

# **PRE FEASIBILITY REPORT**

**Proposed Expansion of Sugar unit from 2500 TCD to  
6000 TCD and Molasses Based Distillery unit from 30  
KLPD to 55 KLPD**

## **M/S. SHREENATH MHASKOBA SAKHAR KARKHANA LIMITED**

Shreenathnagar, Post: Patethan, Tal. Daund, Dist. Pune,  
Maharashtra-412207

**Prepared By**



**VASANTDADA SUGAR INSTITUTE\***

Manjari (Bk), Pune, Maharashtra 412 307

Telephone: (020) 26902100, 26902343/7/6, Fax (020) 26902244

Web Site: [www.vsisugar.com](http://www.vsisugar.com)

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**August 2017**

## 1.0 Introduction

### 1.1 Identification of project and project proponent

This project is proposed by **M/s. Shreenath Mhaskoba Sakhar Karkhana Ltd., (SMSKL)**. The sugar factory is located at village Shreenathnagar, Patethan, Post Rahu, Tal-Daund, Dist- Pune, Maharashtra. It is one of the progressive sugar factories in Maharashtra, set up in the year 2002-03. The factory is registered under the Government of Maharashtra Co-operative Societies Act Registration no. 1622100210937 (Re-validation date 22/12/2016). Shri. Pandurangji Raut is Executive Chairman and Managing Director of the factory. The present installed capacity of the sugar factory is 2,500TCD.

The Management of the factory has undertaken extensive cane development activities in its command area (i.e. area of operations), hence sugarcane area has increased over a period of time. Considering the increased availability of sugarcane, the factory has decided to expand its crushing capacity from 2,500 TCD to 6,000 TCD (operating capacity). Because of increase in the crushing capacity, the production of byproduct like molasses will also increase. Considering this, the management of SMSKL has decided to enhance the capacity of existing distillery unit from 30 KLPD to 55 KLPD, to improve its financial viability.

### 1.2 Project Setting

For any industrial project availability of raw materials in adequate amount, availability of water, power as well as adequate land is considered as key elements. In case of the proposed expansion, the management checked the above factors and planned to set up the proposed activity within the existing industrial premises. The site meets the guidelines prescribed by Ministry of Environment, Forest and Climate Change (MoEFCC) for setting of an industry. It is located approximately 18 km away from State Highway No. 27 connecting Pune to Ahmednagar and approx 2 km from Wagholi-Rahu road. The geographical coordinates of the site are 18°36'20.38"N & 74°13'39.60"E and it is 551 m above mean sea level.

### 1.3 Highlights of the Project

**Table 1.1: Project Highlights**

<b>1</b>	<b>Name of the Proponent</b>	<b>M/s. Shreenath Mhaskoba Sakhar Karkhana Ltd., (SMSKL)</b>
<b>2</b>	<b>Project</b>	Enhancement of crushing capacity of existing sugar unit from 2,500 to 6,000 TCD and existing molasses distillery unit capacity from 30 to 55KLPD

3	<b>Location of the project</b>	Shreenathnagar, Patethan, Post Rahu, Tal: Daund, Dist.: Pune, Maharashtra-412207
4	<b>Land</b>	<p>Total land available with the factory = 76 acres</p> <p>Of which ~50 to 55 acres is allocated/reserved for industrial activities</p> <p>Land occupied for existing sugar unit (including ancillary units such as storage, ETP, cane and bagasse yard, etc.)= ~ 17 acres</p> <p>Land occupied by existing distillery (including its ancillary units such as storage, compost yard, etc.)= ~ 10.4 acres (41,602 sq. m.)</p> <p>Existing Greenbelt: 12 acres</p> <p>Land allocated for proposed Sugar ~1.50 acres</p> <p>distillery unit ~6.00 acre (Considering all the requirements), etc.</p> <p>Greenbelt will be increased by 2.5 acre (33% of proposed land for expansion)</p> <ul style="list-style-type: none"> <li>• No need of acquisition of additional land as the proposed project will be set up in existing factory premises only</li> </ul>
5.	<b>Product</b>	<p><b>Sugar Unit (Considering crushing capacity of 6000 TCD)</b></p> <p>i) White Sugar: ~690 TPD (considering 11.50% on cane)</p> <p>ii) Bagasse (generation 28.50 % on cane): ~1710 TPD</p> <p>iii) Molasses (4% on cane): 240 TPD</p> <p>iv) Press mud (4% on cane): 240 TPD</p> <p><b>Distillery Unit:</b></p> <p>i) Rectified Spirit – 55 KLPD OR</p> <p>ii) ENA – 55 KLPD OR</p> <p>iii) Ethanol – 55 KLPD</p>
6	<b>Operation days per annum</b>	<ul style="list-style-type: none"> <li>• Sugar: Average 160 days and Maximum 220 days</li> <li>• Distillery – Maximum 270 days</li> </ul>
7.	<b>Main Raw Material</b>	<p><b>Sugar Unit</b> (based on operational capacity)</p> <ul style="list-style-type: none"> <li>• Sugarcane: 6,000 TPD</li> <li>• Lime: 8.40 TPD (0.140% Cane)</li> <li>• Sulphur: 2.4 TPD (0.04% Cane)</li> <li>• Bagasse as a fuel: During season for sugar (36 % steam consumption) and distillery operations (including requirement for MEE) 47.61 TPH (Total = 40 % on cane)</li> </ul> <p><b>Distillery</b></p> <ul style="list-style-type: none"> <li>• Molasses: 205 TPD</li> </ul> <p>During off-season for distillery</p> <ul style="list-style-type: none"> <li>• Fuel: Only Biogas will be used as a fuel (generated from own biodigesters)</li> </ul> <p>Power Source: Captive during season and through state electricity board during off-season</p>
8.	<b>Water Requirement</b>	<p><b>Sugar unit</b></p> <ul style="list-style-type: none"> <li>• 60 m<sup>3</sup>/day for process and 43 m<sup>3</sup>/day for domestic activities = Total 103 m<sup>3</sup>/day (<b>Source:</b> Bhima river reservoir- with permission)</li> </ul>

		from Irrigation Dept.) • 25 m <sup>3</sup> /day during off-season (for domestic purpose) <b>Distillery unit</b> • 417 m <sup>3</sup> /day ( <b>Source:</b> Bhima river reservoir – with permission from Irrigation Dept.) • 10 m <sup>3</sup> /day during off-season
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#### 1.4 Need of project and its importance to the country and region

India is one of the largest producers of sugarcane as well as sugar in the world. The sugarcane is a cash crop for farmers. There are about 564 installed sugar factories in India. Most of the sugar industries are located in rural areas providing employment to rural masses. Sugar factories from Maharashtra are the backbone of rural economy. These factories have contributed for the development of economy as well as infrastructure in rural areas, generated ample of employment opportunity to local people.

The project proponent is one of a private sugar factory from the region of Maharashtra. The cultivation of sugarcane is increasing every year in the command area of the factory and it is anticipated to grow gradually for next few seasons. In addition, the sugar factory is having plans to promote and support the cane development programme, in its command area.

**Table 1.2: Expected cane availability for next five years**

S. No.	Season	Sugarcane Area (Ha)	Yield (MT)	Sugarcane Production (Tons - rounded)	Expected Crushing (T)	Expected Sugar Recovery (%)
1.	2017-18	15,517	87	13,50,000	9,30,000	11.25
2.	2018-19	15,434	92	14,20,000	9,60,000	11.25
3.	2019-20	15,503	95	14,73,000	9,90,000	11.25
4.	2020-21	15,588	95	14,81,000	10,20,000	11.25
5.	2021-22	16,100	95	15,29,500	10,80,000	11.25

Expected average molasses production is around 43,200 MT/annum (considering average days of 180 per season). In case of bumper season, (when the crushing at maximum rate for maximum days i.e. 220) the molasses generation will be 52,800 Tons. The proposed distillery unit will require molasses of around 55,350 MT/annum. Therefore, required molasses (considering average season of 180 days) approx. 12,150 T will be procured from nearby sugar mills. .

## 1.5 Steam and Power

Steam required for the proposed activity i.e. sugar unit of 6000 TCD and distillery of 55KLPD will be the max. 100 TPH and power requirement will be 6.5 MW (sugar+distillery). Existing sugar industry has two bagasse fired boiler of 70 TPH and 32 TPH respectively. Thus, the industry will fulfill its steam requirement for proposed sugar as well as distillery unit from own sugar factory boiler, during seasonal operation. During off-season, distillery unit will use standalone boiler of eight TPH capacity. This boiler is biogas fired. It will fulfill the requirement of distillery and its ancillary units such as MEE. Power demand for off-seasonal operations of distillery and miscellaneous activities will be fulfilled from State Electricity Board.

## 1.6 Import vs. Indigenous Production

The processes of manufacturing for sugar as well as spirit/alcohol are well set. These processes are simple and straight and the technology for the same is available indigenously. The technologies for pollution control/disposal are also available indigenously.

## 1.7 Export Possibility

The finished goods from proposed sugar and distillery activity viz. Sugar, Press mud, Rectified Spirit (RS), Extra Neutral Alcohol (ENA) and Anhydrous Alcohol (AA or fuel ethanol) are having excellent potential of export.

