EXECUTIVE SUMMARY

ESTABLISHMENT OF 120 KLPD ETHANOL PLANT TO PRODUCE 120 KLPD RECTIFIED SPIRIT/ETHANOL BASED ON SUGARCANE JUICE/SYRUP/"B" HEAVY MOLASSES AS RAW MATERIAL

AT

VILLAGE: DAHITANE, TQ.: AKKALKOT, DIST.: SOLAPUR, MAHARASHTRA STATE,

BY

SWAMI SAMARTH SAHAKARI SAKHAR KARKHANALIMITED. (SSSSKL)

PROPOSAL FOR

ENVIRONMENT CLEARANCE

(Industry falls under 5(g) 'A' Category as per the EIA Notification, 2006 and amendments thereof

Area: 34.973147 Ha. Project Cost: Rs. 98.00 Cr.

Tors Granted: F. No. J-11011/157/2023-IA-II(I) dated 10th April 2023

Report Prepared By:

M/s SD Engineering Services Pvt. Ltd.

QCI-NABET Accredited EIA Consultant Organization

Certificate No: NABET/EIA/2023/SA 0166

Accredited By: NABET- Quality Council of India

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1. 0 INTRODUCTION

M/s. Swami Samarth Sahakari Sakhar Karkhana Ltd., (SSSSKL). is registered as Co-operative Sugar unit bearing Reg. No. SUR/ AKT/PRG/ (A) 33/5/1990 467date 16 May 1990. The society was started with 2500 TCD (tonnes crushed per day) with first crushing season in year 1999-2000. The cane operational area is from villages of Tahsil of Akkalkot. The total villages are 132 with total shareholders as 20561.

SSSSKL is a Co-operative Limited Company. The registered office and factory site address of SSSSKL is at Village Dahitane, Taluka Akkalkot, Distillery Solapur, Pin code 413216 Maharashtra State.

The sugar factory is not working since 2013-14. The SSSSKL now proposes to set up 120 KLPD Ethanol plant to produce 120 KLPD RS/Ethanol to consume the available molasses from its own existing sugar unit and utilize sugarcane juice/syrup for the production of Rectified Spirit/Ethanol.

The proposed project will produce RS/Ethanol from sugarcane juice/syrup/'B' heavy molasses as raw materials depending on the market demand and availability of raw materials. The steam and power requirement for the proposed distillery plant will be made available from the proposed 30 TPH boiler & 3.0 MW back pressure TG set. The configuration of product after proposed establishment is as below.

1.1 PROJECT LOCATION

The salient features of the project site are

Table 1 Salient features of the project site

Sr. No.	Features	Description	Direction wrt site
1.	Elevation above MSL	505 meters	
2.	Nearest City/Town	Akkalkot ~ 5.0 Km	S
		Solapur ~ 33 Km	NW
3.	Nearest Village	Dahitane ~ 1.5 Km	N
		Kalegaon~ 4.6 Km	SE
		Akkalkot ~ 5.0 Km	S
		Karjal ~ 8.7 Km	W
4.	Road	NH-150E (Solapur-Kalaburgi) ~ 3.8 km	S
5.	Nearest water body	Karnur Dam ~ 5.4 Km	NNE
		Bori River ~ 3.7 Km	E
6.	Railway Station	Akkalkot Road ~ 14.7 Km	SSW
7.	Airport	Solapur Airport ~ 28.7 Km	NWW
8.	Protected Area	None within 10 Km	
9.	Reserved Forests	None within 10 Km	
10.	Wildlife Sanctuary	None within 10 Km	
11.	ESZ Boundary	None within 10 Km	
12.	Archeological site	None within 10 km	
13.	State boundary	None within 10 km	
14.	Defense installations	None within 10 km	

Sr. No.	Features	Description	Direction wrt site
15.	Average Rainfall (2008 - 2017)	527.8 mm	
16.	Seismicity	III	

2.0 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 Existing and Proposed Products manufacturing quantities

Sr. No.	Description	Unit	Existing Capacity	Proposed Capacity	Total Capacity	Remark
1	Sugarcane Crushing	TCD	2500	00	2500	Existing 2*32 TPH boilers for existing sugar and power plant.
2	Power Plant	MW	2.5	00	2.5	
3	Distillery Unit	KLPD	00	120	120	--
	Rectified Spirit or	KLPD	00	120	120	Only one product at a time
	Ethanol		00	120	120	
4	Power Plant	MW	00	3.0	3.0	TG Set Connected to proposed 30 TPH Boiler

2.1 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.

Table 3 Raw material requirement and its source

Sr. No	Item	Quantity	Unit	Remarks/Source
A - Sugar Plant: 2500 TCD (Existing)				
1	Sugarcane	2500	TCD	Local Area (Farmers)
2	Lime	3.97	MT/day	Open market
3	Sulphur	1.11	MT/day	Open market
4	Phosphoric Acid	0.09	MT/day	Open market
5	Steam	40 – 45	TPH	Existing 2*32 TPH Sugar Division Boiler
6	Power	2.5	MW	Existing own 2.5 MW sugar Power Plant
7	Manpower Permanent	100	-	Total manpower for sugar and power plant unit
	Manpower Seasonal	150	-	
B – Sugar Power Plant: 2.5 MW (Existing)				
1	Bagasse	698	MT/day	Own Sugar Unit
C – RS/Ethanol Plant: 120 KLPD (Proposed Establishment)				

Sr. No	Item		Quantity	Unit	Remarks/Source
1 a	B Heavy molasses OR		370	MT/day	Distillery unit will run for 150 days (During off season) on 'B' heavy molasses available from own sugar unit and nearby sugar units
2	Equivalent Sugar cane		1440	MT/day	Distillery unit will be run for 180 days (During crushing season) on sugar cane juice/syrup
Consumable Chemicals					
1	Urea		93.75	Kg/day	Stored in Fermentation house Source: Open Market
2	DAP		62.50	Kg/day	
3	Sulphuric Acid		31.25	Ltr/day	
4	Antifoam oil		31.25	Ltr/day	
Utilities					
1	Steam		20 - 25	TPH	Proposed 1*30 TPH boiler
2	Power		3.0	MW	3 MW TG Set
3	Water	Domestic	5	CMD	Domestic – 5 CMD Industrial – 718 CMD when 'B' heavy Molasses used **OR** 539 CMD when sugarcane juice/syrup used as raw material **Source: -** Bori River jack well. The industry is in process for obtaining water withdrawal permission from competent authority.
		Industrial	718		
	Man power		90	Nos	Local

B) Land use Breakup Details-

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

Table 4 Landuse breakup

Sr. No.	Description	Area in Sq. m	% Area
1	Built-up Area		
a	Existing	27928.15	7.99
b	Proposed	17308.5	4.95
2	Area under utilities		
a	Existing	10002.12	2.86
b	Proposed	7657.5	2.19
3	Internal roads	42218.99	12.07
4	Greenbelt area	119819.7	34.26
5	Parking Area	61450.26	17.57
6	Vacant land	63346.26	18.11
	Total	**349731.47**	**100.00**

C) Power Requirement

The power requirement of the existing sugar unit is 2.5 MW. The power requirement for existing sugar unit is met from existing 2.5 MW Power Plant.

The power requirement of the proposed distillery unit will be 2.5 MW. It is proposed to have a new turbo alternator of about 3.0 MW capacity. The steam produced in the proposed 1*30 TPH multi-fired boiler shall be used for generating power. The exhaust steam of turbine shall have a pressure of about 3.5 kg/cm2, which will be used for distillery operations.

D) Steam Requirement

The steam requirement of the existing sugar and power unit are met from existing 2*32 TPH boiler.

The steam requirement of the proposed distillery depending on the final product to be produced will be 20 to 25 TPH (for TG set, Multi – pressure distillation and Multiple Effect Evaporation and drying). An independent boiler of 1*30 TPH boiler @ 45 kg/cm2 will be installed for distillery operations as well as spentwash treatment (Multiple Effect Evaporation and drying).

3000 KWH turbo alternator, Exhaust steam of the turbo alternator at the pressure of 3.5 kg /cm2 will make available to the distillery unit. Necessary arrangement for reducing the pressure & de-superheating of steam shall be made in the distillery. The boiler shall be able to use either biogas or coal or bagasse as a fuel.

E) Water Consumption Details

The water is sourced from Bori River jack well. The necessary Application for seeking the permission shall be Submitted to Irrigation Authority..

