EXECUTIVE SUMMARY

PROPOSED EXPANSION OF SUGARCANE CRUSHING CAPACITY FROM 7500 TCD TO 13200 TCD, DISTILLERY CAPACITY FROM 45 KLPD TO 145 KLPD (RS/ENA/ETHANOL) AND ESTABLISHMENT OF 24 MW CO-GENERATION POWER PLANT

AT

YESHWANTNAGAR, TALUKA-KARAD, DISTRICT-SATARA

BY

SAHYADRI SAHAKARI SAKHAR KARKHANA LIMITED

Report Prepared By:

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TABLE OF CONTENTS

TABLE	TABLE OF CONTENTS i					
LIST OF	F TABLE ii					
LIST OF	FIGURESiii					
1. INT	TRODUCTION OF THE PROJECT					
1.1.	Purpose of the Report					
1.2.	Identification of Project & Project Proponent					
1.3.	Products and By-products					
1.4.	Capacity Utilization:					
1.5.	Project Cost:					
1.6.	Background:					
1.7.	Importance to the Country and Region					
2. LO	CATION					
3. RE	QUIREMENT OF WATER, ENERGY/POWER, LAND7					
3.1.	Water:					
3.2.	Energy /Power and steam10					
3.3.	Land:10					
4. EX	ISTING ENVIRONMENT					
4.1.	Air Environment					
4.2.	Water Environment:					
4.3.	Soil Environment					
4.4.	Noise Environment:					
4.5.	Ecology and Biodiversity:					
4.6.	Socioeconomic Environment:					
5. Pol	lution Control and Management:					
5.1.	Waste Water Treatment Facilities:					
5.2.	Air pollution Control System:					
5.3.	Solid Waste Management					
5.4.	Hazardous Waste Management					
6. ASS SIGNIFI	SESSMENT OF SIGNIFICANCE OF IMPACTS (CRITERIA FOR DETERMINING ICANCE, ASSIGNING SIGNIFICANCE)					
6.1.	Identification of impact during construction and operation phase					
6.2.	Environmental Monitoring Program:					

EIA/EMP

6	5.3.	Budgetary provisions towards Environmental Management Plan:	.27
7.	Proj	ject Benefits and CSR	.28

LIST OF TABLE

Table 1 List of Board of Directors	1
Table 2 Quantity of products and By-products (At existing as well as after proposed expansion)	2
Table 3 Capacities utilization of various units	2
Table 4 Co-ordinates of the project boundary	3
Table 5 Water budget for Sugar & Co-generation Division	8
Table 6 Water budget for Distillery Division	9
Table 7 Detailed land use planning along with green belt is given as below	10
Table 8 Ambient Air monitoring results (Existing Scenario)	10
Table 9 PM ₁₀ - 24 hr. Concentrations, computed by AERMOD 8.0.5	11
Table 10 PM _{2.5} - 24 hr. Concentrations, computed by AERMOD 8.0.5	11
Table 11 SO2 - 24 hr. Concentrations, computed by AERMOD 8.0.5	11
Table 12 NOx - 24 hr. Concentrations, computed by AERMOD-8.0.5	12
Table 13 CO-1 hr. Concentrations, computed by AERMOD	
Table 14 Groundwater quality monitoring sampling locations	
Table 15 Groundwater quality analysis results	19
Table 16 Surface water quality sampling locations	
Table 17 Surface water quality analysis results	
Table 18 Soil quality monitoring locations	21
Table 19 Soil quality monitoring results	
Table 20 Noise quality monitoring results	
Table 21 Impact identification matrix (Construction Phase)	
Table 22 Identification of Impacts during Operation Phase its source and mitigation measures	
Table 23 Parameters and Frequency for Post Project Environmental Monitoring	
Table 24 Budget for pollution control measures	

LIST OF FIGURES

Figure 1 Map showing General Location	4
Figure 2 Specific Location and Project Boundaries (Refer to Table 4)	4
Figure 3 Toposheet Map (Survey of India)	5
Figure 4 Layout Map of the factory	6
Figure 5 Plant Layout Map	6
Figure 6 Concentration isopleights for PM10 incremental concentrations	.13
Figure 7 Concentration isopleights for PM2.5 incremental concentrations	.14
Figure 8 Concentration isopleights for SO2 incremental concentrations	.15
Figure 9 Concentration isopleights for NOx incremental concentrations	.16
Figure 10 Concentration isopleights for CO incremental concentrations	.17

EXECUTIVE SUMMARY

1. INTRODUCTION OF THE PROJECT

Sahyadri SSK Ltd. has an existing Sugar factory with sugarcane crushing capacity of 7500 TCD and distillery of 45 KLPD capacity. It is proposed to expand sugarcane crushing capacity from 7500 TCD to 13200 TCD, distillery capacity from 45 KLPD to 145 KLPD and establish 24 MW co-generation power plant unit.

1.1. Purpose of the Report

As per the EIA Notification dated 14th September 2006; it is mandatory to have the Environmental Clearance for any proposed industry or for the expansion of the industry from Ministry of Environment, Forests and Climate Change (MoEF and CC), Government of India, New Delhi for which EIA is a prerequisite as per the guidelines of MoEF and CC, New Delhi. The proposed project falls under Category "A", Project Activity 5(g) - molasses based distillery plant and 5(j) - sugar plant. The purpose of the EIA report is to provide a coherent statement of the potential impacts of the proposed project and the measures that should be taken to establish the impacts and suggest mitigation measures.

1.2. Identification of Project & Project Proponent

1.2.1.Identification of project:

Name and Address: Sahyadri SSK Ltd., Factory Site: Yeshwantnagar, Taluka-Karad, District-Satara – 415 115 Maharashtra Ph: (0) (02164) 252097 Mob. 8956015501 to 8956015505 E-mail- <u>sahyadrisugar@gmail.com</u>, <u>purchase.sahyadrisugar@gmail.com</u> Constitution & Type: Private Limited.

