

EXECUTIVE SUMMARY



PROPOSED ESTABLISHMENT OF 200 KLPD MULTIFEED DISTILLERY TO MANUFACTURE RECTIFIED SPIRIT/EXTRA NEUTRAL ALCOHOL/ETHANOL BY M/s. SANT MUKTAI SUGAR AND ENERGY LIMITED AT GHODASGAON, TALUKA MUKTAINAGAR, DISTRICT JALGAON, MAHARASHTRA STATE

Project Area: 48.15 Ha

Project Cost: Rs. 250 Crores

Vide TOR No. J-11011/197/2016-IA-II(I) Dated 24th March

2023

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. Sant Muktai Sugar and Energy Limited (SMSEL) is an unlisted public limited company incorporated on 23rd April 2013. The company is registered in the state of Maharashtra under the Companies Act bearing Certificate of Incorporation (CIN) number U15422PN2013PLC147067 dated 23rd April 2013 and located at Ghodasgaon, Taluka Muktainagar, District Jalgaon, State Maharashtra.

At present, the industry is operated with a sugarcane crushing capacity of 2500 TCD and Co-generation power plant of 12 MW Capacity. The management of SMSEL decided to expand its sugarcane crushing capacity from 2500 TCD to 4900 TCD.

The industry also proposes to establish 200 KLPD multifeed distillery to consume the available molasses from its own sugar unit and utilize sugarcane juice/syrup for the production of RS/Ethanol and 12 MW Cogeneration power plant to consume additional available bagasse to generate power.

The proposed project will produce RS/Fuel Ethanol from sugarcane syrup /C' molasses/B' heavy molasses as raw materials depending on the market demand and availability of raw materials. The configuration of product after proposed establishment is as below

The total cost of the project will be around Rs. 250 Cr. EMP Cost will be Rs. 58.00 Cr. allotted for APCM, ZLD, water pollution control, environment monitoring and management, rain water harvesting, greenbelt development, solid waste management, Safety and fire fighting, emergency handling & occupational health etc.

1PROJECT LOCATION

The salient features of the project site are

Sr. No.	Particulars	Details
A.	Nature and Size of the Project	Sant Muktai Sugar and Energy Limited
B.	Location Details	
1.	Location	Ghodasgaon
2.	Plot/ Survey/ Khasra No.	-
3.	Village	Ghodasgaon
4.	Tehsil	Muktainagar

Sr. No.	Particulars	Details
5.	District	Jalgaon
6.	State	Maharashtra
7.	Geographic Location of Project	21° 1'47.22"N & 76° 6'17.00"E
	Four Corner GPS Location	As Above Table
C.	Area Details	
1.	Total Project Area	481500.00 sqm
2.	Existing + Proposed Green belt Area	159000 sqm
3.	Type of Land	Industrial Land
D.	Environmental Settings details	
8.	Nearest railway station/ airport along with distance in kms.	Railway station: Malkapur 18 Km (S) Airport: Jalgaon airport 55Km (W)
9.	Nearest Town, city, District Headquarters along with distance in km	Muktainagar 5 Km (NW), Jalgaon 55 Km (W)
10.	Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (Complete postal addresses with telephone nos. to be given)	Ghodasgaon 0.5 Km (W)
11.	Nearest Water Body	Purna River 3.5 Km (N) Tapi River 12 Km (N)
12.	Eco-Sensitive Area	No ESZ & EZA Area in 10 km Radius
13.	National Parks, Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	None, in Study area
14.	Reserved Forests (RF) / Protected Forests (PF),	None
15.	Interstate boundary	None

1.2 PROJECT DESCRIPTION

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

Table 1 Existing and Proposed Products manufacturing quantities

Sr. No	Industrial Unit	Product / By-Product	Quantity (Capacity)		
			Existing	Proposed	Total
1	Sugar Unit	Tons Sugarcane Crushing per day (TCD)	2500	2400	4900
a	Product	Sugar (MT/M)	7500	7200	14700
b	By - Product	Molasses (MT/M)	3000	2880	5880
		Press Mud (MT/M)	3000	2880	5880
		Bagasse (MT/M)	22500	21600	44100
2	Cogeneration	Electricity (MW)	12	5	17
3	Distillery	RS/ Ethanol (KLPD)	0	200	200

2.0 RESOURCE REQUIREMENT AND INFRASTRUCTURE FACILITIES

A) Raw material requirement

The details of the raw material requirement for distillery unit and its source are given in table below. The raw materials and other chemicals are transported to the site through designated vehicles by Pakka Roads. The other raw materials like bagasse and Molasses are procured from nearby sugar units/ Khandsaris and allied industries.

Table 2 Raw material requirement

Sr. No	Item	Quantity	Unit	Remarks/Source
1 a	B Heavy molasses OR	607	MT/day	Distillery unit will run for 150 days (During off season) on C or B heavy molasses available from our existing unit/ will be procured from nearby sugar units
1 b	C Molasses OR	715	MT/day	

Sr. No	Item		Quantity	Unit	Remarks/Source
2	Sugarcane Juice/ Sugar Syrup		2667/ 727	MT/day	Distillery unit will be run for 180 days (During crushing season) on sugar cane juice/syrup
Consumable Chemicals					
1	Sodium Meta bi-sulphate		100	Kg/day	Stored in Fermentation house Source: Market Mumbai, Pune, Jalgaon
2	De-foam agent		200	Kg/day	
3	Nutrients (Fertilizers DAP)		175	Kg/day	
4	Enzymes		30	Ltr/day	
Utilities					
1	Total requirement of Steam		25	TPH	1*30 TPH Incinerator boiler will be installed to fulfill the steam requirement of the distillery unit
2	Water	Industrial Use	731	CMD	Source: - 1) Purna River 2) During sugar season balanced sugar CPU condensate is stored and used for existing Distillery operation.
		Domestic Use	10	CMD	
3	Power Requirement		3	MW	Source: 5 MW TG Set connected to Incinerator boiler

B) Land use Details

Details of existing and proposed land utilization pattern within the project site is given in table below

Table 3 Land use breakup

Sr. No.	Description			Area in Sq.m	% of Area
A	Total Plot area			481500.00	100
1	Built Up	Existing	41577.45	78,558.95	8.10
		Proposed	36981.50		
2	Bagasse Yard			3724.00	0.77
3	Space for cane yard			13552.00	2.81
4	Green Belt Area			159380.50	33.10

Sr. No.	Description	Area in Sq.m	% of Area
5	Parking Area	69866.00	15.51
6	Area under road	61584.00	13.37
7	Vacant Land	94834.52	19.70

C) Power requirement

The power requirement of the existing sugar complex is met through own cogeneration power plant of 12 MW. After the proposed project additional 5 MW TG set will be installed in order to meet the power requirement of the distillery unit. Total power requirement of the sugar complex will be 9.12 MW, whereas the net power generation will be 17 MW. The surplus power will be exported to state electricity grids as per the current practice.

Table 4 Details of the power requirement

Sr. No	Description	Quantity			Source
		Existing	Proposed	Total	
1	Sugar and Cogeneration Unit	2.64	2.48	5.12	12 MW Cogeneration power plant
2	Distillery Unit	0	3	3	5 MW TG Set Connected to Incinerator Boiler
3	Domestic Colony	1	0	1	12 MW Cogeneration power plant
	Total	3.64	5.48	9.12	12 MW Cogeneration power plant & 5 MW TG Set

Also, for proposed distillery section Incineration Boiler of 30 TPH will be installed. HSD diesel will be used in D.G. set in case of power shut down or emergency. Fuel & Power consumption details are given in below

Table 5 Fuel requirement

Sr. No.	Boiler details	Fuel	Quantity (MT/D)			Source
			C Molasses	B heavy Molasses	Sugarcane Juice/Syrup	
1	1*30 TPH incineration boiler	Conc. Spentwash	415	262	184	Distillery unit
		Bagasse	178	124	184	Own Sugar Unit

D) Water requirement**Industrial purpose:**

For Distillery project: - 731 MT/Day

Sugar and Cogeneration unit will run based on zero water requirement.

Water requirement for fire-fighting system – Fire-fighting system is already in place for existing sugar & Cogeneration power unit and for the proposed 200 KLPD Distillery the fire-fighting system considerations are as follow-

Water storage of 4 hours with water tank capacity as 1100 m³ has been consider.

Consider Electrical motor driven pump as 273 m³/hr, 120 m head (2nos)

273 m³/hr capacity 120m head stand by diesel engine driven centrifugal pump (1no)

Jockey pump 13.8 m³/hr, 120m head (1no). Auto start panel for diesel engine with auto/manual switch.

Domestic purpose:

For existing project, the domestic water requirement is 45 m³/day

After the implementation of the proposed project the domestic water requirement shall be 55 m³/day.

Source: Purna River

The detailed water budget for existing and proposed configuration is given in below tables.

460 MT/day of treated condensate from sugar unit is used during off-season distillery operation which is stored in existing storage reservoir

