PRE-FEASIBILITY REPORT

FOR

Proposed Expansion of Sugar 6000 TCD to 7500 TCD Sugar Plant and Molasses based Distillery 90 KLPD to 120 KLPD

At

Gut No. 99, Village –Alegaon, Tehsil- Daund, District- Pune, State –Maharashtra

Submitted by

Daund Sugar Pvt Ltd.

Submitted to

Environment Appraisal Committee ,New Delhi

Prepared by

Mantras Green Resources Ltd,

Engineers & Environment Consultant

(QCI/NABET Certificate No. NABET/EIA/1619/RA0060)

Corporate Office: Plot No. A-9,Hall No.1, First Floor, NICE Sankul, Opp.-Nashik Merchant Co-op Bank Ltd., ITI Signal, MIDC Satpur, Nashik-422007

Phone: +91-253-2355665, 2370086; Fax No.: +91-253-2316781

E-mail: Info@mantrasresources.com ,**Website:** www.mantrasresources.com,

Toll Free No.: 1800-233-5565

CONTENTS

LIST OF FIGURES

LIST OF TABLES

PREFEASIBILITY REPORT

1.0 Introduction

M/s Daund Sugar Pvt. Ltd. (DSPL) is an existing sugar mill located at Village-Alegaon, Taluka - Daund, District - Pune in Maharashtra State. DSPL is a private limited company. It is an existing 6000 TCD capacity sugar mill producing 25,920 MT/month white crystalline sugar and also producing by-products such as molasses 9,720 MT/Month, bagasse 60,480 MT/month and Filter Cake (press mud) 8,640 MT/day as shown in **Table 1**. The company has also setup a distillery plant expansion from 45 KLPD to 90 KLPD in the same premises of sugar plant.

Table 1: Product and By-products of Existing Sugar Unit

Product	MT/Month	MT/Day
Sugar	25,920	864
By-products		
Bagasse	60,480	2016
Filter Cake	8,640	288
Molasses	9,720	324

1.1 Project Proponent

This enterprises is a legal entity, registered under Company Act, 1956 with due Registration in 2008. Mr. Jagdish Laxmanrao Kadam is the Chairman of this industry and the profile of the Board of Directors is detailed below:

Table 2: Board of Directors

S. No.	Name	Role
1.	Shri. Jagdish Laxmanrao Kadam	Chairman and Director
2.	Shri Veerdhaval Krushnrao Jagdale	Director
3.	Shri Vivek Shankarrao Jadhav	Director
4.	Shri Shahaji Balasaheb Gaikwad	Whole Time Director

By the honest working, this groups of Directors has developed the existing units well. The present Directors are working hard to fullfill a dream of industrilly strong Nation. The project proponent are known for their track records of honest and transpertent businesses. They go to the sprit of law. The company is well aware about energy crises

and takes various steps for conservations of energy. This indusry is commited to prevent pollution, continually improve environmental performance, comply with environental legislation and regulations, health care etc. Reducing the spillages and fugitive pollution emissions, conserving energy and other resources with waste minimizations. Development clean and green environment. This is a private limited sugar factory and local farmers are the contributing members who grow sugarcane and their number is more than 15,000. In order to integrate the environmental concerns with the developmental activities related to proposed expansion of plant, to plan implement appropriate strategies for the protection of environment and maintenance of ecological balance in the region.

1.2 Project Consultant

To seek environmental clearence, M/s Daund Sugar Pvt. Ltd, appointed Mantras Green Resources Limited (MGRL), Nasik, QCI-NABET Accredited EIA Consultant, for conducting EIA studies for proposed expansion of sugar (from 6000 TCD to 7500 TCD) and distillery (from 90 KLPD to120 KLPD) encompassing baseline scenario with respect to different components of environmental viz air, noise, water, land, biological and socio-economic, including parameters of human interest for evolving suitable cost effective Environmental Management Plan (EMP). MGRL is a group of professionals associated with the industries for past 30 years in highly diversified activities like manufacturing, engineering and consultancy services including imports and exports. On 9th May 2013, the company is having Registered Office at Nasik and Branch office at Kalyan, Pune, Jaipur, Hyderabad and Delhi. MGRL is an ISO 9001-2008 certified company and QCI/NABET Accreditated EIA Consultant for total 13 different Sectors. The company is under leadership of CEO Dr. U. K. Sharma whose visionary approach has made the company one of the most prominent Environmental Consultant in the contary.

2.0 Type of Project

M/s Daund Sugar Pvt. Ltd. is an agro based company focused on the manufacturer of sugar, power and allied by-products. The proposed plant units will be established in the same premises of the existing sugar industry. The raw materials, molasses and bagasse generated from the sugar plant will be utilized in the proposed distillery and co-gen power plants respectively. Presently company has established and operating a 6000 TCD Sugar, 90 KLPD distilleries and 18 MW cogeneration power plants. DSPL

now intends to expand a molasses based distillery from 90 KLPD to 120 KLPD in order to increase its productivity and profitability in addition to abating pollution. Project proponent (PP) wishes another expansion of sugar capacity up to 7500 TCD (1500 TCD expansion) from 6000 TCD. Crystalline sugar production from existing and proposed plant will be about 720 MT/day (21,600 MT/month) and 900 MT/day (27,000 MT/month) respectively. The existing sugar unit generates large quantities of by-products viz. bagasse (1680 MT/day), molasses (270 MT/day) and press mud (240 MT/day). The proposed sugar unit will also be generating large quantities of by-products viz. bagasse (2100 MT/day), molasses (335 MT/day) and press mud (300 MT/day). To be economically and environmentally sustainable, it is necessary for the sugar industry to convert these by-products into high value products and hence existing alcohol distillery of 90 KLPD will be expanded to 120 KLPD is proposed, for which this EIA study is undertaken. Products and by-products of proposed unit are presented in **Table 3**.

Table 3: Products and By-products of Proposed Units

S. No.	Feature	Existing	Proposed	Total
Products				
1.	Capacity of Sugar Plant (TCD)	6000	1500	7500
2.	Sugar Production (MTD)	720	180	900
By-products				
3.	Bagasse (MTD)	1680	420	2100
4.	Molasses (MTD)	270	65	335
5.	Press Mud	240	60	300
6.	Alcohol Distillery (KLPD) (Alcohol of RS/ENA/AA grades)	RS/ENA=84.6 Impure=5.4 AA= 90 KLPD	RS/ENA=28.2 Impure=1.8 AA= 30 KLPD	RS/ENA=112.8 Impure=7.2 AA= 120 KLPD
7.	Co-gen Power (MW)	18	-	18

The total land area of the project site is 61.92 acres which is sufficient for existing and proposed activities. The proposed plants will be established in the same premises of the existing sugar industry. The raw materials molasses and bagasse generated from the sugar plant will be utilized in the proposed distillery and co-gen power plants.

2.1 Consent to Operate of Existing Sugar and Distillery Plant

The existing 6000 TCD Sugar Mill has obtained Consent to Operate (No. Format 1.0/BO/CAC-CELL/UAN No. 0000009760/O&R CAC-1690000965 dated 27.10.2016 and 120 KLPD distillery has obtained Consent to Operate (No. Format -1.0/BO/CAC-

CELL/UNA No. 000009816/O&R/CAC-1703002022 dated 30.03.2017 under Section 26 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of Air (Prevention and Control of Pollution) Act, 1981 and authorization under Rule 5 of the Hazardous waste (M, H and T.M.) Rules 2008 which is valid for a period from 27.10.2016 to 30.7.2017 for sugar and for distillery for a period from 30.03.2017 to 31.08.2017 (Copy attached as **Annexure I & II)**.

2.2 Purpose of the Project

M/s Daund Sugar Pvt. Ltd. has decided for expansion of sugar plant from 6000 TCD to 7500 TCD and distillery plant from 90 KLPD to 120 KLPD in the same premises of existing sugar units. The Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India has issued an EIA Notification No S.O. 1533 promulgated on 14th September, 2006 amended on 1st December, 2009 vide S.O. No. 3067, under Environmental (Protection) Act, 1986. Prior Environmental Clearance (EC) from the EIA Authorities it is mandatory for the establishment of projects/activities listed in the scheduled of above Notification. Sugar industry ≥ 5000 TCD cane crushing capacity categorized under Category **"B"** of schedule 5(j) and 120 KLPD distillery on molasses based is categorized under Category **"A"** of schedule 5(g). Therefore, the Projects require prior Environmental Clearance from the Expert Appraisal Committee (EAC), New Delhi.

3.0 Importance to the Country and Region

(A) Sugar Industry

The Indian sugar industry is passing through a difficult period. The sugar price in the Indian/World market is low. On the other hand, the cost of the raw material the sugarcane keeps increasing every year and so is the production cost. The sugar industry can hope to come out of these situations only by cutting down the cost of production and by adopting energy efficient processing and this justifies going in for higher and more efficient system are as follows:

- India needs sugar, alcohol and power on regular basis. Alcohol saves petrol (additives) and also foreign exchange saver-earner. Condensate water can be used for boiler and process. Consume bagasse and molasses, which otherwise is an environmental risk.

- The world's largest consumers of sugar are India, China, Brazil, USA, Russia to Mexico, Pakistan, Indonesia, Germany and Egypt. Brazil and India are the largest sugar producing countries followed by China, USA, Thailand, Australia, Mexico, Pakistan, France and Germany.
- The world consumption was projected to grow to 160 MMT in 2010 and 172 MMT by 2016. India is predominant an agro based economy.
- Sugarcane plays a very vital role in this agro based economy by providing sugar, the main sweeter used in India. With the growing demand for sugar, the emphasis has been on increasing sugar production.
- Due to the switching over from other sweetening agents to sugar, the effect of population growth and increase in per capital consumption, the sugar consumption is likely to increase. Hence, there is a lot of scope for increasing the sugar manufacturing infrastructure, hence further addition of sugar manufacturing infrastructure is envisaged in India.

The economical size of the sugar plants is shifting from 6000 TCD to 7500 CD considering mainly the cost of production and economical self sufficient own stream industries. The ever growing energy demand and the steep depletion of fossil fuels directed us to explore the possibility of developing other sources of energy particularly from non-conventional renewable energy sources, which is also environmental friendly. Further, it is an undisputed fact that the present level of generation of power from Hydel, Thermal and Nuclear sources could not meet the increasing demand due to various problems. The power situation in Maharashtra is worsening every day. Power interruption leads to unplanned shut down and consequences are excess consumptions of utilities, compromise in quality of sugar and overall increasing in manufacturing costs. Hence, it was decided to utilize bagasse produced in this sugar mill for cogeneration of power. The sugar industry generates large quantities of by-products viz. bagasse, molasses and press mud. To be economically and environmentally sustainable it is necessary for the sugar industries to convert these by-products into high value products. Thus, the proposed plant will be established in the same premises of the existing sugar mill. The raw materials molasses and bagasse generated from the sugar mill will be utilized in the proposed distillery and co-gen power plant, respectively.

In order to reduce the green house gas emission, the non-conventional energy is to be utilized for the generation of electricity. One of the non-conventional renewable energy sources is bagasse. So the ministry of non-conventional energy, Government of India encourages sugar mills for bagasse based co-generation by increasing the various subsidies. Bagasse based cogeneration in sugar mills eminently fits in as a desirable source of augmenting the power generation as it has following merits:

- Bagasse based cogeneration is environment friendly as it does not add to the existing pollution level of the environment due to carbon recycling
- It is a renewable source of energy resulting into reduced dependence on fossil fuels
- There is no need to transport the fuel to the generating stations as the sugarcane in any case is transported to the factories
- It helps in bridging the gap between the demand and supply in the power sector to some extent
- It has lower gestation period and lower installation and operating cost compared to the conventional utility thermal plants
- The project land is in possession of promoters and there are no rehabilitation resettlement issues.
- There is no litigation pending against the proposed project

(B) Distillery Industry

Augmenting Ethanol Supply

Currently, due to very high cost of imported ethanol, the government does not wish to use imported ethanol for the ethanol blending program, hence the focus is on developing domestic production capacities. To augment supply, the government of India has permitted ethanol production directly from sugarcane juice while ensuring that the move does not constrain production of sugar or ethanol for industrial use. The Government of India offering subsidized loans (through sugarcane development funds) to sugar mills for building ethanol production units. The loans would cover a maximum of 40% of the project cost to sugar mills for development of ethanol production unit. Oil companies have stated that during the year 2014, the distilleries could not fulfill their requirement of fuel ethanol for blending and they could get only 50% fuel ethanol for their blending purposes. Recently, for implementing 5% Ethanol Blending Program, the Oil Companies have estimated their requirement of fuel ethanol as 97 Cr Liters during

the year 2015. Accordingly, Tenders have been floated mentioning the landed price of Ethanol to be Rs 49.00/liter.

