Venkateshwara Power Project Ltd.

(Sugar Factory)

■ **Regd. Off.** : Mahadik Pump, Shiroli (P), Tal. Hatkangale, Dist. Kolhapur, Maharashtra 416 122
Phone : 91-230 - 2461002/3/4/5, **Fax**: 91-230 - 2461006
E mail : vppl@mahadikgroup.com

■ **Factory** : A/p. Bedkihal, Tal. Chikodi, Dist . Belgaum, Karnataka 591 214.
Phone : 91 - 8338 - 257001
Telefax : 91 - 8338 - 257008

CIN : U40101PN1994PLC083924

Ref. No.VPPL/ADMIN/DIST/2017-18/604 **11.09.2017**

To,

The Member Secretary -IA-II (I)
Expert Appraisal committee (EAC), Industrial Project
Ministry of Environment, Forest and Climate Change (MoEFCC)
Indira Paryavaran Bhavan, Jor bagh Road, New Delhi - 110 003

Subject: Additional details document for 90 KLPD molasses based distillery project by Venkateshwara Power Project Ltd (IA/KA/IND2/66134/2016).

Ref : 1. Minutes of the 27th meeting of the EAC Ind-2 held on 28th and 29th August, 2017. (Item No. 52)
2. Email alert to proponent 4th Sep 2017 for addition information sought by Member Secretary

Dear Sir,

This is with reference to the 27th meeting and additional information sought for setting up 90 KLPD molasses based distillery project by Venkateshwara Power Project Limited at sr. no. 164 to 170 & 85, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka in the existing sugar factory premises at. As suggested by EAC (Expert Appraisal Committee), we are submitting the details taking into consideration, the integrated project viz. 3500 TCD Sugar, 30 MW cogen & 90 KLPD distillery as per the provisions of EIA Notification 2006.

We have re-worked on the fresh water requirement as per the TOR conditions "Efforts to reduce water 10 KL/KL of alcohol production" and have further reduced to **639 m^3/day** during off season of sugar and further to **339 m^3/day** during sugar season. A separate water balance is attached for reference.

Furthermore, we have reflected the change in the EIA report along with the details of chapter and pages were previously granted EC of 30 MW is mentioned and the cumulative impact study of sugar, cogeneration was done. The EIA report incorporates the suggestions made by the EAC as per the minutes dated 4th September 2017. The details of EIA report are attached.

Sir, we request you to please consider our proposal and grant the EC for setting up the 90 KLPD distillery to execute the project.
Submitted for your kind perusal and consideration.
Thanking you,

Yours faithfully,

For Venkateshwara Power Projects Ltd.

Water Balance Distillery

The total fresh water requirement for distillery at the startup will be around **1527 CMD**, and after recycling daily fresh water requirement will be **639 CMD**. Hence total fresh water consumption is around **7.1 KL/KL** of alcohol production. Source of water will be Sadalga Barrage on Doodhganga River. During season of sugar factory **300 CMD** recycled water will be send to distillery. Hence, fresh water intake of distillery will reduce and required only **339 CMD** as a fresh water intake. Water storage facility is available with the sugar factory. Detail water breakup is given in **Table 1.** Total daily fresh water requirement for current Sugar and Cogeneration project is 340 CMD.

Table 1: Water and wastewater balance for distillery

Sr. No.	Water inputs	CMD
1.	Process water for fermentation section and CO_2 scrubber	705
2.	DM water for RS dilution	100
3.	Water for vacuum pump, pump sealing, air blower & others	12
4.	Soft water makeup for cooling towers	600
5.	Other domestic usage, laboratory uses, cleaning	10
6.	DM water for Boiler	100
7.	**Total water input at start-up**	**1527**
	Water Output	
1.	Spent Lees (PR & Rect.)	225
2.	Process condensate	651
3.	CT Evaporation & Drift Losses	540
4.	Water losses from vacuum pump, pump sealing, Air blower	11
5.	Cooling tower and boiler blow down	100
6.	**Total Water Output**	**1527**
	Recycling water	
1.	Lees recycle for cooling tower make up	225
2.	Process condensate fermentation	432
3.	Process condensate to cooling tower, CIP, Fermentation	219
4.	Pumps Sealing Water Recycle cooling tower	11
5.	CO_2 scrubber beer well to process water to pump	1
6.	**Total Recycling water per day**	**888**
	Daily fresh water input	**639**
During season of sugar factory **300 CMD** recycled water will be send to distillery. Hence, fresh water intake of distillery will reduce and required only **339 CMD** as a fresh water intake.		

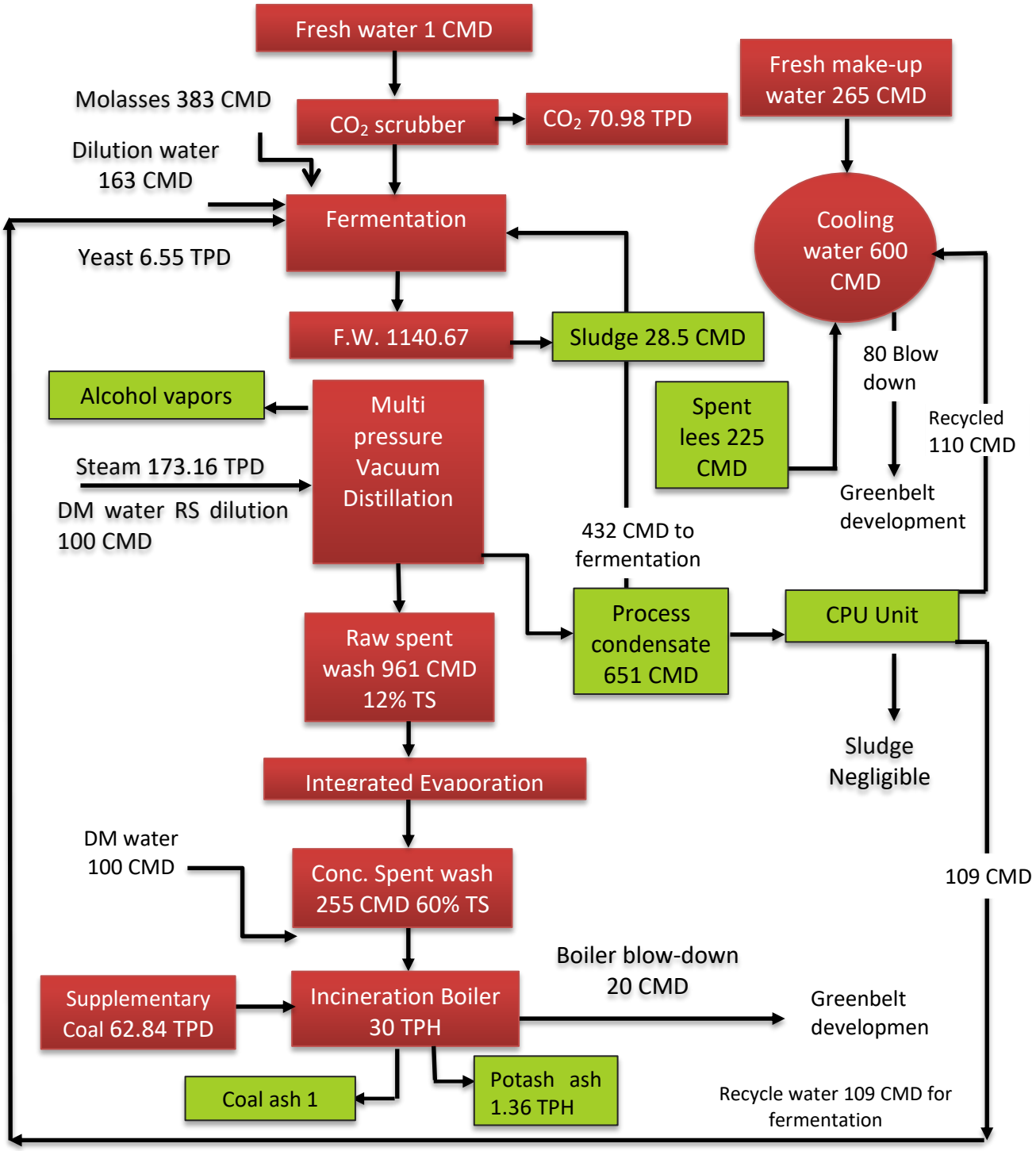


Figure 1: Water balance chart

Water Balance for Sugar and Cogeneration

Table 2: Water requirement for existing sugar and cogeneration

Sr. No.	Particulars	Sugar CMD
1.	For startup of sugar unit	2575
2.	Water recovered	2235
3.	Total daily fresh water required after recycling	340

Table 3: Wastewater generation of sugar and cogeneration

Sr. No.	Source	CMD	Treatment	Final Disposal
1.	Sugar Plant	317.8	ETP Treatment Units: Bar screen and grit chamber, oil and grease traps, reaction tank, equalization tank, anaerobic tank, aeration Tank I, aeration Tank II, secondary clarifier, sludge drying bed and polishing pond. For polishing pond for dilution with other effluent and	For ferti irrigation.

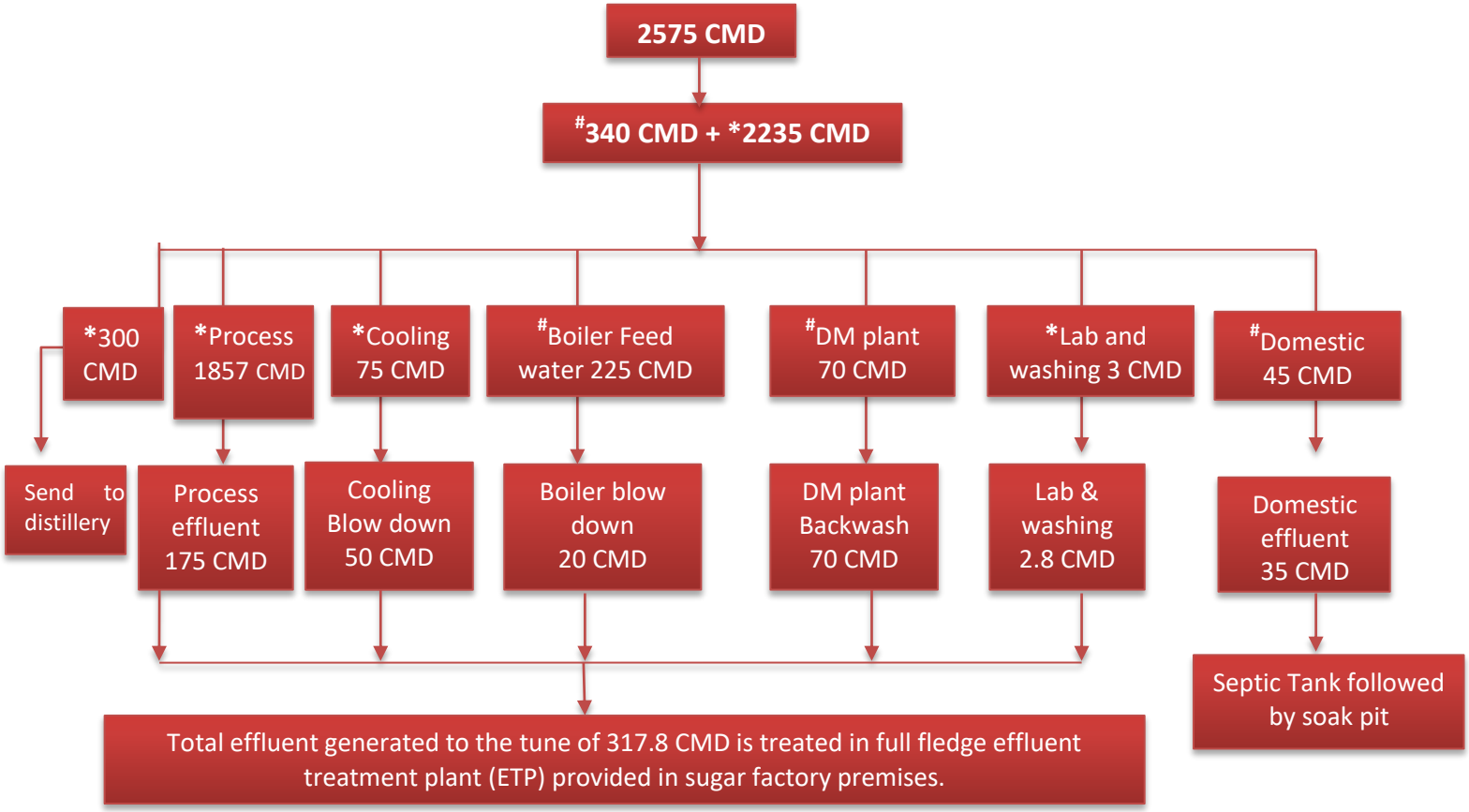


Figure 2: Water Balance in Sugar 3500 TCD and 18 MW Cogeneration plant (m^3/ Day)

Note:

Water consumption represented is the quantity towards daily requirement of water. This is the actual quantity of water taken from outside.

***** Water consumption thus represented is actually utilized from the Condensation water quantity. i.e The Natural water present in sugar cane becoming available after crushing of the cane followed by subsequent processing, evaporation and condensation operation as well as the cogeneration turbine condensate.

Cumulative Impact Assessment Details in earlier Submitted EIA

Existing EC details

- ✓ The copy of the Earlier EC received for up gradation of 15 MW Cogen to 15 MW is attached in Annexure NO IX in EIA report.
- ✓ The same is reflected in the content sheet : List of Annexures - **Annexure No IX**
- ✓ Consent to Operate from KSPCB for current operation of 3500 TCD Sugar and 30 MW cogen plant is attached as Annexure No. VIII
- ✓ Consent is mentioned in Content Sheet : List of Annexures – **Annexure No. VIII**

Data Input for Cogen in EIA report

- ✓ Chapter I mention that we have already such facility working : Page No. 2 (Section 1.2 : Identification of Project and Project Proponent)
- ✓ Chapter II : Page No. 15 (Section Type of Project)
- ✓ Page No. 20 : Table No 2.2 Land Utilization for Cogen plant
- ✓ Page No 27 : Table no 2.11 (Water requirement for existing Sugar & Cogen)
- ✓ Page No. 28 : Table No 2.12 (Waste water generation of Sugar & Cogen)
- ✓ Page No. 48 : Section 2.9.1 (Air Pollution) Last point
- ✓ Page No. 48 : Section 2.9.2 (Waste Water) Last point

Chapter IV

- ✓ Page No. 116 : Solid Waste Generation Quantification: Table No 4.3
- ✓ Page No. 118 : 4.2.2.2 Impacts on Air
- ✓ Page No. 120 to 133: 4.2.2.2.2: Air Quality Modeling for Existing & Proposed Units
- ✓ Page No. 146 & 148 : Impacts on water quality : Existing & Proposed Units

Chapter X

- ✓ Page No. 202 : 10.4.1 : Air Pollution Management
- ✓ Page No 203 : 10.1 : Stack Emission
- ✓ Page No. 205 : Table No 10.4 : Existing Wastewater Generation from Sugar & Cogen

September 2017

FINAL ENVIRONMENT IMPACT ASSESSMENT REPORT

Setting up 90 KLPD Molasses Based Distillery

Sr. no. 164 to 170 & 85, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka

BY

Venkateshwara Power Project Limited

Environment consultant
SMS Envocare Limited
QCI-NABET Accredited Environment consultant
301 Pentagon P3, Magarpatta city, Hadapsar
Pune 411028, Tel: 020-6680112, Fax: 020-66801100

Distillery Consultant
Business Brains
Royal Prestige, E-5, 1127, E Ward,
Sykes Extension, Kolhapur,
Maharashtra - 416 001,
Telephone No: +91 (0) 231+2529813

Environmental Laboratory
Maharashtra Enviro Power Ltd.
MoEFCC approved Laboratory
Plot No. P-56, MIDC, Ranjangaon, Taluka-Shirur, Pune 412 220, Maharashtra

SMSEL/CS/EIA/ VPPL/2016/9/R1

Ref- QCI/NABET/ENV/ACO/16/08/0189

Annexure - I

Date – 22 August, 2016

Name of organization: **M/s SMS Envocare Ltd.**

Accreditation under NABET Scheme for EIA Consultant Organization

Scope of accreditation

Sl. No.	NABET Sector No.	Sectors	As per MoEFCC	Category A/B
1	3	River Valley projects	1 (c)	B
2	4	Thermal power plant	1(d)	B
3	19	Man made fibre manufacturing	5(d)	A
4	21	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	5 (f)	A
5	22	Distilleries	5 (g)	A
6	25	Sugar Industry	5 (j)	B
7	32	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	7 (d)	A
8	36	Common Effluent Treatment Plants (CETPs)	7 (h)	B
9	37	Common Municipal Solid Waste Management Facility (CMSWMF)	7 (i)	A
10	38	Building and construction projects	8 (a)	B
11	39	Townships and Area development projects	8 (b)	B

22/8/16

(A.K Jha)
Senior Director
NABET

DECLARATION BY EXPERTS INVOLVED IN PREPARATION OF EIA REPORT

Proposed 90 KLPD Molasses Based Distillery by Venkateshwara Power Projects Ltd., At Belgaum, Karnataka

I, hereby certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA Coordinator

Name: **Mr. Nilesh D. Deshmukh**

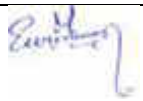
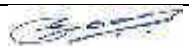
Signature & Date: 03.02.2017

Period of involvement: May 2016 to Feb 2017

Contact information: SMS Envocare Ltd.
301, Pentagon P3, Magarpatta city, Hadapsar, Pune 411028
Tel No: 020 66801112; Mob no: 9011033523
Email: nilesh.deshmukh@smsl.co.in

Functional Area Experts

Sr. No.	Functional Areas	Name of the expert/s	Involvement (Period & Task)	Signature
1.	AP and AQ	Dr. Manoj Mishra	**Oct 2016 to Dec 2016** Air quality modeling for prediction of air pollution impact due to proposed project using ISCST-3 model. Computed the maximum GLC of pollutant over baseline environmental parameter.	
2.	NV	Dr. Manoj Mishra	**Oct 2016 to Dec 2016** Interpretation of baseline air quality results and identification of probable Impacts and suggestion to mitigate the impacts	
3.	WP	Mr. Nilesh Deshmukh	**Oct 2016 to Dec 2016** Study of wastewater pollution sources, its impact, alterative treatment technologies, technology feasibility and formulation of EMP.	
4.	SHW	Mr. Mahendra Kumar	**Oct 2016 to Dec 2016** Interpretation of identified hazardous substances and degree of risk prediction of the impact and suggesting mitigation measures.	

Sr. No.	Functional Areas	Name of the expert/s	Involvement (Period & Task)	Signature
	EB	Mrs. Hemangi Nalavade	**Oct 2016 to Dec 2016** Prediction of the impact and suggesting mitigation measures. Formulation of EMP.	
		Mr. Pawan Kumar Verma	**Oct 2016 to Dec 2016** Identification of Hazardous.	
5.	SE	Mrs. Pawanrekha Mishra	**Oct 2016 to Dec 2016** Data collection, interpretation and impact assessment, suggestion to CSR activities.	
6.	EB	Mrs. Hemangi Nalavade	**Oct 2016 to Dec 2016** Study of flora and fauna in the 10 km area, interpretation of observations, identification of impact if any and proposing mitigation measures, preparation of green belt development plan and formulation of EMP	
		Mr. Pawan Kumar Verma	**Oct 2016 to Dec 2016** Interpretation of observations and suggestions to mitigation measures and formulation of EMP	
7.	HG & Geology	Dr. Dhananjay C. Meshram	**Oct 2016 to Dec 2016** Study of hydrology and geology in the 10 km radius of the project area, data collection and interpretation; identification of impact and formulation of EMP	
8.	LU	Mr. Samir Patil	**Oct 2016 to Dec 2016** Study of present land use in the area, interpretation land use area based on Toposheet map, Settlement pattern (Agricultural, Residential, Commercial etc.) interpretation of secondary data in relation with land use activity and proposed project. Identification of impact and formulation of EMP	
9.	RH	Dr. Sadashiv T. Lonkar	**Oct 2016 to Dec 2016** Study of raw material production process; overall work environment, assessment of risk factor and its management and suggesting environment management plan.	
10.	SC	Mrs. Prajakta	**Oct 2016 to Dec 2016**	

Sr. No.	Functional Areas	Name of the expert/s	Involvement (Period & Task)	Signature
	Laboratory analysis	Chitnis	Field visit for primary data collection. Interpretation of primary data and analysis of results and predicting impacts and providing mitigation measures. Analysis of soil interpretation of results. Impact predictions and suggesting of mitigation measures	
11.	Laboratory analysis	Mr. Neeraj Katiyar	**Oct 2016 to Dec 2016** Supervision of sample analysis collected during baseline study.	

Declaration by the Head of the Accredited Consultant Organization

I, **Nilesh Deshmukh** , hereby, confirm that the above mentioned experts have prepared the EIA report of Proposed 90 KLPD molasses based distillery of Venkateshwara Power Projects Ltd., at Belgaum, Karnataka of I also confirm that, I shall be fully accountable for any miss-leading information mentioned in this statement.

Signature:

Name:

Mr. Nilesh Deshmukh

Designation: Manager

Name of the EIA Consultant Organization: SMS Envocare Limited

301, Pentagon P3, Magarpatta city, Hadapsar,
Pune 411028, Tel No: 020 6680111.

J-11011/179/2016-IA II (I)
Government of India
Ministry of Environment, Forest and Climate Change
(I.A. Division)

Indira Paryavaran Bhawan
Aliganj, Jorbagh Road
New Delhi – 110 003

E-mail :lk.bokolia@nic.in
Telefax: 011-24695313
Dated: 23rd September, 2016

To,

Shri Rajan Shinde
Executive Director
M/ s Venkateshwara Power Project
Mahadik Pump,Shiroli(p)
Tal. Hatkangale
Dist. Kolhapur
Maharashtra-416122

Subject: Setting up of 90 KLPD (RA/ AA/ ENA) molasses based distillery at Sy. No. 164 to 170 & 85, Village Bedkihal, Tehsil Chikkodi, District Belgaum, Karnataka by M/s Venkateshwara Power Project Limited-reg TOR

Ref. No.: Your Proposal no. IA/KA/IND2/56992/2016; dated 2nd July, 2016

Sir,

Kindly refer your proposal no. IA/KA/IND2/56992/2016; dated 2rd July, 2016 along with project documents including Form-I, Pre-feasibility Report and draft 'Terms of Reference' as per the EIA Notification, 2006. It is noted that the proposal is for Setting up of 90 KLPD (RA/ AA/ ENA) molasses based distillery at Sy. No. 164 to 170 & 85, Village Bedkihal, Tehsil Chikkodi, District Belgaum, Karnataka by M/s Venkateshwara Power Project Limited.

2.0 Draft Terms of Reference (TOR) have been discussed and finalized during 11th Expert Appraisal Committee (Industry-2) meeting held on 20th-21st July, 2016 for preparation of EIA/EMP report. The Committee prescribed the following Specific and Additional TOR in addition to Generic TOR provided at Annexure-I (refer to Ministry's website) for preparation of EIA-EMP report:

A. Specific TOR

1. List of existing distillery units in the study area along with their capacity and sourcing of raw material.

2. Number of working days of the distillery unit.
3. Details of raw materials such as molasses/grains, their source with availability.
4. Details of the use of steam from the boiler.
5. Surface and Ground water quality around proposed spent wash storage lagoon, and compost yard.
6. Plan to reduce spent wash generation within 6-8 KL/KL of alcohol produced.
7. Proposed effluent treatment system for molasses/grain based distillery (spent wash, spent lees, condensate and utilities) as well as domestic sewage and scheme for achieving zero effluent discharge (ZLD).
8. Proposed action to restrict fresh water consumption within 10 KL/KL of alcohol production.
9. Details about capacity of spent wash holding tank, material used, design consideration. No. of peizometers to be proposed around spent wash holding tank.
10. Action plan to control ground water pollution.
11. Details of solid waste management including management of boiler ash, yeast, etc. Details of incinerated spent wash ash generation and its disposal.
12. Details of bio-composting yard (if applicable).
13. Action plan to control odour pollution.
14. Arrangements for installation of continuous online monitoring system (24x7 monitoring device).

B. Additional TOR

I. Public hearing to be conducted and issues raised and commitments made by the project proponent on the same should be included in EIA/EMP Report in the form of tabular chart with financial budget for complying with the commitments made.
II. Cumulative impact to be assessed that include the existing sugar plant.
III. To draw proper green belt plan and EIA should includes photographs of plant grown with numbers.
IV. Effort will be made to reduce water.

3.0 These 'TORs' should be considered for the preparation of EIA/EMP for Setting up of 90 KLPD (RA/ AA/ ENA) molasses based distillery at Sy. No. 164 to 170 & 85, Village Bedkihal, Tehsil Chikkodi, District Belgaum, Karnataka by M/s Venkateshwara Power Project Limited in addition to all the relevant information as per the 'General Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. The EIA/EMP as per TORs should be submitted to the Chairman, Karnataka Pollution Control Board, for public consultation. The SPCB shall conduct the public hearing/public consultation as per the provisions of EIA notification, 2006.

4.0 You are requested to kindly submit the final EIA/EMP prepared as per TORs to the Ministry for considering the proposal for environmental clearance ***within 3 years as per the MoEF O.M. No. J-11013/41/2006-IA.II (I) dated 8th October, 2014.***

5.0 The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India/ National Accreditation Board of Education and Training (QCI/NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other Organization(s)/Laboratories including their status of approvals etc.

(Lalit Bokolia)
Additional Director

Copy to:

1 The Chairman, Karnataka State Pollution Control Board, "Parisara Bhavan", #49,4th & 5thFloor, Church Street, Bangalore-560001

2 The Additional Principal Chief Conservator of Forests (C), Ministry of Environment and Forest, Climate Change, Regional Office (SZ), Kendriya Sadan, 4th Floor, E&F Wings, 17th Main Road, Koramangala II Block, Bangalore - 560034

(Lalit Bokolia)
Additional Director

Compliance of TOR for new 90 KLPD Molasses Based Distillery

A. Specific TOR

Sr. No.	Awarded ToR's	Compliance
1.	List of existing distillery units in the study area along with their capacity and sourcing of raw material.	Within the 10 km of study area, there are no distilleries, however, nearest distillery is of 90 KLPD Shree Doodhaganga Krishna S.S.K. Ltd at a distance of 16 km, Nanadiwadi, Chikkodi. Please refer Chapter II page no. 26, of the EIA/EMP report.
2.	Number of working days of the distillery unit.	The distillery will operate for 330 days/ Annum.
3.	Details of raw materials such as molasses/grains, their source with availability.	Please refer Chapter II page no 24. Point no. 2.5.2 of the EIA/EMP report.
4.	Details of the use of steam from the boiler.	Please refer Chapter II page no. 30, point no 2.5.2.4 of the EIA/EMP report.
5.	Surface and Ground water quality around proposed spent wash storage lagoon, and compost yard.	Not applicable as it is new project.
6.	Plan to reduce spent wash generation within 6-8 KL/KL of alcohol produced.	Spent wash generation is 900 KLD; however factory is proposing incineration boiler technology for spent wash treatment.
7.	Proposed effluent treatment system for molasses/grain based distillery (spent wash, spent lees, condensate and utilities) as well as domestic sewage and scheme for achieving zero effluent discharge (ZLD).	Please refer Chapter X page no. 205 to 209 point no. 10.4.3 of the EIA/EMP report. CPU details in Annexure XVI.
8.	Proposed action to restrict fresh water consumption within 10 KL/KL of alcohol production.	After recycling the generated wastewater in the process, daily fresh water requirement is 639 CMD. Hence total fresh water consumption is around 7.1 KL/KL of alcohol production.
9.	Details about capacity of spent wash holding tank, material used, design consideration. No. of peizometers to be proposed around spent wash holding tank.	Spent wash storage lagoon with 5 day capacity will be installed in an area of 7700 sq.m. One or two piezometer will be installed around the lagoon.
10.	Action plan to control ground water pollution.	There will be no ground water pollution due to proposed project as the factory will

		operate on Zero Liquid Discharge technology. Please refer Chapter X page no. 205 to 209 point no. 10.4.3 of the EIA/EMP report. Spent wash storage lagoon details in chapter X.
11.	Details of solid waste management including management of boiler ash, yeast, etc. Details of incinerated spent wash ash generation and its disposal.	Please refer Chapter X page no. 209, point no.10.4.4 of the EIA/EMP report.
12.	Details of bio-composting yard (if applicable).	Not Applicable as there will be any bio-composting of spent wash.
13.	Action plan to control odour pollution.	Please refer Chapter X page no. 215, point no. 10.4.6 of the EIA/EMP report.
14.	Arrangements for installation of continuous online monitoring system (24x7 monitoring device).	The arrangement of continuous online monitoring system will be done. Online flow meter and camera will be also being arranged.

B. Additional TOR

Sr. No.	Awarded ToR's	Compliance
I.	Public hearing to be conducted and issues raised and commitments made by the project proponent on the same should be included in EIA/EMP Report in the form of tabular chart with financial budget for complying with the commitments made.	Public Hearing is conducted on 5th May. Minutes of the same are attached in Annexure 17.
II.	Cumulative impact to be assessed that include the existing sugar plant	Complied EIA report has prepared with considering pollution load of existing sugar and cogeneration unit. Project description, impact assessment with cumulative impact matrix and environmental management plan also made by considering the exiting load.
III.	To draw proper green belt plan and EIA should include photographs of plant grown with number	Complied Please refer Chapter X page no. 210, point no. 10.4.5 of the EIA/EMP report

IV.	Efforts will be made to reduce water	Factor is proposing to adopt incineration boiler technology for spent wash treatment, Hence, process condensate around 639 CMD will be generated during evaporation, and this will be recycled in the process. Moreover spent lees will also be recycled in the cooling tower make up water. After recycling the generated wastewater in the process, daily fresh water requirement is 639 CMD. Hence total fresh water consumption is around 7.1 KL/KL of alcohol production.

C. Generic TOR

Sr. No.	Awarded ToR's	Compliance
1.	**Executive Summary**	It is attached as a separate chapter to the EIA/ EMP report.
2.	**Introduction**	
	i. Details of the EIA Consultant including NABET accreditation	SMS Envocare Limited is a NABET accredited consultant organization(Sr. No 141, 'A' List of NABET accredited EIA consultant organization) EIA Consultant details furnished in chapter I page 2
	ii. Information about the project proponent	Please refer Chapter I page no. 1, of the EIA/EMP report.
	iii. Importance and benefits of the project	Please refer Chapter I page no 5, point no. 1.5 of the EIA/EMP report.
3.	**Project Description**	
	i. Cost of project and time of completion.	Please refer Chapter II page no. 51, point no. 2.12 for project cost and Project implementation schedule page no. 50, point no. 2.10 for time of completion of the EIA/EMP report.
	ii. Products with capacities for the proposed project.	Please refer Chapter II page no. 22, Table no. 2.3 of the EIA/EMP report.
	iii. If expansion project, details of existing products with capacities and whether adequate land is available for	Not Applicable as it is a new project.

	expansion, reference of earlier EC if any.	
	iv. List of raw materials required and their source along with mode of transportation.	Please refer Chapter II page no 23. Point no. 2.5.2 of the EIA/EMP report.
	v. Other chemicals and materials required with quantities and storage capacities	Please refer Chapter II page no 24. Point no. 2.5.2 of the EIA/EMP report.
	vi. Details of Emission, effluents, hazardous waste generation and their management.	Details of emission of effluent, hazardous waste information and their management is briefly summarized in Chapter II Page no. 49 to 51 Moreover chapter X describes details EMP of Emission of effluent and hazardous waste generation.
	vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	All this information is summarized in chapter II page 22, in Table 2.3.
	viii. Process description along with major equipment's and machineries, process flow sheet (quantitative) from raw material to products to be provided	Process description with process flow chart (Fig. 2.4, pg. 28) and quantities of raw water and products are given in Chapter II, Page 30 onwards. Major equipment's and machineries list is given in Chapter II page no. 37
	ix. Hazard identification and details of proposed safety systems.	Hazardous identification and the proposed safety system are thoroughly described in Chapter VII Additional studies.
	Expansion/modernization proposals:	
	a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be	Not Applicable as it is a new project. However, Existing cogeneration unit of 30 MW has taken **Environmental Clearance as per vide letter number J 13012/34/2009-IA.II (T) dated September 9, 2010. The copy of earlier EC granted for Cogeneration Unit is attached in Annexure IX and post EC compliance of the same is attached in Annexure XIX.**

	provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report.	
	b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/ No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.	Not Applicable as it is a new project. However, for 30 MW Cogeneration unit prior Environmental Clearance as per the EIA Notification No. S.O. 1533 (E) dated 14.09.2006 and amendments thereof has taken as per vide letter number J 13012/34/2009-IA.II (T) dated September 9, 2010. The copy of earlier EC granted for Cogeneration Unit is attached in **Annexure IX** and post EC compliance of the same is attached in **Annexure XIX.** A copy of Consent to Establish and Consent to Operate is attached as **Annexure VIII** to the EIA/ EMP report.
4.	**Site Details**	
	i. Location of the project site covering village, Taluka/ Tehsil, District and State, Justification for selecting the site, whether other sites were considered.	The location of the project and site selection criterion is described in Chapter V page no 162, of the EIA/EMP report. No alternative site has considered as proposed project site is appropriate for establishment of distillery unit.
	ii. A toposheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)	Map of study area of 10 km radius marked on Toposheet is given in chapter III, Page 57. A3 size map of 10 km radius marked on toposheet is attached in annexure I.
	iii. Details w.r.t. option analysis for selection of site	Analysis for selection of site information is given in Chapter V, page no 147.
	iv. Co-ordinates (lat-long) of all four corners of the site.	Please refer Chapter II page no. 19, Figure no. 2.2 of the EIA/EMP report.
	v. Google map-Earth downloaded of the project site.	Please refer Chapter II page no. 19, Figure no. 2.2 of the EIA/EMP report.
	vi. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of	Please refer Chapter II page no. 19-A, Figure no. 2.3 of the EIA/EMP report.

		Industrial Area indicating location of unit within the Industrial area/Estate.	
	vii.	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.	Please refer Chapter II page no, photograph 2.1: Existing factory photographs, page No. 52-A
	viii.	Land use break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)	Please refer Chapter II page no 21. Table no. 2.1 and 2.2 for area breakup of project site and Chapter III page no 61, Table no. 3.4 for land use break-up, of the EIA/EMP report.
	ix.	A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area	No major industries occurred in 10 km study radius
	x.	Geological features and Geo-hydrological status of the study area shall be included.	Chapter III pages no 62-64 point no. 3.3.3 of the EIA/EMP report.
	xi.	Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)	Chapter III page no. 64, Figure 3.8. Of the EIA/EMP report for drainage pattern of the study area. No present within 1 km radius of the project site. Doodhganga River is flowing at a distance of 4.45 km in North and Vedganga River 3.87 km in West direction from the project site.
	xii.	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	The total land is in possession with management and the land acquisition.
	xiii.	R&R details in respect of land in line with state Government policy	The site is situated on a barren land without having human settlements. Therefore no R & R study is required.
5.	**Forest and wildlife related issues (if applicable)**		
	i.	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)	Not Applicable as no forest land is involved within 10 km radius of the project site.
	ii.	Landuse map based on High resolution	No forest land is involved. Please refer

	satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)	Chapter III page no. 58, figure 3.3 of the EIA/EMP report for land use map.
	iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.	Not Applicable
	iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	Not Applicable. No National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals located within 10 km radius of the project site.
	v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area	Not Applicable
	vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife	Not Applicable
6.	**Environmental Status**	
	i. Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.	Chapter III page no. 66, point no. 3.4 of the EIA/EMP report for site-specific micrometeorological data.
	ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors	Details of AAQ monitoring are given in Chapter III page No. 70 and 71.

	including reserved forests	
	iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.	Please refer **Annexure XII** for raw AAQ data.
	iv. Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.	Chapter III page no. 75-80 point no. 3.5.3 of the EIA/EMP report.
	v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details.	No. The site does not falls near to polluted stretch of river identified by the CPCB/MoEF&CC
	vi. Ground water monitoring at minimum at 8 locations shall be included	Total 10 ground water monitoring locations were selected and results for the same are given in Chapter III, Page no. 75.
	vii. Noise levels monitoring at 8 locations within the study area	Chapter III page no. 74, point no. 3.5.2 of the EIA/EMP report.
	viii. Soil Characteristic as per CPCB guidelines	Soil characteristics are given in page no. 81-84
	ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.	Details of traffic study are given in Chapter IV, page no. 134 point no. 4.2.2.3.
	x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.	Details of Flora and Fauna are given in Chapter III Page no. 85-93 , point no. 3.5.4
	xi. Socio-economic status of the study area.	Details of Socio-economic are given in Chapter III Page no. 94-106 point no. 3.6 of the EIA report

7.	**Impact and Environment Management Plan**	
	i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modeling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area have been assessed and described in Chapter IV
	ii. Water Quality modeling - in case of discharge in water body	Not Applicable
	iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or convey or cum- rail transport shall be examined.	There will be no negative impact of the transport of the raw materials and end products on the surrounding environment. All product and raw material transportation will be done by adjacent stat highways. No village road will be involved. Transportation of Products and Raw material will be done by Trucks.
	iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under EPA Rules.	Factor is proposing to adopt incineration boiler technology for spent wash treatment, Hence, process condensate around **651 CMD** will be generated during evaporation, and this will be recycled in the process. Moreover spent lees will also be recycled in the cooling tower make up water. After recycling the generated wastewater in the process, daily fresh water requirement is **639 CMD.** Hence

		total fresh water consumption is around **7.1** KL/KL of alcohol production. Complete scheme of effluent generation and its disposal is given in Chapter IV Figure 4.16 and 4.17, page no.149
	v. Details of stack emission and action plan for control of emissions to meet standards	Details of stack emissions and control measures are given in Chapter X, point no. 10.4.1 page no. 203
	vi. Measures for fugitive emission control	Chapter IV page no. 4.2.2.2 Impacts on Air, Page 118 to 119. Of the EIA report.
	vii. Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.	Solid waste will be mainly yeast sludge, ETP sludge, boiler ash and spent oil, discarded container etc. Boiler coal ash will be sold to the brick-manufacturing unit. Spent wash ash will be used as manure. The yeast sludge and sludge from ETP can be used as manure. Scrap oil authorized refiner or will be mixed with coal and burnt in the boiler. Empty containers will be Sold to authorized recyclers.
	viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	Chapter X page no. 203, 209 of the EIA/EMP report.
	ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.	Detail action plan for green belt development is given in Chapter X, page no. 210
	x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the	Chapter X pages no 216-218, point no 10.4.8 of the EIA/EMP report.

	project site to conserve fresh water and reduce the water requirement from other sources.	
	xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	Estimated cost of EMP is Rs. 223 lakhs per annum for environmental pollution control measures.
	xii. Action plan for post-project environmental monitoring shall be submitted.	Action plan for post-project environmental monitoring is given in detail in chapter VI, page no. page no169
	xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.	Details of onsite and offsite Disaster (natural and Man-made) preparedness and Emergency Management Plan including Risk Assessment and damage control is given in Chapter VII, page 188
8.	**Occupational health**	
	i. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers	Chapter X page no. 219 to point no. 7.6.10 of the EIA/EMP report. Initial fund allocation to ensure the occupational health & safety of all contract and casual workers is Rs. 10 lakhs.
	ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.	Details regarding Occupational & Safety Hazards including replacement and periodical examinations etc. have been incorporated in this EIA/EMP Report. Please refer Chapter X page no. 217,218 point no. 7.6.10 of the EIA/EMP report.
	iii. Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what	It is not applicable (NA) since, proposed project is new project.

	measures the company has adopted to keep them within PEL so that health of the workers can be preserved,	
	iv. Annual report of health status of workers with special reference to Occupational Health and Safety.	Annual report of health status of workers will be submitted in six monthly compliance report after the accord of EC as it is a new project.
9.	**Corporate Environment Policy**	
	i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	No, at the movement factory does not have approved Environment Policy; however VPPL shall be planning the same.
	ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms /conditions? If so, it may be detailed in the EIA.	VPPL shall be planning to develop environmental policy and ensures, environment policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions
	iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	Hierarchical system of the company deal with the environmental issues is given in Chapter X, page no 220, Point 10.5.
	iv. Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	The EMC will monitor non-compliances / violations of environmental norms. The cell will also be responsible for maintaining the records of data, documents and information in line with the legislative requirement and will regularly furnish the same to the concern statutory authorities.
10.	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.	Facilities during construction and operation such as clean water for washing the hands, sanitation facility and cleanup after work, Clean area for eating and taking rest shall be provided.

11.	**Enterprise Social Commitment (ESC)**	
	Adequate funds (at least 2.5 % of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.	The VPPL planned to invest 2.5 Cr. (2.5 % of total project cost) on the CSR activities. Details of CSR activities are given in Chapter X, page no 219.
12.	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	No
13.	'A tabular chart with index for point wise compliance of above TOR.	Point-wise compliance of the ToRs has been given in the tabular form.
14.	The ToRs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports.	Noted

D. General Points

Sr. No.	General points	Compliance
I.	All documents shall be properly indexed, page numbered.	Noted and complied
II.	Period/date of data collection shall be clearly indicated.	Noted and complied
III.	Authenticated English translation of all material in Regional languages shall be provided.	Noted and complied
IV.	The letter/application for environmental clearance shall quote the MOEF file No. and also attach a copy of the letter.	Noted and complied
V.	The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.	Noted and complied

VI.	The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA/ EMP Report	Noted and complied
VII.	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.	Noted and complied
VIII.	The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI) /National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.	The letter of provisional Accreditation issued by the QCI NABET is attached as with declaration in the EIA/ EMP report.

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List of Abbreviations

ABBREVIATIONS	FULL FORM
AA	Anhydrous Alcohol
AAQ	Ambient Air Quality
ACF	Activated Carbon Filter
BOD	Biological Oxygen Demand
CIP	Clean In Process
CPU	Condensate Polishing Unit
COD	Chemical Oxygen Demand
CMD	Cubic Metric Per Day
CPCB	Central Pollution Control Board
CREP	Corporate Responsibility For Environmental Protection
CSR	Corporate Social Responsibility
DG	Diesel Generator
DO	Dissolved Oxygen
DM	Demineralised water
EC	Environmental Clearance
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
ENA	Extra Neutral Alcohol
EPA	Environmental Protection Act
ETP	Effluent Treatment Plant
FO	Fusel Oil
FBC	Fluidized Bed Combustion
GI	Galvanized Sheets
GLC	Ground Level Concentration
HSE	Health, Safety And Environmental
HSD	High Speed Diesel
HWMH	Hazardous Waste (Management & Handling) Rules
IMD	Indian Meteorological Department
IMFL	Indian Made Foreign Liquor
IS	Indian Standard
KLPD	Kilo Litres Per Day
KL	Kilo lifers
kVA	kilo-volt-ampere
kWh	kilowatt hour
MoEFCC	Ministry of Environment, Forests and Climate Change
MSDS	Material Safety Data Sheet
MTD	Metric Tons per day
MW	Mega Watt

NABET	National Accreditation Board For Education And Training
NFPA	National Fire Protection Association
OSHA	Occupational Safety And Health Administration
OSPCB	Odisha State Pollution Control Board
PCC	Power Control System
PEL	Permissible Exposure Limit
PFR	Prefeasibility Report
PPE	Personal Protective Equipment's
RS	Rectified Spirit
RSPM	Respirable Suspended Particulate Matter
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
SMSEL	SMS ENVOCARE LTD
SS	Suspended Solids
STG	Steam Turbine Generator
STP	Sewage treatment plan
TA	Total Alcohol
TDS	Total dissolved solid
TSS	Total Suspended solids
TCD	Ton Crush Per Day
TLV	Threshold Limit Value
TPD	Ton Per Day
TPA	Tons Per Annum
TPH	Tons Per Hour
ToR	Terms of References
WTP	Water treatment plant
ZLD	Zero Liquid Discharge

CHAPTER I INTRODUCTION

CHAPTER I
INTRODUCTION

1.1 Purpose of report

India is the world's largest producer of sugarcane and second largest producer of sugar after Cuba; however sugar industry in India is plagued with several problems. Sugar factories cannot survive in a healthy condition on a single product i.e. sugar. Manufacturing of sugar is a seasonal phenomenon with a short crushing season varying normally from 4 to 7 months in a year, thus creating financial problems for the industry as a whole. Hence, it is necessary for the factory to establish distillery unit which provides stability to sugar unit in the financial crises. Molasses is a very important by-product of the sugar industry. The profits earned by the conversion of molasses to alcohol will be much higher than that the value realized by sale of molasses.

In view of above, Venkateshwara Power Projects Limited (VPPL) is planning to setting up 90 KLPD distillery units.

As per EIA Notification dated 14th September 2006 and its amendments thereof, it is mandatory to secure prior environmental clearance before setting up of new industry from the Ministry of Environment, Forest & Climate Change (MoEFCC), Government of India. Based on the notification, proposed activity falls under 5 (g) of category A i.e. All molasses based distillery. To initiate the EC process, Form I, PFR and proposed TOR were submitted to the Ministry of Environment, Forest and Climate Change (MoEFCC) on 2nd July 2016.

1.2 Identification of project & project proponent

Venkateshwara Power Projects Limited is one of the units under the business group called **"Mahadik Business Group".** The other group activities of this group are milk diary, petroleum, transport, LPG &auto Engineering is based in Kolhapur District. **Mahadik Business Group** of Shiroli (P), Kolhapur is in the different lines of business since last 25 years. The management is controlled by a single family. The founder Mr. M. R. Mahadik is the well-known personality of the Kolhapur. He has a very well connected socially in and around Kolhapur. He is Ex-MLC of Maharashtra for the last 12 years. His son Mr. Amal Mahadik is MLA currently. Mr. Mahadik's social and political work is appreciated in the region. Mr. Swroop Mahadik, son of Mr. Mahadik, a mechanical engineer is looking after Venkateshwara Power Projects Limited as a Managing Director. He is attached with this industry since its

establishment and is techno-commercially sound. The co-founder of the Mahadik Group Mr. Rajan Shinde, a commerce graduate is the Executive Director of the company. He has a wide experience and plays a leading role in the expansion of the different activities of the group.

The sugar factory is located in North Karnataka and close to the Maharashtra and Kolhapur Sate border. The sugar factory in operation since 2001 and co-generation is under operation since 2004. VPPL is currently operating sugar factory with capacity 3500 TCD & 30 MW co-generation power. For 30 MW Cogeneration unit prior Environmental Clearance as per the EIA Notification No. S.O. 1533 (E) dated 14.09.2006 and amendments thereof has taken as per vide letter number J 13012/34/2009-IA.II (T) dated September 9, 2010. The copy of earlier EC granted for Cogeneration Unit is attached in Annexure IX. . VPPL is now desirous to establish a molasses based 90 KLPD distilleries in the sugar factory premises at Sr. no. 164 to 170 & 85, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka.

1.3 EIA CONSULTANT

SMS ENVOCARE LTD (SMSEL) is an ISO 9001, 14001 and 18001 certified company registered under Companies Act, 1956 vide its Registration No. U74900MH2007PLC172774, 2007-2008 and is engaged in providing consultancy services in the field of Safety, Health and Environment. It also provides expert services to fulfill the Techno-legal Compliances such and as Environmental clearances and consent management. Other services include but not limited

- Environmental monitoring and analysis
- Design, supply, erection and commissioning ETPs, STPs and WTPs
- Common Hazardous Waste Treatment, Storage and Disposal Facility
- Municipal solid waste treatment, storage and disposal facility
- Common bio-medical waste treatment, storage and disposal facility
- Common Effluent Treatment Plant
- Common Sewage Treatment Plant

SMSEL is having good team of professionals with required qualification, experience and expertise required to undertake various types of jobs from different environmental fields. Within short span of time, SMSEL is accredited from National Accreditation Board for Education and Training (NABET), Quality Council of India for the EIA consultancy services in 11 Sectors and 11 Functional Area Expert (In-house 8 and empanelled 3). SMSEL is also trying to

have all 12 FAEs in-house within a span of two years. SMSEL also trying to get additional 4 to 5 sectors accredited within a year by recruiting appropriate experts. The Sectors approved by the NABET are given below in Table 1.1.

Table 1.1: NABET Accreditation

Sr. No	Sector as per NABET Scheme	Name of Sector	Category	Project or Activity Notification of 14th September, 2006
1	3	River Valley projects	B	1 (c)
2	4	Thermal power plant	B	1(d)
3	19	Man-made fiber manufacturing	A	5(d)
4	21	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	A	5 (f)
5	22	Distilleries	A	5 (g)
6	25	Sugar Industry	B	5 (j)
7	32	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	A	7 (d)
8	36	Common Effluent Treatment Plants	B	7 (h)
9	37	Common Municipal Solid Waste Management Facility (CMSWMF)	A	7 (i)
10	38	Building and construction projects	B	8 (a)
11	39	Townships and Area development projects	B	8 (b)

Ref: As per RA 88th Meeting: 04th May, 2016

SMSEL has enrolled a team of experienced, qualified and dedicated professionals including Engineers, Technologists, and Environmentalists with in-depth knowledge and profound experience in the field of Environment, health and safety. The environmental services pertaining to monitoring and analysis rendered to various Industries and infrastructure projects have been proved to be the best with the help of two State-of-Art laboratories at **MIDC Ranjangaon Pune** and **MIDC Butibori Nagpur as most of the client gave the repeat work orders.** These Laboratories are recognized and approved by **MoEFCC Govt. of India wide circular no. S.O. No. 692 (E) Dated 05.04.2011 and Q-15018/8/-CPW** respectively.

1.4 Brief description of the project

1.4.1 Nature and size of the project

VPPL is proposing 90 KLPD molasses based distillery. Molasses is one of byproducts of sugar industry which is used to produce rectified spirit/alcohol for making liquor and fuel. The main

raw material for distillery is molasses. Other raw materials will be some chemicals and Yeast which are help in fermentation.

1.4.2 Location of the project

The proposed project will be located at sr. No. 85, 164, 165, 166, 167,168, 169 &170, village Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. The proposed site is in the existing sugar factory premises, so that there is less transportation of molasses and press mud. The land requirement for proposed industry unit is already in possession and it is not prime agricultural land. There are no Tropical Forest, Biosphere Reserve, National Park, Wild Life Sanctuary and Coral Formation Reserves within 10 km Influence Zone. Geographically site is located at 580 m MSL, 16°30'51.45" N and 74°28'41.20". Location map for the same is given in Figure 1.1.

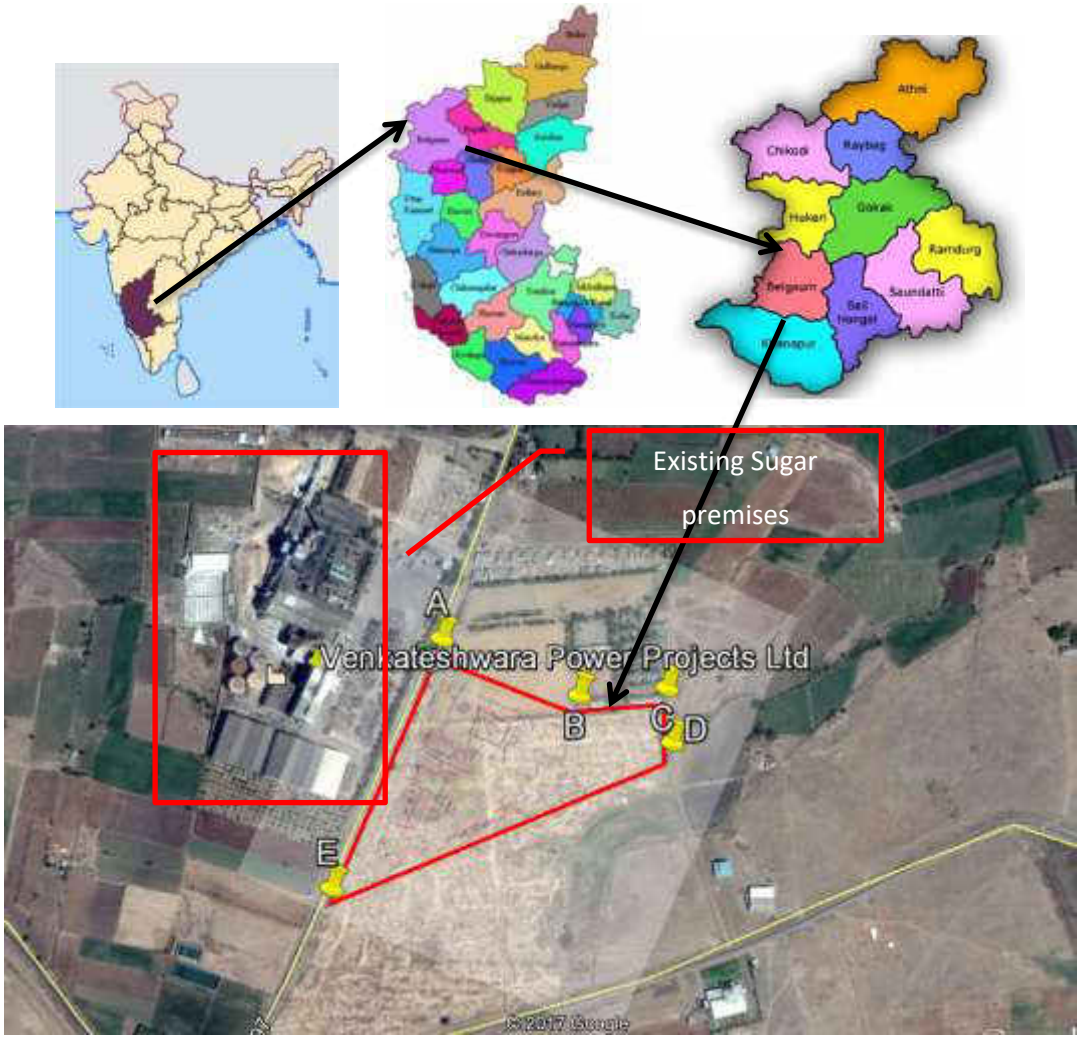


Figure 1.1: Existing sugar premises and proposed distillery location

1.5 Importance to country region

India is the fourth largest producer of alcohol in the world and there has been a steady increase in its production over the last 15 years. The production doubled from 887.2 million liters in 1992-93 to 1,654 million liters in 1999-2000 and almost trebled to 2300 million liters by 2007-08. There are about 356 molasses based distilleries in the country. Among these, about 141 distilleries are attached to sugar Industry (Source– August 2014; Vo.45, No.12 Cooperative Sugar). The present average alcohol production from molasses in the country is around 2500 million liters per annum.

In India alcohol is largely produced in the form of,

i) Rectified Spirit (RS) (95 to 96 % v/v ethanol) which is mainly used for industrial applications in the form of Ordinary Denatured Spirit (ODS) or Special Denatured Spirit (SDS)

ii) Extra Neutral Alcohol (ENA) (96 % v/v ethanol) mainly used for manufacture of potable liquors

iii) Fuel Ethanol or Absolute Alcohol (AA) (99.8 % v/v) mainly used for blending with petrol.

Present consumption of ethanol in the potable, chemical and other sectors (excluding for petrol blending) is about 1800 million liters per annum. Therefore, the net availability of ethanol for Fuel blending is about 700 million liters per annum. However, at the current levels of petroleum consumption, Ethanol requirement for 5% blending is about 1100 million liters per annum and for 10% blending it is 2200 million liters per annum. It is learnt that Oil companies are able to provide about 440 million liters of ethanol as against the 1100 million liters target for the five per cent mix. The National Biofuels Policy envisages the blending of alcohol to be enhanced to 20% by 2017. If this policy is to be implemented in letter and spirit, the demand for alcohol is likely to be increased significantly in the country. It may be noted that the alcohol production from grain based distilleries is largely used for potable purposes.

Before the introduction of Ethanol Blended Petrol (EBP) by the Government, ethanol had two major consumers – the liquor industry (country liquor & IMFL), which consumed 55-60 % of the production, and the chemical industry that consumed 40-45 %. These sectors have also been stating that ethanol availability is not sufficient to meet their current needs. The blending programme 6 might therefore force the country to import ethanol, which may be uncompetitive.

1.5.1 Use of Alcohol

1.5.1.1 Industrial Use

Ethyl alcohol is an important feedstock for the manufacture of various chemicals like acetic acid, butanol, butadiene, acetic anhydride and PVC etc. Although, ethylenes and ethylene oxide are also produced from a petrochemical route, yet this requires plants of huge scales and thus requiring substantially high investments. The drug industry also uses alcohol as a raw material for production of insulin, antibiotics, tonics and several other essential bulk drugs & formulations. The following are the major uses of alcohol- based chemical industries in the country, synthetic fibers and synthetic yarn, drugs and pharmaceuticals , agrochemicals, personal care products, dyestuffs, pigments, flavors and fragrances, textile processing, toiletries and perfumeries, paints and surface coatings, electroplating, synthetic adhesives, plastics and polymers, solvents for inks and lacquer finishes, food preservatives, oilfield chemicals, leather chemicals

1.5.1.2 Beverages

Alcohol is used in India for manufacture of Country liquor and Indian Made Foreign Liquor (IMFL). In India the pattern of alcohol consumption is quite different from the world pattern, and is generally equally utilized for Industrial Alcohol and Potable Alcohol.

Fermentation alcohol has great demand in countries like Japan, United States of America, Canada, Sri Lanka, etc.

Cane Molasses is the single largest raw material. India produces almost 25% of the world's molasses production. The alcohol production from grain will also see a significant rise as many large capacity grain based alcohol plants are likely to commence production from 2006 onwards.

1.5.1.3 Benefits of the project

- Ethanol as a fuel
- RS for industrial use
- ENA for IMFL Units
- Revenue generation
- Help to save foreign currency as import of foreign liquor will reduce.
- Direct and indirect employment to the local people

- Development of region

1.6 Applicable Environmental Acts & Rules

As per the notification, proposed project falls under Activity 5 (g) Cat. A (All molasses based distilleries). The following are the some other acts and rules related to environment which will be applicable for the proposed project

1. **The Environmental (Protection) Act, 1986 :** It is the umbrella legislation providing for the protection of environment in the country. Subject to the provisions of this Act, the Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.
2. **The Environmental (Protection) Rule, 1986**
3. **Water (Prevention and Control of Pollution) Act, 1974** and subsequent amendment
4. **Water (Prevention and Control of Pollution) Cess Act, 1977** and amendment if any
5. **Air (Prevention and Control of Pollution) Act, 1981** and amendment thereafter
6. **The Hazardous and Other Waste (management & Tran's boundary movement) Rules, 2016:** This rule gives directions to ensure safe handling, generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous Waste. Authority while State Pollution Control Boards/ Pollution Control Committees have been designated with wider responsibilities touching across almost every aspect of Hazardous wastes generation, handing and their disposal.
7. **The Factories Act 1948** (as amended by the Factories (Amendment) Act, 1987): The Act was passed with the intention of safeguarding the health (Chapter III, Section 11- 20 of the act) & safety (Chapter-IV, Section 21-41) of workers. The employer shall supply all necessary safety appliances such as safety goggles, helmets, masks, etc., to the workers and staff. The employer has to comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.
8. **Explosive Act 1884 & the Explosive Rules, 2008**: This act and rules mentions safe and protective use and management of explosive. The major work under Explosives Rules,

2008 relates to grant of approval and licenses for manufacture of explosives, authorization of explosives, storage of explosives for Sale/Use, import/export of explosives, transport of explosives by road and packaging for explosives etc.

9. **Public Liability Insurance Act 1991**

This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental there to.

1.7 Chronology of the project

The chronology of the activities during initial stages of the environmental clearance work for the proposed project is given in Table 1.2.

Table 1.2: Chronology of the environmental clearance process

Sr. No.	Particulars	Date
1.	TOR Presentation to EAC	11th EAC Meeting-21.07.2016
2.	Grant of ToR	23rd September 2016
3.	Base Line Monitoring	1st Oct-Nov- 31st Dec 2016
4.	Draft EIA submitted to Public hearing	13th February 2017
5.	Public hearing conducted	5th May 2017

1.8 Scope of the study

The baseline studies required for EIA report has been conducted as per the ToR granted by EAC vide F. No J-11011/179/2016- IA II (I) dated 21 July 2016. Detail baseline study was undertaken during the month of October, November and December 2016. Final EIA report has been prepared in accordance with the Standard TOR issued and as per the generic structure of the EIA mentioned in EIA notification dated 14th September 2006 and its subsequent amendments.

The structure of EIA is given in Table 1.3

Table 1.3: EIA Structure

Chapter No.	Heading
I	Introduction
II	Project Description
III	Description of the Environment
IV	Anticipated Environmental Impact & Mitigation Measures

Chapter No.	Heading
V	Analysis of Alternatives (Technology & Site)
VI	Environmental Monitoring Program
VII	Additional Studies
VIII	Project Benefits
IX	Environmental Cost – Benefit Analysis
X	Environmental Management Plan (EMP)
XI	Summary & Conclusion
XII	Disclosure of Consultant engaged

Detailed scope of studies is given below.

1. Executive summary: Brief of summary of EIA

2. Introduction

- Details of the EIA Consultant including NABET accreditation, information about the project proponent, importance and benefits of the project.

3. Project Description

- Products with capacities, Land requirement and details, list of raw materials, their source along with mode of transportation, Chemicals and other materials required with quantities and storage capacities. Details of emission, effluents, hazardous waste generation and their management. Requirement of water, power, with source of supply, status of approval and water balance details, man-power requirement (regular and contract).Process description along with major equipment and machineries, process flow sheet (quantities) from raw material to products are provided, Hazard identification and details of proposed safety systems, cost of project and time of completion

4. Site Details

Location of the project site covering village, Taluka/Tehsil, District and State, justification for selecting the site

- A toposheet of the study area of radius of 10 km and site location on 1:50,000/ 1:25,000 scale on an A3/ A2 sheet. Including eco-sensitive & environmentally sensitive areas

- Details for selection of site, co-ordinates (Lat-Long) of all four corners of the site and Google map , Layout maps indicating storage area, plant area, greenbelt area, utilities etc.
- Photographs of the proposed plant site. If existing, show photographs of plantation/ greenbelt, in particular. Land use break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc. will be included. (not required for industrial area)
- A list of major industries with name and type within study area (10 km radius) will be incorporated. Land use details of the study area, geological features and geo-hydrological status of the study area will be included.
- Details of drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river will also be provided.

4. Forest and wildlife related issues

i. Location of the project site covering village, Taluka/Tehsil, District and State, justification for selecting the site. A toposheet of the study area of radius of 10 km and site location on 1:50,000/ 1:25,000 scale on an A3/ A2 sheet. Including eco-sensitive & environmentally sensitive areas. Details for selection of site, co-ordinates (Lat-Long) of all four corners of the site and Google map

ii. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/ Estate/ Complex, layout of Industrial area indicating location of unit within the Industrial area/ Estate. Photographs of the proposed plant site. If existing, show photographs of plantation/ greenbelt, in particular. Land use break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc. will be included. (not required for industrial area)

iii. A list of major industries with name and type within study area (10 km radius) will be incorporated. Land use details of the study area, geological features and geo-hydrological status of the study area will be included.

iv. Details of drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river will also be provided.

5. Environmental Status

i. Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

ii. AAQ data (except monsoon) at 8 locations for PM_{10}, $PM_{2.5}$, SO_2, NO_X and other parameters relevant to the project will be collected. The monitoring stations will be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

iv. Surface water quality of nearby River (100 m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

v. Ground water monitoring at minimum at 8 locations will be included.

vi. Noise levels monitoring at 8 locations within the study area.

vii. Soil characteristic as per CPCB guidelines.

viii. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.

ix. Detailed description of flora and fauna existing in the study area will be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan will be prepared and furnished.

x. Socio-economic status of the study area.

6. Impact and Environment Management Plan

i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modeling will be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area will be assessed. Details of the model used and the input data used for modeling will also be provided. The air quality contours will be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.

ii. Water quality modeling - in case of discharge in water body

iii. Impact of the transport of the raw materials and products on the surrounding environment will be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyer cum-rail transport will be examined.

iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes will be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under EPA Rules.

v. Details of stack emission and action plan for control of emissions to meet standards.

vi. Measures for fugitive emission control

vii. Details of hazardous waste generation and their storage, utilization and management. Copies of MoU regarding utilization of solid and hazardous waste in cement plant will also be included. EMP will include the concept of waste-minimization, recycle/ reuse/ recover techniques, energy conservation and natural resource conservation.

viii. Proper utilization of fly ash will be ensured as per Fly Ash Notification, 2009. A detailed Plan of action will be provided.

ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. will be included. The green belt will be around the project boundary and a scheme for greening of the roads used for the project will be incorporated.

x. Action plan for rainwater harvesting measures at plant site will be submitted to harvest rainwater from the rooftops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

xi. Total capital cost and recurring cost/ annum for environmental pollution control measures will be included.

xii. Action plan for post-project environmental monitoring will be submitted.

xiii. Onsite and Offsite Disaster (natural and manufactured) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster Management Plan should be linked with District Disaster Management Plan.

7. Occupational health

i. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

ii. Details of exposure specific health status evaluation of worker. During pre-placement and periodical examinations and the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.

iii. Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved, annual report of health status of workers with special reference to Occupational Health and Safety.

8. Corporate Environment Policy

i. Detailed in Environment Policy of the Factory

ii. Hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.

iii. Reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large and this reporting mechanism will be detailed in the EIA report.

9. Infrastructure facilities

Details such as sanitation, fuel, restroom etc. to be provided to labor force during construction as well as to the casual workers including truck drivers during operation phase.

10. Specific Terms of Reference for EIA Studies for Distilleries

i. List of existing distillery units in the study area along with their capacity and sourcing of raw material.
ii. Number of working days of the distillery unit.
iii. Details of raw materials with their source & availability.
iv. Details of the use of steam from the boiler.
v. Surface and Ground water quality around proposed ETP.
vi. Proposed effluent treatment system (condensate and utilities) as well as domestic sewage and scheme for achieving Zero Liquid Discharge (ZLD).
vii. Proposed action to restrict fresh water consumption.
viii. Details about capacity of storage tank, material used, design consideration.
ix. Action plan to control ground water pollution.
x. Details of solid waste management including management of boiler ash, yeast, etc. Details of incinerated ash generation and its disposal, if used.
xi. Action plan to control odor pollution.
xii. Arrangements for installation of continuous online monitoring system (24 X 7 monitoring device)

CHAPTER II

PROJECT DESCRIPTION

CHAPTER II

PROJECT DESCRIPTION

2.1 INTRODUCTION

This chapter furnishes detail information on project type, its need, location, size/magnitude, technology and process. It also gives details on complete of the project its description, operating conditions and implementation schedule.

2.2 TYPE OF PROJECT

Venkateshwara Power Projects Limited is setting up 90 KLPD molasses based distillery in the existing sugar factory premises. The factory is having a crushing capacity of 3500 TPD and co-generation of 30 MW. **For 30 MW Cogeneration unit prior Environmental Clearance as per the EIA Notification No. S.O. 1533 (E) dated 14.09.2006 and amendments thereof has taken as per vide letter number J 13012/34/2009-IA.II (T) dated September 9, 2010. The copy of earlier EC granted for Cogeneration Unit is attached in Annexure IX and post EC compliance of the same is attached in Annexure XIX.** The Manufacturing of Rectified Spirit/ Extra Neutral Alcohol/ alcohol for making liquor/ fuel will be done by adopting continuous fermentation method. The fermented wash will be distilled in a pressure vacuum distillation to obtain rectified spirit and Extra Neutral Alcohol will be from Rectified Spirit. The impurities in Rectified Spirit will be reduced by diluting and redistilling the spirit. The impurities like aldehydes, ketones, acids, esters, higher alcohols are minimized by controlled condition.

2.3 NEED OF THE PROJECT

Utilization of molasses for the production of ethanol in India will not only provide value addition to the by-product, it also ensures better price stability and price realization of molasses for the sugar mills. This will improve the viability of the sugar mills, which will in turn benefit to cane growers.

2.3.1 Industry overview

Molasses is one of byproducts of sugar industry which is used to produce rectified spirit/alcohol for making liquor and fuel. Traditionally, molasses has been used in India to produce rectified spirit and alcohol of higher than 95% purity for producing liquor for human

consumption and for producing various chemicals. However, with technological developments in the recent past, molasses has been effectively used to produce bioethanol for blending with petrol as a fuel.

2.3.2 Global scenario

Brazil is the second largest producer of ethanol globally after U.S. While U.S. produces ethanol from corn, Brazil manufactures ethanol from sugarcane. Brazil has mandatory blending ratio of ethanol in gasoline ranging from 18% to 25%. The blend rate was as high as 25% before September 2011 and was reduced to 20% due to drop in cane output hence affecting the ethanol production. Currently, flex-fuel cars, which can use either ethanol or blended gasoline, in Brazil account for about 53% of the total car fleet and around 90% of the new vehicles sales. The proportion of the flex-fuel cars are expected to cross 80% by 2020. Currently, the Brazilian light vehicle fleet has been increasing by 6.7% y-o-y since 2003 with currently 90% of the new vehicles being flex-fuel cars. Thus, there exists an increasing demand in Brazil for ethanol which is encouraging for the sugarcane industry.

2.3.3 Indian scenario

India has about 330 distilleries, which produce over 4 billion liters of rectified spirit (alcohol) a year. Beyond total distilleries, about 120 distilleries have the capacity to distillate 1.8 billion liters (an additional annual ethanol production capacity of 365 million liters was built up in the last three years) of conventional ethanol per year which is sufficient to meet requirement for 5% ethanol blending with petrol.

2.3.4 Government policy

In 2006, GOI mandated 5% ethanol blending with petrol, EBP program to directly benefit the sugarcane farmers by assuring the sugar industry a stable and reasonable return for the molasses and then passing a significant part of the same to the farmers. But since then the program has been struggling to take off despite the fact that the Cabinet Committee on Economic Affairs (CCEA) in November 2009 directed that a financial penalty be imposed on oil marketing companies for their failure to reach targets. In November 2012, the CCEA has made it mandatory for Oil Marketing Companies (OMCs) - Bharat Petroleum, Hindustan Petroleum and Indian Oil Corporation - to blend 5% ethanol with petrol. This is likely to reduce the fuel import bill and lower India's dependence on fossil fuel as the ethanol prices are lower than

petrol. The OMCs have been blending ethanol with petrol for the past two years but the policy was partially implemented in absence of any clear directive. The committee, headed by the Prime Minister, has also approved market-based pricing of the biofuel, opening the market for ethanol producers - mostly sugar companies. This shall result in an increased demand for ethanol by OMCs.

The national bio-fuel policy, approved by the Government of India, has plans for a 20% ethanol blending programme by 2017 from the current mandated 5% blending & recently increased to 10%, to reduce India's dependence on fossil fuel imports.

2.3.5 Demand & supply gap

The gap between the availability of alcohol and the requirement by the industry has been widening. The existing requirement of alcohol by the industries is around 450 crore liters annually at 10% fuel ethanol blending, industrial alcohol and potable alcohol and the production is around 285 crore liters. The trend is increasing as the blending increases.

Statement showing estimated production, availability and requirement of alcohol in India- Alcohol Year.

Sr. No.	Particulars		2014 –15	2017-18 Estimated
1.	Estimated Sugar Production during the year	Million Tonns	28.00	27.00
2.	Molasses Production	Million Tonns	12.60	12.15
3.	Wastage and other uses 5%	Million Tonns	0.63	0.50
4.	Molasses available for production (2-3)	Million Tonns	11.97	11.64
5.	Net Alcohol available from molasses	Million Ltrs.	2694	2737
6.	Add: Grain Alcohol Production	Million Ltrs.	1500	1500
7.	Total Alcohol Available (5+6)	Million Ltrs.	4194	4237
8.	Total Consumption for potable sector I.M.F.L. + C.L.	Million Ltrs.	1910	1950
9.	Balance Available (7-8)	Million Ltrs.	2284	2287
10.	Other uses i.e. Chemicals etc.	Million Ltrs.	850	850
11.	Availability for Ethanol Blending	Million Ltrs.	1434	1437
12.	Requirement for blending @10%	Million Ltrs.	2800	2800
13.	Shortfall for blending	Million Ltrs	1366	1363

2.4 LOCATION AND SITE DETAILS

The proposed project will be located at sr. No. 85, 164, 165, 166, 167, 168, 169 &170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. The proposed site is in the existing sugar

factory premises; so that there is less transportation of molasses and the maximum resources like water, power and road connectivity are available. The land requirement for proposed industry unit is already in possession and it is not prime agricultural land. State highway -97 is adjacent to proposed site. District headquarter Belgavi is 74 km away from the project site. The nearest habitation is village Galatga 2.4 km and Bedkihal 2.8 km away from the project site.

There are no Tropical Forest, Biosphere Reserve, National Park, Wild Life Sanctuary and Coral Formation Reserves within 10 km Influence Zone.

Site is geographically located at 580 m MSL, 16°30'47.37"N, and 74°28’39.73” E. The topography of the proposed project site is nearly flat with some undulating patches. The existing land is used for industrial purpose and comes under Karnataka Industrial Development Corporation. Doodhganga River is flowing at a distance of 4.45 km in North and Vedganga River 3.87 km in West direction from the project site.

The general location map is given in Figure 2.1 and Figure 2.2 showing project site boundary on Google map. Plant Layout of proposed project is given in Figure 2.3.

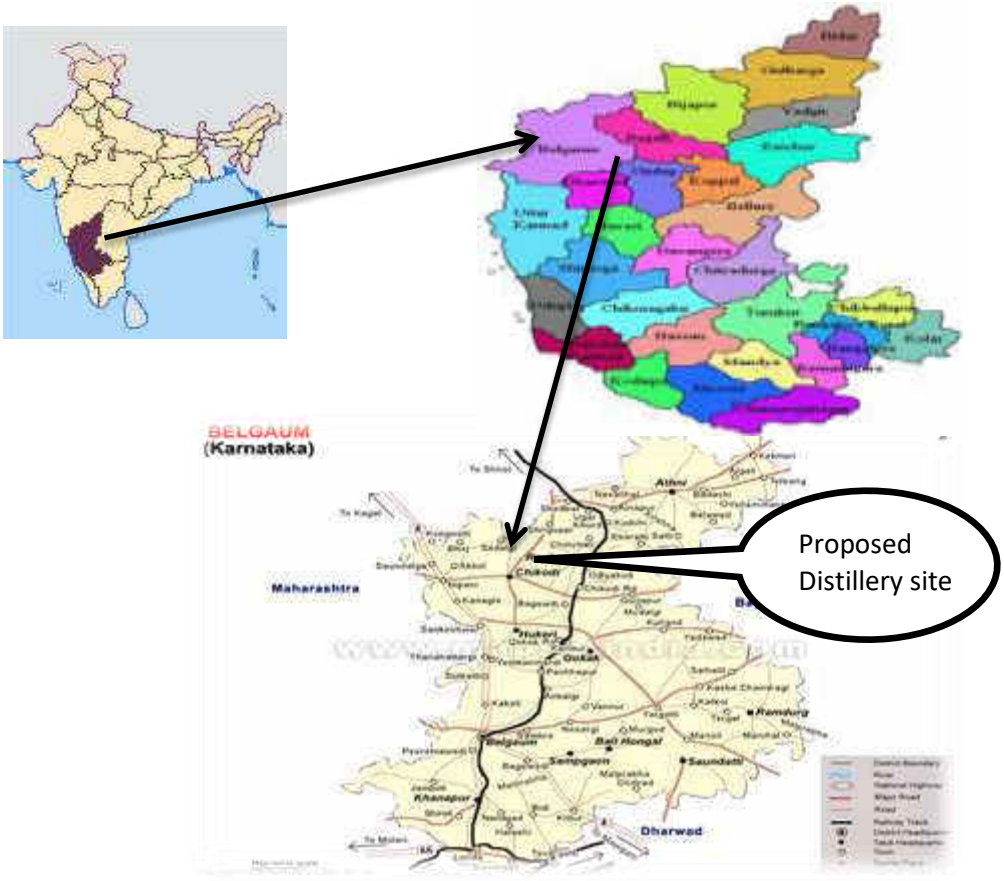


Figure 2.1: General location map of proposed distillery

Figure 2.2: Project boundary map of proposed distillery and existing sugar premises

Geographic co- ordinates of proposed distillery

A	16°30'51.44"N, 74°28'37.49"E	**D**	16°30'48.08"N, 74°28'47.21"E
B	16°30'49.64"N, 74°28'43.26"E	**E**	16°30'41.41"N, 74°28'33.82"E
C	16°30'50.20"N,74°28'46.82"E		

Geographic co- ordinates of existing sugar premises

A	16°30'59.99"N, 74°28'39.22"E	**F**	16°30'51.52"N, 74°28'26.79"E
B	16°31'0.07"N, 74°28'29.97"E	**G**	16°30'51.48"N, 74°28'28.87"E
C	16°30'56.55"N, 74°28'29.57"E	**H**	16°30'44.69"N, 74°28'28.29"E
D	16°30'56.95"N,74°28'27.13"E	**I**	16°30'43.56"N, 74°28'33.67"E
E	16°30'53.19"N, 74°28'26.55"E		

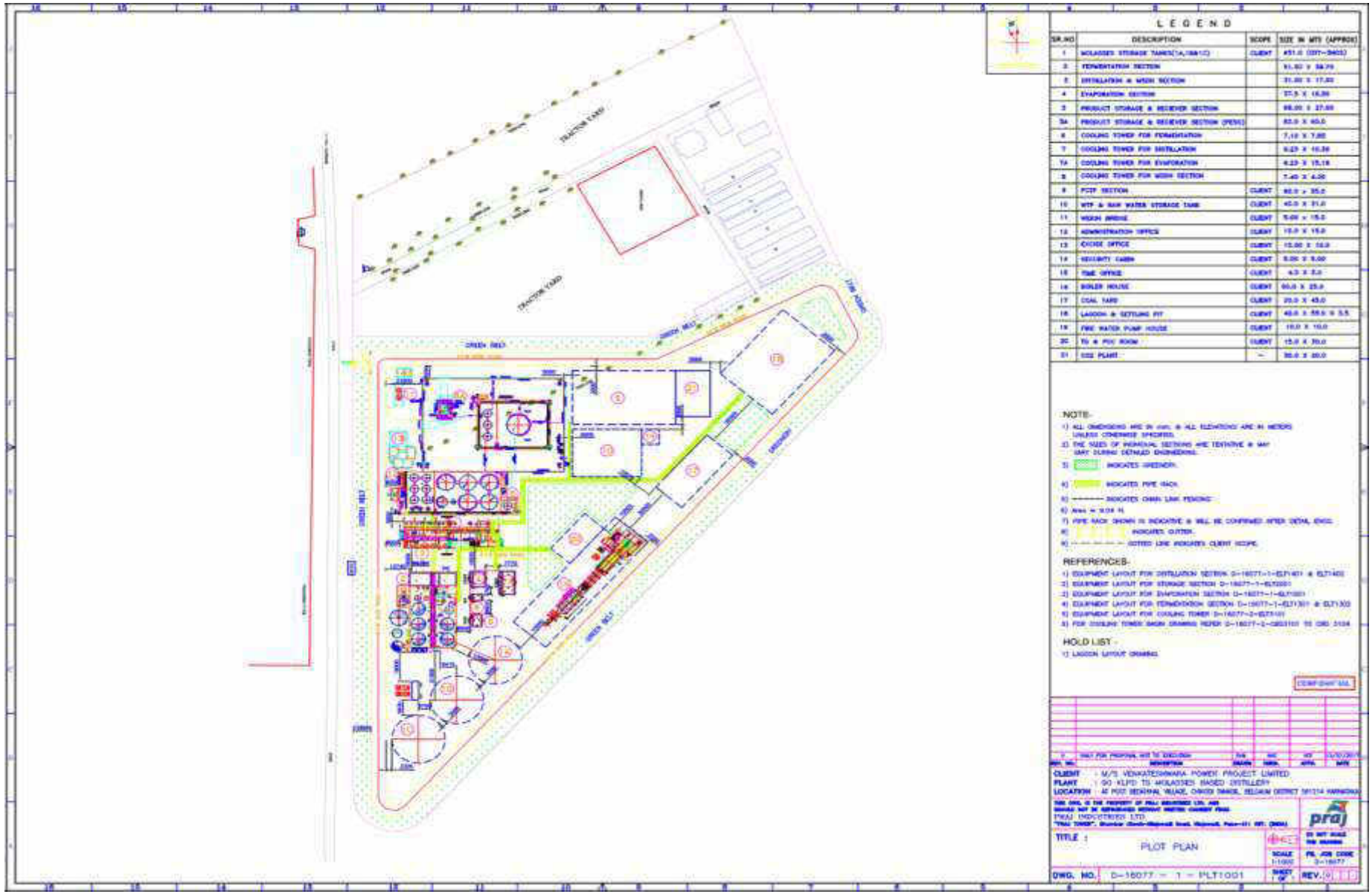


Figure 2.3: Plant Layout

Figure 2.3(A): Existing sugar factory premises with proposed distillery plant layout

Table 2.1: Land bifurcation

No.	Units	
1.	Molasses Storage Tanks	2263.155
2.	Fermentation Section	1993.05
3.	Distillation Section	542.5
4.	Evaporation Section	618.75
5.	Product Storage & Receiver Section	1836
6.	Product Storage & Receiver Section	4920
7.	Cooling Tower for Fermentation	55.735
8.	Cooling Tower for Distillery	95.069
9.	Cooling Tower for Int. Evaporation	140.1114
10.	Cooling Tower for MSDH Section	31.08
11.	PCTP Section	2100
12.	WTP & Raw Water Storage Tank	1240
13.	Weigh Bridge	75
14.	Administration Office	225
15.	Excise Office	100
16.	Security Cabin	25
17.	Time Office	20
18.	Boiler House	2250
19.	Coal Yard	900
20.	Lagoon & Settling Pit	7700
21.	Fire Water Pump House	100
22.	TG and PCC room	390
23.	CO2 Plant	600
24.	Total area	28220.4504
25.	**Acres**	**6.97 Acres**

The land requirement for different applications for the proposed industry consisting of sugar, power and distillery units are given in Table 2.2.

Table 2.2: Land utilization

Sr. No.	Land utilization	Area in acres
1.	Sugar Industry	13.0
2.	Cogeneration unit	3.56
3.	Proposed distillery area	6.97
4.	Existing green belt area	8.53
5.	Vacant land	2.3
6.	Proposed distillery green belt area	2.3
7.	**Total area**	**36.66**

2.5 MAGNITUDE OF THE OPERATION

2.5.1 Salient features of the project

Breif information of the project is given in Table 2.3 and design parameter for distillery is given in Table 2.4.

Table 2.3: Project Information in brief

Sr. No.	Particulate	Description
1.	Name of the proponent	M/s Venkateshwara Power Projects Limited
2.	Project capacity	90 KLPD Molasses Based Distillery
3.	Location of the project	Sr. No. 85, 164, 165, 166, 167, 168, 169 &170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka.
4.	Geographic Location	16°30'47.37"N, 74°28'39.73"E 580 m MSL
5.	Land requirement	6.97 acre built up area 2.3 acre green belt area
6.	Product	• Rectified spirit(RS) :90 KLPD **Or** • Extra Neutral Alcohol (ENA): 90 KLPD **Or** • Anhydrous Alcohol (only Fuel grade):90.00 KLPD • Impure Spirit: 6.25 KLPD (One at time) • CO_2 gas: 71 MT
7.	Operation days	330 days
8.	Molasses required	Molasses 385-390 TPD (Fermentable sugar 42 **%** w/w)
9.	Total water	**Distillery: 639 CMD (After recycling during season of sugar factory) and during off season of sugar factory: 339 CMD (recycled water from sugar unit).** **Sugar: For Initial startup 2575 CMD, after recycling 340 CMD fresh water will required daily.**
10.	Source of water	Sadalga Barrage on Doodhganga River Around 8.0 km in NE.
11.	Electricity	Operational: 2595 kWh Connected load: 3655 kWh
12.	Turbine generator	3.0 MW
13.	Steam	23.05 TPH
14.	Fuel	Indian coal: 62.84 TPD Concentrated spent wash: 242 TPD
15.	Source	Nearby Market
16.	Boiler	30 TPH
17.	DG	Two DG sets of capacity 250 kVA

Sr. No.	Particulate	Description
18.	Effluent treatment system	Condensate Polishing Unit (CPU) will treat spent lees, cooling tower blow down, boiler blow down and process condensate. Spent wash will be treated by multi effect evaporator followed by slope fired boiler.
19.	Man-power	70 skilled and unskilled
20.	Total project cost	103.73 cr.
21.	Total EMP cost	2.23 Cr

Table 2.4: Design Parameter for distillery operation

Sr. No.	Description	Quantity
1.	Sugar factory crushing capacity (TCD)	3500
2.	No. of hrs. per day	24
3.	No. of season days, sugar factory	160
4.	Cane crushing (MT) @ 160 day	560000
5.	Molasses % cane	4.50
6.	Molasses available after diverting B-Heavy molasses @ 160 day(MT)	25200
7.	Molasses available per day @160 days (MTD)	157.5
8.	Distillery capacity (KLPD)	90
9.	No. of days of operation of distillery	330
10.	Molasses required for distillery MT per annum	126390
11.	Molasses required for distillery MT per day	383 TPD
12.	Own molasses available MT per annum	25200 MTA
13.	Procured molasses MT per annum	101190 MTA
14.	Ethanol recovery for one liters /MT of molasses containing 42% w/w fermentable sugars @95 % v/v	251
15.	Spent-wash generation (TPD)	961
16.	Total conc. spent wash generation (CMD)	255
17.	Steam & power requirement	By separate 30 TPH slop fired boiler & attached TG

Table 2.5: Design parameter for Integrated raw spent wash evaporation

Sr. No.	Description	Unit	Data
1.	Feed rate to evaporator including process condensate treatment plant RO reject	TPD	**961**
2.	Total solids in Feed	% w/w	15.15
3.	Product rate/concentrated spent wash	TPD	247-270
4.	Product solids	% w/w	55-60
5.	Feed temperature (assumed)	°C	32
6.	Water evaporation rate	TPD	770-792

Table 2.6: Existing sugar and cogeneration plant details

Sr.No	Description	Quantity		Unit
1.	Crushing capacity, TPD	3500		TCD
2.	Number of crushing days/year	160		
3.	Boiler used	70 and 80		TPH
4.	Power generation capacity	30		MW
5.	Power consumption	**Season**	**Offseason (Cogen.)**	MW
	For sugar plant and cogen	12	12	
	Other In-house consumption	4.5	2.5	
	Power export	7.5	9.5	
6.	Bagasse generation	945		TPD @28.4%
7.	Bagasse required for cogeneration	840		TPD
8.	Saved bagasse	105		TPD
9.	Molasses generation	25200		TPD
10.	Fresh water requirement for Sugar and cogeneration after recycling.	**For startup 2575**		CMD
		Daily fresh water 340 CMD		
11.	Water storage capacity	4700		CMD
12.	Effluent generation form sugar and cogeneration plant	**317.8 CMD**		CMD
13.	Final disposal of treated effluent	For ferti irrigation.		-
14.	Ash generation from existing plant	110		TPD
15.	Pressmud	135		TPD
16.	ETP Sludge	0.300		TPD
17.	Lime sludge	0.500		TPD
18.	WTP Sludge	0.1		TPD
19.	Final disposal of Ash	Given to farmer as manure.		-
20.	Storage capacity of Bagasse's yard	10000		MT
21.	Storage capacity of Molasses	24000		MT
22.	Existing manpower requirement for Cogeneration (skilled and unskilled)	500- 550		No.

2.5.2 Resource requirement

The detail raw material required for distillery operation listed below in Table 2.7.

Table 2.7: Raw material requirement

Sr. No.	Name of raw material	Quantity	Storage	Transportation
	Distillery			
1.	Molasses	385-390 TPD	3 X 10000 MT Existing 24000 MT	Tanker
2.	Coal	62.84 TPD	-	Trucks
3.	Sulfuric Acid	10 kg /kl	-	Trucks/tempo

4.	Urea	5 kg/kl	-	Trucks/tempo
5.	Di ammonium Phosphate	4 kg /kl	-	Trucks/tempo
6.	Anti-foam reagent	2.5 kg/kl	-	Trucks/tempo
	Existing sugar and Cogeneration			
1.	Sugarcane	3500	-	Trucks/trackers /bullock cart
2.	Lime	5.25 MTD	-	Trucks/tempo
3.	Sulphur	0.02 MTD	-	Trucks/tempo
4.	Caustic soda (50%)	0.150 MTD	-	Trucks/tempo
5.	Hydrochloric acid (30%)	0.6 MTD	-	Trucks/tempo
6.	Caustic soda	0.150 MTD	-	Trucks/tempo

2.5.2.1 Molasses

Molasses is a by–product from sugar industry left behind after the extraction of crystalline sugar from the evaporated sugar can juice. Molasses fermentation process utilizes yeast enzymes to convert the sugar into alcohol. Molasses is a viscous byproduct of the refining of sugarcane or sugar beets into sugar. Molasses contains 50 to 55% dissolved sugar, of which 35 to 40% is in the form of sucrose and 15 to 20% in the form of inverted sugar. An output of 250 liters of alcohol can be secured out of every ton of molasses, allowing for wastage and use of molasses for various other purposes. Proposed distillery of 90 KLPD will required 383 TPD molasses. The factory will have its own molasses of 25200 MT. Remaining quantity of molasses of about 1, 01,190 MT will be procured from nearby sugar factories. The factory has received letter of intent from five nearby sugar factories regarding the supply of molasses. The molasses storage will be as per the CPCB guidelines. General specification of molasses is given in Table 2.8 . List of sugar factories providing molasses is given in Table 2.9.

Table 2.8: Molasses specification

Sr. No.	Specification	Per	
1.	Molasses requirement	385-390	TPD
2.	Total Solids	80	%W/W
3.	Color in terms of optical density (OD) at 375 nm with 0.1 % w/v molasses dilution	<0.35	OD
4.	pH at 40° Brix	4.5 -5.0	
5.	Total Inorganics	< 12	%W/W
6.	Fermentable Sugar (FS)	42	%W/W
7.	F/N Ratio	0.9	
8.	Total Dry Sludge at pH 4.5	< 2.5	%W/W
9.	Titrable Volatile Acids	< 5000	ppm
10.	Yeast Free Assimilable Nitrogen Content (FAN)	1500	ppm
11.	Butyric Acid Content	<100	ppm

Sr. No.	Specification	Per	
12.	Total Bacterial Count	<1000	Cfu/gm
13.	Sulphated Ash	12	

Table 2.9: Sugar factory list

Sr. No.	Name of factory/ supplier	Molasses quantity	Distillery Capacity	Distance from factory
1.	Shri. Chhatrapati Rajaram Sahakari Sakhar Karkhana Ltd., Kasaba Bawada, Kolhapur	16000-20000 MT	45 KLPD	~35-40 km
2.	Shree Chhatrapati Shahu Sahakari Sakhar Karkhana Ltd., Kagal, Kolhapur	7000 TCD sugar	60 KLPD	21 km
3.	Jawahar Shetkari Sahakari Sakhar Karkhana Ltd., Hupari, Shri Kallappanna, Hupari, Kolhapur 416203.	60000-65000 MT	-	~20-25 km
4.	Shri Gurudatt Sugars Limited Takaliwadi, Taluka Shirol, Kolhapur	30000-35000 MT	-	~20-25 km
5.	Shri Halasidhanath SSK Ltd. Shankaranandnagar, Nipani, Tal. Chikodi, Chikodi, Belgaum - 59120	7500-8000 MT	-	~20-25 km
6.	Shree Doodhganga Krishna Sahakari Sakkare Karkhane., Chikodi, Belgaum, Karnatak	33000-38000 MT	90 KLPD	~20-25 km
7.	Shivshakti Sugars Limited Ankli Raibag Road, Raibag Road, Belgaum (Under construction)	16000-20000 MT	90 KLPD	~40-45 km
8.	Shree Renuka Sugars Ltd. RS 367/1, Manoli, Saundatti-Yellamma, Karnataka	45000-50000 MT	-	~80-90 km
9.	Shree Doodhaganga- Vedganga Sahakari Sakkare Karkhane LTD, Chikodi, Belgaum	33000-38000 MT	90 KLPD	~16 km
10.	Ghataprabha Sahakari Sakkare Karkhane Niyamit, Gokak, Belgaum - 591307, Near Ghataprabha Railway Station	15000-18000 MT	-	52 km
11.	Athani Sugars Ltd. Vishnuanna Nagar, Post: Navalihal, Tal: Athani, Dist: Belgaum - 591 234, Karnataka	27000-32000 MT	90 KLPD	~40-45 km
12.	The Ugar Sugar Works Ltd. Dist :Belagavi, Karnataka.	60000-65000 MT	200 KLPD	~60-65 km
13.	Shree Someshwar Sahakari Sakkare. Belwadi, Bailhongal, Belgaum, Karnataka	15000-18000 MT	-	~40-45 km
14.	Vishwanath Sugars Ltd., Bagewadi, Hukeri, Belgaum - 591309	15000-18000 MT	-	~30-35 km
15.	Sar Senapati Santaji Ghorpade Sugar Factory Ltd. Kagal, Kolhapur, Maharashtra.	27000-32000 MT	30 KLPD	~30-35 km
16.	M/s. Soubhagya Laxmi Sugars Ltd., Hirenandi Village, Gokak Taluk, Belgaum District, Karnataka State	7500 TCD	60 KLPD	70 km

17.	Bhima Sahakari Sakhar Karkhana Ltd., Takali Sikandar, Mohol, Solapur, Maharashtra 413248	5000 TCD	-	165 km
18.	Ajara Shetkari Sahakari Sakhar Karkhana Ltd., Tal.Ajara, Gavase, Kolhapur	3500 TCD	-	58 km

2.5.2.2 Water requirement

The total fresh water requirement for distillery at the startup will be around **1527 CMD**, and after recycling daily fresh water requirement will be **639 CMD**. Source of water will be Sadalga Barrage on Doodhganga River. During season of sugar factory **300 CMD** recycled water will be send to distillery. Hence, fresh water intake of distillery will reduce and required only **339 CMD** as a fresh water intake. Water storage facility is available with the sugar factory. Detail water breakup is given in **Table 2.10.** Total daily fresh water requirement for current Sugar and Cogeneration project is 340 CMD. Detail water balance are given in Table 2.11 and Figure 2.5

Table 2.10: Water and wastewater balance for distillery

Sr. No.	Water inputs	CMD
1.	Process water for fermentation section and CO_2 scrubber	705
2.	DM water for RS dilution	100
3.	Water for vacuum pump, pump sealing, air blower & others	12
4.	Soft water makeup for cooling towers	600
5.	Other domestic usage, laboratory uses, cleaning	10
6.	DM water for Boiler	100
7.	**Total water input at start-up**	**1527**
	Water Output	
1.	Spent Lees (PR & Rect.)	225
2.	Process condensate	651
3.	CT Evaporation & Drift Losses	540
4.	Water losses from vacuum pump, pump sealing, Air blower	11
5.	Cooling tower and boiler blow down	100
6.	**Total Water Output**	**1527**
	Recycling water	
1.	Lees recycle for cooling tower make up	225
2.	Process condensate fermentation	432
3.	Process condensate to cooling tower, CIP, Fermentation	219
4.	Pumps Sealing Water Recycle cooling tower	11
5.	CO_2 scrubber beer well to process water to pump	1
6.	**Total Recycling water per day**	**888**
	Daily fresh water input	**639**
During season of sugar factory **300 CMD** recycled water will be send to distillery. Hence, fresh water intake of distillery will reduce and required only **339 CMD** as a fresh water intake.		

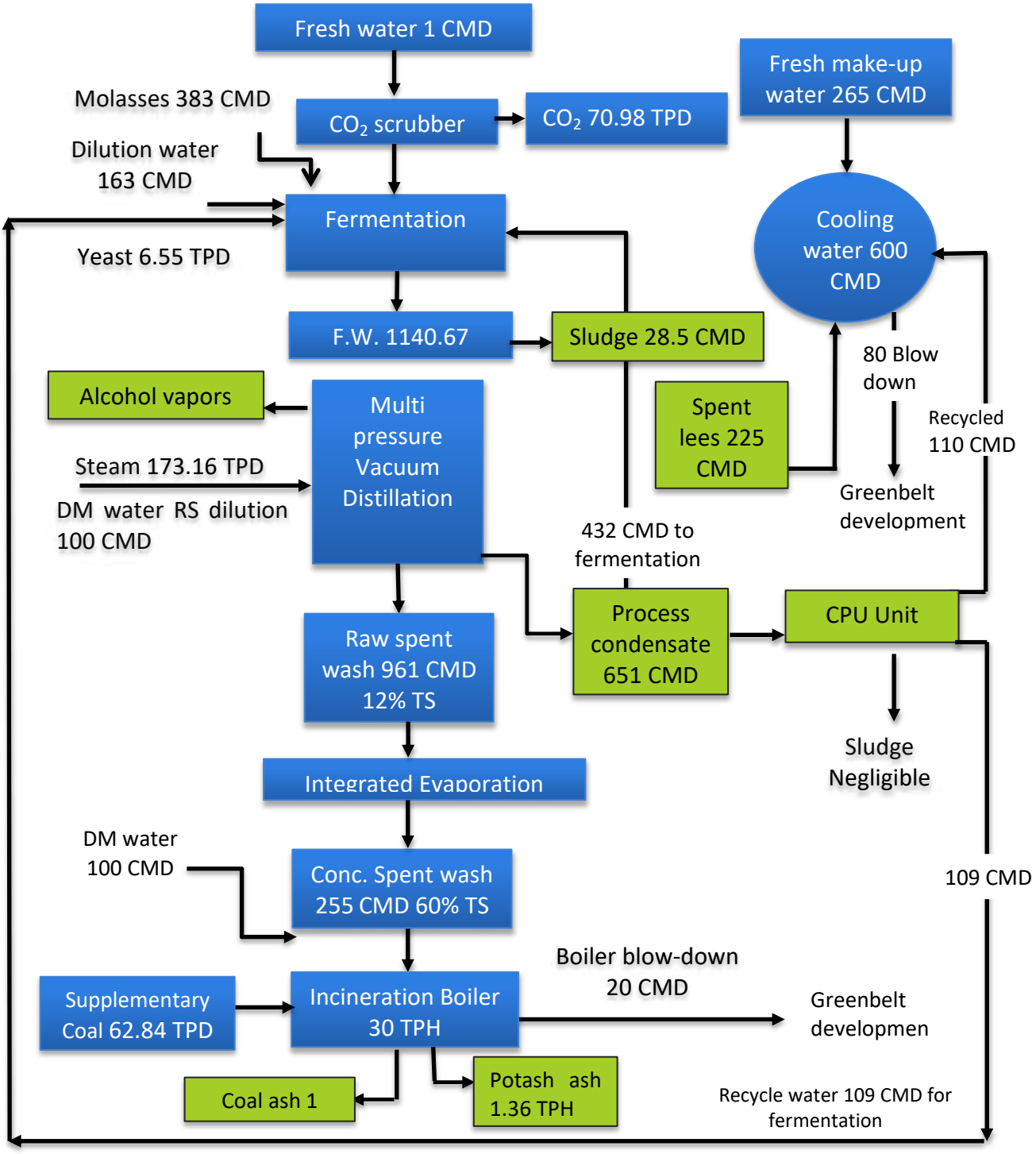


Figure 2.4: Water balance chart

Table 2.11: Water requirement for existing sugar and cogeneration

Sr. No.	Particulars	Sugar CMD
1.	For startup of sugar unit	2575
2.	Water recovered	2235
3.	Total daily fresh water required after recycling	340

Table 2.12: Wastewater generation of sugar and cogeneration

Sr. No.	Source	CMD	Treatment	Final Disposal
1.	Sugar Plant	317.8	ETP Treatment Units: Bar screen and grit chamber, oil and grease traps, reaction tank, equalization tank, anaerobic tank, aeration Tank I, aeration Tank II, secondary clarifier, sludge drying bed and polishing pond. For polishing pond for dilution with other effluent and	For ferti irrigation.

