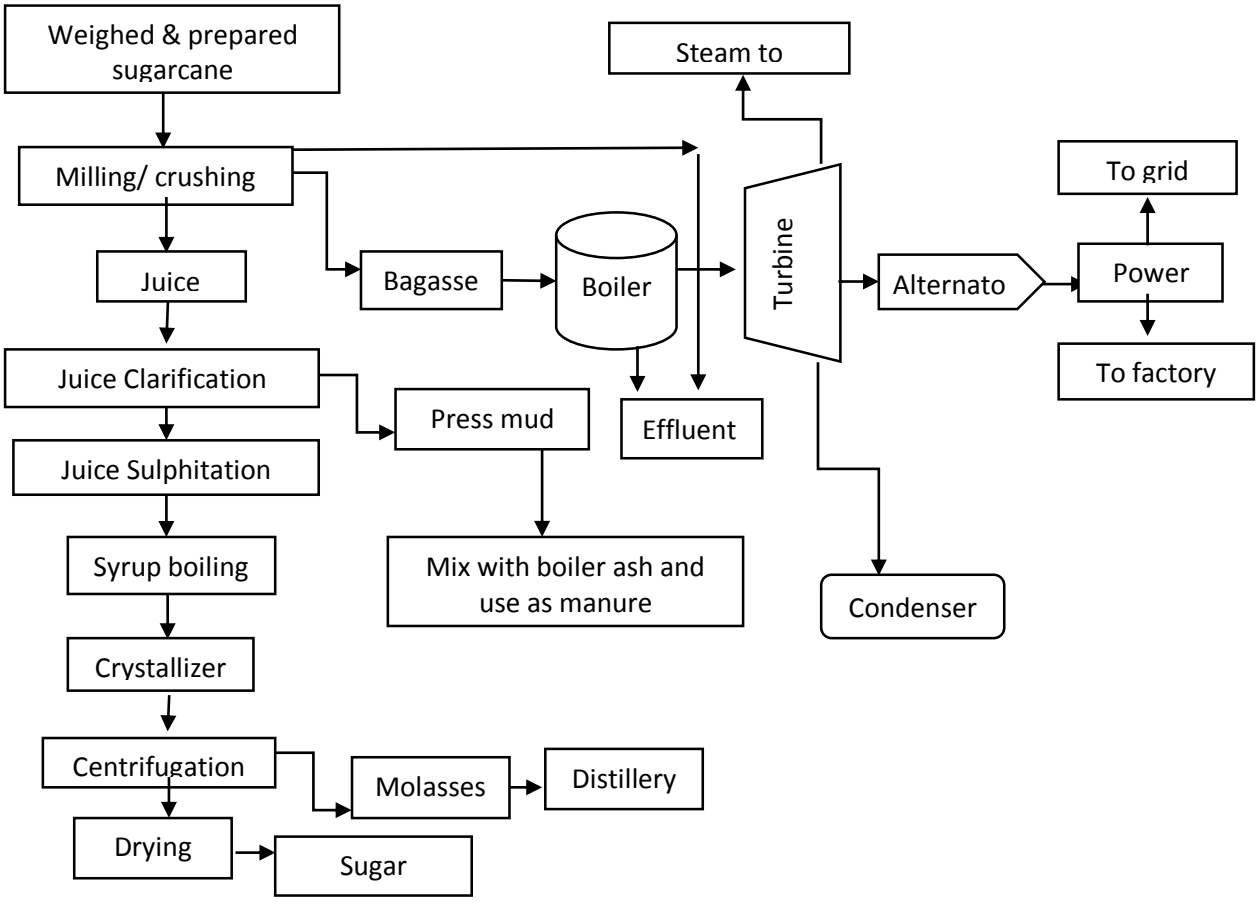

Figure 6: Sugar and cogeneration process flow chart

Distillery

Alcohol manufacturing mainly involved below given steps

- Feed preparation and weighing
- Dilution: Preparation of molasses for fermentation by appropriate dilution with water
- Fermentation: Production of alcohol from fermentable sugars in molasses solution with the help of yeast
- Distillation: Product recovery through distillation processes