Table 5 Water Consumption Details

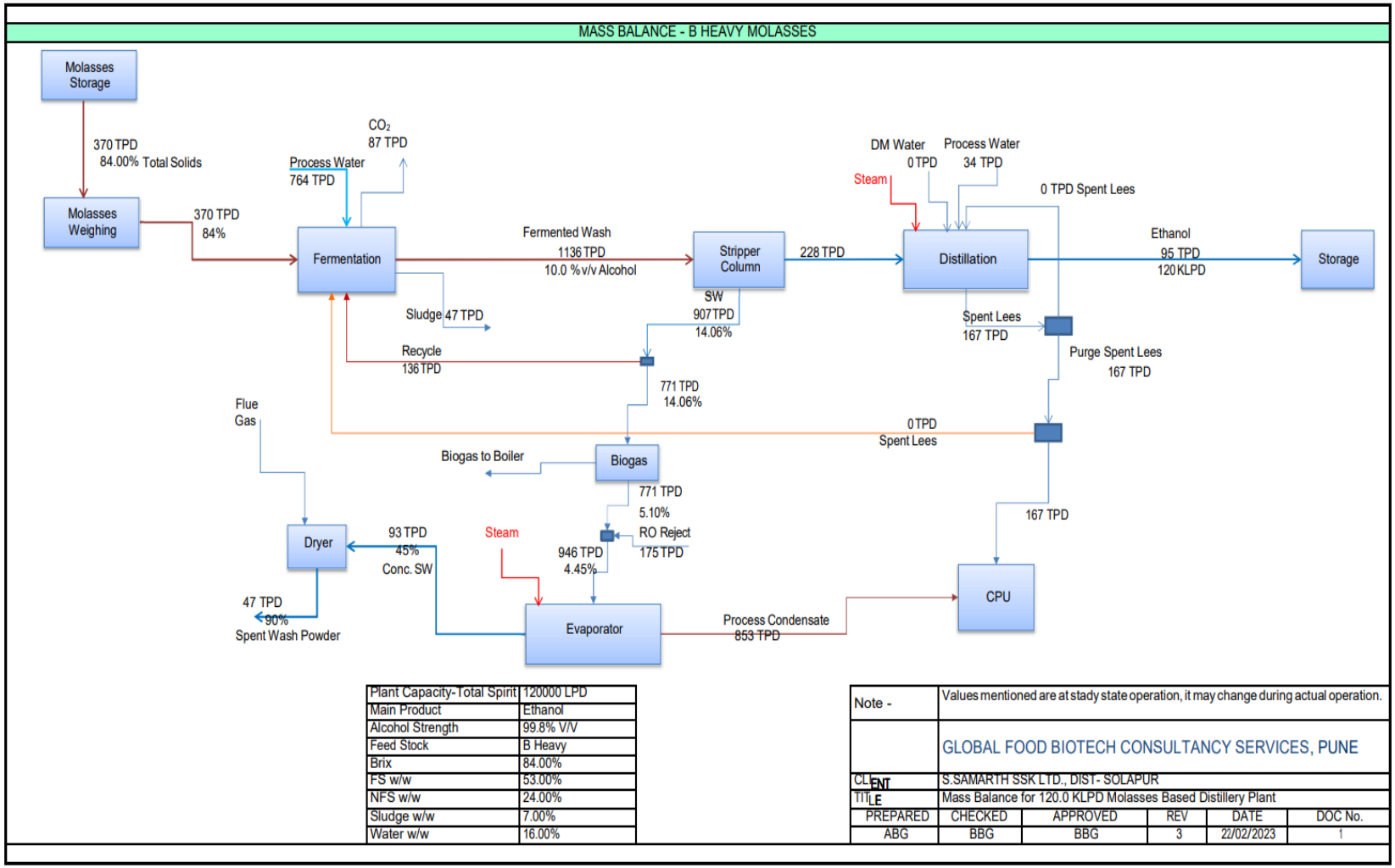
Description	Quantity	Remarks
Domestic use	5 CMD	For Sugar division 90 CMD and for Distillery division 5 CMD
Distillery Unit	718 CMD OR	When B Heavy Molasses used as raw material
	539 CMD	When Juice/syrup Molasses used as raw material

Sugar and Cogeneration power plant Division

The detailed water budget is given in below tables.

Water Budget for Distillery unit

For "B" Heavy molasses as raw material



Plant Capacity-Total Spirit	120000 LPD
Main Product	Ethanol
Alcohol Strength	99.8% V/V
Feed Stock	B Heavy
Brix	84.00%
FS w/w	53.00%
NFS w/w	24.00%
Sludge w/w	7.00%
Water w/w	16.00%

Note -	Values mentioned are at stady state operation, it may change during actual operation.				
	GLOBAL FOOD BIOTECH CONSULTANCY SERVICES, PUNE				
CLIENT	S.SAMARTH SSK LTD., DIST- SOLAPUR				
TITLE	Mass Balance for 120.0 KLPD Molasses Based Distillery Plant				
PREPARED	CHECKED	APPROVED	REV	DATE	DOC No.
ABG	BBG	BBG	3	22/02/2023	1

Figure 1 Material balance flow sheet for B Heavy Molasses as raw material

For Sugarcane juice/Syrup as raw material

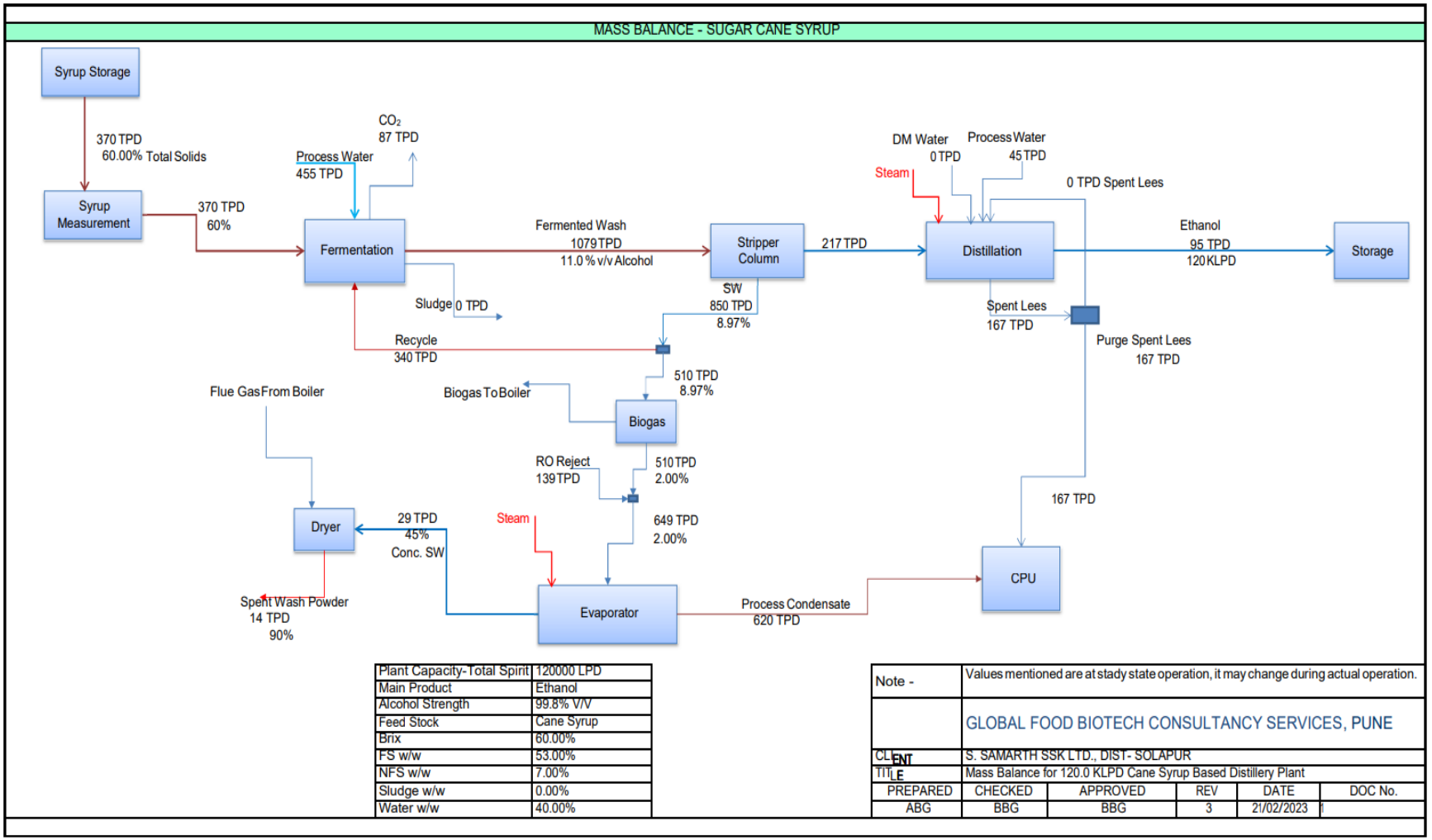


Figure 2 Material balance flow sheet for Sugarcane Juice or Syrup as raw material

Distillery Division

Table 6 Total Input Water

Sr. No.	Section	Water Quantity (m3/day)	
		when B Heavy Molasses	when Sugarcane Juice Syrup
1	Water in Molasses / Syrup	62	156
2	Process Water for Fermentation	892	781
3	Process water for Process	53	49
4	DM water for RS dilution	0	0
5	DM water for Boiler & DS	627	565
6	Soft water for Cooling Tower	670	635
7	Soft water for vacuum pump & Blower	216	216
8	Washing water for WTP	76	61
	Total Water Input	**2596**	**2463**

Table 7 Total Output Water

Sr. No.	Section	Water Quantity (m3/day)	
		when B Heavy Molasses	when Sugarcane Juice Syrup
1	Spent Lees	167	167
2	Water in Spent Wash	774	774
3	Water in sludge after decanter	28	0
4	Vacuum pump & Blower	208	208
5	Water in Product	1.0	1
6	Washing Water	10	10
7	Blow Down Water & Reject Streams	342	285
8	Steam Generation	586	528
	Total Water Output	2116	1973

Table 8 Loss During Continious Operation

Sr. No.	Section	Water Quantity (m3/day)	
		when B Heavy Molasses	when Sugarcane Juice Syrup
1	Vacuum Pump loss	8	8
2	CT Evaporation & Drift Losses,	472	481
	Total Losses	480	489

Table 9 Recycling Stream

Sr. No.	Section	Water Quantity (m3/day)	
		when B Heavy Molasses	when Sugarcane Juice Syrup
1	Spent Lees Recycle for RS Dilution	0	0
2	Vacuum Pump Recycle	208	208
3	Spent Wash Recycle	136	340
4	Steam Condensate	481	433
5	Treated Effluent	990	787
	Total Recycle	1815	1768

Table 10 Water balance calculation

Sr. No.	Section	Water Quantity (m3/day)	
		when B Heavy Molasses	when Sugarcane Juice Syrup
1	Total Water Requirement Without Recycle	2533 m3/day	2307 m3/day
2	Total Treated Water & Internal Streams Recycle	1815 m3/day	1768 m3/day
3	Total Fresh Water Requirement for Distillery	718 m3/day	539 m3/day
	KL of water per KL of Ethanol Production	5.99	4.49

Table 11 Details of CPU inlet and Outlet quantity

CPU				
Sr. No.	--	Details of CPU inlet and Outlet	Water Quantity (m3/day)	
			when B Heavy Molasses	when Sugarcane Juice Syrup
1	Inlet	Process Condensate	853 m3/day	620 m3/day
2		Spent Lees	167 m3/day	167 m3/day
3		Cooling Tower Blow Down	84 m3/day	80 m3/day
4		Other Blow down	62 m3/day	60 m3/day
5		TOTAL	1166 m3/day	927 m3/day
6	Outlet	Treated Effluent Recycle	990 m3/day	787 m3/day
7		Sludge	1 m3/day	1 m3/day
8		Reject	175 m3/day	139 m3/day

E) Wastewater generation and its treatment technology

Distillery unit

I. Industrial – The industry shall adopt Zero Liquid Discharge System for the treatment of wastewater generated from the proposed distillery unit. The effluent streams are separated into strong stream (Spent wash) and weak stream (Spent lees, Utilities process condensates etc.). The raw spent wash is treated in anaerobic digester followed by concentration in MEE followed by dryer to obtained potash rich dry powder to achieve Zero Liquid Discharge (ZLD). Dry powder shall be sold as potash rich manure to farmers.

