

Executive Summary

Chapter 1: Introduction

- a) M/s Loknete Baburao Patil Agro Industries Ltd., acronymic [LBAPIL], is a presently became one of the major industry in the area. LBPAIL is majorly in Manufacturing Sugar. LBPAIL is established in the year 2002 by Founder chairman Hon. Shri Rajan Baburao Patil. LBAPIL is contributing to change the Social & economic environment of the area.
- b) The proposed Expansion of Sugar from 4000 TCD to 5500 TCD, Co-gen from 14.5 MW to 24.5 MW and molasses based distillery of 30 KLPD to 60 KLPD at Laxminagar, Village-Angar, Tehsil-Mohol, District-Solapur (MH). The plot admeasures of proposed area is about 660000 sqm and there is no change in land use pattern. The expansion project will be done within the existing premises.
- c) It has excellent communication facilities & is connected by rail & road ways. This place is easily accessible for transportation of raw material. The notification no. S.O. 1533 promulgated on 14th September 2006 have covered these type of industries under its entry 1(d), 5(g) & 5(j). It is stated that captive power plant, Distillery & Sugar processing industry respectively. Standard TOR issued by the MoEF&CC vide Letter No. J-11011/120/2017-IA II (I) dated 19th July 2018.
- d) LBAPIL has retained the services of *M/s sd engineering services pvt. ltd.* as an environmental consultant for assessing the impact of the Industry on various environmental parameters in the study area and to prepare EIA report and Environment Management Plan (EMP).
- e) **Importance & Justification for Implementation of the Project**
 - i. As per the increase in population demand in the Market for sugar and power always prevail. As far as the products like sugar, power and alcohol are concerned; there is a huge gap in our country in demand and supply. Requirement of alcohol and Sugar globally is always be there and there is a huge potential for these products in global market. Around 30-40 % finished goods can be exported to the Regulated and non-regulated international Market.
 - ii. The potential release during manufacturing Air, Liquid Waste and solid waste have been taken into consideration, while designing the control technologies. The R&D efforts will be taken to reduce emissions and to ensure minimum use of raw material requirements. Optimum process conditions in each process will be ensured to minimize the environmental pollution.
 - iii. The project creates direct & indirect employment opportunities to the local people, from the nearby villages depending upon skilled & un-skilled man-power available and /or by imparting training in the required field. Total direct employment is around 36 people. Apart from direct employment, there is substantial indirect employment to the people giving support services in various fields. It enhances the earnings due to various direct or indirect businesses in the areas.

Chapter 2: Project Description

a) Location of Project:

- i. The geographical location of the project is 17°52'18.95"N Latitude & 75°35'23.13"E Longitude with an elevation of 498 m above mean sea level. The authority has 660000 sqm of land. Industry has earmarked 22640 sqm as Build-up Area, 24232 sqm as ware storage area, 49405 sqm as road area, 404 sqm as parking area and 191725 sqm as existing green belt area and 26075 sqm for green belt development.
- ii. This place is easily accessible for transportation of raw material & finished products. Local authority provided all infrastructures like Electrical power, continuous water supply, internal road network, external approach road, etc. The basic raw materials Raw Materials are easily available in the farms surrounding factory. All raw materials shall be transported by road to the site. Raw materials will be stored in dedicated storages areas at the project site.
- iii. The plant will house the various machineries and equipment required for production of sugar, cogen plant and distillery plant, like injection Pumps, condensers, evaporators, Centrifuge, Crystallizer, Melter, ETP, etc.

b) Manufacturing Process:

i. Sugar:

- Harvested cane transport to the factory & where cane weighing is done on Weigh Bridge.
- Cane carrier & Cane kicker can help for upcoming process.
- In fibrizor the cane is cut in fine pieces to make possible juice.
- Then in four mill tandem, cane is crushed in three rollers to get maximum juice.
- After crushing Raw juice is heated at 35°C & up to 70°C.
- Then sulphitation process done with adding the milk of lime as well as SO₂ is passed through juice. Sulphited juice again heated up to 102° C to 103°C.
- After that the scum settled through the Rapi Dorr & then Clear juice from rapi dorr is heated again in tubular juice heaters up to 100- 111°C.
- Clear juice contains around 70% of water. The clear juice is boiled / heated in a series of 4 to 6 evaporator vessels to evaporate water from clear juice.
- Thick clear juice obtained from evaporator vessels called syrup is taken on pan floor and boiled in the pan bodied. Pan is also a vessel in which syrup is boiled. The pan is boiled up to proper size of crystals are formed.
- After the crystallization process in pan a ready material containing sugar crystals called massecuite. A ready massecuite is rotated in centrifugal machine having high RPM to separate sugar and mother liquor from massecuite.
- In Hooper, Separated Sugar from centrifugal machines dropped in to the hoppers where sugar is dried and cooled down.

ii. Co-Generation:

- The cogeneration plant is selected to utilize bagasse as non conventional fuel.
- The boiler capacity is 25 × 2 TPH at 545°C and 40 x 1 TPH. The high pressure Turbo Generator is selected as back pressure type with oil cooler. It is expected that Co-generation Plant will fulfill the energy requirement of the Sugar Plant and remaining power can be exported to the Maharashtra State Power Grid.