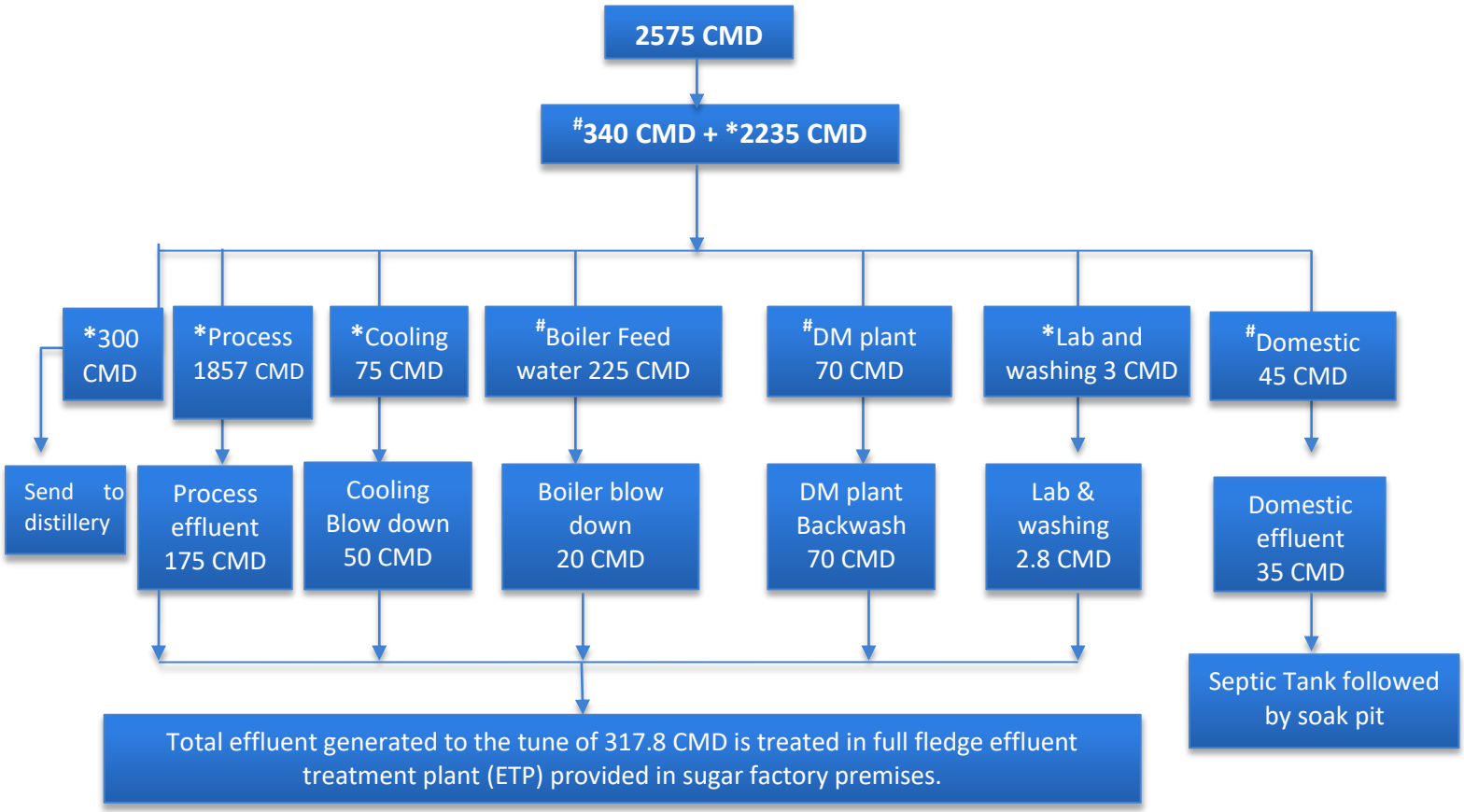


Figure 2.4(A): Water Balance in Sugar 3500 TCD and 18 MW Cogeneration plant (m^3/ Day)

Note:

Water consumption represented is the quantity towards daily requirement of water. This is the actual quantity of water taken from outside.

***** Water consumption thus represented is actually utilized from the Condensation water quantity. i.e The Natural water present in sugar cane becoming available after crushing of the cane followed by subsequent processing, evaporation and condensation operation as well as the cogeneration turbine condensate.

2.5.2.3 Electricity requirement

The estimated power requirement will be 2595 kWh. The power required will be met from power generation 3.0 TG attached to slope filer boiler. Total power requirement for fermentation, distillation, ENA section, cooling tower, storage and plant yard lightning. The existing sugar factory is having one TG of 30 MW capacity. Backup power arrangement is done with DG sets of capacity 250 kVA. Electricity consumption breakup is given in **Table 2.13.**

Table 2.13: Electricity consumption bifurcation

Sr. No.	Section	Operating load (kWh)	Connected load (kWh)
1.	Fermentation	280	400
2.	Distillation	150	300
3.	MSDH	35	70
4.	Integrated RSW evaporation	425	525
5.	Process condensate treatment plant	185	340
6.	Alcohol storage	40	80
7.	Utility (Cooling tower)	550	850
8.	Instrument air compressor	30	60
9.	Boiler	800	900
10.	Watet Treatment Plant	100	130
11.	**Total**	**2595**	**3655**

2.5.2.4 Steam requirement

The estimated total steam requirement of the proposed distillery will be 23.05 TPH. The factory has decided to install slope fired boiler of 30 TPH for distillery operations. Existing sugar factory is having two boilers, of 70 TPH & 80 TPH. Steam consumption bifurcation of proposed distillery and existing sugar is given in Table 2.14.

Table 2.14: Steam Bifurcation

Sr. No.	Section	Quantity (TPH)
Steam utilization for Distillery		
1.	Steam for Distillation (Wash to ENA mode)	12.85
	Or Steam for Distillation (Wash to EQRS)	9.65
2.	Steam for Integrated Evaporation	8.00
3.	Steam for MSDH	2.20
4.	**Total**	**23.05**
Steam utilization for sugar factory		
5.	Crushing rate	3500 TCD
6.	Steam Generation	1920 MTD

7.	Steam Requirement	1440 MTD
8.	Steam Condensate	480 MTD

2.5.2.5 Major utilities details

Table 2.15: Boiler details with stack details

Sr. No.	Boiler	Unit	Design Capacity
1.	New 30 TPH slope fired boiler	TPH	30
2.	Fuel Indian coal	TPD	62.84
3.	Flow rate of flue gases, Nm^3/hr	Nm^3/hr	97500
4.	Flue gas temperature at stack, C^0	^0C	180
5.	Flue gas velocity through stack,m/s	m/s	18
6.	Emission rate of PM10	mg/Nm3	50
7.	Emission rate of NOx	ppmv on 7% O_2 DRY	300
8.	Emission rate of SO_2	ppmv on 7% O_2 dry	1100+/- 25
9.	Stack height, m	m	62
10.	APC device in boiler	-	Electrostatic precipitator
11.	Ash generated from Boiler	TPH	2.36

Table 2.16: Cooling tower details

Sr. No	Particular	Quantity
1.	Distillation	500 CMD
2.	Fermentation	400 CMD
3.	Cooling tower for MSDH	250 CMD
4.	Evaporation	500 CMD

2.5.2.5 Fuel Requirement

Indian coal and concentrated spent wash will be used as Boiler fuel. HSD diesel will be used in D.G sets in case of power shut down or emergency. Fuel consumption details are given in below in Table 2.17.

Table 2.17: Fuel consumption

Sr. No	Fuel	Quantity
1.	Concentrated spent wash	255 TPD
2.	Indian Coal	62.84 TPD
3.	HSD	140 lit/hr
4.	Spent wash concentrate, GCV	1600 kcal/kg
5.	Coal GCV	8,000 kcal/kg

2.5.2.6 Manpower requirement

During construction phase 50-60 skilled and un-skilled labors will be required. Local labors will be engaged during construction phase. During operation phase skilled labor like distillery

Manager, Process Engineers, Supervisor and Operators will be required. Total initial manpower requirement during operation phase is given below in Table 2.18. The required skilled manpower shall be made available from the local area and appropriate training will be imparted to get required skill for the operation of the plant.

Table 2.18: Total manpower requirement

Sr. No	Staff	Nos.
1.	Distillery manager	1
2.	Production manager	1
3.	ETP in-charge	1
4.	Lab chemist	2
5.	Operators	5
6.	Project Engineer / Shift Engineer	3
7.	Electrician	3
8.	Mechanical fitters	3
9.	Office Peon	2
10.	Office assistant	2
11.	Excise officer	1
12.	Waterman/ Pump man	1
13.	Other Contractual staff	45
14.	Total	70

2.6 PROCESS DESCRIPTION

Alcohol will be manufactured by continuous fermentation process. The main steps in this operation are as follow:

- Feed preparation and weighing
- Dilution: Preparation of molasses for fermentation by appropriate dilution with water
- Fermentation: Production of alcohol from fermentable sugars in molasses solution with the help of yeast
- Distillation: Product recovery through distillation processes

  Sugar and Cogeneration process flow chart are given in **Figure 2.6(A)**

2.6.1 Feed preparation and weighing

Molasses stored in a storage tank is first weighed in a tank with load cells so that accurate quantity can be fed to the fermentation section. The weighed molasses then transferred from tank to the dilutor in fermentation section where it is diluted with water and fed to the Fermenter.

2.6.2 Dilution

The molasses contains about 42-45% sugar. The main dilution operation occurs in a diluter where the solid concentration is brought down to 20-25° Brix. The bulk of this diluted molasses is fed to the fermentation Tank while a small quantity is further diluted to 10-15° Brix and used for preparation of the final yeast inoculum. Additives like urea and de-foaming oil are also introduced in the fermenter as required. Propagation of yeast for the final inoculation is done in successive stages in volumes of 10, 100, 1000 and 10,000 liters where, in each stage, 10 parts of diluted molasses is inoculated with 1 part of yeast culture.

2.6.3 Fermentation

Fermentation process in the fermentation tank continues for about 30 to 45 hours after the final inoculum of yeast addition. *Saccharomyces cerevisiae* metabolize sugar in the absence of oxygen, they produce ethanol and CO_2.

The fermentation process is exothermic in nature. Every kilogram of alcohol generates about 290 kilocalories of heat. This excess heat is removed by continuous circulation of fermented wash through an external plate heat exchanger called the fermenter cooler. The fermenter temperature is always maintained between 32-34^{0}C, the optimum range for efficient fermentation.

2.6.3.1 Yeast Propagation

- Culture yeast is grown in laboratory during plant startup. Yeast propagation section comprises molasses diluter and hygienically engineered yeast vessels equipped with heating, cooling and air sparging facility.
- Dilute molasses media is prepared in yeast vessel. Laboratory propagated cell mass is scaled up in series of yeast vessels. Sterile air is sparged in pasteurized and cooled dilute molasses medium for optimum growth of yeast. Temperature is maintained by recirculation of cooling water through jacket of yeast vessels. Cell mass from Yeast vessel is transferred to yeast activation vessel to buildup cell mass required for Fermentation by cell mass transfer pump.

  Pre Fermentation

  In Pre-Fermenter vessel, molasses, process water, nutrients and additive are added for activation/growth of cell mass. Filtered air is sparged as required for repairing of cell

membranes and other cell components. Activated cell mass is transferred to fermenter to maintain desired cell mass concentration in fermenter.

Fermentation

The Fermentation process is engineered to operate in batch mode or continuous mode depending upon the quality of molasses. The purpose of Fermentation is to convert the fermentable sugars into alcohol. During Fermentation, sugars are broken down into alcohol and carbon dioxide and significant heat is released. The fermenter temperature is maintained at around 30 -32^{0}C by forced recirculation flow through plate heat exchangers.

2.6.4 Multi pressure distillation

Multi-pressure distillation scheme has distillation columns operating under different pressures. Heat energy from columns operating under high pressure is recycled back to columns operating under low pressure to conserve energy. The plant can be operated under two different modes to produce Rectified Spirit (RS) or Extra Neutral Alcohol (ENA) as desired. The columns will be under operation are Analyzer Column, Degasifying Column, Extractive Distillation / Purifier column, Rectifier Column, Fusel Oil Concentration Column.

Process

- Pre-heated Fermented wash will be fed to Degasifying Column.
- Fermented wash is stripped off alcohol by ascending vapours in Analyser Column.
- Vapors of Degasifying Column are condensed and fed to PR/ED Feed tank.
- Condensed Analyser vapors are taken to ED Feed Tank.
- The condensate from ED feed tank is fed to Purifier column in 1:3 dilution and diluted alcohol stream from the Purifier column bottom is fed to Rectifier Column, which operates under pressure. Rectifier column concentrates the diluted alcohol to 95% v/v concentration. A suitable Impure Spirit cut is taken out from this Column.
- Rectified Spirit draw of 95% v/v is taken out from the upper trays of Rectifier Column and taken to storage after passing it through a cooler. Fusel oil draw from Rectifier column is fed to Fusel oil column and concentrated impurities are separated from top of column. Concentrated fusel oil draw is taken from appropriate trays and fed to Fusel oil decanter for separation of Fusel oil.

Distillation – Wash to ENA mode

The columns will be under operation Analyzer Column, Degasifying Column, Pre-Rectifier Column, Extractive Distillation Column, Rectifier cum Exhaust Column, Recovery Column, and Simmering Column

- Pre-heated Fermented wash will be fed to Degasifying Column.
- Fermented wash is stripped off alcohol by ascending vapors in Analyser Column. Rectifier vapors provide energy to Analyser Column. Vapors of Degasifying Column are condensed and taken to Recovery Feed Tank. Analyser vapors are condensed in Falling Film Evaporator and are taken to Pre-Rectifier Feed Tank. Analyser Condensate is concentrated in Pre-Rectifier Column, which operates under pressure. Condensing steam provides energy to Pre-Rectifier.
- A Technical Alcohol cut of Total Spirit is taken from the Pre-Rectifier column.
- Concentrated alcohol draw from Pre-Rectifier Column is fed to Extractive Distillation Column for purification. Dilution water is added in this column for concentrating higher alcohol at the top. Top of this Column is condensed in its condensers and fed to Recovery Feed Tank while bottoms are fed to Rectifier cum Exhaust Column for concentration.
- Rectifier Column operates under Pressure and condensing steam provides energy to this column. Technical Alcohol cut is taken out from the top of this Column while ENA draw is taken out from appropriate upper trays and fed to Simmering Column after partial cooling.
- Fusel Oil build up is avoided by taking fusel oil draws from appropriate trays. These Fusel oils along with the condensate of Degasifying & Extractive Distillation columns are fed to Recovery Column for concentration. A Technical Alcohol cut is taken out from the top of this column. Simmering Column is operated under high reflux for better separation of methanol and di-acetyls. Final ENA product draw is taken from the bottom of this column.

2.6.5 Benefits of Multi Pressure Distillation

- Multi Pressure Distillation system has lower steam consumption as it is designed for maximum heat integration to conserve energy.

- Energy efficient Multi-Pressure Distillation system with a Steam Consumption kg/lit of Total Spirit (depending on mode of operation).
- Vacuum operation nearly eliminates scaling problem in Analyzer Column and ensures better separation of impurities, which results into better quality product.
- Well-engineered Plants with high efficiency trays to ensure elaborate separation and removal of impurities ensuring superior quality of Extra Neutral Alcohol.
- Analyzer Column with Hyper-stat Rh-Grid trays ensure high turbulence on tray, this minimizes chances of scaling. Also, this special construction of trays and access to each tray helps in easier cleaning column internals

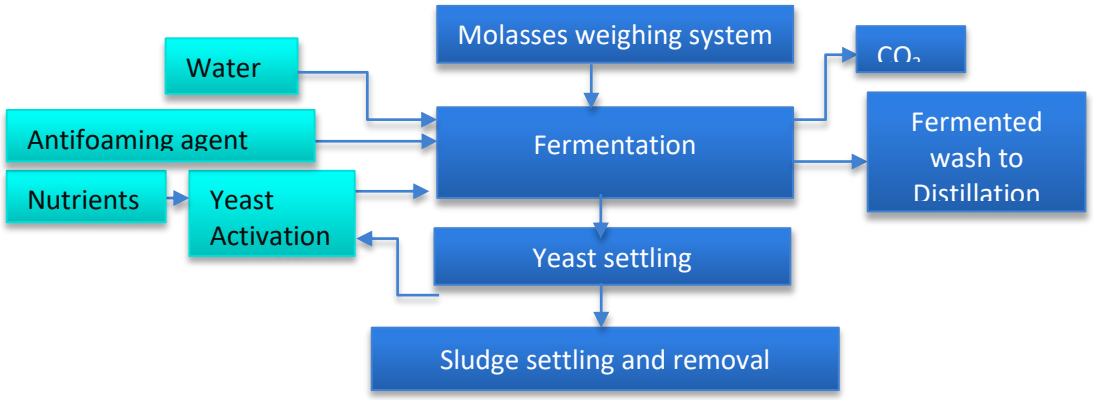


Figure 2.5: Fermentation Flow chart

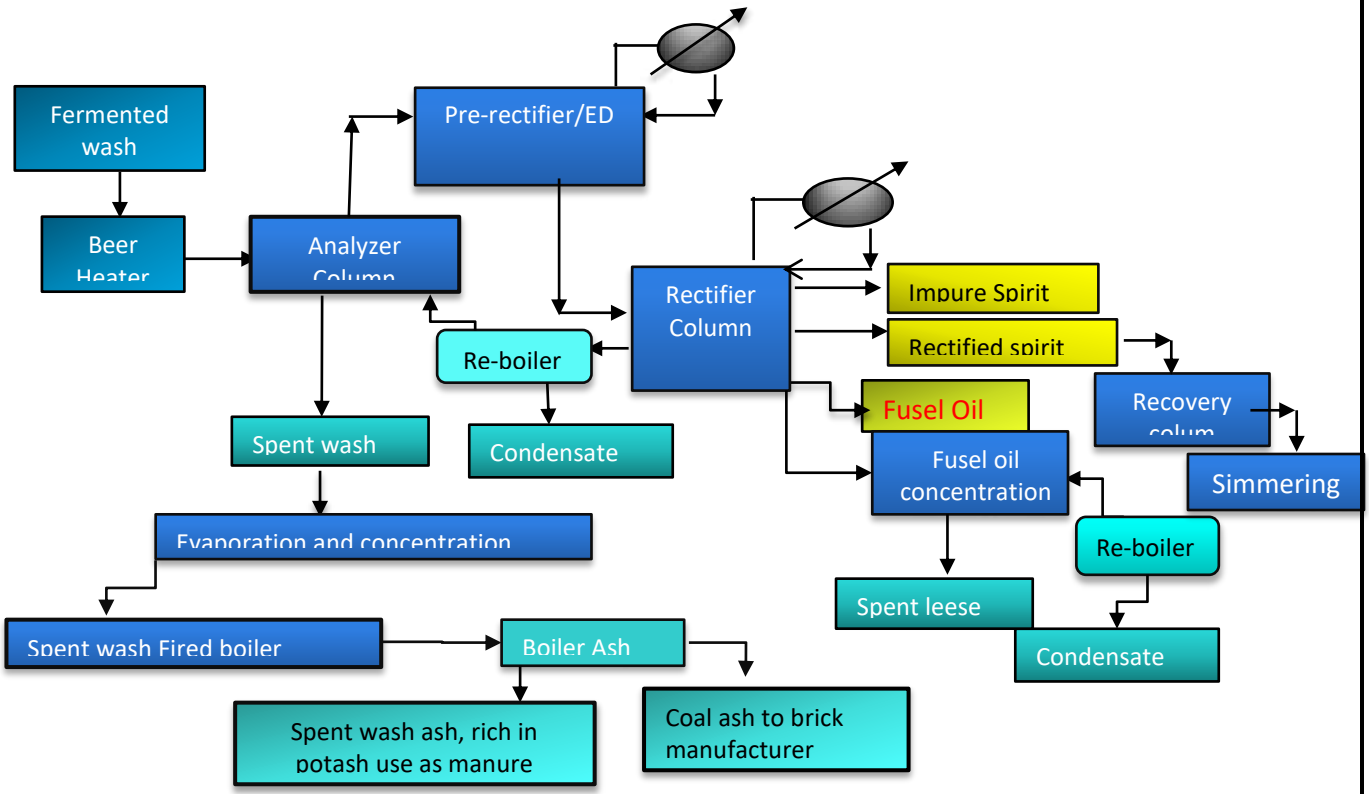


Figure 2.6: Process flow chart for Distillery operation

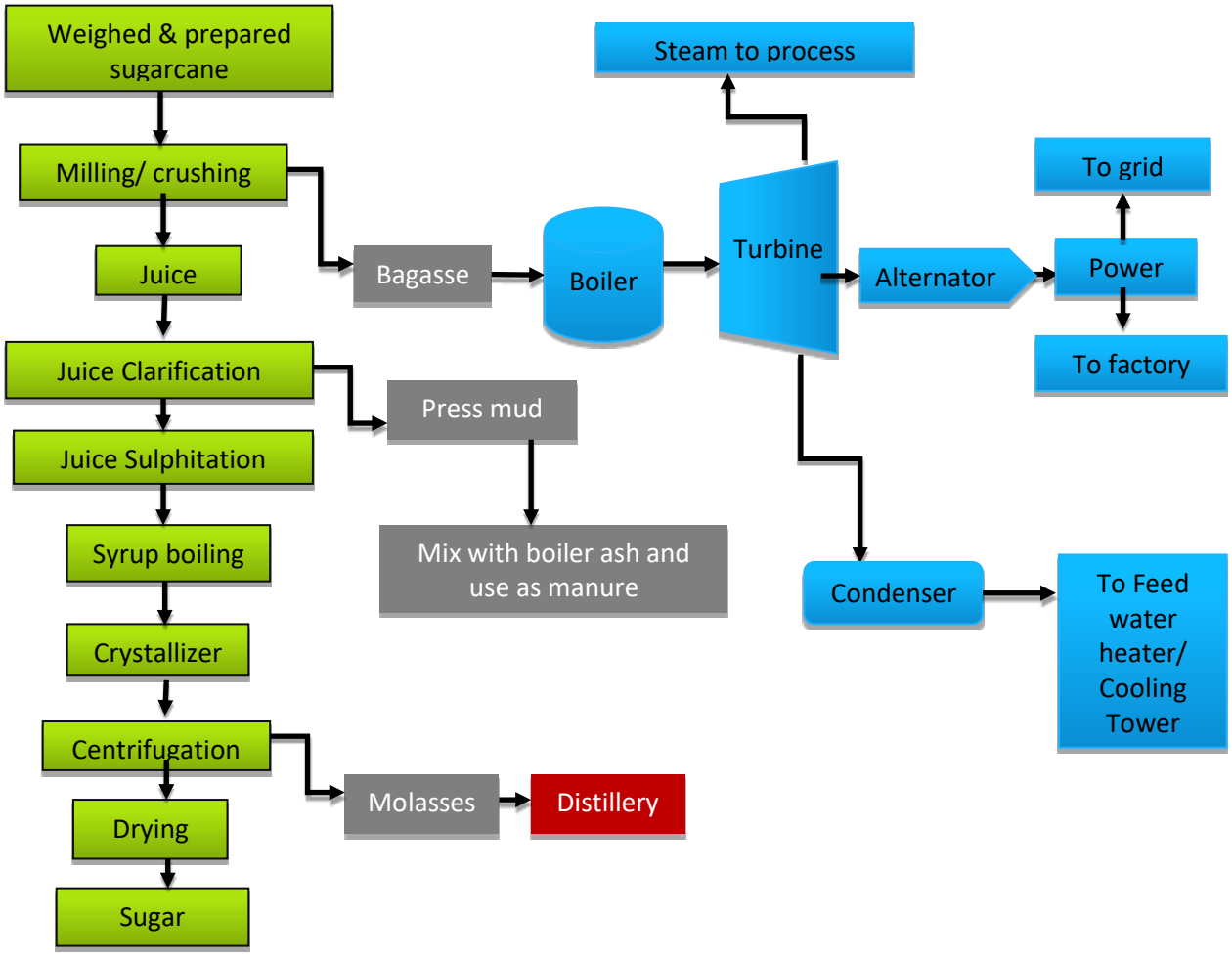


Figure 2.6(A): Process flow chart for sugar and cogeneration unit

2.7 EQUIPMENT LIST

Table 2.19: List of Equipment's required for distillery

Sr. No.	Equipment's	Specification	Quantity
1.	Molasses Day Tank	Type :Cylindrical Vertical With Conical Top and Flat Sloping Bottom, Gross Cap:425 MT(300 m3) MOC: Mild Steel	-
2.	Molasses Weighing tank	Type :Cylindrical Vertical With open Top and conical Bottom, Cap – 3.0 m3	-
3.	Molasses Filter	Basket Strainer MOC: Mild Steel	-
4.	Automatic Weighing system	Type- Load Cell Capacity- 4 MT/Trip Standard	-
5.	Fermentation Culture Vessel-I	Type :Cylindrical, jacketed, Vertical, With Top and Bottom	-

Sr. No.	Equipment's	Specification	Quantity
	With cooling jacket & Air sparger	Dish Ends, Capacity: 0.05 m3 MOC: AISI 304	
6.	Culture Vessel-II With cooling jacket & Air sparger	Type :Cylindrical, Jacketed, Vertical, With Top and Bottom Dish Ends, Capacity: 0.3 M3 MOC: AISI 304	-
7.	Culture Vessel-III With cooling jacket & Air sparger	Type :Cylindrical, jacketed, Vertical, With Top and Bottom Dish Ends, Capacity: 2 M3 MOC: AISI 304	-
8.	Culture Vessel-IV With cooling jacket & Air sparger	Type :Cylindrical, jacketed, Vertical, With Top and Bottom Dish Ends, S/T/B - 4/4/4 mm Capacity: 12 M3 MOC: AISI 304	-
9.	Dilute Acid Dosing Tank	Type :Cylindrical, Vertical, With Flat Top and Sloping Bottom, Capacity Gross :1 m3 MOC: MS	-
10.	Antifoam Agent Tank	Type :Cylindrical, Vertical, With Flat Top and Sloping Bottom, Capacity Gross : 1 m3 MOC: MS	-
11.	Nutrient Dosing Tank	Type :Cylindrical, Vertical, With Dished Top and Dished Bottom, Capacity Gross :1 m3 MOC: AISI 304	-
12.	Blower Water Collection Tank	Type :Cylindrical, Vertical, With Open Top and Flat Sloping Bottom, Capacity Gross :0.5 m3 MOC: MS	-
13.	CO2 Scrubber	Standard MOC: AISI 304	-
14.	Molasses Broth Mixer for Fermentors	Static Mixer MOC: AISI 304	-
15.	Sealing Water Tankpump	Type :Cylindrical, Vertical, With	-

Sr. No.	Equipment's	Specification	Quantity
		Open Top and Flat Sloping Bottom Capacity Gross :0.5 m3 MOC: AISI 304	
16.	Fermenter with Side Agitator	Type :Cylindrical, Vertical, With Conical Top and Flat Sloping Bottom, Capacity Gross : 450 m3 MOC: SS304	-
17.	Beer well with Side Agitator	Type :Cylindrical, Vertical, With Conical Top and Flat Sloping Bottom Capacity Gross : 450 m3 MOC: MS Epoxy	-
18.	Weighed Molasses Tank	Type :Cylindrical, Vertical, With Conical Top and Flat Sloping Bottom, Capacity Gross : 30 m3 MOC: Mild Steel	-
19.	Pre Fermenter with Air Sparger	Type :Cylindrical, Vertical, With Conical Top and Flat Sloping Bottom, Capacity Gross : 90 m3 MOC:SS304	-
20.	CIP Tank	Type :Cylindrical, Vertical, With Conical Top and Sloping Bottom, Capacity Gross : 10 m3 MOC: MS	-
21.	Wash Settling Tank	Type :Cylindrical, Vertical, With Conical Bottom, Capacity Gross : 175 m3 MOC: MS Epoxy	-
22.	Sludge settling tank	Type :Cylindrical, Vertical, With Conical Bottom, Capacity Gross : 40 m3 MOC: MS Epoxy	-
23.	Dilute Acid Dosing Pump	Type :Centrifugal Type MOC: Alloy 20	-
24.	Nutrient Dosing Pump	Type :Centrifugal Type MOC: CF8	-
25.	Fermenter - Fermented	Type :Centrifugal Type	-

Sr. No.	Equipment's	Specification	Quantity
	Wash Recirculation Pumps	MOC: CF8	
26.	Motor for Fermenter Recirculation Pumps	Type :Non flame proof MOC: Standard	-
27.	Motor for Pre fermenter Transfer Pump	Type :Non flame proof MOC: Standard	-
28.	Day Molasses Transfer Pump	Type :Screw/Gear Type MOC: Body CI, Wetted Parts - CF8	-
29.	Blower Water Recycle Pump	Type :Centrifugal Type Capacity : 2 m3/ hr, 25 m MOC: Wetted Parts - CF8	-
30.	Motor for Blower Water Recycle Pump	Type :Non flame proof MOC: Standard	-
31.	Air Blower	Type :Water Ring Air Blower MOC: CI	-
32.	Motor for Air Blower	Type :Non flame proof MOC: Standard	-
33.	Air Filter for Blower	HEPA MOC: MS Frame	-
34.	Fermented Wash Coolers	Type :Plate Heat Exchanger MOC: Frame: MS, Plates: SS316	-
35.	Pre Fermenter Cooler	Type :Plate Heat Exchanger MOC: Frame: MS, Plates:SS316	-
36.	Blower Water Cooler	Type :Plate Heat Exchanger MOC: Frame: MS, Plates:SS316	-
37.	Safety System for Fermenters	Type: Breather Valve MOC: AISI 304	-
38.	Cleaning Nozzle for Fermenters	Type: Breather Valve MOC: AISI 304	-
39.	Decanter	Type – centrifuge MOC: Std.	-
40.	**DISTILLATION SECTION:**		
41.	Analyzer Column Dia Type of tray No. of trays Trays Spacing	2180 mm dia.Rh Grid, 18+1 Nos.750 mm, MOC: Shell : SS304, Trays : SS304	1
42.	Degasifying Column	1200 mm dia.	1

Sr. No.	Equipment's	Specification	Quantity
	Dia, Type of tray No. of trays Trays Spacing	Sieve / Grid tray,5 trays, 750 mm,	
43.	Pre-Rectifier Column Dia, Type of tray No. of trays Trays Spacing	1550 mm dia. Combination of Sieve tray & Bubble Cap, 56 trays, 250 mm	1
44.	Rectifier cum exhaust Column Dia Type of tray No. of trays Trays Spacing	2050 mm dia. Combination of Sieve tray & Bubble Cap 68 trays 250 mm MOC: Shell – AISI 304, Trays - T1- T38 AISI 304, & Shell & Trays - T39-T68 Dow Cu	1
45.	Fusel Oil Column Dia Type of tray No. of trays Trays Spacing	720 mm dia. Sieve 50 trays 250 mm MOC: Shell : SS304, Trays : SS304	1
46.	Simmering Column DiaType of tray No. of trays, Trays Spacing	1200 mm dia. Sieve 50 trays 250 mm Shell : Dow Cu Trays : Dow Cu	1
47.	Alcohol Scrubber	Sieve Tray MOC: Shell : SS304, Trays : SS304	1
48.	Re-boilers		
49.	Reboiler for Analyzer Column Vertical Thermosyphon	25.4 mm OD, tubes, MOC: AISI 304	3
50.	Reboiler for Pre - Rectifier Column Vertical Thermo syphon	25.4 mm OD tubes, MOC: AISI 304	1
51.	Reboiler for Rectifier cum Exhaust Column Vertical Thermo syphon	25.4 mm OD tubes, MOC: AISI 304	1
52.	Reboiler for Extractive Distillation Column Vertical Thermo syphon	25.4 mm OD tubes, MOC: AISI 304	1
53.	Reboiler for Simmering Column Vertical Thermo syphon	25.4 mm OD tubes, MOC: AISI 304	1
54.	Condensers and Coolers		
55.	Analyser Vent Condenser	25.4 mm OD tubes	1

Sr. No.	Equipment's	Specification	Quantity
	Shell and tube heat exchanger	MOC: AISI 304	
56.	Degasifying cond 1 Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
57.	Degasifying cond 2 Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
58.	Vent Condenser for Analyser Reboiler Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
59.	Rectifier PCV (Vent) Condenser Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
60.	ED cond I Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
61.	ED cond II Shell and tube heat exchanger,	25.4 mm OD tubes, MOC: AISI 304	1
62.	FOC Condenser I Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
63.	FOC Condenser II Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
64.	Simmering Cond- I, Shell and tube heat exchanger	25.4 mm OD tubes MOC: AISI 304	1
65.	Simmering Cond-II Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
66.	Vent Condenser for Simmering Reboiler Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
67.	Pre-Rectifier PCV condenser Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
68.	ED Feed Cooler Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
69.	TA Cooler Shell and tube heat exchanger	25.4 mm OD tubes, MOC: AISI 304	1
70.	Fusel Oil Cooler	Double pipe HE MOC: AISI 304	2

Sr. No.	Equipment's	Specification	Quantity
71.	Rectifier ENA Cooler Shell and tube heat exchanger	25.4 mm OD MOC: AISI 304	1
72.	Pre-Rectifier FO Cooler Shell and tube heat exchanger	25.4 mm OD MOC: AISI 304	1
73.	Rectifier FO Cooler Shell and tube heat exchanger	25.4 mm OD MOC: AISI 304	1
74.	Product cooler	25.4 mm OD MOC: AISI 304	1
75.	Fermented Wash preheater	Plate heat exchanger MOC: Plates: SS 316 Frame: CS	2
76.	Rectifier Feed Preheater	Plate heat exchanger MOC: Plates: SS 316 Frame: CS	1
77.	Pre-Rectifier Feed Preheater	Plate heat exchanger MOC: Plates: SS 316 Frame: CS	1
78.	DM Water Preheater	Plate heat exchanger MOC: Plates: SS 316 Frame: CS	1
79.	Spent Lees Cooler	Plate heat exchanger MOC: Plates: SS 316 Frame: CS	1
80.	Sealing Water Cooler	Plate heat exchanger Plates: SS 316 Frame: CS	1
81.	Analyser Bottom Transfer Pump	Centrifugal Pump MOC Wetted parts: CF 8	2
82.	Flash tank bottom transfer pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
83.	Analyser condensate transfer pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
84.	Rectifier reflux pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
85.	FOC Feed Pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
86.	Rect. Spent lees transfer pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
87.	FOC Reflux Pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
88.	ED bottom transfer pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
89.	FO Washing Pump	Centrifugal Pump	2

Sr. No.	Equipment's	Specification	Quantity
		MOC: Wetted parts: CF 8	
90.	Pre-Rectifier Reflux Pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
91.	ENA Transfer Pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
92.	Simmering Reflux pump	Centrifugal Pump MOC: Wetted parts: CF 8	2
93.	Vacuum pump	Centrifugal Pump MOC: CI	2
94.	Sealing water pump for vacuum pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
95.	Steam condensate pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
96.	Sealing water transfer pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
97.	Tanks & Miscellaneous:		
98.	Analyzer Flash tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 5 m3 MOC: AISI 304	1
99.	Rectifier Reflux Tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 3.5 m3 MOC: AISI 304	1
100.	Analyser Condensate Tank	Cyl/ Hori shell Top & bottom Dished, Gross Cap – 3.5 m3 MOC: AISI 304	1
101.	FO Washing tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 1 m3 MOC: AISI 304	1
102.	Recovery Feed tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 0.5 m3 MOC: AISI 304	1
103.	Recovery Reflux Tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 0.5 m3 MOC: AISI 304	1
104.	PR Reflux tank	Cyl/ Hori shell Top & bottom Dished,	1

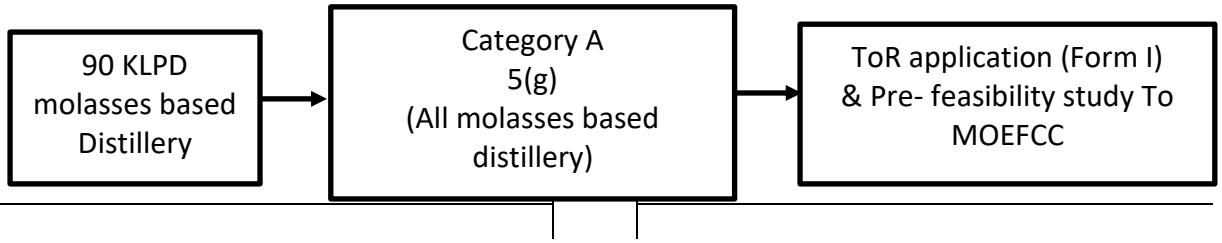
Sr. No.	Equipment's	Specification	Quantity
		Gross Cap – 3 m3 MOC: AISI 304	
105.	Simmering Reflux tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 1 m3 MOC: AISI 304	1
106.	Steam condensate tank	Cyl/ Hori shell Top & bottom Dished, Gross Cap – 2 m3 MOC:MS	1
107.	Spent Lees tank	Cyl/ Vert shell Top & bottom Dished, Gross Cap – 1 m3 MOC: AISI 304	1
108.	Sealing water Tank for vacuum pump	Cyl/ Vert shell Top & flat sloping Bottom MOC:MS	1
109.	Fusel Oil Decanter pre rectifier column	Dumbell Shaped MOC: AISI 304	1
110.	Fusel Oil Decanter recovery column	Dumbell Shaped MOC: AISI 304	1
111.	Gas Liquid Separator	Praj Standard MOC: AISI 304	1
112.	TA Mixing Bottle	Cylindrical/ Vertical MOC: AISI 304	1
113.	Manometer Bottle	Cylindrical/ Vertical MOC: AISI 304	2
114.	ED Mixing Bottle	Cylindrical/ Vertical MOC: AISI 304	1
115.	Vapour. Bottle	Cylindrical/ Vertical MOC: AISI 304	-
116.	MSDH Section		
117.	Columns		
118.	Evaporator Column Dia Type of tray, No. of trays Trays Spacing	850 mm dia. Sieve 23 trays 300 mm	1
119.	Sieve Bed 1	Type :Cylindrical Shell with Top and Bottom Dished End MOC: AISI 304	1

Sr. No.	Equipment's	Specification	Quantity
120.	Sieve Bed 2	Type :Cylindrical Shell with Top and Bottom Dished End MOC: AISI 304	1
121.	**REBOILERS**		
122.	Evaporation Column Reboiler, Shell & Tube Type Vertical Thermo syphon	25.4 mm OD tubes MOC: AISI 304	1
123.	**CONDENSERS AND COOLERS**		
124.	Super heater Shell and tube heat exchanger	25.4 mm OD tubes MOC: Shell:- AISI 304 Tubes:- AISI 304	1
125.	Regeneration Condenser Shell and tube heat exchanger	25.4 mm OD tubes MOC: Shell:- AISI 304 Tubes:- AISI 304	1
126.	Product Condenser Shell and tube heat Exchanger	25.4 mm OD MOC: Shell:- AISI 304 Tubes:- AISI 304	1
127.	Feed Preheater Shell and tube heat exchanger	25.4 mm OD MOC: Shell:- AISI 304 Tubes:- AISI 304	1
128.	Regeneration Preheater Shell and tube heat exchanger	25.4 mm OD MOC: Shell:- AISI 304 Tubes:- AISI 304	1
129.	Feed Filter	Bag Filter MOC: CS	1
130.	Regeneration Filter	Bag Filter MOC: CS	1
131.	Product Filter	Bag Filter MOC: CS	1
132.	**PUMPS & BOUGHT OUTS:**		
133.	Vacuum Eductor	M.O.C: AISI 316	1
134.	Regeneration Cooler	Plate heat exchanger MOC: Plates: SS 304, Frame: CS	1
135.	Product Cooler	Plate heat exchanger MOC: Plates: SS 304,Frame: CS	1
136.	Regeneration Pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
137.	Product Pump	Centrifugal Pump MOC: Wetted parts:CF 8	2
138.	Molecular Sieve	PRAJ Standard	-

Sr. No.	Equipment's	Specification	Quantity
139.	Sieve Bed Internals (Inserts)	-	
140.	**TANKS & MISCELLANEOUS:**		
141.	Regeneration Receiver	Cyl/ Vert shell Top & bottom Dished	1
142.	Product Receiver	Cyl/ Vert shell Top & bottom Dished	1
143.	Piping & Valves Instrumentation, Electrical	As specified in Respective annexure	-
144.	**INTEGRATED STANDALONE EVAPORATION PLANT**		
145.	Evaporator Calendria	Type: Shell and Tube Heat Exchanger Designed on basis of Falling film principle. HTA with standby effects – 2650 M2 Tube OD – 50.8mm, mm. Tube Thick : 1.2 mm, MOC: Shell : AISI 304, Tube :AISI 304, Tube sheet : AISI, 304	-
146.	Evaporator Calendria	Type: Shell and Tube Heat Exchanger Designed on basis of Forced circulation principle. HTA with standby effects – 420 M2 Tube OD – 38.1 mm, Tube Thick : 1.2 mm MOC: Shell : AISI 304, Tube :AISI 304 Tube sheet : AISI 304	-
147.	Evaporator Calendria	Type: Shell and Tube Heat Exchanger Designed on basis of Forced circulation principle. HTA with standby effects – 420 M2 Tube OD – 38.1 mm, Tube Thick : 1.2 mm MOC: Shell : AISI 304, Tube :AISI 316, Tube sheet : AISI 304	-
148.	Vapour Liquid Separators	Type: Vertical, with tangential entry for effective vapor Separation. MOC : AISI 304	-
149.	Surface Condenser	Type: Shell and Tube Heat Exchanger. Tube OD – 38.1 mm, Tube Thickness: 1.2 mm. MOC : AISI 304	-
150.	Spent wash feed Tank	Type :Cylindrical, vertical shell with dished top and bottom end; Gross Vol. – 10 M3 MOC: AISI 304	-
151.	Process Condensate Tank	Type :Cylindrical, vertical shell	-

Sr. No.	Equipment's	Specification	Quantity
		with dished top and bottom end; Gross Vol – 2M3 MOC: AISI 304	
152.	Product Tank (Concentrated spent wash)	Type :Cylindrical, vertical shell with dished top and bottom end; Gross Vol – 2M3 MOC: AISI 304	-
153.	CIP tank	Type :Cylindrical, vertical shell with dished top and bottom end; Gross Vol – 15 M3 MOC: AISI 304	-
154.	Sealing water Tank for vacuum pump	Cyl/ Vert shell Top & flat sloping bottom MOC: MS	-
155.	Sealing water Tank for process pump	Cyl/ Vert shell Top & flat sloping bottom MOC: AISI 304	-
156.	Vapour Bottles	Type :Cylindrical / Vertical Shell with Dished Ends MOC: AISI 304	-
157.	Bought out Equipment		-
158.	Spent Wash Transfer pumpfrom lagoon	Type :Centrifugal Type MOC: Wetted Parts CF8	-
159.	Motor for Spent Wash Transfer pump from lagoon	Type : Flame proof Type :Centrifugal Type;	-
160.	Feed Pump	Type :Centrifugal Type;	-
161.	Motor for Feed Pump	Type : Flame proof	-
162.	Recirculation cum Transfer Pump for FF	Type :Centrifugal Type; MOC: Wetted Parts CF8	-
163.	Motor for Recirculation cum Transfer Pump for FF	Type : Flame proof	-
164.	Recirculation cum Transfer Pump for FC/FN	Type :Centrifugal Type	-
165.	Motor for Recirculation cum Transfer Pump for FF	Type :Flame proof	-
166.	Recirculation cum Transfer Pump for FC /FN	Type :Centrifugal Type; MOC: Wetted Parts CF8	-

2.8 SCHEMATIC REPRESENTATION OF THE FEASIBILITY DRAWING SHOWING EIA PURPOSE



2.9 ENVIRONMENT ASPECTS

Summary of major waste generation of the proposed distillery and its proposed disposal/treatment mechanism is given in Table 2.20

Table 2.20: Waste generation and its treatment mechanism

Sr. No.	Aspect	Pollutant Quantity	Treatment
1.	Wastewater	900 KLD Spent wash	Spent wash concentration through MEE and concentrated spent wash will be burnt in incineration boiler.
2.	Air Emission	SPM_{10}, $SPM_{2.5}$, SOx and NOx	Electro-Static Precipitator (ESP).
3.	Solid	• Yeast sludge • Ash from coal • Ash from spent wash	Sludge (Yeast and ETP) will be dried and used as fertilizer or it will be incinerated along with spent wash in the boiler. Spent wash ash is potash rich ash and can be use directly use as manure. Coal ash will sell to brick manufacturer. Ash will be store in the ash silos,

2.9.1 Air Pollution

- Air pollution during construction phase will be due to material handling, dust emission, vehicular movement and emission from machinery. Air emissions / pollution during operation phase will be mainly form flue gases, manufacturing process, material & Ash handling and from vehicular movement.
- Necessary preventive measures shall be taken during construction phase so that the ambient air quality will conform to National Ambient Air Quality standards.
- To avoid the generation of dust emission water sprinklers will be provided to suppress the dust.
- ESP will be provided to the stack of 62 m height to control the particulate matter emission into the air as main pollution control measures. This boiler shall run on coal and concentrated spent wash.
- Water sprinkler will be provided at coal stack pit and ash disposal area to control fugitive emission.
- Work zone area including internal roads in the plant will be asphalted or concreted. Water spraying system will be installed for regular spraying of water on road and work zone to minimizing fugitive dust emission.

- Ventury Wet-scrubber is provided to existing stack of sugar and cogeneration of stack height 65 m and 75 m. Stack gas emission report are attached in annexure.

2.9.2 Waste water

- Spent wash generated during the process of distillation will be treated in multiple effective evaporators to concentrate the spent wash and it will be used in boiler as a fuel.
- The condensate around 651 generated during the process of Multiple Effective Evaporators will be reused in the process consequently decreasing the net water requirement.
- Total effluent quantity from existing sugar and cogeneration unit is 317.8 CMD Effluent will be treated in ETP and treated effluent will be use gardening purpose.

2.9.3 Solid waste/Hazardous waste

- Yeast sludge mixed with spent wash and incinerated in the boiler or used as manure.
- Ash generated will be given to brick manufacturers.
- Sludge from ETP will be used as manure.

2.10 PROJECT IMPLEMENTATION SCHEDULE

Project action will start after getting Environment Clearance from EAC, MoEFCC and after getting the consent to establish from Karnataka Pollution Control Board. Estimated time schedule of project implementation will be as mentioned in **Table 2.21**

Table 2.21: **Project Implementation**

Sr. No	Activity	Period
1	Basic Engineering	4 weeks
2	Specification of Tender	2 weeks
3	Commercial Bidding	4 weeks
4	Bid Review & Finalization	4 weeks
5	Load Data	3 weeks
6	Civil	18 weeks
7	Structural work	18 weeks
8	Equipment manufacturing	18 weeks
9	Dispatch	2weeks
10	Installation	10 weeks
11	Local fabrications	10 weeks

12	Piping	15 weeks
13	Water Trials & commissioning	4 weeks
14	Commercial Production & handover	4 weeks
	Total	**116 weeks**

2.11. ENVIRONMENTAL CLEARANCE PROCESS CHRONOLOGY

- ToR Application: 2nd July 2016
- ToR Presentation: 21th July 2016
- ToR Approval: 21th July 2016
- Baseline data collection period : October to December 2016
- Public hearing conducted 5th May 2017

2.12 PROJECT COST ESTIMATE

The total cost of the project is estimated about Rs. 103.73 crores. The project cost estimates include land & land development, civil, building structure, plant & machinery band other expenses, contingencies @2% on building, plant & machinery, margin money of working capital. Environment management cost will be around Rs. 2.23 crores. The details of project cost are given in Table. 2.22 and EMP cost is mentioned in **Table 2.23.**

Table 2.22: Total Project Cost

Sr. No	Description	Cost in (Rs. in lakhs)
1.	Land and Land Development	600
2.	Civil, Building / Structure	1975
3.	Plant & Machinery	6780
4.	Preliminary & Pre-operative and Other expenses	70
5.	Contingencies @ 2% on building, plant & machinery	175.1
6.	Margin money of working capital	773
8.	**Total**	**10373**

Table 2.23: Environment Management Cost

Sr. No	Description	Capital Cost (Rs. in lakhs)	Recurring Cost (Rs. in lakhs)
1.	Air Pollution Control	100	10
2.	Water Pollution Control	75	5
3.	Solid waste Management	8	3
4.	Environmental Monitoring and Management	_	7

5.	Rainwater Harvesting	20	3
6.	Occupational Health	10	5
7.	Green belt development	10	3
	Total	**223**	**36**

2.13 CONCLUSION

Chapter II describes the size, magnitude and basic requirements of the project. Environmental impacts due to proposed project activities have been identified. From the project description it is clear that major impacts are anticipated from wastewater, solid waste generation and air emissions. To predict the environmental impact of the project, baseline studies have been conducted in the month of October to December 2016. Baseline study reveals that the existing environmental condition in the proposed project area help to understand extent of existing pollution and thereafter the impact of the proposed activities from the prediction or through the air modeling.

Photograph 2.1: Existing factory photographs

CHAPTER III DESCRIPTION OF THE ENVIRONMENT

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

The base line data of existing environmental condition is essential for Environmental Impact Assessment and prediction of impact of the proposed project activities. This chapter illustrates the description of existing environmental status of the study area with reference to the prominent environmental attributes. The data were collected from both primary and secondary sources. The primary data was collected through environmental monitoring in the study area. Primary survey involved meteorological study, hydro geological aspects, atmospheric conditions, water quality, soil quality, ecology & biodiversity, socio-economic profile and land use pattern of the study area. Secondary data were collected from various organizations to substantiate the primary data. The data thus collected were compared with the standards prescribed for the respective environmental parameters. Information on the existing environmental status is essential for assessing the likely environmental impacts of the proposed project. Sampling locations were selected based on following criteria:

1. Existing topography
2. Meteorological conditions of study area
3. Location of human habilitation
4. Sensitive areas present in the vicinity of the project site
5. Representative areas for baseline conditions
6. Accessibility for sampling

Based on these criteria, various locations for baseline environmental monitoring were selected upwind and downwind of the project location. During selection of locations for other studies, topography and hydrogeology was considered.

3.2 STUDY PERIOD AND FREQUENCY OF SAMPLING

Baseline monitoring study was conducted in Post Monsoon Season i.e. October to December 2016. Details of frequency of environmental sampling considered for the study are illustrated in **Table 3.1.**

Table 3.1: Sampling locations and frequency of sampling

Environment Aspect	Number of locations	Parameter	Frequency	Method
Meteorology	_	Temperature,	Primary data:	Monitoring for

Environment Aspect	Number of locations	Parameter	Frequency	Method
		Relative Humidity, Precipitation Wind direction, Wind Speed	• Hourly continuous • readings during the study period at plant site • Secondary data from meteorology department	primary data IS 8829:1978
Ambient Air Quality	10	PM_{10}, $PM_{2.5}$, SO_2 & NOx	10 Locations 24 hourly, twice a week (as per CPCB Guidelines)	PM_{10}, $PM_{2.5}$: Gravimetric method SO_2 : Modified West and Gaeke Method (IS : 5182, Part II) NOx : Jacobs and Hochheiser Method (IS 5182 Part VI)
Water Quality	15	pH, EC, Total alkalinity, Chlorides, 18.59, Hardness, Ca, Mg, TDS, DO, COD, BOD, Sulphate, Phosphate, Na, K, Cu, Fe, Total coliform & *E.coli*	Once in study period	IS 3025 method for sampling & Standard Methods for Examination of Water and Wastewater, 21st edition, APHA 2005
Noise Quality	10	Noise levels in dB(A)	Once in study period	IS: 4954 as adopted by CPCB.
Soil Quality	10	Physical, Chemical Characteristics, Soil Texture	Once in study period	BIS specifications
Ecology	Within 10 km	Existing Flora & Fauna for both terrestrial and aquatic Env.	Once in Study Period	Primary data by site visit and from literature, internet
Socioeconomic Data	Within 10 km	Socio-economic characteristics of the affected area	Once in Study Period	Secondary data, based on Census Data 2011
Land use	10 km	Land use for	Based on data	Topo-sheets

Environment Aspect	Number of locations	Parameter	Frequency	Method
pattern	radius	different categories	published in Primary Census Abstract and satellite imagery LISS –III	Satellite imageries
Geology and hydrogeology	10 km radius	Data collected during field survey and from secondary sources	Based on data collected from field survey once during the study period and from secondary sources.	Hydrogeological study conducted

3.3 DETAILS OF SITE AND SURROUNDING AREA

The district of Belgaum is located east of the Western Ghats and is situated in the northwestern part of Karnataka state. It is bordered by the state of Goa on its southwest and Maharashtra state towards its west and north. The districts of Bijapur and Bagalkot of Karnataka state lie towards its northeast and east respectively whereas; the districts of Dharwar and Uttar Kanara lie towards its south and southwest, respectively. The district lies between 15°00’ and 17°00’ north latitudes and between 74°00 and 75°30’ east longitudes. It covers an area of 13,444 sq. km.

The proposed project will be located at sr. No. 85, 164, 165, 166, 167, 168, 169 &170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. The proposed site is in the existing sugar factory premises. State highway -97 is adjacent to proposed site. District headquarter Belgavi is 74 km away from the project site. The nearest habitation is village Galatga 2.4 km and Bedkihal 2.8 km away from the project site.

There are no Tropical Forest, Biosphere Reserve, National Park, Wild Life Sanctuary and Coral Formation Reserves within 10 km Influence Zone.

The site is geographically located at 16°30'47.37"N and 74°28'39.73"E, 580 m MSL. The topography of the proposed project site is nearly flat with some undulating patches. The existing land is used for industrial purpose and comes under Karnataka Industrial Development Corporation. Doodhganga River is flowing at a distance of 4.45 km in North and Vedganga River 3.87 km in West direction from the project site. Brief description of environmental setting around the factory is given in Table 3.2.

Table 3.2: Environmental setting

Sr. No.	Aspects	Description
1.	Project Location	Sr. No. 167, 168, 169 to 170 & 85, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka.
2.	Geographical Coordinates	16°30'47.37"N and 74°28'39.73"E, 580 m MSL
3.	Toposheet number	47 L/6, 47L/7, 47L/10 & 47L/11
4.	Nearest Town	Tehsil Chikkodi 15.72 km Belagavi: 74 km
5.	Nearest airport	Belagavi airport: 74 km
6.	No. of Villages in 10 km Study area	Around 32 no.
7.	Bio-geographical zone	Semi-Arid
8.	Precipitation	Maximum average Precipitation of Tahshil Chikkodi 826.64 mm.
9.	Temperature	15.3 ^{0}C to 35.8 ^{0}C
10.	Humidity	55%
11.	Wind Direction	North East
12.	Soil Type	Shallow to very deep black soils, red loamy soils, lateritic soils etc.
13.	Nearest Water body	Doodhganga River is flowing at a distance of 4.45 km in North and Vedganga River 3.87 km in West direction from the project site.
14.	Nearest Village	• Bedkihal Village is located at a distance of 2.65 km from the plant on North East direction. • Galataga Village is located at a distance of 2.32 km from the plant on South Direction. • Bhoj Village is located at a distance of 4.5 km on North West direction. • Nej Village is located at a distance of 5.5 km on East direction. • Village Dilalpurwadi is located at 2.0 km on West direction
15.	Nearest Reservoir	Hidkal Dam is Located at a distance of 44 km from the plant in the Southern direction.
16.	Nearest Railway station	Chhatrapati Shahu Maharaj Terminus railway station: 33 km in
17.	Nearest Highway	SH-12 located at a distance of 16 km from the plant in Eastern direction. SH-18 located at a distance of 16 km from the plant in South Eastern direction. NH-4 located at a distance of 15 km from the plant in Western direction.
18.	Nearest airport	Belagavi airport: 74 km

Sr. No.	Aspects	Description
19.	Nearest Heritage site	Belgaum Fort located is located at a distance of 80 km from the plant in Southern direction. Gol Gumbaz (Bijapur) located at a distance of 138 km from the plant in North East direction.
20.	State boundaries	Maharashtra-Karnataka interstate boundary 8.66 km
21.	Nearest densely populated place	Chikkodi located at a distance of 15 km from the plant in South Eastern direction.
22.	Eco-sensitive area	There are no tropical forest, biosphere reserve, national park, wildlife sanctuary, coral formation, defense installations, recreational sites, holiday resorts, pilgrimage site, historically important structures, monuments, etc. within 10 km of the study area
23.	Nearest IMD station	At Belagavi 74 km (Station ID- 43197)

Figure 3.1: General location map of proposed distillery

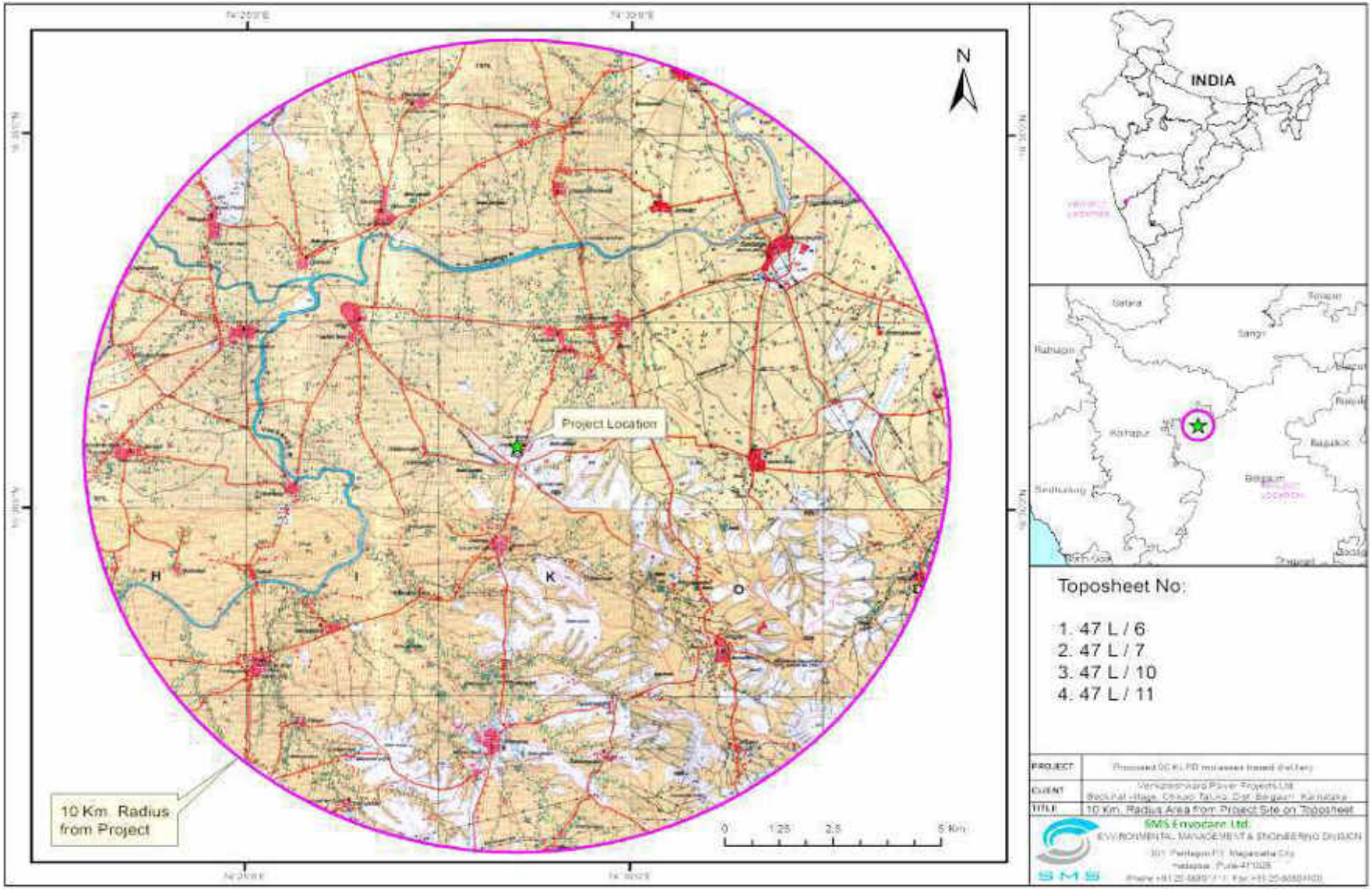


Figure 3.2: Toposheet of 10 km study area

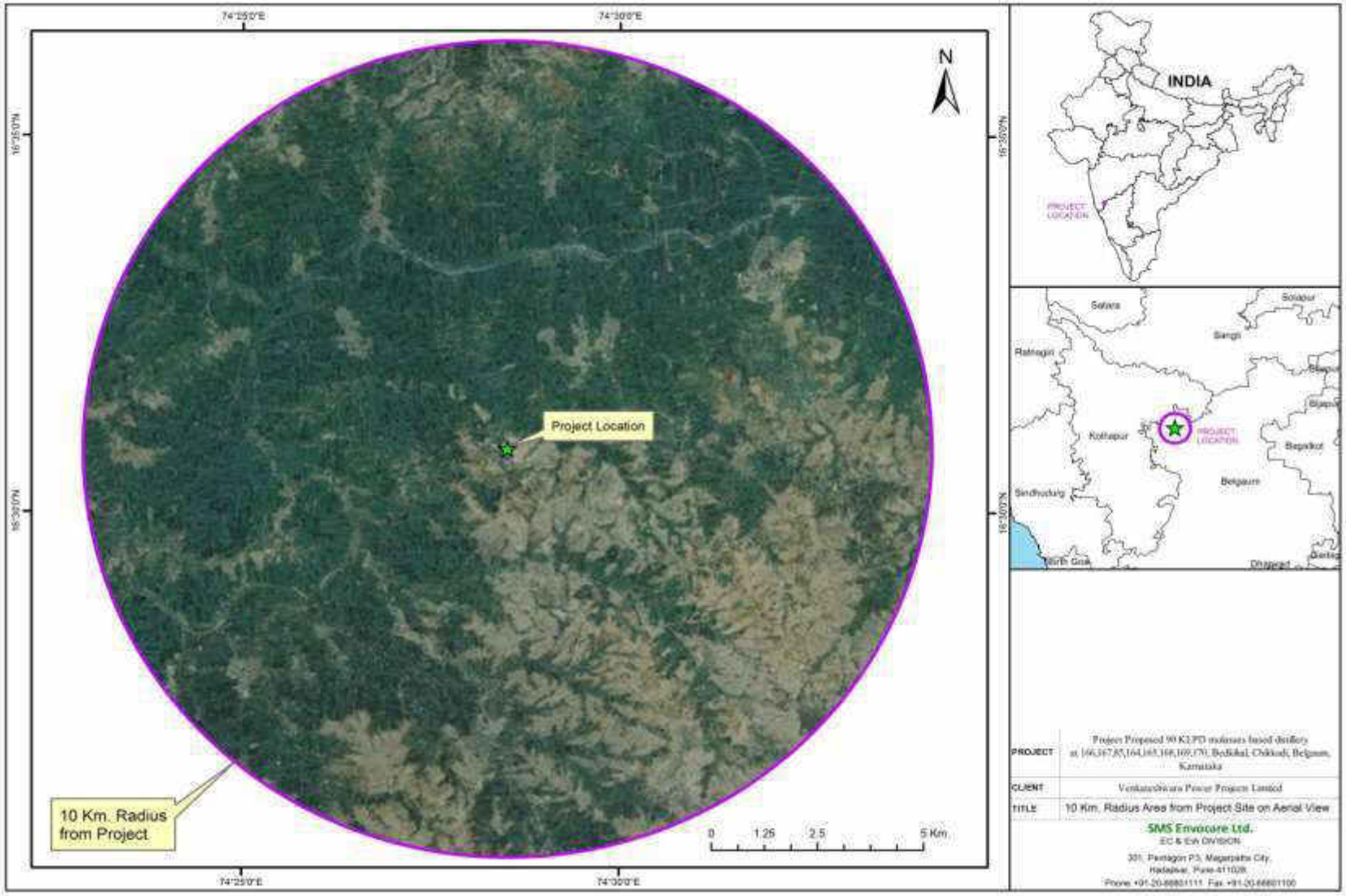


Figure 3.3: Google map of the 10 km study area

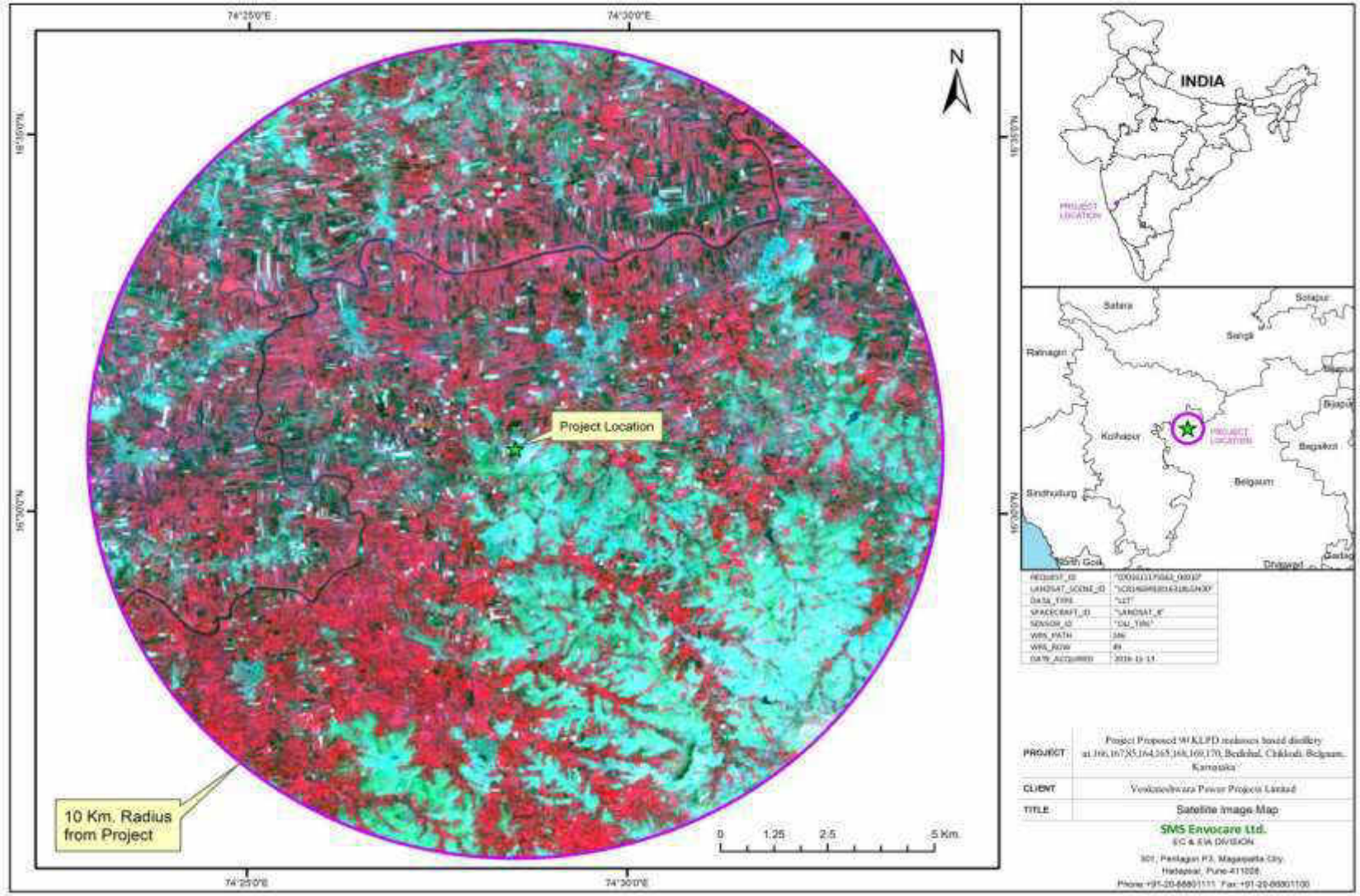


Figure 3.4: Satellite image of the 10 km study area

3.3.1 Land Environment

An area covering 10 km radius, with project site as center, is considered as the study area.

3.3.1.1 Land use Pattern

Net sown area in the Belgaum district is 839,242 hectares, which is 62% of the total geographical area of 1,344,382 hectares of the district. About 31.4% of the 'Net sown' area i.e. 264,140 hectares is sown more than once. Major crops grown in the area are Jowar, Maize, Paddy, Wheat, Bajra, Grams, Tur, Groundnut, Sunflower, Sugarcane, Cotton, Tobacco etc.*(Ground Water Information Booklet Belgaum District, Karnataka 2007).* Land utilization of Chikkodi Taluka is described below,

Table 3.3: Land utilization of Chikkodi taluka

Sr. No.	Name	Area in hect
1	Geog. Area	126,949
2	Forest	547
3	Land not available for cultivation	12,817
4	Uncultivable land	4,571
5	Fallow land	24,947
6	Sown Area	84,587

Land utilization pattern of the 10 km study area is described in below mentioned figure.

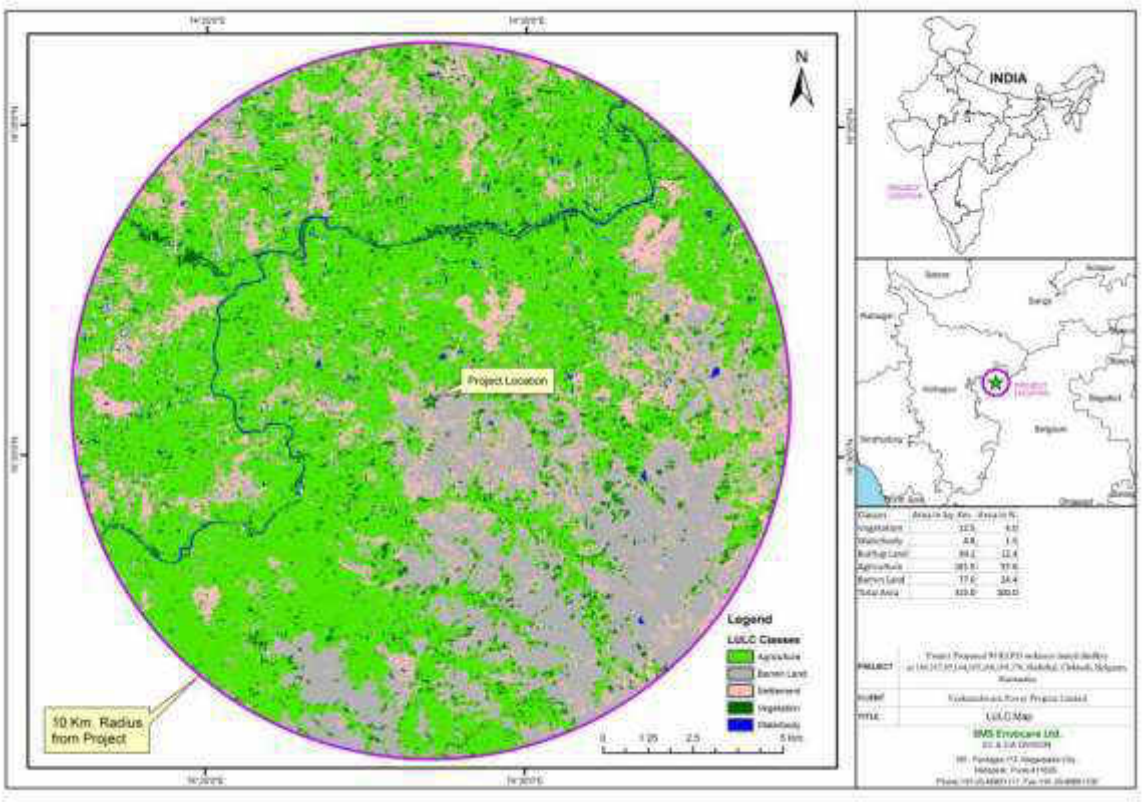


Figure 3.5: Land use image of the 10 km study area

Table 3.4: Land Use/ Land cover Statistics of 10 km study area

Sr. No.	Type	Color Code Bifurcation	Area in Sq. m.	Area in %
1.	Vegetation		12.5	4.0
2.	Water body		4.8	1.5
3.	Built-up land		39.2	12.4
4.	Agriculture		181.5	57.6
5.	Barren Land		77.0	24.4
	Total area		**315.0**	**100.00**

3.3.2 Topography

The topography of the project site and study area of 10 km radius zone is generally plan. Some hilly portion is present at south east site. The slope is towards North West site. The average elevation of the study area is about 580 m above mean sea level. Digital elevation map of the project site and the study area is given in Fig 3.6.

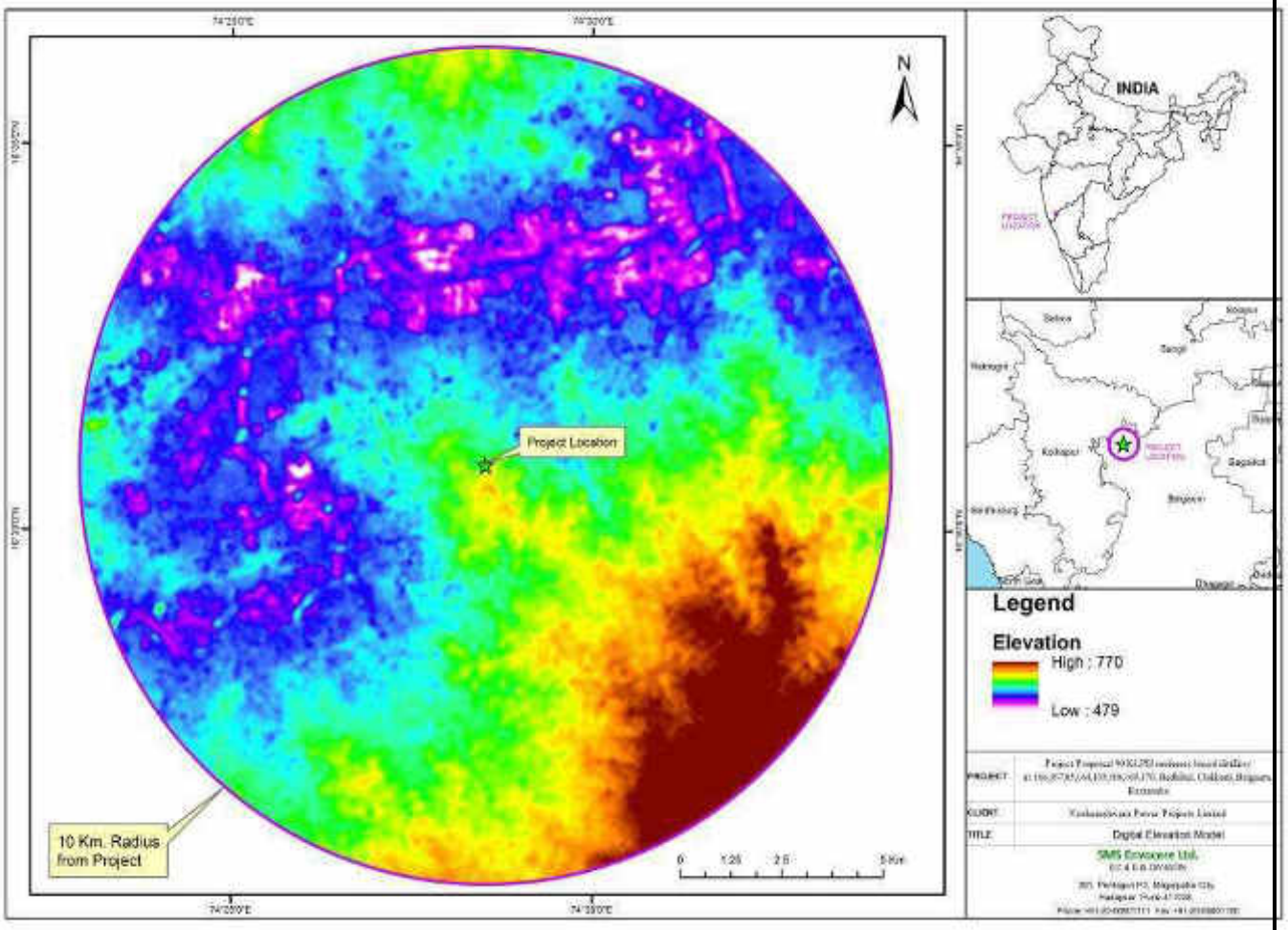


Figure 3.6: Digital elevation Map of the 10 km study area

3.3.3 Geology & hydrology

The district is primarily located on the eastern side of the Western Ghats and its topography is predominantly undulating. A “rugged terrain” marks the western part of Khanapur and Belgaum taluks with deep cutting ravines on the foothills of the Western Ghats. The elevation of these hills varies from 796 to 1025 m. Northern portion of the district is a plateau region formed by basaltic lava flows, which represents “Deccan Peneplain”. The central and southern parts exhibit moderate to gently “undulating terrain” having sparsely distributed knolls and tors. In some parts, especially in Ramdurg and Saundatti taluks, hills with elevations between 686 and 783 m are present. Chikkodi taluka is situated in the heart of Belgaum district and is 75 km. far away from district headquarters, which lies between 19° 2T to 19° 36' latitude and 74° 22' to 74° 46' longitude. From North and West side it is bound by Kolhapur district of Maharastra state, on the eastern side it is bound by Raibag, Athani and Gokak taluks and on Southern side it is bound by Hukkeri taluka. Chikkodi taluka is extended over an area of 1296.5 sq.km consisting of 155 villages and are four 7 circles namely Chikkodi, Sadalaga, Nippani and Nagarmunnoli. Chikkodi is 753 meters above the mean sea level.

The Western Ghats is the main watershed of the peninsular rivers. In this region separating the short swift flowing West streams from the long winding courses of the eastward rivers. Majority of the rivers in this region are characterized by their Southeasterly drainage. The river Krishna enters in the Chikkodi Taluka at Chandur 35 km, North of Chikkodi and leaves the region at Ingali in the same taluka. The river flows in the taluka at a distance of about 45 kms. It flows in the South-westerly direction for about 10 km and joins the river Panchaganga and then enters Kolhapur district of Maharastra.

The second river i e, Dudhaganga flows on the Western side of the Chikkodi taluka from South to Northern direction. It receives the water of Vedaganga near village Bhoj and Barwad and joins river Krishna near Yedur from the South. There are many streams which originate in the same taluka and join Dudhaganga. The river Vedaganga rises in the Sahyadrian main range near Pallegavi of Maharastra. It enters the taluka at the North-west near the villages. Budihal, Kurli, and Yamgarni. It flows in the Easterly and North-Easterly direction at a distance of about 26 kms and joins the river Dudhaganga from the South near the village Bhoj and Barwad in the Chikkodi

taluka.*(Ref:http://shodhganga.inflibnet.ac.in/bitstream /10603 / 100720 /10 /10_chapter% 202.pdf)*

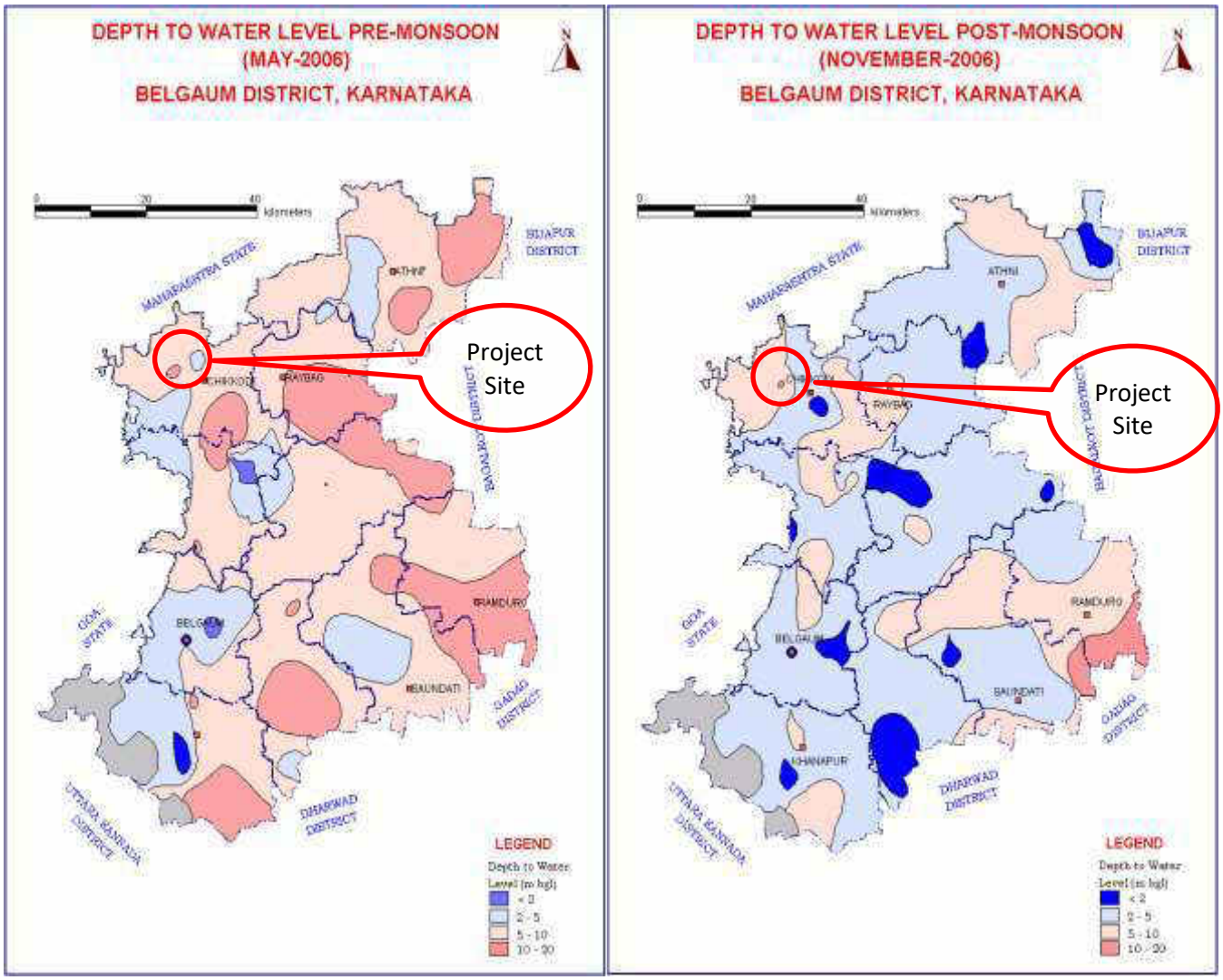


Figure 3.7: Water level in Pre-mansoon and Post-mansoon

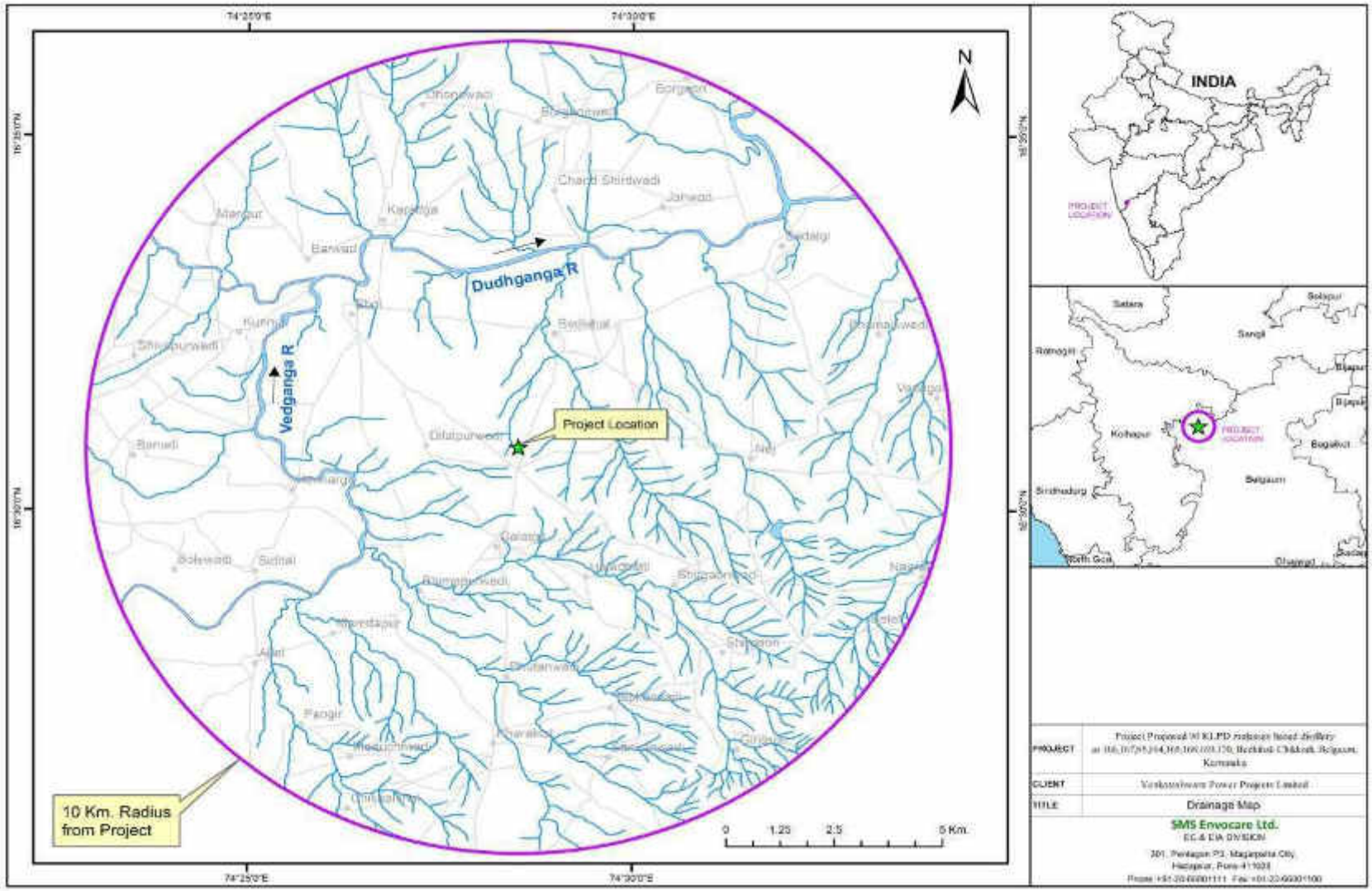


Figure 3.8: Drainage Map of the 10 km study area

3.3.4 Seismology

In India, seismic zones are divided into four zones i.e. V, IV, III and II.

- Zone – V: Very High Risk Zone
- Zone – IV: High Risk Zone
- Zone – III: Moderate Risk Zone
- Zone – II: Low Risk Zone

From Seismic Zone map, it appears that, the plant site as well as study area lies in Zone-III of Seismic Zoning Map, and thus can be said to be located in an area of moderate seismic hazard by national standards. In this zone, the probable earthquake intensity of 5-6 Richter scale could be observed. Seismic Zoning Map of India showing the plant site is given in Figure 3.9.

No defense installations or recreational sites, historically or archeologically important/ notified sites, ecologically sensitive sites, national parks, sanctuaries, biosphere reserves present in study area of 10 km radius.

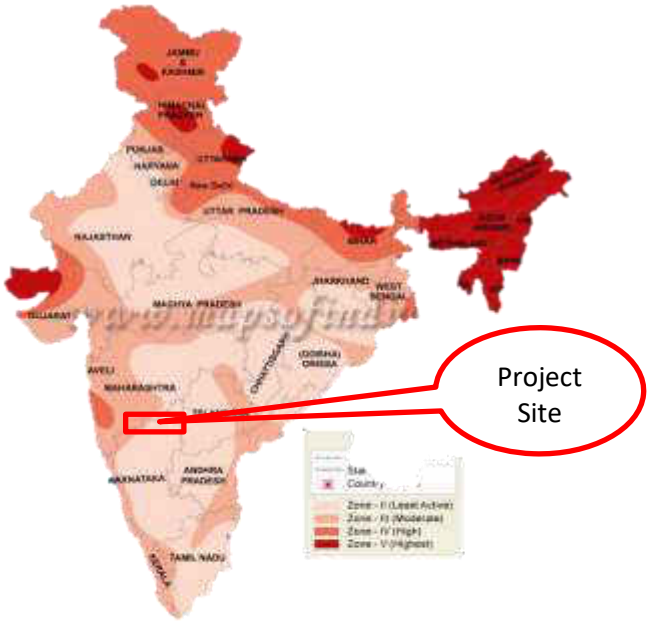


Figure 3.9: Seismology Map

3.4 METEOROLOGY

Meteorology plays a vital role in effective the dispersion of pollutants once discharged into the atmosphere. Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data. India Meteorological Department (IMD), which maintains a network of meteorological stations at several important locations and collect and accumulate meteorological data over a

period of time to be used in future forecast. The nearest IMD station to the study area is located at Belgaum. The Meteorological data with respect to temperature, humidity, rainfall, wind speed, and wind direction was obtained for winter Season from IMD which was recorded on daily basis.

3.4.1 Climate

The climate of the district as a whole can be termed as semi-arid. The variation in the maximum temperature during the year ranges from 27^0C to 35.7^0 C and minimum from 13.9^0C to 20.6^0 C. The district experiences pleasant winters and hot dry summers. The hot season extends from March to May, during which the daily maximum temperature often shoots up to 35.7 ^{0}C. Agro-climatologically the district can be divided into three zones i.e. high rainfall "Hilly zone", "Northern transitional zone" and "Northern dry zone" from southwest to northeast respectively.

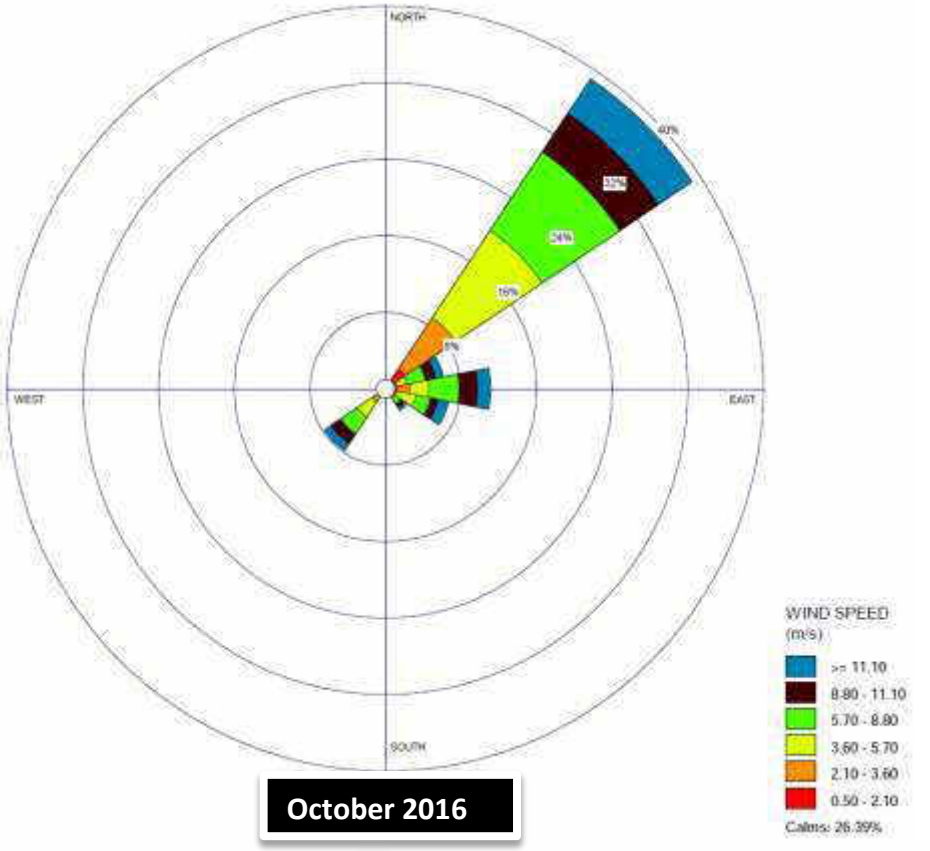
The average annual rainfall during the period 1971 to 2000 recorded in the district is 769.1 mm. The standard deviation and Coefficient variation of rainfall for the Belgaum district is 196.2 mm and 25.5% respectively (Table-5). The highest mean annual rainfall recorded in the district was 1,064 mm in the year 1975 and the lowest rainfall 455 mm in the year 2003.

The contribution by the northeast monsoon or post monsoon (Oct to Dec) is nearly 17.3% and the rest 11.1% is the contribution of the dry weather and pre-monsoon period (Jan to May). Maximum average Precipitation of Tehsil Chikkodi 826.64 mm.

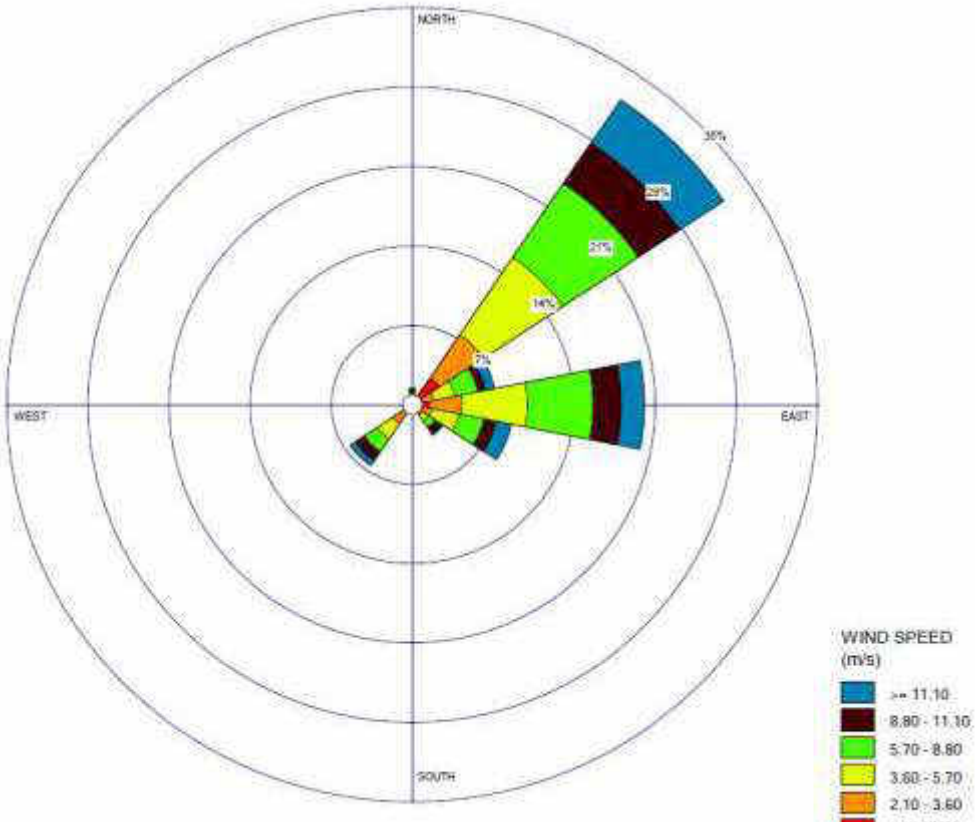
3.4.2 Wind Speed & Wind Direction

Wind direction is the direction from which the wind blows and is based on surface observations. Over the course of a season, wind usually blows in all directions with varying frequencies. Certain direction, which occurs more frequently than others, is known as the prevailing wind direction.

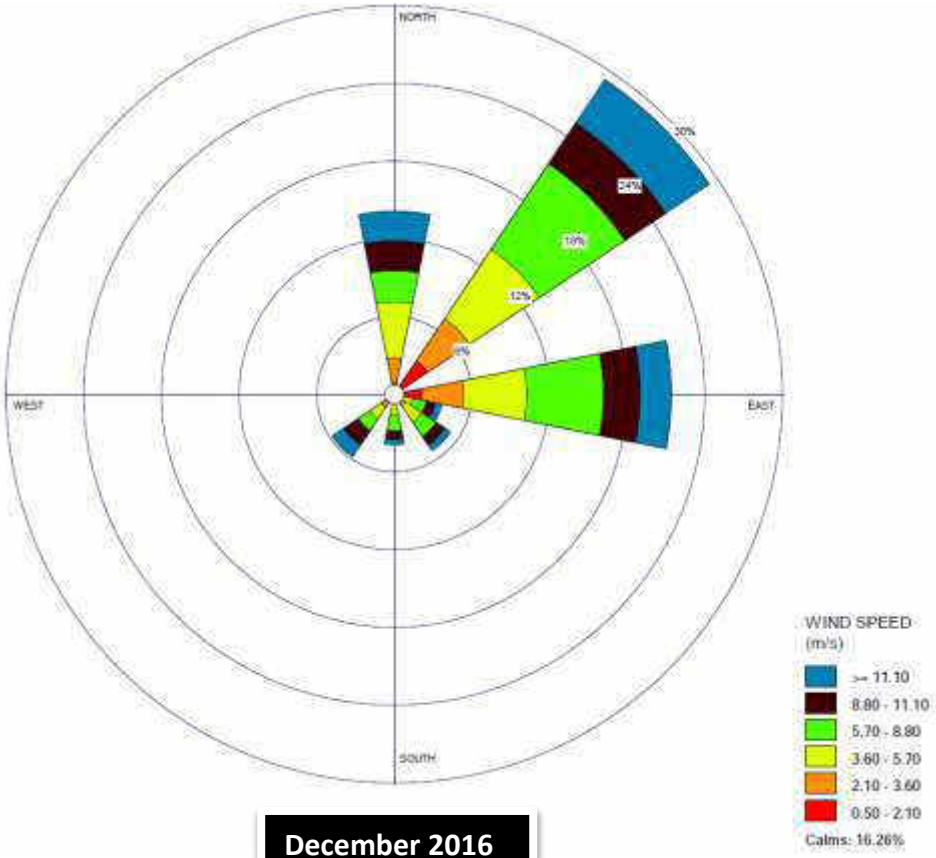
The wind rose denotes a class of diagrams designed to display the distribution of wind direction experienced at a given location over a period of time — long for a climatological record of prevailing winds or short to show wind character for a particular event or purpose. Wind rose for the month of October, November, December is summarizes in **Fig. 3.10.**



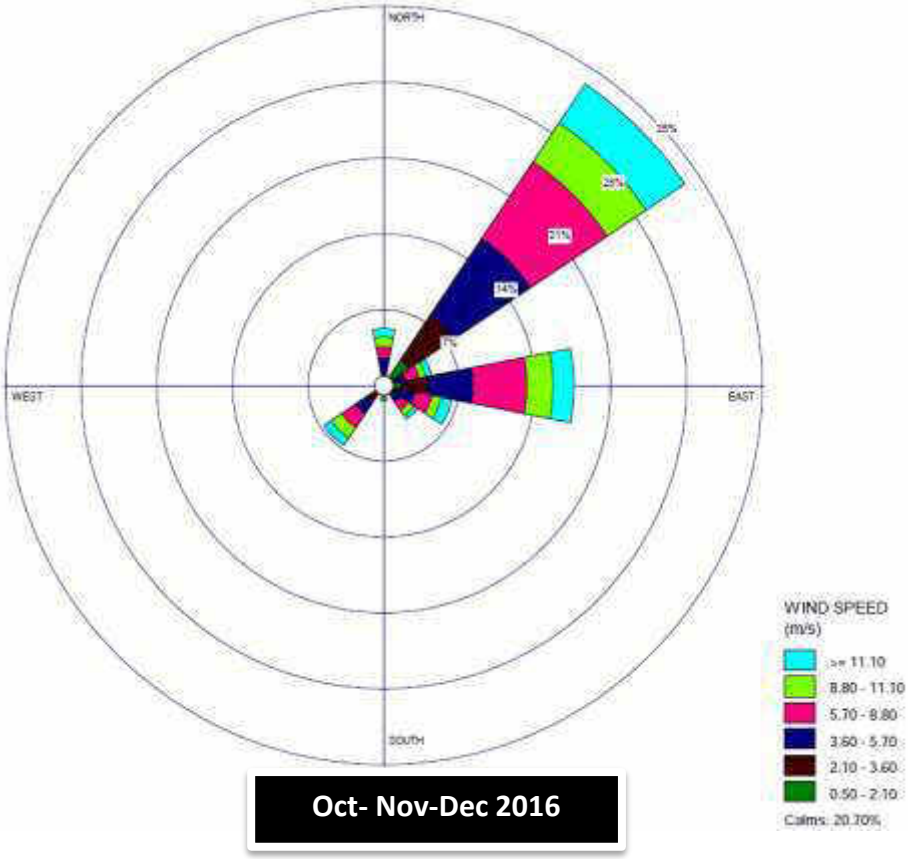
October 2016



November 2016



December 2016



Oct- Nov-Dec 2016

Figure 3.10: Wind rose of the study area

The wind rose diagram reveals that wind was blowing predominantly from the northwest direction with frequency of approximately 38% having speed in the range of 0.5-5.6 m s^{-1} during the monitoring period. The onsite average wind speed was observed 1.58 m $s^{-1}$with frequency of calm winds 20.70% during the monitoring period. Wind class frequency distribution observed during the monitoring period is presented graphically as shown in below.