A) "B" Heavy Molasses as raw material:

The raw spent wash [907 MT/D (14.06% Solids) out of which 136 MT/D shall be recycle and remaining 771 MT/D] shall be fed to anaerobic digester (771 MT/D i.e., 5.10 % Solids) followed by concentration in MEE (175 MT/D RO reject combined with 771 MT/D digester outlet (946 MT/D and 4.45 % Solid after combination) shall be feed to MEE and it concentrated up to 93 MT/D i.e. 45% Solids) followed by dryer

(47 MT/D i. e. 90 % Solids). The process condensate of 853 MT/D, shall be treated in proposed condensate polishing unit based on primary, secondary and tertiary treatment along with Spentlees-167 MT/D, Cooling tower blow down of 84 MT/D and other blow down of 62 MT/D, totaling to 1166 MT/D, out of which 990 MT/D is recycled back as process water, 1 MT/D of sludge generation and 175 MT/D of RO reject which shall be given to MEE along with digester outlet.

B) Sugarcane Juice/ Syrup as raw material:

The raw spent wash [850 MT/D (8.97% Solids) out of which 340 MT/D shall be recycle and remaining 510 MT/D] shall be fed to anaerobic digester (510 MT/D i.e. 2 % Solids) followed by concentration in MEE (139 MT/D RO reject combined with 510 MT/D digester outlet (649 MT/D and 2 % Solid after combination) shall be feed to MEE and it concentrated up to 29 MT/D i.e. 45% Solids) followed by dryer (14 MT/D i. e. 90 % Solids). The process condensate of 620 MT/D, shall be treated in proposed condensate polishing unit based on primary, secondary and tertiary treatment along with Spentlees-167 MT/D, Cooling tower blow down of 80 MT/D and other blow down of 60 MT/D, totaling to 927 MT/D, out of which 787 MT/D is recycled back as process water, 1 MT/D of sludge generation and 139 MT/D of RO reject which shall be given to MEE along with digester outlet.

ii. Domestic –

From existing sugar unit - 50 KLD and from proposed distillery unit – 4 KLD

Domestic effluent shall be treated in proposed 60 KLD Sewage Treatment Plant after proposed establishment and used for gardening.

F) Air Emission Management

Table 12 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 based on SO2 Emission	APC Equipment
1	Existing sugar division boilers of 2*32 TPH	Bagasse	38.48*m	Cyclone dust collector for both boilers and a stack of 60 meters height is already provided
2	Proposed 1*30 TPH Conventional boiler for Distillery	Bagasse OR Coal	47.09*m	Bag-filter and a stack of 60 meters height shall be provided
3	Existinng 1*320 KVA DG Set for Suagr division Proposed 2*500KVA for Distillery division)	HSD	6 m above roof level each	--

G) Solid waste Management

a) Non-Hazardous solid wastes details

Table 13 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity (MT/D)	Mode of Collection and Disposal
1.	Boiler Ash (MT/D)		
	Existing Sugar Division boilers of 2*32 TPH		
	Bagasse as fuel	10.47	Sale to brick manufacturers
	Proposed Distillery Boiler of 30 TPH		
	Bagasse as fuel Or	4.48	Mixed with pressmud and CPU sludge and sold as manure or Sale to brick manufacturers
	Coal as fuel	17.10	
2.	CPU Sludge (MT/A)	160	Mixed with boiler ash along with pressmud and sold as manure
Other Solid Wastes			
Sr. No.	**Description of waste**	**Quantity (Kg/M)**	**Mode of Collection and Disposal**
1.	Paper waste	30	Manually collected and stored in a designated area and sold to scrap vendors
3.	Municipal Solid waste		
	Non-Biodegradable	150	Manually collected and sold to scrap vendors
	Bio-degradable	1500	Used in Composting

b. Hazardous Waste

Table 14 Details of hazardous waste generated and its disposal

Sr. No.	Category	Description	Quantity in KLA	Disposal
From existing sugar				
1	5.1	Used Oil	3.0	Used as lubricant oil for bullock carts
From Proposed Distillery Unit				
1	5.1	Used Oil	00	There is no hazardous waste generation due to the proposed distillery plant.

3. 0 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

3.1.1 METEOROLOGICAL CHARACTERISTICS OF THE STUDY AREA

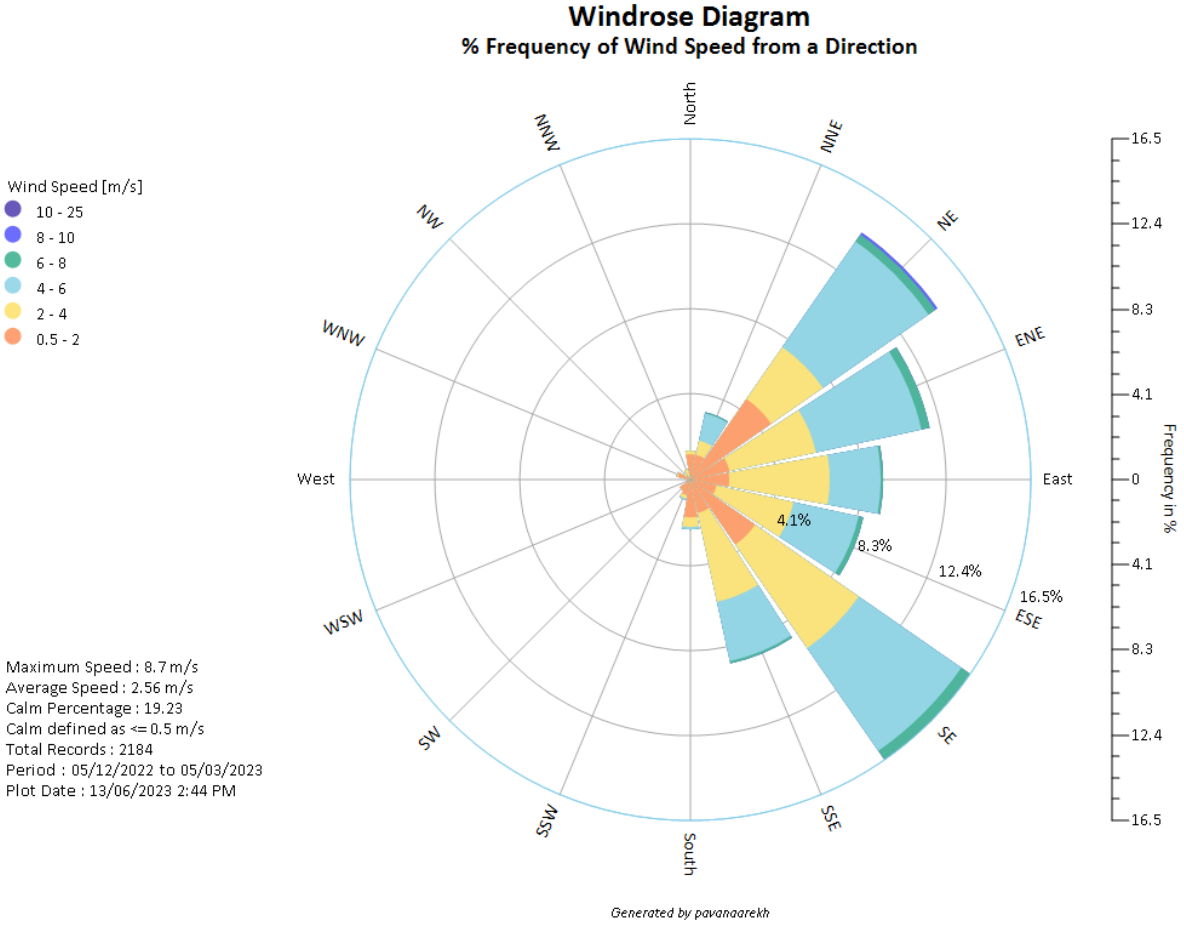


Figure 3 Windrose diagram for the study area (blowing from)

From **Figure 3** it can be seen that the average wind speed of the study period is 2.56 m/s. and the predominant wind direction is from South-east to North-west direction. This has been used in selecting the receptors.

