EXECUTIVE SUMMARY

EXPANSION OF SUGARCANE CRUSHING CAPACITY FROM 3500 TCD TO 8000 TCD, ESTABLISHMENT OF 40 MW CO-GENERATION POWER PLANT AND 135 KLPD DISTILLERY TO PRODUCE RECTIFIED SPIRIT/ 125 KLPD(EXTRA NEUTRAL ALCOHOL)/ 125 KLPD(ETHANOL) BASED ON C"/B" HEAVY MOLASSES/SUGARCANE JUICE/SYRUP/GRAINS

AT

TURCHI, TAL. TASGAON, DIST. SANGLI MAHARASHTRA,

BY

SGZ AND SGA SUGARS (JV) LIMITED

Report Prepared By:

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1 INTRODUCTION

SGZ & SGA Sugars (JV) Ltd, a limited company purchased the unit of Tasgaon Sahakari Sakhar Karkhana Limited, Sangli, under SERFESI Act 2002 from Maharashtra State Co-operative Bank Ltd. SGZ & SGA Sugars Limited, Turchi, Taluka Tasgaon, Dist Sangli is registered in the state of Maharashtra under companied act, 1956 on 4th January 2019, CIN: U15134PN2019PLC181176.

The registered office of SGZ & SGA Sugars (JV) Ltd. is located at Kakabhavan, Madhavnagar Road, Sangli, Maharashtra- 416416 and the project site is located at post Turchi, Tal. Tasgaon, Dist. Sangli, Maharashtra- 416312. SGZ & SGA Sugars (JV) Ltd. has existing sugar factory of 3500 TCD. The command area is rich in sugarcane cultivation and has very good irrigation facilities.

Considering the Sugarcane cultivation potential and the availability of sugarcane in the command area SGZ & SGA Sugars (JV) Ltd., proposes to expand its sugarcane crushing capacity from 3500 TCD to 8000 TCD. In order to meet the requirements of steam and power the industry propose to establish 40 MW Co-generation power plant. The industry also proposes to establish 135 KLPD distillery to consume the available molasses from its own sugar unit and utilize sugarcane juice/syrup/'B' heavy Molasses/grains for the production of 135 KLPD RS/125 KLPD ENA/125 KLPD Ethanol. In the command area, the availability of Grains is also abundant and as such Grains based distillery unit is also proposed of the same capacity of 135 KLPD for production of 135 KLPD RS/125 KLPD ENA/125 KLPD Ethanol as per demand.

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	17° 03'38.62'' N	
2.	Longitude	74° 32'15.39''E	
3.	Elevation above MSL	590 m	
4.	Nearest highway	NH 4 (35 km)	W
5.	Nearest railway station	Bhilawadi (7 km)	SWS
6.	Nearest air port	Kolhapur (52 Km)	SW
7.	Nearest town	Tasgaon (8 km)	SE
8.	Nearest human settlement	Turchi. (2 km)	NE
9.	Nearest port	Jawaharlal Nehru Port (270 km)	NW
10.	Nearest water body	Yerala River (2 Km) Krishna River (9 Km)	NE SW
11.	Protected Area	None within 10 km	
12.	Reserved Forests	None within 10 km	
13.	Wildlife Sanctuary	None within 10 km	SW
14.	Archeological site	None within 10 km	

Sr. No.	Features	Description	Directions w.r.t. site
15.	State boundary	None within 10 km	
16.	Defense installations	None within 10 km	
17.	Average Rainfall	600 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 2.1Existing and Proposed Products manufacturing quantities

Sr. no.	Description	Unit	Existing Capacity	Proposed Capacity	Total	Remark
1.	**Sugar Unit**	TCD	**3500**	**4500**	**8000**	
2	**Co-generation Power**	MW	**0**	**40**	**40**	
3.	**Distillery Unit**	KLPD	**0**	**135**	**135**	
	Rectified Spirit or	KLPD		135	135	Only one product at a time
	Extra Neutral Alcohol or			125	125	
	Ethanol			125	125	

2.1 RESOURCE REQUIREMENT AND INFRASTURE FACILITIES

A) Land use Details

The total area available with the factory is **47.69 Hectares** Out of which,**16.12 Hectares will be** utilized for green belt development. A detailed area breakup is given below

Table 2.2 Landuse breakup

Sr. No.	Description	Area in Hectares	% of Area
1	Built Up	7.09	14.86
2	Area under road	8.65	18.14
3	Green Belt Area	16.12	33.80
4	Parking Area	3.49	7.32
5	vacant Area	12.34	25.88
	Total Plot Area	**47.69**	**100%**

B) Power requirement

At present, the power requirement is 4.0 MW. Additional 11 MW of power will be required after the proposed expansion. Thus the total power requirement after the proposed expansion will be 15 MW.

At present 1*50 TPH and 1*40 TPH boilers are working. After the proposed expansion both the boilers shall be abandoned and 1*200 TPH boiler @ 110 kg/cm2 and 540^0C shall be installed. For co-generation power plant 40 MW turbo-generators set @ 105 kg/cm2 and 535^0C shall be installed, in order to meet the power and steam requirement of the industry. Excess electricity produced will be supplied to the state electricity grid.

C) Water Consumption details

Industrial Purpose:

The Krishna River is the nearest River is 09 km away from the factory site, which is the main source of water.

Sugar Division - The sugar unit works on zero water requirements except for Co-generation power plant290 KLD fresh water is taken as make- up water for boiler. The detailed water budget is shown in **Table 2.3**

Distillery Division – The net fresh water requirement for distillery division shall be 851 KLD (Max of I to IV). Detailed water budget of the industry is shown in **Table 2.4 to Table 2.7**

Domestic Purpose:

At present water requirement for domestic purpose is 100 KLD, no additional water requirement after the proposed expansion

Thus, the net fresh water requirement of the industry is **1241 KLD** (Industrial 1141 KLD, Domestic 100 KLD). The required water is sourced from Krishna River. The necessary permission from the state irrigation department is already obtained.

Water balance calculations

Sugar and cogeneration division

Table 2.3 Water Budget -Sugar and Co-generation Power Plant

Sr. No.	Details	Water Requirement (KLD)			Consumption/Losses (KLD)			Reuse / Recovery (KLD)			Waste Generation (KLD)		
		E	**P**	**T**	**E**	**P**	**T**	**E**	**P**	**T**	**E**	**P**	**T**
Domestic Purpose													
1	Domestic	100	--	100	20	--	20				80	--	80
Industrial Purpose													
1	Boiler 1*200 TPH	--	4510	4510	--	200	200	--	4260	4260	--	50	50
2	DM Plant	--	**290****	**290****	--	250	250	--	--	--	---	40	40
3	Process water	120	150	270	15	27	42	--	--	--	105	123	228
4	Washing of equipment	30	40	70	--	--	--	--	--	--	30	40	70
5	Air compressors & pumps	40	40	80	05	05	10	35	35	70	--	--	--
6	Condenser Water	--	--	--	--	--	--	700	900	1600	All the condenser water shall be treated in proposed CPU of capacity 2000KLD and recycled as process water.		
7	Spray pond blow-down	700	900	1600	350	450	800	--	--	--	350	450	800
8	Cooling tower blow-down	--	150	150	--	80	80	--	--	--	--	70	70
9	Colony fire fighting & Gardening	250	--	250	250	--	250	--	--	--	--	--	--
10	Recycling of Excess Condensate	--	--	--	--	--	--	700	900	1600	--	--	--
Total		**1140**	**6080**	**7220**	**620**	**1012**	**1632**	**1435**	**6095**	**7530**	**485**	**773**	**1258**

Where,

E – Present 3500TCD
P – Expansion of 4500 TCD & Establishment of 40 MW Co-generation unit.
T - Total 8000 TCD & 40MW.

- The consumption/losses and final wastewater generated is amounting (1603 + 1237) = 2840 KLD
- The excess condensate and condensers water available is 3200 KLD. Thus the excess water available for reuse would be around 3200 – 2840 = 360 KLD.

Note:

1.At present there are 2 boilers 1*50 TPH and 1*40 TPH capacities each shall be abandoned and one boiler of 1*200 TPH capacity with a pressure of 110 kg/cm2 and temperature of 540^0C shall be installed. For co-generation power plant 40 MW turbo-generator set with a pressure of 105 kg/cm2 and temperature of 535^0C shall be installed.

2. The fresh water requirement for DM plant only **290**** KLD and 100KLD for domestic purpose. Thus total fresh water requirement would be 390KLD.

- The consumption/losses and final wastewater generated is amounting (1632 + 1258) = 2890 KLD
- The excess condensate and condensers water available is 3200 KLD. Thus the excess water available for reuse would be around 3200 – 2890 = 310 KLD.