1.2.2.Project Proponents:

The list of the Board of Directors is as below:

Table 1 List of Board of Directors

Sr. No.	Name	Role
1	Shri. Shamrao Pandurang Patil	Chairman
2	Sou. Laxmi Sambhajirao Gaikwad	Vice - Chairman
3	Shri. Abasaheb Jotiram Patil	Managing Director
4	Shri. Sureshrao Nanaso Mane	Director
5	Shri. Mansingrao Vasantrao Jagdale	Director
6	Shri. Sanjay Shamrao Jagdale	Director
7	Shri. Ramesh Narayanrao Mohite	Director
8	Shri. Manikrao Ramchandra Patil	Director
9	Shri. Shankar Bandu Chavan (Nangare)	Director
10	Shri. Pandurang Dnyandev Patil	Director
11	Shri. Sanjay Baburao Thorat	Director
12	Shri. Tanaji Vyankat Jadhav	Director
13	Shri. AshokraoYashwantrao Patil	Director
14	Shri. Jaywantrao Vasantrao Jadhay (Patil)	Director

15	Shri. Kantilal Bajirao Bhosale	Director
16	Shri. Bhaskar Appaso Gore	Director
17	Shri. Nandkumar Dagadu Mane	Director
18	Shri. Mahadev Abaji Waghmare	Director
19	Shri. Lahuraj Ganapati Jadhav	Director
20	Shri. Sanjay Dattatraya Kumbhar	Director
21	Sou. Pranjali Vijay Salunkhe	Director
22	Shri. Dattatraya Baburao Jadhav	Director
23	Shri. Avinash Jaywantrao Mane	Director
24	Late Vilasrao Dhondiram Patil (Till 1 st May 2015)	Director

1.3. Products and By-products

List of the products and by-products along with their existing and proposed quantities, proposed by the industry are given in the table below

Sr. No.	Description	Existing quantity (MT/M)	Proposed quantity (MT/M)	Total (MT/M)
1	Sugarcane crushing capacity	2,25,000	1,71,000	3,96,000
2	Sugar	30,000	22,800	52,800
	Rectified Spirit or	1350	3000	4350
3	Extra Neutral Alcohol or	600	2400	3000
	Ethanol	-	3000	3000
4	Bagasse	69,999.9	53,199	1,23,199
5	Molasses	9000	6840	15840
6	Press mud	7200	5472	12672
7	Fusel oil	2.5	2.5	5
8	Compost	5000	-	5000
9	Co-generation Power	-	24 MW	24 MW

Table 2 Quantity of products and By-products (At existing as well as after proposed expansion)

1.4. Capacity Utilization:

Existing and proposed capacities of various units are as under

Table 3 Capacities utilization of various units

Sr. No.	Description	Existing quantity	Proposed quantity	Total
1	Sugarcane crushing capacity (TCD)	7500	5700	13200
2	Distillery (KLPD)	45	100	145
3	Co-generation Power (MW)		24	24

1.5. Project Cost:

The total cost of the project is around Rs.300.0 Crores.

1.6. Background:

M/s Sahyadri SSK Ltd. has an existing sugar factory of 7500 TCD and Distillery of 45 KLPD. The Sugar cane availability in this area is sustainable as Krishna River is the main source of water to the farmers. The steam and power requirement for the proposed Project shall be met from the proposed establishment of 24 MW Cogeneration power plant.

1.7. Importance to the Country and Region

In agro-based industries in India, the sugar industry is the second largest agricultural industry after the textile industry. As there is excess cane available in the command area, industry shall have to make an arrangement for the timely crushing of sugarcane available in the command area. Incidentally, the economic viability would also improve not only by producing more quantity of sugar but also generate power which can be exported to state grid and additional money can be distributed to farmers as cane price.

Most of the sugar units have by-product utilization plants, based on bagasse and molasses. Ethanol and power projects have tremendous scope for development in India, as absolute alcohol demand on all India basis is going to increase in proportion to petrol with 5% blend. Besides the direct benefit, the expansion would help to crush sugarcane in time so that the high recovery due to timely crushing would further improve the economy of the industry and the farmers. Apart from this, the establishment of such institutions brings employment and other developmental opportunities in the entire region. In case of SSSKL, the proposed expansion in sugarcane crushing and distillery capacity and establishment of co-generation of power plant would greatly increase the productivity and profitability of the industry.

2. LOCATION

There are no sensitive, historical and wildlife sanctuaries etc. within a 10 km radius of the factory site. The latitude and longitude are $17^{0}21$ ' 50" N and $74^{0}09$ ' 47" E respectively. The Elevation above the Mean Sea Level is 600 m.

- > The Project Site is conveniently located for development of the Project.
 - 50 km away from Satara, and is a district place.
 - Karad, at a distance of 13 km.
 - Shirawade, nearest railway station on South Central Railway, adjacent to the industry.
 - Pune International Airport is nearest Airport 177 km away from factory site.

Environmental Setting-

- ▶ Location $-17^{0}21$ 'N and $74^{0}09$ 'E
- Nearest Village Yeshwantnagar
- Nearest town Karad 13 km
- Nearest City Satara 50 km
- Nearest National Highway NH 48 3 km
- Nearest River Krishna River 3 km
- Seismicity Seismic Zone III (6 to 8 Richter scale)

Table 4 Co-ordinates of the project boundary

Direction	Latitude	Longitude
North East	17° 22' 06" N	74° 10' 8" E
North	17° 22' 03" N	74° 9' 50" E
West	17° 21' 51" N	74° 9' 32" E
South	17° 21' 23" N	74° 10' 5" E
East	17° 21' 43" N	74° 10' 15" E



Figure 1 Map showing General Location



Figure 2 Specific Location and Project Boundaries (Refer to Table 4)

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Figure 3 Toposheet Map (Survey of India)



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Figure 4 Layout Map of the factory

3. REQUIREMENT OF WATER, ENERGY/POWER, LAND

3.1. Water:

Krishna River is the main source of raw water. Net water requirement of the Sugar complex would be 655m3/day (405m3/day for distillery unit, 250m3/day for domestic purpose). Sugar unit works on zero water requirements and for the co-generation unit, treated excess condensate water shall be used as makeup water for cooling tower and boiler. Required water shall be drawn from Krishna River which is 3 Km away from the industry. Detailed water budget of the industry is given in **Table 5 & Table 6**

3.1.1.For Sugar & Co-generation unit

Net water requirement: $7150 - 8150 = -1000 \text{ m}^3/\text{day}$

- Due to excess condensate available from Sugar unit, there is no requirement of water for sugar unit. In fact, an excess of about 1000 m3/day is saved and is being utilized for Co-generation and other usages
- 1000 m³/day of excess condensate shall be treated using anaerobic treatment followed by aerobic treatment followed by a sand filter and R.O. and then used for boiler and cooling tower makeup water.
- The net freshwater requirement shall be $250 \text{ m}^3/\text{day}$, which is for Domestic purpose only.