Table 15 Receptor summary

Sr. No.	**Station ID**	**Location**	**Latitude**	**Longitude**	**Distance from site** (In meters)	**Direction** (In degrees)
1	AAQ 1	Near Entry Gate of Project Site	17°34'15.29"N	76°11'40.11"E	261.44	227.97
2	AAQ 2	Within Project Site	17°34'16.05"N	76°12'3.99"E	531.83	106.55
3	AAQ 3	Near Motyal	17°36'13.87"N	76°13'32.30"E	4663.93	41.71
4	AAQ 4	Near Kolekarwadi	17°34'40.12"N	76°12'53.16"E	2047.41	73.17
5	AAQ 5	Near Nimgaon	17°31'28.86"N	76°14'52.88"E	7626.63	134.10
6	AAQ 6	Near Dodyal	17°30'18.04"N	76° 9'29.16"E	8498.50	208.37
7	AAQ 7	Near Halhalli	17°34'50.16"N	76° 6'45.52"E	8926.79	275.82
8	AAQ 8	Near Hasapur	17°32'55.13"N	76° 9'32.77"E	4749.73	236.10
9	AAQ 9	Near Chapalgaon	17°36'8.08"N	76°10'8.23"E	4391.01	318.79

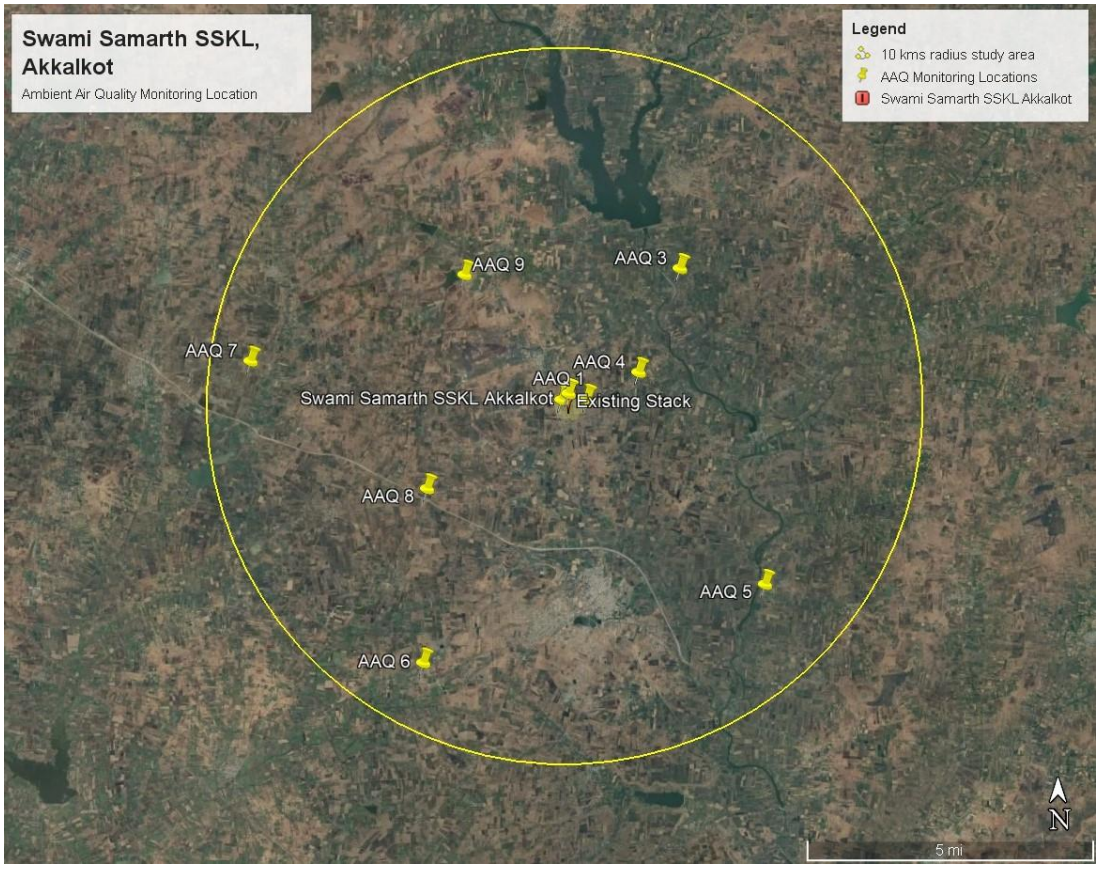


Figure 4 10 km. radius study area map indicating Ambient air quality monitoring locations

Table 16 Ambient air quality monitoring results

Ambient Air Quality Monitoring Results Summary						
Duration of Monitoring: 05 December 2022 to 28 February 2023						
Pollutant		**PM_{10} ($\mu g/m^3$)**	**$PM_{2.5}$ ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**NOx ($\mu g/m^3$)**	**CO (mg/m^3)**
NAAQ Standard		**100 ($\mu g/m^3$)**	**60 ($\mu g/m^3$)**	**80 ($\mu g/m^3$)**	**80 ($\mu g/m^3$)**	**04 (1 hr)**
AAQ1	Maximum	56.80	38.00	13.20	18.40	1.40
	Minimum	47.10	29.30	8.00	11.80	0.50
	Average	**51.36**	**33.32**	**9.94**	**14.83**	**0.92**
	98 Percentile	55.98	37.33	12.53	17.97	1.40
AAQ2	Maximum	57.90	38.20	13.70	18.20	1.50
	Minimum	47.70	29.30	8.90	12.60	0.70
	Average	**52.10**	**33.58**	**10.77**	**14.90**	**1.04**
	98 Percentile	56.51	37.43	13.27	17.53	1.40
AAQ3	Maximum	54.70	36.30	13.20	16.40	1.10
	Minimum	46.80	28.80	8.80	11.90	0.40
	Average	**50.56**	**32.40**	**10.24**	**15.02**	**0.72**
	98 Percentile	54.32	35.48	12.53	16.35	1.10
AAQ4	Maximum	48.20	29.30	9.61	15.20	0.80
	Minimum	42.50	26.30	7.10	11.80	0.20
	Average	**44.82**	**27.52**	**8.26**	**13.79**	**0.48**
	98 Percentile	47.91	29.06	9.44	15.20	0.80
AAQ5	Maximum	55.20	35.20	14.20	16.80	1.30
	Minimum	46.10	30.60	9.10	11.30	0.50
	Average	**49.41**	**32.69**	**11.07**	**14.25**	**0.84**
	98 Percentile	54.82	35.01	13.72	16.61	1.25
AAQ6	Maximum	53.20	34.80	12.61	16.10	1.00
	Minimum	45.80	29.20	8.80	12.90	0.30
	Average	**49.24**	**31.82**	**10.72**	**14.54**	**0.62**
	98 Percentile	52.86	34.37	12.24	16.10	1.00
AAQ7	Maximum	58.40	36.90	14.90	16.20	1.10
	Minimum	49.70	31.00	8.90	11.50	0.50
	Average	**53.86**	**34.30**	**11.07**	**14.19**	**0.86**
	98 Percentile	57.54	36.61	14.08	16.01	1.10
AAQ8	Maximum	47.30	26.60	11.20	14.80	0.60
	Minimum	40.20	22.90	7.94	9.20	0.10
	Average	**42.82**	**24.15**	**8.95**	**12.05**	**0.31**
	98 Percentile	47.20	26.60	10.67	14.80	0.60
AAQ9	Maximum	45.50	25.50	10.60	13.90	0.60
	Minimum	37.80	21.60	7.40	8.20	0.10
	Average	**40.80**	**22.87**	**8.53**	**10.93**	**0.25**
	98 Percentile	45.36	25.26	10.15	13.71	0.55

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

Table 17 Details of the incremental concentrations due to proposed expansion

Sr. No.	Receptor/Village	PM10- 24-hour concentration (µg/m3)			PM2.5- 24-hour concentration (µg/m3)			SO_2- 24-hour concentration (µg/m3)			NOx- 24-hour concentration (µg/m3)			CO - 1-hour concentration (µg/m3)		
		Background	Incremental	Total	Background	Incremental	Total	Background	Incremental	Total	Background	Incremental	Total	Background	Incremental	Total
1	AAQ 1	56.80	0.06	56.86	38.00	0.04	38.04	13.20	0.00	13.2	18.40	0.06	18.46	1400	35.80	1435.8
2	AAQ 2	57.90	0.04	57.94	38.20	0.03	38.23	13.70	0.00	13.7	18.20	0.03	18.23	1500	42.73	1542.73
3	AAQ 3	54.70	0.00	54.7	36.30	0.00	36.3	13.20	0.00	13.2	16.40	0.00	16.4	1100	1.24	1101.24
4	AAQ 4	48.20	0.01	48.21	29.30	0.01	29.31	9.61	0.00	9.61	15.20	0.01	15.21	800	11.25	811.25
5	AAQ 5	55.20	0.00	55.2	35.20	0.00	35.2	14.20	0.00	14.2	16.80	0.00	16.8	1300	0.07	1300.07
6	AAQ 6	53.20	0.19	53.39	34.80	0.13	34.93	12.61	0.39	13	16.10	0.36	16.46	1000	0.56	1000.56
7	AAQ 7	58.40	0.09	58.49	36.90	0.06	36.96	14.90	0.18	15.08	16.20	0.17	16.37	1100	0.74	1100.74
8	AAQ 8	47.30	0.37	47.67	26.60	0.25	26.85	11.20	0.77	11.97	14.80	0.73	15.53	600	2.70	602.7
9	AAQ 9	45.50	0.14	45.64	25.50	0.09	25.59	10.60	0.31	10.91	13.90	0.30	14.2	600	2.03	602.03

Conclusions:

Air quality predictions are done considering the biogas, bagasse or coal as a fuel. Considered the existing and proposed boilers working at full load conditions to estimate the GLC of PM10, PM2.5, SO2, NOx and CO due to the proposed establishment of the distillery industry under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for Swami Samarth Sahakari Sakhar Karkhana Ltd. Incremental concentrations are worked out for 9 receptor locations, at which ambient air quality monitoring were carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed establishment. Results are compared with the Ambient Air Quality Standards (AAQS).

From the results, it can be concluded that,

At the selected 9 receptor locations, surrounded in 10 km radius around Swami Samarth Sahakari Sakhar Karkhana, Akkalkot, Solapur, Maharashtra State. GLCs are well within the limits of AAQ Standards.

- Under the working conditions of existing 2*32 TPH boiler, proposed 1*30 TPH boiler and considering vehicular emissions, PM10GLCs at all the 9 receptor locations are in the range of 45.64 µg/m3 to 58.49 µg/m3 which are within the limits of AAQS.

- Similarly, PM2.5 GLCs for those receptors are in the range of 25.59 µg/m3 to 38.23 µg/m3 which is within the limits of AAQS.
- For SO2, GLCs are in the range of 9.61 µg/m3 to 15.08 µg/m3 which is within the limits of AAQS.
- NOx GLCs are in the range of 14.2 µg/m3 to 18.46 µg/m3 which is within the limits of AAQS.
- CO GLCs are in the range of 602.03 µg/m3 to 1542.73 µg/m3 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 establishment.

3.2 WATER ENVIRONMENT

The unit is located at Dahitane Village, Taluka Akkalkot, District Solapur, Maharashtra. Majority of the study area (10 km around site) is under agriculture land use. The industry is lifting fresh water from Bori River Jack-well which is 4.0 km away from the industry. The industry is in process for obtaining water withdrawal permission from competent authority.

