

# **PREFEASIBILITY REPORT**

for

## **NIRANI SUGARS LTD**

**EXPANSION OF COGENERATION UNIT FROM 94 MW  
TO 117 MW, (ADDITIONAL 23 MW COGENERATION  
UNIT)**

at

**at Sy No.166, Kulali Cross, Jamakhandi Road, Mudhol Taluk,  
Bagalkot District, Karnataka State, India.**

***PREPARED BY***



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## 1. Executive Summary

M/s Nirani sugars Ltd., have already obtained Environmental Clearance for the establishment of 20,000 TCD sugar cane crushing & 94 MW cogeneration unit vide letter dated 28.10.2016 bearing File No. SEIAA 7 IND 2015. As per this EC obtained, cogeneration unit from 62 MW to 94 MW is not yet implemented. Now, the management has decided to increase the Co-generation unit from 62 MW to 117 MW by proposing new Boiler of 200 TPH in-place of the earlier proposed Boiler of 150 TPH i.e., additional 55 MW.

Sl.No	Items	Particulars
1	Objective of the Project	Expansion from 94 MW to 117 MW cogeneration unit
2	Promoters	M/s Nirani Sugars Ltd.
3	Total Investment	Rs.126.4 Crores for the expansion
4	Project location	Sy Nos. 166, Kulali Cross, Jamakhandi Road, Mudhol Taluk, Bagalkot District, Karnataka State.
5	Extent of land	73.9 Acres (No additional land required, expansion proposed within the same premises)
6	Man Power	22 No's additional
7	Water demand and Source	Maximum fresh water will be required during offseason as during season, condensate water will be utilised. During off-season for expansion 1673 KLD. Source of water is from Ghataprabha river.
8	Power requirement and source	<b>Normal Generation</b> Season : 106.8 MW Off season : 55 MW <b>In-house consumption</b> Season (Sugar + Cogen) : 32.3 MW Off season : 6 MW <b>Power Export</b> Season : 74.5 MW Off season : 49 MW
9	Latitude	16°21'01.44" N
10	Longitude	75°16'12.76" E

Comparison chart (Cogeneration)

SI No	Particulars	Existing EC SEIAA 7 IND 2015 Dated 28.10.2016	Present expansion	Difference
1	Promoters	M/s Nirani Sugars Ltd.,		
2	Location	Sy No.166, Kulali Cross, Jamakhandi Road, Mudhol Taluk, Bagalkot District, Karnataka State, India.		
3	Objective	Expansion of sugar cane crushing from 15000 TCD to 20000 TCD and cogeneration from 62 MW to 94 MW	Expansion of cogeneration from 94 MW to 117 MW	Additional 23 MW
4	Plot area	73.9 Acres		No additional requirement
5	Total Man power including sugar cane crushing	910 nos	932 nos	+ 22 nos
6	Total Investment, Rs	710 Crores	836.4 Crores	+ 126.4 Crores

7	Raw material	For 94 MW cogen: Bagasse: 133 TPH	For 117 MW cogen: Bagasse: 216 TPH	Additional: Bagasse: 83 TPH
8	Product	Power: 94 MW	Power: 117 MW	+ 23 MW
9	Water requirement and source	During off season for cogen: 6012 KLD Ghataprabha	During offseason for cogen: 7685 Ghataprabha	+ 1673 KLD
10	Wastewater generation	During offseason 566 KLD	During offseason: 597 KLD	Additional 31 KLD
11	ETP capacity	2500 KLD	-	Capacity adequate
12	Air pollution control management	ESP	ESP	New ESP for 200 TPH boiler
13	Solid waste	Boiler ash: 60 TPD	Boiler ash: 70 TPD	Additional: 10 TPD

## **2. Introduction of the Project/ Background Information**

### **2.1 Identification of project and project proponent.**

Mr. Murugesh R Nirani is a self made man, born to a farmer in 1965 at Basava Hachanal, a backward Village in Bilagi Taluk of Bagalkot District. Unperturbed by the family finances and with a strong will to succeed, Mr. Murugesh Nirani went on his own to complete his Bachelor of Engineering at Hubli and then successfully completed the Diploma in Business Management from the well-known Ferguson College in Pune. After completion of his studies, Mr. Nirani returned to his hometown and saw the potential for sugarcane processing in the nearby area. The farmers were then transporting their sugarcane over a long distance. With a view to help the farmers, Mr. Nirani decided to start with a small unit at Mudhol, where he first started the 500 TCD Khandasari Unit. Subsequently, taking the advantage of the Government's policies, he quickly and in time converted the Khandasari Unit to White Crystal Sugar Unit.