Effluent Generation: 745m³/day (Sugar effluent- 375 m³/day, Cogeneration power plant effluent-170 m³/day m³/day and Domestic effluent 200 m³/day)

Remarks: Sugar effluent shall be treated in the existing ETP (Primary and Secondary Treatment) and disposed on land for irrigation. Cogeneration Power Plant effluent shall be treated along with sugar effluent and disposed on land for irrigation.

3.1.2.For Distillery unit

Net water requirement: $2630-2225 = 405 \text{ m}^3/\text{day}$.

Effluent Generation: 782 m³/day (Spentwash = 470 m³/day, Spentless = 200 m³/day Cooling make-up effluent = 80 m^3 /day, Washings = 30 m^3 /day and Domestic effluent = 2 m^3 /day)

Manpower Requirement

After the proposed expansion, many employment opportunities would be generated (Direct employment-50 Personnel, Indirect employment- 100 Personnel), Also, around 20 % increase in indirect employment is expected due to the additional transportation required after proposed expansion.

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		Water Requirement (m3/day) C				Consumption/Losses (m3/day)			Reuse / Recovery (m3/day)			Waste Generation (m3/day)		
Sr. No.	Details	Presen t 7500 TCD	Expansion of 5700 TCD & Establishing 24 MW	Total 13200 TCD & 24 MW	Presen t 7500 TCD	Expansion of 5700 TCD & Establishin g 24 MW	Total 13200 TCD & 24 MW	Presen t 7500 TCD	Expansion of 5700 TCD & Establishin g 24 MW	Total 13200 TCD & 24 MW	Presen t 7500 TCD	Expansion of 5700 TCD & Establishin g 24 MW	Total 13200 TCD & 24 MW	
1	Boiler 2*120 TPH	2880	2880	5760	240	240	480	2630	2630	5260	10	10	20	
2	For Cooling of Mill Bearing	200	100	300	20	10	30	180	90	270				
3	Washing of equipment	40	20	60							40	20	60	
4	Air compressors & pumps	70	60	130	05	05	10	65	55	120				
5	Spray pond blow down	250	150	400	100	75	175				150	75	225	
6	Cooling tower blow down	250		250	100		100				150		150	
7	Domestic	250		250	50		50				200		200	
8	Recycling of Excess Condensate							1400	1100	2500	50	40	90	
Total		3940	3210	7150	515	330	845	4275	3875	8150	600	145	745	

 Table 5 Water budget for Sugar & Co-generation Division

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Sr		Water Requirement (m3/day) Consumption/Losses (m3/day) Reuse / Recovery (m3/day)		13/day)	Was	Remarks								
• N 0	Details	Present 45KLP D	Propose d 100 KLPD	Total 145 KLP D	Present 45KLP D	Propose d 100 KLPD	Total 145 KLP D	Present 45KLP D	Propose d 100 KLPD	Total 145 KLP D	Present 45KLP D	Propose d 100 KLPD	Total 145 KLP D	
1.	Process Water	330	800	1130					460	460	270*	200*	470*	Spentwas h
	Castina										60	140	200	Spentless
2.	Tower Make-up Water	440	1000	1440	110	240	350	305	705	1010	25	55	80	
3	Fermenter Washing	10	20	30							10	20	30	
4	Miscellaneo us such as pump and gland cooling etc.	15	15	30				15	15	30				
5	Evaporator Condensate							00	740	740				
6	Domestic	01	02	03	0.3	-0.7	1.0				0.7	1.3	2.0	
Total (Industrial)		795	1835	2630	110	240	350	305	1920	2225	95	215	310	
Ren	narks:		-											
The	The spent wash from existing 45 KI PD Distillery shall be treated based on Composting principles (Quantity: 270 m3/day)													

 Table 6 Water budget for Distillery Division

The spent wash from existing 45 KLPD Distillery shall be treated based on Composting principles (Quantity: 270 m3/day)

The spent wash from proposed 100 KLPD Distillery shall be treated by Concentration and incineration (Quantity: 200 m3/day)

Other effluents shall be treated in the CPU (Quantity: 310 m3/day)

3.2. Energy /Power and steam

At present, the power requirement is 7.5 MW which is taken from state electricity grids, 1*500 KVA transformer and 2* 160 KVA DG sets and 1*625 KVA DG set are utilized to fulfill power requirements. After the proposed expansion, total power requirement would be nearly 17 MW, which shall be fulfilled by the means of proposed 24 MW co-generation power plant. Thus, there would not be any power extraction from MSEB Grids. The newly proposed co-generation unit would possibly export around 7 MW to state electricity grids.

3.3. Land:

The total area available with the factory is 106.45 Hectares. Out of which, 37 Hectares is reserved for green belt development. A detailed area breakup is given below:

Sr. No.	Description	Area in Hectares
	Built-up area	
1	a. Existing	7.62
	b. Proposed infrastructure	5
2	Storage area (Raw material and finished product)	2.98
3	Internal Roads	1.94
4	ETP	10.35
5	Parking	12.75
6	Residential colony, school, and recreational center	2
7	Greenbelt	37
8	Vacant Land	26.81
	Total	106.45

Table 7 Detailed land use planning along with green belt is given as below

4. EXISTING ENVIRONMENT

4.1. Air Environment

Ambient air monitoring was carried out at 9 locations (two inside the factory premise and 7 within study area) twice a week at each location over/for a period of three months to determine background concentrations. The Maximum concentrations of each pollutant observed is considered as a background concentration of the respective location, the results of which are given in Table below. AERMOD 8.0.5 is used to compute incremental concentrations due to the proposed establishment. Total concentrations are compared with the National Ambient Air Quality Standards.