Bori River and Karnur Dam are main source of water for agriculture use. Bori River is flowing at 3.5 km towards East 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 18 Details of the ground water quality monitoring sampling locations

Sr. No.	Symbol	Location	Latitude	Longitude	Distance from site (In meters)	Direction from site (In degrees)
1	GW 1	Near Badole Bk	17°37'45.34"N	76°15'50.02"E	9738.37	48.56
2	GW 2	Near Kolibet	17°33'30.18"N	76°14'4.04"E	4431.46	108.82
3	GW 3	Near Akkalkot	17°30'54.45"N	76°13'35.91"E	7064.66	151.67
4	GW 4	Near Chapalgaon	17°36'28.61"N	76°10'20.12"E	4721.92	329.53
5	GW 5	Near Hasapur	17°33'18.37"N	76°10'36.69"E	2620.18	226.87
6	GW 6	Near Burhanpur	17°36'31.53"N	76°12'17.95"E	4288.27	14.34
7	GW 7	Near Matanhalli	17°29'46.31"N	76°11'37.18"E	8305.99	180.92
8	GW 8	Near Halhalli	17°35'10.59"N	76° 6'59.25"E	8493.91	281.38

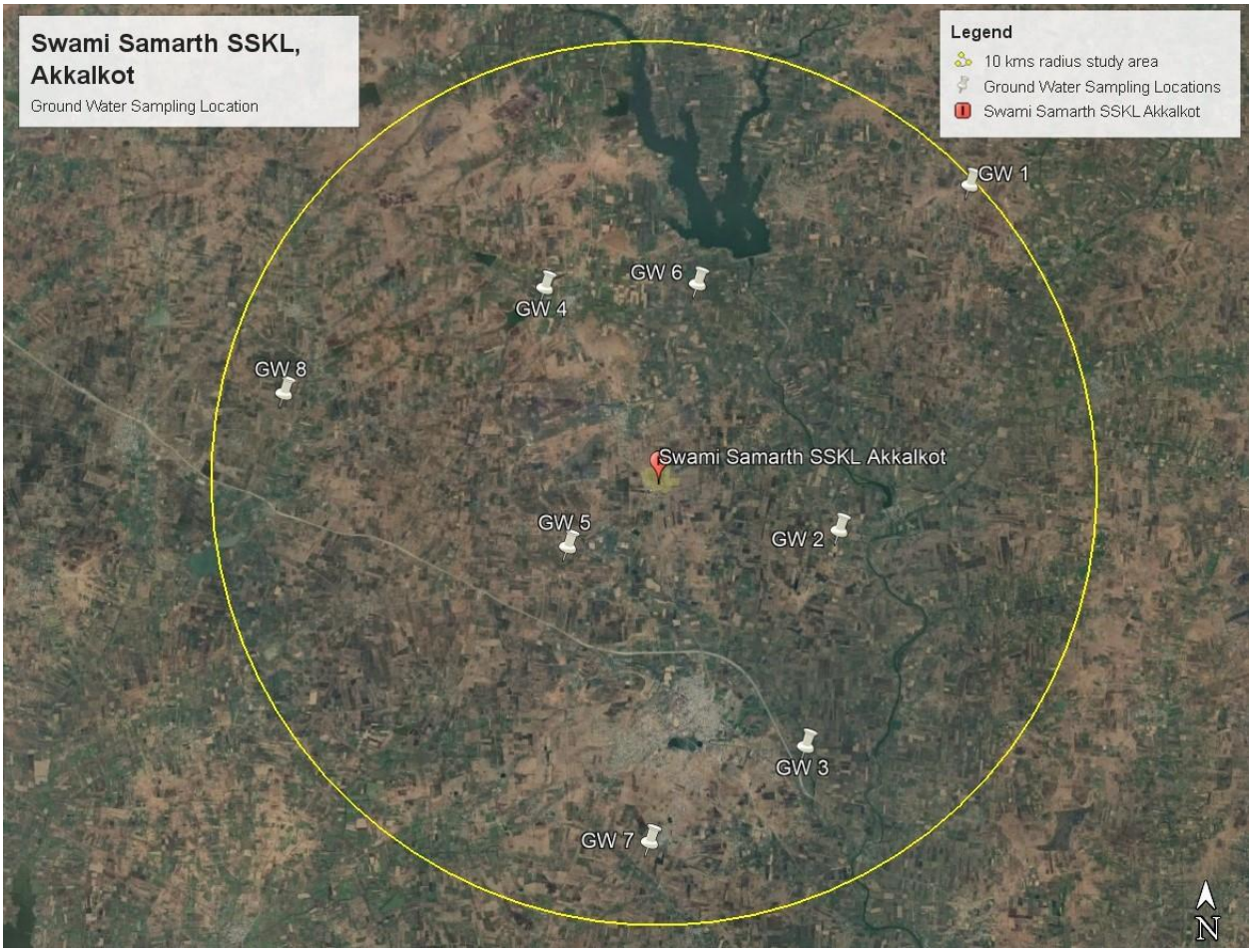


Figure 5 10 km. radius study area map indicating groundwater sampling location

Table 19 Groundwater analysis report within 10 km radius of the study area

Sr. No.	Parameters	Unit	Results								Desirable	Permissible
			GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	IS 10500:2012 Standards	
01	pH	--	7.80	6.97	7.43	8.06	7.10	8.17	7.50	7.05	6.5-8.5	No Relaxation
02	Temperature	^oC	27	26.5	26.5	28.2	27.6	26	28.1	26.3	Not Specified	
03	Turbidity	NTU	0.57	0.55	0.62	0.68	0.75	0.63	0.74	0.66	1	5
04	Total Suspended Solids	mg/lit	5	7	4	5	3	3	4	6	Not Specified	
05	Total Dissolved Solids	mg/lit	378.2	424.5	520.2	368.6	403.3	471.7	355	429.5	500	2000
06	Electric Conductivity	mS/cm	0.581	0.646	0.788	0.566	0.619	0.717	0.545	0.652	Not Specified	
07	Total Hardness $CaCO_3$	mg/lit	257	313	307	197	350	217	237	303	200	600
08	Total Alkalinity as $CaCO_3$	mg/lit	241	223	282	169	208	253	176	207	200	600
09	Salinity	ppt	1.4	1.9	2.6	1.5	1.8	1.6	1.3	1.4	Not Specified	
10	Chemical Oxygen Demand	mg/lit	8	10	7	6	8	7	9	10	Not Specified	
11	Biochemical Oxygen Demand @ 27^oC for 3 days	mg/lit	2.4	3	2.6	2.2	2.3	2.2	2.9	2.8	Not Specified	
12	Chlorides as Cl	mg/lit	85	107	149	100	82	138	108	125	250	1000
13	Sulphate as SO_4	mg/lit	51	68	104	117	48	72	65	88	200	400
14	Nitrate as NO_3-N	mg/lit	1.60	1.05	1.00	1.14	1.40	1.80	1.45	1.30	45	No relaxation
15	Nitrite as NO_2	mg/lit	0.20	0.10	0.08	0.06	0.12	0.10	0.18	0.12	Not Specified	
16	Total Ammonia as N	mg/lit	0.09	0.11	0.15	0.08	0.05	0.06	0.10	0.07	0.5	No relaxation
17	Total Phosphate as PO_4	mg/lit	0.30	0.25	0.18	0.10	0.10	0.20	0.26	0.36	Not Specified	
18	Fluoride as F^-	mg/lit	0.62	0.54	0.45	0.39	0.55	0.42	0.62	0.48	1	1.5
19	Calcium as Ca	mg/lit	61	70	61	42	73	55	43	78	75	200
20	Sodium as Na	mg/lit	18	16	21	27	17	29	12	17	Not Specified	
21	Cadmium as Cd	mg/lit	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	No relaxation	

22	Total Chromium as Cr	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	No relaxation	
23	Chromium as Cr+6	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	No relaxation	
24	Copper as Cu	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	1.5
25	Iron as Fe	mg/lit	0.12	0.14	0.08	0.15	0.09	0.08	0.18	0.10	0.3	No relaxation
26	Magnesium as Mg	mg/lit	25	33	37	22	40	19	31	26	30	100
27	Lead as Pb	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No relaxation
28	Nickel as Ni	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	No relaxation
29	Zinc as Zn	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5	15
30	Mercury as Hg	mg/lit	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	No relaxation
31	Arsenic as As	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.05
32	Cyanide as Cn	mg/lit	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	No relaxation
33	Total Coliform	MPN/ 100ml	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	No relaxation	
34	Fecal Coliform	Org/ 100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	No relaxation	

Note:

Ground water samples collected from eight locations within 10 km radius from the plant site & analyzed as per standard methods of water and wastewater analysis (APHA). The water quality of the study area is found to be below the acceptable limit of IS: 10500: 2012. 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 as presence of coliform is observed.