## 1.8 Domestic /Export Markets

Domestic market for Sugar, RS and ENA are Pune, Mumbai, Solapur, Hyderabad, Bangalore, entire state of Maharashtra and its neighboring states such as Karnataka, Gujarat, Goa, Andhra, Telangana as well as the other states of the country.

For fuel ethanol, petro-chemical industries are the major buyers.

## 1.9 Employment Generation

Proposed expansion activity of sugar and distillery unit will provide direct employment to 50 persons from which 25 are skilled and 25 are unskilled employees. The project has a great potential to generate large number of indirect employment particularly for unskilled labours (for cane cultivation, harvesting and its transportation, etc.).

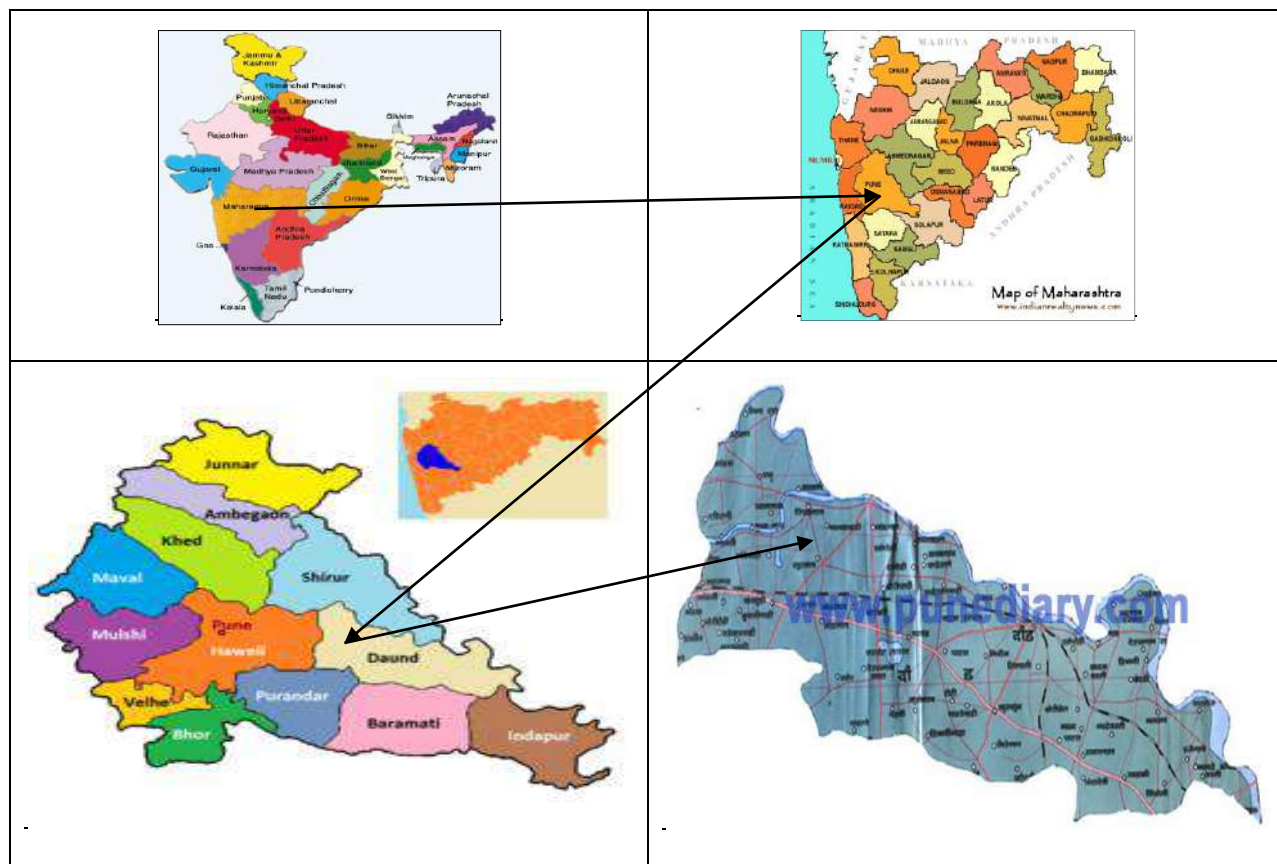
## 2.0 PROJECT DESCRIPTION

### 2.1 Type of project

This is an agro-based industry. In the proposed project, capacity of sugar unit will be enhanced from 2,500 TCD to 6,000 TCD (operational capacity) and capacity of distillery from 30 KLPD to 55 KLPD. There is a cogeneration unit of 10 MW exist in the same premises. In addition, the sugar mill is having an old idle steam turbine generator (STG) of 3 MW; it has planned to bring this STG in operation mode. Cogeneration unit will be operational during cane crushing season only.

In the case of proposed project, sugar industry is placed under 5 (j) – 'B' category and for distillery it is placed in 5 (g) - as 'A' category as per EIA Notification, 2006 (as amended till the date). Both the projects are clubbed/integrated for the environmental clearance process and therefore, the proposed activity will be appraised at central level.

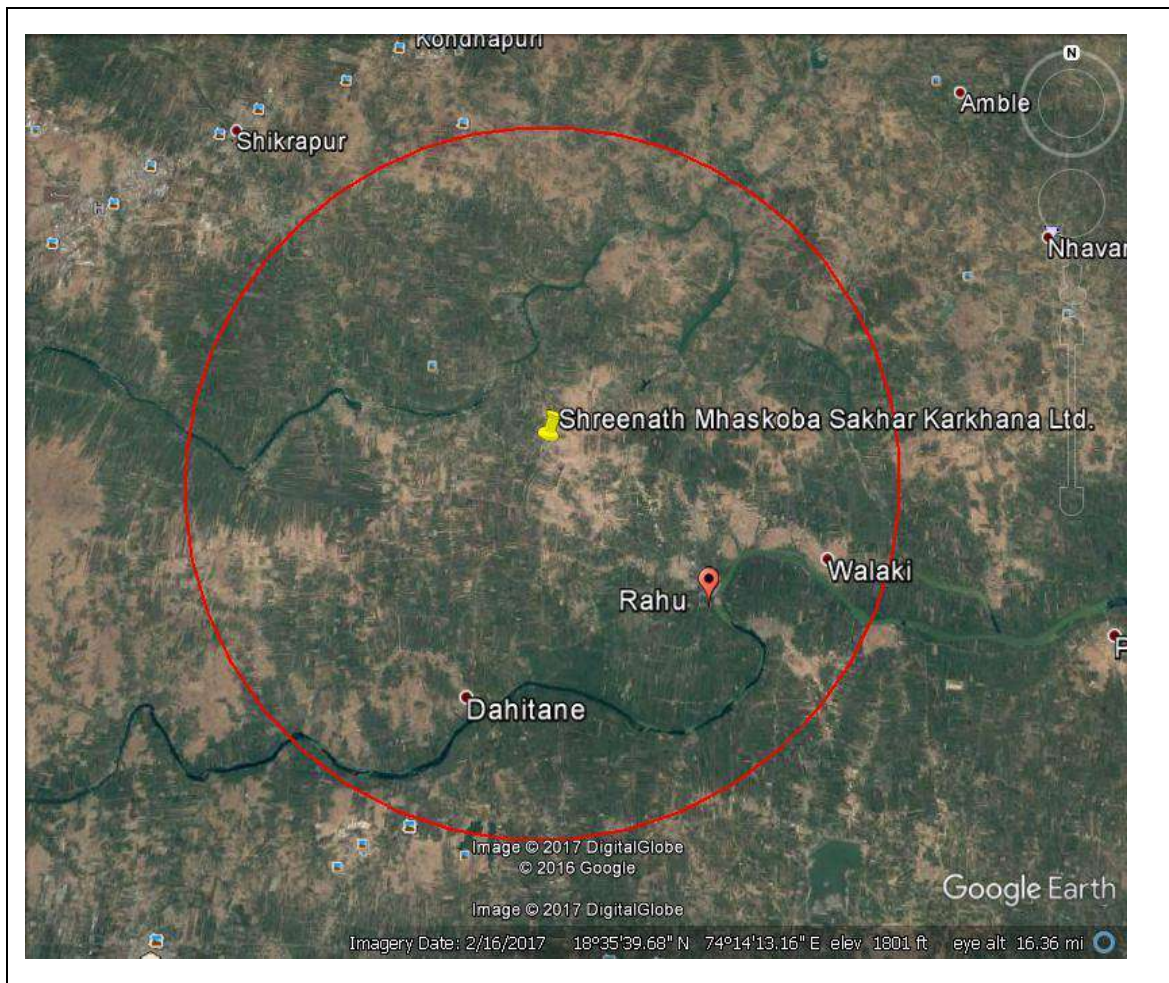
### 2.2 Location with coordinates



**Figure 2.1: Location Map**

**Project coordinates:** 18°36'20.38"N, 74°13'39.60"E





**Figure 2.2: Satellite Image of the project sit**

### **2.3 Details of alternative site consider and basis of selecting the proposed site**

Alternative sites for the proposed project are not considered, because of the following reasons.