Net Water saving would be:

i) Industrial Purpose: 7220 – 7530 = -310 KLD.

Due to excess condensate available from Sugar unit, there shall not be any water requirement for sugar unit. For Co-generation unit 290 KLD fresh water shall be taken as DM plant water for boiler make-up. Fresh water requirement for domestic purpose shall be 100KLD. Thus the total requirement of fresh water would be 310KLD for sugar and cogeneration unit.

Excess amount 310 KLD is saved, which shall be used for gardening, irrigation and in distillery operation etc. and remaining water shall be stored in proposed tank to be used during off season.

ii) Domestic Purpose: At present water requirement is 100KLD, no additional water requirement after the proposed expansion.

Effluent Generation:

i. Industrial - 1258 KLD out of which sugar effluent - 298 KLD, spray-pond effluent – 800 KLD and co-generation power plant effluent 160 KLD (Co-gen effluent-160 KLD, out of which 50 KLD boiler blow-down, 70 KLD cooling tower blow –down and 40 KLD of DM plant reject).

ii. Domestic – 80KLD.

Distillery division

I. Based on "C"Molasses

Table 2.4 Water Budget for Distillery Division (based on "C"Molasses)

Sr. No.	Details	Water Requirement (KLD)	Consumption/Losses (KLD)	Reuse / Recovery (KLD)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
1.	Boiler 50 TPH	1115	60	1040	15	--	15
2.	DM Plant	**85****	75	--	10	10	
3	Process Water	1350	--	**Evaporator Condensate**	Spentwash - 216	--	216
					Spentlees – 270	270	00
4	Cooling Tower Make-up Water	350	260	--	90	90	00
5	Fermenter Washing	30	--	--	30	30	00
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**864**	--	--	--
8	ENA	100	100	--	--	--	--
9	Condensate Polishing Unit	--	--	400			
Total		**3070**	**495**	**2344**	**631**	**400**	**231**

Note:

1*50 TPH boiler required for the proposed 135 KLPD distillery unit with a pressure of 45 kg/cm2 shall be installed.

Remark: 216 KLD of concentrated spent wash shall be generated after anaerobic digester followed by MEE. (Raw Spentwash quantity - 1080)

Solids content in raw spent wash shall be around 12 – 14 % by its weight, hence convert to 5% to 6% in anaerobic digester and finally it's converted to 30% by its weight after MEE.

Note:

The consumption/losses and final wastewater generated is amounting (495 + 231) = 726 KLD.

Net Water Requirement: 3070 –2344 = 726 KLD.

Effluent Generation: 631 KLD out of which spentwash - 216 KLD, spentlees – 270 KLD, DM plant wastewater generation-10KLD, fermenter washing waste-30 KLD, boiler blow-down wastewater-15KLD and cooling tower wastewater generation – 90KLD.

All the effluent except concentrated spentwash and boiler blow-down shall be treated in CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be converted to dry powder/granules (potash rich powder/manure)

II. Based on "B" Heavy Molasses

Table 2.5Water Budget for Distillery Division (based on "B" Heavy Molasses)

Sr. No.	Details	Water Requirement (KLD)	Consumption/Losses (KLD)	Reuse / Recovery (KLD)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
1.	Boiler 50 TPH	1115	60	1040	15	--	15
2.	DM Plant	**85****	75	--	10	10	
3	Process Water	1080	--	**Evaporator Condensate**	Spentwash - 135	--	135
					Spentlees – 270	270	00
4	Cooling Tower Make-up Water	350	260	--	90	90	00
5	Fermenter Washing	30	--	--	30	30	00
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**675**	--	--	--
8	ENA	100	100	--	--	--	--
9	Condensate Polishing Unit	--	--	400			
Total		**2800**	**495**	**2155**	**550**	**400**	**150**

Note:

1*50 TPH boiler required for the proposed 135 KLPD distillery unit with a pressure of 45 kg/cm2 shall be installed.

Remark: 135 KLD of concentrated spentwash shall be generated after anaerobic digester followed by MEE. (Raw spentwash quantity - 810)

Solids content in raw spentwash shall be around 7– 8 % by its weight, hence convert to 4% to 5% in anaerobic digester and finally it's converted to 30% by its weight after MEE.

Note:

The consumption/losses and final wastewater generated is amounting (495 + 150) = 645 KLD.

Net Water Requirement: 2800 –2155 = 645 KLD.

Effluent Generation: 550 KLD out of which spentwash - 135 KLD, spentlees – 270 KLD, DM plant wastewater generation-10KLD, fermenter washing waste-30 KLD, boiler blow-down wastewater-15KLD and cooling tower wastewater generation – 90KLD.

All the effluent except concentrated spentwash and boiler blow-down shall be treated in CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be converted to dry powder/granules (potash rich powder/manure)

III. Based on Sugarcane juice / concentrated sugarcane juice

Table 2.6Water Budget for Distillery Unit (based on Sugarcane juice / concentrated sugarcane juice)

Sr. No.	Details	Water Requirement (KLD)	Consumption/ Losses (KLD)	Reuse / Recovery (KLD)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
1	50 TPH Boiler	1200	60	1125	15	15	
2	Process Water for fermentation	878	--	**Evaporator Condensate**	140(Spentwash)	--	140
					175(Spentlees)	175	--
3	Soft water Cooling Tower Make Up and sealing	250	185	--	65	65	--
4	DM plant	70	60	--	10	10	
5	Washing water	65	--	--	65	65	--
6	ENA	100	100	--			
7	**Evaporator Condensate**	--	--	563	--	--	--
8	Condensate Polishing Unit			300			
Total		**2563**	**405**	**1988**	**470**	**330**	**140**

Remark: 140 KLD of concentrated spentwash shall be generated after MEE. (Raw spentwash quantity - 703)

Note:

The consumption/losses and final wastewater generated is amounting (405 + 140) = 545 KLD.

Net Water Requirement: 2563 –1988 = 545 KLD

Effluent Generation: 470 KLD out of which spentwash - 140 KLD, spentlees – 175 KLD, DM plant wastewater generation-10KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-15KLD and cooling tower wastewater generation – 65KLD.

All the effluent except concentrated spentwash shall be treated in CPU and treated effluent shall be recycled in process.
Concentrated spentwash shall be converted to dry powder/granules

IV. Based on Grains

Table 2.7 Water Budget for Distillery Unit (based on Grains)

Sr. No.	Details	Water Requirement (KLD)	Consumption /Losses (KLD)	Reuse / Recovery (KLD)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU/MEE	Wastewater
1	50 TPH Boiler	1200	60	1125	15	15	
2	Process & dilute water	1114	135	**In MEE**	**777**	**Decanter where 142 MT/day Wet cake & 635 KLD thin slops to MEE**	142
					202	**202 to MEE**	--
3	Cooling water	250	185	--	65	65	--
4	Washing Requirement	70			70	70	--
6	DM plant	70	60	--	10	10	
7	ENA	100	100	--			
8	**Evaporator Condensate**		102	668	67	--	67
	Condensate Polishing Unit			160			
	Total	**2804**	**642**	**1953**	**1206**	**160**	**209**

Remark: Final Waste generation shall be 209KLD out of which 142 KLD of wet cake and 67 KLD of MEE wastewater shall be generated after MEE. (Raw process waste quantity - 979)

Note:

The consumption/losses and final wastewater generated is amounting (642 + 209) = 851 KLD.

Net Water Requirement: 2804 –1953 = 851 KLD

Effluent Generation: 1206 KLD out of which process and dilute wastewater - 979 KLD, DM plant wastewater generation-10KLD, fermenter washing waste-70 KLD, boiler blow-down wastewater-15KLD, MEE wastewater generation-67 and cooling tower wastewater generation – 65KLD.
All the effluent except concentrated spentwash shall be treated in CPU and treated effluent shall be recycled in process.
Concentrated spentwash shall be converted to dry powder/granules.

Table 2.8 Water Requirement and wastewater generation of the factory

Sr. No.	Water Requirement KLD	Wastewater generation KLD	
1.	Sugar Division		
	Zero water requirement for sugar division except DM plant water requirement of 290 and domestic water requirement of 100. Thus total water requirement shall be 390. Water Saved – 310 (due to excess condensate from sugarcane juice)	1258	
		Sugar effluent	298
		Spray-pond effluent	800
		Co-generation power plant effluent	160
2.	Distillery Division		
A.	Based on “C” Molasses		
	726	631	
		Concentrated spentwash	216
		Spentlees	270
		Other dilute effluent	145
	OR		
B.	Based on “B” Heavy Molasses		
	645	550	
		Concentrated spentwash	135
		Spentlees	270
		Other dilute effluent	145
	OR		
C.	Based on “Sugarcane Juice/Syrup”		
	545	470	
		Concentrated spentwash	140
		Spentlees	175
		Other dilute effluent	155
	OR		
D.	Based on “Grains”		
	851	1206	
		Process and diluted wastewater	979
		Other diluted effluent	227
Note: other diluted effluent consist of DM plant wastewater, fermenter washing waste, boiler blow-down wastewater and cooling tower wastewater generation.			