Having successfully demonstrated his capability as an industrialist with the small sugar plants, Mr. Nirani set his eyes on expansion and diversification of the sugar plant as stated above. After subsequent expansions, now the industry is crushing 15,000 TCD of sugar cane and 62 MW of power from cogeneration unit. He has also been recognised and awarded Bharat Udyog Ratna award from Govt of India. Mr. Hanumath R Nirani, is a Chairman and managing Director of the company. He comes from an agricultural family and entrusted with all the matters connected with operation of the sugar plant to make profits.

Mrs. Kamala Murugesh Nirani is another Director of the company actively involved in making effective decisions to run the company profitably.

### **Organizational Structure**

Since Mr. Murugesh R Nirani is pre-occupied with Politics, while his brother Mr. Hanmanth R.Nirani and wife Mrs. Kamala R.Nirani are looking after the policy matters of NSL as Board of Directors, the youngest brother Mr.Sangamesh R.Nirani is looking after the day-to-day affairs of NSL as its Executive Director. He is ably assisted by a team of Senior Executives of NSL.

**Mr. SANGAMESH R. NIRANI :** Mr. Sangamesh Nirani is a young Mechanical Engineer with enthusiasm and a challenge to succeed. He is the youngest brother of Mr. Murugesh R. Nirani, who started Nirani Sugars Ltd, Mudhol more than a decade back with only 500 TPD Khandasari Sugars. Ever since Mr. MR Nirani became the Hon'ble Minister in the Karnataka Government from 2009 to 2013, he entrusted the management of Nirani Sugars Ltd to Mr. Sangamesh Nirani. He is continuing to look after the day to day management of NSL as its Executive Director, which has already undertaken vast expansion and diversification under his leadership. He has ensured that NSL has been continuously growing.

**Mr. M.S.HATTIKAL** is the Director (Technical) of NSL. He is also an Engineering graduate in Electrical & Electronics, besides having an Energy Auditor certificate from the Bureau of Energy & Efficiency, and Boiler Operation Engineers certificate from the Department of Factories & Boilers, Government of Karnataka. He has over 18 years experience in various capacities in various sugar factories in Karnataka, including project implementation, erection and commissioning. He has worked as a Joint Chief Engineer at Prabhulingeshwar Sugars, Chief Engineer in Davanagere Sugars, and as a Deputy General Manager (Co-gen) at Doodhaganga SSK Ltd.

Besides the above, there are several other qualified and experienced General Managers and others executives working for NSL at the factory.

NSL has also set up an office in Bangalore which looks after all Liaoning and co-ordination work with Government Departments, Financial Institutions & Banks, etc.

## **2.2. Brief description of nature of the project.**

M/s Nirani Sugars Ltd is located at Sy.No. 166, Kulali cross, Jamakhandi road, Mudhol Taluk, Bagalkot district, Karnataka state. The present proposal is for expansion of Co-generation Unit from 94 MW to 117 MW with a proposal of new Boiler of 200 TPH by replacing the earlier proposed 150 TPH Boiler. Expansion is being planned within the existing premises.

### **2.3. Need for the project and its importance to the country and / or region.**

The demand of electrical power has been ever increasing at a faster pace after country's economic development pace speeded up. The effective generation of power has not been meeting the demand and the same trend is expected to continue, especially during the peak hours and summer seasons. Hence there is a good scope for exporting power to the grid through power traders. Now based on demand of electricity, co-generation unit is planned for expansion from 94 MW to 117 MW. Currently, 62 MW capacity Co-generation Unit is in operation.

The abundant availability of high recovery cane and potential for improvement in profits necessitate expansion of the co-gen capacity. While proposing schemes for expansion, efficient use of energy is considered. The schemes suggested will cover:

- a) Stable and Efficient operation
- b) Modern technology with emphasis on energy efficiency
- c) Surplus power generation for sale to grid

### **2.4. Demand-Supply**

The demand for electrical power has been increasing at a faster pace after the country's economic development the pace speeded up, especially in Karnataka which has been the hub of software services. The effective generation of power has not been meeting the demand and the same trend is expected to continue, especially during the peak hours and summer seasons. Hence, there is good scope for exporting power to the third parties using the state grid through power traders / purchasers. The company has PPA with HESCOM to sell the surplus power generated from the existing capacity under open access through power exchange, there by getting better realization from the existing power sale. However, in view of the revision in PPA Tariff effective January 2015, it is proposed to sell the entire surplus power from Co-gen plant to HESCOM.

### **2.5. Imports vs. Indigenous production**

Not Applicable

### **2.6. Export possibility and Domestic / Export markets.**

The power exported is as given below:

During the season: 74.5 MW and during the Off-season: 49 MW.