- i) The proposed sugar and distillery unit will be installed in the existing sugar factory premises, as the project proponents are having adequate land for the proposed units as well as ancillary units thereof such as storage, treatment, disposal units, etc.
- ii) The present site meets the guidelines for sitting of an industry prescribed by MoEF&CC.

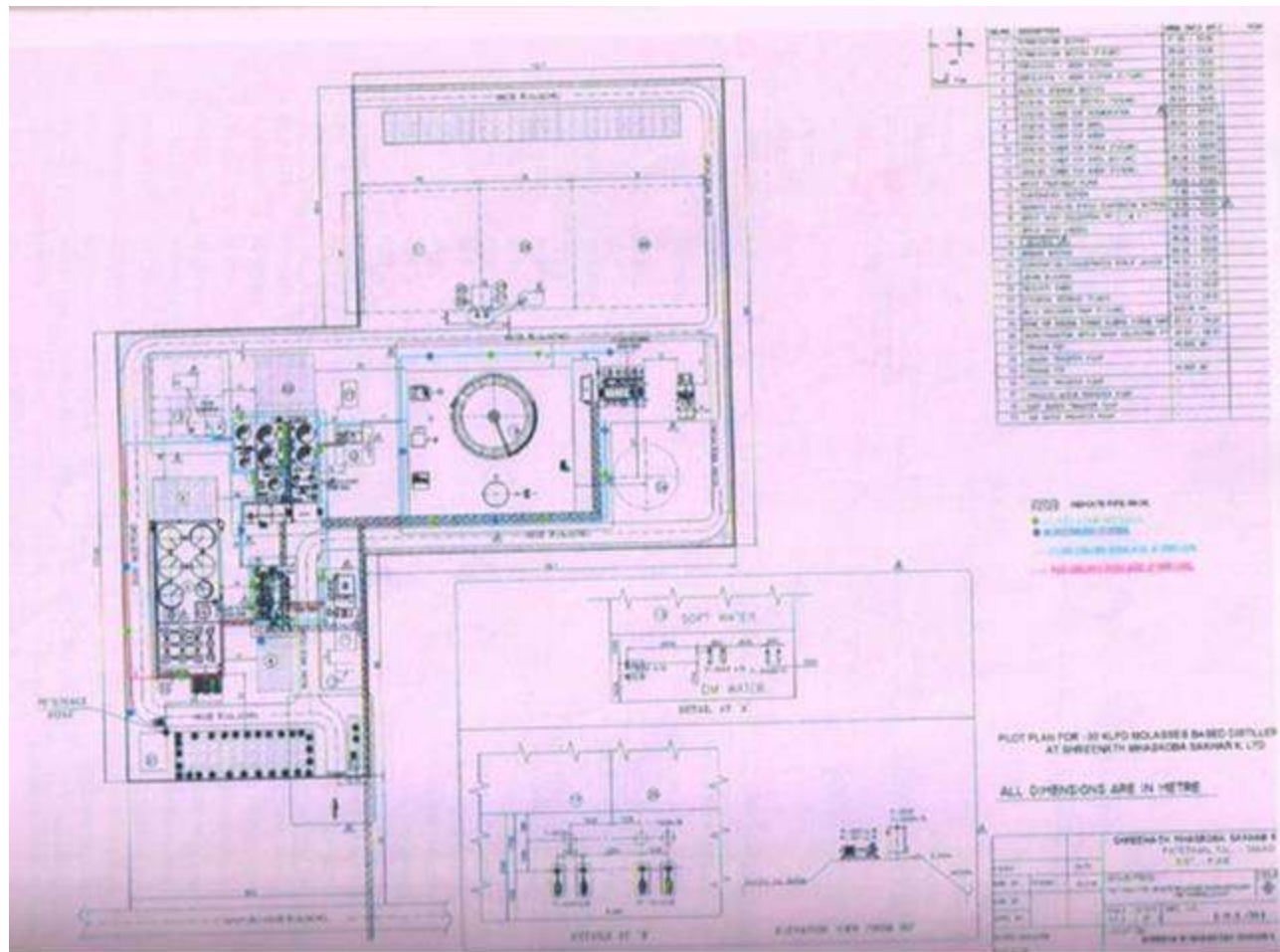
### **2.4 Size or magnitude of operation**

For sugar unit: Capacity Enhancement of existing unit of 2,500 TCD to 6,000 TCD

For distillery: capacity enhancement from 30 to 55 KLPD.







**Figure 2.4: project Layout: Distillery Unit**

## 2.5 Project description with process details

### Process: Distillery

SMSKL decided to adopt the latest technology to achieve Zero Liquid Discharge (ZLD) for the proposed 55 KLPD unit. The peculiarities of manufacturing process are as follows:

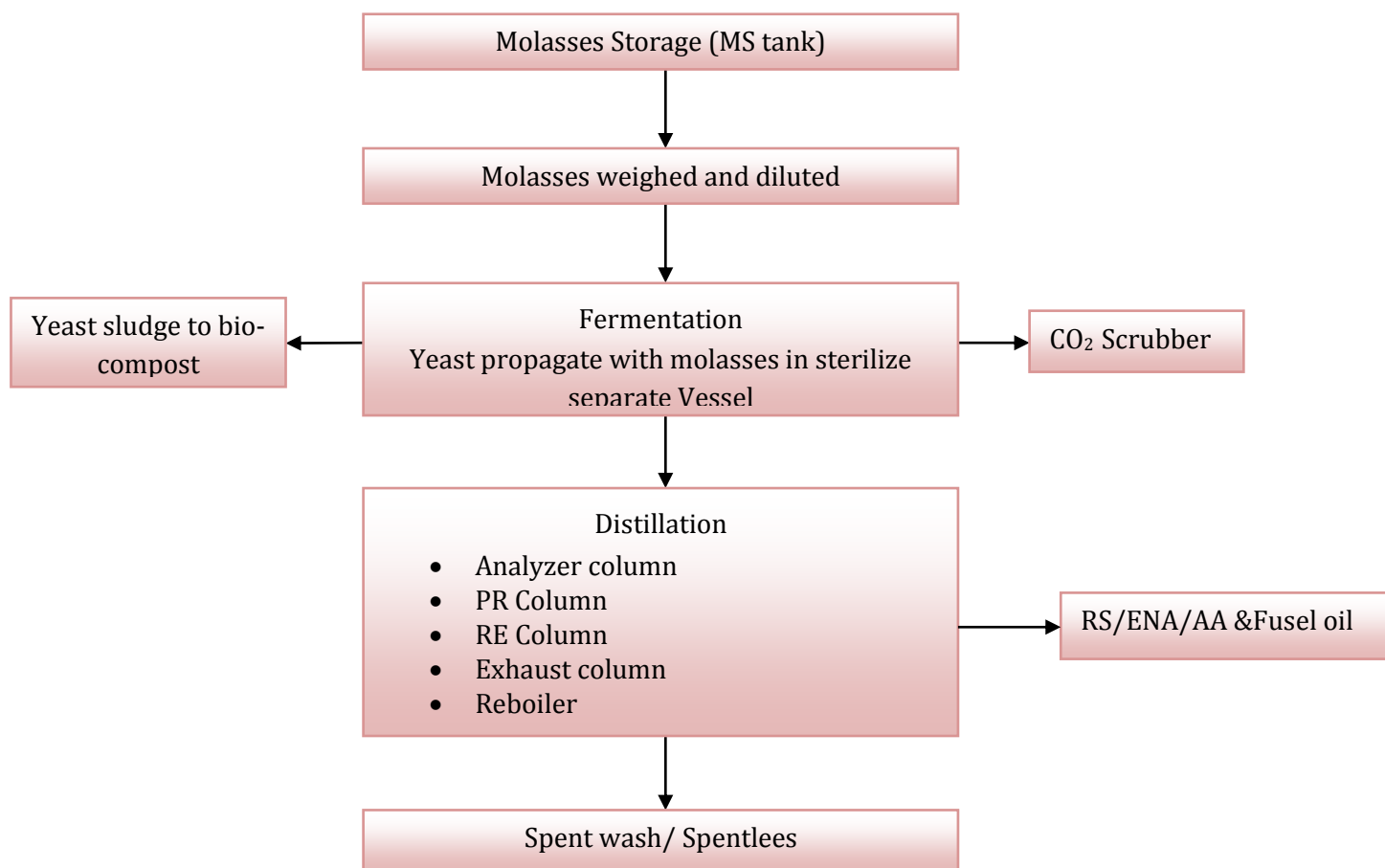
#### Manufacturing Process

The production process involves the following stages

1. Fermentation
  2. Distillation
- **Fermentation-** Molasses is the chief raw material used for production of alcohol. Molasses contains about 50% total sugars, of which 30 to 33% are cane sugar and the rest are reducing sugar. During the fermentation, yeast strains of the species *Saccharomyces cerevisiae*, a living microorganism belonging to class fungi converts sugar 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.
  - **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, distillation method is employed. After separation of alcohol, the remaining part is the effluent of the process i.e. spentwash and spent lees.
  - **Manufacture Extra Neutral Alcohol (ENA)**

ENA is prepared by wash to ENA. 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) &by dilutingrectified spirit with soft water for the removal of impurities like higher alcohols, aldehydes and methyl alcohol. This process is done in the ENA column.
  - **Anhydrous Alcohol (AA)**

Anhydrous alcohol is an important product required by industry. As per IS specification, it is nearly 100% pure or water free alcohol. Alcohol as manufactured by Indian distilleries is rectified spirit, which is 94.68% alcohol. Molecular Sieves process will be adopted for dehydration of alcohol.