Table 2.9Details of Bio-gas production for various configurations

Sr. No.	Discription of Spentwash	Spentwash Quantity m3/day	COD Concentration (mg/l)	COD Removal in Anaerobic Digester	Kg of COD Removal	Bio-gas Production Rate	Total Bio-gas Production in
1	Raw Spentwas-based on 'C' Molasses **OR**	1,080	1,20,000	85,000	91,800	0.50 m3 of Bio-gas/kg of COD Removal.	45,900
2	Raw Spentwas-based on 'B' Heavy Molasses **OR**	810	75,000	50,000	40,500		20,250
3	Raw Spentwas-based on Sugarcane juice/Syrup	703	35,000	25,000	14,060		17,575

Note: For off season raw material used as 'B' heavy molasses, hence quantity of bio-gas production will be 20,250m3/day say 20,000m3/day.

Fuel consumption during off season:

Coal consumption during off season shall be 240 MT/day for 1*50 TPH boiler.

Calorific value of coal – 5000 Kcal/kg of coal

Calorific value of Bio-gas – 5000 Kcal/m3 of Bio-gas

Therefore, 1 kg of coal equivalent to 1 m3 of bio-gas, hence reduction of coal requirement shall be 20 MT/day due to the use of bio-gas as a fuel. Thus, the coal requirement would be 220 MT/day instead of 240 MT/day, if bagasse is not available as fuel during off season.

D) Air Emission Management

Bagasse will be used as fuel in 1*200 TPH boiler and 1*50 TPH Boiler. The bagasse requirement of the proposed unit will be 2307.7038 MT/D. Bio-gas from Bio-methanation unit shall be used as supplementary fuel in order to further reduce the requirement of bagasse. Coal requirement at 220 MT/day and 20,000 m3/day of Bio-gas will be used in case of shortage of bagasse for distillery boiler.

Common stack of 82 meters height and electrostatic precipitator (ESP) as APC equipment will be provided to control the dispersion of pollutants releasing due to combustion of fuel.

Table 2.10 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
Present Installation					
1	Boiler 1*50 TPH		Bagasse	40	Wet Scrubber
2	Boiler1*40TPH		Bagasse	40	Wet Scrubber
Proposed Installation					
1	Boiler 200 TPH	Sugar & Co-generation Division	Bagasse	Common Stack of 82 m	ESP
2	Boiler 50 TPH	Distillery Division	Bagasse or Coal& Bio-gas.		

E) Solid waste Management

a) Non Hazardous solid wastes details

Table 2.11 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
	Bagasse as fuel for both the boilers		
1.	Fly/ Boiler Ash	1*200 TPH Boilers- 664.56 MT/M	Ash generated shall be sold to to brick manufacturer/ mixed with pressmud and sold as manure
		50 TPH Boiler- 116.2 MT/M	
2	Bottom Ash	1*200 TPH Boilers– 166.14 MT/M	
		50 TPH Boiler- 41.54 MT/M	
	Coal as fuel for 50 TPH Distillery Boiler		
	Fly/ Boiler Ash	792 MT/M	Ash generated shall be sold to to brick manufacturer/ mixed with pressmud and sold as manure
	Bottom Ash	198 MT/M	
3.	ETP Sludge	300 MT/A	ETP Sludge and Pressmud shall be sold as manure.
4.	Pressmud	320 MT/D	
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	

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
3.	Municipal Solid waste		
	Non-Biodegradable	7 MT/M	Manually collected and sold to scrap vendors
	Bio-degradable	10 MT/M	Used as manure.

The industry is negotiating with fertilizer manufacturers whereby dried spentwash shall be used as potash rich manure; in such an event anaerobic digester shall not be installed. The raw spentwash shall be concentrated in MEE and dried in spray drier.

b. Hazardous Waste

Table 2.12 hazardous waste generated and and its disposal

Sr. No.	Category	Description of waste	Quantity	Mode of Collection and Disposal
1.	5.1	Used Oil	1.01 KL/A	Shall be collected in Leak Proof Containers and utilized as lubricant for bullock carts

3 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

Ambient air monitoring was carried out at 8 locations (two inside the factory premise and 6 within study area) 24 hours a day, twice a week at each location over/for a period of three months (December 2019 to February 2020) to determine background concentrations. The Maximum concentrations of each pollutant observed is considered as a background concentration (monitored results + incremental 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 38.9 to 70.4µg/ m^3. The maximum 98th Percentile concentration is 67.8µg/ m^3 were recorded at Somvar Peth Tasgaon (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 24.3– 47.4µg/m^3. Highest 98th percentile value is 46.1µg/m^3 which was observed at Village Bambavade (Location-3). 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 8.4 – 24.5µg/ m^3. Maximum 98th Percentile value of Sulfur dioxide is 22.6 µg/ m^3obtained at Factory site (Location-1). 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 12.1– 29.8µg/ m^3. Maximum 98th Percentile value of Oxides of Nitrogen (NOx) is 29.8 µg/ m^3obtained at Factory site (Location-1). 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 0.2 – 1.28mg/ m^3. Maximum 98th Percentile value of Carbon Monoxide (CO) is 1.2 µg/ m^3obtained at Somvar Peth (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 3.1Receptor Summary

Sr. No.	Description of Receptor	Receptor/Village	Latitude	Longitude	Distance (in meter) from stack	Angle w. r. t. stack-
	-	Stack	17° 3'41.70"N	74°32'13.96"E	--	--
1	AAQ-1	Factory	17° 3'39.24"N	74°32'25.18"E	340	103
2	AAQ -2	Factory	17° 3'37.72"N	74°32'2.12"E	370	251
3	AAQ -3	Bambavade	17° 4'49.61"N	74°30'17.25"E	4030	301
4	AAQ -4	Gondilwadi	17° 4'5.63"N	74°27'24.60"E	8630	275
5	AAQ -5	Yelavi	17° 2'49.04"N	74°30'36.85"E	3310	240
6	AAQ -6	Somwar peth Tasgaon	17° 2'.28.57"N	74°35'52.64"E	6850	109
7	AAQ -7	Dhavali	17° 4'7.87"N	74°34'25.02"E	3940	78
8	AAQ -8	Gat Office Nehrunagar	17° 2'11.61"N	74°32'59.05"E	3080	154