### 2.7. Employment Generation (Direct and Indirect) due to the project.

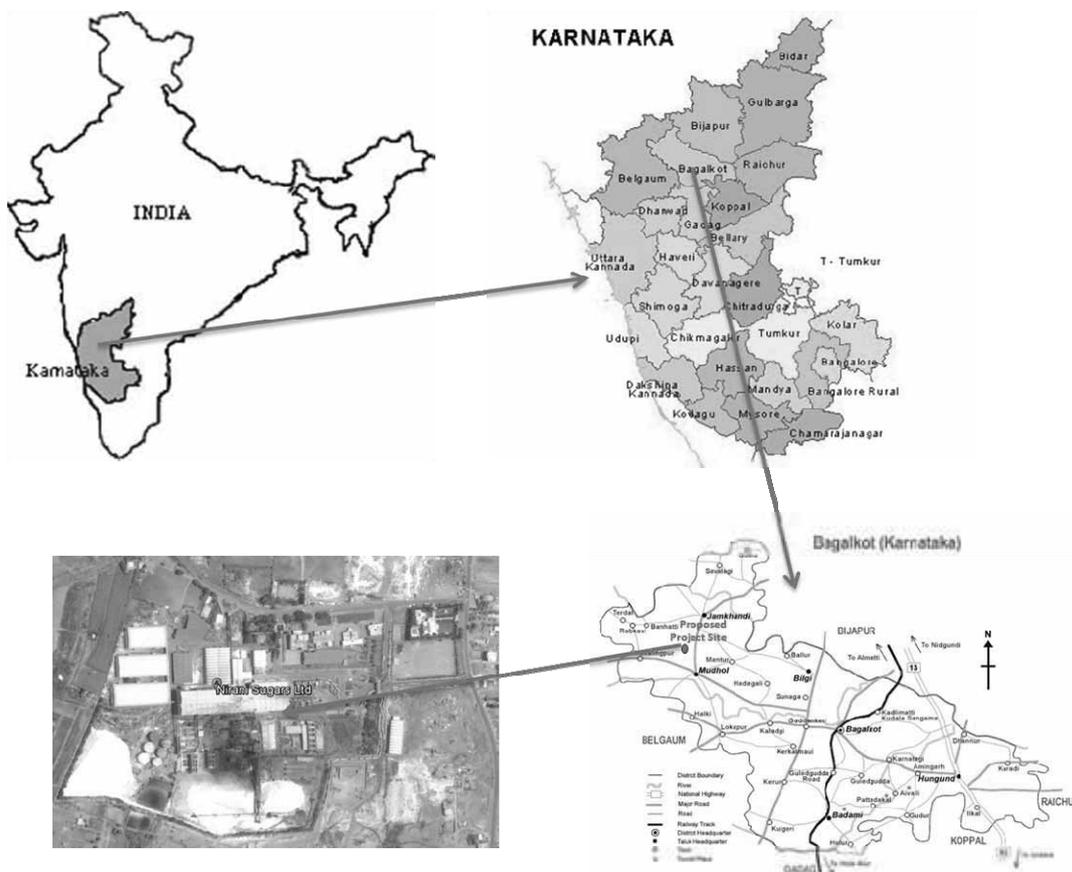
From the expansion proposal, direct employment is 22 No.s and indirect employment is 75 No.s.