**Figure 2.5: Schematic of RS/ENA/AA Manufacturing Process**

## 2.6 Process: Sugar

### ▪ Extraction of Juice

Sugarcane is passed through preparatory devices like knives for cutting the stalks into fine chips before being subjected to crushing in a milling tandem comprising 4 to 6 roller mills. In the best milling practice, more than 95% of the sugar of cane gets extracted into the juice.

### ▪ Clarification

The treated juice on boiling fed to continuous clarifier from which the clear juice is decanted while the settled impurities known as mud is sent to rotary drum vacuum filter for removal of unwanted stuff called filter cake. It is discarded or returned to the field as fertilizer.

### ▪ Evaporation

Clear Juice is evaporated from 15° Bx. to 60° Bx. in evaporator

- **Pan boiling**

The syrup is again treated with sulphur dioxide before being sent to the pan station for crystallization of sugar. Crystallization takes place in single-effect vacuum pans, where the syrup is evaporated until saturated with sugar. At this point “seed grain” is added to serve as a nucleus for the sugar crystals, and more syrup is added as water evaporates.

- **Centrifugation**

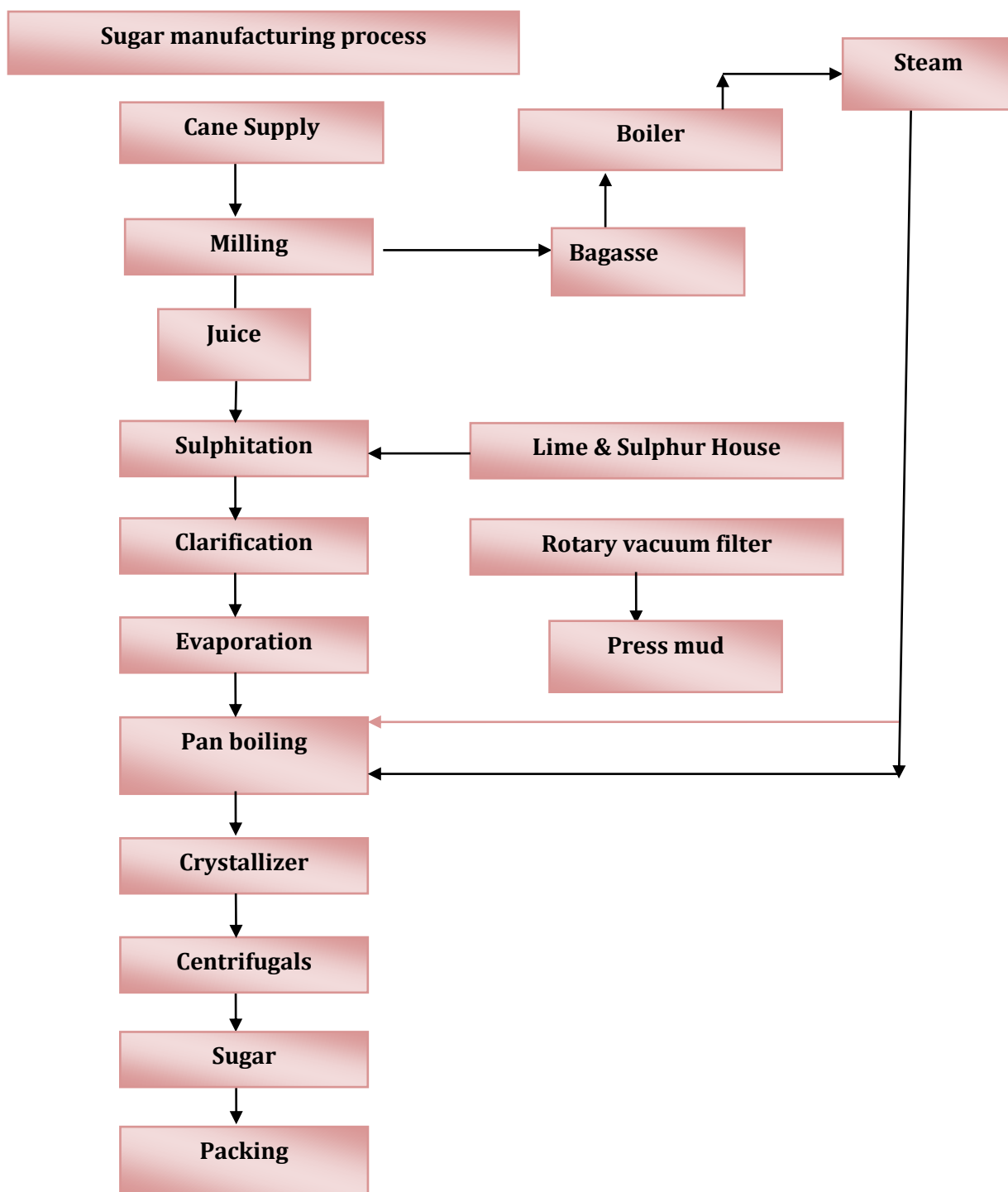
The massecuite from crystallizer is drawn into revolving machines called centrifuges. The perforated lining retains the sugar crystals, which may be washed with water, if desired. The mother liquor “molasses” passes through the lining because of the centrifugal force exerted and after the sugar is “purged” it is cut down leaving the centrifuge ready for another charge of massecuite.

- **Gradation & Packing**

The final product in the form of sugar crystal is dropped through pan section and this sugar is graded and picked. Gradation of sugar depends on the size of crystal viz. Small (S), Medium (M) and Large (L).

## 2.7 Raw Materials for Finished Products

Raw materials for the proposed project will be available from the local market. Bagasse used as a fuel and molasses as raw material will be available from in-house only. Product wise raw material consumption is given below.



**Figure 2.6: Flowchart of Sugar Manufacturing Process**



**Table 2.1: Availability of raw materials, finished goods/ product and mode of transport**

Raw materials	Estimated quantity	Source market	Final product	Estimated quantity KL/day	Source market	Transport mode
<b>Distillery</b>						
<b>Molasses</b>	205 TPD	Own factory, Maharashtra, India	Rectified spirit + Impure spirit (5%)	52.25 KLPD + 2.75 KLPD	Maharashtra India	Surface transport through Tanker
			<b>OR</b>			
			ENA + Impure spirit (6 %)	51.70 KLPD + 3.30 KLPD		
			<b>OR</b>			
			Fuel Alcohol + Impure spirit (5%)	52.25 KLPD + 2.75 KLPD		
<b>Nutrients N,P (daily)</b>	50 Kg	Pune, Ahmednagar, Mumbai	-	-	-	By road - Truck Tempo
<b>Turkey Red Oil (TRO) (daily)</b>	150 Kg	Pune, Ahmednagar, Mumbai	-	-	-	By road - Truck Tempo

## 2.8 Resource optimization / recycle and reuse envisaged in the project

In the proposed project, optimum utilization of the available resource is strived by using a renewable energy source i.e. bagasse as a fuel. Bagasse will be used as a fuel for boilers that produces process steam. Distillery project is an effort for efficient use of available steam (bagasse) and molasses. Steam will be used twice – once for power generation and the exhaust steam will be used in sugar mill as well as distillery. Condensate water will be recycled/reused, that will reduce the freshwater requirement.

## 2.9 Water Requirement and Its source

Necessary water requirement for the proposed project will be met from Bhima River. Water will be required for domestic, process and utility purpose. Daily fresh water requirement for the proposed project will be as follows.

**Table 2.2: Water Balance: Sugar and Distillery (Quantities in cum/day)**

**A) Sugar unit at operational capacity of 6,000 TCD**

<b>A) WATER INPUT (Daily requirement)</b>	<b>m<sup>3</sup>/day</b>
RO Water For Boiler feed (@100 TPH)	2,400
Milling section (including washing@ 30% on cane crush)	1,800
Water For condenser/boiler parts cooling, Vacuum Pump & Others	900
Other Domestic Usage	43
<b>Total Water Input</b>	<b>5,143</b>
<b>B) WATER OUTPUT</b>	
Steam Condensate	2,160
Cooling water from turbine and boiler parts pump and gland	900
Domestic Consumption	9
Excess condensate water from cane @70% on cane crushing	4,200
Effluent (from process)	600
Spray pond over flow water	600
<b>Total Water Output</b>	<b>8,469</b>
<b>Domestic waste will not be available for recycle/reuse</b>	
<b>Net water available for recycle</b>	<b>8460</b>

**C) Recycle water streams (for sugar and cogeneration unit)**

<b>Water Recycled</b>	
Steam Condensate	2,160
Water For condenser/boiler parts cooling, Vacuum Pump & Others	900
<b>TOTAL</b>	<b>3,060</b>
<b>Excess condensate water will be used to fulfil requirement of (8460 - 3060)</b>	<b>5,400</b>
<b>Water in product , by-product and effluent</b>	
Water loss in bagasse@ 50% moisture	855

Water loss in ,press mud @ 70% moisture on production @ 4% on cane crushed	168
Water loss in molasses @ 12% moisture on production @ 4% on cane crush	29
<b>TOTAL</b>	<b>1,052</b>

#### D) Water recycle streams

Condensate water for imbibition (including washing@ 30% on cane crush)	1,800
Condensate water recycle for vacuumed filter @5% on cane crush	300
Molasses movement water @ 6% on cane crush	360
Milk of lime preparation @ 3% on cane crush	180
Centrifugal section for sugar washing @ 5% on cane crush	300
Excess condensate recycle to boiler make up water	240
<b>TOTAL</b>	<b>3180</b>
Excess condensate available for proposed unit m <sup>3</sup> /day (5400 – 1052-3180)	1168

After recycle of excess condensate water from sugar mill, available 1168 cu.m. which will be partially recycled in process (of distillery) and remaining condensate will be utilized for irrigation after necessary treatment/s.