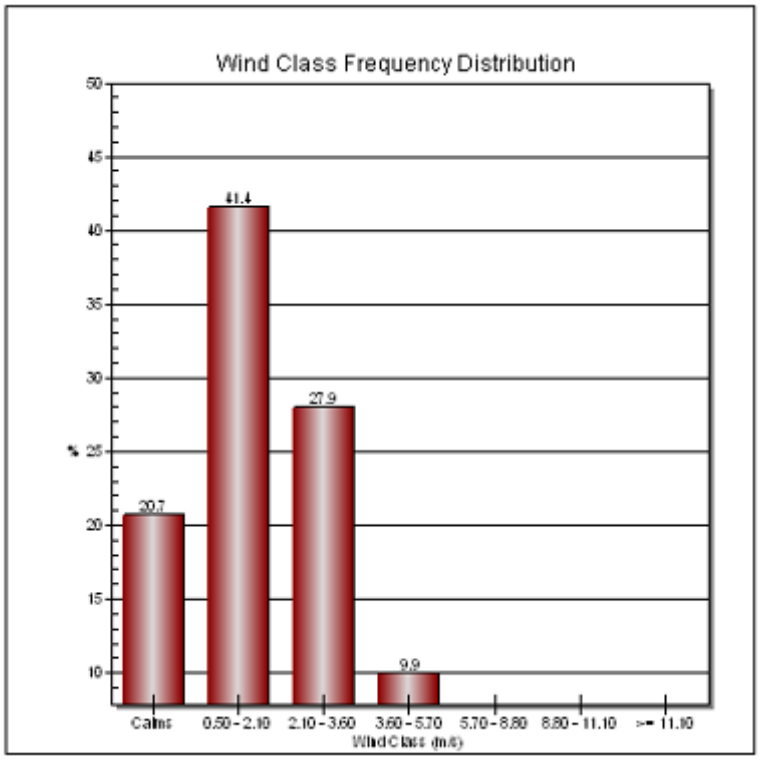


Figure 4.1: Wind Class Frequency Distribution

3.4.3 Atmospheric stability

A measure of the tendency of air to move upward or downward within the atmosphere generates turbulence. The atmosphere may be more or less turbulent at any given time, depending on the amount of incoming solar radiation as well as other factors. There are six defined Pasquill atmospheric stability classes, from A to F, each representing a different degree of turbulence in the atmosphere. When moderate to strong incoming solar radiation heats air near the ground, causing it to rise and generating large eddies, the atmosphere is considered unstable. Unstable conditions are associated with atmospheric stability classes A, B and C. In this stability class air has strong tendency to move up or down, and the atmosphere is more turbulent. When solar radiation is relatively weak or absent, air near the surface has reduced tendency to rise and less turbulence develops. In this case, the atmosphere is considered stable, the wind is weak, and the stability class would be E or F. Stability classes D represents

conditions of neutral stability (moderately turbulent). Neutral conditions are associated with relatively strong wind speeds and moderate solar radiation. The frequency of stability classes during the study period is provided in below **Table**

Frequency of Stability Classes

Stability Class	Frequency (%)
A – Extremely Unstable	17.0
B – Unstable	19.0
C – Slightly Unstable	2.7
D – Neutral	0.5
E – Slightly Stable	9.6
F – Stable	51.2

This data indicates that over the monitoring period, the site exhibits trends of stable atmospheric conditions with 51.2% time during monitoring period. Stable conditions exhibit poor vertical mixing, and low levels of contaminant dispersion. Use of this stability data for modeling purposes will produce higher concentrations of pollutants at a given receptor (i.e. more conservative results).

3.4.4 Mixing height

Mixing Height (MH) is the vertical extent through which the contaminant plume can be mixed. Forecasting of mixing height is done with the aid of the vertical temperature profile. The MH is a function of stability. In unstable air the MH is higher and in stable air the MH is lower. With a lower MH, there is a smaller volume of air in which the pollutant can be dispersed, resulting in higher concentrations in the ambient environment. There is a seasonal variation of MH. During summer daylight hours, MH can be few thousand feet whereas for winter it can be a few hundred feet. It varies also in the course of a day. It is lowest at night and increases during the day. Secondary information has been used to determine the mixing height over the study region for the study period (Oct-Dec, 2016) and it varies from 25-1200 meters (IMD).

3.5 BASELINE ENVIRONMENTAL STATUS OF AIR, WATER, SOIL & NOISE

The baseline environmental study was carried out for the Air, Water, Soil, Noise & Socioeconomic environment. The study was conducted from October, November, and December 2016. Locations have been selected within 10 km radius from the project site & environmental samples were collected from the selected locations. Primary data were verified by reviewing the secondary data. Sources of secondary data are Census of India 2011,

Forest department, District & Village Panchayat, Internet etc. The scenario of environmental condition of the area revealed from the sample & data analysis is described below in subsequent paragraphs.

3.5.1 Air Environment

As mentioned above, ambient air monitoring was conducted during the month October, November and December 2016. The monitoring frequency was selected as per the guidelines of CPCB. Based on the nature, characteristics and prevailing conditions, following parameters were selected for monitoring and details studies and evaluation.

- Particulate Matter 10
- Particulate Matter 2.5
- Sulphur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Carbon monoxide(CO)

While selecting the locations for baseline studies and to collect various types of samples and monitoring, following criteria was considered:

- Topography of the study area
- Population in the area
- Downwind direction
- Dominant wind Direction
- Availability of manpower, electricity, approach, structure and protection of samplers.

The details of air monitoring locations including whether it was upwind, downwind or cross wind are tabulated in Table 3.5 and analysis results are given in **Table 3.6.**

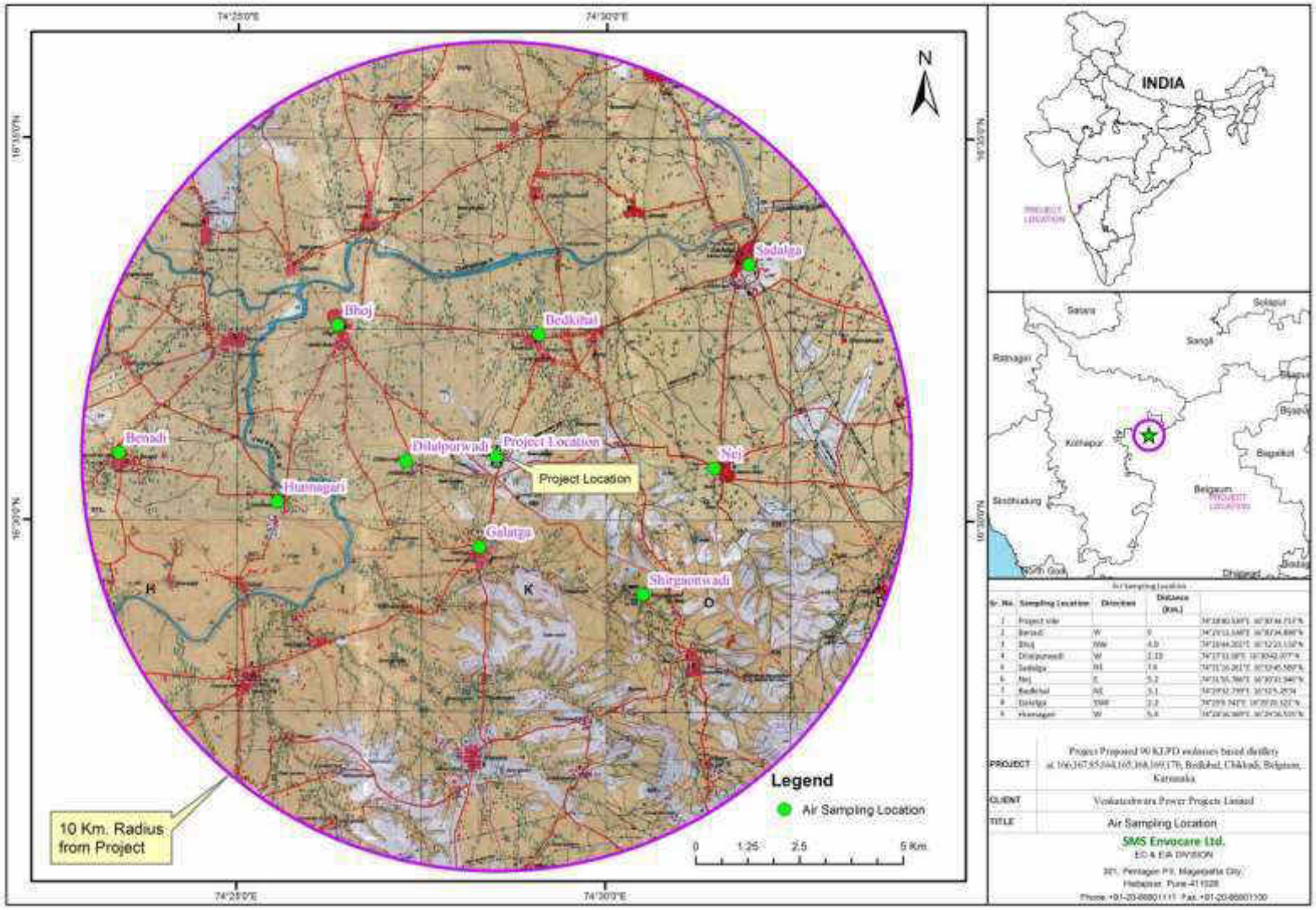


Figure 3.11: Air sampling location map of the 10 km study area

Table 3.5: Air monitoring location of 10 km study area

#	Sampling Location	Coordinates	Wind pattern	Direction	Distance (km)
1	Project site	$16^0$30' 50.28" N, $74^0$28' 30.99" E	-	-	Core
2	Bedkihal	$16^0$32' 18.33" N, $74^0$29' 05.15" E	UW	NE	2.75
3	Dilalpurwadi	$16^0$30' 41.06" N, $74^0$27' 22.05" E	Second DW	W	1.94
4	Galatga	$16^0$29' 31.94" N, $74^0$28' 22.67" E	DW	SSW	2.51
5	Shirgaonwadi	$16^0$28' 21.68" N ,74^0 31' 11.69" E	CW	SE	4.55
6	Nej	$16^0$30' 41.37" N ,$74^0$31' 38.24" E	Second UW	E	5.71
7	Sadalaga	$16^0$33'14.38" N, $74^0$31'52.34" E	UW	NE	7.41
8	Bhoj	$16^0$32' 23.92" N, $74^0$26' 33.19" E	CW	NW	4.3
9	Hunnagari	$16^0$30' 02.55" N, $74^0$25' 30.98" E	Second DW	W	5.58
10	Benadi	$16^0$30' 46.87" N, $74^0$23' 35.47" E	Second DW	W	8.83

UW: Upwind, DW: Downwind, CW: Cross wind

Table 3.6: Analysis results of ambient air samples

Sr. No.	Location	Description	$PM_{2.5}$ µg/m^3	PM_{10} µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3	CO mg/m^3
		NAAQ Standards	**≤60**	**≤100**	**≤80**	**≤80**	**4**
1.	Project Site	Minimum	34.9	76.2	7.4	14.2	1
		Maximum	59.4	106.2	14.2	22.3	3
		Average	45.0	89.2	10.1	18.5	2.3
		98^{th}	58.85	104.85	13.65	22	3.00
2.	Bedkihal	Minimum	27.8	52.8	4.8	6.4	0
		Maximum	44.6	70.4	7.2	12.5	3
		Average	34.4	59.5	6.1	8.9	0.7
		98^{th}	43.6	68.75	7.2	12.15	2.48
3.	Dilalpurwadi	Minimum	30.8	60.8	5.6	11.4	0
		Maximum	52.3	94.3	9.4	18.1	3
		Average	37.2	69.7	7.5	14.6	1.4
		98^{th}	50.75	86.25	9.3	17.15	3.00
4.	Galatga	Minimum	29.6	58.4	5.7	9.4	0
		Maximum	47.2	76.2	9.1	15.5	2
		Average	36.1	64.5	7.1	12.7	0.7
		98^{th}	46.25	75.25	8.65	15.05	2.00

Sr. No.	Location	Description	$PM_{2.5}$ µg/m^3	PM_{10} µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3	CO mg/m^3
		NAAQ Standards	**≤60**	**≤100**	**≤80**	**≤80**	**4**
5.	Shirgaonwadi	Minimum	22.8	40.9	3.4	3.8	0
		Maximum	33.5	63.8	5.2	7.4	2
		Average	26.4	48.2	4.5	5.3	0.8
		98th	33.35	60.05	5.2	7.1	2.00
6.	Nej	Minimum	21.4	40.2	3.2	3.4	0
		Maximum	32.4	58.3	4.9	6.2	2
		Average	25.8	47.8	4.1	4.8	0.7
		98th	32.25	56.45	4.85	6.15	2.00
7.	Sadalaga	Minimum	30.6	51.2	3.9	3.8	0
		Maximum	39.2	58.9	6.4	7.2	3
		Average	34.0	55.1	5.3	5.4	1.3
		98th	38.25	58.8	6.3	7.2	2.48
8.	Bhoj	Minimum	26.8	45.9	4.6	5.4	0
		Maximum	41.6	69.5	7	9.6	2
		Average	32.6	54.0	5.8	7.1	0.8
		98th	41.4	67.4	6.85	9.05	2.00
9.	Hunnagari	Minimum	24.6	42.8	3.4	4.3	0
		Maximum	39.6	68.5	6.3	7.5	2
		Average	28.6	51.4	4.8	5.8	0.7
		98th	38.4	65.45	6.1	7.35	2.00
10.	Benadi	Minimum	21.3	40.9	3.4	3.7	0
		Maximum	31.2	59.2	4.5	6.5	2
		Average	26.0	48.0	4.0	4.8	0.8
		98th	31	57.3	4.5	6.3	2.00

3.5.1.1 Results and discussion

Concentrations of PM_{10} and $PM_{2.5}$ for all 10 AAQM locations were found to be in the range of 47.8 to 89.2 µg/m^3 and 25.00 to 45.0 µg/m^3 respectively. SO_2 concentrations are found to be in the range of 4.0 to 10.1 µg/m^3 and NO_2 concentrations were in the range of 4.8 to 18.5 µg/m^3. From the results, it is revealed that the concentrations of all these pollutants are within the norms of National Ambient Air Quality Standards. From the results, it is understood that after project execution, all these values of various pollutants can be controlled to acceptable level with the help of development of proper green belt in and

around the facility. And, simultaneously implementing the periodical monitoring programs for these pollutants to ascertain the concentration of individual pollutants is within limits.

3.5.2 Noise Environment

Sound is an important feature of our life and is the means of communication and entertainment in most animals including human beings. It is known that a low sound is pleasant whereas a loud sound is unpleasant and is commonly referred to as “noise”. Therefore, noise can be defined as an unpleasant and unwanted sound. Whether, a given sound is pleasant or unpleasant as it depends on its loudness, duration, rhythm and the mood of the person listing to it. But loudness is definitely the most significant criterion which converts sound into noise. Exposure to loud noise is indeed annoying and harmful too. Noise is a physical form of pollution and is not directly harmful to the life supporting systems namely air, soil and water. Its effects are more directly on the receiver i.e. man. Noise pollution is the result of modern industrialized urban life and congestion due to over population.

Even though noise pollution is not fatal to human life, yet its importance cannot be overlooked because repeated exposure to noise reduces the sleeping hours and productivity or efficiency of a human being. It affects the peace of mind and invades the privacy of a human being. The importance of noise pollution as environmental problem is being recognized as the ill effects of noise on human health and environment.

Therefore, to identify the existing noise level in and around the project site within 10 km radius, monitoring of noise was undertaken at selected locations. With the monitoring activity, existing noise sources and background noise levels at sensitive receptors were identified within the study area. The source of noise pollution in the study area is particularly the vehicular movement. Noise pollution source in the factory premises is Sugar factory milling house, boiler house and vehicular movement from the adjacent road of the existing factory site. The details of locations monitored during day and night are given in Table 3.7 and Figure 3.12. Monitoring results obtained at these locations are given in Table 3.8.

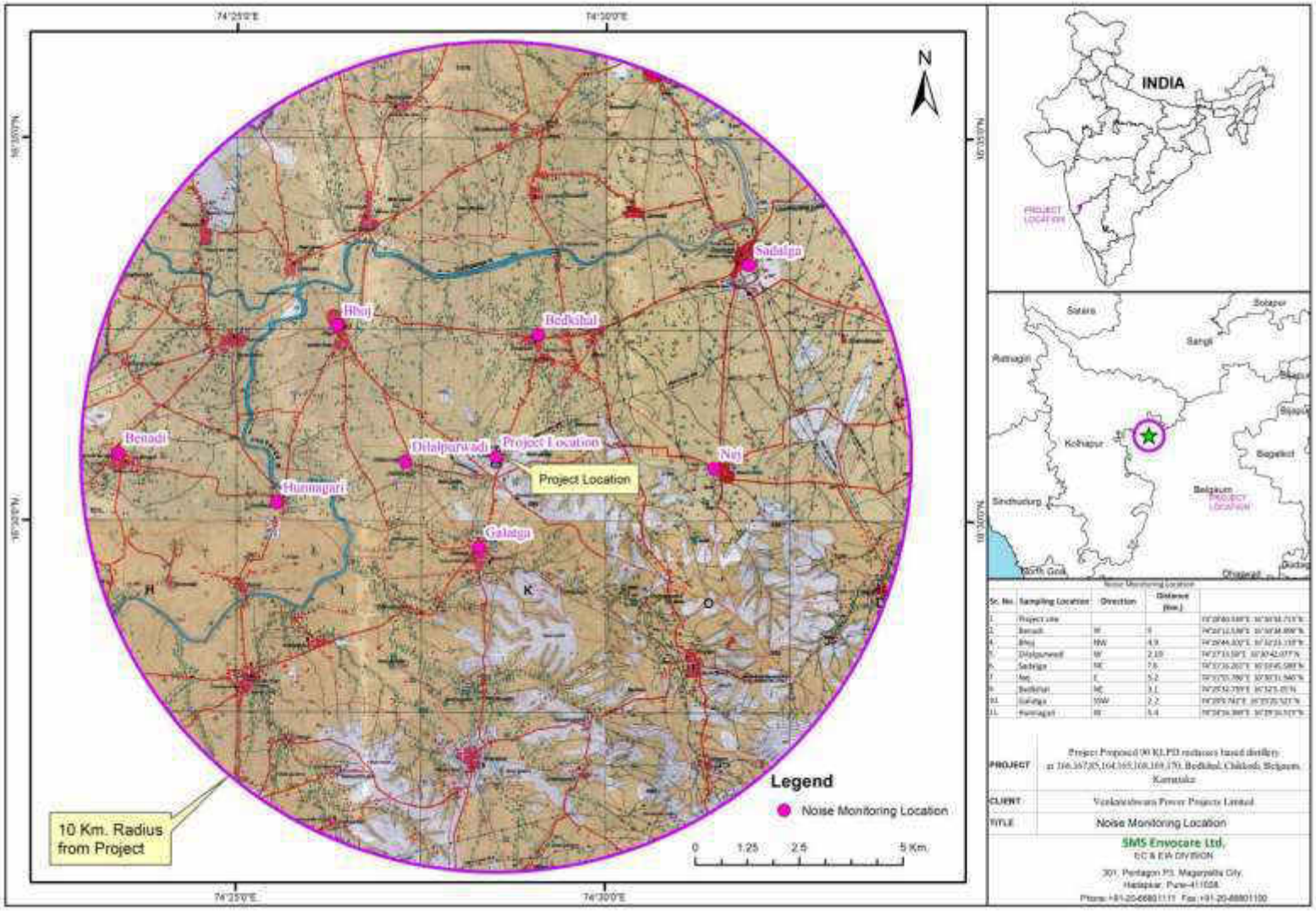


Figure 3.12: Noise monitoring location map of the 10 km study area

Table 3.7: Noise monitoring location of 10 km study area

#	Sampling Location	Coordinates	Direction	Distance (km)
1	Project site	16^{0}30' 50.28" N, 74^{0}28' 30.99" E	-	Core
2	Bedkihal	16^{0}32' 18.33" N, 74^{0}29' 05.15" E	NE	2.75
3	Dilalpurwadi	16^{0}30' 41.06" N, 74^{0}27' 22.05" E	W	1.94
4	Galatga	16^{0}29' 31.94" N, 74^{0}28' 22.67" E	SSW	2.51
5	Shirgaonwadi	16^{0}28' 21.68" N ,74^0 31' 11.69" E	SE	4.55
6	Nej	16^{0}30' 41.37" N ,74^{0}31' 38.24" E	E	5.71
7	Sadalaga	16^{0}33'14.38" N, 74^{0}31'52.34" E	NE	7.41
8	Bhoj	16^{0}32' 23.92" N, 74^{0}26' 33.19" E	NW	4.3
9	Hunnagari	16^{0}30' 02.55" N, 74^{0}25' 30.98" E	W	5.58
10	Benadi	16^{0}30' 46.87" N, 74^{0}23' 35.47" E	W	8.83

Table 3.8: Noise monitoring results

Location codes	Location	Equivalent noise level, leq in dB (A)		CPCB Noise standards in dB(A) for Residence	
		Day Time	Night Time	Day Time	Night Time
1	Project site	73.8	67.5	75	70
2	Bedkihal	48.2	38.4	55	45
3	Dilalpurwadi	48.9	43.7	55	45
4	Galatga	47.6	40.3	55	45
5	Shirgaonwadi	40.6	38.5	55	45
6	Nej	42.8	36.8	55	45
7	Sadalaga	40.5	37.2	55	45
8	Bhoj	43.2	38.9	55	45
9	Hunnagari	44.1	40.1	55	45
10	Benadi	41.6	36.5	55	45

3.5.2.1 Results and discussion

Noise levels were measured at 9 different locations in the study area to establish present scenario. The day and night time equivalent continuous sound level (Leq) varies from 40 dB (A) to 45 dB (A) and 30 (A) to 40 dB (A) respectively. From the results it is found that noise level is much below the permissible limit of CPCB and there are no negative impacts on existing environment from the noise pollution.

3.5.3 Water Environment

Water samples were collected once during the study period from eleven locations for ground water and four surface water. Ground water samples were collected from tube-well and dug wells from different locations in the study area. Surface water samples were collected from Dudhganga River and Vedganga River. All the samples were analyzed with respect to physical, chemical and biological parameters by Standard methods. The locations from where the samples were collected are shown below in **Figure 3.13.** Similarly, **Table 3.9** show the location name and corresponding sample collected from the source of well, hand pump or Lake.

Table 3.9: Water sampling location

Sr. No.	Location	Coordinates	Distance	Direction
1.	Dudhganga upstream-Bedkihal	$16^0$32'18.33"N, $74^0$29' 05.15"E	2.75	NE
2.	Sadalga- Dudhganga down stream	$16^0$33'14.38"N, $74^0$31'52.34"E	7.41	NE
3.	Kunnur- Vedganga river Upstream stream	$16^0$32' 17.79" N, $74^0$25' 09.93" E	7.5	NW
4.	Bhoj – Vedganga river downstream	$16^0$32' 23.92" N, $74^0$26' 33.19" E	4.3	NW
Ground Water samples				
1.	Project site- Water tank	$16^0$30' 38.41" N, $74^0$28' 28.83" E	Core	Core
2.	Benadi- Dug well	$16^0$30' 46.87" N, $74^0$23' 35.47" E	8.83	W
3.	Kunnur – Bore well	$16^0$32' 13.16" N, $74^0$25' 27.27" E	7.5	NW
4.	Bhoj- Bore well	$16^0$32' 23.92" N, $74^0$26' 33.19" E	4.3	NW
5.	Dilalpurwadi-Bore water	$16^0$30' 41.06" N, $74^0$27' 22.05" E	1.94	W
6.	Sadalga: Dug well	$16^0$33'14.38"N, $74^0$31'52.34" E	7.41	NE
7.	Nej-Bore water	$16^0$30' 41.37" N,$74^0$31' 38.24" E	5.71	E
8.	Sirgaon-Bore water	$16^0$28' 21.68" N,74^0 31' 11.69" E	4.55	SE
9.	Mamdapur-Dug well	$16^0$28' 29.11" N, $74^0$25' 58.85" E	6.0	SW
10.	Bedkihal- Bore water	$16^0$32' 18.33" N, $74^0$29' 05.15" E	2.75	NE
11.	Galatga- Bore water	$16^0$29' 31.94" N, $74^0$28' 22.67" E	2.51	SSW

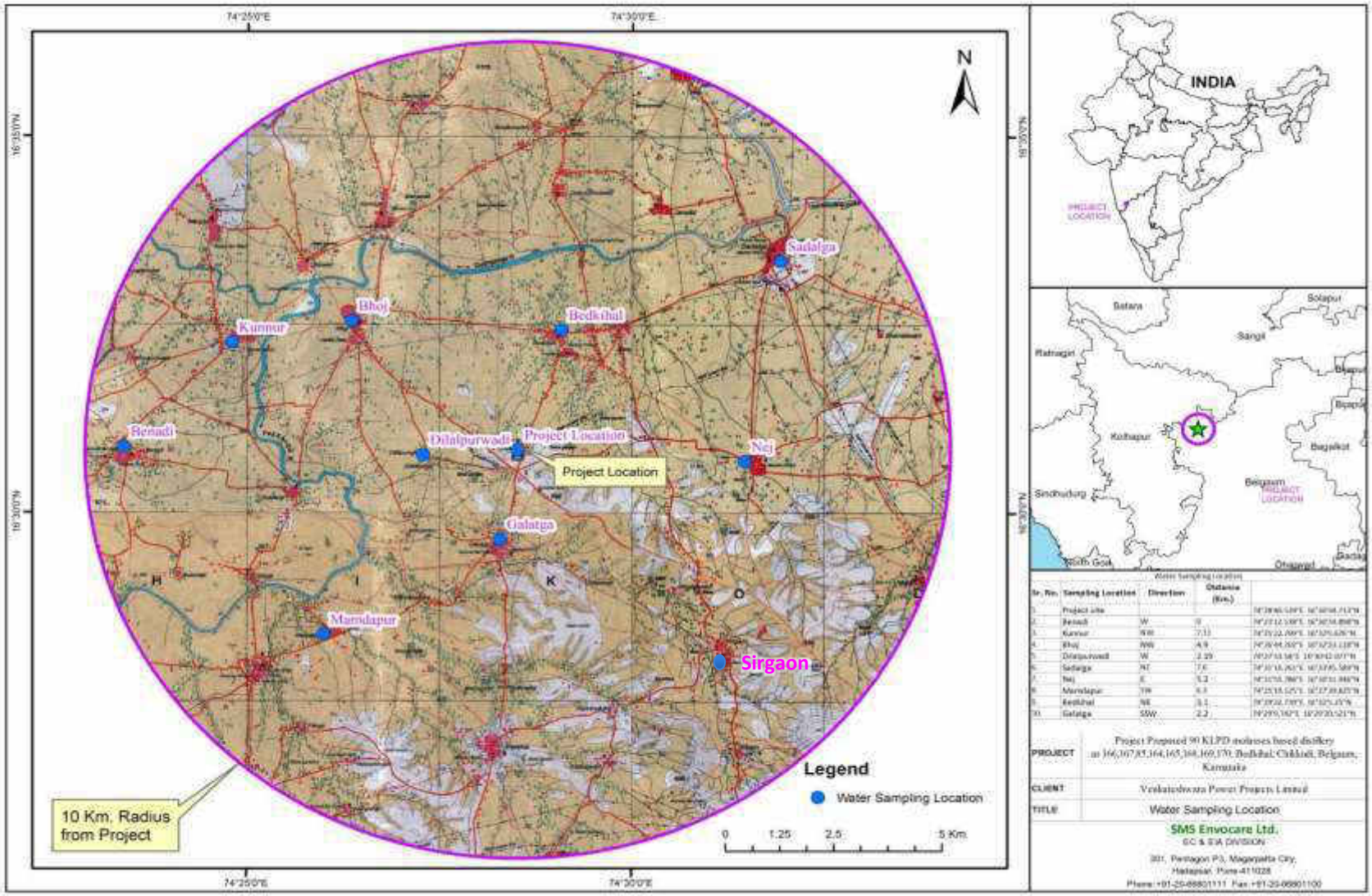


Figure 3.13: Water sampling location map of the 10 km study area

Table 3.10: Analysis results of water samples

Locations → Parameters ↓	Dudh ganga upstr eam	Dudhgan ga down stream	Vedganga Upstream	Vedganga river down stream	Project site	Banadi	Kunnur	Bhoj	Dilalpur wadi	Sadalga	Nej	Sirgaon	Mamda pur	Bedkihal	Galatg a	IS 1050 0: 2012
pH at 25˚C	6.92	7.15	7.22	7.26	7.21	7.33	7.16	7.06	7.19	7.23	7.12	7.36	7.09	7.24	7.08	-
Conductivity 25˚C (µmhs/ cm)	565	638	586	612	644	784	546	684	447	516	408	853	976	376	797	NS
Turbidity (NTU)	1.6	2.2	0.9	0.8	2.8	1.2	0.6	0.9	1.4	0.6	0.9	2.4	1.6	0.6	1.8	10
Odour (apparent)	Unobj ectio nable	Unobjec tionable	Unobjectio nable	Unobjecti onable	Un objecti on able	Unobje ctiona ble	Unobj ectio nable	Unobj ectio nable	Unobje ctiona ble	Unobjec tionable	Unobj ectio nable	Unobjec tionable	Unobjec tionable	Unobject ionable	Unobje ctiona ble	UO
Colour (Hazen)	<1	<1	Colorless	Colorless	<1	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	25
TDS (mg/l)	394	456	208	220	472	574	386	478	356	374	288	614	598	278	569	2000
Total Hardness $CaCO_3$(mg/l)	210	216	164	168	224	264	230	244	292	210	114	252	268	110	224	600
Calcium Ca(mg/l)	44	46.4	33.15	33.15	46.4	59.2	60.8	67.2	76.8	48	28	65.6	64	28	60.8	200
Magnesium Mg(mg/l)	24	24	20.57	20.57	24	27.84	18.72	18.24	24	16.74	10.56	21.12	25.97	9.6	17.28	100
Total Alkalinity $CaCO_3$ (mg/l)	238	274	138	144	268	186	280	286	216	224	172	368	360	108	340	600
Chlorides Cl (mg/l)	47	52	16	20	47	65	41.5	38.5	40.5	35	26.5	51.5	62	15	76.1	1000
Sulphate SO_4 (mg/l)	26	31.3	9.35	11.13	26.5	40.2	32.7	31.8	29.65	23.7	16.4	43.6	48.7	14.7	51.2	400
Nitrate NO_3(mg/l)	1.35	1.42	1.55	1.63	1.35	4.12	2.55	4.52	2.85	2.18	0.87	5.44	6.35	0.96	6.32	NR

Locations → Parameters ↓	Dudhganga upstream	Dudhganga down stream	Vedganga Upstream	Vedganga river down stream	Project site	Banadi	Kunnur	Bhoj	Dilalpurwadi	Sadalga	Nej	Sirgaon	Mamdapur	Bedkihal	Galatga	IS 10500: 2012
Phosphate PO_4(mg/l)	0.03	0.02	0.03	0.04	0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NS
Ammonia NH_3(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NR
DO (mg/l)	6.2	5.9	5.5	5.6	5.4	5.2	5.2	5.1	4.9	4.8	5.1	4.7	4.5	4.5	4.2	NS
COD(mg/l)	15	23	17	18	20	14	12	11	16	12	10	15	14	12	16	NS
BOD(mg/l)	6	7	9	8	5	4.5	6.5	5	8	6	3.5	7	6	5.5	7	NS
Sodium Na(mg/l)	23	28	15	19	22	13.2	16.3	13.2	16.2	8.5	2.35	23.4	31.5	9.2	36.5	NS
Potassium K(mg/l)	3	4	3.11	2.65	3.2	1.5	5	2.7	1.9	1.6	0.3	3.4	3.95	6.52	8.9	NS
Copper Cu(mg/l)	0.02	0.03	0.05	0.04	0.03	0.021	0.01	0.01	0.02	0.01	BDL	0.04	0.02	0.05	0.03	1.5
Iron as Fe(mg/l)	0.12	0.14	0.09	0.08	0.18	0.09	0.07	0.12	0.12	0.09	0.07	0.18	0.2	0.11	0.16	NR
Manganese Mn(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.3
Zinc as Zn(mg/l)	1.32	1.52	1.33	1.28	1.74	0.65	1.25	1.03	1.74	1.23	0.54	1.82	1.25	0.62	BDL	15
Fluoride F(mg/l)	0.26	0.29	0.26	0.22	0.31	0.42	0.47	0.33	0.41	0.35	0.24	0.47	0.37	0.17	0.54	1.5
Boron as B(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.0
Cadmium as Cd	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NR
Hexavalent Chromium as Cr^{6+}(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NS
Total chromium as Cr (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NR

Locations → Parameters ↓	Dudhganga upstream	Dudhganga down stream	Vedganga Upstream	Vedganga river down stream	Project site	Banadi	Kunnur	Bhoj	Dilalpurwadi	Sadalga	Nej	Sirgaon	Mamdapur	Bedkihal	Galatga	IS 10500: 2012
Lead as Pb (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NR
Arsenic as As (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.05
MPN (mg/l)	260	298	253	253	260	190	17	8	26	11	8	10	4.5	5	14	Absent
E-coli (mg/l)	5 Present	8 Present	6 Present	6 Present	4 Present	Present	Absent	Absent	present	Absent	Absent	Present	Present	Absent	Present	Absent

Note:

- UO: Unobjectionable
- BDL: Below Detectable Limit
- NR: No Relaxation.
- NS: Not Specified

Photograph 3.1: Water sampling photographs

5.5.3.1 Result and discussion

Water samples were collected from 15 different locations as mentioned in Table 3.10 and analyzed in the laboratory. The pH level was found to be in the range of 7.0 to 7.36 and Total Dissolved Solids were found to be in the range of 220 to 598 mg/l. From the results, it is observed that TDS values are high at Mamdapur, Benadi, Galatga. Similarly, Chlorides values are found in the range of 15.0 to 76.1 mg/l.

The above chemical analysis reveals that water from all sources is suitable for drinking purposes after disinfection, as E-Coli is present in all the surface water and some ground water samples collected. All other constituents are within the limits prescribed for drinking water standards of Indian Standards (10500: 2012).

3.5.4 Soil Environment

To study the soil environment in and around the project site in the study area of 10 km radius, total ten samples were collected by the Team of Expert. After the collection of samples, analysis was carried out for all required physico-chemical parameters. During sampling of Soil samples, standard procedure was followed and samples were collected in polythene bags. Soil sampling locations are presented in Figure 3.14 and the names of locations are mentioned in Table 3.11. During sampling of the soil, it is observed that the Soil is mostly alluvial, black lateritic, red and saline. The texture is sandy loam or clay loam. As the Project will be based on zero liquid discharge, hence no chance of adverse impact on the soil is envisaged from the project activities.

Table 3.11: Soil sampling location

Sr. No.	Location	Direction	Distance (km)	Direction
1.	Project site	$16^0$30' 50.28" N, $74^0$28' 30.99" E	Core	Core
2.	Benadi	$16^0$30' 46.87" N, $74^0$23' 35.47" E	8.83	W
3.	Bhoj	$16^0$32' 23.92" N, $74^0$26' 33.19" E	4.3	NW
4.	Dilalpurwadi	$16^0$30' 41.06" N, $74^0$27' 22.05" E	1.94	W
5.	Sadalga	$16^0$33'14.38" N, $74^0$31'52.34" E	7.41	NE
6.	Nej	$16^0$30' 41.37" N ,$74^0$31' 38.24" E	5.71	E
7.	Sirgaon	$16^0$28' 21.68" N ,74^0 31' 11.69" E	4.55	SE
8.	Mamdapur	$16^0$28' 29.11" N, $74^0$25' 58.85" E	6.0	SW
9.	Bedkihal	$16^0$32' 18.33" N, $74^0$29' 05.15" E	2.75	NE
10.	Galatga	$16^0$29' 31.94" N, $74^0$28' 22.67" E	2.51	SSW

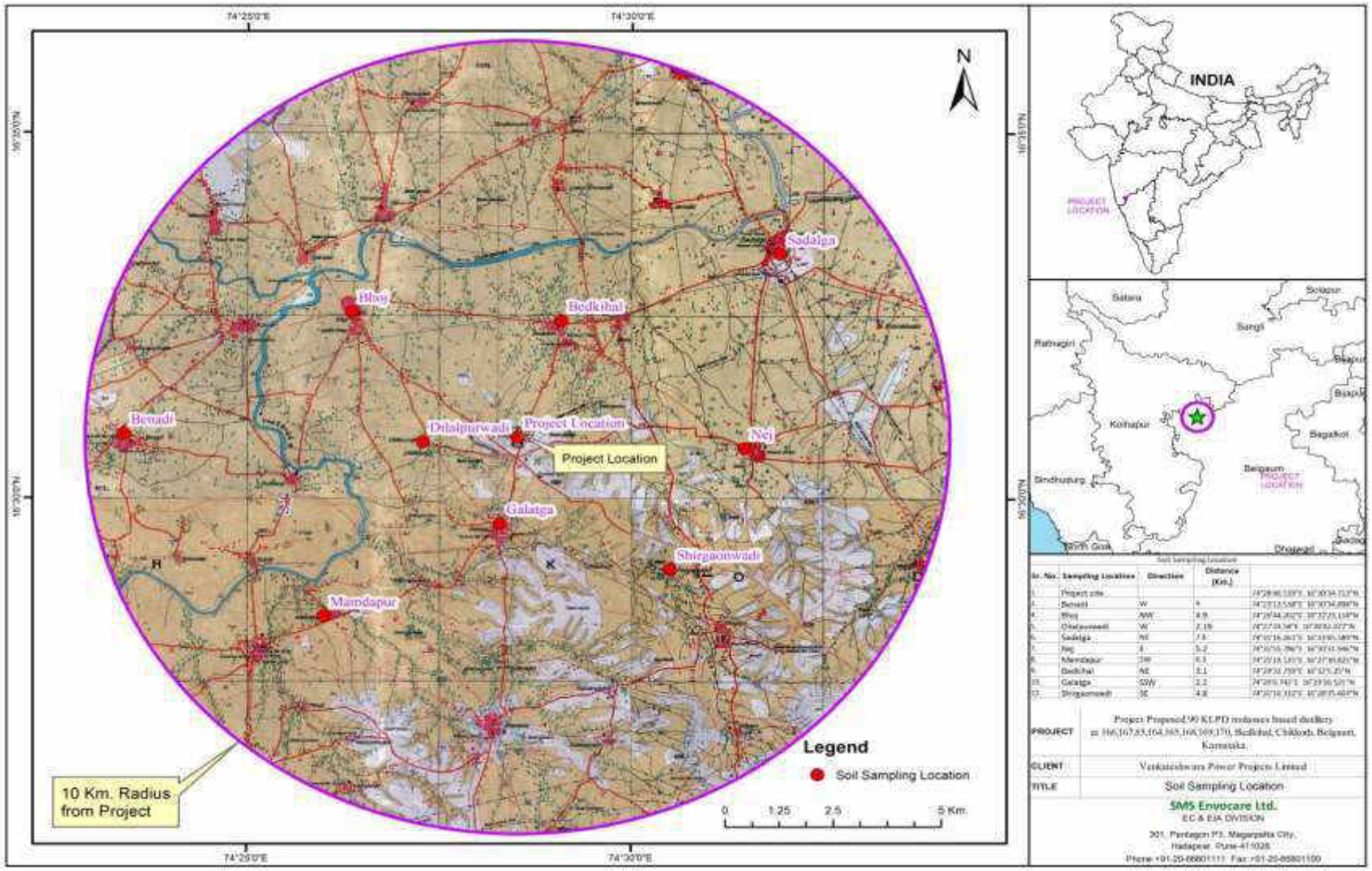


Figure 3.14: Soil sampling location map of the 10 km study area

Table 3.12: Soil analysis results

Parameters	units	Project site	Banadi	Bhoj	Dilalpurwadi	Sadalga	Nej	Sirgaon	Mamdapur	Bedkihal	Galatga
pH	-	7.23	7.18	7.08	6.98	7.22	7.16	7.03	7.42	7.33	7.46
Conductivity	µmho s/cm	1426	863	1012	966	1204	1132	1084	997	1018	1019
Moisture Content	%	16.8	17.6	18.5	20.8	19.4	18.6	19.5	18.7	20.3	17.6
Bulk density	mg/kg	1.26	1.24	1.26	1.24	1.25	1.27	1.26	1.24	1.25	1.25
Water Holding capacity	mg/kg	3.5	50	49	52	48	51	48	52	50	49
Organic Matter	%	4.55	3.62	3.75	4.26	4.12	3.95	3.85	3.75	4.15	3.85
Total nitrogen	%	0.13	0.15	0.11	0.14	0.12	0.11	0.14	0.17	0.14	0.14
Phosphorus	mg/kg	6.8	5.2	6.3	7.1	6.7	8.2	6.4	8.1	9.2	8.1
Potassium as K	mg/kg	24.15	32.7	22.1	25.3	26.3	22.8	20.6	26.8	24.6	27.1
Calcium as Ca	mg/kg	426	388.4	410.3	386.4	403.5	368.7	407.5	418.9	384.6	396.5
Magnesium Mg^{++}	mg/kg	236	186.7	179.4	176.3	201.7	191.3	205.4	191.4	186.2	206.3
Sodium as Na	mg/kg	120.3	131.1	135	132	122.4	167.9	134.5	144.8	168.5	187.5
Sulphate as SO_4	mg/kg	316.2	402.8	413.9	342.5	286.79	205.6	237.4	264.3	278.5	233.4
Chloride as Cl	mg/kg	78.5	89.2	81.4	79.3	69.2	71.2	78.5	61.8	63.9	58.5
Boron	mg/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron as Fe	mg/kg	26.3	28.4	23.8	27.1	20.23	84.6	20.23	20.67	25.57	15.12
Zink as Zn	mg/kg	5.65	3.68	3.73	3.81	4.92	3.35	2.76	3.75	3.18	2.93
Copper as Cu	mg/kg	0.35	0.27	0.32	0.35	0.27	0.32	0.23	0.22	0.28	0.24
Nickel as Ni	mg/kg	0.02	0.01	0.03	0.01	0.01	0.01	0.02	0.02	0.01	0.03
Total Chromium-Cr	mg/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Lead as Pb	mg/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury	mg/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Texture	mg/kg	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam

Photograph 3.2: Soil and air sampling photographs

3.5.4.1 Results and discussion

In order to establish the baseline status of soil characteristics, soil samples were collected from eight sampling location. The analysis results of pH value ranging from 6.98 to 7.46 with organic contents of 3.5 to 4.26%. The phosphorus varies from 5.2 to 9.2 mg/kg. Potassium ranges from 20.6 to 32.7 mg/kg.

Thus soil secondary nutrient show good fertility. Heavy metal contamination signs not seen. Soil is medium fertile and shows good water holding capacity.

3.5.5 Biological Environment

3.5.5.1 Methodology adopted for Ecological study

Flora & Fauna data was collected on visual observation during the site visit by the experts and also the data collected from the secondary information available from the literature and local people. Authenticity of the primary data was checked by reviewing the data collected from Forest Department.

3.5.4.2 Ecology

3.5.4.3 Flora

The vegetation of Belgaum district is of two types. The moist occurs in the south-western portion where the district touches the crest line of the Western Ghats. The second, found towards the east of Belgaum city stretches from the northern areas around Athani, Chikkodi and Gokak right down to Sampagaon and Saundatti in the south. It is of the dry type. The moist vegetation is sustained by the heavy seasonal precipitation from the south-west monsoon which is active from June to October. The duration of the monsoon decreases from south to north. As there is a long dry spell from late October to early June the plant cover has to survive despite the rainless period.

3.5.4.4 Observations during Site visit

During site visit, Expert from the Team, local People and the Proponent have observed the following variety of the Plants in the study area. They noticed and noted the following Trees, Shrubs, Herbs and grasses. All these plants were recorded during the site visit and while interacting with local people which are presented in Table 3.13. The name of observed / found plants is given along with their botanical names for easy identification.

Table 3.13: List of Plants /Flora observed during study period

Sr. No.	Common Name	*Botanical Name*
1.	Aboli	*Crossandra infundibuliformis*
2.	Ain	*Terminalia alata*
3.	Ambotti	*Oxalis corniculata L.*
4.	American Soft head / Jharwad	*Lagascea mollis*
5.	Amla	*Emblica officinalis*
6.	Apata	*Bauhinia racemosa*
7.	Arjun	*Terminalia arjuna*
8.	Ashok	*Polyalthia longifolia*
9.	Asthma weed	*Euphorbia hirita*
10.	Australian acacia	*Acacia auriculiformis*
11.	Awala	*Phyllanthus emblica*
12.	Babul	*Acacia nilotica/ Vachellia nilotica*
13.	Babul	*Prosopis spicgera*
14.	Vilayati babul	*Prosopis Juliflora*
15.	Bamboo	*Bambusa vulgaris*
16.	Bambusa	*Bamboos*
17.	Banana	*Musa acuminata*
18.	Barleria	*Barleria prionitis L*
19.	Bechka /Gokhru	*Indigofera cordifolia*
20.	Bel	*Aegle marmelos*
21.	Besharam	*Ipomea aquatica*
22.	Bhrusunga Patra	*Murraya koenigii*
23.	Bishalya karani	*Tridax procumbens*
24.	Bitti	*Thevetia peruviana*
25.	Bogan wel	*Bougainvillea spectabilis*
26.	Bor	*Ziziphus Jujuba*
27.	Bottle brush	*Callistemon citratus*
28.	Celosia	*Celosia argentea*
29.	Chandan	*Santalum album*
30.	Chandni	*Tabernaemontana divaricata*
31.	Chinch	*Tamarindus indica*
32.	Chitrak	*Plumbago zeylanica*
33.	Christmas Tree.	*Araucaria columnaris*
34.	Coconut tree	*Cocos nucifera*
35.	Common groundsel	*Senecio vulgaris L.*
36.	Congress grass	*Parthenium hysterophorus*
37.	Copper pod/ Tamrashingi	*Peltophorum pterocarpum DC*
38.	Dalimb	*Punica granatum (L.)*
39.	Deepmal	*Leonotis nepetifolia (L) R.Br.*
40.	Deshi Badam	*Terminalia catappa*
41.	Dev Chapha	*Plumeraia alba Linn.*
42.	Devhari	*Ixora coccinea L.*

Sr. No.	Common Name	*Botanical Name*
43.	Dhattura	*Datura stramonium*
44.	Dhatura	*Xanthium strumarium L.*
45.	Dhuranda	*Duranta rapens L.*
46.	Ekdandi	*Tridax procumbensL*
47.	Ficus tree	*Ficus benjamina*
48.	Vad	*Ficus benghalensis*
49.	Fire plant	*Euphorbia heterophylla*
50.	Fish tail palm	*Caryota urenes*
51.	Ghaneri,	*Lantana camara Var. aculeata (L.)*
52.	Ghayapat	*Agave desmettiana marginata*
53.	Glyricedia	*Gliricidia sepium*
54.	Gokhru	*Tribulus terrestris*
55.	Golden trumpet tree	*Tabebuia chrysotricha*
56.	Gulab	*Rosa*
57.	Gulbaks	*Mirabilis jalapa*
58.	Gulmohar	*Delonix regia (Boj.) Raf.*
59.	Hivar	*Acacia leucophloea*
60.	Indian bael	*Aegle marmelos*
61.	Indian Coral Tree	*Erthrina subrosa*
62.	Indian Cork	*Millingtonia hortensis*
63.	Indian rosewood	*Dalbergia sissoo*
64.	Ipomia	*Ipomia nil*
65.	Jacaranda	*Jacaranda mimosifolia*
66.	Jamun	*Syzygium cumini*
67.	Jaswandi	*Hibiscus rosa-sinensis L.*
68.	Kachaan	*Bauhinia purpurea*
69.	Kanchan	*Bauhinia sp.*
70.	Kanher	*Nerium indicum Mill.*
71.	Karanja	*Pongamia glabra*
72.	Kasid	*Senna siamea*
73.	khorjurri	*Phoenix dactylifera*
74.	Landga	*Acanthospermum hispidum*
75.	Lantana	*Lantana camara*
76.	Mango	*Mangifera indica*
77.	Mogara	*Jasminum sambac*
78.	Mogli Erand	*Jatropha curcas L.*
79.	Morpankhi	*Biota oriantalis Endl.(L.)*
80.	Neem	*Azadiracta Indica*
81.	Nilgiri	*Eucalyptus tereticornis Sm.*
82.	Palash	*Butea monosperma*
83.	Pangara,	*Erythrina indica L.*
84.	Papaya	*Carica papaya L.*
85.	Parthenium hysterophorus	*Congress grass*
86.	Peepal	*Ficus religiosa*

Sr. No.	Common Name	*Botanical Name*
87.	Pichakari	*Spathodea campanulata*
88.	Piwala Dhotra	*Argemone maxicana Linn.*
89.	Prajakta	*Nyctanthes arbor-tristis Linn.*
90.	*Rui*	*Calotropis procera*
91.	Rain tree	*Albizia saman*
92.	Sadafully	*Catharanthus roseus*
93.	Sahadevi	*Ageratum conyzoides Linn.*
94.	*Saptparni*	*Alstonia scholaris*
95.	Shami	*Prosopis spicgera*
96.	Shevga	*Moringa oleifera Lamk*
97.	Silver oak	*Grevillea robusta*
98.	Siris	*Albizzia lebbeck*
99.	Sitaphal	*Annona squamosa L.*
100.	Singapore cherry tree	*Muntingia calabura*
101.	Sonaki	*Senecio grahamii*
102.	Suru	*Casuarina equisetifoli**a***
103.	Tagar	*Tabernaemontana divaricata*
104.	Tangle mat	*Alternanthera sessilis*
105.	Tarwad	*Cassia auriculata L*
106.	Teak	*Tectona grandis*
107.	Tentra	*Albizia procera*
108.	Terda	*Impatiens balsamina*
109.	Touch me not tree	*Mimosa pudica*
110.	Umber	*Ficus racemosa*
111.	Unhali	*Tephorsia villosa*
112.	Van Kapus	*Hibiscus vitifolius*
113.	Vedi Babhul	*Prosopis cineraria*
114.	Vilayati vakhandi	*Pithecellobium dulce*
115.	Karambal	*Justicia procumbens*
116.	Chikoo	*Manilkara zapota*
	Grasses	
1.	*Pennisetum pedicellatum*	
2.	*Bothriochloa bladhii*	
3.	*Dichanthium annulatum*	
4.	*Eragrostis unioloides (Retz.) Nees*	
5.	*Heteropogon contortus*	
6.	*Hierochloe odorata*	
7.	*Carex grayi*	
8.	*Sorghastrum nutans*	
9.	*Chloris*	
10.	*Cynodon dactylon*	
11.	*Cyperus rotundus*	

Chloris

Pennisetum pedicellatum

Celosia argentea

Euphorbia hirita

Senecio grahamii

Crossandra infundibuliformis

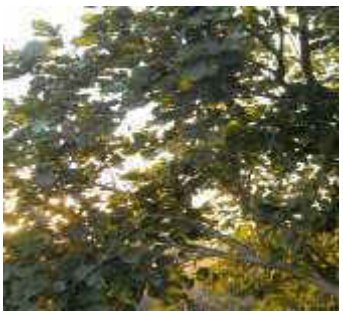
Ipomea indica

Euphorbia heterophylla

Lantena

Leucas aspera

Emblica officinali ***Terminalia catappa*** ***Tabebuia chrysotricha***



Cocos nucifera ***Peltophorum pterocarpum*** ***Butea monosperma*** ***Azadiracta Indica***

Photograph 3.3: Floral diversity observed during visits

3.5.4.5 Vegetation Structure

The structure of vegetation does not only depend on the number of species. Out of hundred species present in the forest, a relatively few exert a major controlling influence by virtue of their size, structure, physiogamy and number. It is again dependent on the height difference. Overall structure of the vegetation of this area is scattered scrubland interspersed with Grasslands. It is dominated by few tree species like *Prosopis Juliflora, Acacia sp, Azadirachta India*. This vegetation structure is the result of extreme local environmental factors. The commonly observed naturally occurring trees species are *Prosopis spicgera; Acadia Nilotica, Acacia leucophloea and Azadirachta indica* are found growing on agricultural bunds. It was observed that vegetation along the dry streambeds is remarkably different than that of the other vegetation.

3.5.4.6 Agricultural Pattern

Agriculture is the main resource of the district. Agriculture has played an important role in the economic development of the district and it is bound to be a prominent sector in the overall development of the district. Kharif, Rabi and summer are the three seasons. During Kharif season major crops like Paddy, Jowar, and Maize are grown. During Rabi season Wheat, Jowar

are grown. In summer season crops like Groundnut and vegetables are grown with the help of irrigation. Sugarcane, Cotton & Tobacco these are the cash crops in the district.

Table 3.14: Major Crops

Sr. No.	English name	Botanical name
1.	Wheat	*Triticum*
2.	Maize	*Zea mays*
3.	Jowar	*Sorghum*
4.	Bajra	*Pennisetum glaucum*
5.	Banana	*Musa acuminata*
6.	Groundnut	*Arachis hypogaea*
7.	Cotton	*Gossypium arboreum*
8.	Tobacco	*Nicotiana tabacum*
9.	Sugarcane	*Saccharum officinarum*
10.	Green vegetables	-

Nicotiana tabacum ***Saccharum officinarum*** ***Musa acuminata***

Photograph 3.4: Crops observed in the area

3.5.4.7 Fauna

Belgaum district is endowed with a rich and variegated fauna. Animals are dependent directly upon plants. Among the domestic animals cows and buffaloes, sheep, goat, pigs, horses, donkeys, mules, cats, dogs and fowls are prominent. Cows are reared for milk & draught purposes, while bullocks are used in Agriculture & transport. Surti, Gavali, Pandharapur & local breeds of buffaloes are noticed. Avifauna observed and during the site visit and while interacting with local people which are presented in Table 3.15 and some pictures are given in below mentioned figure.

Black wagtail ***Black wing stilt*** ***Red vented lapwing***

Green bee-eater ***Red-naped ibies*** ***Copper smith barbet***

Photograph 3.5: Fauna diversity observed during visits

Table 3.15: List of fauna

Sr. No.	Common name	Scientific name	Conservation status	IUCN status
Mammals				
1.	Cattle	*Bus indica*	_	LC
2.	Goat	*Capra aegagrus hircus*	_	LC
3.	Sheep	*Ovis aries*	_	LC
4.	Dogs	*Canis famiaris*		LC
5.	Indian languor	*Semnopithecus entellus*	II	LC
6.	Squirrel	*Funumbuls palmarum*	IV	LC
7.	Indian Rat	*Mus rattus*	V	LC
8.	Common mouse	*Mus musculus*	V	LC
9.	Common Mongoose	*Herpestres edwardsii*	II	LC
10.	Bat	*Chiroptera*	V	LC
Reptiles				
11.	King Cobra	*Naja naja*	II	LC
12.	Rat snakes	*Ptyas mucosa*	II	LC
13.	Ghonas	Russell's viper		
Amphibians				
14.	Common frog	*Rana tigrina*	IV	LC
15.	Toad	*Bufo melanosticus*	IV	LC
Aves				
1.	White throated kingfisher	*Halcyon smyrnensis*	IV	LC
2.	Green bee eater	*Merops orientalis*	IV	LC
3.	Pied bush chat	*Saxicola caprata*	IV	LC
4.	Lark	*Alaudidae*	IV	LC
5.	Indian Roller	*Coracias benghalensis*	IV	LC
6.	Common myna	*Acridotheres tristis*	IV	LC
7.	Common kingfisher	*Alcedo atthis*	IV	LC
8.	House sparrow	*Passer domesticus*	IV	LC
9.	House crow	*Corvus splendens*	IV	LC

10.	Black wing stilt	*Himantopus himantopus*	IV	LC
11.	Cormorant	*Phalacrocoracidae*	IV	LC
12.	Black drongo	*Dicrurus adsimilis*	IV	LC
13.	Common babbler	*Turdoides caudatus*	IV	LC
14.	Red vented bulbul	*Pycnonotus cafer*	IV	LC
15.	Pond heron	*Ardeola*	IV	LC
16.	Great egret	*Ardes alba*	IV	LC
17.	Cattle Egret	*Bubulcus ibis*	IV	LC
18.	Little Egret	*Egretta garzetta*	IV	LC
19.	Magpie robin	*Copsychus saularis*	IV	LC
20.	Brahmny kite	*Haliastur indus*	IV	LC
21.	Hoppo	*Upupa epops*	IV	LC
22.	River Tern	*Sterna aurantia*	IV	LC
23.	Rose ringed parakeet	*Psittacula krameri*	IV	LC
24.	Purple sunbird	*Nectarinia asiatica*	IV	LC
25.	Rock dove	*Columba livia*	IV	LC
26.	Shrike/ Khatik	*Lanius schach*	IV	LC
27.	Fly catcher	Fly catcher	IV	LC
28.	Red-wattled Lapwing	*Vanellus indicus*	IV	LC
29.	Kala Sharathi	*Red-naped Ibis*	IV	LC
30.	Barbet	*Copper smith barbet*	IV	LC
31.	Weaver bird	*Ploceus philippinus*	IV	LC
32.	*Large grey babbler*	*Turdoides malcolmi*	IV	LC

Table 3.16: List of butterflies

Sr. No.	Common name	Scientific name
1.	Plan tiger	*Danaus chrysippus*
2.	Small orange tip	*Colotis etrida*
3.	Small grass yellow	*Eurema brigitta*
4.	Dark glossy tiger	*Parantica agleoides*
5.	Brown king crow	*Euploea klugii*
6.	Common crow	*Euploea core*
7.	Glassy tiger	*Parantica aglea*
8.	Common grass yellow	*Eurema hecabe*
9.	Small grass yellow	*Eurema brigitta*
10.	Common emigrants	*Catopsilia pomona*
11.	Tawny coster	*Acraea terpsicore*
12.	Crimson rose	*Pachliopta hector*
13.	Common leopard	*Phalanta phalantha*
14.	-	Small Salmon arab (Yellow)

3.6 SOCIOECONOMIC ENVIRONMENT

3.6.1 Reconnaissance

An essential part of environmental study, which deals with the total environment, is socio-economic environment incorporating various facts related to socio-economic situation in the area. These includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation and feature of aesthetic significance such as temples, historical monuments and disease pattern. This would help in visualizing and predicting the likely impact depending upon the nature and magnitude of the project. Socio-economic study of an area gives an opportunity to assess the socio-economic conditions of the population staying in and around the project area.

3.6.2 Baseline Status objectives

- Demographic structure of the study area male/female ratio, occupational pattern, employment and income.
- Infrastructural resource base, viz. medical, education, water resources, power supply.
- Economic resource base, viz. agriculture, industries, forest, trade and commerce.
- Health Status, viz. morbidity pattern with reference to prominent and endemic diseases.
- Socio economic status with reference to Quality of Life
- Cultural and Aesthetic attributes in the study region including places of historical/archaeological importance.
- Assessment of impacts on places of historical/ archaeological importance and aesthetic impairment.
- Awareness and opinion of people about the project

3.6.3 Methodology

For socioeconomic study of the project area, both qualitative and quantitative methods were adopted. Data regarding the study area were collected from secondary source like Censes of India of 2011, records and consultations with the locals. Data collected from various sources were tabulated, processed and computed.

3.6.3.1 Sampling Method

A judgmental and purposive sampling method was used for choosing respondents of various sections of the society i.e. Sarpanch, adult males and females, teachers, medical practitioners,

businessmen, agriculture laborers, fishermen, unemployed group etc. Judgmental and purposive sampling method includes the right cases from the total population that helps to fulfill the purpose of research needs. Observations are restricted to this group & conclusions from these observations are generalized to the total population. Judgment or purposive sampling is very precarious, because must stronger assumption can be made about the population and sampling procedure than required while employing probability sampling.

3.6.3.2 Data Collection Method

In order to assess and evaluate the likely impacts arising out of for any area on socio-economic environment, it is necessary to gauge the apprehensions of the people in the project area. For the process of data collection through primary and secondary sources certain methods are used among that are:

3.6.3.3 Field Survey and Observations:

Field Survey and Observations is made at each sampling village and the quality of life of that region is studied. Visits are made at hospitals, primary health centers and sub-centers to know the health status of the region. Various governmental organizations such as statistical department, department of census operations are visited to collect the population details of that region.

3.6.3.4 Interview Method

Structured interview method is used to collect data regarding the awareness and opinion from the sample selected of the various socio- economic sections of the community. Structured interviews involve the use of a set of predetermined questions that includes fixed and alternative questions. The questionnaire mainly highlights the parameters such as income, employment and working conditions, housing, food, clothing, water supply, sanitation, health, energy, transportation and communication, education, environment and pollution to assess the quality of life of that particular region and general awareness and opinion of the respondents about the project.

The interview method has the advantage that almost all perfect sample of the general population can be reached and respond to the approach. Interview method helps to collect more correct and accurate information as the interviewer is present during the field survey.

Socio-economic survey was conducted in 01 town and 22 villages within the study area with reference to the project region.

The respondents were asked for their awareness/opinion about the region and also of their opinion about the impacts of the Venkateshwara Power Projects Ltd. area which is an important aspect of socio-economic environment, viz. job opportunities, education, health care, housing, transportation facility and economic status.

The salient observations recorded during survey in the study area:

- Majority of the respondents are engaged in other activity while near about ¼th of the population are engaged in agricultural and its allied activities. The main crop grown in the study area is Sugar Cane and Tobacco.
- Sanitation facilities are unsatisfactory in the study area. There are open drains from where the domestic waste water is disposed. People are not at all aware and careful about hygiene and cleanliness, this has resulted to increase of health problems in the area
- Power supply facility is available in almost villages and town in the study area mostly for domestic purpose
- Drinking water sources is mostly from PWD water supply also from wells and hand pump. As regard to the drinking water facility people expressed that the quality and quantity of water is good.
- Medical facilities in terms of primary health center and primary health sub centers in the rural areas are good. The hospitals are available, have very good facilities. Doctors and nurse visit the villages for providing medical treatment. Primary Health Center Bedkihal also have ambulance service for emergency and casualty Transportation facility is seen very satisfactory in the study area because the road conditions are very good and satisfactory.
    - Almost all the people use LPG as a main source of fuel and very few people use kerosene and wood for cooking purpose
    - Sufficient communication facility are available in the study area
    - Educational facilities are available in the form of primary and middle schools. In some villages, it is extended up to high school. For higher studies people avail the facility from the nearest town
    - Houses of the region are mostly puccha house
    - Awareness among the people regarding the study region project is poor but when asked about their opinion regarding the water quality people complaint about the quality and

they require checking of their water by laboratories.

3.6.4 Introduction of Belgaum District

Belgaum is a district in the state of Karnataka, India. It is also called as the second capital for the state of Karnataka, as it houses the Suvarna Vidhana Soudha. The city of Belgaum is the district headquarters in North Karnataka. According to the 2011 Census of India, it has a population of 4,778,439 of which 24.03% live in urban areas, making it the second most populous district in Karnataka (out of 30), after Bangalore. The district has an area of 13,415 square kilometers, and is bounded on the west and north by Maharashtra state, on the northeast by Bijapur District, on the east by Bagalkote District, on the southeast by Gadaga District, on the south by Dharawad District and Uttara Kannada districts, and on the southwest by the state of Goa.

3.6.5 Demography of the area

The study area comprises of 22 villages and 1 town from Chikodi Taluka of Belgaum District. Comparison of socio- economic attributes of the area with district and state is as follows:

The summary of demographic data based on district census, Karnataka 2011, household, population, density, sex ratio and literacy is presented in Table 3.17 and demographic data at a glance for rural & urban area are presented in Table **3**.18.

Table 3.17: Summary of demographic data of Belgaum

Particulars	Study Area	District
Population	101561	4779661
Sex ratio (no. female per 1000 males)	972	972
Literacy (%)	68900 (67.84%)	3052032 (63.85%)
Total Main worker (%)	42296 (41.65%)	1734501 (36.29%)

Source: District Census. Karnataka, 2011

3.6.6 Population

The significant demographic features of rural & urban area are:

Rural area

- Total population of the region as per 2011 census is 77771 out of which 39533 are male and 38238 are female
- Total number of households in the region about 16463
- Sex ratio (number of male per thousand female) in the region is 967 this shows that male

population is higher in the region as compared to the female population

- Out of the total population Scheduled Caste and Scheduled Tribe population is about 14.91% and 1.29% respectively
- Total main worker population is about 41.77%,7.96% comes under marginal worker category and 50.27 % belongs to non-workers category
- Literacy rate of the population in the study area is about 67.19%

Urban area

- Total population of the urban area according to 2011 census is 23790 out of which 11968 are male and 11822 are female, total number of households in the region about 5080.
- Sex ratio (number of male per thousand female) in the region is 988. This shows that male population is higher in the region as compared to the female population. Sex ratio of urban area is low as compared to the rural area.
- Out of the total population very less is the population of Scheduled Caste and Scheduled Tribe population that is about 15.55% and 0.74% percent respectively. Maximum population in the urban area belongs to other caste.
- Total main worker population is about 41.23%. Only 5.68% comes under marginal worker category while highest percentage of population i.e. 53.09% is shared by non-workers
- Literacy rate of the urban population is about 69.98%.

Table 3.18: Demographic structure of the study area

Name	No of Household	Population			Scheduled Caste	Scheduled Tribe	Literate	Total Worker	Main Work	Marginal worker	Non worker
		Total	Male	Female							
Rural											
Benadi	1444	6647	3355	3292	1012	444	4461	4230	3454	776	2417
Bolewadi	201	992	504	488	119	0	708	504	460	44	488
Donewadi	843	3984	2031	1953	375	7	2728	1929	1637	292	2055
Boragaonwadi	320	1535	788	747	39	0	1082	743	538	205	792
Karadaga	1819	8937	4597	4340	1314	32	6319	4037	3514	523	4900
Barwad	609	2873	1432	1441	625	8	2090	1202	1127	75	1671
Mangur	1536	7219	3666	3553	651	1	5432	3784	2891	893	3435
Gajabarwadi	230	1118	572	546	139	0	764	673	573	100	445
Shivapurawadi	306	1369	680	689	49	4	974	729	565	164	640
Bhimapurwadi	273	1209	640	569	57	0	867	629	620	9	580
Galatga	2141	9817	5004	4813	2290	5	6640	4434	4241	193	5383
Dilalapurwadi	196	940	475	465	0	0	639	561	549	12	379
Shamanewadi	1384	6228	3124	3104	909	54	4414	2921	2139	782	3307
Nej	1521	6875	3508	3367	997	328	4532	3525	3105	420	3350
Nagaral	655	3445	1770	1675	711	6	1854	1871	1302	569	1574
Girgaon	310	1315	672	643	541	13	908	651	422	229	664
Thapakarwadi	158	688	346	342	0	0	451	235	234	1	453
Pangire (A)	348	1468	752	716	349	0	1157	840	635	205	628
Chikalwal	678	3187	1607	1580	373	1	1952	1754	1439	315	1433
Manuchiwadi	163	788	418	370	45	0	576	270	231	39	518
Nagaral	623	3060	1541	1519	631	101	1657	1057	1012	45	2003
Nallanatti	705	4077	2051	2026	366	0	2047	2100	1799	301	1977
Total	16463	77771	39533	38238	11592	1004	52252	38679	32487	6192	39092
Urban											
Sadalgi (TP)	5080	23790	11968	11822	3700	176	16648	11160	9809	1351	12630
Total	5080	23790	11968	11822	3700	176	16648	11160	9809	1351	12630
Grand Total	21543	101561	51501	50060	15292	1180	68900	49839	42296	7543	51722

Source: Primary Census Abstract CD-2011, Belgaum District, Kolhapur State.

Table 3.19: Locations for Socio –economic Survey in the Study Area

Sr. No.	Sampling Location	Direction from Industrial Area	Distance from Industrial Area in Km
1.	Dilalpurwadi	W	1.94
2.	Kunnur	NW	7.5
3.	Chikhalvhal	NW	9.5
4.	Nej	E	5.71
5.	Karadga	NW	6
6.	Chand Shiradwadi	N	6
7.	Bhoj	NW	4.3
8.	Benadi	W	8.83
9.	Bedkihal	N	2.75
10.	Galatga	S	2.51

Table 3.20: Demography at a Glance within Study Area

Sr. No.	Demographic parameters	Details
1.	Number of villages	22
2.	Number of Towns	01
3.	Total no. of residential households	21543
4.	Total population	101561
5.	Scheduled caste %	15292 (15.06%)
6.	Scheduled tribe %	1180 (1.16%)
7.	Sex ratio (female per thousand male)	972
8.	Literates (%)	68900 (67.84%)
9.	Main workers (%)	42296 (41.65%)
10.	Marginal workers (%)	7543 (7.43%)
11.	Non workers (%)	51722 (50.93%)

Source: Primary Census Abstract CD-2011, Belgaum District, Karnataka State.

3.6.7 Infrastructure Resource Base

The infrastructure resources base of the study area with reference to education, medical facility, water supply, post and telegraph, transportation and communication facility and power supply etc. are available in the area. The infrastructure resources details have been abstracted from village Directory CD 2011 of Maharashtra State and are described below:

Education: Educational facilities are available i all of the villages in the study area. Literacy rate of the study area is quite good that is about 67.84%. Primary, Middle and Higher schools are available in the villages. College facility is available in nearby town viz. Sadalgi. Female literacy is good; people attitude regarding female education is good.

Drinking Water: The water supply in the region is mostly through wells and hand pumps. For

drinking purpose people are using only Panchayat water supply, but supplied is not sufficient. People observed odor & oil contain in well water. Panchayats of the villages do not take any steps to treat water.

Communication and Transportation: Transportation is to the satisfactory level in the villages. Bus service is available in all most all villages. The roads condition is good and also properly maintained. Most of the villages in the study area have the communication facility i.e. post office at village. Private telephone connections in most of the villages.

Power Supply: Almost all villages are electrified in the region and electricity is available for domestic purpose in all the villages while power supply used for agricultural purpose is rare.

Medical/Primary Health Care: Medical facilities in terms of; primary health center and primary health sub centers are adding medical facility in the villages. Primary Health Centre in the study area is available at a distance of 0-5 Kms i.e in Bedkihhal village & primary health sub centers are also available in most of the village. Community Health worker & doctors visit villages periodically & provide health facilities to the people. Vaccination & health camps are also organized by PHC to aware the people about family planning, hygiene, & health care.

3.6.8 Economic Attributes

Economy of the study area is mainly based on the Cultivation activity 42.32%, 31.68% work as Agricultural Labour and 23.75% population is engaged in other activity. The major crop grown in the study area is Sugar Cane and Tobacco besides that other crops are jawar, Soyabeen, Ground Nut and vegetables. The average monthly income of the villagers is approximately 5000-10000.

Main Workers; those who have worked for at least 183 days

Marginal Workers; those who worked less than 183 days

Work; Work may define as participation in any economically productive activity; such participation may be physical or mental in nature. Work involves not actual work but also effective supervision and direction of work. It also includes unpaid work on farm or in family enterprise.

The workers coming under the main and marginal workers category are; Cultivators, agricultural labors, livestock, forestry, fishing, hunting, and plantations, orchards and allied activities, mining and quarrying, manufacturing, processing, servicing and repairs in household industry, construction trade and commerce, transport, storage and

communication, other services

The employment pattern of the study area is described below and presented in Figure 3.15,

- Main worker population in the study area is 42296(41.65%)
- People in the region are mostly engaged in Cultivation activity and Agricultural labor and rest of them are engaged in fishing, constructions, trade and commerce, transport, storage and communications, business and service. 42.32% population for cultivation 31.68% Agricultural Labor of and 23.75% engaged as other activity only 2.25% working as household worker.
- Cultivators i.e. a person engaged in cultivation of land owned or held from government or from private persons or from institutions by payment in money, kind or share are only 41.23% of urban and 41.77% of rural engaged in agriculture activity
- Unemployment level is high in the region as non-worker population shares more than half of the total population in the region i.e. 51722(50.93.%). Non-worker population includes student, household duties, dependent, pensioner, beggar and others.

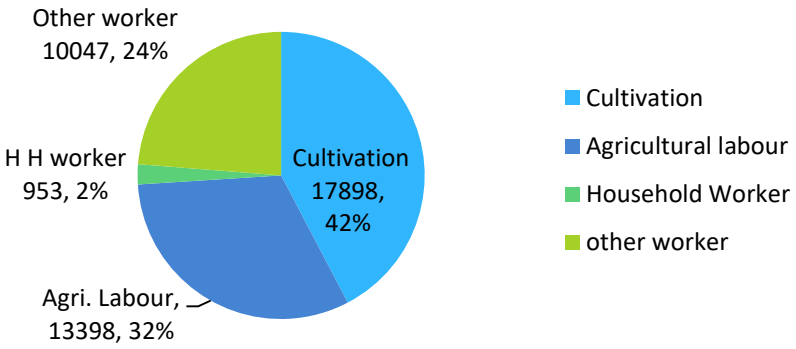


Figure 3.15: Employment Pattern

3.6.9 Health Status

Health is a very important socio-economic parameter and it has direct linkage with environment. Health of the people is not only a desirable goal, but it is also an essential investment in human resources. As per the National Health Policy (1983), Primary Health Care has been accepted as main instrument for achieving this goal of development and strengthening rural health infrastructure through a three-tier system, viz., Primary Health Center (PHCs), Sub Centers and Community Health Center, which have been established. The standards to be met according to National Health Policy are given below:

Population	**Infrastructure**	**Personnel**
3,000-5,000	1 Sub Center	1 ANM (Auxiliary Nurse Midwife)

25,000-30,000	1 PHC, 6 Beds	2 Medical Officers
1,00,000	Rural Hospital	Medical Superintendent

During discussion with the Doctor of Bedkihal PHC of the region it has been revealed that the general prevailing diseases in the region. The diseases prevailing in the region may be due to the increased pollution and the unsanitary conditions. Cough, cold, viral fever, diabetes, hypertension, and tuberculosis are the common diseases prevalent in the study area. Every Primary health center organizes immunization camp, pulse polio camp, eye camp, ANC and PNC clinic and respiratory clinic.

3.6.10 Cultural and Aesthetic Attributes

All most all villages have their own Temples in the villages and common function are celebrated in the village. Study region do not have any cultural and aesthetic value as per the survey. The ancient name of the town of Belgaum was Venugrama meaning Bamboo Village. The most ancient place in the district is Halsi; and this, according to inscriptions on copper plates discovered in its neighborhood, was once the capital of a dynasty of nine Kadamba kings. It appears that from the middle of the 6th century to about 760 the area was held by the Chalukyas, who were succeeded by the Rashtrakutas .There are several names available for Belgaum city. Marathi people call it as belgaon Kannada people call Belgavi, South Karnataka people call it as Belgaum. Famous sweet Kunda is originated from Belgaum. People across nation come here as Belgaum valuable shopping destination.

3.6.11 Conclusion

All the basic facilities like road and rail connectivity, medical and educational facilities and other required basic facilities are available in and around the project site to some extent. Due to upcoming proposed project, there will be additional requirement of facilities by the employees of the project. Therefore, by looking at the project, its requirement of raw material and associated facilities, there will be overall development of the area to fulfill the additional requirement created due to the project activities and employees. In addition to the direct requirement, there will be indirect requirement for the employees and their families with respect to housing, education, hospital, recreations which need to developed causing overall development of the area. Hence, to fulfill the demand of the area and also to have proper and timely service for other activities for the project, there will be overall development of the area, district and state and therefore of the country.

Photograph 3.6: Photographs of site visit during socioeconomic survey

CHAPTER IV

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

CHAPTER IV

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

4.1 INTRODUCTION

This chapter deals with the prediction and evaluation of impacts resulting from the various activities during construction and operation phase of the proposed project. "Environmental Impact" refers to the alteration of environmental conditions or creation of a new set of environmental conditions, adverse or beneficial, caused or induced by the action or set of actions under consideration. Both the beneficial (positive) and adverse (negative) impacts on various components of environment are identified based on the nature of the various activities associated with proposed project. Predictions are superimposed over baseline environmental status to derive ultimate environmental scenario.

For identifying the impact due to proposed project, baseline monitoring has been carried out in the month of **October 2016 to December 2016.** The existing environmental conditions have been described in the Chapter 3 Impacts on various environmental attributes during construction as well as operation and mitigation measures have been discussed in this chapter.

4.2 IDENTIFICATION OF THE IMPACT

Impacts are identified during construction and operation phase. Below mentioned environmental parameters are considered while identifying the impact.

- **Air Environment**

  Sources, ambient air quality, emission control, environment and health effects
- **Water Environment**

  Sources, water & wastewater quality, environment and health effects
- **Noise Environment**

  Sources, control measures, environment and health effects
- **Soil/ Land Environment**

  Land use, change in land use pattern, pollution sources, soil quality change, environment and health effects

- **Biological Environment**

  Flora and fauna of the study area, vegetation and habitat change and control measures

- **Socioeconomic Environment**

  Demographical details, economic status, employment status, infrastructure availability, environment and health effects

- **Occupational health and Safety Environment**

  Identification of health hazard due to operation, material handling, exposure of hazardous chemical, health and safety plan and disaster management.

4.2.1 Identification of impact during construction phase

Activities like leveling of site, construction and erection of main plant structures and equipment. Impact matrix for different environmental components for construction phase is given in below mentioned table.

Table 4.1: Construction phase impact matrix

Environment components	Construction Phase					
	Project activity → / Impacts on ↓	Site clearing	Site preparation	Transportation of material	Civil/construction work	Influx of construction workers
Resources utilization	Fuel			√	√	√
	Electricity				√	√
	Water				√	√
	Construction material ex. Stone				√	
Air	Air Quality	√	√	√	√	√
Soil/Land	Soil erosion	√	√			
	Contamination			√		√
	Alteration of Soil properties/ Soil Quality	√	√	√	√	√
	Land topography	√	√		√	
Noise	Noise pollution	√	√	√	√	
Ecology	Effect on trees, grasses, herbs & shrubs	√	√	√		√
Occupational Health & Hazards	Health				√	
	Sanitation					√
	Generation of temporary and permanent Jobs	√	√	√	√	

4.2.1.1 Impacts on Land

Activities

- Excavation, land clearance

- Waste water and solid waste from construction activity
- Waste generation from labor force
- Sewage generation

Impacts

- Site preparation activities shall change land use and land cover which will result in loss of fertility of top soil and will change the natural terrain of the land. Fertile soil and nature of terrain supports associated living of organisms. Change in land cover affects the specific niche of the organism.
- During site preparation change in land cover and land use was envisaged. Excavated top soil will be reused for backfilling and in green belt development.
- Proposed land is vacant land; hence there will be no tree cutting is envisaged.
- Construction debris leads to ground water pollution, surrounding aesthetics & human health.
- Spillage & leakage of fuel as well as contamination of land due to spill of construction material may impact the land to some extent.
- There will be generation of garbage and sewage by the worker and other staff involved during construction phase. Untreated sewage and garbage disposal on land might pollute the land which may change physical and chemical properties of soil. Change in soil properties ultimately affects the living organisms present in the soil. Open dumping or improper disposal of sewage and garbage provides breeding ground for pathogenic bacteria and other creatures which may spread diseases like Diarrhea, Infections with intestinal helminthes (worms), Malaria, Typhoid and other infectious diseases.

Proposed mitigation measures:

- The construction activities like excavation for foundation, site preparation and vehicular movements will definitely bring the changes in the landscape. However, these changes shall be of short duration with no much impact. Excavated soil will be stored properly to avoid the spread of wind-blown dust and shall be reused for backfilling and landscape development.
- Spillage & leakage of fuel will be prevented by providing well lined/ paved area for the works having potential of leakage/ spillage of fuel or material. Hence

contamination of land due to spillage/ leakage of fuel or construction material with soil would not arise.

- Disposal of untreated sewage & garbage generated by workers & other staff will be required in a systematic manner otherwise it will add into the contamination of land. The sewage will be treated properly and garbage if any shall be disposed utilized to make composts to avoid the impact of these pollutants on the land.
- The packaging materials like wooden boxes and jute wrappers will be stored and disposed of properly.

4.2.1.2 Impacts on Air Quality

The impacts on the ambient air quality during construction phase will be temporary and restricted to project site. However, necessary mitigation measures like shutdown of machineries when not in use, sprinkling of water, cover excavated/ construction materials by sheets, etc. will be taken. Thus no adverse impacts on the surrounding environment are anticipated due to proposed project.

Activities

- Dust will be emitted during the leveling, grading, earthworks, foundation works and other construction related activities
- Dust emission due to transportation

Impacts

- Marginal increase in the levels of SO_2, NOx, PM and CO within the plant area
- Dust accumulation on leaf retard the photosynthesis rate of plant which affect growth of plants
- Health problems to construction workers Ex. eye irritation, coughing & sneezing

Proposed mitigation measures:

- Excavation activity strictly restricted to in windy days
- PUC holder trucks will be allowed at site during construction phase.
- Frequently water sprinkling will be carried out in dust emission area.
- Use of Tarpaulin on the trucks to suppress the dust emission during transportation of raw material
- Internal tarred roads will be available for the as distillery will be in the existing sugar factory premises, hence there will be no major dust emission.

- To avoid health hazards during construction phase, personal protective equipment's will be provided to workers as and when required

4.2.1.3 Impacts on Noise Quality

Activity

- Digging and excavation etc.
- Construction material loading and unloading, fabrication and
- Handling of equipment and materials

Impacts

Predicted noise pollution sources and its impacts during the construction phase:

- Operation of construction machineries, equipment and associated mechanical works will generate the noise.
- Noise from Vehicular movement.
- Noise level will be in the range of 70 - 85 dB (A) at receptor point from the associated work of construction. This generation will be of temporary nature and limited up to project boundary.
- The exposure of workers to noise of high decibel may cause headache or other occupational health hazards.
- Noise pollution during construction phase is temporary and restricted to project boundary only.

Proposed mitigation Measures

- Noise from Vehicular movement will be within the limit by implementing the policy of maintenance of Vehicles and PUC.
- Transportation of construction machinery or raw material shall be allowed only during daytime to reduce the impacts of increased noise
- The construction equipment / machineries shall be turned off when not in use
- Loud horn of vehicles will not be allowed at project area. Regular maintenance & lubrication of construction equipment & machineries will be undertaken to reduce the noise generation.
- All rotating parts of construction machinery will be well lubricated

- Adequate Personal Protective Equipment (PPEs) like ear muff, ear plug, hand gloves, gum boots etc. will be provided to worker which helps to prevent occupation health problems.
- Overall, the impact of noise generated on the environment is likely to be insignificant, reversible and restricted to plant boundary.

4.2.1.3 Impacts on water quality

During construction water requirement will be 6-7 CMD & it will be met from water storage tank build in existing factory premises. Impact on water quality during construction phase may be due to sewage generated from the construction work force stationed at the site.

Further, the construction activities are more related to mechanical fabrication, assembly and erection, the need of water requirement will be small.

Activity

- Sewage generation maximum 15-20 CMD from construction labor (30-50)
- Runoff from construction activity during rainy season
- Stagnation of sewage and construction waste water if any

Impacts

- Disposal of untreated sewage will lead to ground pollution & foul odor in the area.
- Surface run-off during rainy season may contain more of eroded soil and other loose matter.
- Stagnant water attracts flies, mosquitoes, and growth of water hyacinth.

Proposed mitigation Measures

- Generated sewage 15-20 CMD will be treated in existing ETP/septic tank followed soak pit
- Temporary of toilet arrangement will be make available
- The earth work will be avoided during rainy season and will be completed during the winter and summer seasons only.
- Strengthening of the green belt in and around plant will be undertaken during the monsoon season which helps to avoid soil erosion.

4.2.1.4 Impacts on Biological environment

The project area does not encroach into any wildlife sanctuary/national park/eco-sensitive area/protected area. Hence project would not have adverse impact on the wildlife. Proposed site is flat with some hilly terrene, however there is very little ground vegetation with some grasses and herby vegetation. It could, therefore, be concluded that the project would not have major. The construction of the plant is not likely to have any impact on aquatic eco-system, as there are no major surface water bodies in the immediate vicinity of the plant.

Activity

- Clearance of site

Impacts

- Loss of grass species
- Soil erosion

Proposed mitigation measures:

- Development of thick green belt and in a course of time
- Emphasized on indigenous, local, nesting, tress while development of green belt

4.2.1.5 Impacts on Socio-economics

- Proposed site is located in the existing sugar factory premises; hence there are no any rehabilitation problems.
- Construction phase will be increase in floating population.
- Additional stress on road, transport, communication, drinking water, sanitation and other facilities will take place.
- The project will provide temporary employment of skilled and highly skilled manpower.
- Most of the people will be employees of contractors/sub-contractors.
- Most of the manpower during the construction period will be from local area.
- During the construction phase there will be increased demand of services
- The influx of population is very limited it is anticipated hence, there will be no social conflicts between the visitor and present communities.

- The movement of labor and the movement of vehicles carrying equipment/construction material are expected to increase the stress on the local transport and road network. However, considering the number of people required, the impact on road/traffic is marginal and temporary.

4.2.1.6 Occupational Health and safety

Construction activities involved many health & safety issues.

Activity

- Working at height
- Storage of hazardous material/ chemicals ex. diesel, petrol etc.
- Work without protective equipment and/or safety belt
- Site sanitation

Impact

- Loss of life due to accident such as falling, improper safety
- Fire & explosion due to hazardous material
- Foul odor due to degradation of food waste, other bio-degradable waste

Proposed mitigation measures:

- All personal protective equipment's will be provided. Mask, helmet, hand gloze etc.
- safety trainings will be conducted
- Helmet will be compulsory while working on construction site
- Safety instructions will be placed at construction area
- Emergency preparedness plan will be implemented from construction phase
- Sign boards such as safety, isolated area, risk prone area will be placed

4.2.2 Identification of impact during Operation phase

During operation phase emission from manufacturing processes will cause considerable impacts on air, water and soil environment. Gaseous emission deteriorates the air quality, which ultimately will affect other environmental parameters. The impacts may be direct or indirect, short or long term and reversible or irreversible.

Table 4.2: Operation phase impact matrix for cumulative impact assessment of Existing Sugar and cogeneration power plant and proposed distillery

Environment components	Operation Phase									
	Activities → / Impacts on ↓	Manufacturing	Boiler operation	Storage of raw material & Products	Fugitive and Stack emissions	Effluent generation	Solid disposal	Traffic	Runoff	Green belt development
Resources utilization	Fuel		√		√					
	Electricity	√	√	√						
	Water	√	√							
Air	Air Quality	√	√	√	√	√	√	√		√
Soil/Land	Contamination			√		√	√		√	
	Alteration of Soil properties/ Soil Quality			√		√	√		√	√
Noise	Noise pollution	√	√	√				√		√
Ecology	Effect on trees, grasses, herbs & shrubs, fauna				√	√	√	√	√	√
Occupational Health & Hazards	Health	√	√	√	√	√	√	√	√	√
	Sanitation				√	√	√	√		
	Generation of temporary and permanent Jobs	√	√	√						

On the basis of the above mentioned impact prediction, the anticipated considerable impacts on the environment are,

- Ambient Air Quality
- Water Quality
- Noise Levels
- Water Resources

4.2.2.1 Impacts on land/ soil

The solid waste generations from the proposed distillery project will be having negative impact on the soil characteristics. The negative impacts will be minimized by proper disposal of solid waste generated in the plant.

Proposed distillery industry will be established in the existing sugar factory premises. The solid waste generations from the existing sugar factory are sugarcane trash,

bagasse, press mud, ash are the major source of land pollution, however factory has provided proper shed to bagasse, ash storage area, press mud. Press mud will be mix with ETP sludge and sell to the farmer as manure. Sugarcane is an excellent biomass resource; Cane trash's calorific value is similar to that of bagasse. Hence it is mixed with bagasse and burnt in the boiler as a fuel. Ash generated from the bagasse is rich in potash; hence it is sold to farmers as manure.

Quantitative anticipated impact and measures

Activity

- Fermentation- yeast sludge
- Distillation - spent wash
- Boiler operation- ash
- ETP operation – Sludge
- Used oil

Table 4.3: Solid waste generation quantification

Sr. No.	Type of waste	Quantity		Hazardous category if any
		From existing sugar & cogeneration plant	Proposed Distillery	
1.	Yeast sludge	-	28.5 TPD	-
2.	ETP sludge	0.300 T/D	-	-
3.	Lime sludge	0.500 T/D	-	-
4.	WTP sludge	0.100 T/D	-	
5.	Ash	110 TPD	Coal ash: 22-24 TPD Spent wash ash 29-30 TPD	
6.	Domestic waste	Negligible	Negligible	-
7.	Spent oil	Negligible	Negligible	5.1

Impacts

- Deterioration of soil characteristics within plant premises
- Ground water pollution due to disposal of waste
- Foul odor due to yeast and ETP sludge
- Negative effect on aesthetic environment

Proposed mitigation measures

Table 4.4: Solid waste generation and disposal

S. No.	Type of waste	Disposal
1.	Yeast sludge	Sludge (Yeast and ETP) will be dried and used as fertilizer or it will be incinerated along with spent wash in the boiler.
2.	ETP sludge	
3.	Ash	Coal ash will be send to Brick manufacturer, bagasse ash will be sold to farmer as manure
4.	Domestic waste	Septic tank followed by soak pit
5.	Spent oil	Authorized recycler

Table 4.5: General Composition of spent wash and coal ash

S. No.	Parameter	Coal (%)	Spent wash (%)
1.	Al_2O_3	19.63	0.34
2.	CaO	2.65	9.74
3.	Fe_2O_3	5.80	0.6
4.	K_2O	2.98	35.55
5.	MgO	1.11	12.73
6.	MnO	0.11	0.02
7.	Na_2O	0.47	6.08
8.	P_2O_5	0.10	1.68
9.	SiO_2	60.70	0.32
10.	SO_3	1.44	8.58
11.	TiO_2	2.48	0.02
12.	ZnO	0.18	0.01
13.	Cl	0.08	5.32

Table 4.6: Proximate analysis of spent wash concentrate

S. No.	Constituent	Spent wash Value %	Indian Coal %
1.	Moisture Content	47.01	10 - 20
2.	Volatile Matter	35.69	16 - 30
3.	Ash Content	10.59-15.00	25 - 50
4.	Fixed Carbon	6.71	24- 40
5.	GCV (kcal/kg)	2000	2800-5000

(Source: Guidelines-Coprocessing-Distillery_Spentwash_in_Cement_Ind.pdf)&

http://www.eecpowerindia.com

Table 4.7: Ultimate analysis of spent wash concentrate

S. No.	Constituent	Value %	Indian Coal %
1.	Carbon	19.92	30 - 55
2.	Hydrogen	2.59	2 - 4
3.	Nitrogen	1.35	0.7- 1.15
4.	Sulphur	0.96	0.3 - 0.8

(Source: Guidelines-Coprocessing-Distillery_Spentwash_in_Cement_Ind.pdf) &

http://www.eecpowerindia.com

4.2.2.2 Impacts on Air

During operation phase emission from manufacturing processes will cause considerable impacts on air, water and soil environment. Gaseous emission deteriorates the air quality, which ultimately will affect other environmental parameters.

Activity

- Main sources of air emission will be from the boiler stacks
- Two DG sets of capacity 250 kVA which will be operated in case of power failure only.
- Air pollutants like PM_{10}, SO_2, NO_x, and CO_2 & VOC's will be emitted from manufacturing process. Types of pollutant emission from Sugar , cogeneration and distillery unit is given in below,

Table 4.8: Cumulative Pollutant Potential

Sr. No.	Source	Pollutant
1.	Flue gases from 80 TPH boiler stack of cogeneration	PM_{10}, SO_2 and NOx
2.	Flue gases from 70 TPH boiler stack of Sugar	PM_{10}, SO_2 and NOx
3.	Flue gases from 30 TPH distillery boiler	PM_{10}, SO_2, NOx, CO_2 & VOCs

- Dust generation is predicted from conveyors of bagasse, press mud, sugar grader, sugar drier, boiler ash generation and handling will be suitably covered with hood or enclosures to control fugitive emissions.
- Emission from vehicular movement. Particulate emissions in the project area envisaged primarily due to emissions from traffic of State Highway-97, which is close to the project site. During the operation phase of the proposed project, movement of goods vehicles, loading and unloading operations may contribute to air emission.
- Other Air emissions like VOC from distillation columns, CO_2 and ethanol from fermentation process.

Impacts

- Marginal increase in the levels of PM, SO_2 and NOx as the Air Control Equipment-Electrostatic Precipitator will be installed. For exiting unit Venturi scrubber has already installed.
- Emission from vehicular movement leads to increase in PM level
- Dust inhalation by workers will results in eye irritation , coughing & sneezing

- Dust accumulation affect growth of plants

Proposed mitigation measures

- Major source of air pollution will the boiler stack. Height of the proposed stack will be 62 m height and the stack height designed on the basis of CPCB guidelines to ensure proper disposal of gas emissions. Stack height calculations are given in Table 4.9.
- **Fugitive emissions** from raw material storage yards, loading and unloading operations will be controlled water sprinkling system, whenever necessary.
- Electrostatic precipitator (ESP) will be provided in the additional boiler stack.
- For existing sugar and cogeneration unit Venturi Wet scrubber has been installed. Bagasse is used as fuel, to generate steam in the exiting boilers. Thus, the air pollution could be mainly due to burning of bagasse in the boilers. Generation of SO_2 and NO_X are negligible as sulphur and nitrogen are present in bagasse are present.
- For existing sugar factory, water sprinkling system is provided in strategic area for control of fugitive emissions.
- In existing factory premises Bullock carts, trucks and tractors are used for transportation.
- All internal roads shall be constructed as tar roads and regular water sprinkling shall be carried out on all the Kaccha roads for preventing fugitive dust emissions.
- Huge tree plantation will be carried out around plant area for minimizing environmental impacts of the proposed activities over a period of time. Plantation program shall be designed and a budget should be allocated for this purpose every year. Total 33% of the area will be developing for greening.
- Factory will maintain good housekeeping in all units

4.2.2.2.2 Air Quality Modeling

Air pollution can cause significant effects on the ambient environment, and subsequently on humans, animals, vegetation and materials. It primarily affects the respiratory (e.g. by fine dust), circulatory (e.g. by carbon monoxide) and olfactory (e.g. by odors) systems in humans. In most cases, air pollution aggravates pre-existing diseases or degrades health status, making people more susceptible to other infections

or the development of chronic respiratory and cardiovascular diseases. Environmental impacts from air pollution can include acidic deposition and reduction in visibility. Assessment of prevailing ambient air quality status in the vicinity of proposed project site is an important part of environmental impact assessment study. The tropical climatic conditions, especially prevailing winds controls the dispersion of air pollutants during different seasons. According to the Indian climatology, for all practical purposes in air pollution studies, there are three seasons in a year, viz. winter, pre-monsoon and post-monsoon. For the quantitative assessment of the environmental impact on these seasons, atmospheric dispersion modeling is required.

Atmospheric dispersion modeling is the mathematical simulation of how air pollutants disperse in the ambient atmosphere. It is performed with computer programs that solve the mathematical equations and algorithms which simulate the pollutant dispersion. The dispersion models are used to estimate or to predict the concentration of air pollutants emitted from sources on the desired area. Such models are important to governmental agencies for protecting and managing the ambient air quality. The models are typically employed to determine whether the ambient air quality level will be able to comply with ambient air Quality Standards (NAAQS) or not**.** Over and above, these studies will serve to assist in the design of effective control measure / strategies to reduce emissions of harmful air pollutants to acceptable level.

Methodology

The dispersion modeling studies of proposed pollutant was carried out using ISCST 3 version which is also approved by United States Environmental Protection Agency (USEPA) and also recommended by the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India. This regulatory air quality model (Industrial Source Complex Short Term version 3 was applied to predict ground level incremental concentrations (GLCs) of concerned critical pollutants. Prior to air quality modeling exercise, meteorological condition of one season within the study area was extensively studied. Concentrations were estimated for the critical pollutants over 8 and 24 hours and compared with NAAQS.

Industrial Source Complex Short Term Model (ISCST3)

The ISCST3 model is based on a steady-state Gaussian plume algorithm and is applicable for estimating impacts from point, area, and volume sources out to a distance of about 50 kilometers. The ISC Short Term model accepts hourly meteorological data records to define conditions for plume rise, transport, diffusion and deposition. The model estimates the concentration value for source and receptor combination for each hour of input meteorology and calculates user-selected short-term averages.

Table 4.9: Emission Details of Stack

S. No.	Particulate	Existing		Proposed
		Sugar Factory	Coge.	Distillery
1.	Boiler capacity	**70 TPH**	**80 TPH**	**30 TPH**
2.	Fuel consumption	Bagasse	Bagasse	Concentrated spent wash and Coal
3.	Stack height	65 m	75 m	62 m
4.	Diameter	2.8 m	2.8 m	1.67 m
5.	Stack gas exist velocity	9.17 m/sec	8.80 m/sec	18 m/sec
6.	Stack gas temperature	156 ^{0}C	149 ^{0}C	180^{0}C
7.	Flow rate	-	-	97500 Nm^3/sec
8.	SO_2 emission rate	11.03 mg/Nm^3	11.49 mg/Nm^3	1100+/- 25 ppmv on 7% O_2 dry
9.	NO_x emission rate	21.66 mg/Nm^3	22.15 mg/Nm^3	300 g/sec
10.	PM10 emission rate	143.3 mg/Nm3	146.31mg/Nm3	50 mg/Nm3

Potential Impact of Air Pollutants

During operation phase, stack attached to 30 TPH boilers could be considered as the main air pollution source and PM2.5, PM10, SO_2 and NO_x may be expected as prime criteria air pollutants. Source characteristic used for atmospheric dispersion modeling is provided in the following **Table 4.10**. For the proposed 30 TPH boiler emission rate for PM10 is based on the emission limit 50 mg/Nm3 and PM2.5 emission rate is calculated with the assumption of 60% of PM10. SO_2 emission rate is estimated on the basis of fuel consumption of each type of fuel and sulphur content i.e. Coal (62.84 TPD with S content 0.38%) and spent wash (255 TPD with S content 0.56%) and NOx emission rate is based on 300 ppmv emission limit. The proposed boiler is also simulated with the existing two boilers of 70 TPH and 80 TPH capacities. Stack characteristics for these two existing boilers is also provided in the same **Table 4.10**. Pollutants emission rate is used for cumulative air quality impact assessment as per the stack's monitoring results.