Water budget for Proposed 200 KLPD Distillery unit

1. Proposed 200 KLPD - C Molasses (All Quantity in MT/D)

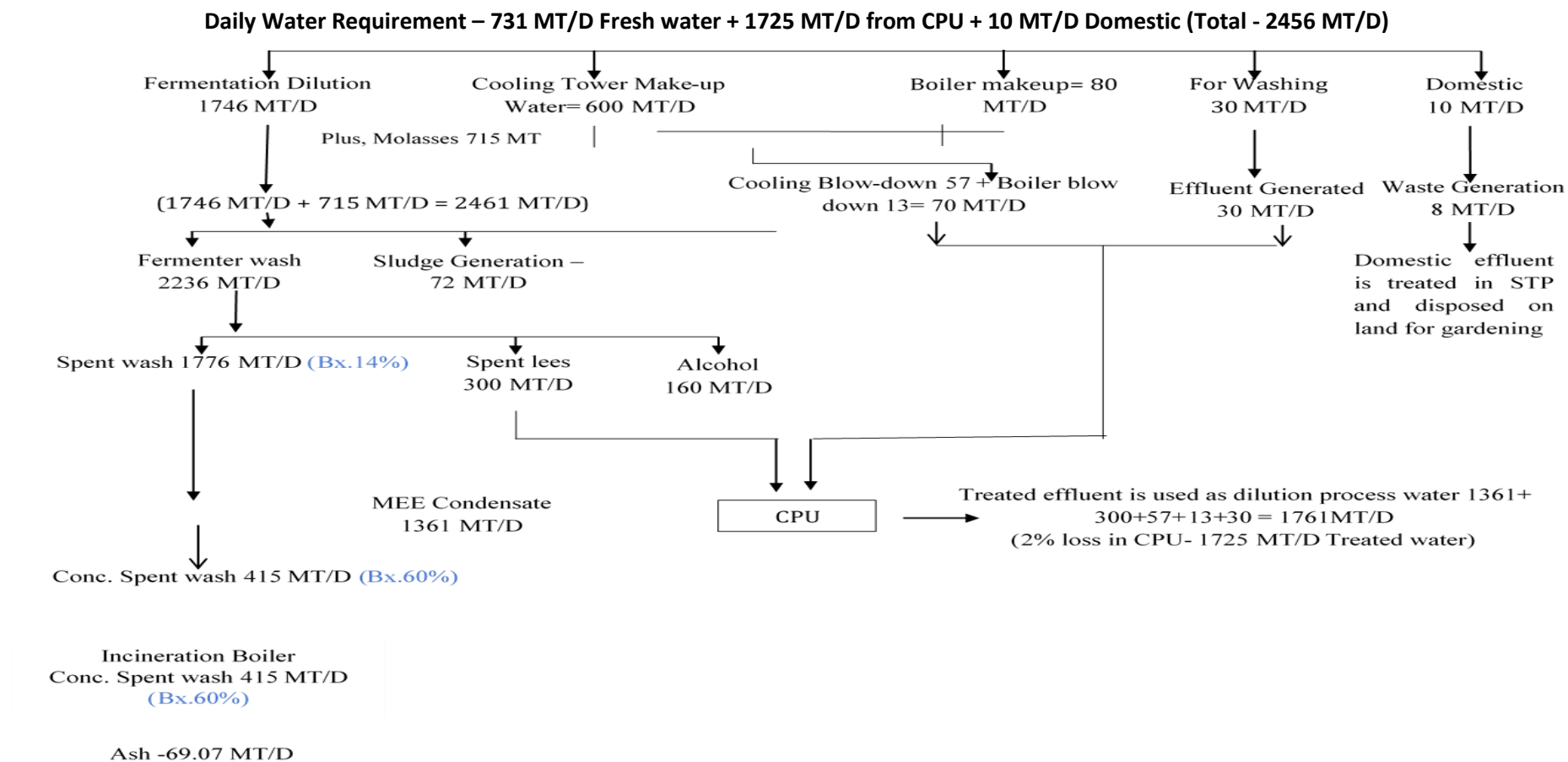


Figure 1 Material balance flow sheet for 'C' Molasses as raw material

Proposed 200 KLPD – B Heavy Molasses (All Quantity in MT/D)

Daily Water Requirement – 637 MT/D Fresh water + 1420 MT/D from CPU + 10 MT/D Domestic (Total - 2057 MT/D)

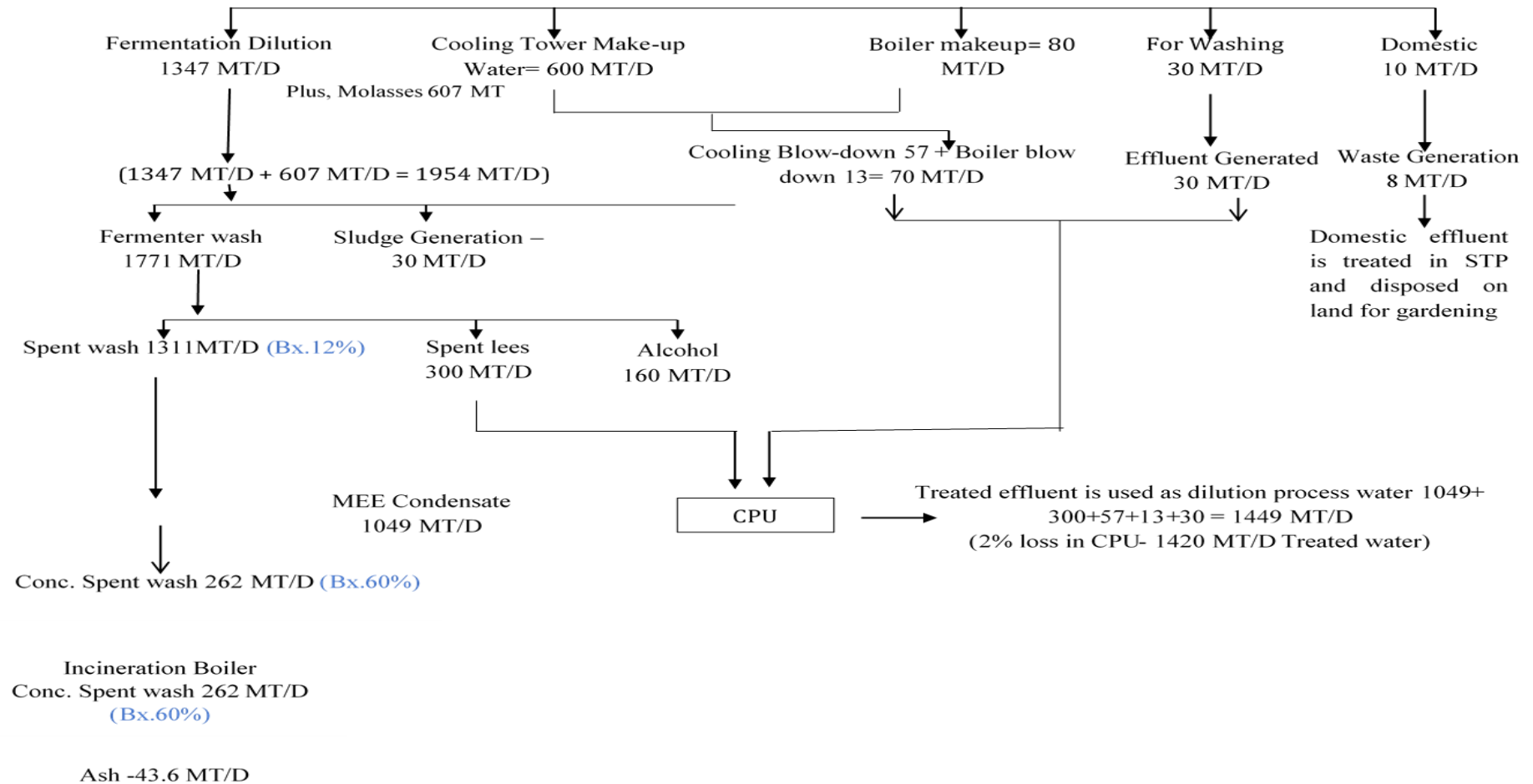
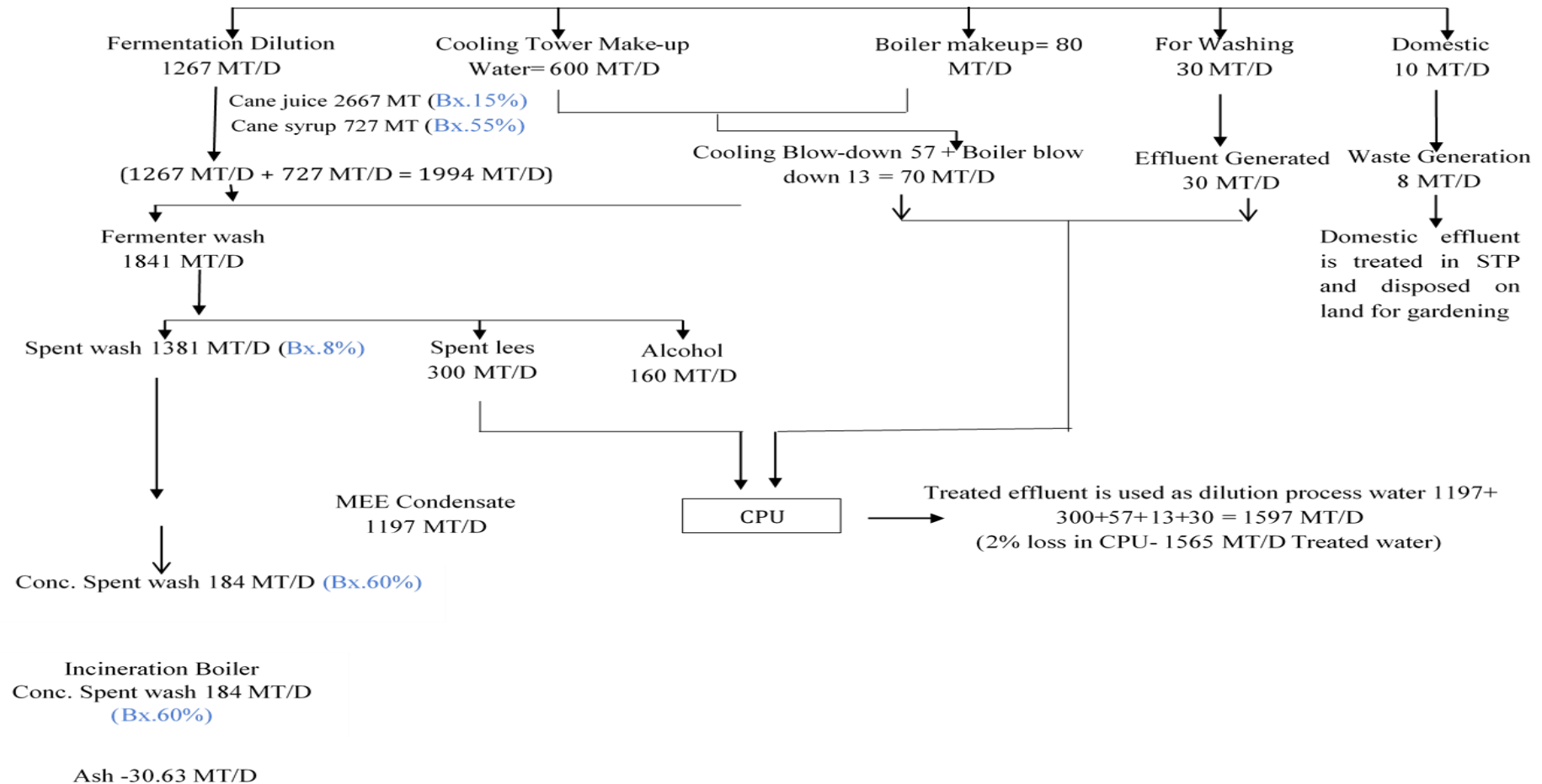


Figure 2 Material balance flow sheet for 'B' Heavy Molasses as raw material

Proposed 200 KLPD – Sugarcane Juice/Syrup (All Quantity in MT/D)**Daily Water Requirement – 412 MT/D Fresh water + 1565 MT/D from CPU + 10 MT/D Domestic (Total - 1977 MT/D)****Figure 3 Material balance flow sheet for Sugarcane juice/syrup as raw material**