## 3. Project Description

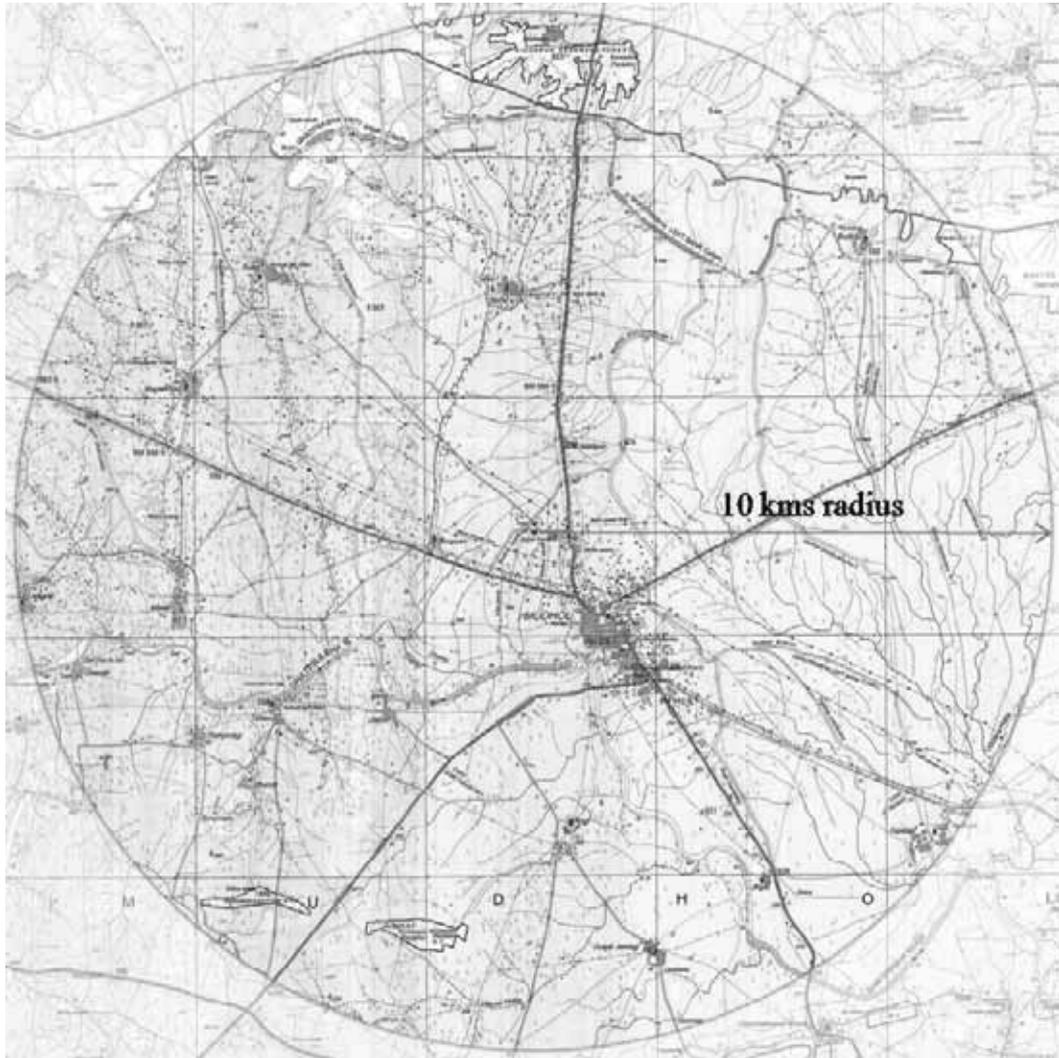
### 3.1. Type of project including interlinked and interdependent project, if any.

Co-generation Unit expansion project under 1(d) of the EIA Notification, 2006 and its amendments.

### 3.2. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.



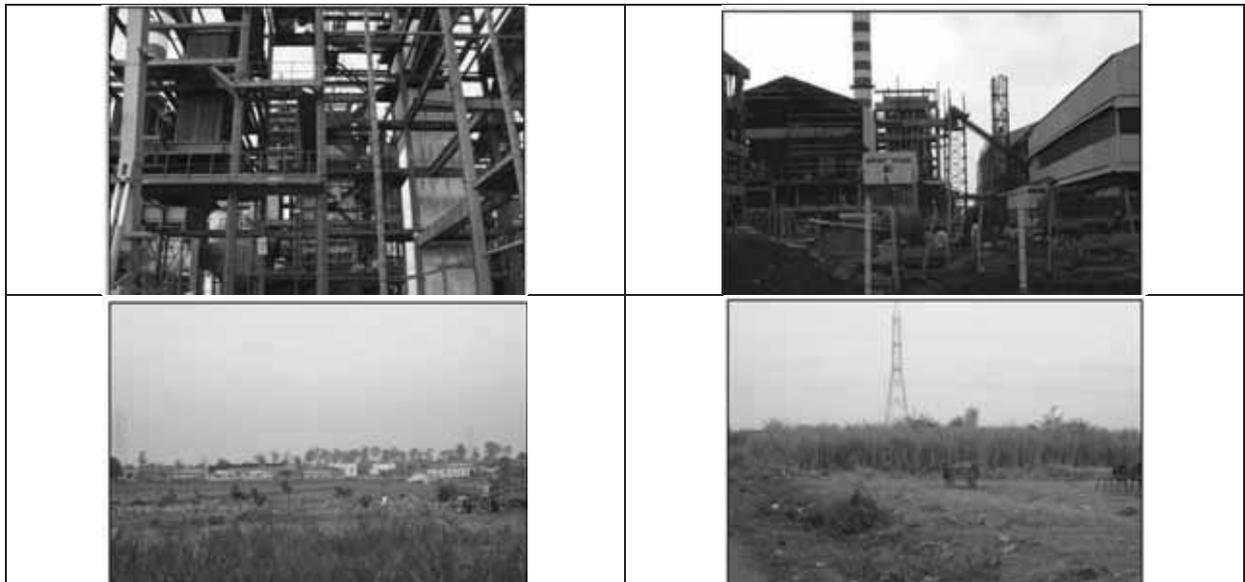
Location of the project



**Location of the Proposed Project site on Toposheet with 10 Kms radius  
Demarcation  
(Toposheet No: 47 P/3 & 47 P/7 Scale: 1:50,000)**



**Aerial View of the proposed project site**



**Project Site Photographs**

**3.3. Details of alternative sites, considered and the basis of selecting the proposed site particularly the environmental considerations gone into should be highlighted.**

Not applicable as the project is an expansion proposal planned within the existing premises.

