EXECUTIVE SUMMARY

ENVIRONMENT CLEARANCE FOR EXPANSION OF DISTILLERY CAPACITY FROM 25 KLPD TO 200 KLPD BASED ON SUGARCANE JUICE/ SYRUP/"C"/"B" HEAVY MOLASSES AS RAW MATERIAL TO PRODUCT RS/ENA/ETHANOL ALONG WITH EXPANSION OF SUGAR UNIT FROM 2000 TCD TO 5500 TCD

AT HARALI

TAL. GADHINGLAJ, DIST. KOLHAPUR, MAHARASHTRA

BY

M/S APPASAHEB NALAWADE GADHINGLAJ TALUKA SAHAKARI SAKHAR KARKHANA LIMITED

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EXECUTIVE SUMMARY

1 INTRODUCTION

Appasaheb Nalawade Gadhinglaj Taluka Sahakari Sakhar Karkhana Limited (ANGTSSKL), Harali, Taluka Gadhinglaj, Dist. Kolhapur, was established in the year 1978 with a sugarcane crushing capacity of 2000 TCD. The command area of the sugar factory has excellent cane potential and the sugarcane grown in this area is rich in sucrose content. The Industry has also established a distillery of 25 KLPD in the year 1989 at which time the Environmental Clearance could not be obtained as distillery was established prior to the gazette notification 1994. However, the industry has been getting the CTO renewed regularly and the present CTO for distillery unit is valid till 2024 and for sugar unit till 31st July 2023.

Considering the Sugarcane cultivation potential and the availability of sugarcane in the command area the industry proposes to increase Distillery capacity from 25 KLPD to 200 KLPD based on "C"/"B" heavy molasses/sugarcane juice/syrup as a raw material to produce RS/ENA/Ethanol along with expansion of sugarcane crushing capacity from 2000 TCD to 5500 TCD.

The aggregated capital investment for the proposed establishment is estimated as Rs. 250 Crores

1.1 PROJECT LOCATION

The salient features of the project site are

Table 1-1 Salient features of the project site

Sr. No.	Features	Description	Directions w.r.t. site
1.	latitude	16°10'1.34"N	
2.	Longitude	74°20'28.36"E	
3.	Elevation above MSL	686 m	
4.	Nearest highway	NH 548 H (4 km)	N
5.	Nearest railway station	Ghatprabha (45 km)	ENE
6.	Nearest air port	Belgaum (45 Km)	SE
7.	Nearest town/City	Gadhinglaj (6.6 km)	N
8.	Nearest human settlement	Harali (1 km)	N
9	Nearest water body	Hiranyakeshi River(0.45 Km)	N
10.	Protected Area	None within 10 km	
11.	Reserved Forests	None within 10 km	
12.	Wildlife Sanctuary	None within 10 km	
13.	Archeological site	None within 10 km	
14.	State boundary	None within 10 km	
15.	Defense installations	None within 10 km	

Sr. No.	Features	Description	Directions w.r.t. site
16.	Average Rainfall	670 mm	

2 PROJECT DESCRIPTION

The details about the maufacturing capacity of existing unit as well as after the proposed expansion are given in table below

Table 2-1 Existing and Proposed Products manufacturing quantities

Sr. No.	Product Name	Existing	Proposed	Total	Remark
Product					
1	Sugar Crushing Capacity in TCD	2000	3500	5500	--
2	Distillery in KLPD	25	175	200	--
a)	RS/ENA/Ethanol in KLPD	25	175	200	Only one product at a time
By-product					
1	CO2 in TPD	--	130-150	130-150	Shall be collected and sold in open market

2.1 RESOURCE REQUIREMENT AND INFRASTURE FACILITIES

A) Land use Details

The total area available with the factory is **54.45 Hectares** Out of which **17.97 Hectares** will be utilized for green belt development. A detailed area breakup is given below

Table 2-2 Landuse breakup

Sr. No.	Description	In Sq. m.	% of Total Area
1	Existing Built up area	86000.85	15.79
2	Existing area under utility	35486.74	6.52
3	Proposed Built up area	8490.00	1.56
4	Proposed area under utility	8203.70	1.51
5	Parking	99116.04	18.20
6	Area under road	74646.00	13.71
7	Greenbelt	179708.20	33.00
8	Open space	52848.47	9.71
	Total	544500.00	100.00

B) Power requirement

Total power requirement for the industry after proposed expansion shall be 7 MW which shall be produced from TG set of boilers which shall be adequate for sugar and distillery unit.

The steam and power requirement are met from present 35 TPH sugar boiler, 2*25 TPH distillery boiler and proposed 50 TPH sugar boiler.

C) Water Consumption details

Industrial Purpose:

The Hiranyakeshi River is the main source of water. The industry has water lifting permission of 13.25 MCFT/year

Due to excess condensate available from Sugar unit, there shall not be any water requirement for sugar unit except as 205 KLPD as boiler makeup water and100 m^3/day for domestic purpose.

Distillery Division – The net fresh water requirement for distillery division shall be 78 KLD (during season and during off season fresh water requirement hall be 657 KLD. Domestic water requirement for distillery shall be 20 KLD, 124 for boiler makeup water and 250 KLPD for cooling tower makeup water

Detailed water budget of the industry is shown in **Table 2.3 to Table 2.6**

Domestic Purpose:

The water requirement for domestic purpose is 120 KLD (100 KLD for sugar and 20 KLD for distillery).

Hence, total fresh water requirement for proposed project shall be **1434 KLD** (i.e. 205 KLD for sugar and 124 KLD for distillery boiler makeup water, 78 KLD for distillery during season, 657 KLD for distillery unit during off season, 250 KLD for cooling tower makeup water and 120 KLD for domestic purpose)

Water balance calculations:

Sugar division

Table 2-3 Water Budget -Sugar unit

Sr. No.	Details	Water Requirement (m3/day)			Consumption/Losses (m3/day)			Reuse / Recovery (m3/day)			Waste Generation (m3/day)		
		E	P	T	E	P	T	E	P	T	E	P	T
Domestic Purpose													
1	Domestic	100	0	100	20	0	20	0	0	0	80	0	80
Industrial Purpose													
1	Boiler 35 TPH	805	0	805	40	0	40	745	0	745	20	0	20
2	Boiler 50 TPH	0	1150	1150	0	60	60	0	1065	1065	0	25	25
3	DM Plant	55	75	130	45	60	105	0	0	0	10	15	25
4	Process water	70	120	190	10	20	30	0	0	0	60	100	160
5	Washing of equipment	20	50	70	0	0	0	0	0	0	20	50	70
6	Air compressors & pumps	20	20	40	5	5	10	15	15	30	0	0	0
7	Condenser Water	0	0	0	0	0	0	400	700	1100	All the condenser water shall be treated in proposed CPU of capacity 1100 m3/day and recycled as process water.		
8	Spray pond blow-down	400	700	1100	200	350	550	0	0	0	200	350	550
9	Cooling tower blow-down	60	100	160	12	21	33	0	0	0	48	79	127
10	Colony firefighting & Gardening	50	0	50	50	0	50	0	0	0	0	0	0
11	Recycling of Excess Condensate	0	0	0	0	0	0	400	700	1100	0	0	0
Total		**1480**	**2215**	**3695**	**362**	**516**	**878**	**1560**	**2480**	**4040**	**358**	**619**	**977**

Where,

E – Existing 2000 TCD.
P – Proposed 3500 TCD
T – Total 5500 TCD

Note:

1. At present there is 30 TPH boiler which shall be upgraded to 35 TPH and proposed 50 TPH boiler shall be utilized for sugar unit after expansion.
2. Treated excess condensate used in DM plant to meet the boiler make-up water requirement.

Remark:

- The consumption/losses and final wastewater generated is (878+977) = 1855 m3/day.
- The excess condensate and condensers water available is 2200 m3/day. Thus the excess water available for reuse would be around 1855-2200 = 345 m3/day.

Net Water saving would be:

i) Industrial Purpose: 3695-4040 = -345 m3/day.

Due to excess condensate available from Sugar unit, there shall not be any water requirement for sugar unit except as 205 KLPD as boiler makeup water and100 m^3/day for domestic purpose.

In fact an excess amount of 345m3/day is saved, which shall be used for distillery unit during season.

ii) Domestic Purpose: After proposed expansion, domestic water requirement will be 100 m3/day.

Effluent Generation:

i. Industrial – 977 m3/day out of which sugar effluent - 230 m3/day, spray pond effluent – 550 m3/day and other effluent 197 m3/day (out of which 45 m3/day boiler blow-down, 127 m3/day cooling tower blow –down and 25 m3/day of DM plant reject).

ii. Domestic – 80 m3/day.

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Distillery division

I. Based on Sugarcane Juice/Syrup

Table 2-4 Water Budget for Distillery Division (Sugarcane Juice/Syrup)

Sr. No.	Details	Water Requirement (KLD)			Consumption/Losses (KLD)			Reuse / Recovery (KLD)			Waste Generation (KLD)			Recycle / Reuse (after CPU)
		E	P	T	E	P	T	E	P	T	E	P	T	
Domestic														
1	Domestic	12	8	20	4	3	7	0	0	0	8	5	13	
Industrial														
1	Boiler-25 TPH	575	0	575	30	0	30	530	0	530	15	0	15	15 to CPU
2	Boiler-25 TPH	575	0	575	30	0	30	530	0	530	15	0	15	15 to CPU
3	DM water plant	80	0	80	64	0	64	0	0	0	16	0	16	16 To CPU
4	Process Water	165	1135	1300	0	0	0	Raw Spentwash			125	855	980	Drying
								Dried/ Conc. Spentwash			22	152	174	
								MEE Condensates			103	703	806	806 To CPU
								Spentless			40	280	320	320 to CPU
5	Cooling Tower Make-up Water	35	215	250	20	105	125	0	0	0	15	110	125	125To CPU
6	Fermenter Washing	20	45	65	0	0	0	0	0	0	20	45	65	65 To CPU
7	Miscellaneous such as pump and gland cooling etc.	20	40	60	0	0	0	0	0	0	20	40	60	60 to CPU
8	Excess Condensate available from sugar unit	0	0	0	0	0	0	0	345	345	0	0	0	--
9	Treated effluent from Distillery CPU	0	0	0	0	0	0	244	1178	1422	0	0	0	--
Total		**1470**	**1435**	**2905**	**144**	**105**	**249**	**1304**	**1523**	**2827**	**266**	**1330**	**1596**	**1422 To CPU**

Where,

E= Existing 25 KLPD,

P=Proposed 175 KLPD,

T= Total 200 KLPD

Note:

Condensate quantity of 345KLD is available from sugar crushing unit, which used for distillery based on sugarcane syrup as raw material during crushing season.