Ethanol Demand V/S Production Capacity

Alcohol has assumed a very important place in the economy of the country. It is used as a raw material for number of organic chemicals as a potential fuel in the form of power alcohol when blended with petrol and as an ingredient in beverages. The importance and utility of alcohol as an industrial raw material for manufacturer of variety of organic chemicals is now being increasingly appreciated all over the world. In India production of ethanol is from sugarcane molasses (a by-product of sugar Industry). Traditionally, molasses has been used in India to produce rectified spirit and alcohol of about 94.5% purity for producing liquor for human consumption and for producing various chemicals. But in the past few years, it has been effectively used to produce bio-ethanol for blending with petrol as a fuel. Despite of steady demand for ethanol from the chemical and potable liquor industries, there will be a certain rise in demand for ethanol for implementing the Ethanol Blending Program as per the Government Policy.

Given below the Balance Sheet for Production/Consumption for Ethanol in India:

S. No.	Particular	2009	2010	2011	2012	2013
1.	Beginning Stock	1672	1241	1061	757	908
2.	Production	1073	1522	1681	2154	2064
3.	Imports	280	92	39	34	35
4.	Exports	4	14	29	22	20
5.	Potable & Chemicals Industry Consumption	1680	1730	1630	1710	1755
6.	Fuel Ethanol Consumption	100	50	365	305	650
7.	Total Consumption	1780	1780	1995	2015	2405
8.	Balance Stock	1241	1061	757	908	582
9.	Petrol Consumption	18022	19954	21080	22132	22510
10.	Blending Rate (%)	0.6	0.3	1.7	1.4	2.9

Source: Grain Report

On comparison between the petrol consumption and ethanol consumption, it is evident that there is a huge potential for ethanol for blending with petrol. The ethanol blended petrol program of government of India would become a reality only by increasing the

capacity of fuel ethanol production in India. M/s Daund Sugar Mill through its proposed distillery (120 KLPD) is taken such an initiative which would help in achieving the fuel ethanol blending programmed and also revenue to the mill.

Ethanol Blending Policy

Ethanol is produced in India from sugarcane molasses for blending with gasoline. Beginning in January 2003, Government of India mandated the use of 5 % ethanol blend in gasoline through its ambitious Ethanol Blended Petrol (EBP) program. At present there are 356 distilleries, including 160 attached with sugar factories, having a total installed capacity of only 6.0 billion liters ethanol, operational in India. However, India is producing approximately 3.0 Billion Liters of Alcohol with a capacity utilization of only about 50%. It is a challenging task for the sugar industry, distilleries and other interested investors. In order to meet the above mentioned challenge, following steps are needed to be taken at the earliest:

- To expand the capacity of existing distilleries in sugar complexes on the basis of individual factory's requirement, keeping in view the possibility of producing ethanol from mixed juice, secondary juice, heavy molasses and other alternatives.
- All factories having a capacity of 2500 TCD and above, having no distillery and co-generation at present should install distilleries of suitable capacities in their sugar complexes and to start co-generation too.

Use of Ethanol: Potable Alcohol Industry in India

The Indian potable alcohol market can be classified into "Country Liquor" and "Indian-Made Foreign Liquor" (IMFL) which account for the bulk of alcohol utilization in the country. The potable alcohol industry is estimated at a market value of approximately Rs. 300 billion and has been growing at the rate of 7-10 %/annum over the past few years. However, the exact shares of country liquor and IMFL manufacturing are unknown since production of country liquor is still being done illegally in many areas, making it difficult to arrive at a correct estimate.

The potable alcohol produced in India is primarily made from sugarcane molasses and not from grain as in many other countries. Due to the increasing uncertainties involved in molasses availability (and the resultant increase in its prices) the industry is gradually accepting the option of grain-based alcohol. However, molasses still accounts for most of the domestically produced potable alcohol in the country. The process of manufacturing IMFL (such as whisky, rum and brandy) includes a secondary distillation

of the fermented mixture of grains and molasses that yields extra neutral alcohol (ENA) with 96% alcohol content, which is diluted to obtain IMFL. The IMFLs are usually of 42.8% v/v ethanol content. In the past few years, significant growth has been achieved in the production of quality spirits and the industry is now exporting these products. In terms of market players, the IMFL industry is highly consolidated with a few companies holding significant shares in the market. The production centers for IMFL are mostly located in the sugar-producing states of Maharashtra, UP, Karnataka and Tamil Nadu and some in Haryana and Punjab. Regulation and taxation of the sector is under the jurisdiction of the state governments and is large source of revenue for the states.

The Chemical Alcohol-based Industry in India

Traditionally, the ethanol produced in the country was used primarily for potable purposes. However, the difficulties in disposing off the molasses (a waste by-product from sugar Industry), has been used as a feed to set up alcohol-based chemical industry in the country. This has facilitated the production of chemicals such as acetic acid, acetic anhydride, ethyl acetate, acetone, mono-ethylene glycol (MEG) etc. These then provide the feedstock for a variety of industries such as synthetic fibers, pesticides, pharmaceuticals, paints, dye and adhesives. Ethanol produced in the country easily met the consumption requirements of these industries until around the year 2002. However, after 2002, blending of 5% ethanol with petrol in many of the Indian States have resulted in problems of availability of adequate quantity of feedstock for production in above industries.

Now many major units are engaged in the manufacture of chemicals. Therefore alcohol-based industry is a very important constituent of the organic chemical sector and the entire Indian chemicals industry in general. The above substantial consumption of ethanol by this sector makes it second largest consumer of ethanol in the country, behind the potable sector.

Fuel Ethanol for Blending in Gasoline

The Government of India (GOI) approved the National Policy on Bio-fuels on December 24, 2009. The policy encourages use of renewable energy resources as alternate fuel to supplement transport fuels and had proposed an indicative target to replace 20% of petroleum fuel consumption with bio-fuels (bio-ethanol and bio-diesel) by end of 12th Five-Year Plan (2017) in a bid to renew its focus and strongly implement the Ethanol

Blending Program (EBP), the Cabinet Committee of Economic Affairs (CCEA) on November 22, 2012, recommended 5% mandatory blending of ethanol with gasoline. It has also recommended that the procurement price of ethanol shall now be decided by between the Oil Marketing Companies (mostly PSU) and suppliers of ethanol. The government's current target of 5% blending of ethanol in gasoline has been partially successful in years of surplus sugar production and not fulfilled when sugar production declines

4.0 Site Location

This proposed expansion plant is of about 19.42 ha has a connecting road and has approachability. The site is connected with MSEB power. When various sites were seen, this site appears to be environmentally best as also from the business angle and therefore this option was finally adopted, including infrastructure optimization. The Pune - Solapur high way SH 67 is about 6.5 km from the project site. The nearest town is Daund 10 km North-West direction and nearest village is Alegaon, 2 km North. District place is Pune 87 km and 2.5 km river Bhima is locared. The project site is near SH 60 (Nagar-Aurangabad) and on the Daund - Baramati Road axis. The site is bounded by rural areas. The location feature and environmental setting of the site is given in **Table 4.** Project location map is given in **Fig. 1,** Google map of the site is presented in **Fig. 2** and topographical map with 10 km radius study area is presented in **Fig. 4**.

Table 4: Environmental Setting of the Project Site

S. No.	Feature	Particulars
1.	Location	M/s Daund Sugar Pvt. Ltd. Gut No.99, Village-Alegaon, Taluka-Daund, District-Pune, State-Maharashtra – Pin code 413 801
2.	Latitude Longitude	18°25'39.74" N 74°37'59.44" E
3.	Average Altitude	523 m above msl
4.	Temperature	Minimum 16^0C and Maximum 41^0C
5.	Rain Fall (Average)	600mm
6.	Wind Velocity	2.0 -2.5 km/hr
7.	Nearest Highway	SH-67; 6.5km (Pune-Solapur)

8.	Nearest village	Alegaon – 2 km (North)
9.	Nearest Railway Station	Daund railway station 10 km from site Pune railway station 87 km from site
10.	Nearest Airport	Pune Airport-93.8 km
11.	Nearest Town	Daund 10 km (north-west) from the site
12.	Nearest Water Bodies	Bhima River : 2.5 km
13.	Sensitive locations	No such locations in the study area
14.	Seismic Zone	Zone III

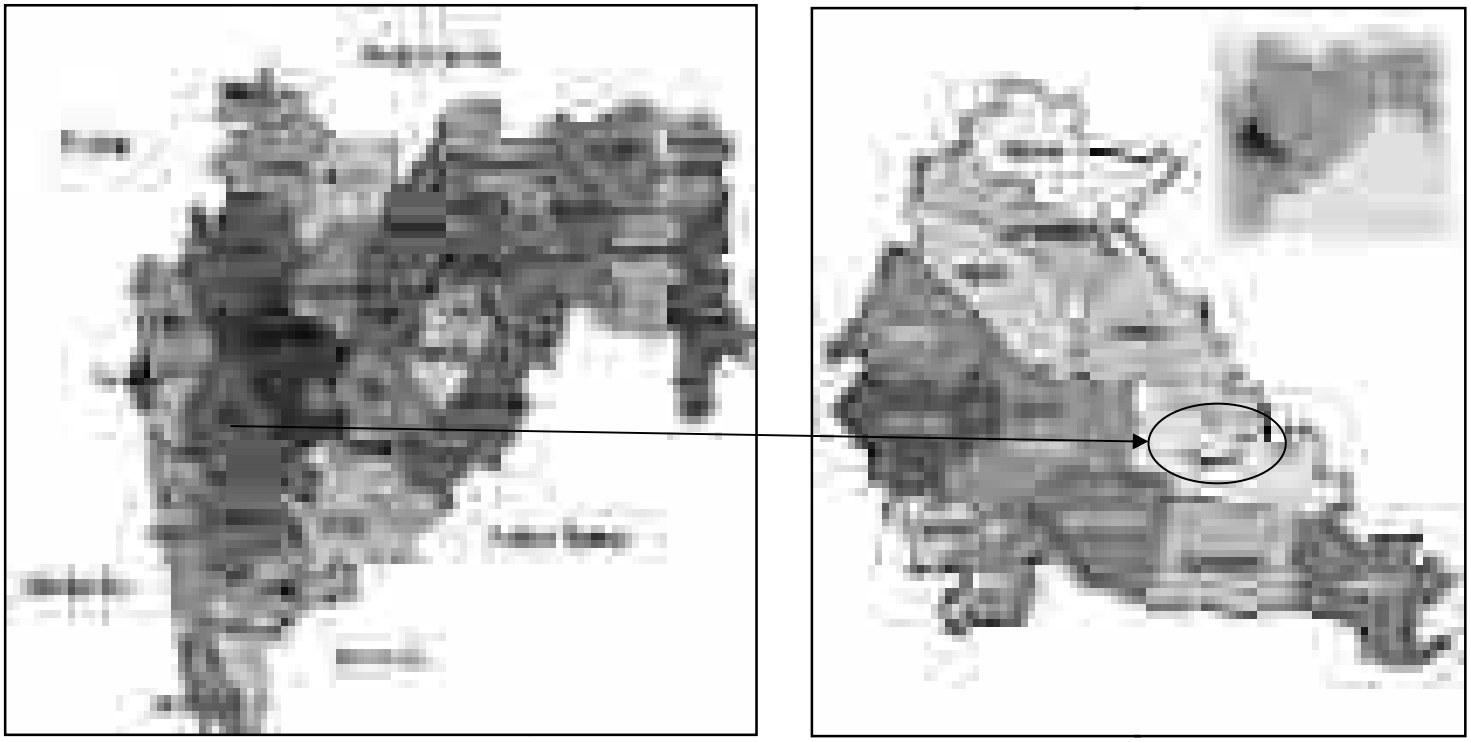

Fig. 1: Project Location Map

Fig. 2: Google Image Showing Daund Sugar Limited

There is no sensitive establishment in the visinity such as health resort, hospitals, archeological monuments, sancturies, no critically/severly polluted areas, eco-sensitive area with in 10 km redius of the project site. Photographs of the existing site and showing greenbelt etc is presented in **Fig. 3**.