- The steam generating system for the proposed Cogeneration project consist of one bagasses fired boiler with a maximum continuous rating of 90 TPH, with the outlet steam parameters at 45 Kg/cm² and 545°C. The tolerance on the super heater outlet temperature shall be +5 to -5 °C

iii. Distillery:

- Molasses after weighing is diluted and also pre-treated to an appropriate sugar concentration while pumping through continuous molasses Broth Mixer into the continuous mixed bio reactors.
- The bio reactors are then inoculated with culture developed in the culture vessels. This culturing with suitable yeast is carried out only during the start-up of the plant.
- The culture thus developed maintains itself in bio reactors on a continuous basis.
- To help the fermentation sustain the assimilate nutrients are added in the medium in the form of Urea and DAP as required.
- Temperature in the bioreactors is maintained to an optimum level as required for efficient reaction with the help of Plate Heat Exchanger and recirculating pumping system.
- This recirculation also helps in proper mixing of fermented wash. The retention time for the reaction is about 24 to 36 Hrs. air blower is provided to supply the necessary oxygen required for the yeast and also for agitation. After completion of reaction the fermented wash is delivered to wash settling clarifier.
- In wash settling clarifier, settlable solids settle down. The supernatant goes to buffer wash Tank (BWT) and sludge from bottom goes to sludge Tank.

c) Availability of Resources & Treatment

- **Power:** The total power generation here will be 24.5 MW/day. The power required for the factory will be consumed from the in-house production and excess will be sold to MSEDCL.
- **Water:** The water requirement is about 313 CMD for industrial purpose and for domestic use. The source of water is already available from Ashti dam.

Water Budget for Sugar- Co-gen

Sr. No.	Station	Input Cum/Day	Loss Cum/Day	Effluent Cum/Day
1.	Boiler Water Make up	27	05	22
2.	Industrial Process	320	33	287
3.	Cooling water makeup for mill & TURBINE Bearing	110	77	33
4.	Floor and equipment washing	40	07	33
5.	Water treatment plant regeneration	28	22	6
6.	Laboratory	05	-	1
7.	Domestic	80	16	64
	Total	610	160	446

Total Water Requirement: 610 CMD

Condensate Available within Industry: 460 CMD

Fresh water Requirement: 610-460 = 150 CMD

Water Budget for Distillery

Sr. No.	Station	Input Cum/Day	Loss Cum/Day	Effluent Cum/Day
1.	Domestic	03	01	02
2.	Industrial Process	460	-	120
a]	Fresh water	160	-	-
b]	Excess Condensate from Sugar	150	-	-
c]	Recycle	150	-	-
3.	Cooling Tower	300	-	20
a]	Fresh Water	100	-	-
4.	Recycle	200	-	-
	Total	763	-	142

Total Water Requirement: 763 CMD

Excess Condensate and recycle water Available within Industry: 600 CMD

Fresh Water Requirement: 763-600= 163 CMD

- **Manpower:** The manpower required for administration and production purposes will be recruited locally. The requirement of 31 nos. work- forces including staff members, working in shifts.
 - **Steam Requirement:** Steam requirement for the unit can be met by using existing Boilers of 25 TPH (2 Nos.) and 40 TPH (1 No.) with proposed 1 boiler of 15 TPH Incineration boiler. Bagasse will be used as Fuel for boilers and for incineration boiler bagasses and spent wash will be used as fuel.
 - **DG Set:** DG Set of capacity 500 KVA (2 nos.) is proposed for emergency backup. HSD will be used as fuel for DG Set.
 - **Cost:** Total Cost of the Project estimated is **Rs. 28.03 Cr.** out of which **Rs. 3 Cr.** is earmarked for expenditure on EMP and **Rs. 0.60 Cr.** towards CER.
- d) Waste Water Treatment for Sugar & Cogen Plant:** The waste water generated will be treated in conventional ETP consist of Primary Treatment, Secondary Treatment & Tertiary Treatment followed by sludge dewatering system for sludge treatment and condensate polishing unit.
- e) Waste Water Treatment for Distillery Plant:**
- An Effluent Treatment Plant (ETP) for distillery is envisaged to treat the effluent. Major portion of treated effluent from ETP will be reused in the fermentors of the distillery plant for molasses dilution.
 - The effluent generated from the proposed ETP is disposed through MEE envisaged in the Process plant. By this way, Zero Liquid Discharge (ZLD) concept is achieved and there will not be any liquid effluent which will be discharged outside the plant premises.
- f) Air Emissions:**
- The air pollution caused by this industry is mainly from boiler. The boiler will be provided with ESP & adequate stack height to combat ash pollution .
- g) Solid Waste Management:**
- The main solid waste from factory will be of non-hazardous from office, garden and boiler ash. Non hazardous waste will be segregated as compostable and saleable. Solid waste such as yeast sludge and Boiler Ash are mixed with press mud and converted to bio compost will be made available to nearby farmers. The hazardous waste from ETP

and process will be generated. Spent oil will be burnt along with bagasses in co-gen boiler.

h) Odour Pollution:

- ETP Sludge would be the source of odour nuisance from distillery operations. For the same, separate impervious storage yard with thick stone soiling would be provided. Further, fermentation section may cause odour. Proper operations at the fermenters including closing it appropriately shall curb odour generation.

i) Compliance with the Norms:

- All the relevant acts, rules and guidelines with respect to effluent treatment and disposal, solid & hazardous wastes handling and disposal as well as in respect of emission handling and disposal, wherever applicable, as specified by the CPCB/ MPCB or any other concerned authority are strictly followed in the existing set up. Same practice shall be continued after implementation of proposed expansion activities.