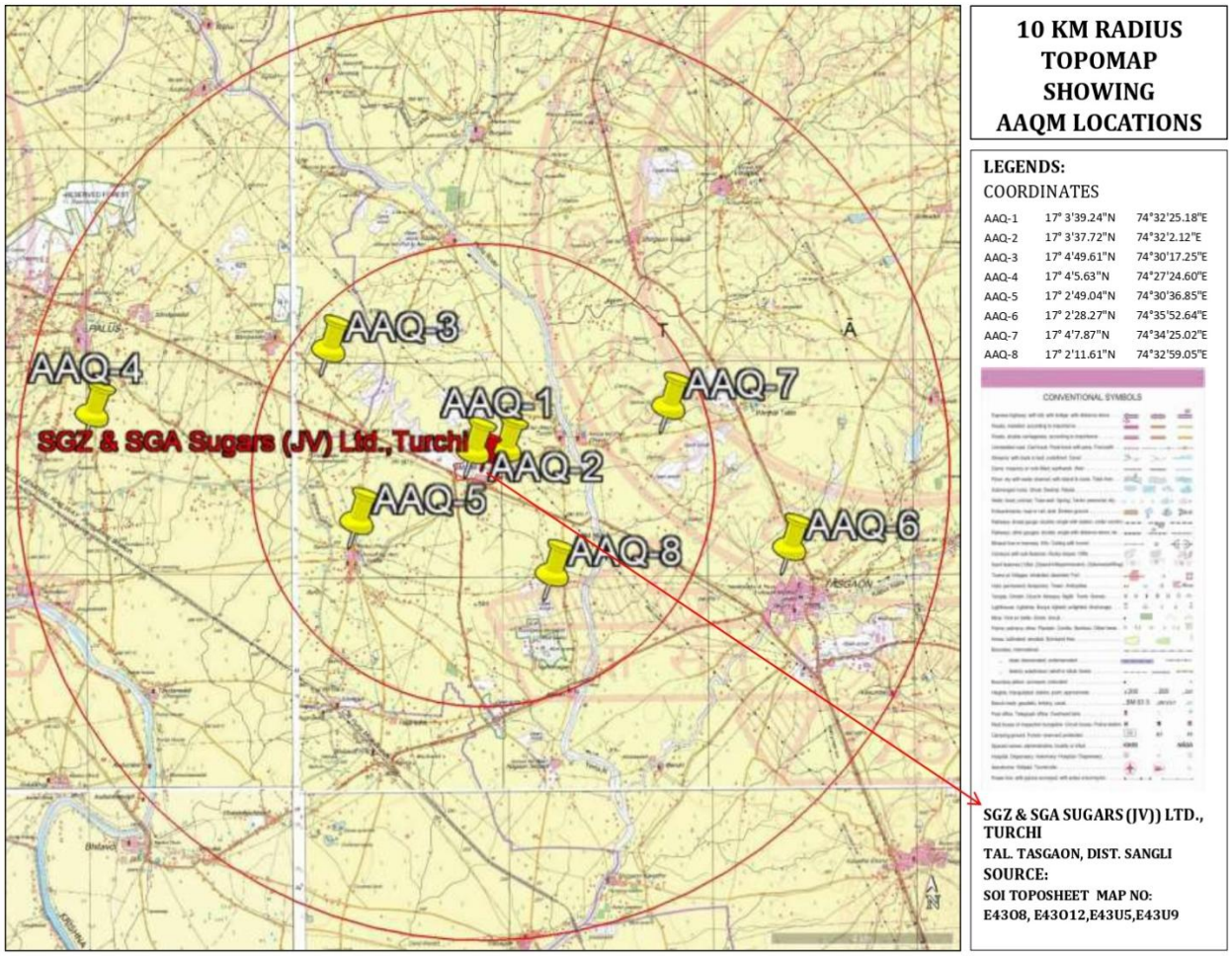


Figure 3.110 km. radius study area map indicating air quality monitoring locations

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

At present there are two numbers of 1*50 TPH and 1*40 TPH boilers, these boilers shall be abandoned and new boilers of 1*200 TPH for sugar division and 1*50 TPH for distillery division shall be installed (i.e. after expansion).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 SGZ & SGA Sugars (JV) Ltd., Turchi, Tal Tasgaon, Dist Sangli. 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 3.2PM_{10}& $PM_{2.5}$- 24 hr. Concentrations, computed by AERMOD 8.0.5

		PM_{10}- 24 hour concentration (µg/m3)			$PM_{2.5}$- 24 hour concentration (µg/m3)		
Sr. No.	**Receptor/Village**	**Background**	**Incremental**	**Total**	**Background**	**Incremental**	**Total**
1	Factory	53.4	0.14	53.54	36	0.09	36.09
2	Factory	57.9	0.25	58.15	35.9	0.16	36.06
3	Bambavade	66.5	0.06	66.56	47.4	0.04	47.44
4	Gondilwadi	65.6	0.02	65.62	36.2	0.02	36.22
5	Yelavi	67.5	0.11	68.51	42	0.07	41.17
6	Somwar peth Tasgaon	68.4	0.01	67.51	41.1	0.01	42.01
7	Dhavali	70.4	0.05	70.45	37.9	0.04	37.94
8	Nehrunagar	64.4	0.05	64.45	41.2	0.03	41.23

Table 3.3SO_2& NO_X-24 hr. Concentrations, computed by AERMOD 8.0.5

		SO_2 - 24 hour concentration (µg/m3)			NOx - 24 hour concentration (µg/m3)		
Sr. No.	**Receptor/ Village**	**Background**	**Incremental**	**Total**	**Background**	**Incremental**	**Total**
1	Factory	24.5	0.97	25.47	29.8	0.83	30.63
2	Factory	22.8	1.73	24.53	26.7	1.47	28.17
3	Bambavade	22	0.60	22.6	28	0.85	28.85
4	Gondilwadi	19.1	0.17	19.27	27	0.15	27.15
5	Yelavi	20.8	0.75	22.85	14.5	0.63	26.73
6	Somwar peth Tasgaon	22.1	0.10	20.9	26.1	0.04	141.54
7	Dhavali	22.2	0.41	22.61	25.2	0.35	25.55
8	Nehrunagar	22.9	0.31	23.21	26.2	0.26	26.46

From the results, it can say that,

- At the selected 8 receptor locations, surrounded in 10 km radius around SGZ & SGA Sugars (JV) Ltd., Turchi, Tal Tasgaon, Dist Sangli, GLCs are well within the limits of AAQS. Results of the Ambient Air monitoring are enclosed in the **Annexure II.**
- At the selected 8 receptor locations, surrounded in 10 km radius around SGZ & SGA Sugars (JV) Ltd., Turchi, Tal Tasgaon, Dist Sangli, 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*200TPH and 1*50 TPH boilers, PM_{10} GLCs at all the 8 receptor locations are in the range of **53.53µg/m^3** to **70.46µg/m^3** which are within the limits of AAQS.
- For $PM_{2.5}$, GLCs are in the range of **36.05µg/m^3** to **47.44µg/m^3** which is within the limits of AAQS.
- For SO_2, GLCs are in the range of **19.68µg/m^3** to **27.94µg/m^3** which is within the limits of AAQS.
- NO_x GLCs are in the range of **15.05µg/ m^3** to **30.41µg/ m^3** which is 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 & 3 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 3.4Details of the ground water quality monitoring sampling locations

Sr. No.	Description of samples	Sampling location Village Name	Latitude	Longitude
Ground Water				
1	GW-1	Borewell – Vasagade road	16° 58' 38.49"N	74° 30' 56.98"E
2	GW-2	Borewell –Shirgaon	17° 6'21.45"N	74°34'9.60"E
3	GW-3	Borewell –Bambavade	17° 4' 50.85"N	74° 30' 16.19"E
4	GW-4	Borewell – Bhilavadi road	17° 4'5.58"N	74°27'27.25"E
5	GW-5	Borewell –Yelavi	17° 2' 40.56"N	74° 30' 39.6"E
6	GW-6	Borewell – Morale	17° 7'8.72"N	74°30'18.22"E
7	GW-7	Well Water – Dhavali	17° 4'7.22"N	74°34'25.31"E
8	GW-8	Borewell –Nehrunagar	17° 2'13.29"N	74°32'56.66"E