Fig.3 Photographs of the existing site

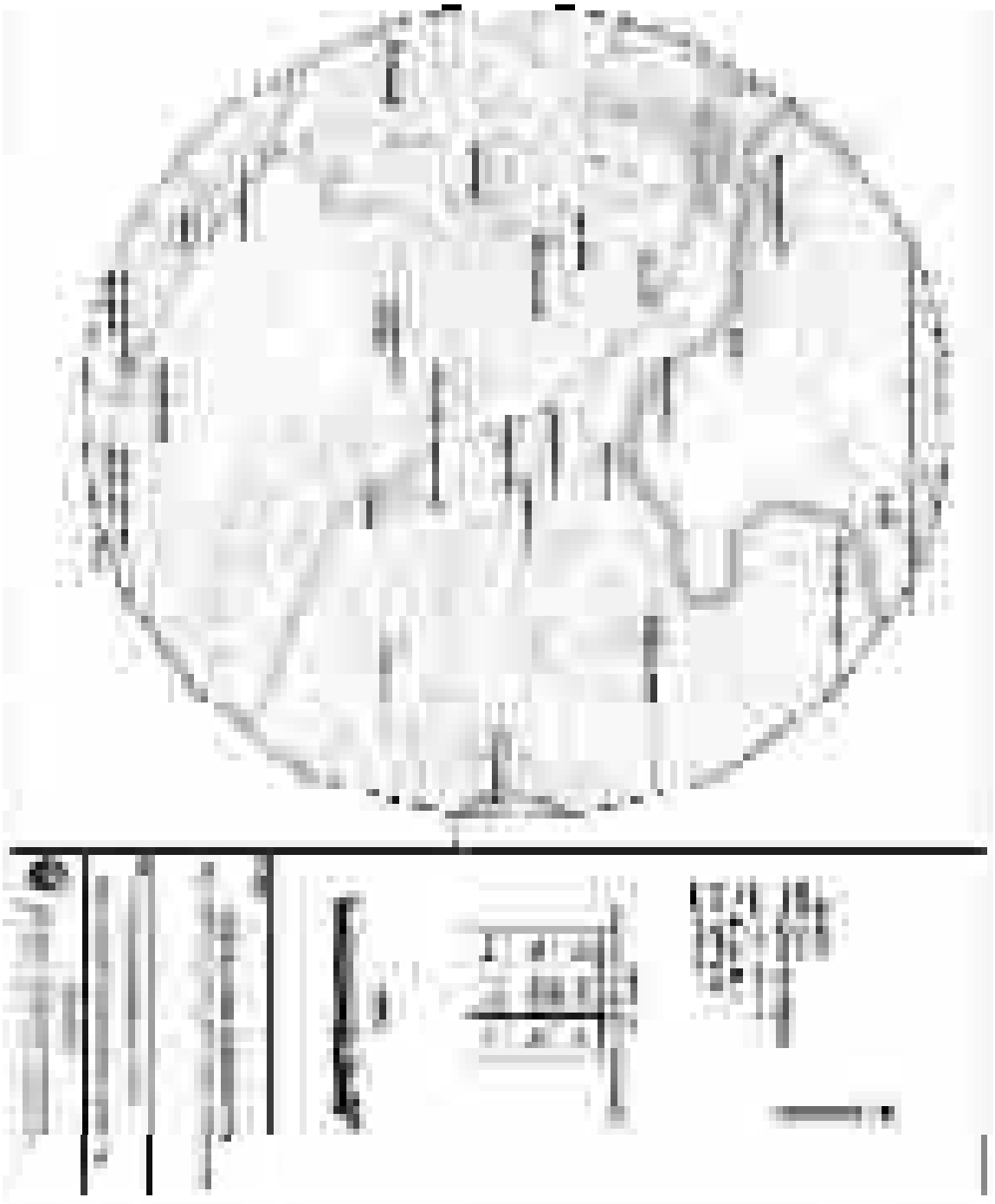

Fig.4: Topographical Map with 10KM Radius

4.1 Plant Layout Plan

The project site lay out plan to scale using Auto CAD showing sugar-cogen units, distillery, raw materials, fly ash, and other storage facilities/plan, bore well or water storage, compost Yard, ETP, waste disposal, greenbelt area, colony, water reservoir, lagoon etc. shown in (**Fig. 5**).

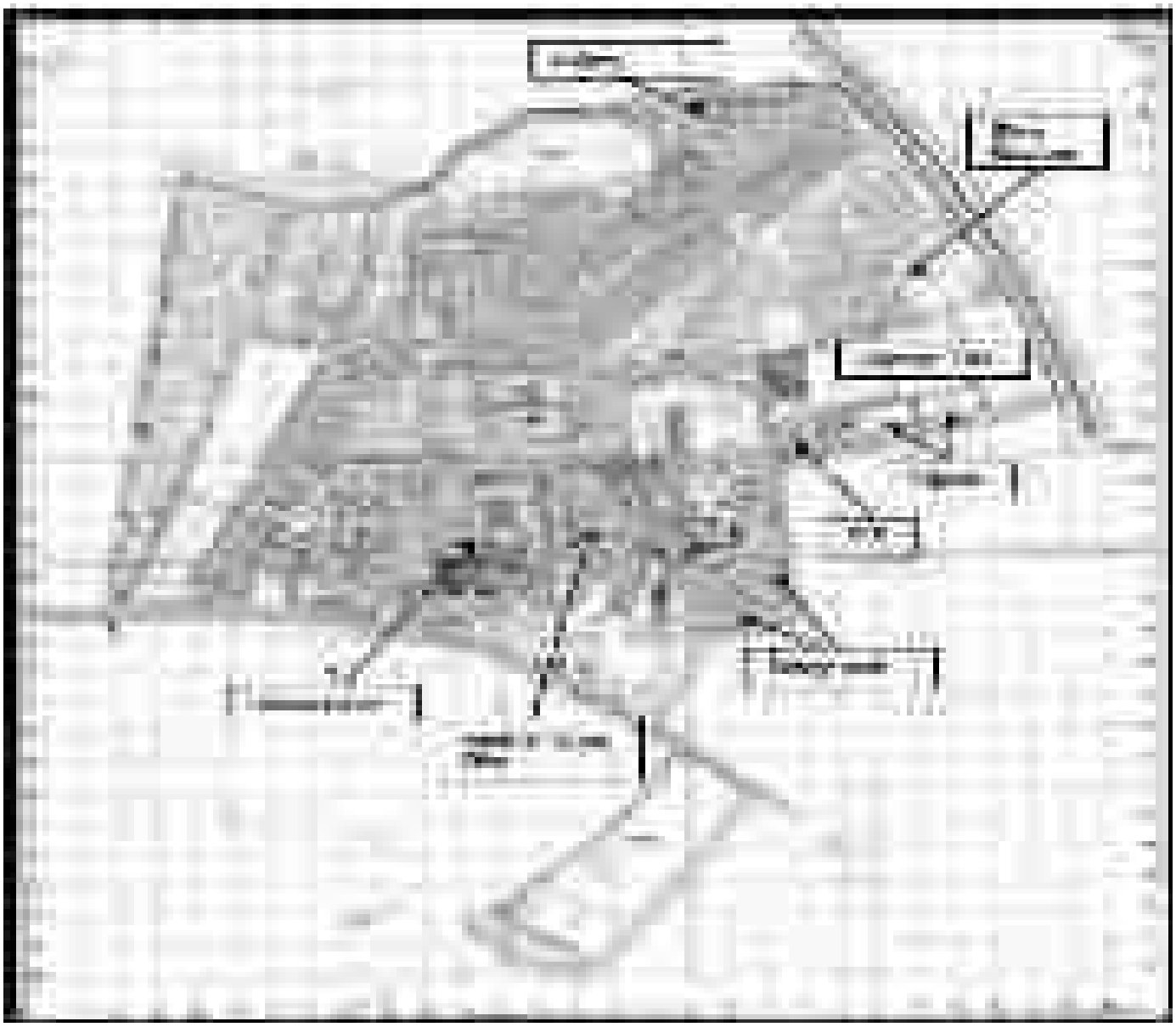

Fig. 5: Layout Plan of the DSPL

4.2 Site Selection Criteria

- There is an existing sugar mill of 6000 TCD capacity which generates molasses and press mud required for existing distillery. These by-products presently being used in existing and proposed distillery
- Company intends to increase its profitability by adding more products generated from by-products.
- Company has enough land for installing manufacturing facilities along with composting facility to ensure a zero discharge project.
- Project area is in reserve plot of existing sugar mill where raw material, fuel and power are already available
- Adequate land is available with DSPL to installed manufacturing units using both raw materials and associated pollution control facilities to ensure a zero discharge project
- Infrastructure facilities like communication and electricity are also closely available.
- Available of water resources is Bhima River only 2.5km away from the site
- The site is away from the flood plain of major revering system
- The site is away from metropolitan cities, National parks, wildlife sanctuaries, ecological sensitive areas like tropical forest, biosphere reserve and coastal areas
- There is no defence installation close to the site
- The proposed project provides employment opportunities to a large number of rural populations in the region.
- Location in rural areas benefitting farmers as it is an agro based industry

4.3 Alternative Sites

Alternative sites have not been considered as this is an expansion project to be executed at existing location based on above site selection criteria. Therefore, no alternative site has been proposed for this expansion of sugar and distillery units.

4.4 Land Requirement

The project site is fully in possession over the years as the factory is working since long. There is no major river within 1 km radius. The details of factory area, built up area and the area reserved for green belt development is given below. Daund sugar Pvt Ltd has about 141.79 acres (57.38 ha) of N. A. land in its possession to conduct it's for

manufacturing activities. The land requirement for different applications for the existing and proposed sugar co-gen and distillery units is presented in **Table 5.(Refer Annexure-III)**

Table 5: Land Utilization

S. No.	Land Break up	Area (m^2)
1	Industrial Area Main sugar factory and co-gen Units	2,14,544
2	Distillery Units	1,04,944
3	Open Space Plantation and cane yard	2,19,098
4	Roads	25,502
5	Reservoir	9,715
	Total	**5,73,803**

4.5 Soil Condition

The soils of the region can broadly be classified into three groups' viz., black, red or laterite and gray of interior quality locally known as barad. Pune district possesses mainly three types of soils, viz. black-fertile, brown and mixed type. The richest alluvial soil track found in the Valley of Bhima River. Therefore, the agro-climatic condition of district is favorable.

4.6 Climate

The climate of the region is dry. The periods from early June to about the beginning of October constitute the southwest monsoon season. The succeeding period up to November is the post-monsoon or transition season. The minimum and maximum temperature ranged between 16 ^{0}C and 41 ^{0}C respectively. The average annual rainfall in the district is 800 mm. About 87 % of the annual normal rainfall in the district is received during the monsoon months June to September, July being the rainiest month generally. The mean day velocities are of 2.0-4.5 km/hr low to moderate, especially high during pre-monsoon period of April to May.

4.7 Environmental Sensitivity

With project site as center, 10km radius area does not involve any place of Archeological interest or any ecological sensitive area or critically polluted area or the interstate boundary etc. As this project site is free from any forest land, permission and approval

for the use of forest land i.e. forestry clearance is not applicable. The project is not located within study area of National Parks, Sanctuaries, Biosphere Reserve and migratory corridors of wildlife animals. There is no existence of Schedule I Fauna that needs consecration as per Wildlife (protection) Act, 1972.

5.0 Project Description

5.1 Raw Materials

The capacity of the proposed molasses based Distillery shall be 120 KLPD, Sugar 7500 TCD and Co-gen (existing) 18 MW. For this the main and sole raw material is molasses. The yeast brings about the change. Some chemicals in small quantities are used for supporting propagation of the yeast and helps to fermentation. This is a molasses based distillery unit so raw material required is molasses. Required quantity of molasses is 3.64 MT/KL which will be made available from attached sugar unit. Electricity demand will be fulfilled by own cogeneration unit using available bagasse. Raw Material Consumption Norms for Distillation and Bio-fertilizer and CPP presented in **Table 6**.

Table 6: Requirements of Raw Materials

Particulars	Existing	Additional	Total	Mode of Transportation
Sugar Capacity (TCD)	6000	1500	7500	• Sugarcane available with self and in the district • Transportation will be by tractors, carts and tankers
Molasses (MTD)	270	65	335	
Lime (MTD)	12	3	15	• Raw materials are available in nearby markets (Pune, Mumbai) • Brought by road or railway
Phosphoric Acid (MTD)	0.8	0.2	1.0	
Sulphur (MTD)	3.5	0.88	4.38	
Nutrients (N, P) (kg/day)	100	25	125	
Turkey Red Oil (kg/day)	72	18	90	
Bio-composting				
Press mud (MTD)	64.8	21.6	86.4	Available from own sugar mill
Bagacillo	25.2	8.4	33.6	Available from nearby market Transportation by vehicle
Culture	0.162	0.254	0.216	

DG Set Furnace Oil (kg/hr)	750	-	750	Available from nearby market Transportation by vehicle

The requirement of molasses is 335 MTD for 300 days computed as 1,00,500 MT/annum. As per norms 3.64 MT/KL molasses will be required for 120 KLPD distillery computed as 1,31,040 MT/annum obtained from captive sources from associated sugar mill. The required balance molasses (30,540 MT/annum) will be obtained from nearby sugar industries which presently do not have distillery units. There is a sister concern M/s Jarendeshwar Sugar Mills, Satara of 2500 TCD capacity (without distillery unit) producing molasses being generated from whom we have obtained the commitment for supply of molasses by bilateral arrangement. Daund Sugar Mill has also entered in MoU with Chhatrapati Sahakari Sakhar Kharkhana (3500 TCD) and Astoria Agro and Allied Industries (2500 TCD) for supply of molasses as per requirements is presented in **Table 7**.

