Project No: AESPL/EIA/15/IND/001

Executive Summary of

Draft Environmental Impact Assessment Report

Proposed Establishment of Synthetic Organic Chemicals Manufacturing Facility

at

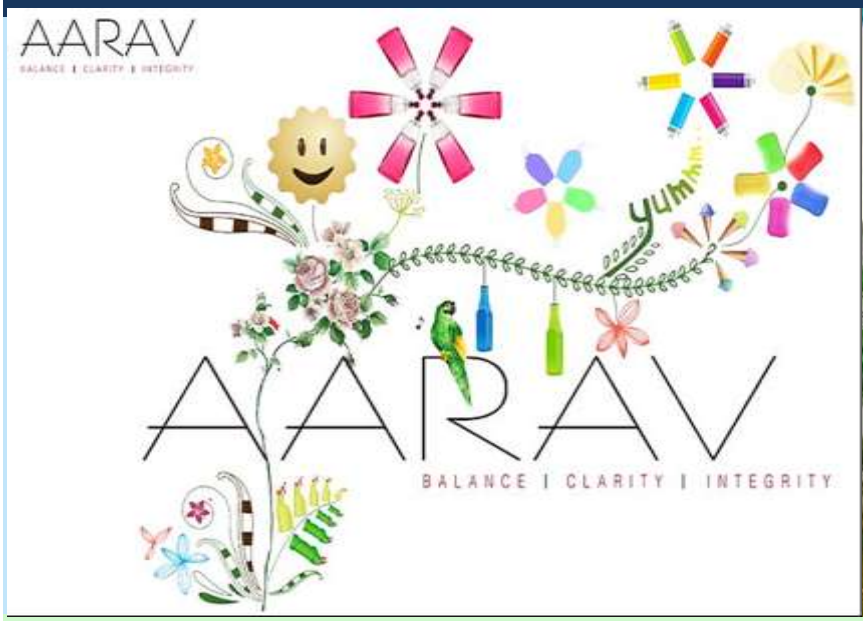
Aarav Fragrances & Flavors Pvt. Ltd.

AARAV
BALANCE | CLARITY | INTEGRITY

Village: Jamghar- Lakhmapur,
Tal. Wada, Dist. Palghar, Maharashtra

Baseline Monitoring: Winter 2015-16

December - 2016



Environmental Consultant:
Aditya Environmental Services Pvt. Ltd., Mumbai
QCI- NABET Accredited EIA Consultant
www.aespl.co.in

EXECUTIVE SUMMARY

1. Project Description

1.1. Introduction

Aarav Fragrances and Flavors Pvt. Ltd. (AFFPL) is a privately owned and professionally managed enterprise established in the year 2007 with it's corporate office in Thane and manufacturing unit at Village Jamghar – Lakhmapur, Tal Wada Dist Palghar, Maharashtra.

Aarav is an ISO 9001: 2015, ISO 22000: 2005 & ISO 27000 (under implementation) and food safety standards authority certified company.

The total Plot area is 97,750 sq. m. The proposed establishment activity will be set up within existing plant with addition & up gradation of units with estimated cost of Rs. 10 Crores.

The proposed establishment is at existing plot at Gut no 150, 151, 166, 167, 168, 169, 170, 171, 172, 239, 242, 282, 285, 286, 287, 289, 290, 291, 292, 293, 294, 295, 296, Village Jamghar- Lakhmapur, Tal. Wada, Dist. Palghar, Maharashtra.

The project is located at latitude 19°35'43.37"N & longitude 73°6'36.54"E (centre coordinates) with elevation of 52 m above Sea level.

The site is well connected by rail and road. Nearest Atgaon railway station is at distance of 25 km & Bhivandi which is 36 km away. Town Wada is at a distance of 7.5 km on NE. Mumbai international airport is at 61 km on SW side. Bhivandi Wada road is 500 m away from site. National highway Mumbai Agra is 30 km towards east side.

River Tansa is around 3.5 km to North from site. Tansa wildlife sanctuary is located at a approx. distance of 5.8 km to East from site.