Remark: Raw Spentwash (980 KLD) shall be treated based on anaerobic digester followed by MEE followed by drying.

Note:

The consumption/losses and final wastewater generated is amounting to (249+1596-1422) = 423 KLD.

Therefore, water requirement shall be 423 KLD, but 345 KLD excess condensate taken from sugar unit for proposed distillery based on syrup as raw material during crushing season.

Water requirement shall be 423-345=78 KLD

Industrial:

Net Water Requirement: 2905-2827 = 78 KLD.

Effluent Generation: 1596 KLD out of which conc. spentwash –174KLD, spentlees – 320 KLD, DM plant wastewater generation-16 KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-30 KLD and cooling tower wastewater generation – 125 KLD, Miscellaneous- 60 KLD, MEE condensate-806 KLD

All the effluent except spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Spentwash shall be treated based anaerobic digester followed by MEE followed by drying

II. Based on "C Molasses

Table 2-5Water Budget for Distillery Division (based on "C" Molasses)

Sr. No.	Details	Water Requirement (m^3/day)			Consumption/Losses (m^3/day)			Reuse / Recovery (m^3/day)			Waste Generation (m^3/day)			Recycle / Reuse (after CPU)
		E	P	T	E	P	T	E	P	T	E	P	T	
Domestic														
1	Domestic	12	8	20	4	3	7	0	0	0	8	5	13	
Industrial														
1	Boiler-25 TPH	575	0	575	30	0	30	530	0	530	15	0	15	15 to CPU
2	Boiler-25 TPH	575	0	575	30	0	30	530	0	530	15	0	15	15 to CPU
3	DM water plant	80	0	80	64	0	64	0	0	0	16	0	16	16 To CPU
4	Process Water	250	1750	2000	0	0	0	Raw Spentwash			200	1400	1600	Drying
								Dried/ Conc. Spentwash			51	357	408	
								MEE Condensates			149	1043	1192	1192 To CPU
								Spentless			50	350	400	400 to CPU
5	Cooling Tower Make-up Water	35	215	250	20	105	125	0	0	0	15	110	125	125To CPU
6	Fermenter Washing	20	45	65	0	0	0	0	0	0	20	45	65	65 To CPU
7	Miscellaneous such as pump and gland cooling etc.	20	40	60	0	0	0	0	0	0	20	40	60	60 to CPU
8	Treated effluent from Distillery CPU	0	0	0	0	0	0	300	1588	1888	0	0	0	--
Total		**1555**	**2050**	**3605**	**144**	**105**	**249**	**1360**	**1588**	**2948**	**351**	**1945**	**2296**	**1888 To CPU**

Where,

E= Existing 25 KLPD,

P=Proposed 175 KLPD,

T= Total 200 KLPD

Remark: Raw Spentwash (1600 KLD) shall be treated based on anaerobic digester followed by MEE followed by drying.

Note:

The consumption/losses and final wastewater generated is amounting to (249+2296-1888) = 657 KLD.

Industrial:

Net Water Requirement: 3605-2948 = 657 KLD.

Effluent Generation: 2296 KLD out of which conc. spentwash –408 KLD, spentlees – 400 KLD, DM plant wastewater generation-16 KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-30 KLD and cooling tower wastewater generation – 125 KLD, Miscellaneous- 60 KLD, MEE condensate-1192 KLD

All the effluent except spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Spentwash shall be treated based anaerobic digester followed by MEE followed by drying

III. Based on B Heavy Molasses

Table 2-6 Water Budget for Distillery Unit (based on B Heavy Molasses)

Sr. No.	Details	Water Requirement (m^3/day)			Consumption/Losses (m^3/day)			Reuse / Recovery (m^3/day)			Waste Generation (m^3/day)			Recycle / Reuse (after CPU)
		E	P	T	E	P	T	E	P	T	E	P	T	
Domestic														
1	Domestic	12	8	20	4	3	7	0	0	0	8	5	13	
Industrial														
1	Boiler-25 TPH	575	0	575	30	0	30	530	0	530	15	0	15	15 to CPU
2	Boiler-25 TPH	575	0	575	30	0	30	530	0	530	15	0	15	15 to CPU
3	DM water plant	80	0	80	64	0	64	0	0	0	16	0	16	16 To CPU
4	Process Water	200	1400	1600	0	0	0	Raw Spentwash			150	1050	1200	Drying
								Dried/ Conc. Spentwash			28	190	218	
								MEE Condensates			122	860	982	982 To CPU
								Spentless			50	350	400	400 to CPU
5	Cooling Tower Make-up Water	35	215	250	20	105	125	0	0	0	15	110	125	125To CPU
6	Fermenter Washing	20	45	65	0	0	0	0	0	0	20	45	65	65 To CPU
7	Miscellaneous such as pump and gland cooling etc.	20	40	60	0	0	0	0	0	0	20	40	60	60 to CPU
8	Treated effluent from Distillery CPU	0	0	0	0	0	0	273	1405	1678	0	0	0	--
Total		**1505**	**1700**	**3205**	**144**	**105**	**249**	**803**	**1405**	**2738**	**301**	**1595**	**1896**	**1678 To CPU**

Where,

E= Existing 25 KLPD,

P=Proposed 175 KLPD,

T= Total 200 KLPD

Remark: Raw Spentwash (1200 KLD) shall be treated based on anaerobic digester followed by MEE followed by drying.

Note:

The consumption/losses and final wastewater generated is amounting to (249+1896-1678) = 467 KLD.

Industrial:

Net Water Requirement: 3605-2738 = 467 KLD.

Effluent Generation: 1896 KLD out of which conc. spentwash –218 KLD, spentlees – 400 KLD, DM plant wastewater generation-16 KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-30 KLD and cooling tower wastewater generation – 125 KLD, Miscellaneous- 60 KLD, MEE condensate-982 KLD

All the effluent except spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Spentwash shall be treated based anaerobic digester followed by MEE followed by drying

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Table 2-7 Water Requirement and wastewater generation of the factory

Sr. No.	Water Requirement m^3/day	Wastewater generation m^3/day	
1.	Sugar Division		
	Zero water requirement for sugar division Water Saved –345 (due to excess condensate from sugar unit). However fresh water requirement 250 m^3/day for boiler makeup and 100 m^3/day for domestic purpose	977	
		Sugar effluent	230
		Spray-pond effluent	550
		Cooling tower and boiler effluent	197
2.	Distillery Division		
A.	Based on "C" Molasses		
	657 For process	2296	
	1051 (657 for process+124 for boiler makeup+250 for cooling tower makeup+20 for domestic)	Spentlees	400
		Conc. Spentwash	408
		Other dilute effluent	296
		MEE Condensate	1192
	OR		
B.	Based on "B" Heavy Molasses		
	467 For process	1896	
	861 (467 for process+124 for boiler makeup+250 for cooling tower makeup+20 for domestic)	Spentlees	400
		Conc. Spentwash	218
		Other dilute effluent	296
		MEE Condensate	982
	OR		
C.	Based on "Sugarcane Syrup"		
	78 For process	1596	
	472 (78 for process+124 for boiler makeup+250 for cooling tower makeup+20 for domestic)	Spentlees	320
		Conc. Spentwash	174
		Other dilute effluent	296
		MEE Condensate	806

Note:
A. Other diluted effluent consist of DM plant wastewater, fermenter washing waste, boiler blow-down wastewater, cooling tower wastewater generation and MEE condensate
B. Spentwash Storage Ponds:
-Raw Spentwash (1600 m^3/day) - 7 days storage capacity i. e. 1600*7 = 11200 m^3.

Table 2-8 Details of Bio-gas production for various configurations

Sr. No.	Raw Material used for Distillery	Bio-gas Generated in m3/day.
1.	'C' Molasses OR	64,000
2.	'B' Heavy Molasses OR	30,000
3.	Sugarcane Juice/Syrup	12,250

D) Air Emission Management

Bagasse will be used as fuel for existing 1*35 TPH sugar boiler, 2*25 TPH distillery and proposed 1*50 TPH sugar boiler. The bagasse requirement of the proposed unit will be 1927 MT/D. Bio-gas from Bio-methanation unit shall be used as supplementary fuel in order to further reduce the requirement of bagasse. During season 12,250 m^3/day and during off season 30,000 m^3/day of biogas shall be used for 2*25 TPH distillery boiler.

Common stack of 65 meters height and electrostatic precipitator (ESP) as APC equipment shall be provided for 1*35 TP and 1*50 TPH sugar boiler to control air emissions. 56 meters height and bag filter as APC equipment shall be provided for 2*25 TPH distillery boiler to control air emissions

Table 2-9 Details of boilers and its APC equipment for existing as well as proposed

Sr. No.	Stack attached to	Types of Fuel	Height in meter	APC System
1	Sugar Boiler 1*35 TPH	Bagasse	Common stack of 65 m	ESP
2	Sugar Boiler 1*50 TPH			
3	DG Set of 2*160 kVA	Diesel	6 m above roof level	Acoustic enclosure
4	Distillery Boiler 2*25 TPH	Bagasse and biogas	56 m	Bag filter
5	DG sets of 1*250 kVA	Diesel	6 m above roof level	Acoustic enclosure

E) Solid waste Management

a) Non Hazardous solid wastes details

Table 2-10 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity		Mode of Collection and Disposal
1.	Total Ash	Bagasse as fuel for 50 TPH and 35 TPH Boilers	417.6 MT/M	Ash generated shall be used for brick manufacturing / mixed with pressmud and sold as manure.
		Bagasse as fuel during season for 2*25 TPH boiler	233.55 MT/M	
		Bagasse as fuel during off season for 2*25 TPH boiler	216 MT/M	
2..	ETP Sludge	150 MT/A		Used as manure for gardening after filter press.
3..	Pressmud	6600 MT/M		

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
Other Solid Wastes			
1.	Paper waste	0.01 MT/M	Manually collected and stored in a designated area and sold to scrap vendors
2.	Plastic waste	0.01 MT/M	
3.	Municipal Solid waste		
	Non-Biodegradable	7 MT/M	Manually collected and sold to scrap vendors
	Bio-degradable	10 MT/M	Used as manure.

b. Hazardous Waste

Table 2-11 hazardous waste generated and its disposal

Sr. No.	**Category**	**Description of waste**	**Quantity**	**Mode of Collection and Disposal**
1.	5.1	Used Oil	1.1 KL/A	Shall be mixed with bagasse and burnt in boiler

3 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

Ambient air monitoring was carried out at 8 locations 24 hours a day, twice a week at each location over/for a period of three months (December 2022 to February 2023) to determine background concentrations. The Maximum concentrations of each pollutant observed are considered as a background concentration of the respective location, the summary of the results is given below.