Chapter 3: Description of the Environment

Environmental samples were collected & analyzed for relevant parameters to arrive at the baseline environmental quality status as per standard TOR received from MoEF&CC, Delhi. The study area is defined as area within 10 km radius from proposed site. The baseline monitoring for ambient air quality, water quality, soil quality and noise levels has been carried out by *SA Encon Pvt. Ltd.* an MoEF&CC, GOI, New Delhi recognized and ISO 9001:2008, OHSAS 18001: 2007 NABL Certified Company. The results obtained after compilation were interpreted against respective Environmental Standards for each component as follows:

j) Air Environment:

Metrological data was obtained from IMD Aurangabad station for summer season. Accordingly, Ambient Air Quality (AAQ) monitoring stations were set up at 9 different locations. AAQ Parameters monitored were PM₁₀, PM_{2.5}, Sulphur Dioxide, Oxides of Nitrogen and Carbon Monoxide for all locations and Ammonia, Ozone, Benzene, BaP, Lead, Arsenic and Nickel are additionally monitored at Project site.

- Maximum concentration of Particulate matter, PM₁₀ was 58.40 µg/m³ at Project Site & minimum concentration was 36 µg/m³ at Yavli. Maximum concentration of Particulate matter, PM_{2.5} was 29.6 µg/m³ at Project Site & minimum concentration was 13.9 µg/m³ at Galandwadi.
- Maximum concentration of gaseous pollutants, SO₂ was 11.01 µg/m³ at Project Site & minimum concentration was 4.23 µg/m³ at Khandobachiwadi. Maximum concentration of gaseous pollutants, NO_x was 20.59 µg/m³ at Project Site & minimum concentration was 9.52 µg/m³ at Narkhed.
- CO concentrations at all locations were found 0.01–1.40 mg/m³ & all other parameters were observed below the prescribed limits.
- Hydrocarbons as Methane was found BDL at Project Site.
- The ambient air quality in the study area and at project site is well within prescribed limit of CPCB stipulated NAAQS.

Narkhed	Average	7.41	13.27	43.45	21.87	0.15	NA	NA	NA	NA	NA	NA	NA	NA
	Maximum	9.56	14.85	49.52	24.22	0.21	NA	NA	NA	NA	NA	NA	NA	NA
	Minimum	5.21	9.52	38.52	18.23	0.01	NA	NA	NA	NA	NA	NA	NA	NA
	98 th Percentile	9.37	14.55	48.53	23.74	0.21	NA	NA	NA	NA	NA	NA	NA	NA
Ekurke	Average	5.99	13.38	46.55	19.83	0.20	NA	NA	NA	NA	NA	NA	NA	NA
	Maximum	7.85	16.52	50.50	22.57	0.41	NA	NA	NA	NA	NA	NA	NA	NA
	Minimum	4.35	10.23	40.21	15.98	0.10	NA	NA	NA	NA	NA	NA	NA	NA
	98 th Percentile	7.69	16.19	49.49	22.12	0.40	NA	NA	NA	NA	NA	NA	NA	NA
Galandwadi	Average	7.20	12.56	39.31	16.94	0.20	NA	NA	NA	NA	NA	NA	NA	NA
	Maximum	8.69	13.90	42.35	20.54	0.38	NA	NA	NA	NA	NA	NA	NA	NA
	Minimum	5.23	9.63	36.52	13.98	0.10	NA	NA	NA	NA	NA	NA	NA	NA
	98 th Percentile	8.52	13.62	41.50	20.13	0.37	NA	NA	NA	NA	NA	NA	NA	NA
Khandobachiwadi	Average	6.47	13.89	46.15	16.81	0.20	NA	NA	NA	NA	NA	NA	NA	NA
	Maximum	8.52	17.41	49.68	19.65	0.29	NA	NA	NA	NA	NA	NA	NA	NA
	Minimum	4.23	10.23	41.20	14.52	0.13	NA	NA	NA	NA	NA	NA	NA	NA
	98 th Percentile	8.35	17.06	48.69	19.26	0.28	NA	NA	NA	NA	NA	NA	NA	NA

ii) Noise Environment:

Noise levels were recorded at 8 different locations within the study area. The maximum noise level both in day time & in night time was observed to be 52.7 dB (A) and 41.5 dB(A) respectively at Chikhli and Bitle. However, the minimum noise level was observed to be 51.6 dB(A) at village Yavli in day time and 41.2 dB (A) at village Chikhli in night time. All observations were found within the limits prescribed by CPCB.

The baseline monitoring of noise levels shows that, the prevailing noise levels would hardly make any disturbance to the local population in study area.