**3.4. Size & magnitude of operation**

The sugar plant will produce about 274 TPH (30.36% on cane) of bagasse for 20,000 TCD crushing in 22 hrs. However, keeping in view of the bagasse availability, bagacillo and start up requirements, 216 TPH bagasse has been considered for the co-generation plant for producing 106.9 MW power and steam of 512 TPH during the crushing season including additional 55 MW co-gen. Balance saved bagasse will be used for off season days.

Additional steam requirement for generation of 55 MW power will be around 200 TPH, including consumption for de-aerator and process application. During the crushing season, based on the bagasse availability & process steam demand, it is proposed to generate 106.8 MW power in the 20000 TCD sugar plant. The in-house consumption of power is estimated at 32.3 MW out of 106.8 MW generation during season, including the cogen auxiliary requirements. The surplus exportable power would be 74.5 MW.

Condensate from the process will be recycled for entry to the boilers. The existing outdoor switchyard & power export facilities will be extended to facilitate sale of surplus power to HESCOM/ other buyers. The surplus power generated at 11 KV will be stepped up, through step-up transformers, to 110 KV and connected to the 100 KV receiving bay at mantur sub-station at about 12 Km from the plant, using the existing 110 KV transmission line. The present LYNX conductor of the transmission line may be replaced by HTLC conductor to limit voltage regulations & loses within permissible limits during phase-IV implementation.

It is proposed to operate the Co-generation plant for about 160 days in the season, using in-house bagasse. Operation of the co-gen plant will be continued in the condensing mode in the Off-season with the saved bagasse and power will be sold to HESCOM/ Other buyers. During the crushing season of the factory, the additional cogen plant will operate at its rated capacity and can export surplus power to the extent of 41.9 MW. Surplus bagasse available/stored in season shall be used in off-season to generate 55 MW for 45 days and can export surplus power 49 MW (operating on condensing mode).

The gross power generation during the crushing season in phase IV will be 55 MW. After meeting the plant's power requirements, the net power exportable to the

KPTCL grid will be 40 MW during the season. This will amount to a export of about 163 MU to the KPTCL grid after considering a plant load factor of 0.9 from the 2<sup>nd</sup> year of operation during season.

Orders for the additional plant & machinery like 200 TPH boiler, 11 KV 55 MW, bleed, extraction cum condensing type TG set, 11/110 KV step up transformer and the connected switchgears & other auxiliaries are proposed to be released immediately after achieving financial closure of the project.

**3.5. Project description with process details (a schematic diagram/flow chart showing the project layout, components of the project etc) should be given.**

The proposed Co-gen expansion program aims at significantly improving the energy efficiency of the sugar factory, enabling the plant to export the surplus power to the state grid.

The proposed co-generation project at NSL sugars has been sized keeping in view the following:

- Total availability of in-house bagasse of the sugar mill of 20000 TCD
- Requirement of process steam at 2.5 ata
- To get maximum power generation from co-gen plant at the most economical cost.

The new additional 55 MW power plant will comprise the following:

- Steam boiler: 200 TPH, 127 ata & 545<sup>o</sup>C
- Steam turbine generator set: 55 MW, Bleed, Extraction cum condensing type.

Crushing season duration of 160 days & off-season 45 days are considered for generating electric power and selling to other buyers through open access. In the final scheme, during crushing season a total power of 52.3 MW will be generated, 10.4 MW used for in-plant requirement and the balance 41.9 MW will be sold to other buyers through open access. During Off-sesaon, there is no steam requirement for sugar plant process. Hence, all the steam generated will be used for power generation. Of the total 55 MW generation, 6MW will be used for in-plant consumption and the balance 49 MW exported to grid.

High pressure and High temperature cycles are essential for increase in the operating efficiency and the power output from the co-gen plants. Nirani sugars have installed and successfully operating 67 ata and 87 ata cycles. Hence for the 4<sup>th</sup> phase, it is decided to go for 127 ata high pressure steam cycle for better efficiency, saving in bagasse and higher power generation.