1. Particulate Matter (PM_{10})

The maximum, minimum, average and 98th percentile concentrations for PM_{10} were recorded in the study area in the range of 42.80 to 71.60 μg/ m^3. The maximum 98th Percentile concentration is 71.46μg/ m^3 were recorded at Gadhinglaj (location -6). The concentrations of PM_{10} are well below the CPCB standard of 100μg/ m^3.

2.Particulate Matter ($PM_{2.5}$)

The maximum, minimum, average and 98th percentile concentrations for Particulate Matter ($PM_{2.5}$) monitored in the study area were 21.00 to 37.80/m^3. Highest 98th percentile value is 37.52 μg/m^3 which was observed at Gadhinglaj (location -6). The concentration of $PM_{2.5}$ is well below the prescribed limit of 60μg/m^3.

3. Sulfur Dioxide (SO_2)

The Minimum, maximum, average and 98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 9.10 to 21.80μg/ m^3. Maximum 98th Percentile value of Sulfur dioxide is 21.57 μg/ m^3obtained at Gadhinglaj (location -6).The concentration of SO_2 is well below the prescribed limit of 80μg/m3.

4.Oxides of Nitrogen (NOx)

The Minimum, maximum, average and 98th percentile value of Oxides of Nitrogen (NOx) in the study area from the monitored data was in the range of 11.60 to 24.70μg/ m^3. Maximum 98th Percentile value of Oxides of Nitrogen (NOx) is 24.42 μg/ m^3obtained at Gadhinglaj (location -6). The concentration of NOx is well below the prescribed limit of 80μg/m^3.

5. Carbon Monoxide (CO)

The Minimum, maximum, average and 98th percentile value of Carbon Monoxide (CO) in the study area from the monitored data was in the range of 0.4 to 1.0 mg/ m^3. Maximum 98th Percentile value of Carbon Monoxide (CO) is 1.0 μg/ m^3obtained at Gadhinglaj (location -6). The concentration of CO is well below the prescribed limit of 4.0 mg/m^3

The ambient air quality monitoring results indicates that the overall air quality in the study area is within permissible standards prescribed by NAAQ Standards.

Table 3-1 Receptor Summary

Sr. No.	Description	Location	Latitude	Longitude
	Stack	Stack-1	16°10'0.97"N	74°20'26.02"E
1	AAQ-1	Saroli Grampanchayat	16°10'6.18"N	74°18'10.17"E
2	AAQ-2	Karambali Grampanchayat	16°12'34.39"N	74°17'39.63"E
3	AAQ-3	Hasurwadi	16° 8'46.96"N	74°22'46.15"E
4	AAQ-4	Jambhulwadi	16° 6'27.16"N	74°23'5.47"E
5	AAQ-5	Sule	16° 7'17.69"N	74°19'24.47"E
6	AAQ-6	Gadhinglaj	16°13'10.82"N	74°20'56.23"E
7	AAQ-7	Harali	16°10'34.11"N	74°20'32.99"E
8	AAQ-8	Narewadi	16° 8'34.43"N	74°25'25.08"E

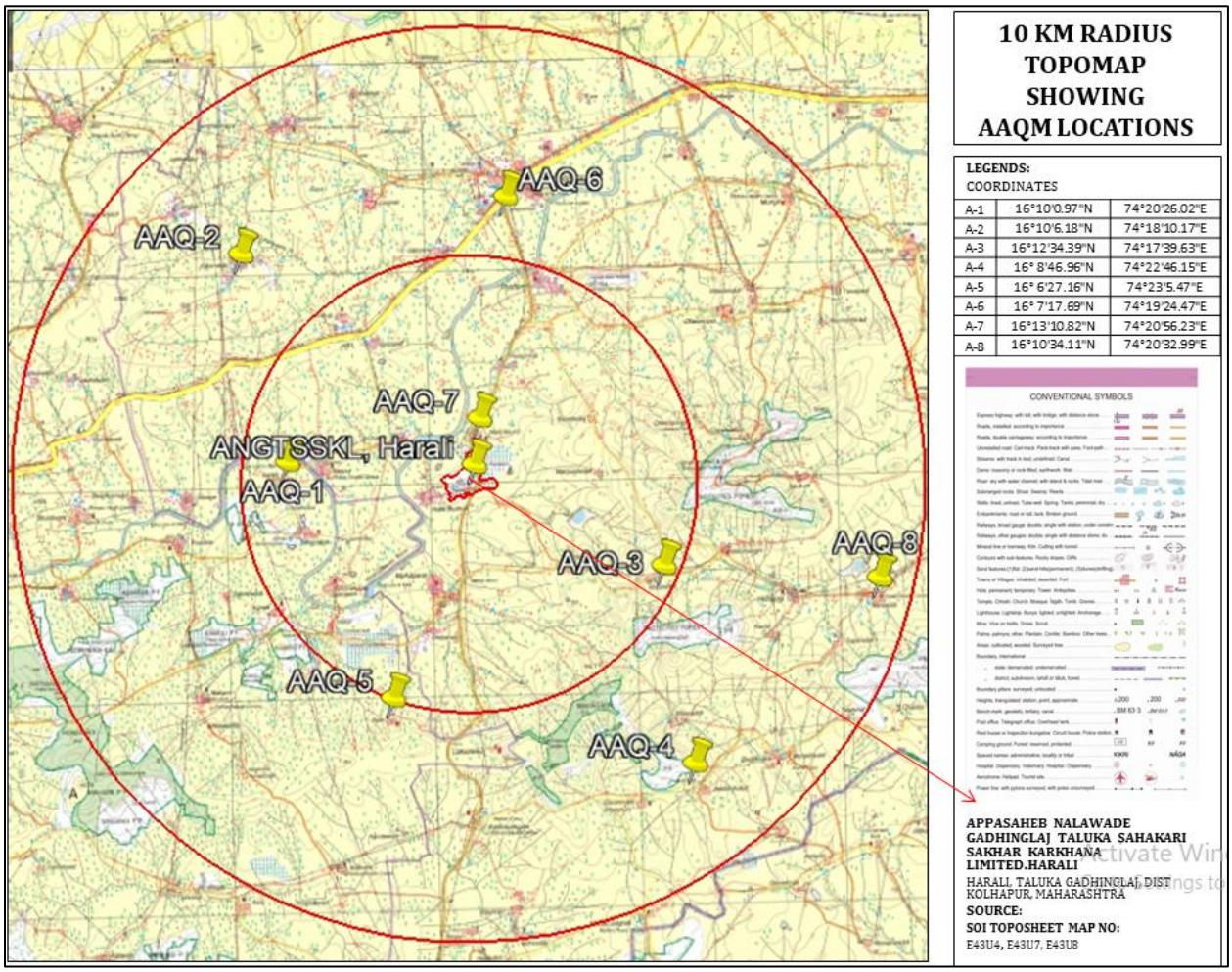

Figure 3.110 km. radius study area map indicating air quality monitoring locations

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

The Industry has existing 1*30 TPH, 2*20 TPH and 1*10 TPH boilers. After the proposed expansion 10 TPH boiler shall be abandoned. The existing 2*20 TPH boilers shall be upgraded to 2*25 TPH boilers and the existing 30 TPH boiler shall be upgraded to 35 TPH .The Industry proposes to add one 50 TPH boiler. The Proposed 50 TPH Boiler and upgraded 35 TPH boiler shall be utilized for 5500 TPD sugar unit and 7.5 MW TG Set which shall be installed along with expansion of the sugar unit. 2*25 TPH boiler shall be utilized for the proposed expansion of Distillery capacity from 25 to 200 KLPD.

Considered the all boilers working at full load conditions to estimate the GLC of PM_{10}, $PM_{2.5}$, SO_2 and NO_x due to the proposed expansion of the industry under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for Appasaheb Nalawade Gadhinglaj Taluka Sahakari Sakhar Karkhana Limited, Harali, Tal- Gadhinglaj, Dist. Kolhapur, and Maharashtra. Incremental concentrations are worked out for 8 receptor locations, at which ambient air quality monitoring was carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed expansion. Results are compared with the Ambient Air Quality Standards (AAQS).