Water consumption details for proposed 200 KLPD Distillery unit**Table 6 Water consumption details of proposed distillery unit for various raw materials**

Sr. No.	Propose	Water consumption (CMD)		
		C Molasses	B heavy molasses	Sugarcane juice/ syrup
Domestic				
1	Domestic	10	10	10
Industrial				
1	Process	1746	1347	1267
2	Boiler make up	80	80	80
3	Cooling tower makeup	600	600	600
4	Washings	30	30	30
Total		2456	2057	1977

Details of waste water generation of proposed 200 KLPD distillery unit**Table 7 Wastewater generation details of proposed distillery unit for various raw materials**

Sr. No.	Propose	Wastewater Generation (CMD)			Remarks
		C Molasses	B heavy molasses	Sugarcane juice/ syrup	
Domestic					
1	Domestic	8	8	8	To Septic tank followed by soak pit
Industrial					
1	Process (Spentwash)	1776**	1311**	1381**	
a	Conc Spentwash	415*	262*	184*	Used as fuel for 30 TPH incineration boiler
b	Spentlees	300	300	300	To CPU
c	MEE Condensates	1361	1049	1197	To CPU
2	Boiler blow down	13	13	13	To CPU
3	Cooling tower blow down	57	57	57	To CPU
4	Washings	30	30	30	To CPU
	Total	1761	1449	1597	

Net water requirement of proposed 200 KLPD distillery unit**Table 8 Net water requirement for proposed distillery unit for various raw materials**

Sr. No.	Propose	Wastewater Generation (CMD)		
		C Molasses	B heavy molasses	Sugarcane juice/ syrup
Industrial				
1	Total water consumption excluding domestic	2456	2057	1977

Sr. No.	Propose	Wastewater Generation (CMD)		
		C Molasses	B heavy molasses	Sugarcane juice/ syrup
2	Treated effluent recycled from CPU	1725	1420	1565
	Net fresh water requirement	731	637	412
	KL/KL of Alcohol	3.66	3.19	2.06

Wastewater generation and its treatment technology

The distillery process effluent (spentwash) shall be treated based on concentration and incineration to achieve Zero Liquid Discharge (ZLD). The MEE condensates and other dilute effluent streams (Spentlees, Cooling and boiler blow down, and Washings etc.) shall be treated in condensate polishing unit based on primary, secondary and tertiary treatment. The treated condensates shall be recycled back as process water. The sugar process effluent shall be treated in existing ETP after up-gradation and sugar condensate shall be treated in proposed sugar CPU based on primary, secondary and tertiary treatment. The treated condensates shall be recycled back as process water and used for greenbelt/gardening purpose.

Distillery Unit-

A) C Molasses as raw material: -

The raw spent wash (1776 MT/D) shall be concentrated in MEE [415 MT/D]. The evaporator condensates (1361 MT/D) shall be treated in proposed condensate polishing unit based on primary, secondary and tertiary treatment along with other dilute effluent streams (Spentlees-300 MT/D, Boiler blow down of 13 MT/D, Cooling tower blow down of 57 MT/D, and Fermenter washings of 30 MT/D totalling to 400 MT/D). Total effluent going to CPU shall be 1761 MT/D out of which 2% losses and remaining 1725 CMD shall be recycled back as process water or make up water for cooling tower and boiler.

B) B' Heavy Molasses as raw material:

The raw spent wash (1311 MT/D) shall be concentrated in MEE [262 MT]. The evaporator condensates (1049 CMD) shall be treated in proposed condensate polishing unit based on primary, secondary and tertiary treatment along with other dilute effluent streams (Spentlees-300 MT/D, Boiler blow down of 13 MT/D, Cooling tower blow down of 57 MT/D, and Fermenter washings of 30 MT/D totalling to 400 MT/D). Total effluent going to CPU shall be 1449 MT/D out of which 2% losses and remaining 1420 CMD shall be recycled back as process water or make up water for cooling tower and boiler.

C) Sugarcane Juice/ Syrup as raw material:

The raw spent wash (1381 MT/D) shall be concentrated in MEE (184 MT). The evaporator condensates (1197 MT/D) shall be treated in proposed condensate polishing unit based on primary, secondary and tertiary treatment along with other dilute effluent streams (Spentlees-300 MT/D, Boiler blow down of 13 MT/D, Cooling tower blow down of 57 MT/D, and Fermenter washings of 30 MT/D totalling to 400 MT/D). Total effluent going to CPU shall be 1597 MT/D out of which 2% losses and remaining 1565 CMD shall be recycled back as process water or make up water for cooling tower and boiler.

Wastewater characteristics: Characteristic of distillery CPU inlet and outlet wastewater are given below.

Table 9 Waste Water Characteristics of CPU (Distillery)

Sr. No.	Parameter	Unit	Inlet Concentration	Outlet to be achieved
1.	pH	--	4.5 to 6	7.5 to 8
2.	COD	ppm	7000-9000	< 70
3.	BOD	ppm	2500-3000	< 20
4.	TDS	ppm	< 500	< 300
5.	TSS	ppm	25 to 30	< 10

Domestic Effluent: 8 CMD after proposed establishment of 200 KLPD Distillery unit.

Sewage from various buildings in the plant area is conveyed through separate drains of septic tank followed by soak pit. Sludge is removed occasionally and disposed of as land fill at suitable places. In Proposed project, SMSEL shall be install separate STP based on MBBR.

f) Air Emission Management

Table 10 Details of boilers and its APC equipment for existing as well as proposed

Sr. No.	Stack Attached to	Type of Fuel	Minimum requirement of stack height	APC Equipment
	Existing			
1	2*38 TPH Incinerator boiler	Bagasse	60	Wet Scrubber
	Proposed			
1	1*30 TPH Incinerator boiler	Conc. Spent wash + Bagasse	70	ESP

G) Solid waste Management**Table 11 Details of solid waste generation and its management**

Sr. No.	Description of waste	Quantity			Mode of Collection and Disposal
		Existing	Proposed	Total	
1.	2* 38 TPH Boiler Ash (MT/D)	12.45	0	12.45	Sold to brick manufacturers
2.	CPU Sludge (MT/Annum)	150			Disposed in composting
3	Incinerator boiler ash (MT/D)				
	C Molasses	0	69.07	69.07	Given as potash rich manure to farmers
	B Heavy Molasses	0	43.6	43.6	
	Sugarcane Juice/Syrup	0	30.63	30.63	
Other Solid Wastes					
1.	Paper waste (Kg/Month)	40	30	70	Manually collected and stored in a designated area and sold to scrap vendors
3.	Colony - Solid waste				
	Non-Biodegradable (MT/Month)	0.3	0.2	0.5	Manually collected and sold to scrap vendors
	Bio-degradable (MT/M)	0.5	0.5	1.0	Used in Composting

h) Hazardous solid wastes details**Table 12 Details of hazardous waste generated and its disposal**

Sr. No	Category	Waste	Quantity			Disposal
			Existing	Proposed	Total	
1	5.1	Spent Oil	100 Kg/M	200 Kg/M	300 Kg/M	Collected in leak proof container and used as lubricant oil for bullock carts
2	33.1	Empty barrels/ Containers	20 Nos	50 Nos	70 Nos	Sold to authorized recyclers

3.0 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

METEOROLOGICAL CHARACTERISTICS OF THE STUDY AREA

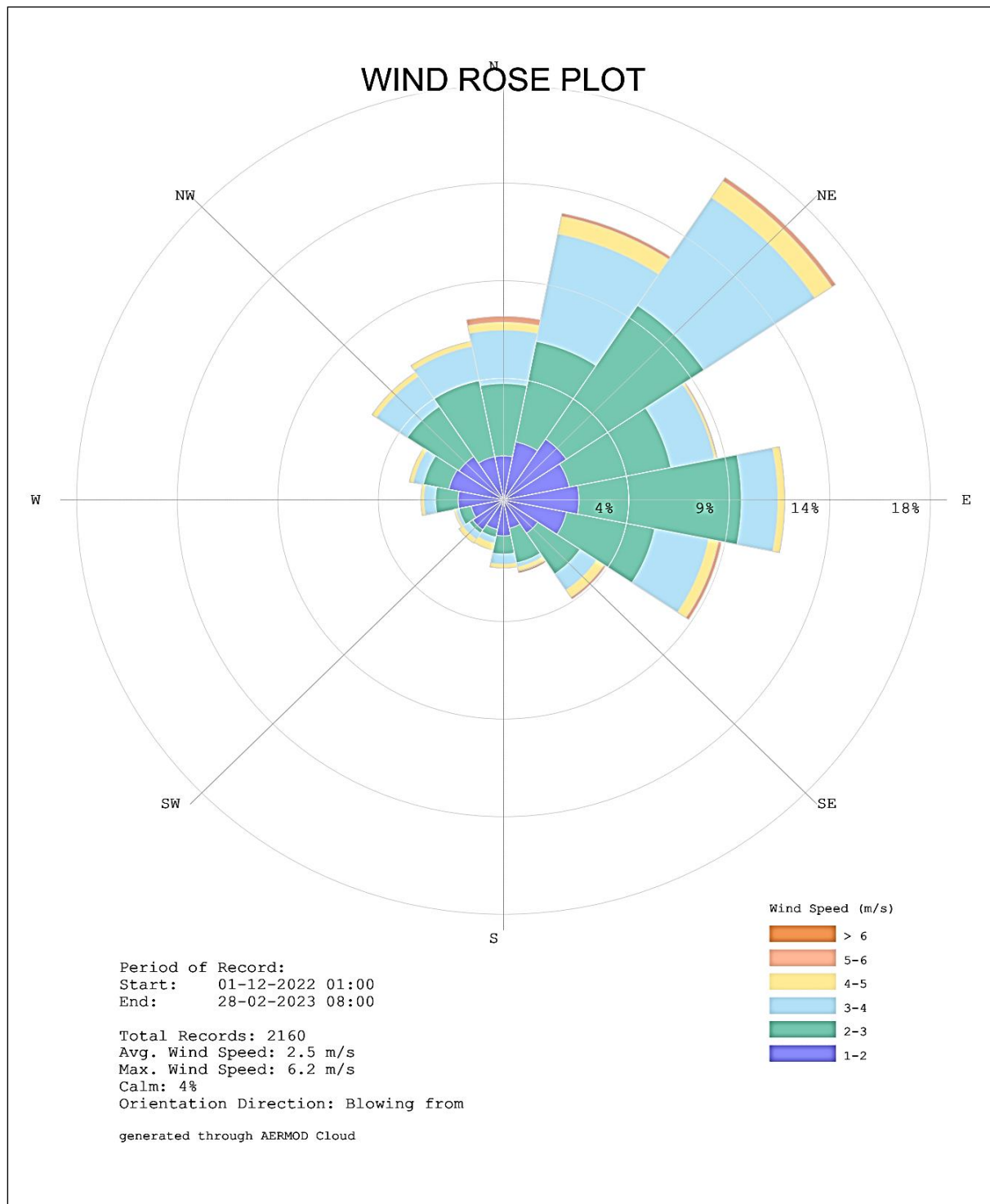


Figure 4 Wind rose diagram for the study area (blowing from)