**Capacity and Performance after expansion**

1	Cane crushing capacity, TCD	20,000
2	Pol % cane %	13.0

3	Fibre % came avg %	14.5
4	Gross season days	160
5	Time efficiency of sugar mill	90 %
6	Cane crushed per season MT	28,80,000
7	Co-gen working days – Season - Off Season	160 30
8	Time efficiency of Co-gen plant	90%
9	Bagasse generation @ 30.36% on cane, MT	8,74,400
10	For Co-gen @ 30.16% on cane, MT	8,68,600
11	Bagasse for present boilers, MT	5,34,500
12	Balance for proposed Boiler, MT	3,34,100
13	Additional Power generation Installed capacity Normal generation - Season Off season	117 MW 106.8 MW 55 MW
14	In-house consumption (sugar +cogen) Season Off season	32.3 MW 6.0 MW
15	Power Export Season Off season	74.5 MW 49 MW

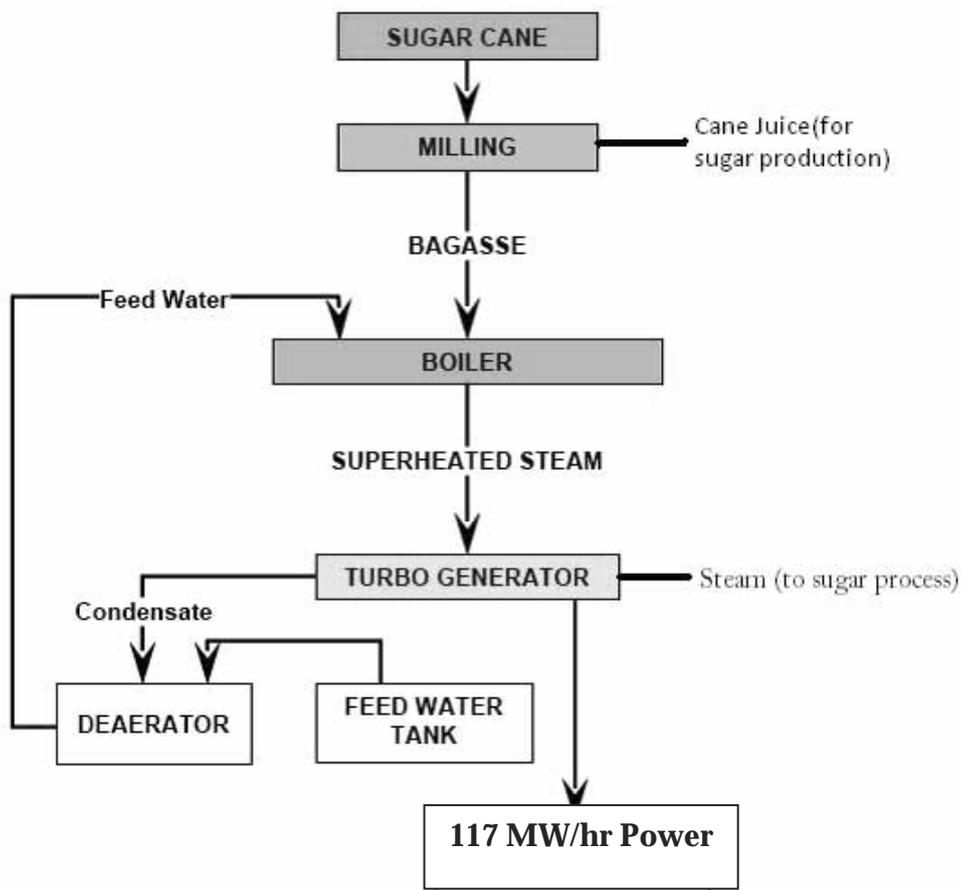
#### Details of boilers:

Existing 62 MW Co-gen plant consists of 3 Turbines (16+24+22), with following plant parameters:

<b>Phase I</b>	90 TPH Travelling Grate Boiler @ 67 ata, 500°C with feed water temp of 120°C	16 MW Extraction cum Condensing TG set @ 64 ata, 490°C
<b>Phase II</b>	120 TPH Travelling Grate Boiler @ 87 ata, 515°C with feed water temp of 120°C	24 MW Bleed, Extraction cum Condensing TG set @ 84 ata, 510°C
<b>Phase III</b>	90 TPH Travelling Grate Boiler @ 67 ata, 500°C with feed water temp of 120°C	22 MW Back Pressure TG set @ 64 ata, 490°C

#### Additional 55 MW Co-generation Plant

<b>Phase IV</b>	200 TPH Travelling Grate Boiler @ 127 ata, 545°C with feed water temp of 215°C	55 MW Bleed, Extraction cum Condensing TG set @ 122 ata, 540°C steam pressure
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**Process flowchart of Cogeneration process**

### Working of Co-gen plant

The company proposes to procure a new high-pressure boiler of 200 TPH capacity at 127 ata &  $545 \pm 5^{\circ}\text{C}$ . Steam from this boiler will be expanded through 55 MW steam turbine with intermediate bleed and extraction. The remaining steam will be condensed in condenser & the condensate recycled back to the boiler. Bleed steam are used for heating the boiler feed water in the HP heaters & Ejectors to create vacuum in condenser. Extracted steam is used in the process house for manufacturing sugar as well as in the de-aerator for feed water heating. Electrical power generated is partly used for in-plant & the balance power is exported to the state grid for sale.