Table 3-2 Stack Inventory

Sr. No.	Particulars	Description	
A. Point Source (Stack attached to boiler)			
1	Stack attached to	Sugar unit boiler	Distillery boiler
2	Capacity	35 TPH and 50 TPH boiler	2*25 TPH
3	Fuel type	Bagasse	Bagasse & Bio-gas
4	Total fuel quantity requirement	928 MT/day	Bagasse -519 MT/day and 12,250 m3/day of Bio-gas
5	Stack height	65 m	56 m
6	Stack diameter	3.0 m.	3.0 m.
7	Flue gas temp.	120^0 - 135^0C	115^0 - 130^0C
8	Flue gas velocity	7.5 – 11.0 m/s	7.5 – 11.0 m/s
9	Controlling equipment	ESP – 99% removal efficiency	Bag – 99% removal efficiency
10	Emission rate	(g/sec)	
	i. TPM	1.3148	0.7208
Based on Observed Conc.& Fuel			
	ii. NOx		
	Based on assumed max emission standards	3.89	3.89
	iii. SO_2		
	Based on Fuel characteristics - Bagasse - 0.02%	4.296	2.4027
	Based on assumed max emission standards	6.48	6.48

Sr. No.	Particulars	Description	
11	Ash content	13.92 MT/day	7.785 MT/day
12	Ash below grate	2.784 MT/day (20 % of the total ash)	1.557 MT/day (20 % of the total ash)
13	Remaining Ash	11.136 MT/day (80 % of the total ash)	6.228 MT/day (80 % of the total ash)
14	Ash going to stack, QPM (with ESP removal efficiency of 99%)	0.1136 MT/day (Consider 99% ESP Efficiency)	0.06228 MT/day (Consider 99% ESP Efficiency)
15	Ambient temperature	30^0C	
B. Line Source (Vehicular emission)			
	Average time of movement of vehicle inside the premises	5 min	
	Distance travelled by the vehicles inside premises	0.2 km	
	Q_{PM} (g/sec)	0.1047	
	Q_{NOx} (g/sec)	1.1367	
	Q_{CO} (g/sec)	0.5967	

3.1.1.1 Results of the AERMOD software for air quality predictions for proposed expansion of the factory

The proposed expansion of Sugarcane crushing capacity from 2000TCD to 5500 TCD along with 7.5 MW TG Set and distillery capacity from 25 KLPD to 200 KLPD. The AERMOD software was developed by US-EPA and American Meteorological Society (AMS) to compute dispersion of air pollutants in the ambient air due to the various sources. In this study, emissions from proposed stack are coupled with the subsequent meteorological data by using AERMOD 8.0.5 air quality model. Also, dispersion patterns are studied by the output of concentration isopleths plotted by the software. Incremental concentration values for selected receptors are added in the background concentration values.

Table 3-3 PM_{10}& $PM_{2.5}$- 24 hr. Concentrations, computed by AERMOD 8.0.5

Sr. No.	Receptor /Village	PM_{10}- 24 hour concentration (µg/m3)			$PM_{2.5}$- 24 hour concentration(µg/m3)		
		Background	Incremental	Total	Background	Incremental	Total
1	Saroli Grampanchayat	57.10	0.08	57.18	32.40	0.27	32.67
2	Karambali Grampanchayat	59.50	0.04	59.54	33.2	0.20	33.4
3	Hasurwadi	54.70	0.01	54.71	30.8	0.13	30.93
4	Jambhulwadi	48.90	0.01	48.91	25.7	0.12	25.82
5	Sule	53.60	0.01	53.61	27.60	0.10	27.7
6	Gadhinglaj	71.60	0.03	71.63	37.80	0.15	37.95
7	Harali	65.90	0.04	65.94	35.60	0.50	36.1
8	Narewadi	63.40	0.01	63.41	33.60	0.11	33.71
NAAQ Standards (24 hr)		**100 (µg/m^3)**			**60 (µg/m^3)**		

Table 3-4SO_2& NO_X-24 hr. Concentrations, computed by AERMOD 8.0.5

Sr. No.	Receptor /Village	SO_2 - 24 hour concentration (µg/m3)			NOx - 24 hour concentration (µg/m3)		
		Background	Incremental	Total	Background	Incremental	Total
1	Saroli Grampanchayat	13.2	2.58	15.78	17.6	1.81	19.41
2	Karambali Grampanchayat	14.7	1.89	16.59	19.8	1.36	21.16
3	Hasurwadi	12.3	0.13	12.43	16.7	0.90	17.6
4	Jambhulwadi	12.2	0.99	13.19	14.9	0.81	15.71
5	Sule	13.10	0.72	13.82	15.60	0.58	16.18
6	Gadhinglaj	21.80	1.58	23.38	24.70	1.28	25.98
7	Harali	16.30	2.91	19.21	20.80	2.48	23.28
8	Narewadi	15	0.82	15.82	19.80	0.66	20.46
NAAQ Standards (24 hr)		**80 (µg/m^3)**			**80 (µg/m^3)**		

From the results, it can say that,

- At the selected 8 receptor locations, surrounded in 10 km radius around Appasaheb Nalawade Gadhinglaj Taluka Sahakari Sakhar Karkhana Limited, Harali, Tal- Gadhinglaj, Dist. Kolhapur, GLCs are well within the limits of AAQS. Results of the Ambient Air monitoring are enclosed in the **Annexure II.**
- Under the working conditions of 1*35 TPH, 1*50 TPH and 2*25 TPH boilers, PM_{10}GLCs at all the 8 receptor locations are in the range of **42.80µg/m^3**to**71.60µg/m^3** which are within the limits of AAQS.
- For $PM_{2.5}$, GLCs are in the range of **21.00µg/m^3**to**37.80µg/m^3**which are within the limits of AAQS.
- For SO_2, GLCs are in the range of **9.10µg/m^3**to**21.80µg/m^3**which are within the limits of AAQS.
- NO_x GLCs are in the range of **11.60µg/m^3**to **24.70µg/m^3**which are within the limits of AAQS.

It can be inferred that there shall not be any adverse effect on Ambient Air Quality due to the proposed expansion/establishment project.

3.2 WATER ENVIRONMENT

Water sampling and subsequent analysis was carried out to determine both the groundwater and surface water quality of the study area. Ground water & Surface water samples were collected at 8 locations & 7 locations respectively within study area. These samples were analyzed for physical and chemical parameters to ascertain the Baseline status in the existing surface water and ground water bodies.

Table 3-5 Details of the ground water quality monitoring sampling locations

Sr. No.	Location	Description	Latitude	Longitude
1	GW-1	Well- Shri. Maruti Jyoti Patil, Saroli.	16° 9'24.72" N	74°18'13.59" E
2	GW-2	Well water- Shri. Nanaso Antu Sabale, Karambali.	16°11'59.20"N	74°17'28.18"E
3	GW-3	Borewell water- Gadhinglaj Nagarparishd, Gadhinglaj.	16°13'25.89"N	74°21'2.55"E
4	GW-4	Well water- Gram Panchayat Well, Jambhulwadi	16° 6'26.12"N	74°23'7.61"E
5	GW-5	Borewell water- Hasurwadi Gram Panchayat	16° 8'53.91"N	74°22'49.68"E
6	GW-6	Well water- Sule Gram Panchayat	16° 7'18.03"N	74°19'23.78"E
7	GW-7	Well water- Harali	16°10'37.53"N	74°20'39.63"E
8	GW-8	Borewell water-Narewadi	16° 8'34.11"N	74°25'23.27"E

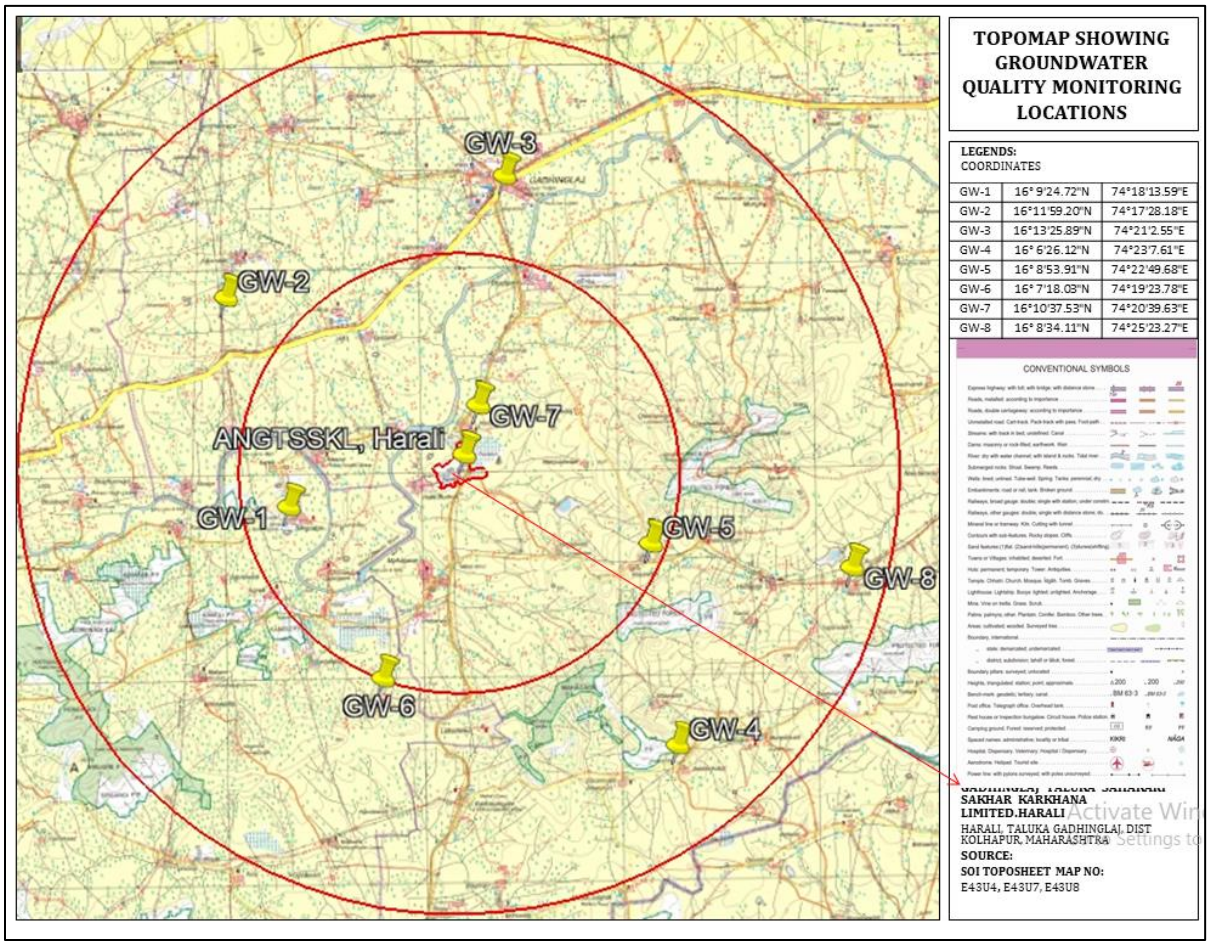

Figure 3.210 km. radius study area map indicating groundwater sampling location

Table 3-6 Details of the surface water quality monitoring sampling locations

Sr. No.	Location	Description	Latitude	Longitude
1	SW-1	Upstream Hiranyakeshi River	16°10'33.25" N	74°20'16.94"E
2	SW-2	Downstream Hiranyakeshi River	16°10'31.58"N	74°20'13.40"E
3	SW-3	Lake Water [Mangai Devi, Karambali]	16°11'48.89"N	74°17'30.96"E
4	SW-4	Lake Water [Channekuppi Lake]	16°11'5.54"N	74°23'33.73"E
5	SW-5	Lake Water [Yenechivandi Lake]	16°10'31.40"N	74°25'58.48"E
6	SW-6	Lake Water [Narewadi Lake]	16° 8'51.24"N	74°25'22.82"E
7	SW-7	Lake Water [Vairagwadi Lake]	16° 9'27.07"N	74°21'38.80"E