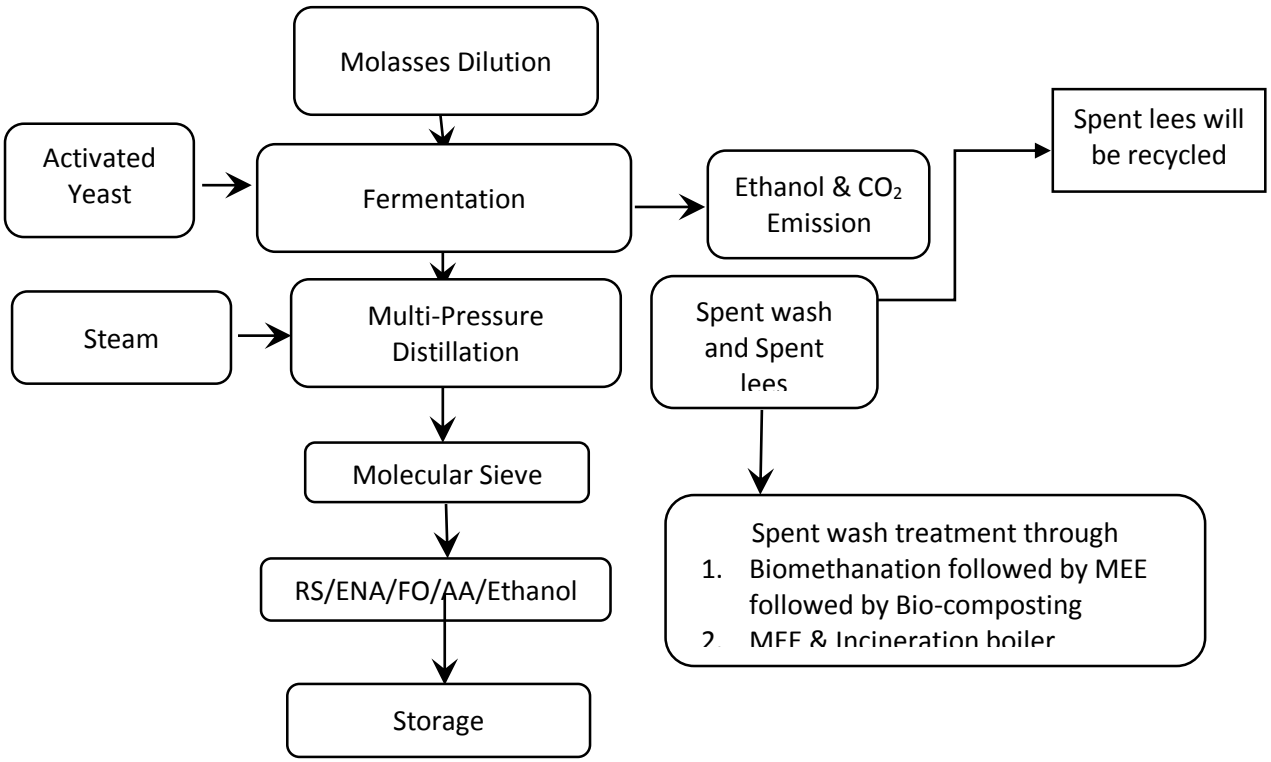

Figure 7: Distillery process flow chart

5.0 Description of the Environment

The study area as per awarded model TOR, 2015 is earmarked to be 10 km from the project site. The study period conducted was from March 2018 to May 2018. The guiding factors for the present baseline study are the requirements prescribed by the guidelines given in the EIA Manual of the MoEFCC and methodologies mentioned in Technical EIA Guidelines Manual for Distilleries by IL&FS Ecosmart Ltd., approved by MoEFCC.

Table 3: Observation of Environmental monitoring

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results (March 2018- May 2018)
Meteorology	Microprocessor based Weather Monitoring Station Continuous hourly recording	Wind speed,	Max 28-30 km/h
		Wind direction	W and SW
		Max. Temp.	39^0C
		Mini. Temp.	21^0C
		Relative Humidity	Max 77
		Precipitation	Monthly total annual avg. 681.8 mm
Ambient Air Quality	9 Locations 24 hourly samples	PM10	All parameters are within limit of NAAQ 2009
		PM2.5	
		SO_2	

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results (March 2018- May 2018)
	Twice a week for 3 months (in µg/m$^{3)}$	NO_x	
Water Quality (Ground & Surface)	Once in season at 10 locations (Physical, chemical and biological parameters)	Colour	All parameters are within limit except MPN count and E-Coli in surface water as well as ground water.
		pH	
		TDS	
		COD	
		E-Coli	
Soil Quality	Once in season at 9 locations	Soil type and texture, Physico-chemical properties, NPK	Dark brown to black, clay loam, soil is medium in fertility, good water holding capacity, heavy metal contamination signs not seen.
Noise Quality	Once in season at 9 Locations (Noise levels in dB(A))	Day	42.6-66.5
		Night	39.5-65.5
Land use Pattern	One time visit of the study area for ground truthing	Identification & classification of land use	Most of the land is Agricultural land followed by Barren land
Geology and hydrogeology	Once in study period	Geology and hydrogeology of the study area	Basaltic lava flows, the ground water in Deccan trap basalt occurs mostly in the upper weathered and fractured parts down to 20-25 m depth, alluvium occurs in small areas.
Ecology	General in 10 km radial study area and data collected around the project site through field visits	Flora	*Accasia sp. Azadirachta indica, Cassia tora, Senna siamea* etc.
		Fauna	Common Mormon, Lemon pansy, Green Bee-eater, Drongo etc.
Socioeconomic Data	General in 10 km radial study area and data collected around the project site through field visits	Socio-economic characteristics of the affected area	Sanitation facilities are unsatisfactory, Power supply facility is available in almost villages and town, Drinking water sources is mostly from PWD water supply, Medical facilities in terms of primary health centre and primary health sub centres in the rural areas are good.