Sr. No.		PM ₁₀	PM _{2.5}	SO ₂	NOx	CO
	Keceptor/vinage	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(mg/m3)
1	Factory site – ETP plant	58.2	39.6	36.8	38.4	1.3
2	Factory site – Guest house	54.8	37.4	41.3	34.5	1.2
3	Sahyadri agriculture College	59.5	43.7	35.4	40.5	1.4
4	Gat office, Masur	53.6	31.4	26.2	23.6	0.8
5	Malwadi	48.5	24.5	24.3	23.1	1

 Table 8 Ambient Air monitoring results (Existing Scenario)

6	Vadoli Nileshwar	59.6	28.5	31.8	29.6	1.2
7	Gat office, Tasavde	51.6	30.4	28.6	28.6	1.1
8	Koparde Haveli	53.2	31	28.7	35.1	0.9
9	Banawdi	47.3	24.6	29.6	37.5	0.7

Sr No	Pocontor/Villago	PM ₁₀ - 24 hour concentration (µg/m3)				
51.140.	Keceptor/vinage	Background	Incremental	Total		
1	Factory site – ETP plant	58.2	0.22	58.42		
2	Factory site – Guest house	54.8	0.37	55.17		
3	Sahyadri agriculture College	59.5	0.11	59.61		
4	Gat office, Masur	53.6	0.07	53.67		
5	Malwadi	48.5	0.06	48.56		
6	Vadoli Nileshwar	59.6	0.11	59.71		
7	Gat office, Tasavde	51.6	0.09	51.69		
8	Koparde Haveli	53.2	0.06	53.26		
9	Banawdi	47.3	0.07	47.37		

Table 9 PM ₁₀ -	24 hr.	Concentrations.	computed	bv AEF	RMOD	8.0.5
	M -1 111 •	concentrations,	computeur	<i>by</i> 11	anob	0.0.0

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

Sr. No	Decentor/Village	PM _{2.5} - 24 hour concentration (μg/m3)				
SI. NU.	Keteptor/ v mage	Background	Incremental	Total		
1	Factory site – ETP plant	39.6	0.15	39.75		
2	Factory site – Guest house	37.4	0.25	37.65		
3	Sahyadri agriculture College	43.7	0.07	43.77		
4	Gat office, Masur	31.4	0.05	31.45		
5	Malwadi	24.5	0.04	24.54		
6	Vadoli Nileshwar	28.5	0.07	28.57		
7	Gat office, Tasavde	30.4	0.06	30.46		
8	Koparde Haveli	31	0.04	31.04		
9	Banawdi	24.6	0.05	24.65		

Table 11 SO₂ - 24 hr.	Concentrations , com	puted by AERMOD 8.0.5

Sr No	D ocontor/Villago	SO2- 24 hour concentration (µg/m3)					
51. 110.	Keceptor/vinage	Background	Incremental	Total			
1	Factory site – ETP plant	36.8	12.82	49.62			
2	Factory site – Guest house	41.3	14.28	55.58			
3	Sahyadri agriculture College	35.4	3.34	38.74			
4	Gat office, Masur	26.2	2.39	28.59			
5	Malwadi	24.3	1.84	26.14			
6	Vadoli Nileshwar	31.8	3.52	35.32			
7	Gat office, Tasavde	28.6	2.98	31.58			
8	Koparde Haveli	28.7	1.85	30.55			
9	Banawdi	29.6	2.21	31.81			

Sn No	Decenter/Village	NOx- 24 hour concentration (µg/m3)					
SI. NU.	Keceptor/vinage	Background	Incremental	Total			
1	Factory site – ETP plant	38.4	2.25	40.65			
2	Factory site – Guest house	34.5	2.17	36.67			
3	Sahyadri agriculture College	40.5	0.57	41.07			
4	Gat office, Masur	23.6	0.39	23.99			
5	Malwadi	23.1	0.31	23.41			
6	Vadoli Nileshwar	29.6	0.59	30.19			
7	Gat office, Tasavde	28.6	0.50	29.1			
8	Koparde Haveli	35.1	0.32	35.42			
9	Banawdi	37.5	0.38	37.88			

 Table 12 NOx - 24 hr. Concentrations, computed by AERMOD-8.0.5

Sr. No	Decenter /Village	CO- 24 hour concentration (mg/m3)				
5r . 1 v 0.	Receptor/vinage	Background	Incremental	Total		
1	Factory site – ETP plant	1.3	0.00013	1.30013		
2	Factory site – Guest house	1.2	0.00011	1.20011		
3	Sahyadri agriculture College	1.4	0.00007	1.40007		
4	Gat office, Masur	0.8	0.00001	0.80001		
5	Malwadi	1	0.00	1		
6	Vadoli Nileshwar	1.2	0.00002	1.20002		
7	Gat office, Tasavde	1.1	0.00	1.1		
8	Koparde Haveli	0.9	0.00001	0.90001		
9	Banawdi	0.7	0.00	0.7		

4.1.1.Concentration contours

Isopleights or contours are plotted by software model (AERMOD). The same colour represents the same concentration value range. Under the conditions of this meteorological scenario, dispersion pattern is obtained; following dispersion contours (or isopleights) are based on the incremental concentrations due to the proposed expansion capacity of sugarcane complex.