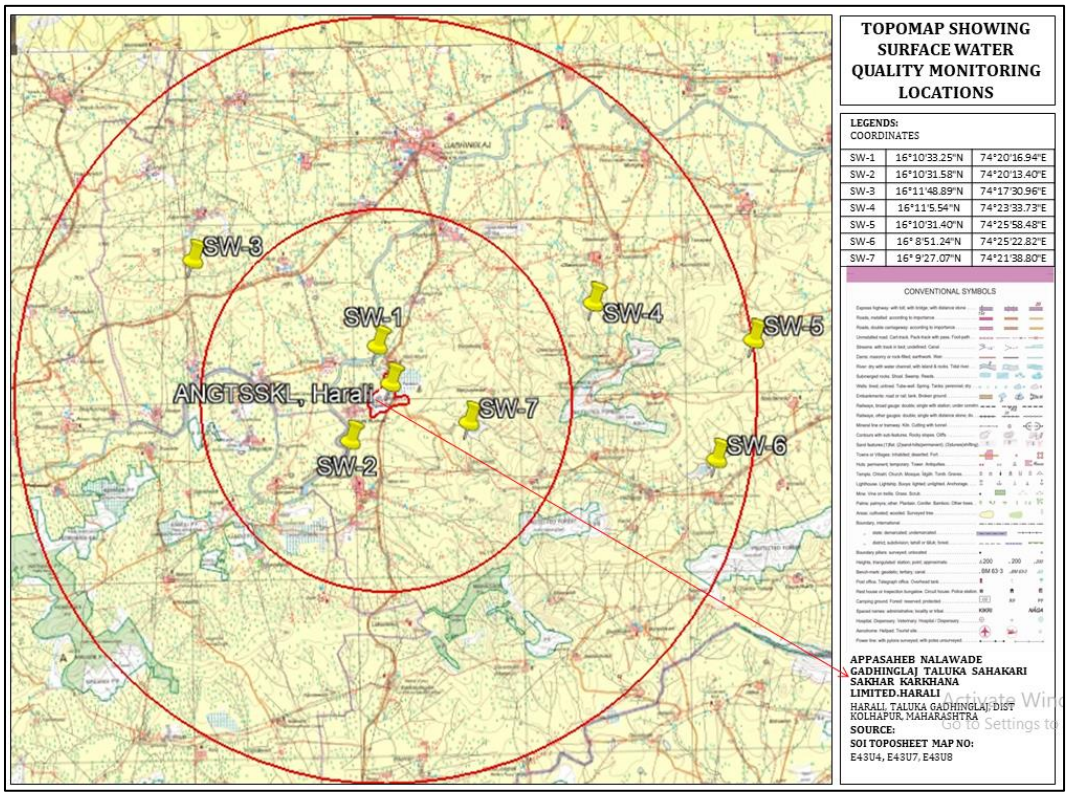

Figure 3.310 km. radius study area map indicating surfacewater sampling location

Table 3-7 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water		Desirable	Permissible
		Min	Max	Min	Max	IS 10500:2012 Standards	
1.	pH	7.09	7.73	7.47	7.77	**6.5-8.5**	**No relaxation**
2.	Dissolved Solids (mg/l)	282	397	180	277	**500**	**2000**
3.	Total Hardness (mg/l)	159	290	140	209	**200**	**600**
4.	Chlorides (mg/l)	45	72	12	49	**250**	**1000**
5.	Fluoride (mg/l)	0.53	0.69	0.62	0.73	**1**	**1.5**
6.	Sulphates (mg/l)	12	23	10	19	**200**	**400**

Ground water and surface water samples were collected and analyzed as per the Standard methods and the water quality of the study area is found within the permissible limits of IS: 10500- 2012. Except Fluoride concentrations observed are lower than the required concentration.

Groundwater quality is found to be good, which can be directly used for irrigation purpose. However, ground water used for drinking purpose after the appropriate treatment.

Surface water quality is found to be good, which can be directly used for irrigation purpose. However, for drinking purpose, conventional treatment suggested.

3.3 SOIL ENVIRONMENT

Table 3-8Details of the soil sampling locations

Sr. No.	Location	Description	Latitude	Longitude
1	S-1	Shri. Maruti Jyoti Patil, Saroli	16°10'10.74"N	74°18'13.59"E
2	S-2	Shri. Nanaso Antu Sabale, Karmbali.	16°11'59.20"N	74°17'28.18"E
3	S-3	Shri. Mahadev Shivappa Devgonde, Gadhinglaj	16°12'47.97"N	74°21'12.77"E
4	S-4	Shri. Ashok Santu Desai, Jambhulwadi.	16° 6'26.12"N	74°23'7.61"E
5	S-5	Shri. Sadashiv Maruti Mudhale, Hasurwadi	16° 8'53.17"N	74°22'50.71"E
6	S-6	Shri. Shivaji Babu Redekar, Sule	16° 7'37.52"N	74°19'30.89"E
7	S-7	Harali	16°10'37.46"N	74°20'38.84"E
8	S-8	Narewadi	16° 8'33.66"N	74°25'23.44"E

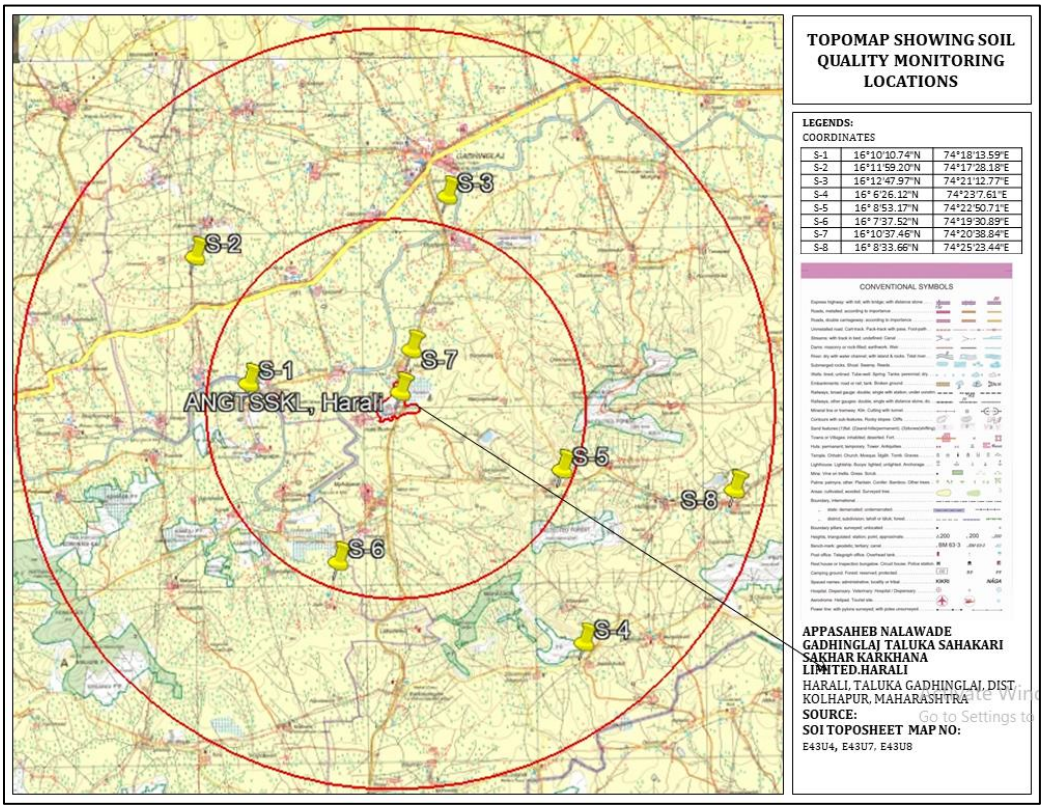

Figure 3.410 km. radius study area map indicating soil sampling location

Table 3-9 Soil Analysis report within 10 km radius of the study area

Sr. No.	Test Parameter	Unit	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Standards
1	pH	--	7.71	7.83	7.79	7.91	7.87	8.13	7.96	8.09	6.5 – 8.5
2	Conductivity	mmhos/cm	0.18	0.72	0.26	0.469	0.22	0.21	0.34	0.29	0.2 – 0.5
3	Available Nitrogen	Kg/ha	269	291	244	252	276	259	268	285	>200
4	Available Phosphorus	Kg/ha	42.3	44.7	41.6	42.2	42.59	43.8	47.1	44.8	40 – 60
5	Available Potassium	Kg/ha	592	388	354	318	516	421	430	540	>280
6	Organic Carbon	%	1.09	1.3	0.89	0.76	0.83	0.71	0.89	0.93	>0.75
7	Sodium (as Na)	%	0.093	0.079	0.073	0.103	0.116	0.096	0.108	0.088	< 5
8	Calcium (as Ca)	%	2.14	2.05	2.19	2.35	2.19	2.07	2.31	2.19	---
9	Magnesium (as Mg)	%	0.25	0.19	0.23	0.21	0.15	0.18	0.23	0.21	---
10	Cation Exchange Capacity	meq/100gm	46.95	45.71	46.02	43.09	45.92	47.08	44.61	47.58	>30
11	Water Holding Capacity	%	51.39	48.97	47.35	52.19	47.75	49.35	53.05	51.43	---
12	Particle Size Distribution										
12a	Sand	%	23	25	24	22	24	25	24	23	---
12b	Silt	%	22	21	20	22	22	22	21	24	---
12c	Clay	%	55	54	56	56	54	53	55	53	---

The soil monitoring was carried out at 8 locations in the study area, and analyzed for chemical and physical characteristics; the summary of the results is as under

- Soil in the area is mainly clayey in nature hence good water holding capacity.
- The finding of the study reveals that pH of soil in the area ranged between **7.71** to **8.13** which is an indicative of the **neutral** to **slightly alkaline** soil.
- The values for Nitrogen at all locations varied between **244** to **291 kg/ha**. Maximum concentration of nitrogen was observed at location S-2, while the lowest concentration can be observed at location S-3
- It is important to note that the concentration of potassium was found to be high at all locations ranging between **318** to **592 kg/ha.**
- Based on the above findings it can be concluded that the soil samples can be classified as per soil classification given by Tondon H.L.S. (2005). The samples fall under **medium low to medium** fertile soils.