Table 7: MoU for Supply of Molasses from Sugar Industry

S. No.	Existing Sugar Industry	Capacity (TCD)
1.	Jarandeshwar Sugar Ltd., Satara	2500
2.	Chhatrapati Sahakari Sakhar Kharkhana	3500
3.	Astoria Agro and Allied Industries	2500

Details of raw materials and products along with production capacity are given along with its source and mode of transportation. Instructions are given that all the trucks for raw materials and finished products must be “Environmentally Compliant”. In order to have continuity of operation, molasses supply is ensured. The availability of sugarcane in the area is also sufficient for continuous production of by-products. The molasses will be transferred very carefully. Molasses will be out sourced partly from the surrounding sugar mills. All the material transportation shall be only during day time, tankers will be leak proof. Molasses loading and unloading will be in steel tanks and watering to avoid auto-combustion. Monthly statement of transport will be sent to government for necessary information. Those who are handling molasses, their occupational health will be examined on regular basis by the Doctors.

5.2 Magnitude of Operation

Following table clearly indicates all facets of proposed project to elaborate magnitude of project (**Table 8**):

Table 8: Magnitude of Operation

S. No.	Feature	Details	
1.	**Area Statement**		
	Total Plot Area	5,73,804 m^2	
	Distillery Area	1,04,944 m^2	
	Industrial area main factory and co-gen	2,14,544 m^2	
2.	**Working Days**	Distillery : 300 Sugar: 180 days Co-gen :210 days	
3.	**Category of Project** (EIA Notification dated 14th September, 2006)	120 KLPD Distillery: 5(g)-A 7500 TCD Sugar Mill: 5(j)-B	
4.	**Products**	**Existing**	**Proposed**
	Sugar Crushing Capacity (TCD)	6000	7500
	White Crystalline Sugar (MT/day)	720	900
5.	**By-products**		
	Bagasse (MTD)	1680	2100
	Molasses (MTD)	270	335
	Press Mud (MTD)	240	300
	RS/ENA (KLPD) Impure (KLPD) **Total (KLPD)**	84.6 5.4 **90.0**	112.8 7.2 **120.0**
	Fusel Oil (KLPD)	0.18	0.24
6.	**Water Requirement**		
	Source of Water	Bhima River	
	Fresh Water required (m^3/day) Sugar Distillery **Total**	 780 895 **1675**	
5.	**Power requirement**	Cogen:14 MW Grid: 11 MW Use: 7 MW	
6.	**Backup power**		
	D G set rating	1010 KVA X 2	1010 KVA X 2
	Fuel used (HSD) (kg/hr)	750	750

7.	**Man power**		
	Staff	57	8
	Workers	320	14
	Contractual labor	200	20
	Total	**577**	**42**
8.	**Power Requirement**		
	Boiler Capacity: **(Sugar + Cogen)**	100 TPH @ 87 kg/cm^2, 510 ^{o}C 15 TPH @ 47 kg/cm^2, 490 ^{o}C	
	Fuel Used	Bagasse	
	Fuel consumption (Sugar & Co-gen) (100 TPH & 15 TPH)	40.26 MT/hr 6.8 MT/hr= Total 1130 MTD	
	Flue gas velocity	12 m/sec	
	Total Ash generation (MTD)	22.58	
	Height of chimney (Sugar + cogen) 115 TPH (based on ash generation) i.e. 1.2 TPH	H=74 (0.73)$^{0.27}$= 67.7m Stack height provided= 70 m 3.5 m diameter	
	H_2S generation	0.2 %	
	SO_2 generation due to H_2S	kg/day	
	Boiler Capacity (Distillery Unit)	40 TPH @ 43 kg/ cm^2, 390 ^{o}C	
	Fuel Used	Spent wash- 12 MT/hr and Coal -5 MT/hr	
	Total Ash generation (MTD)	8.13	
	Flue gas velocity	12 m/sec	
	Height of chimney for distillery boiler of 40 TPH	H=14 (Q)$^{0.3}$=14 (306.6)$^{0.3}$ =78m Stack height provided= 81m 3.5 m diameter	
	APC measures for Boilers	ESP for Existing and Proposed	
9.	**Effluent Treatment Facilities**		
	Distillery Spent Wash (960 MTD) Sugar Unit	• Concentrated in MEE and CSW (60 brix) fired with coal in incineration boiler for 300 days • ETP Capacity (750 m^3/day) • Bio-oxidation and tertiary treatment	

		• CPU for excess condenser
	Disposal	Gardening/Plantation
10.	**Solid Waste** ETP Sludge Total Ash (Distillery + Sugar-cogen Boiler)	 86 kg/day 30.69 MT/day
11.	**Project Costs**	Distillery: Rs. 8695.00 lakhs Sugar: Rs. 5079.73 lakhs **Total Rs.:13,774.73 Lakhs**

5.3 Manufacturing Process

5.3.1 Molasses Based Distillery

Requirement of Machinery

Section	Main Instrument and Machineries
Fermentation	Molasses weighing system, Yeast vessels, air blower, nutrient tanks, decanter, centrifuge, clarifier, CO_2 scrubber, heat exchangers, fermenter
Distillation	Distillation columns (7 Nos.), re-boilers, condensers, heat exchangers
Power Plant	Boiler, Steam turbine, Chimney, ESP, Fuel and Fuel yards
Spent Wash Treatment	Evaporation, Incineration boiler
Auxiliaries Units	WTP, ETP, cooling Tower etc.
Bulk Storage	Molasses, Alcohol and Diesel
Compressed Air	instrumentation and servicing

Substrate (Feed) Preparation for Fermentation

Molasses is procured carefully with good contents. Molasses stored in a storage tank is first weighed in a tank with load cells so that accurate quantity can be fed to the fermentation section. The weighed molasses then transferred from tank to the diluter in fermentation section where it is diluted with water and fed to the fermenters or culture preparation vessels.

Yeast Propagation and Continuous Fermentation

In this process the culture containing highly efficient yeast strain is propagated in yeast culture vessel under aseptic conditions. The ready yeast seed is then transferred from culture vessel to fermenter. The sugar/glucose in media gets converted to alcohol in the fermenters operating on continuous cascade mode. CO2 gas liberated during reaction is contaminated with traces of alcohol vapors. It is sent to CO2 scrubber for recovery of alcohol. After fermentation, the sludge containing spent yeast is separated from the wash in a thickener consisting of settler cum decanter tank and then concentrated in a decanter centrifuge. The yeast sludge in the form of cake with 2.5 % solids is disposed for use as manure.

Multi-pressure Distillation

The distillation plant consists of multi pressure vacuum distillation and columns operate at different pressures to save steam. The plant operated with exhaust steam obtained from co-gen steam turbine. The distillation consists of following stages:

- Distillation of clarified fermenter product (wart) in distillation columns to separate aqueous alcohol (40 %) and spent wash.
- Rectification of aqueous alcohol to separate rectified spirit (RS) containing 95 % alcohol and spent lees.
- Dilution and rectification of rectified spirit to produce extra neutral alcohol (ENA).

The fermentation wash containing alcohol, non-fermentable solids and water is supplied to distillation to separate the alcohol and other impurities, as a continuous flow. The distillation system is designed for quality. The system details are as below:

The system consists of 7 columns, namely Analyzer Column, De-gassifier, Pre-rectifier Column, Rectification Column, Extraction Column, Recovery Column and Simmering Column. Wash is fed to de-gassifier cum analyzer column. CO_2 and other non-condensable gases are removed at the de-gassifier unit. Distillate containing 40 % alcohol from top of analyzer column is sent to RS column for further purification and concentration. Alcohol free aqueous solution containing non-fermentable matter is discharged as spent wash from the bottom of analyzer column. Dilute alcohol is concentrated in RS column from where distillate containing 95 % of alcohol is removed

as Rectified Spirit (RS) from top and aqueous waster containing trace impurities is discharged from bottom as effluent. In case of ENA (Extra Neutral Alcohol) production, the RS along with dilution water is sent to extraction column. Most of the high boiling impurities are removed from top of this column and from bottom aqueous alcohol is obtained. The latter is taken to ENA column, and from where 95 % alcohol is obtained as distillate. 95 % alcohol is further distilled in recovery column to remove low boiling impurities (mainly methanol) along with bottoms. ENA from top of purification is sent to storage tanks.

The alcohol with high boiling impurities (mainly aldehydes) removed from top of RS, extraction, rectifier and refining columns are taken to aldehyde column. Impure spirit is recovered from top of aldehyde column and the balance alcohol with moderate purity is recycled to RS column for further distillation. Low boiling alcohols such as propyl and amyl alcohol are removed from appropriate locations of the RS and ENA columns. These are concentrated in fusel oil columns and recovered as fusel oil.

Dehydration of RS to Anhydrous/Fuel grade Ethanol

There are various dehydration routs such as Azeotropic Distillation, Evaporation, Membrane Technology and Molecular sieve Technology. Environmentally best is selected. Rectified spirit is pumped by a feed pump to the dehydration plant. The rectified spirit containing 95 % alcohol and 5 % water will first pass through feed economizer, then through a vaporizer cum super heater which will convert the rectified spirit feed to superheated vapors. The superheated vapor will pass through a sieve column, which is already regenerated and pressurized to working pressure. All the water vapors present in vapor mixture are adsorbed in the column. Along with alcohol traces of alcohol are also adsorbed in the column. The anhydrous alcohol vapors free from water vapors exhausted from the column are duly condensed in the re-boiler at the recovery column and is further passed through feed economizer to preheat the incoming feed and then to a final product cooler. After saturation of sieve column with water, the flow will be shifted to the next sieve column, which is already regenerated and pressurized. After completion of dehydration cycle, the sieve column saturated with water is regenerated by evacuation of adsorbed water and alcohol. The evacuated vapors are condensed. The condensed mixture of alcohol and water is then fed to a recovery column. This sequence of adsorption and regeneration of sieve column continues. Flow diagram of Distillery process is given in **Fig 6**.

It is to note- worthy that:

- Rectified spirit feed is pretreated by product vapor
- Evaporator column gets energy from re-boiler
- Steam condensate is fed back to boiler
- Twin adsorbents beds, one in dehydration mode, other is regeneration mode
- Switching of beds by Automation

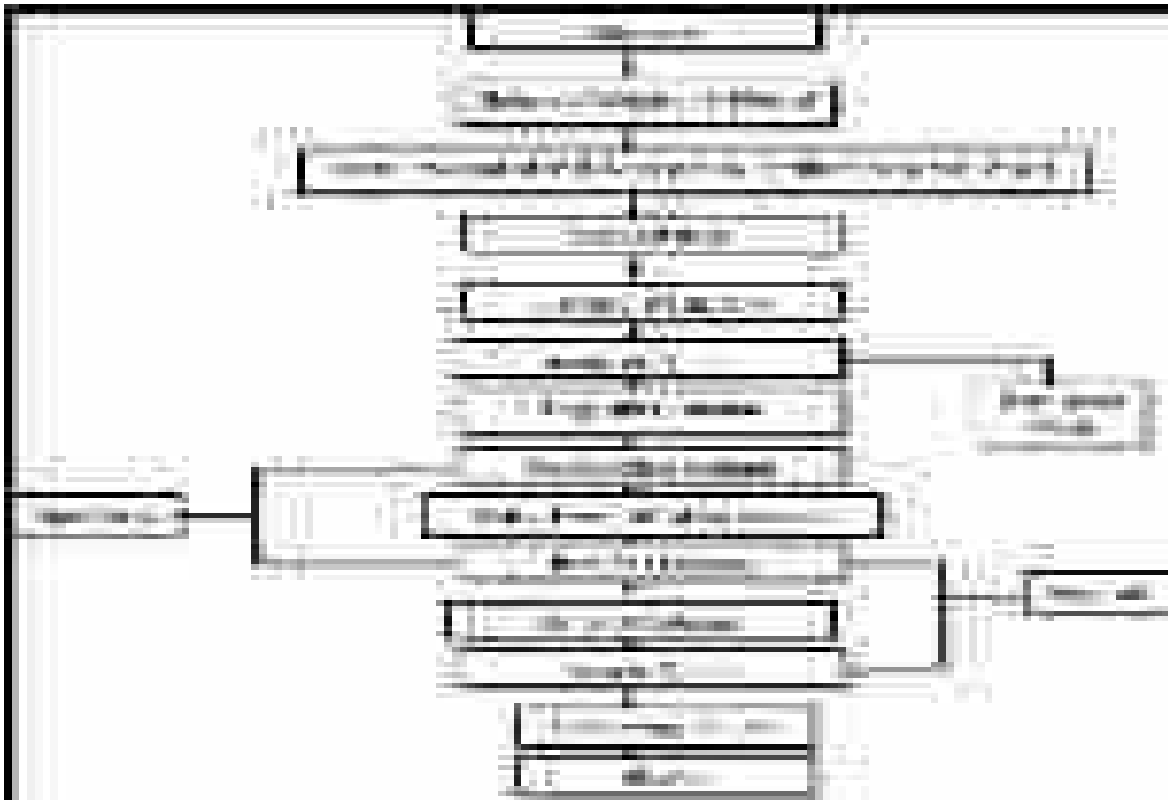

Fig. 6: Flow Diagram of Distillery Process

Storage Facilities

Alcohol and molasses storage facilities shall be provided as per the Rule of:

(i) Excise Department

(ii) Factory Inspectors

(iii) MOEF/SPCB

(iv) Were house will be provided for other requirement

(v) Sugar Godowns for finished products

Table 9: Storage Capacity for Molasses and Alcohol

Products	Particulars	Existing (BL)		Proposed (BL)	
Molasses	Storage Tank	9,500	2 Nos.	9500	2 Nos.
Alcohol	RS/ENS (Bulk Storage Tank)	740,000	4 Nos.	360,000	4 Nos.
	A.A. (Bulk Storage Tank)	-	-	90,000	1 Nos.
	I.S. (Bulk Storage Tank)	204,863	2 Nos.	90,000	1 Nos.
Note: There will be supporting attendant small capacity Tanks to holds R.S., E.N.A., A.A. and I.S. Receiver as also fusel oil and de-natured spirit					

5.3.2 Sugar Manufacturing Process

The manufacturing process of sugar unit and flow diagram is given below:

Most of the sugar factories in India follow double sulphitation process and produce plantation white sugar. The major unit operations are shown in **Fig. 7.**

(i) Extraction of juice	(ii) Clarification
(iii) Evaporation	(iv) Crystallization
(v) Centrifugation	

Extraction of Juice

The sugarcane is passed through devices like knives for cutting the stalks in to chips before being subjected to crushing in a milling tandem comprising 4 to 6 three roller mills. Fine preparation with its impact on final extraction is receiving special attention and shredders, particularly the fibroses gaining popularity. The mills are of modern design, being equipped with turbine drive, special feeding devices, efficient compound imbibitions system etc. In the best milling practice, more than 95% of the sugar in the cane goes into the juice, this percentage being called the sucrose extraction or more simply the extraction. A fibrous residue called bagasse; with a low sucrose content is produced about 25 to 30 % of cane, which contains 45 to 55% moisture.