TABLE 4.10: Emission Source Characteristics

Stack No.	Stack Attached	SO_2 (g/s)	NO_x (g/s)	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	Height (m)	velocity (m/s)	Temp (k)	Diameter (m)
1	Boiler (30TPH)	36.9	14.6	1.2	0.72	62	18	453	1.67
2	Boiler (70 TPH)	0.4	0.9	2.84	1.70	65	9.17	429	2.8
3	Boiler (80 TPH)	0.4	0.8	2.78	1.67	75	8.80	422	2.8

Based on the model simulation result under observed meteorological condition, 24 hours average maximum GLC of PM2.5, PM10, SO_2 and NO_x average over 24 hours are estimated to be approximately **0.44, 0.73, 22.3 and 8.84 µg/m^3** respectively and occurs at a distance at about **849** m from the source location in the southwest direction. Spatial distribution of incremental concentrations of modeled pollutants PM2.5, PM10, SO_2 and NO_x due to proposed 30 TPH boiler source on the major impact zone area 5 km x 5 km with modelling grid size of 100 m x 100 m around the proposed site is shown below subsequent. Predicted PM2.5, PM10, SO_2, and NO_x ground level concentration along with background and resultant concentrations at the monitoring location around the project site is given in the **Table 4.11.** Model simulated result envisages that incremental ground level concentrations of critical pollutants due plant operation may be expected minimal and the resultant concentration level of PM2.5, PM10, SO_2, and NO_x pollutants may also be expected well within the NAAQS.

Maximum incremental concentration of PM2.5, PM10, SO_2 and NO_x due to existing 70 TPH and 80 TPH boilers average over 24 hours are predicted to be **1.67, 2.77, 0.40 and 0.84 µg/m^3** respectively and occur in the southwest direction at the distance about 990 m from the source location. However, cumulative incremental concentrations of PM2.5, PM10, SO_2 and NO_x due to both existing and proposed boilers over 24 hours average over 24 hours are predicted to be **2.10, 3.50, 22.73 and 9.65 µg/m^3** respectively and occur also in the southwest direction at the same distance **990m.** Spatial distribution of pollutants concentrations on the impact zone 5 km x 5 Km with the modeling grid size of 100 m x 100 m are shown in below subsequent **Figures.** Predicted pollutants

concentration level at the discrete receptors due to existing boilers and proposed boilers with existing boilers are provided in the below **Table.**

Table 4.11: GLC increment load with distance

Boiler	Air parameter	Nearest distance in downwind southwest direction	Incremental concentration towards Nearest Downwind Site µg/m^3	Baseline concentration at nearest location Dilalapur wadi µg/m^3	Resultant concentration, µg/m^3	CPCB Limit for residential & Rural Areas, µg/m^3
Proposed 30TPH boiler	PM_{10}	849	0.73	69.7	70.43	≤100
	$PM_{2.5}$		0.44	37.2	37.64	≤60
	SO_2		22.3	7.5	29.8	≤80
	NOx		8.84	14.6	23.44	≤80
Existing 70 and 80TPH boiler	PM_{10}	990 m	2.77	69.7	72.47	≤100
	$PM_{2.5}$		1.67	37.2	38.87	≤60
	SO_2		0.40	7.5	7.9	≤80
	NOx		0.84	14.6	15.44	≤80
Cumulative Existing + Proposed	PM_{10}	990 m	3.50	69.7	73.2	≤100
	$PM_{2.5}$		2.10	37.2	39.3	≤60
	SO_2		22.73	7.5	30.23	≤80
	NOx		9.65	14.6	24.25	≤80

Stack Height Calculation for 30 TPH Boiler

A. When 20% Coal and 80 % spent wash will used for boiler

- Spent wash consumption = 10.6 TPH
- Sulphur content in coal = 0.56% (Max, by mass)
- SO_2 emission (Q) = 119.0 Kg/hr
- Stack height (H) = $14(Q)^{0.3}$
- = $14(119)^{0.3}$ = 58.72 m

  =59 m

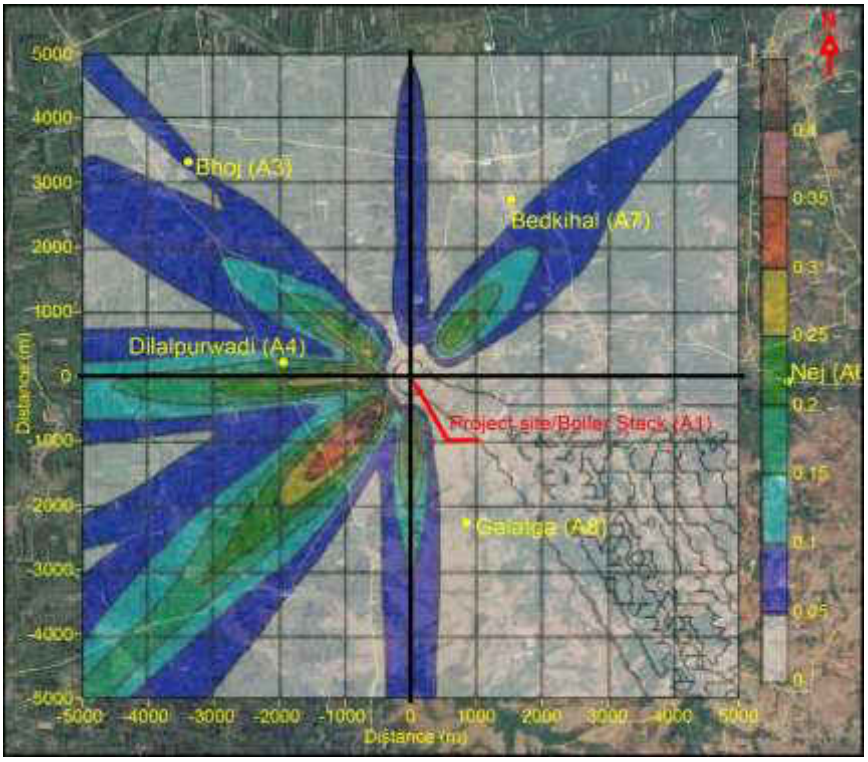


Figure 4.1: Spatial distribution of 24-hr Avg. $PM_{2.5}$ conc ($\mu g/m^3$) for proposed 30 TPH boiler

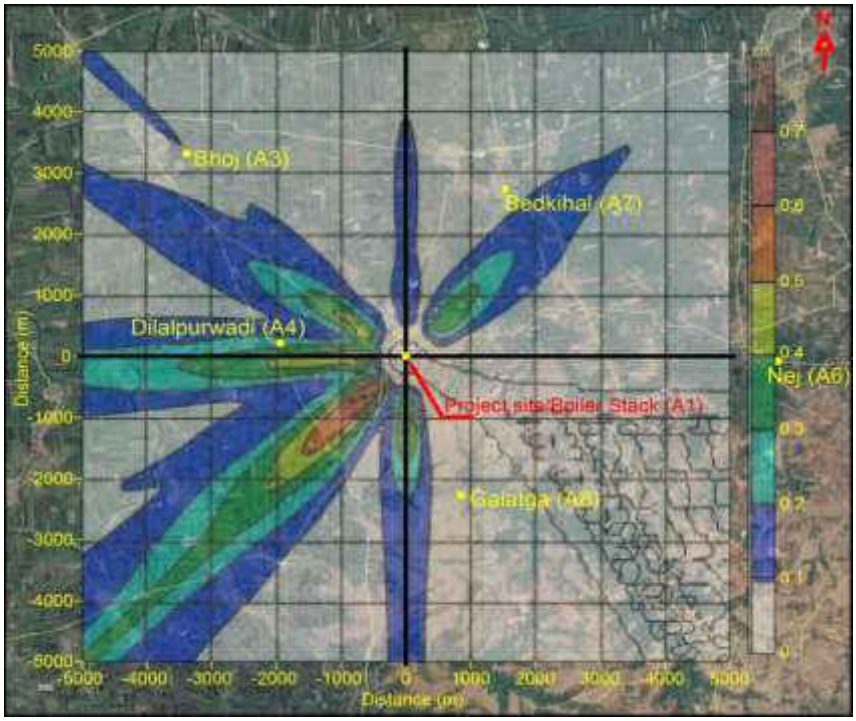


Figure 4.2: Spatial distribution of 24 hr Avg. PM_{10} conc. ($\mu g/m^3$) for proposed 30 TPH boiler

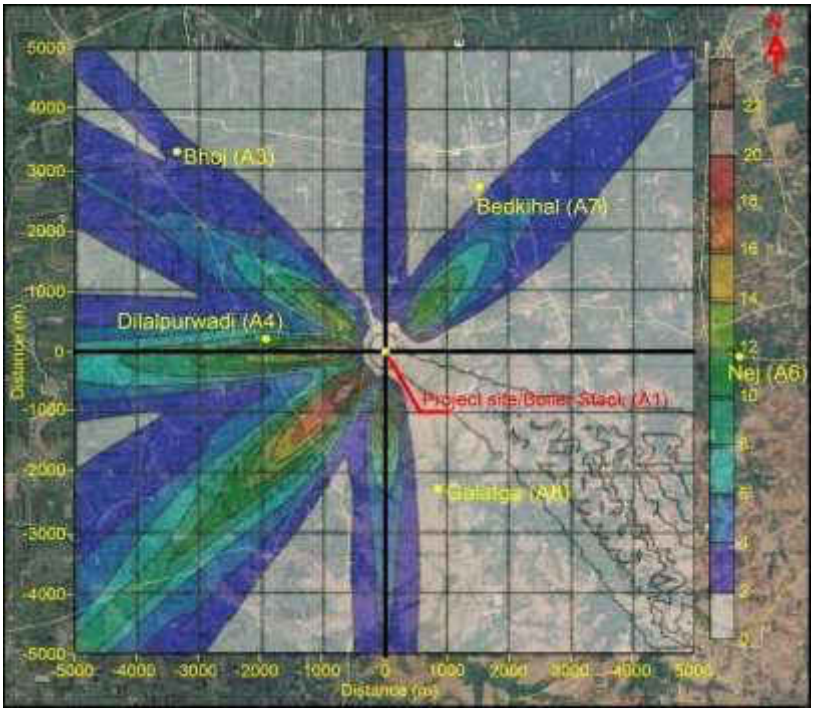


Figure 4.3: Spatial distribution of 24-hr Avg. SO_2 conc. (μg/m^3) for proposed 30 TPH boiler

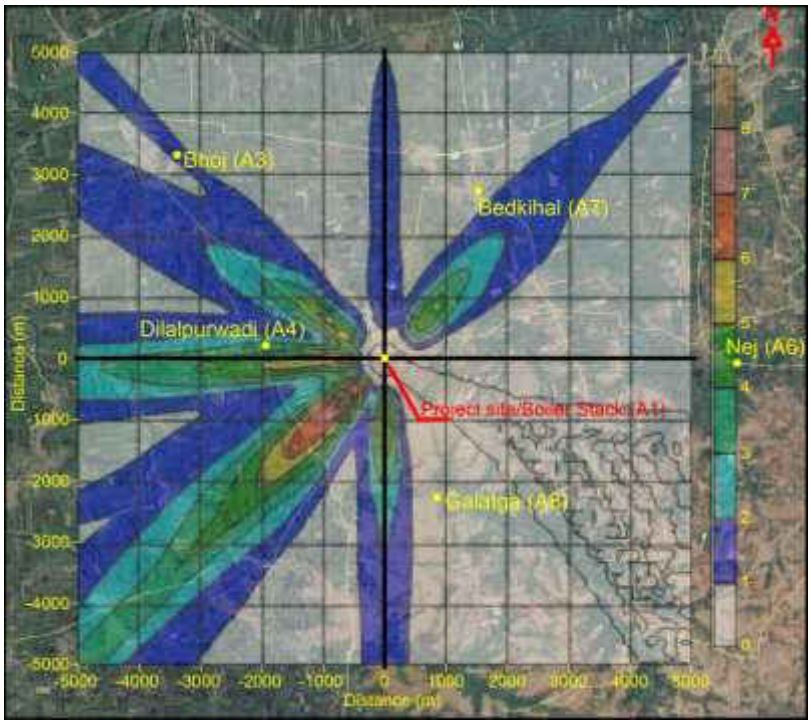


Figure 4.4: Spatial distribution of 24-hr Avg. NOx conc. (μg/m^3) for proposed 30 TPH boiler

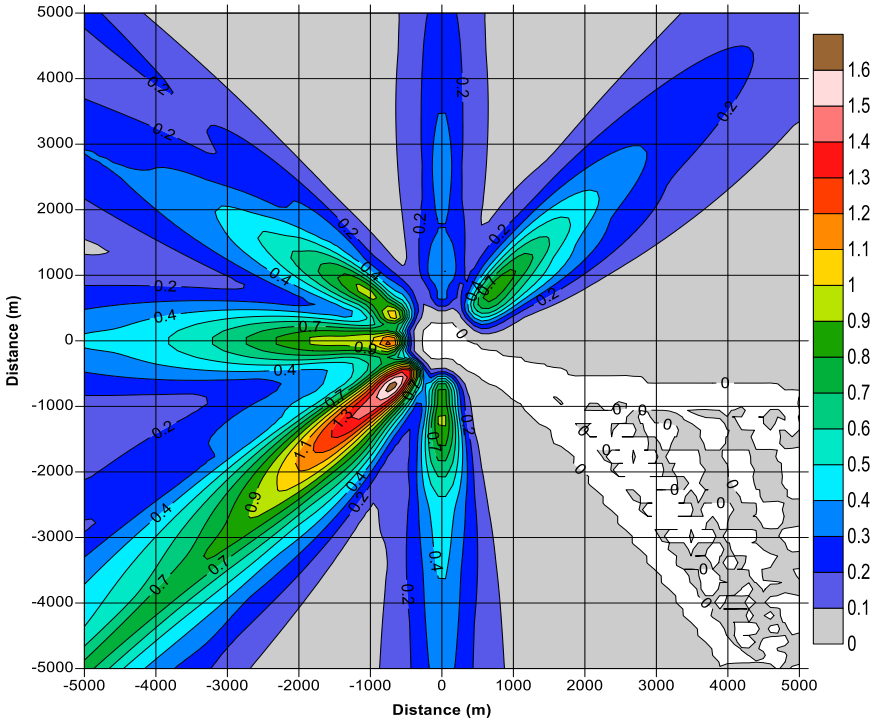


Figure 4.5: Spatial distribution of 24-hr Avg. $PM_{2.5}$ conc. ($\mu g/m^3$) for Existing 70 & 80 TPH Boilers

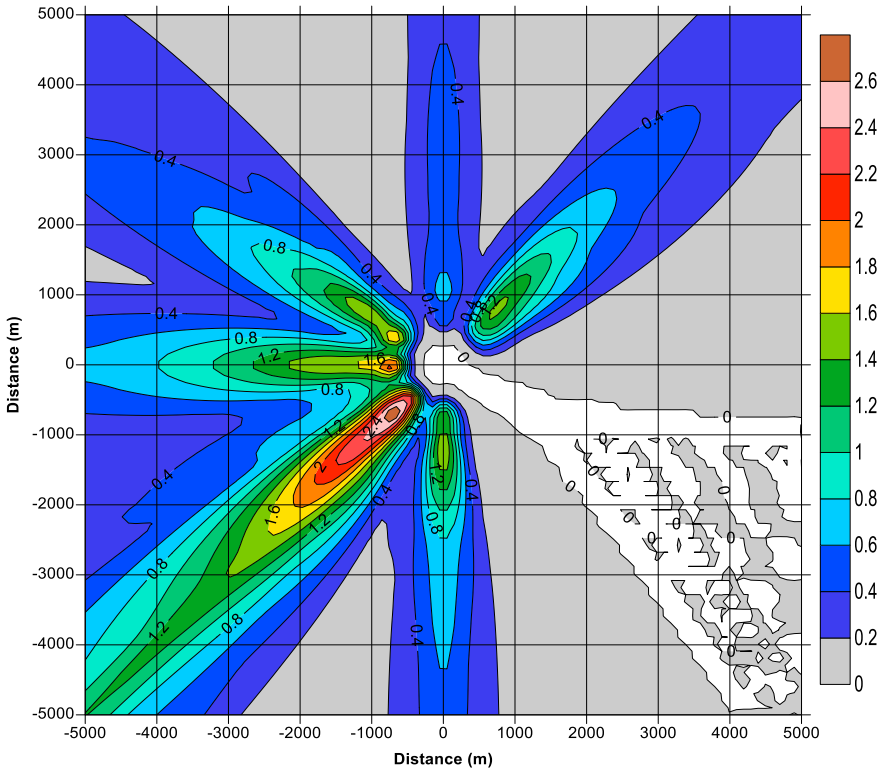


Figure 4.6: Spatial distribution of 24-hr Avg. PM_{10} conc. (µg/m3) Existing 70 & 80 TPH Boilers

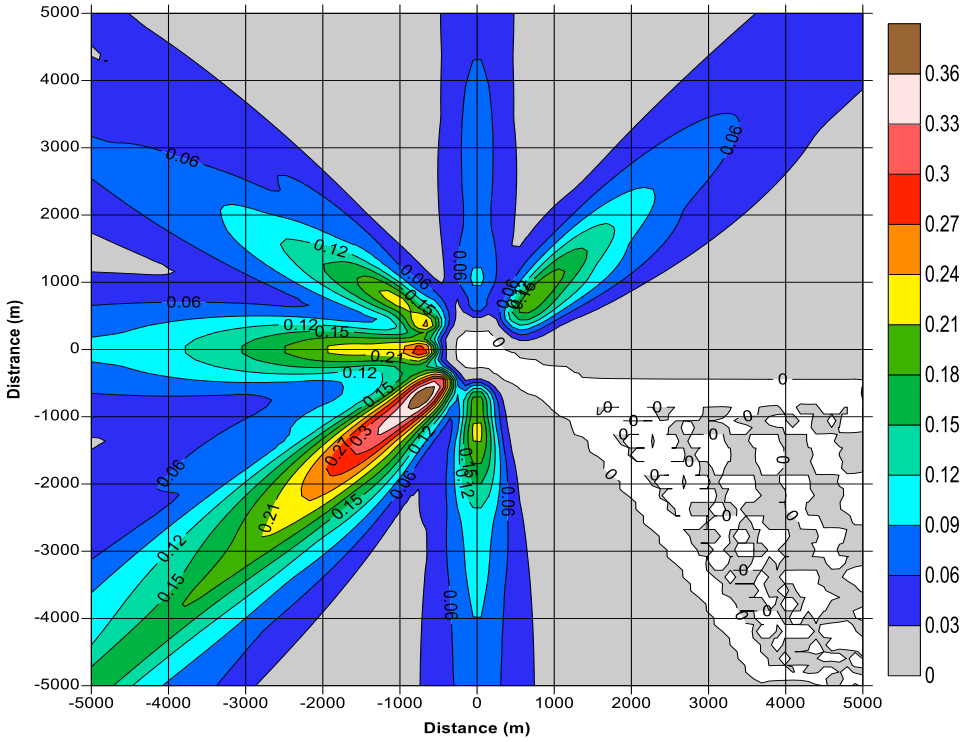


Figure 4.7: Spatial distribution of 24-hour average SO_2 conc. (µg/m3) Existing 70 & 80 TPH Boilers

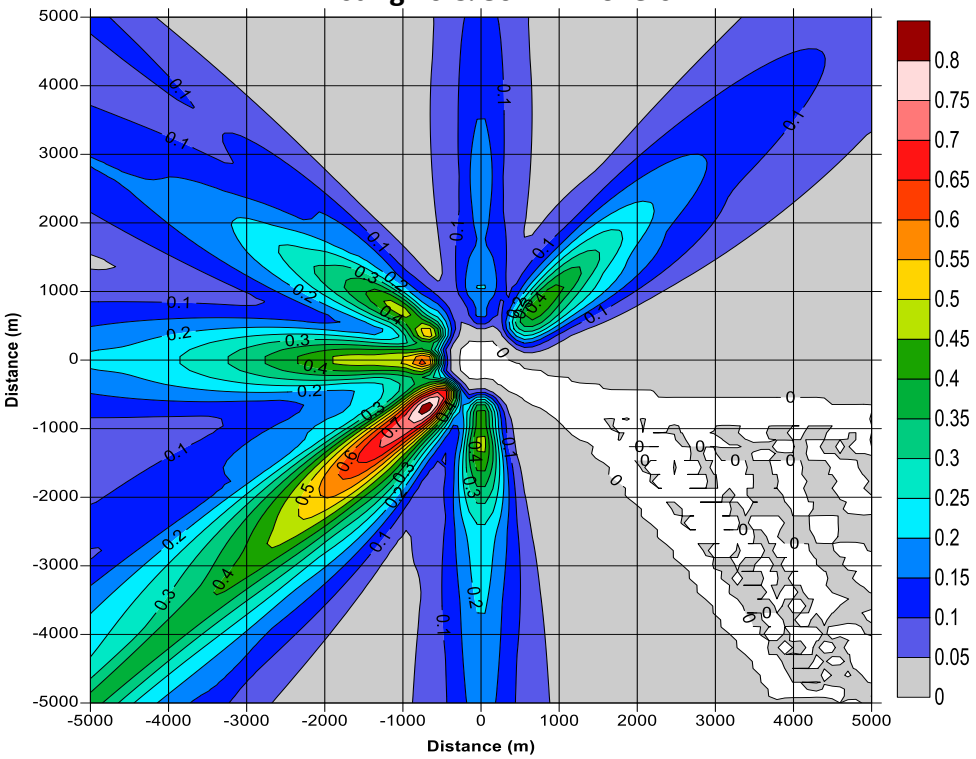


Figure 4.8: Spatial distribution of 24-hour average NOx conc. (µg/m3) Existing 70 & 80 TPH Boilers

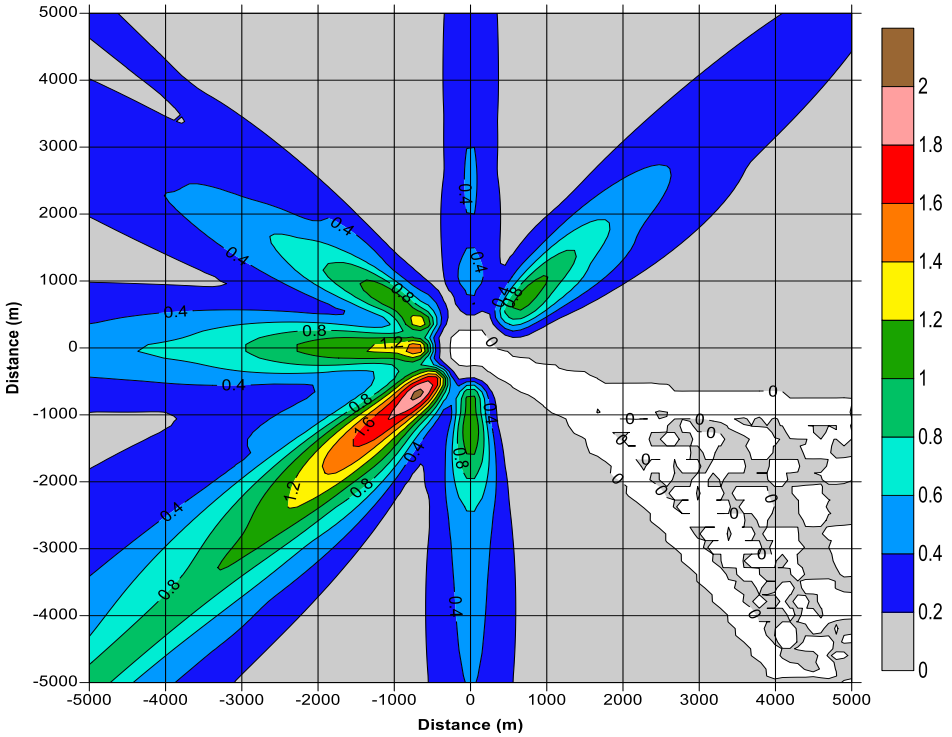


Figure 4.9: Spatial distribution of 24-hour average $PM_{2.5}$ conc. (µg/m^3) Existing (70 & 80 TPH) & Proposed (30 TPH) Boilers

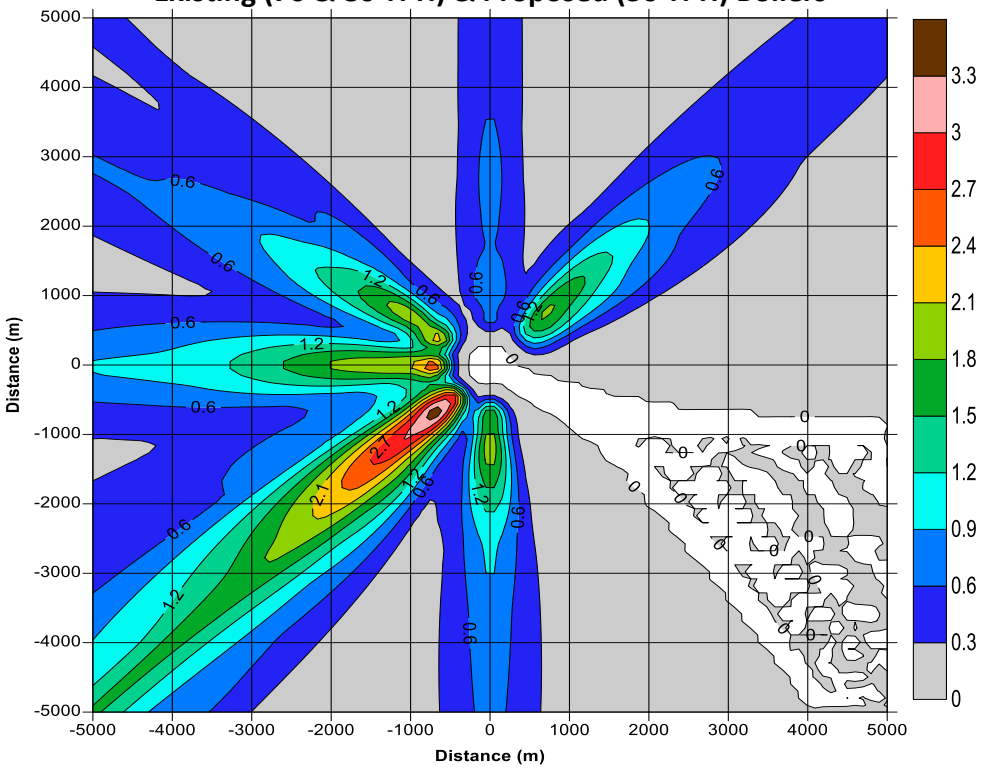


Figure 4.10: Spatial distribution of 24-hour average PM_{10} conc. (µg/m3) Existing (70 & 80 TPH) & Proposed (30 TPH) Boilers

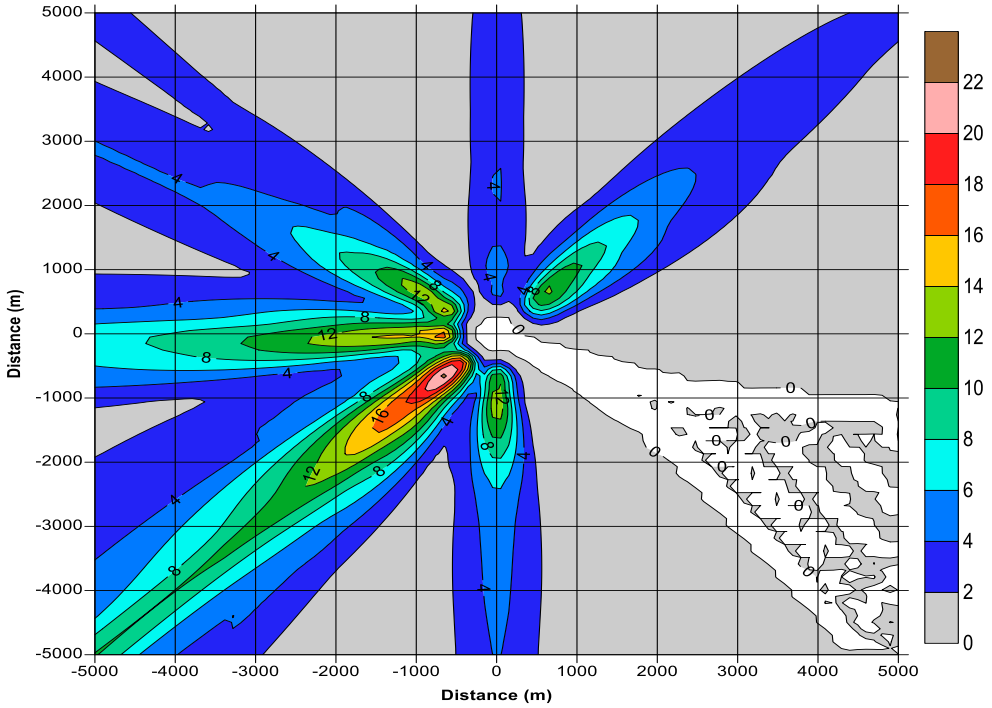


Figure 4.11: Spatial distribution of 24-hour average SO_2 conc. (µg/m^3) Existing (70 & 80 TPH) & Proposed (30 TPH) Boilers

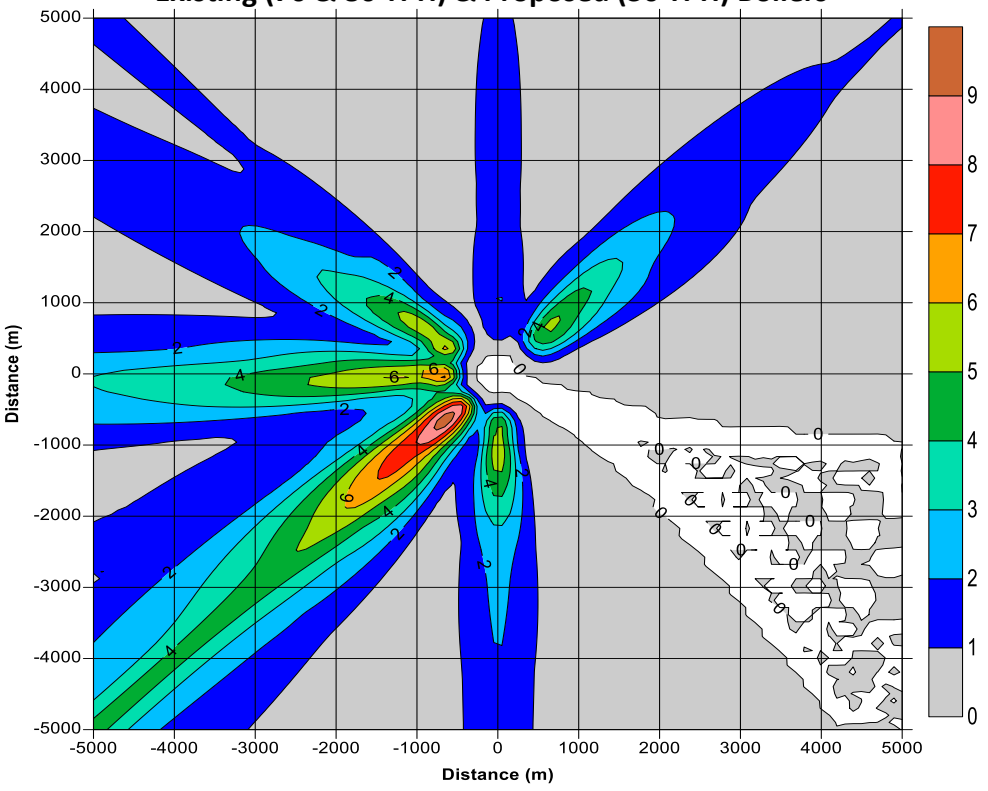


Figure 4.12: Spatial distribution of 24-hour average NOx conc. (µg/m3) Existing (70 & 80 TPH) & Proposed (30 TPH) Boilers

Table 4.12: Air Dispersion Modeling Results at Discrete Receptors (μg/m^3)

Pollutant	Location	Proposed			Existing Stack		Cumulative impact for Existing and proposed		CPCB Limits
		Background (max)	Predicted (max)	Resultant	Predicted (max)	Resultant	Predicted (max)	Resultant	
PM $_{10}$	Project site	89.2	Nil	89.2	Nil	89.2	Nil	89.2	100
	Bennadi(-9784, 7)	48.0	0.17	48.17	0.62	48.62	0.79	48.79	
	Bhoj(-3465,3370)	54.0	0.09	54.09	0.31	54.31	0.38	54.38	
	Dilalpurwadi (-1995, 232)	69.7	0.27	69.97	1.15	70.85	1.42	71.12	
	Sadalga(4639, 5942)	55.1	0.05	55.15	0.21	55.31	0.26	55.36	
	Nej(5825, -76)	47.8	0	47.8	0	47.8	0	47.8	
	Bedikihal (1557, 281)	59.5	0.04	59.54	0.18	59.68	0.22	59.72	
	Galatga (867, -2303)	64.5	0.01	64.51	0.05	64.55	0.06	64.56	
	(Hunnagari)(-7872, -2429)	51.4	0.03	51.43	0.14	51.54	0.17	51.57	
PM $_{2.5}$	Project site	45.0	Nil	45.0	Nil	45.0	Nil	45.0	60
	Bennadi(-9784, 7)	26.0	0.10	26.1	0.37	26.37	0.48	26.48	
	Bhoj: (-3465, 3370)	32.6	0.06	32.66	0.19	32.79	0.23	32.83	
	Dilalpurwadi (-1995, 232)	37.2	0.16	37.36	0.69	37.89	0.85	38.05	
	Sadalga(4639, 5942)	34.0	0.03	34.03	0.13	34.13	0.16	34.16	
	Nej(5825, -76)	25.8	0	25.8	0	25.8	0	25.8	
	Bedikihal (1557, 281)	34.4	0.02	34.42	0.11	34.51	0.13	34.53	

Pollutant	Location	Proposed			Existing Stack		Cumulative impact for Existing and proposed		CPCB Limits
		Background (max)	Predicted (max)	Resultant	Predicted (max)	Resultant	Predicted (max)	Resultant	
	Galatga (867, -2303)	36.1	0.01	36.11	0.03	36.13	0.04	36.14	
	(Hunnagari)(-7872, -2429)	28.6	0.02	28.62	0.08	28.68	0.10	28.7	
SO_2	Project site	10.1	Nil	0	Nil	0	Nil	0	80
	Bennadi(-9784, 7)	4.0	5.32	9.32	0.09	4.09	5.41	9.41	
	Bhoj: (-3465, 3370)	5.8	2.86	8.66	0.05	5.85	2.87	8.67	
	Dilalpurwadi (-1995, 232)	7.5	8.41	15.91	0.16	7.66	8.57	16.07	
	Sadalga(4639, 5942)	5.3	1.42	6.72	0.03	5.33	1.44	6.74	
	Nej(5825, -76)	4.1	Nil	4.1	Nil	4.1	Nil	4.1	
	Bedikihal (1557, 281)	6.1	1.19	7.29	0.03	6.13	1.20	7.3	
	Galatga (867, -2303)	7.1	0.33	7.43	0.01	7.11	0.34	7.44	
	(Hunnagari)(-7872, -2429)	4.8	0.90	5.7	0.02	4.82	0.92	5.72	
NOx	Project site	18.5	Nil	18.5	Nil	18.5	Nil	18.5	80
	Bennadi(-9784, 7)	4.8	2.11	6.91	0.19	4.99	2.30	7.1	
	Bhoj (-3465, 3370)	7.1	1.13	8.23	0.10	7.2	1.21	8.31	
	Dilalpurwadi (-1995, 232)	14.6	3.33	17.93	0.35	14.95	3.67	18.27	
	Sadalga(4639, 5942)	5.4	0.56	5.96	0.07	5.47	0.62	6.02	
	Nej(5825, -76)	4.8	0	4.8	0	4.8	0	4.8	

Pollutant	Location	Proposed			Existing Stack		Cumulative impact for Existing and proposed		CPCB Limits
		Background (max)	Predicted (max)	Resultant	Predicted (max)	Resultant	Predicted (max)	Resultant	
	Bedikihal (1557, 281)	8.9	0.47	9.37	0.05	8.95	0.52	9.42	
	Galatga (867, -2303)	12.7	0.13	12.83	0.02	12.72	0.15	12.85	
	(Hunnagari)(-7872, -2429)	5.8	0.36	6.16	0.04	5.84	0.40	6.2	

4.2.2.3 Cumulative Impact on traffic density

Incoming raw material for exiting sugar factory is sugarcane and in future incoming raw material will be mainly molasses. The transportation shall be carried out by bullock cart, trucks, and tractors. Hence, additional impact on air due to vehicular emission for incoming raw material is anticipated.

Existing Road network details

Project site is located at sr. no. 164 to 170 & 85, Bedkihal, Tal. Chikodi, Dist. Belgaum, Karnataka. The factory site is well connected by roads. Nippani – Bedkihal Road is passing adjacent to the factory. It is well connected by roads to Nippani, Belgaum & Kolhapur cities. The nearest airport is situated at 80 km from the factory at Belgaum city. Connected road network is given in Figure.

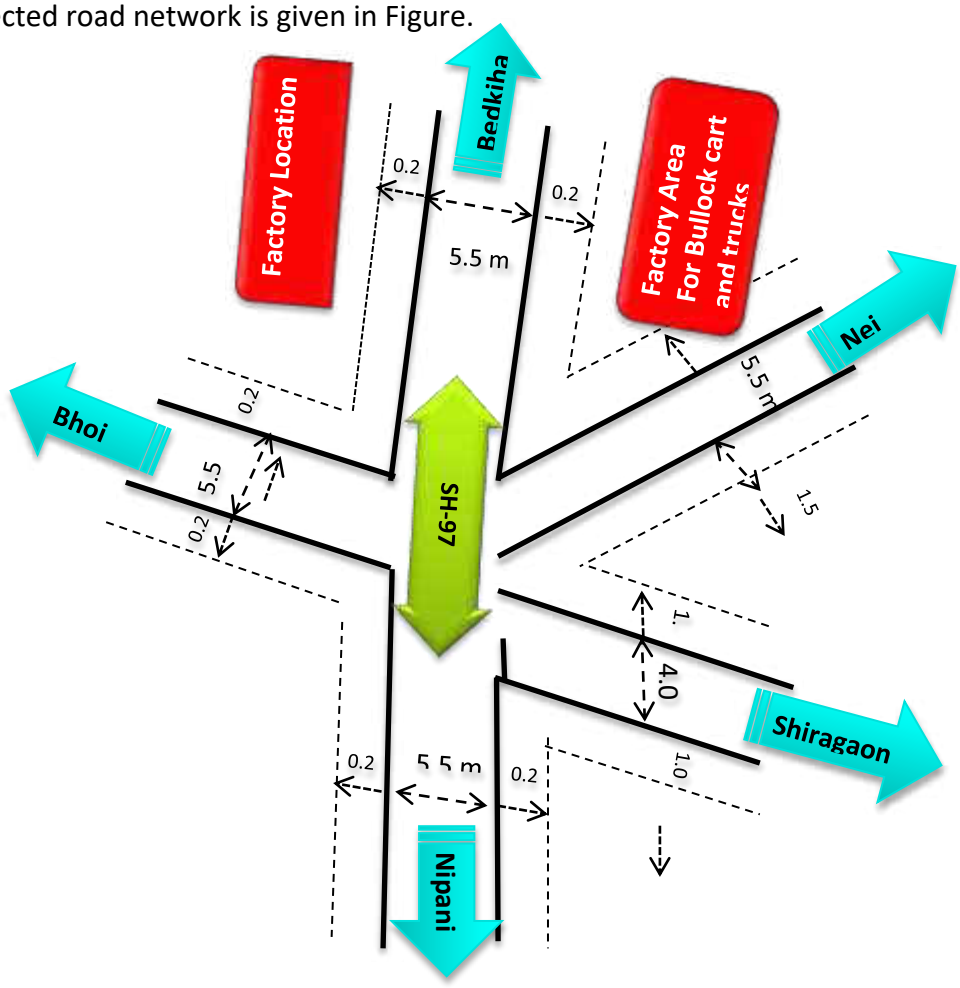


Figure 4.13: Road network near to Factory

Figure 4.14: Google Image showing nearby road connectivity

There are three possible ways have been identified for transportation and given in figure given below.

- Rout 1- First routs identified which is about 51.3 km starting from Kolhapur, Gandhinagar to Factory and it will take 1 h 33 min.
- Rout 2- Second rout identified which has total distance 41.4 km starting near Kolhapur- Kagal- Kagal MIDC road- Bedkihal and required 1 h 9 min.
- Rout 3- Third rout identified which has total distance 49.4 km & 1 h 15 min starting from Kolhapur- Saundalga- Jatrat-Akkol-Galatga road.
- Rout 4 – Fourth rout identified which has total distance 57.7 km & 1 h 30 min starting from Kolhapur- Nipani- Lakhanpur-Galatga SH -97 road.

The schematic diagram of the traffic circulation pattern at of the above mentioned road is shown below in **Figure 4.15.**

Figure 4.15: Road connectivity from Kolhapur

Existing traffic data

A 24 hour traffic survey was conducted on each of the aforesaid roads separately for ascertaining the existing traffic on each of the roads. The findings of the traffic survey are depicted in below mentioned table.

- The peak traffic hours on each of the roads were found to be from 9 a.m. – 12 p.m. in the morning hours and 4 p.m. – 7 p.m. in the evening.
- As is evident the major component of the traffic composition in terms of vehicles on SH-61 is Heavy Vehicle, Public Transport, cars, Bullock carts, tractor, tempo and two wheelers.
- The major component of the traffic composition in terms of vehicles on SH-97, which is adjacent to the factory.

Table 4.13: Existing Traffic composition in both directions during crushing season (per day) in the study area

S. No.	Name of the road	Bullock cart	Agricultural Tractor/ Truck	Passenger car, tempo, Cars	Two wheelers	Total	Total PCU's
1	SH-97	410	447	161	1195	**2238**	**2238**
2	**Equivalency**	6.0	3.0	1.0	0.5	-	-

	factors for different types of vehicles as per IRC 73 -1980							
3	**Total PCU's (A)**	2460	1341	161		597.5	-	4559.5

Note: The equivalency factors for different factors have been taken from IRC publication number IRC: 73 – 1980 titled "Geometric design standards for rural (non- urban highways)" for State Highway No. 97.

PCUs: Passenger Car Unit
LCV : Light Commercial Vehicle
LMV: Light Motor Vehicle

Roads of intermediate width, i.e. having a carriageway of 5.5 m with normal earthen shoulders should have 5000 Passenger car units per day in both directions. It has observed that vehicle count is less than standard PCU count (i.e < 5000). Hence, the present road capacity is sufficient for the current traffic load.

Impact from Transportation of Raw Materials and Finished Products

Transportation of raw material and products will be mainly through state highway 97 during crushing season of the sugar factory which is adjacent to project site. Presently, the background emissions in the project area are primarily due to emissions from the Vehicular Traffic on the state highway. During the crushing season, movement of goods vehicles and loading & unloading operations may contribute to emission of pollutants. The site will be properly regulated through strict and disciplined vehicular movement during crushing season of the sugar factory. It is recommended that good quality road network shall be developed within the premises so that air pollution due to dust shall be minimized. However, factory will ensures proper arrangement of transportation and their movement, for existing and proposed distillery unit and hence this would not lead to any major impact. All the trucks, carrying various raw materials will be covered with tarpaulin. At loading and unloading points, arrangement for water sprinkling will be made so that dusts generation during transportation of materials will be minimized further

Estimated Traffic from Project

With the implementation of the project the traffic is likely to increase on the existing road network near the plant and its surroundings during construction and operation

phase. The raw material and finished products of the proposed distillery will be transported by the following roads enlisted below:

- Adjacent SH-97 road (Nipani - Bedkihal)
- Bhoj to factory road
- Nej to factory road

The impact of the traffic is assessed on the basis of;

- Adequacy of the existing road network
- Impact on air quality

Construction Phase

Trucks will be used in transporting construction material and plant components to the proposed plant site during construction phase. The estimated number of vehicles would be as tabulated in table below for a period of stipulated 10 months. Construction work of distillery will be done during offseason of the sugar to avoid additional load on road. However, worst case scenario i.e. crushing season has been considered to calculate PCU. Ultimate transportation comes to state highway 97. Therefore vehicular count on SH-97 has been considered.

Table 4.14: Traffic composition in both directions
(Proposed traffic superimposed over baseline traffic during construction)

S. No.	Name of the road	Bullock cart	Agricultural Tractor/ Truck	Passenger car, tempo, Cars	Two wheelers	Total	Total PCU's
1	SH-97	410	480	182	1215	**2287**	**-**
2	**Equivalency factors for different types of vehicles as per IRC 73 -1980**	6.0	3.0	1.0	0.5	-	-
3	**Total PCU's (A)**	**2460**	**1440**	**182**	**607.5**	-	4689.5

Note: The equivalency factors for different factors have been taken from IRC publication number IRC: 73 – 1980 titled "Geometric design standards for rural (non- urban highways)" for State Highway No. 97

PCUs: Passenger Car Unit
LCV : Light Commercial Vehicle
LMV: Light Motor Vehicle

Roads of intermediate width, i.e. having a carriageway of 5.5 m with normal earthen shoulders should have 5000 Passenger car units per day in both directions. It has

observed that vehicle count is less than standard PCU count (i.e < 5000). Hence, the present road capacity is sufficient for the expected traffic load during construction phase.

Operation Phase

All the raw materials and finished products will be ultimately approached on Adjacent SH-97 road (Nipani - Bedkihal). Hence vehicular count on SH-97 has been considered. The details of the likely generated traffic due to the proposed plant according to assumptions are given in below mentioned table.

Table 4.15: Assumptions and resulting estimated traffic due to the proposed project (Operation Phase)

Sr. No.	Particulars	Quantity (MT/month)	Mode of transport	No. of Vehicles per day
1.	Raw material			
	• Molasses	11490	By road through tankers	5-8
	• Coal	1885	By road through trucks	5-6
2.	Finished products	2700 KL/M	By road through trucks	150-200
3.	Person vehicular movement	-	By road	30

The split –up of the generated traffic due to the proposed project in operation phase is given in below mentioned Table.

Table 4.16: Traffic composition in both directions (proposed traffic superimposed over baseline traffic)

S. No.	Name of the road	Bullock cart	Agricultural Tractor/ Truck	Passenger car, tempo, Cars/ tankers	Two wheelers	Total	Total PCU's
1	SH-97	410	647	170	1225		-
2	**Equivalency factors for different types of vehicles as per IRC 73 -1980**	6.0	3.0	1.0	0.5	-	-
3	**Total PCU's (A)**	**2460**	**2040**	**170**	**613**	-	5283

Note: The equivalency factors for different factors have been taken from IRC publication number IRC: 73 – 1980 titled "Geometric design standards for rural (non- urban highways)" for State Highway No. 97
PCUs: Passenger Car Unit
LCV : Light Commercial Vehicle

LMV: Light Motor Vehicle

Roads of intermediate width, i.e. having a carriageway of 5.5 m with normal earthen shoulders should have 5000 Passenger car units per day in both directions. It has observed that vehicle count is slightly greater than standard PCU count (i.e. >5000). Hence, the present road capacity is not sufficient for the expected traffic load.

Conclusion

The conclusion regarding adequacy of the existing road network is tabulated in Table 4.18

Table 4.17: Conclusion regarding adequacy of the existing road network

Sr. No.	Road Name	Predicted Total PCU's	Existing carriageway width(m) of the road	Recommended PCU's as per applicable IRC codes (IRC 73 -1980)	Whether up-gradation / expansion of roads required (Yes / No)
1.	Main Road	5283	5.5	5000	Yes

Impact

As mentioned above the predicted final PCU's work out to be as follows:

1- Main Road adjacent to factory SH-97 -5283

When predicted PCUs are compared with standard capacity as prescribed by relevant IRC codes listed in Table 4.14 it has been observed that main road adjacent to factory SH-97 requires expansion.

Air Pollution Dispersion Modeling due to Traffic

With the implementation of the project the traffic is likely to increase on the existing road network near the plant and its surroundings during construction and operation phase. In order to estimate the impacts due to transportation of raw materials and the finished goods dispersion modeling has been carried out by using the air quality model CALINE4 developed by California Department of Transportation. The model is based on Gaussian diffusion equation and uses a mixing zone concept to characterize pollutant dispersion over the roadway. The model has been extensively tested for its predictive capability for traffic related air quality impacts. Given the source strength, meteorology, site geometry and site characteristics, the model can reliably predict pollutant

concentrations for receptors located within 300 meters of the roadway, the most important region for estimating the impacts due to the low elevation emissions.

The long-term variations in air quality scenarios during the project life are expected due to the change in traffic on the road network with time. The existing and the predicted traffic volumes from the plant have been considered to project future air quality scenarios. A longer time horizon has not been considered because of uncertainty in ascertaining the emission factors for various categories of vehicles in future due to the probable change in technology and fuel use and the future development in the area.

The averaging time for model predictions is restricted to 60 minutes because the primary meteorological factors that influence the air quality predictions i.e. wind speeds and directions do not remain steady for longer time periods. Also, during the peak traffic hours, the traffic volumes typically show significant variations over periods longer than one hour. In any case such an exercise requires that the wind is blowing in the same direction for all 24 hours - which is not a practical assumption.

Due to averaging time of 60 minutes, the project impacts on air quality are essentially assessed based on one hourly standard for CO. NOx levels however have been developed for peak traffic conditions and compared with 'WHO' standard of 400 $\mu g/m^3$ for hourly average. The standards for Hydrocarbons (HC) are not specified by CPCB. The comparison of the predicted concentration of HC in absence of the standards could not be possible. Further the SPM contributions are dominated by background concentrations as well as traffic induced re-suspension, both of which are difficult to quantify.

Model Input

For modeling purpose, representing the worst prediction due to traffic, the peak hourly generated traffic on the state highway- 97 is considered, as it is the adjacent road to factory and which the main road for transportation. The data on the village road is not considered due to low volume of traffic. The Peak Hourly Traffic used for model prediction is tabulated below in Table 4.18

Table 4.18: Peak Hourly Projected Traffic – Operation Phase

Time	Name of the road	Agricultural Tractor/Truck	Passenger car, tempo, Cars/tankers	Two wheelers
9 am- 11 am	State Highway (SH-	62	50	235

	97)			

The vehicle speeds for different categories of vehicles considered for the modeling purpose are provided in Table: 4.19

Table 4.19: Speed of the Vehicles (kmph)

Bus / Truck / Tractors	Agricultural Tractor/Truck	Passenger car, tempo, Cars/tankers	2 wheelers
40	50	60	40-60

The vehicular emission norms in the year 2005 recommended in Auto Fuel Policy decided by the Inter-Ministerial Task Force (headed by the Chairman, CPCB) have been used to provide the emission factors for the different vehicle types. These Emission factors are as specified in Table 4.20.

Table 4.20: Emission Factors In g/km/Vehicle*

Type of Vehicles	Average Tailpipe Emissions (g/km)		
	CO	PM	NOx
After 2008 Bharat III (Euro IV) - Petrol			
Two Wheeler (post 2005>100CC)	0.4	0.0015	0.25
Passeng er Cars (<100 CC post 2000)	1.3	0.004	0.2
Agricultural Tractor/Truck	-	-	-
After 2008 Bharat III (Euro IV) – Diesel			
Passeng er Cars(<160cc post 2000)	0.72	0.19	0.84
LCV (>300 OCC post 2000)	3.66	0.475	2.12
HCV Diesel Truck (600 occ post 2000)	6.0	1.240	9.3

(Source: http://www.cpcb.nic.in/Emission_Factors_Vehicles.pdf)

The air quality scenarios were developed for all stability classes using the representative wind speeds (minimum wind speed in the respective stability) for the particular stability class.

For model computations, the receptor locations have been chosen to account for its location with respect to center of the road. The scenarios were modeled for cross wind direction representing the worst case scenario.

The Ground Level Concentrations (GLC) is computed for distances viz: 50, 100, 150, 200, 250 and 300 m from center of the road.

Table 4.21: Results and Discussion:

Category / Pollutants	Two Wheelers(g/km)	Passenger Cars (Petrol) (g/km)	Passenger Cars (Diesel) (g/km)	LCV (Diesel) (g/km)	HCV (Diesel) (g/km)

CO	94	65	14.4	109.8	372
PM	0.3525	0.2	3.8	14.25	76.88
NOx	58.75	10	16.8	63.6	576.6

Mitigation measures

- Roads and intersections up gradation
- Expansion of road width from 5.5 m to 6.5 m
- Maintenance of roads from time to time
- Maintenance of the vehicles
- Erection of traffic signals at strategic locations if required
- Overloading of the vehicles shall be avoided. Optimums loading of the trucks and cross checking at weigh bridge.
- Pollution under Control' (PUC) certificates shall be issued to the vehicles.
- Water sprinkling on roads leading to plant and within plant
- Dense tree plantation along the road side

4.2.2.2 Impacts on noise quality

Ambient noise levels will be increased during operation phase due to machineries and other industrial activities. However the impacts of noise during this phase will be confined within plant boundary or within the source of generation.

Activity

Existing sugar and cogeneration

Mill house, boiling house, sugar house, bagasse & ash handballing, power house, steam turbines and, transportation etc.

Distillery

Fans, blowers and compressors, steam turbines etc.

Impacts

Existing quality of noise in the sugar and cogeneration area are given below,

Steam turbines : 70 dB
Milling : 72 dB
Pan boiling : 69 dB
Factory main gate: 65 dB

- The sound intensity appears to be at moderate level in co-gen power and sugar plants. The reference noise levels at these sources vary in the range of 65-75 dB (A).However; noise level is restricted to the factory premises only.
- Noise health effects are the health consequences of regular exposure, to consistent elevated sound levels.
- Elevated workplace or environmental noise can cause hearing impairment, hypertension, ischemic heart disease, annoyance, and sleep disturbance.

Mitigation measures

- Vibrating pads & acoustic enclosure will be provided to noise generating equipment to control noise level within norms
- Latest technology and utmost care will be taken at the time of equipment / machinery installation
- Lubrication of moving/ rotating part or component of machineries will be done on regular basis
- The insulation provided for prevention of loss of heat and personnel safety gears will also act as noise reducers
- Design and layout of building to minimize transmission of noise, segregation of particular items of plant
- The operator's cabins (control rooms) will be properly (acoustically) insulated with special doors with observation windows
- The operators working in the high-noise areas will be provided with ear-muffs or plugs
- Acoustic enclosures and silencers will be provided to the Equipment wherever necessary
- Proper green belt will be developed to reduce the noise level

Thus, it is envisaged that there will not be any adverse impacts of noise. The greenbelt developed within the premises will have significant beneficial impacts on reduction of noise within the periphery and outside the boundary.

4.2.2.3 Odor management

Activity

- Typical compounds generating odor in sugar industry are acetic acid, ethyl alcohol / butyl alcohol, bacterial decomposition of organic matter (stale cane smell) & bacterial decomposition of sulphur compounds (H_2S).
- Causes of odor are stale cane, bad mill sanitation, bacterial growth in the interconnecting pipes & unattended drains etc.
- Typical odor compounds in distillery are molasses storage tank, spent wash, alcohol, iso amyl & iso butyl alcohol (fuel oils), acetic acid
- Causes of odor are bad management of fermentation house, long retention of fermented wash, unattended drains & ETP.

Impacts

- Nausea, insomnia and discomfort.
- Nasal irritation; trigger symptoms in individuals with breathing problems or asthma.

Mitigation measures

- Better cane management to avoid staling of sugar
- Use of mill sanitation bio-cides to minimize the growth of aerobic / anaerobic micro–organisms
- Steaming of major pipe lines
- Proper cleaning of drains
- Regular use of bleaching powder in the drains to avoid growth of sulphur decomposing micro-organisms to control H_2S generation.
- Better housekeeping by regular steaming of all fermentation equipment's
- Regular steaming of all fermentation equipment.
- Use of efficient bio-cides to control bacterial contamination.
- Control of temperature during fermentation to avoid in-activation / killing of yeast.
- Avoiding staling of fermented wash.

4.2.2.4 Impacts on water quality

Direct discharge of untreated sewage & effluent on land, generated from proposed Distillery will lead to ground pollution as well as soil quality. Various activities their impacts and mitigation measures for the same has been describes in below mentioned paragraphs.

Activities

- Surface water extraction from Sadalga Barrage on Doodhganga River
- Effluent generation from distillery, sugar and cogeneration unit
- Run off storm water

Impacts

- No negative impacts are envisaged on surface water availability and drawl will be restricted during lean season. The industry has constructed water storage reservoir of for use of fresh water during lean season. The reservoir will be filled up with storm water available at the premise.
- Distillery generates huge amount of effluent. Normally, 8-10 L/L of alcohol effluent will be generated. If effluent is not treated properly before disposal, it will pollute land and ground water quality and thereby will change the existing characteristics of soil and water.
- Discharge of waste water within & outside plant boundary will leads to the ground water pollution.
- Discharge of distillery effluent loss of soil fertility and deteriorate the soil quality
- Discharge of effluent in the surface water body alters the water characteristics and may leads to eutrophication of water bodies. Further, its dark color hinders photosynthesis by blocking sunlight and is therefore deleterious to aquatic life.

Mitigation measures

- The total fresh water requirement for distillery for startup will be around 1527 CMD, and after recycling daily fresh water requirement will be 639 CMD. Water storage facilities is available with the sugar factory. Total fresh water requirement for current sugar and cogeneration project is 340 CMD for season. Existing water storage tank capacity is 4700 CMD.

- Spent wash around 961 **KLD** will be concentration through integrated evaporation and burnt in incineration boiler. Waste water generation from sugar and cogeneration plant **317.8 CMD**.
- Process condensate, spent lees, boiler and cooling tower blow down will be the major effluent streams. Details of effluent generation and its characteristic are described in the following Tables.
- Process condensate around **651** CMD will be treated in condensate treatment plant.
- Wastewater from Sugar mill will not have significant BOD/ COD levels. All waste water will be collected in effluent treatment plant and treated water is used for green belt development /irrigation purpose. The treatment scheme incorporates Aerobic treatment and anaerobic method for the wastewater with state of the art. Effluent generated by cogeneration plant will be treated in existing sugar plant
- Domestic wastewater is generated from the proposed plant, which disposed through Septic tank via Soak pit

Table 4.22: Summary of effluent generation from proposed distillery, existing sugar and cogeneration unit

Source	Effluent	Quantity	Disposal
Distillery	Spent wash	• Raw spent wash generation 961 CMD • 255 CMD concentrated spent wash	Sent to 30 TPH incineration boiler
Sugar and cogeneration	Molasses	25200 TPD	Sent to distillery
	Effluent	317.8	**Sent to Effluent treatment plant of Aerobic** and anaerobic type. Treated water is used for green belt development /irrigation purpose.
	Sewage	15-19 CMD	Septic tank via Soak Pit

Table 4.23: Composition of spent wash from continuous manufacturing process

Sr. No.	Parameter	Raw spent wash (mg/l)	Concentrated spent wash (mg/l)
1.	Total volume expected	900 CMD	255
2.	Color	Dark brown	**Dark brown**
3.	pH	4.0 – 4.3	3.8 - 4.3
4.	COD	110000 – 130000	2,80,000 - 2,90,000

5.	BOD	55000 – 65000	85,000 -95,000
6.	Total Solids	130000 - 160000	3,00,000- 3,10,000
7.	Chloride (Cl)	6000 – 7500	16,000 -17,500
8.	Sulphate (SO4)	4500 – 8500	18,500 - 20,000
9.	Nitrogen (TKN)	1000 – 1400	2,000 - 2,500
10.	Potassium(K2O)	10000 – 14000	25,000 -28,000
11.	Sodium (Na)	1400 – 1500	4,000 -4,500

(IL&FS Technical EIA Guideline manual for Distilleries)

Table 4.24: Characteristics of Spent Lees

S. No.	Parameter	Range
1.	Volume	240 CMD
2.	pH	3.6 – 4.5
3.	COD	5000 - 6000 mg/l
4.	BOD	200 – 300 mg/l
5.	Dissolved Solids	5000 – 6000 mg/l
6.	Suspended Solids	500 – 1000 mg/l
7.	Chlorides	50 – 100 mg/l

(IL&FS Technical EIA Guideline manual for Distilleries)

Table 4.25: Characteristic of wastewater from cooling tower and boiler blow down

Sr. No	Parameter	Range
1.	Quantity	110-120 CMD
2.	pH	8.0-9.0
3.	COD	1500
4.	BOD	60-70 mg/l
5.	Suspended solids	800-1500 mg/l
6.	Total dissolved solids	1500-3000 mg/l

Table 4.26: Inlet and outlet characteristics of Process Condensate treatment unit

Sr. No	Parameter	Inlet	Outlet	Unit
1.	Flow	550	467	CMD
2.	pH	3.5-4.0	6.5-7.5	-
3.	COD	<4500	<100	mg/l
4.	BOD	<3000	<10	mg/l
5.	Total dissolved solids	<100	-	mg/l

Table 4.27: Characteristic of wastewater generated from sugar factory

S. No.	Parameter	Inlet characteristics	Outlet characteristics
1.	pH	5.4	6.4
2.	BOD	8445.00	90
3.	Total Suspended Solids	1293.00	92
4.	Oil and grease	BDL	BDL

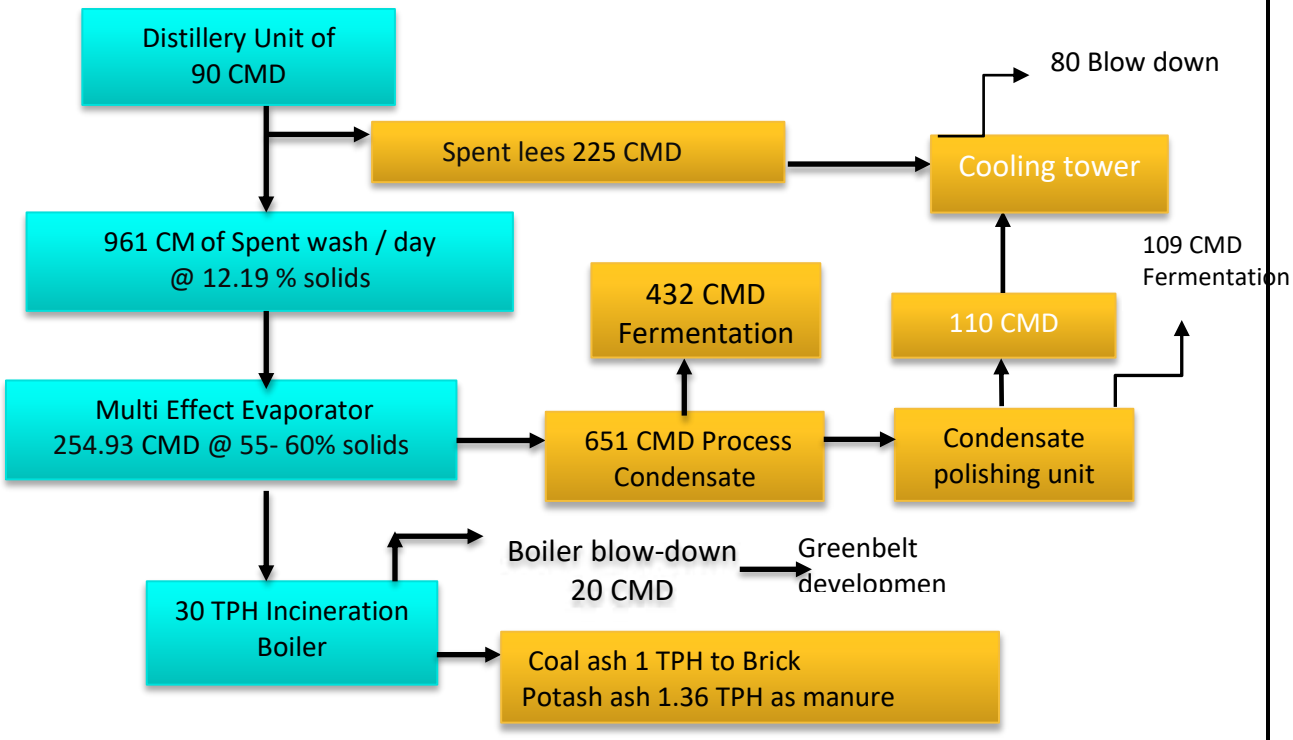


Figure 4.16: Waste water balance chart of proposed distillery

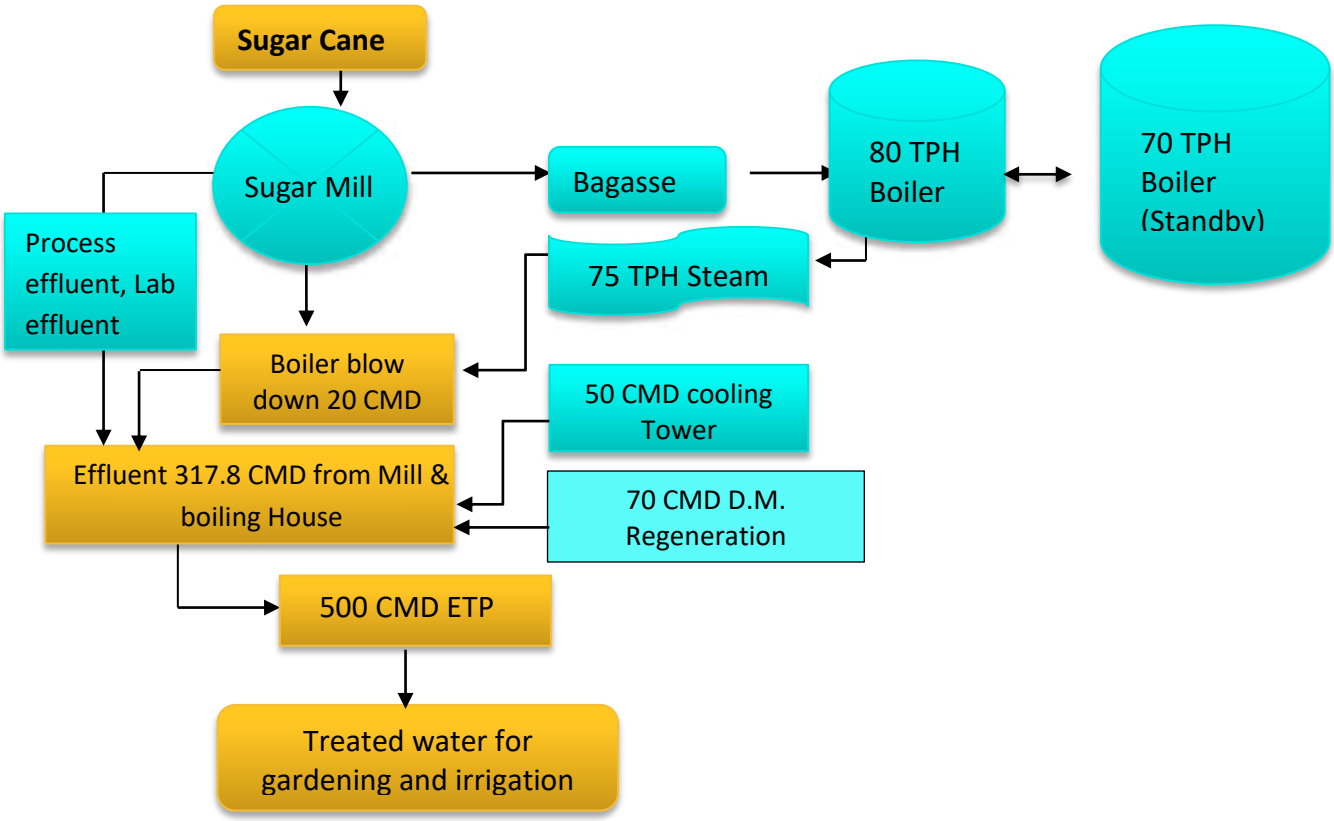


Figure 4.17: Waste water balance chart of sugar and cogeneration

4.2.2.5 Impacts on Biological environment

There will be no impacts on natural vegetation and species diversity due to the proposed distillery unit. The unit will establish in existing sugar factory premises. There will be no tree cutting or shrub removal will take place. The proposed green belt development help to control temperature and keep the surroundings cool. It will attract avifauna and create suitable habitat to micro flora and fauna. The green belt will help as a sink to dust and gaseous pollutants. While developing proposed green belt native, ornamental, medicinal values trees will be planted; which results in enrichment of biodiversity & beautification of area.

There are no wild life sanctuaries with in the study zone. Within the 10 km from project site dry vegetation is found. The impact on flora is insignificant. As site is flat with some undulating patches, very little leveling activities will be required. Hence no impact on existing landscape is anticipated.

Activity and its impacts

Impacts on ecology shall be from the following sources:

- Flue gas emissions in the air will lead to increase in concentration of Particulate Matter, Sulphur Dioxide and Oxides of Nitrogen. An increase in air pollutants may affect the vegetation growth in and around the area
- Dust emission is envisaged during material handling & transportation, which affects the growth of vegetation.
- Disposal of solid / hazardous waste on land pollute the soil, which eventually affect the vegetation

Mitigation measures

To mitigate the above mentioned impact following mitigation measures will be implemented:

- Air pollution control equipment like Electrostatic Precipitator (ESP) will be provided to reduce the emission of particulate matter
- Well-designed material storage area as well as handling facilities will be provided to prevent particulate emissions from the storage, handling & transportation activities.

- Solid waste storage area will be designed as per the guidelines to avoid the leachate percolation into the ground or water bodies.
- Distillery process condensate effluent will be treated in condensate polishing unit and recycled in the process.
- Greenbelt area will be developed in & around the plant premises and shall be maintained properly.
- There is no any discharge from the project activities. Existing sugar ETP treated water is used for exiting green belt development and irrigation purpose. However, no any impact on the biological environment has been found any alteration or destruction to the biological environment.
- All efforts will be put-up by the factory management to maintain the ecological balance and improve the environment in terms of ecology and green Belt development. Industry will follow the zero discharge norms. Hence no adverse impacts on surrounding ecology.

4.2.2.6 Impact on Socio-Economic Environment

- The impacts of the proposed distillery will lead to the positive impact on surrounding. The proposed project will generate the employment to local people. Thus, the said project will not have any significant impact on Socio-economic pattern of the surrounding region.
- The distillery plant will provide stability to sugar factory in financial terms. This ultimately benefited to farmers and employees.

4.2.2.7 Occupational Health & Safety

- Workplace area involving production unit, distillation unit, Boiler section, turbine section, raw material handling area etc.
- It is envisaged that occupational health hazards shall be associated with operational activities such as spillage and exposure to the chemical, mechanical hazards like cuts and hits and electrical shocks.
- Accident due to fall from height, burn injury and trap in the machine or motors during operation.

All these above mentioned impact or risk associated with various operational activities of the plant shall be mitigated by implementing the following measures:

- All safety signs will be placed at proper location.
- First aid kits will be made available at every department
- Pre-employment Medical checkup and periodical medical checkup shall be undertaken to know the occupational health hazards at the early stage.
- Work permit system will be introduced to avoid the entry or un-authorized working to avoid the incidences which can lead to the accident if proper care is not taken
- All arrangement required for Fire hydrant system shall made at every vulnerable location to have the firefighting facility.
- Apart from above, all required Fire Extinguishers shall be provided at appropriate locations
- All staff and workers will be trained in firefighting operations and emergency preparedness plan or to tackle the accident
- Apart from all engineering control measures, if required necessary PPEs shall be provided as last protection measures to the employees.

Good housekeeping also plays important role in avoiding the undesirable incidences / accidents, hence good housekeeping practices will be employed throughout the Factory premises.

4.3 IMPACT ASSESSMENT MATRIX

Impact matrix facilitates to identify components and phases of project activities for determination of likely impacts. Matrix identifies the interaction between project activities and environmental components using a grid like table. Entries are made in the cell which highlights impact severity in the form of symbols or numbers or descriptive comments. The impact of different project activities on various environmental components like biological environment, air environment, aesthetics and socio-economic have been summarized in a form of a matrix in Table 4.28.

- Environmental Pollution
  - Water: surface and ground water pollution
  - Air: Ambient air quality
  - Soil: Soil quality

- Land: Change in land use pattern and topography

- Biological Environment

- Existing Flora and fauna

- Aquatic Ecosystem

- Socioeconomic Environment

- Health and safety, cultural, aesthetic and economic aspects

Table 4.28: Impact Matrix of Proposed Project

		Pre-construction		Construction Phase					Operation and maintenance							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Environment components	Project activity / Parameters	Land acquisition	Site clearing	Site preparation	Excavation / Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy reserves	Alcohol Manufacturing process	Sugar and Cogeneration power	Raw Material / Finished Products Storage & Handling	Storage of raw material and finished products	Operation of cooling system	Pollution control equipment's nonfunctioning
Resources utilization	Fuel	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0
	Electricity	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0
	Water	0	0	0	0	0	-1	-1	0	-1	-1	-1	0	0	-1	0
	Construction material ex. Stone	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0
	Land	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0
Air	Air Quality	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-2
	Climate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water	Alteration of surface/ groundwater bodies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2
	Alteration of surface run-off and interflow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Alteration of Hydraulic Regime	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Pre-construction		Construction Phase					Operation and maintenance							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Environment components	Project activity / Parameters	Land acquisition	Site clearing	Site preparation	Excavation / Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy reserves	Alcohol Manufacturing process	Sugar and Cogeneration power	Raw Material / Finished Products Storage & Handling	Storage of raw material and finished products	Operation of cooling system	Pollution control equipment's nonfunctioning
	Contamination	0	0	0	0	0	0	-1	0	0	-1	0	-1	-1	-1	-2
Soil/Land	Soil erosion	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0
	Contamination	0	0	0	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1	-3
	Alteration of Soil properties/ Soil Quality	0	0	-1	-1	0	-1	-1	0	-1	-1	-1	-1	0	-1	-3
	Land topography	0	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0
Noise	Noise pollution	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-2
Ecology	Effect on trees, grasses, herbs & shrubs	0	-1	-1	-1	-1	0	0	-1	0	0	0	0	0	0	-3
	Effect on farmland	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0
	Effect on aquatic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Effects on fauna ex. Birds, butterflies,	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2

		Pre-construction		Construction Phase					Operation and maintenance							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Environment components	Project activity / Parameters	Land acquisition	Site clearing	Site preparation	Excavation / Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy reserves	Alcohol Manufacturing process	Sugar and Cogeneration power	Raw Material / Finished Products Storage & Handling	Storage of raw material and finished products	Operation of cooling system	Pollution control equipment's nonfunctioning
	mammals etc.															
	Habitat change and removal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
	Introduce new exotic species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occupational Health & Hazards	Health	0	0	-1	-1	-1	-1	0	-1	0	-1	-1	-1	-1	0	-3
	Sanitation	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0
Socioeconomic	Creation of new economic activities	+1	0	0	0	0	+1	0	+1	0	+1	0	0	0	0	0
	Commercial value of properties	+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Generation of temporary and permanent Jobs	0	0	0	0	0	+1	0	0	0	+1	+1	+1	+1	0	0

		Pre-construction		Construction Phase					Operation and maintenance							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Environment components	Project activity / Parameters	Land acquisition	Site clearing	Site preparation	Excavation / Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy reserves	Alcohol Manufacturing process	Sugar and Cogeneration power	Raw Material / Finished Products Storage & Handling	Storage of raw material and finished products	Operation of cooling system	Pollution control equipment's nonfunctioning
	Effect on crops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
	Reduction of farmland productivity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
	Income for the state and private sector	+1	0	0	0	+1	0	0	+1	0	+2	0	0	0	0	0
	Savings in foreign currency for the state	0	0	0	0	0	0	0	0	0	+2	0	+1	0	0	0
	Training in new technologies and new skills to workers	0	0	0	0	0	0	0	0	0	+1	+1	0	0	0	0
	Political/social Conflicts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2
	Land use change	0	0	-1	-1	0	0	-1	0	0	0	0	0	0	0	0
	Aesthetics and human interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1

		Pre-construction		Construction Phase					Operation and maintenance							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Environment components	Project activity / Parameters	Land acquisition	Site clearing	Site preparation	Excavation / Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy reserves	Alcohol Manufacturing process	Sugar and Cogeneration power	Raw Material / Finished Products Storage & Handling	Storage of raw material and finished products	Operation of cooling system	Pollution control equipment's nonfunctioning
	Cultural status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evaluation marking criteria

Description	Value
Significant negative impact	: -2
Significant positive impact	: +2
High negative impact	: -3
High positive impact	: +3

4.2.3.1 Conclusion of impact matrix assessment

Proposed project will not have any significant negative impacts on the environment. In absence of pollution control equipment, project will have high negative impact. Appropriate Environmental Management Plan (EMP) nullifies all high potential adverse impacts. Moreover, implementation of EMP helps to convert negative impact into positive impacts. Thus proposed project is certainly safe from the environmental point of view.

4.4 SUMMARY OF ANTICIPATED IMPACTS AND PROPOSED MITIGATION MEASURES

Significant impact from the project activities and its mitigation measures are summarize in Table 4.29.

Table 4.29: Impacts and mitigation measures

Sr. No.	Environment Aspects	Potential source of Impact	Proposed mitigation measures
1.	Air Environment	Stack emissions, vehicular movement, raw material handling	• ESP will be installed which has 99% efficiency. • PUC of the vehicles shall be checked periodically • Periodical maintenance of vehicles • If required spraying of water on the road to suppress the dust emission
2.	Odor	Fermentation, Molasses, spent wash	• Fermentation process will be in closed container • Spent wash will use quickly • Spent wash storage lagoon not more than 5 days. • Better cane management to avoid staling of sugar • Use of mill sanitation bio-cides to minimize the growth of aerobic / anaerobic micro–organisms • Steaming of major pipe lines
3.	Water Environment	Exploitation of surface water and disposal of waste water on land	• Proposed distillery project will be based on ZLD system • Process condensate treated water will be recycled back into process. • Domestic effluent Septic tank followed by soak pit system • Sugar Process water, washing, boiler blow

Sr. No.	Environment Aspects	Potential source of Impact	Proposed mitigation measures
			down and cooling tower blow down will be treated in ETP.
4.	Land	Land use	• Currently, land does not have any agricultural uses • It is open land and without any human settlement
5.	Soil	Disposal of waste on the land	• Coal ash will be sold to brick manufacturers; spent wash ash will be used as manure. • Yeast and ETP sludge will be used as a manure in green belt • Effluent will be treating in process condensate treatment plant. Hence no effluent disposal on the land or in water body
6.	Noise	During Operation	• Acoustic enclosure will be provided. • Sound from the machineries or from other operation shall be restricted within plant boundary
7.	Ecology	Release of pollutant in environment and loss of vegetation during construction	• No vegetation clearance is required • All required pollution control equipment will be provided to ensures the control of pollution
8.	Socioeconomic	Influx of people, settlement and existing resource utilization	• Over all positive impact is envisaged • CSR activities by proponent will be beneficial to local people
9.	Occupational Health and safety	Exposure to the chemicals, Operation of machines, Fire hazardous	• All safety measures and safety equipment's will be in place. • PPEs will be provided to workers and associated staff

4.5 CONCLUSION

The anticipated/identified potential environmental impacts of proposed project will be mainly from solid waste disposal, effluent disposal, ground water exploitation and flue gaseous emissions. However an effective mitigation measure reduces level of significant impact on the environment. Hence proposed project will be safe as there won't be disposal of effluent on the land or into the water body. Moreover, all required control measures and required equipment shall be provided to mitigate the impacts.

CHAPTER V ANALYSIS OF ALTERNATIVES

CHAPTER V

ANALYSIS OF ALTERNATIVES

5.1 INTRODUCTION

Chapter provides the information on various alternatives for the site and technology. The industry shall explore and adopt cleaner technologies and improve the management practices to reduce generation of pollutants.

5.2 SITE SELECTION

Proposed 90 KLPD distillery will be located in the existing sugar factory premises at sr. no. 85, 164, 165, 166, 167, 168, 169 &170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka.

Factory possess 36.66 acres land which includes 13 acres land for existing sugar and 3.56 acre cogeneration unit and 6.97 acre land for distillery unit.

Site selection for the existing site was made considering the following points,

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. Source of water for proposed distillery will be Sadalga Barrage on Doodhganga River.

Availability of infrastructural facility

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

The plant area does not fall under the industrial areas/ cluster, which are listed in MoEFCC office memorandum dated 13th January 2010.

Environmental features of site

There are no any eco-sensitive areas such as biosphere, mangrove, protected forest, national parks etc. or environmental sensitive locations such as protected monuments, historical places within 10 km from the site. River Doodhganga is flowing at a distance of 4.45 and Vedganga River 3.87 km is present at 10 km from the site. Maharashtra-Karnataka Interstate boundary 8.66 km away from the site.

5.3 TECHNOLOGY ALTERNATIVES

The technology selection is done on the basis of following considerations

- Indigenous technology
- Least stress on resources
- Reduce, recycle and reuse of wastes
- Reduce the pollution from the industry
- No risk to human and property

Technology selection will be done on the basis of efficient utilization of raw material, water, electricity, fuel and considering the recycle and reuse of wastes generated from industry.

The operations of distillery will be mainly Continuous Fermentation & Mutli-Pressure Distillation.

5.3.1 Fermentation process

The fermentation processes are classified as Batch and Continuous fermentation. In batch fermentation, the bacteria are inoculated into the bioreactor. Then, under controlled conditions (temperature 30^0C-32^0C, pH 4.8-5.8, aeration, etc.) the bacteria go through all the growth phases (lag, exponential, stationary). At last, the fermentation is stopped and the product is collected. Then, after cleaning and sterilization of the fermenter, the fermenter is ready for another batch.

In **continuous fermentation,** the fresh medium flows into the fermenter continuously and part of the medium in the reactor is withdrawn from the fermenter at the same flow rate of the inlet flow.

Continuous fermentation is superior to batch culture in several ways. The technology options for the proposed plant were considered based on efficiency of fermentation and distillation, efficient utilization of raw materials, fuel and water along with efficiency in power generation. It is observed from various industries & available literature of CPCB that the spent wash generated per liter of Alcohol production is less from the continuous and bio-still processes when compared to the batch process where the spent wash is more concentrated.

Hence continuous fermentation process has been selected for proposed Distillery project.

5.3.2 Distillation

Distillation is a process of separating the component substances from a liquid mixture by selective evaporation and condensation. In alcohol production the boiling points of the components in the mixture will be sufficiently close. It is the separation of a mixture into its component parts, or fractions, separating chemical compounds by their boiling point by heating them to temperature at which one or more fractions of the compound will vaporize. Therefore fractional distillation is used in order to separate the components by repeated vaporization-condensation cycles within a packed fractionating column. This separation, by successive distillations, is also referred to as rectification.

Fractional distillation separates alcohol with other fractions at their respective boiling points and extracts the alcohol concentration up to 95-96 % v/v. The obtained alcohols are termed as Rectified Spirit (RS) and distill further to produce extra neutral alcohol. At the end, remaining the dark brown liquid mass in distillation column called Spent Wash.

Proposed distillery is proposes multi pressure distillation. Multi pressure distillation has following advantages,

- Lower steam consumption
- Lower scale formation
- Reduced by-product formation in the mash column

In Multi Effect Evaporated distillation the mash column is operated under vacuum and is heated by overhead alcohol vapors from the rectifying column. Thus, steam supply to the mash column is saved. Similarly, other columns are also operated 'in-pair' using overhead vapors from one to heat the other. There could be nearly a 50% saving in energy.

Technology for producing alcohol from fermentation is well proven technology over a few decades all over the world. No adverse impacts are anticipated due to proposed project**.** Hence no alternative technologies are considered**.**

5.4 WASTEWATER TREATMENT OPTIONS

Spent wash generated during the process of distillation will be treated in multiple effective evaporators to concentrate the spent wash followed by slope fired boiler. Alternative methods of spent wash treatment are given in Fig. 5.1.

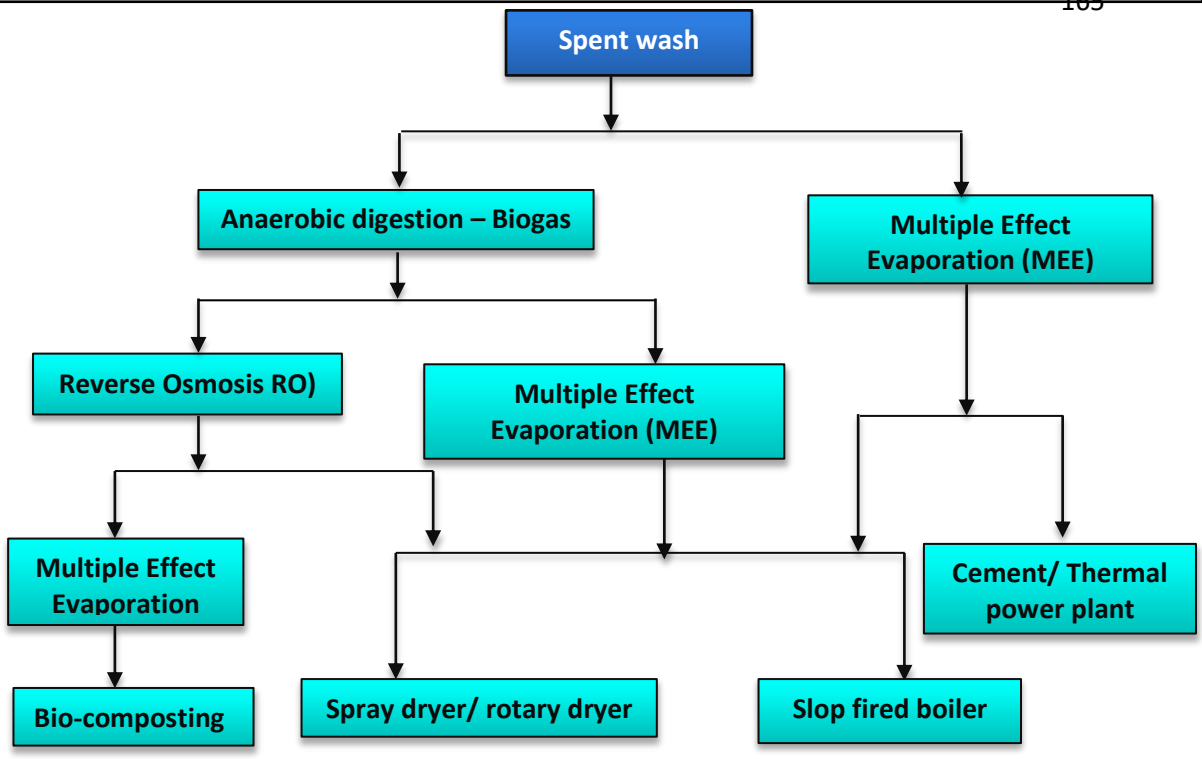


Figure 5.1: Alternative technologies for spent wash treatment

(Guidelines On Techno – Economic Feasibility Of Implementation Of Zero Liquid Discharge (ZLD) For Water Polluting Industries By Central Pollution Control Board January 2015*)*

Considering the aspect reuse of water recycling, cost of the technology and treatment efficiency, the industry has decided to adopt Multi effect evaporator followed slop fired boiler. Brief of both the system is given below,

Multi Effect Evaporator (MEE)

- Well established technology for concentration up to 40 % solids, which can result in substantial spent wash volume reduction.
- Integrated raw spent wash evaporation can result in reduction of final volume.

Slop fired boiler

- Solids concentrate (55 to 60 %) or spent wash powder is fired in a specially designed boiler with or without subsidiary fuel. Steam generated runs a TG set to generate electricity. Exhaust steam is used in distillery and evaporation plant operations
- Overall system is supposed to be self-sustaining in terms of steam and power balance after initial stabilization period.

- Potash rich ash as a by-product.

5.5 CONCLUSION

Technology selection is done on the basis of efficient utilization of raw material, water, electricity, fuel and considering the recycle and reuse of wastes generated from industry.

Considering the advantages and technology feasibility, distillery will be operated through Continuous Fermentation & Mutli Pressure Distillation.

Spent wash generated during the process of distillation will be treated in multiple effective evaporators to concentrate the spent wash followed by slope fired boiler. The proposed spent wash treatment option will be able to achieve the aim of “zero discharge” of effluent.

CHAPTER VI Environment Monitoring Program

CHAPTER VI

ENVIRONMENT MONITORING PROGRAM

6.1 INTRODUCTION

Present chapter delivers environment monitoring program, its frequency, parameters and methodology for air, water, noise, and solid hazardous waste/ soil environment. It also furnishes the information of reporting system of environmental parameters and responsibility of environmental monitoring program.

An environmental monitoring plan provides a delivery mechanism to address the adverse environmental impacts of a project during its execution by periodic monitoring of important environmental parameter so as to maintain the environmental quality within the standards, and to introduce standards of good practice to be adopted for all project works.

An environmental monitoring program is important as,

- It assists in detecting the impacts and control measures.
- It evaluates the performance and effectiveness of mitigation measures proposed in the Environment Management Plan (EMP) and suggests improvements in management plan, if required.

An Environmental Monitoring Program has scheduled with the following objectives,

- To verify the result of the impact assessment study with respect to new developments
- To study the parameters which have been identified as critical
- Status of pollution load within the project site and its vicinity
- Generation of data for predictive or corrective purpose in respect of pollution
- To check or assess the efficiency of controlling measures

6.2 ENVIRONMENT ASPECTS TO BE MONITORED

Proposed project shall monitor the following environmental aspects to ensure effectiveness of EMP and mitigate any impact envisaged during the commissioning and operation phase.

6.2.1 Ambient air and stack monitoring

- Ambient air quality will be monitored at three locations and pollutants monitored will be Respirable Suspended Particulate Matter (PM 10, 2.5), Sulphur Dioxide (SO_2) and Oxides of Nitrogen (NOx).
- Monthly monitoring of stack will be carried out for the parameters such as PM, SO_2 and NOx to assess the performance of pollution control facilities installed for the unit.

6.2.2 Water and waste water quality

- Surface and ground water samples towards downstream of project will be collected and analyzed periodically.
- Characteristics of Cooling Tower and Boiler fed water will be check periodically.
- The characteristics of Spent Wash, cooling tower blow down, boiler blow down, process and steam condensate wastewater will be analyzed periodically.
- Environment Statement Reports will be filed as per the schedule prescribed by Pollution Control Board
- Analysis of water, wastewater will be in laboratories approved by Ministry of Environment, Forest and Climate Change (MoEFCC) or National Accreditation Board of Laboratory (NABL) will be hired.

6.2.3 Soil and Solid/ Hazardous Waste

- One surface soil sample from proposed ETP, Spent wash storage lagoon and project site will be taken and analyzed as per the standard method.
- Solid hazardous waste will be disposed of regularly as per EMP. Management will keep record of Ash generation and its disposal i.e. by selling.

6.2.4 Noise monitoring

- Five noise monitoring location will be selected considering noise generation area.
- Personal protective equipment like ear plugs/ear muffs will be provided to employees working near such noisy area.
- The noise attenuation measures will be taken at the design stage.

6.2.5 Occupational health and safety

Routine medical examination of personnel will be carried out at regular intervals and followed for all workers to determine any changes in health condition due to the working conditions. Pre-medical check-up will also be carried out at the time of employment.

6.3 ENVIRONMENT MONITORING PLAN

The post project monitoring plan will be as follows,

- Prior to the commencement of operation
- After 6 months of commencement of operation
- Once in a year from the commencement of operation

Environmental parameters to be monitored and its frequency after commissioning of proposed project is mentioned in Table 6.1

Table 6.1: Environmental monitoring schedule

Sr. No.	Particulate	Parameters	Number of location	Frequency
1.	Ambient air quality	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, etc.	Ambient air quality at minimum 3-5 locations. 1 location within the plant premises, 1 location in upwind, 1 location in downwind direction and 1 location in cross wind direction.	Monthly
2.	Stack gas	PM, SO_2 and NOx	Number of stacks	Monthly
			Online stack monitoring installed	-
3.	Work place	$PM_{2.5}$, SO_2, NOx, CO, O_3	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
4.	Waste water	pH, EC, SS, TDS, O&G, Ammonical Nitrogen, COD, BOD, Chloride, Sulphides etc.	Wastewater from all sources. Inlet & outlet of ETP, Condensate treatment plant	Monthly
			Camera at spent wash tank will be installed	

Sr. No.	Particulate	Parameters	Number of location	Frequency
5.	Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) & *E.Coli*	3-5 location Ground as well as Surface water	Half yearly
6.	Solid waste	Ash	• Process dust generated sludge and ash. • Before used as manure if used manure	Monthly
7.	Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity	5 location At all source and outside the Plant area.	Monthly
8.	Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plant site	Monthly
9.	Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	2-3 near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied. Near spent wash storage lagoon	Quarterly
10.	Occupational health	Health and fitness checkup of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year

6.3.1 Monitoring methodologies

Environmental samples will be collected as per the guidelines provided by MoEFCC/ CPCB. The method followed for monitoring will be recommended/ standard method approved/ recommended by MoEFCC/ CPCB. Detail of the same is mentioned in Table 6.2.

Table 6.2: Methodology of Environmental Monitoring

Sr. No	Description	Method	
		Sampling/ Preservation	Analysis
1.	Ambient air monitoring	Samplers (Designed as per USEPA) to collect PM $_{2.5}$, PM_{10} & the gaseous samples	Any standard methods such as IS 5182, CPCB guideline etc.
2.	Stack gas monitoring	Samplers (Designed as per USEPA) to collect particulate matter & the gaseous samples	-
3.	Water and waste water	Standard methods for examination of water and wastewater published by APHA 21st edition, 2005	Standard methods for examination of water and wastewater published by APHA 21st edition, 2012
4.	Noise monitoring	Instrument : Sound level meter	-
5.	Soil monitoring	Collected as per soil analysis reference book, M. I. Jackson and soil analysis reference book by C.A. Black	Analysis reference book, M. I. Jackson and soil analysis reference book by C.A. Black

6.4 REPORTING AND DOCUMENTATION

All the necessary reports and documents will be prepared to comply with statutory rules and regulations. The records of the monitoring program along with the results of all the parameters being monitored will be maintained on regular basis.

The environmental monitoring activities will be recorded and the following documents are proposed to be maintained,

1. Log sheets of operation and maintenance of pollution control facilities/ equipment such as ETP/slope fired boiler operation and test results of inlet and outlet.
2. Instruction manuals for operation and maintenance of pollution control facilities/ equipment like ETP as well as for manual for monitoring of water, solid and gaseous parameter discharged from the project.
3. Statutory records as per the environment related legislation.
4. Monthly and annual progress report.
5. Bi-annual compliance statement for Regional Office, MoEFCC.
6. Annual environmental audit statements and compliance to NOC/ Consent conditions to State Pollution Control Board/ Regional Office, MoEFCC.

6.5 FORMULATION OF ENVIRONMENT MANAGEMENT CELL (EMC)

The Environmental Management Cell shall be responsible for the environmental management, monitoring and implementation activities of the proposed unit. EMC will carry out various activity of environment under the supervision of the Head of the plant.

EMC cell shall be responsible for,

- Monitoring of efficiency of pollution control equipment's
- Preparation of maintenance schedule of pollution control equipment and treatment plants and see that it is followed strictly.
- Monitoring activities within core and buffer zone of proposed project as per monitoring schedule.
- Inspection and regular cleaning of setting tanks, drainage system etc.
- Greenbelt development and maintenance
- Water and energy conservation measures
- Good housekeeping

Structure of EMC is mentioned in Figure 6.1.

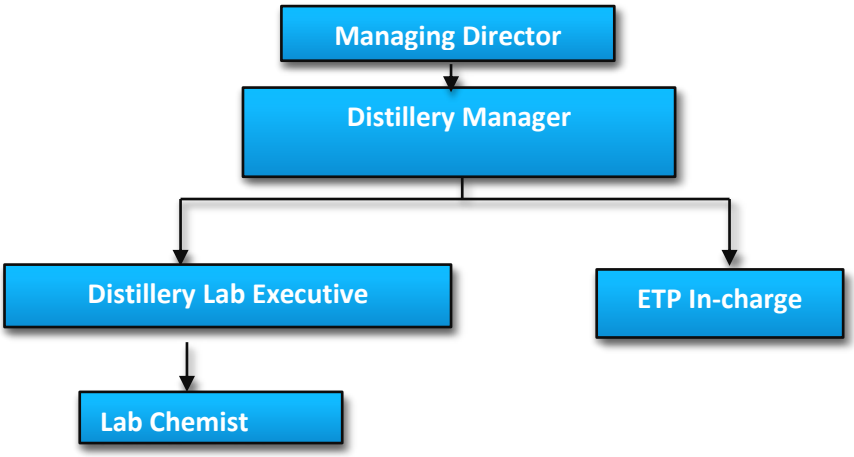


Figure 6.1: Structure of EMC

6.6 LABORATORY FACILITY

The plant will have an in-house environmental laboratory for the routine monitoring of water and wastewater. The outside agencies can also be hired for analysis of other environment aspects like air, noise and soil. The following equipment's are recommended to the project proponent for implementing the post project environmental monitoring

program. Following are the list of instruments which are suggested to implement at the site for proper monitoring of operation of the plant.

Table 6.3: List of Laboratory Instruments

Sr. No	Name of equipment
1.	pH meter
2.	COD Digester
3.	BOD Incubator
4.	Oven
5.	Analytical Balance
6.	Hot Plates & Water Bath
7.	Refrigerator
8.	Magnetic Stirrer
9.	Vacuum Pump
10.	DO Meter
11.	Required Glassware's, chemicals and reagents

6.7 BUDGETARY PROVISION FOR ENVIRONMENT MANAGEMENT

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The approximate cost for the EMP will be Rs. 259.00 lakhs. Bifurcation of the EMP cost is given in Table 6.4.

Table 6.4: Environment Management Cost

Sr. No	Description	Capital (Rs. in lakhs)	Recurring (Rs. in lakhs)
1.	Air Pollution Control	100	10
2.	Water Pollution Control	75	5
3.	Solid waste Management	8	3
4.	Environmental Monitoring and Management	_	7
5.	Rainwater Harvesting	20	3
6.	Occupational Health	10	5
7.	Green belt development	10	3
8.	**Total**	**223**	**36**

CHAPTER VII

ADDITIONAL STUDIES

CHAPTER VII

ADDITIONAL STUDIES

7.1 INTRODUCTION

Additional studies like review of social impact and public consultation were undertaken. Apart from the public consultation, major portion is dedicated to the study of hazard identification and risk assessment. It also covers the requirement for onsite and offsite disaster (natural and manmade) preparedness plan including emergency management plan including.

7.2 SOCIAL IMPACT ASSESSMENT STUDIES (SIA)

Rehabilitation and Resettlement (R & R) and Social Impact Assessment (SIA) studies has not found any relevance for the proposed project site as there would not be any temporary or permanent displacement of the personnel or goods as the proposed project will be located on unoccupied open land. At present no agricultural cultivation of the crops is being taken on the proposed land. Hence, no R & R and SIA studies or plan were undertaken for the particular site.