Table 13 Receptor summary

Sr. No.	Symbol	Monitoring Location	Distance (km)	Direction w.r.t project	Latitude	Longitude
1.	AAQ-1	Project Site	--	--	21° 1'38.46"N	76° 6'30.78"E
2.	AAQ-2	Project Site	--	--	21° 1'47.51"N	76° 6'37.92"E
3.	AAQ-3	Ghodasgaon	1.89	NNE	21° 2'35.59"N	76° 6'48.53"E
4.	AAQ-4	Chinchkhede	7.55	ENE	21° 2'53.24"N	76°10'37.72"E
5.	AAQ-5	Chikhali	6.29	ESE	20°59'46.80"N	76° 9'33.01"E
6.	AAQ-6	Ruikhede	5.49	S	20°58'38.32"N	76° 6'37.55"E
7.	AAQ-7	Satod	3.60	SW	21° 0'33.82"N	76° 4'44.20"E
8.	AAQ-8	Muktainagar	4.90	WNW	21° 2'24.63"N	76° 3'47.58"E

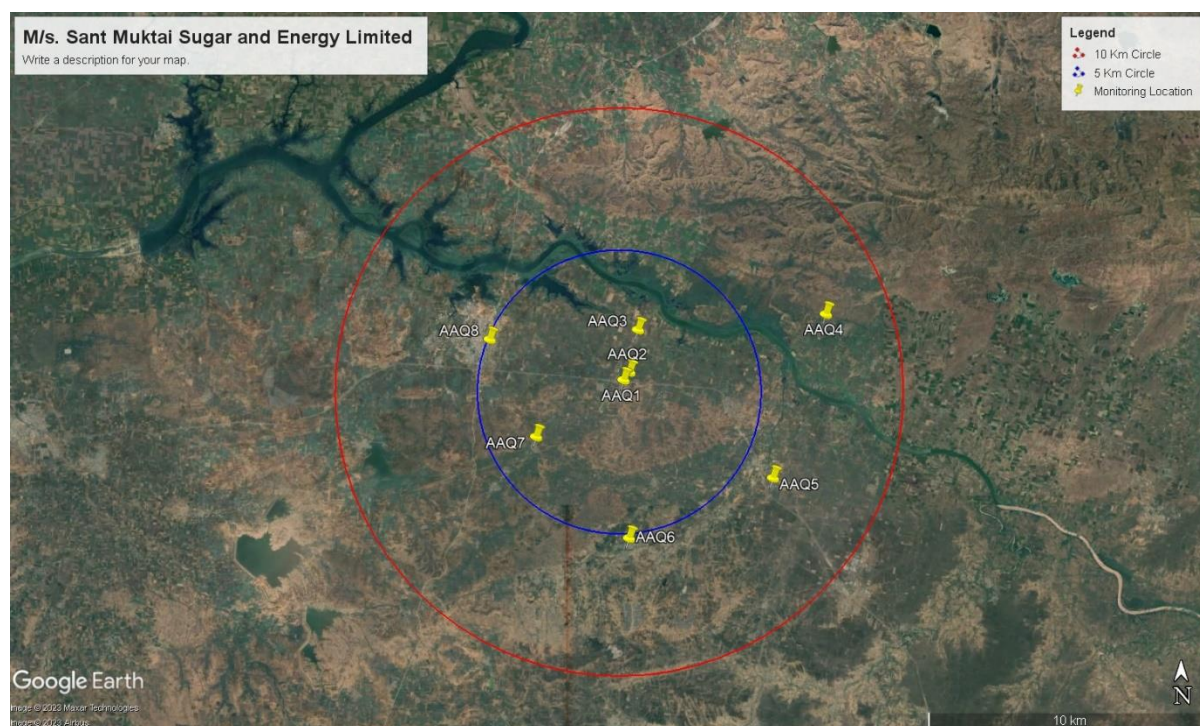
**Figure 5 10 km. radius study area map indicating ambient air quality monitoring location**

Table 14 Ambient air quality monitoring results

Pollutant		PM₁₀ (µg/m³)	PM_{2.5} (µg/m³)	SO₂ (µg/m³)	NO₂ (µg/m³)	CO (mg/m³)
AAQ1	Maximum	61.10	40.90	15.60	19.90	1.50
	Minimum	49.20	25.20	10.10	13.20	0.70
	Average	55.80	35.90	12.00	16.20	1.07
	98 Percentile	60.32	40.02	14.87	19.33	1.50
	NAAQ Standard	100	60	80	80	04 (1 hr)
AAQ2	Maximum	62.20	41.30	15.80	19.30	1.60
	Minimum	50.30	25.90	11.10	14.60	0.80
	Average	56.55	36.25	12.81	16.41	1.22
	98 Percentile	61.00	40.47	15.33	18.83	1.60
	NAAQ Standard	100	60	80	80	04 (1 hr)
AAQ3	Maximum	54.70	36.30	13.20	15.90	1.10
	Minimum	46.80	28.80	8.80	11.40	0.40
	Average	50.59	32.45	10.26	14.46	0.72
	98 Percentile	54.30	35.45	12.50	15.85	1.10
	NAAQ Standard	100	60	80	80	04 (1 hr)
AAQ4	Maximum	58.40	38.00	15.90	15.90	1.40
	Minimum	49.70	31.00	9.90	11.30	0.50
	Average	53.90	34.37	12.09	13.92	0.92
	98 Percentile	57.50	37.15	15.05	15.85	1.35
	NAAQ Standard	100	60	80	80	04 (1 hr)
AAQ5	Maximum	53.20	34.80	11.61	14.10	1.00
	Minimum	45.80	29.20	8.23	11.50	0.30
	Average	49.31	31.88	9.73	12.63	0.62
	98 Percentile	52.85	34.35	11.23	14.00	1.00
	NAAQ Standard	100	60	80	80	04 (1 hr)
AAQ6	Maximum	51.50	32.10	14.20	15.90	1.30
	Minimum	46.10	28.60	9.10	11.30	0.50
	Average	48.46	30.15	11.09	14.20	0.83
	98 Percentile	51.30	31.90	13.70	15.80	1.25
	NAAQ Standard	100	60	80	80	04 (1 hr)

Pollutant		PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
AAQ7	Maximum	48.20	29.30	9.61	13.20	0.80
	Minimum	42.50	26.30	6.74	10.50	0.20
	Average	44.99	27.57	8.17	11.83	0.47
	98 Percentile	47.89	29.04	9.57	13.04	0.80
	NAAQ Standard	100	60	80	80	04 (1 hr)
AAQ8	Maximum	45.30	25.10	8.41	12.80	0.60
	Minimum	40.20	22.90	5.63	10.50	0.10
	Average	42.46	23.83	6.94	11.49	0.30
	98 Percentile	45.20	25.10	8.27	12.80	0.60
	NAAQ Standard	100	60	80	80	04 (1 hr)

3.2 WATER ENVIRONMENT

The unit is located at Ghodasgaon, Tal. Muktainagar, Dist. Jalgaon, Maharashtra State. Majority of the study area (10 km around site) is under agriculture land use. The industry is lifting fresh water from Purna River backwaters which is 3.0 km away from the industry. The permission is already available with the industry from respective authorities.

Purna River is main source of water for agriculture use. The river is flowing at 3.0 km towards North from the project site. Groundwater is used as an alternate source in surrounding villages for domestic and drinking purposes. Therefore, it is important to assess the existing baseline status of both ground water quality and surface water quality within the study area.

3.2.1 GROUND WATER

Table 15 Details of the ground water quality monitoring sampling locations

Sr. No.	Symbol	Description	Distance	Direction	Latitude	Longitude
1	GW-1	Project Site	--	--	21° 1'36.86"N	76° 6'30.15"E
2	GW -2	Satod	3.63	WSW	21° 0'29.36"N	76° 4'46.29"E
3	GW -3	Satod	5.58	SW	20°59'46.31"N	76° 3'55.71"E
4	GW -4	Kothali	4.89	WNW	21° 2'7.36"N	76° 3'43.44"E
5	GW -5	Ghodasgaon	3.96	ESE	21° 1'19.60"N	76° 8'45.21"E
6	GW -6	Chikhali	5.32	SE	21° 0'15.59"N	76° 9'13.64"E
7	GW -7	Wiwara	9.05	SES	20°57'34.21"N	76° 9'27.08"E
8	GW -8	Sarole	7.35	SWS	20°58'41.65"N	76° 3'36.17"E