Clarification

The dark-green juice from the mills is acidic (pH 4.5) and turbid, called raw juice or mixed juice. The mixed juice after being heated to 65 to 75 ^{0}C is treated with phosphoric acid, sulphur dioxide and milk of lime for removal of impurities in suspension in a

continuously working apparatus. The treated juice on boiling fed to continuous clarifier from which the clear juice is decanted while the settled impurities known as press mud is sent to the field as fertilizer. The clear juice goes to the evaporators without further treatment.

Evaporation

The clarified juice contains about 85 % water. About 75% of this water is evaporated in vacuum multiple effects consisting of a succeeding (generally four) of vacuum boiling cells arranged in series so that each succeeding body has higher vacuum. The vapours from the final body go to condenser. The syrup leaves the last body continuously with about 60% solids and 40% water

Crystallization

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. The growth of the crystals continues until the pan is full. Given a skilled sugar boiler (or adequate instrumentation) the original crystals can be grown without the formation of additional crystals, so that when the pan is just full, the crystals are all of desired size and the crystal and syrup form a dense mass known as “massecuite”. The “strike” is then discharged through a foot valve into a crystallizer.

Centrifugation

The massecuite from crystallizer is drawn in to 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. Continuous centrifuges may purge low grades. The mother liquor separated from commercial sugar is again sent to pan for boiling and re-crystallization. Three stages of re-crystallization are adopted to ensure maximum recovery of sugar in crystal form. The final molasses is sent out the factory as waste being unsuitable for recovery of sugar under commercial condition
from economical point of view.

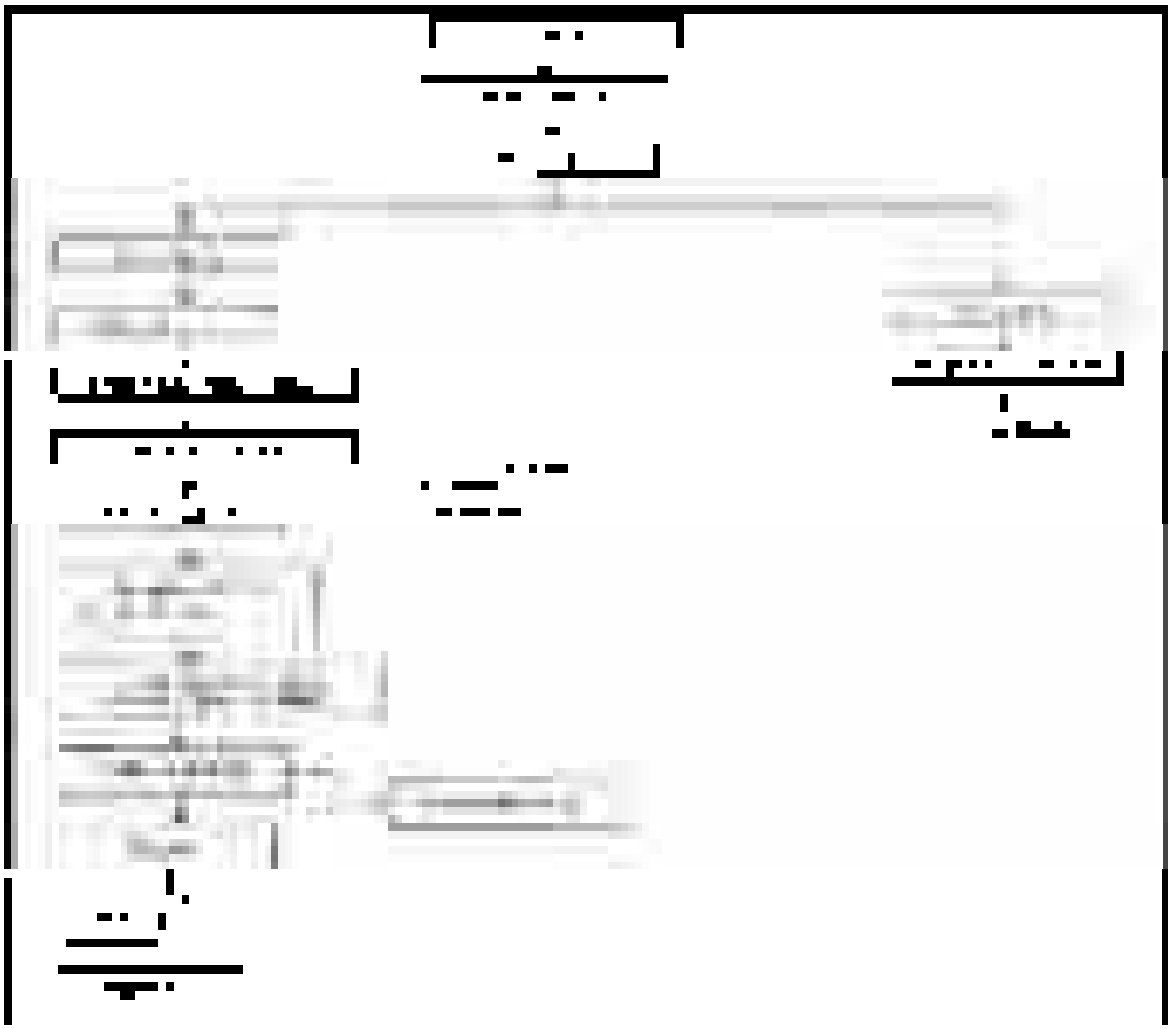

Fig. 7: Flow Diagram of Sugar Manufacturing Unit

6.0 Utilities

In addition to raw material requirement, utilities are also required as presented below:

6.1 Requirement of Steam and Power

Steam economy is achieved by employing multi-pressure distillation and multi-effect-evaporation (MEE) units and adopting heat recovery systems in the plant.

Power requirement need connected load 2000 KW, available through Government Electricity Board and co-gen power generation. Fuel will be used for power generation

are available bagasse, concentrated spent wash and coal. The distillery will be supported by 40 TPH high pressure boilers and sugar and co-gen supported by 100 TPH and 15 TPH boilers and its steam turbine as shown below:

Table 10: Requirement of Steam and Power

Particulars	Distillery Units			Sugar Co-gen Unit		
	Capacity (TPH)	Pressure (kg/cm^2)	Temp. (^0C)	Capacity (TPH)	Pressure (kg/cm^2)	Temp. (^0C)
Boiler	40 -	43 -	390 -	100 15	87 47	510 490
B.P. Steam Utilization	Distillation : 15 TPH Evaporation : 15 TPH (**Total 30 TPH**)			**-** **-** **Total 93 TPH**		
Power Generation	Captive			Captive		
Diesel Generators **Furnace Oil (kg/hr)**	**2 x 1010 kVA** (utilized only during power failure for essential services) **750**			**2 x 1010 kVA** (utilized only during power failure for essential services) **750**		

The steam turbine to be used in the project is extraction and condensation type. For sugar-cogen mill steam requirement is 93 TPH. 15 TPH for distillery and 15 TPH for evaporation (total 30 TPH) this size of steam requiring can be met by using boiler of 40 TPH for distillery. Power generation from the co-gen will be used internally and the excess power will be sold to grid. Although the company will be utilizing in-house power, still the company will have suitable DG sets in distillery and sugar units to safeguard any power failure situations.

Requirement of Fuels

Requirement of fuels are (i) Coal (ii) Spent Wash Concentrations (SWC), (iii) Bagasse. Total requirements of fuels and their characteristics are given below:

Table 11: Requirement of Fuels and its Characterizations

S. No.	Parameters	Coal	SWC	Bagasse
1.	Heat Value (GCV) (kcal/kg)	3800	1750	2200
2.	Sulfur content (% wt)	0.38	0.62	0.04
3.	Ash content (% wt)	38.66	18.66	20
4.	Steam/Fuel ratio (kg/kg)	40.08	2.35	2.2
5.	**Requirement of Fuel (T/day)**	**150**	**300**	**1176**

Energy Balance

Energy is provided by steam with appropriate pressure at 3.5 kg/cm^2 (g) and its temperature ranging from 127 ^{0}C to 148 ^{0}C (**Table 12**).

Table 12: Energy Balance

Section	Normal Operation (kg/hr)	Peak (kg/hr)	Pressure (kg/cm^2 (g)	Temperature (^{0}C)
Wash to RS Mode	6875	8250	3.5	147.9
Wash to ENA Mode	10625	12750	3.5	147.9
MSDH Plant	1375	1650	3.5	147.9
Fermentation Section	500	700	1.5	127.5
Evaporation Section	8600	9000	1.5	127.5

6.2 Water Requirement

Total water requirement is already available for sugar, co-gen and distillery units are about 2051 m^3/day and totally met from surface flow from Bhima River about 3.5 km. Source of water granted by Irrigation Department, Government of Maharashtra and Khadakwasla Dam Canal near the site the permission is available and earmarked for this industry and by recycling the waste water after suitable treatment. **(Refer Annexure –V)**

Table 13: Water Balance (m^3/day) for Sugar Industry

Particulars	Requirement	Losses	Effluent Generation	
			Sober	Moderate
Milling	105	10	-	95
Preparation of Sulfur & Lime solution	20	05	-	15
Process	575	25	-	550
Floor and vessel washing	30	05	-	25
Cooling	50	05	45	-
Total	**780**	**50**	**45**	**685**
	780	**780**		

Table 14: Water Balance (m^3/day) for Distillery Unit

Particulars	Requirement	Losses	Wastewater Generation	
			Quantity	Nature
Boiler Make up	41	9	32	Sober
Cooling Make up	150	100	50	Sober
Fermentation Feed Recycle Recycle	664 90 58 30 **(842)**	10	832	Recycle
Distillation	832	4	720 50 58 **(828)**	High BOD Moderate Recycle
CO_2 Scrubbing	30	-	30	Recycle
Floor and Vessel Washing	10	3	7	Moderate
		126	**947**	
	1073	**1073**		

In Put (Industrial)	m^3/day	Out put (Effluent)	m^3/day
Fresh water for Industry	895	Loss from industrial use	126
Moisture from Feed	90	Effluent Sobar in Nature	82
Internal Recycle	88	Effluent moderately polluted	57
		Effluent highly polluted spent wash	720
		Internal recycle	88
Total	**1073**	**Total**	**1073**

Internal recycling is condensed water, CO_2 scrubbing steam and spent lees. The industrial high BOD effluent is 720 m^3/day

- Input Water Sugar 780 + 1073 Distillery= 1853 m^3/day

The characteristics of this effluent stream are expected to be as below:

Table 15: Characteristic of Effluents

S. No.	Parameters	(C) Spent Wash	(A+B) Sobar and Moderate
1.	pH	4.0 – 4.5	5.5 – 6.5
2.	Temperature (^{0}C)	90 - 95	45 -85
3.	Colour	Dark brown	Faint
4.	Total solids (mg/l)	125000 - 137000	1300 – 1500
5.	BOD (mg/l)	50000 - 55000	500 - 700
6.	COD (mg/l)	120000 - 130000	1200 - 2000
7.	Quality (m^3/day)	720	139 – (82+57)

6.2.1 Water Requirement for Domestic Use

Total family staying in the premises are 172 @ 4 persons in a family therefore about 688 staff are staying in the plant premises. In addition to this water is needed for domestic use (workers, personnel hygiene and canteen/colony) greening drive and partly power plant. The recovered wastewater is treated and recycled. 93 m^3/day water is used as domestic for workers/hygiene and out of this effluent generation will be 75 m^3/day.