Ambient Noise Quality Results

LBPAIL Solapur					
Average Noise Quality at Various Locations					
Sr .no	Location	Day time	Day time	Night time	Night time
			Leq (dBA)		Leq (dBA)
1	Project Site	6.00 am-10.00 pm	52.2412	10.00 pm -6.00 am	41.28571
2	Angar	6.00 am -10.00 pm	52.2059	10.00 pm -6.00 am	41.37143
3	Bitle	6.00 am -10.00 pm	52.5647	10.00 pm -6.00 am	41.52857
4	Malikpeth	6.00 am -10.00 pm	52.6706	10.00 pm -6.00 am	41.28571
5	Yavali	6.00 am -10.00 pm	51.6471	10.00 pm -6.00 am	41.47143
6	Chikhli	6.00 am -10.00 pm	52.7294	10.00 pm -6.00 am	41.24286
7	Hivare	6.00 am -10.00 pm	52.5941	10.00 pm -6.00 am	41.38571
8	Kurunwadi	6.00 am -10.00 pm	52.6529	10.00 pm -6.00 am	41.32857

iii) Hydrogeology:

Sina River is a large tributary of the Bhima river which is starting near Ahmednagar city. It has two chief sources, one near Jamgaon about 20 km. west of the town of Ahmadnagar and the other near Jeur about 16 km. to its north-east. For a distance of about 55 km. roughly, the river forms boundary between Ahmadnagar District on the one hand and Beed district on the other. On the right, it receives the waters of Mahekri and ultimately joins the Bhima on the Karnatak State border. It has earth filled Sina Dam near Karjat in Ahmadnagar District.

The entire Solapur district is occupied by lava flows of the Deccan Basalt formation, which constitute the main rock formation of the district. Ground water in Deccan Traps mostly occurs in the weathered and fractured parts down to 10-15 m depth. At places potential zones are encountered at deeper levels in the form of fractures and inter-flow zones which are generally confined down to 60-80 m in the district.

Hydrogeologically the geological formation of entire 10 Km. radius study area comprises mainly Basalt rock of Deccan Trap Formation.

Water Level Scenario of Solapur District

Central Ground Water Board monitors ground water level 53 National Hydrograph Network monitoring Stations (NHNS) established in the district four times a year ie during January, May (Pre-monsoon), August and November (Post-monsoon).

Pre-monsoon Depth to Water Level (May-2011)	:	GL to 12.80 m bgl
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Post-monsoon Depth to Water Level (Nov.-2011)	:	1.00 to 19.60 m bgl
Pre-monsoon Water Level Trend (2001-10)	:	Rise: 0.0041 to 4.050 m/year Fall: 0.0037 to 0.78 m/year
Post-monsoon water level trend (2001-10)	:	Rise: 0.0157 to 3.53 m/year Fall: 0.0013 to 1.499 m/year

iv) Surface and Ground Water:

Ground water samples were collected from 8 locations. Surface water samples were collected from 7 locations.

- pH of the all ground water samples ranged between 6.59 to 7.31, while of surface water samples ranged between 7.21 to 7.71.
- Total Dissolved Solids (TDS) were found in the range of 883 to 3831 mg/lit in ground water and 395 to 430 mg/lit in surface water samples.
- As per Hardness classification, the values of hardness for ground water can be classified as very hard, while for surface water as moderately hard.
- BOD values in ground water samples were found in the range of 6.4 mg/lit to 28.8 mg/lit, while in surface water samples; ranged between 7.8 mg/lit to 21.2 mg/lit indicating that the ground water and surface water are not contaminated.
- Other parameters like Cadmium, Lead, Zinc, Copper, Manganese, Free Ammonia, Mercury, Selenium, Silver, Arsenic, etc. were not found in all ground and surface water samples.

This concludes that, ground water satisfy the permissible limits as per IS 10500:2012 specified for drinking water and hence, is suitable for drinking, if it is disinfected by suitable method, before use for potable purpose. The comparison of surface water results with IS 2296:1992 shows that the designated best use of water falls under category A & B.

v) Geology:

The area is entirely covered by basaltic lava flows overlain by sporadic duricrust soil and alluvium at places. The soil is of varying thickness, reddish brown to black in colour and loamy in nature. It popularly known as black cotton soil. Alluvial spread is along the banks of Bhima and Sina river. It is formed of consolidated to semiconsolidated, poorly sorted, arenaceous to rudaceous sediments. The grains are sub-angular to sub-rounded. The alluvium attains a maximum thickness of 15 m. Kankar development on the soil is sporadic and many attain a thickness of 1 to 2 m.

The basalt flows have been grouped together into three different formations. These are Diveghat, Purandargh and Mahabaleshwar Formation in order of antiquity. The Diveghat formation consists of about 10 flows varying in thickness from 5 m to 32 m. The lower 3 flows are Aa type, non to sparsely porphyritic followed by an impersistent Pahoehoe and 6 Aa flows towards the top. Most of these Aa flows are moderately to highly porphyritic showing at places characters of both Pahoehoe and Aa flows and therefore termed by many mappers as mixed flows. In the Diveghat Formation, a number of flows pinch out, specially those at lower elevations and the older flows. The exposed thickness of Diveghat Formation is over 190 m. The base is not seen in the area.