Figure 6 Concentration isopleights for PM10 incremental concentrations



Figure 7 Concentration isopleights for PM2.5 incremental concentrations



Figure 8 Concentration isopleights for SO2 incremental concentrations



Figure 9 Concentration isopleights for NOx incremental concentrations



Figure 10 Concentration isopleights for CO incremental concentrations

4.1.2.Conclusion:

2*120 TPH boilers and 1*35 TPH incinerator boiler are considered working at full load conditions to estimate the GLC of PM₁₀, PM_{2.5}, SO₂ and NO_x due to the proposed expansion of the industry Under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for SSSK Ltd., Yeshwantnagar. Incremental concentrations are worked out for 9 receptor locations, at which ambient air quality monitoring was carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed expansion. Results are compared with the Ambient Air Quality Standards (AAQS). From the results, it can say that,

At the selected 9 receptor locations, surrounded in 10 km radius around SSSK Ltd., Yeshwantnagar, Taluka-Karad, Dist.-Satara GLCs are well within the limits of AAQS. Results of the Ambient Air monitoring are enclosed in the **Annexure III.**

Under the working conditions of 2*120 TPH & 1*35 TPH incineration boilers, PM10 GLCs at all the 9 receptor locations are in the range of **47.37µg/m3 to 59.71** µg/m3 which are within the limits of AAQS.

Similarly, PM2.5 GLCs for those receptors are in the range of 24.54 μ g/m3 to 43.77 μ g/m3 which are within the limits of AAQS.

For SO2, GLCs are in the range of 26.14 μ g/m3 to 55.58 μ g/m3 which are within the limits of AAQS NOx GLCs are in the range of 23.41 μ g/m3 to 41.07 μ g/m3 which are within the limits of AAQS. CO GLCs are in the range of 0.7mg/m3 to 1.4 mg/m3 which are within the limits of AAQS.

It can be inferred that there shall not be any adverse effect on Ambient Air Quality due to the proposed expansion of Sugarcane crushing capacity from 7500 TCD to 13200 TCD, Distillery from 45 KLPD to 145 KLPD and establishing 24 MW Co-generation power plant.

4.2. Water Environment:

4.2.1.Ground Water

According to the Standard ToRs given by the EAC, Groundwater quality monitoring was carried out 8 Locations, within the study area. The sampling was done as per the CPCB Guidelines. The details of the Groundwater sampling locations are given in **Table 14**, and the analysis results are reported in **Table 15**.

Sr. No.	Symbol	Description	Co-ordinates
1	GW-1	Chikali (Well water)	(N-17°25.670' E-074°10.410')
2	GW-2	Shivde (Well water)	(N-17°23.570' E-074°06.444')
3	GW-3	Korti (Borewell water)	(N-17°25.568' E-074°05.870')
4	GW-4	Tasavde (Borewell water)	(N-17°21.920' E-074°07.495')
5	GW-5	Masur (Borewell Water)	(N-17°23.352' E-074°09.803')
6	GW-6	Sakurdi (Well water)	(N-17°20.170' E-074°05.964')
7	GW-7	Mundhe (Borewell Water)	(N-17°17.321' E-074°09.664')
8	GW-8	Koparde Haveli (Borewell Water)	(N-17°19.704' E-074°11.055')

 Table 14 Groundwater quality monitoring sampling locations

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 Table 15 Groundwater quality analysis results

Sr. No.	Test Parameter	GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	Unit	Standards
1	Color	Colorless	Hazen	< 5							
2	Odor	Odorless		Odorless							
3	pН	7.25	7.49	7.22	7.47	7.23	7.78	7.43	7.40		6.5 - 8.5
4	Turbidity	1.9	2.7	0.6	0.4	0.2	0.8	1.6	2.7	NTU	< 1
5	Total Alkalinity (as CaCO ₃)	230	264	188	178	165	185	270	284	mg/l	< 200
6	Chemical Oxygen Demand	20	28	12	12	8	21	32	28	mg/l	
7	B.O.D. (3day's at 27°C)	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	mg/l	
8	Total Dissolved Solids	474	690	368	375	342	403	481	830	mg/l	< 500
9	Chlorides (as Cl)	42	83	27	35	20	37	45	117	mg/l	< 250
10	Hardness (as CaCO ₃)	430	585	347	315	275	390	430	642	mg/l	< 300
11	Calcium (as Ca)	118	168	102	98	93	125	138	197	mg/l	< 75
12	Magnesium (as Mg)	33	40	22	17	10	19	21	36	mg/l	< 30
13	Sodium (as Na)	120.1	151.7	78.0	85.3	92.7	81.5	96.2	154.5	mg/l	
14	Potassium (as K)	2.4	1.9	1.2	1.3	3.1	1.9	2.1	3.2	mg/l	
15	% Na (Max)	37.6	36.0	32.85	36.97	42.1	31.1	32.55	34.29	%	< 70
16	Sodium Absorption Ratio	2.51	2.73	1.82	2.09	2.43	1.79	2.01	2.65		< 10
17	Residual Sodium Carbonate	-4.05	-6.45	-3.17	-2.75	-2.18	-4.13	-3.25	-7.17	meq/l	< 2.5
18	Electrical Conductivity	820	1160	510	640	570	660	710	1450	µmhos/cm	

4.2.2. Surface water

Surface water quality was assessed at 6 locations. The details of the sampling locations are given the **Table 16** and the analysis results are reported in **Table 17**.

Sr. No.	Symbol	Description	Co-ordinates
1	SW-1	Mundhe (Koyna River water)	(N-17°16.702' E-074°10.479')
2	SW-2	Shivrde (Farshi Nala)	(N-17°21.234' E-074°10.045')
3	SW-3	Krishna River Jackwell – Down Stream.	(N-17°21.469' E-074°08.992')
4	SW-4	Tasavde (Krishna River water)	(N-17°21.966' E-074°08.202)
5	SW-5	Khodshi (Dam water)	(N-17°18.543' E-074°10.115')
6	SW-6	Near factory (Rede Talav)	(N-17°22.024' E-074°10.011')