**Therefore, fresh water will be required mainly for drinking purpose and in minor quantity for process, which is as follows.**

- **For domestic purpose: 43 m<sup>3</sup>/day**
- **Overall for plant: 60 m<sup>3</sup>/day**
- **TOTAL (day-to-day fresh water requirement) = 103 m<sup>3</sup>/day**

## B) Distillery unit

**Distillery: Water Requirement (in m<sup>3</sup>/day)**

Particulars	Intake	Consumption And Losses	Generated Effluent	Recycle and Reuse	Daily Net Requirement
<b>Industrial</b>					
<b>Process</b>	550.0	55.0	160.0	335.00*	215.0
<b>Cooling Purpose</b>	192.00	100.0	92.0	00	192.0
<b>Domestic</b>	10.0	03.00	7.00	00	10.0
<b>Other</b>	-----	-----	-----	----	----
<b>Total</b>	<b>752.00</b>	<b>158.00</b>	<b>259.00</b>	<b>335.00</b>	<b>417.0</b>

**Net fresh water requirement for distillery unit = 417 m<sup>3</sup>/day**

**\*condensate of MEE + treated water from CPU will be recycled**

### 2.9.1 Power & Fuel requirement and Its source

Fuel: In case of the proposed project, bagasse will be used as main fuel. It will be sourced from own sugar mill. In addition to bagasse, biogas generated through primary treatment of spent wash will be used as an auxiliary fuel. Fuel availability is adequate to fulfill the steam requirement of sugar and distillery unit at enhanced capacities. The power required for the proposed sugar and distillery unit will be 6.5 MW which will be met through captive generation. As stated earlier, the factory is having TG sets of 13 MW. During cane crushing season surplus power of 5.5 MW will be generated which will be exported to state electricity board's grid.

**Table 2.3: Power and fuel requirement**

Sr. No.	Particulars	Requirement	Source
1.	Power Requirement (Sugar + distillery)	6.5 MW	In-house (Captive)
	Power Requirement (for distillery during off-season of sugar + for sugar unit – miscellaneous purpose)	1.5 MW	State Electricity Board
2.	Bagasse (during cane crushing season)	47.61 TPH	In-house (from own production)

## 2.10 Waste generation & disposal scheme

Quantities of waste to be generated & scheme for their disposal are given in following chart:

### 2.10.1 Liquid waste

#### Sugar Unit

Effluent generation will be about 600m<sup>3</sup> per day and will be sent to sugar ETP and utilized for gardening/irrigation after treatment. Sugar condensate water (600 m<sup>3</sup>) will be recycled/reused in sugar as well as proposed distillery unit to minimize the fresh water intake (as described in the water budget). Hot water from various sources will be cooled in cooling pond and recycled to respective activity after reaching to ambient temperature. The factory is having ~16 acres cane plantation area (seed plot) and ~ 14.5 acres of greenbelt where treated water will be utilized.

#### Distillery Unit

Spent wash generated from distillery will be treated through bio-methanation followed by evaporation (multi-effect) followed by biocomposting process. Effluent such as spent lees, cleaning water and condensate will be treated in condensate polishing unit (CPU). Treated water will be recycled/reused within the premises and thus, zero liquid discharge (ZLD) will be achieved.

Spent wash generation rate will be 8 L/L of alcohol. Therefore, spent wash generation will be 440 m<sup>3</sup> per day (with 5<sup>o</sup> brix) from the 55 KLPD unit. Spent wash volume will be reduced through multi-effect evaporation (MEE) treatment and it will be 88 m<sup>3</sup>/day at 25<sup>o</sup> brix. This spent wash will be mixed with press-mud in 1:1 ratio and converted into bio-compost. The existing distillery is having 10 acres of land for composting activity. Of this actual compost yard has been constructed on six acres of land, which will be adequate even after expansion.

#### Spent wash storage lagoons

In the existing unit, spent wash storage lagoon of five days capacity (two in number) and one lagoon of maximum 30 days capacity has been provided. In the proposed expansion, lagoons of same capacities i.e. five and thirty day will be provided.

### 2.10.2 Solid waste

#### Sugar Unit

The proposed industrial activity at SMSKL will generates solid waste in the form of ETP sludge which is biodegradable and boiler ash. The quantity and disposal method is given below-



**Table 2.4: Solid waste Generation and Disposal**

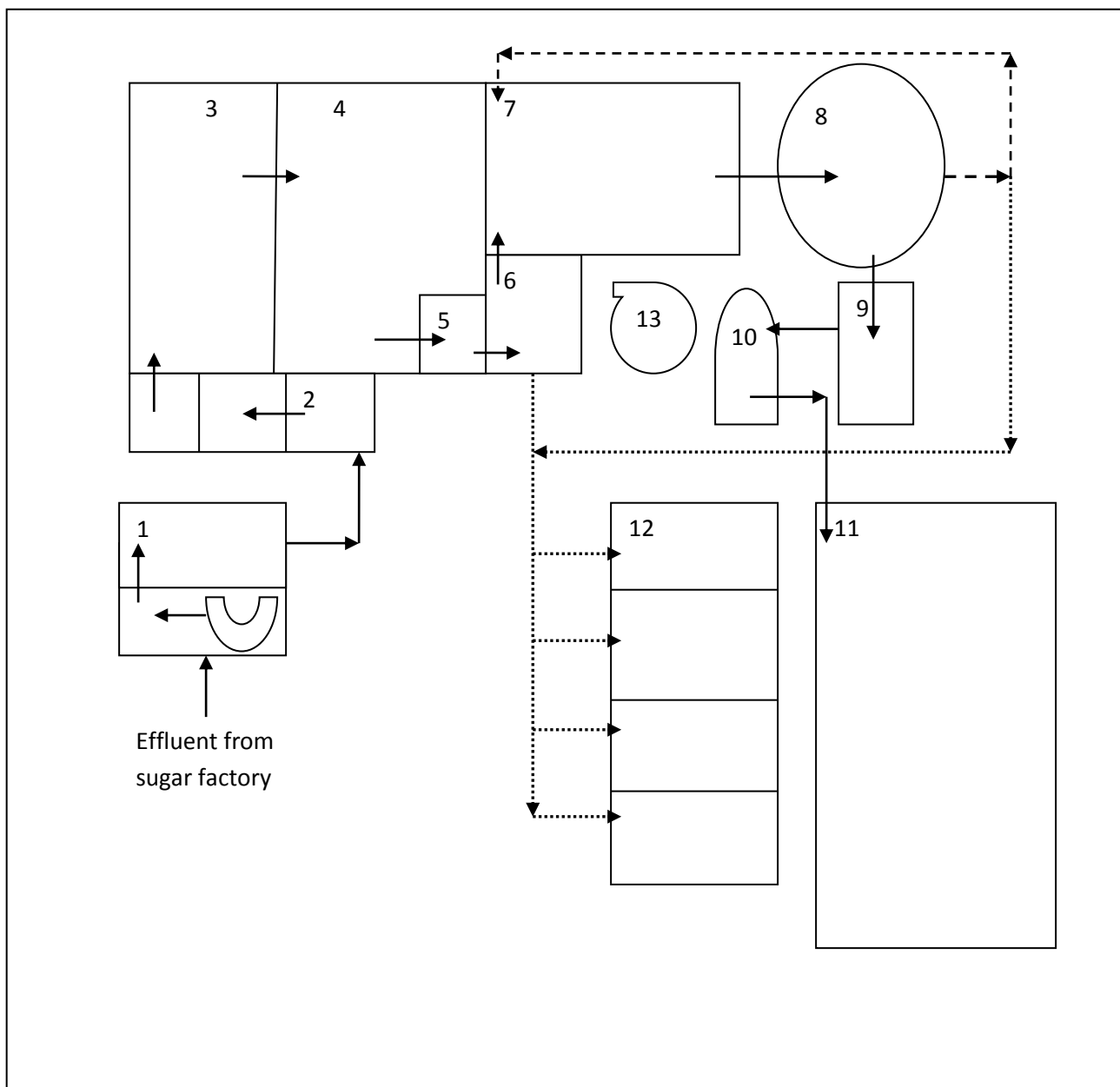
#	Waste	Quantity (per season)	Treatment	Disposal	Remark
1	Sugar ETP sludge	35 MT	Disposal into land/soil	Sold to member farmer/own plot	Organic
2	Ash (considering 180 days of season)	4115 MT	Disposal into land/soil	Used as a soil enriching material (bagasse ash is rich in potash)	Inorganic
3	Oil & grease	4 - 5 KL	Remove by oil skimmer	Use for boiler	

### **DISTILLERY UNIT**

The proposed industrial activity will generate solid waste in the form of fermentation sludge which is biodegradable. The quantity and disposal technique is given briefly in the following table.