The boiler plant will be complete with fuel storage, fuel conveying & firing systems, ash handling and storage system, HP & LP chemical dosing systems, Electro static precipitators (ESP ), ID, FD & SA Fans, boiler feed tank, De-aerator, BFW pumps, etc., with necessary controls and safety devices. Boiler control panel will be housed in the boiler house to facilitate operational convenience.

The design parameters for the proposed boiler are:

Sl. No.	Description	Unit	Quantity
1	Steam generation, MCR	TPH	200
2	Steam pressure at super heater outlet	ata	127
3	Steam temperature at super heater outlet	Deg C	545 ± 5
4	Feed water temperature at economizer inlet	Deg C	215
5	Expected temperature loss from boiler to TG	Deg C	5
6	Expected pressure loss from boiler to TG	ata	5
7	Blow down water loss	%	2

### **Travelling Grate**

Travelling grate is a continuous ash discharge firing equipment provided with spreader stokers which gives maximum performance, easy to operate and maintain and can suit to any type of boiler design.

The travelling grate is a self cleaning and designed to burn bagasse, wood, coal, biomass, and other solid fuels to suit the requirements of boiler. Firing equipment consists of a travelling grate upon which the larger fuel burns, the fine particles burns in suspension and fuel feeding system regulate the fuel supply through pneumatic spreader and distribute uniformly over the width of the grate.

### **Boiler Furnace**

The furnace of the boiler will be of water -cooled membrane - wall, tube-fin-tube construction and will be adequately supported by buck stays. The design will ensure that there is no warping or distortion of steel due to thermal expansion. The furnace will also be gas tight. The furnace will be reinforced on the outside by suitable buck stays and tie beams. The furnace will be so designed as to enable proper and complete combustion of the fuels. Necessary openings will be provided in the furnace for fuel feed, secondary air admission, manhole, peep holes, etc. The furnace is fitted with a travelling grate stoker.

### **Boiler Pressure Parts Assembly**

The pressure parts assembly of the boiler will consist of steam drum of fusion welded construction provided with necessary nozzles & with dished ends on both side with many ways. Drum internals comprising of cyclones, scrubbers & demisters. Primary and secondary super heaters are of seamless tube construction including inlet & outlet manifolds & connecting piping. Spray type attemperator located in between primary and secondary super heaters to control the super heater temperature in the control range of 70-100% MCR. SS liner is provided for the desuperheater header / pipe at spray point to withstand erosion and thermal shock. One No. Common blow down tank for CBD and IBD shall be considered.

### **Economizer**

Economizer will be of bare-type connected with inlet & outlet headers. Inlet header will be connected from the feed water tank & outlet header will be connected to the steam drum. Flue gas velocity over tube bank will be limited to 10m/sec. Economizer will be complete with steel plate casing and supporting structures. At

the bottom of economizer, a mild steel hopper and a rotary airlock valve will be installed at the outlet of the hopper for discharging the fly ash.

### **Feed Water System**

Feed water piping from de-aerator tank to boiler pump suction & from boiler feed pump discharge to economizer through HP feed water heaters & feed control stations. Feed water piping from economiser outlet header to steam drum. Spray water piping from boiler feed pump discharge to attemperator & de-superheating stations.

### **Storage water tank with De-Aerator**

The Boiler Feed Water Tank is a horizontal, cylindrical tank of carbon steel construction. A spray-cum-tray type or spray type de-aerator will be designed to suit the evaporation capacity of the boiler. All necessary inlet and outlet nozzles of adequate size and also level gauges, vent & safety valves, platforms & ladders, etc., as required shall be provided. The boiler feed water tank is mounted at a specific elevation to ensure adequate positive head for the boiler feed pumps.

### **Boiler Feed Pumps**

Three nos. of 50% capacity electrically driven, multi-stage, centrifugal ring section type, boiler feed pumps will be provided (2W & 1S). Each pump shall be provided with automatic recirculation system, suction strainer & balance leak of line. The pumps will be complete with drive motors, coupling, base plates, isolation valves, non-return valves, lubrication system & pressure & temperature gauges, etc.

### **Air Pre-heaters**

Air-Pre-heaters will be of recuperative type with vertical tubes. The design will be such that gas temperature at the outlet of the Air Pre-heater will be about 150°C and therefore eliminates chances of cold end erosion. Inlet end of tubes will be fitted with sleeves to prevent erosion. Manually operated valve will be provided at the bottom for fly ash discharge. The air-preheater will be designed to guarantee a flue gas exit temperature of not more than 150°C.