Table 16 Surface water quality sampling locations

Fable 17 Surface water	r quality	analysis	results
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Sr. No	Test Parameter	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	Unit	Standar ds
1	Color	Colorle ss	Colorle ss	Colorle ss	Colorle ss	Colorle ss	Colorle ss	Hazen	< 5
2	Odor	Odorles s	Odor	Odorles s	Odorles s	Odorles s	Odorles s	-	Odorless
3	pН	7.92	7.31	7.33	7.15	7.38	7.34		6.5 - 8.5
4	Turbidity	1.5	2.1	0.7	0.5	0.5	0.7	NTU	< 1
5	Total Alkalinity (as CaCO ₃)	162	290	148	141	153	184	mg/l	< 200
6	Chemical Oxygen Demand	12	44	12	8	16	12	mg/l	
7	B.O.D. (3day's at 27°C)	< 4	< 4	< 4	< 4	< 4	< 4	mg/l	
8	Total Dissolved Solids	337	569	196	185	190	273	mg/l	< 500
9	Chlorides (as Cl)	13	58	8	8	10	41	mg/l	< 250
10	Hardness (as CaCO ₃)	169	603	177	187	173	288	mg/l	< 300
11	Calcium (as Ca)	53	189	59	60	59	102	mg/l	< 75
12	Magnesiu m (as Mg)	9	32	7	9	6	8	mg/l	< 30
13	Sodium (as Na)	12.3	44.8	19.7	16.6	19.0	21.4	mg/l	

14	Potassium (as K)	1.0	20.3	1.5	1.4	1.5	3.1	mg/l	
15	% Na (Max)	13.55	13.40	19.4	16.06	19.2	13.79	%	< 70
16	Sodium Absorption Ratio	0.41	0.79	0.64	0.52	0.63	0.54		< 10
17	Residual Sodium Carbonate	-0.16	-6.31	-0.57	-0.93	-0.39	-2.08	meq/l	< 2.5
18	Electrical Conductivi ty	590	942	271	268	277	391	µmhos/c m	

4.2.3.Conclusions

Water quality is found to be good for irrigation purpose. The groundwater table is around 6 m to 8 m below the ground level. The main source of water is the Krishna River. Groundwater quality appears to be good and fit for irrigation

4.3. Soil Environment

Soil quality is assessed at 8 locations; the samples were collected as per the CPCB guidelines. The details of soil quality monitoring location are given in **Table 18** and the analysis results are reported in **Table 19**.

Sr. No.	Symbol	Description	Co-ordinates
1	S-1	Chikali	(N-17°25.670' E-074°10.410')
2	S-2	Shivde	(N-17°23.570' E-074°06.444')
.3	S-3	Korti	(N-17°25.568' E-074°05.870')
4	S-4	Tasavde	(N-17°21.920' E-074°07.495')
5	S-5	Masur	(N-17°23.352' E-074°09.803')
6	S-6	Sakurdi	(N-17°20.170' E-074°05.964')
7	S-7	Mundhe	(N-17°17.321' E-074°09.664')
8	S-8	Koparde Haveli	(N-17°19.704' E-074°11.055')

Table 18 Soil quality monitoring locations

EIA/EMP

Sr. No.	Test Parameter	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Unit	Standards
1	pH	8.25	8.21	7.45	7.02	7.90	8.03	8.40	6.90		6.5 - 8.5
2	Conductivity	0.145	0.236	0.129	0.155	0.270	0.35	0.281	0.217	µmhos/cm	0.2 - 0.5
3	Available Nitrogen	290	254	158	291	261	161	238	210	Kg/ha	>200
4	Available Phosphorus	29	32	57	77	37	29	46	52	Kg/ha	40 - 60
5	Available Potassium	670	594	561	840	690	479	780	570	Kg/ha	>280
6	Organic Carbon	0.83	1.06	1.03	1.17	2.03	0.72	0.89	1.49	%	>0.75
7	Sodium (as Na)	0.092	0.078	0.112	0.092	0.061	0.089	0.065	0.076	%	< 5
8	Calcium (as Ca)	3.12	1.29	1.98	3.16	1.78	5.19	2.97	1.61	%	
9	Magnesium (as Mg)	0.059	0.021	0.031	0.027	0.021	0.083	0.052	0.029	%	
10	Cation Exchange Capacity	45	41	58	49	45	40	48	45	meq/100gm	>30
11	Water Holding Capacity	47	44	41	47	48	46	51	53	%	
12	Particle Size Distribution										
12a	Sand	20	21	23	22	22	20	21	21	%	
12b	Silt	27	23	27	24	21	23	24	25	%	
12c	Clay	53	56	50	54	57	57	55	54	%	

Table 19 Soil quality monitoring results

4.3.1.Conclusions

The soil samples indicate that the fertility values can be classified as grade B.

4.4. Noise Environment:

Noise Monitoring was performed at the factory site and at surrounding villages. The ambient/source noise values during day time as well as during night time are computed, and the results are given in the table below.

Sr. No.	Station	Standard Limit dB(A) Leq	Time	dB (A) Leq
1	Factory Main Gate	75	Day	63.5
1.	Pactory Main Gate	70	Night	52.9
2	Near FTP Plant	75	Day	61.7
2.		70	Night	49.5
3	Near Boiler	75	Day	84.6
5.	Near Doner	70	Night	81.2
4	Near Compressor	75	Day	83.2
ч.	Near Compressor	70	Night	78.9
5	Near Turbine	75	Day	93.7
5.	iveal furbilie	70	Night	88.1
6	Near Mill house	75	Day	90.0
0.	ivear with nouse	70	Night	82.4
7	Karkhana Gate	55	Day	53.1
7.	Office, Umbraj.	45	Night	43.5
8	Karkhana Gate	55	Day	53.8
0.	Office, Korti.	45	Night	44.1
0	Karkhana Gate	55	Day	52.9
9.	Office, Masur.	45	Night	43.7
10	Karkhana Gate	55	Day	52.3
10.	Office, Tasavde.	45	Night	41.6
11	Laxman Bhau	55	Day	43.8
11.	Jamade, Mundhe.	45	Night	39.2
12	Puja Pragati Bricks,	55	Day	54.1
12.	Koparde-Haveli	45	Night	43.9

 Table 20 Noise quality monitoring results

4.4.1.Conclusions

Noise levels are not exceeding in the surrounding villages, during both day and night. Whereas, in some of the stations of the factory premises, Noise Levels are found to be slightly exceeding the desired limits (Near Boiler, Near Compressor, Near Turbine and near mill house). 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 workplaces are provided with ear plugs/muffs

4.5. Ecology and Biodiversity:

The ecology and biodiversity studies indicate that Shannon Weiner index for plant varies between 2.21 to 3.49 and species richness of plant population from 42 to 63. The Shannon Weiner index of bird's

population varies between 1.32 to 3.0 and species richness from 4 to 24. Thus Shannon Weiner index indicates the maximum species diversity

4.6. Socioeconomic Environment:

The socioeconomic studies indicate that the social, cultural and economic development have substantially improved by the growth of the industries in and around the project area. There were no complaints with regard to the proposed expansion of the sugarcane crushing, distillery and establish 24 MW co-generation power plant. Rainwater harvesting has been implemented and collected in a reservoir and used for the process after treatment.