3.2.2 SURFACE WATER

Table 20 Details of surface water quality monitoring locations

Sr. No.	Symbol	Location	Latitude	Longitude	Distance from site (In meters)	Direction (In degrees)
1	SW 1	Bori River – Near Kurnur Dam	17°37'9.66"N	76°12'40.39"E	5601.92	17.87
2	SW 2	Bori River – Near Sangvi	17°33'59.24"N	76°14'41.78"E	5336.15	95.71
3	SW 3	Lake in Akkalkot	17°31'10.38"N	76°12'0.44"E	5746.47	174.53
4	SW 4	Lake near Hingani	17°33'38.99"N	76°11'34.99"E	1168.41	189.75
5	SW 5	Lake near Chapalgaon	17°36'15.85"N	76°10'5.28"E	4644.70	322.41
6	SW 6	Halchincholi Talav	17°33'25.92"N	76° 6'14.44"E	9777.40	260.82
7	SW 7	Lake near Dahitane	17°34'46.10"N	76°10'12.87"E	2775.26	289.30
8	SW8	Lake near Konhali	17°32'6.36"N	76° 6'52.36"E	9423.17	244.80

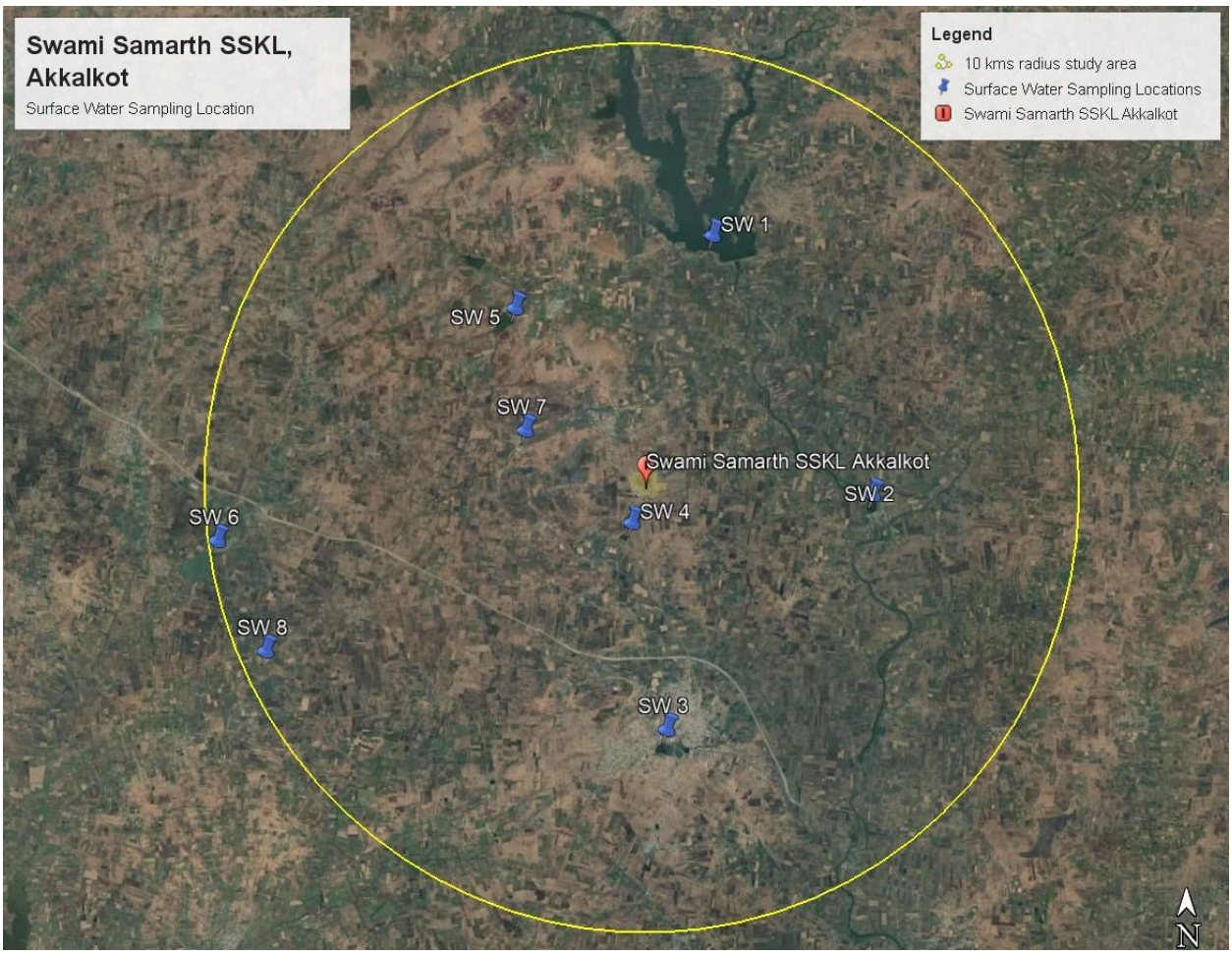


Figure 6 10 km. radius study area map indicating surface water sampling location

Table 21 Surface water analysis report within 10 km radius of the study area

Sr. No.	Parameters	Unit	Results								LIMITS IS: 2296 for Surface Water Quality (Class E)
			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	
01	pH	--	7.21	8.10	7.42	7.20	7.63	6.97	7.35	8.40	<8.5
02	Temperature	^oC	27	27.5	28.4	26.8	26.90	27.00	26.00	26.30	Not Specified
03	Turbidity	NTU	1.8	1.5	2.3	1.6	1.9	1.7	2.0	1.3	Not Specified
04	Total Suspended Solids	mg/lit	14	14	11	9	13	8	12	15	Not Specified
05	Total Dissolved Solids	mg/lit	308.5	318.7	388.1	340.8	328	384.9	402.6	387.5	<2100.00
06	Electric Conductivity	mS/cm	0.474	0.485	0.588	0.524	0.503	0.585	0.618	0.588	< 2250.00
07	Total Hardness $CaCO_3$	mg/lit	143	180	211	183	148	173	222	185	Not Specified
08	Total Alkalinity as $CaCO_3$	mg/lit	124	161	146	127	109	128	140	163	Not Specified
09	Salinity	ppt	2.2	2.4	3.6	2.9	3.6	2.7	3.6	4.3	Not Specified
10	Dissolved Oxygen	mg/lit	7.1	7.4	5.8	6.5	6.1	6.8	5.9	6	Not Specified
11	Chemical Oxygen Demand	mg/lit	9	11	14	10	12	14	8	11	Not Specified
12	Biochemical Oxygen Demand @ 27^oC for 3 days	mg/lit	2.8	3.6	4.2	3.1	4	3.8	2.8	4.1	Not Specified
13	Chlorides as Cl	mg/lit	85	89	104	102	90	112	117	98	<600.00
14	Sulphate as SO_4	mg/lit	57	59	73	42	65	61	78	86	<1000.00
15	Nitrate as NO_3-N	mg/lit	3.5	2.9	5.1	4.3	3.8	4.3	3.7	3.9	Not Specified
16	Nitrite as NO_2	mg/lit	0.2	0.16	0.32	0.09	0.14	0.13	0.34	0.30	Not Specified
17	Total Ammonia as N	mg/lit	0.23	0.27	0.32	0.25	0.28	0.31	0.26	0.22	Not Specified
18	Total Phosphate as PO_4	mg/lit	0.18	0.15	0.22	0.19	0.10	0.09	0.20	0.15	Not Specified
19	Fluoride as F^-	mg/lit	0.64	0.68	0.48	0.52	0.74	0.69	0.41	0.38	Not Specified
20	Calcium as Ca	mg/lit	29	32	39	43	26	34	42	47	Not Specified
21	Sodium as Na	mg/lit	19	21	28	16	25	26	31	30	Not Specified
22	Cadmium as Cd	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
23	Total Chromium as Cr	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified

24	Chromium as Cr+6	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
25	Copper as Cu	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
26	Iron as Fe	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
27	Magnesium as Mg	mg/lit	17	24	27	18	20	21	28	16	Not Specified
28	Lead as Pb	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
29	Nickel as Ni	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
30	Zinc as Zn	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
31	Mercury as Hg	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
32	Arsenic as As	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
33	Cyanide as Cn	mg/lit	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Not Specified
34	Total Coliform	MPN/ 100ml	90	70	34	220	70	26	40	23	Not Specified
35	Fecal Coliform	Org/ 100ml	Present	Present	Present	Present	Present	Present	Present	Present	Not Specified

Note:

All samples of surface water are of Class E as per Central Pollution Control Board Water Quality criteria. Accordingly the surface water can be directly used for, Irrigation, Industrial Cooling, Controlled Waste disposal.

Summary of the groundwater and surface water quality monitoring results

Table 22 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water	
		Min	Max	Min	Max
1.	pH	6.97	8.17	6.97	8.40
2.	Total Dissolved Solids (mg/l)	355	520.2	308.5	402.6
3.	Total Hardness (mg/l)	197	350	143	222
4.	Chlorides (mg/l)	82	149	85	117
5.	Fluoride (mg/l)	0.39	0.62	0.38	0.74
6.	Sulphates (mg/l)	51	117	42	86

3.3 SOIL ENVIRONMENT

Table 23 Details of the soil sampling locations

Sr. No.	Symbol	Location	Latitude	Longitude	Distance from site (In meters)	Direction (In degrees)
1	S 1	Near Badole Bk	17°37'44.42"N	76°15'49.93"E	9718.43	48.67
2	S 2	Near Kolibet	17°33'28.67"N	76°14'3.97"E	4444.04	109.39
3	S 3	Near Akkalkot	17°30'53.83"N	76°13'35.85"E	7079.33	151.76
4	S 4	Near Chapalgaon	17°36'27.72"N	76°10'20.01"E	4700.99	329.32
5	S 5	Near Hasapur	17°33'17.58"N	76°10'36.62"E	2637.75	226.53
6	S 6	Near Burhanpur	17°36'31.44"N	76°12'18.89"E	4293.48	14.70
7	S 7	Near Matanhalli	17°29'45.27"N	76°11'36.93"E	8336.92	180.97
8	S 8	Near Halhalli	17°35'9.42"N	76° 6'58.92"E	8496.76	281.14