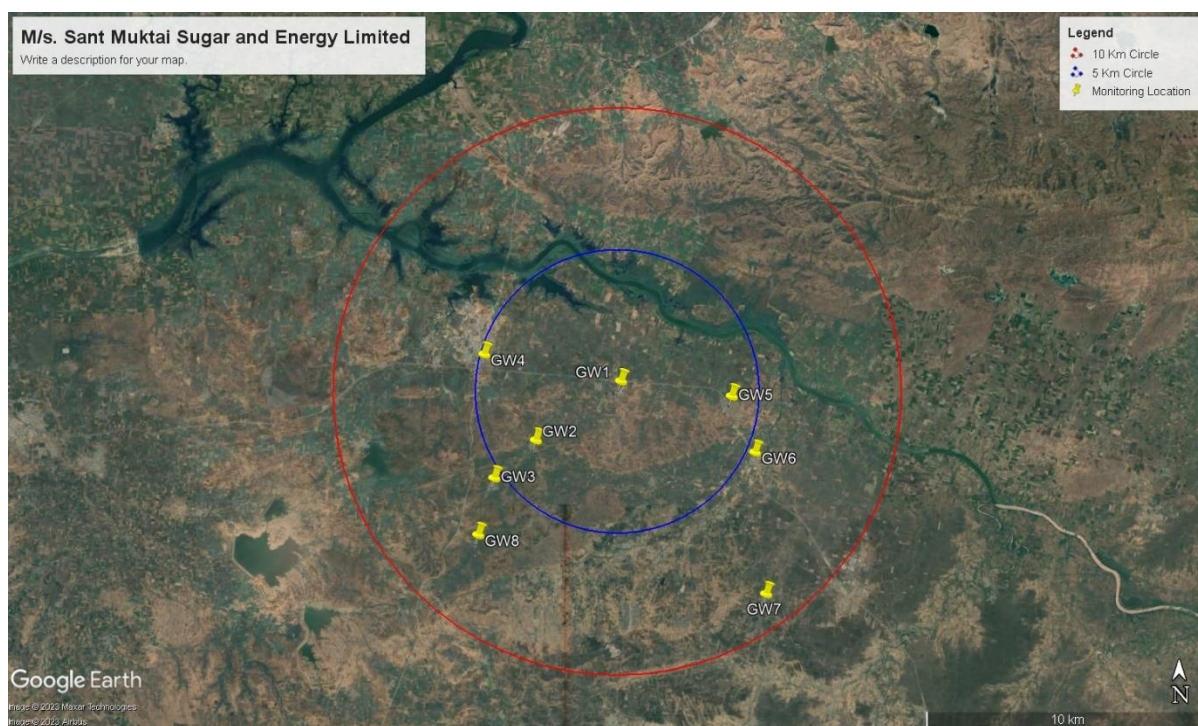


Figure 6 10 km. radius study area map indicating groundwater sampling location

Table 16 Groundwater analysis report within 10 km radius of the study area

Sr. No	Description	Unit	Results								Desirable	Permissible
			GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	IS 10500:2012 Standards	
1	pH	---	6.90	6.85	7.04	6.86	6.92	6.77	7.23	7.34	6.5-8.5	No relaxation
2	Temperature	°C	27.5	27	26.8	26.8	27.7	27.6	28.0	27.4	Not Specified	
3	Turbidity	NTU	0.9	0.97	1.02	0.85	1.00	0.79	0.98	1.1	1	5
4	Electrical Conductivity	μS/cm	663	586	663	378	642	604	626	701	Not Specified	
5	Total Dissolved Solids	mg/lit	411.1	369.3	408	379.4	411	368.5	385.6	449.4	500	2000
6	Total Suspended Solids	mg/lit	4	5	3	4	6	3	4	3	Not Specified	
7	Salinity	ppt	1.8	1.3	1.5	1.2	1.6	1.8	1.4	1.5	Not Specified	
8	Chemical Oxygen Demand	mg/lit	12	11	16	15	13	15	17	18	Not Specified	
9	Biochemical Oxygen Demand @ 27°C for 3 days	mg/lit	< 4	< 4	< 4	< 4	< 4	< 4	< 4	5	Not Specified	
10	Chlorides as Cl ⁻	mg/lit	130	118	140	113	104	99	134	143	250	1000
11	Sulphates as SO ₄ ⁻⁻	mg/lit	40	49	55	42	61	45	47	55	200	400
12	Fluoride as F ⁻	mg/lit	0.61	0.42	0.57	0.58	0.67	0.60	0.71	0.60	1	1.5
13	Total Alkalinity as CaCO ₃	mg/lit	148	171	140	173	167	133	144	163	200	600
14	Nitrate as NO ₃	mg/lit	3.8	3.2	4.4	5.1	3.3	5.2	4.7	4.1	45	No relaxation
15	Nitrite as NO ₂	mg/lit	0.07	0.06	0.08	0.11	0.10	0.15	0.09	0.10	Not Specified	

Sr. No	Description	Unit	Results								Desirable	Permissible
			GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	IS 10500:2012 Standards	
16	Ammonia as N	mg/lit	0.35	0.26	0.28	0.31	0.34	0.28	0.21	0.30	0.5	No Relaxation
17	Total Phosphate as PO ₄	mg/lit	0.21	0.19	0.15	0.19	0.18	0.14	0.20	0.19	Not Specified	
18	Magnesium as Mg	mg/lit	43	24	31	33	39	40	27	37	30	100
19	Total Hardness as CaCO ₃	mg/lit	337	198	259	246	308	327	216	320	200	600
20	Calcium as Ca	mg/lit	63	39	52	43	58	64	41	66	75	200
21	Sodium as Na	mg/lit	31	24	30	29	33	27	35	32	Not Specified	
22	Iron as Fe	mg/lit	0.19	0.13	0.18	0.24	0.24	0.20	0.17	0.15	0.3	No Relaxation
23	Copper as Cu	mg/lit	0.05	0.08	0.06	0.06	0.08	0.06	0.05	0.07	0.05	1.5
24	Total Chromium as Cr	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.05	No Relaxation
25	Chromium as Cr+6	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.10	No Relaxation
26	Nickel as Ni	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.02	No relaxation
27	Cadmium as Cd	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.003	No relaxation
28	Mercury as Hg	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.001	No Relaxation
29	Arsenic as As	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.01	0.05
30	Cyanide as Cn	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.05	No Relaxation
31	Lead as Pb	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.01	No Relaxation
32	Zinc as Zn	mg/lit	0.05	0.04	0.03	0.04	0.05	0.05	0.04	0.05	5	15
33	Total Coliform	Org/ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	No Relaxation	
34	Fecal Coliform	Org/ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	No Relaxation	

3.2.2 SURFACE WATER

Table 17 Details of surface water quality monitoring locations

Sr. No.	Symbol	Description	Distance	Direction	Latitude	Longitude
1	SW-1	Hartala Lake	9.00	WSW	21° 0'27.60"N	76° 1'26.66"E
2	SW-2	Purna River	9.32	WNW	21° 4'8.24"N	76° 1'53.35"E
3	SW-3	Pimpri Pancham Lake	9.57	NNE	21° 6'32.91"N	76° 8'10.21"E
4	SW-4	Purna River	6.92	E	21° 1'37.86"N	76°10'28.68"E
5	SW-5	Purna River	5.82	SE	21° 0'18.79"N	76° 9'33.07"E
6	SW-6	Purna River	5.50	NW	21° 4'8.88"N	76° 4'49.80"E
7	SW-7	Purna River	5.51	NNW	21° 2'27.26"N	76° 7'40.26"E

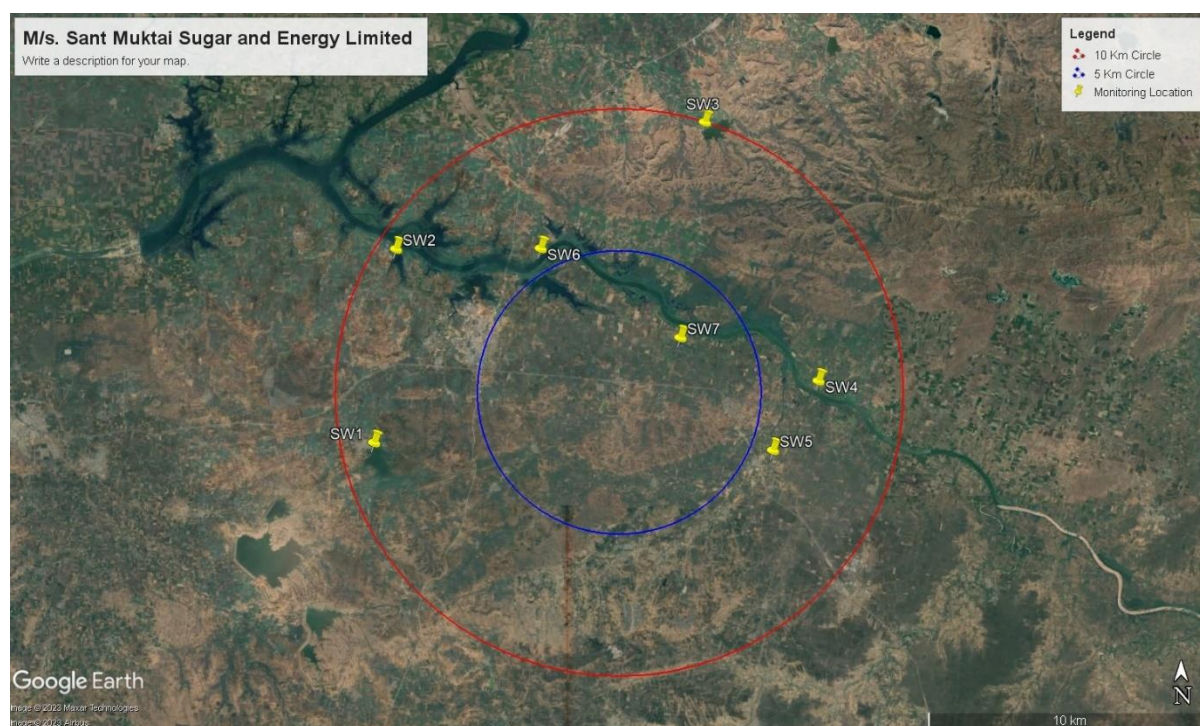


Figure 7 10 km. radius study area map indicating surface water sampling location

Table 18 Surface water analysis report within 10 km radius of the study area

Sr. No	Description	Unit	Results						
			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7
1	pH	---	7.2	7.83	7.42	7.12	7.53	7.9	7.65
2	Temperature	°C	28	27.4	28	28	27	27.7	28
3	Turbidity	NTU	3.3	2.7	2.3	2.8	2.6	3.1	3.4
4	Electrical Conductivity	µS/cm	411	473	514	410	471	429	416
5	Total Dissolved Solids	mg/lit	263.1	288.6	316.4	262.8	292	270.5	256.2
6	Total Suspended Solids	mg/lit	10	8	11	12	6	7	8
7	Salinity	ppt	4.9	5.1	4.4	4.7	5.9	6	5.3
8	Dissolved Oxygen	mg/lit	6.2	5.6	5.3	5.9	6.3	6.8	5.4
9	Chemical Oxygen Demand	mg/lit	18	22	25	17	19	16	27
10	Biochemical Oxygen Demand @ 27°C for 3 days	mg/lit	< 4	5	6	5	5	< 4	6
11	Chlorides as Cl ⁻	mg/lit	77	89	105	97	109	65	57
12	Sulphates as SO ₄ ⁻⁻	mg/lit	21	29	33	37	50	43	40
13	Fluoride as F ⁻	mg/lit	0.62	0.58	0.7	0.52	0.71	0.53	0.62
14	Total Alkalinity as CaCO ₃	mg/lit	151	163	170	122	117	140	146
15	Nitrate as NO ₃	mg/lit	5.4	4.3	6.3	5.9	4	5.5	4.2
16	Nitrite	mg/lit	0.02	0.02	1.01	0.03	0.66	0.02	0.02
17	Ammonia as N	mg/lit	0.23	0.21	0.34	0.24	0.27	0.23	0.2