Seismic zone study states that the study area fall in **Zone III**, which is Moderate intensity zone of earthquake zone.

vi) Soil:

Samples of soil were collected from 9 locations in the study area.

- Soil around site area is dark brown to black colored cotton soil most commonly associated with Deccan plateau. As per Soil Classification, the soil within study area is mostly silt soil. The clay content varies from 23 to 28%.
- The maximum moisture content was observed at the Project Site (11.98%). The minimum moisture content was observed in the Village Bitle (0.22%).
- The porosity of soil in the study area was in the range of 40-48%.
- Maximum water holding capacity of soil was at Village Khandobachiwadi & Project Site (40%). The minimum Water holding capacity was at Village Harwadi (38%).
- Analysis of soil samples collected from the study area shows that soil has neither been affected by liquid effluent nor by disposal of solid / hazardous waste. Porosity shows that soil has good percolation capacity during rainy season.

vii) Land Use:

A recent satellite image for study area was collected from NRSC. The image was interpreted for identification of various land use / land cover classes. Ground truthing was done to confirm and edit the interpreted land use / land cover classes. The major portion of land is covered by Crop land. Land use of the study area has been classified into Built up area (4.34%), Crop land (36%), Fallow land (28.36%), Scrub Land (17.87%), Barren Land (12.56%) and River (1.09%). The project site is located on the elevation; there could be chances of effluent moving down to the nearby fields and impact the crop land in the downstream.

viii) Ecology & Biodiversity:

The present study on the biological assessment of the proposed project is based on field survey of the area supported by secondary data from various governmental and non-governmental sources.

- **Floral Investigation:** Core zone (proposed Project site): Tree species viz. *Mangifera indica*, coconut (*Cocos nucifera*), Tamarind (*Tamarindus indica*), Aonla (*Phyllanthus emblica*), Guava (*Psidium guajava*), Sapota (*Manilkara zapota*), Jambhul (*Syzigium cumini*) and Custard apple (*Annona reticulata*) etc.
- **Buffer zone (10 km from project boundary):** The structure and composition of vegetation in the buffer zone was studied by visual observations during the site visit. The study area is dominated by agricultural fields. Most of the area is covered by active cropping accompanying patches of barren land and grassland in between. *Azadirachta indica*, *Prosopis Juliflora*, *Mangifera indica*, *Ficus religiosa*, *Ficus benghalensis*, *Samania saman*, *Peltophorum sp.*, *Acacia nilotica*, *Alstonia scholaris*, *Albizzia lebbeck* and *Albizzia procera* are the common species occur in abundance in the study.
- **Faunal Investigation:** During the field investigation Palm Squirrel (*Funambulus palmarum*), Common Mongoose (*Herpestes edwardsii*) and Common Langur (*Presbytis entellus*) were observed in the study area.
- During the public consultation and information collected from forest / wildlife department Jackal (*Canis aureus*), Indian Hare (*Lepus nigricollis*), Common Langur (*Presbytis entellus*), Indian Wild Boar (*Sus scrofa*), Jungle cat (*Felis chaus*) and Hyena (*Hyaena hyaena*) are generally observed in different parts of the study area.
- Some reptiles i.e. Krait (*Bungarus caeruleus*), Russel viper (*Vipera russelli*), Common Rat Snake (*Ptyas mucosus*) are generally observed in the study area.
- The total 8 mammal species and 4 reptile species were recorded in the study area.

- **Avifauna:** During overall survey in the study area, a total of 56 bird species belonging to 32 families were recorded in the study area. Most dominant family was *Ardeidae* (5 species), *Columbidae*, *Motacillidae* (4 species each) and *Cuculidae*, *Estrildidae*, *Muscicapidae*, *Phasianidae* (3 species each). 23 families were recorded from the study area with one species each. The bird species observed during the survey are Baya weaver (*Ploceus philippinus*), Black drongo (*Dicrurus macrocercus*), Common Myna (*Acridotheres tristis*), Small Bee-eater (*Merops Orientalis*), Ashy prinia (*Prinia socialis*), House Crow (*Corvus splendens*), Indian robin (*Copsychus fulicatus*), Indian silverbill (*Euodice malabarica*)

ix) Socio-Economic component:

Social survey was conducted in 14 villages to collect factual information by involving community. For secondary data Primary Census Abstract of 2011, Government of India has been used. Interpretation of the data thus, gathered has formed the basis for assessing the status of this component in the study area.

Chapter 4: Anticipated Environmental Impacts and Mitigation Measures

Anticipated environmental impacts and related mitigation measures required are suggested for implementation by the project proponent. Many of the mitigation measures required are built in at the design state itself. Legal requirement to manage the environmental impacts are also incorporated. Potential environmental impacts are discussed and quantification has been done, wherever possible. Accordingly mitigation measures are suggested to enhance positive impacts and minimize negative impacts.

Potential environmental impacts are delineated in nine categories consisting air quality, noise and vibration, surface water & ground water quality, soil environment and land use, ecology & biodiversity, socio economic and occupational health. Impacts are identified during the site selection and preparation of site for installation of plant and machineries. Impacts in construction phase activities and during operation of plant are categorized to evaluate positive and negative impacts. Impacts are listed in tabular form and component wise mitigation measures are described in Chapter 4. Generation of solid & liquid waste and its disposal methods are mentioned. Possibility of air, water and land pollution and their impacts are recognized during the construction and operational phase.