6. Anticipated Environmental Impacts

Table 4: Anticipated Impacts

Environmental Facets	Anticipated Impacts
Air Environment	Probable increase in concentration of air pollutants due to process, fugitive and utility emissions.
Water Environment	Generation of industrial & domestic wastewater.
Land Environment	Impacts on land due to improper disposal of hazardous/ soild waste.
Ecological Environment	Positive as greenbelt of appropriate width will be developed and maintained by the company in the area. No impacts are envisaged on aquatic flora & fauna as there will be zero effluent discharge outside the plant premises.
Social Environment	Overall development of the area in respect of the infrastructure development, educational growth, health facilities etc.
Economic Environment	Positive impacts on economy of the region and the country as the Alcohol will be exported and revenue generation.
Noise Environment	Minor increase in noise level within the project area.
Occupational Health & Safety	Major health hazards are identified in worst case scenario.

7. Environmental Monitoring Programme

Table 5: Environmental monitoring schedule

Particulate	Parameters	Number of location	Frequency
Ambient air quality	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, etc.	Ambient air quality at minimum 3 locations. Two samples downwind direction at 500m and 1000m respectively. One sample upwind direction at 500m.	Monthly
Stack gas	PM, SO_2 and NOx	Number of stacks	Monthly
		Online stack monitoring is installed for existing system.	-
Work place	$PM_{2.5}$, SO_2, NOx, CO, O_3	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
Waste water	pH, EC, SS, TDS, O&G, Ammonical Nitrogen, COD, BOD, Chloride, Sulphides etc.	Wastewater from all sources. Inlet & outlet of ETP, spent wash, Condensate treatment plant	Monthly
		Online Monitoring machine is already installed at existing ETP.	

Particulate	Parameters	Number of location	Frequency
		Camera at spent wash tank is also installed.	
Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) & *E.Coli*	3-5 location Ground as well as Surface water. Within 1 km radius from spent wash tank and compost yard. 2 locations downward 1 location upward additional three locations within 10 km radius from the site. River sample One each at upstream and downstream	Half yearly
Solid waste	Ash	• Process dust generated sludge and ash. • Before used as manure if used manure	Monthly
Soil Organic and Inorganic matter	N, P, K, moisture, EC, heavy metals etc.	At lands utilizing compost manure and treated effluent, 3 locations	Pre – monsoon and Post monsoon
Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity	5 location At all source and outside the Plant area.	Monthly
Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plant site	Monthly
Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	2-3 near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied. Near spent wash storage lagoon	Quarterly
Occupational health	Health and fitness checkup of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year
Emergency preparedness,	Fire protection and safety measures to take care of	Mock drill records, on site emergency plan, evacuation	Monthly during

Particulate	Parameters	Number of location	Frequency
such as fire fighting	fire and explosion hazards, to be assessed and steps taken for their prevention.	plan	operation phase

8.0 Additional Studies

The following Additional Studies were done in reference to the awarded Terms of References issued by MoEFCC, New Delhi.

- Public Consultation
- Risk Assessment for storage and handling of alcohol and mitigation measure due to fire and explosion and handling areas.

9.0 Environmental Management Plan

Following mitigation measures shall be adopted by factory to minimize the impact of project on the surrounding environment.

Table 6: EMP for various environmental attributes

Environmental Attributes	Mitigation Measures
Air Quality Management	**Process Emission** • ESPs shall be provided for PM emissions. • The whole process will be carried out in closed condition so as to avoid any chances of VOC emissions. **Utility Emission** • All the D.G. sets shall be standby arrangement and will only be used during power failure. • Adequate stack height shall be provided to Boiler and D.G. sets. • Electrostatic Precipitator shall be provided as an air pollution control device to the boiler with approximately 99% efficiency to capture maximum boiler fly ash. **Fugitive Emission** • The main raw material and product shall be brought in and dispatched by road in covered enclosures. • Dust suppression on haul roads shall be done at regular intervals.
Water & Wastewater Management	• The proposed Sugar and distillery would be based on “Zero Liquid Discharge “technology. • Total Spent wash generation will be 600 CMD. For existing unit spent wash is treated trough Biogas unit followed by Multi effect evaporator (MEE) followed by Bio composting. For Proposed 70 KLPD expansion spent wash will be treated through generated spent wash will be concentrated in MEE and then burn in proposed 40 TPH spent wash fired boiler.