Sr. No	Description	Unit	Results						
			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7
18	Total Phosphate as PO ₄	mg/lit	0.16	0.06	0.14	0.08	0.1	0.09	0.08
19	Calcium as Ca	mg/lit	42	37	39	28	30	40	33
20	Magnesium as Mg	mg/lit	18	23	21	15	19	26	25
21	Total Hardness as CaCO ₃	mg/lit	180	189	186	133	154	208	187
22	Sodium as Na	%	2.02	0.07	1.88	0.09	0.19	0.07	0.05
23	Iron as Fe	mg/lit	NIL	NIL	NIL	NIL	0.2	NIL	NIL
24	Copper as Cu	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
25	Total Chromium as Cr	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
26	Chromium as Cr+6	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
27	Nickel as Ni	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
28	Cadmium as Cd	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
29	Mercury as Hg	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
30	Arsenic as Ar	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
31	Cyanide as CN	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
32	Lead as Pb	mg/lit	NIL	NIL	NIL	NIL	NIL	NIL	NIL
33	Zinc as Zn	mg/lit	NIL	NIL	NIL	NIL	0.03	NIL	NIL
34	Total Coliform	Org/ml	86	46	56	77	86	63	80
35	Faecal Coliform	Org/ml	Present	Present	Present	Present	Present	Present	Present

3.3 SOIL ENVIRONMENT

Table 19 Details of the soil sampling locations

Sr. No.	Symbol	Description	Distance	Direction	Latitude	Longitude
1	S-1	Project Site	--	--	21° 1'38.46"N	76° 6'30.78"E
2	S-2	Ruikhede	5.62	S	20°58'34.33"N	76° 6'34.78"E
3	S-3	Godasgaon	1.89	NNE	21° 2'35.59"N	76° 6'48.53"E
4	S-4	Chinchkhede	7.55	ENE	21° 2'53.24"N	76°10'37.72"E
5	S-5	Chikhali	6.92	SE	20°59'46.80"N	76° 9'33.01"E
6	S-6	Sarole	7.76	SW	20°58'46.10"N	76° 3'11.49"E
7	S-7	Dhormal	4.38	SSW	20°59'40.34"N	76° 5'1.70"E
8	S-8	Muktainagar	5.35	WNW	21° 2'37.02"N	76° 3'35.81"E

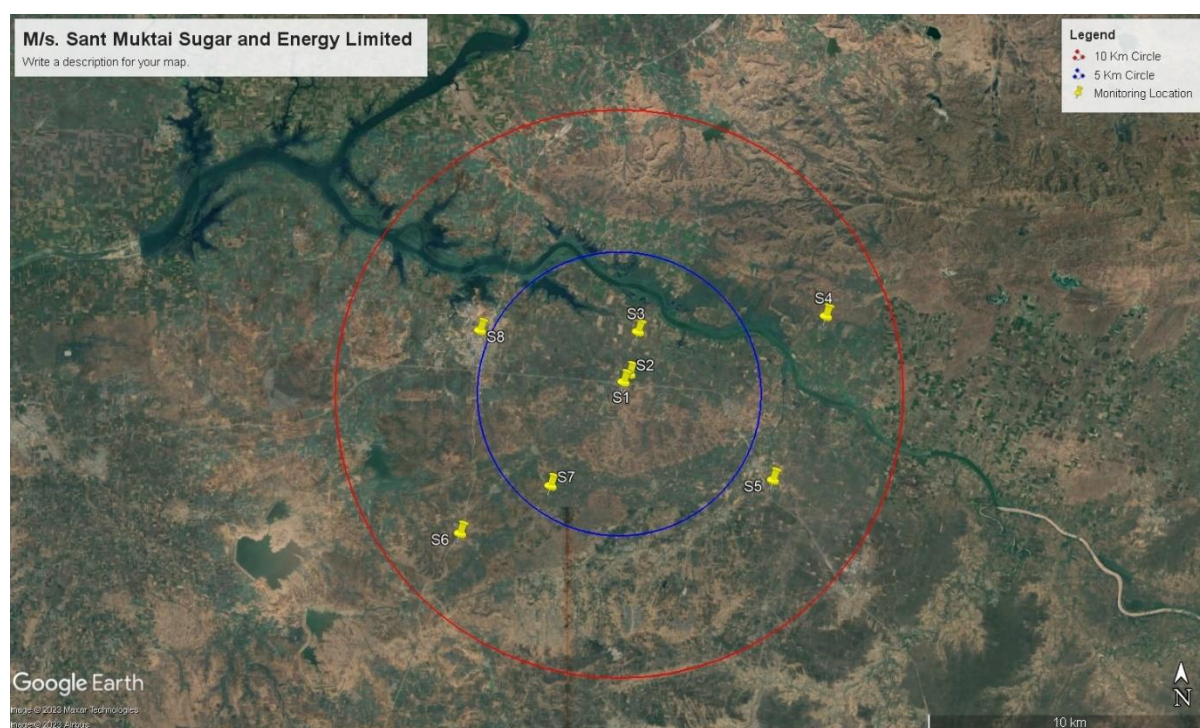


Figure 8 10 km. radius study area map indicating soil sampling location

Table 20 Soil Analysis report within 10 km radius of the study area

Sr. No.	Description	Unit	RESULT								As per Ministry of Agriculture 2011
			S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	
1.	Colour	-	Black	Black	Black	Black	Black	Black	Black	Black	Ministry of Agriculture 2011
2.	Grain Size Distribution										
	Clay	%	15	10	14	10	18	16	22	17	Not Specified
	Sand	%	52	58	57	55	58	60	50	62	Not Specified
	Silt	%	33	32	29	35	24	24	28	21	Not Specified
3.	Texture Class	--	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Clay Loam	Sandy Loam	Not Specified
4.	Bulk Density	gm/cc	1.3	1.24	1.42	1.26	1.08	1.12	1.17	1.34	Not Specified
5.	Permeability	cm/hr	4.9	3.9	4.7	4.9	3.8	4.5	4.1	4.4	Not Specified
6.	Water Holding capacity	%	43	41	52	48	47	45	38	52	Not Specified
7.	Porosity	%	43	41	52	48	47	45	38	52	Not Specified
8.	pH (1: Aq Extraction)	--	7.21	7.63	7.08	7.83	7.03	7.28	7.89	7.35	<8.5
9.	Electrical Conductivity	μS/cm	983	1084	627	846	594	586	1107	1037	150 – 650

Sr. No.	Description	Unit	RESULT								As per Ministry of Agriculture 2011
			S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	
	(1: Aq Extraction)										
10.	Cation Exchange Capacity	meq/100gm	0.61	0.79	0.74	0.57	0.73	0.7	0.62	0.68	Not Specified
11.	Sodium Absorption Ratio	-----	11	12.62	11.28	11.8	12.33	12.71	10.55	10.55	10-18
12.	Total Nitrogen Content	Kg/ha	280	268	310	225	211	324	258	334	280-560
13.	Available Phosphorous (P)	Kg/ha	23.6	11.8	20.2	27.1	14.7	23.1	19	23	10-24.60
14.	Available Potassium	Kg/ha	205	294	217	225	325	237	330	293	108-280
15.	Organic Carbon	%	0.36	0.39	0.44	0.33	0.28	0.56	0.38	0.67	Not Specified
16.	Organic Matter	%	0.32	0.4	0.35	0.42	0.25	0.48	0.34	0.57	0.5 – 0.75
17.	Total Iron (Fe)	mg/kg	3.33	3.01	2.58	3.46	3.25	2.4	3.28	3.18	Not Specified
18.	Zinc (Zn)	mg/kg	0.73	0.38	0.36	0.48	0.34	0.6	0.74	0.88	Not Specified
19.	Nickel (Ni)	mg/kg	1.52	1.37	2.35	1.63	1.58	1.2	1.44	1.75	Not Specified
20.	Copper (Cu)	mg/kg	0.6	0.45	1	0.78	1.22	0.68	0.46	1.04	Not Specified

Summary of the results

- The finding of the study reveals that pH of soil in the area ranged between **7.03 – 7.89** which is an indicative of the **neutral** to slightly alkaline soil.
- The values for Nitrogen was found to be better to more than sufficient at all locations ranging between **211 to 334 kg/ha**, which is an indicative of good to Better nitrogen content in soils
- The concentration of Phosphorous was found to be less at all the locations ranging between **11.8 to 27.1 kg/ha**, i.e 28.11 to 52.5 kg/ha which is an indicative of less to on an average sufficient phosphorous in soil
- The concentration of organic carbon was found to be medium to on an average sufficient at all the locations ranging between 0.28 to 0.67 %, which is an indicative of on an average sufficient to more than sufficient organic carbon in soil
- It is important to note that the concentration of potassium was found to be less at all locations ranging between 205 to 330 kg/ha i.e. which is an indicative of medium potash content in soil This indicates it is required to use potash rich fertilizers for agriculture purposes
- 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.