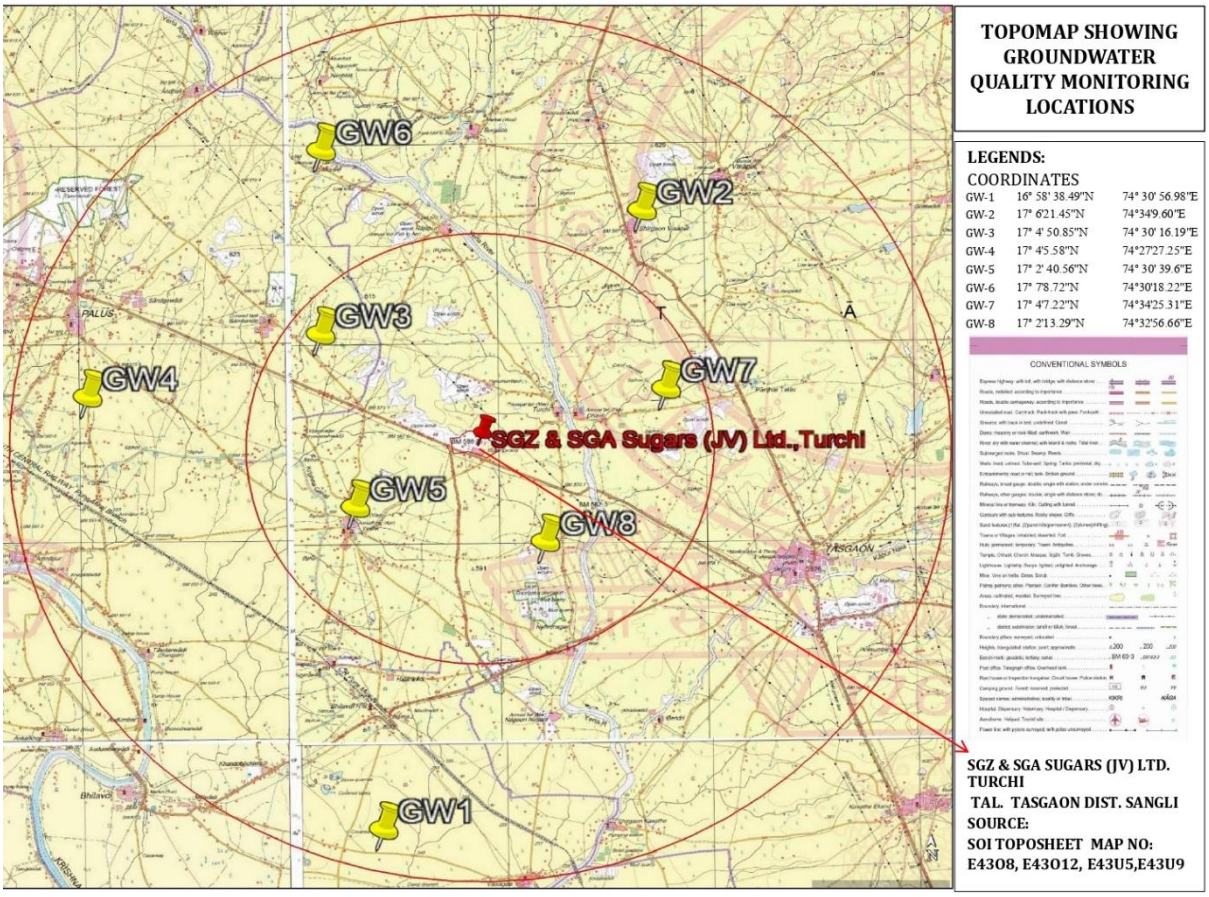


Figure 3.210 km. radius study area map indicating groundwater sampling location

Table 3.5 Details of the surface water quality monitoring sampling locations

Sr. No.	Description of samples	Sampling location Village Name	Latitude	Longitude
Surface Water				
1	SW-1	Dam Water- Yelavi Canal	17° 2'53.33" N	74°30'25.37"E
2	SW-2	Odha Water- Morale Odha	17° 7' 9.13"N	74° 30' 18.04"E
3	SW-3	Canal Water – Yerla River	17° 4' 2.41"N	74° 33' 19.92"E

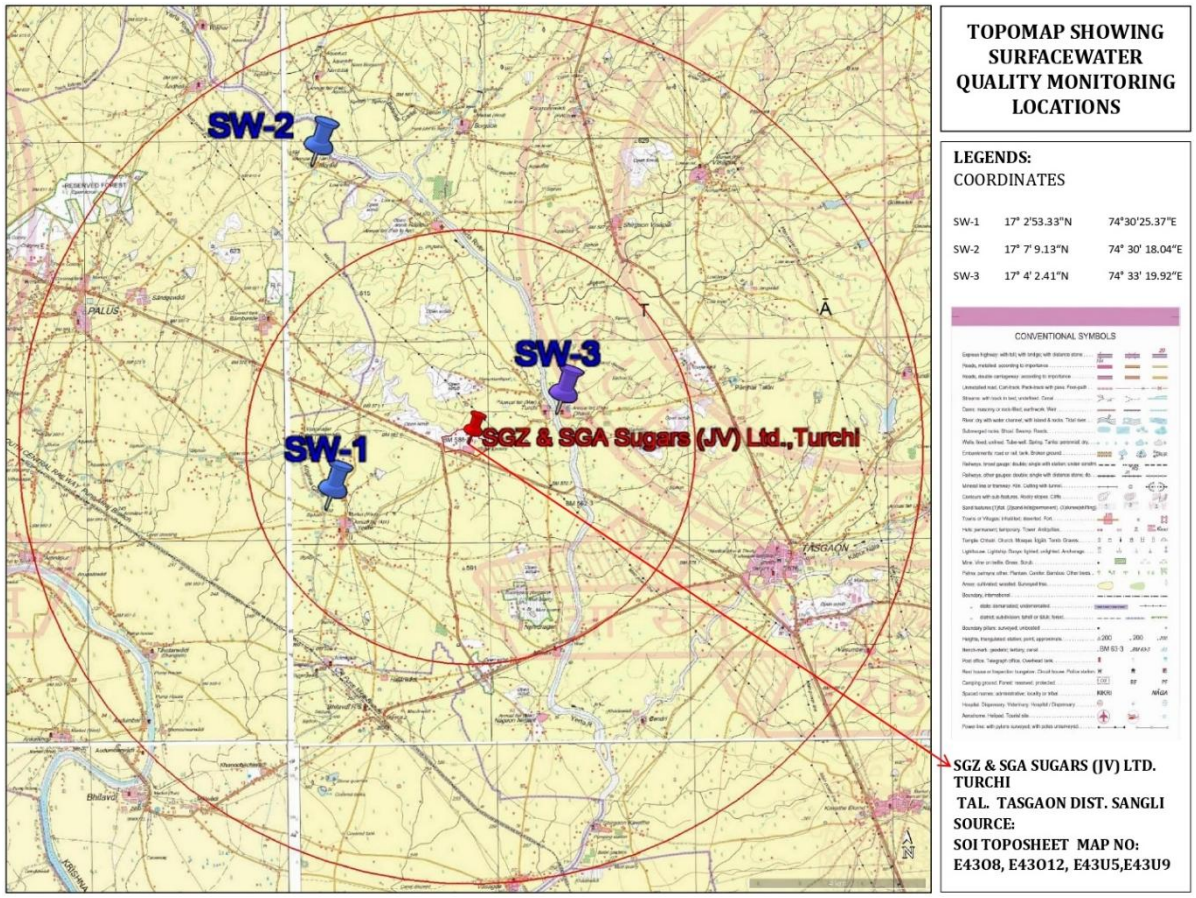


Figure 3.310 km. radius study area map indicating surfacewater sampling location

Table 3.6 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water	
		Min	Max	Min	Max
1.	pH	6.57	7.7	6.84	7.60
2.	Dissolved Solids (mg/l)	462	676	520	569
3.	Total Hardness (mg/l)	294	585	242	582
4.	Chlorides (mg/l)	50	194	74.94	152.40
5.	Fluoride (mg/l)	0.25	0.63	0.42	0.53
6.	Sulphates (mg/l)	27	43	23	39

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 3.7Details of the soil sampling locations

Sr. No.	Description of samples	Sampling location Village Name	Latitude	Longitude
1	S-1	Soil – Vasagade road	16° 58' 38.49"N	74° 30' 56.98"E
2	S-2	Soil - Shirgaon	17° 6'21.45"N	74°34'9.60"E
3	S-3	Soil–Bambavade	17° 4' 50.85"N	74° 30' 16.19"E
4	S-4	Soil – Bhilavadi road	17° 4'5.58"N	74°27'27.25"E
5	S-5	Soil–Yelavi	17° 2' 40.56"N	74° 30' 39.6"E
6	S-6	Soil – Morale	17° 7'8.72"N	74°30'18.22"E
7	S-7	Soil– Dhavali	17° 4'7.22"N	74°34'25.31"E
8	S-8	Soil -Nehrunagar	17° 2'13.29"N	74°32'56.66"E