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3.4 NOISE ENVIRONMENT

In order to assess the noise levels in the study area, monitoring was carried out at eleven different locations within 10 km radius of the study area.

Table 3-10 Details of noise quality monitoring locations

Sr. No.	Location	Description	Latitude	Longitude
1	N-1	Factory colony	16° 9'54.96"N	74°20'15.85" E
2	N-2	Factory main gate	16°10'3.10"N	74°20'32.14"E
3	N-3	Near Saroli Gram Panchayat	16°10'5.89"N	74°18'10.33"E
4	N-4	Near Karambali Gram Panchayat	16°12'29.12"N	74°17'38.49"E
5	N-5	Near Hasurwadi Gram Panchayat	16° 8'53.91"N	74°22'49.68"E
6	N-6	Near Jambhulwadi Gram Panchayat	16° 6'20.97"N	74°23'17.66"E
7	N-7	Near Sule Gram Panchayat	16° 7'15.38"N	74°19'28.67"E
8	N-8	Near Gadhinglaj Nagarparishad	16°13'25.61"N	74°21'2.87"E
9	N-9	Harali	16°10'34.02"N	74°20'33.22"E
10	N-10	Narewadi	16° 8'35.02"N	74°25'24.47"E

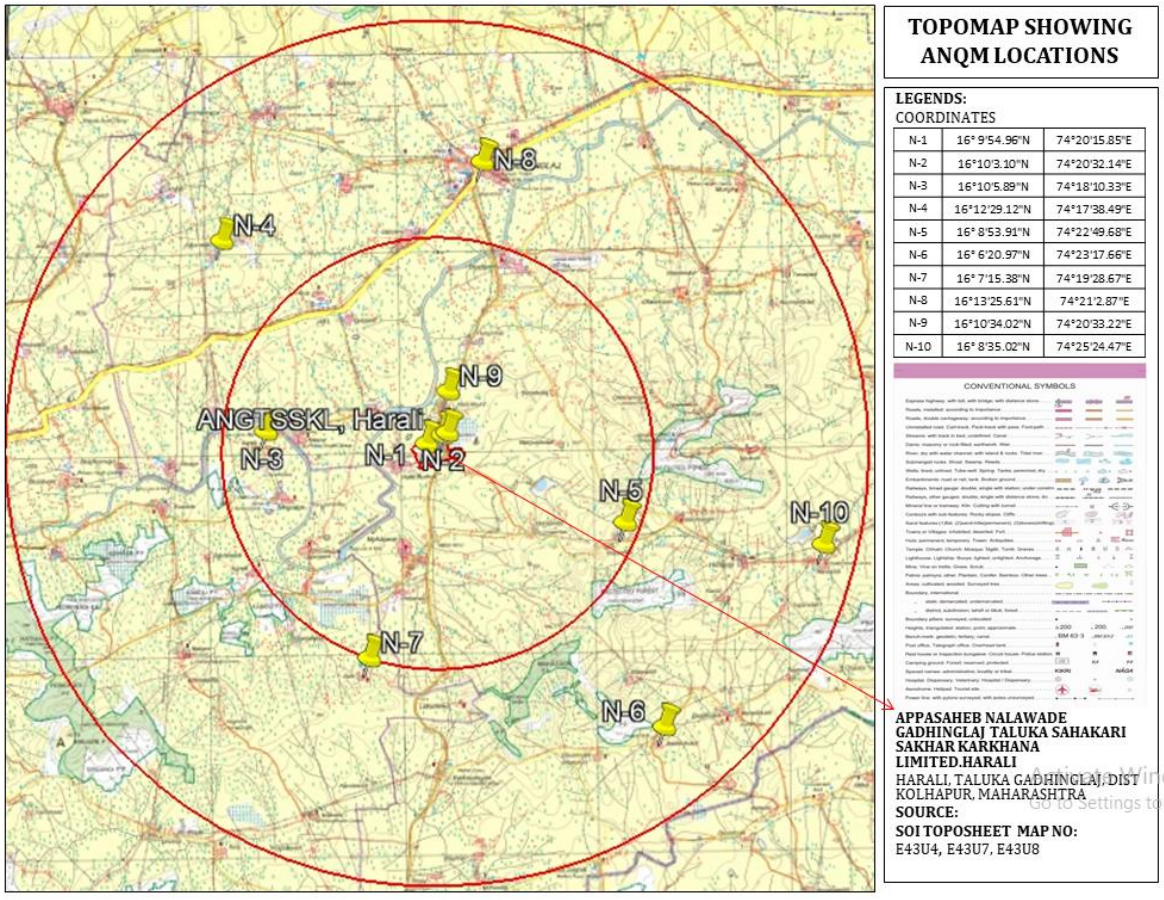


Figure 3.5km. radius study area map indicating noise location

Daytime Noise Levels $(Leq)_{day}$

Industrial Zone: The day time noise level at the Project site was found in the range of 45.7-48.2 dB (A), which is well below the permissible limit of 75 dB (A).

Residential Zone: The daytime noise levels in all the residential locations were observed to be in the range of 41.9 dB (A) to 53.4 dB (A), which is well below the permissible limit of 55 dB (A).

Night time Noise Levels $(Leq)_{night}$

Industrial Zone: The night time noise level in the Project site was observed in the range of 35.1-35.9 dB (A), which is well below the permissible limit of 70 dB (A).

Residential Zone: The night time noise levels in all the residential locations were observed to be in the range of 34.8 dB (A) –40.1 dB (A), which is well below the permissible limit of 45 dB (A).

The industry is making all efforts to control the noise levels within the limits by providing acoustic measures and silencer pads etc. all the employees in these work places shall be provided with ear plugs / muffs after the proposed expansion/establishment.

Table 3-11 Noise levels of the study area

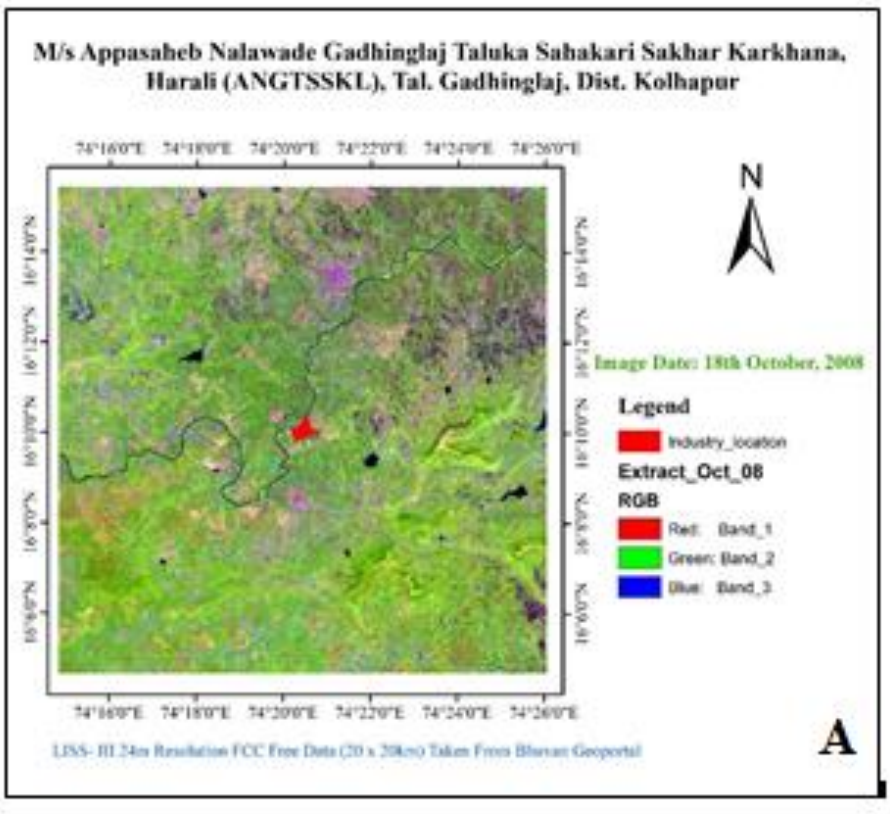
Sr. No.	Station	Standard Limit dB(A) Leq	Time	dB (A) Leq
Inside factory premises				
1.	Factory Colony	75	Day	45.7
		70	Night	35.1
2.	Factory Main Gate	75	Day	48.2
		70	Night	35.9
Outside factory (within study area)				
1.	Near Saroli Gram Panchayat	55	Day	44.7
		45	Night	36.2
2.	Near Karambali Gram Panchayat	55	Day	46.1
		45	Night	37.9
3.	Near Hasurwadi Gram Panchayat	55	Day	42.5
		45	Night	36.7
4.	Near Jambhulwadi Gram Panchayat	55	Day	41.9
		45	Night	35.5
5.	Near Sule Gram Panchayat	55	Day	42.7
		45	Night	36.6
6	Near Gadhinglaj Nagarparishad	55	Day	53.4
		45	Night	40.1
7	Harali	55	Day	43.2
		45	Night	36.1
8	Narewadi	55	Day	42.6
		45	Night	34.8

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 3-12 Change in General Land use/ Land cover of Study Area (2008 to 2018)

Land use	Area in km2		% of Study Area	
	2008	2018	2008	2018
Agriculture land	317.42	348.33	79.95	87.72
Barren Land	15.77	8.95	3.97	2.25
Open Scrub	41.2	9.88	10.38	2.49
Settlement	21.14	28.46	5.32	7.17
Water Bodies	1.51	1.48	0.38	0.37
Total	**397.04**	**397.1**	**100**	**100**

- In the year 2008 Water body area is about 1.51 km^2, whereas in the year 2018 it is decreased and is 1.48 km^2.
- It can be inferred that there is an increase in 9.61 % of land under settlement and agricultural land whereas a decrease in area under forest land and Barren Land is 9.61 %.
- Increase in settlement due to an increase in industrial growth and migration of the people.
- Increase in agricultural land due to improved irrigation facilities like drip/trickle irrigation instead of surface and subsurface irrigation techniques. Therefore barren land is converted into agricultural land.