3.4 NOISE ENVIRONMENT

Table 21 Details of noise quality monitoring locations

Sr. No.	Symbol	Description	Distance	Direction	Latitude	Longitude
1	N-1	Project Site	--	--	21° 1'38.46"N	76° 6'30.78"E
2	N-2	Project Site	--	--	21° 1'47.51"N	76° 6'37.92"E
3	N-3	Ghodasgaon	1.89	NNE	21° 2'35.59"N	76° 6'48.53"E
4	N-4	Chinchkhede	7.55	ENE	21° 2'53.24"N	76°10'37.72"E
5	N-5	Chikhali	6.92	SE	20°59'46.80"N	76° 9'33.01"E
6	N-6	Ruikhede	5.45	S	20°58'39.71"N	76° 6'36.66"E
7	N-7	Dhormal	4.38	SSW	20°59'40.34"N	76° 5'1.70"E
8	N-8	Muktainagar	5.35	WNW	21° 2'37.02"N	76° 3'35.81"E

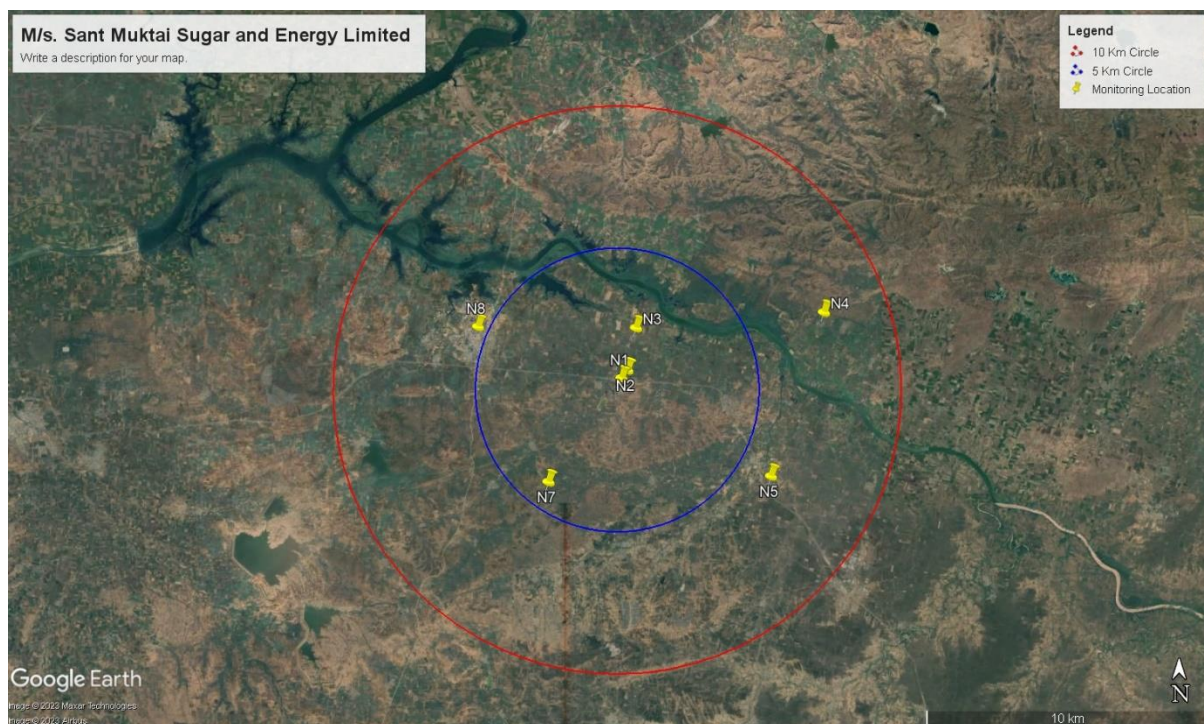


Figure 9 10 km. radius study area map indicating noise monitoring location

Table 22 Noise levels of the study area

Sr. No	Location	Category Of Area	(Leq dB(A)) Average		CPCB limit (Leq dB(A))	
			Day time	Night time	Day time	Night time
1	Project Site	Industrial Area	74.7	68.2	75	70
2	Project Site	Industrial Area	62.6	49.4	55	45
3	Ghodasgaon	Residential Area	46.4	42.7	55	45
4	Chinchkhede	Residential Area	49.2	41.6	55	45
5	Chikhali	Residential Area	48.5	43	55	45
6	Ruikhede	Residential Area	49.1	43.2	55	45
7	Dhormal	Residential Area	44.8	38.4	55	45
8	Muktainagar	Residential Area	46.0	40.4	55	45

Summary of the results**Daytime Noise Levels (Leq) day**

- Industrial Zone: The day time noise level at the Project site was found is 74.7 (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 46 to 49.2 dB (A).

Night time Noise Levels (Leq) night

- Industrial Zone: The night time noise level in the Project site was observed is 68.2 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 38.4 to 43.2 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.

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 23 Land use/ Land cover areas in km² around 10 km radius for project site

Sr.no.	Classes	Area in Ha.	Percentage
1	Dense Vegetation	4210.47	42.10
2	Scrub Land	1990.53	19.91
3	Open Land	16822.51	168.23
4	Agriculture	10345.05	103.45
5	Reservoir/Dam	384.73	3.85
6	Settlement	685.22	6.85
7	Waterbody	449.06	4.49
8	Total Area	34887.56	348.88
9	Dense Vegetation	4210.47	42.10
	Total	31415	100

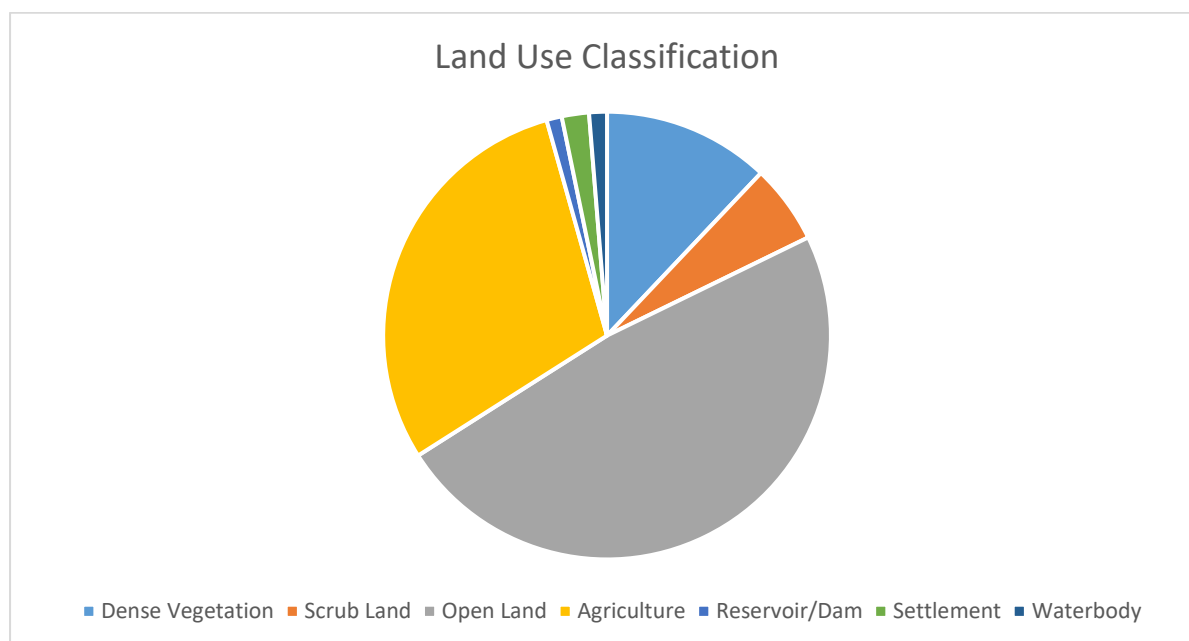


Figure 10 Pie chart of LULC classes around 10 km radius of project site

4.0 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.

5.0 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

The technologies for the treatment and safe disposal of spent wash- most polluting element from distilleries and the site selection criteria are discussed in this chapter. This is to understand the available technology options and the option selected by the project proponent. Molasses based distilleries are among the most polluting industries. Therefore, it is important to use state of the art technologies to achieve the Zero Liquid Discharge. The whole process is based on proven technology i.e., Concentration in Multiple Effect Evaporator followed by incineration in incinerator boiler.

For the treatment of effluent from sugar and co-generation unit, the existing ETP will be upgraded. The condensates from sugar unit and distillery unit will be treated in Condensate Polishing Units and recycled back as process water or makeup water for boilers and cooling towers.

M/s. Sant Muktai Sugar and Energy Limited is located at Ghodasgaon, Taluka Muktainagar, District Jalgaon, State Maharashtra. The total plot area of the sugar complex is 48.15 Ha which is already in possession with the industry. This site is connected with Maharashtra State Electricity Board power. When various sites were seen, this site appeared to be environmentally best as also from the business angle and therefore this option was finally adopted, including infrastructure optimization. The site is located approximately 0.5 Km away from Ghodasgaon Village. Nearest railway station is Malkapur which is approx. 18 km towards the South of the project site. The Purna River water body is located near to site at 3.5 km in N Direction of the project site. Jalgaon Airport is at 55 km from the project site @W Direction. No eco-sensitive zones like tropical forest, biosphere reserve, national park, wild life sanctuary, and coral formation reserves is located within 10 km from project site.

6.0 ENVIRONMENT MONITORING PROGRAMME

Table 24 Environment management plan during construction phase

Impacting activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
Air Environment						
1.Dust generation due to Site Preparation/ Excavation work.	- Sprinkling of water for dust suppression. - Sprinkling of water for dust suppressions & barricading of area under excavation to avoid accidents.	At the site only	Once in a day during the work in progress	Random check by Site Engineer	Contractor	Water consumption records, Ambient Air Quality, Monitoring Records
2. Transportation of construction materials.	- Ensure that vehicles have a PUC Certificate. - Vehicles shall be covered.	Along the vehicle movement track	During construction phase	Check by security staff	Contractor	PUC Certificate, Covering the materials with Tarpaulin.
Noise Environment						
1.Vehicular movement for transportation of	- Vehicles trips during daytime only.	At entry gate	Daily	Vehicle movement (Manual)	Security officer	-Vehicle movement records -Route for safe exit shall be in place

Impacting activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
materials and equipment	- Fixing of route by avoiding populated area.					
2.Noise due to use of construction Equipment	- Ear plugs and Ear muffs to be provided to workers.	Inside plant construction area	Once during week (Hourly reading for 24 hours at each location)	Noise levels using Sound Level Meter	Contractor	Regular Maintenance of equipment to be done.
Land Environment (Solid Wastes)						
1. Soil Erosion	- Level the land by cutting & filling or by importing soil from out side	At Project Site	Prior to vegetation & site clearance as well as completion of work	Periodic monitoring of Soil for Water Holding Capacity & Porosity	Contractor / I/C Civil works	Records of Soil analysis to be maintained
2. Loss of Top soil	- Area to be earmarked for top soil storage, -Protection/conservation of area for storage of top soil	At Project Site	Till it is used for green belt, once in a month	Periodic monitoring of Top soil for EC (Salinity), pH,	Contractor / I/C Civil works	Records of analysis of Top Soil samples be maintained

Impacting activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
				Organic Carbon (OC) & ESP		
3. Soil Contamination	- Control spillage of construction materials	At Project Site	During construction & Completion of construction work	Periodic monitoring of EC, pH & ESP	Contractor / I/C Civil works	Records of Soil analysis to be maintained
4. Solid Wastes: Construction Materials, Wastes / Debris Generation, Storage & Disposal.	- Dedicated/proper storage Excavated waste from construction activity will be used for the backfilling and levelling in low laying area within the Project Site.	At Project Site	All time	Periodic Workplace monitoring shall be carried out.	Contractor	Records of quantity of construction waste generation and disposal to be maintained
Water Environment						

Impacting activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
1.Domestic Effluent Disposal/Use of water for Construction Activity	- Domestic effluent disposed into septic tank followed by soak pit.	At Project Site	All time	Site EHS Manager/EHS Team	Monitoring of water consumption at intake points	Records of Water consumption at each unit to be carried out
Occupational Health and Safety						
1.Safety Measures during Construction Activity	<ul style="list-style-type: none"> - Training of workers regarding safety before deploying to work. - Compulsory use of PPE's - First Aid Arrangements - Safety Harnesses - Work Permit system 	At the Project Site	All Time	Daily Workplace Monitoring shall be carried out.	Contractor/ Site Engineer	Training & work permit records
2. Hazards while using crane and lifting heavy equipment's and	-Licensed and trained crane operators	At the Project Site	All Time	Daily Workplace Monitoring shall be carried out.	Contractor/ Site Engineer	Work permit records

Impacting activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
	<ul style="list-style-type: none"> - Use of well-maintained and certified lifting machinery from competitive authority - Lifting and erection work to be done under supervision of safety person. 					