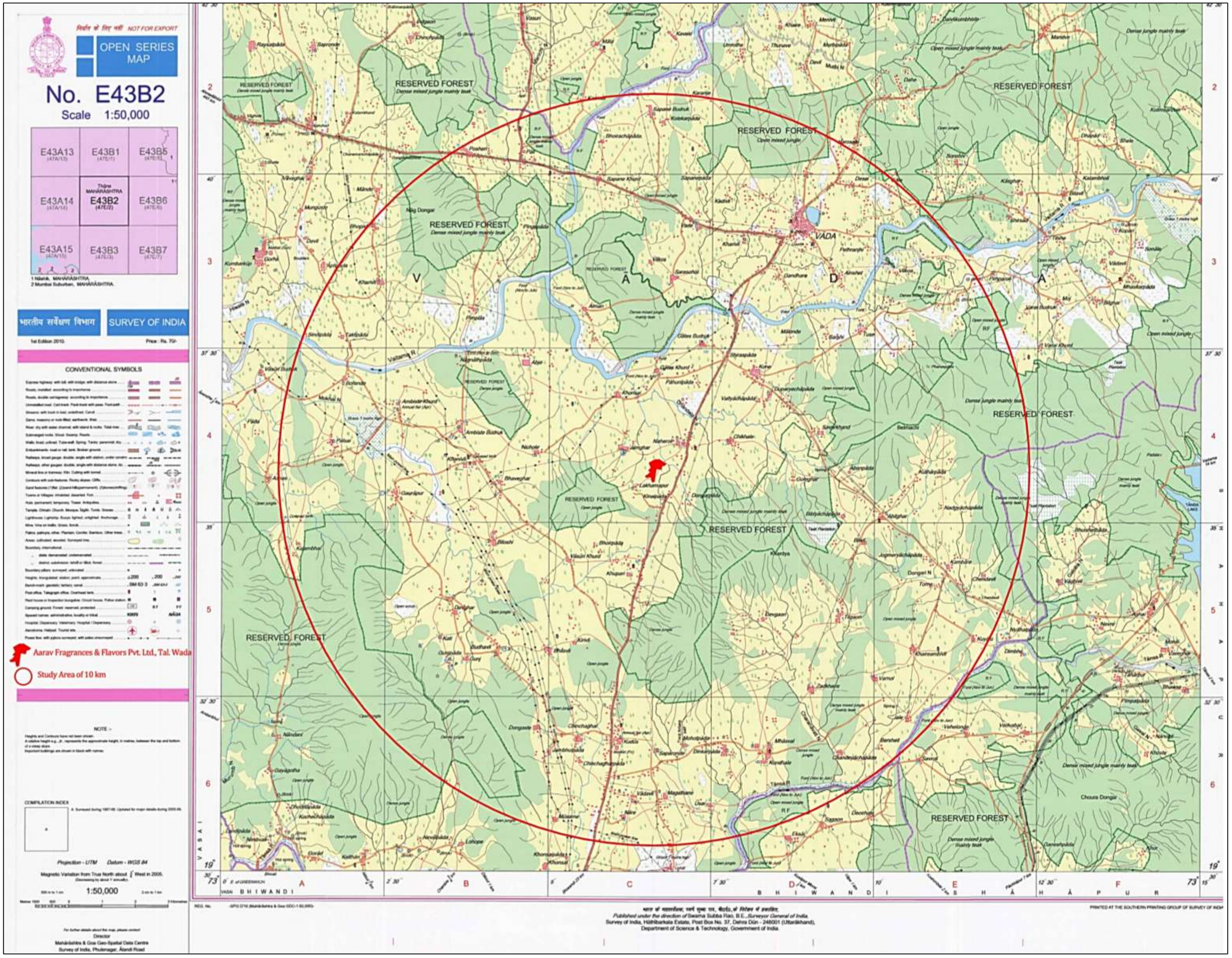


Figure 1 Toposheet showing 10 km of study area

1.2. Manufacturing process & Proposed products

There is an ever-growing requirement of the consumers for fragrances & flavors in India and world markets. Hence the company proposing to produce synthetic organic chemicals & molecules which will be used captively by the company and also sold to other reputed manufacturers.

Manufacture of Fragrances and flavors involves formulations of organic compounds. Proposed specialty chemicals & molecules required for the above are manufactured by the following organic synthesis processes such as Grignard reaction, Aldol condensation, esterification, trans esterification, Darzen condensation, saponification of esters, Dimerization and Trimerization of simple olefins, Cyclo Alkylation Reactions /Acetylation, Diel Alders Reactions: Cyclization Reaction, Etherification of Alkyl Halide and Alcohol, Epoxidation of Alkenes/ Friedel Craft Reactions etc.