Environmental Attributes	Mitigation Measures
	• The Process condensate, spent lees will be cooled and will be treated in Condensate Polishing Unit, after treatment of which it will be recycled back to the process again. • Domestic wastewater will be treated in proposed STP. The treated water will be used for gardening. • Proper storm water drainage will be provided during rainy season to avoid mixing of storm water with effluent. • Rain water harvesting from the catchment area will be done for the proposed distillery project.
Noise Management	• Closed room shall be provided for all the utilities so as to attenuate the noise pollution. • Acoustic enclosure shall be provided to D.G sets. • Free flow of traffic movement shall be maintained. Earmuffs shall be used while running equipment's of the plant. • Proper maintenance, oiling and greasing of machines at regular intervals shall be done to reduce generation of noise. • Greenbelt shall be developed around the periphery of the plant to reduce noise levels.
Odour Management	• Odour shall be primarily controlled at source by good operational practices, including physical and management control measures. • Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment. • Use of efficient biocides to control bacterial contamination. • Control of temperature during fermentation to avoid in-activation/ killing of yeast. • Avoid staling of fermented wash.
Solid & Hazardous Waste Management	• The hazardous waste i.e. spent oil generated shall be very minor and shall be burnt in boiler along with fuel. • Boiler coal ash shall be sold to brick manufacturer. • Bagasse and spent wash ash will be used as • ETP & yeast sludge can be used in greenbelt development
Traffic Management	• Culverts shall be maintained. • The trucks carrying raw material & fuel shall be covered to reduce any fugitive dust generation. • Good traffic management system shall be developed and implemented for the incoming and outgoing vehicles so as to avoid congestion on the public road.
Green Belt Development / Plantation	• Plantation shall been done as per Central Pollution Control Board (CPCB) Norms. • The plantation in and around the plant site helps/will help to attenuate the pollution level. • Native species shall be given priority for Avenue plantation.

Environmental Attributes	Mitigation Measures
Corporate Social Responsibility	• An amount of INR 2.87 Cr. (As CER OM dated 1.05.2018 Brownfield project. 0.5% of total project cost) will be allocated for CSR activities in the coming 3 years which will be utilized on the basis of requirement for weaker sections of the society for next 3 years.
Occupational Health & Safety	• Factory shall monitor the health of its worker before placement and periodically examine during the employment • Health effects of various activities and health hazard if any observed shall be recorded and discussed with the health experts for corrective and preventive actions need to be taken by the industry • All safety gear shall be provided to workers and care shall be taken by EMC that these are used properly by them. All safety norms shall be followed

10.0 Environment Management Cost

Table 7: Environment Management Cost

Sr. No	Description	Capital Cost (Rs. in lakhs)	Recurring Cost (Rs. in lakhs)
1.	Air Pollution Control	700	10
3.	Sugar ETP	250	5
4.	Solid waste Management	-	7
5.	Environmental Monitoring and Management	40	3
6.	Rainwater Harvesting	25	4
7.	Occupational Health	20	4.8
8.	Green belt development	15	3.5
	Total	**1050**	**37.3**

11.0 Project Benefits

1. The command area is rich in sugar cane cultivation and has adequate irrigation facilities for assured annual sugarcane availability
2. Readily available infrastructure, fuel, & water for renewable energy power generation project.
3. Provides an initiative to sugar mill to concentrate more on conservation of energy & reduction of operating cost, thereby improving their profitability of operation.
4. Saves the expenditure on safe storage and disposal of bagasse.
5. Benefits of quick return on biomass power capital investment and generation of additional revenue.

6. The economic benefits available to the sugar factories from sale of exportable surplus and improvement in the operations
7. Entire integrated project is proposed to be set up based on the stand-alone commercial viability of each component of the project.

12. CONCLUSION

- Proposed project does not anticipate any adverse impacts on environment.
- Zero liquid discharged is proposed with efficient mitigation measures implemented.
- Air emissions through stack will be controlled by ESP.
- Loss of vegetation and habitat will not be attributed.
- Personal protective equipment's, safety precautions, emergency plan & disaster management plan shall be in place to avoid the environment hazards.