6.3 Building Materials

It will not be a heavy construction and majority is in fabrication from mild steel materials. The orientation is so kept as to balance nearly the cutting and filling. The construction and erection time will be of short duration and will be done in day time therefore labor camp is not necessary required.

6.4 Project Cost

Total cost for distillery units will be Rs. 8695.00 lakhs and for existing sugar mill is estimated to Rs. 3087.00 lakhs and additional Rs. 1992.73 lakhs for proposed mill. Therefore, total amount will be Rs. 13,774.73 lakhs as shown in **Table 16**.

Table 16: Project cost break-up for proposed Unit (Rs. in lakhs)

S. No.	Particulars	Distillery	Sugar	Total
1.	Land and site Development	10	-	10
2.	Civil works	435	75	510
3.	Plant and Machinery	7491	2772	10263
4.	Preliminary and Pre-operative expenses	357	145	502
5.	Contingencies	197	70	267
6.	Margin Money	20	25	45
7.	Miscellaneous and Fixed Asset	185	-	185
	Total	**8695**	**3,087**	**11,782**
	Additional	**-**	**1992.73**	**1992.73**
	Total	**8695**	**5079.73**	**13,774.73**

6.5 Manpower Requirement

S. No.	Manpower	Existing Plant	Proposed Plant	Total
1.	Staff	57	8	65
2.	Workers	320	14	334
3.	Contractual Labors	200	20	220
	Total	**577**	**42**	**619**

7.0 Environmental Management Plan

DSPL is an existing industry planning for expansion of Sugar from 6000 TCD to 7500 TCD and distillery from 90 KLPD to 120 KLPD in the same premises which have well established environmental management plan (EMP). The sugar and co-gen units and distillery plants utilize resources such as water, sugarcane, bagasse, molasses and press mud and discharges gaseous, liquid and solid waste products. Mitigation measures are incorporated in the project to protect environment against any harm. A comprehensive environmental management plan (EMP) is adopted consisting proposed pollution control measures and additional mitigation measures for abatement undesirable impacts. Environmental management plan is presented in **Fig. 8** and summary of measures indicated with zero pollution discharge as given below:

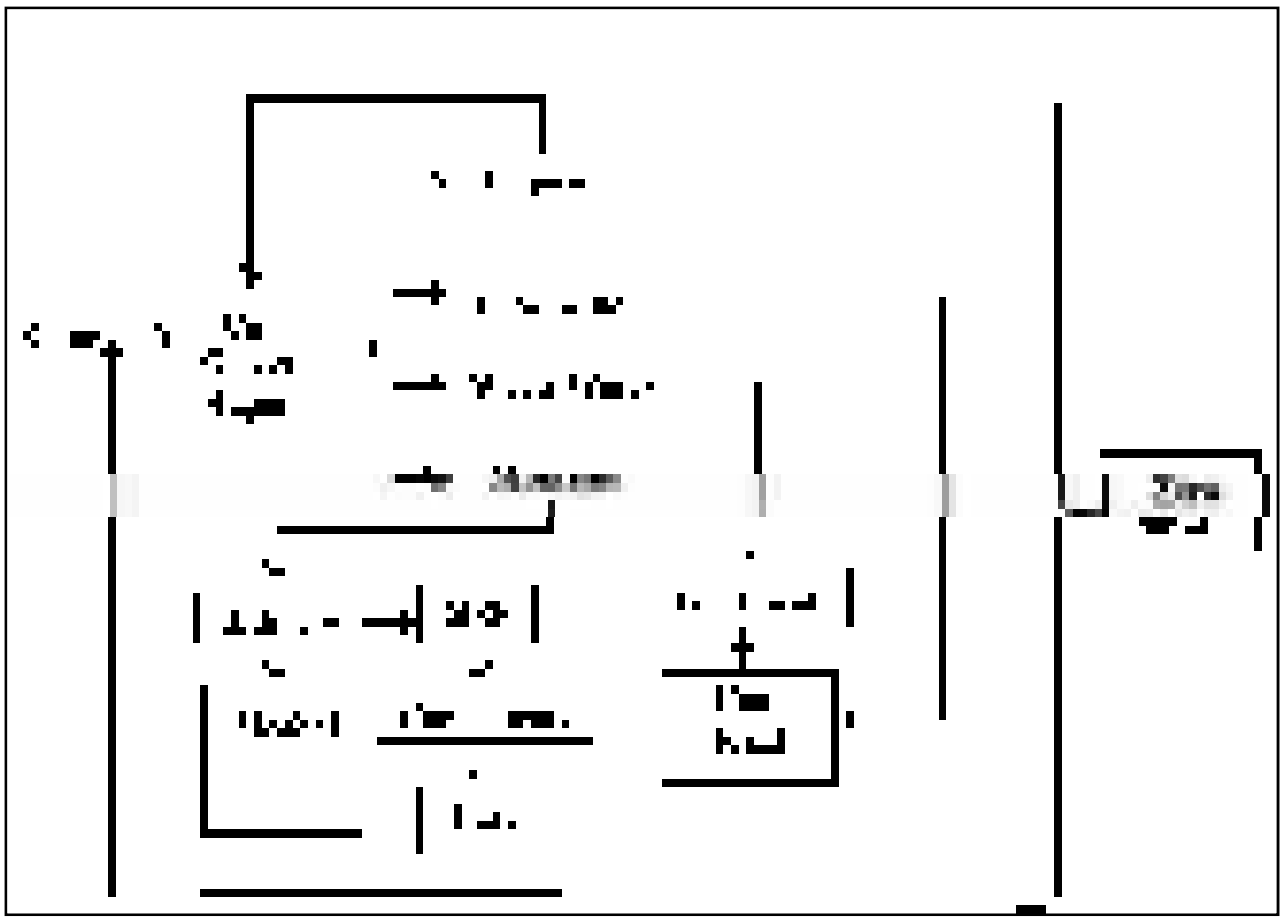

Fig.8: Flow Diagram for Environmental Management Plan: Distillery Expansion

Proposed ESP

The boiler will be equipped with high efficiency electro-static precipitator which will remove the suspended particulate as ash particles from the flue gas. The efficiency of the unit 1 co-gen boiler ESP is 99.2% and that of slop fired boiler will be 99.88% efficiency. The dust concentrations of the out fall of ESP of co-gen boiler will be 50mg/Nm^3 and that of slop fired co-gen boiler will be 100mg/Nm^3. There is a 40TPH dedicated boiler for distillery unit bases on coal and concentrated spent wash (CSW). The two boilers of 100 TPH and 15 TPH are serving sugar and co-gen unit and are selected with good features.

DG Set 1010KVA (2 No)

It is used only during emergency of power failure from the regular sources to run essential services for a limited period. A maximum utilization of this gen set is about

30 hours per month. Performance of this DG set will meet CPCB/MOEF specifications with regards to noise and emission. In addition, other attended efforts like water spraying, three plantation and covered storage etc. should be adopted wherever feasible and needed for pollution control and funds are also earmarked for this purpose.

- Green belt and greenery development in the factory premises. Total Plant Area is 1,94,210 m^2 and Green Belt will be developed in 33% of plot area about (64,000 m^2) area.
- Wastewater management as recycle and reuse by ETP treatment
- Paving and lying of roads, solid storage yards of ash etc
- Self monitoring system is established in the industry with manpower and facilities to ascertain the compliances of environmental norms and standards
- Personnel health care program, emergency management plan and safety management systems will be implemented in the proposed expansion project activities
- Operation and maintenance of pollution control methods
- Establishment of waste reduction measures
- The project is technically and financially viable, subject to the assumption made in this report found good.
- Fugitive Emission: Rubber wheel carts/tractors/trucks to bring in case , not filled high, side caddied, slow speed travelled, avoiding vibration en-route
- Internal roads paved leveled, no undulation, no sharp curve, slow speed
- No open storage bagasse, husk, and molasses involved, provided with closed go-down, wherever transmission line and steel tank for finished products
- Tree plantation on surrounding available area as barrier
- Bagasse where excess is bladed used during off season

7.1 Wastewater Management

- Operation of ETP should be started at least one month before starting of plant to achieve desired MLSS so as to meet the prescribed standards from day one of the operation of the plant
- Reduction of waste generation
- Plant should achieved zero discharge to inland water surface
- Plant should provide 15 days storage capacity for treated effluent to care for demand for irrigation
- Rainwater harvesting scheme will be adopted

7.1.1 Effluent Treatment Plant

(a) Sugar–Co-gen Unit

Effluent treatment plant is the process of removing contaminant from wastewater, including households' wastewater (sewage) and runoff (effluents). It includes physical, chemical and biological process to removal physical, chemical and biological contaminants. Its objectives are to produce an environmentally safe fluid wastewater stream (treated effluent) and a solid waste (treated sludge) suitable for disposal or reuse (usually as farm fertilizer). Total moderate effluent generation is 685 m^3/day and sober effluent 135m^3/day that will be treate 4d in 750 m^3/day capacity of ETP plant. **Fig. 9** gives an overview of a typical effluent treatment plant. The treatment trend is presented as below:

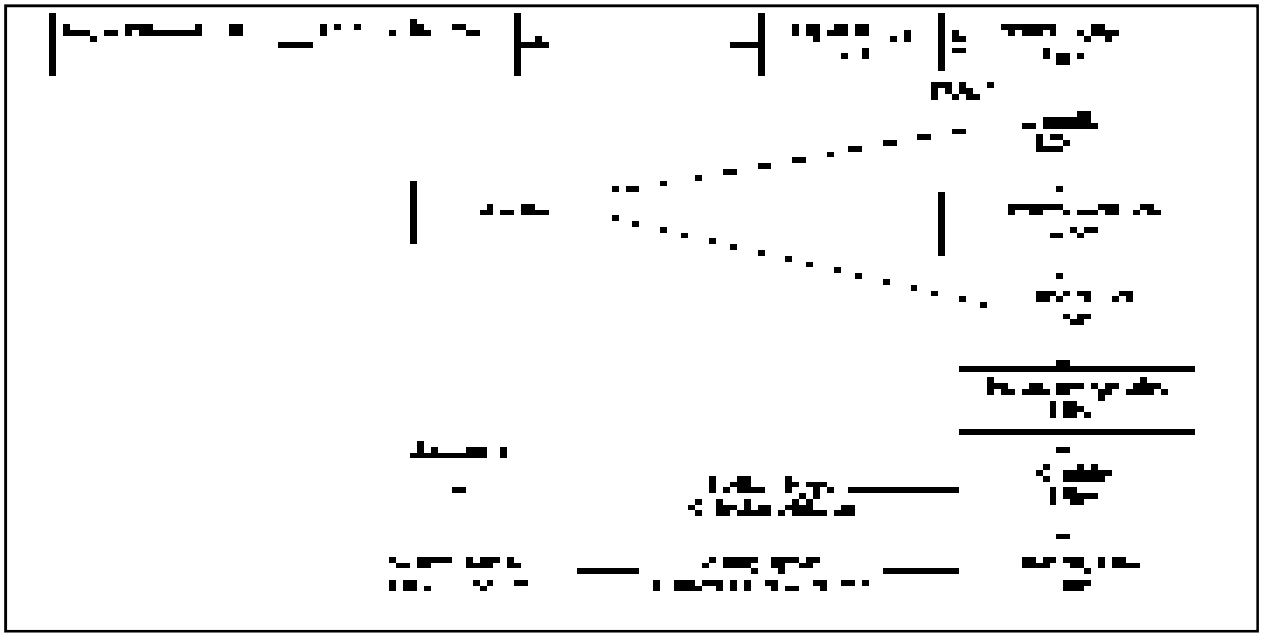

Fig. 9: Flow Diagram of Sugar ETP (750 m^3/day)

(b) Distillery Unit

Segregation

As MOEF desires, this industry is decided to bring the segregation principal in practice. Now the industrial wastewater stream are segregated first in 3 branches as (A) Sober (B) moderately polluted and (C) high BOD polluted effluent. The first two are then combine. It shall help in many ways for ease of treatment.

(a) Stream (A): Sober effluent 82 m^3/day physical treatment by bringing down the temperature to ambient and then joining to stream (B) as dilutants.

(b) Stream (B): Moderately polluted effluent of floor washing 7m^3/day and spent lees 50m^3/day (Total 57m^3/day) added to the stream (A) Sober effluent 82 m^3/day as equalization-cum-buffer, followed by aerobic treatment and tertiary treatment

(c) Stream (C): with high BOD spent wash 720 m^3/day (C-1) 360 m^3/day new 45 KLPD evaporation and concentrations as fuel working for 300 days

The steam required is provided with a pressure of 3.5 kg/cm^2 (g) and temperature 127^{0}C to 148 ^{0}C at normal rate of operation as 20,000 kg/hr is available

The summary of water and wastewater can be submitted as follows:

S. No.	Input	Effluent		Treatment
		Sober	Moderate	
Distillery Unit	1073	82	57	Equalization-cum-buffer, followed by aerobic treatment and tertiary treatment
Distillery MME	-	-	180	Concentration and evaporation
Distillery Concentration	-	-	276	
Sub-total	**1073**	**82**	**513**	
Total	**1073**	**595**		

The schematic of effluent (A and (B)

Sober, moderate effluent and concentration water 57+180+276= 513 m^3/day

7.2 Emission Control

In order to control emission, the plant should provide ESP high efficiency (98%) scrubber to comply with the standards for particulate matter emission to less than 50 mg/Nm^3.