Table 25 Environment management plan during operational phase

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
Air Environment						
1.Transportation of raw materials and products	- Vehicles will have a PUC Certificate. - Spill control mechanism in place. -Sourcing of raw material from nearby places	Along the vehicle movement track	At all times during Operational Phase	Check by Security staff at the entry gate	Safety Department	PUC Certificate
2.Operation of Boiler	- Stack height of 74 m and Provision of ESP is already provided to existing 110 TPH Boiler & Stack Height of 70m with ESP will be provided for proposed Boiler of 50 TPH	At site	At all time, during the Production Process	Periodic Stack monitoring	Safety Department	Stack monitoring and emissions record of the stack.

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
3.VOCs Control & Odour Management	<ul style="list-style-type: none"> - Provision of Double Vent Condensers. - Proper ventilation system shall be provided. - Volatile material shall be stored in closed containers. 	At Site	At all time, during the Production Process.	Periodic Workplace Monitoring for VOCs shall be carried out.	Plant In charge OR General Manager {Operation}	<ul style="list-style-type: none"> -Workplace monitoring reports -Regular periodic health check-up reports of employee.
4. Fugitive dust emissions	<ul style="list-style-type: none"> -All roads shall be of Tar / Concrete -Bagasse yard shall be provided concrete floor and walls from all sides -Ash shall be stored in silos -Ash disposal shall be through covered trucks 	At Site	At all time, during the Production Process.	Periodic Workplace Monitoring for Ambient Air Quality shall be carried out.	Safety Department	Ambient Air Quality monitoring reports

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
	-Bagasse feeding shall be by covered conveyor belt					
Noise Environment						
1.All Operations of other utilities like Cooling Tower, Pumps, Blowers, Boiler etc. & Equipment Maintenance	<ul style="list-style-type: none"> - Acoustic Enclosures shall be provided to DG Set. - PPEs shall be provided to workers 	All plants at strategic locations	Once during week (Hourly reading for 24 hours at each location)	<ul style="list-style-type: none"> -Noise levels using Sound Level Meter -Periodic maintenance of all equipment will be scheduled 	Plant In charge OR General Manager {Operation} & Third Party Contractor	<ul style="list-style-type: none"> -Regular Noise level recording reports , Preventive maintenance of noise generating equipment records -Periodic health check-up records with Audiometric test, Especially Operators of noise generating equipment
Water Environment						

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
1.Usage of Water	- Use of water in manufacturing process.	At Project Site	All time	Monitoring of water consumption at intake points	Site EHS Manager/EHS Team	-Records of Water consumption at each unit to be carried out
2.Wastewater Generation, Treatment and Disposal	<p>- Commissioning of CPU.</p> <p>- Spent lees, blow down and condensate will be treated in CPU of capacity 700 CMD and treated water will be recycled. - Treated water is recycled/reused in greenbelt development.</p> <p>- Spent wash will be treated in Standalone Multi effect evaporator (MEE) followed by spray dryer.</p>	At Project Site	All time	Monitoring of Inlet and Outlet Quality of Wastewater	Site EHS Manager/EHS Team	-Records of wastewater generation and discharge quantity to be maintained. - Also records for recycled treated wastewater to be maintained.

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
Land Environment (Solid Wastes)						
1.Soil Quality/ Soil Contamination	- Control spillage of chemicals/oils - Spill control Mechanism shall be in place	At Project Site	Before growing plants & once in a year after post monsoon	EC (Salinity), pH, Organic Carbon (OC), ESP	Garden-in Charge/EHS Officer	Yearly Soil Quality Monitoring Reports
2.Hazardous waste Management and Disposal	- Hazardous waste shall be segregated at source and stored in the area demarcated for hazardous waste with impervious flooring and binding - Spill control mechanism shall be in place. PPE’s shall be mandatory while handling the waste	At Project Site	All time	Periodic Workplace monitoring shall be carried out.	EHS Manager OR Site EHS Manager	-Records of quantity of hazardous waste generation and disposal to be maintained.

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
	- Sale to approved vendors. - ETP Sludge shall be disposed off as per statutory norms					
3. Non-hazardous waste, Solid Waste	- Segregation & storage of Non-hazardous waste as per type. - Sale to approved vendors.	At Project Site	All time	Periodic Workplace monitoring shall be carried out.	EHS Manager OR Site EHS Manager	Records of Hazardous Waste generation and disposal quantity to be maintained.
Occupational Health and Safety						
1. All Project Activities concerning/ Frightening to Occupational Health & Safety of the employees	- Setting up SOPs for all critical operations, reactions & separations. - Training to workers for safe practices. - Appropriate firefighting & fire detection arrangements at	At Site	All time	Daily Workplace monitoring shall be carried out.	EHS Manager Or EHS Officer	Regular periodic health check-up report of employee

Impacting Activity	Mitigation Measures	Implementation & Management				
		Location	Timing / Frequency	Monitoring / Emergency Procedure	Resource/ Responsibility	Records / Remarks Procurement Schedule
	<p>production unit., Provision of adequate fire extinguishers at site.</p> <p>- Use of provided PPE's shall be made mandatory. Provision of First Aid Box and trained personnel, - Work zone area to maintain free from any dust/fumes/ Vapours.</p>					
2. Transportation of raw materials and products	<p>- Adequate safety measures along with spill control mechanism</p> <p>- Proper personnel protective equipment to be worn by workers at all times</p>	At site	During Transportation	Periodic monitoring by a party acceptable to regulatory authority	EHS Officer	Type of chemicals, operating condition of chemicals transported, Periodic Workplace Air Quality Monitoring, Record of leak detection

7.0 ADDITIONAL STUDIES

RISK ASSESSMENT

Hazard analysis involves the identification and quantification of the various hazards (unsafe condition) that exist in the plant during both construction and operation phases. On the other hand, risk analysis deals with the identification and quantification of the risk, the plant equipment and Personnel exposed to accidents resulting from the hazards present in the plant. Risk analysis involves the identification and assessment of risks to the population, which is likely to be exposed to as a result of hazards incidence.

This requires an assessment of failure probability, credible accident scenario, vulnerability of population, etc. Much of this information is difficult to get or generate consequently, the risk analysis in present case is confined to worst case and maximum credible accident studies and safety and risk aspect related to sulphitation process, alcohol storage and plant operations. Detailed Quantitative Risk Assessment (QRA) on potentially more hazardous and risky situations have been carried out in details and presented in the report in the later part.

8.0 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN

Table 26 EMP Budget

Sr. No.	Component	Particulars	Capital investment in Lakhs	Recurring Cost in Lakhs
1	Air	Construction of new stack for boiler and ESP	590	30
2	Water	<ul style="list-style-type: none"> Distillery CPU. MEE & 1*30 TPH Incinerator boiler for Distillery 	4000	180
3	Noise	Acoustic enclosures, Silencer pads, ear plugs etc.	80	5
4		Monthly Environment Monitoring (Per Year)	--	5

Sr. No.	Component	Particulars		Capital investment in Lakhs	Recurring Cost in Lakhs
	Environment monitoring and Management	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 Plugs etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		200	30
6	Greenbelt	Green belt development activity		280	5.0
7	Solid Waste Management	Solid Waste Management		300	20
8	Rain water harvesting	Rain water harvesting		50	2
9	Storm water drainage	Storm water drainage design and construction		40	3
9	Solar Power & Energy Conservation	Street lights installation with Solar Systems		100	3
10	Fire and Safety	Fire and Safety Management		150	15
11	Laboratory	Testing and Analysis		10	2
Total Cost (In Lakhs)				5800	300

9.0 GREENBELT DEVELOPMENT PLAN

Greenbelt development is undertaken in the area provided separately. According to CPCB guidelines, 2500 trees should be available per hectare of land for greenbelt development. Total 15.90 Hectares of land is reserved for greenbelt development; hence there should be minimum 39750 no. of trees. At present the industry has already planted about 12000 Trees, and remaining 27750 trees shall be planted within two to three years. The industry proposes to plant 1000 to 1500 trees per year in order to increase the greenbelt over and above 33% of the total factory area.

10.0 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The estimated time of completion of project will be one and half years after the receipt of Environmental Clearance from the respective authority. The industry has reserved Rs. 1.88 Crores (0.75 % of the cost of the project as per Office Memorandum Vide F. No. 22-65/2017-IA.III Dated 01.05.2018) which will be spent on the activities like sanitation and health, education, and educational facilities as a cost towards corporate environment responsibility (CER).

The finalization of the activities shall be done in consultation with the District Collector.

11.0 RAINWATER AND STORMWATER HARVESTING PLAN

Rainwater harvesting is a mechanism involved in collecting, storing and using rainwater when it is most needed. A rainwater harvesting system comprises of various stages – transporting rainwater through pipes or drains, filtration and storage in tanks for reuse or recharge. There are five components in a rainwater harvesting system namely catchment, conveyance, filtration, storage and recharge.

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 690 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about 39000 Sq.m of area. 21528 m³ 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.

Stormwater management system shall be also adopted by the industry. Separate drains of minimum 0.6 m * 1.0 m will be provided for the collection and disposal of stormwater from the industry premises.

Table 27 Rain water harvesting quantity

Sr. No.	Location	Area in m2	Average Run-off Factor	Rainfall in mm	The quantity of rainwater per year m³
1	Built-up area	Only 78,558.95 m2 area use for rainwater harvesting	0.80	690	43365

12.0 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 of sugar unit would help to produce good quality of sugar and establishment programme would help to produce good quality of RS/Ethanol and has a great potential for export. Ethanol produced will mainly utilized in blending with petrol (additives).