The nearest residential settlement is at Bedkihal 2.8 km (NE), Khotwadi 2.0 km (W) and Galatga 2.4 km (S) from the site. Proposed project activity will not cause any negative impacts on the environment and on the society as it will increase the direct and indirect job opportunities along with indirect work to the local people residing in the area. There will be some development of secondary service market near the site which will be beneficial to the local economy.

7.3 PUBLIC CONSULTATION

The project falls under Category “A”, Activity 5 (g) ii [All molasses based distilleries ≥60 KLPD], of schedule–I of the EIA notification -2006 (as amended timely), since the proposed project is a distillery project and is listed in the Annexure I of O.M. dated 4th April 2016 for industries to conduct Public Hearing irrespective of location in notified estate or outside notified estate and as per the ToR’s issued by MoEFCC dated 7/09/2016. Hence, Public consultation is applicable to the proposed project. The Public Hearing will be conducted after the submission of the draft EIA to the Karanataka Pollution Control Board. The details of Public hearing minutes will be unified in this report after completion of Public Hearing.

Public Hearing for the proposed project will be conducted. Draft EIA/EMP report with executive summary in English and local language will be submitted to Karnataka State Pollution Control Board (KSPCB). The news of Public Hearing to be conducted on the above mentioned date will be widely published in the English & Local Newspaper for the knowledge of local people and stakeholders before one month. The copies of EIA report in English and local language will be made available with the office of pollution control board and the Collector. During the public consultation, all the dignitaries including Collector, SRO, RO and local Sarpanch will be present for the meeting.

7.4 HAZARD IDENTIFICATION

In practical terms, hazard identification is a thorough look at the workplace and processes to identify those things, situations, processes that may cause harm, particularly to the working force and nearby population. After identification of the potential hazards, one has to evaluate it potential to cause harm and then decide what type of control measures shall be taken to control it from the happening. Hazard identification is very important tool as it is integral part of a good occupational health and safety management plan. The aim of the hazard identification process is to reduce level of risk by taking precautions or initiating control during project execution.

The various hazard analysis techniques that may be applied are Hazard and Operability (HAZOP) studies, Fault – Tree Analysis (FTA), event –tree analysis and failure and effects mode analysis.

7.4.1 Hazard Identification & Risk Assessment (HIRA)

The purpose of a Hazard Identification and Risk Assessment (HIRA) is to understand what risks or threats to public safety, property or the environment exist.

Figure 7.1 : Hazard Identification & Risk Assessment (HIRA) process

Hazard Identification and Risk Assessment (HIRA) Process,

- Identification of hazards
- Analyze or evaluate the risk associated with the hazards
- Determine appropriate ways to eliminate or control the hazards
- Evaluate the likelihood of an injury or illness occurring, and its severity
- Review of all available health and safety information about the hazard including MSDS, manufacturer's literature, information from organizations and results of testing
- Identify actions necessary to eliminate or control the risk
- Monitoring to confirm the risk is controlled
- Keep any documentation or records that may be necessary. Documentation may include detailing the process used to assess the risk, outlining any evaluations, or detailing how conclusions were made.

7.4.2 Identification Hazard

Details of major anticipated risks from the Hazards is given in Table 7.1

Table 7.1: Hazards of the proposed plant

Sr. No.	Name	Description	Severity	Hazard
1.	Transportations of raw material	Molasses	Major	Exposure
		Coal	Minor	-
		Yeast, urea	Minor	Exposure & inhalation
		Sulphuric Acid, Di ammonium Phosphate, Anti-foam reagent, Caustic soda	Major	Exposure & inhalation
2.	Storage of Molasses Products and byproducts	Molasses, RS/ ENA/ Technical Alcohol, fusel oil	Major	Explosion, Fire
3.	Manufacturing process	Fermentation	Major	Fire
		Distillation Unit	Major	Heat & fire
		Power Plant	Major	Heat fire & electrocution
4.	Utilities	D.G set, Boiler, Turbine	Major	Heat, fire & electrocution
5.	Other accidents	Leakages from the vessels, Catastrophic rupture of pressure vessels and Storage Tanks	Major	Exposure & fire

7.5 RISK ASSESSMENT

Risk analysis deals with the identification and quantification of risks, the plant equivalent and personnel are exposed to, due to accidents resulting from the hazards present in the factory. Risk classification table is given in Table 7.2.

Table 7.2: Risk classification and score table

Impact \ Likelihood	Rare (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost Certain (5)
Catastrophic (5)	Moderate Risk	Moderate Risk	High Risk	Critical Risk	Critical Risk
Major (4)	Low Risk	Moderate Risk	High Risk	High Risk	Critical Risk
Moderate (3)	Low Risk	Moderate Risk	Moderate Risk	High Risk	High Risk
Minor (2)	Low Risk	Low Risk	Moderate Risk	Moderate Risk	Moderate Risk
Insignificant (1)	Low Risk	Low Risk	Low Risk	Low Risk	Moderate Risk

Risk Score	Risk Level Category	Description
1 to 4	Low Risk	Manage by routine procedures and operations; should not require much attention but should be reviewed at least every 18 months.
5 to 10	Moderate Risk	Manage by specific monitoring or response procedures; should be monitored ad reviewed every 12 months.
11 to 18	High Risk	Requires escalation to VP; should be constantly monitored and reviewed every 3 months.
19 to 25	Critical Risk	Requires escalation to Board Committee responsible for risk management oversight; should be constantly monitored and reviewed monthly.

7.5.1 Potential risk and mitigation measures for during construction phase

Risk impact and mitigation measures during construction phase are describes in Table 7.3

Table 7.3: Risk Impact and rating matrix during construction phase

Activity	Associated Hazards	Health impact	Risk rating	Proposed mitigation and control measures
Site Leveling	Vehicular movement, Insect/snake bite	Physical injury, and organ damage	M	• Providing PPEs to workers • Appointing the qualified persons for the particular job. • Speed limit control

Activity	Associated Hazards	Health impact	Risk rating	Proposed mitigation and control measures
				• Providing Training
Loading and Unloading of material	**Accidents**	Physical Injury	M	• Providing PPEs to workers • Training to workers
Excavation	• Falling objects or objects near an excavation • Slips, trips, and falls	Property Loss Physical injury	M	• Work Permit System will be followed. • Excavated material will be stacked safely. • Area will be barricaded • Training to workers • PPEs will be provided
Construction	• Structure may fall down • Workers may fall down from the height.	Physical Injury Physically handicapped Property Loss	H	• Work Permit System will be followed. • Height work permit will be issued to the person. • Safety belt will be provided to workers Training to workers
Cutting and Welding	fire or explosion Electric shock from electrical welding	Physical Injury Burn Injury Property loss	H	• Standards Work Procedure • Training will be provided • Proper PPEs will be • Provided. • Regular monitoring of electrical equipment's to avoid loose connection • Area will be barricaded
Installation of Machineries.	Structure may collapse	Property loss Physical Injury	M	• Only authorized person will operate the machine • Appropriate platform will be designed as per the load bearing calculation.

7.5.2 Potential risk and mitigation measures during operation phase

7.5.1.1 Boiler Operation

The potential risk and its mitigation measures for Boiler operation is given in Table 7.4.

Table 7.4: Risk Impact and rating matrix for Boiler operation

Sr. No.	Activity	Associated Hazards	Health impact	Risk rating	Proposed mitigation and control measures
1.	Working near Boiler	High noise	Noise induced hearing loss	M	Required PPEs need to be used
2.	Boiler maintenance	Mechanical hazard	Physical injury	M	• PPEs • Regular monitoring for checking leakages • Individual vigilance and proper training to worker for proper handling • Provision of First aid box
3.	High Pressure Steam	Explosion	Risk of severe injury, damage to equipment	H	• Required PPEs • Good housekeeping • Regular monitoring of the storage facility • Flammable chemicals stored away from the source of ignition • Firefighting facility • Provision of First aid Box
4.	Incomplete Combustion	Asphyxiation from carbon monoxide	Possible fatality	H	• Online CO monitors • Regular checking of workplace • Individual alertness and precaution
5.	Maintenance work	Slips, Trips and Falls	Physical injury	M	• PPEs • Individual alertness and precaution
6.	Electrical maintenance work	Electricity	Electric shock, Possible burns	H	• Regular checking and maintenance of electrical units • PPEs • Provision of First aid box
7.	Maintenance of burner	Burn injury	Severe Physical injury or burn	M	• PPES will be provided. • Work will be carried out under proper supervision. • Follow of SOPs. • Individual alertness and

Sr. No.	Activity	Associated Hazards	Health impact	Risk rating	Proposed mitigation and control measures
					precaution is important • Provision of First aid box

7.5.2.2 Risk during D.G. set operation

Table 7.5: Risk Impact and rating matrix for D.G. set operation

Sr. No.	Activity	Associated Hazards	Associated Risk /Health impact	Risk rating	Proposed mitigation measures
1.	Working near DG	High noise	Noise induced hearing loss	M	• Use of PPEs • Acoustic enclosure
2.	Maintenance	Fire	Burns, Serious injury	H	• Restricted Entry • Use of flame proof fittings • Use of PPEs
3.	HSD Storage	Leakage / Fire	Risk of severe physical injury and burn	H	• Storage will be away from ignition source • Regular monitoring to check the leakages and spillages • Firefighting facility will be provided • PPEs will be provided • First aid box
4.	DG set maintenance	Mechanical Hazard	Physical injury	M	• PPEs • Leakage and heat in the joint will be checked before maintenance • First aid box at approachable place

7.5.2.3 Hazard & associated Risk of storage and handling of raw material

Impact matric for risk associated with storage and handling of material is given in **Table 7.6.** Grain and alcohol storage Tanks details are given in **Table 7.8.** Material safety data sheets for Chemicals are enclosed as Annexures.

Table 7.6: Impact matrix of Storage and handling of raw material

Sr. No.	Activity	Associated Hazards	Associated Risk / Health impact	Risk rating	Proposed mitigation measures
1.	Storage, handling, loading & Unloading of	Exposure, leakage, Fire, Explosion	Physical Injury, burn, Eye irritation and respiratory problem	H	• Provision of Eye wash • Inspection and regular monitoring of storage area

	material				• Training to Workers for proper handling • PPEs will be provided as Nose mask, Hand gloves. • Proper system for loading operation to prevents spillage • Provision of level indicators for storage Tanks • Spill kit for Acid and other chemicals • Proper ventilation • First Aid boxes
2.	Transportation	Fire, Accident, leakage	Burns, serious injury	H	• Firefighting facility • Training to Driver • MSDS • TREM Card • First Aid Box

7.5.2.4 Hazard & associated Risk of Molasses storage tank

Molasses can ferment if excessive moisture contamination is allowed. Fermentation can yield carbon dioxide with possible traces of ethanol or volatile fatty acids (e.g. acetic, propionic, lactic, or butyric) and if exposed to a spark or flame may result in an explosion. Fermentation may also occur in dilute surface layers formed by condensation from the headspace above the liquid.

Table 7.7: Impact matrix of storage of molasses

Sr. No.	Activity	Associated Hazards	Associated Risk/ Health impact	Risk rating	Proposed mitigation measures
1.	Storage and Handling	Explosion	• May cause slight irritation • May cause irritation	H	• Proper ventilation shall be provided • Inspection and regular monitoring of storage area • Training to Workers for proper handling • PPEs will be provided as Nose mask, Hand gloves. • Provision of level indicators for storage Tanks

					• If causes eye irritation wash area with soap, flood eye with water and water

Table 7.8: Storage Tanks details

Sr. No.	Particular	Capacity
1.	Molasses storage	Existing: 28000 MT Proposed: 1 X 10000 MT 2 X 5000 MT
2.	ENA daily receiver	110 CMD X 9
3.	TA receiver	15 CMD X 3
4.	RS bulk storage	900 CMD X 1
5.	ENA bulk storage	900 CMD X 1
6.	TA storage	200 CMD X1
7.	FO bulk storage	20 CMD X 1
8.	Ash storage yard	2 days storage
9.	Bagasse storage yard	10000 MT

7.5.2.5 Risk associated with alcohol storage and its mitigation measures

Material Safety Data Sheet (MSDS) for ethyl alcohol is enclosed as Annexure. Impact matric of risk associated with storage and transportation of alcohol along with control and mitigation measures are given in Table 7.9.

Table 7.9: Impact matric of risk associated Alcohol storage

Sr. No.	Activity	Associated Hazards	Health impact	Risk rating	Proposed Control and mitigation measures
1.	Storage of Alcohol	Exposure, inhalation, ingestion & Fire	• Exposure to over 1000 ppm may cause headache, drowsiness and lassitude, loss of appetite, and inability to concentrate. Throat Irritation • Ingestion causes depression of central nervous system, nausea, vomiting, and diarrhea • Liquid or vapor may	H	**Storage** • Storage will be away from process area with well-ventilation. Avoid all possible sources of ignition like spark or flame. • Use spark/flame proof hand tools • Electrical wiring will be flame proof type • Based on the leakage quantity, wiped out with or dilute by spraying the water to suppress the vapors

			cause eye and skin irritation • Burn injury		**Control measures in case of over exposure** • If victim is conscious and able to swallow, then give water or milk to drink to dilute the contents in the stomach • Look out for medical help **Skin or Eye exposure** • Immediately flush affected area with plenty of water. Eyes should be flushed for at least 15 minutes with water • PPEs will be provided to avoid exposure

7.5.2.6 Risk associated with work area of distillation

Table 7.10: Impact matric of risk associated distillation area

Sr. No.	Activity	Associated Hazards	Health impact	Risk rating	Proposed Control and mitigation measures
1.	Working near Distillation column	Heat & Fire	Physical injury & burning	H	• PPEs • Firefighting facility • First aid box • Periodic checking of all parts

7.6 SAFETY MEASURES RECOMMENDATION

7.6.1 Storage and material handling area

- Proper ventilation shall be provided
- Area will be marked as “No smoking Zone”
- Use of proper PPEs
- Pressure relief valves shall be provided
- Provision of Safety valves and rupture disk
- Provision of fire hydrant system along with other portable fire extinguishers
- Adequate distance between the storage Tanks
- Provision of dyke wall to the Tanks
- Proper earthing to the Tanks

7.6.2 Reactor Safety

- Provision will be made for temperature & pressure indicators
- Heating & cooling Jacket will be provided to maintain the temperature
- Pressure switch with hooter shall be provided
- Pressure safety valve will be provided
- Double earthing shall be provided

7.6.3 DG Sets

- Acoustic enclosures to be provided
- Entry near the unit shall be restricted
- Qualified and highly trained engineers shall be appointed

7.6.4 Boiler

- Work permit system will be evolved and will be followed during maintenance work
- Proper ventilation shall be maintained
- Entry shall be allowed only after proper checking of gases, if any
- Worker should be trained properly
- Working should be under supervision of qualified and trained personnel

7.6.5 Storage and Handling of Alcohol

- Keeping away from oxidizers, heat and flames.
- Avoidance of plastics, rubber and coatings in the storage area.
- Cool, dry, and ventilated storage and closed containers.
- Leakage should be washed out and diluted.
- Regular monitoring and maintenance to avoid leakages.
- If major leakage in tanks can be mitigated by transferring the material to other tank.
- Transfer the material to other tank.
- Grounding of the container and transferring of equipment to eliminate static electric sparks. In case of any emergency following measures would be taken:
  - First Aid Measures
  - Use of extinguishing media surrounding the fire as water, dry chemicals (BC or ABC powder), sand, dolomite, etc.

- Foam system for firefighting will be provided to control fire from the alcohol storage tank. The foam thus produced will suppress fire by separating the fuel from the air (oxygen), and hence avoiding the fire and explosion to occur in the tank. Foam would blanket the fuel surface smothering the fire. The fuel will also be cooled by the water content of the foam. The foam blanket suppresses the release of flammable vapors that can mix with the air.
- Special Fire Fighting Procedures; Keeping the fire upwind. Shutting down of all possible sources of ignition, keeping of run-off water out of sewers and water sources. Avoidance of water in straight hose stream which will scatter and spread fire. Use of spray or fog nozzles will be promoted, cool containers will be exposed to flames with water from the side until well after the fire is out.

7.6.6 Molasses storage

- Store in good quality ventilated and leak-proof tanks (mild steel, stainless steel, polyethylene, PVC) at ambient temperatures, out of moisture.
- Continuous mixing of molasses should be done.
- If there is increase in temperature beyond 30 ^{o}C external cooling of tanks should be provided. A temperature recorder should be provided to the tanks.
- Avoid microbiological contamination or dilution with water.
- Regular monitoring and maintenance to avoid leakages.

7.6.7 Building & workspace

- Adequate space will be provided for equipment repair or removal
- Equipment maintenance shops will be set up with appropriate safety provisions for hazards associated with maintenance activities
- Lightning protection will be provided

7.6.8 Electric items

- Medium and high voltage cables will be completely enclosed
- Electrical equipment will be grounded adequately
- Wiring will be properly insulated, grounded, and non-exposed
- Emergency shutoff switch, clearly labeled, at all machinery units will be provided
- DG set will be provided as stand by source of power

- Maintenance tools with insulated handles will be provided

7.6.9 Fire

The fire protection system is to provide for early detection, alarm, containment and suppression of fires. The complete fire protection system will comprise of the following. Fire hydrant network will be provided for firefighting in the entire project area along with following firefighting equipment will be provided

- Different type of Fire Extinguishers, Detectors and fire Alarm shall be provided
- Fire hydrant system
- Fire Tender with chemicals foam and required arrangement for firefighting to control the fire from the alcohol storage
- Foam system shall be contain aqueous film forming compound of 3 to 6% alcohol resistance foam concentrated with ISI mark 4889
- Water storage Tank exclusively for firefighting operation
- Rubber mat will be used near panel area
- Periodical training to the identified supervisors and Employees in the field of Firefighting and safety
- Emergency exits at specific locations and will be marked on the layout
- Cautionary note, safety posters, stickers will be displayed at appropriate locations
- First Aid boxes will be made available at appropriate locations
- Emergency Control Center Provision shall be made to establish an Emergency Control Centre (ECC) from which emergency operations are directed and coordinated. This center is activated as soon as on–site emergency is declared. ECC is equipped with adequate communication systems in the form of telephones (Emergency telephone numbers.) and other equipment's to allow unhampered organizations and other nearby facility personnel.

7.6.10 Occupational health hazard and safety measures

During operation handling of chemicals and other material used, a practice of preventive maintenance shall be adopted to take care of employee's health. The various safety equipment such as breathing apparatus, gum boots, goggles and helmets will be provided to the workers/operators. Besides, all the first aid, firefighting devices will also be inspected,

tested and maintained periodically so that it is available in ready to use condition. Provision of pre-medical and periodical health check-up for all the employees shall be implemented and record maintained. If any abnormality is noticed due to occupational exposure, necessary

Treatment will be assured from qualified physician. Following measures shall be implemented to avoid the occupational hazards to the employees:

- Regular housekeeping of the entire plant area
- Regular or preventive maintenance of floor, platforms, staircases and passages to avoid the slip incident
- Provision of obstruction free walkways and workplace
- Periodical training to the employees for the proper operation of the Plant and various processes
- Restricted entry into the plant premises
- Checking and calibration of all Instruments and Fire Devices to keep them in proper operating conditions
- Installation of Electrical devises as per the prescribed standards
- Provision of D.G. Sets to avoid the complication during power failure
- Provision of required fire Extinguishers at different locations for easy access
- Provision of lighting Arrester
- Various types of PPEs like breathing apparatus, ear muffs, earplug, masks, leather hand gloves; asbestos hand gloves; acid/alkali proof rubber hand gloves; electrical resistance hand gloves and gum boots, goggles and helmets will be made available

Provision of First aid Boxes and periodical checking for required medicine and other material to take care of superficial bodily injuries during work

7.7 DISASTER MANAGEMENT PLAN (DMP)

A disaster is an unforeseen combination of circumstances that causes serious body injuries, loss of life or extensive damage to the plant, Machineries or to the environment.

Following uncontrollable situation may lead to disaster or plant emergency:

7.7.1 Manmade

- Plant failure

- Rupture or damage of the line, vessel or Tank
- Excessive leakage of flammable material

7.7.2 Natural

- Cyclone
- Earthquake
- Flood
- Fire
- Terrorist attack

Disaster management plan is a written document where all the details regarding the causes of disaster are noted along with required control measures. It also gives details about the responsible personnel shall be available on site during emergency and their role to control the disaster to a minimum level or from spreading the outside to protect the plant and machinery including employees and nearby areas. The DMP to tackle the emergency can be divided into the two parts for the ease of operation and to effectively control the emergencies within shortest possible time.

Figure 7.2: Disaster management process

7.7.3 Onsite Emergency Plan

If an accident / incident takes place and its effects are confined to the only, then it is termed as an onsite emergency. It involves employees and other infrastructure within the organization. In this plan, the company officers and employees are given pre-decided responsibilities to handle the emergency. All other required resources to tackle this type of

emergency are available. The individual employee or designated persons will be held responsible to take or initiate appropriate action as and when required. All the employees / responsible persons required to take or initiate the action at the time of emergency are trained appropriately so that they can perform their task without any difficulty. To make the handling of emergencies absolutely perfect, mock drills need to be conducted periodically for a particular scenario. During mock drills, particular scenario is simulated to understand the gravity and requirements of action. During the mock drills, all the important points or happenings are noted and discussed to find out the lacunae or for the further improvement in the written plan.

7.7.4 Offsite Emergency Plan

If the accident or incident occurred in the premises, man will need help from outside sources because of magnitude of emergency then it termed as Offsite Emergency. This offsite emergency cannot be controlled only by using the internal resources and need timely help from the outside companies or from the government authorities to tackle such type of emergencies to avoid the loss of property, human health or environment in and around the premises. An offsite emergency management plan involves government bodies as well as nearby industries for necessary help and to control the emergency.

7.7.5 Objectives of disaster management

- To control the incident or accidents from the happening
- To eliminate the emergencies if possible
- Prepare for the emergency handling
- To see whether required activities are performed in right order by the individuals or not
- To find out the required changes for coordinated activities
- To reduce the time of activities to control the emergencies
- To minimize the effects of the incident on person, property and environment
- Continuous improvement

7.7.6 Onsite Emergency Preparedness Plan

Main elements of on-site Emergency Preparedness Plans are:

- Leadership and emergency management cell

- Defined role and responsibilities of the key personnel
- Emergency actions to be executed by the Members of the Committee
- Protective and rescue equipment
- Medical care Unit
- Training and periodic review
- Periodical Mock drills, its monitoring and analysis to find out the short coming for the improvement
- List of available firefighting equipment, its maintenance and records
- Training to the committee members and feedback on requirements if any
- Line of command
- Requirement of Siren and alarm system
- Written document
- List of available resources with the Company
- List of resources available from outside during the emergency
- Important phone numbers of authorities

7.7.6.1 Disaster Management Cell

Disaster Management Cell (DMC) consisting of authorized head that will be responsible for the handling of emergency situations. All the details of team members will be available at the site; their contact details will be displayed in the plant and will be informed to other employees. DMC will make the employees to understand and aware about the hazards and associated risks that may give rise to an emergency situation at the plant. DMC will train and inform the employees regarding their role and responsibilities during emergency and dos and don’ts. Following team of personnel will be required to fulfill their responsibilities to tackle the emergency.

TEAM A

The distillery In-charge/Occupier along with manager of each section will be responsible for handling of any kind of emergency in the factory. They will inform the concern employees or authorities about the emergency situation and action that need to be initiated. They will take initiative in directing the action of the people.

TEAM B

After knowing the emergency situation, in-charge of individual section / department will communicate with In-charge **(Disaster Main Controller)** for any specific instruction and then he will guide other employees of the section to leave the workplace after taking safe shut down. They will be asked to assemble at Assembly point upwind of the Factory. After reaching the assembly points they should watch the activities undertaken by the Team A and wait for further instruction if any form the Manager. The Manager / Supervisor will act as an Incident Controller at his Section or the Emergency location and need to wait for further instruction from Disaster Main Controller

TEAM C

The maintenance In-charge and other maintenance head from each department such as Mechanical Engineering, Electrical Engineering, Instrumentation and Civil Engineering along with Safety and Fire will form this Team who will actually fight the situation to control the emergency. All the required equipment and firefighting accessories will be available to their disposal. They will have all safety appliances in their custody / use and they will act to minimize effect of incidence. They will keep informing the progress to DMC and for want of any help. After the emergency is under control, they will inform the DMC and DMC will inform all other Teams involved that emergency is under control. The DMC shall appraise the situation and if found Ok, he will inform control room to declare all clear sound / siren so that employees can resume the duties.

TEAM D

This Team is mainly concern with the security and outside news and will take the instruction from the DMC. It will consist of security department and welfare officer who will be available at the office with all necessary records including names of Team Members and other required help from outside. They will have the list of people along with their addresses and telephone numbers. They will keep the records of important offices of the Government authorities such as Directorate of Industrial Safety and Health, Boiler Inspector of factory, Commissioner of Police, local Police station, Fire Brigade, company Doctors, private Doctors and other important contact which will be helpful during and after the emergency.

All required facilities shall be made available at a particular location in the Factory for emergency use. All the personnel involved in emergency shall proceed or will be brought to

the factory. Based on the information gathered and provided by the incident controller of a particular section where there is emergency, if required emergency shall be declared by the DMC by giving instruction to Team D to sound the a particular Siren. After listening to the sound of Siren, concern person will understand the type and of emergency and will come prepared at the site of incident.

During emergency and as per the information received by the DMC from IC, the Team members from the Rescue team shall look out for the casualties if any on the site and will provided necessary help. The required medical and other help shall be provided based on the requirement and assessment of the gravity of the situation. The team will also carry out the head count if required and as per the instruction of DMC or the Occupier. Further, the detail shall be provided to outside agencies by the nominated authorized person from the Factory to avoid the mismatch of the situation so that right message goes to the media. During emergency, care shall be taken to avoid the panic situation within and outside the factory premises or in the general public.

7.7.6.2 Key Personnel

The actions necessary in an emergency will clearly depend upon the prevailing circumstances. Nevertheless, it is imperative that the required actions are initiated and directed by nominated people, each having specified responsibilities as part of coordinate plan. Such nominated personnel are known as Key Personnel.

The Key Personnel are:

- Site Controller (SC)
- Incidental Controller (IC)
- Liaison and Communication Officer (LCO)
- Fire and Security Officer (FSO)
- Team Leaders (TL)

7.7.6.3 Requirement of Equipment and Materials

- Based on actual assessment of emergency, there can be requirement of Extra First Aid personnel to deal with casualties and need to be provided from outside
- All types of PPEs

- Emergency engineering works, provision of extra or replacement of light, isolation of equipment, temporary by pass electrical lines etc.
- Assembly point, emergency control center, sign boards
- Moving Tankers or other vehicles from area of risk
- Fire protection and firefighting facilities
- Emergency lighting and standby power
- Emergency equipment and rescue equipment
- Material safety data sheets for hazardous chemicals
- Plan showing hazardous material storage area
- List of emergency equipment
- List of safety equipment
- List of important telephone numbers and addresses
  - Nearest hospitals and ambulance service center
  - Nearest fire station
  - Govt. Officials
  - Transport provider
  - Names and address & contact telephone number of key personnel

The onsite emergency plan will be documented and circulated to all concerned for knowledge, study, to understand and easy follow up. The emergency plan will be rehearsed and practiced at regular intervals i.e. Mock drills shall be conducted at suitable interval to test efficiency of plan, personnel, equipment and coordinated efforts to increase confidence level of personnel during emergencies.

7.7.6.4 Training

- Training on fire fighting
- Training on spill control
- Training on toxic release control
- Training on good housekeeping
- Training on use of PPEs

7.7.6.5 Communication

Following means of communication will be been made available,

- Telephones
- Walkie-talkies
- Mobiles
- Public announcement system
- Emergency Siren

7.7.7 Offsite Emergency Plan

In case the hazard spreads out-side the premises Team A under the instruction of DMC will communicate to the District Magistrate, Commissioner of the Police and inform the situation as Off-Site Emergency. Types of emergency facilities/actions required from outside bodies are,

- Firefighting facilities required: Factory will have its own firefighting facilities but during emergency, fire brigade may be called from nearby areas or other establishments
- Police help shall be required during emergency for control of people, traffic and security arrangements
- Medical help required: seriously injured personnel may be referred to the Hospital/Primary Health Centre depending upon injuries

7.7.8 Information to authorities

- Emergency situations will be informed to the local Panchayat official regarding the likely hazards from the industry and the steps to be taken when there is an Off-Site Emergency. It is preferable that the Local Panchayat Officials are also trained on simple protective methods through demonstrations and practice
- District Magistrate, Commissioner of the Police and District Control Room if exists

7.7.9 General Natural Disaster Management Measures

As Project site is located at Bedkihal, Tal. Chikodi, Dist. Belgaum. Seismic zone for the proposed project site comes under zone III (Moderate).

- Factory Management shall train their staff to manage emergencies arises from fire, flood, lightning and leakages.
- As soon as the emergency warning receives from District Disaster Management Authority, the raw material as well as finished products shall be kept to a minimum to avoid spillage or misuse

- All the material and products shall be stored properly to avoid the damage or mixing with other
- All the employees will have the list of important phone numbers and contact details to help in getting the required help in time. These numbers shall be displayed at distinct location within Factory premises
  - Company's designated person from Team A will be main contact person for all the employees for any type required help from outside
  - District level disaster management units
  - Health & Family Welfare
  - Medical
  - Nearest Fire station
  - Nearest Doctors & Ambulance
  - Forest & Environment department
  - Police Station
  - Village heads & Panchayat
  - Company's Emergency Management Cell Members
  - Transport
  - Electricity
  - PWD
  - Substation details from where Company takes power
  - Civil Supplies
  - Animal Husbandry
  - Agriculture

7.8 CONCLUSION

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

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

CHAPTER VIII PROJECT BENEFITS

CHAPTER VIII

PROJECT BENEFITS

8.1 INTRODUCTION

Project benefit chapter furnishes the benefits of the project towards the society. This chapter is intended to give improvements in the physical infrastructure, improvements in the social infrastructure, employment potential – skilled, semi-skilled and unskilled and other tangible benefit from this project.

8.2 PROPONENT APPROACH TOWARDS THE PROJECT

Venkateshwara Power Projects Limited is one of the units under the business group called **"Mahadik Business Group".** The other group activities of this group are milk diary, petroleum, transport, LPG &auto Engineering is based in Kolhapur District.

Mahadik Business Group of Shiroli (P), Kolhapur is in the different lines of business since last 25 years. The management is controlled by a single family. The founder Mr. M. R. Mahadik is the well-known personality of the Kolhapur. He has a very well connected socially in and around Kolhapur. He is Ex-MLC of Maharashtra for the last 12 years. His son Mr. Amal Mahadik is MLA currently. Mr. Mahadik's social and political work is appreciated in the region. Mr. Swroop Mahadik, son of Mr. Mahadik, a mechanical engineer is looking after Venkateshwara Power Projects Limited as a Managing Director. He is attached with this industry since its establishment and is techno-commercially sound.

The co-founder of the Mahadik Group Mr. Rajan Shinde, a commerce graduate is the Executive Director of the company. He has a wide experience and plays a leading role in the expansion of the different activities of the group.

The sugar factory is located in North Karnataka and close to the Maharashtra and Kolhapur Sate border. The sugar factory in operation since 2001 and co-generation is under operation since 2004.

VPPL is currently operating sugar factory with capacity 3500 TCD & 30 MW co-generation power at Sr. no. 164 to 170 & 85, Bedkihal, Tal. Chikodi, Dist. Belgaum, Karnataka.

VPPL is now desirous to establish a molasses based 90 KLPD distillery in the sugar factory premises.

8.3 PROJECT BENEFITS

8.3.1 Improvements in the physical infrastructure

The industry is established in the rural region of the state. The establishment of industry will provide direct and indirect employment to more than 70 local rural persons. Major part of these labors will be mainly from local villagers who are expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area.

It helps to sustain the development of this area including further development of physical infrastructural facilities

The following physical infrastructure facilities will improve due to proposed project.

- **Road transport facilities**

  The road connectivity will get improved due to the industry. This improved physical infrastructure will be an added facility to the community for surface transport.

- **Water supply**

  Efforts will be more focused on recycling of wastewater after adequate treatment. Thus water extraction for process will be minimized.

8.3.2 Improvements in the social infrastructure

- The industry will be established in the rural region and economically backward. Creation of job opportunity and other business activity will improve the economy and attitude of the public towards education and health. This may result in the creation of additional education and health care facilities in this rural area.
- The proposed project will change the pattern of demand of various items of food and non-food products. It will help to generate sufficient income to local people.
- Living in harmony is an important aspect of the society. This can happen only if, all the components are comfortably placed. Persons engaged in their respective vocation and accruing job satisfaction leads to this. This will become possible by this venture.
- Rural sector economy is generally growing slow because of lack of amenities and facilities. Proposed project helps to provide steady support of money-flow, such utilities can come to that area and sustain.
- This improved physical infrastructure will increase purchasing power of the farmers. They will be able to invest in modern agricultural practices.

- It will develop economy brings with literacy and healthy living. Ultimately educational and health level will increases, if there is confirm income source.

8.3.3 Employment Potential

- The industry will be established in the rural region of the state.
- The industry will provide skilled, semi-skilled, unskilled people, direct and indirect employment to more than 70 local rural persons.
- It can be stated that by this activity employment potential is certainly increasing in all walks of life – skilled, semi-skilled and unskilled.

8.3.4 Advantages of Distillery

- The importance and utility of alcohol is well known as an industrial raw material for manufacture of a variety of organic chemicals including pharmaceuticals, cosmetics, polymers etc.
- Alcohol is a potential fuel when blended with petrol. In the presence of ethanol, petrol burns with more efficiency and low toxic smoke.
- Alcohol is an eco-friendly product and is a substitute to the imported petroleum.
- As sugar cane cultivation is enhances in the country, the production of molasses from the sugar industry has greatly increased.
- Establishment of distillery will enable sugar factories to give better prices to the farmers supplying sugar cane.

CHAPTER IX

Environment Cost Benefit Analysis

CHAPTER IX

ENVIRONMENT COST BENEFIT ANALYSIS

9.1 INTRODUCTION

This chapter provides information about benefits of the proposed project to the environment. Project is aimed to fulfill the objective of sustainable development. In what way and to what extent this will reach is submitted herein below.

9.2 ENVIRONMENTAL BENEFITS

- Alcohol is well known as an industrial raw material for manufacture of a variety of organic chemicals including pharmaceuticals, cosmetics, polymers etc.
- A large demand is anticipated for alcohol as a fuel. Alcohol is an eco-friendly product and is a substitute to the imported petroleum.
- Indeed fuel ethanol production has been promoted for a variety of reasons as mentioned below,
  - It has less severe impact on the environment than conventional gasoline and less dangerous to health. As oxygenates are compounds such as alcohols or ethers which contain oxygen in their molecular structure. Oxygenated fuels tend to give a more complete combustion of its carbon to carbon dioxide (rather than monoxide) which leads to reduced air pollution from exhaust emissions.
  - It reduces the dependence on oil imports.
  - It helps to maintain rural economy.
- Factory proposes zero liquid discharge method for waste water treatment. Maximum waste water will be recycled back into the system.
- Factory proposes to install Multiple Effect evaporator followed by Incineration boiler. Advantages are as follows
  - Production of steam and power generation
  - Reduction in air pollution as compared to coal based boiler.
  - Reduction in water pollution and achieve zero discharge in inland surface water.

CHAPTER X

ENVIRONMENT MANAGEMENT PLAN

CHAPTER X

ENVIRONMENT MANAGEMENT PLAN

10.1 INTRODUCTION

Environment Management Plan (EMP) is a system to address potential adverse impacts, to instruct project proponent to introduce standards of good practice to be adopted for all project activities. EMP is a site specific document for the project, to ensure that the project will be implemented in an environmentally sustainable manner and where all concerned persons of the industry as well as contractors, understand the potential environmental risks arising from the proposed project to implement appropriate actions so that risk can be managed properly. Detail description pertaining to identification of pollution sources, its assessment and related impact along with mitigation measures are given in Chapter IV.

In this chapter all the required details of Environment Management Plan and its implementation is given for identified impacts. Similarly, various systems and their functions are also given.

10.2 OBJECTIVES OF EMP

1. To control the pollution by implementing environment management plan all environment aspects such as air, water, noise and soil.
2. To ensure health & safety of human beings, plant and machinery by adequate risk & hazard management to protect the environment in general.
3. To comply with all regulations stipulated by Central /State Pollution Control Boards so that environment is protected from the adverse impact of various plant activities.
4. Contribute to sustainable development.
5. To plan and implement CSR activities to take care of stakeholder and their socioeconomic status and to bring improvement in the nearby area.

10.3 ENVIRONMENT MANAGEMENT PLAN FOR CONSTRUCTION PHASE

Anticipated environmental impact due to proposed project during construction phase has been discussed in chapter IV along with mitigation measures. To implement the identified mitigation measures effectively, following environmental management plan is prepared and presented below to mitigate adverse impact.

- Minor vegetation clearance will be required at site along with soil excavation. However identified impacts would be of temporary type and within the plant boundary. Excavated soil will be covered with tarpaulin sheet or shall be kept in such way that dust emission will be avoided.
- During transportation of Men, Machine and Materials, care shall be taken to avoid spread of particular matter into the air.
- Regular sprinkling of water around vulnerable areas of the construction sites to control the dust spread or emission into the atmosphere
- Green belt area shall be developed to reduce air and noise pollution impacts
- All Equipment and Machinery to be used for the construction activities shall be in good condition and need to operated and maintained properly to avoid the emission of pollutants
- All Vehicles to be used on the site shall be PUC certified and well maintained
- No idling of Machine shall be allowed during construction activities
- Night time construction activities and vehicular movement shall not be allowed
- Personal Protective Equipment like ear muffs or ear plugs, masks etc. will be provided to workers who will be exposed to high noise.
- First Aid facilities shall be made available during construction.
- All necessary infrastructural services like water, drainage facilities and electrification will be provided as per requirement
- Drainage network will be properly channelized. Storm water drainage will be developed properly. This network will be checked & maintained regularly.

10.4 ENVIRONMENT MANAGEMENT PLAN FOR OPERATION PHASE

Factory proposes comprehensive environment management plan to combat pollution arising from the project activities. Detailed EMP is described below for various environmental parameters.

10.4.1 Air Pollution Management

- Baseline ambient air quality monitoring has been carried out during the month of Oct 2016 to Dec 2016. It is observed that the concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NOx are well within the prescribed limits as per the National Ambient Air Quality

Standards. The major sources of air emissions from the proposed projects include non-point and point source emissions.

- The major sources of air pollution from the proposed projects will be from flue gas emission, process emission and vehicular emissions. The emission details from the stacks are given in Table 10.1 and emissions from the various processes are described in Table 10.2.
- Electrostatic Precipitator will be provided as air pollution control equipment for proposed distillery. Existing sugar and cogeneration boilers are attached with Venturi Wet Scrubber. The emissions from the boiler are passed through ESP before releasing into atmosphere through the Stacks. The proposed distillery stack heights of 62 m will be provided for proper dispersion of the air pollutants. Existing stack of sugar and cogeneration is 65 m and 75 m respectively.
- Fly ash collection system will be installed with ESP. Process flow diagram of ESP is given in Fig. 10.1. Details of ESP are attached in **Annexure.** Fly ash will be collected through ESP and collected ash will send to brick manufacturer. Bag filters/ dust collectors and proper ventilation will be installed wherever particulate matter emission is likely to be occurred.
- To control the vehicular pollution, control measures will be implemented such as periodical check of Vehicle for its fitness and PUC certificates. Observance of periodical maintenance schedule and its proper implementation.
- Factory is planning to installed CO_2 recovery plant. Details of the same are attached in **Annexure**

Table 10.1: Stack Emission

S. No.	Particulate	Existing		Proposed
		Sugar Factory	Coge.	Distillery
1.	Boiler capacity	70 TPH	80 TPH	30 TPH
2.	Fuel consumption	Bagasse	Bagasse	Concentrated spent wash and Coal
3.	Stack height	65 m	75 m	62 m
4.	Diameter	2.8 m	2.8 m	1.67 m
5.	Stack gas exist velocity	9.17 m/sec	8.80 m/sec	18 m/sec
6.	Stack gas temperature	156 ^{0}C	149 ^{0}C	180^{0}C
7.	Flow rate	-	-	97500 Nm^3/sec
8.	SO_2 emission rate	11.03 mg/Nm^3	11.49 mg/Nm^3	1100+/- 25

				ppmv on 7% O_2 dry
9.	NO_x emission rate	21.66 mg/Nm^3	22.15 mg/Nm^3	300 g/sec
10.	PM10 emission rate	143.3 mg/Nm3	146.31 mg/Nm3	50 mg/Nm3

Table 10.2: Process emission

Sr. No.	Description	Process emissions
1.	Fermentation	CO_2, VOC, alcohol vapor
2.	Distillation	VOC, alcohol Vapor
3.	Molasses and spent wash	Odor

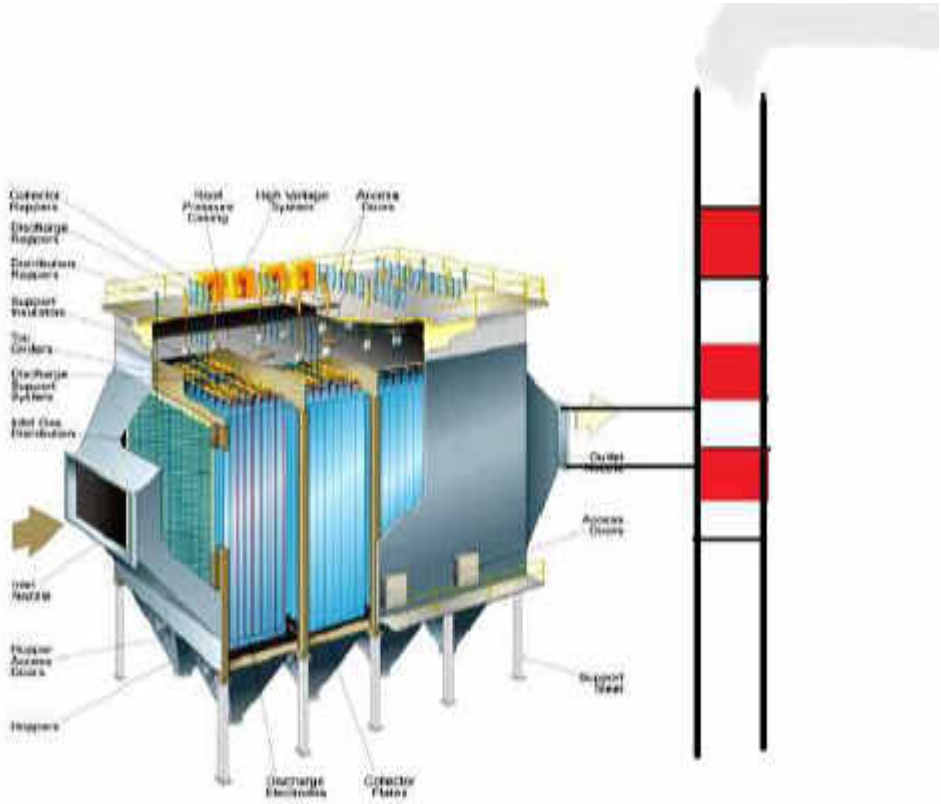


Figure 10.1: Schematic diagram of electrostatic precipitator

10.4.2 Noise pollution management

- Construction work shall be carried out during day time only.
- The workers working near noise producing machineries or noisy areas shall be provided with ear plugs / muffs.
- Construction equipment and vehicles shall be maintained in good running condition.
- Noise producing machinery shall have acoustic enclosures / acoustic rooms to reduce the noise levels.

- Roads need to be maintained in good condition to reduce the noise as well as dust emission due to traffic.
- Green belt shall be developed in and around the project site which will help to reduce the noise pollution.

10.4.3 Waste water management

- Sadalga Barrage of Doodhganga River will be the main source of fresh water for different activities of the project during construction and operation phase. Necessary permission for water extraction is available with the factory. VPPL planning to proposes rainwater harvesting.
- It is estimated that around **1527** CMD of water shall be required for initial startup and thereafter intake of fresh water will be reduced due to use of recycled water. During operation, steam condensate will be recycled back into the process. Around **888** CMD of water will be recycled and remaining quantity of **639** CMD will be required on daily basis as fresh water. Water and wastewater balance is given in Table 10.3 and flow chart for of wastewater generation and its recycling is described in Fig. 10.2.
- Waste water generation from existing sugar and cogeneration unit and ETP for sugar factory is given below.
- Sewage will be dispose through septic tank via soak pit.

- The process condensate effluent from evaporation processes shall be treated Process Condensate Treatment Plant and the details are attached in **Annexure XVI**
- The industry will have integrated evaporation followed by spent wash fired boiler system as effluent treatment. Spent wash coming out of distillation section will be subjected to integrated evaporation followed by spent wash fired boiler. The process condensate Treatment Plant will be provided to treat the process condensate from evaporation. **CPU details are attached in Annexure XVI.** Cooling tower and boiler blow down will used for green belt irrigating on 5.0 COC. Boiler blow down can be used for cooling tower.
- Total daily fresh water requirement for current Sugar and Cogeneration project is 340 CMD. For initial startup of sugar unit water requirement is 2575 CMD.

Table 10.3: Quantification of water and wastewater generation

Sr. No.	Water inputs	CMD
1.	Process water for fermentation section and CO_2 scrubber	705
2.	DM water for RS dilution	100
3.	Water for vacuum pump, pump sealing, air blower & others	12
4.	Soft water makeup for cooling towers	600
5.	Other domestic usage, laboratory uses, cleaning	10
6.	Boiler	100
7.	Total water input at start-up	**1527**
	Water out Put	
1.	Spent Lees (PR & Rect.)	225
2.	Process condensate	651
3.	CT Evaporation & Drift Losses	540
4.	Water losses from vacuum pump, pump sealing, Air blower	11
5.	Cooling tower and boiler blow down	100
6.	**Total Water Output**	**1527**
	Recycled water	
1.	Lees recycle for cooling tower make up	225
2.	Process condensate fermentation	432
3.	Process condensate to cooling tower, CIP, Fermentation	219
4.	Pumps Sealing Water Recycle to pump	11
5.	CO_2 scrubber beer well to process water for fermentation	1
6.	**Total Recycling water per day**	**888**
	Daily fresh water input	**639**

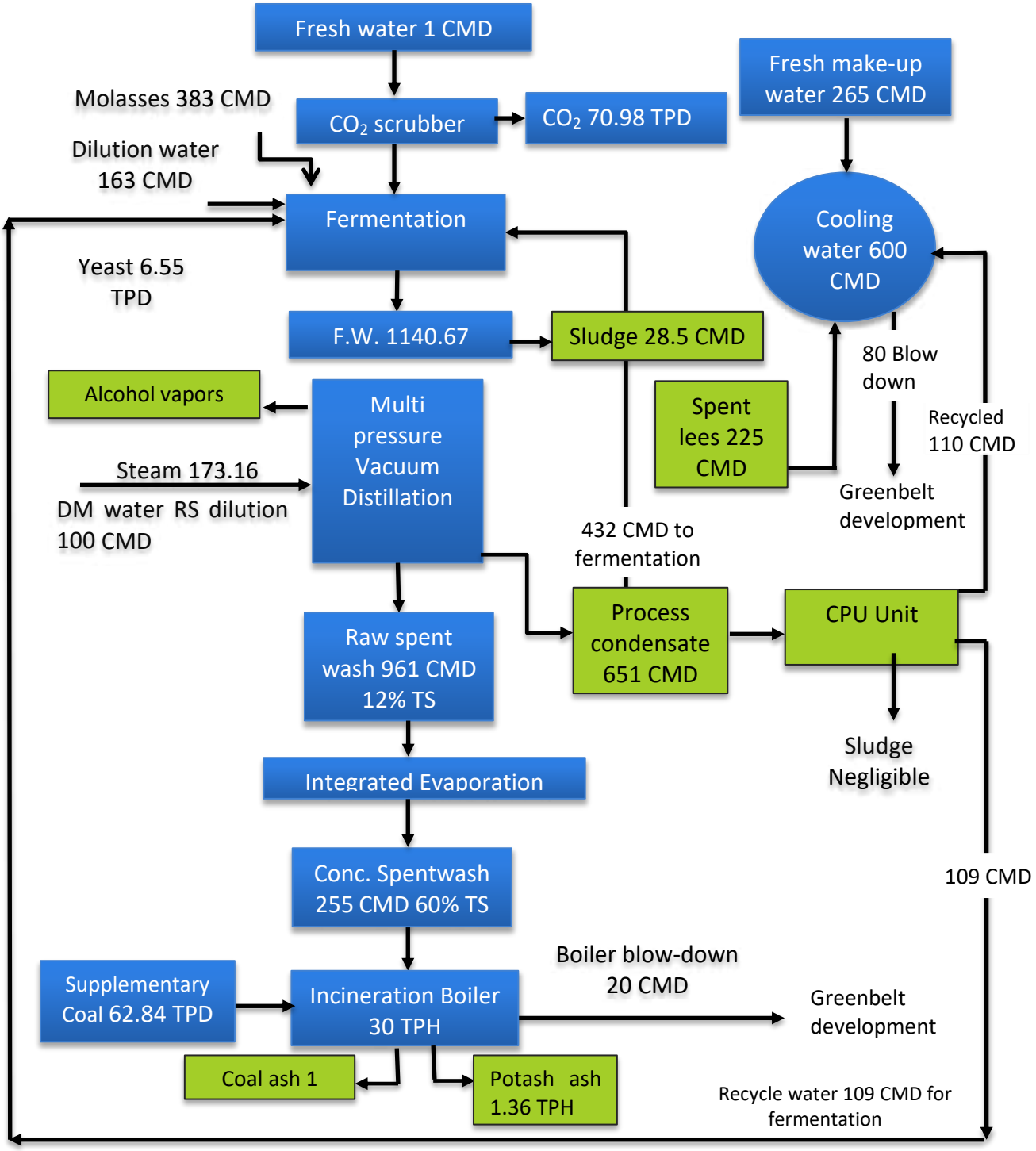


Figure 10.2: Water and mass balance chart

Table 10.4. : Existing Wastewater generation from sugar and cogeneration

Sr. No.	Source	CMD	Treatment	Final Disposal
1.	Sugar Plant	317.8	ETP Treatment Units: Bar screen and grit chamber, oil and grease traps, reaction tank, equalization tank, anaerobic tank, aeration Tank I, aeration Tank II, secondary clarifier, sludge drying bed and polishing pond. For polishing pond for dilution with other effluent and	For ferti irrigation.

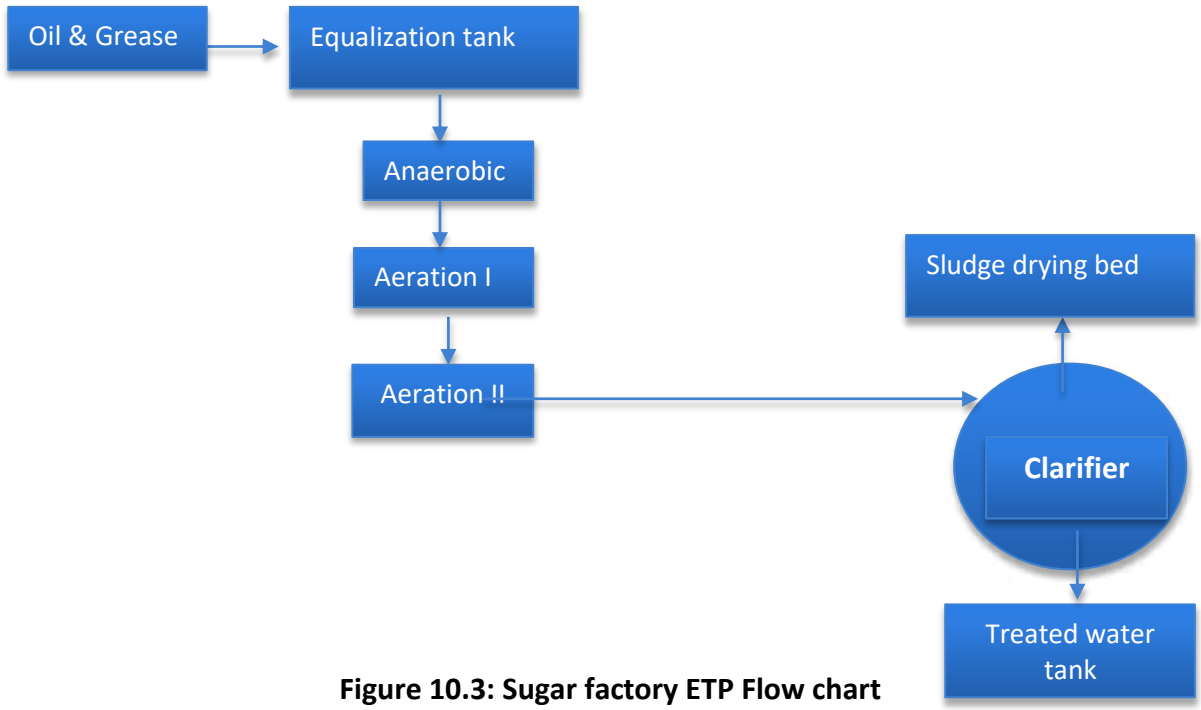


Figure 10.3: Sugar factory ETP Flow chart

ETP Units

- Grit Chamber
- Screen – V Notch
- Oil and grease Trap
- Equalization and Neutralization: 180 m3
- Anaerobic tank: 1047
- Aeration Tank I: 484 m3
- Aeration II: 732 m3
- Clarifier: 1 No's 9 m Dia X 2.5 m SWD with 0.5 Free Board with mechanical scrapper
- Sludge Slump: 1 No's : 30 m3
- Sludge Drying Beds: 2 No's5m X 5m X 1.0m
- Finial Treated Tank : 1 No': 1064 m3

10.4.3.1 Spent wash storage lagoon details

- Storage lagoon capacity: Five days.
- Preparation of embankment in soil for all four sides 1:2 slopes to be maintained.
- Proper compaction.
- Laying of 250 micron thick HDPE sheet
- Flat brick lining over HDPE sheet for bottom and slopes in cement mortar 1:5 with pointing.
- Construction of the wall to avoid underscoring of the embankment during heavy rains.
- Lagoon top with bricks on edge in cement mortar 1:5.
- Two coats of coal tar epoxy paint (120 micron total)
- Provision of fencing around the lagoon to prevent entry of trespassers and stray animals

10.4.4 Land Environment / Solid hazardous waste management

- The zero discharge system will be implemented for proposed molasses based distillery.
- Mainly, Yeast sludge shall be the main source of solid waste generation. Apart from this, ETP sludge, Boiler ash, spent oil and discarded Container will be generated. Details of solid / hazardous waste generation and its disposal are mentioned in Table 10.5.
- Coal ash from the boiler will be sold to the brick-manufacturing unit. Spent wash ash will be sold to farmer as it is rich in potassium.
- The Yeast sludge and sludge from ETP can be used as manure

Table 10.5: Quantification of Solid Waste

Sr. No	Solid Waste	Quantity	Disposal
1.	Yeast sludge	28.5 TPD	Shall be used as a manure
2.	Ash	Coal ash: 22-24 TPD Spent wash ash: 29-30 TPD	Spent wash ash is potash rich ash and can be use directly use as manure. Ash will be store in the ash silos, Coal ash will be separately collected in the ash silos and sent to brick manufacturer. Fly ash will be collected through ESP and collected ash will send to brick manufacturer.
3.	Domestic waste	25-30 kg/d	Local waste collection system

Sr. No	Solid Waste	Quantity	Disposal
4.	Oil from DG	Negligible	To authorized dealer or mixed with coal and burnt in the boiler. Hazardous waste manifest for Used oil from exiting sugar factory is attached in **Annexure**
5.	Discarded drums and containers	Negligible	Will be sold to authorized Recyclers

10.4.5 Greenbelt development

Development of greenbelt in and around the industrial complex is an effective way to attenuate air pollution. The degree of pollution attenuation depends upon height, width, foliage, surface area of leaf and density of planted trees. Greenbelt will be developed as per CPCB guidelines. VPPL proposes to develop a green belt in 2.3 acres of land. The Layout of proposed greenbelt development is shown Figure 10.6.

10.4.5.1 The objectives of the proposed greenbelt development will be,

- Mitigate impact due to dust emissions
- Control and assist to mitigate odor and air pollution impacts
- Create an aesthetic environment
- Enhance the bio-diversity of the vicinity
- Prevent soil erosion and surface run-off
- Spatial-visual separation of larger parts of the premises
- Entrance and roadside greenery helps in separating the main industrial structures
- Provision of greenery along all interior pedestrian network

10.4.5.2 Selection of plant species will be based on the following characteristics

- Fast growing
- Thick canopy cover
- Perennial and ever green
- Large leaf area
- Preferably Indigenous
- Resistant to pollutants and should maintain ecological balance for soil and geo hydrological conditions of the region.

Approximately more than 1000 Trees shall be planted around the proposed distillery unit and around the existing sugar and cogeneration unit. Factory has already started extensive tree plantation. Photographs of tree plantation are given below. Factory has run the tree plantation program and planted more than 4000 trees in and around the factory. The plant species will be selected according to CPCB guidelines and pollutant tolerance capacity of specific Tree. Large trees will be planted along the boundary of the project and planted in the initial phase of construction. Shrub and medium growing Trees will be planted along the road side. Plantation inside the project boundary will be done after completion of inside construction. Tree plantation with location and numbers are given in Table 10.6. List of recommended Tree species for greenbelt development is given in Table 10.7.

Table 10.6: Tree Plantation

Sr. No	Location	Type	Tree density	Trees interspacing
1.	Boundaries of small units, landscape area	Shrubs, small and medium Trees	20-25	3 x 3 m
2.	Boundaries of units/internal road sides	medium to large size Trees	7-10	5 x 5 m
3.	Around the industry	Large trees /Large canopy trees	1	1.5 m X 1.5 m or 2.5 m X 2.5 m
4.	Road sides	Large size Trees	5-6	20-25 m

Table 10.7: Trees recommended for Greenbelt Development

Sr. No.	Botanical Name	Local name	Type	Location
1.	*Terminalia arjuna*	Arjuna	T	Around the industry or Avenue plantation
2.	*Terminalia elliptica*	Ain	T	Around the industry or Avenue plantation
3.	*Millingtonia hortensis*	Indian Cork		Around the industry
4.	*Tamarindus indica*	Chinch	T	Around the industry
5.	*Azadiracta indica*	Neem	T	Around the industry or Avenue plantation
6.	*Bauhinia purpurea*	Kanchan	T	Around the industry
7.	*Bauhinia variegata*	-	T	Around the industry or Avenue plantation
8.	*Emblica officinalis*	Avala	T	Avenue plantation / around the units
9.	*Erythrina indica*	Indian Coral	T	Around the industry or

Sr. No.	Botanical Name	Local name	Type	Location
		Tree		Avenue plantation
10.	*Ficus glomerata*	Cluster fig Tree	T	Around the industry or Avenue plantation
11.	*Ficus religiosa*	Peeple	T	Around the industry or Avenue plantation
12.	*Ficus benjamina*	Weeping fig	T	Around the industry or Avenue plantation
13.	*Michelia champaca*	Champak	T	Internal road of industrial complex/ ETP
14.	*Polyalthia longifolia*	Ashoka	T	Around the industry or Avenue plantation
15.	*Aegle marmelos*	Bel Tree	T	Around the industry
16.	*Butea monosperma*	Palash	T	Around the industry /ETP/ Avenue plantation
17.	*Ravenala madagascariensis*	Travellers palm	T	Around the industry /Avenue plantation/ industrial units
18.	*Pongamia pinnata*	Karanj	T	Around the industry /Avenue plantation/ industrial units/ETP
19.	*Dalbergia sissoo*	Sisoo	T	Around the industry /Avenue plantation
20.	*Cassia fistula*	Bahava, Amaltash	T	Avenue plantation, around the units, ETP and open plots
21.	*Caesalpinia pulcherrima*	Shankasur	T	Avenue plantation, around the units and open plots
22.	*Alstonia scholaris*	Saptaparni	T	Avenue plantation, around the units/ETP and open plots

Table 10.8: Flowering and foliage shrubs recommended for greenbelt

Sr. No	Flowering plant (Shrubs)	Location
1.	*Palm spp.*	Potted plants/ Internal roads/open plots
2.	*Ixora Spp.*	Internal roads/open plots/ around the units
3.	*Tabernaemontana divaricata (Tagar)*	Avenue plantation, around the units, ETP and open plots
4.	*Cassia biflora*	Avenue plantation, around the units, ETP and open plots
5.	*Calliandra haematocephala (Powder puff)*	Avenue plantation, around the units, ETP and open plots
6.	*Nerium oleander (Nerium)*	Avenue plantation, around the units, ETP and

		open plots
7.	*Allamanda cathartica (Alamanda)*	Avenue plantation, around the units, ETP and open plots
8.	*Plumbago zeylanica (Plumbago)*	Avenue plantation, around the units, ETP and open plots
9.	*Hemalia petans*	Avenue plantation, around the units, ETP and open plots
10.	*Vinca rosea*	Avenue plantation, around the units, ETP and open plots
11.	*Cestrum nocturnum (Night Jasmin)*	Avenue plantation, around the units, ETP and open plots
12.	*Canna indica*	Avenue plantation, around the units, ETP and open plots
13.	*Chrysanthemum indicum*	Avenue plantation, around the units, ETP and open plots
14.	*Muscanda spp.*	Avenue plantation, around the units, ETP and open plots
15.	*Hibiscus spp.*	Avenue plantation, around the units, ETP and open plots
16.	*Jasmin Spp.*	Avenue plantation, around the units, ETP and open plots
17.	*Powder puff spp.*	Avenue plantation, around the units, ETP and open plots

10.4.5.3 Tree Plantation Planning

The plantation programs have to be implemented in phase wise manner. To ensure the effective plantation of various kinds of trees, a four year plantation programs with number of Tree/ shrubs to be planted is given below in **Table 10.9**

Table 10.9: Tree Plantation Program

Sr. No.	Year	Greenbelt area (acres)	Total plants	Location
1	2017	1	1000	Around the industry in first tier
2	2018	0.5	1000	Around the industry in second and third tier
3	2019	0.3	1000	Around the units and internal road side

More than 1000 plants shall be planted in the span of three year plantation program. Required nutrients / water/ manure and protection shall be provided. Water requirement for the proposed greenbelt will be met from treated water from existing sugar factory and

Distillery cooling tower and boiler blow down. Plantation is suggested in three tier sysytem aorund the factory. Anticipated total lenth of three tier will be 8-10 m. Schematic of Three plantation is shown in below mentioned figure.

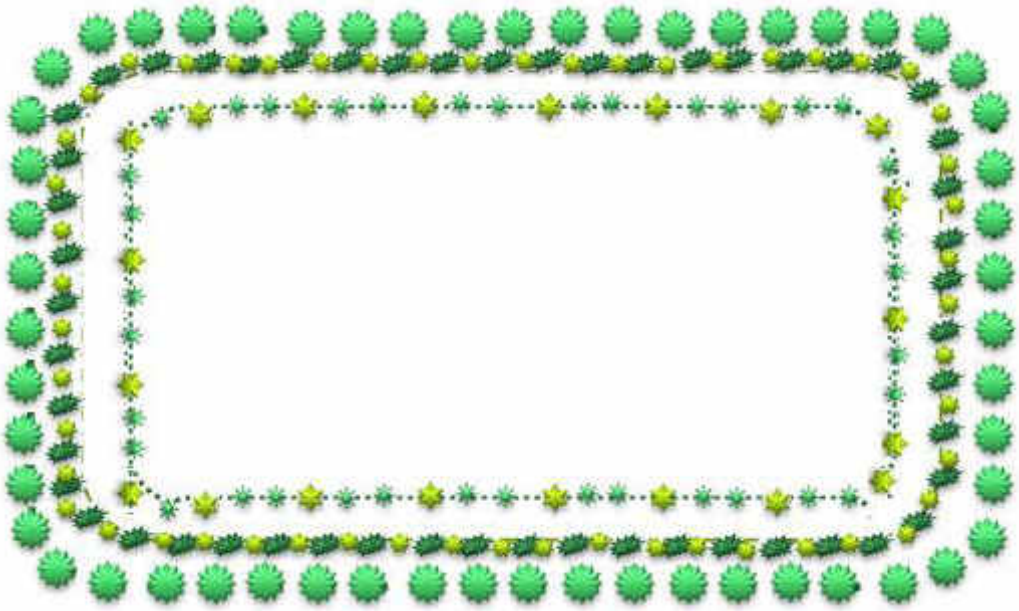
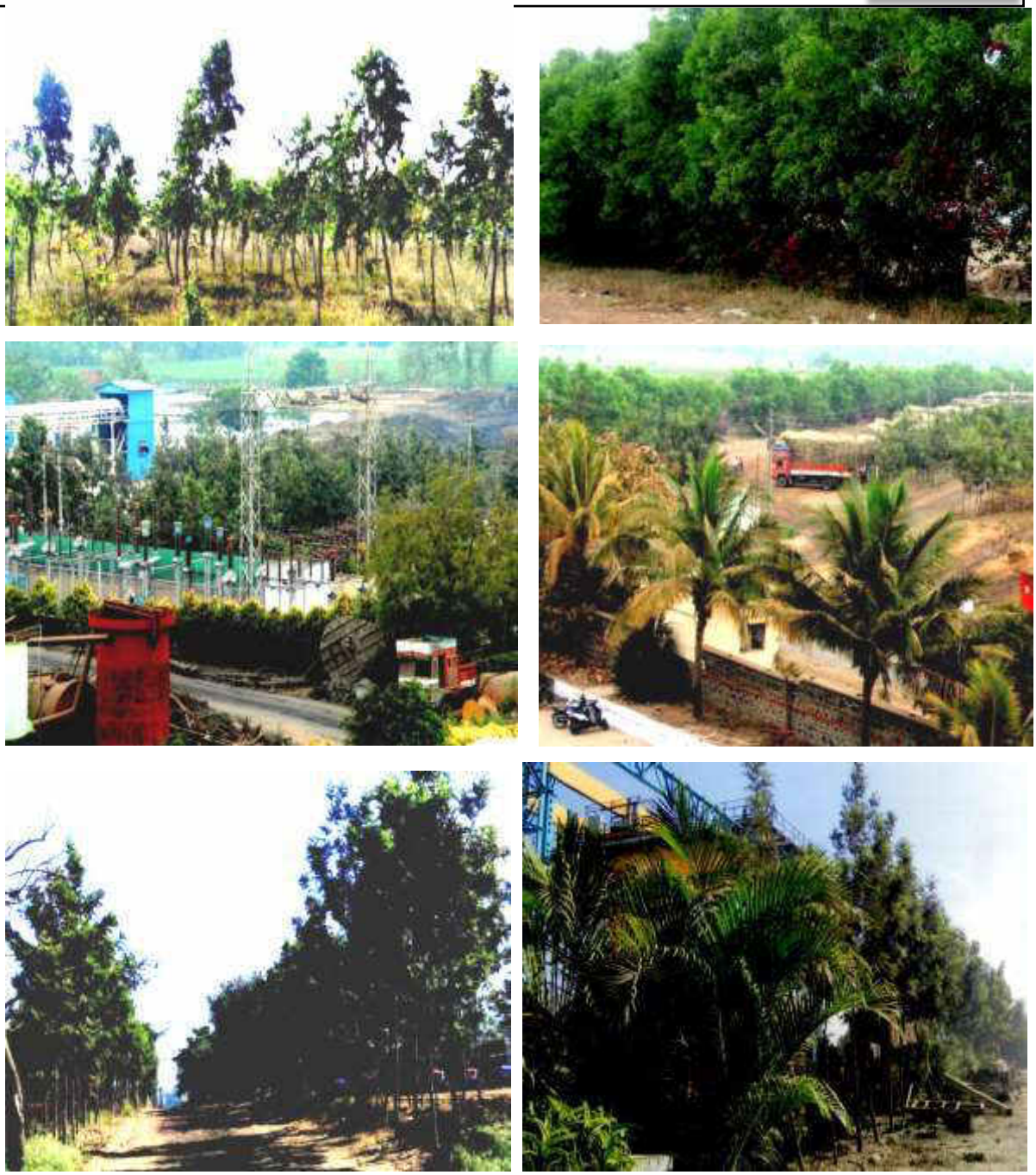


Figure 10.4 Schematic of green belt development



Photographs 10.1: Existing greenbelt development and tree plantation program

10.4.6 Odor Management Plan

Anticipated odor generation sources will be molasses, fermentation unit, spent wash, ETP septic tank, Yeast storage & ETP sludge.

Following control measures shall be implemented to avoid the odor in the atmosphere:

- Better house-keeping
- Whole process is work under closed conditions, close pipeline.

- Spent wash from evaporation would be in a closed tank and directly send to the incineration in boiler.
- No bio-methanation will be adopted.
- Fermentation unit will be provided with proper cover to avoid the spread of odor and regular steaming of all fermentation equipment's; temperature will be kept under control during fermentation to avoid inactivation/killing of yeast; staling of fermented wash would also be avoided.
- Use of mill sanitation biocides to minimize the growth of aerobic /anaerobic micro–organisms.
- Regular use of bleaching powder in the drains to avoid generation of putrefying micro-organisms.
- ETP and Yeast sludge will be used as manure.
- Steaming of major pipelines
- Proper operating condition will be maintained.
- Proper cleaning of drains.
- Efficient operation of ETP.
- Well planned Greenbelt will be developed in and around the plant premises to suppress the odor.

10.4.7 Management of traffic

- The site is adjacent to SH-97 and connected to it.
- There will be enough space for movements of vehicles and parking.
- The traffic management on the project site will be easily and smoothly monitored without any hindrance to the regular flow of traffic on the main road.
- Flow of traffic is eased out by providing adequate entries and exits from parking areas

10.4.8 Rain water harvesting

Objectives:

- To arrest ground water depletion and to augment ground water table
- To improve the water quality of Aquifers

- Rain water harvesting will be an important activity to conserve the rainwater for reuse and thus reducing the overall raw water consumption for the plant. Rain water harvesting aids in meeting the non-potable water usage like
- Water for gardening
- Water for sprinklers to suppress the dust

Rainwater Harvesting Management

Water harvesting potential

The quantum of water that could be generated in the Plant area is calculated using the formula:

Volume of Runoff generated = Area (m^2) X Runoff Coefficient X Annual Rainfall (m)

For the area it has been calculated to be 75918 m^3 per annum, considering an average annual rainfall of Chikkoldi Tehsil is 678.6 mm within a time span of 90 days of monsoon. Calculated rainwater harvesting potential during rainy days will be around 19174 CMD.

Table 10.10: Annual Rain Water Harvesting Potential

Sr. No.	Type of Runoff Catchment Area	Effective Area (m^2)	Runoff Coefficients	Volume (m^3)
Rainwater Harvesting				
1.	Roof Top Area	23338	0.75	11877.875
2.	Roads + Paved Areas	18050	0.5	6124.365
3.	Green Area	34530	0.05	1171.6029
4.	Barren + Open area		0.1	0
5.	**Total**	76890		19173.843

(Note: Rainfall data source:http://cgwb.gov.in/district_profile/karnataka/belgaum_brochure.pdf)

10.4.9 Occupational Health and Safety (OHS)

The main aim of occupational health and Safety will be to take care of Employees and plant and machinery to avoid any type of harm to human beings and environment. It will also be to provide safe workplace to the employees and workers working in the plant. It is the responsibility of the management to provide safe workplace so as to avoid any type of incidence or accident at the workplace due to malfunctioning of any type of equipment or units. By having safe and healthy work environment, the employees will provide work safely so that their family members, employers, customers, and others will be protected from the indirect adverse effects.

Following control measures will be taken for the employees and workers engaged in work:

- Personal protective equipment's will be provided to all concern staffs and workers.
- All safety signs will be placed at proper location
- First aid kits will be made available at every department
- Medical checkup at regular intervals for monitoring of health status of all workers
- Work permit system will be introduced to avoid un-authorized person's entry
- Fire hydrant system, fire extinguishers will be provided at specific locations
- All staff and workers will be trained to fight the emergency situation
- Good housekeeping also plays important role in avoiding the undesirable incidences. Therefore, good housekeeping practices will be employed.

Facilities such as provision of good quality water, sanitation and clean room for eating and resting shall be provided. It is evident from the project details that the risk or accidental spillage of chemicals may cause ill effects on the health of employees involved. In view of the effect on the health of workers from various activities and exposure during the work, required mitigation / control measures shall be implemented to reduce the associated risk and hazards.

10.4.10 Socioeconomic Development

Proponent is planning to implement the CSR activities for the nearby areas like infrastructure facility development, to make the provision of health and sanitation facilities in the required areas after talking to the gram panchayat or local people. VPPL has already identified certain areas where CSR activities. The company is planning to spend at least Rs. 2.5 cr., which is about 2.5% of project cost (Rs. 103.73 crore) within a period of five years. The time bound action plan for implementation of CSR activities is given in Table 10.11.

Proposed CSR activities:

- Tree plantation with tree guards and maintenance as per green belt development guideline
- Construction village roads in the locality
- Renovation of school building
- Furniture facility for Z.P. school
- Implementation of Different schemes for women empowerment in the study area
- Scholarships for students
- Arrangement of Books for School Children
- Computers for all Z. P. school so as to improve the educational level

- Lighting by CFL bulb / solar street lamps in villages.
- Construction village roads in the locality
- Free health camp
- Drinking water facilities

Table 10.11: CSR Activity Action Plan

CSR activity	2017-18 (Lacs)	2018-19 (Lacs)	2020-21 (Lacs)	2022-23 (Lacs)	2024-25 (Lacs)	Total Investment (Lacs)
Tree plantation	2	1.5	0.5	0.5	0.5	5
Lighting by CFL bulb/ Solar Light	3.5	2.5	1.5	1	1	9.5
Free health camp	6	3	2	2	2	15
Construction village roads in the locality	25	25	20	10	10	90
Renovation of school building	15	10	10	8	8	51
Computers for all Z. P. school	10	5.5	3.5	3.5	2.5	25
Scholarships for students	2.5	2.5	2.5	2.5	2.5	12.5
Books for School Children	1.5	1.5	1	0.5	0.5	5
Provision of computers in schools	3.5	3.5	3.5	3.5	3.5	17.5
Construction of toilets	2.5	1.5	1	1	1	7
Drinking water facilities	5	3	2	1.5	1.5	13
Total	**76.5**	**59.5**	**48**	**34**	**33**	**250.5**

10.5 ENVIRONMENT MANAGEMENT CELL (EMC)

The EMC will be developed to co-ordinate the project activities in an environmentally friendly manner without harming human health or the environment. The main aim of EMC shall be the effective implementation of environment management system during construction and operation phase. In the EMC, all HODs will be included so that they can co-ordinate the activities in effective way or as per the standard laid down norms. The EMC will monitor the general and preventive maintenance of pollution control system / equipment undertaken by the maintenance department to achieve optimum efficiency. The EMC will co-ordinate all the activities of the plant and process in an environment friendly manner to avoid any type of adverse effect on the human health or the environment. Structure of EMC is given in below table

Table 10.12. : EMC cell structure

Sr. No.	Designation	Responsibility
1.	Chairman	Managing Director
2.	Coordinator/Environmental officer	Environmental Engineer ETP in charge/EHS officer
3.	Members	Distillery Manager, Chief Engineer, Chief Chemist, Civil Engineer, H. R. Manager, ETP quality control.

10.5.1 Responsibilities of Environmental Management Cell

The EMC has the responsibility to supervise all the activities in the plant to ensure that those are being carried out as per the standard operating procedure to avoid any type harm to the environment. The EMC also undertake periodical monitoring or survey of various environmental parameters including monitoring and analysis of effluent, air, water and noise to ensure that these parameters are maintained within the prescribed limits. If any deviation observed, they will inform to initiate corrective action by the concern department or they will do themselves if required.

They also undertake the physical survey of the green belt to ensure required growth and survival rate of the plant. They will also inform the concern department for corrective action if any to have proper growth of the plants.

- **Environmental monitoring:** EMC will ensure that pollution is well below the prescribed limits or there is no much difference between the present concentrations and baseline data. If wide difference is observed then they will need to initiate required corrective action either by optimizing the treatment process or by providing equipment or improving the performance of existing pollution controls equipment. In case the results indicate parameters exceeding the prescribed limits, remedial actions will be taken through the concerned plant people. The actual operation and maintenance of pollution control equipment will be the responsibility of respective department head or a plant in charge.
- **Legal and statutory compliance:** EMC will also supervise the work of other department pertaining to the activities of preparation of environment statement report, environment audit, Water Cess return and consent application as per the requirement

- under various Rules and regulations. They will also guide the HODs of individual department to fulfill the statutory requirements under various acts and applicable rules. Following Rules shall be applicable to the facility:
  - The Water (Prevention and Control of Pollution) Act, 1974,
  - The Air (Prevention and Control of Pollution) Act, 1981
  - Hazardous and Other Waste (Handling and Trans-boundary Movement) Rules, 2016
  - The Environment Protection Act, 1986.
- **Documentation**: The cell will also be responsible for maintaining the records of data, documents and information in line with the legislative requirement and will regularly furnish the same to the concern statutory authorities.

10.6 POST CLEARANCE MONITORING PROTOCOL

- After grant of environmental clearance by the MoEFCC, half yearly compliance reports will be submitted in hard and soft copies to the concerned regional MoEFCC office on 1st June and 1st December of each calendar year with respect to EC conditions. All such compliance reports submitted will be the public documents. Copies of the same will be made available to the stakeholder upon the request.

10.7 ENVIRONMENT MANAGEMENT COST

- Estimated cost of EMP will be Rs. 273 lakhs

Table 10.13: EMP cost bifurcation

Sr. No	Description	Capital Cost (Rs. in lakhs)	Recurring Cost (Rs. in lakhs)
1.	Air Pollution Control	100	10
2.	Water Pollution Control	75	5
3.	Solid waste Management	8	3
4.	Environmental Monitoring and Management	_	7
5.	Rainwater Harvesting	20	3
6.	Occupational Health	10	5
7.	Greenbelt development	10	3
	Total	**223**	**36**

10.8 CONCLUSION

Major potential environmental impacts from proposed project will be from solid waste generation, wastewater generation, ground water exploitation and flue gas emission. However, an effective environment management plan reduces level of significant impact on the environment. Factory will implement effective occupational health and safety measures. Hence, proposed project will be environment friendly and safe.

CHAPTER XI

SUMMARY AND CONCLUSION

CHAPTER XI

SUMMARY AND CONCLUSION

11.1 INTRODUCTION

This chapter executes summary of whole EIA report which includes project description in brief, environmental setting in 10 km radius, impact identification and mitigation measures and environmental management plan. Moreover brief information of Post mentoring program and risk assessment is also furnished in this chapter. An EIA report for proposed project has been prepared as per the ToR issued on dated 23rd September by MoEF&CC and as per generic structure as per EIA notification 2006 and amendment thereof. EIA report is prepared by SMS Envocare Ltd., Pune (QCI-NABET accredited consultant**). For 30 MW Cogeneration unit prior Environmental Clearance as per the EIA Notification No. S.O. 1533 (E) dated 14.09.2006 and amendments thereof has taken as per vide letter number J 13012/34/2009-IA.II (T) dated September 9, 2010. The copy of earlier EC granted for Cogeneration Unit is attached in Annexure IX** and post EC compliance attached in Annexure XIX.

11.2 SCOPE OF THE STUDY

EIA study has been conducted prior to commissioning of proposed project and in accordance with the standard ToR issued by MoEF&CC. The EIA study of proposed project is limited to the project site and study area of 10 km surrounding the project site. Baseline data collection and environmental monitoring of study area was carried out for the period of October 2016 to December 2016.

11.3 SALIENT FEATURES OF THE PROPOSED PROJECT

Venkateshwara Power Projects Limited is proposing 90 KLPD molasses based distillery in the existing sugar factory premises. The factory is having a crushing capacity of 3500 TPD and co-generation of 30 MW. The Manufacturing of Rectified Spirit/ Extra Neutral Alcohol/ alcohol for making liquor/ fuel will be done by adopting continuous fermentation method. The fermented wash will be distilled in a pressure vacuum distillation to obtain rectified spirit and Extra Neutral Alcohol will be from Rectified Spirit. The impurities in Rectified Spirit will be reduced by diluting and redistilling the spirit. The impurities like aldehydes, ketones, acids, esters, higher alcohols are minimized by controlled condition. Project highlights are given in Table 11.1

11.4 RAW MATERIAL

Table 11.1: Project Information in brief

Sr. No.	Particulate	Description
1.	Name of the proponent	M/s Venkateshwara Power Projects Limited
2.	Project capacity	90 KLPD Molasses Based Distillery
3.	Location of the project	Sr. No. 85, 164, 165, 166, 167, 168, 169 &170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka.
4.	Geographic Location	16°30'47.37"N, 74°28'39.73"E 580 m MSL
5.	Land requirement	6.97 acre built up area 2.3 acre green belt area
6.	Product	• Rectified spirit(RS) :90 KLPD **Or** • Extra Neutral Alcohol (ENA): 90 KLPD **Or** • Anhydrous Alcohol (only Fuel grade):90.00 KLPD • Impure Spirit: 6.25 KLPD (One at time) • CO_2 gas: 71 MT
7.	Operation days	330 days
8.	Molasses required	Molasses 385-390 TPD (Fermentable sugar 42 **%** w/w)
9.	Total water	Distillery: 639 CMD (After recycling during season of sugar factory) and during off season of sugar factory: 339 CMD (recycled water from sugar unit). Sugar: For Initial startup **2575 CMD,** after recycling **340 CMD** fresh water will required daily.
10.	Source of water	Sadalga Barrage on Doodhganga River Around 8.0 km in NE.
11.	Electricity	Operational: 2595 kWh Connected load: 3655 kWh
12.	Turbine generator	3.0 MW
13.	Steam	23.05 TPH
14.	Fuel	Indian coal: 62.84 TPD Concentrated spent wash: 242 TPD
15.	Source	Nearby Market
16.	Boiler	30 TPH
17.	DG	Two DG sets of capacity 250 kVA
18.	Effluent treatment system	Condensate Polishing Unit (CPU) will treat spent lees, cooling tower blow down, boiler blow down and process condensate. Spent wash will be treated by multi effect evaporator followed by slope fired boiler.
19.	Man-power	70 skilled and unskilled
20.	Total project cost	103.73 cr.
21.	Total EMP cost	2.23 Cr

Daily consumption of the raw material required for production is described in Table 11.2

Table 11.2: List of raw materials

#	Raw material	Quantity	Storage	Transportation
	Distillery			
1.	Molasses	385-390 TPD	3 X 10000 MT Existing 24000MT	Tanker
2.	Coal	62.84 TPD	-	Trucks
3.	Sulfuric Acid	10 kg /kl	-	Trucks/tempo
4.	Urea	5 kg/kl	-	Trucks/tempo
5.	Di-ammonium Phosphate	4 kg /kl	-	Trucks/tempo
6.	Anti-foam reagent	2.5 kg/kl	-	Trucks/tempo
	Existing sugar and cogeneration			
1.	Sugarcane	3500	-	Trucks/trackers/bullock cart
2.	Lime	5.25 MTD	-	Trucks/tempo
3.	Sulphur	0.02 MTD	-	Trucks/tempo
4.	Caustic soda (50%)	0.150 MTD	-	Trucks/tempo
5.	Hydrochloric acid (30%)	0.6 MTD	-	Trucks/tempo
6.	Caustic soda	0.150 MTD	-	Trucks/tempo

11.5 MANUFACTURING PROCESS

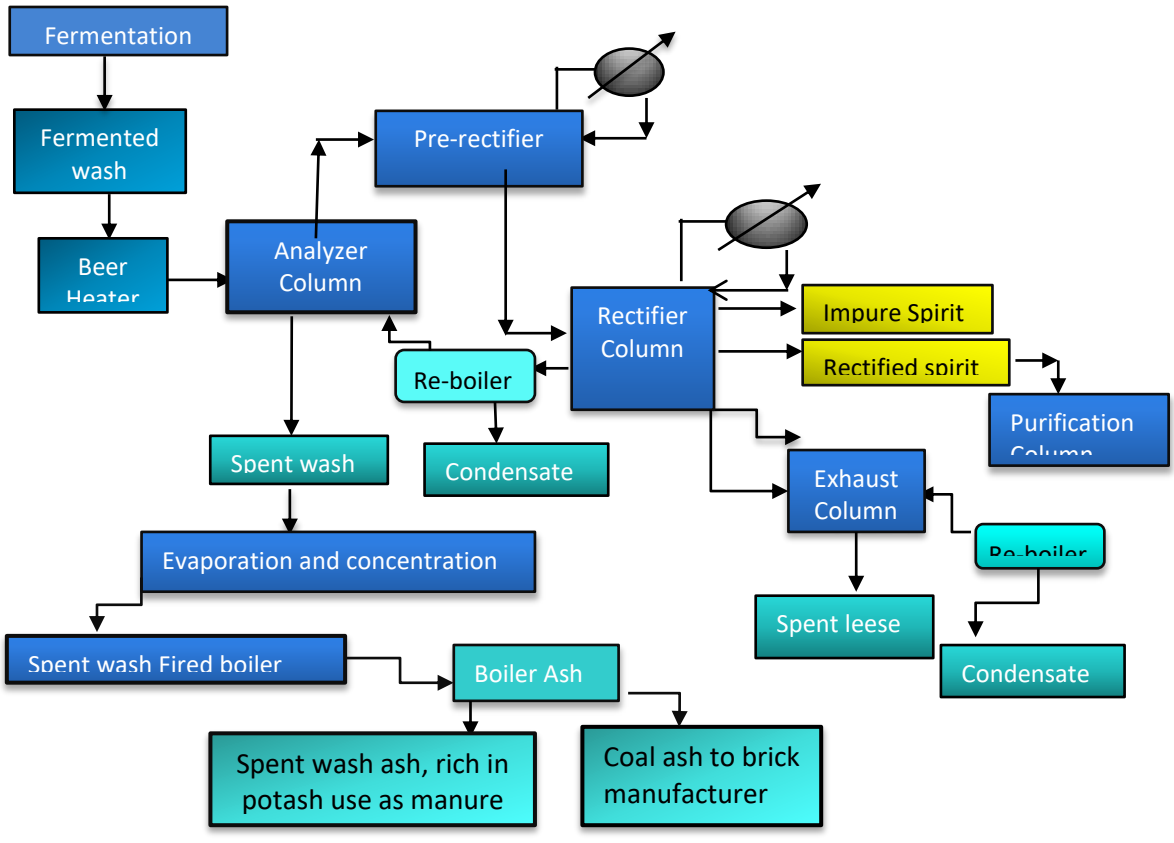


Figure 11.1: Manufacturing process flow chart

11.6 DESCRIPTION OF THE ENVIRONMENT

Environmental monitoring is carried out for air, noise, water, biological and socioeconomic. The baseline environmental study has been conducted for the study area for the period of October 2016 to December 2016. Frequency of sampling with location and parameters are mentioned in Table 11.3.

Table 11.3: Sampling plan

Sr.No.	Attribute	Parameter	Location	Frequency
1.	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2 & NOx,	10 location	24 hourly, twice a week during study period
2.	Noise	Noise Levels in dB(A)	10 location	Once in Study Period
3.	Ground Water	pH, Electric Conductivity(EC) TDS, TSS, Total hardness, Total alkalinity, , DO, Chlorides, sulphates, Phosphate, nitrate, Fluorides, Potassium, Most probable number (MPN) and total coliform	Grab samples of 11 Locations	Once in Study Period
4.	Surface water	pH, Conductivity TDS, TSS, Total hardness, Total alkalinity, , DO, Chlorides, sulphates, Phosphate, nitrate, Fluorides , Potassium, Most probable number (MPN) and total coliform	Grab samples of 4 Locations	Once in Study Period
5.	Soil	Texture, pH, EC, metals, Sodium Absorption Ratio (SAR), Permeability, Water holding, capacity, bulk density, Porosity, Nitrogen, Phosphorus, Potassium, Moisture, organic content	10 locations	Once in Study Period
6.	Ecological Data	Existing flora & fauna	10 km study area	Once in Study Period
7.	Socioeconomic Data	Demographic Structure, Education, Infrastructure, Economic, Health status and other area specific information	Within 10 Km radius of study area	Once in Study Period

11.6.1 Ambient Air Quality

It has been observed that all ambient air results are within prescribed limits as per NAAQS standard 2009. Detailed ambient air samples results are mentioned in chapter III. Major highlights of the results are mentioned below,

- Maximum concentration of PM 10 found at 47.8 to 89.2 µg/m^3
- Maximum concentration of PM 2.5 found at 25.00 to 45.0 µg/m^3
- Maximum concentration of SO_2 found at 4.0 to 10.1 µg/m^3
- Maximum concentration of oxides of nitrogen 4.8 to 18.5 µg/m^3

From the results, it can be concluded that the ambient air quality of the study region is good as all the results are well within the limit.

11.6.2 Water Quality

Ground water and surface water sample result summary of some major parameter is descried as below,

- It has been observed that pH range was between 7.0 to 7.36
- Average total dissolved solids were in the range of 220 to 598 mg/l
- Chlorides were in the range of 15.0 to 76.1 mg/l.
- As microbiological parameters MPN and total coliform analysis was also carried out and it was found that *E. Coli* are detected in river water sample as well as some well water samples. Moreover, MPN count was also found high as per ISO-10500 specifications.

The above chemical analysis reveals that water from all sources is suitable for drinking purposes after disinfection, as E-Coli is present in all the surface water and some ground water samples collected. All other constituents are within the limits prescribed for drinking water standards of Indian Standards (10500: 2012).

11.6.3 Soil Quality

Soil sample result summary is described below,

- Results of pH were varying between 6.98 to 7.46
- Organic matter in the soil samples was found in the range of 3.5 to 4.26%.
- Total Phosphorous content was found in the range of 5.2 to 9.2 mg/kg.
- Potassium ranges from 20.6 to 32.7 mg/kg.

11.6.4 Noise Quality

Noise level was monitored in **9** locations. Average noise level found in between **40 to 45** dB (A) during day time and it is within the prescribed limits.

11.7 PROPOSED IMPACTS & MITIGATION MEASURES

Summary of probable impacts due to proposed project and its control measures are briefed in Table 11.4.

Table 11.4: Project activities, anticipated impact and mitigation measures

Sr. No.	Activity	Impact identification	Mitigation measures
1.	Site preparation/ Excavation/ foundation	• Loss of fertile soil • Loss of vegetation • Temporary impacts because of air contamination due to dusting & emissions from machineries. Health effects like allergic sickness, breathing problems etc., due to dust emission. • Noise generation due to excavation machineries created hearing problems	• Excavated soil will be used for greenbelt development. • There will be minor vegetation clearance and earth excavation required. However, no major impact is anticipated. • Personal protective (PPs) equipment like masks, ear muffs will be provided to worker. • All construction machineries/equipment's and vehicles will be turned off, when not in use.
2.	Transportation of construction material, equipment and machineries	• Air emissions created occupational health hazards like allergic sickness, breathing problems etc. • Noise generation	• During the transportation of dusty materials, loaded trucks will be covered to avoid PM dispersion level in air. • Regular spraying of water for dust suppression. • Electrically operated machineries shall be preferred
3.	Handling of raw material /loading and unloading of material	• Health effect on labor due to dust emission while handling of construction material. • Occupational health issues due to frequent exposure of dust, chemicals etc.	Personal protective (PPs) equipment like masks, ear muffs will be provided to worker.
4.	Civil work	• Disposal of construction waste on land changes the soil physical and	• Construction waste dispose will be done safely in accordance with statutory norms.

Sr. No.	Activity	Impact identification	Mitigation measures
		chemical properties. • During construction, occupational health hazards due to frequent exposure of dust. Labor may suffer from respiratory and allergic disease. • Air pollution due to emission of dust. • Noise pollution due to machineries and equipment. Frequent exposure of high decibel noise causes hearing problems in construction labors.	• Personal protective (PPs) equipment like masks, ear muffs will be provided to worker to avoid the heath effect.
5.	Domestic activities	• Sewage generation causes water pollution, if water is dumped in the water body or soil pollution if it disposed on the soil. • Soil pollution occurs if solid waste disposed on the soil.	• Septic tank /soak pits will be provided
	Operation Phase		
1.	Manufacturing process	**Resources consumption** Ground water extraction causes exploitation of ground water. **Air emissions** Boiler stack releases air pollutant like PM (10, 2.5), SO_x and NO_x may causes loss of vegetation, health effect on community residing nearby like respiratory, allergic diseases, Asthma, lung disease etc.	• **Rain water harvesting will be implemented** • Air pollution control equipment like Electrostatic precipitator and dust collectors will be installed.
		Waste water Waste water from Boiler blow down, cooling tower blow down, machine washing, flower washing,	• Waste water will be treated in condensate polishing unit. • Treated water will be recycled back into the process.

Sr. No.	Activity	Impact identification	Mitigation measures
		sugar manufacturing Process and process condensate, Spent lees from distillation. Ground water and soil pollution if directly disposed of on the land. Surface water pollution if it disposed of into water body. Disposal of untreated wastewater causes health effects on community, change in physical and chemical properties of soil and water which ultimately affects organism present. **Noise generation** Noise due to Boiler operation and during operation of other machineries equipment. Occupational health hazardous can be faced by operators and other staff whoever working in that area. **Solid waste generation** • Yeast sludge • Ash (Fly and bottom ash) • ETP sludge • Other hazardous/ non-hazardous waste like empty containers, batteries etc. **Social environment** • Employment generation • Development of road due to proposed project • No rehabilitation and resettlement required, hence no negative impacts	• Noise will be concise in the working area only. • PPEs will be provided to operators/ workers to avoid the occupational health hazards • Yeast sludge is no hazardous and can be used as manure. • Ash will be sell to brick manufacturer • Disposal of hazardous waste to CHWDF/ sold to authorize buyers if any. • No negative impacts are anticipated. Overall positive impact and CSR activities will be planned by the project proponent.

Sr. No.	Activity	Impact identification	Mitigation measures
		• No change in land use hence no negative impacts	
2.	Transportation of raw material and product	Major pollutant during transportation is dust and other fugitive emissions, which causes health effect and loss of vegetation of nearby area due to deposition of dust on the leaves of trees.	• Use of vehicles meeting the statutory norms related to emission. • Use of vehicles with PUC certificates • Proper traffic management • Tar road will be developed hence; no major dust emission is anticipated.
3.	Handling and storage of raw material	• Risk of accident due to leakage/explosion of chemicals which directly affect health of working staff. • Risk associated with fire due to storage of fuel and Alcohol. If accident arises, factory staff gets trapped in the fire.	• PPEs will be provided to operators/ workers to avoid the occupational health hazards. • Firefighting facility as per norms. • All safety measures will be undertaken to avoid accidents

11.7.1 Impact Assessment

Overall impacts from various activities on different environmental parameters are negligible if EMP properly implemented. Hence, no adverse negative impacts are predicted and project is ecofriendly.

11.8 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

11.8.1 Construction phase

Environment management plan will be adopted properly to mitigate the adverse impact as below,

- Loss of vegetation during excavation will not be major; moreover 33% of total land is allotted for greenbelt development.
- During the transportation, trucks will be covered to avoid dust dispersion in the air.
- Dust emission from construction machineries as well as vehicles on the road will be minimized by regular water spraying of for suppression.
- Regular maintenance of vehicles/ machineries and use of vehicles with PUC certificates to avoid the vehicular pollution.

- All construction machineries/ equipment's and vehicles will be turned off, when not in use.
- Noise from the vehicular movement and operation of equipment's/ machineries will be managed by restricting the same during night time.
- Personal Protective Equipment's like ear muffs or ear plugs will be provided to workers who will have exposure to high noise.

11.8.2 Operation phase

11.8.2.1 Air emissions

- **Flue gas emissions**

Particulate matter (PM), SO_2 & NOx are main pollutants being/to be emitted from stacks attached with steam Boilers of capacity 30 TPH. Two D.G sets of capacity 250 kVA each will be used in case of power failure. Air pollution equipment's like Electrostatic precipitator (ESP) and dust collectors will be installed. Stack height will be **62 m**. Existing sugar and cogeneration boilers are attached with Venturi Wet Scrubber. Existing stack of sugar and cogeneration is **65 m** and **75 m** respectively.

- **Process emissions**

Fermentation and Distillation are the main source of process emissions. CO_2 and VOC's will be generated during the process. The CO_2 will be scrubbed in water. VOC emissions are very minor as distillation process in closed.

11.8.2.2 Waste water generation

Factory will be adopting Zero Liquid Discharge (ZLD) practice hence; discharge of effluent outside the factory will not be permitted. Domestic effluent will be discharged to soak pit via septic tank.

Waste water will be generate from process and steam condensate, boiler and cooling tower blow down and water treatment plant, will be treated in ETP called Condensate polishing unit and reused in process. Spent lees from distillation, will be recycled back in the process. Spent wash generated during the process of distillation will be treated in multiple effective evaporators to concentrate the spent wash and it will be used in boiler as a fuel.

Waste water generation from existing sugar and cogeneration unit and ETP for sugar factory.

11.8.2.3 Solid Waste generation

Solid wastes are generated from the Fermentation (Yeast sludge), distillation (spent wash), and Effluent treatment Plant (ETP Sludge), spent oil from DG sets and Ash generation from Boiler. Spent oil will be mixed with coal and burnt in the Boiler. Spent wash from the distillation will be concentrate in Multi effect evaporator and burn in incineration boiler. Fly ash generated from Coal/ spent wash Boiler will be collected in the ash silos and sent to brick manufacturing units without creating public nuisance. Spent wash ash is rich in potassium thus it can be used as a manure. The fly ash will be pneumatically conveyed to the silos and vents of silo will be provided with bag filter to control fugitive emission. The bottom ash will be conveyed through submerged ash conveyor to storage hopper and from there it will be transported in moisten condition to ash disposal site.

Sludge dewatering unit will be installed for instead of sludge drying bed to avoid Odor. Yeast sludge will be used as manure or can be burn in the boiler.

The other solid wastes expected from the unit will be containers, empty drums which will be used for packing product, and/ or returned to the product seller or sold to authorized buyers. For avoiding any kind of fire incident leakages inside the factory premises, the safety measures have to be undertaken. Probable solid waste generation quantity are given in **Table 11.5**

Table 11.5: Solid waste generation quantities and disposal

Sr. No.	Type of waste	Quantity		Hazardous category if any
		From existing sugar & cogeneration plant	Proposed Distillery	
1.	Yeast sludge	-	28.5 TPD	-
2.	ETP sludge	0.300 T/D	-	-
3.	Lime sludge	0.500 T/D	-	-
4.	WTP sludge	0.100 T/D	-	
5.	Ash	110 TPD	Coal ash: 22-24 TPD Spent wash ash 29-30 TPD	
6.	Domestic waste	Negligible	Negligible	-
7.	Spent oil	Negligible	Negligible	5.1

11.8.2.4 Occupational health and safety

Occupation health hazard during the operation will be minimizing by providing PPE's. Moreover all safety precautions will be taken to reduce the accidents during operation.

Firefighting program will be prepared and equipment's for the same will be placed properly. Workers will be trained and will be made aware with all operational hazards occurred during the operation.

11.8.2.5 Greenbelt Development

Greenbelt will be developed in 2.3 acres of total plot area, which is 33 % of total land. Details of trees and shrubs to be planted are given in Chapter X. Local and native trees will preferably plant. Broad leaves trees will be planted around the industrial area. Avenue plantation will be done along the road sides.

11.9 POST PROJECT ENVIRONMENTAL MONITORING PROGRAM

Post project monitoring helps to identify the adverse environmental impacts of the proposed project. It also recognizes the efficiency of the pollution control equipment's which are placed for pollution abatement. Environmental monitoring program prepared for proposed project is given in Table 11.6.