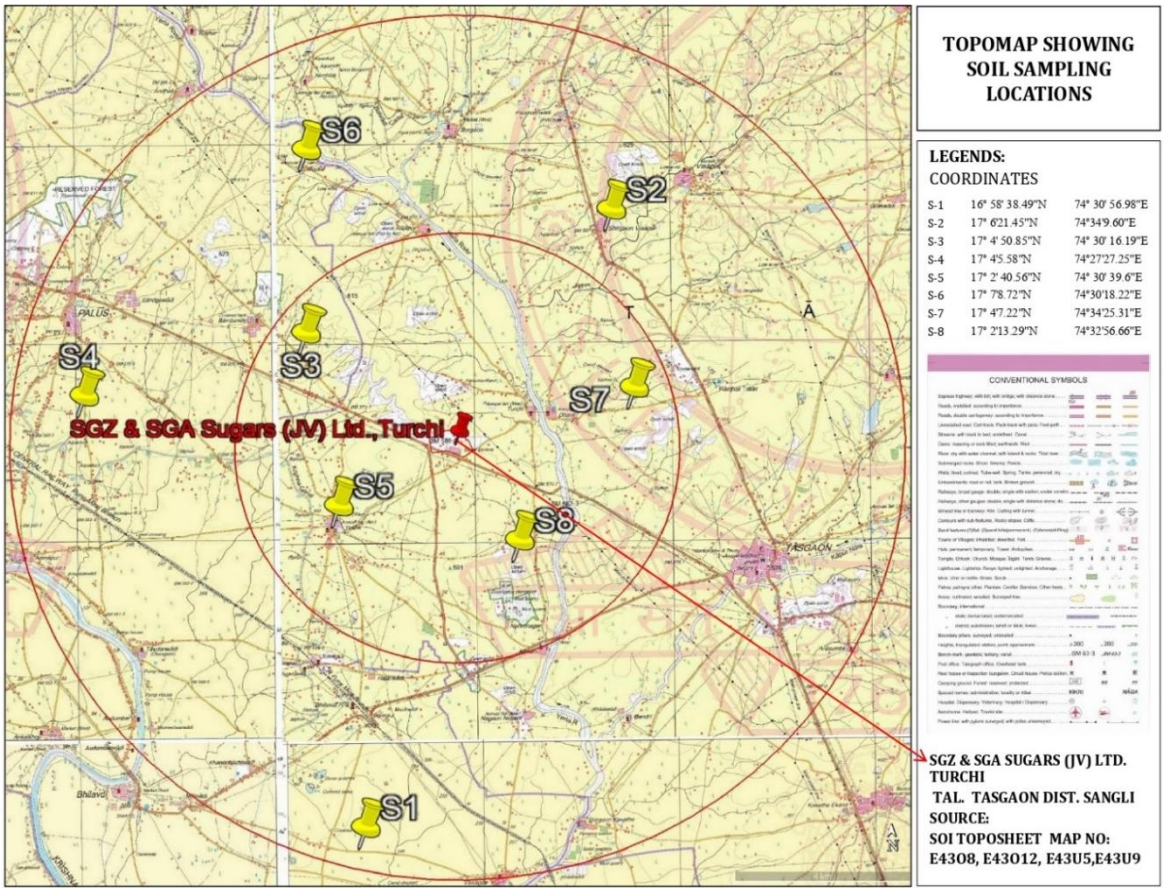


Figure 3.410 km. radius study area map indicating soil sampling location

Table 3.8Soil 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	--	7.90	7.77	7.84	7.90	7.12	7.67	7.84	8.22	6.5 – 8.5
2	Conductivity	mmhos/cm	0.22	0.29	0.32	0.31	0.35	0.39	0.42	0.37	0.2 – 0.5
3	Available Nitrogen	Kg/ha	210	286	254	310	261	270	275	276	>200
4	Available Phosphorus	Kg/ha	41	47	41	57	48	44	52	56	40 – 60
5	Available Potassium	Kg/ha	298	330	452	301	367	512	301	397	>280
6	Organic Carbon	%	0.76	0.78	0.79	0.94	0.95	0.86	1.01	0.97	>0.75
7	Sodium (as Na)	%	0.004	0.004	0.005	0.005	0.003	0.005	0.005	0.006	< 5
8	Calcium (as Ca)	%	0.22	0.24	0.29	0.22	0.19	0.28	0.26	0.35	---
9	Magnesium (as Mg)	%	0.04	0.05	0.07	0.06	0.03	0.06	0.07	0.05	---
10	Cation Exchange Capacity	meq/100gm	14.65	17.20	21.51	16.82	12.54	20.30	19.85	22.62	>30
11	Water Holding Capacity	%	41	43	51	53	53	48	49	46	---
12	Particle Size Distribution										
12a	Sand	%	23	22	21	21	21	22	21	22	---
12b	Silt	%	24	22	22	23	25	23	25	24	---
12c	Clay	%	53	56	57	56	54	55	54	54	---

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

- The finding of the study reveals that pH of soil in the area ranged between**7.12** to **8.22**which is an indicative of the **neutral** to **slightly alkaline** soil.
- The values for Nitrogen at all locations varied between **210**to **310 kg/ha**. Maximum concentration of nitrogen was observed at location S-4, while the lowest concentration can be observed at location S-1 and S-3.
- It is important to note that the concentration of potassium was found to be high at all locations ranging between **298** to **412 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 to high** fertile soils.

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.

Note: Industry is not working state since last 6 years.

Table 3.9Details of noise quality monitoring locations

Sr. no.	Description	Locations	Latitude	Longitude
Within Factory				
1	N-1	Factory- Main Gate	17° 03'38.38"N	74°32'09.02"E
2	N-2	Factory- Manufacturing House	17° 03'40.61"N	74°32'16.98"E
3	N-3	Factory- Near ETP	17° 03'50.44"N	74°32'17.89"E
4	N-4	Factory-Near Guest House	17° 03'46.53"N	74°32'9.40"E
5	N-5	Factory-Near Quarters	17° 03'49.63"N	74°32'07.31"E
Outside the Factory Premises (within 10 km radius)				
6	N-6	Bambavade	17° 4'49.61"N	74°30'17.25"E
7	N-7	Yelavi	17° 2'49.04"N	74°30'36.85"E
8	N-8 i	Gondilwad	17° 4'5.63"N	74°27'24.60"E
9	N-9	Somwar peth, Tasgaon	17° 2'28.27"N	74°35'52.64"E
10	N-10	Dhavali	17° 4'7.87"N	74°34'25.02"E
11	N-11	Neharunagar	17° 2'11.61"N	74°32'59.05"E

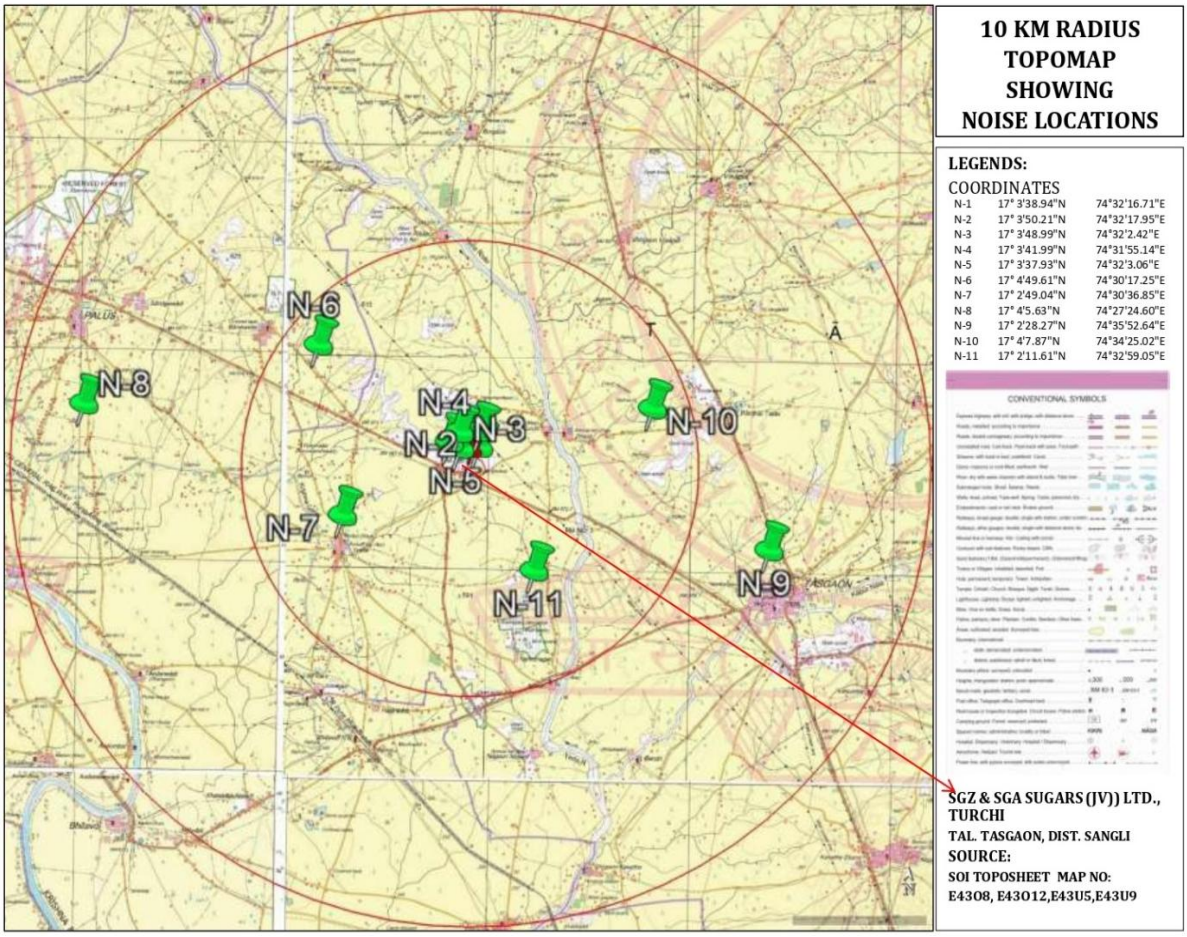


Figure 3.5km. radius study area map indicating noise location

Note: Industry is not working state since last 6 years.