5. Pollution Control and Management:

5.1. Waste Water Treatment Facilities:

Wastewater generated from Sugar & proposed Co-gen Division shall be 745 m³/day. This effluent shall be treated in sugar ETP consisting of Preliminary treatment (Mechanical oil separator and Oil and Grease trap), Equalization tank, Aeration tank, Secondary Clarifier, Sump well, Sludge drying beds, 15 days treated storage tank and Monthly washing tank etc. treated effluent will be used for irrigation.

Domestic wastewater of 200 m^3 /day, shall be treated on the principle of Root Zone Technology and treated effluent shall be used for gardening/irrigation.

Spentwash generated from 45 KLPD distillery shall be 270 m³/day and from proposed 100 KLPD distillery shall be 200 m³/day. The existing of 45KLPD distillery spentwash shall be treated in the existing composting plant and the proposed 100 KLPD distillery spentwash shall be treated on the principle of concentration and incineration technology. Other effluents like spentless 200 m³/day, boiler make up effluent 80 m³/day and fermenter washing 30 m³/day shall be treated in condensate polishing unit and recycled as process water/makeup water for the cooling tower.

5.2. Air pollution Control System:

Electrostatic Precipitator (ESP) shall be provided as Air Pollution Control equipment, for both the boilers

5.3. Solid Waste Management

The total quantity of pressmud generated shall be 11200 to 12000 MT per month. The presumed generated will be used in composting along with the spentwash from the distillery.

The fly ash generated shall be 1080 MT per month which will be used in composting/manure the remaining will be taken for Brick manufacturing

The total quantity of ETP sludge generated shall be 100 MT/annum, which will be used in composting along with the spentwash from the distillery.

5.4. Hazardous Waste Management

The spent oil generated which shall be classified as Hazardous waste is 1.23 MT/annum. The spent oil is mixed with Bagasse and Burnt in the Boiler.

6. ASSESSMENT OF SIGNIFICANCE OF IMPACTS (CRITERIA FOR DETERMINING SIGNIFICANCE, ASSIGNING SIGNIFICANCE)

6.1. Identification of impact during construction and operation phase

Table 21 Impact identification matrix	(Construction Phase)
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		Environmental Attributes									
Activities	Air	Noise	Wate r	Hydro geology	Geology	Climate	Land	Ecology	Socio Econo mic	Solid/ Hazar dous	Ris k
Operation of DGs	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Operation of Construction Equipment	~	~	~	-	Nil	-	~	~	-	~	~
Traffic	✓	✓	-	-	-	-	-	-	-	-	✓
Land Development and Building Construction	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Table 22 Identification of Impacts during Operation Phase its source and mitigation measures

Sr.	Environmental	Source	Impact	Mitigation measures
No.	Component			
1.	Air Quality	- Emission	- Increased Dust	-Provide masks to the workers and spray
		through the	levels.	water to suppress the dust.
		stack (After the	- Increase in the	-The green belt will be developed in the
		Plant is	Ground level	plant premises to act as a carbon sink.
		commissioned)	concentration of	- Regular air quality monitoring will be
			SPM	carried out as per CPCB/SPCB norms and
			- Causing	in case of any variations in the quality of
			respiratory diseases	ambient air/stack emissions necessary
			on human and	modifications/ replacement of the APC,
			animal life and	equipment shall be carried out.
			effect on the health	-Install Wet-scrubber/ Electrostatic
			of vegetation	Precipitator to control stack emissions.
2.	Water Quality	-Process	-Oil & grease,	- Domestic effluent shall be treated on the
			COD, BOD, low	principle of Root Zone Technology. The
			pH, and suspended	treated effluent shall be used for
			solids can cause	gardening/irrigation.
			water pollution in	-Wastewater generated from Sugar &
			surface and	proposed Co-gen Division gen shall be
			groundwater and	745m3/day. This effluent shall be treated in
			can affect on human	sugar ETP consist of Preliminary treatment
			and aquatic life.	(Mechanical oil separator and Oil and
		- Hot water	-ETP performance	Grease trap), Equalization tank, Aeration

Sr.	Environmental	Source	Impact	Mitigation measures
No.	Component			
		(Condensates)	gets affected, Can deplete dissolved oxygen and affect biological activity resulting in fish kills Would affect the ETP performance if it is combined with process effluent.	tank, Secondary Clarifier, Sump well, Sludge drying beds, 15 days treated storage tank and Monthly washing tank etc. treated effluent will be used for irrigation. -Spentwash from 100 KLPD distillery shall be 200m3/day which shall be treated using concentration incineration technology and spentwash from 45 KLPD shall be 270m3/day which shall be treated on composting principle. Dilute effluents spentlees, condensate, and for washing etc.shall be treated in CPU and recycle back for cooling towers and process
		-Spillages, leakages & washings	-Shock loads on ETP. The efficiency of ETP would get affected resulting in poor quality of effluent. - Shock loads on ETP	 Adopt Clean technologies as per Comprehensive Industry Document on Sugar Industry (COINDS), Control pH by biological means. Cool the water and reuse. Adopt dry-cleaning methods and collect the leakages, spillages and reprocess, the effluent. Provide a separate storage pond and add in a controlled manner to ETP. To avoid shock loading
3.	Noise	Turbines, Steam exhausts, Vibrator, Cane Cutters, Boiler etc.	Affects the hearing and cause fatigue and sometimes nervous breakdown.	 Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce the generation of noise. Personal protective equipment like earplugs and earmuffs will be provided to the workers exposed to the high noise level. Regular monitoring of noise level will be carried out and any higher noise levels shall be controlled by proper alignment/ maintenance of the machinery. Acoustic enclosure for turbine and D.G. sets would be provided. Change the work schedules of the workers from high exposure places to low levels of exposure.
4.	Soil Quality	Application of treated effluent	Increase in soil salinity.	-Effluent quality, as well as quantity, shall be strictly controlled by regular monitoring.
5	Solid/Hazardous	Boiler/Stack-	Impact on worker	-ETP sludge, yeast sludge and pressmud