Table 11.6: Post project environmental monitoring schedule

Sr. No.	Particulate	Parameters	Number of location	Frequency
1.	Ambient air quality	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, etc.	Ambient air quality at minimum 3-5 locations. 1 location within the plant premises, 1 location in upwind, 1 location in downwind direction and 1 location in cross wind direction.	Monthly
2.	Stack gas	PM, SO_2 and NOx	Number of stack	Monthly
3.	Work place	$PM_{2.5}$, SO_2, NOx, VOCs, CO_2	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
4.	Waste water	pH, EC, SS, TDS, O&G, Ammonical Nitrogen, COD, BOD, Chloride, Sulphides etc.	Wastewater from all sources. Inlet & outlet of ETP Process condensate treatment plant Inlet and outlet	Monthly
5.	Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD,	3-5 location Ground as well as Surface water	Half yearly

Sr. No.	Particulate	Parameters	Number of location	Frequency
		Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) & *E.Coli*	Ground water preferably Near to spent wash storage lagoon	
6.	Solid waste	Ash	• Process dust generated sludge and ash. • Before used as manure if used manure	Monthly
7.	Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity	5 location At all source and outside the Plant area.	Monthly
8.	Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plant site	Monthly
9.	Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	2-3 Near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied.	Quarterly
10.	Occupational health	Health and fitness checkup of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year

11.10 ADDITIONAL STUDY

Additional studies have been included in chapter VII are as below,

- Risk Assessment in which risks arising from
  - Storage and Handling of Alcohol, Molasses.
  - Operation of DG sets, Boiler, Storage and Handling of hazardous chemicals

- Disaster Management Plan
- Occupational Health and Safety Management System

11.11 PROJECT BENEFITS

Project contributes many direct and indirect benefits to the local people in terms of financial, social welfare and other tangible benefits and these are,

- Direct and indirect employment generation for local community of surrounding area during construction phase and operation phase. Around 70-100 No. skilled manpower will be required during the project execution.
- Major part of these labors will be mainly from local villagers who are expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area.

11.12 CONCLUSION

- Proposed project does not attract rehabilitation and resettlement of people, since the proposed site in open and vacant.
- Proposed project does not anticipate any adverse impacts on environment.
- Production process is environmentally safe as ZLD is proposed with efficient mitigation measures implemented.
- Air emissions through stack will be controlled by ESP.
- Loss of vegetation and habitat will not be attributed.
- Workplace/ operation hazards, which will be minimized by providing personal protective equipment's, safety precautions, emergency plan & disaster management plan.

Consequently, impacts on air, water, land and ecological environments are insignificant and the socio-economic benefits are predominantly positive.

Thus, overall project features, process, potential of pollution, pollution prevention measures and environmental management plan proposed by proponent illustrates that proposed project will not have any considerable impacts on environment as well as on socio-economic & ecological conditions of the project area. Therefore, proposed project is environmentally safe.

Chapter XII

Disclosure Of Consultant

CHAPTER XII

DISCLOSURE OF CONSULTANT

12.1 INTRODUCTION

SMS ENVOCARE LTD (SMSEL) is an ISO 9001, 14001 and 18001 certified Company registered under Companies Act, 1956 vide its Registration No. U74900MH2007PLC172774, 2007-2008 and is engaged in providing consultancy services in the field of Safety, Health and Environment. It also provides expert services to fulfill the Techno-legal compliances such and as Environmental clearances and consent management. Other services include but not limited to,

- Environmental monitoring and analysis
- Design, supply, erection and commissioning ETPs, STPs and WTPs
- Common Hazardous Waste Treatment, Storage and Disposal Facility
- Municipal solid waste treatment, storage and disposal facility
- Common bio-medical waste treatment, storage and disposal facility
- Common Effluent Treatment Plant
- Common Sewage Treatment Plant

SMSEL is having good team of professionals with required qualification, experience and expertise required to undertake various types of jobs from different environmental fields. Within short span of time, SMSEL is accredited from National Accreditation Board for Education and Training (NABET), Quality Council of India for the EIA consultancy services in 11 Sectors and 11 Functional Area Expert (In-house 8 and empanelled 3). SMSEL is also trying to have all 12 FAEs in-house within a span of two years. SMSEL is also trying to get additional 4 to 5 sectors accredited within a year by recruiting appropriate experts. The sectors approved by the NABET are given below in Table 12.1

Table 12.1: NABET Accreditation

Sr. No.	Sector as per NABET Scheme	Name of Sector	Category	Activity as per Notification of 14th September, 2006
1	3	River Valley projects	B	1 (c)
2	4	Thermal power plant	B	1(d)
3	19	Man-made fiber manufacturing	A	5(d)

4	21	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	A	5 (f)
5	22	Distilleries	A	5 (g)
6	25	Sugar Industry	B	5 (j)
7	32	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	A	7 (d)
8	36	Common Effluent Treatment Plants (CETPs)	B	7 (h)
9	37	Common Municipal Solid Waste Management Facility (CMSWMF)	A	7 (i)
10	38	Building and construction projects	B	8 (a)
11	39	Townships and Area development projects	B	8 (b)
Ref: As per RA 88th Meeting: 04th May, 2016				

12.2 KEY PERSONNEL'S

12.2.1 Key personnel's Engaged in preparation of EIA report

Mr. Nilesh Deshmukh is an EIA coordinator for this molasses based distillery project. Other Functional Area Expertise (FAE) and Team Members (TM) undertaking this project with their specific roles and responsibilities are given in Table 12.2.

Table 12.2: Key personnel's engage in preparation of EIA report

Sr. No.	Name of expertise	EIA Coordinator/ Functional Area
In-house Expertise's		
1.	Mr. Nilesh D. Deshmukh	**EIA Coordinator** **WP :** Water Pollution Monitoring Prevention & Control **SHW :** Solid & Hazardous Waste Management **AP** : Air pollution monitoring, prevention & control **AQ** : Meteorology, Air Quality modeling & prediction
2.	Mrs. Hemangi N. Nalavade	**EB** : Ecology and Biodiversity **SHW:** Solid & Hazardous Waste Management

		AQ : Meteorology, Air Quality modeling & prediction
3.	Mr. Mahendra Kumar	**SHW:** Solid & Hazardous Waste Management
4.	Mr. Pawan Kumar Verma	**EB** : Ecology and Biodiversity **SHW :** Solid & Hazardous Waste Management
5.	Mrs. Savita Upadhyay	**EB** : Ecology and Biodiversity **WP** : Water pollution monitoring prevention & control **AQ :**Meteorology, Air Quality modeling & prediction
6.	Mrs. Pawanrekha Mishra	**SE** **:** Socio economic aspect
7.	Mrs. Prajakta Chitnis	**SC** **:** Soil Conservation **WP** : Water Pollution Monitoring Prevention & Control **AP** **:** Air pollution monitoring, prevention & control **Environmental Monitoring and Analysis** Interpretation of laboratory results
8.	Mr. Neeraj Katiyar	**Laboratory In-charge** Maharashtra Enviro Power Ltd., Ranjhangaon (MEPL) Pune
9.	Dr. Sadashiv T. Lonkar	**RH:** Risk and Hazard Identification
Empanelled Expertise's		
1.	Dr. Manoj Kumar Mishra	**AP** **:** Air Pollution Monitoring, Prevention & Control **AQ** **:**Meteorology, Air Quality Modeling & Prediction **NV** **:** Noise & Vibration
2.	Dr. Dhananjay C. Meshram	**HG** **:** Hydrology, Ground Water & Water Conservation **HGO:** Geology
3.	Mr. Samir S. Patil	**LU** : Land use
4.	Mr. Deepak Desai	Distillery consultant

List of Annexure

Annexures	Description
I	Plant Layout
II	Toposheet of 10 km radius
III	Grampanchayat NoC
IV	Water drawl permission
V	Geotechnical investigation report
VI	Molasses supply letters
VII	Assurance letters of brick manufacturers
VIII	Consent to operate existing sugar and cogeneration
IX	Existing Cogeneration EC letter
X	Existing Sugar and cogeneration stack report and ambient copy
XI	Laboratory report of existing sugar ETP inlet and outlet
XII	Baseline monitoring results (Air, Noise, Water, Soil etc.)
XIII	Kasara Map
XIV	ESP Details
XV	Manifest of Hazardous waste
XVI	CPU details
XVII	Public hearing Document
XVIII	CO2 Plant proposal
XIX	Post EC Compliance visit report

L E G E N D

SR.NO	DESCRIPTION	SCOPE	SIZE IN MTS (APPROX)
1	MOLASSES STORAGE TANKS(1A,1B&1C)	CLIENT	ø31.0 (QTY–3NOS)
2	FERMENTATION SECTION		51.50 X 38.70
3	DISTILLATION & MSDH SECTION		31.00 X 17.50
4	EVAPORATION SECTION		37.5 X 16.50
5	PRODUCT STORAGE & RECIEVER SECTION		68.00 X 27.00
5A	PRODUCT STORAGE & RECIEVER SECTION (PESO)		82.0 X 60.0
6	COOLING TOWER FOR FERMENTATION		7.10 X 7.85
7	COOLING TOWER FOR DISTILLATION		9.23 X 10.30
7A	COOLING TOWER FOR EVAPORATION		9.23 X 15.18
8	COOLING TOWER FOR MSDH SECTION		7.40 X 4.20
9	PCTP SECTION	CLIENT	60.0 x 35.0
10	WTP & RAW WATER STORAGE TANK	CLIENT	40.0 X 31.0
11	WEIGH BRIDGE	CLIENT	5.00 x 15.0
12	ADMINISTRATION OFFICE	CLIENT	15.0 X 15.0
13	EXCISE OFFICE	CLIENT	10.00 X 10.0
14	SECURITY CABIN	CLIENT	5.00 X 5.00
15	TIME OFFICE	CLIENT	4.0 X 5.0
16	BOILER HOUSE	CLIENT	90.0 X 25.0
17	COAL YARD	CLIENT	20.0 X 45.0
18	LAGOON & SETTLING PIT	CLIENT	40.0 X 55.0 X 3.5
19	FIRE WATER PUMP HOUSE	CLIENT	10.0 X 10.0
20	TG & PCC ROOM	CLIENT	15.0 X 30.0
21	CO2 PLANT	–	30.0 X 20.0

ORIENTATION: 0° GN PN 30° 90° 180° 270°

NOTE-

1) ALL DIMENSIONS ARE IN mm, & ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2) THE SIZES OF INDIVIDUAL SECTIONS ARE TENTATIVE & MAY VARY DURING DETAILED ENGINEERING.
3) INDICATES GREENERY.
4) INDICATES PIPE RACK.
5) —x—x—x— INDICATES CHAIN LINK FENCING
6) Area = 9.04 H.
7) PIPE RACK SHOWN IS INDICATIVE & WILL BE CONFIRMED AFTER DETAIL ENGG.
8) INDICATES GUTTER.
9) — — — — — DOTTED LINE INDICATES CLIENT SCOPE.

REFERENCES-

1) EQUIPMENT LAYOUT FOR DISTILLATION SECTION D-16077-1-ELT1401 & ELT1402
2) EQUIPMENT LAYOUT FOR STORAGE SECTION D-16077-1-ELT2001
3) EQUIPMENT LAYOUT FOR EVAPORATION SECTION D-16077-1-ELT1501
4) EQUIPMENT LAYOUT FOR FERMENTATION SECTION D-16077-1-ELT1301 & ELT1302
5) EQUIPMENT LAYOUT FOR COOLING TOWER D-16077-2-ELT3101
6) FOR COOLING TOWER BASIN DRAWING REFER D-16077-2-CBD3101 TO CBD 3104

HOLD LIST -

1) LAGOON LAYOUT DRAWING.

CONFIDENTIAL

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPD.	DATE
0	ONLY FOR PROPOSAL NOT TO EXECUTION	SVM	NVG	VCT	13/07/2017

CLIENT : M/S VENKATESHWARA POWER PROJECT LIMITED
PLANT : 90 KLPD TS MOLASSES BASED DISTILLERY
LOCATION : AT POST BEDKHIHAL VILLAGE, CHIKODI TAHASIL, BELGAUM DISTRICT 591214 KARNATAKA

THIS DWG. IS THE PROPERTY OF PRAJ INDUSTRIES LTD. AND SHOULD NOT BE REPRODUCED WITHOUT WRITTEN CONSENT FROM
PRAJ INDUSTRIES LTD.
"PRAJ TOWER", Bhumkar Chowk–Hinjewadi Road, Hinjewadi, Pune–411 057. (INDIA)

DO NOT SCALE THE DRAWING

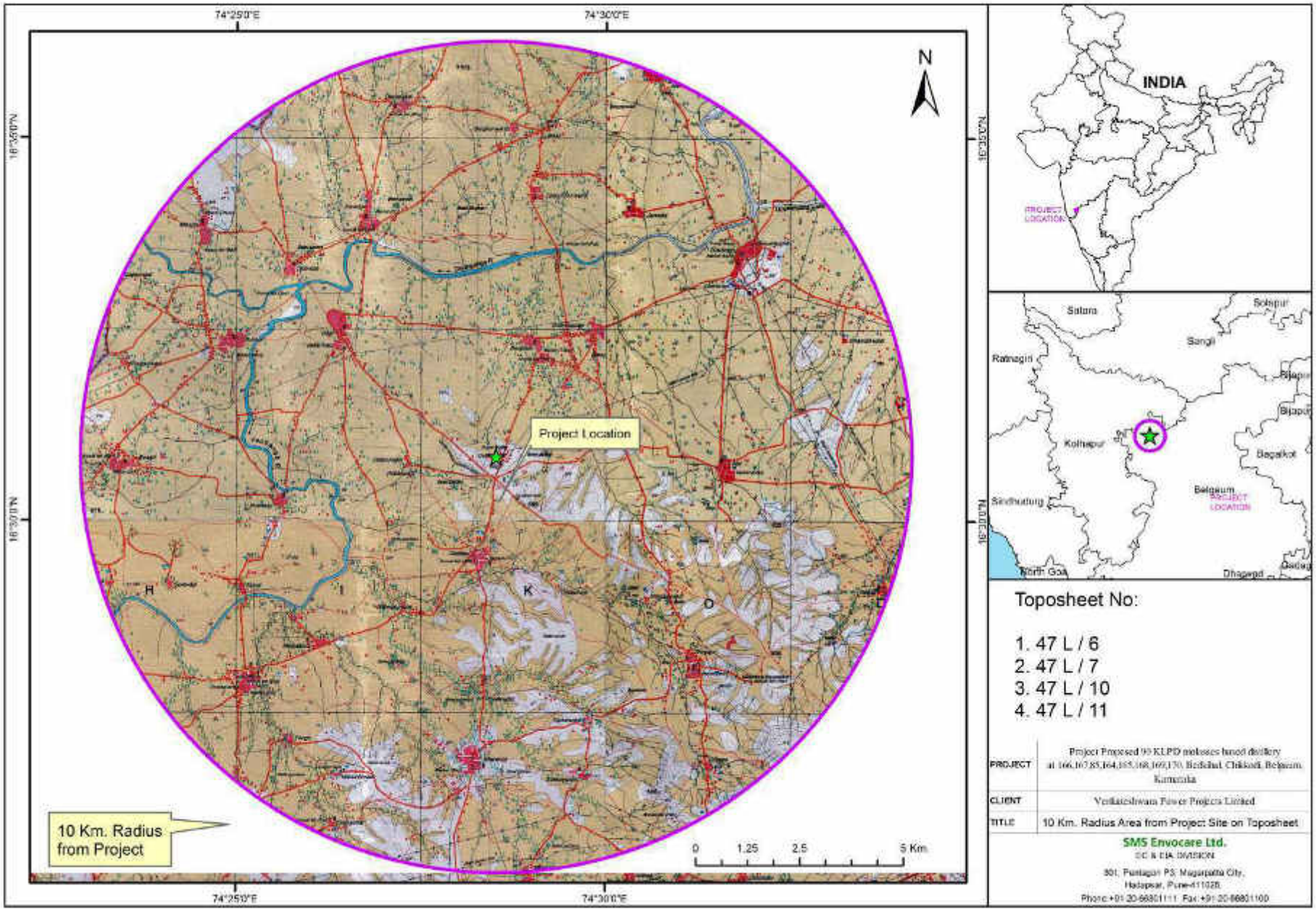
TITLE : PLOT PLAN

SCALE 1:1000 | PIL JOB CODE D-16077 | SHEET 1 OF 1

DWG. NO. D-16077 – 1 – PLT1001 | **REV.** 0

I.D. NO. PLT1001 | CAD FILE NAME D-16077-1-PLT1001

Annexure II: Toposheet of 10 km radius



Annexure III: Grampanchayat NoC

Karnataka Government

Zilla Panchayat, Belagavi — Taluka Panchayat, Chikodi

GRAM PANCHAYAT OFFICE

Taluk: Chikodi — Bedakihal -591214 — Dist: Belagavi

No/GPB/2016-17

Date:10/08/2016

To,

Managing Director
Venkateshwar Power Project Ltd
Bedakihal.

Sub: In respect of No Objection Certificate to expanding sugar, co-generation unit and to establish compost unit, distillery and ethanol unit in your factory.

In respect of above subject already your Sugar Factory is existed in lands R.S.No.85, 166/1B, 166/1C, 166/1D, 166/2 and 167/1 of Bedakihal village. Now, you applied application for a new No Objection Certificate to expanding sugar, co-generation unit and to establish compost unit, distillery and ethanol units.

Accordingly in General Meeting No.2 dated 28/06/2016 it is unanimously resolved in Resolution No.6/4 and it is published in public at large that anyone has got objection to establish above said units, then object the same within one month from the date of publication. In said period nobody has objected. Thus we issued this No Objection Certificate with following conditions.

1) With lookout not to pesky civilian and cattles in the factory area.
2) Polluted water and chemical water should be utilized in your factory land but not leave towards nalas and river of public.
3) Your factory should take care not to allow occurrence of any accident and if any accident occurred, your factory will become solely responsible.
4) All units to be established, after receiving permissions from respective departments.

It is issued herewith No Objection Certificate to establish all units after considering above all conditions.

Place: Bedakihal
Date : 10/08/2016

Sd/-
Panchayat Development Officer
Gram Panchayat, Bedakihal
Taluk: Chikodi, Dist: Belagavi

Sd/-
President
Gram Panchayat, Bedakihal
Taluk: Chikodi, Dist: Belagavi

TRUE TRANSLATED COPY
FROM KANNADA TO ENGLISH

Shri. B. R. KAMATE
B A. LL.B. (Spl)
ADVOCATE & NOTARY CHIKODI

15 AUG 2016

NOTARY
Sri. B.R. Kamate
Chikodi
Regd. No. LCL 2015
Date of Expire 18-6-2021
GOVT. OF KARNATAKA

Annexure IV: Water drawl permission

ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಜಲ ಸಂಪನ್ಮೂಲ ಇಲಾಖೆ (ಸಣ್ಣ ನೀರಾವರಿ)

ನಂ/ಸನೀವಿ/ಬೆ/ಸಿ-1/2014-15

ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನೀಯರವರ ಕಚೇರಿ
ಸಣ್ಣ ನೀರಾವರಿ ವಿಭಾಗ, ಬೆಳಗಾವಿ
ದಿನಾಂಕ:

ಇವರಿಗೆ,

ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು,
ವೆಂಕಟೇಶ್ವರ ಪವರ್ ಪ್ರೋಜೆಕ್ಟ ಲಿಮಿಟೆಡ
ಸಕ್ಕರೆ ಕಾರ್ಖಾಣೆ
ಬೆಡಕಿಹಾಳ, ತಾ: ಚಿಕ್ಕೋಡಿ

ಮಾನ್ಯರೇ,

ವಿಷಯ : ವೆಂಕಟೇಶ್ವರ ಪಾವರ ಪ್ರೋಜೆಕ್ಟ ಸಕ್ಕರೆ ಕಾರ್ಖಾನೆ ಲಿಮಿಟೆಡ ಬೆಡಕಿಹಾಳ
ತಾ: ಚಿಕ್ಕೋಡಿ ಇವರಿಗೆ ನೀರೆತ್ತುವ ಪರವಾನಿಗೆ ಕೊಡುವ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1) ವೆಂಕಟೇಶ್ವರ ಪಾವರ ಪ್ರೋಜೆಕ್ಟ ಸಕ್ಕರೆ ಕಾರ್ಖಾನೆ ಲಿಮಿಟೆಡ ಬೆಡಕಿಹ
ತಾ: ಚಿಕ್ಕೋಡಿ ಪಸಂ: 125, ದಿನಾಂಕ:16-06-2014

ಮೇಲಿನ ವಿಷಯದನ್ವಯ ಉಲ್ಲೇಖಿತ ಪತ್ರದಲ್ಲಿ ಜೌದ್ಯೋಗಿಕ ಉದ್ದೇಶಕ್ಕಾಗಿ ನೀರನ್ನು ಬಳಸುವ ಸಂಬಂಧದಲ್ಲಿ ಪರವಾನಿಗೆ ನವೀಕರಿಸಲು ತಿಳಿಸಿರುವ ಪ್ರಯುಕ್ತ ನಿಮ್ಮ ನಿಯೋಜಿತ ಕಾರ್ಖಾನೆಗೆ ನಮ್ಮ ವಿಭಾಗ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ನೀರೆತ್ತುವ ಕುರಿತು ಇಲಾಖೆಯೊಂದಿಗೆ ಕೈಗೊಂಡ ಒಡಂಬಡಿಕೆಯ ಪ್ರತಿಯನ್ನು ಈ ಪತ್ರದೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ಕಳುಹಿಸಲಾಗಿದೆ.(ನವೀಕರಣ ಪ್ರತಿ ಲಗತ್ತಿಸಲಾಗಿದೆ.)

ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಅಡಕ: ಒಡಂಬಡಿಕೆಯ ಪ್ರತಿ-1

ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನೀಯರರು,
ಸಣ್ಣ ನೀರಾವರಿ ವಿಭಾಗ ಬೆಳಗಾವಿ.

INDIA NON JUDICIAL

Government of Karnataka

e-Stamp

सत्यमेव जयते

Certificate No.	:	IN-KA89079031178169M
Certificate Issued Date	:	27-Jun-2014 05:31 PM
Account Reference	:	NONACC (FI)/ kaksfcl08/ CHIKODI2/ KA-BL
Unique Doc. Reference	:	SUBIN-KAKAKSFCL08326274904262 72M
Purchased by	:	M S HIREMATH AP CHIKODI
Description of Document	:	Article 12 Bond
Description	:	Bond
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	EXE ENG M I DIVISION BELGAUM
Second Party	:	MANAGING DIRECTOR V C T L BEDKIHAL
Stamp Duty Paid By	:	MANAGING DIRECTOR V C T L BEDKIHAL
Stamp Duty Amount(Rs.)	:	100 (One Hundred only)

Dr. Prabhakar Kore Credit Souharda Sahakari Ltd. ANKALI CHIKODI

Please write or type below this line

AGREEMENT

Agreement made on the day of 17/7/2014 between the Executive Engineer,M.I.Division Belgaum,acting on behalf of the Governor of Karnataka (here after called I.D.) of the one part and the " Managing Director "The Venkateshwara power project Ltd, (sugar factory) Bedkihal ,Tal:-chikodi Dist:-Belgaum.here ofter called "sugar factory" of the other part witness as follow.

Managing Director
Venkateshwara

1) The drawl of water is permitted provided there is sufficient storage In"sadalga Barrage" on the Dudhaganga river and the interest of the Existinng irrigation on both the banks of Dudhaganga river and requorment at bedkihal are not prejudiced in case there is acute scarcity of "drinking water" to the down stream village, the M.I.Divisonis free to cut off water supply to the sugar factory and no claim for compensation of damages will be admitted.
2) No assurance for the supply of water shall be given to the sugar factory.
3) The M.I.Division reserves the right for the stoppsge of the side sugar factory, for valid reasons and in event of such stoppages the sugar fact ory shall not entitle to get any compensation or rebate for contingencies that may arise due to such stoppage of water,the use water by the said factory shall be subject to the stoppage after one month's notice If the m.I.Divisionnecessitatesuch a stoppage.
4) The sugar factory shall not draw water exceeding 150 MCFT per year or any other leaser quantity that may be specified by M.I.Division from time to time.
5) **(A)** The factory shall install a standerd meter or meters approved by M.I.Division and the site is made accessible to the M.I.Division for checking the meters shall be replaced for repairs if found defective by the Officers of M.I.Division during inspection within three month's.

   (B) The meters shall be sealed with two separate seal (one on behalf of the M.I.Division and one on behalf of the sugar factory) and shall only be accessible to and open for the joint inspection and examination by the officers of the M.I.Division and the sugar factory duly authorized in this behalf the readings of the meters shall be taken on the first working day of every month and recorded in a register kept in the office of the Assistant Ex.Engineer, and the sugar factory duly signed by both the Officers.

Managing Director

(c) The recording of the meters shall be prima – facie evidence of the quantity of water draw by the sugar factory.

(D) In the event of break down of measuring device, the quantity of water shall be assessed by the minor Irrigation Division Belgaum ,no the Strenght of energy consumption and capacity of pumping equipment etc.till such time the meters are rectified or replaced as per the instruction of M.I.Division the decision of the Executive Engineer, M.I.Division Belgaum.in this connection shall be final and is binding on said factory.

6) The factory has deposited with Government Rs. --
The amount equal to the estimate charges for one year which amount is held by the Government as security deposit for the due for performance of the terms of this agreement.

A) The sugar factory shall keep a record of all pumping hours and the water so pumped from the river and shall make those record available to the M.I.Division officers, whenever required by the M.I.Division.

7) The pumping plant or any other works required for drawing water by pumps from the rivershall be so housed as not to interface with the free flow in the river and shall be subject to the approval of the Executive Engineer concerned.

8) The use of water shall be only for the sufficient purpose i.e.for the use in said factory for industrial purpose only, including M.T.crushing per day capacity of sugar plant and 8 M.W.Co-Genaration plant for anyunauthorised use of water (except for irrigation and domestic purpose as approved by (Executive Engineer) the said sugar factory is liable to pay additional water rates to levied as panalty.the ceiling of penalty shall be 3 times of the normal water rate approved by the Government for the period.

9) The sugar factory should make arrangements to see that the molasses or other water products left over crushing shall not be allowed to be thrown in to the river so as to pollute the river water.

Managing Director

10) The sugar factory shall the required machinery to remove the pollution and industrial refused of used water ofter treatment before allowing the west water from the sugar factory back in to the river.

11) The water drawn by the factory shall be paid at the rate of Rs.3200/- per M.C.Ft.as per G.O. or at the rates that may be revised for enhanced subsequently by the Government.

12) The water rates shall be paid by half yearly payments (financial year) by the sugar factory for each period ending with 30th September & 31st March to the Executive Engineer M.I.Division belgaum or to such officer as the Government in writing specify within noe month from the date of receipt by the factory of the bill in behlf. The bill shall deemed to have been served on the factory if it is sent by registered post addressed to the Managing director in charge of said sugar factory or by delivering same at the office of sugar factory.

13) In case arrears of water rate's the M.I.Division reserves the right to recover the same arrears of land revenue.

14) The department also reserves the right of termination of the agreement on branch of any terms by the factory.

15) Further that tha factory is willing to pay the stamp duty charged if it is more than now prescribed.

16) This agreement shall be in force from -- 17/7/2014 to 16/7/2017 at the end of which the Government reserves the to renew or revoke the Agreement.

17) The Executive Engineer M.I.Division Belgaum reserves the right to Revoke or cancel the permission subject to the detrimentof availability of water to the irrigators coming under the command area of sadalga barrage and also due to the drinking water problem.

Venkateshwara Power Project Ltd

18) The Executive Engineer M.I.Division Belgaum reserves the right to cancel the permission on the ground of direction from higher authorities or the Government.

Executive Engineer
Minor Irrigation Division,
Belgaum

For Venkateshwara power project Ltd,

Managing Director

Venkateshwara Power Project Ltd
A/P. [illegible] Tal. Chikodi,
Dist. [illegible]

WITNEES

1)

2)

HYDRO GEOLOGICAL

AND

GEOPHYSICAL STUDIES

OF

VENKATESHWARA POWER PROJECTS LTD.. BEDKIHAL,

TAL.- CHIKODI, DIST.- BELGAVI

KARNATAKA STATE

FOR THE PROPOSED DISTILLERY SITE

Please add Factory photo

Report Prepared by:

Shri. M. B. Kulkarni

M.Sc.(Geology)

Warananagar, Tal.-Panhala

Dist.-Kolhapur, (M.S).

e mail- milind5kulkarni@yahoo.com

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1) Introduction

a) Location

b) Geomorphology

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d) Rain fall and Landuse

2) Methodology

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1. INTRODUCTION :

The work of Hydrogeological survey with detailed Geophysical investigations was carried out at the proposed distillery site of Venkateshwara Power Projects Ltd., Bedkihal, Tal.:Chikodi, Dist.: Belgavi, Karnataka with an objective to understand the geological and geohyrological conditions of the area surrounding the proposed distillery site. Geological formations were recorded by studying the outcrops in the nearby area and observations of road cuttings and dug wells. The subsurface conditions were ascertained by Electrical Resistivity Surveys.

a) LOCATION :

Bedkihal is a major town in the Chikodi tehsil and the proposed site is just 3 Kms. South of Bedkihal town. Venkateshwara Power Projects (Sugar Unit) and the proposed distillery site are adjacent to each other.

The place is well connected by road to important places like Belgavi, Kolhapur, Chikodi, Ichalkaranji etc.

Fig.1) Map of Belgavi District:

Fig. 2) LOCATION MAP OF PROPOSED DISTILLERY SITE :

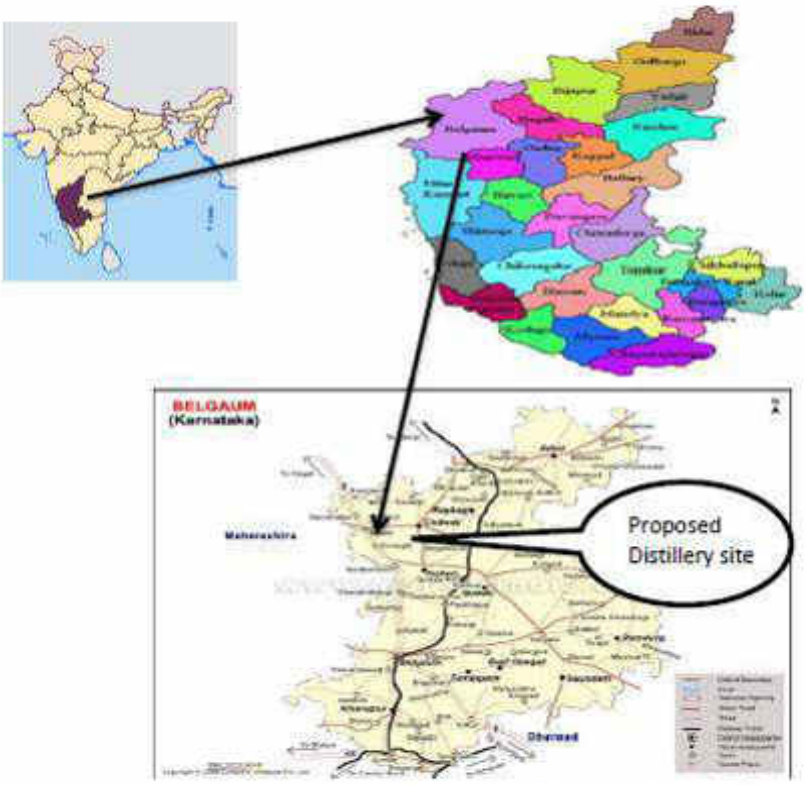

Figure 2.1: General location map of proposed distillery

Figure 2.2: Project boundary map of proposed distillery

1.	16°30'47.41" N, 74°28'24.88" E	4.	16°30'51.57" N, 74°28'27.02" E
2.	16°30'52.85" N, 74°28'25.57" E	5.	16°30'51.74" N, 74°28'28.89" E

PROJECT SITE OF PROPOSED DISTILLERY UNIT :

b) GEOMORPHOLGY:

The region falls towards the east of the western ghats with easterly flowing rivers.

The area is mostly characterized by a flat topography with local ruggedness at some places. The major river in the region is the river Vedganga which is the tributary of Krishna River. The area of the proposed distillery site is slightly elevated as compared to the surroundings.

The streams in the study area show a typical dendritic pattern which is typical of the Basaltic terrain.

c) GEOLOGY:

The surface study of the exposed out crops indicate that the region falls in the deccan trap basaltic terrain. Basalts are the fine grained, volcanic igneous rocks that are spread over a large area of western and central India.

The basalts of Bedkihali area are mostly Amygdaloidal basalts which have small to large vesicles filled by secondary minerals. Basaltic rocks are composed chiefly of two minerals i.e.black coloured Augite and Plagioclase feldspar. These rocks are very fine grained due to sudden cooling of lava thus no crystallization can be seen in these rocks. Other than the amygdaloidal variety, jointed and compact basalts can be seen at some road cuttings and in the well sections.

The soils are mostly black cotton soils having different types such as shallow black soil to deep black soil. Red soil mixed with black can be seen at some places. Along the banks of river Vedganga alluvial soil is present. Soil has varied thickness in the region rangimg from 4 m. to 9 m.

d) RAINFALL AND LANDUSE:

The area falls in the rain shadow zone that shows large variation in the rainfall of the district. The area close to the western ghat such as Khanapur and Belgavi receive annual rainfall more than 1200 mm. while the eastern area receives much less rainfall of just 600 mm.

Bedkihal receives mean annual rainfall of 678 mm.

As far as the land use is concerned out of the 126949 Hectors of the total available land in the Chikkodi Tehsil, 547 Hectors is forest land, 4571 Hectors is uncultivable land and 24947 is fallow land.

Around the proposed area the land is mostly cultivable due to various lift irrigation schemes that lift water from Vedganga River. Major crops include sugarcane, wheat, jawar etc.

The climate of the is semi arid type with temperature ranging from 27 to 37 degree Celsius in summer to 14 to 31 degrees in the winter season.

2) METHODOLOGY :

To collect the information about surface &subsurface setups, hydro geological &

geophysicalresistivitystudies were carried out. Thetotal areaof project is about 4 acres.

Thesurfacefeatureswerestudiedvisuallybyobservingsurfaceprofileand rocks exposed alongwellface,road cuttingsand pits.

a) SURFACE STUDY :

The surface hydro geological data was obtained from nearby wells. A well towards the north west of the site shows a thick column of red and black soil with thickness of 6 m.This soil layer is followed by hard weathered basalt (Muroom) with 3 m.thickness. Ground water is tapped at 7m. depth i.e. through the contact between the weathered rock and soil.

The region shows large variation in depth of water bearing strata which is at places as deep as 12 m. The main reason for the occurrence of ground water in the region is the various irrigation schemes that provide water to the fields. Water that percolates in the ground recharges the water table leading to the availability of ground water at shallow depths.

. b) **SUBSURFACE STUDY:**

The subsurface study of the geological and hydro geological characteristics of the proposed site area was carried with the help of electrical resistivity surveys. Three soundings were taken to ascertain the ground water conditions in the region . Electrical Resistivity Method is a proven method of subsurface investigation particularly for obtaining hydrological data. The method consists of introducing current in the ground and recording resistance offered by soils and rocks to this current.

The Wenner method was used to condict the survey as this method gives accuate results in DeccanTrap basaltic area in particular.This method consists of four electrodes (two current electrodes, C1C2 and two potential electrodes P1P2) having equal spacing between them.

The survey was conducted up to 30 m. depth as this much depth data was sufficient to provide necessary information related to the hydrological conditions of the region.

A sample data sheet of the survey.

WENNER ELECTRICAL SOUNDING DATA SHEET

Location : Premises of the Proposed Distillery Site.

Sl No.	C1C2/2 in mtrs.	P1P2/2 in mtrs.	A=Eectrode spacing mtrs.	R=Resistivity	2*pie*a	1/R
1	1.5	0.5	1	3.45	6.28	0.28
2	3.0	1.0	2	1.45	12.56	0.68
3	4.5	1.5	3	1.01	18.89	0.99
4	6.0	2.0	4	0.89	25.10	1.12
5	7.5	2.5	5	0.77	31.40	1.29
6	9.0	3.0	6	0.75	37.70	1.33
7	10.5	3.5	7	0.68	44.00	1.47
8	12.0	4.0	8	0.67	50.30	1.49
9	13.5	4.5	9	0.64	56.50	1.56
10	15.0	5.0	10	0.62	62.80	1.61
11	18.0	6.0	11	0.58	75.40	1.72
12	21.0	7.0	12	0.57	88.00	1.75
13	24.0	8.0	13	0.52	100.00	1.92
14	27.0	9.0	14	0.49	113.10	2.04
15	30.0	10.0	15	0.46	125.70	2.17

The data obtained was interpreted by inverse slope method as this method is the most reliable method of interpretation in Basaltic terrain. This can be done by plotting graph (Spacing between the electrodes on X axis and the inverse of resistivity on Y axis). By measuring the slopes we can interpret the underground geological conditions and also the hydrological parameters of the rocks underneath.

The interpretation of the data has given following findings.

Depth in Meters	**Rock formation**
0 to 4.5 ------	Soil
4.5 to 7 ------	Hard Muroom
7.0 to 10.0---	Compact, Jointed Basalt
10.0 to 15.0---	Hard, Compact Basalt

3. CONCLUSION:

The electrical resistivity data and the field study indicates that the area has a thick layer of soil and alluvium of up to 5 mtrs. Thick. Suitable care should be taken to place the foundation of the proposed buildings for the plant in hard rock.

Appropriate civil engineering precautions are needed to be taken while designing the plant for the stability.

The site appears to be geologically suitable.

The hydrological conditions are favourable for occurrence of ground water at a shallower depth however they will not affect the stability of the project.

Annexure VI: Molasses supply letters

BHIMA SAHAKARI SAKHAR KARKHANA LTD.

Takali Sikandar, Tal. Mohol, Dist. Solapur
S.T.D. : (02189) 246235 Phone: 246226, 246230 Fax : (02189) 246226
email : bhima_takali@yahoo.com, admin@bhimassk.com

Ref. No. : Mfg./ /2016-17 Date :11-01-2017

To,
The Managing Director,
Venkateshware Power Project Ltd.(Sugar Factory)
A.P.Bedkihal, Tal.Chikkodi,
Dist.Belgaum.

Sub:- Supply of Molasses for the proposed Distillery Unit

Ref:- Your Letter No.670 dt.11-1-2017

Dear Sir,

With reference to your letter cited above, we hereby confirm that, we are ready to supply molasses produced in our Sugar Factory from time to time as per the prevailing market rate.

At present our daily Sugar cane crushing capacity is 2500 TCD and In comming season we are going to start our sugar plant on expanded capacity i.e. 5000 TCD. Our annual molasses production will be approximately 32000 M.T. to 35000 M.T./annum.

Thanking you,

Yours faithfully,

(Sadanand E.G.)
Managing Director

SHRI CHHATRAPATI RAJARAM SAHAKARI SAKHAR KARKHANA LTD.

KASABA BAWADA, TALUKA-KARVEER, KOLHAPUR-416006 (MAHARASHTRA)
PHONE : 2600421 TO 24, 2600202 E-MAIL : rajaram.sakhana05@gmail.com
FAX : (0231) 2600674 REGD.NO.KPR/KVP/PRS (A) 2(S)/ 83-84 DT. 11-4-1984

Ref.No. CRSSK/ADM/PUR-2/ 151 /2016-17 18th July,2016

To
The Managing Director,
Venkateshwara Power Project Ltd.(Sugar Factory)
A.P.Bedkihal, Tal.Chikkodi
Dist.Belgaum

SUB :- Supply of Molasses for the proposed Distillery Unit

REF :- Your letter dated 18-7-2016

Dear Sir,

With reference to your letter under reference, we hereby confirm that, we are ready to supply molasses produced in our Sugar Factory from time to time as per the rates prevailing in the Market.

At present, our daily crushing capacity is 3500 TCD and we are going to expand it upto 4800 to 5000 TCD. Our annual molasses production will be approximately 16000 to 20000 M.T.

Thanking you.

Yours faithfully,
for SHRI CHH. RAJARAM SAH. SAKHAR KARKHANA LTD.,

(RAJENDRA K.CHOUGULE)
MANAGING DIRECTOR

For Venkateshwara Power Project Ltd.

Executive Director

C.C. [illegible]
[illegible]

Annexure VII: Assurance letters of brick manufacturers

SHRI R.D.L.BRICKS WORK'S

A/p. Chand Shirdwad Tq. Chikodi Dist. Belgaum
Cell : 9535719545

Ref.No. Date :

To,
M/S Venkateshwara Power Project ltd.
Bedkihal Village
Chikodi Taluk , Belgaum District Karnataka

Kind Attention: Mr Swaroop M. Mahadik (Managing Director)

Respected sir,

This is with reference to our discussion we have with your good selves, Regarding Ash Utilization from your proposed 90 KLPD molasses based distillery at village Bedkihal Chikodi Taluk, Belgaum District, Karnataka.

We would like to confirm that we will take around 10-12 ton per day Ash generated from your distillery plant.

Thanking You

Yours faithfully
For R.D.L. Bricks Works.

SHRI MAHALAXMI BRICKS WORK'S

A/p. BEDKHAL Tq. Chikodi Dist. Belgaum

Date :

To,
M/S Venkateshwara Power Project ltd.
Bedkihal Village
Chikodi Taluk , Belgaum District Karnataka

Kind Attention: Mr Swaroop M. Mahadik (Managing Director)

Respected sir,

This is with reference to our discussion we have with your good selves, Regarding Ash Utilization from your proposed 90 KLPD molasses based distillery at village Bedkihal Chikodi Taluk, Belgaum District, Karnataka.

We would like to confirm that we will take around 25-30 ton per day Ash generated from your distillery plant.

Thanking You

Yours faithfully
For Mahalaxmi Bricks Works.

JAI HANUMAN BRICKS WORK'S

A/p. BHOJ Tq. Chikodi Dist. Belgaum

Date :

To,
M/S Venkateshwara Power Project ltd.
Bedkihal Village
Chikodi Taluk , Belgaum District Karnataka

Kind Attention: Mr Swaroop M. Mahadik (Managing Director)

Respected sir,

This is with reference to our discussion we have with your good selves, Regarding Ash Utilization from your proposed 90 KLPD molasses based distillery at village Bedkihal Chikodi Taluk, Belgaum District, Karnataka.

We would like to confirm that we will take around 20-25 ton per day Ash generated from your distillery plant.

Thanking You

Yours faithfully
For Jai Hanuman Bricks Works.

GANESH BRICKS WORK'S

A/p. SHAMANEWADI Tq. Chikodi Dist. Belgaum

Date :

To,
M/S Venkateshwara Power Project ltd.
Bedkihal Village
Chikodi Taluk , Belgaum District Karnataka

Kind Attention: Mr Swaroop M. Mahadik (Managing Director)

Respected sir,

This is with reference to our discussion we have with your good selves, Regarding Ash Utilization from your proposed 90 KLPD molasses based distillery at village Bedkihal Chikodi Taluk, Belgaum District, Karnataka.

We would like to confirm that we will take around 35 ton per day Ash generated from your distillery plant.

Thanking You

Yours faithfully
For Ganesh Bricks Works.

ಫ್ಯಾಕ್ಸ್ / Fax : 080-25586321
ಈಮೇಲ್ / E-mail : ho@kspcb.gov.in
ವೆಬ್‌ಸೈಟ್ / Website : http://kspcb.gov.in

☎ 25581383, 25588112
25588151, 25588270
25588142, 25586520

DESPATCHED

ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮಾಲಿನ್ಯ ನಿಯಂತ್ರಣ ಮಂಡಲಿ
Karnataka State Pollution Control Board

"ಪರಿಸರಭವನ", 1 ರಿಂದ 5ನೇ ಮಹಡಿಗಳು, ನಂ.49, ಚರ್ಚ್‌ಸ್ಟ್ರೀಟ್, ಬೆಂಗಳೂರು - 560 001, ಕರ್ನಾಟಕ, ಭಾರತ
"Parisara Bhavana", 1st to 5th Floor, # 49, Church Street, Bengaluru - 560 001, Karnataka, INDIA

//By RPAD//

8 OCT 2015

(This document contains **10** Pages including annexure)

Combined Consent order **No. PCB/128/HPI/2015-16** / 1240 **Dated:**

Consent for discharge of effluents under the Water (Prevention and Control of Pollution) Act, 1974 and emissions under the Air (Prevention and Control of Pollution) Act, 1981.

Ref: 1. Application filed by the industry for consent for operation received at Regional Office, Chikkodi on 01.07.2015. (Reg.No. 94451)
2. Inspection of the Industry by R.O. Chikkodi on 27.05.2015.
3. Proceedings of Consent Committee Meeting held on 14.09.2015.

******

Consent is hereby granted under section 25 of the Water (Prevention and Control of Pollution) Act, 1974 and under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 (herein after referred as the Water Act and the Air Act respectively) and the Rules and Orders made there under and subject to the terms and conditions as detailed in the schedule annexed to this order.

Consent is granted to "**The Managing Director, M/s. Venkateshwara Power Project Ltd, Sy. No. 84,85,86,166,168,169 of A/P Bedkihal, Chikkodi Taluk, Belgaum District-591 214**", authorizing him to operate their industrial plant and to make discharge of effluents and emissions from the premises as detailed above;

For discharge of effluents under the Water Act:

Sl. No.	Description	Permitted Quantity of discharge	Place of discharge
1	Trade effluent • sugar plant • Co-gen plant.	305 KLD 226 KLD	Shall be used on land for irrigation after treating in ETP to the standards stipulated in **Annexure-I.**
2	Domestic effluent	15.50 KLD	Septic tanks & Soak pits.

Discharge of air emissions under the Air Act from the following stacks etc.

Sl. No.	Description of chimney/outlet	Limits specified refer schedule
As per **Annexure-II**		

CHIEF ENVIRONMENTAL OFFICER

The consent is valid for the manufacture of;

Sl. No.	Products & By-products	Maximum Capacity
1	Sugarcane Crushing	3500 TCD
2.	Co- generation plant	30 MW

THE CONSENT IS GRANTED FOR THE PERIOD FROM 01.07.2015 TO 30.06.2016.

For and on behalf of the
Karnataka State Pollution Control Board

CHIEF ENVIRONMENTAL OFFICER

To,
The Managing Director,
M/s. Venkateshwara Power Project Ltd,
Sy No. 84, 85, 86, 166, 168, 169 of A/P Bedkihal,
Chikkodi Tq, Belgaum District-591 214

SCHEDULE
TERMS AND CONDITIONS

(To accompany Consent order No.PCB/128/HPI/2015-16 Dated:)

I. (A) TREATMENT AND DISPOSAL OF EFFLUENTS UNDER THE WATER ACT.

1. The discharge from the premises of the applicant shall pass through the terminal manhole/manholes where from the Board shall be free to collect samples in accordance with the provisions of the Act or Rules made there under.

2. The daily quantity of effluent discharge shall not exceed the limits and shall not contain the constituents in excess of the tolerance limits laid down as indicated in the table below. The applicant shall monitor the quality of effluents for the parameters stipulated as per the frequency indicated.

Sl. No.	Description of the effluents	Daily quantity of discharge in KL	Tolerance Limits	Frequency of monitor
1	2	3	4	5
1	Trade effluent • sugar plant • Co-gen plant.	305 KLD 226 KLD	**Annexure-I**	Once in 15 days.
2	Domestic effluent	15.50 KLD	Septic tanks and soak pits	-

3. The applicant shall ensure that the trade effluent is treated in the treatment plant to the standards stipulated in **Annexure-I** and the treated effluent shall be utilized as indicated above.

4. The ETP site and the entire premises shall be always kept clean. The ETP site, inspection chamber, Outlets, flow measuring ponits should be made easily approachable to the inspecting officers.

5. The applicant shall ensure that the waste water generation from sugar unit is less than or equal to 100 lts/ ton of cane crushed.

6. The applicant shall provide flow meters for inflow and outflow of ETP and provide separate energy meter for ETP and record hourly readings in a log book for verification of inspecting Officers.

7. The applicant shall provide adequate storage capacity for treated effluent to take care of no demand for irrigation (15 days holding capacity). The storage tanks shall be impervious.

8. The industry should provide alternate power supply to the ETP pr its continuous operation.

CHIEF ENVIRONMENTAL OFFICER

9. Industry has to provide a separate drainage system for storm water management & there shall not be mixing of storm water with treated effluent.

10. The applicant shall discharge the treated effluent on Sy. No's as indicated in the agricultural management plan vide letter no: .VPPL/ENVT/126/2014-15/,Dated: 09.10.2014. The application of treated effluent for agriculture shall be controlled so as to avoid either flooding of land or ground water contamination.

11. The factory authorities shall display the approved flow sheet in the ETP area on a board along with discharge standards stipulated in the consent order.

12. The applicant shall display the treated effluent parameters, as per the latest analysis report of the treated trade effluent, at the ETP location.

13. The applicant shall paint the name and capacity of each unit of ETP.

14. No effluent shall be contained in unlined/ Katcha pits/ponds.

15. The applicant shall provide lined and closed drains to convey trade effluents to ETP for further treatment and disposal.

16. The applicant shall ensure that the operation of treated effluent treatment plant shall be started at least one month before starting of cane crushing to achieve desired MLSS so as to meet the prescribed standards from day one of the operation of mill.

17. The applicant shall not discharge any treated/untreated effluent out side the premises or into the ground for percolation, at any point of time.

II. TREATMENT AND DISPOSAL OF SEWAGE EFFLUENTS

The applicant shall ensure that the sewage effluent is treated in the septic tank and soak pit constructed as per IS 2470 Part-I & II and no overflow from soak pit is allowed.

III. MOLASSES STORAGE

1. (a) The applicant shall store the molasses only in steel tanks covered with proper roof in.
   b) Adequate number of steel tank shall be provided for molasses containment. Containment of molasses in earthen pits is not allowed.
2. The applicant shall obtain permission from the Board to dispose of the spoiled molasses and it shall be disposed off in a manner as laid down by the Board

IV. WATER CESS ACT:

The applicant shall provide water meters for every source of water and shall submit the cess returns regularly as required under Water Cess Act before 5th of every month in the prescribed form.

CHIEF ENVIRONMENTAL OFFICER

V. DISCHARGE OF EMISSIONS UNDER THE AIR ACT

1. The discharge of emissions from the premises of the applicant shall pass through the stacks/ chimneys mentioned in **Annexure-II** to the consent, where from the Board shall be free to collect the samples at any time in accordance with the provisions of the Act and Rules made there under. The stacks/ chimneys heights shall be as per **Annexure-II.**

2. The applicant shall operate the air pollution control equipment as specified in the **Annexure–II**, continuously so as to ensure that the emission does not exceed the limits specified. The operation of the control equipment shall be synchronized with the operation of the emission source.

3. The applicant shall provide port holes for sampling the emissions and access platforms for carrying out stack sampling and provide electrical outlet points and other arrangements for all chimneys/ stacks and other sources of emissions within 30 days from the date of receipt of this consent order so as to collect the sample of emissions by the Board or the applicant at any time in accordance with the provision of the Acts & rules made there under

4. The applicant shall maintain port hole, access platforms for carrying out stack sampling with electrical outlet points for sampling the emissions from port holes in all the stacks, as per the guidelines.

5. The applicant shall treat and dispose any liquid effluents produced in the course of control of air pollution by scrubbing, conditioning etc., of flue gases in accordance with the provisions of the Water (Prevention and Control of Pollution) Act, 1974. The details of such discharges shall be quantified and monitored immediately after commissioning and details of collection, treatment and disposal shall be furnished to the Board.

VI. LIQUID WASTES

The applicant shall treat and dispose any liquid effluents produced in the course of control of air pollution by scrubbing, conditioning etc., of flue gases in accordance with the provisions of the Water (Prevention and Control of Pollution) Act, 1974. The details of such discharges shall be quantified and monitored immediately after commissioning and details of collection, treatment and disposal shall be furnished to the Board.

VII. SELF MONITORING AND REPORTING BY THE INDUSTRY

1. The applicant shall at his own cost get the treated trade effluent samples collected from the place specified and analyze the same once is a month for the parameters indicated in **Annexure-I** and report submitted once in a month along with the quantity of water used, waste water generated, treated, and discharged, product manufactured, etc., in a compiled statement to the concerned Regional Office.

CHIEF ENVIRONMENTAL OFFICER

2. The applicant shall carryout the ambient air quality monitoring and submits the report to the Regional Office of the Board. The AAQM stations shall be carried out in all the established stations as per the requirement under the National Ambient Air Quality Monitoring Standards stipulated in Environmental (Protection) Rules, 1986. Monitoring shall include the parameters, $PM_{2.5}$, PM_{10} sulphur-di-oxide, Nitrogen Oxide The industry shall furnish statistical analysis for annual average of pollutants at all the locations as per Ambient Air Quality standards Notification once in a year.

3. The applicant shall at his own cost get the samples of emissions collected and get them analyzed once a month for the parameters indicated from the sampling port holes provided.
4. The applicant shall regularly monitor the ground water of the wells situated in agricultural where treated trade effluent is used for irrigation for water quality parameters and submit report.

5. **The applicant shall install on line continuous stack emission monitoring system for measurement of emissions parameter like PM and monitoring data shall be connected & up loaded to KSPCB and CPCB's servers on or before 30.09.2015.**

6. **The applicant shall install on line continuous effluent quality monitoring system at the out let of sugar plant ETP for the measurement of parameters like flow, pH, COD, BOD, TSS & other consented parameter and monitoring data shall be connected & up loaded to KSPCB and CPCB's servers on or before 30.09.2015.**

7. The applicant shall;

a) Submit the monitoring results as under;

i) Data monitored as per prescribed schedule shall be submitted to the Regional Office every month.

ii) A compiled data of all monitoring conducted as per schedule during the consent period shall be submitted in hard copy along with Consent application

VIII. ENVIRONMENTAL STATEMENT

The applicant shall submit the Environmental Statement every year for the period ending 31st March in Form V as per Rule 14 of Environment (Protection) Rule, 1986 on or before 30th September.

IX. HAZARDOUS WASTE (MANAGEMENT, HANDLING AND TRANSBOUNDRY MOVEMENT) RULES 2008

The applicant shall comply with the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008.

X. SOLID WASTE MANAGEMENT:

1. The applicant shall segregate solid waste from Hazardous Waste/ Bio-medical Waste/ Municipal Solid Waste and store it properly till treatment/disposal without causing pollution to Environment.
2. The storage & disposal shall be as specified below:

CHIEF ENVIRONMENTAL OFFICER

Sl No	Type of Solid Waste	Quantity in MT	Mode of storage, treatment and disposal
1	Press mud	28737	Given to farmers as manure.
2	ETP sludge	170	Mixed with boiler ash and to member farmers
3	Boiler ash	110	

XI. NOISE POLLUTION CONTROL:

1. The applicant shall take steps to control noise levels so as to maintain ambient air quality standard in respect of noise as laid down under the Air Act, 1981.
2. The applicant shall provide necessary acoustic enclosures or measures to control noise levels generated from the DG Sets as per Environment Protection Rules, 1986.

XII. GENERAL:

1. The Board reserves the right to review, impose additional conditions, revoke, change or alter terms and conditions of this consent.
2. This consent for discharging sewage and/ or trade effluents from the factory shall not be taken or construed as the Board's permission to continue to discharge the sewage and/ or trade effluents from the factory into the place (as mentioned in this consent Order) which pollutes the water there-in endangering the life and property of the persons using the said water before, during or after the periods indicated in the Terms and Conditions of this Consent Order
3. The applicant shall not change or alter either the quality or quantity or rate of emission or install/ replace or alter the air pollution control equipment, change in raw material or manufacturing process resulting in change in quality and/ or quantity of emissions without the prior permission of the Board
4. The industry shall not change or alter (a) raw materials or manufacturing process, (b) change the products or product mix (c) the quality, quantity or rate of discharge/ emissions and (d) install/replace/alter the water or air pollution control equipments without the prior approval of the Board.
5. The applicant shall promptly comply with all orders and instructions issued from time to time by the Board or any other officers of the Board duly authorized in this behalf.
6. The applicant shall forthwith keep the Board informed of any accidental discharge of emissions/ effluents into the atmosphere in excess of the standards laid down by the Board. The applicant shall also take corrective steps to mitigate the impact
7. The applicant shall not store any raw materials on naked ground.The applicant shall construct impervious dyke walls/tank form for storage tanks constructed above ground level.
8. The applicant shall display flow diagram of the pollution control system at the site.

CHIEF ENVIRONMENTAL OFFICER

9. Applicant shall maintain the Environmental Management System in conformity with ISO 14001:2004 standards.

10. The applicant shall appoint a qualified environmental engineer/ scientist for environment management in the factory and also establish an environmental cell.

11. The applicant shall comply with the guidelines under Corporate Responsibilities for Environment Protection (CREP) 2003 issued by Ministry of Environmental Forests and CPCB.

12. The applicant shall maintain register recording the ambient air quality, stack monitoring and analysis report of treated effluents. The register shall be open for inspection by the Board Officers at all time.

13. An inspection book shall be opened and made available to the Board Officers during their visit to the factory.

14. The applicant shall provide alternate power supply sufficient to operate all pollution control equipments utilized by the applicant to maintain compliance with the terms and conditions of this consent.

15. The entire premises shall be always kept clean. The effluent holding area, inspection chambers, outlets, flow measuring points should be made easily approachable.

16. The applicant shall display the consent granted in a prominent place for perusal of the inspecting Officers of the Board.

17. The applicant is heirs, legal representatives or assigns shall have no claims what so ever to the continuation or renewal of this consent after expiry of the period of consent.

18. The industry shall transport and store the raw materials in a manner so as not to cause any damage to environment, life and property. The applicant shall be solely responsible for any damages to environment.

19. The applicant shall plant and maintain adequate number of trees in and around the industry to arrest the dust emissions escaping into the surrounding area and improve the environment and aesthetic appearance of the industry and the surrounding

20. A well designed rainwater harvesting shall be put in place. Central Groundwater Authority/ Board shall be consulted for finalization of appropriate rainwater harvesting technology within a period of three months and details shall be furnished. Status of implementation shall be submitted to the Regional Office of the Board.

21. The applicant shall make an application for consent at least 120 days before expiry of this consent.

CHIEF ENVIRONMENTAL OFFICER

22. Industry shall comply with all the consent conditions and furnish report within 30 days to the Regional Office.

For and on behalf of
Karnataka State Pollution Control Board

CHIEF ENVIRONMENTAL OFFICER

ANNEXURE – I

Sl. No.	Characteristics.	Tolerance limits.
1.	Colour and Odour.	See Note.
2.	Suspended Solids mg/l.Max.	100
3.	pH value.	6 to 8.5
4.	Oil and Grease mg/l. Max.	10
5.	Bio-chemical Oxygen Demand, mg/l. (3 days at 27°C) max.	100

Note: All efforts should be made to remove colour and unpleasant odour as far as practicable.

TABLE

HYDRAULIC LOADING APPLICABLE FOR DIFFERENT SOILS

SL. No.	Soil Texture.	Loading rate in M^3/Hec/day.
1.	Sandy	225 to 280
2.	Sandy Loam.	170 to 225
3.	Loam.	110 to 170
4.	Clay Loam.	055 to 110
5.	Clayey.	035 to 055

ANNEXURE - II

Chimney	Chimney Attached to	Minimum Chimney Height to be Provided	Rate of emission Nm^3/ Hr.	Constituents to be controlled in the emission.	Tolerance limits Mg/N m^3	Air Pollution Control equipment to be installed, in addition to Chimney height as per Col (3)
1.	70 TPH Boiler (Bagasse fired)	60 m AGL	-	Particulate matter	150	Wet scrubber
2	90 TPH Boiler (Bagasse fired)	75 m AGL	-	Particulate matter	150	Venturi Wet scrubber
3	200 KVA DG set	3 m ARL	-	-	-	Acoustic enclosure

CHIEF ENVIRONMENTAL OFFICER

J 13012/34/2009-IA.II(T)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan
CGO Complex, Lodi Road
New Delhi-110 003
Dated: September 09, 2010

To

M/s Venkateshwara Power Projects Ltd.
A/p. Bedkihal, Taluk Chikodi
District Belgaum
Karnataka - 591 214

Sub: ***Expansion of 15 MW Co-Generation Power Plant by addition of 15 MW at village Bedkihal, in Chikkodi Taluk, in Belgaum Distt., in Karnataka - reg. Environmental Clearance.***

Sir,

The undersigned is directed to refer to your letter dated 19.03.2010 on the subject mentioned above regarding environmental clearance under the provisions of EIA Notification, 2006.

2. The Ministry of Environment & Forests has examined the application. The proposal is for expansion of existing 15 MW Co-Generation Power Plant by addition of another 15 MW. Expansion will be carried out within the existing plant premises of 92.0 acres. The plant is captive to Sugar Industry. The co-ordinates of the proposed expansion site are: Latitude 16°30'56.1" N and Longitude 74°28'32.33" E. Bagasse will be used as fuel. A stack of 70 m height will be installed. Additional water requirement of 188 KLD will be met from Doodhganga river for which permission has been obtained from the State Govt. There are no wildlife sanctuaries, national parks, biosphere reserves, elephant / tiger reserves, heritage sites etc. within 10 km of the plant boundary. Public hearing was conducted on 16.03.2010. Cost of the project will be Rs. 20.0 Crores.

3. The project has been considered in accordance with the provisions of the EIA notification issued by the Ministry of Environment & Forests vide S.O. 1533 (E), dated September 14, 2006. It has been noted that the proposal is a 'B' Category project but being located within 10 km of interstate boundary is considered at the Centre as per General Conditions of EIA Notification 2006.

4. Based on the information submitted by you as at para no.2 above and others and presentation made by you before the Expert Appraisal Committee (Thermal) in the 1st Meeting held during July 7-9, 2010, the Ministry of Environment and Forests hereby *accords environmental clearance* to the above project under the provisions of EIA notification dated September 14, 2006, subject to the compliance of the following Specific and General conditions:

A. Specific Conditions:

i) In case fuel for running the power plant is proposed to be changed from Bagasse to other fuel (liquid or solid) the project proponent shall apply for such a change in environmental clearance along with necessary documents as required under EIA notification, 2006 (and its amendments). In such a case the necessity for holding public hearing again or otherwise will be determined by the Ministry in consultation with the Expert Appraisal Committee (Thermal Power).

ii) Wet Scrubber shall be installed to control particulate emissions from Bagasse fired Boilers.

iii) Stacks of 70 m shall be installed. Exit velocity of flue gases shall not be less than 22 m/sec.

iv) COC 5.0 shall be adopted.

v) No ground water shall be extracted for the project work at any stage.

vi) Green Belt consisting of 3 tiers of plantations around the plant of 50 m width and adequate tree density not less than 2500 per ha with survival rate not less than 75 % shall be developed. In areas where 50 m width is not possible adequate justification shall be submitted to the regional Office of the Ministry.

vii) The treated effluents conforming to the prescribed standards only shall be reused to the extent possible and excess discharged. Arrangements shall be made that effluents and storm water do not do not get mixed.

viii) A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation. Continuous monitoring of effluent discharge shall be undertaken and it shall be ensured that when discharge enters the natural drain the temperature of effluent shall be at ambient.

ix) Monitoring of ground and surface water quality (if any nearby) shall be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.

x) A well designed rainwater harvesting shall be put in place. Central Groundwater Authority/ Board shall be consulted for finalization of appropriate rainwater harvesting technology within **a period of three months** from the date issue of clearance and details shall be furnished. Status of implementation shall be submitted to the Regional Office of the Ministry.

xi) Adequate safety measures shall be provided in the plant area to check/minimize spontaneous fires especially during summer season. Copy of these measures with full details along with location plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.

xii) Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75 dBA at 1m from the source of noise. For people working in the high noisc area, requisite personal protective equipment like earplugs/ear muffs etc. shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing loss including shifting to non noisy/less noisy areas.

xiii) Regular monitoring of ground level concentration of SO_2, NOx, RSPM (PM_{10} & $PM_{2.5}$) etc. shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.

xiv) Time bound action plan for implementation of issues raised in public hearing shall be submitted to the Ministry within **three months**.

xv) An amount of Rs 0.08Crores shall be earmarked as one time capital cost for CSR programme. Subsequently a recurring expenditure of Rs 0.016 Crores per annum shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be **submitted within one month** along with road map for implementation.

xvi) As part of CSR programme the company shall conduct need based assessment for the nearby villages to study economic measures with action plan which can help in upliftment of poor section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. This will be in addition to vocational training for individuals imparted to take up self employment and jobs.

xvii) It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.

B. General Conditions:

i) Storage facilities for auxiliary liquid fuel such as LDO and/ HFO/LSHS (if any) shall be made in the plant area in consultation with Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.

ii) First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.

iii) Provision shall be made for the housing of construction labourers within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

iv) The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in.

v) A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad / Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions/representations, if any, received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.

vi) An Environmental Cell shall be created at the project site itself and shall be headed by an officer of appropriate seniority and qualification. It shall be ensured that the head of the Cell shall directly report to the head of the organization.

vii) The proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB.

viii) The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well by e- mail) to the

respective Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB.

ix) **The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional Office, Ministry of Environment and Forests.**

x) Regional Office of the Ministry of Environment & Forests will monitor the implementation of the stipulated conditions. A complete set of documents including Environmental Impact Assessment Report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring. Project proponent will up-load the compliance status in their website and up-date the same from time to time at least six monthly basis. **Criteria pollutants levels including NO_x (from stack & ambient air) shall be displayed at the main gate of the power plant and in public domain.**

xi) Separate funds shall be allocated for implementation of environmental protection measures along with item-wise break-up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.

xii) The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of plant.

xiii) Full cooperation shall be extended to the Scientists/Officers from the Ministry / Regional Office of the Ministry at Bangalore / CPCB/ SPCB who would be monitoring the compliance of environmental status.

4. The Ministry of Environment and Forests reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction of the Ministry. The Ministry may also impose additional environmental conditions or modify the existing ones, if necessary.

5. The environmental clearance accorded **shall be valid for a period of five years** to start operations by the power plant.

6. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in

withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

7. In case of any deviation or alteration in the project proposed including coal transportation system from those submitted to this Ministry for clearance, a fresh reference should be made to the Ministry to assess the adequacy of the condition(s) imposed and to add additional environmental protection measures required, if any.

8. The above stipulations would be enforced among others under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and rules there under, Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and its amendments (as may be issued), the Public Liability Insurance Act, 1991 and its amendments.

9. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997.

Yours faithfully,

(**Dr. P.L. Ahujarai**)
Scientist 'F'

Copy to:

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi 110001.
2. The Secretary (Environment), Forests and Environment Department Government of Karnataka
3. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066.
4. The Chairman, Karnataka State Pollution Control Board, Parisara Bhawan, 4th & 5th Floor, 49, Church Street, Bangalore – 560 001.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi- 110032.
6. The Chief Conservator of Forests, Regional Office (SZ), Kendriya Sadan, 4th Floor E&F Wings 17th Main Road, 1 Block , Koranmangala, Bangalore-560 034.
7. The District Collector, Belgaum District, Govt. of Karnataka.
8. The Director (EI), MOEF.
9. Guard file.
10. Monitoring file.

(**Dr. P.L. Ahujarai**)
Scientist 'F'

Annexure X: Existing Sugar and cogeneration stack report and ambient copy

ACCREDITATIONS

CERTIFICATIONS
ISO 9001 : 2008 (TUVNORD)
OHSAS 18001:2008 (TUVNORD)

NTLR
CIN: U74900KA2018PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
179, JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008 KARNATAKA
PH : 0836 – 2771115, FAX :2770065, email : nicrotech@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWS&DB(GOK), UAS, DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/19/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
70 TPH Boiler

Sample Number:	**NOV/2016-17/626**
Type of Sample:	**STACK**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS: 11255 (Part 3): 2008 (Reaffirmed : 2014)
Particulars of Sample Collected:	Stack Sampler
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	20/11/2016
Date of Completion:	22/11/2016
Date of Report:	23/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016

GENERAL DETAILS

Fuel Used	Baggase
Height (m)	65
Diameter (m)	2.8
Stack Temperature ^{0}C	156
Ambient Temperature ^{0}C	31
Flue Gas Velocity (m/sec.)	9.17

RESULTS

SL.NO	PARAMETERS	TEST METHOD	UNIT	RESULT	KSPCB STANDARDS
1	Particulate Matter	IS 11255 (Part 1) : 1985 (Reaffirmed-2014)	mg/Nm^3	143.43	150
2	Sulphur dioxide	IS 11255 (Part 2) : 1985 (Reaffirmed-2014)	mg/Nm^3	11.03	Not Specified
3	Nitroger dioxide	IS 11255 (Part 7) : 2005 (Reaffirmed-2012)	mg/Nm^3	21.66	Not Specified

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Mana

-: END OF REPORT:-

Note:
1. The results listed above pertain only to the tested samples and applicable parameters. 2. Samples which are degradable/unstable will be disposed immid testing and others will be disposed after 15 days from the date of issue of test report unless otherwise specified. 3. Total liability of our laboratory is limited invoiced amount. 4. This report is not to be reproduced either wholly or in part and cannot be used as evidence in the court of law and should not be used advertising media without prior written permission.Subject to Dharwad Jurisdiction. **5. Sampling is not done by us unless otherwise specified.**

6. Any discrepancy in the test report should be notified within 15 days.

ACCREDITATIONS

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ISO 9001 : 2008 (TUVNORD)
OHSAS 18001:2008 (TUVNORD)

CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
170, JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008 KARNATAKA
PH : 0836 – 2771118, FAX :2770085, email : nrtechm@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWS&DB(GOK), UAS DHARWAD, DEPT OF HORTICULTURE (GOK)

Format No: NTLR/F/19/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
80 TPH Boiler

Sample Number:	**NOV/2016-17/627**
Type of Sample:	**STACK**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS: 11255 (Part 3): 2008 (Reaffirmed : 2014)
Particulars of Sample Collected:	Stack Sampler
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	20/11/2016
Date of Completion:	22/11/2016
Date of Report:	23/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016

GENERAL DETAILS

Fuel Used	Baggase
Height (m)	75
Diameter (m)	2.8
Stack Temperature ^{0}C	149
Ambient Temperature ^{0}C	31
Flue Gas Velocity (m/sec.)	8.80

RESULTS

SL.NO	PARAMETERS	TEST METHOD	UNIT	RESULT	KSPCB STANDARDS
1	Particulate Matter	IS 11255 (Part 1) : 1985 (Reaffirmed-2014)	mg/Nm^3	146.31	150
2	Sulphur dioxide	IS 11255 (Part 2) : 1985 (Reaffirmed-2014)	mg/Nm^3	11.49	Not Specified
3	Nitrogen dioxide	IS 11255 (Part 7) : 2005 (Reaffirmed-2012)	mg/Nm^3	22.15	Not Specified

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Mana

NTLR

-: END OF REPORT:-

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NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
NO. JUDGE'S BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008 KARNATAKA
PH : 0836 – 2771115, FAX : 2770085, email : nichrome@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWS&DB(GOK), UAS DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/34/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near Main Gate

Sample Number:	**NOV/2016-17/628**
Type of Sample:	**NOISE**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS:9989-1981(Reaffirmed 2001)
Particulars of Sample Collected:	Sound level meter
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	19/11/2016
Date of Completion:	21/11/2016
Date of Report:	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016

RESULTS

SL.NO.	TEST METHOD	TIME FREQUENCY	PARAMETERS		
			L Min. (dB)	L Max. (dB)	L_{EQ} dB (A)
1	IS:9989-1981 (Reaffirmed 2001)	10:00 am to 10:15 am	70.2	75.6	73.2

KSPCB Limits for Day time = 75 dB (A) L_{EQ}, Night Time (9.00 PM to 6.00 AM) Limits = 70 dB (A) L_{EQ}

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Manag

NTLR

-: END OF REPORT:-

Note:
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CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
176 JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008, KARNATAKA
PH : 0836 – 2771116, FAX :2770880, email : nichetest@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KIWSSA(GOK) KUWS&DB(GOK), UAS DHARWAD, DEPT OF HORTICULTURE (GOK)

Format No: NTLR/F/34/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near ETP Plant

Sample Number:	**NOV/2016-17/629**
Type of Sample:	**NOISE**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS:9989-1981(Reaffirmed 2001)
Particulars of Sample Collected:	Sound level meter
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	19/11/2016
Date of Completion:	21/11/2016
Date of Report.	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016

RESULTS

SL.NO.	TEST METHOD	TIME FREQUENCY	PARAMETERS		
			L Min. (dB)	L Max. (dB)	L_{EQ} dB (A)
1	IS:9989-1981 (Reaffirmed 2001)	10:30 am to 10:45 am	67.1	72.4	70.0

KSPCB Limits for Day time = 75 dB (A) L_{EQ}, Night Time (9.00 PM to 6.00 AM) Limits = 70 dB (A) L_{EQ}

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Manag

NTLR

-: END OF REPORT:-

Note:
1. The results listed above pertain only to the tested samples and applicable parameters. 2. Samples which are degradable/unstable will be disposed immid testing and others will be disposed after 15 days from the date of issue of test report unless otherwise specified. 3. Total liability of our laboratory is limited invoiced amount. 4. This report is not to be reproduced either wholly or in part and cannot be used as evidence in the court of law and should not be used advertising media without prior written permission. Subject to Dharwad Jurisdiction. 5. **Sampling is not done by us unless otherwise specified.**
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CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
170, JUDGES BUNGALOW ROAD, NAVANAPUR DHARWAD – 580008 KARNATAKA
PH : 0836 – 2771115, FAX :2770085, email : nichrom@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS KTPP/SSA(GOK), KUWS&DB(GOK), UAS DHARWAD, DEPT. OF HORTICULTURE (GCK)

Format No: NTLR/F/34/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near Boiler House

Sample Number:	**NOV/2016-17/630**
Type of Sample:	**NOISE**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS:9989-1981(Reaffirmed 2001)
Particulars of Sample Collected:	Sound level meter
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	19/11/2016
Date of Completion:	21/11/2016
Date of Report	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016

RESULTS

SL.NO.	TEST METHOD	TIME FREQUENCY	PARAMETERS		
			L Min. (dB)	L Max. (dB)	L_{EQ} dB (A)
1	IS:9989-1981 (Reaffirmed 2001)	11:00 am to 11:15 am	69.8	75.1	73.6

KSPCB Limits for Day time = 75 dB (A) L_{EQ}, Night Time (9.00 PM to 6.00 AM) Limits = 70 dB (A) L_{EQ}

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Manag

NTLR

-: END OF REPORT:-

Note:
1. The results listed above pertain only to the tested samples and applicable parameters. 2. Samples which are degradable/unstable will be disposed immedi testing and others will be disposed after 15 days from the date of issue of test report unless otherwise specified. 3. Total liability of our laboratory is limited invoiced amount. 4. This report is not to be reproduced either wholly or in part and cannot be used as evidence in the court of law and should not be used advertising media without prior written permission.Subject to Dharwad Jurisdiction. **5. Sampling is not done by us unless otherwise specified.**

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CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
170, JUDGES BUNGALOW ROAD NARAYANPUR, DHARWAD – 580008,KARNATAKA
PH : 0836 – 2771115, FAX :2770980, email : nonchem@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWS&DB(GOK)
UAS DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No. NTLR/F/34/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Turbion

Sample Number:	**NOV/2016-17/631**
Type of Sample:	**NOISE**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS:9989-1981(Reaffirmed 2001)
Particulars of Sample Collected:	Sound level meter
Environmental Condition:	**Normal**
Date of Collection:	19/11/2016
Date of Sample receipt	19/11/2016
Date of Analysis started:	19/11/2016
Date of Completion:	21/11/2016
Date of Report:	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016

RESULTS

SL.NO.	TEST METHOD	TIME FREQUENCY	PARAMETERS		
			L Min. (dB)	L Max. (dB)	L_{EQ} dB (A)
1	IS:9989-1981 (Reaffirmed 2001)	11:30 am to 11:45 am	69.2	74.7	72.8

KSPCB Limits for Day time = 75 dB (A) L_{EQ}, Night Time (9.00 PM to 6.00 AM) Limits = 70 dB (A) L_{EQ}

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Manage

NTLR

-: END OF REPORT:-

Note:
1. The results listed above pertain only to the tested samples and applicable parameters. 2. Samples which are degradable/unstable will be disposed immediat testing and others will be disposed after 15 days from the date of issue of test report unless otherwise specified. 3. Total liability of our laboratory is limited t Invoiced amount. 4. This report is not to be reproduced either wholly or in part and cannot be used as evidence in the court of law and should not be used in advertising media without prior written permission.Subject to Dharwad Jurisdiction. **5. Sampling is not done by us unless otherwise specified.**
6. Any discrepancy in the test report should be notified within 15 days.

ACCREDITATIONS

CERTIFICATIONS
ISO 9001 : 2008 (TUVNORD)
OHSAS 18001:2008 (TUVNORD)

CIN: U7490DKA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
170, JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008,KARNATAKA
PH : 0836 – 2771115, FAX : 2770085, email : dlcechub@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWS&DB(GOK), UAS DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/33/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near Main Gate

Sample Number:	**NOV/2016-17/622**
Type of Sample:	**AIR – AMBIENT**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS :5182 (Part 14): 2000 (Reaffirmed. 2005)
Particulars of Sample Collected:	Respirable Dust Sample: APM 460 B Fine Particulate Sampler
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	20/11/2016
Date of Completion:	21/11/2016
Date of Report:	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016
Wind Direction:	South West

RESULTS

SL. NO	PARAMETERS	TEST METHOD	UNIT	DURATION OF MONITORING	RESULT	NAAQ STANDARD
1	PM_{10}	IS 5182 (Part 23) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	97.73	100
2	$PM_{2.5}$	Lab SOP No : NTLR/SOP/37	$\mu g/m^3$	8 Hrs	58.24	60
3	Sulphur di Oxide	IS 5182 (Part 2) : 2001 (RA 2006)	$\mu g/m^3$	8 Hrs	5.32	80
4	Nitrogen di Oxide	IS 5182 (Part 6) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	10.19	80

Inference as per NAAQ Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Mana

-:END OF REPORT:-

Note:
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6. Any discrepancy in the test report should be notified within 15 days.

ACCREDITATIONS

CERTIFICATIONS
ISO 9001 : 2008 (TUVNORD)
OHSAS 18001:2008 (TUVNORD)

CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
170, JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD - 580008 KARNATAKA
PH : 0836 - 2771115, FAX :2770065, email : nicechem@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWSA&DB(GOK), UAS DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/33/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near Administrative Office

Sample Number:	**NOV/2016-17/623**
Type of Sample:	**AIR – AMBIENT**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS :5182 (Part 14): 2000 (Reaffirmed. 2005)
Particulars of Sample Collected:	Respirable Dust Sampler (APM 460 B Fine Particulate Sampler
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	20/11/2016
Date of Completion:	21/11/2016
Date of Report:	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016
Wind Direction:	South West

RESULTS

SL. NO	PARAMETERS	TEST METHOD	UNIT	DURATION OF MONITORING	RESULT	NAAQ STANDARD
1	PM_{10}	IS 5182 (Part 23) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	87.69	100
2	$PM_{2.5}$	Lab SOP No : NTLR/SOP/37	$\mu g/m^3$	8 Hrs	50.12	60
3	Sulphur di Oxide	IS 5182 (Part 2) : 2001 (RA 2006)	$\mu g/m^3$	8 Hrs	5.21	80
4	Nitrogen di Oxide	IS 5182 (Part 6) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	9.99	80

Inference as per NAAQ Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Mana

-:END OF REPORT:-

Note:
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ACCREDITATIONS

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CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
170, JUDGES BUNGALOW ROAD, NANAVANPUR, DHARWAD – 580008,KARNATAKA
PH : 0836 – 2771115, FAX :2770085, email : nicrotwin@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRNNSSA(GOK), KUWS&DB(GOK), UAS, DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/33/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near ETP Plant

Sample Number:	**NOV/2016-17/624**
Type of Sample:	**AIR – AMBIENT**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS :5182 (Part 14): 2000 (Reaffirmed. 2005)
Particulars of Sample Collected:	Respirable Dust Sampler (APM 460 B Fine Particulate Sampler
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	20/11/2016
Date of Completion:	21/11/2016
Date of Report:	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016
Wind Direction:	South West

RESULTS

SL. NO	PARAMETERS	TEST METHOD	UNIT	DURATION OF MONITORING	RESULT	NAAQ STANDARD
1	PM_{10}	IS 5182 (Part 23) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	91.70	100
2	$PM_{2.5}$	Lab SOP No : NTLR/SOP/37	$\mu g/m^3$	8 Hrs	52.96	60
3	Sulphur di Oxide	IS 5182 (Part 2) : 2001 (RA 2006)	$\mu g/m^3$	8 Hrs	5.30	80
4	Nitrogen di Oxide	IS 5182 (Part 6) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	10.17	80

Inference as per NAAQ Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Mana

-:END OF REPORT:-

Note:
1. The results listed above pertain only to the tested samples and applicable parameters. 2. Samples which are degradable/unstable will be disposed immid testing and others will be disposed after 15 days from the date of issue of test report unless otherwise specified. 3. Total liability of our laboratory is limited invoiced amount. 4. This report is not to be reproduced either wholly or in part and cannot be used as evidence in the court of law and should not be used advertising media without prior written permission.Subject to Dharwad Jurisdiction. **5. Sampling is not done by us unless otherwise specified.**

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ACCREDITATIONS

CERTIFICATIONS
ISO 9001 : 2008 (TUVNORD)
OHSAS 18001:2008 (TUVNORD)

CIN: U74900KA2013PTC069193

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
L10, JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008,KARNATAKA
PH : 0836 – 2771155, FAX : 2770085, email : nlcchem@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWS&DB(GOK), UAS DHARWAD, DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/33/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
Near Store Office

Sample Number:	**NOV/2016-17/625**
Type of Sample:	**AIR – AMBIENT**
Sample Collected by:	Nichrome Testing Laboratory and Research Private Limited
Sampling Method:	IS :5182 (Part 14): 2000 (Reaffirmed. 2005)
Particulars of Sample Collected:	Respirable Dust Sampler (APM 460 B Fine Particulate Sampler
Environmental Condition:	Normal
Date of Collection:	19/11/2016
Date of Sample receipt:	19/11/2016
Date of Analysis started:	20/11/2016
Date of Completion:	21/11/2016
Date of Report:	22/11/2016
Customer Reference:	WO No :335 Date:08/NOV/2016
Wind Direction:	South West

RESULTS

SL. NO	PARAMETERS	TEST METHOD	UNIT	DURATION OF MONITORING	RESULT	NAAQ STANDARD
1	PM_{10}	IS 5182 (Part 23) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	94.96	100
2	$PM_{2.5}$	Lab SOP No : NTLR/SOP/37	$\mu g/m^3$	8 Hrs	56.80	60
3	Sulphur di Oxide	IS 5182 (Part 2) : 2001 (RA 2006)	$\mu g/m^3$	8 Hrs	5.26	80
4	Nitrogen di Oxide	IS 5182 (Part 6) : 2006 (RA 2012)	$\mu g/m^3$	8 Hrs	10.09	80

Inference as per NAAQ Standards	Above tested parameters confirming to standards.

Authorized Signatory
V. H. Hugar (Technical Mana

NTLR

-:END OF REPORT:-

Note:
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Annexure XI: Laboratory report of existing sugar ETP inlet and outlet

NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSDA(GOK), KUWSDB(GOK), UAS DHARWAD DEPT. OF HORTICULTURE (GOK)

Format No: NTLR/F/16/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
ETP

Sample Number:	**FEB/2015-16/515**
Type of Sample:	**TREATED WATER**
Sample Collected by:	Customer
Sampling Method:	-
Particulars of Sample Collected:	-
Environmental Condition:	Normal
Date of Collection:	11/02/2016
Date of Sample receipt:	11/02/2016
Date of Analysis started:	11/02/2016
Date of Completion:	16/02/2016
Date of Report:	17/02/2016
Customer Reference:	Order No:281 Date:14/11/2015
Sample Condition:	Satisfactory

RESULTS

SL.NO	PARAMETERS	UNITS	TEST METHOD	RESULT	Tolerance Limits (As per KSPCB Standards)
1	Colour*	-	APHA 22ND EDITION-2012, 2120 B	Colourless	Colourless
2	Odour*	-	IS:3025 (Part 5) 1983 (RA : 2002)	Odourless	Odourless
3	pH @ 25° C	-	APHA 22ND EDITION,2012,4500 H+, B	6.28	6.0 – 8.5
4	Total Suspended Solids, Max	mg/L	APHA 22ND EDITION,2012,2540 D	96.00	100
5	Biological Oxygen Demand(BOD) 3 days at 27° C, Max	mg/L	IS : 3025 (Part : 44) 1993 (RA : 2014)	97.00	100
6	Oil and Grease, Max	mg/L	IS : 3025 (part- 39) – 1991 (RA : 2014)	BDL	10

BDL: Below Detectable Limit, BDL (Oil & Grease -1.0 mg/L)

Inference as per KSPCB Standards	Above tested parameters confirming to standards.

Note: The tests marked with an * are not accredited by NABL

Authorized Signatory
V. H. Hugar (Technical Manager)

NTLR

-: END OF REPORT:-

Note:
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NICHROME TESTING LABORATORY AND RESEARCH PRIVATE LIMITED
175, JUDGES BUNGALOW ROAD, NARAYANPUR, DHARWAD – 580008, KARNATAKA
Ph : 0836 – 2371115, FAX: 2770965, email : ntlachem@gmail.com
TESTING SERVICES, ENGINEERS & CONSULTANTS
OTHER APPROVALS : KRWSSA(GOK), KUWSB(GOK), UAS, DHARWAD, DEPT OF HORTICULTURE (GOK)
CIN: U74900KA2013PTC068193

Format No: NTLR/F/16/05

TEST REPORT

Name of Customer and Address:
M/S.Venkateshwara Power Projects Ltd.,
Bedkihal, Tq: Chikkodi,
Dist: Belgaum

Sampling Location:
ETP

Sample Number:	**FEB/2015-16/516**
Type of Sample:	**UNTREATED WATER**
Sample Collected by:	Customer
Sampling Method:	-
Particulars of Sample Collected:	-
Environmental Condition:	Normal
Date of Collection:	11/02/2016
Date of Sample receipt:	11/02/2016
Date of Analysis started:	11/02/2016
Date of Completion:	16/02/2016
Date of Report:	17/02/2016
Customer Reference:	Order No:281 Date:14/11/2015
Sample Condition:	Satisfactory

RESULTS

SL.NO	PARAMETERS	UNITS	TEST METHOD	RESULT
1	Colour*	-	APHA 22ND EDITION-2012, 2120 B	Cream
2	Odour*	-	IS:3025 (Part 5) -1983 (RA : 2002)	Foul
3	pH @ 25° C	-	APHA 22ND EDITION,2012,4500 H+, B	4.40
4	Total Suspended Solids	mg/L	APHA 22ND EDITION,2012,2540 D	1193.00
5	Biological Oxygen Demand(BOD) 3 days at 27° C	mg/L	IS : 3025 (Part : 44) 1993 (RA : 2014)	8942.00
6	Oil and Grease	mg/L	IS : 3025 (part- 39) – 1991 (RA : 2014)	BDL

BDL: Below Detectable Limit, BDL (Oil & Grease -1.0 mg/L)

Note: The tests marked with an * are not accredited by NABL

Authorized Signatory
V. H. Hugar (Technical Manager)

NTLR

-: END OF REPORT:-

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MAHARASHTRA
ENVIRO POWER LTD
ISO 9001:2008 | EMS 14001 : 2004 | OHSAS 18001 : 2007 Certified Company
(Common Hazardous Waste Treatment, Storage and Disposal Facility)
The Corporate Identity Number (CIN) : U40106MH2006PLC160780

SMS

AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address				
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39		
	Date	11/01/2017		
	Reference No	170139/1	**Sampling Duration**	24 Hrs
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	58.3	103.5	14.2	19.6
2	02-10-2016	48.7	98.7	10.1	22.3
3	07-10-2016	59.4	88.2	7.8	15.4
4	08-10-2016	56.7	91.3	11.6	17.8
5	14-10-2016	48.6	88.2	10.2	18.5
6	15-10-2016	49.4	89.3	12.6	14.7
7	21-10-2016	43.7	83.6	9.2	14.2
8	22-10-2016	42.9	82.7	10.6	15.9
9	28-10-2016	47.4	79.8	12.1	18.5
10	29-10-2016	48.2	98.6	10.2	19.4
11	01-11-2016	46.2	91.2	9.5	17.2
12	02-11-2016	43.1	83.5	13.1	20.2
13	07-11-2016	42.1	82.9	9.6	16.7
14	08-11-2016	40.2	90.4	10.4	18.4
15	14-11-2016	38.7	82.6	9.5	19.2
16	15-11-2016	43.7	86.5	8.7	20.4
17	21-11-2016	38.6	87.2	7.4	16.4
18	22-11-2016	40.3	91.3	8.2	17.6
19	28-11-2016	34.9	76.2	9	18.2
20	29-11-2016	43.7	87.9	8.3	19.1
21	05-12-2016	44.6	86.4	7.8	21.7
22	06-12-2016	41.3	87.5	8.1	18.7
23	12-12-2016	42.3	98.6	10.3	20.8
24	13-12-2016	48.1	106.2	11.8	21.4
25	19-12-2016	36.8	86.3	12.7	19.5
26	20-12-2016	43.2	91.7	10.3	18.7
Average Values					
Minimum		34.9	76.2	7.4	14.2
Maximum		59.4	106.2	14.2	22.3
Average		45.04	89.24	10.13	18.48
98th		58.85	104.85	13.65	22

FOR MAHARASHTRA ENVIROPOWER LIMITED

Dipa
Checked By

MAHARASHTRA ENVIRO POWER LTD. PUNE

Mali
Approved By

MAHARASHTRA
ENVIRO POWER LTD
ISO 9001:2008 | EMS 14001 : 2004 | OHSAS 18001 : 2007 Certified Company
(Common Hazardous Waste Treatment, Storage and Disposal Facility)
The Corporate Identity Number (CIN) : U40106MH2006PLC160780

SMS

AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/2	**Sampling Duration**	24 Hrs
	Co-ordinates	**16^{0}30' 41.06" N, 74^{0}27' 22.05" E**		
	Test Location	**Dilalpurwadi**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	52.3	94.3	8.4	16.2
2	02-10-2016	47.6	78.2	8.1	14.7
3	07-10-2016	49.2	68.7	5.6	16.2
4	08-10-2016	48.7	71.2	9.2	15.1
5	14-10-2016	41.2	68.4	8.1	14.8
6	15-10-2016	39.4	69.8	6.6	13.2
7	21-10-2016	36.3	73.1	9.2	12.8
8	22-10-2016	32.9	68.2	8.1	11.4
9	28-10-2016	37.4	69.4	7.4	13.5
10	29-10-2016	38.3	71.8	8.2	11.8
11	01-11-2016	36.4	70.9	8.7	16.2
12	02-11-2016	33.1	67.8	6.9	14.7
13	07-11-2016	32.2	72.1	8	15.6
14	08-11-2016	39.4	70.6	9.4	13.7
15	14-11-2016	37.8	72.5	7.2	18.1
16	15-11-2016	33.7	66.8	6.7	16.2
17	21-11-2016	36.8	67.3	7.5	15.8
18	22-11-2016	32.4	71.9	6.2	14.2
19	28-11-2016	31.4	66.3	8.7	13.7
20	29-11-2016	33.7	67.4	8.0	15.6
21	05-12-2016	34.1	62.8	6.4	14.2
22	06-12-2016	31.6	65.2	6.1	12.3
23	12-12-2016	32.8	60.8	7.2	13.7
24	13-12-2016	37.4	67.4	6.9	14.3
25	19-12-2016	30.8	66.5	7	15.5
26	20-12-2016	31.4	61.8	6.3	14.9
Average Values					
Minimum		30.8	60.8	5.6	11.4
Maximum		52.3	94.3	9.4	18.1
Average		37.24	69.66	7.54	14.55
98th		50.75	86.25	9.3	17.15

FOR MAHARASHTRA ENVIROPOWER LIMITED

Dipa
Checked By

MAHARASHTRA ENVIRO POWER LTD. PUNE

Mali
Approved By

MAHARASHTRA
ENVIRO POWER LTD
ISO 9001:2008 | EMS 14001 : 2004 | OHSAS 18001 : 2007 Certified Company
(Common Hazardous Waste Treatment, Storage and Disposal Facility)
The Corporate Identity Number (CIN) : U40106MH2006PLC160780

SMS

AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/3	**Sampling Duration**	24 Hrs
	Co-ordinates	**16^{0}29' 31.94" N, 74^{0}28' 22.67" E**		
	Test Location	**Galatga**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	47.2	74.3	7.6	14.6
2	02-10-2016	45.3	76.2	6.3	13.8
3	07-10-2016	44.1	67.5	5.7	11.9
4	08-10-2016	40.6	70.6	8.1	14.2
5	14-10-2016	42.1	65.8	7.4	13.6
6	15-10-2016	34.5	61.7	6.9	12.7
7	21-10-2016	31.6	63.5	8.2	11.2
8	22-10-2016	34.7	60.9	7.4	10.3
9	28-10-2016	31.7	69.4	6.9	13.8
10	29-10-2016	30.3	62.4	7.2	12.2
11	01-11-2016	42.8	60.7	8.1	10.7
12	02-11-2016	41.9	65.4	7.6	11.6
13	07-11-2016	40.2	63.2	6.3	12.7
14	08-11-2016	41.6	63.8	7.4	13.6
15	14-11-2016	38.4	67.2	6.9	14.1
16	15-11-2016	32.7	60.4	5.8	15.5
17	21-11-2016	30.8	61.2	9.1	14.2
18	22-11-2016	34.7	59.8	6.1	13.6
19	28-11-2016	30.2	63.4	7.7	12.4
20	29-11-2016	31.6	64.5	7.4	11.8
21	05-12-2016	33.8	66.7	6.8	10.6
22	06-12-2016	30.4	64.2	6.9	12.3
23	12-12-2016	29.6	59.4	6.4	13.8
24	13-12-2016	32.7	58.4	6.3	13.4
25	19-12-2016	33.4	63.7	6.4	12.5
26	20-12-2016	32.4	62.9	7.1	9.4
Average Values					
Minimum		36.9	61.8	8.7	15.6
Maximum		45.2	74.2	13.8	23.6
Average		41.0	68.5	10.8	18.9
98th		45	73.9	13.75	23.05

FOR MAHARASHTRA ENVIROPOWER LIMITED

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/4	**Sampling Duration**	24 Hrs
	Co-ordinates	**16^{0}32' 18.33" N, 74^{0}29' 05.15" E**		
	Test Location	**Bedkihal**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	44.6	70.4	6.7	11.8
2	02-10-2016	40.7	66.2	5.3	10.4
3	07-10-2016	42.6	65.4	5.7	9.5
4	08-10-2016	39.4	67.1	7.1	8.6
5	14-10-2016	38.5	66.2	6.1	11.2
6	15-10-2016	37.4	58.6	6.4	7.2
7	21-10-2016	36.1	55.6	7.2	8.5
8	22-10-2016	33.8	56.2	6.3	7.3
9	28-10-2016	31.4	57.8	5.9	10.6
10	29-10-2016	30.3	60.5	6.2	11.8
11	01-11-2016	40.2	56.7	6.1	7.1
12	02-11-2016	36.7	55.1	7.2	8.6
13	07-11-2016	35.2	53.2	5.3	7.2
14	08-11-2016	36.8	60.9	6.4	10.6
15	14-11-2016	34.8	64.7	5.9	11.4
16	15-11-2016	30.4	56.2	4.8	12.5
17	21-11-2016	31.2	57.3	6.1	10.6
18	22-11-2016	30.7	52.8	6.4	8.9
19	28-11-2016	33.6	61.4	6.7	8.4
20	29-11-2016	30.8	55.9	7.1	7.9
21	05-12-2016	31.2	61.8	5.8	6.8
22	06-12-2016	30.4	62.4	4.9	7.2
23	12-12-2016	27.8	55.8	5.6	6.8
24	13-12-2016	30.2	54.7	5.8	6.4
25	19-12-2016	29.6	53.4	6.1	7.4
26	20-12-2016	30.4	60.2	6.5	6.8
Average Values					
Minimum		27.8	52.8	4.8	6.4
Maximum		44.6	70.4	7.2	12.5
Average		34.42	59.48	6.14	8.90
98th		43.6	68.75	7.2	12.15

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/5	**Sampling Duration**	24 Hrs
	Co-ordinates	**$16^0$32' 23.92" N, $74^0$26' 33.19" E**		
	Test Location	**Bhoj**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	40.7	69.5	6.1	8.1
2	02-10-2016	38.5	63.2	5.4	7.4
3	07-10-2016	36.4	60.5	6.7	8.5
4	08-10-2016	41.2	65.3	7	7.6
5	14-10-2016	37.1	64.2	6.3	8.3
6	15-10-2016	35.9	55.2	5.9	6.4
7	21-10-2016	33.6	53.7	6.4	7.4
8	22-10-2016	32.7	51.6	5.8	7.1
9	28-10-2016	30.8	50.9	5.1	8.4
10	29-10-2016	34.5	54.7	6.7	8.1
11	01-11-2016	41.6	52.6	5.9	6.3
12	02-11-2016	33.6	50.4	6.3	5.7
13	07-11-2016	30.2	49.8	4.6	6.4
14	08-11-2016	31.8	56.7	5.8	6.1
15	14-11-2016	30.4	55.1	6.1	8.2
16	15-11-2016	30.6	52.3	5.7	9.6
17	21-11-2016	29.6	50.4	5.4	7.5
18	22-11-2016	28.7	51.2	5.9	6.8
19	28-11-2016	30.5	53.7	6.3	6.1
20	29-11-2016	29.4	50.1	6.1	5.9
21	05-12-2016	31.2	54.3	5.4	6.2
22	06-12-2016	29.4	48.3	4.6	7.3
23	12-12-2016	27.4	47.1	4.8	6.7
24	13-12-2016	26.8	46.8	5.2	5.8
25	19-12-2016	27.4	45.9	6.2	6.3
26	20-12-2016	28.6	50.6	5.5	5.4
Average Values					
Minimum		26.8	45.9	4.6	5.4
Maximum		41.6	69.5	7	9.6
Average		32.64	54.00	5.82	7.06
98th		41.4	67.4	6.85	9.05

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Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/6	**Sampling Duration**	24 Hrs
	Co-ordinates	**16^{0}30' 02.55" N, 74^{0}25' 30.98" E**		
	Test Location	**Hunnagari**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	37.2	68.5	5.9	7.2
2	02-10-2016	35.2	60.9	4.4	6.3
3	07-10-2016	34.1	59.4	5.7	5.4
4	08-10-2016	39.6	56.8	6.3	4.6
5	14-10-2016	35.2	62.4	5.8	7.2
6	15-10-2016	31.8	53.2	4.6	7.1
7	21-10-2016	29.4	54.7	4.4	6.5
8	22-10-2016	30.1	49.3	5.1	6.2
9	28-10-2016	28.2	51.2	4.2	7.5
10	29-10-2016	27.1	56.2	4.7	6.9
11	01-11-2016	26.3	51.4	4.8	5.2
12	02-11-2016	24.7	50.4	5.4	6.6
13	07-11-2016	25.9	48.7	3.9	5.2
14	08-11-2016	26.1	56.7	4.2	4.9
15	14-11-2016	25.4	50.3	4.8	5.3
16	15-11-2016	26.3	48.2	5.1	4.7
17	21-11-2016	25.8	47.1	5.5	5.7
18	22-11-2016	24.7	45.6	4.9	6.2
19	28-11-2016	25.4	44.9	4.6	5.2
20	29-11-2016	26.4	42.8	3.9	4.8
21	05-12-2016	29.2	49.3	3.4	5.3
22	06-12-2016	28.7	47.2	4.1	6.5
23	12-12-2016	26.5	45.2	3.8	6.1
24	13-12-2016	25.4	43.8	4.3	4.9
25	19-12-2016	24.6	45.9	5.4	5.4
26	20-12-2016	24.9	47.5	4.5	4.3
Average Values					
Minimum		24.6	42.8	3.4	4.3
Maximum		39.6	68.5	6.3	7.5
Average		28.62	51.45	4.76	5.82
98th		38.4	65.45	6.1	7.35

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Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/7	**Sampling Duration**	24 Hrs
	Co-ordinates	**$16^0$28' 21.68" N ,74^0 31' 11.69" E**		
	Test Location	**Shirgaonwadi**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	33.5	63.8	4.8	6.8
2	02-10-2016	33.2	52.8	4.3	6.1
3	07-10-2016	30.2	55.4	4.1	5.5
4	08-10-2016	29.6	54.7	4.2	4.7
5	14-10-2016	25.2	52.6	5.2	6.3
6	15-10-2016	26.1	50.7	4.7	6.4
7	21-10-2016	28.5	51.3	4.6	5.5
8	22-10-2016	29.2	48.2	5.2	6.1
9	28-10-2016	27.3	46.3	4.7	6.8
10	29-10-2016	26.4	52.6	4.2	7.4
11	01-11-2016	25.1	48.7	5.1	6.5
12	02-11-2016	23.8	56.3	4.8	6.3
13	07-11-2016	26.7	44.7	4.2	5.8
14	08-11-2016	27.5	41.6	4.3	4.5
15	14-11-2016	26.9	46.8	4.8	4.1
16	15-11-2016	24.1	45.3	4.9	3.8
17	21-11-2016	23.7	41.8	5.1	4.2
18	22-11-2016	22.8	44.6	4.6	5.4
19	28-11-2016	23.5	43.2	4.3	5.1
20	29-11-2016	24.6	40.9	4.1	4.7
21	05-12-2016	25.4	47.8	3.6	4.9
22	06-12-2016	26.7	46.5	3.9	4.6
23	12-12-2016	24.1	46.9	3.4	3.9
24	13-12-2016	23.5	44.7	4.1	4.2
25	19-12-2016	22.8	43.2	4.7	4.8
26	20-12-2016	25.4	41.5	5.1	4.1
Average Values					
Minimum		30.2	62.7	7.1	13.8
Maximum		44.3	71.6	10.8	22.7
Average		36.3	66.9	8.8	17.5
98th		43.2	70.9	10.6	21.75

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Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/8	**Sampling Duration**	24 Hrs
	Co-ordinates	**$16^0$30' 41.37" N ,$74^0$31' 38.24" E**		
	Test Location	**Nej**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	32.1	58.3	3.9	5.7
2	02-10-2016	30.6	50.4	4.0	4.8
3	07-10-2016	32.4	54.6	3.9	4.6
4	08-10-2016	27.4	50.2	3.2	4.1
5	14-10-2016	26.3	46.8	4.8	5.8
6	15-10-2016	24.5	49.5	3.7	3.4
7	21-10-2016	27.6	50.2	4.1	5.1
8	22-10-2016	26.7	49.1	4.2	5.8
9	28-10-2016	24.5	47.3	4.7	6.2
10	29-10-2016	27.1	45.6	4.2	5.4
11	01-11-2016	26.3	44.5	3.9	6.1
12	02-11-2016	25.4	41.8	3.8	5.8
13	07-11-2016	23.9	45.6	4.1	6.1
14	08-11-2016	26.8	40.2	3.9	4.8
15	14-11-2016	27.1	42.6	4.2	4.2
16	15-11-2016	23.5	46.1	4.1	3.9
17	21-11-2016	24.6	45.6	4.9	4.1
18	22-11-2016	24.2	51.2	4.4	4.4
19	28-11-2016	23.8	49.2	3.9	4.9
20	29-11-2016	21.4	48.4	4.3	4.5
21	05-12-2016	23.9	46.7	3.9	5.1
22	06-12-2016	25.4	45.9	4.1	4.4
23	12-12-2016	23.7	46.1	4.2	3.7
24	13-12-2016	26.1	42.8	3.5	4.3
25	19-12-2016	21.9	51.7	3.7	4.1
26	20-12-2016	22.6	52.6	4.2	3.9
Average Values					
Minimum		21.4	40.2	3.2	3.4
Maximum		32.4	58.3	4.9	6.2
Average		25.76	47.81	4.07	4.82
98th		32.25	56.45	4.85	6.15

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Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/9	**Sampling Duration**	24 Hrs
	Co-ordinates	**16^{0}30' 46.87" N, 74^{0}23' 35.47" E**		
	Test Location	**Benadi**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	30.4	59.2	4.1	6.1
2	02-10-2016	31.2	51.3	3.7	4.2
3	07-10-2016	30.8	55.4	3.6	4.4
4	08-10-2016	26.8	49.6	3.7	3.8
5	14-10-2016	26.4	44.2	4.1	5.7
6	15-10-2016	25.4	45.6	3.6	3.8
7	21-10-2016	26.3	49.8	4.4	5.2
8	22-10-2016	27.4	50.2	4.5	5.7
9	28-10-2016	25.3	49.1	4.2	6.5
10	29-10-2016	24.6	44.7	4.3	5.8
11	01-11-2016	24.9	44.2	3.8	4.1
12	02-11-2016	26.1	46.5	3.7	5.2
13	07-11-2016	24.5	47.8	4.4	4.9
14	08-11-2016	26.3	42.8	3.5	4.8
15	14-11-2016	25.9	44.6	4.1	5.1
16	15-11-2016	24.7	49.2	3.9	4.6
17	21-11-2016	23.8	50.7	4.2	5.2
18	22-11-2016	21.3	51.4	3.8	4.7
19	28-11-2016	22.8	47.8	3.5	5.1
20	29-11-2016	24.3	52.9	4.4	4.8
21	05-12-2016	26.2	48.7	4.2	5.6
22	06-12-2016	28.4	49.2	3.8	4.4
23	12-12-2016	29.2	46.3	3.7	4.2
24	13-12-2016	25.2	41.5	3.4	3.8
25	19-12-2016	23.2	40.9	3.9	4.4
26	20-12-2016	24.1	44.7	4.5	3.7
Average Values					
Minimum		21.3	40.9	3.4	3.7
Maximum		31.2	59.2	4.5	6.5
Average		25.98	48.01	3.96	4.84
98th		31	57.3	4.5	6.3

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/10	**Sampling Duration**	24 Hrs
	Co-ordinates	**16^{0}33'14.38" N, 74^{0}31'52.34" E**		
	Test Location	**Sadalaga**		

Sr. No	Date of Monitoring	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Unit		µg/m^3	µg/m^3	µg/m^3	µg/m^3
NAAQ Standards		**≤60**	**≤100**	**≤80**	**≤80**
1	01-10-2016	36.7	58.6	5.3	7.2
2	02-10-2016	35.7	54.7	4.9	6.3
3	07-10-2016	31.4	58.5	4.1	4.8
4	08-10-2016	37.2	56.2	4.9	5.9
5	14-10-2016	30.6	52.4	5.1	5.1
6	15-10-2016	31.2	56.7	5.7	5.6
7	21-10-2016	33.4	51.2	6.2	5.1
8	22-10-2016	32.8	52.3	5.7	6.2
9	28-10-2016	30.9	54.7	5.4	7.1
10	29-10-2016	32.4	58.7	6.1	6.8
11	01-11-2016	36.5	52.7	5.4	4.5
12	02-11-2016	39.2	52.3	5.5	5.1
13	07-11-2016	37.3	51.5	6.1	5.0
14	08-11-2016	35.6	58.4	5.3	7.2
15	14-11-2016	32.8	51.2	4.9	5.6
16	15-11-2016	33.7	56.3	4.7	5.2
17	21-11-2016	31.2	51.2	5.1	5.5
18	22-11-2016	32.6	54.3	4.8	5.1
19	28-11-2016	32.8	56.1	5.3	5.6
20	29-11-2016	33.7	55.4	5.3	4.4
21	05-12-2016	34.5	55.2	6.4	4.3
22	06-12-2016	32.6	57.4	3.9	4.2
23	12-12-2016	36.2	58.9	4.1	3.8
24	13-12-2016	37.1	57.2	4.5	4.6
25	19-12-2016	32.8	56.2	5.9	6.1
26	20-12-2016	31.9	55.3	6.2	4.8
Average Values					
Minimum		30.6	51.2	3.9	3.8
Maximum		39.2	58.9	6.4	7.2
Average		34.0	55.1	5.3	5.4
98th		38.25	58.8	6.3	7.2

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NOISE QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017
	Reference No	170139/11
	Test Location	N1 to N10 Day Time
		N1 to N10 Night Time

RESULTS

Sr. No.	Location	Equivalent Noise Level Leq in dB(A)		CPCB Noise standards	
		Day Time	Night Time	Day Time	Night Time
1	Project Site N-1	73.8	67.5	75	70
2	Dilalpurwadi	48.9	43.7	55	45
3	Galatga	47.6	40.3	55	45
4	Bedkihal	48.2	38.4	55	45
5	Bhoj	43.2	38.9	55	45
6	Hunnagari	44.1	40.1	55	45
7	Shirgaonwadi	40.6	38.5	55	45
8	Nej	42.8	36.8	55	45
9	Benadi	41.6	36.5	55	45

REMARKS/ OBSERVATIONS:

- All Noise levels are within limit as per Noise Pollution (Regulation & Control) (Amendment) Rules 2010.