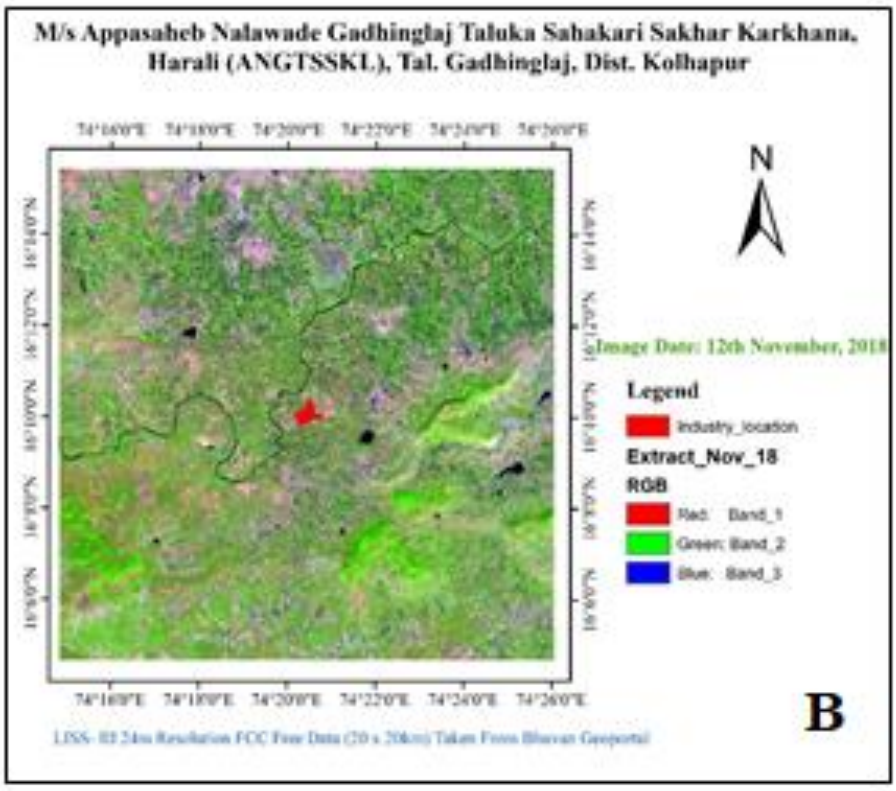


Figure 3.6 Landuse/Land cover map 1) 2008 & 2) 2018

3.6 ECOLOGY AND BIODIVERSITY

- A biodiversity conservation plan has to be formulated and put to practice in the core and surrounding areas with focus on freshwater ecosystem conservation.
- There is already plantation done of approximately 11000 trees of indigenous type to enhance the local ecosystem however plantation drive beyond the project will further help in conservation of biodiversity.
- Despite all waste management practices already in place their efficiency and applicability should be checked periodically.
- The proponent should include CSR and CER activities even during the operational phase of the project keeping in mind the large number of water bodies in the buffer area and the deteriorating health of their ecosystem.
- The project activities should be carried out only after considering all possible secondary and tertiary impacts on the environment and mitigation measures should be incorporated such as to reduce any possibility of impact on the existing environment.

3.7 DEMOGRAPHIC OR SOCIO-ECONOMIC PROFILE

The proposed project has a positive response from the public. The willingness to pay and the willingness to accept the project has positive outcome. The losses due to the polluting agents can be diluted through various methods. The unit has recycled waste water after treatment. The social and cultural vulnerability index responds a very less and level of resilience is at the higher side. The families dwelling around could get more facilities due to the industry during the corresponding period

4 IDENTIFICATION, PREDICTION AND MITIGATION MEASURES

Approx. 50 nos. of labors shall be employed during installation phase for the project which includes installing new machinery and units of the plant.

Table 4-1 Anticipated environment impacts its effect and mitigation measures during construction phase

Sr. No.	Impacts	Effects	Mitigation Measures
1	Dust	Respiratory diseases	All the internal Roads are tar felted Dust separation sprinkling water, use machinery
2	Noise	Impairing, Hearing, Fatigue related Health issues	Provide acoustic measures and silencer pads to reduce noise level. Provide personal protective equipment to the workers.
3	Land	Reduction of vacant land	Utilize the existing infrastructures and adopt vertical expansion and maximize the operation schedules.
4	Top soil	Loss of fertility	Utilize for Green belt development.
5	Water	Additional water is required for construction activities and Drinking	Minimize the water requirements by adopting mechanical mixing and Drinking water in Bottles instead of Taps.
6	Wastewater	Improper disposal of waste water leads to contamination of water sources and soil	Domestic wastewater shall be treated in Sewage treatment plant and treated wastewater shall be used for gardening.

Anticipated environment impacts its effect and mitigation measures during operational phase are given in chapter 4.

5 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

Appasaheb Nalawade Gadhinglaj Taluka Sahakari Sakhar Karkhana Limited .has existing sugar factory of 2000 TCD and 25 KLPD distillery unit. Considering the Sugarcane cultivation potential and the availability of sugarcane in the command area the industry proposes to increase the Distillery capacity from 25 KLPD to 200 KLPD based on "C"/"B" heavy molasses/sugarcane juice/syrup as a raw material to produce RS/ENA/Ethanol along with expansion of sugarcane crushing capacity from 2000 TCD to 5500 TCD on own land of 54.45 HA and as such there is no requirement of analysis of alternative site. The existing site is environmentally suitable for proposed expansion

5.1 Analysis of alternative technology

It is proposed to adopt anaerobic digestion followed by concentration in MEE followed by drying in order to make the valuable by-product from spentwash treatment.

The Industry has existing 1*30 TPH, 2*20 TPH and 1*10 TPH boilers. After the proposed expansion 10 TPH boiler shall be abandoned. The existing 2*20 TPH boilers shall be upgraded to 2*25 TPH boilers and the existing 30 TPH boiler shall be upgraded to 35 TPH .The Industry proposes to add one 50 TPH boiler. The Proposed 50 TPH Boiler and upgraded 35 TPH boiler shall be utilized for 5500 TPD sugar unit and 7.5 MW TG Set which shall be installed along with expansion of the sugar unit. 2*25 TPH boiler shall be utilized for the proposed expansion of Distillery capacity from 25 to 200 KLPD. The total power required after proposed expansion of sugar and distillery units shall be 7 MW which shall be produced from TG set of boilers

6 ENVIRONMENT MONITORING PROGRAMME

Table 6-1Environment management programme

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
1.	Ambient Air quality at appropriate location for PM_{10}, $PM_{2.5}$, SO_2,andNO_x,	PM_{10}, $PM_{2.5}$, SO_2,andNO_x	24 hourly, Quarterly	8 Locations 1 @ Upwind and 2@ downwind directions from stack @ 120^0 to each other Near entry and exit gates
2.	Stationary Emission from Stack PM, SO_2, NOx	PM, SO_2, NOx	Monthly	1 DG set Stack, 2 Boiler Stack
3.	Water	Water quality parameters as per 10500:2012	Monthly	Drinking water locations
	Waste water quality (treated and Untreated)	pH, BOD, COD, TSS, Flow, TDS etc.	Monthly	ETP inlet and Outlet
4.	Noise	Day and Night levels Equivalent noise level- dB (A)	Quarterly or as often as required	8 Locations Upwind and downwind directions Near boilers and near main gate and ETP.
5.	Soil (Qualitative and quantitative testing/analysis to check the soil fertility,)	pH, Cation Exchange Capacity, Total Nitrogen, Phosphorous, Potassium, moisture, Permeability, Conductivity, Texture & structure, Organic carbon	Quarterly or as often as required	8 Locations, 1 near Greenbelt 1 near ETP Composite sample shall be taken at each location
6.	Solid waste generation monitoring / Record Keeping	Manual record keeping	To be updated daily	--
7	Greenbelt and plantation monitoring	Type of species shall be decided based on soil &climatic conditions. The number of trees would be 2500 per hectare, however; the number of trees would	Six Monthly	--

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
		vary depending on the type of soil		
8	Carbon and Water foot Print Monitoring	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery	Daily and Monthly	--

7 ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

HAZOP and Quantitative Risk Assessment studies are carried out for each product, disaster management plan, onsite and offsite emergency plan are prepared and given in Chapter 7 of the EIA Report

Table 7-1 Input data for ALOHA- Atmospheric conditions

Particulars	Details
Average wind speed	6.88 m/s
Ground Roughness	Open
Cloud Cover	5 tenth
Air Temperature	30° C
Stability Class	B
Relative Humidity	50%