Mitigation Measures

Air Pollution Control

Sources of air pollution are: Boiler, Stack emission, DG Set emission and vehicular movement. Details of air pollution control measures presented in **Table 17**.

Table 17: Distillery and Sugar and Co-gen Plant

S. No.	Particulars	Distillery Unit	Sugar and Co-gen Unit
1.	Existing Boiler Capacity	40 TPH	100 TPH and 15 TPH
2.	Fuel used	Coal & Spent wash	Bagasse
3.	Required Fuel Quantity	Coal 5MT/hr CSW-12MT/hr	40.26 MT/hr 6.8 MT/hr
	Sulphur (%) at maximum	Coal-0.38; CSW-0.62	0.04
6.	Fuel Gas velocity	12.0 m/sec	12.0 m/sec
7.	Fuel gas flow rate		
8.	Feel gas temperature (^{0}C)	390(^{0}C)	510 (^{0}C) and 490(^{0}C)
9.	SO_2 Emission Rate		
10.	Height of the stack (CPCB) norms	H=14 $(306.6)^{0.3}$= 78	H=74 $(0.73)^{0.27}$=67.7
11.	Stack diameter (m)	3.5	3.5
12.	Existing Stack Height (m)	81	70
Ash Emission			
13.	Total Ash emission (MTD)	8.13	22.56
14.	Fly Ash emission (MTD)	6.50	18.05
15.	Bottom Ash emission (MTD)	1.63	4.51

The critical PM concentrations in the flue gas will be less than 50mg/Nm^3. Majority of the particulates (60-70%) will have size in the range of 2.10 um. The emission is expected to have temperatures in the range of 140-150 ^{0}C.

- DSPL has installed the wet scrubber for control of particulate emission
- DSPL installed Electrostatic Precipitator (ESP) of 98 % efficiency for distillery and sugar-cogen units
- The existing (distillery and sugar-cogen) power plant will cause environmental pollution in the following forms:
- Particulate matter emission from steam boiler
- Dust emission from un-paved access roads
- The elements polluting the ambient air that are discharged from the cogen plants that are dust, fly ash, NOx, SO_2 in flue gases
- There are the provision of ESP which will reduce dust emission from the plant to the level <50mg/Nm^3
- There is a provision of MS Chimney/stacks of 70m and 81m height will be considered for Travelling Grate Steam Generator of 100 TPH 87 ata steam pressure, 15 TPH, 47 ata and 40 TPH 43 ata and 510^{0}C, 490^{0}C and 390 ^{0}C temperature respectively at inlet of ID Fan
- The air quality monitoring will also be undertaken to ensure that the dust pollution levels is within limits
- Adequate sampling opening will be provided in the stack. The sampling at the stack will be done once in six months to check on performance of ESP

Mitigation Measures

- ESP to capture ash due to burning of bagasse/coal/CSW as boiler fuel
- Providing well designed Chimney with adequate height for proper dispersion of pollutants

- Providing road surface with black toping to avoid dust emission due to transportation
- Dust catchers to collect sugar from sugar graders
- Periodic monitoring of stack and ambient air quality to keep a check on pollution parameters as per the directives of State Pollution Control Boards

7.3 Water Pollution Control

Spent Wash Treatment by MEE:

The spent wash treatment use for the proposed expansion of distillery will be concentrated in multi-effect evaporation (MEE) plant followed by incineration with CPU.

Effluent Treatment Plant

- Existing 6000 TCD sugar plant has a ETP of 700 m^3/day capacity for the treatment of effluent generated from the sugar and co-gen plants
- The existing ETP plant will be upgraded to a capacity of 750 m^3/day with advance treatment technology
- ETP sludge (85 kg/day) will be used for land filling
- Treated water will be used for gardening and flushing purposes

Domestic Wastewater Treatment

- DSPL will construct a sewage treatment plant with latest technology for the treatment of domestic sewage
- Treated sewage will be used in gardening and plantation purposes
- The plant should ensure that the treated effluent quality shall comply with the norms set by the pollution control boards

Mitigation Measures

The project consultant recommends the following measures to mitigate water pollution as below:

- Process wastewater from the plant will be treated in an effluent treatment plant.
- The treated options consisting as:
- Equalization tank for maintaining the flow and load
- Sedimentation tank for removal of suspended solids
- Biological treatment consisting of extended aeration followed by settling tank or an-aerobic lagoons, aerobic lagoon based on the imperviousness of soil in the area
- Disinfection by chlorination or ultra-filtration as per the recommendation of PCB
- Sludge generated can be provided with sludge thickener followed by sludge drying beds
- Treated effluent from the ETP can be used for irrigation or discharged to sewer or to the CETP if available in the area as per the recommendations of SPCB
- Monitoring of inlet and outlet effluent quality from ETP to keep a check on pollution parameters
- Comprehensive water management plan has been planned with the site wide strategies for minimizing water use efficiencies, minimizing wastewater discharge and encouraging a policy of reuse and recycle to control a plants water footprint
- The effluent will then be pumped into the effluent treatment ponds which form a part of the power plants effluent disposal system
- The rejects from WTP which will be used for clean purposes in the project activities and also for plantation.

7.4 Noise Pollution Management

- The existing cogeneration power plant cause noise pollution due to presence of centrifugal pumps, motors, DG sets, EOT Cranes etc
- The consultants believe that noise pollution can be controlled to a considerable extent by providing proper maintenance to equipment and providing suitable acoustic enclosure to DG set. There is a provision of acoustic enclosure to DG sets
- Providing thick green belt (33%) area in and around the plant premises that can attenuate noise pollution
- The plant should ensure that the ambient noise quality standards set by PCB as indicated below:

Area Code	Category of Zone/Area	Limit in dB(A) Leq	
		Day Time	Night Time
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Area	50	40

7.5 Solid Waste Management

The plant will generate solid waste in the following forms:

- Press mud generation: existing 240 MTD and expansion 300 MTD
- Press mud is solid in nature, acts as soil conditioners will be sold immediately to farmers for using as manure
- Fly ash and bottom ash 6.50MTD and 1.63 MTD respectively will be generated from distillery cogen unit will be sold to brick manufacturers.
- While fly ash 18.05 MTD and bottom 4.51 MTD will be generated from sugar–cogen units will be sold to brick manufactures

- Sludge from ETP (85 kg/day) can also be sent to land fill or as per the directions of PCB

- Establishment of waste reduction measures for other waste generation will be adopted as shown below:

Particulars	Quantity	Compositions	Uses/Disposal
Canteen	20 m^3/day	Organic	Own Garden
Colony	4 m^3/day	Mixed	Own Garden
Office	2m^3/day	Non-hazardous	Sales
Parking section	1 m^3/day	Non-hazardous	Sales
ETP sludge	85 kg/day	Organic-Non-hazardous	On land
Yeast sludge	10 kg/day	Organic-Non-hazardous	On greenbelt
Ash	47 T/day	Taker available	Sales
Lube Oil	25 kg/day	In season	Carts

7.6 Flora and Fauna

- **Fauna**: Most dominant plant species found in this area are *Bogainvelia glabra, Casuriana equisetifolia, Galphamia gluca, Lantena camera, Accalifa wilkesiana, Bahunia, blakena, Caesolpinea sankasur, Tagar regular, Cassia biflora, Azadirachta indica* (Neem), Ficus black, Canna yellow, Hippestrum hybrid, *Stachisterpheta indica*, Babhul, Pals, Pimple, Adulsa, Lajalu, Nirgudi, Kaju, Ashoka, Bor, Chinch, Sitafa, Tantni, Tarwad, Mango, Gulmohar, Nilgiri, Bel, etc. The common grasses found in the area are Lemon grass, Marvel, Kusali, Kunda and Goshya

- **Fauna**: The common fauna found in the region are Jackal, Sheal, Hyena, wild cat etc. The herbivorous animals commonly found are Indian Gazella, monkey, Dear. Animal such as the Here, Khargosh, Parempine are also found in the area. Among the birds the partridges, Titer, Peter, pigeons are found in some varieties of ducks, Kingfisher etc. and some other water birds found near water bodies. There is endangered flora and fauna or rare species plant or animals existent at this location

- Adequate environment protection systems will be put in place for the treatment of all liquid, solid and gaseous discharges from the proposed plant to achieve the required emission levels well within the permissible limits of SPCB
- As a result there shall be no adverse impacts on either the air or water quality in and around the sugar-cogen and distillery complexes
- Green drive provide a measure of air pollution mitigation, fugitive dust control, shed for men and bullocks, cooler absorbance, adsorption of green house gases, utilization of NPK of wastewater, noise barrier and evaporation prevention etc.
- Bio-diversity: trees, shrubs, dwarf trees and vegetation vovers/lawns is proposed. For suitable biodiversity we purpose the variety of species such as Mango, Ashok, Wad, Coconut, Nilgiri, Sitafal, Badam, Gulmohar, Pipal, Chinch, Umbar, Babhul, Santra/Mosambi, Papaya, Leman, Jamb, Sag, Aavala
- Greenbelt already developed with 43,570 plantation and proposed for implementation more plantation in the near future during this expansion
- Action plan for greenbelt is based on CPCB guidelines in 33% of plant area
- Layout maps indicating existing units as well as proposed units indicating greenbelt area of diverse plant species. **Fig. 10** represents dense green belt development around the plant area.

.

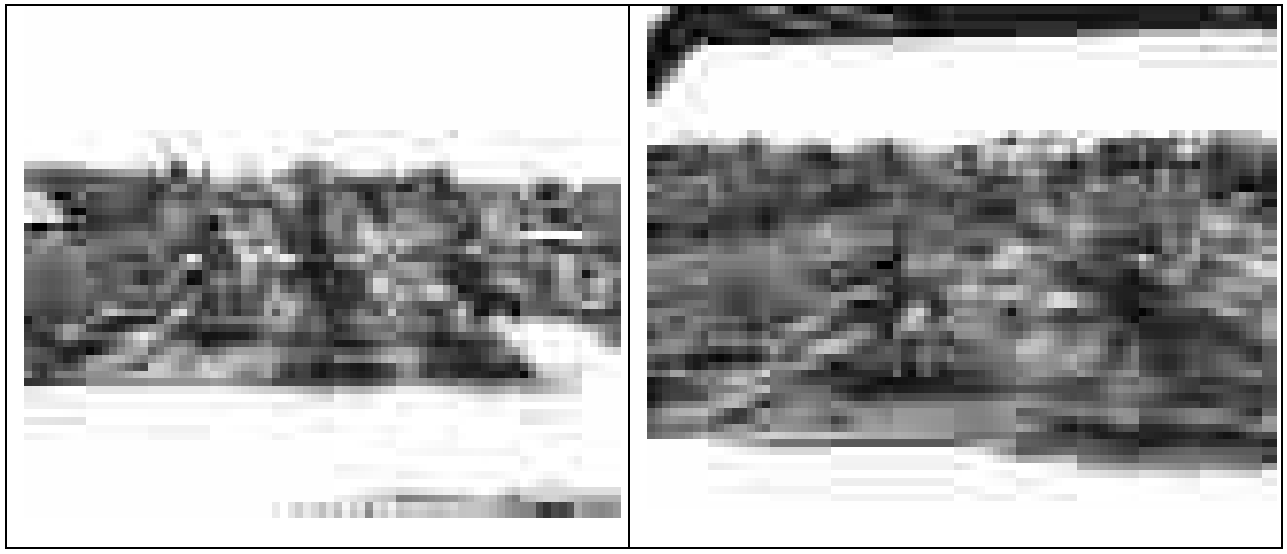

Fig.10: Green Belt Development in and around the Industry

7.7 Budgets for Implementation of Environmental Management Plan

For environmental management plan and environmental care, funds are already provided for existing units. Now considering expansion of sugar and distillery a total of Rs. 52.41Cr is earmarked as shown in Table below:

Table 18: Budget for EMP

S. No.	Environmental Protection Measures	Capital Cost (Rs. Cr)	Recurring Cost/annum (Rs. Cr.)
1.	Emission Control Engineering	12.00	3.00
2.	Water and Wastewater Management	25.00	4.50
3.	Solid Waste Management	9.00	1.50
4.	Green Belt Development	3.00	0.90
5.	Monitoring	1.01	0.54
6.	Environmental Cell and PR	0.50	0.50
7.	Rain Water Harvesting, Safety and security	1.90	0.30
	Total	**52.41**	**11.24**

In addition to the above, for occupational health and incidental additional funds are reserved at Rs. 5.0 Cr. Thus, total funds provided and earmarked as environmental management funds will be Rs. 57.41 Cr.