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/12
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Bedkihal- Dudhganga River upstream	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	6.92	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	565	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	1.6	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	<1	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	394	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	210	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	44	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	24	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	238	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	47	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	26	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	1.35	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	0.03	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	6.2	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	15	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	6	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	23	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	3	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.02	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.12	≤0.3	IS 3025 P 53 RA:2014

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Bedkihal- Dudhganga River upstream (170139/12)

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014
24	Zinc as Zn	mg/l	1.32	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.26	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	260	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	5	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/13
	Date	11/01/2017
	Date Of Sampling	18/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Sadalga: Dudhganga Down stream	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.15	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	638	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	2.2	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	<1	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	456	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	216	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	46.4	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	24	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	274	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	52	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	31.3	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	1.42	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	0.02	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.9	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	23	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	7	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	28	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	4	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.03	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.14	≤0.3	IS 3025 P 53 RA:2014

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CHWTSDF : Plot No. P-56, Ranjangaon, Tal. Shirur, Dist. Pune. Pin-412220. Ph : +91-2138-670352, Telefax : +91-2138-670350

Pune Office : 301, Pentagon P-3, Magarpatta Township, Hadapsar, Pune - 411028. (Mah), India. Ph. : +91-20-66801111 Fax : +91-20-66801100
E-mail : infomepl@smsl.co.in Web : www.smsenvocare.co.in, www.smsl.co.in

Regd. Office : 287, Ganesh Phadnavis Bhavan, Near Triangular Park, Dharampeth, Nagpur. Ph. : +91-0712-2551952/53 Telefax : +91-0712-6665100

Marketing Office (Abd) : Bharat Bazar Commercial Complex, I-Wing, 2nd Floor, Near API Corner, MIDC Area, Chikalthana, Aurangabad - 431210. Ph. : +91-240-2473047 Fax : +91-240-2470145
E-mail : infomepl@smsl.co.in Web : www.smsl.co.in, www.smsmepl.com

Corporate Office : 20, IT Park, Parsodi, Nagpur - 440022.
Ph. : +91-0712-6665300 Telefax : +91-0712-6665100

Dudhganga Downstream ***(170139/13)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014
24	Zinc as Zn	mg/l	1.52	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.29	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	298	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	8	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/14
	Date	11/01/2017
	Date Of Sampling	18/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Vedganga River Upstream	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.22	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	586	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.9	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	208	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	164	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	33.15	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	20.57	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	138	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	16	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	9.35	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	1.55	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	0.03	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.5	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	17	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	9	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	15	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	3.11	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.05	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.09	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Bhoj – Vedganga River Downstream ***(170139/14)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.33	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.26	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	253	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	6	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/15
	Date	11/01/2017
	Date Of Sampling	18/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Bhoj – Vedganga River Downstream	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.26	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	612	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.8	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	220	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	168	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	33.15	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	20.57	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	144	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	20	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	11.13	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	1.63	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	0.04	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.6	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	18	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	8	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	19	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	2.65	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.04	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.08	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Bhoj – Vedganga River Downstream ***(170139/15)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.28	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.22	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	253	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	6	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/16
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Project Site- Water tank	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.21	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	644	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	2.8	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	<1	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	472	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	224	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	46.4	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	24	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	268	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	47	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	26.5	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	1.35	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	0.02	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.4	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	20	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	5	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	22	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	3.2	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.03	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.18	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Project site- Water tank ***(170139/16)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.74	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.31	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	260	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	4	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/17
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Banadi- Dug well	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.33	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	784	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	1.2	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	574	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	264	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	59.2	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	27.84	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	186	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	65	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	40.2	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	4.12	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.2	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	14	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	4.5	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	13.2	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	1.5	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.021	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.09	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Banadi- Dug well ***(170139/17)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	0.65	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.42	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	190	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	3	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/18
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Surface Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Kunnur – Bore well	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.16	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	546	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.6	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	386	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	230	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	60.8	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	18.72	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	280	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	41.5	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	32.7	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	2.55	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.2	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	12	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	6.5	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	16.3	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	5	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.01	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.07	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Kunnur – Bore well ***(170139/18)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.25	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.47	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	17	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Absent	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/19
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Bhoj- Bore well	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.06	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	684	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.9	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	478	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	244	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	67.2	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	18.24	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	286	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	38.5	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	31.8	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	4.52	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.1	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	11	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	5	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	13.2	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	2.7	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.01	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.12	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Bhoj- Bore well ***(170139/19)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.03	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.33	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	8	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Absent	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/20
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Dilalpurwadi-Bore water	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.19	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	447	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	1.4	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	356	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	292	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	76.8	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	24	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	216	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	40.5	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	29.65	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	2.85	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	4.9	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	16	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	8	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	16.2	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	1.9	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.02	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.12	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Dilalpurwadi-Bore water (170139/20)

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.74	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.41	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	26	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	2	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/21
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Sadalga: Dug well	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.23	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	516	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.6	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	374	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	210	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	48	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	16.74	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	224	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	35	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	23.7	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	2.18	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	4.8	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	12	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	6	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	8.5	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	1.6	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.01	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.09	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	7.23	≤0.1	IS 3025 P 59 RA:2014

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Pade-Bore Well(*170139/21)*

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	BDL	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	1.23	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	0.35	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	11	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Absent	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

FOR MAHARASHTRA ENVIROPOWER LIMITED

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/22
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Nej-Bore water	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.12	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	408	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.9	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	288	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	114	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	28	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	10.56	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	172	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	26.5	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	16.4	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	0.87	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	5.1	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	10	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	3.5	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	2.35	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	0.3	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	BDL	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.07	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Nigdol-Bore Well 170139/22

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	0.54	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.24	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	8	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Absent	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/23
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Sirgaon-Bore water	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.36	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	853	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	2.4	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	614	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	252	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	65.6	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	21.12	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	368	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	51.5	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	43.6	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	5.44	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	4.7	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	15	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	7	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	23.4	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	3.4	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.04	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.18	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Indore-Bore Well(170139/23)

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.82	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.47	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	10	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Present	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/24
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Mamdapur-Dug well	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.09	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	976	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	1.6	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	598	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	268	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	64	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	25.97	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	360	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	62	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	48.7	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	6.35	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	4.5	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	14	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	6	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	31.5	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	3.95	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.02	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.2	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Mamdapur-Dug well ***(170139/24)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	1.25	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.37	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	4.5	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Present	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/25
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Bedkihal- Bore water	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.24	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	376	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	0.6	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	278	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	110	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	28	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	9.6	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	108	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	15	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	14.7	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	0.96	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	4.5	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	12	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	5.5	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	9.2	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	6.52	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.05	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.11	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Bedkihal- Bore water ***(170139/25)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	0.62	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.17	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	5	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Absent	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

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DRINKING WATER ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/26
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Ground Water
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Galatga- Bore water	

RESULTS

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
1	pH at 25˚C	-	7.08	6.5-8.5	IS: 3025 P11 RA 2012
2	Specific Conductance 25˚C	µS	797	N.S.	IS: 3025 P14 RA 2012
3	Turbidity	NTU	1.8	≤1	IS: 3025 P10 RA 2012
4	Odour	-	Unobjectionable	Unobjectionable	IS:3025 P4 RA 2002
5	Colour	Hazen	Colorless	≤ 5	APHA 2120 B 22ndEd.2005
6	Total Dissolved Solids	mg/l	569	≤500	IS 3025 P 16 RA:2006
7	Total Hardness as CaCO3	mg/l	224	≤200	IS 3025 P 21 RA:2014
8	Calcium as Ca	mg/l	60.8	≤75	IS 3025 P 40 RA:2014
9	Magnesium as Mg	mg/l	17.28	≤45	IS 3025 P 46 RA:2014
10	Total Alkalinity as CaCO3	mg/l	340	≤200	IS 3025 P 23 RA:2009
11	Chlorides As Cl	mg/l	76.1	250	APHA 2340-Cl B 22nd Ed. 2005
12	Sulphate as SO4	mg/l	51.2	200	APHA 2120 B 22ndEd.2005
13	Nitrate as NO3	mg/l	6.32	45	APHA 4500 SO4 E 22nd Ed. 2005
14	Phosphate as PO4	mg/l	BDL	N.S.	IS: 3025 (Part-31) -1988
15	Ammonia as NH3	mg/l	BDL	0.5	APHA 4500 NH3 F22nd Ed. 2005
16	Dissolved Oxygen	mg/l	4.2	N.S.	IS: 3025 (Part 38)
17	Chemical Oxygen Demand	mg/l	16	N.S.	APHA 5220C 22ndEd.2005
18	Biochemical Oxygen Demand	mg/l	7	N.S.	IS:3025 P 44 RA 2003
19	Sodium as Na	mg/l	36.5	N.S.	IS: 3025 (Part-45)
20	Potassium as K	mg/l	8.9	N.S.	IS: 3025 (Part-45)
21	Copper as Cu	mg/l	0.03	0.05	APHA 3100 22nd Ed. 2005
22	Iron as Fe	mg/l	0.16	≤0.3	IS 3025 P 53 RA:2014
23	Manganese as Mn	mg/l	BDL	≤0.1	IS 3025 P 59 RA:2014

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Galatga- Bore water ***(170139/26)***

Sr. No.	Description	Unit	Results	Acceptable Limits as per IS-10500 Standards	Analysis Method
24	Zinc as Zn	mg/l	BDL	≤ 5	IS 3025 P 37 RA:2014
25	Fluoride as F	mg/l	0.54	≤ 1.0	IS 3025 P 60 RA:2014
26	Boron as B	mg/l	BDL	≤ 0.5	IS 3025 P 57 RA:2014
27	Cadmium as Cd	mg/l	BDL	≤ 0.003	APHA 3100 22nd Ed. 2005
28	Hexavalent Chromium as Cr6+	mg/l	BDL	N.S.	IS 3025 P 52 RA:2014
29	Total chromium as Cr	mg/l	BDL	≤ 0.05	APHA 3100 22nd Ed. 2005
30	Lead as Pb	mg/l	BDL	≤ 0.01	APHA 3100 22nd Ed. 2005
31	Arsenic as As	mg/l	BDL	≤0.01	IS 3025 P 37 RA:2014
32	MPN	Nos./100 ml	14	Absent	IS 1622 RA 2009
33	E-coli	Nos./100 ml	Present	Absent	IS 1622 RA 2009

REMARKS/OBSERVATION:

- BDL – Below Detection Limit
- N.S – Not Specified

FOR MAHARASHTRA ENVIROPOWER LIMITED

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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SOIL ANALYSIS REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Reference No.**	170139/27
	Date	11/01/2017
	Date Of Sampling	18/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Project site	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.23
2	Conductivity	µmhos/cm	1426
3	Moisture Content	%	16.8
4	Bulk density	mg/kg	1.26
5	Total Water Holding capacity	mg/kg	52
6	Organic Matter	%	4.55
7	Total nitrogen	%	0.13
8	Phosphorus	mg/kg	6.8
9	Potassium as K	mg/kg	24.15
10	Calcium as Ca	mg/kg	426
11	Magnesium as Mg^{++}	mg/kg	236
12	Sodium as Na	mg/kg	120.3
13	Sulphate as SO4	mg/kg	316.2
14	Chloride as Cl	mg/kg	78.5
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	26.3
17	Zinc as Zn	mg/kg	5.65
18	Copper as Cu	mg/kg	0.35
19	Nickel as Ni	mg/kg	0.02
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/28
	Date	11/01/2017
	Date Of Sampling	18/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Banadi	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.18
2	Conductivity	µmhos/cm	863
3	Moisture Content	%	17.6
4	Bulk density	mg/kg	1.24
5	Total Water Holding capacity	mg/kg	50
6	Organic Matter	%	3.62
7	Total nitrogen	%	0.15
8	Phosphorus	mg/kg	5.2
9	Potassium as K	mg/kg	32.7
10	Calcium as Ca	mg/kg	388.4
11	Magnesium as Mg^{++}	mg/kg	186.7
12	Sodium as Na	mg/kg	131.1
13	Sulphate as SO4	mg/kg	402.8
14	Chloride as Cl	mg/kg	89.2
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	28.4
17	Zinc as Zn	mg/kg	3.68
18	Copper as Cu	mg/kg	0.27
19	Nickel as Ni	mg/kg	0.01
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

FOR MAHARASHTRA ENVIROPOWER LIMITED

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The Corporate Identity Number (CIN) : U40106MH2006PLC160780

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/29
	Date	11/01/2017
	Date Of Sampling	18/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Bhoj	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.08
2	Conductivity	µmhos/cm	1012
3	Moisture Content	%	18.5
4	Bulk density	mg/kg	1.26
5	Total Water Holding capacity	mg/kg	49
6	Organic Matter	%	3.75
7	Total nitrogen	%	0.11
8	Phosphorus	mg/kg	6.3
9	Potassium as K	mg/kg	22.1
10	Calcium as Ca	mg/kg	410.3
11	Magnesium as Mg^{++}	mg/kg	179.4
12	Sodium as Na	mg/kg	135
13	Sulphate as SO4	mg/kg	413.9
14	Chloride as Cl	mg/kg	81.4
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	23.8
17	Zinc as Zn	mg/kg	3.73
18	Copper as Cu	mg/kg	0.32
19	Nickel as Ni	mg/kg	0.03
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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SOIL ANALYSIS REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Reference No.**	170139/30
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Dilalpurwadi	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	6.98
2	Conductivity	µmhos/cm	966
3	Moisture Content	%	20.8
4	Bulk density	mg/kg	1.24
5	Total Water Holding capacity	mg/kg	52
6	Organic Matter	%	4.26
7	Total nitrogen	%	0.14
8	Phosphorus	mg/kg	7.1
9	Potassium as K	mg/kg	25.3
10	Calcium as Ca	mg/kg	386.4
11	Magnesium as Mg^{++}	mg/kg	176.3
12	Sodium as Na	mg/kg	132
13	Sulphate as SO4	mg/kg	342.5
14	Chloride as Cl	mg/kg	79.3
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	27.1
17	Zinc as Zn	mg/kg	3.81
18	Copper as Cu	mg/kg	0.35
19	Nickel as Ni	mg/kg	0.01
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/31
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Sadalga	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.22
2	Conductivity	µmhos/cm	1204
3	Moisture Content	%	19.4
4	Bulk density	mg/kg	1.25
5	Total Water Holding capacity	mg/kg	48
6	Organic Matter	%	4.12
7	Total nitrogen	%	0.12
8	Phosphorus	mg/kg	6.7
9	Potassium as K	mg/kg	26.3
10	Calcium as Ca	mg/kg	403.5
11	Magnesium as Mg^{++}	mg/kg	201.7
12	Sodium as Na	mg/kg	122.4
13	Sulphate as SO4	mg/kg	286.79
14	Chloride as Cl	mg/kg	69.2
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	20.23
17	Zinc as Zn	mg/kg	4.92
18	Copper as Cu	mg/kg	0.27
19	Nickel as Ni	mg/kg	0.01
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/32
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Nej	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.16
2	Conductivity	µmhos/cm	1132
3	Moisture Content	%	18.6
4	Bulk density	mg/kg	1.27
5	Total Water Holding capacity	mg/kg	51
6	Organic Matter	%	3.95
7	Total nitrogen	%	0.11
8	Phosphorus	mg/kg	8.2
9	Potassium as K	mg/kg	22.8
10	Calcium as Ca	mg/kg	368.7
11	Magnesium as Mg^{++}	mg/kg	191.3
12	Sodium as Na	mg/kg	167.9
13	Sulphate as SO4	mg/kg	205.6
14	Chloride as Cl	mg/kg	71.2
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	84.6
17	Zinc as Zn	mg/kg	3.35
18	Copper as Cu	mg/kg	0.32
19	Nickel as Ni	mg/kg	0.01
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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CHWTSDF : Plot No. P-56, Ranjangaon, Tal. Shirur, Dist. Pune. Pin-412220. Ph : +91-2138-670352, Telefax : +91-2138-670350

Pune Office : 301, Pentagon P-3, Magarpatta Township, Hadapsar, Pune - 411028. (Mah), India. Ph. : +91-20-66801111 Fax : +91-20-66801100
E-mail : infomepl@smsl.co.in Web : www.smsenvocare.co.in, www.smsl.co.in

Regd. Office : 287, Ganesh Phadnavis Bhavan, Near Triangular Park, Dharampeth, Nagpur. Ph. : +91-0712-2551952/53 Telefax : +91-0712-6665100

Marketing Office (Abd) : Bharat Bazar Commercial Complex, I-Wing, 2nd Floor, Near API Corner, MIDC Area, Chikalthana, Aurangabad - 431210. Ph. : +91-240-2473047 Fax : +91-240-2470145
E-mail : infomepl@smsl.co.in Web : www.smsl.co.in, www.smsmepl.com

Corporate Office : 20, IT Park, Parsodi, Nagpur - 440022.
Ph. : +91-0712-6665300 Telefax : +91-0712-6665100

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/33
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Sirgaon	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.03
2	Conductivity	µmhos/cm	1084
3	Moisture Content	%	19.5
4	Bulk density	mg/kg	1.26
5	Total Water Holding capacity	mg/kg	48
6	Organic Matter	%	3.85
7	Total nitrogen	%	0.14
8	Phosphorus	mg/kg	6.4
9	Potassium as K	mg/kg	20.6
10	Calcium as Ca	mg/kg	407.5
11	Magnesium as Mg^{++}	mg/kg	205.4
12	Sodium as Na	mg/kg	134.5
13	Sulphate as SO4	mg/kg	237.4
14	Chloride as Cl	mg/kg	78.5
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	20.23
17	Zinc as Zn	mg/kg	2.76
18	Copper as Cu	mg/kg	0.23
19	Nickel as Ni	mg/kg	0.02
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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Pune Office : 301, Pentagon P-3, Magarpatta Township, Hadapsar, Pune - 411028. (Mah), India. Ph. : +91-20-66801111 Fax : +91-20-66801100
E-mail : infomepl@smsl.co.in Web : www.smsenvocare.co.in, www.smsl.co.in

Regd. Office : 287, Ganesh Phadnavis Bhavan, Near Triangular Park, Dharampeth, Nagpur. Ph. : +91-0712-2551952/53 Telefax : +91-0712-6665100

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E-mail : infomepl@smsl.co.in Web : www.smsl.co.in, www.smsmepl.com

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/34
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Mamdapur	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.42
2	Conductivity	µmhos/cm	997
3	Moisture Content	%	18.7
4	Bulk density	mg/kg	1.24
5	Total Water Holding capacity	mg/kg	52
6	Organic Matter	%	3.75
7	Total nitrogen	%	0.17
8	Phosphorus	mg/kg	8.1
9	Potassium as K	mg/kg	26.8
10	Calcium as Ca	mg/kg	418.9
11	Magnesium as Mg^{++}	mg/kg	191.4
12	Sodium as Na	mg/kg	144.8
13	Sulphate as SO4	mg/kg	264.3
14	Chloride as Cl	mg/kg	61.8
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	20.67
17	Zinc as Zn	mg/kg	3.75
18	Copper as Cu	mg/kg	0.22
19	Nickel as Ni	mg/kg	0.02
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/35
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Bedkihal	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.33
2	Conductivity	µmhos/cm	1018
3	Moisture Content	%	20.3
4	Bulk density	mg/kg	1.25
5	Total Water Holding capacity	mg/kg	50
6	Organic Matter	%	4.15
7	Total nitrogen	%	0.14
8	Phosphorus	mg/kg	9.2
9	Potassium as K	mg/kg	24.6
10	Calcium as Ca	mg/kg	384.6
11	Magnesium as Mg^{++}	mg/kg	186.2
12	Sodium as Na	mg/kg	168.5
13	Sulphate as SO4	mg/kg	278.5
14	Chloride as Cl	mg/kg	63.9
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	25.57
17	Zinc as Zn	mg/kg	3.18
18	Copper as Cu	mg/kg	0.28
19	Nickel as Ni	mg/kg	0.01
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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SOIL ANALYSIS REPORT

Client's Name & Address		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39
	Reference No.	170139/36
	Date	11/01/2017
	Date Of Sampling	17/10/2016
	Nature Of Sample	Soil
	Sample Collected By	SMS Envocare Ltd.
	Date of Analysis	19/10/2016
Test Location	Galatga	

RESULTS

Sr. No.	Description	Unit	Results
1	pH	pH units	7.46
2	Conductivity	µmhos/cm	1019
3	Moisture Content	%	17.6
4	Bulk density	mg/kg	1.25
5	Total Water Holding capacity	mg/kg	49
6	Organic Matter	%	3.85
7	Total nitrogen	%	0.14
8	Phosphorus	mg/kg	8.1
9	Potassium as K	mg/kg	27.1
10	Calcium as Ca	mg/kg	396.5
11	Magnesium as Mg^{++}	mg/kg	206.3
12	Sodium as Na	mg/kg	187.5
13	Sulphate as SO4	mg/kg	233.4
14	Chloride as Cl	mg/kg	58.5
15	Boron	mg/kg	BDL
16	Iron as Fe	mg/kg	15.12
17	Zinc as Zn	mg/kg	2.93
18	Copper as Cu	mg/kg	0.24
19	Nickel as Ni	mg/kg	0.03
20	Total Chromium as Cr	mg/kg	BDL
21	Lead as Pb	mg/kg	BDL
22	Mercury	mg/kg	BDL
23	Texture	mg/kg	Clay Loam

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/36	**Sampling Duration**	24 Hrs
	Date of Monitoring	02/10/2016		
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site**		

OBSERVATIONS

Ambient Temperature In ◦C	Relative Humidity In %	Time of Sampling In Hrs.	Duration of sampling In Hrs.
28	38.2	6:30 am	24 Hrs.

RESULTS

Sr. No	Description	Unit	Results	NAAQ Standards	Method
01	Respirable Suspended Particulate Matter (PM 10)	µg/m^3	98.7	≤100	IS 5182 (Part-23)2006 RA:2012
02	Respirable Suspended Particulate Matter (PM 2.5)	µg/m^3	48.7	≤60	CPCB Guidelines for measurement of AAP Vol. I, 2011
03	Sulphur Dioxide	µg/m^3	10.1	≤80	IS 5182 Part(2) 2001 RA2012
04	Oxides of Nitrogen	µg/m^3	22.3	≤80	IS 5182 (Part VI) : 2006RA 2012
05	Lead	µg/m^3	BDL	≤1.0	CPCB Guidelines for measurement of AAP Vol. I, 2011
06	Carbon Monoxide	mg/m^3	02	≤04	IS 11255 Part 6 -1999
07	Ammonia	µg/m^3	BDL	≤400	CPCB Guidelines for measurement of AAP Vol. I, 2011
08	Benzene	µg/m^3	BDL	≤05	IS 5182 (Part 11/:2006)
09	Benzopyrene	ηg/m^3	BDL	≤01	IS 5182 (Part 12/:2004)
10	Nickel	ηg/m^3	BDL	≤20	CPCB Guidelines for measurement of AAP Vol. I, 2011
11	Arsenic	ηg/m^3	BDL	≤06	CPCB Guidelines for measurement of AAP Vol. I, 2011
12	Ozone	µg/m^3	BDL	≤180	CPCB Guidelines for measurement of AAP Vol. I, 2011
13	Total VOC	mg/m^3	BDL	N.S.	Instrumentation (GC-PID detector)

REMARKS/ OBSERVATIONS:

- All above results are within National Ambient Air Quality Standards.
- BDL: Below detectable level.

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address	Report No.	MEPL/LAB/VPPL/2017/01/39		
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Date**	11/01/2017		
	Reference No	170139/37	**Sampling Duration**	24 Hrs
	Date of Monitoring	08/11/2016		
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site- AAQ-1**		

OBSERVATIONS

Ambient Temperature In ◦C	Relative Humidity In %	Time of Sampling In Hrs.	Duration of sampling In Hrs.
25	37.5	7:00 am	24 Hrs.

RESULTS

Sr. No	Description	Unit	Results	NAAQ Standards	Method
01	Respirable Suspended Particulate Matter (PM 10)	µg/m^3	91.3	≤100	IS 5182 (Part-23)2006 RA:2012
02	Respirable Suspended Particulate Matter (PM 2.5)	µg/m^3	56.1	≤60	CPCB Guidelines for measurement of AAP Vol. I, 2011
03	Sulphur Dioxide	µg/m^3	11.6	≤80	IS 5182 Part(2) 2001 RA2012
04	Oxides of Nitrogen	µg/m^3	17.8	≤80	IS 5182 (Part VI) : 2006RA 2012
05	Lead	µg/m^3	BDL	≤1.0	CPCB Guidelines for measurement of AAP Vol. I, 2011
06	Carbon Monoxide	mg/m^3	03	≤04	IS 11255 Part 6 -1999
07	Ammonia	µg/m^3	BDL	≤400	CPCB Guidelines for measurement of AAP Vol. I, 2011
08	Benzene	µg/m^3	BDL	≤05	IS 5182 (Part 11/:2006)
09	Benzopyrene	ηg/m^3	BDL	≤01	IS 5182 (Part 12/:2004)
10	Nickel	ηg/m^3	BDL	≤20	CPCB Guidelines for measurement of AAP Vol. I, 2011
11	Arsenic	ηg/m^3	BDL	≤06	CPCB Guidelines for measurement of AAP Vol. I, 2011
12	Ozone	µg/m^3	BDL	≤180	CPCB Guidelines for measurement of AAP Vol. I, 2011
13	Total VOC	mg/m^3	BDL	N.S.	Instrumentation (GC-PID detector)

REMARKS/ OBSERVATIONS:

- All above results are within National Ambient Air Quality Standards.
- BDL: Below detectable level.

FOR MAHARASHTRA ENVIROPOWER LIMITED

Dipa
Checked By

MAHARASHTRA ENVIRO POWER LTD. PUNE

Mali
Approved By

AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address				
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39		
	Date	11/01/2017		
	Reference No	170139/38	**Sampling Duration**	24 Hrs
	Date of Monitoring	22-11-2016		
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site- AAQ-1**		

OBSERVATIONS

Ambient Temperature In ◦C	Relative Humidity In %	Time of Sampling In Hrs.	Duration of sampling In Hrs.
24	38	6:30 am	24 Hrs.

RESULTS

Sr. No	Description	Unit	Results	NAAQ Standards	Method
01	Respirable Suspended Particulate Matter (PM 10)	µg/m^3	91.3	≤100	IS 5182 (Part-23)2006 RA:2012
02	Respirable Suspended Particulate Matter (PM 2.5)	µg/m^3	40.3	≤60	CPCB Guidelines for measurement of AAP Vol. I, 2011
03	Sulphur Dioxide	µg/m^3	8.2	≤80	IS 5182 Part(2) 2001 RA2012
04	Oxides of Nitrogen	µg/m^3	17.6	≤80	IS 5182 (Part VI) : 2006RA 2012
05	Lead	µg/m^3	BDL	≤1.0	CPCB Guidelines for measurement of AAP Vol. I, 2011
06	Carbon Monoxide	mg/m^3	02	≤04	IS 11255 Part 6 -1999
07	Ammonia	µg/m^3	BDL	≤400	CPCB Guidelines for measurement of AAP Vol. I, 2011
08	Benzene	µg/m^3	BDL	≤05	IS 5182 (Part 11/:2006)
09	Benzopyrene	ηg/m^3	BDL	≤01	IS 5182 (Part 12/:2004)
10	Nickel	ηg/m^3	BDL	≤20	CPCB Guidelines for measurement of AAP Vol. I, 2011
11	Arsenic	ηg/m^3	BDL	≤06	CPCB Guidelines for measurement of AAP Vol. I, 2011
12	Ozone	µg/m^3	BDL	≤180	CPCB Guidelines for measurement of AAP Vol. I, 2011
13	Total VOC	mg/m^3	BDL	N.S.	Instrumentation (GC-PID detector)

REMARKS/ OBSERVATIONS:

- All above results are within National Ambient Air Quality Standards.
- BDL: Below detectable level.

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address				
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39		
	Date	11/01/2017		
	Reference No	170139/39	**Sampling Duration**	24 Hrs
	Date of Monitoring	06/12/2016		
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site- AAQ-1**		

OBSERVATIONS

Ambient Temperature In ◦C	Relative Humidity In %	Time of Sampling In Hrs.	Duration of sampling In Hrs.
21	36.3	6:30 am	24 Hrs.

RESULTS

Sr. No	Description	Unit	Results	NAAQ Standards	Method
01	Respirable Suspended Particulate Matter (PM 10)	µg/m^3	87.5	≤100	IS 5182 (Part-23)2006 RA:2012
02	Respirable Suspended Particulate Matter (PM 2.5)	µg/m^3	41.3	≤60	CPCB Guidelines for measurement of AAP Vol. I, 2011
03	Sulphur Dioxide	µg/m^3	8.1	≤80	IS 5182 Part(2) 2001 RA2012
04	Oxides of Nitrogen	µg/m^3	18.7	≤80	IS 5182 (Part VI) : 2006RA 2012
05	Lead	µg/m^3	BDL	≤1.0	CPCB Guidelines for measurement of AAP Vol. I, 2011
06	Carbon Monoxide	mg/m^3	03	≤04	IS 11255 Part 6 -1999
07	Ammonia	µg/m^3	BDL	≤400	CPCB Guidelines for measurement of AAP Vol. I, 2011
08	Benzene	µg/m^3	BDL	≤05	IS 5182 (Part 11/:2006)
09	Benzopyrene	ηg/m^3	BDL	≤01	IS 5182 (Part 12/:2004)
10	Nickel	ηg/m^3	BDL	≤20	CPCB Guidelines for measurement of AAP Vol. I, 2011
11	Arsenic	ηg/m^3	BDL	≤06	CPCB Guidelines for measurement of AAP Vol. I, 2011
12	Ozone	µg/m^3	BDL	≤180	CPCB Guidelines for measurement of AAP Vol. I, 2011
13	Total VOC	mg/m^3	BDL	N.S.	Instrumentation (GC-PID detector)

REMARKS/ OBSERVATIONS:

- All above results are within National Ambient Air Quality Standards.
- BDL: Below detectable level.

FOR MAHARASHTRA ENVIROPOWER LIMITED

Dipa
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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address				
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39		
	Date	11/01/2017		
	Reference No	170139/40	**Sampling Duration**	24 Hrs
	Date of Monitoring	13/12/2016		
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site- AAQ-1**		

OBSERVATIONS

Ambient Temperature In ◦C	Relative Humidity In %	Time of Sampling In Hrs.	Duration of sampling In Hrs.
20	35.4	6:30 am	24 Hrs.

RESULTS

Sr. No	Description	Unit	Results	NAAQ Standards	Method
01	Respirable Suspended Particulate Matter (PM 10)	µg/m^3	106.2	≤100	IS 5182 (Part-23)2006 RA:2012
02	Respirable Suspended Particulate Matter (PM 2.5)	µg/m^3	48.1	≤60	CPCB Guidelines for measurement of AAP Vol. I, 2011
03	Sulphur Dioxide	µg/m^3	11.8	≤80	IS 5182 Part(2) 2001 RA2012
04	Oxides of Nitrogen	µg/m^3	21.4	≤80	IS 5182 (Part VI) : 2006RA 2012
05	Lead	µg/m^3	BDL	≤1.0	CPCB Guidelines for measurement of AAP Vol. I, 2011
06	Carbon Monoxide	mg/m^3	03	≤04	IS 11255 Part 6 -1999
07	Ammonia	µg/m^3	BDL	≤400	CPCB Guidelines for measurement of AAP Vol. I, 2011
08	Benzene	µg/m^3	BDL	≤05	IS 5182 (Part 11/:2006)
09	Benzopyrene	ηg/m^3	BDL	≤01	IS 5182 (Part 12/:2004)
10	Nickel	ηg/m^3	BDL	≤20	CPCB Guidelines for measurement of AAP Vol. I, 2011
11	Arsenic	ηg/m^3	BDL	≤06	CPCB Guidelines for measurement of AAP Vol. I, 2011
12	Ozone	µg/m^3	BDL	≤180	CPCB Guidelines for measurement of AAP Vol. I, 2011
13	Total VOC	mg/m^3	BDL	N.S.	Instrumentation (GC-PID detector)

REMARKS/ OBSERVATIONS:

- All above results are within National Ambient Air Quality Standards.
- BDL: Below detectable level.

FOR MAHARASHTRA ENVIROPOWER LIMITED

Dipa
Checked By

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AMBIENT AIR QUALITY MONITORING REPORT

Client's Name & Address				
M/s Venkateshwara Power Projects Limited Sr. No. 85, 164 to170, Bedkihal, Tal. Chikkodi, Dist. Belgaum, Karnataka. **Proposed 90KLPD Molasses based Distillery**	**Report No.**	MEPL/LAB/VPPL/2017/01/39		
	Date	11/01/2017		
	Reference No	170139/41	**Sampling Duration**	24 Hrs
	Date of Monitoring	20/12/2016		
	Co-ordinates	**$16^0$30' 50.28" N, $74^0$28' 30.99" E**		
	Test Location	**Project Site- AAQ-1**		

OBSERVATIONS

Ambient Temperature In ◦C	Relative Humidity In %	Time of Sampling In Hrs.	Duration of sampling In Hrs.
18.7	32.7	6:30 am	24 Hrs.

RESULTS

Sr. No	Description	Unit	Results	NAAQ Standards	Method
01	Respirable Suspended Particulate Matter (PM 10)	µg/m^3	91.7	≤100	IS 5182 (Part-23)2006 RA:2012
02	Respirable Suspended Particulate Matter (PM 2.5)	µg/m^3	43.2	≤60	CPCB Guidelines for measurement of AAP Vol. I, 2011
03	Sulphur Dioxide	µg/m^3	10.3	≤80	IS 5182 Part(2) 2001 RA2012
04	Oxides of Nitrogen	µg/m^3	18.7	≤80	IS 5182 (Part VI) : 2006RA 2012
05	Lead	µg/m^3	BDL	≤1.0	CPCB Guidelines for measurement of AAP Vol. I, 2011
06	Carbon Monoxide	mg/m^3	03	≤04	IS 11255 Part 6 -1999
07	Ammonia	µg/m^3	BDL	≤400	CPCB Guidelines for measurement of AAP Vol. I, 2011
08	Benzene	µg/m^3	BDL	≤05	IS 5182 (Part 11/:2006)
09	Benzopyrene	ηg/m^3	BDL	≤01	IS 5182 (Part 12/:2004)
10	Nickel	ηg/m^3	BDL	≤20	CPCB Guidelines for measurement of AAP Vol. I, 2011
11	Arsenic	ηg/m^3	BDL	≤06	CPCB Guidelines for measurement of AAP Vol. I, 2011
12	Ozone	µg/m^3	BDL	≤180	CPCB Guidelines for measurement of AAP Vol. I, 2011
13	Total VOC	mg/m^3	BDL	N.S.	Instrumentation (GC-PID detector)

REMARKS/ OBSERVATIONS:

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- BDL: Below detectable level.

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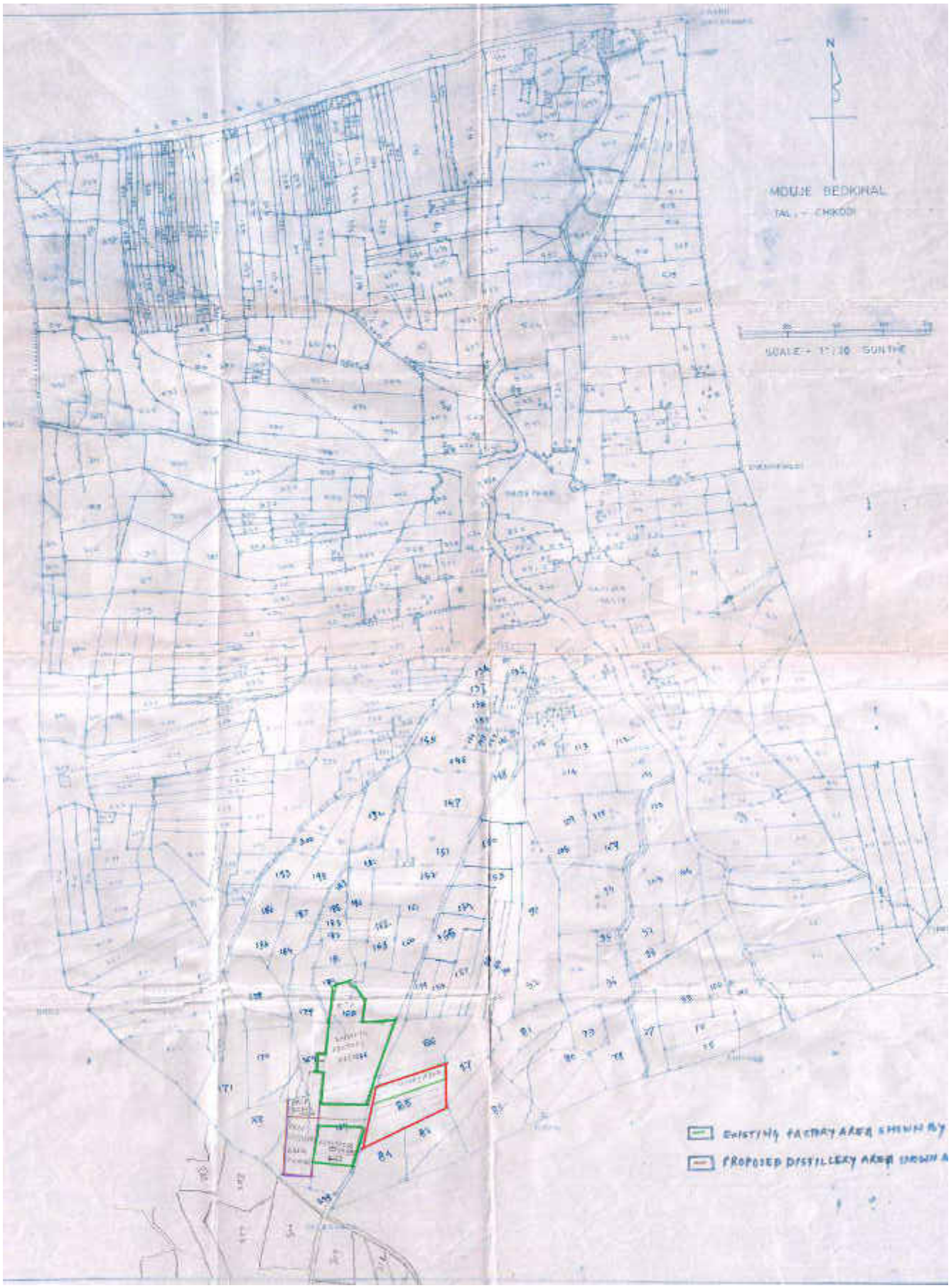
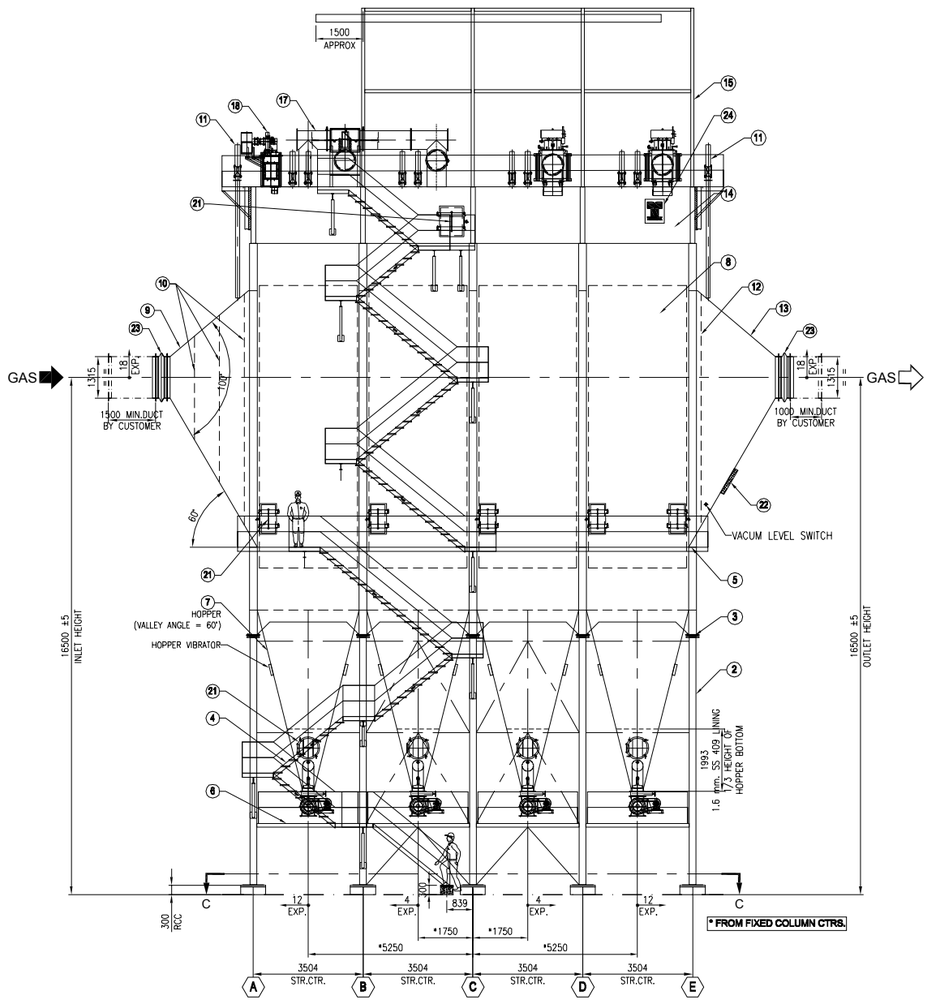
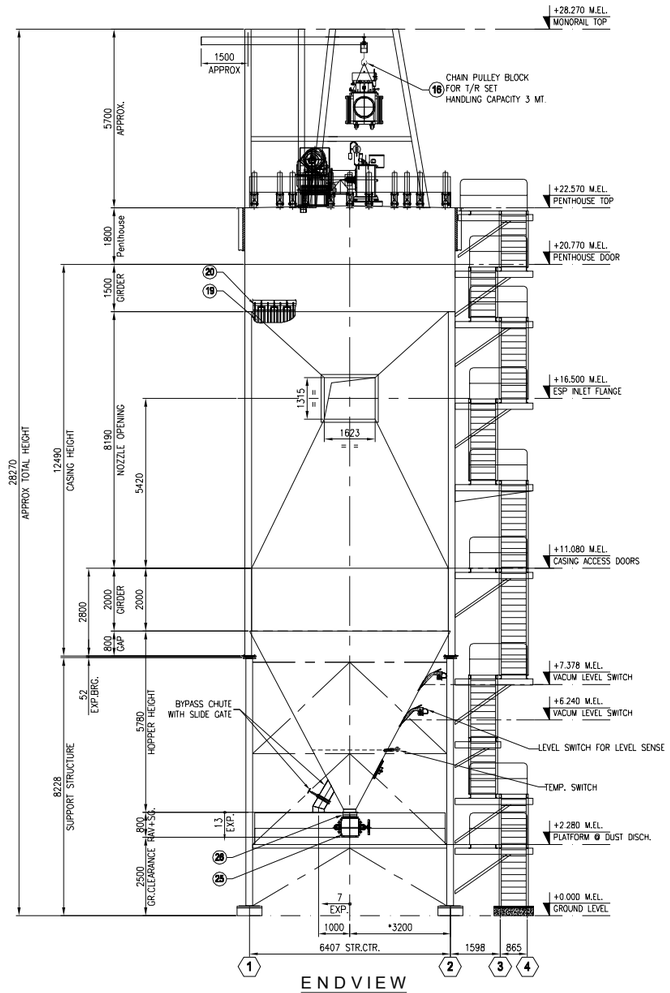
Annexure XIII: Kasara Map

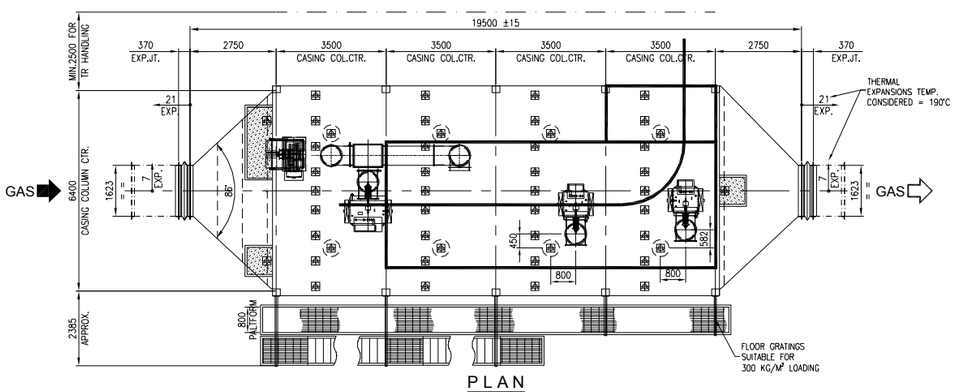




ELEVATION

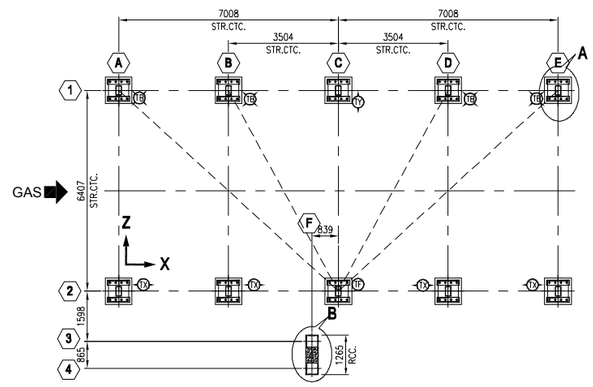


ENDVIEW



PLAN

VIEWED AT PENTHOUSE TOP LEVEL



FOUNDATION PLAN

SECTION AT : 'C-C'

FOR EXPANSION BRG ASSEMBLY MAINTAIN STRUCTURE CTC FOR BRG BOTTOM PLATE. MAINTAIN COLD CTC FOR BRG TOP PLATE.

STRUCTURAL BEARING SYMBOLS IN FOUNDATION PLAN.

- (TX) MONO–AXIAL–X
- (TY) MONO–AXIAL–Y
- (TB) BI–AXIAL
- (TF) FIXED BRG.

CONSULTANT : NA				END USER : Venkateshwara Power Projects Ltd. / 1	
APPLICATION : ESP FOR 30 TPH Spent Wash / 1				ORDER TYPE :	DOMESTIC
PROJECT NO : E210410				CUSTOMER : B&H AC_Venkateshwara Sugars	
PREPARED	CHECKED	APPROVED	SIZE / SCALE	PRODUCT NAME : ELECTROSTATIC PRECIPITATOR	
			A1 / 1 : 96	TITLE : GENERAL ARRANGEMENT OF ESP	
				MODEL - TTR	

DIGITAL AUTHORIZATION WITH SIGNATURE

DRAWING / DOCUMENT IN PDF FORMAT VALID ONLY WITH DIGITAL SIGNATURES AND AUTHORIZED FOR SUBMISSION / RELEASE FOR CONSTRUCTION

THERMAX LIMITED

ENVIRO DIVISION

PROJECTION	SHEET	DRAWING NO.	REV.
	1 OF 2	EEAA090034	1

REFER REVISION HISTORY IN SHEET NO. 2 OF 2

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SCOPE OF SUPPLY (MECHANICAL)

FOR ELECTRICAL SUPPLY REFER P & I DIAGRAM

T = THERMAX ENVIRO
C = THERMAX B&H
N = NA

SR.NO	DESCRIPTION	SCOPE	REMARKS
1	FOUNDATION BOLTS	T	
2	SUPPORT STRUCTURE	T	STEEL
3	STRUCTURAL BEARING	T	
4	STAIRCASE & PLATFORM	T	
5	PLATFORM AT CASING ACCESS DOOR	T	
6	PLATFORM AT DUST DISCHARGE LEVEL	T	
7	HOPPER ASSEMBLY WITH SS LINING	T	Hopper lining - SS 409 Lining 1.6 - 1.0rd Hopper Height
8	CASING ASSEMBLY	T	
9	INLET NOZZLE FABRICATED COMPONENTS	T	
10	INLET NOZZLE PERFORATED SHEETS	T	
11	INLET NOZZLE / OUTLET RAPPER COMPONENTS	T	
12	OUTLET NOZZLE FABRICATED COMPONENTS	T	
13	OUTLET NOZZLE PERFORATED SHEET	T	
14	PENTHOUSE ASSEMBLY	T	
15	MONORAIL STRUCTURE	T	
16	TR SET HANDLING ARRANGEMENT- CHAIN PULLEY BLOCK TYPE	T	
17	HV ASSEMBLY AND T.R. SET BASE FRAME WITH MANUAL BUS COUPLER	T	FOR 1ST 2 FIELDS
18	PURGE AIR ASSLY - WORKING WITH HEATER	T	
19	COLLECTING ASSEMBLY	T	
20	E-TUBE ASSEMBLY	T	
21	ACCESS DOORS ##	T	
22	INSULATION AND CLADDING ASSEMBLY	T	
23	EXPANSION JOINTS AT INLET NOZZLE & OUTLET NOZZLE	T	Metalic, Carbon Steel
24	SIGNS AND BRACKETS	T	
25	ROTARY AIR LOCK VALVE	T	
26	SLIDE GATE FOR ISOLATION BELOW HOPPER & BYPASS CHUTE	T	
27	ERECTION TOOLS FOR ESP	T	
28	OPERATION AND MAINTENANCE MANUAL FOR ESP	T	
29	ERECTION & COMISSIONING	C	
30	SUPERVISION OF ERECTION & COMISSIONING	T	
31	EXCLUSIONS AS PER CONTRACT DOCUMENT	C	
32	COMMISSIONING SPARES	T	
33			
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50			

F - GENERAL NOTES

1	TOTAL UNIT IS INSULATED WITH LRB MAT TRESSES OF MINERAL WOOL AND PLAIN ALUMINUM CLADDING.
2	NOZZLE FLANGES ARE NOT DESIGNED TO TAKE ANY EXTERNAL LOAD AND DUCT EXPANSIONS.
3	THE EQUIPMENT SHALL BE DISPATCHED IN KNOCK DOWN CONDITION.
4	WEIGHT OF HEAVIEST COMPONENT IN TONNES (DESPATCHABLE) 3.0 T / T.R. SET.
5	SUPPLY VOLTAGE : 415±10% 50±5% AC 3 ph 4 wire
6	DUST MUST BE CONTINUOUSLY EVACUATED FROM HOPPERS THE FIELD WISE ASH COLLECTION RATES AS INDICATED IN TABLE - B
7	THE EQUIPMENT SHALL BE DISPATCHED IN CKD CONDITION. CASING, NOZZLES, HOPPERS AND PENTHOUSE SHALL BE SUPPLIED IN PANEL FORM.
8	CUSTOMER TO PROVIDE 100 NB X 150 LG. SAMPLING PORT ON ESP INLET AND OUTLET DUCT.
9	CUSTOMER SHOULD PROVIDE GUIDE VANES AT THE INLET DUCTING OF ESP TO ENSURE UNIFORM GAS DISTRIBUTION AT THE INLET OF ESP TO GET DESIRED PERFORMANCE
10	IN CASE OF HOPPER FILLED CONDITION ARISE DUE TO ABNORMAL WORKING CONDITIONS, HOPPER TO BE EVACUATED ONE BY ONE BEFORE NORMAL START-UP. THIS IS TO AVOID ANY OVERLOADING OF DOWNSTREAM CONVEYING SYSTEMS.
11	CUSTOMER TO PROVIDED APPROPRIATE SEALING ARRANGEMENT BELOW HOPPER IN ABSENCE OF RAV.
12	FOR CIVIL WORK ONLY STRUCTURAL DIMENSIONS TO BE REFEREED.
13	MATERIAL OF CONSTRUCTION :- CARBON STEEL AS PER IS 2062.
14	CUSTOMER TO PROVIDE ALL GROUTING & PACKING MATERIAL REQUIRED FOR FOUNDATION WORK.

A - DESIGN DATA.

SR.NO.	DESIGN PARAMETER	100% MCR SW (52% Conc) + Indian Coal	100% MCR SOLO INDIAN COAL
1	DESIGN GAS FLOW RATE IN AM3/HR	115200	144000
2	TEMPERATURE DEG.C (OPERATING)	180	200
3	CASING MECHANICAL DESIGN TEMPERATURE DEG.C	250	250
4	DUST TYPE	Fly ash	Fly ash
5	MAXIMUM INLET DUST LOADING (GM / NM3)	30	16.00
6	OUTLET EMISSION FOR ESP (MGM / NM3) ALL FIELD WORKING.	50	50
7	OUTLET EMISSION (MGM/NM3) - FIRST FIELD OUT OF SERVICE		
8	MOISTURE IN GAS (% V/ V)	19.46	6.77
9	UNBURNT CARBON IN DUST (%)	3-10	5-15
10	COLLECTION AREA M2	3456	3456
11	SPECIFIC COLLECTION AREA M2 / M3 / SEC.	108.00	86.40
12	NO OF GAS PASSAGES	16	
13	EFFECTIVE CE WIDTH (METER)	3	
14	EFFECTIVE CE HEIGHT (METER)	9	
15	VELOCITY THROUGH ESP M/SEC.	0.56	0.69
16	TREATMENT TIME (SEC.)	21.60	17.28
17	NO OF FIELDS IN SERIES	4	
18	MIGRATION VELOCITY (CM/SEC.)	5.92	6.67
19	DESIGN PRESSURE (mmWC)	-300	-300
20	DUST DENSITY FOR POWER (KG/M3)	800	1100
21	DUST DENSITY FOR DISCHARGE (KG/M3)	200	800
22	FLG TO FLG PRESSURE DROP (mmWC)	30	30
23	EFFICIENCY (%)	99.83%	99.69%
-			
-			
-			
-			
-			
-			

C - PROCUCT DATA

C - 1	CASING THK. mm.	5
C - 2	HOPPER WALL THK. mm.	5
C - 3	INLET & OUTLET NOZZLE THK. mm.	5
C - 4	PENTHOUSE SIDE WALL THK. mm.	3
C - 5	PENTHOUSE TOP SHEET CHQ. PLT. THK. mm.	4
C - 6	PERFORATED SHEET FOR NOZZLE THK. Mm	2.5
C - 7	INSULATION THK. mm	65
C - 8	INSULATION DENSITY Kg/M3	100
C - 9	CLADDING TYPE / THK. (SWG)	Plain Aluminium / 24
C - 10	HOPPER VOLUME M3 (100% FULL)	41.00

D - TR SET DETAILS

D - 1	T.R. CONTROLL TYPE		MICRO PROCESSOR BASED CONTROL.		
D - 2	T.R. SET RATING DETAILS -				
	a) OUTPUT VOLTAGE		95 KV DC PEAK / 111 KV DC PEAK		
	b) OUTPUT CURRENT (mA)				
	1) TR SET NO.1	3 Ph TR SET	600	5) TR SET NO.5	
	2) TR SET NO.2			6) TR SET NO.6	
	3) TR SET NO.3		300	7) TR SET NO.7	
	4) TR SET NO.4		300		

E - PAINTING DETAILS

TYPE	INSULATED	NON INSULATED	
Components	Casing, Hopper, Nozzle, Pent House,Insulator Box & misc.	Support Structure, Monorails, Staircase & Platforms, Ladder, Canopy if applicable	
Surface Preparation	Mechanical Cleaning to ST-2 Grade	Mechanical Cleaning to ST-2 Grade	
Primer (Inside)	Two Coats Alkyd based High build Zinc Phosphate	Two Coats Alkyd based High build Zinc Phosphate	
Primer (Outside)	Two Coats Alkyd based High build Zinc Phosphate		
DFT/Coat (Microns)	35	35	
Intermediate Paint (Inside)	NA	NA	
Intermediate Paint (Outside)			
DFT/Coat (Microns)			
Finish Paint (Inside)	NA	NA	
Finish Paint (Outside)			
DFT/Coat (Microns)			
Finish Paint Shade (Inside)	NA	NA	
Finish Paint Shade (Outside)			
Grating for Staircase & Platform	Hot dip Galvanized	Internals	Rust preventive Oil Coating
Railing for Staircase & Platform	Hot dip Galvanized	Bought outs	As per manufacturer standard
Paint Make	TL Standard	Hardware	Standard

B - LOAD DATA

DESIGN WIND PRESSURE (KG/M2) 134 SEISMIC ZONE III AS PER IS : 1893

ESP LOAD DATA ON RCC PEDESTAL TOP — ALL LOADS ARE IN TON / COLUMN

SR NO.	COLUMN NUMBER	STATIC LOAD	DUST LOAD	LOADS DUE TO WIND IN HORIZONTAL +/-X	HORIZONTAL +/-Z	VERTICAL +/-X	VERTICAL +/-Z	LOADS DUE TO SEISMIC IN HORIZONTAL +/-X	HORIZONTAL +/-Z	VERTICAL +/-X	VERTICAL +/-Z	LIVE LOAD
1	A1, A2	21	12	3	5	6	21	3	3	3	7	1.5
2	B1, B2	32	23	4	7	18	28	5	4	22	10	1.5
3	C1, C2	32	23	7	7	3	28	10	4	3	10	1.5
4	D1, D2	32	23	4	7	18	28	5	4	22	10	1.5
5	E1, E2	21	12	3	5	6	21	3	3	3	7	1.5
6	F3, F4	0.5										
7												
8												
9												
10												
11												
12												
13												
14												
15												

ASH DENSITY CONSIDERED (KG/M3) = 1100

CIVIL FOUNDATION DETAILS SHOWN IN THIS DRG. ARE PICTORIAL ONLY.

CIVIL FOUNDATION DESIGN & DETAILING IS IN CUSTOMER SCOPE BASED ON LOAD DATA MENTIONED ABOVE.

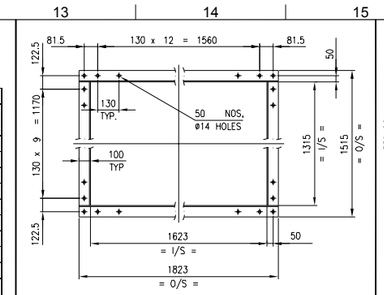
G - ASH COLLECTION RATE IN EACH FIELD (KG/HR)

SR NO.	FUAL	100% MCR SW (52% Conc) + Indian Coal	100% MCR SOLO INDIAN COAL
1	FIELD-1	1661	1016
2	FIELD-2	336	240
3	FIELD-3	68	57
4	FIELD-4	14	13
5	FIELD-5		
6	FIELD-6		
7	FIELD-7		
8	TOTAL DUST COLLECTED IN ESP (KG/HR)	2079	1326

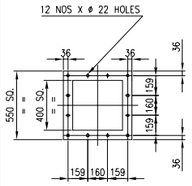
VALUES IN PARENTHESIS ARE FOR FIRST FIELD OUT OF SERVICE. APPLICABLE

ROTARY AIR LOCK VALVE CAPACITY IN M3/HR. AT 50 % FILLING EFFICIENCY. 10

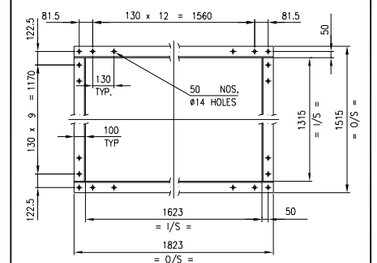
MINIMUM WIDTH OF ASH HANDLING SYSTEM SHALL BE GREATER THAN 350 mm.



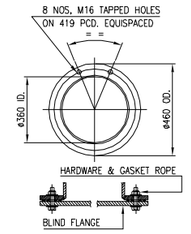
INLET NOZZLE FLANGE DETAIL
(INCLUDING MATCHING FLANGE, HARDWARES & GASKETS)



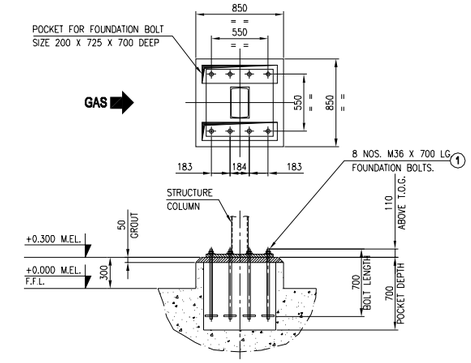
HOPPER / SLIDE GATE & RAV FLANGE DETAIL
(INCLUDING MATCHING FLANGE, HARDWARES & GASKETS)



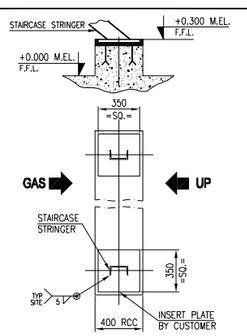
OUTLET NOZZLE FLANGE DETAIL
(INCLUDING MATCHING FLANGE, HARDWARES & GASKETS)



BYPASS CHUTE FLANGE DETAIL
(INCLUDING BLIND FLANGE, HARDWARES & GASKETS)



ENLARGED DETAIL AT "A" TYP.
(STRUCTURE COLUMN BASE PLATE & GROUTING DETAIL)



ENLARGED DETAIL - "B"
(RCC PEDESTAL FOR STAIRCASE)

REV. NO.	ZONE	REVISION DETAIL	PRPD. DATE	REV.BY	CHK.BY	APP.BY
1		DRAWING REVISED AS PER CUSTOMER COMMENTS DTD :- 16.02.17	17.02.17	DAK	ASP	DMD
0		INITIAL RELEASE	4.1.2017	DAK	ASP	DMD

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CONSULTANT : NA

END USER : Venkateshwara Power Projects Ltd. 1

APPLICATION : ESP FOR 30 TPH Spent Wash 1

ORDER TYPE : DOMESTIC

PROJECT NO.: E210410

CUSTOMER : B&H AC_Venkateshwara Sugars

PREPARED	CHECKED	APPROVED	SIZE	SCALE
			A1	1 : 96

PRODUCT NAME : ELECTROSTATIC PRECIPITATOR

TITLE : GENERAL ARRANGEMENT OF ESP
MODEL - TTR

DRAWING / DOCUMENT IN PDF FORMAT VALID ONLY WITH DIGITAL SIGNATURES AND AUTHORIZED FOR SUBMISSION / RELEASE FOR CONSTRUCTION

THERMAX LIMITED
ENVIRO DIVISION

PROJECTION	SHEET	DRAWING NO.	REV.
	2 OF 2	EEAA090034	1

Annexure XV:Manifest of Hazardous waste

FORM - 10

[See Rule 19 (1)]

Manifest for Hazardous and Other Waste

1. Sender's Name and mailing Address : (Including Phone No. & e-mail)	Venkateshwara Power Project Ltd.Bedkihal
2. Sender's authorization No.	
3. Manifest Document No.	01/2017-18
4. Transporter's Name & Address : (Including Phone No. & e-mail)	Shantadurga Petrochemicals Varde Complex, Belgaum Road, At/Post: KHANAPUR-591302 Dist: Belgaum, Karnataka
5. Type of Vehicle	Special
6. Transporter's Registration No.	—
7. Vehicle Registration No.	GA 01 Z-0191
8. Receiver's Name & Mailing Address : (Including Phone No. & e-mail)	Shantadurga Petrochemicals Varde Complex, Belgaum Road, At/Post: KHANAPUR-591302 Dist: Belgaum, Karnataka
9. Receiver's authorization No.	1008 CCM dtd 14/08/15
10. Waste Description	Used oil with Barrels.
11. Total Quantity No. of Containers	11600 Ltrs / MT / Barrels / Litter 7 Nos.
12. Physical form	(Solid / Semi-Solid / Sludge / Oily)
13. Special Handling Instructions and additional information	

14. Sender's Certificate : I hereby declare that the contents of the consignment are fully & accurately described above by proper shipping name and are categorised, packed, marked and labelled and are in all respects in proper condition for transport by road according to applicable National Government regulations.

Name & Stamp — VENKATESHWARA POWER PROJECT BEDKIHAL — Signature — Month 04 Day 21 Year 17

15. Transporter's Acknowledge of Receipt of Waste

Name & Stamp — Signature — Month 04 Day 21 Year 17

16. Receiver's Certification for Receipt of Hazardous and other Waste

Name & Stamp — SHANTADURGA PETROCHEMICALS — Signature — Month 04 Day 21 Year 17

Annexure XVI CPU details

I. Basic Design Data:

Characteristics of Raw Condensate considered for designing Condensate Polishing Unit (CPU)are as follows:

S.No	PARAMETRS	UNIT	Value
1.	Flow	m^3/day	1000
2.	pH	--	3.0 – 3.5
3.	Temperature	Deg.C	65
4.	Total dosiiolved solids	mg/L	100
5.	Total Suspended solids	mg/L	Nil
6.	COD	mg/L	8000
7.	BOD	mg/L	3500
8.	Volatile Acids	mg/L	3000

It is assumed that the Condensate does not contain any inhibitory substance for the biological process.

II. Performance Guarantee:

Upon reaching the steady state, the treated Condensate from the plant shall confirm the following characteristics subjected to proper operation and maintenance and maximum with ± 5% deviation in the influent characteristics.

At the outlet of ACF:

S. No	Parameter	Unit	Value
1.	pH	--	> 7.0
2.	COD	mg/L	< 200
3.	BOD	mg/L	< 100
4.	Turbidity	NTU	< 5
5.	Residual Free Chlorine	ppm	< 1

III. Treatment Scheme:

As per the attached Process Flow Diagram (PFD).

IV. Process Description:

Condensate Polishing Unit (CPU):

Condensate from process plant shall be taken to treatment plant by suitably designed channel or closed pipe depending upon the topography of the site. Condensate shall enter into the equalization tank.

- **Equalization Tank (EQT):**

The objective of the equalization is to minimize or control fluctuations in condensate flow & characteristics in order to provide optimum conditions for subsequent treatment processes. The equalization basin will adequately absorb condensate fluctuations caused by variation in plant production scheduling and to dampen the concentrated batches periodically dumped or spilled. Condensate from equalization tank shall be then enters into buffer tank through Plate heat exchanger (PHE) by pumping.

- **Plate Heat Exchanger & Cooling Tower:**

Condensate shall pass through plate heat exchanger to optimize the temperature for preceding bio reactor. PHE works on the principle of indirect cooling of water.

- **Buffer Tank (BT):**

In buffer tank the complex organics in the Condensate is subjected to hydrolysis. The hydrolyzed Condensate shall be pumped from the buffer tank into the LESBAR reactor for anaerobic treatment.

- **Lars Enviro Sludge Blanket Anaerobic Reactor (LESBAR):**

LESBAR reactor consists of mainly feed distribution network at the bottom, sludge blanket at approx. mid height of reactor and the gas, liquid, solid separator at the top of the reactor. In LESBAR process the bacteria responsible for digestion process are present in the form of sludge blanket. The bacteria grow and reside as bacterial flocs suspended in the Up flow Condensate stream. The bacteria take upon organic content of Condensate to metabolize it and produce biogas and biomass. LESBAR operates in the mesophillic range of temperature, i.e. 36 Deg.C – 40 Deg.C. The pH inside the reactor is usually kept around 7.2 while proper ratio of volatile acid and alkalinity is maintained. The anaerobically digested Condensate is collected from the network of gutters and launder and sent to settling tank. Biogas is collected at the top of the reactor shall be flared off OR utilized for other heating purposes.

- **Settling Tank:**

The overflow from anaerobic reactor enters to this tank for settling of unwanted anaerobic solids and to avoid extra load on aeration tank.

- **Extended Aeration Tank (EAT):**

In EAT micro organisms degrade soluble organics aerobically. In order to ensure required population of bacteria in EAT, a requisite Mixed Liquor Suspended Solids (MLSS) is maintained in EAT. To maintain requisite MLSS and Food to Micro organism ratio (F/M), part of the settled sludge from clarifier will be re-circulated back to the conventional aeration tank. An aeration system consisting of surface aeration shall be used to provide oxygen to bacteria.

- **Secondary Clarifier :**

The mixed liquor from EAT enters the central well of clarifier for separation of sludge and liquid. The clarifier is a hopper bottom circular tank with centrally driven clarifier mechanism. In clarifier solids get settled at the hopper bottom. The supernatant from the clarifier overflows uniformly over the peripheral launder. A part of sludge from the clarifier is re-circulated back to EAT while balanced is sent to sludge drying beds for disposal.

- **Accelerated Gravity Separator (AGS):**

AGS is a high rate treating clarifier, which produces treated water of highest quality with minimum time, space and chemicals.

In AGS, chemicals and large quantities of recalculating sludge's are thoroughly mixed and are retained in intimate contact for a prolonged period of time in the draft and cone sections of the solids clarifier.

The intimate contact between the effluents, coagulant, polymer and previously formed sludge causes the chemical reactions to proceed at rapid rate with a minimum of treating chemicals. Furthermore, by contacting the water with the great volumes of sludge in circulation, maximum clarification of the water can be obtained by the adsorptive properties of the sludge, or flocs formed.

The draft tube and the impeller, which is driven by the variable speed gear drive, is essentially a low-lift vertical pump. With the impeller operation in the proper speed range, recalculating sludge will be drawn into the lower draft tube around the bottom of the draft tube extension and flows up through the draft tube assembly and discharges near the top of the cone. The effluent and treating chemicals are introduced to this recalculating sludge stream below the impeller where they are thoroughly mixed to produce uniform results with minimum chemical consumption.

After leaving the upper draft tube, the effluent and recirculated sludge flows downward beneath the cone, where one portion of the top stream will flow back to the lower draft tube for continued recirculation.

IX. List of Supply Items (Lars Scope):

Sr.No.	Equipment Specifications	
Pre –Treatment		
1.	**Transfer Pumps near EQT**	
	Type	Horizontal, centrifugal, non clog, gland pack
	MOC	SS all
	Flow	Approx. 42 m^3/hr,10-12 m head
	Quantity	2 nos. [1W + 1SB]
2.	**Caustic Dosing System**	
	Dosing Pump	
	Type	Electronic Metering Pump
	Flow	175 LPH
	MOC	PP
	Qty	1 No
	Dosing Tank	
	Type	Chemically Inert Material
	Capacity	1500 L
	MOC	HDPE
	Qty	1 No.
	Dosing Agitator	
	Type	High Speed Centrally Driven
	MOC	SS 304
	Qty	1 No.
3.	**Plate Heat Exchanger**	
	Qty	1 No
	Design flow	Approx. 42 m3/hr
	Inlet Temp	65 Deg C (Max)
	Outlet Temp	38 Deg C
4.	**Cooling Tower**	
	Qty	1 No
	Capacity	To suit PHE requirement
	Purpose	To cool hot water from PHE
5.	**Cooling Tower Recirculation Pump**	
	Type	Horizontal , Centrifugal, Non Clog, Gland Pack
	MOC	CI all
	Flow	Approx. 145 m3/hr
	Head	Approx. 15 mtr
	Qty	2 nos. (1W +1 SB)

Anaerobic System		
6.	**LESBAR Feed Pumps**	
	Quantity	2 nos. [1W + 1SB]
	Flow	Approx. 63 m3/hr,10-12 m head
	Type	Horizontal, centrifugal, non clog, gland pack
	MOC	Body/Impeller – CI, Shaft – SS
7.	**LESBAR Gas-Liquid-Solid-Separator (GLSS)**	
	MOC	MSEP 3 mm thick with 1 mm FRP coating in gas zone only.
	Quantity	Suitable for LESBAR reactor
8.	**Liquid Flow Meter on LESBAR Feed line**	
	Quantity	1 no.
	Capacity	0 – 63 m3/hr
	Type	Electromagnetic type with totalizer
9.	**Liquid Flow Meter on LESBAR Acidification line**	
	Quantity	1 no.
	Capacity	0 – 21 m3/hr
	Type	Electromagnetic type with totalizer
10.	**Flame Arrestor**	
	Quantity	1 no.
	Type	Online
	MOC	CI body with SS bank.
11.	**Breather valve**	
	Quantity	1no
	Type	Dead weight pallet type
	MOC	CI body with SS bank.
12.	**Moisture Trap**	
	Quantity	1no
	MOC	MSEP
13.	**Manometer**	
	Type	Glass 'U' Tube
	Quantity	1 no.
14.	**Liquid level Indicator for Flare Stack**	
	Quantity	1no
15.	**Flare Stack**	
	Quantity	1 no
	Type	Manually ignited
	MOC	MS
16.	**Sludge Transfer Pumps near Settling Tank**	

	Type	Horizontal, centrifugal, non clog, gland pack
	MOC	CI all
	Flow	Approx. 7.0 m3/hr , 8-10 m head
	Quantity	2 nos. [1 W + 1 SB]
Extended Aerobic System		
17.	**Air Blowers in EAT**	
	No.	2 nos. (1W+1SB)
	Type	Root Type, Twin Lobe
	MOC	CI All
	KW	Suitable
18.	**Diffusers in Aeration Tank**	
	Retrievable Arrangement	1 Lot
	Type	Fine Bubble, Tubular
	MOC	EPDM
	Quantity	Suitable
19.	**Secondary Clarifier Mechanism**	
	Diameter	Approx. 10.3 m
	Qty	1 no.
	Type	Central driven, MSEP
	Bridge	RCC Bridge by client
	RPH	2.5 - 3.0
20.	**Sludge Recirculation Pumps near Clarifier**	
	Type	Horizontal, centrifugal, non clog, gland pack
	MOC	CI all
	Flow	Approx. 30 m3/hr , 8-10 m head
	Quantity	2 nos. [1 W + 1 SB]
21.	**Coagulant dosing system**	
	Dosing Pumps	
	Quantity Offered	01 No
	Pump Capacity	50 LPH
	MOC of Pump	PP
	Type	Positive Displacement
	Dosing Tank	
	Quantity Offered	01 No
	Tank Capacity	500 L
	MOC of Tank	HDPE
	Quantity of Agitator	01 No
	MOC of Agitator	SS304
22.	**Polymer dosing system**	
	Dosing Pumps	

	Quantity Offered	01 No
	Pump Capacity	100 LPH
	MOC of Pump	PP
	Type	Positive Displacement
	Dosing Tank	
	Quantity Offered	01 No
	Tank Capacity	1000 L
	MOC of Tank	HDPE
	Quantity of Agitator	01 No
	MOC of Agitator	SS304
23.	**AGS Mechanism**	
	Quantity Offered	01 No.
	Capacity	Approx 42 m3/hr
	Type	Central driven.
	Bridge	RCC by client
	Diameter	Approx 6.9 meter
	Clarifier shaft MOC	MS
24.	**Sludge Transfer pump**	
	No. of pumps	02 Nos(1W+1S)
	Capacity	Approx 10 m3/hr
	Head	10 mwc
	Type	Horizontal Centrifugal
	Material of construction	CI
25.	**Hypo Dosing System**	
	Dosing Pumps	
	Quantity	1 No
	Capacity	6 LPH
	Pressure	2.0 bar
	MOC	PP
	Dosing Tank	
	Quantity Offered	One No
	Tank Capacity	50 Litres
	MOC of Tank	HDPE
26.	**MGF Feed Pumps**	
	Type	Horizontal, centrifugal, non clog, Gland Pack
	MOC	CI All
	Flow	Approx. 42 m^3/hr. 25 m head
	Quantity	2 nos. [1 W + 1 SB]
27.	**Multi Grade Filter (MGF)**	
	Qty	1 no.

	Type	Cylindrical Vertical
	Diameter	Approx 2200 mm
	HOS	Approx 1500 mm
	MOC	MSEP
28.	**Activated Carbon Filter (ACF)**	
	Qty	1 no.
	Type	Cylindrical Vertical
	Diameter	Approx 2200 mm
	HOS	Approx 1500 mm
	MOC	MSEP
29.	**Ultraviolet Disinfection System**	
	Qty	1 No
	Capacity	Approx 38 m3/hr
	MOC	SS 316 L
Common Items		
30.	**Piping**	
	No.	1 Lot
	MOC of pipes	
	Up to digester feed line	SS 304 Sch 5
	All other piping	UPVC/HDPE 6 Kg/cm2
31.	**Valves**	
	No.	1 Lot
	MOC of Valves	
	Valves on piping	Butterfly valves -CI CI,
		Ball Valves – CI SS,
		Check Valve - CI CI,
32.	**Electrical Items**	
	MCC panel	1 no (Non-Compartmentalized), MCCB based
	Cables Qty	1 Lot
	Earthing material	1 Lot
	Other Electrical Specification as per **Annexure - 2**	

XI. List of Civil Units (Client Scope):

Sr. No.	Unit Name	Qty.	Volume / Area	MOC
Condensate Treatment Plant				
1.	Equalization Tank	1	Approx 417 m^3	RCC M25
2.	Buffer Tank	1	Approx 250 m^3	RCC M25
3.	LESBAR Reactor foundation.	1	Approx 305 m^2	RCC M25
4.	Settling Tank	1	Approx. 83 m^3	RCC M25
5.	Extended Aeration Tank	1	Approx. 1464 m^3	RCC M25
6.	Sec. Clarifier	1	Approx 250 m^3	RCC M25
7.	Filter Feed Tank	1	Approx 128 m^3	RCC M25
8.	Sludge Drying Bed	1	Suitable	Brick Masonry
9.	MCC room / Lab room	1	Suitable	Brick Masonry
10.	Foundations	lot	--	RCC Footings

Settled sludge will be moved continuously along the floor towards center of unit by means of a slowly rotating scraper. The accumulated sludge will be transferred to pockets, which concentrates the sludge thereby reducing the total amount of blow down. The excess sludge will be removed from time to time to avoid build-up of same.

- **Chlorine Contact Tank (CCT):**

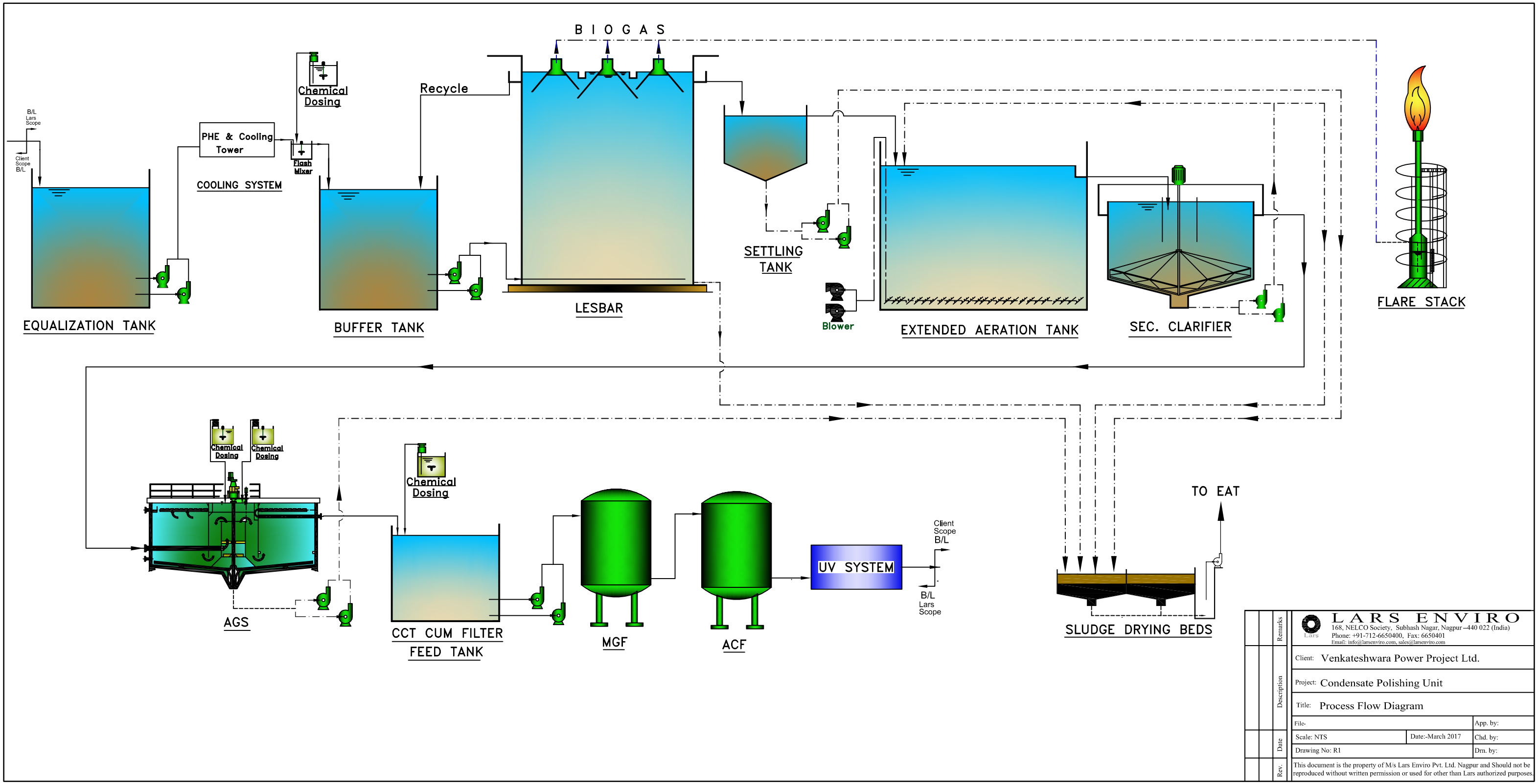
The treated Condensate , Filters backwash, UF reject & Softener reject will be further taken to CCT for disinfection. Chlorine and will be added to treated Condensate. A baffled wall channel constructed in MS will be provided. Chlorine dose will be adjusted to maintain the residual chlorine concentration of 0.5 - 1.0 ppm.

- **MGF, ACF & UV:**

Filter feed pumps transfer the treated condensate water to downstream multi grade filter for removal of suspended solids then followed by activated carbon filter for removal of Odor & slight color. These filters will have to be backwashed at regular intervals to remove the accumulated dirt. These filters will have to be backwashed once every 22 hours or whenever the differential pressure exceeds 1.0 Kgs/cm2 across the filter. Treated Water water from ACF shall pass through UV system to control bacterial growth, treated water shall be recycled to distillery as molasses dilution water.

- **Sludge Drying Beds :**

In the aerobic digestion the sludge is sufficiently mineralized and does not need any further treatment before dewatering and disposal. The sludge drying beds will be used, where sludge will be dewatered by filtration through sand bed and drying of the dewatered sludge by solar radiation.



Remarks	Description	Date	Rev.

LARS ENVIRO
168, NELCO Society, Subhash Nagar, Nagpur –440 022 (India)
Phone: +91-712-6650400, Fax: 6650401
Email: info@larsenviro.com, sales@larsenviro.com

Client: Venkateshwara Power Project Ltd.

Project: Condensate Polishing Unit

Title: Process Flow Diagram

File-		App. by:
Scale: NTS	Date:-March 2017	Chd. by:
Drawing No: R1		Drn. by:

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Annexure XVII Public hearing Document

PROCEEDINGS OF THE PUBLIC HEARING TO UNDERTAKE NEW 90 KLPD MOLASSES BASED DISTILLERY OF M/S. VENKATESHWAR POWER PROJECT LTD, AT EXISTING PREMISES AT SY. NO. 164 TO 170 AND 85, BEDKIHAL VILLAGE, CHIKKODI TALUK, BELAGAVI DISTRICT.

DATE : 05.05.2017

TIME : 11.00AM

VENUE : AT PROJECT SITE

M/s. Venkateshwar Power Project Ltd,. Bedkihal–village having its corporate office at Shiroli village, Hathkanagala-Tq, Kolhapur-Dist, Maharashtra State has proposed to undertake following projects.

- To undertake new 90 klpd molasses based distillery.

DETAILS OF THE PROJECT LOCATION

Survey Numbers 164 to 170 and 85 of Bedkihal village, Chikkodi Taluk, Belagavi District , Karnataka State.

OFFICERS PRESENT

The public hearing was conducted as per EIA notification of MoEF,Government of India 14-09-2006 &amendment notification 01-12-2009.

Public Hearing Panel

Public Hearing Panel Members Present		
1	Shri N. Jayram, I.A.S., The Deputy Commissioner, Belgavi District.	Chairman
2	Sri. M A Maniyar, District Environmental Officer, KSPCB Regional Office,Belgavi-2 (Chikkodi Centre)	Member

REPRESENTATIVES OF M/s. Venkateshwar Power Project Ltd (PROJECT PROPONENT)		
1.	Shri. Swaroop. M. Mahadik	Managing Director
2.	Shri. M. N. Vishwanath	General Manager
3.	Shri. C. B. Kadam	Works Manager
4.	Shri. S. R. Bachche	Chief Chemist
5.	Shri. D. B. Desai	Consultant
6.	Shri. S. A. Chougule	C.D.O.
7.	Shri. Ajit. Narake	Distillery Manager
8.	Shri. Ramdas Patil	Environmental Engineer
9.	Shri. Nilesh. D. Deshmukh	Environmental Consultant
10.	Miss. Hemangi Nalavade	Environmental Consultant
11.	Miss. Savita Upadhyay	Environmental Consultant
12.	Shri. Arunkumar	Environmental Consultant
13.	Miss. Vanita S	Environmental Consultant

As per the Notification issued by the Ministry of Environment and Forests,Government of India on 14.09.2006 (Amendment Notification on 01-12-2009), it is a prerequisite to get Environmental Clearance from the MoEF and it is manadtory that, an Environmental Public Hearing at the project site is be held under the charmanship of Deputy Commissioner or an officer not below the rank of Additional Deputy Commissioner.

As per the State Level Expert Appraisal Committee, Government of Karnataka, Terms of Reference Letter dated:23-09-2016 and the concurrence of The Deputy Commissioner Belagavi letter dated: 21-03-2017, the Public Hearing was conducted by the Karnataka State Pollution Control Board on 05-05-2017 at the Project Site, chaired by the Deputy Commissioner Belagavi.

As per the EIA Notification, the Karnataka State Pollution Control Board gave the paper Notification 30 days in advance. The advertisement to this effect was published in the Kannada Daily Newspaper "Vijay Vani" and English Daily Newspaper "The Deccan Herald" dated: 05-04-2017. And in local daily Kannada Newspaper "Rajakiya Moulya" on 06-04-2017.

The suggestions / views / comments and objections of the interested bonafide residents, Environmental groups and others located at the Project site and are likely to be affected by the expansion were given opportunity to send their suggestions, objections, grievances, etc. Either orally or written or through E-mail to the Karnataka State Pollution Control Board / Chairman, Environment Public Hearing Committee, within 30 days from the date of publication of this notification.

The copy of the EIA draft report and Executive summary of the EIA report both in Kannada and English were placed at the following places for the references of the general public.

- Office of the Deputy Commissioner, Belagavi
- Office of the Chief Executive Officer, Zillah Panchayat, Belagavi

- District Industries and Commerce Centre, Belagavi
- The Chief Officer, Town Municipal Council, Chikkodi, Belagavi- District.
- The Gram Panchayat Office, Bedkihal village, Chikkodi- Taluk, Belgavi-District.
- The Senior Environmental Officer, KSPCB, Zonal Office, Dharwad
- Regional Office, Karnataka State Pollution Control Board, Belgavi-02,(Chikkodi Centre)
- Ministry of Environmental & Forests, South Zone Office, E-3/240, KendriyaSadan, 4th floor, E&F Wings, 17th main road, 2nd Block, Koramangal, Bangalore.
- Help Desk, KSPCB, ParisarBhavan, Ground Floor, No.49, Church Street, Bangalore.

The Deputy Commissioner and Chairman of the Public Hearing panel Belagavi verified the notifications issued in the newspapers and ascertained whether sufficient publicity had been made as required under the statute.

The Regional office K S P C B, Belagavi-2(Chikkodi Centre) received one E-mail application till 04-05-2017.

- Suggestion letter from VootkuriSunanada Reddy, Environmentalist Nalgonad, Telangana State through mail on 03-05-2017.
- The memorandum was submitted in the Environmental Public Hearing by the President of the Gram Panchayat, Bedkihal village, Chikkodi-Tq, Belagavi-Dist.

All the above cited letters are enclosed as Annexure-01.

On 05-05-2017, the day fixed for public hearing, Sri M.A. Maniyar, Environmental Officer, Karnataka State Pollution Control Board, Belagavi - 02, (Chikkodi Centre) extended a warm welcome to the Deputy Commissioner Belagavi, the Senior Environmental Officer, all the public, all the officials of different departments, elected representatives and members and the Staff of the Company who were present.

He briefly explained the need for Environmental Clearance from the Ministry of Environment and Forest, Govt. of India and the Environmental Public Hearing as per the EIA Notification, and informed that, accordingly publicity was given in the newspapers 30 days in advance and explained the procedure of the Public hearing and the documents kept for the Public Hearing. He requested the Deputy Commissioner, Chairman of the Environmental Public Hearing to preside over the Public Hearing and requested the Public to interact and to give their views/opinion about the project and to present all their submissions either in writing or orally. The proceedings will be video graphed.

On behalf of M/S. SMS Envocare Ltd., Pune, the Environmental Consultants, Sri ArunKumar., presented the Power Point presentation of the objectives of the proposed project, the Environmental base line data, present scenario of existing environment in the project area. The impact of the project on the environment. Environment Management Plan, measures proposed to control / mitigate the Environmental Pollution and its protection. The hard copy of the presentations made in the public Hearing is enclosed with this proceeding Enclosed as Annexure-02.

Leaders of various political parties, villagers from surrounding villages, NGOs, Students, press and other interested parties, attended the Public Hearing. List of participants, who attended the Public Hearing, is enclosed as Annexure-03.

The Deputy Commissioner requested all the participants to submit their views and comments in writing also, if any to the Chair. In the Public hearing 08 persons expressed their views and are as stated below:

1. Shri. Baburao. Jipre, Nej village.

- He requested the Project proponents to submit the details of the action taken report on the green belt development undertaken by the industry.