Measures for minimizing adverse impacts are suggested with impact scoring system developed for this industry. Consequence analysis along with probability occurrence has indicated the level of risk for each environmental component like air and water quality, land use and land cover, occupational health and safety. Impact scores are given in the tabular form for all the environmental attributes indicating the severity of impacts with low or high risk involved.

A. Air Environment:

- Ambient Air Quality [AAQ] modeling has been done to assess the dispersion of air pollutants from the stacks. Mathematical model ISCST-3, 1996, suggested by CPCB, New Delhi indicates increase air pollutants in the atmosphere and their dispersion through the stack. In summer season for existing operations, maximum GLCs for PM₁₀, PM_{2.5} SO₂ and NO_x are computed to be 0.014 µg/m³ (7211 m in NE Direction), 0.004 µg/m³ (7211 m in NE Direction) and 0.009 µg/m³ (7211 m in NE Direction) & 0.012 µg/m³ (7211 m in NE Direction) respectively. Thus, the AAQ due to the gaseous emission like PM₁₀, PM_{2.5}, SO₂ and NO_x, from the stack will not have significant effect.

- Vehicles used for transport of raw material and finished products must have PUC certification. Effective water spraying will be done on the roads within the campus. Transportation of construction material will be through covered trucks / vehicles.

B. Noise Environment:

- Noise sources in the plant are pumps, compressors and sudden release of steam from boiler. Blowers in ETP and DG set may be other sources of noise. DG set should be covered from all sides with acoustic enclosures and PPE's are recommended to be put on by operators in noisy areas.

C. Water Environment:

- The total fresh water requirement of 313 CMD and shall be supplied from Ashti Dam. The effluent generated from various sources may adversely affects surface as well as ground water quality.
- **Mitigation measures to reduce ground water related impacts are:**
 - i. Effluent treatment plant (ETP) is being installed to treat the wastewater.
 - ii. The treated waste water will be used for gardening.
 - iii. The spent wash from Distillery will be used for fired in boiler.
 - iv. The steam generated by the incineration boiler and power generated in the turbine will be used for distillery plant, IMEE, standalone MEE and incineration boiler.
 - v. Thus the zero liquid discharge will be achieved.
 - vi. Efforts will be made to reduce water requirement by recycle and reuse of process waste water etc.
 - vii. Domestic waste water shall be reused for Green belt.
 - viii. Rainwater harvesting will be done from the security building, administrative building, ware house etc. This water will be utilized for ground water recharge.

D. Land:

The study area covers 314 km². In that context the likely change in land use and land cover due to the project is likely to be in the order of 0.01-0.02% of the entire area, a relatively modest figure. Also as per the environmental risk categorization it comes under moderate risk level where the activity can operate subject to management and or modification.

- **Impacts :** Potential Impacts on the Land Use and land cover shall be due to the project are given below:
 - i. There is a chance of that water bodies gets polluted if the effluent from the plant is discharged into the drains.
 - ii. The surrounding land use may get affected due to solid waste, if it is not disposed properly. The soil and the ground water can get polluted.
 - iii. Site preparation.
 - iv. Green belt development (Positive Impact).
- **Mitigation measures to reduce Land Use and land cover related impacts are:**
 - i. Optimization of land requirement through proper site lay out design will be a basic criteria at the design phase.
 - ii. As the Site is surrounded by Agriculture land as LU map suggest so care should be taken for the waste disposal.
 - iii. The management of the proposed plant should implement the proper disposal method for solid and hazardous waste. The waste should not be dumped on open ground without liners.

- iv. Development and maintenance of green belt within project premises, a positive impact is envisaged.

E. Soil

- **Impacts:** Potential impacts on soil due to production of sugar and co-generation activities are given below:
 - i. Impacts during construction phase
 - ii. Impacts during operation phase.
- **Mitigation measures to reduce soil related impacts are:**
 - i. Construction activity is limited. Effect is limited to factory area only.
 - ii. Fertile soil will be stacked and used in landscaping.
 - iii. The drainage plan will be implemented.
 - iv. Fly ash will be sale to authorized brick manufacturer for disposal.
 - v. Waste water will be treated in ETP.
 - vi. Reduce erosion.
 - vii. Silt trap will be installed to prevent siltation.