The existing manufacturing facilities is for Formulation of Fragrances and Flavors & an associated R & D activity. AFFPL proposes to establish the manufacturing of synthetic organic chemicals along with expansion of existing formulation and R & D activities. Details of Existing products & proposed establishing products are listed in **Table 1**.

Table 1: Existing & Proposed establishing Products & Quantities

Sr. No.	Products	Existing TPM	Proposed TPM	Total TPM
1a.	*Fragrances/Perfumes & Flavors **(*)***	70	210	280
1b.	*R & D for fragrances and Flavors **(*)***	--	--	--
2.	Perfumery & Flavor Esters Products in various grades	Nil	372	372
3	Perfumery & Flavor Alcohol Products in various grades			
4	Perfumery & Flavor Aldehyde and Aldehyde derivatives Products in various grades			
5	Dimerization and Trimerization of simple olefins. Products in various grades			
6	Ketals / Acetals / substituted 1,3-propanediols Products in various grades			
7	Macro cyclic and polycyclic musks derived from propylene/ butadiene and other propylene derivatives Products in various grades			
8	Aldehydes & Ketones by Aldol Condensation Products in various grades			
9	Acetylene and other alkyne derivatives Products in various grades			
10	Cyclo Alkylation/Acetylation, Diel Alders Reactions: Cyclization Reaction, Etherification of Alkyl Halide and Alcohol, Epoxidation of Alkenes /Friedel Craft Reactions Products in various grades			
11	Hydrogenation Products in various grades			

12	Inorganic Salts (side stream products)		50	50
	Total	**70**	**632**	**702**

(*) *MPCB Consent to Operate No. Formate 1.0/AST/RO-KN/EIA no KN -6887 -16/R/CC-4912 dated 13th April 2016 and valid up to 30th September 2020.*

1.3. Fuel requirement

One boiler of 5 TPH and one thermic fluid heater of 3 Lac kcal/Hr are proposed to be installed to fulfill heating requirement of the proposed project.

	Boiler (1x 5 TPH)	**Thermic Fluid Heater (1 x 3 Lac kcals/ hr)**
Fuel used & Quantities	Agricultural Waste: 22 TPD *OR* Bio Coal: 22 TPD *OR* Furnace oil: 10 TPD *OR* Coal: 22 TPD *OR* Natural Gas: 8500 m^3/Day	Agricultural Waste: 5 TPD *OR* Bio Coal: 5 TPD *OR* Furnace Oil: 2.5 TPD *OR* Coal: 5 TPD *OR* Natural Gas: 2500m^3/day

1.4. Water Consumption

Additional requirement of fresh water will be fulfilled through borewell/ tanker. Aarav Fragrances has received Approval letter from CGWA (vide letter no. 21-4 (211)/CR/CGWA/2015-1523 dated 30th September 2015) for with drawal of 130 cmd of Ground water. The proposed additional water consumption will be 115.5 cmd. The total water consumption post establishment project will be 124 cmd.

2. Description of the Environment

Considering the local and regional setting of the area surrounding the plant facility, surrounding area of 10 km of the plant site is considered as study area for setting up environmental baseline to study/ predict the impacts in surroundings due to the proposed establishment project, as per MoEFCC guidelines. Environmental data monitoring was done during Winter of 2015-16 *(Dec-15, Jan-16, Feb-16)* for meteorology, air quality, water quality, noise levels and soil characteristics, by setting up monitoring stations as prescribed. Further, existing ecological and socioeconomic features were also studied.

2.1 Land Environment

The soil samples were collected at 8 locations having different land use. Soil texture of all sampling location is sandy in nature. The pH of soil samples ranging from 5.55 to 6.93. Electrical conductivity is in range of 0.002 µmhos/cm to 0.422 µmhos/cm. The potassium concentration is ranging from BDL to 357.4 kg/ha. The phosphate concentration is ranging from BDL to 0.19 kg/ha. The % TOC concentration was ranging from 0.42 % to 0.50 %. The soil is found to be low in nitrogen content.

As per the results presented, Soil quality in the study area is good in terms of nutrient value but moderately acidic in nature at all locations which is expected considering the high rainfall in the area. This may result into reduced root growth, reduced nutrient availability, affect crop protectant activity. But for most agronomic crops the soil pH should be between 6.9-7.0. Hence it is not much of a concern. The electrical conductivity is low/average, soil has medium Organic carbon but has low Nitrogen content. Deficiency of Phosphorous, Potassium and Nitrogen generally seen from the results are to be taken care and accordingly fertilizers shall be required at time of green belt development and tree plantations. Otherwise, soil is good for tree plantation and green belt development.