2. Shri. Sunanda Reddy, Environmentalist.

- He informed that, he is an environmentalist and advocate by profession and expressed his views and comments on the behalf of the industry.
- He informed that, 01 crore educated youths will come out every year. But, the organised sectors and other institutions will provide hardly 04-05 lakhs employments to them and the remaining the employments will be catered by the industries.
- He congratulated the industry for assigning the task of preparing the environmental assessment report to the highly qualified, experienced environmental consultants.
- He informed that, the detailed study has been carried out on Air, Water and Soil while preparing the environmental assessment report.
- He demanded that, the industry should take up the study on health status of the surrounding villagers, crop yield and ground water recharge within the 10 K.M. radius of the industry.
- He sought the clarification on the precautionary measures taken by the industry for the prevention of the surface and ground water contamination from the pollutants and a detailed report on the rain water harvesting system adopted by the industry.
- He suggested that, industry should economically consume the ground water in par with its availability and recharging capacity.
- He demanded that, the technical institutions shall be established by the industry to train the local people as per the requirements of the industry and provide the employments in the industry.
- He demanded that, to meet the needs of the surrounding people on demand basis and to supervise and review the C.S.R. activities undertaken by the industry, the committee shall be constituted comprising of the Government nominee, Karnataka State Pollution Control Board representative and member from the management.

3. Shri. Malagouda Patil, Bedkihal village.

- He informed that, the Project proponents adopted the modern technologies to combat water pollution and air pollution in the industry. Due to which they are not facing any problems of pollution from the existing industry.
- He further informed that, due to increase in the sugarcane crushing capacity, the farmers are transporting the sugarcane well within the time. The farmers are getting the better price for their sugarcane from the industry.
- He informed that, the industry is supplying the compost manure to the farmers at subsidiary rate.
- The existing industry already provided the adequate employment to the youths. By undertaking the proposed project further more employment opportunities will be generated.
- In view of the above, he requested the Deputy Commissioner to recommend the expansion proposal at the earliest in the benefit and up liftment of the farmers.

4. Shri. Ajit Thombre, Sadalaga.

- He sought the clarification from the authorities regarding the air pollution control measures adopted in the existing industry and the air pollution control measures proposed in the expansion project.
- He informed that, the farmers are getting the better price for their sugarcane from the industry.

5. Shri. R. E. Dhomane, Bedkihal village.

- He informed that, this is one of the best industry operating in the border area. It is boon to the farmers of the surrounding area.
- There are many other sugar industries exist in this area. But, they are not fulfilling nor catering the needs of the surrounding people. But, this industry works in the welfare of the people and fulfils the needs and demands of the surrounding villagers.
- Due to this industry, the surrounding villagers are leading happy and peaceful life.
- The surrounding people are not facing any kind of hardship from the existing industrial operations. At present, there is no air pollution of any kind in this area. The waste water generated from the different processes is being reused and recycled completely.
- The villagers will be more benefitted from the proposed expansion project.
- In view of the above, he sought the co-operation of all the people for the upcoming expansion project and requested the Deputy Commissioner to accord approval for the expansion project of the factory.

6. Shri. Malagouda Patil, Bedkihal village.

- He informed that, this industry is paying highest price to their sugarcane in this area as compared to the other industries in the Belagavi district.
- More employment opportunities will be generated from the proposed expansion project.

- In view of the above, he sought the co-operation of all the people for the upcoming expansion project and requested the Deputy Commissioner to accord approval for the expansion project of the factory.

7. Shri. S. C. Mane, Bedkihal village.

- He said that, he is the Gram Panchayat member and the legal adviser to Gram Panchayat.
- He informed that, there are no major issues with the industry.
- He informed that, during the rainy season the storm water is getting contaminated due to unscientific discharge of the trade waste and other solid wastes generated from the industry. The residence of the ward no. 02, 03, 04 and 05 are facing hardship and health problems.
- The industry should take all suitable steps, precautionary measures and should adopt the latest best available technologies to avert any adverse effects on the health of the people.
- He requested the Project proponents to ensure that, absolutely there shall not be any adverse impact on the health of the people before undertaking the proposed project.
- He demanded that, the Project proponents should not discharge any kind of liquid and solid waste in the water bodies.

8. Shri. Pramodkumar. Patil, Bedkihal village.

- He informed that, it is the matter of fact that, the people will be more benefitted from the proposed project. But, it is also the boundant duty of the factory management that, they should take all the steps and measures and adopt best available modern technology to avert any ill effects on the health of the people.
- He requested the project proponents to review the ill effects if any due to the proposed project on the health of the people. Accordingly adopt the appropriate modern technologies to avert any such ill effects on the people before undertaking proposed project.

9. The memorandum was submitted in the Environmental Public Hearing by the President and other members of the Gram Panchayat, Bedkihal village, Chikkodi-tq, Belagavi-Dist. The following are the contents of the memorandum read before the public.

- There is a strong protest from the villagers to the upcoming 90 KLD molasses based distillery proposed at Sy. No. 164 to 170 and 85 of Bedkihal village, Chikkodi-Tq, Belagavi-Dist.
- There are discontents for the proposed distillery from the villagers.
- Already surface water and ground water bodies are contaminated due to the unscientific discharge of the trade effluents from the existing industry.
- The Air emissions from the chimney and bagges nuisance during wind blow affecting the villagers and the road users.
- In view of the above, the members of Gram Panchayat, Bedkihal and the villagers boycott this public hearing.

- No permission shall be accorded to the proposed project. If the approval is granted the villagers will strongly oppose and protest the same.

The Deputy Commissioner, Belagavi sought the clarification from the Project Proponents on the following issues:

- He informed that, all the industries should develop 33% of the total area as green belt. He expressed his dissatisfaction over the existing the green belt development undertaken by the industry and also informed that, the Project proponents have not taken the serious note on protecting and developing the existing green belt development in this area.
- The Project proponents not fulfilled their earlier promises made during the last public hearing. Now, how can the public keep faith and belief on the promises made in this public hearing?
- He directed the Project proponents to explain the details of the rain water harvesting system adopted/ proposed.
- He informed to explain the necessary steps taken and preventive measures proposed to combat surface and ground water contamination in the surrounding area.
- The details of the water sources, consumption, generation of the trade effluent. Method of collection, storage, transportation, treatment and disposal of the trade waste and solid waste generated during the process.
- Explain the progress and achievements made in the Corporate Social Responsibility activities undertaken by the industry.
- Submit the parawise reply to queries raised through memorandum by the President of the Gram Panchayat, Bedkihal village, Chikkodi-Tq, Belagavi-Dist.

Clarification Submitted by the Project Proponents in the Meeting:

- The environmental consultant informed that, the Project proponents err marked 8.5 Acres of land for the green belt development. During this financial year they have proposed to undertake plantation of 4000 samplings within the factory premises and 10000 samplings outside the factory premises.
- Total area of the factory is 28 Acres. Out of which 33% of the area i.e. 09 Acres is reserved for the green belt development. Now, out of 09 acres the green belt development is completed in 06 acres of land. The green belt development in the remaining 03 acres of land will be completed at the earliest.
- The speciality doctor appointed by the Project proponents serving and taking care of the health of the surrounding people.

- The parameters exceeding the limits stipulated by the Board of Air, Water and Soil samples are not only due to the industrial activities. Some other factors from the surrounding activities will also contribute in crossing the stipulated limits.
- The spent wash generated during the distillery operation is incinerated in the boiler and reduced to ash form. This spent wash ash is rich in potash and used as manure.
- Already the rain water harvesting system is in place. Further study will be undertaken to find out the lacunas in the system and corrective measures will be taken in this year on priority. Due care and all possible precautionary and necessary steps will be taken to prevent the any hardship to the public during rainy season.
- The measures will be taken to avert the storm water contamination by adopting the latest and the best available technologies in rain water harvesting system in this year only.

SHRI. N JAYARAM, I A S, THE DEPUTY COMMISSIONER, BELAGAVI HAS SUMMED UP THE PROCEEDINGS AFTER PERUSING THE DOCUMENTATION, LISTENING TO THE PUBLIC AND RECORDING, WHAT IS IN PUBLIC INTEREST AS UNDER.

- He informed that, the reply given by the Project proponents to the queries raised in the Public hearing is not satisfactory and expressed his displeasure in this matter.
- Not taken a serious steps and due care in developing the green belt development.
- Not submitted the details regarding the coal consumption and fly ash management.
- Alternative source of water required during the month of March and April.
- The demands, views, grievances & suggestions submitted by the local people in the public hearing meeting will be viewed seriously.
- To undertake stringent dust control measures & dust suppression system to combat the dust emissions generated during the operations. The emission levels in the surrounding areas shall be maintained well below the stipulated standards
- KSPCB shall ensure that the project proponents adopt the best available technologies in revelation & control of the emissions. The stack & Ambient Air Quality monitoring values are to be maintained within the stipulated standards
- Rain water harvesting and water shed management plan should be implemented
- The Company has provide employment, education, health facilities and other amenities as promised by them and in case of any violations shall be viewed seriously and appropriate action shall be taken

- The company will ensure the zero discharge from the plant which ensures that, there will be no contamination of the water bodies during the process.
- The company will undertake Socio-economic development schemes and programs in the surrounding villages.
- The CSR coasting should be as per actual and should not include a separate line item, etc for deliberate buffering to take care of inflation In the CSR time bound action plan submitted. Also, wherever explicitly increase in contribution or execution has been delineated with regards to inflation year on year on a compounding bases, this has to be scrupulously followed and in this CSR should not include existing item/Assets. The action plan includes implementation after public hearing report submission date.
- Plantation of tress in factory and nearby areas-10000 sampling per year over next 5 years and maintained the green belt, and maintain the tress In association with gram panchayat and Forest department
- The appeals, suggestions, complaints and grievances of the public have been recorded through video and same would be made into CDs and the proceedings of the meeting, as it has to sent to the Ministry of Environment, Forests and Climate change, Government of India for further action.

Based on the remarks and views received from the public, who have attended the environmental public hearing, the recommendation will be sent to Ministry of Environment, Forests & Climate Change, Government of India, while considering permission to proposed projects with conditions that the project proponents shall take all precautionary measures during the establishment and operation of the Unit by following guidelines / norms / conditions / directions / standard stipulated by Karnataka State pollution Control Board and Ministry of Environment & Forest, Government of India and other competent authorities.

At the ourset Shri M A Maniyar. Environment Officer, KSPCB, Regional office Belagavi-2(Chikkodi Center) has extended his thanks to Deputy Commissioner, Belagvi, Other Departmental Officers, management, Staff of industry He also extended his thanks to the public, other dignitaries, Press, Police personnel for the support extended during the course of the public hearing and concluded the meeting.

(N Jayaram, I.A.S.)
Deputy Commissioner & Chairman,
Environmental Public Hearing Committee,
Belagavi, Karnataka.

Karnataka State Pol
Control Board Be
M/s. Venkatesh
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Karnataka State Pollution Control Board, Bengaluru

ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮಾಲಿನ್ಯ ನಿಯಂತ್ರಣ ಮಂಡಳಿ, ಬೆಂಗಳೂರು
ಮೆ॥ ವೆಂಕಟೇಶ್ವರ ಪವರ್ ಪ್ರಾಜೆಕ್ಟ್ ಲಿಮಿಟೆಡ್,
ಸರ್ವೆ ನಂ. 164 ರಿಂದ 170 ಮತ್ತು 85, ಬೆದಕಿಹಾಳ ಗ್ರಾಮ, ಜಾ॥ ಬಿಜಾಪುರ, ಗಳಗಾವಿ ರಸ್ತೆ, ಕರ್ನಾಟಕ ರಾಜ್ಯ ಕಡಿ
ಹೊಗ 90 ಕಿಲೋಮೀಟರ್ ಕಲಬುರ್ಗಿ ಬಳ್ಳಾರಿ ಫ್ಲೈಓವರ್ ಸರ್ವೆ ನಂ. 164 ರಿಂದ 170 ಮತ್ತು 85,
ಬೆದಕಿಹಾಳ ಗ್ರಾಮ, ಜಾ॥ ಬಿಜಾಪುರ, ಗಳಗಾವಿ ರಸ್ತೆ, ಕರ್ನಾಟಕ ರಾಜ್ಯದಲ್ಲಿ
ಸ್ಥಾಪಿಸಲು ಪ್ರಸ್ತಾಪಿಸಲಾಗಿದ್ದ ಶಾಖೆಯಿಂದ ಪರಿಸರ ಪರಿಣಾಮದ ಉದ್ದೇಶಿತ
ಪರಿಸರ ಕುರಿತು ಸಾರ್ವಜನಿಕ ಅಲಿಕೆ ಸಭೆಗೆ
ಸರ್ವರಿಗೂ ಸುಸ್ವಾಗತ
ದಿನಾಂಕ : 05.05.2017
Karnataka State Pollution
rol Board, Bengalu
M/s. Venkateshwar
Project Limited.
164 to 170 and 85 Bedkihal
nental Pl
ation Mee

Dated : 05.05.2017
Pollu

RAM RATAN ANKALI

ಮೆ: ವೆಂಕಟೇಶ್ವರ ಪವರ್ ಪ್ರಾಜೆಕ್ಟ್ ಲಿಮಿಟೆಡ್, ಇವರು ಬೆಳಗಾವಿ ಜಿಲ್ಲೆಯ ಬೆಳ್ಳೋಡಿ ತಾಲ್ಲೂಕು, ಬೆಡಕಿಹಾಳ ಗ್ರಾಮದ ಸರ್ವೇ ನಂ. 164 ರಿಂದ 170 ಮತ್ತು 85ರಲ್ಲಿ, ಸ್ಥಾಪಿಸಗೊಂಡಿರುವ ಸ್ಥಳೆ ತಾಲ್ಲೂಕಿಯ ಆವರಣದಲ್ಲಿ 90 ಕೆ.ಎಲ್.ಪಿ.ಡಿ. ಆಕಾಂಡ ಪದ್ಧತಿಯ ಬಟ್ಟಿಗೈದ ಆರಂಭಿಸಲು ಉದ್ದೇಶಿಸಿರುತ್ತಾರೆ. ಇದರ ಪ್ರಮುಖ ಸಾರ್ವಜನಿಕ ಪರಿಸರ ಕುರಿತು ಆಲೆಕೆಯ ಸಭೆ.

ದಿನಾಂಕ : 05-05-2017
ಸಮಯ : ಬೆಳಿಗ್ಗೆ 11.00 ಗಂಟೆ

ಸ್ಥಳ: ಯೋಜನಾ ಸ್ಥಳ
ಬೆಡಕಿಹಾಳ ಗ್ರಾಮ, ಬೆಳ್ಳೋಡಿ ತಾಲ್ಲೂಕು,
ಜಿಲ್ಲೆ: ಬೆಳಗಾವಿ.

ಕ್ರ ಸಂ.	ಹೆಸರು	ಹುದ್ದೆ	ಸಹಿ
1.	ಶ್ರೀ. ಎಸ್ ಜಯರಾಮ್, ಭಾಸ್ಕರ್.	ಮಾನ್ಯ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು ಹಾಗೂ ಅಧ್ಯಕ್ಷರು, ಜಿಲ್ಲಾ ಪರಿಸರ ಸಾರ್ವಜನಿಕ ಸಮಿತಿ, ಬೆಳಗಾವಿ.	
2.	ಶ್ರೀ. ಸಿ.ಡಿ. ಕುಮಾರ	ಹಿರಿಯ ಪರಿಸರ ಅಧಿಕಾರಿಗಳು, ಪಲುಷ ಕಛೇರಿ, ಧಾರವಾಡ.	
3.	ಶ್ರೀ. ಎಮ್. ಎ. ಮಣಿಯಾರ	ಪರಿಸರ ಅಧಿಕಾರಿಗಳು, ಕ.ರಾ.ಮಾ.ಮಂ. ಪ್ರಾದೇಶಿಕ ಕಛೇರಿ, ಬೆಳಗಾವಿ-2 (ಬೆಳ್ಳೋಡಿ).	

ಮೆ. ಪೆಂಚಟೇಶ್ವರ ಪವರ್ ಪ್ರಾಜೆಕ್ಟ್ ಲಿಮಿಟೆಡ್, ಇವರು ಬೆಳಗಾವಿ ಜಿಲ್ಲೆಯ ಬೆಳ್ಳೋಡಿ ತಾಲ್ಲೂಕು, ಬೆಡಕಿಹಾಳ ಗ್ರಾಮದ ಸರ್ವೇ ನಂ. 164 ರಿಂದ 170 ಮತ್ತು 85ರಲ್ಲಿ ಸ್ಥಾಪಿಸಲ್ಪಡುವ ಸಕ್ಕರೆ ಕಾರ್ಖಾನೆಯ ಆವರಣದಲ್ಲಿ 90 ಕೆ.ವಿ.ಎ./ಪಿ.ಡಿ. ಕಾಕಂಬಿ ಪೆದ್ದತಿಯ ಬಟ್ಟಿಗೃಹ ಆರಂಭಿಸಲು ಉದ್ದೇಶಿಸಿರುತ್ತಾರೆ. ಇದರ ಪ್ರಯುಕ್ತ ಸಾರ್ವಜನಿಕ ಪರಿಸರ ಕುರಿತು ಆಲಿಕೆಯ ಸಭೆ.

ದಿನಾಂಕ : 05-05-2017
ಸಮಯ : ಬೆಳಿಗ್ಗೆ 11.00 ಗಂಟೆ

ಸ್ಥಳ: ಯೋಜನಾ ಸ್ಥಳ
ಬೆಡಕಿಹಾಳ ಗ್ರಾಮ, ಬೆಳ್ಳೋಡಿ ತಾಲ್ಲೂಕು,
ಜಿಲ್ಲೆ: ಬೆಳಗಾವಿ.

ಕ್ರ. ಸಂ.	ಹೆಸರು	ಹುದ್ದೆ	ಸಹಿ
1.	Swaroop M. Mahadik	Managing Director	
2.	M. N. Vishwanath	General Manager	
3.	C. B. Kadam	Works Manager	
4.	S. R. Bachche	Chief Chemist	
5.	D. B Desai	Consultant	
6.	S. A. Chougule	C. D. O.	
7.	Ajit P. Narake	Distillery Manager	
8.	Ramdas T. Patil	Envt Engg	
9.	Nilesh D. Deshmukh	Environment Consultant	
10.	Hemangi Nalavade	-11-	
11.	Savita Upadhyay	-11-	
12	Anil Kumar	-11-	
13.	Vaibhav S.	-11-	

14	Dinakar Babu Bhat	
15	Ashok Dattu Mane.	
16	Appasab Raghu Koli	
17	chidanand Panchandra Naishule.	
18	Pancchandra Bairu Budake.	
19	Mahadev Satteppa Gawade.	
20	Ganapati Pandurang Budade. Regr	
21	Ajit Shripal Mekkalaki Nipani	
22	Bhimarao Bhatu Lokande.	
23	Ashok Dhondiram Bhale.	
24	Rategh Ashok Vite.	
25	Satish Sashikant Killedar.	
26	Vishwanath Dasharat Awate	
27	Satish Shivaling Bhat.	
28	Pundalik Vittal pujeri	
29	Babu Shankar Zipare.	
30	Sidram Ningappa Madihalli	
31	Maruti Bhimappa Madihalli	
32	Bhimappa Satteppa Madihalli	
33	Bhimappa Bhimappa Hittanagi.	
34	Siddappa Balappa Pujeri	
35	Peerasab Shamanasab Multani	
36	Dhashurat satteppa Kotare	
37	Sidram Dundappa Kabbure.	
38	Siddappa Ramappa Wader.	
39	Shivanand Siddappa Wader.	
40	A. K. Patil	
41	Mahantesh Shrikant Naik.	
42	Maruti Lakkappa Pradani	
43	Honnappa Vittal Shiragappagol.	
44	Sunil Hari Patil	
45	Pundalik Shivaling Bakale.	
46	Bhuratesh Babu Shedabale.	
47	Sunil Shrikant Magadum	

48	Balayyanaka. Ramayyanaka Nagadum.	
49	Raju. Krisan. Jadhav.	
50	Sanju. Bhima. Gurav	
51	Santosh. Kalya. Jadhav.	
52	Anil. Kalasa Rao	
53	Suresh Annasaheb Mane	
54	Hitesh Shamkant Barve	
55	Amol B. Gangadhar	
56	Ramesh. Iranppa. Kurubet.	
57	Sufiyan M. Kak	
58	Mahadev B Bhosale	
59	Santosh R Rayamane	
60	ANIL D Hindalkar	
61	S S. Hande.	
62	Raju. B Nawale	
63	Shivaji D Chigale	
64	Sunil S. Kamalikalage	
65	Shivaji V Todekar	
66	Vinod S. Rawal.	
67	Bh. Nappa S Madihall.	
68	H. V. Shivagapagol	
69	N S. Fulladev	
70	B. B. Kotabagi.	
71	S. P. Kadam.	
72	A. M. Sonar	
73	S. L. Kesarkar	
74	S. S. Ugale	
75	S R. Mulik	
76	Kumar P. Shankar G S. Bedakihal	
77	Anil. Ramachandra Supatale.	
78	Balagonda Shivagonda Adrashe.	
79	Gadage Babel Mineche.	
80	Arun Surendra Umrani	
81	Kushama Mahadev Sutar.	
	Vijaykumar R. Patil	

12	Sudhendra/ M. Kumbhar	
57	N. S. Sonje.	
1		
	Dayanand B. Sawant	
	Pradip M. Khatavkar	
	Rahul S. Sankpal	
	Shankar Shelloli	
	Appasaheb M. Mali	
	Tukaram A. Patil	
1	Arun Appa Chougule	
2	Ajit M. Shirse.	
3	Yeshwant M. Pawar	
4	Sagar A. Dabhade.	
	Vrushali D. Pathrudkar	
	Ashok R. Gurav	
	Ganesh B. Shinde	
8	Mali R. K.	
9	D.G. Shinde	
10	A. K. Shinde	
11	Kakaso M. Abare.	
12	Jayakumar Ramu Sadalage.	
13	Amit Adinath Sadalge	
14	Deepak Shripati Shindkar	
	Bhimarao A. Suryawanshi	
16	Tanaji Krishnaji Ganyake	
17	Rajkumar Bhanbag Mangale.	
18	Ganapati Gangadhar Chougale	
19	Sunil Appasaheb Khot	
20	Devendra Jayavanda Patil	
21	Prabhakar Dhanu Yadhave	
22	Kalendra Shivappa Yadhave	
23	pradeep vasant deshpande	
24	Vijay Dadaso Shinde	
25	Hemant Ramesh Jiangade	

116)	Appasab Rama Nirgal		
117)	Bankat Nagnnaik		
118)	Nilesh Amb		Nilesh Amb
119)	Mauleuval A Bhui		
120)	Annasaheb Tele		
121)	Vijay T Ingale		
122)	Girish Patil		Patil
123)	Ananda Yashavant Patil.		
124)	Jagdish D Jathar		
125	Vishal R. Pawar		
126	Anil P. Patil		
127	Mukti K. Babar		Babar.
128	Subhash A. patil.		
129	Rahul S. Mehta		
130	Rama Pra N Nidoum.		
131	Narasing L Gurav		
132	V Sunanda	09842179723	
133	Sandeep Patil - Proj Industries Ltd.		Patil
135	Vishal D. Bhopale - Proj Industries Ltd.		
135	Balkrishna V. Daudekar Proj Industries Ltd		
136	Chaitanya P Joshi		
137	Amish Brahmbhatt	THERMAX LTD	
138	TARASI R. KONDEKAR		
139	Tanaji A Shinde		
140	Ashok R. more		
141	Ashok J. Bansal		
142	Mahavuor. A. Aitwade		
143	Sudhakar . > . Nagar		
144	Ashok Pagmalla		
145	K. K Kulkarni		
146	Vishwanath Nagadum		
147	Santosh Washimade		
149	Sanjay T. Nalawade		
150	Baban J Sultanwar		
151	Lakhan N. Hanal		
152	Sachin R. Patil		

153	Rajendra B. kumbhar	
154	Appaso R. Rao	
155	Sukhdev J PATIL	
156	ASHOK PATIL	
157	Baikaj Undre	
158	Pandu PATIL	
159	Chandrakant mulike	
160	Patil D. Y.	
161	Kagale S. M.	
162	[illegible]	
163	Kshirsagar K Chougale	
164	Vijay Patil	
165	Nilesh P Jadhav	
166	Salim N. Beg	
167	[illegible]	
168	Shivaji S Nemade	
169	Kiran B. kamble	
170	suresh B khot	
171	Amasheb A Dhanke	
172	B A kadnale	
173	Suhas B - khot "	
174	" Salem N - ~~Bhagat~~ mumtaleem	
175	Eramma. N Hulammanor	
176	[illegible]	
177	Bhanmu S kahat	
178	Krishnath K Mule	
179	mallappa M Jamawade	
180	[illegible]	
181	[illegible]	
182	Dhanaji D khade	
183	[illegible]	
184	Ramesh S waddar	
185	[illegible]	
187	pandurang S Nande	
188	[illegible]	

189	S M Jathar	
190	Parshuram Baburao Gadakari	
191	Jeevan B. Suryawanshi	
192	[illegible]	
193	[illegible]	
194	I N Nalawade	
195	B. N. Patil	
196	[illegible]	
197	[illegible]	
198	Gurudatt K. Kamat	
199	Vishwas R. Patil	
200	Pawar R. B.	
201	Suresh B Chemmanur	

TECHNICAL PROPOSAL FOR

50 METRIC TONS PER DAY FOOD / BEVERAGE GRADE CO_2 RECOVERY PLANT

(BASED ON CO_2 FROM MOLASSES BASED FERMENTATION)

Submitted to:

VENKATESHWARA POWER PROJECT LIMITED,
A/p BEDKIHAL, TAL.CHIKODI,
DIST-BELGAUM,
KARNATAKA - 591214.

April'25, 2017

PRAJ Industries Limited.

274 & 275, Bhumkar Chowk, Hinjewadi Road,
Hinjewadi, Pune 411057 India
Phone: +91 20 71802000 / 22941000
Fax: +91 20 22941299
info@praj.net ***www.praj.net***

INTELLECTUAL PROPERTY

The technologies represented herein are proprietary to **PRAJ INDUSTRIES LIMITED of PUNE, INDIA.**

All data and information submitted now or likely to be submitted in future for evaluation regarding design details, system operation, processing techniques and prices shall be divulged only to those persons having a direct need to participate in the evaluation. No use shall be made of any information provided herein other than for the evaluation of this proposal, nor shall such data be transferred to others without the written permission of **PRAJ INDUSTRIES LIMITED, INDIA.**

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	COVERING LETTER
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SECTION 8	EQUIPMENT LIST
SECTION 9	LIST OF TYPICAL MAKES
SECTION 10	BATTERY LIMITS
SECTION 11	EXCEPTION LIST (CLIENT'S RESPONSIBILITY)

Dear Sir,

This is with reference to above, we are pleased to submit our Technical proposal for Process, Design, Basic & Detailed Engineering, Supply and Erection for the "ECOPURE-FG" 50 MT/day Food / Beverage Grade CO_2 Recovery plant based on CO_2 from Molasses based Fermentation plant.

PRAJ's ongoing projects under execution:

- **Emperador Distillers, Philippines:** ***100 TPD based on CO_2 from molasses based Fermentation.***

PROCESS PLANT CONFIGURATION

1. About Plant Capacity and PRAJ's Offered Process Configuration:

The capacity of the plant will be designed for the recovery of 50 TPD Food / Beverage Grade CO_2 Recovery and Liquefaction plant having high purity of **99.998 %** based on CO_2 from molasses based Fermentation as a Feed stock.

2. ABOUT THE PROCESS PLANTS / SECTIONS OFFERED – PRAJ'S OFFERING

PRAJ's Scope of supply (CO_2 plant):
PRAJ has offered services for CO_2 Recovery plant within the battery limits mentioned in Respective Section and based on the exclusions in Respective Section.

PRAJ'S CO_2 PLANT SHALL CONSIST:

"ECOPURE-FG" High Purity CO_2 technology, using Raw CO_2 from Molasses based fermentation.

"ECOPURE-FG" TECHNOLOGY:

Keeping in mind specific needs for Product Quality, Energy Consumption.

- ❖ Our Technology offers Cost Effective Recovery Plants.
- ❖ High Product Purity up to 99.998 %.
- ❖ Higher Efficiency with Ease of Operation & Less Maintenance.
- ❖ Higher performance with Low Operating Cost.

We do hope that you will find our proposal interesting, comprehensive & in line with your requirements. **PRAJ's process and plant will enable you to obtain high productivity, lowest cost of production.**
Please feel free to contact us for any additional information.

Yours Sincerely,

For PRAJ INDUSTRIES LTD

Mr. Uday Kulkarni

PART – II: TECHNICAL INFORMATION

SECTION 1
PROJECT OVERVIEW

It is envisaged that the proposed **50 Tons Per Day Food / Beverage Grade CO_2 Recovery Plant** is for 90 KLPD Molasses based distillery.

SCOPE MATRIX

	PRAJ SCOPE OF WORK						CUSTOMER SCOPE OF WORK					
	D&E	SU	ER	SC	SE		D&E	SU	ER	SC	SE	
Process Section												
CO_2 Recovery section	✓	✓	✓	✓	✓		X	X	X	X	X	
Utility												
Cooling Tower	✓	✓	✓	✓	✓		X	X	X	X	X	
Instrument Air compressor	✓	✓	✓	✓	✓		X	X	X	X	X	
Plant Lighting	X	X	X	X	X		✓	✓	✓	✓	✓	
Yard Lighting	X	X	X	X	X		✓	✓	✓	✓	✓	
Others												
Piping, fitting & valves for PRAJ scope of supply	✓	✓	✓	✓	✓		X	X	X	X	X	
Instrumentation PLC based for PRAJ scope of supply	✓	✓	✓	✓	✓		X	X	X	X	X	
MCC & Onwards Electrical	✓	✓	✓	✓	✓		X	X	X	X	X	
Liquid CO_2 Storage Tank	✓	✓	✓	✓	✓		X	X	X	X	X	
Painting for Tanks & Piping	✓	✓	✓	✓	✓		X	X	X	X	X	
Insulation for Praj Scope of supply.	✓	✓	✓	✓	✓		X	X	X	X	X	
Structure	✓	✓	✓	✓	✓		X	X	X	X	X	
Civil	✓	X	X	X	X		X	✓	✓	✓	✓	

Notes:

1. D & E – Design and Engineering
. SU – Supply
. ER – Erection
. SE – Supervision of Erection
. SC – Supervision of commissioning

2. ✓- Indicates included in scope, X - Indicates NOT included in scope
3. Scope specified in above scope matrix is summary, for detailed scope clarity refer Scope definition, Equipment list section, Scope of work section.

1.0 SCOPE DEFINITION

1.2.1 Design Engineering

1. Basic engineering
2. Detailed engineering

1.2.2 Supply

1. Supply of equipment as per equipment list and scope of work specified in respective section.

1.2.3 Erection

1. Erection and supervision of erection work of critical equipment, bought out equipment, site fabricated equipment, Piping fabrication and assembly, Structure fabrication and assembly, Instrument cable and cable tray laying and connection, Electrical cabling and connection as per equipment list and scope of work specified in respective section.

1.2.4 Supervision Of Commissioning

1. Training to customer operators, P & ID audit, preparation of joint punch list, Water, vacuum and steam trials, Start up, stabilization and Performance guarantee runs.

SECTION 2
DESIGN BASIS AND ASSUMPTIONS

Following Process Design Basis and assumption shall be considered

2.1.1. DESIGN CODES AND STANDARDS:

Design and fabrication of equipment will be carried out as per following codes and standards.

Code / Standard	Applicability	Remark
ASME Sec. VIII Div.1	Pressure Parts of Water Scrubber, Reboiler, Column, Vessels, Tanks, and Shell & Tube Heat Exchangers having max. operating internal pressure above 103 kPa(g)	No stamping of any pressure vessel (refer notes)
ASME B 16.5	Nozzle Flanges : up to Size DN 600	--
ASME B 16.47	Nozzle Flanges : Size above DN 650	Only for Bolting Dimensions
General Engineering Practices	Design of Atmospheric Tanks & Vessels.	--
UBC	Wind & Seismic Design / Analysis	--
ASTM / IS	Material Specification	Alternative materials specification for non-pressure components

Notes:

1) CO_2 Plant equipment (such as Column, Water Scrubber, Heat Exchangers, Pressure Vessels & Tanks) having maximum operating internal pressure less than 103 kPa(g) will be designed as per PRAJ's Good Engineering practices based on proven design & plant performance.
2) Columns shall be designed for design pressure along with operating weight condition. Wind & Seismic Loads will be transferred to foundation, as column is stand-alone.

2.1.2. FLANGES:

Nozzle Flanges : Up to DN 150	ASME B16.5, 150# / 300 # rating	SORF Type
Nozzle Flanges : DN 200 to DN 600	ASME B16.5, 150# / rating	Plate Fabricated or Forged Rings
Nozzle Flanges : Above DN 600	ASME B16.47, 150# /300 # rating, Series A	Plate Fabricated or Forged Rings having Bolting dimensions as per ASME B16.47, 150# rating, Series A. (Strength Calculations as per ASME Sec. VIII, Div.1, Appendix-2)
Manhole Flanges	--	Either Standard Flanges as per ASME B16.5 (150#) **OR** Designed as per ASME Sec. VIII, Div.1, Appendix-2
Heat Exchanger Channel Flanges & Column Body Flanges	--	Either Standard Flanges as per ASME B16.5 (150#) **OR** Designed as per ASME Sec. VIII, Div.1, Appendix-2

2.1.3. MATERIAL OF CONSTRUCTION:

Description	Material of Construction	Remark
PLATES		
SS Plate (Pressure / Non Pressure Parts)	SA 240 TYPE 304/304L/316/316L	(As per process requirement)
Carbon Steel Plate (Pressure Parts)	SA 516 Gr. 60/70 / IS 2062 Gr. B	--
Carbon Steel (Non Pressure Parts)	SA 36 / IS2062 Gr. B	Parts like Skirt, Gusset, Support lug, Lifting Lugs
Carbon Steel	SA 36 / SA283 Gr.C / IS2062	For atmospheric Tanks & Vessels
NOZZLE PIPE / SUPPORT PIPE		
Carbon Steel Pipe (Non-Pressure Parts)	IS1239 Part-I / IS3589 / SA 53	Leg supports / Trunion pipes, railings, process nozzles of atmospheric Equipment.
SS Nozzle Pipe up to DN250	SA 312 TP 304/304L/316/316L	Welded Pipe
SS Nozzle Pipe for DN300 & above	SA 240 TYPE 304/304L/316/316L	Rolled from Plate
CS Nozzle Pipe up to DN300 for Carbon Steel equipment	SA 106 Gr.B	--
CS Nozzle Pipe for DN350 and above for Carbon Steel equipment	SA 516 Gr.70 / IS3589 / IS 2062 Gr. B	Rolled from Plate
NOZZLE FLANGE / BODY FLANGE		
SS Flange up to DN150 for Stainless Steel equipment	SA 182 F304/304L/316/316L	--
CS Flange (DN200 and above) for Stainless Steel equipment	SA 105 / SA 516 Gr.70 / SA 266 Gr.2	With weld SS overlay
CS Flange up to DN600 for Carbon Steel equipment	SA 105	--
CS Flange for DN650 and above for Carbon Steel equipment	SA 105 / SA 516 Gr.70 / SA 266 Gr.2	Based on application & availability
CS Body Flange for Heat exchanger & Column	SA 105 / SA 266 Gr.2 / SA 516 Gr.70	With SS weld overlay.
HARDWARE		
Bolts and Nuts for Flange (Up to size DN150)	SA 193 Gr.B7 / SA 194 Gr.2H or IS 1367 Gr.10.9	(Green Passivated- Contains Zinc)
Bolts and Nuts for Flange (Size DN200 and above)	SA 193 Gr.B7 / SA 194 Gr.2H or IS 1367 Gr.10.9	(Green Passivated- Contains Zinc)
Bolts and Nuts (Internal)	AISI 304	
Setting Bolts	SA 193 Gr.B7	(Green Passivated- Contains Zinc)
Foundation Bolts	ASTM F1554 Gr.36 **OR** SA307 Gr.B/C	

FITTINGS		
SS Fittings (Elbows, Tees, Reducers, Bends, End Caps)	SA 403 WP 304/304L/316/316L	Plate fabricated reducers, Miter Bends may be used for Size above DN 300
CS Fittings (Elbows, Tees, Reducers, Bends, End Caps)	SA 234 WPB / IS 1239 Part-II	Plate fabricated reducers, Miter Bends may be used for Size above DN 300
HEAT EXCHANGER TUBES		
Heat Exchanger Tubes - 1.6 mm.	SA249 TP304/304L/316/316L	Welded Tubes
OTHER		
Gaskets for Nozzle Flanges / Heat Exchanger Channel Flanges / Body Flanges	NACF (Non Asbestos Compressed Fiber)	--
Gaskets for Pass Partition Plates in Heat Exchanger	EPDM (Ethylene Propylene Diene Monomer)	C-Type
Surface Finish	Mill Finish	--
Surface treatment Stainless Steel	ASTM A 380	Pickling and Passivation for external surfaces prior to shipment
Painting For CS part of Equipment (External)	Epoxy	Sand Blast cleaned SA 2 ½ & painted

Abbreviation:
IS: Indian Standard
ASME: American Society of Mechanical Engineers
ASTM: American Society for Testing and Materials
API : American Petroleum Institute

2.1.4. STANDARD PRACTICES FOLLOWED AT PRAJ:

1) Corrosion allowance is not applicable for Stainless Steel Equipment.
2) Corrosion Allowance of 1.6 mm shall be considered for Carbon Steel parts which are in contact with the process fluid.
3) Equipment nozzle companion flanges and related hardware (bolts, nuts, and gaskets) are not considered by equipment manufacturer
4) Threading standard for pipe threads, Nipples, Sockets shall be of **NPT** type.
5) For Hygienic service piping quick connect couplings shall be of SMS unions.
6) Minimum thickness for pressure parts (excluding nozzles & tubes) shall be 3 mm.
7) All stud bolts shall be Full threaded ones. Bolts will extend approximately two clear threads from the nut.
8) High pressure and Low Pressure Packed Columns & Large Size equipment (Capacity above 10 m^3) will be pneumatically tested in horizontal condition at manufacturing facility. Hydro testing will not be carried out due to complex internals.

9) Foundation bolts, holding down bolts, cleats & base plate levelling shims / packing pieces are in the scope of Client or Civil contractor appointed by client.
10) Manhole size for Equipment will be of minimum ID 450 mm with Hinge arrangement.
11) For Heat Exchangers, Tube to Tube sheet joint shall be expanded type only. No seal welding will be done.
12) For Heat Exchangers, 'C' type gasket shall be used for Pass Partition Plates in case of Multi-Pass Heat Exchangers (No grooves in tube sheet).
13) Backing Strip may be used for joints where no adequate access is available from inside.
14) If nozzle opening or RF Pad comes on weld seam then that part of weld seam shall be fully radio graphed.
15) **Statutory and Regulatory Requirements:** PRAJ shall provide necessary technical assistance limited to engineering design if required by the Client.
16) **Additional safety Requirements:** PRAJ shall provide necessary technical assistance limited to engineering design if required by the Client

2.1.5. DESIGN BASIS FOR PIPING

PIPING AND VALVES: (CODES AND STANDARDS):

1) Design	
Wall thickness	ASME B31.3
Branch Calculation	ASME B31.3
Other design Requirements	Good Engineering Practice

Following are the applicable dimensional and material standards,

Dimensional Standard	
Items	**Description**
Pipes	ASME B36.19 / ASME B36.10
Fittings	ASME B16.9 / ASME B16.11
Flanges	ASME B16.5 / Plate Fabricated or Forged Rings having Bolting dimensions as per ASME B16.47, 150# rating, Series A. (Strength Calculations as per ASME Sec. VIII, Div.1, Appendix-2)
Gaskets	ASME B16.20 / ASME B16.21
Bolts	ASME B 18.2.1
Nuts	ASME B 18.2.2
OD Based Pipe & Fittings	ISO 2037 / Vendor Standard

Pipe and fittings Material Standards					
Items	Size (DN)	Carbon Steel		Stainless Steel	
		Thk / Rating	MOC	Thk / Rating	MOC
Pipe*	≥15 ≤ 200	Sch 40	A 53 Gr B / A 106 Gr B/ API 5L Gr B	Sch10S	A 312M TP 304 / 316
	≥250 ≤ 600	Sch STD	A 53 Gr B / A 106 Gr B/ API 5L Gr B	Sch 5S	A 358M Gr 304/316 A 240 Gr 304/ 316
	≥650≤1200	Sch STD /Sch 10	A 106 Gr B/ API 5L Gr B	Sch 5S / **	A 240 Gr 304/ 316
Fitting*	≥15 ≤ 200	Sch 10/ Sch 40	A 105 / A 234 Gr WPB / WPBW	Sch10S	A 182M F 304 / 316 / A 403M WP 304/316
	≥250 ≤ 600	Sch STD	A 234 Gr WPB / WPBW	Sch 5S	A 403M WP 304/316
	≥650≤1200	Sch STD /Sch 10	A 234 Gr WPB / WPBW / A 516 Gr 70	Sch 5S / **	A 403M WP 304/316 A 240 Gr 304/ 316
Flange	≥15 < 80	150#	A 105	150#	A 182M F 304 / 316
	≥80 ≤ 600	150#	A 105	150#	A 105M (LJFF) + Stub End (AISI 304 / 316)
	≥650≤1200	150#	A 105	150#	A 105M / A 516 Gr 70 + AISI 304 / 316 Weld Overlay
Blinds	≥15 ≤ 100	150#	A 105	150#	A 182M F 304/316
	≥150≤1200	150#	A 105	150#	A 105M / A 516 Gr 70 + AISI 304 / 316 Liner
OD Based Pipe & fittings	All Sizes	-	-	-	AISI 304 / AISI304L / AISI 316 / AISI 316L / As per vendor standard
Gasket	All Sizes	As per Process requirement			
Bolts	All Sizes	A193 GRB7 (Green Passivated)			
Nuts	All Sizes	A194 GR2H (Green Passivated)			

Valves:

Design Manufacturing Standards for Valves	
Gate Valves	ASME B 16.34 / API 602
Globe Valves	ASME B 16.34 / API 602
Butterfly Valves	ASME B 16.34 / API 609
Check Valves	ASME B 16.34 / API 6D / API 594
Ball Valves	ASME B 16.34 / API 608

Valve types	CS Body / Trim or Disc / Seat	SS Body / Trim or Disc / Seat	Valve Ratings
Gate Valve	A105/AISI410/AISI410 A216/AISI410/AISI410	A182F304/AISI304/AISI304 A182F316/AISI316/AISI316 CF8/AISI304/AISI304 CF8M/AISI316/AISI316	800# 150#
Globe Valve	A105/AISI410/AISI410 A216/AISI410/AISI410	A182F304/AISI304/AISI304 A182F316/AISI316/AISI316 CF8/AISI304/AISI304 CF8M/AISI316/AISI316	800# 150#
Butterfly Valve	A126/DI/EPDM A536/AISI304/PTFE+EPDM A536/AISI304/PTFE+VITON	A126/AISI304/EPDM A536/AISI304/PTFE+EPDM A536/AISI304/PTFE+VITON A126/AISI316/EPDM A536/AISI316/PTFE+EPDM A536/AISI316/PTFE+VITON	PN10, PN16 (as per design)
Lift Check Valve	A216/AISI410/AISI410	CF8/AISI304/AISI304 CF8M/AISI316/AISI316	150#
Wafer Check Valves	A216/A216/EPDM A216/A216/VITON A216/A216/PTFE	CF8/AISI304/EPDM CF8/AISI304/VITON CF8/AISI304/PTFE CF8M/AISI316/EPDM CF8M/AISI316/VITON CF8M/AISI316/PTFE	150#
Ball valve	A105/AISI304/PTFE A216/AISI304/PTFE	A182F304/AISI304/PTFE A182F316/AISI316/PTFE CF8/AISI304/PTFE CF8M/AISI316/PTFE	800# 150#

Other Standards	
Valve Inspection and Testing	As per Praj Quality Assurance Plan

Notes:

1. All Pipe threads will be "NPT" type
2. Detailed Pipe, Fitting and Valve specifications will be decided depending upon Process parameters and will be confirmed during detailed engineering.
3. Miter Bends DN 650 & above will be fabricated from ASTM A 240 Gr 304/316 / A 516 Gr 70 plate material with 100 % radiography.
4. Stainless Steel pipe DN 400 & above will be fabricated from ASTM A 240 plate material with 10 % radiography.
5. ** Thickness will be calculated as per ASME B 31.3 Para. 304
6. * All welded type pipe & fittings will be without heat treatment.

2.2. DESIGN BASIS: INSTRUMENTATION:

1	Design	Generally as per ISA guide lines
2	Manufacturing and testing	Selected Vendor Specification
3	Inspection and Testing	As per PRAJ QAC
4	Painting	As per Manufacturer Standard
5	Area Classification	CO2 Recovery & Liquefaction Plant– Safe Area
6	Control Room	Located in safe area and 15 meter away from Hazardous area.
7	Control System	Non Redundant Conventional (Non Profibus) based control Redundancy shall be given for CPU & power supply.
8	Control Panel	Weather proof – MS powder coated, Front and Rear access, cable entry Bottom
9	Control System Power Supply	110 VAC, 50 Hz from Uninterrupted Power Supply.
10	Field Instrument Enclosure	Ex-proof or Intrinsically safe, IP 65
11	Flange Standard	ANSI B16.5 / ANSI B 16.36
12	Threading standard	NPT
13	Instrument Air	7 $Kg/cm^2(g)$ with – 40 deg C dew point at atmosphere pressure
14	Junction Box Enclosure	1) Flameproof / Intrinsically Safe to above mentioned hazardous area Junction Boxes shall be considered with bottom & side entry.
15	Instrument Cables	PVC Insulated, PVC sheathed, Armoured copper cables, multi stranded. Cables will be as per IS/BS standard.
16	Cable Installation	On Trays tied with cable ties for indoor installation
		On Trays clamped with Aluminum clamp for outdoor installation
17	Cable Tray without cover	Galvanized Iron, Perforated /ladder type

Notes:

1. All field transmitters i.e. D.P transmitters for Level, Flow, Pressure, Flow Meters i.e. Magnetic flow meters, Mass Flow Meters shall be 4-20mA & shall be with integral display.
2. Temperature Transmitter & Control Valve Positioner will not be with integral display.
3. The MCC shall be interfaced to control system panel with One digital input & one digital output and interfacing will be done by client.
4. Control System will be designed to 4-20mA DC analog Input and Output signals.

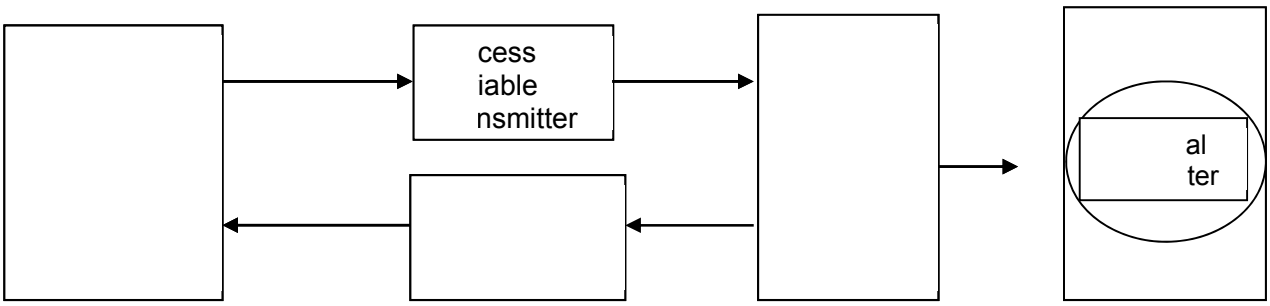
5. Praj will provide operating & Engineering station with 19" Flat screen TFT Square monitors.(1 No. operating stations & 1 No Engineering station)

6. Magnetic Type Flow meters & Mass Flow meters shall be 4 Wire & Power supply will be 110 VAC.

7. In case of On/Off Valves it is considered as one digital output signal through interposing relay to OPEN/CLOSE valve, and one digital input signals for Valve CLOSE/OPEN position feedback

TYPICAL NON-PROFIBUS PLC BASED CONTROL AUTOMATION SYSTEM:

All these control loops shall consist typically of a process variable transmitter (like RTD / Flow meter / Pressure transmitter / level transmitter etc.) control valve with I to P convertor. The process variable is passed on to a control system from where it is viewed on a PC. The Set variable can be set through the PC. The following block diagram shows the schematic sketch of the overall system



Variable transmitter, Control valve shall be situated in the field. The control system and the personal computer are located in the control room. The Process plant shall be controlled by a control system.

PRAJ SCOPE:

		Engineering	Supply
1.	Field Instruments	Yes	Yes
2.	Control System	Yes	Yes
3.	Cables for instrument signal	Yes	Yes
4.	Cables between MCC and Control Room	Yes	Yes
5.	Earthing for Instrument Panel above Ground	Yes	Yes
6.	Cable Trays without cover for Instrument signal cables within battery limit	Yes	Yes
7.	Cable Trays between MCC & control room	Yes	Yes
8.	UPS (for PRAJ supplied Control system)	Yes	Yes
9.	Instrument Air compressor	Yes	Yes
10.	Instrument Air Dryer	Yes	Yes
11.	Wireless Walky Talky system	No	No
12.	Intercom Telephone system	No	No
13.	Data network (LAN/WAN)	No	No
14.	ERP System	No	No
15.	Instrument erection material including ferrules, Lugs, Tag Plates, Impulse tubing & fittings,	Yes	Yes
16.	Statutory approval of installation	Not in PRAJ Scope PRAJ shall submit: a) Routine Test certificates of instruments	

2.3 Electrical design basis (MCC and onwards) and specifications

MOTOR CONTROL CENTOR (MCC) & Cabling Up to Motors:

MCCs shall be made from MS Powder coated. MCCs shall be non-compartmentalized type, non- draw out, "safe area" type, with fuse-less system.

MCCs shall be floor mounting, suitable for indoor installation and dust and vermin-proof. MCCs shall be weather-proof suitable for indoor installation with IP42 degree of protection. Cable entry shall be from the bottom as a standard feature. Top cable entry may be provided, if reqd.

Each starter of MCC will consist of:

1. Motor protection circuit breaker (MPCB) with inbuilt overload relay
2. Contactor
3. ON / Tripped indication
4. Emergency stop stay-put type push button.

For motors up to & including 15 kW, DOL starters shall be provided. For motors above 15 kW, Star Delta Starter shall be provided. For motors above 15 kW, CT will be provided in Y-phase with analogue Ammeter to read the starting and load current.

For motors including & above 160 kW Electronic Soft Starters shall be provided.

Incomer of MCC will be:

1. MCCB for rating up to & including 800 A.
2. ACB for rating including and above 801 A.

Selection of all components will be based on manufacturers selection chart only.

MOC of bus bar will be of Aluminium with current density 0.8 A/mm2.

The Incomer of the MCC panel shall have digital kW, KWh meters (Class: 1.0) Analogue Ammeter, Voltmeter (Class 1.0).

INTERNAL POWER WIRING:

All the power wiring inside MCC will be carried out by using multi-strand Copper conductor, PVC insulated wires. Wires sizes will be as follows:

For DOL Starter:

Motor Rating	Up to 5.5 kW	7.5 Kw	9.3 Kw	11 kW	15 kW
Wire Size	2.5 sq. mm	4.0 sq. mm	4.0 sq. mm	6.0 sq. mm	10 sq. mm

For Star-Delta Starter:

Motor rating	18.5 kW	22 kW	30 kW	45 kW
Wire size [supply side]	10 sq. mm	16 sq. mm	25 sq. mm	50 sq. mm
Wire size [motor side]	4.0 sq. mm	6.0 sq. mm	10 sq. mm	25 sq. mm

The wire sizes mentioned above are indicative and may change during detail engineering.

POWER AND CONTROL CABLES:

Individual motors will be connected to MCC by 690/1100 V grade, XLPE cables.
Single stranded copper conductor will be used for cable sizes 2.5mm2 and below cross section.
Single stranded aluminium conductor will be used for cable sizes including 4 mm2 and up to 10 mm2.
Multi stranded aluminium conductor will be used for cable sizes above 10 mm2.
Cable sizes for motor will be designed for 5% voltage drop during running and 15% drop during starting of motors.

EARTHING:

Earthing pits will provided by using GI pipe/ plate. Excavation work for earth pits and Earthing is in civil contractor's scope. GI Earthing will be done for all electrical equipment & non- current carrying metallic structures / tanks. GI Earthing will be used for lightning protection, connected directly to separate earth pit(s).

PUSH BUTTON STATION:

Key lockable Emergency stop Push button station will be provided near motor(s) wherever required. Motors will be started only from PLC. Flameproof push button station (as per IS 2148) will be provided for hazardous area / section and weather proof push button station will be provided for "Safe" area / section.

CABLE TRAYS:

MS powder coated ladder type cable trays are considered for indoor application wherever possible. Trays shall be designed to accommodate all cables in our scope.

STRUCTURAL SPECIFICATIONS

Structural material will be confirming to Indian Standards as follows:

Sr.No	Sections	Grade / Specification
1.	Structural steel like Beam, columns, Channels & angles etc.	IS 2062 Grade A
2.	Painting	One Coat of Red Oxide and two coats of Enamel Paint
3.	Gratings	25 mm thick MS Painted
4.	Chequered plate	5.0 mm Thick
5.	Hand Railing	Top rail & Vertical post shall be 32 NB and Mid Rail 25 NB MS medium class Pipe.

Note:

- All connections shall be welded connections.

2.3. SECTION 3
PROCESS DESCRIPTION

"ECOPURE-FG" CO_2 RECOVERY SECTION:

3.1. CO_2 RECOVERY SECTION:

Raw CO_2 Gas from Fermenters is washed through a specially designed High Capacity Stainless Steel Foam Trap designed to reduce the potential hazard of Fermenters Foam carry over contaminating the CO_2 Recovery Equipment. Water Spray Nozzles are used for rinse-down in the advent that Foam is detected. Water exits the Foam Trap through a Seal Drain.

The Raw CO_2 Gas is sent through a CO_2 Gas Booster Blower. The Booster draws Feed CO_2 Gas from the Fermenters and increases its pressure to overcome recovery piping and equipment pressure losses and deliver elevated suction pressure to the main CO_2 Compressor. The Booster is equipped with a Variable Frequency Drive that is automatically modulated to maintain a constant CO_2 Fermentation Pressure even with changing CO_2 production rates.

3.2. CO_2 PURIFICATION SECTION:

In this Section, first the CO2 Gas is passed through Low Pressure CO2 Gas Scrubber. Designed to perform with a high efficiency removal of water soluble impurities due to use of water scrubbing through Structured Packing. The Scrubber operates with very high alcohol removal efficiency.

Whenever the Plant is in operation a continuous feed of water automatically adjusted to be proportional to the CO2 collection rate, is evenly distributed over the top of a Structured Packing. Counter current to the water flow is the flow of impure CO2. The water is collected in the sump and drained. At the top of the tower the entrained moisture is removed from the CO2 in the Demister Pad / Mist Eliminator and the CO2 exits the tower.

After Low Pressure Water CO2 Scrubber, the Clean Gas is continuously Fed to CO2 Gas Compressor at constant pressure and this specially designed non-lubricated, two stages Gas Compressor compress the gas to approximate 19 bar (g) pressure at the discharge. The Two Stage Compressor is complete with first stage and second stage cooling with cooling tower water and automatic drains with provision of manual checks for drains.

CO2 Gas compressed & then passes through High Pressure Water Gas Scrubber again to remove heavier impurities from the Feed Gas, to bring down the impurities load on the downstream Purification System in the Plant. After the High Pressure Water Gas Scrubber, the CO2 gas is passed through specially designed Stainless Steel Dual Tower Deodorizers. The Deodorizer removes odour causing impurities from the High Pressure Gas. The Dual Towers are filled with special Activated Carbon. CO2 Gas is Deodorized in the on-line tower while the Media in the parallel tower is regenerated with steam @ 3.5 bar (g) and followed by Natural Cooling. After each cycle, this regenerated parallel tower is changed to process and the other tower goes for regeneration by steam.

Again this Clean CO2 Gas is passed through High Pressure Precooler in Stainless Steel Construction. The Cooled CO2 Gas from Precooler then passes through Dual Tower Dryer

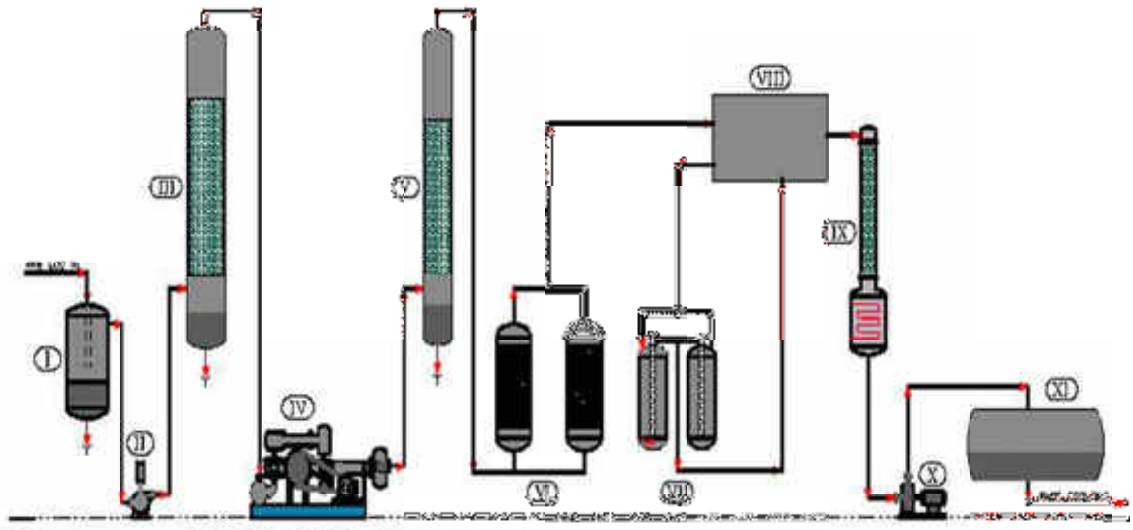
filled with Molecular Sieves. This Dryer is designed for removal of moisture prior to Liquefaction of CO2. The Dryer has two tower systems with tower alteration as well as regeneration. It is completely automatic and regeneration is conducted every cycle. The CO2 Feed Gas is then passed through a fine filter to remove any particulate matter.

3.3. CO_2 LIQUEFACTION SECTION:

Dried, Clean and Purified CO2 Gas is Liquefied in a CO2 Liquefaction System operating on Ammonia Refrigerant. CO2 Gas is liquefied at about minus -27°C in a Flooded CO2 Condenser. The Liquefaction System runs on automatic mode for continuous service.

Liquid CO2 from Liquefying System is further purified by removing the non-condensable gases like O2, N2, etc., via stripping technology and passed through Stripper Section based on Liquid CO2 being stripped by CO2 through CO2 Reboiler using Refrigerant from Liquefying System. High Purity Liquid CO2 is transferred to Special Dual NOx Removal Towers to finally remove / polish the Product Liquid CO2 from the objectionable impurities like NO, NO2 to make the Final Product Liquid CO2 as High Purity Food Grade Quality. Finally this High Purity Product goes to the Liquid CO2 Storage Tank for distribution / supplying High Purity Food Grade Liquid CO2 to Customers or Consumers through Road Tankers.

Process Flow Diagram



SECTION 4
INPUT REQUIREMENT FOR PROCESS PLANT

4.1 FEED STOCK (Raw CO_2):

The Feed Stock specifications and consumption details for Recovery of 50 TPD Food / Beverage Grade CO_2 Recovery and Liquefaction plant having high purity of **99.998 %** based on CO_2 from molasses based Fermentation as a Feed stock.

Component	Unit	Quantity
Raw CO_2 Gas	Kg /hr	~ 2300
Temperature	^0C	~ 32

Note:- The above is the actual raw CO_2 required for 50 TPD CO2 plant. This is assumed to be recovered from 90 KLPD Molasses based Distillery Process plant fermentation section after removing operational & handling losses.

4.2 STEAM CONSUMPTION:

Sr. No.	Parameters	Steam Pressure in psig	Steam consumption
1	Steam for regeneration Required for 20 ~24 hrs, **3-4 times a week operation**	7.0 kg/cm2 (g) /102 psig (~ 168 Deg C)	950 to 1000 kg/hr

4.3 ELECTRICITY:

No.	Electricity	415 V, ± 5v,50Hz, 3 Phase 4-wire supply	
1	**Main CO_2 Plant & Machinery**	Connected Power (kW) **450 Approx***	Operating Power (kW) **400 Approx***
2	**For control system**	**240 V, 50 Hz, 1-phase A.C.**	

***** Electricity consumption figures depend upon the final layout, pipe routing, efficiency of pumps and the actual temperature difference & the flow. Exact electricity consumption will be informed after detailed engineering.

4.4 COOLING WATER:

Cooling Tower heat Duty – 880 Kcal/hr.

4.5 SOFT WATER :

Soft water required for scrubbing at rate of **4.2 m^3/hr** at pressure of 3.0 kg/cm^2 (g) at the inlet of header in the plant with temperature of **30 ^0C maximum**.

4.6 INSTRUMENT AIR:

Instrument air requirement will be confirmed during detailed engineering phase.

4.7 Space Requirement:

Area required for CO2 recovery plant only around 30 m X 30 m without CO2 Storage tanks & cooling tower.

NOTES:

1. The Input consumptions specified above are at rated capacity, under steady state plant operation and uninterrupted supply of inputs as specified.
2. Requirements for Start-up, Shut down, Upset condition etc. are not considered in the above estimated quantities. Hence actual consumption will vary and shall be confirmed after Detailed Engineering.
3. The above parameters given are indicative and may vary depending upon composition of Feedstock .The feed stock composition will have a significant impact on the design and process.
4. Cooling tower make-up water will depend upon the local wind speeds and drift losses and TDS content of water.
5. Electricity consumption is based on the equipment layout attached with the Offer. Any major change in the Layouts will have impact on actual consumption.
6. Dry, saturated Steam should be provided at the respective battery limit
7. The maximum variation in the steam pressure shall not be more than +/- 0.1 kg/cm^2

SECTION 5
EXPECTED OUTPUT STREAMS

5.1 SCRUBBING WATER COMING OUT FROM CO_2 PLANT:

Component	Unit	Quantity
Impurities like Alcohols, Aldehydes and Ketones	m^3/day	~ 100
Temperature	^0C	~ 30

5.2 QUANTITY OF STEAM CONDENSATE:

Component	Unit	Quantity
Normal Quantity(#) with odor causing impurities like Mercaptons	Kg /hr	760 ~ 800
Temperature	^0C	~ 140

NOTES:

- All the figures above are expected figures based on theoretical calculations excluding any heat loss and at steady state operation.
- Steam condensate generation figures can vary and depend on normal handling losses and venting losses.
- ~ shows indicative values.

SECTION 6
SPECIFICATIONS OF INPUTS

6.1 Feed Stock(Raw CO_2):

Typical CO_2 obtained from fermentation process with the following characteristics:

PARAMETER	UNIT	VALUE
Raw CO_2 to be available at approximate	Bar g	0.03
Purity	% v/v	98
Ammonia	ppm v/v	5
Carbon Monoxide	ppm v/v	15
Carbonyl Sulphide (COS)	ppm v/v	10
Hydrogen Sulphide	ppm v/v	10
Sulphur Dioxide	ppm v/v	2
Nitric Oxide (NO)	ppm v/v	50
Nitrogen Dioxide (NO_2)	ppm v/v	35
Oxygen	ppm v/v	Trace
Moisture	ppm v/v	Trace
Total Hydrocarbons (as CH_4)	ppm v/v	10500
Volatile Hydrocarbons (as Ethane)	ppm v/v	14500
Non-Volatile Residue	ppm v/v	ND
Odour	ppm v/v	YES
Assay	ppm v/v	ND
Benzene	ppm v/v	ND
Ethyl Benzene	ppm v/v	ND
Toluene	ppm v/v	ND
Xylene	ppm v/v	ND
Hydrogen	ppm v/v	Trace
Nitrogen	ppm v/v	100
Acetaldehyde	ppm v/v	200
Ethanol	ppm v/v	11000
Ethyl Acetate	ppm v/v	15
Methanol	ppm v/v	20
Dimethyl Sulphide	ppm v/v	35
Ethylene Oxide	ppm v/v	ND
Phosphine	ppm v/v	ND
Hydrogen Cyanide	ppm v/v	ND
Volatile C1-C4 Mercaptons	ppm v/v	ND
Other inerts (Total He. Ar.)	ppm v/v	ND
Unsaturated Hydrocarbons	ppm v/v	ND
Total Sulphur Content	ppm v/v	30
Oxides of Nitrogen(NOX)	ppm v/v	25
Propionaldehye	ppm v/v	0.5
Acetone	ppm v/v	1.3
2-Butonal	ppm v/v	0.1
N-Propanol	ppm v/v	8
Isobutanol	ppm v/v	5
n-Butanol & Isoamyl Actate	ppm v/v	0.2
Isoamyl Alcohol	ppm v/v	20

Notes:

1) Purity of CO_2 Gas as mentioned above is along with air & some congeners. The above mentioned Quality represents the typical Raw Gas Composition from an Ethanol Fermenter based on molasses and is the Basis of Design. This needs to be verified upon Start-up of the Distillery. This Composition is also dependent on the Feed Stock Quality as well as how Fermentation Reaction works for that. Any change in the Raw Gas Composition will impact the Final Product CO_2 Composition.
2) ND indicates the impurity was Not Detected below MDL (Method Detection Limit).

6.2 SPECIFICATIONS FOR SOFT WATER:

Soft water should be filtered, potable and supply at a temperature of 30 ^{0}C max. and 40 psig pressure at inlet of soft water header in process plant.

Sr. No.	Parameter	Unit	Value
1.	pH	-	6 – 9
2.	Chloride (Cl^-) (Expressed as NaCl)	mg/lit	< 250
3.	H_2S	mg/lit	Nil
4.	Residual Free Chlorine	mg/lit	< 1
5.	Silica (SiO_2)	mg/lit	< 50
6.	Total Hardness (Expressed as CaCO3)	mg/lit	< 5
7.	Turbidity	NTU	<10
8.	Total dissolved solids	Mg/lit	< 750

*mg/lit – Parts Per Million (PPM).

6.3 SPECIFICATIONS FOR STEAM:

Dry, saturated steam at should be provided at the inlet of steam header in process Plant. The maximum variation in the steam pressure shall not be more than +/- 0.1 bar. Expected Steam condensates recycle to boiler after considering flashing and line losses: 85 ~ 87% of the steam utilized.

Sr. No.	Section	Steam Pressure psig	Steam Temperature ^{0}C
1	Dry, Saturated de-superheated and regulated steam at constant pressure.	102	~168

6.4 INSTRUMENT AIR:

Sr. No.	Parameter	Unit	Composition
1.	Pressure	psig	90 – 100
2.	Dew Point	^{o}C	-40
3.	Purity of Instrument Air	-	Oil free as per ISO 8573-1 Class 2-2-2

6.5 ELECTRIC POWER:

Sr. No.	System Ratings / Parameter	Unit	Value
1	Nominal voltage	volts	415 ± 5v volts
2	Nominal frequency	Hz	50 Hz to definite
3	Phases/wires	phase	**For Motors:** 3 phase, 4-wire supply **For control system:** 240 V, 50 Hz, 1-phase, A.C. supply.

SECTION 7
PERFORMANCE PARAMETER NORMS

7.1 PLANT CAPACITY: The Plant is designed to produce 50 TPD.

7.2 PRODUCT SPECIFICATION (LIQUEFIED CO_2):

SR. NO.	PARAMETERS	CO_2 SPECIFICATIONS, APPROVED BY (PEPSI/COKE)
1.	Purity	Not less than 99.998 % v/v
2.	Moisture	Not more than 20 ppm v/v
3.	Appearance in Water	No colour or turbidity
4.	Odour (Snow Test)	Odourless
5.	Taste and odour	Free from forgein taste and odour in Water
6.	Non –Volatile Residue	Not more than 10 ppm w/w with no observable particulate matter such as carbon fines
7.	Non –Volatile (Organic Residue)	Not more than 5 ppm w/w
8.	Non –Volatile Hydrocarbons (as Methane)	Not more than 50 ppm v/v of which not more than 20 ppm v/v is non-methane hydrocarbon
9.	Total Sulphur(as S)	Not more than 0.1 ppm v/v
10.	Aromatic Hydrocarbons	Not more than 20 ppb v/v
11.	Acetaldehyde	Not more than 0.2 ppm v/v
12.	Ammonia	Not more than 2.5 ppm v/v
13.	Carbon Monoxide	Not more than 10 ppm v/v
14.	Nitrogen Oxide (Nox)	Not more than 2.5 ppm v/v

Notes:

1. Above mentioned Purity of CO_2 is based on quality of input Raw CO_2 gas from Fermentation Section, which shall be verified upon start-up of Fermentation Section. Any change in Raw CO_2 gas composition will impact final Product CO_2 composition.
2. The analysers required to certify this purity level is assumed to be in off-taker's / Companies scope.
3. The excess Raw CO_2 gas above the input quantity mentioned will be vented to atmosphere without recovery from Fermentation Section.
4. The Capacity of the CO_2 Recovery Plant is measured by means of Coriolis type liquid CO_2 flow meter on product liquid CO_2 outlet of the plant.
5. The Dew Point is measured in the CO_2 gas phase after the Driers. Measurement is done with automated Dew Point Tester (DPT).
6. For the quantification of organic and / or sulfur components, a gas sample after the Driers can be taken for analysis.
7. Lab, testing facilities or any chemicals will be in client's scope.

SECTION 8
EQUIPMENT LIST

PRAJ's Process plant consists of following sections and sub-sections of CO_2 Plant.

8.A. PROCESS PLANT:

8.1 CO_2 recovery and liquefaction section

8.2 Bough Out equipment

8.3 Tanker filling Arrangement

8.4 Cooling Tower & Pumps

8.5 – Liquid Storage Tank Scope

8. B. INSTRUMENTATION AND CONTROL SYSTEM :

8.1 Instrumentation for CO_2 Plant

8.2 Control System for CO_2 Plant

8.1 CO_2 RECOVERY AND LIQUEFACTION SECTION :

Equipment List –

8.1.1 CRITICAL AND PROPRIETARY EQUIPMENT TO BE SUPPLIED BY PRAJ

Sr.No.	Equipment Description	Technical Specifications	MOC	Qty. (Nos.)
1.	LP CO_2 Gas Water Scrubber-I	Packed Column With Structured Packing	Shell: AISI 304	1
2.	HP CO_2 Gas Water Scrubber	Packed Column With Structured Packing	Shell: AISI 304	1
3.	CO_2 Foam Trap	Standard Design	AISI 304	1
4.	CO_2 Knock Out Drum	Standard Design	AISI 304	3
5.	Dual Tower CO_2 Gas Dryer System Skid	Type: Packed Bed With Molecular Sieve Desiccant Charge	AISI 304	1
6.	Liquid CO_2 Stripper Column Assembly	Standard Design	C.S.	1
7.	Dual Tower CO_2 Gas Deodorizer System Skid	Type: Packed Bed With Activated Carbon Charge	AISI 304	1
8.	NOx Tower Skid	Type: Packed Bed With Molecular Sieve Charge	C.S.	1

8.2 BOUGHT OUT EQUIPMENT TO BE SUPPLIED BY PRAJ

Sr.No.	Equipment Description	Technical Specifications	MOC	Qty. (Nos.)
1.	CO_2 Gas Booster Blower With Motor Skid	Standard Design	CI	1
2.	HP CO_2 Gas Scrubber Water Pump With Motor	Type: Centrifugal Pump	Wetted Parts CF8	1+1
3.	Liquid CO_2 Transfer Pump With Motor	Type: Rotary Vane Pump	CI	1+1
4.	CO_2 Gas Compression System With Cooler Skid	Type: Two Stage Reciprocating Non-Oil Lubricated	CI	1
5.	CO_2 Gas Liquefying System Skid	Type: Refrigeration System Ammonia /R404/$410 Based	AISI 304	1
6.	Spray Nozzles	Type: Spray Nozzle	AISI 304	LOT
7.	Mist Eliminators	Standard Design	AISI 304	LOT
8.	Piping & Valves	As Per Design Basis Given in respective section	--	LOT

Sr.No.	Equipment Description	Technical Specifications	MOC	Qty. (Nos.)
9.	Instrumentation & Control	As Per Design Basis Given in respective section	--	LOT
10.	Electricals	As Per Design Basis Given in respective section	--	LOT
11.	Metallic Structure including skids	As per specification given in respective section	Structural Carbon Steel	

8.3 Tanker Filling Arrangement

1.	CO_2 Tanker filling arrangement	Standard with pumps & interconnecting piping	Carbon steel	1

8.4 Cooling Tower & Pumps, Instrument Air Compressor

1.	Cooling tower	Heat Load – 550 Kcal/hr to be located within 10 m from the CO_2 plant battery limit	FRP/Wooden	1
2.	Recirculation pumps with (non- flame proof) motor	Capacity – Suitable	CI	1+1
3.	Instrument Air Compressor with Motor	Capacity – Suitable	Standard	1+1

8. 5 Liquid CO_2 Storage tank:

1	Liquefied CO_2 Storage Tank	Type: Cylindrical / Horizontal Shell with Dish Ends (Insulated) ASME Sec VIII, Division-1 Capacity – 50 MT	Low Temperature Carbon Steel	1

Notes:-

1) The above equipment list and specifications are preliminary. The exact specifications will be confirmed only after detailed engineering.
2) The material of construction is for wetted parts only. Other parts such as flanges, nuts, bolts etc. will be MS / CI / CS as applicable.
3) Instrumentation Panel shall be non-flameproof type and Instrumentation Control room will be located in non-flameproof area.
4) MOC for all skids will be C.S.

8.B. CONTROL SYSTEM PLC BASED (NON-*PROFIBUS) FOR CO_2 PLANT*:

Sr. No.	Particulars	Quantity
1	Control Panel for Control System Consisting of a. Marshaling Panel b. CPU cards c. Power supply d. Analog Input /Output Module e. Digital Input / Output Module f. 24 VDC Field Power supply g. I/O installation racks h. Interposing Relay Board i. Communication Device & accessories between control system & operating station, accessories and connecting cables **Non-Redundancy for CPU, Power supply & communication between CPU & operating stations.**	1 No.
2	Operator /Engineering station with 19" Monitor With desktop mounted PC Operating System- WINDOWS –XP Licensed System software Report generation software Licensed Engineering software	1 Nos.
3	Desk Jet colour printer (to be procured by Customer)	1 No.
4	Modem	1 No.

SECTION 9
LIST OF MAKES OF BOUGHTOUTS

Sr. No.	ITEM DESCRIPTION	STANDARD MAKES.
Mechanical Equipment		
1.	CO_2 Gas Compressor	ABC-Spain/ Mehrer-Germany
2.	CO_2 Gas Blower	TMVT / Equivalent
3.	High Pressure Pumps	Grundfuss / KSB / Proflo / Equivalent
4.	Liquid CO_2 Pumps	Black Smith / Blackmer / Equivalent
5.	Molecular sieves	Zeochem / CECA / Equivalent
6.	Activated Carbon	Calgon /Cobot / Equivalent
7.	Structured Packings	Kevin / Sulzer / Equivalent
8.	Ammonia Compressor	J and E Hall/Equivalent
9.	Electrical Motors	ABB-Baldor / Crompton Greaves /Equivalent
Valves		
10.	Manual butterfly valves	Delval Flow Controls /Omkar / Intervalve / Crane / Equivalent
11.	Manual ball valves	Flowjet Valves /Aqua control / Equivalent
12.	Gate/ Globe/check valves	Flowjet valves/Metflow/ Expert Engineering / Equivalent
13.	Solenoid Valves	Rotex / Bray / Asco/ Equivalent
14.	NRV	Omkar Valves / Hawa Valves / Equivalent
15.	Steam Traps	Spirex Marshall / Uniklinger / Equivalent
16.	Breather valve	Fainger Engineering / Equivalent
Control System		
17.	Programmable Logic Controller (PLC)	Siemens /Allen Bradley / ABB
Control Valves		
18.	Globe Control Valves	Samson / Forbes Marshall / Equivalent
19.	Pressure Safety Valve	Fainger Engg/ Tyco Sanmar/ Equivalent
20.	Butterfly control / On-off Valve	Bray Controls / Delval Flow Controls / Equivalent
21.	Segmented ball valves	Metso Automation / Bray Controls / Equivalent

Flow Instruments		
22.	D.P. Flow Transmitter	Siemens / Yokogawa / Emerson / Equivalent
Level Instruments		
23.	D.P. Type Level Transmitter	Siemens / Yokogawa / Emerson / Equivalent
24.	Remote Seal Level Type Transmitter	Siemens / Yokogawa / Emerson / Equivalent
25.	Conductivity Type Level Switch	Endress& Hauser / Equivalent
26.	Level Gauge	Pune Techtrol / Equivalent
Temperature Instruments		
27.	RTD with Temp. Transmitter	Wika / Endress& Hauser / Smart Sensors / BelloframBaumer / Goa instruments / Equivalent
28.	Temperature Gauge	Wika Instruments / Goa Thermostatic/ Baumer / General Instruments/ Equivalent
Pressure Instruments		
29.	Pressure Transmitter	Siemens / Yokogawa / Emerson / Equivalent
30.	Pressure Gauge	Wika / Goa Thermostatic/ Baumer/ General Instruments /Equivalent
31.	Pressure Switch	Orion/ Indfoss/ Switzer/ Equivalent
Electrical		
32.	MCC Panel	Reputed local vendor (**IEC Standard**)
33.	Electrical Motors	Baldor / WEG / ABB / TECO / Equivalent
34.	Electrical cables	Gemscab / Polycab/
35.	Electrical Switchgears	Siemens/ Schneider
Erection Hardware		
36.	Instrumentation cables	Icon cables /Thermo cable / Equivalent
37.	Pneumatic, Impulse Tubing & fittings	Fluid Controls/Arya/Elcon/Equivalent

Note:

- Any change in above makes would call for the change in the price and other commercial terms
- Bought out Equipment, Instrumentation, Piping and Valve manufacturer may source the equipment based on their global sourcing strategy worldwide including China.

SECTION 10
BATTERY LIMITS

Sr. No.	Stream	Battery Limit
1.	Feed :Raw CO_2 Gas	From inlet of CO2 Scrubber in fermentation section.
2.	Product : Liquid CO_2	At the outlet pipe flange of Liquid CO2 storage tank with Hose pipe 3 M length.
3.	Electricity	At the incomer of MCC panel
4.	Steam	At the inlet flange of steam header in CO_2 Plant.
5.	Steam condensate	At the outlet pipe flange of Dual Tower Activated carbon Deodorizer in CO_2 Plant.
6.	Soft Water	At the inlet Flange of Soft water Header in CO_2 Plant. At the inlet of cooling tower basin.
7.	Vents / drains/ Scrub water	At the outlet flange of respective vent and drain points or respective equipment in CO_2 Plant.

SECTION 11
EXCEPTION LIST (CLIENT'S RESPONSIBILITY)

The following activities are in the scope of work of the Client:

1. Raw & Product CO_2 Gas online Analyzers as required by the CO_2 off taker.
2. Food grade certification equipment/infrastructure.
3. Cylinder filling station

- **CIVIL WORK:-**

1. Dismantling of any existing structure, demolishing existing building, leveling of plot for civil construction. Contour Plan and trial pits for soil data.
2. Civil supply, supervision & construction of all foundations, buildings, cooling tower basins and other civil / masonry tanks.
3. Compound wall, fencing to CO2 Storage tanks area.
4. Landscaping, construction of internal roads, storm water drains, main drains fencing, gate, security cabin, yard lighting, plant illumination etc.

- **UTILITY SERVICES:-**

1. Boiler, supply of steam from boiler & piping of steam up to battery limits.
2. Supply of utilities like Steam, process & soft water, electricity etc. All piping required for supply of utilities like steam, Soft water and process water up to respective battery limits of PRAJ scope.
3. Design, engineering, supply and execution of the entire electrical system power generation, power distribution, cables, switch gears, Earthing, PCC, & switch-gears, plant lighting, yard lighting, lightning arrestors for the entire plant.
4. Design, Engineering, supply and erection of Water Treatment plant and piping for supply of sealing water, soft water up to battery limits.
5. Preparation and supply of CIP Liquid up to battery limits and treatment and disposal of exhausted CIP solutions.

- **STORAGE :-**

1. All material handling and storage equipment like trucks, trolleys, tanker, storage cupboards, etc.
2. Storage of liquid effluent or feed materials.
3. Gas daily receiver and bulk storage tanks, Air receiver tanks, CO_2 bottling system.
4. Storage & security of supplied equipment.

- **SOLID AND LIQUID DISPOSALS:-**

1. Storage disposal and treatment of other output streams such as floor-washing, rain water streams etc.
2. Treatment of Sealing water Purge and soft water from Process pumps, water from water scrubber, cooling tower blow down etc.

- **MISCELLANEOUS:-**

1. Laboratory equipment / apparatus, laboratory chemicals.
2. Supply of Feed Stock, utilities and Chemicals.
3. Supply of CO2 cylinder.
4. Fire-fighting facility & fire extinguishers Safety Showers, Fire sprinklers and washing stations.
5. Preliminary and final Hazop study.
6. Supply of Electricity power and water during construction & commissioning phase at free of cost.
7. Guidance and obtaining work permits / formalities and payment of fees to appropriate authorities.
8. Applications and License fees to various statutory Government Authorities like air & water permit for obtaining various clearances, no-objection certificates etc.
9. Lodging, boarding, food expenses, local conveyance and local transportation up to site for all PRAJ's engineers visiting site for this project.
10. Any other item /activity not specifically mentioned in scope of work and equipment list.

EP/12.1/2010-11/12/KAR 331

Government of India
Ministry of Environment and Forests
Regional Office (South Zone)

Kendriya Sadan, 4th Floor,
E & F Wing, 17th Main Road, 2nd Block,
Koramangala, Bangalore -560 034

Dated: 11th July 2017

To

Mr. Swaroop M. Mahadik, Managing Director,
M/s Venkateshwara Power Projects Ltd.,
Village Bedkihal, Chikkodi Taluk,
Belgaum District. Karnataka-591214.

Sub: Expansion of 15 MW Co-gen power plant by addition of 15 MW at village Bedkihal, Chikkodi Taluk, Belgaum by M/s Venkateshwara Power Projects Ltd- Cleared by the Ministry vide Ref No. No. J-13012/34/2009-IA, II (I) dated 9.9.2010- - Request for the certified compliance report -regarding.

Ref: Your letter No. VPPL/ADMIN/DIST/2017-18/105 dated 13-05-2017.

Sir,

This is in response to your letter of above mentioned subject and reference.

As requested by you a site visit was carried out to this unit on 21.06.2017 and I am enclosing here with a copy of the approved monitoring report for this unit for necessary action at your end.

Yours faithfully

(Dr U Sridharan)
Scientist 'G'

Encl: As above.

EP/12.1/12/2010-11/Karnataka
GOVERNMENT OF INDIA
Ministry of Environment and Forests
(Regional Office, Southern Zone)
Bangalore-34

MONITORING REPORT

PART I

1	Name of the projects	Expansion of 15 MW Co-gen power plant by addition of 15 MW at village Bedkihal, Chikkodi Taluk, Belgaum by M/s Venkateshwara Power Projects Ltd
2	Clearance letter No.& date	No. J-13012/34/2009-IA, II (T) dt. 9.9.2010.
3	Location: District & State / UT	Vill. Bedkihal, Chikkodi Tk, Belgaum Karnataka
4	Address for correspondence:	Mr. Swaroop M. Mahadik, Managing Director, M/s Venkateshwara Power Projects Ltd Village Bedkihal, Chikkodi Taluk, Belgaum District Karnataka-591214. Phone 08338-262457, 261057 Fax: 262957 Cell: 9901137408
5	Date of site visit for this report	21.06.2017
6	Date of previous visit(s) if any	18-01-2012
7	Brief on the project along with the present status:	

The project site was visited on 21-06-2017 along with Mr. Vishwanath (General Manager) Mr. Ramdas Patil (Environmental Officer), Mr. Ajit Narke (Distillery Manager) and representatives of their environmental consultant – M/s Equinox Environments (I) Pvt. Ltd., Kolhapur.

M/s. Venkateshwara Power Projects Ltd (VPPL) is an integrated project of Sugar factory and Co-generation power plant implemented by Mahadik Business Group. This project is located 55 Km from Belgaum. The environmental clearance is issued for their expansion of their Co-generation plant from 15 MW to additional 15 MW. The existing capacity of sugar factory is 3500 TCD. This unit has started their first crushing operations in the year 2001 and started the co-generation plant in year 2003-04. Expansion of Co generation plant was done in year 2011 from 15 MW to 30 MW for which they have obtained their environmental clearance from the Ministry. This project is situated on an area of 30 acres

land. Bagasse, a by-product of sugar factory is used as fuel in boiler which generates steam This steam is used to rotate the turbine in power house which generates electricity which is supplied to state grid. The excess steam from turbine is condensed and is again fed into boiler as feed water. Earlier the industry has achieved 1st prize for highest cane recovery in year 2007-08 as well as 2nd prize for best cane development in year 2012-13 by SISSTA. However, due to low rainfall in recent years there is decreased sugarcane production in the region which has ultimately affected the sugar production causing economic pressure on the industry. The number of crushing days for year 2014-15 was 139, for year 2015-16 was 129 and for year 2016-17 was 88 respectively only.

The environmental management measures for their existing operations are as follows:

Air pollution control measures: The steam required for their activities is taken from 2 bagasse fired boilers namely 70 TPH and 90 TPH. Stacks of 65 M for the 70 TPH boiler and 75 M for 90 TPH followed by wet scrubber as air pollution control equipment with 95% efficiency have been installed. The internal diameter of both stacks is 2.8 M. Also 2 DG sets of capacity 500 KVA and 200 KVA with stack of 5 M ARL each are provided in the Industry. Regular monitoring of air quality is being carried out by the Industry. As per the data provided all parameters are within the permissible limits.

Water pollution control measures: Freshwater required for their activities of the Sugar factory and Co-generation Unit is taken from Dudhganga River. For this, an agreement has been made with Minor Irrigation Division of Government of Karnataka for withdrawal of not more than 150 MCFT of water per year. Water cess returns is regularly submitted to KSPCB. The industry has adopted water conservation methods in their factory in order to reduce waste water generated. Also the effluent generated from sugar factory to the tune of 305 KLD and that from Co-gen plant is 226 KLD is treated in their ETP which consists of equalization tank, anaerobic treatment followed by aerobic treatment. Flow meters at inlet as well as outlet have been installed in the ETP section. Regular monitoring of treated effluent is carried out by the industry in its own laboratory as well as from external approved laboratory. In-house laboratory consists of 9 instruments (pH Meter, Conductivity meter, Turbidity meter, Spectrophotometer, COD digester, BOD incubator, Hot air oven, Weighing balance and hot plate). As per the monitoring reports provided during the visit all the parameters are within the permissible limits. The treated water is supplied to nearby farmers for irrigation on land area of about 60 acres for which an agreement is made with the farmers.

Noise reduction measures: There are no major noises generating activities in the factory, however the co-generation unit turbine creates noise pollution and the turbines in this section have been provided with acoustic enclosure to prevent noise pollution. Workers prone to noise pollution are being provided with ear plugs. Regular work-zone noise level monitoring is being carried out from external laboratory and noise levels are within the permissible limits.

Solid and Hazardous Waste Management: The industry segregates solid waste from hazardous waste. Solid wastes namely press mud (28581.37 MT), ETP sludge (200 MT)

and boiler ash (245 MT) are being generated in the factory. Press mud is used for bio-composting while ETP sludge is mixed with boiler ash and this is sent to member farmers. For this, an agreement is done with the farmers. Hazardous waste in the form of used oil to the tune of 2 KL/A is generated for which authorization for handling is obtained from KSPCB. The industry has obtained membership from authorized re-processor for disposal of hazardous waste. Also, the industry regularly files the hazardous waste returns to KSPCB.

The project authorities have approached the regional office of the Ministry for obtaining a compliance report for the conditions of their environment clearance of their existing operations since they are going in for an expansion of their unit. Earlier the regional office of the Ministry has monitored this project in January 2012 and several points were communicated to the project authorities for improvement for which the project authorities have taken action for improvement. The project authorities were not regular in submitting their six monthly reports on the status of compliance to the conditions of the environmental clearance including the results of the monitored data. However now they have submitted a detailed report to the regional office and assured that they will submit their reports regularly now onwards. During the monitoring visit the unit was not in operation and the regular maintenance operations were going on at site. The project authorities have also uploaded the copies of consent from KSPCB, (Ref: AW-301644 dated 15.12.2016) environmental clearance (Ref: J- 13012/34/2009 IA. II (T) dated 09.09.2010), recent compliance report and the monitoring data on the company's website at http://www.venkateshwarapower.com/approvals.

After the field visit, discussion with the project authorities, Pollution Control Board officials and perusal of the documents provided by the project authorities the compliance status of the project has improved considerably. The detailed point wise compliance for their environmental clearance is given in this report

(Dr U. Sridharan)
Scientist "SG"

PART-II

Status of compliance to the Environmental clearance issued by the Ministry of Environment and Forests for the Expansion of 15 MW Co-gen power plant by addition of 15 MW at village Bedkihal, Chikkodi Taluk, Belgaum by M/s Venkateshwara Power Projects Ltd. issued vide Ref. No. J-13012/34/2009-IA. II (T) dt. 9.9.2010

Compliance status in brief:

Sl.No	Specific Conditions	COMPLIANCE
1	In case of change in fuel, clearance needs to be obtained	Agreed to comply
2	Wet scrubber shall be installed.	Complied
3	Stack of 70 m be provided	Complied
4	COC 5.0 shall be adopted	Being complied
5	No ground water to be used	Complied
6	Green belt developement	Being complied
7	Effluent treatment	Being complied
8	Sewage treatment	Being complied
9	Monitoring water quality	Being complied
10	Rain Water harvesting.	Being complied
11	Safety measures	Being complied
12	Noise pollution control	Being complied
13	Monitoring air quality	Being complied
14	Action plan for issues of public hearing	No issue raised
15	CSR Programme details	Being complied
16	Need based assessment study for villages	Agreed to comply
17	In built monitoring mechanism for CSR activities	Being complied

Sl.No	General Conditions	COMPLIANCE
1	Storage of auxiliary liquid fuel	Being complied
2	First aid and sanitation	Complied
3	Provision of housing for labourers	Complied
4	Advertisement in local paper	Complied
5	Copy of EC letter to local panchayat authorities	Complied
6	Setting up of Environmental Cell	Complied
7	Uploading in their website	Complied
8	Six monthly progress reports	Being complied
9	Submission of Six monthly Reports	Being complied
10	Submission of project related documents	Being complied
11	Earmarking separate fund for EMP.	Being complied

PART-III

Detailed Compliance status

A). SPECIFIC CONDITIONS

1. **In case fuel for running the power plant is proposed to be changed from Bagasse to other fuel (liquid or solid) the project proponent shall apply for such a change in environmental clearance along with necessary documents as required under EIA notification, 2006 (and its amendments). In such a case the necessity for holding public hearing again or otherwise will be determined by the Ministry in consultation with the Expert Appraisal Committee (Thermal Power).**

The project authorities have informed that their existing quantity of Bagasse is sufficient enough to meet the requirement of their co-generation and assured that they will obtain necessary approvals if they propose to change the fuel.

2. **Wet Scrubber shall be installed to control particulate emissions from Bagasse fired Boilers.**

The project authorities have installed venture wet scrubber which is common to their boilers of capacity 70 TPH and 90 TPH respectively to control particulate emissions.

3. **Stacks of 70 m shall be installed. Exit velocity of flue gases shall not be less than 22 m/sec.**

The project authorities have provided 70 M stack and assured that they will maintain exit flue gas velocity of 22 m/s.

4. **COC 5.0 shall be adopted.**

The project authorities have provided 5.0 cycles of concentration which has led to water conservation.

5. **No ground water shall be extracted for the project work at any stage.**

It was informed that they are not using ground water for their project.

6. **Green Belt consisting of 3 tiers of plantations around the plant of 50 m width and adequate tree density not less than 2500 per ha with survival rate not less than 75% shall be developed. In areas where 50 m width is not possible adequate justification shall be submitted to the regional Office of the Ministry.**

The project authorities have developed green belt in an area of 10 Acres. It was informed that they have carried out mass plantation, shelterbelt plantation and avenue plantation. The

survival rate of the tree species is good. It was also informed that they are planning to plant at least 2000 more trees during every monsoon.

7. **The treated effluents conforming to the prescribed (as applicable) and the treated sewage shall be reused to the extent possible and excess discharged. Arrangements shall be made that effluents and storm water do not get mixed.**

The project authorities have provided an effluent treatment plant with online monitoring system; flow meters at inlet as well as outlet and separate lines for separation of ETP treated water and storm water. It was informed that entire treated effluent is given to nearby farmers for irrigation as well as used for gardening in own premises. An agreement copy with local farmers for supply of treated water was verified during the site visit.

8. **A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt / plantation. Continuous monitoring of effluent discharge shall be undertaken and it shall be ensured that when discharge enters the natural drain the temperature of effluent shall be at ambient.**

The project authorities have provided septic tanks in decentralized manner for domestic effluent generated. The overflow of septic tanks is being used for gardening.

9. **Monitoring of ground and surface water quality (if any nearby) shall be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.**

It was informed by project authorities that there is no perennial stream passing through the industry and reaching any river. Dudhganga river is located at a distance of 4.5 Km in north and Vedganga river is located at 4 Km from the project site. Ground water monitoring at selected locations is regularly being carried out. The said reports were verified and parameters are found to be within the permissible limits.

10. **A well designed rainwater harvesting shall be put in place. Central Groundwater Authority / Board shall be consulted for finalization of appropriate rainwater harvesting technology within a period of three months from the date issue of clearance shall be submitted to the Regional Officer of the Ministry.**

The project authorities have implemented rooftop rainwater harvesting at specific locations in the industry.

11. **Adequate safety measures shall be provided in the plant area to check/ minimize spontaneous fires especially during summer season. Copy of these measures with full details with location plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.**

The project authorities have provided Fire fighting arrangements comprising of fire extinguishers like CO_2 and DCP cylinders, fire hydrant box, fire hydrant hose nozzles, monitor, fire buckets, safety showers etc at selected locations in factory premises. It was informed that regular fire fighting mock drills are being conducted to train workers for fire hazards. The project authorities have an emergency plan to control any emergencies including fire

12. **Noise levels' emanating from turbines is controlled in such a way that the noise in the work zone shall be limited to 75 dBA at 1m from the source of noise. For people working in the high noise area, requisite personal protective equipment like earplugs / ear muffs etc. shall be provided. Workers engaged in noisy areas such as turbine areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing loss including shifting to non noisy / less noisy areas.**

During site visit, it was observed that turbines have been provided with acoustic enclosures to prevent noise pollution. It was informed that workers entering inside plant are provided with PPE like earplugs. Records of noise monitoring reports were observed during the visit.

13. **Regular monitoring of ground level concentration of SO2, NOx, RSPM (PM10 & PM2.5) etc. shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided by the Regional Office of this Ministry. The data shall also be put on the website of the company.**

Records of air quality monitoring reports for period 2015 to 2017 were maintained with the project authorities. It was informed that these reports were also uploaded on their Industry's website.

14. **Time bound action plan for implementation of issues raised in public hearing shall be submitted to the Ministry within three months.**

It was informed that no specific issues were raised during the public hearing.

15. **An amount of Rs. 0.08 Crores shall be earmarked as one time capital cost for CSR programme. Subsequently a recurring expenditure of Rs.0.016 Crores per annum shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted within one month along with road map for implementation.**
16. **As part of CSR programme the company shall conduct need based assessment for the nearby villages to study economic measures with action plan which can help in upliftment of poor section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and**

income generating programmes. This will be in addition to vocational training for individuals. This will be in addition to vocational training for individuals imparted to take up self employment and jobs.

17. **It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.**

It was informed by project authorities that due to lack of understanding on the CSR program based on need based assessment was not been able to implement. However, based on request letters and demands from local people, the project authorities have contributed Rs. 11,73,791 for year 2013-14, Rs. 8,79,124 for year 2014-15, Rs. 6,29,704 for year 2015-16 and Rs. 4,06,450 for year 2016-17 respectively as a part of their CSR programme. It was informed that the industry is going for the establishment of molasses based distillery project for which as a part of EIA studies, a socio-economic survey of the study region was also carried out. Moreover, the project authorities have assured that an immediate need based assessment shall be carried out within next 2 months and accordingly a CSR program shall be altered and implemented.

B. GENERAL CONDITIONS

1. **Storage facilities for auxiliary liquid fuel such as LDO and / HFO / LSHS (if any) shall be made in the plant are in consultation with Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.**

It was informed that the industry is provided with D. G. Sets in which diesel is used as fuel and is run only during power failure. Further, it was told that only one barrel of 200 liter capacity diesel is stored on site for which no permission from Department of Explosives, Nagpur is required. Necessary safety measures are taken for the storage of the little quantity of the diesel.

2. **First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.**

It was informed by project authorities that they have provided first aid and sanitary facilities to their workers during construction phase.

3. **Provision shall be made for the housing of construction labourers within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. the housing may be in the form of temporary structures to be removed after the completion of the project.**

It was informed that during the construction work, all infrastructure and facilities like cooking, mobile toilets, drinking water, medical health care etc., were provided by the industry.

4. **The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board / Committee and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in.**

The project authorities have already advertised in two newspapers, i.e in Indian express in English and Samyukthakarnataka in Kannada on 31-10-2010 and a copy was provided to the regional office.

5. **A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parishad / Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.**

It was informed that they have already submitted copies of their environmental clearance to the local authorities.

6. **An Environmental Cell shall be created at the project site itself and shall be headed by an officer of appropriate seniority and qualification. It shall be ensured that the head of the Cell shall directly report to the head of the organization.**

It was informed that they have established an environmental cell with Mr. Ramdas Patil as the coordinator and all the other officers are the members of the cell to improve the environmental compliance of their project.

7. **The proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB.**

The project authorities have uploaded all the compliances and monitoring data on the company's website (http://www.venkateshwarapower.com/approvals)

8. **The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well by e-mail) to the respective Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB.**

The submission of six monthly compliance reports subsequent to issue of Environmental Clearance on 09.09.2010 was not done routinely. The project authorities have assured that they will periodically submit the progress report. The latest six monthly compliance report (period Oct 2016 to March 2017) was submitted on 17.05.2017.

9. **The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the environmental clearance conditions on their website and update the same periodically and simultaneously sent the same by e-mail to the Regional Office, Ministry of Environment and Forest.**

The latest six monthly compliance report (period Oct 2016 to March 2017) was submitted on 17.05.2017. The same is also been uploaded on the company's website.

10. Monitoring by the Regional Office and provision of required information during visit

The project authorities have submitted the required documents during site visit.

11. Separate funds allocation for implementation of environmental safeguards

The project authorities have informed that they have necessary financial allocation for environmental safeguards and they have provided the details on the expenditures already made towards Environmental safeguards which is as follows.

Sr. No.	Description	Cost Component	
		Capital	Annual O & M
1.	Air Pollution Control – Wet Scrubber, Stacks, etc.	Rs. 3.5 Lakh	Rs. 2.4 Lakh
2.	Water Pollution Control- ETP	Rs. 150 Lakh	Rs. 6 Lakh
3.	Solid / Hazardous Waste storage & disposal	Rs. 10 Lakh	Rs. 1 Lakh
4.	Noise Pollution Control	Rs. 10 Lakh	--
5.	Environment Monitoring & Management	Rs. 15 Lakh	Rs. 5 Lakh
	Total	Rs.188.5 Lakh	Rs.14.4 Lakh

(Dr U. Sridharan)
Scientist "SG"