F. Socio-Economic

- Critical analysis of socio-economic profile of the area vis-à-vis its scenario with proposed project activities indicate that the impacts of the project are expected to be of varying nature.
- **Impacts** The impacts predicted will be on following Environmental components:
 - i. Population.
 - ii. Education.
 - iii. Employment Generation.
 - iv. Infrastructure.
 - v. Sanitation/Public Health.
 - vi. Agriculture.
- **Mitigation measures for Socio Economic:**
 - i. Construction and maintenance of the approach road at regular interval will be carried out by the project proponent.
 - ii. Developed water management and adoption of Soil and Water conservation methods with recharge the groundwater. Improving organic farming practices by providing agriculture technology in some of the villages in 10 km radius area. To solve the sanitation problems by sock pits, covered drains and construction of toilets and solid west management.
 - iii. To stop the migration by start the income generation activities and employment opportunity, job opportunities will be created in the project area from industrial sector, Creation of employment opportunity in the areas.
 - iv. The sugar factory should have strict vigilance on pollution control systems to ensure strict compliance with laws.
 - v. Full proof arrangements to be made by the factory to keep pollution under check.
 - vi. People will not migrate to city or urban area in search of employment / livelihood.
 - vii. The sugar and distillery production has positive impacts on the community due to the availability of job opportunity in industrial sector.
 - viii. Export of these products will fetch foreign currency.
 - ix. Overall, the industry will have positive impacts on the social front. CER activities by the industry will uplift the quality of life in the nearby villages.

G. Occupational Health & Safety

▪ Impacts on Occupational Health, Community Health and Safety listed below:

- i. Impact during preparation of site development which is Risk of occupational injuries.
- ii. Impact on community health due to various transportation activities, like Noise pollution, Dust pollution, potential damages to village road. Due to this lot of inconvenience may happen to local community.
- iii. Occupational risk during working at heights, during welding etc for Construction activity.
- iv. During storage, handling and disposal of waste water, Risk to community health due to spillage in surrounding area if not stored properly.
- v. Risk during manufacturing process.
- vi. Risk due to Fire for all type of storages.

▪ Mitigation Measures:

- i. By using PPE's during process impacts on occupational health and safety shall be overcome.
- ii. Occupational health and Safety surveillance program will be carried out
- iii. Continuous CER activities shall be there by proponent such as construction of approach roads, various awareness programs
- iv. By proper Risk Assessment and risk management of process.

Chapter 5: Analysis of Alternatives

A. Site selection:

The proposed project is within the existing premises; site is already in possession of proponent At Laxminagar, Village-Angar, Tehsil-Mohol, District-Solapur (MH). The site has been selected and finalized with the following considerations. Hence alternative site was not studied.

B. Availability of Required Land:

The total land area with LBAPIL is 660000 sqm and is adequate enough for the proposed expansion.

C. Site Approach:

The site is approachable by the nearest railway station namely Kurduwadi 40 km away from project site in South East direction. The nearest airport is Solapur which is 45 km from the project site in South-East direction. The National highway no. 9 is at a distance of 3 km from the project site.

D. Topography / Nature of Terrain:

The existing site has plain topography with normal slope in North-East and doesn't require cutting or filling and subsequently doesn't require copious manpower and machinery.

E. Availability of Water:

The water will be sourced through the existing source. The Irrigation Department (Ashti Dam) has endorsed abstraction of water of 313 m³/day for the industry. It is proposed to recycle the condensate water and reduce fresh water requirement. This quantity of allocated water will be sufficient considering need of expansion project.

F. Environmental Considerations:

The site selected is feasible with respect to following listed points.

- No forest land is involved.

- No cultivable land is involved.
- No requirement of cutting of trees.
- No displacement of people.

G. Technology Process:

The existing technology used by **M/s Loknete Baburao Patil Agro Industries Ltd.** for Manufacturing of sugar, co-gen & alcohol and from Treatment of wastewater point of view is one of the best and proven technologies; treatment point of view for existing as well as expansion project. MEE-incineration boiler for distillery will play important role where it can achieve Zero Liquid Discharge as per CPCB norms. Condensate polishing unit for sugar and distillery will save on fresh water requirement.

Chapter 6: Environmental Monitoring Program

An environmental monitoring plan provides a delivery mechanism to address the adverse environmental impacts of a project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for the project works. An environmental monitoring program is important as it provides useful information of the project.

A. Objective of monitoring:

- To measure effectiveness of operating procedure.
- To confirm statutory & mandatory compliance.
- Identify unexpected change.

B. Environmental Monitoring:

The following will be monitored on a regular basis during operation phase and also throughout the life of the project to ensure that a high level of environmental performance is maintained:

- Periodic monitoring of PM₁₀, PM_{2.5}, SO₂ and NO_x will be carried out during the operational phase.
- Water quality, stack emissions monitoring, ambient noise quality monitoring & work zone monitoring will be done on quarterly basis.
- Soil quality monitoring will be done once in year.
- Monitoring of solid waste will be done regular on daily basis.
- Periodic medical check-up of all employees will be at the time of pre & post-employment at the OHC.
- Safety audit of whole plant will be done on half yearly.
- Post project sampling and effect on baseline data generated during preparation of EIA report.

Chapter 7: Additional Studies

A. Public consultation:

Details of Public consultation will be incorporated after conducting Public hearing for the project as guided by MPCB and their suggestions will be incorporated in operation of the plant and CSR activities.

B. Hazard Identification and Consequence Assessment:

Specific Studies were carried out on risk and hazard management for the LBPAIL plant. Hazards in process, storage and handling of chemicals are identified for the proposed products

in the plant. QRA for the process and for storage of chemicals and raw material are carried out along with mitigation measures required to reduce the risk / probability of accidents. Guidelines for onsite and offsite emergency plan are incorporated.