**Table 2.5: Solid waste Generation and Disposal**


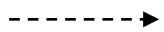

#	Waste	Quantity MT/annum	Upshot
1	Yeast sludge (dry)	50	Used as a soil enriching material
2	Boiler Ash (off-season of sugar)	220	sold to brick manufacturing units
3	Distillery CPU Sludge	70	Used as a soil enriching material
4	Spent oil from DG	0.1-0.2 KL	Spent oil is burnt in boiler

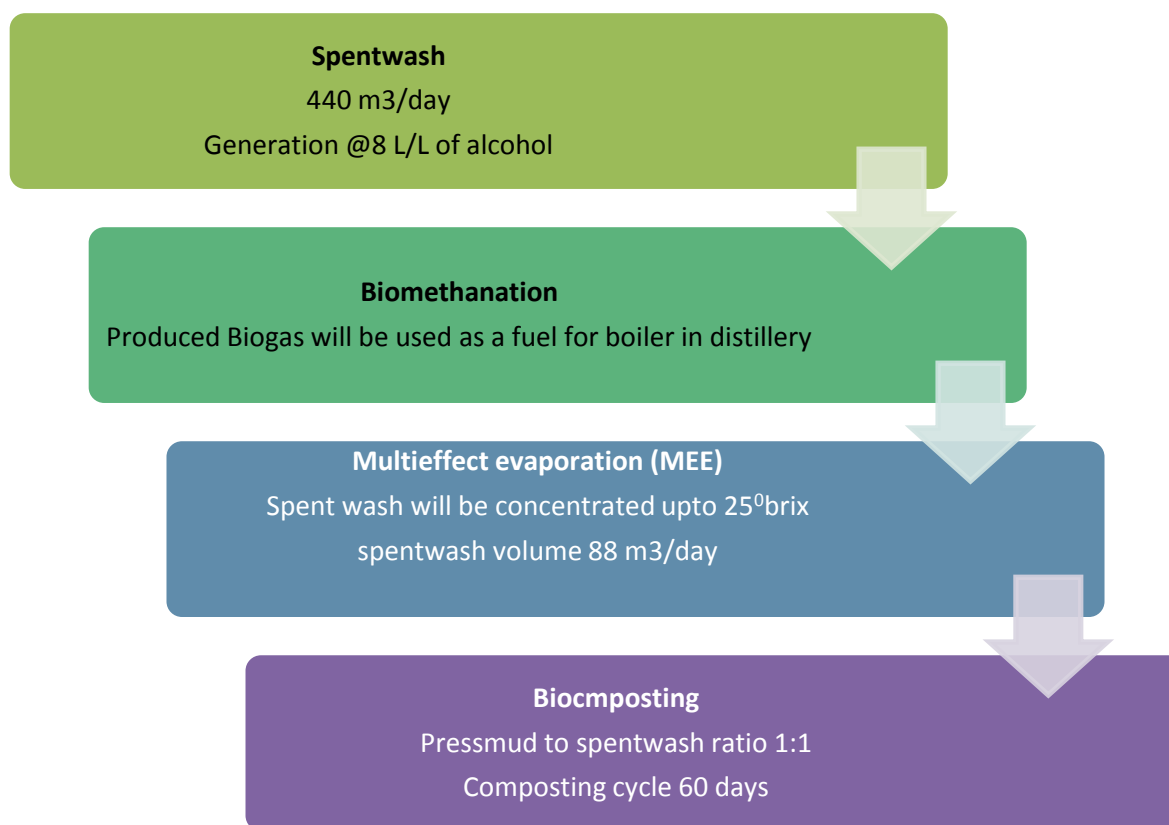


**Figure 2.7: Process flow diagram of Sugar mill ETP (Existing)**

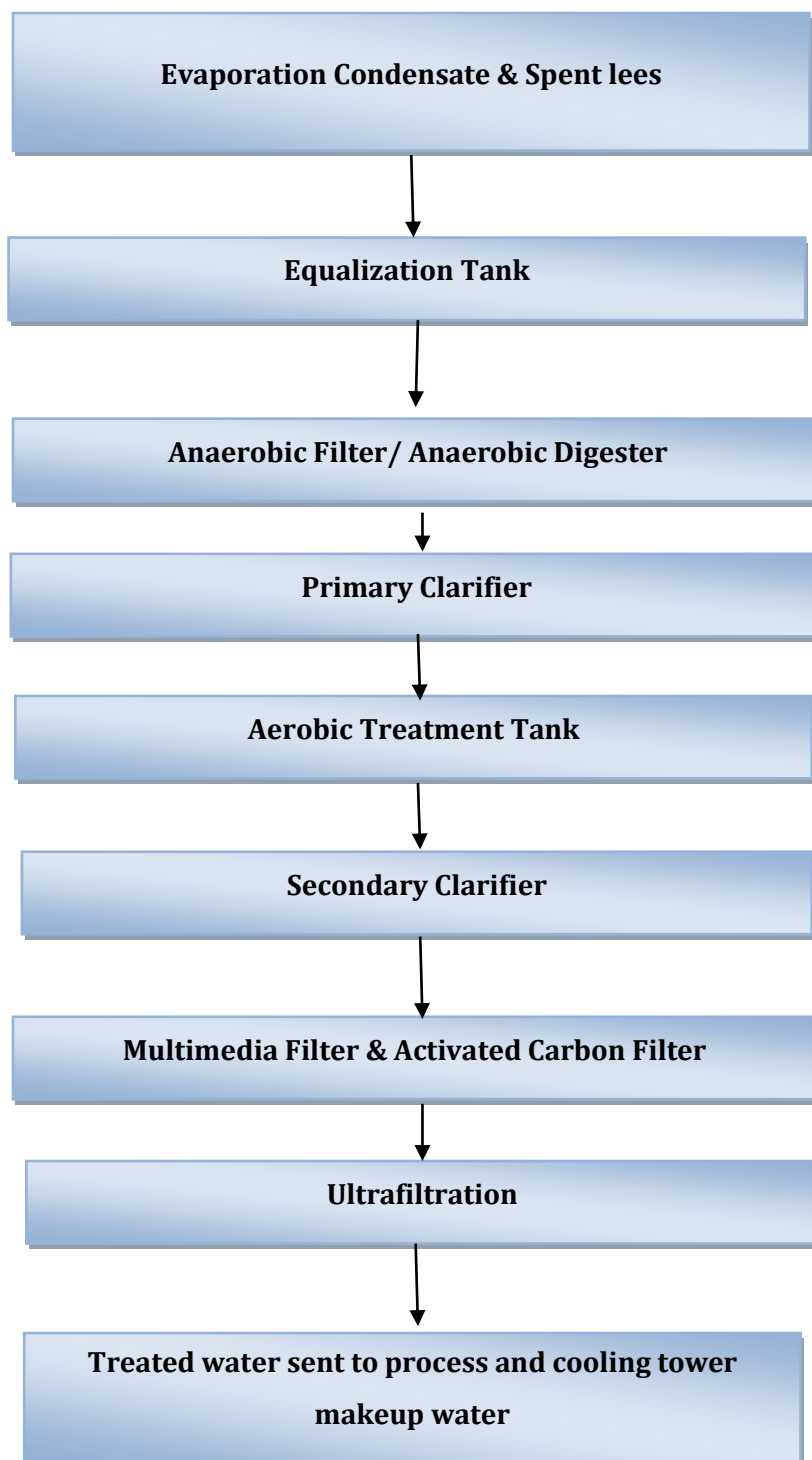
**Table 2.6: Existing sugar mill ETP (Sizes)**

Sr. No	Name of tank	Dimension ( L x W X H) in meter
1.	Oil & Grease chamber	13.0 X 2.0 X 1.2
2.	Equalization Tank	8.0 X 15.0 X 1.5
3.	Balancing Tank	11.0 X 15.0 X 1.4

4.	Neutralization tank	2.0 X 2.0 X 1.4
5.	Primary Clarifier	6.0 X 6.0 X 2.5
6.	Aeration Tank	11.0 X 8.0 X 3.5
7.	Secondary Clarifier	Ø 8.0 X 2.5
8.	Holding Tank	7.0 X 4.0 X 1.2
9.	Multi Media Filter	-----
10.	Storage Tank (treated water)	15.0 X 12.0 X 2.5
11.	Sludge Drying Beds	4.0 X 3.0 X 1.2
12.	Air Blower	Capacity 800 cum/Hrs
13.		Oil Skimmer
14.		Sludge recirculation
16.		Waste/ excess sludge to sludge beds



**Figure 2.8: Flow diagram of spentwash disposal scheme**



**Figure 2.8: Process flow diagram of CPU**

### 2.10.3 Air Emission & Control

In the existing unit Venturi Wet scrubber system is in place. It is attached to existing boilers of 70 and 32 TPH. It is connected to a stack of 65 m height. The same will be used even after expansion, after modifying it suitably as per requirement. An independent 8 TPH boiler of distillery is biogas fired. It will be used during off-season of sugar mill. Bagasse and ash will be handled mechanically through closed conveyors to control fugitive dust. Enhancement of greenbelt by ~2.5 acres is an additional measure for air emissions.