2.2 Meteorology & Climate

The temperature data recorded in study area is ranging from 36.9^0C to 16.5^0C. From the wind rose graph it was observed that wind speed ranges from 0.5-2.1 m/s to ≥ 11.1 m/s. Out of total data 48.4% contributing as calm. The predominant wind direction is WWN, N, E during monitoring period.

2.3 Air Environment

The baseline air quality was established by monitoring major air pollutants PM_{10}, $PM_{2.5,}$ SO2, NOX, CO, and nMHC at eight locations (including onsite) in study area for 24 hours during period of winter 2015-16. The air quality was observed to be within the NAAQS norms for residential and rural area.

- Concentration of PM_{10} is varying from 40.8 µg/m^3 to 78.9 µg/m^3. The maximum concentration is mainly due to transportation / industrial activities/ quarrying activities within study area.

- Concentration of $PM_{2.5}$ is varying from 30.8 µg/m^3 to 39.5 µg/m^3. The maximum concentration is mainly due to transportation (along Bhiwandi- Wada road) / quarrying activities within study area.

- Concentration of SO_2 is varying from 10.2 µg/m^3 to 14.3 µg/m^3. The maximum concentration is mainly due to industrial activities in study area.

- Concentration of NOx is varying from 10.9 µg/m^3 to 14.0 µg/m^3. NOx levels are higher due to industrial activity/ fairly high traffic along Bhiwandi Wada road.

- Concentration of CO is varying from 0.41 µg/m^3 to 1.38 µg/m^3. The maximum concentration is mainly due to transportation & high traffic.

- nMHC values are not detectable within study area

Concentration of air pollutants (like PM_{10}, $PM_{2.5}$ SO_2, NOx, CO, nMHC etc.) is below the specified CPCB norms. Hence ambient air in the 10 km study zone is well within the norms

laid down by CPCB. Thus, it can be concluded that ambient air quality in the area is not polluted.

2.4 Noise Environment

The onsite data was observed well within standard for Day & Night time. In Residential zone Day time results ranging from 59.5 dB(A) to 41.6 dB(A) & Night time results ranging from 37.2 to 59.8 dB(A). Out of 8 monitoring locations, values at 3 villages exceeded the standards. The higher noise levels in the study area can be attributed to industrial/ transportation/ quarrying activities. Data monitored onsite is within specified limits.

2.5 Water Environment

Ground water (Borewell water) was collected at 8 locations in study area.
It is observed that ground water is slightly hard though within the permissible norms. Heavy metals are observed in some water samples. Samples are seen to have contamination of TAN probably due disposal of untreated sewage in the area and and/or high humic substances in soil. Samples also fail w.r.t E-coli and Coliform content and is not suitable for drinking. This may be due to disposal of untreated sewage in the area near the ground water source, use of well water for bathing and cleaning of utencils, animals, vehicles etc. From the analysis results, it is observed that ground water does not meet the criteria as per IS 10500:2012 for Drinking Water Quality.

Surface water quality was monitored for Vaitarna River which is at a distance of about 3 km at North side of plot area. The sample was taken upstream and downstream of Vaitarna River with reference to site location.
From the analysis results it can be observed that surface water has contamination of Coliform and is not suitable for drinking. This may be due to disposal of untreated sewage in the area and/or vehicle washing, animals bathing, cloth / utensil washings etc. Heavy metals are observed on higher side in surface water samples.

2.6 Biological Environment

Study area encompasses mostly part of Wada taluka. According to classification of Biogeographical zone of India, study area falls under 'Western Ghats'. 18 villages in study area are listed as Ecological Sensitive Area, in directions under section 5 of Environment Protection Act 1986, dated 13th November 2013, draft notification dated 10th March 2014 and 4th September 2015 issued by MoEFCC.

Tansa Wildlife Sanctuary a protected area under Wildlife Protection Act 1972 is located partially within study area (approx. 5.8 km to East). The proposed project neither requires Forest land nor any area in Tansa wildlife Sanctuary and will be carried out in existing plot held by Company.

Field observations at the site shows the species planted in green belt are mostly showy and inappropriate from noise, air pollution abatement point of view.

2.7 Socio Economic Environment

79 villages & 2 census town falls under study area from Wada tehsil of Thane district. Socio-economic survey was conducted in 21 villages of the study area located in all directions & distances with reference to the proposed project site.