Sr.	Environmental	Source	Impact	Mitigation measures
No.	Component			
	waste	Ash,	health	used for Composting
	Environment	ETP- Sludge		-Ash used for composting or sold to a brick
		and Spent oil,		manufacturer
		Process-		-Spent oil mixed with bagasse and burned
		Pressmud and		as fuel for the boiler.
		Yeast sludge.		
6.	Greenbelt	-Cutting of trees	-To increase	-Provide at least 1500 plants per hectare
			greenhouse gases	covering more than 33% area of the total
			-Adverse effect on	area.
			the environment	

6.2. Environmental Monitoring Program:

Table 23 Parameters and Frequency for Post Project Environmental Monitoring

Sr. No	Item	Parameters	Frequency
1.	Ambient Air quality	PM_{10} , $PM_{2.5}$, SO_{2} , and NO_x .	24 hourly, Once in a Month
2.	Stationary Emission from Stack	РМ	Continuous Online Monitoring
3.	Water and Wastewater	All the parameters required for reuse & recycle.	As often as possible
4.	Treated Effluent	pH, BOD, COD, TSS, Flow, TDS	Continuous Online Monitoring
5.	Noise	Equivalent noise level- dB (A)	Monthly or as often as required
6.	Soil	pH, Cation Exchange Capacity, Total Nitrogen, Phosphorous, Potassium, moisture, Permeability, Conductivity, Texture & structure, Organic carbon	As required
7.	Solid wastes and Manure/Compost	Moisture, pH, Organic Carbon, N, P, K	As required
8.	Greenbelt	Type of species shall be decided based on soil & climatic conditions. A number of trees would be 1500 per hectare, however; the number of trees would vary depending on the type of tree.	The survival rate should be 90% and the plant shall be planted to cover 100% greenbelt.

6.3. Budgetary provisions towards Environmental Management Plan:

The capital cost of the project is around Rs. 300 Crores. About 18% of the total project cost is reserved for environment and pollution control measures, 1.7 % for operation and maintenance. 0.75 % of the total project cost shall be reserved for corporate social responsibility.

Sr.	Unit	Capital	Recurring expenditure
No.	emt	expenditure (Lacs)	(Lacs per annum)
1	Sugar & Co-generation	950	90
2	Distillery	4500	400
3	Laboratory	40	6.0
4	Green belt development		6.0
5	Monitoring & Consultancy (3 rd Party)		8.0
	Total	5490	510

Table 24 Budget for pollution control measures

7. Project Benefits and CSR

Sahyadri SSK Ltd., Yeshwantnagar, Taluka Karad was established in 1969, the industry started its crushing operations with an initial capacity of 1250 TCD in the year 1974-75 and Distillery operations were started in the year 1987-88 with an initial capacity of 45 KLPD. The industry started a number of lift irrigation schemes on Krishna River and thus the irrigation facilities in the area have increased substantially. The industry has increased its crushing capacity from time to time from 1250 TCD to 7500 TCD. Besides the sugar industry, numbers of ancillary industries such as foundry, dairy, spinning mill were established due to the industrial growth. Education facilities in the study area are also very good. The industry has also established the number of colleges in the study area.

The industry developed seed farm and supplies seeds, bio fertilizers, pesticides, insecticides to the farmers on deferred payment basis. It can be also visualized from land use pattern and socio-economic studies that the economy of the people residing in the surrounding village has improved to a great extent as compared to the urban areas. The industry provides RO treated drinking water to the needy villages through tankers Numbers of recreational facilities in this factory area are also developed by the industry.

The industrial growth has taken place without any adverse impacts on the environment with a green flush of trees to absorb greenhouse gases and make the environment clean and tidy. The industry has established 45 KLPD distillery from its own molasses which have improved the economy of the industry to pay remunerative prices for sugarcane

Due to the diversification of industrial activities of the Sahyadri SSK Ltd., Yeshwantnagar Taluka Karad, the farmers are highly benefited by getting remunerative prices to their produce sugarcane and this expansion of the crushing capacity would help for the timely crushing of their products with high recovery which would improve the economy of the industry further.

The industry had also established a distillery unit whereby the byproduct molasses is utilized in its own premises and hence reducing the cost of transportation and pollution due to the transportation of raw materials. The distillery unit has further improved the economy and improved cane price which had benefitted the farmers. The ecological balance of the region is well maintained and in fact, further improved due to the availability of nutrients such as bio compost which enhanced plant growth and biodiversity. Treated wastewater is used for maintaining the flora and fauna in the region.

The establishment of an industry in Yeshwantnagar Karad area has given indirect employment to a number of ancillary industries and establishment of tourist resorts and hotels. The industry has 241 office staff and 851 workers in sugar unit while 19 office staff and 62 workers in distillery unit. As it is a Co-operative factory, all the benefits accrued are distributed to the shareholders which are the farmers, the

backbone of the Nation. The establishment of the industry helped to enhance the socio-cultural and political activities in the region due to which the developmental activities gave a positive impact.

Any developmental activity could have some adverse impacts; however, the resilience of the community and acceptance to pay in terms of losses as compared to benefits has a positive response by the people and has been observed to vary at a ratio of 1:12. In other words, the benefits of the projects are 12 times more as compared to the damages/losses in the community.

Thus, it can be concluded that the project has a positive impact and would immensely benefit the growth and development of not only the project area but also the entire region around the Sahyadri SSKL.

The total cost of the project would be 300 crore rupees, **0.75** % of the project cost is earmarked for Corporate Social Responsibility, which shall be spent within period of 5 years on activities like creating recreational facilities in the area, construction of roads, sanitation facilities, Street lighting, plantation, supplying drinking water to the needy villages etc.