There are three DG set available in the existing unit. These are of 750, 200 and 63 KVA capacity with adequate stack height and acoustic enclosures.

### 2.10.4 Noise Control

Steam turbine generator will be a major noise source from the existing project. Apart from that, noise is anticipated from pumps, motor drives, utilities etc. The plant and equipment will be specified and designed with a view to minimize noise pollution. The major noise producing equipment will be provided with soundproof devices and silencers. DG set will be provided with acoustic enclosures. Ear Plugs and ear muffs will be provided to the workers in utility section. Greenbelt will be developed.

### 2.10.5 Health and Safety Measures

SMSKL is committed to the Health and Safety of its all employees. It strives to provide hygienic & safe work place and continually improve the effectiveness of health & safety system.

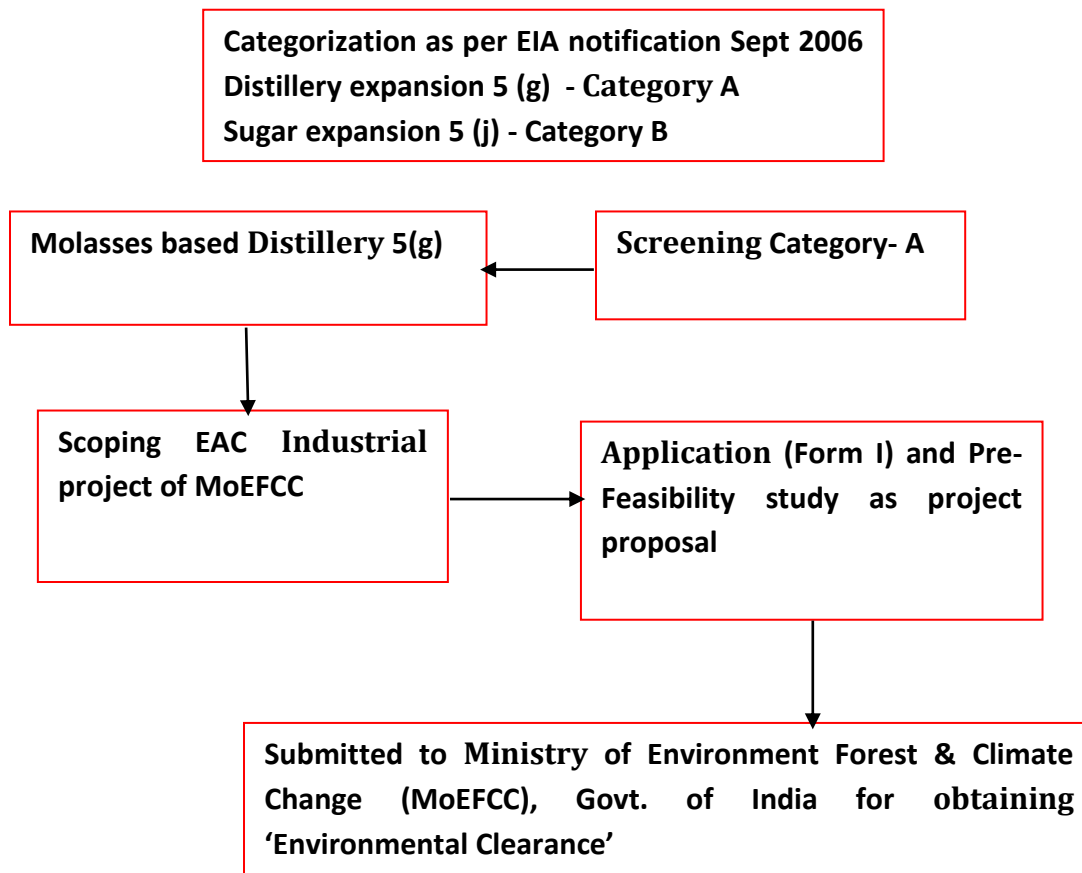
To meet these objectives the SMSKL will;

- Comply all relevant laws, regulation, statutory provisions & codes of practice
- Continually asses Risks & Hazards so as to evolve establish & upgrade hazard control measures, emergency preparedness, & risks mitigation and correct the deficiency identified in timely manner
- Ensure safe handling, storage, use and disposal of all substance & materials which are classified as hazardous to health & environment
- Create awareness amongst employees by providing appropriate training, motivation information's so as to create individual sense of duty, responsibility & participations and an institutionalize culture of continually improvement in safety, health & environment matters
- Make HOD responsible to communicate the safety policy to all concerned in his department
- Make supervisors responsible or implementation of the safety precautions, use of safety devices, & the safety of the people



- Empower employees at all levels to be responsible & accountable for their personal health & safety
- Fire protection system shall be provided in accordance to the LPA's regulations. The firefighting system will consist of a hydrant network
- Factory has already a fire protection system including electric driven pump, one diesel engine pump, and one jockey pump, etc.
- Portable fire extinguishers shall be provided in strategic locations in new unit.

## 2.11 Schematic representation of the feasibility drawing which give information of EIA purpose



**Figure 2.9: Categorization of Proposed Project as per EIA Notification**

## 3.0 SITE ANALYSIS

### 3.1 Connectivity

The site is well connected by road, railway as well as air network. It is approx. 18 km away from the state highway no. 27 (Pune-Ahmednagar) and ~16 km away from the national highway no. 9. Yavat railway station (on Pune-Solapur route) is approx. 16 km from the project site. The international Airport of Pune (approx. 45 km) is the nearest air port to the site.

### 3.2 Land form, land use and ownership

The sugar factory is holding approx. 76 acres of land. The land is flat, open and already under the industrial use (i.e. sugar factory and allied units). Out of available, a provision is made of approx. 7.5 acre for the proposed expansion of sugar and distillery unit. As per the guidelines, 33% of land of proposed development is allocated for green belt i.e. approx. 2.5 acres. Hence, the total land required for the proposed Sugar and distillery will be 10.00 acres, which is readily available with the factory (project proponent).

### 3.3 Topography

The terrain is almost flat, no hills in the surroundings. The geographical coordinates of the area are 18°36'20.38"N, 74°13'39.60"E. The site is 551 m high from mean sea level.

### 3.4 Salient Features

The proposed project requires no additional land. Therefore, no issues of rehabilitation and restoration are involved. There won't be change in the land use pattern since the land is already used for industrial purpose. There is no sanctuary, biosphere reserve or national park within the 10km radius area. The project surrounding land is either fallow land or used for agricultural purpose. There are 29 villages in the study area of 10 km radius. Bhima river is approx. 2.20 km away from the project site.

**Table 3.1: Salient features of the project location**

<b>Roads</b>	State Highway No. 27 is approx. 18 km from the site National Highway No. 9 is approx. 16 km from the site
<b>Nearest Residential area (village)</b>	Patethan is approx. 2.50 km from the project site.
<b>Railway Station</b>	Yavat railway station and Urali Kanchan railway station is approx. 16km and 20km respectively from the site. (Pune-Solapur route of central railway)

<b>Air Port</b>	Pune airport is the nearest airport approx. 35 km from the site.
<b>River</b>	Bhima river is approx. 2.20 km.
<b>Schools</b>	Kailas Vidya Mandir, Rahu approx. 7 km from site Navbharat Vidyalay, Walki is about 9 km from site, Zila Parishad School is available in the village for primary education
<b>Colleges</b>	Maharashtra Academy of Naval Education and Training, is approx. 25 km from the project site
<b>Medical and health care centers</b>	Medical center at Rahu is approx. 5 km and Emergency Hospital at Talegaon Dhamdere near Shikrapur is approx. 18 km from the project site.
<b>Banks</b>	Bank of Maharashtra, Yavat is approx. 16 km from the project site
<b>Market places</b>	Yavat is a nearest market place at approx. 16km from the project site
<b>Protected Area/ Sanctuaries/NP</b>	No
<b>CRZ applicability</b>	Not applicable
<b>Seismicity</b>	Seismic Zone- III
<i>Note: All the above mentioned distances are the aerial distance from the project site</i>	

### 3.5 Existing Infrastructure

**Table 3.2: Existing Infrastructure**

<b>Land</b>	Total plot area available with the industry is 76 acre. Land required for the proposed expansion is about 7.5 acre. The greenbelt area is 12 acre additional 2.5 acre of green belt will be developed.
<b>Water</b>	Source: Bhima River
<b>Power</b>	Captive power supply
<b>Road</b>	State highway no.27 approx. 18 km from the site
<b>Fuel</b>	Fuel required for steam generation will be bagasse & Biogas, which will be obtained from own sugar & Distillery unit
<b>Steam generator</b>	Existing boilers will be used for steam generation

### 3.5.1 Raw Material: Sugarcane

The viability of the proposed distillery unit depends on the availability of raw material i.e. sugar cane, molasses. **Table 3.3**, shows the cane production from the operational/command area of the factory and its cane crushing performance for last five years.