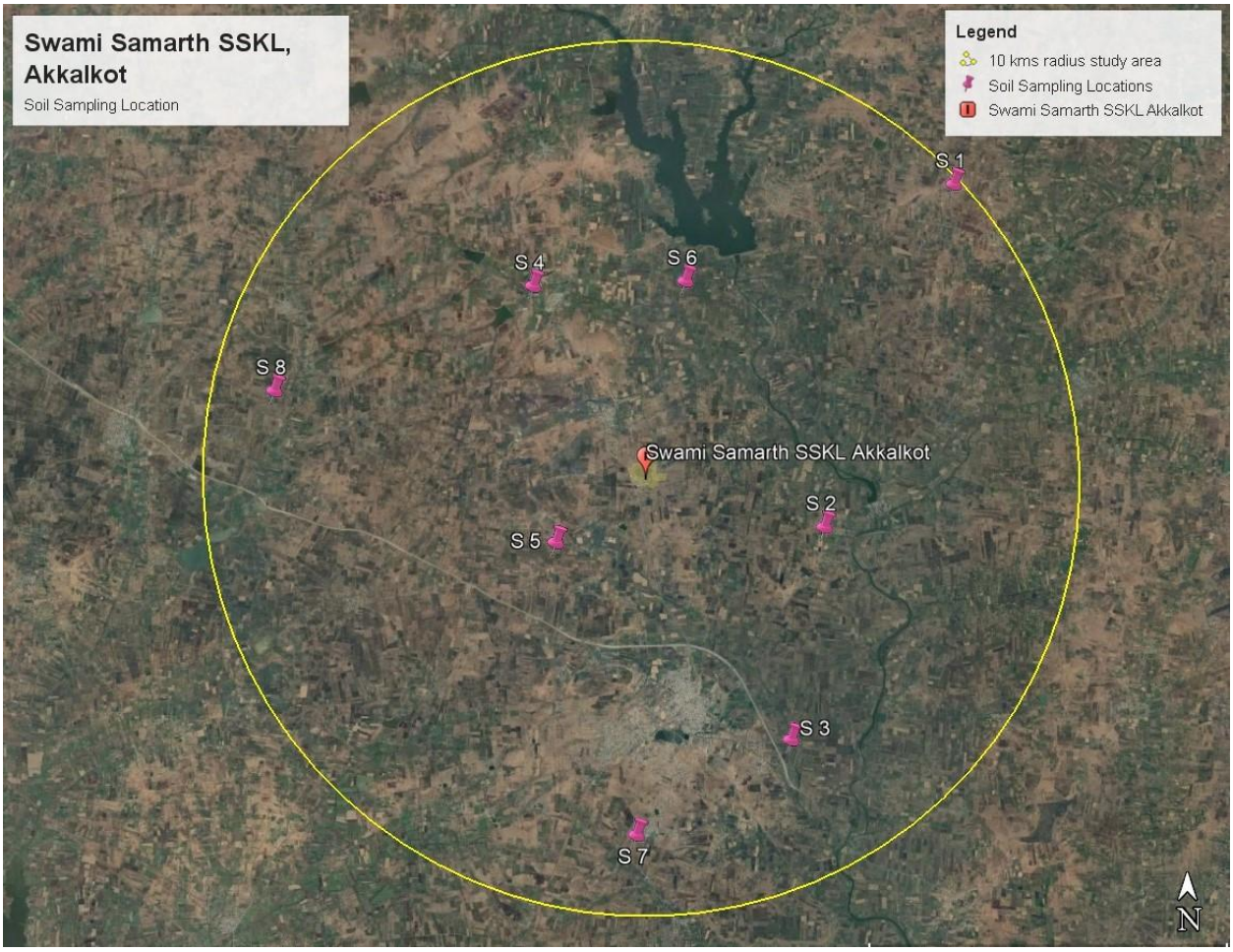


Figure 7 10 km. radius study area map indicating soil sampling location

Table 24 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.	pH @ 25 ºC	--	8.20	7.98	8.14	7.63	7.54	8.44	7.98	8.18	< 8.5
2.	Electric Conductance	mS/cm	0.60	0.62	0.58	0.59	0.60	0.58	0.64	0.62	0.15 – 0.65
3.	Colour	--	Brown	Brown	Black	Black	Brown	Brown	Brown	Black	Not Specified
4.	Grain Size Distribution	--									
	Clay	%	32	38	40	30	42	40	34	38	Not Specified
	Sand	%	24	26	32	38	34	28	22	32	Not Specified
	Silt	%	44	36	28	32	24	32	44	30	Not Specified
5.	Texture Class	--	Clay Loam		Clay	Clay Loam	Clay	Clay	Clay Loam		Not Specified
6.	Organic Matter	%	0.70	0.69	0.60	0.59	0.74	0.58	0.72	0.59	0.5 – 0.75
7.	Organic Carbon	%	0.40	0.40	0.35	0.34	0.43	0.33	0.42	0.34	0.3 – 0.55
8.	Bulk Density	gm/cc	1.25	1.20	1.16	1.18	1.26	1.14	1.15	1.27	Not Specified
9.	Porosity	%	42	38	31	39	28	29	36	37	Not Specified
10.	Permeability	Cm/hr	0.8	1.0	0.2	0.7	0.3	0.2	0.7	0.6	Not Specified
11.	Water Holding Capacity	%	42	46	51	45	55	52	38	41	Not Specified
12.	Sodium Adsorption Ratio (SAR)	--	14.30	11.40	16.50	12.30	14.74	11.30	10.30	12.50	10-18
13.	Total Nitrogen Content	kg/ha	296	340	295	295	389	299	325	303	280 - 560
14.	Available Potassium K^{++}	kg/ha	160	110	158	110	189	178	167	198	Not Specified
15.	Available Sodium as Na	mg/kg	74	58	75	65	95	95	89	79	Not Specified
16.	Available Phosphorus as P	kg/ha	15.80	12.90	20.20	17.56	22.10	18.36	14.16	20.50	10- 24.60
17.	Cation Exchange Capacity	meq/100gm	0.95	1.10	0.85	0.68	1.20	0.96	1.05	0.68	Not Specified
18.	Iron as Fe	mg/kg	6.40	5.16	4.25	4.63	7.13	6.38	4.63	6.14	Not Specified
19.	Nickel as Ni	mg/kg	1.18	1.88	1.10	0.98	1.85	0.85	0.88	0.45	Not Specified
20.	Zinc as Zn	mg/kg	3.45	2.35	1.95	1.85	3.47	3.17	1.19	3.18	Not Specified
21	Copper as Cu	mg/kg	4.32	3.12	2.56	2.96	4.19	4.63	2.93	4.47	Not Specified

Summary of the results

The soil samples were collected at total eight locations within the study area.

- The finding of the study reveals that pH of soil in the area ranged between 7.54 to 8.44 which is an indicative of the neutral to moderate alkaline soil.
- The values for Nitrogen were found to be better to more than sufficient at all locations ranging between 295 to 389 kg/ha, which is an indicative of Better to sufficient nitrogen content in soils.
- The concentration of Phosphorous was found to be very less to less at all the locations ranging between 12.9 to 22.1 kg/ha, which is an indicative of less phosphorous in soil.
- The concentration of organic carbon was found to be less to medium at all the locations ranging between 0.33 to 0.43%, which is an indicative of less organic carbon in soil.
- It is important to note that the concentration of potassium was found to be very less to medium at all locations ranging between 110 to 198 kg/ha. which is an indicative of less to 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 fertile soils.

3.4 NOISE ENVIRONMENT

Table 25 Details of noise quality monitoring locations

Sr. No.			Location	Latitude	Longitude	Distance from site (In meters)	Direction from site (In degrees)
1		N 1	Within Industry	17°34'17.52"N	76°11'45.29"E	---	---
2	Outside Industry	N 2	Near Motyal	17°36'13.87"N	76°13'32.30"E	4663.93	41.71
3		N 3	Near Kolekarwadi	17°34'40.12"N	76°12'53.16"E	2047.41	73.17
4		N 4	Near Nimgaon	17°31'28.86"N	76°14'52.88"E	7626.63	134.10
5		N 5	Near Dodyal	17°30'18.04"N	76° 9'29.16"E	8498.50	208.37
6		N 6	Near Halhalli	17°34'50.16"N	76° 6'45.52"E	8926.79	275.82
7		N 7	Near Hasapur	17°32'55.13"N	76° 9'32.77"E	4749.73	236.10
8		N 8	Near Chapalgaon	17°36'8.08"N	76°10'8.23"E	4391.01	318.79

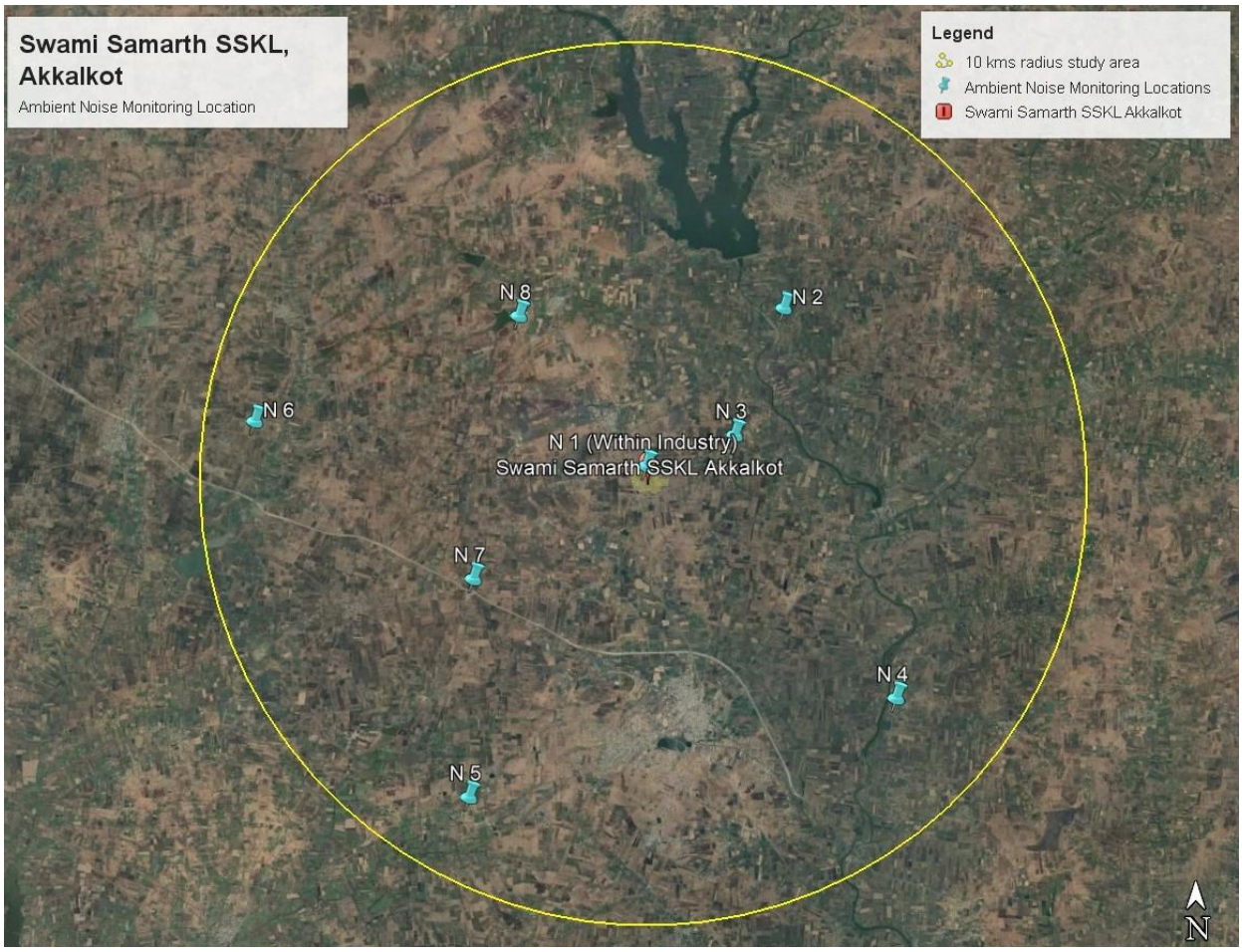


Figure 8 10 km. radius study area map indicating noise quality sampling location

Table 26 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	Within Industry	Industrial Area	54.7	46.9	75	70
2	Near Motyal	Residential Area	53.8	45.5	55	45
3	Near Kolekarwadi	Residential Area	52.7	45.8	55	45
4	Near Nimgaon	Residential Area	45.7	39.4	55	45
5	Near Dodyal	Residential Area	51.1	43.9	55	45
6	Near Halhalli	Residential Area	44.9	38	55	45
7	Near Hasapur	Residential Area	47.2	42.1	55	45
8	Near Chapalgaon	Residential Area	44.8	38.3	55	45