Major hazards which are involved during construction and operation phase and their mitigation measures are given in detail in chapter 7.

- **Hazards during Construction phase:**

- i. Hazards of working at heights.
- ii. Hazards while using crane or heavy lifting machinery.

- **Mitigation Measures:**

- i. Work Permit system to be introduced and followed.
- ii. All necessary PPEs to be issued to all the company and contract workers and wearing these must be encouraged and insisted.

- **Hazards during Operation phase:**

- i. Bagasse storage: Fire hazard
- ii. Production and handling of SO₂
- iii. Molasses Storage tanks: Leakage of molasses due to tank failure

- **Mitigation Measures:**

- i. The fire- hydrant system has to be continuously charged with water pressure of 7 Kg/sq.cm.
- ii. Hydrant points must be always approachable, even during night.
- iii. Fire hose and boxes have to be in good ready to use condition.
- iv. High tension voltage lines to be avoid near storage of bagasse.
- v. Creating awareness among workers about sudden bagasse fire and emergency action plan.
- vi. Posting of proper supervision staff with necessary communication facility.
- vii. Smoking and the use of matches shall be prohibited in all areas.
- viii. Adequate number of Fire extinguishers has been provided inside the warehouse

C. Quantitative Risk Analysis:

- QRA has been carried out by using the tool ALOHA for the SO₂ gas concentration, Pipeline carrying SO₂, Molasses Storage Tank and Storage of alcohol. ALOHA is the hazard modeling program, which is used for chemical emergencies. It allows to-enter the details about a real or potential chemical release and it will generate threats zone, estimate for toxic gas cloud, flammable gas clouds, jet fire, pool fire and vapor cloud explosion.
- A QRA result for raw material indicates that the threat zones as estimated based on the PAC values and other recommended values. Workers inside the warehouse will be affected and onsite emergency plan will be put in action and if required, off site emergency plan needs activations in case leakage gets unnoticed for long period of time like 30-45 min.

D. Planning:

On-site and Offsite emergency plan will be prepared as per the factory act and will be prepared as per Rule no. 12 of factory act (control of Industrial Major Accident Hazard Rules, 2003) as per the guidelines. It is absolutely necessary to train carryout mock drills for success of emergency plan during actual emergency. Emergency procedures should be laid down clearly and convincingly to everyone on site.

Chapter 8: Project benefit

- The proposed project on implementation will generate potential jobs directly and will also generate many indirect job opportunities;
 - Indirect and direct employment opportunities to local people in contractual works like housing Construction, transportations, sanitation, for supply of goods and services to the project and other community services.
 - The production of sugar, alcohol which lead the state higher level.
 - Market and business establishment facilities will be also increase also Cultural, recreation and aesthetic facilities will be improved.
 - Improvement in communication, transport, education, community development and medical facility.
 - The activities would result in an increase in local skill levels through exposure to proposed technology.
- The proposed project will increase the infrastructural facility for the area, especially in terms of an opportunity for employment generation and development of service sectors through other need based initiatives through CER.
- The proposed project will reduce the pollution load in the micro level environment and enhance the aesthetic beauty with the development of green belt. In existing project, the development of green belt has been carried out in the factory premises with prominent aesthetic value.

Chapter No. 9: Environment Management Plan

- In LBPAIL plant in-house pollution control laboratory will monitor air, water and other parameters to control environmental pollution.
- An environmental management cell (EMC) will be created to maintain good environmental conditions within and outside the premises.
- Detailed EMP is presented for air, water and land pollution control.
- Environmental monitoring can be assigned to NABL accredited external laboratory.
- Environmental audit reports will be prepared and submitted to MPCB by this cell.
- The recurring cost expected per annum towards EMP in around Rs.56 Lakhs whereas, capital investment for pollution control equipment is Rs. 560 Lakhs.
- Corporate environmental responsibility has been prepared and focus is on Water conservation & Sanitation facility, Funds for Improvement in schools & village infrastructure, Drinking water facilities, Promote Women Empowerment, Education to girl child, etc,
- Presently the industry has made budgetary provision of Rs.190.00 Lakhs, which will be impressed after full-fledged commissioning of the plant.

Chapter 10: Summary & Conclusion:

- M/s Loknete Baburao Patil Agro Industries Limited proposed project is not going to affect the surrounding environment as this project will adopt the latest technology.
- Further, it will generate a fair amount of direct, indirect and induced employment in the region. The local economy will receive a boost due to employee spending and services generated by the company.
- All the possible environmental aspects are adequately assessed and necessary control measures are formulated.

- Due to the implementation of the project activity there shall be improvement in the standard of living viz. better education, improved health, sanitation facilities etc. This is envisaged as a major positive benefit.
- The company's management shall recruit semi-skilled and unskilled workers from the nearby villages due to availability of local labors.
- The employment provided due to the proposed project would rapidly increase the social status of the villagers.
- Thus implementing this project will minimize adverse impacts on surrounding environment. Hence proposed project will be a welcome development.

Executive Summary Conclusion

During environmental assessment, it can be concluded at constructive note that the project activities during the construction and operation phase due to adequate provision of mitigation measures and its implementation through proposed environmental management plan will minimize negative impacts and enhance positive impacts.