Scenario-: Release of Chemical Due To Leakage and Form Burning Puddle (Pool Fire)

a) Source Strength

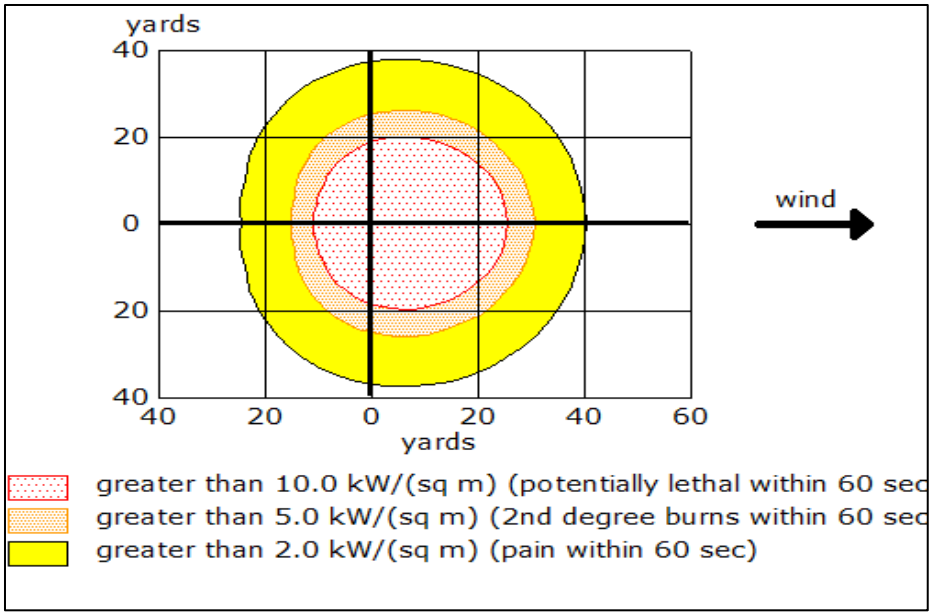
When chemical will escape from storage unit as a liquid and form a burning puddle, source strength will be as given below

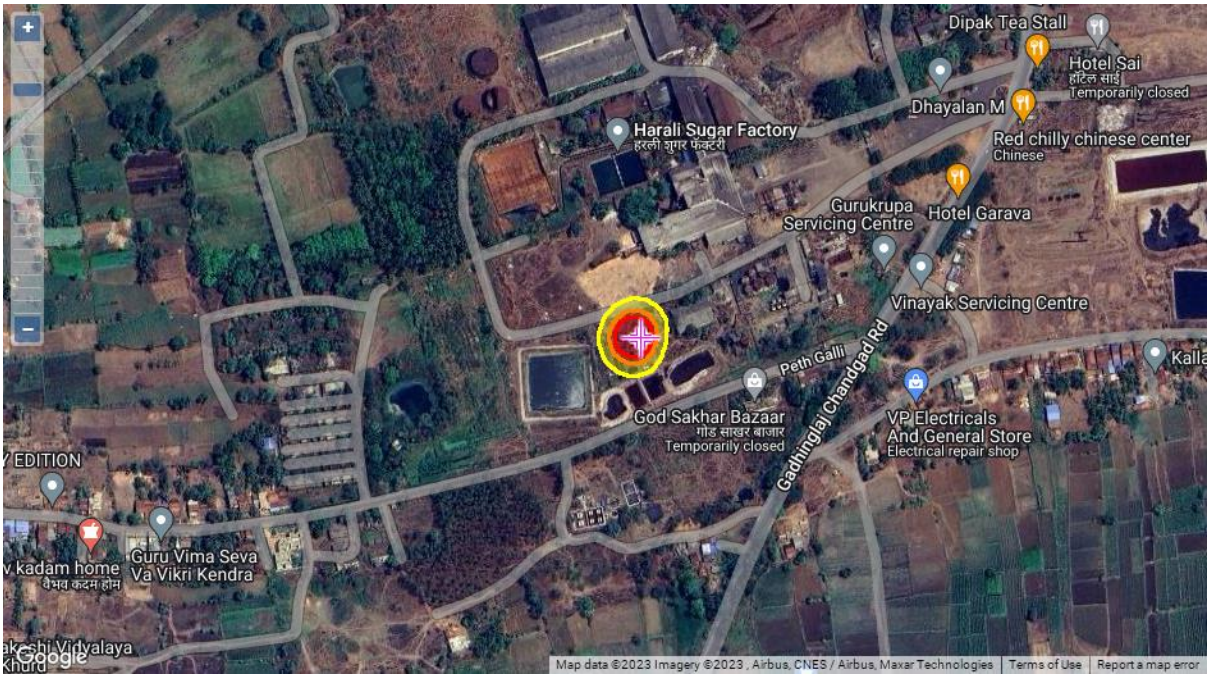
Details of Source		Model Outcome Particular	
Name of Chemical	Ethanol	Maximum Flame Length (m)	10.97
Chemical storage	SS Tank	Burn Duration (min)	60
Storage Capacity (Liter)	1600	Maximum Burn Rate (kg/min)	729.69
Chemical Mass Stored (tons)	1034	Total Amount Burned (kg)	20922
Circular Opening Diameter(Cm)	10	Burning Puddle Diameter (m)	16.64
Opening from bottom of tank (m)	1		
Internal Temperature (°C)	30		

a) Threat zone of thermal radiation from pool fire

Model output of the threat zone of thermal radiation from pool fire is given below

Flammable threat zone	LOC, kW/sq. m.	Model Outcome	
		Distance (m)	remarks
Red (Potentially Lethal within 60 sec.)	10	24	Maximum distance of thermal radiation @10kW/sq.m from pool fire is 24m, where the personnel expose to this radiation at 10 kW/sq.m within the distance of 10 m could be potential lethal.
Orange (2nd Degree burn within 60 sec.)	5	29	
Yellow (Pain within 60 sec.)	2	37	





Conclusions

Risk of thermal radiation from pool fire is 24 m at the level of concentration 10 kW/sq.m which is confined within the plant premise, where the personnel expose to this radiation within the distance of less than 10 m could be potential lethal. Maximum distance of thermal radiation is observed at 29 m at the level of concentration 5 kW/sq.m and maximum distance of thermal radiation is observed at 37 m at the level of concentration 2 kW/sq.m caused from the pool fire of ethanol storage tank causing the personnel exposed could experience notable discomfort, irritation, or certain a symptomatic non sensory effects. Overall from the analysis, it is shown that the impact at the range of 10kW/sq.m, 5 kW/Sq.m and 2 kW/sq.m is within the plant boundary. Only the employees present in the vicinity of the ethanol storage

tank will be exposed to heat radiation at the range of 10kW/sqm in case of a fire, it is reasonable to assume the protection by clothing.

Project proponent will implement all preventive measures to tackle all type of emergencies arising out of operation or malfunction of individual unit's. The required resources for Onsite and Offsite emergency management plan will be properly planned and provided to implement the plan effectively. The factory shall give highest priority towards Health and safety of the employees and people residing nearby areas. Management shall conduct the training to the nearby villagers to appraise them about their role during emergency. All nearby people shall be given training on do's and don'ts during emergency situation.

Distillery Industry (Ethanol Plant) is associated with potential hazards to the employee and environment**.** As the hazards involved during operation and production activities will be known to the Management, all required mitigation measures shall be implemented in time to avoid the emergency situation from the arising. Unfortunately, if there is any emergency onsite of offsite, it will be tackled effectively due to availability of required resources at the site. Similarly, all the concern staff and members of the Teams shall be trained appropriately to tackle the emergencies in the plant. By knowing the type of emergency situation that may arise during operation of the plant, appropriate control measures will be implemented to reduce the gravity of the emergencies. Similarly, to avoid the emergency situation, all required mitigation measures will be implemented as recommended.

8 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN:

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The capital cost for the EMP will be Rs. 3302 Lakhs. And recurring cost will be Rs. 360 Lakhs. The detailed EMP budget is given in table below

Table 8-1EMP Budget

Sr. No.	Component	Particulars		Capital in Lakhs	Recurring in Lakhs
1	Air	Up gradation of APC equipment		400	20
2	Water	• Sugar CPU, Distillery CPU. • Anaerobic digester, MEE and Dryer for Distillery Spentwash treatment		2600	50
3	Noise	Acoustic enclosures, Silencer pads, ear plugs etc.		30	5
4	Environment monitoring and Management	Monthly Environment Monitoring (Per Year)		--	20
		Ambient air monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx		
		Boiler & DG Set Monitoring	TPM, SO_2, Nox		
		Effluent (Treated &Untreated)	pH, COD, BOD, TSS, TDS, Oil & Grease		
5	Occupational Health	Glares, Breathing Masks, Gloves, Boots, Helmets, Ear plug and ear mask etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		60	10
6	Greenbelt	Green belt development activity		42	20
7	Solid Waste Management	Solid Waste Management		50	20
8	Rain water harvesting	Rain water harvesting		25	5
9	Storm water drainage	Storm water drainage design and construction		20	5
10	Carbon and Water Foot Print	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery		--	20
11	Solar Power & Energy Conservation (0.5 MW)	Street lights installation with Solar Systems		--	150
12	Fire and Safety	Fire and Safety Management		--	20
13	Laboratory	Testing and Analysis		75	15
Total Cost (In Lakhs)				**3302**	**360**

9 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The capital cost of the proposed expansion project will be Rs. 250 Crores. The industry will spend 2.5 % of the Project Cost as per the standard Terms of Reference on Corporate Environment Responsibility, which works out to be **Rs. 6.25Crores** only.

Table 9-1 Proposed CER Activity

Sr. No.	Activity	Cost in Lakhs
1	Sanitation, Drainage and waste treatment plant facilities	**625** (Shall be decided based on the public hearing issues raised)
2	Drinking water facility	
3	Electrification facility	
4	Solid waste & management	
5	Educational aids such as computers, E-learning materials etc., in the command area, Primary schools High-schools & Agricultural engineering college.	
6	Medical camps	
7	Solar Power to nearby villages	

10 RAINWATER AND STORMWATER HARVESTING PLAN

The industry is making efforts to conserve natural resources by adopting green technologies and as such industry proposes to adopt rain water harvesting system. With the annual rainfall of 670 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about 11660.68 m^3 per year water is harvested. This harvested water shall be utilized for greenbelt development/gardening.

Storm water management system is also adopted by the industry. Separate drains of minimum 0.45m * 0.6 m are provided for the collection and disposal of storm water from the industry premises.

11 CONCLUSIONS

As the industry has provided all the necessary pollution control measures for water, Air and Solid and hazardous waste disposal, the negative impacts on the environment would be minimal/ negligible. The expansion programme would help the farmers to crush their produce in time which would help to minimize the loss of sugarcane tonnage and yield maximum financial benefits. The expansion of the distillery to produce ethanol shall benefit to farmers to increase the cane prize as well as the financial health of the industry.