Summary of the results

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

Industrial Zone: The day time noise level at the Project site was found as 54.7 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 44.8 (A) to 53.8 dB (A).

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

Industrial Zone: The night time noise level in the Project site was observed 46.9 dB (A), which is well below the permissible limit of 70 dB (A).

Residential Zone: The night time noise levels in all the residential locations were observed to be in the range of 38.0 dB (A)to 45.5 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 27 Land use/ Land cover areas in km^2 around 10 km radius for project site

Sr No.	LULC Class	Area in Ha	Area in km^2	Percentage
1	Scrub Land	4830.44	48.30	15.45
2	Open Land	10992.1275	109.92	35.15
3	Agriculture	7292.7	72.93	23.32
4	Fallow Land	7298.19	72.98	23.34
5	Settlement	450.41	4.50	1.44
6	Reservoir/Dam	319.86	3.20	1.02
7	Waterbody	88.90	0.89	0.28
	Total Area	31272.62	312.73	**100.00**

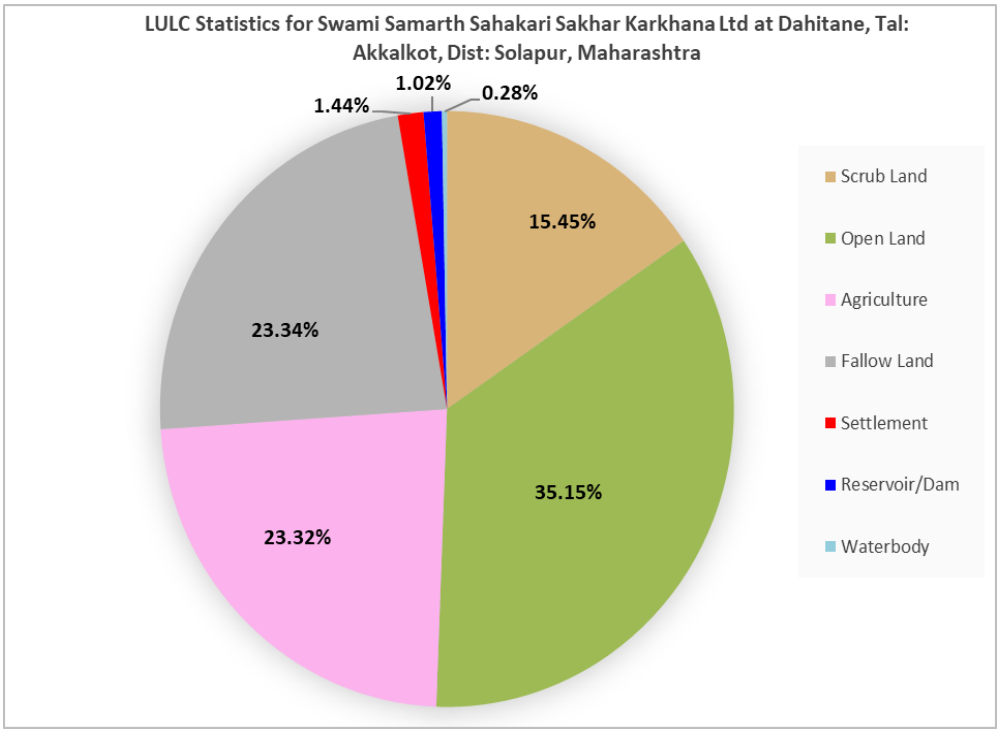


Figure 9 Pie chart of LULC classes around 10 km radius of Project site

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., Anaerobic digester followed by Multi Effect Evaporation and Dryer.

- The final spent wash converted to Dry powder.
- Useful as agricultural feed. The final output (i.e., Potash rich Powder) is not a waste but a nutrient rich by-product.
- This technology will help in meeting the potash requirement of the soil.
- Zero Liquid Discharge Technology.

This Industry has decided to undertake an "Alternative Analysis (AA)" for this project. The various alternatives are (1) Product (2) Raw materials, (3) Technology, Engineering & Hardware, (4) Site, and (5) Project.

- Availability of raw material/fuel.
- Proximity of molasses as a raw material and cost-effective transportation logistics.
- Availability of water supply.
- The availability of water from the source is adequate to meet the requirement of the proposed distillery establishment. For proposed project water will be sourced from Bori River Jack Well.
- Availability of infrastructural facility.

Industrial infrastructural facilities such as roads, transport, security, water, power, administration etc. are available with existing factory. Community facilities such as quarters, medical services and training facility etc. are also available at site.

6.0 ENVIRONMENT MONITORING PROGRAMME

Table 28 Environment management programme

Sr. No.	Item	Parameters	Frequency of Monitoring	Location
1.	Ambient Air quality at appropriate location for PM_{10}, $PM_{2.5}$, SO_2, and NO_x	PM_{10}, $PM_{2.5}$, SO_2, and NO_x	24 hourly, Quarterly	4 Locations 1 @ Upwind and 2@ downwind directions from stack @ 120^0 to each other 1 Near entry
2.	Stationary Emission from Stack PM, SO_2, NOx	PM, SO_2, NOx	Monthly	1 DG set Stack, 1 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	STP inlet and outlet CPU inlet and Outlet
4.	Noise	Day and Night levels Equivalent noise level - dB (A)	Quarterly or as often as required	5 Locations Upwind and downwind directions Near boilers and near main gate and CPU
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 CPU Composite sample shall be taken at each location
6.	Solid waste generation monitoring / Record Keeping	Manual record keeping	To be updated daily	
7	Greenbelt and plantation monitoring	Type of species shall be decided based on soil &climatic conditions. The number of trees would be 2500 per hectare, however; the number of trees would vary depending on the type of soil	Six Monthly	

7.0 ADDITIONAL STUDIES
7.1: 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 chapter 7 in the EIA report.

8.0 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN

Table 29 EMP Budget

Sr. No.	Component	Particulars		Capital investment in Lakhs	Recurring Cost in Lakhs
1	Air	Construction of new stack for boiler, Bag-filter and OCEMS		510	18
2	Water	• STP • Distillery CPU. • Anaerobic Digester, MEE & dryer for Distillery Spent wash treatment • OCMS		1220	80
3	Noise	Acoustic enclosures, Silencer pads, ear plugs etc.		20	2
4	Environment monitoring and Management	Monthly Environment Monitoring (Per Year)		0	5
		Ambient air monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx		
		Boiler & DG Set Monitoring	TPM, SO_2, NOx		
		Effluent (Distillery CPU) (Treated & Untreated)	pH, COD, BOD, TSS, TDS, Oil & Grease		
5	Occupational Health	Glares, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual health-medical check-up of workers, Occupational Health (training, OH centre)		45	7
6	Greenbelt	Green belt development activity		50	12
7	Solid Waste Management	Solid Waste Management		18	3
8	Rain water harvesting	Rain water harvesting		25	4
9	Storm water drainage	Storm water drainage design and construction		50	7
10	Solar Power & Energy Conservation	Street lights installation with Solar Systems		35	5
11	Fire and Safety	Fire and Safety Management		75	5
12	Laboratory	Testing and Analysis		40	5
Total Cost (In Lakhs)				**2088**	**153**

9.0 GREENBELT DEVELOPMENT PLAN

Greenbelt development is undertaken in the area provided separately. As per suggestion given earlier by EAC for similar kind of proposal 2500 trees should be available per hectare of land for Greenbelt development t. Total 11.98 Ha. of land is reserved for greenbelt development; hence there should be minimum 29955 no. of trees. At present there are 1356 number of trees at site, remaining 28599 number of trees will be planted within three years after the receipt of environment clearance. The list of the saplings which industry is going to plant in their area is given in table below.

10.0 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The estimated time of completion of project will be two years after the receipt of Environmental Clearance from the respective authority. The industry has reserved Rs.1.47 Crores (1.5 % of the total cost of the project (98 crores) 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).

11.0 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 527.8 mm there is good potential to harvest rainwater. The rainwater harvesting system will be installed at various buildings and about 44159.2 Sq.m of area.18645.8 m3 per year water is harvested. The harvested water is stored in tank and utilized for greenbelt/fire-fighting purpose.

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 30 Rain water harvesting quantity

Sr. No.	Location	Area in m2	Average Run-off Factor	Rainfall in mm	The quantity of rainwater per year m^3
1	Built-up area	Only 44159.20 m2 area use for rainwater harvesting	0.80	527.8	18645.80

Storm water harvesting

Table 31 Quantity of Storm water per annum

Sr. No	Location	Area m2	Average Run-off Factor	Rainfall in mm	The quantity of rainwater per year m^3
1	Total factory area - Built-up area	349731.47 - 44159.2= 305572.27	0.40	527.8	64512.4176

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