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

Industrial Zone: The day time noise level at the Project site was found in the range of 45.8 – 49.5 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 44.9 dB (A) to 52.3 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 40.0 – 43.7 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 39.8 dB (A) –45.9 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 3.10Noise levels of the study area

Sr. No.	Station	Standard Limit dB(A) Leq	Time	dB (A) Leq
Inside factory premises				
1.	Factory	75	Day	49.5
		70	Night	43.7
2.	Factory	75	Day	46.7
		70	Night	41.2
3.	Factory	75	Day	45.8
		70	Night	40
4.	Factory	75	Day	46.1
		70	Night	40.6
5.	Factory	75	Day	45.2
		70	Night	39.7
Outside factory (within study area)				
1.	Bambavade	55	Day	45.9
		45	Night	41.7
2.	Yelavi	55	Day	47.8
		45	Night	41.9
3.	Gondilwadi	55	Day	47.1
		45	Night	43.2
4.	Somwar peth, Tasgaon	55	Day	52.3
		45	Night	44.9
5.	Dhavali	55	Day	46.3
		45	Night	39.8
6.	Neharunagar	55	Day	49.3
		45	Night	43.1

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 3.11Change in General Land use/ Land cover of Study Area (2008 to 2017)

Landuse	Area in km2		% of Study Area	
	2008	2017	2008	2017
Water Bodies	14.61	13.54	3.56	3.30
Settlement	41.59	64.19	10.12	15.62
Open Scrub	15.14	10.04	3.68	2.44
Agriculture	225.83	231.95	54.96	56.45
Barren Land	113.74	91.19	27.68	22.19
Total	**410.91**	**410.91**	**100**	**100**

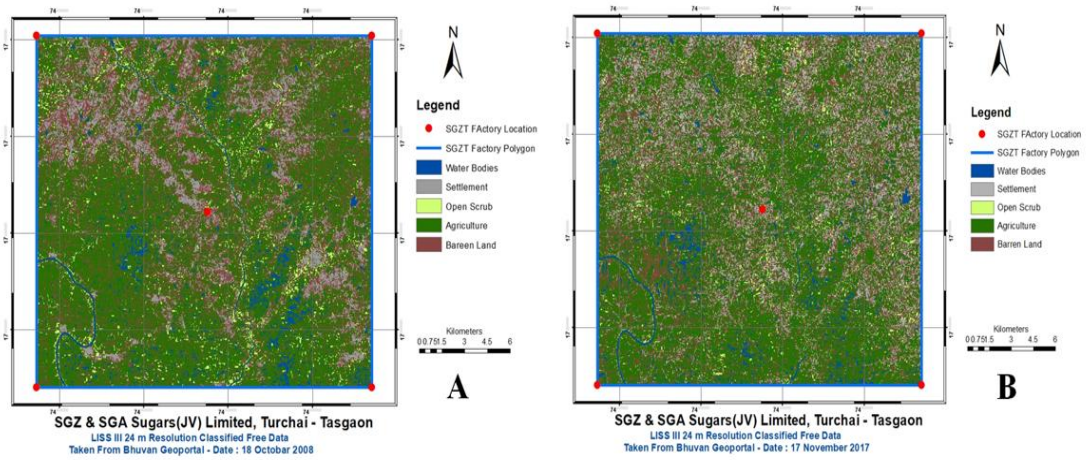


Figure 3.6 Landuse/Land cover map 1) 2008 & 2) 2017

- In the year 2008 Water body area is about 14.61 km^2, whereas in the year 2017 is decreased and it is 13.54 km^2.
- It can be inferred that there is an increase in 6.986 % of land under settlement and agricultural land whereas a decrease in area under Scrub, water body and Barren Land is 6.986%.
- 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.

3.6 ECOLOGY AND BIODIVERSITY

- The existing biodiversity in the study area was observed to be very low mainly due to the semi-rural and agrarian setting of the location. The project does not involve any clearance of trees as the project is expansion of existing facility and well connected to major and minor roads.
- This being an expansion of the existing facility there are already existing measures for treatment of wastes generated from the facility along with effective recycling practices.
- During project implementation, monitoring of the existing biodiversity and its improvement or degradation with respect to project activities should be monitored periodically.
- Proper sanitary conditions should be provided to all workers working within the premises to avoid open defecation as it poses not only a health hazard but can also allow unwanted weeds to grow within the premises. The staff and workers should also be educated and sensitized about the same.
- The efficiency of the waste treatment facilities should also be periodically with proper maintenance of records for auditability. Also the recycled water being supplied for agriculture should be checked for its pathogenic activity.
- 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.

3.8 Site photographs

Figure 3.7 Site photographs

4 IDENTIFICATION, PREDICTION AND MITIGATION MEASURES

The anticipated impacts during construction and operational phase due to the proposed activity on air, water, soil, noise, ecology and biodiversity, and socio-economic environment are assessed and mitigation measures to minimize the impacts on the same are suggested in Chapter 4 in this report.

5 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

Analysis of alternative site

SGZ & SGA Sugars (JV) Ltd. has existing sugar factory of 3500 TCD. The command area is rich in sugarcane cultivation and has excellent irrigation facilities. The industry purchased the unit of Tasgaon Sahakari Sakhar Karkhana Limited, Sangli, under SERFESI Act 2002 from Maharashtra State Co-operative Bank Ltd. SGZ & SGA Sugars Limited, Turchi, Taluka Tasgaon, Dist Sangli is registered in the state of Maharashtra under companied act, 1956 on 4th January 2019, CIN: U15134PN2019PLC181176.

The Project Site is conveniently located for development of the Project.

- 25.0 Km away from Sangli, which is a district place.
- Turchi, at a distance of 2.0 km
- Tasgaon, at a distance of 8.0 km
- Nearest National Highway – NH-4 – 35 K
- Nearest River – Yerala River - 2 Km, Krishna River – 9.0 Km
- Bhilavadi is nearest Railway station 7.0 km away from factory site.
- Kolhapur is nearest Airport 52.0 Km away from factory site.

The industry has sufficient land for proposed expansion and necessary infrastructure to undertake the expansion. There will not be any additional requirement of water for sugar/cogeneration plant and distillery unit. The minimum quantity of water is required, which can be obtained from the existing water source supply. The existing utilities can be effectively and economically utilized for proposed expansion and thus alternate site is not advantageous for the expansion. It is always economical and cost effective to utilize the existing infrastructures. There are no negative impacts due the proposed expansion. Thus, the existing site is suitable for the proposed expansion.

Analysis of alternative technology

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

For sugar unit the expansion may be incorporated in existing sugar mill by providing additional, Milling Tandem. At present the industry take steam from existing1*50 TPH and 1*40 TPH low pressure boilers. It is proposed to demolish the existing low pressure boilers and add 1*200 TPH and 1*50 TPH boilers in order to reduce the bagasse and steam requirement for the process. It is proposed to establish 40MW bagasse based co-generation power plant which will fulfill the power and stem requirement of proposed unit and excess power will be supplied to the state electricity grid.

6 ENVIRONMENT MONITORING PROGRAMME

Table 6.1Environment management progrmme

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, VOCs	PM_{10}, $PM_{2.5}$, SO_2,andNO_x	24 hourly, Quarterly	5 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	6 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	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 1500 per hectare, however; the number of trees would vary depending on the type	Six Monthly	

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
		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, disasters management plan, onsite and offsite emergency plan are prepared and given in Chapter 7 of the EIA Report

Consequence analysis of ethanol due to storage facility

Scenario of Ethanol in different forms

SITE DATA:

Location: TASGAON, SANGLI, INDIA

Building Air Exchanges Per Hour: 0.74 (unsheltered single storied)

Time: September 7, 2020 1612 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL

CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol

ERPG-1: 1800 ppm ERPG-2: 3300 ppm ERPG-3: N/A

IDLH: 3300 ppm LEL: 33000 ppm UEL: 190000 ppm

Ambient Boiling Point: 76.5° C

Vapor Pressure at Ambient Temperature: 0.088 atm

Ambient Saturation Concentration: 94,125 ppm or 9.41%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2.5 meters/second from WNW at 10 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 27° C Stability Class: C

No Inversion Height Relative Humidity: 50%

Type of Tank Failure: BLEVE tank explodes and chemical burns in afireball

Potential hazards from BLEVE:

- Thermal radiation from fireball and pool fire
- Hazards fragments and blast force from explosion
- Downwind toxic effects of fire by-products

BLEVE/Fire ball Scenario: The higher the internal tank pressure/temperature at the time of tank failure, the larger the fire ball. Any liquid not consumed by the fire ball will form a pool fire.

SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank

Tank Diameter: 20 meters Tank Length: 15.9 meters

Tank Volume: 5000 cubic meters

Tank contains liquid

Internal Storage Temperature: 27° C

Chemical Mass in Tank: 3240 tons Tank is 75% full

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 831 meters Burn Duration: 37 seconds

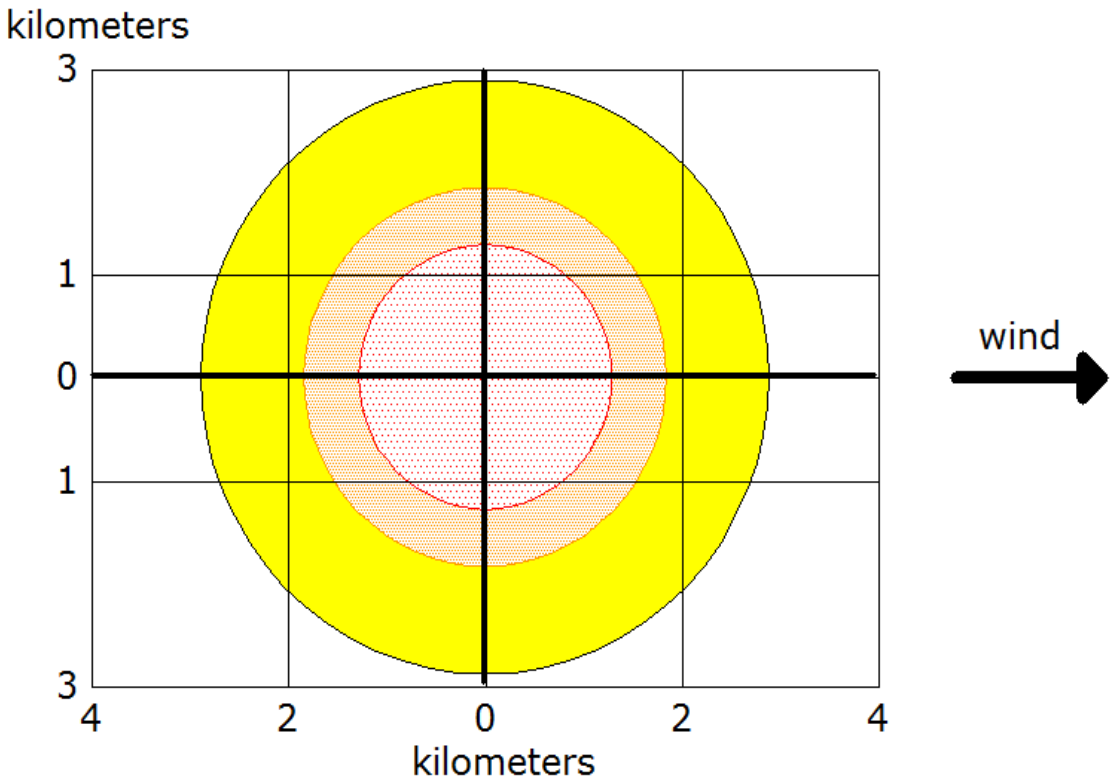
THREAT ZONE:

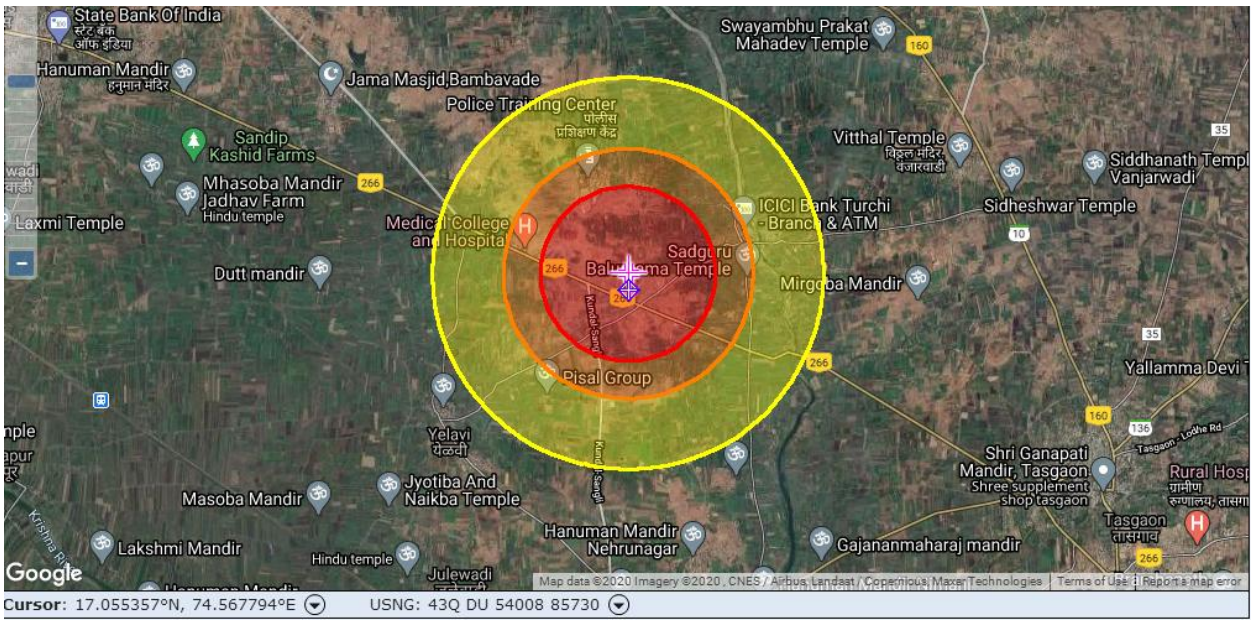
Threat Modeled: Thermal radiation from fireball

Red : 1.3 kilometers --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 1.8 kilometers --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 2.9 kilometers --- (2.0 kW/(sq m) = pain within 60 sec)


kilometers
3
1
0
1
3
4
2
0
2
4
kilometers
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)


State Bank Of India
Hanuman Mandir
Jama Masjid,Bambavade
Police Training Center
Swayambhu Prakat Mahadev Temple
Sandip Kashid Farms
Mhasoba Mandir Jadhav Farm
Hindu temple
Laxmi Temple
Medical College and Hospital
Vitthal Temple
Siddhanath Temple Vanjarwadi
Sidheshwar Temple
ICICI Bank Turchi - Branch & ATM
Dutt mandir
Mirgoba Mandir
Pisal Group
Yallamma Devi
Yelavi
Shri Ganapati Mandir, Tasgaon
Shree supplement shop tasgaon
Masoba Mandir
Jyotiba And Naikba Temple
Hanuman Mandir Nehrunagar
Gajananmaharaj mandir
Tasgaon
Lakshmi Mandir
Hindu temple
Julewadi
Google
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Conclusions

When tank explodes and ethanol in a fireball due to BLEVE;

The thermal radiation for the Ethanol tank confined to the maximum at 1.3 km that means the thermal radiation intensity of 10kW/m^2 is potentially lethal within 60 seconds. Similarly, the other threat zone of 5.0 kW/m^2 causes 2nd degree burns within 60 seconds at 1.8 km and the rest is 2.0 kW/m^2 subjected to within the unit at 2.9 km, which causes pain within 60 seconds

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. 3220 Lakhs. And recurring cost will be Rs. 265 Lakhs. The detailed EMP budget is given in table below.

Table 8.1EMP Budget

SR. NO.	COMPONENT	PARTICULARS		CAPITAL INVESTMENT (IN LAKHS)	RECURRING INVESTMENT (IN LAKHS)
1.	Air	Construction of new stack for boiler and ESP		600	50
2.	Water	• Upgradation of ETP • Sugar and distillery CPU • Anaerobic Digestor, MEE & Drier for Distillery Spentwash treatment		2500	150
3.	Noise	Acoustic enclosures, Silencer pads, ear plugs etc		20	5
4.	Environment monitoring and Management	Quarterly 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	Gloves, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		15	5
6.	Greenbelt	Green belt development activity		10	
		Maintenance of green belt		--	5
7.	Solid Waste Management	Solid Waste Management		50	20
8.	Rain water harvesting	Rain water harvesting		25	5
9.	Carbon and Water Foot Print	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw		--	5

SR. NO.	COMPONENT	PARTICULARS	CAPITAL INVESTMENT (IN LAKHS)	RECURRING INVESTMENT (IN LAKHS)
		materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery		
		TOTAL COST (INR, LAKHS)	**3220**	**265**

9 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The capital cost of the proposed expansion project will be Rs. 350 Crores. As per the Ministry's Office Memorandum, Vide F. No. 22-65/2017-IA.III dated 01.05.2018, the industry is to spend 0.75 % of the Project Cost on Corporate Environment Responsibility, which works out to be **Rs. 2.625 Crores** only.

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 600 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about 3059.83 m^3 per year water is harvested. This harvested water shall be utilized for ground water recharge in order to increase the ground water table in the surrounding area

Storm water management system is also adopted by the industry. Separate drains of minimum 0.45 m * 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 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.