As per 2011 census record:

- Total population of the study area is 1,06,566 out of which 55,673 (52%) are males and 50,893 (48%) are females
- There are 24,021 households in the study area with average family size is 4.4 persons per household.
- Sex ratio within study area is 914 females per 1000 male which is higher as compared with 2001 census data.
- Literacy rate of the study area has increased from 63% in 2001 to 66%. The male and female literacy rates are 73% and 60% respectively.

Observations from site survey:

Majority of respondents opined positively regarding industrial development activity since they are aware industries provide employment opportunities in skilled & semi-skilled works. 4 surveyed villages i.e. Lakhmapur, Kone, Varale & Kambare expressed negative impact of industrialization mainly due to nearby operating industries.

Main concern of these villages that pollution problem should be sorted out by authorities and industrialists by well-planned precautionary measures for pollution. Villagers expressed that the industrial activity should be beneficial in terms of local employment so that the standard of living of nearby population will enhance & suitably will develop the area.

Along with local recruitment villagers also expecting the development of infrastructural facilities in the form of roads, drainage line, health facilities, irrigation facility, library, godown (storehouse or room) for crops & cold storage facility for vegetables, street light & tree plantation etc.

3. Anticipated Environmental Impacts & Mitigation Measures

Environmental impact identification & Mitigation measures is based on the type, scale and location of proposed project activity. Environmental components that may be affected negatively and positively due to proposed activity are identified.

Environment parameters are selected for impact assessment due to proposed activity during various phases. The maximum impacts during Construction & Operation phase were listed below:

Table 3 Anticipated Impacts & Mitigation measures for different phases of project

Sr. No.	Step/Activity	Environmental Aspect	Anticipated Impact	Suggested Mitigation Measures
1.0	Construction Phase	Land Environment	Generation of Solid waste/ Improper disposal method	Segregation of Solid waste & Hazardous waste/ Separate storage for solid waste/ Disposal of solid waste as per MPCB norms
		Air Environment	Dust generation/ emission of SO_2, NO_x, CO from construction activities	Dust suppression & Water sprinkling system for Dust generating area/ Proper maintenance of equipment's & vehicles
		Noise Environment	From loading, unloading of material/ Equipment handling/ Noise generating equipment	Use of damping material/ Regular maintenance of equipment/ Isolation of noise generating equipment/
		Water Environment	Exploitation of ground water of 10- 12 cmd / Improper disposal of sewage	Fresh water requirement will be fulfilled from existing borewell. Sewage of ~5 cmd will be disposed off properly/ reused for gardening.
		Biological Environment	Generation of dust/ Improper disposal of sewage/	Existing green belt will be developed suitably. Sewage will be disposed off properly & reused for gardening.
		Socio Economic Environment	Employment generation/ Health of workers	Approx. 50-60 no. of persons will be employed from nearby area for construction phase. Adequate provision of PPE/ Suitable infrastructure facilities for workers
2.0	Operation Phase	Land Environment	Generation of Solid waste (243 TPM Ash) & Total Hazardous waste of 60 TPM requiring disposal	15 Days Ash storage will be provided & will be given for landfill/ brick making. Hazardous waste will be segregated & stored in designated storage area. Hazardous waste will be disposed off as per CPCB/ MPCB norms.
		Air Environment	Emission of TPM & flue gases from Boiler & Thermic Fluid heater/ Fugitive emission/ Increase in conc. of SO_2	Boiler & Thermic Fluid heater will be provided with adequate Stack height & air pollution control system (scrubbers). Regular monitoring of stacks as per MPCB/ CPCB norms. From the air modelling

Sr. No.	Step/Activity	Environmental Aspect	Anticipated Impact	Suggested Mitigation Measures
			emission: 2.1 µg/m^3 Increase in conc. of NO_x emission: 1.26 µg/m^3 Increase in conc. of PM_{10} emission: 0.72 µg/m^3	study, it is observed that flue gas emission is within permissible standard.
		VOCs	Increase in VOC levels due to increased handling/ processing of organic chemicals and storages	Company will have strict VOC control through use of : Mechanical seals on pumps and agitators, closed loop sampling, RD provided upstream of PRV and discharging into common header going to scrubber, all process vents to be provided with condensers with chilled brine for condensation
		Noise Environment	From loading, unloading of material/ Operation of pumps & machineries	Isolation of vibrating units & equipment/ Regular maintenance of equipment's/ Use of vibration dampening/ Adequate PPE for workers
		Water Environment	Exploitation of ground water of 124 cmd/ Effluent generation, treatment & disposal	Fresh water will be sourced from existing borewell for which NOC from CGWA received. Water conservation measures: • Effluent will be segregated , treated & recycled in order to have ZERO liquid discharge • ETP at site will be upgrade to provide Two stage aeration tank and high TDS effluent will be evaporated • RWH plan developed which will recharge ground water table. • RWH scheme will harvest conservatively 12,000 m^3 of incident rainfall annually
		Biological Environment	Emission of pollutant/ Solid & Hazardous waste generation/ Effluent generation & disposal	14,863 sq. m of area will be developed as Green belt. Green belt will be developed to provide screening effect. 800 No. of local indigenous species of Trees will be planted as part of green