**Table 3.3: Production & Crushing Performance for last five years**

Sr. No.	Particulars	2012-13	2013-14	2014-15	2015-16	2016-17
1	Gross operational days	153	137	178	145	63
2	Cane crushed (MT)	383374	373196	524686	461382	192911
3	Sugar produced (Qtls)	416000	412500	586000	517400	210850
4	Sugar recovery (%)	10.83	11.03	11.15	11.1	10.9
5	Bagasse generation on cane (%)	28.8	28.5	28.8	28.3	28.2
6	Molasses (MT)	15280	15325	21700	20190	8015

### 3.5.2 Irrigation and transportation facilities

The SMSKL is located in the vicinity of Bhima river (approx. 2.20 km from project site). Cane is usually grown by using well, bore well water. In some parts water from river and canal is used for irrigation. Very good road network is available in the vicinity of the site.

### 3.5.3 Fuel

Fuel required for steam generation will be bagasse & biogas, it will be obtained from own sugar factory and distillery.

### 3.5.4 Water

At present sugar factory draw water from Bhima River, the permission letter attached at the end of the report as an **Annexure-1**. The water requirement for proposed project will be around 520 m<sup>3</sup>/day for sugar and distillery. Water conservation will be achieved by recycling of water.

### 3.5.5 Power

As stated earlier, SMSKL is having cogeneration unit of 10 MW and they have planned to re-operate an idle STG of three MW (Total operating capacity will be 12 MW). Thus, the required power will be sourced from this captive power station during cane crushing season. During off-season, power will be taken from state electricity board.

### 3.6 Soil classification

Soil in this area are slightly deep, well drained, fine, calcareous soils on very gently sloping lands with meadows and buttes with moderate erosion. In the study region, light brown and deep black soil was found. The black soil is generally found with layers of one to five feet and it has covered large portion of cultivated area. Black soil is found in the villages which are located on the bank of Bhima river. This kind of soil has the capacity to hold moisture for long period and contains calcium carbonate which is useful for the cultivation.

### 3.7 Social Infrastructure available

The sugar factory has already initiated several activities for the development of the region. Some of the prime activities are as follows.

- The factory is providing medical aid to the employees and their dependents at very low cost
- It provides primary school educational facilities to the children of workers
- The factory also arranges field demonstration to educate the farmers in sugarcane cultivation through application of scientific methods
- It provides drip irrigation facilities to the sugarcane growers on subsidized basis
- It provides insurance policy facilities for members and workers
- To facilitate better transport of sugarcane, the factory has undertaken major program to construct roads in its area of operation



## 4.0 PLANNING BRIEF

### 4.1 Planning concept

This is an agro-based industry. Sugar cane which is a main raw material of the industry is available easily and adequate amount. It is a renewable source. The project is a vertical integration. Due to expansion of sugar mill, the proponent has planned to expand distillery.

### 4.2 Facilities for Transport

SMSKL is situated approx. 18 Km off the State highway 27 and 16 km from NH 9. All the villages from the command area of SMSKL are accessible by asphalted (*pucca*) road, operational year around. Hence, public transportation is available. State transport (ST) buses ply on schedule and connect almost all the villages of the command area.

### 4.3 Town and country planning / Development authority classification

The project is located at Village Patethan taluka Daund of Pune district. Local Grampanchyat is the authority for planning. The Grampanchyat has issued 'No Objection Certificates (NOC)' for this expansion project. The copy of the same is attached as an **Annexure-2**. Presently, the land is used for industrial purpose and will be used for the same purpose only.

### 4.4 Population projection

No major population flux is anticipated due to expansion. In the proposed project candidates from local areas will be preferred for employment. Only for exceptional posts it may employ candidates from other areas. In that case existing colony have the facilities to accommodate the additional man power for the new activity.

### 4.5 Land use Planning

Total plot area with sugar industry is 76 acre. Land required for proposed expansion of sugar unit is about 1.5 acre and 6.00 acres for distillery. Existing greenbelt area is 12 acre additional 2.5acre of green belt will be developed.

#### **Assessment of infrastructure Demand (Physical & Social)**

The basic infrastructure such as roads, electricity, transportation, drinking water supply, health centers and hospitals, school, colleges, sanitation facilities are available in the vicinity. The proposed project is not going to exert any unbearable load on any of these infrastructure and resources.

#### **4.6 Amenities/ Facilities**

Following amenities/facilities are available at existing sugar factory

- Housing colony for employees
- Guest house facility
- Petrol pump
- Canteen
- Medical facility
- Separate dedicated parking facility for goods vehicle and personal vehicles at site
- Provision of street light within premises as well as on approach road
- Security check post and round the clock security persons on duty
- Fire extinguishing facilities
- Drinking water and power supply to housing colony
- Diesel generator as a backup facility
- Fresh water and wastewater treatment plants

#### **5.0 PROPOSED INFRASTRUCTURE**

##### **5.1 Industrial Area**

The proposed project will be carried out in the existing factory premises only. The total allocated land for the proposed project is 10.00 acres (includes greenbelt).

##### **5.2 Residential Area**

Existing housing colony area is approx. 2.5 acre. There is no plan to expand this housing colony.

##### **5.3 Greenbelt Area**

Proposed greenbelt area is ~2.5 acre.

##### **5.4 Social infrastructure**

Only existing/available infrastructure will be used. No new roads or water/air routes will be developed

##### **5.5 Connectivity**

The site is well connected by road, railway and air way. The same is described earlier.

##### **5.6 Drinking water management**

SMSKL draws water from Bhima River. It operates a special water treatment plant to supply drinking water to factory as well as the staff colony.

## 5.7 Industrial waste management

Distillery spent wash is a major source of liquid waste which will be disposed through biomethanation (biogas generation) followed by evaporation (MEE) and finally get converted into biocompost by mixing with press mud. The Process condensate from evaporators and spent lees from the process will be treated in Condensate Polishing Unit (CPU) and used for process and cooling tower make up water, etc.. The sanitary wastewater will be disposed by using septic tank and soak pit system. Thus, due to proper treatment of effluent, disposal of treated water within the factory premises and recycling of it, the issue of wastewater is envisaged to be insignificant.

**Table 5.1: Solid/ Hazardous waste generation, treatment & Disposal**

#	Waste	Quantity MT/annum	Upshot
1	Yeast sludge (dry)	50	Used as a soil enriching material
2	Boiler Ash (off-season of sugar)	220	sold to brick manufacturing units
3	Distillery Polishing unit Sludge	70	Used as a soil enriching material
4	Spent oil from DG	0.1-0.2 KL	Spent oil is burnt in boiler

## 5.8 Power Requirement and Source

Particular	Power ( MW)	Source
Sugar and Distillery (during season)	6.5	Captive
Distillery and misc for sugar (during off-season of sugar)	1.5	State electricity board

## 5.9 Rehabilitation and Resettlement (R & R) Plan

There will be no any issue of rehabilitation and resettlement (R & R) for the proposed project, since the required land is available with the factory.

## 5.10 Project Scheduled & Cost Estimates

**Table 5.2: Project scheduled & Cost Estimate**

1.	Date of start of construction (Anticipatory)	March 2018
2.	Date of completion (Anticipatory)	Dec. 2018
3.	Proposed Project cost	Rs. 5,367.00 lakhs
4.	EMP cost	Rs. 560.00 lakhs

## 5.11 Analysis of proposal (Final Recommendations)

### I) Benefits

- This industry will produce RS, ENA and Anhydrous Alcohol (fuel ethanol) which are useful products for the country. It will earn & save foreign exchange in the potable alcohol cadre as well blending in petrol
- Cane growers are likely to get good rates for their crop
- No external electricity required (during cane crushing season) due to in-house power generation in the proposed activity
- The evaporation condensate, spent lees and other non-polluting water will be recycled into process and cooling tower makeup water which will minimize the fresh water requirement
- Solid waste like sludge from process and CPU and boiler ash are also a soil enriching materials
- Compatible architecture will be adopted and Land is already under industrial use. Trees will be maintained and not razed down.
- No Rehabilitation is involved.
- The problematic liquid waste materials such as distillery spent wash will be disposed off through biogas production followed by evaporation followed by composting and ZLD will be achieved
- The process is straight line and the technologies are available indigenously
- Indirect employment to many since, the project is agro-based
- The aggregate effect of the project is likely to boost the local economy
- Direct employment opportunities for local youths.

### II) Conclusion

- a) Expansion of sugar and distillery is very necessary for effective utilization of land, bagasse, steam, press mud and molasses
- b) The local sugarcane growers are strongly willing for the project
- c) The candidate site is suitable from general MoEFCC expectations.
- d) Water, power, raw material, filler material and market is assured and found available with ease.
- e) Full precautions will be taken for pollution control, resource conservation and environmental protection
- f) All the units are agro-based and hence promote sustainable development