7.8 Budgets for CSR Activities

The new company rules of CSR will be homogenized with this ToR that at least 5% of the total cost of the project shall be earmarked towards the Enterprise Social Commitment based on public hearing issues and item-wise details along with time bound action plan accordingly will be planned. Total cost of the proposed project (distillery and Sugar) is worked out is Rs. 135.75 Cr. Total capital cost and recurring cost/annum for environmental pollution control measures comes to respectively Rs. 57.41 Cr and 11.24 Cr. About 5% of the capital cost will be earmarked for CSR activities such as education, road development, drip irrigation, rainwater harvesting, plantation; health program etc with approximate amount will be about Rs. 6.78 Cr. The amount will be used for the development of education, Rural roads, drip irrigation, Rainwater harvesting, plantation drive, health program, organic farming such as

supply of bio-fertilizer, bio-compost at subsidized rates to the farmers and cane growers.

8.0 Project Benefits

- The industry on expansion will provide direct and indirect employment to many local rural people
- The project will a boon as power will be fed to grid for other users as power deficit state of Maharashtra
- This industry activity will help in improving the socio-economic benefits like communication, education, infrastructure, employment etc.
- Proposed expansion project shall definitely improve the environment of surrounding areas.
- Proposed integrated sugar complexes with distillery expansion will enable sugar industry and cane growers to earn additional revenue. This will be a big boost for substantial increase in cane area.
- Besides direct employment, during plant installation many local people are engaged by various contractors executing the plant jobs. Here also people are properly trained and deployed for various jobs. By this, people once trained for particular job, will certainly get opportunity in future for similar jobs.

8.1 Proposed Infrastructure

- Residential area (172 flats) for factory staff will be provided
- Green belt : 33% of open area will be developed as green belt
- Social infrastructure: Residential community center, play ground will be constructed.
- Location is in Alegaon - village, Daound - Taluka , Pune - District in Maharashtra
- Drinking water management: Through pipeline from Bhima River

8.2 Rehabilitation and Resettlement

The project site is fully in possession over the years. This is a working factory since long. The present proposal is only for expansion and diversification. Thus, no

Rehabilitation or Resettlement issues are any more involved with no human settlement.

8.3 Analysis of Proposal

a. Project expansion for 90 KLPD to 120 KLPD molasses based distillery is classified under schedule of activities 5 (g) Category "A" and expansion of sugar 6000 to 7500 TCD is classified under schedule of activity 5(j) falls under category "B" and will require environmental clearance from MoEFCC, New Delhi.

b. Existing cogeneration plant 18 MW is more than the threshold limit specified in EIA Notification, hence environmental clearance is required, but it is already granted EC for this cogeneration plant along with interlinked projects

9.0 Scope of the Study

The purpose of EIA study is to determine as precisely as possible, within the present limits of knowledge and expertise, the likely environmental impacts of the proposed activities. The objective is to establish a clean unit with minimum waste discharge. Feasibility of reuse and recycle of waste generated from the project will be explored. The ToR allotted for the activity by MOEFCC shall be followed.

The study area is covered in 10km radius around the proposed project site. The EIA procedure as given in the Notification SO 1533 dated 14 September, 2006 will be followed as below:

The present lands are already non-agriculture and have a NOC from the District collector for use in industrial purposes. The raw material requirement, water requirement and uses of water and wastewater generation, process details, technology, storage facilities etc taken in to consideration as this is an existing industry

9.1 Air Environment

- Collection of Ambient Air Quality (AAQ) monitoring for three months except monsoon on air pollutants (PM_{10}, $PM_{2.5}$, SO_2, NOx) on 24 hourly basis, twice a week, from 8 sampling station and computation of mean, minimum, maximum,

98th percentile values as per CPCB guidelines for AAQM: NAAQS/25/2009-16 November, 2009

- CO monitoring will be done for one hour average time twice a week in a season
- The monitoring locations will be located in predominant downwind direction where maximum significant ground level concentrations from the project are anticipated
- Monitoring locations will be established inside the plant area, in the adjacent villages and also in the upwind direction as well as downwind direction with respect to the proposed project
- Quantification of air pollution load from existing as well as proposed project
- Potential environmental impacts have been assessed qualitatively and quantitatively
- The changes in the quality of environment have been predicted using Industrial Source Complex-Short Term-3(ISCST-3) Model
- The isopleths have been drawn on the location map clearly showing the sensitive targets and impacts due to proposed activities

9.1.1 Meteorology

- Meteorological data for wind speed, wind direction, relative humidity, rainfall and ambient temperature will be collected from the project site
- Continuous monitoring will be carried out at project site to collect primary data
- Readings will be recorded on hourly basis for one full season
- Historical met data from Indian Meteorological (IMD) has been obtained to assess the climatic trends
- Meteorological parameters measurement for wind velocity, cloudiness, and stability characteristics of atmosphere shall be asses

9.2 Noise Environment

- Inventory of noise sources (day time and night time) at 8 locations
- Prediction of noise levels due to project activity

- Occupational exposure and exposure to public to noise levels
- Development noise barriers to attenuate noise levels
- Measures of occupational safety from noise pollution

9.3 Water Environment

- Surface and groundwater sampling locations within study area were identified based on drainage pattern, water utilization and locations of bore wells/ dug wells etc
- Groundwater quality of the villages around factory has been analyzed
- Parameters recommended by CPCB/IS 10500 have been analyzed following the Standard Methods (APHA)
- Water sampling has been done at 8 locations (surface and Ground) during study period
- Physico-chemical (including heavy metals/toxicants), biological (phytoplankton and zooplankton) and bacteriological analysis of all surface and groundwater samples
- Physico-chemical analysis of ETP effluents samples
- Water Balance: uptake, use and reuse, wastewater generation and disposal shall be provided
- Wastewater treatment methods for sugar, co-gen and distillery and their effectiveness shall be provided in details
- Procedures proposed to ensure zero discharge from ETP shall be provided
- Details of rivers/ stream/ or groundwater sources from where it is proposed to be lifted / pumped etc have been provided
- Availability of water and impact on other uses on account of water drawl for the activity will be assessed using historical flow data of stream
- Rainwater harvesting strategies within the project premises will be suggested as a measure to augment the available groundwater resources

9.4 Soil and Land Environment

- Soil samples collection from agriculture field at 8 locations in 10 km radius that are likely to be impacted from the project related activities
- Soil quality analysis to be done for its structure, moisture, organic matter, conductivity. pH, bulk density, water holding capacity and NPK
- Physico-chemical analysis of soil samples as per CPCB guidelines
- Estimation of fertility status of the soil
- Microbiological analysis, sodium adsoption ratio (SAR), cataion exchange capacity
- Collect information on ecological sensitive locations within study area
- Study of Land use pattern of the area from satellite image
- Various physiographic locations of landforms as per survey of India map
- Satellite imagery of the area to establish latest landforms of the study area will be provided from Google Earth/Wikipedia

9.5 Biological Environment

- Study type and area of the forest, checking sensitive ecosystems and its distance from the project site
- Biodiversity (aquatic and terrestrial) field survey shall be done to list flora, fauna (wildlife), birds, domestic animals, amphibians and reptiles
- Listing of flora and fauna will be carried out by referring to the published documents for Forest/wildlife Department and observations recorded by the FAE during the field visits
- Rare and endangered species of flora and fauna shall be in focus
- Details of agriculture, cropping pattern, crops, productivity, horticultural gardens, social forestry, plantations in the area shall be obtained
- Greenery development plan will be prepared to enhance the aesthetic quality of the environment. The plan will be concentrate on measures that will be helpful in attenuating air and noise pollution levels from the project activities

- CPCB guideline will be followed to design the green belt. Indigenous species and those having long-term economic value will be considered for greenbelt development. 33% of the project area will be reserved for developing the green belt, landscaping gardening and lawn preparation.

9.6 Socio-economic Environment

- Baseline information will be collected through secondary sources, mainly District Statistics Handbook/Tehsildars office: Data on population distribution, occupational pattern, agriculture, and cropping pattern, educational facilities, health care facilities, literacy rate, infrastructure facilities, etc will be collected
- Demographic data will be collected regarding human settlement, health status of the community, existing infrastructural facilities for social welfare including sources of livelihood, job opportunities, safety and security of workers and surrounding populations
- Study of socio-economic profile of the people around study area
- Socio-cultural life, status of women, children, youth, identifying traditional skills generally available
- Obtain people's perception of the proposed developmental activities
- Estimation of Quality of Life (QoL)
- Occupational Health: Survey of existing prevalent disease and facilities for treatment
- Social impact assessment will be carried out by assessing the various developmental potential of the proposed project in the field of employment generation, improvement in physical and social infrastructure base

9.7 Risk Assessment and Mitigation Measures

- For the safe operation of the proposed activities, following the risks management plans have been identifies
- Prevention and mitigation of fires and possibility of explosion in plant equipment

- Action plan for possible emergency situations with reference to offsite DMP will be established
- Based on standards procedures prescribed by the National Safety Council and provisions mentioned in the Factories Act, occupational health and safety aspects of the project will be identified
- Risk assessment study has been undertaken and onsite disaster management plan will be prepared to tackle any accident that may occur due to proposed activities
- Potential hazards that may arise out of storage of hazardous chemicals/materials or due to operation of various process have been systematically identified using standard hazard identification procedures
- Maximum credible accident scenario has been considered for consequences analysis

9.8 Environmental Management Plan (EMP)

- Based on baseline data on different environmental components, prediction and evaluation of impacts, appropriate strategies would be formulated under each environmental components for minimization of adverse impacts of the proposed activities
- EMP has been prepared to maintain and enhance the environmental quality in and around the project area
- Wherever the quality of environment is expected to deteriorate beyond acceptable limits, additional strategies have been suggested. Such strategies includes wastewater treatment and reuse, more efficient air pollution control devices, noise reduction measures and additional thrust of ash utilization
- The EMP will earmark specific staff, instruments and finances for routine environmental management as well as collection, collation and examination of various environmental data
- Necessary administrative measures have been incorporated in the EMP to achieve the above objectives

- All environmental concerns directly related to the project activity, as address by the public, state Administration and NGO during public hearing process have been addressed in the final EIA report along with the commitments of the project promoter

9.9 Post-project Environmental Quality Monitoring Plan

- A post project monitoring plan has been suggested to monitor the changes in the environmental quality after implementation of the project
- Methods to examine the effectiveness of adopted EMP measures and to enable the project authorities to take necessary actions to mitigate the impacts
- An environmental quality monitoring plan has been delineated under each environmental components
- Reduction of adverse environmental impacts
- Improvement of environmental quality of the surrounding area
- Waste minimization, reuse and resource recovery
- Waste segregation to make the treatment and disposal cost-effective
- Establish proper monitoring mechanism with adequate infrastructure and manpower
- DSPL will ensure effectiveness of pollution control measures will be ascertained by systematic monitoring of discharges at factory and receiving levels
- Environmental monitoring cell (EMC) consisting of Departmental Heads will be created to effectively manage the environmental activities in the existing plant and proposed expansion
- Environment department will be formed with environmental experts, laboratory chemist, and operators to implement and operate pollution control and environmental protection measures
- Third party monitoring will be carried out to double check effectiveness and mitigation measures

- Proponent analysis report, third party report will be collaborated with statutory body, so that results are in line with standards all time

9.10 Monitoring Facilities and Schedule

- The laboratory will be established with manpower and facilities to analyze water, wastewater etc, stack emission, ambient air quality monitoring will be outsources
- The parameters monitored will be temperature, PM_{10}, $PM_{2.5}$, NOx, SO_2, CO, HC for air quality monitoring parameters
- Analysis is also carried out by competent third party for cross checking
- The quality of discharges including wastewater, flue gases and the receiving bodies such as ambient air, water, surface water, ground water, and soil will be monitored for the desired parameters
- Sampling locations and post project monitoring schedule have been workout

9.11 Environmental Records

- Environment department will maintained log sheets and manual for operation and maintenance of pollution control and related facilities
- Progress report and statutory records as per environmental acts will also be maintained
- DSPL is an existing industry planning expansion of sugar and distillery units and they have well established environmental management plan (EMP)
- A comprehensive environmental management plan is adopted consisting of proposed pollution control measures for abatement undesirable impacts

10. 0 Conclusions

- The waste is bagasse produced in own sugar mill will be used as fuel for boilers
- The waste molasses is the by-product of sugar industry will be used in distillery industry for production of alcohol in the form of RS/ENS
- This industry is agro-industry, eco-friendly and therefore does not have adverse impacts on the quality of land, water, air and ecosystem

- The industry will take all necessary preventive measures to mitigate even the small effects which may be caused various industrial activities
- The concept of "3R" i.e. Reduce, Recycle and Reuse is proposed in the industry. This will results in reducing the water, solid waste and air pollutants discharges in to the environment
- The industry has adopted an effective environmental management system and environmental management plan to protect the environment
- The industry has given due priority for 33% greenbelt development within and around the factory premises
- In the vicinity of the factory there are no protected forests, sanctuary, or any exotic flora and endangered fauna
- Therefore, the proposed expansion will not have adverse effect on environment or the ecosystem.