Sr. No.	Step/Activity	Environmental Aspect	Anticipated Impact	Suggested Mitigation Measures
				belt development.
		Socio Economic Environment	Employment generation/ Health of workers	Approx. 100-125 nos. of persons will be employed during operation phase. Preferences shall be given to local employment. CSR budget of 15 Lakhs for next financial year. Proposed project will result in Increased taxes to local Gram panchayat

4. Environment Monitoring Program

For tracking of the effectiveness of mitigation measures & EMP at specific interval, regular monitoring of the necessary environmental parameters is required.

- Regular monitoring through MoEFCC recognized laboratory for compliance with conditions of EC, Consent to operate and provisions under Factory Act & Environmental Protection Act
- Monitoring of environmental samples shall be done as per the methods/guidelines provided by MoEFCC/ CPCB and /or relevant Indian Standards or methods as specified by Standard Methods
- Assessment of the changes in environmental conditions, if any, during the project operation/activities.
- Identification of any significant adverse transformation in environmental condition to plan additional mitigation measures; if & as required.

5. Additional Studies (Safety and risk assessment studies)

Safety and risk assessment studies have been conducted for principal storage tanks and chemicals proposed to be handled onsite (OSBL tanks).

The calculations of F & EI and Recommendations are done for the Acetic acid, FO, Dicyclopentadiene, Pentanol, Propionaldehyde tanks. The degree of hazards is tabulated based on F & E I, Mond index.

Systematic study based on ALOHA has been carried out for Pentanol, FO, Propionaldehyde, acetic acid, dicyclopentadiene etc. The details of consequence analysis studies have been presented in the EIA chapter 7 which shows that some risk contours (representing damage distances during worst accident scenarios are going out of factory premises).

The precautions to be taken and recommendation for safe operations are mentioned at site.

Company has committed to comply with suggested recommendation.

6. Project Benefits

- Project will result in benefit to the country in form of foreign exchange revenues, duties etc.

- Enhanced production will also result in increased taxes to local gram panchayat and State Exchequer.

- Manpower requirement during Construction phase will be approximately 50-60 No. of persons from nearby local area

- Manpower requirement during Operation phase will be approximately 100-125 No. of Persons from nearby local area

- Further, the indirect employment via increased transportation, ancillary units & local economic activities with enhances spending power will also add in the employment potential.

- Indirect improvement in public infrastructure through CSR activities carried by Aarav Fragrances & Flavors with enhances spending power will help to improve the overall quality of life in study area.

7. Environment Management Plan

The plan incorporates environment management measures during construction and operation phases. The capital outlay for environmental control & management measures estimated to be Rs. 98.5 lakhs. Aarav Fragrances proposes Rs. 15 Lakhs for CSR activities.

Environmental Controlling Measure	Capital Investment (Rs. In Lakhs)	O&M Cost/Annum (Rs. In Lakhs)
Water pollution control	45.00	5.00
Noise pollution control	NA	NA
Environment monitoring and management	10.00	2.50
Occupational health and safety	0.00	5.00
Green belt / plantation development	10.00	3.00
Hazardous waste and solid waste management	2.50	8.00
Other Green initiatives -		
- Rain water harvesting	16.00	3.00
- Solar power / LED	15.00	3.50
Total	**98.50**	**30.00**

8. Conclusion:

The study for the proposed project of AFFPL at Lakhmapur has revealed that the upcoming activities of synthetic organic chemicals will have some minimal impacts during operation phase. All other impacts of the project will remain far below acceptable limits after necessary mitigation as described & suggested in EIA report. The major impacts will also be brought under acceptable limits by implementing the required hazard prevention & control measures as suggested in the report. Thus, it has been concluded that there would not be any major impacts on environment due to the proposed project.