### **Soot Blowers**

Soot Blowers will be installed in strategic locations to effectively clean the heat transfer surfaces off deposits. Soot blowers will be electrically operated long retractable rotary soot blowers for super heater zone & electrically operated rotary soot blowers for economizer and boiler bank zone complete with PRS & other accessories including valves and fittings.

### **Chemical dosing System**

The chemical dosing system consist of one (1W + 1S) HP dosing system and one (1W + 1S) LP dosing system. The HP dosing systems consists of a storage tank, which is filled with water and chemicals and stirrer. A motorized stirrer will be provided for this purpose. The mixed chemical solution is pumped to the steam drum by means of high pressure reciprocating type pumps.

### **HP Heaters**

HP feed water heaters including valves, fitting & necessary instrument provided to pre-heat the feed water from 125°C – 215°C. Feed water piping from feed pump discharge with manual bypass valve and feed water piping from HP heater outlet to economizer inlet with isolation valves. The HP heaters shall be of Shell and tube design and shall have provision for complete drainage of both shell and tube sides. The heaters shall be designed for the operating conditions and full vacuum. The tube shall be of seamless construction, of alloy steel ASME SA 213 Gr. TP 304 or equivalent specifications and the tube bundle shall be removable.

### **Electrostatic Precipitators**

One unit of Electro Static Precipitators (ESP) of single stream type shall be installed to collect and remove the flyash carried away in the flue gases. The ESP will be installed between the air-preheater and the ID fan. The outlet of ESP is connected to the suction of the ID fans. The ESP is designed to ensure that the quality of flue gases leaving the ESP shall conform to the statutory requirements of the applicable pollution control act. The dust concentration in the flue gases leaving the ESP will not exceed 100 mg/Nm<sup>3</sup>

### **Ducting**

All air ductwork will be fabricated from carbon steel plates, of thickness not less than 4 mm & the flue gas ducts not less than 5 mm. Ductwork mainly consists of flue gas ducting and air ducting with necessary stiffeners & expansion bellows.

### **Chimney**

Flue gas from the discharge of ID fans is taken through duct to the chimney and vented to the atmosphere. The chimney will be of RCC construction, cylindrical, self-supporting type, 3.8m in diameter & 90m height for 200 TPH boiler will be provided with required platforms & ladders. The chimney will be designed as per IS 6533.

### **Turbo Generator and Auxiliaries**

The proposed Co-gen plant at NSL will have one no. 55 MW, 11 KV, Bleed-cum-Extraction-cum-Condensing type Turbo generator set (TG set) in the system. Power generation during season will be 52.3 MW and during off season will be 55 MW.

Steam outlets from the TG set during crushing season are as follows:

- Bleed steam of about 14.4 TPH at 22 ata for HP Heater-I for heating feed water from 175°C to 215°C
- Bleed steam of about 16 TPH at 10 ata for HP heater-II for heating feed water from 125°C to 175°C
- Extraction steam of about 20.5 TPH at 3 ata for the de-aerator
- Balance 147.7 TPH of steam at 0.1 ata to condenser.

The TG set will be provided with Electronic speed Governor, AVR, 11 KV Switchgear with VCB / SF6, control panels, synchronizing facility, safety devices,

earthing network & grid interfacing facility, etc.

Description	Unit	Qty Season	Qty Off-season
Rated capacity of the TG set (one unit)	MW	55	55
Steam flow at the inlet of the turbine	TPH	200	200
Steam pressure at inlet of the turbine	ata	122	122
Steam temperature at STG inlet	Deg. C	540	540
Bleed Flow (HP Heater 1)	TPH	14.4	14.1
Bleed Pressure	ata	22	22
Bleed Flow (HP Heater 2)	TPH	16	17.4
Bleed pressure	ata	10	10
Extraction flow (To process & Deaerator)	TPH	30	20.5
Extraction pressure	ata	3	3
Exhaust flow	TPH	138	147.7
Exhaust pressure	ata	0.07	0.1
Cooling water temperature at Condenser O/L	Deg. C	32.0	32.0
Cooling water temperature at Condenser O/L	Deg. C	38.0	40.0
Power Generation	MW	52.3	55
	KV	11 ± 10%	11 ± 10%
	Phase	3	3
	Hz	50	50
	PF	0.85	0.85

**3.6. Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished products.**

**Raw material for cogeneration**

- Fuel: Bagasse
- Source: Own sugar mill
- Quantity: 1705 T/d for the operation of 200 TPH boiler
- The power generated from the expansion proposal after utilization within for industry usage, surplus will be exported to grid. The details are furnished in the above section 3.5

**3.7. Resource optimization/recycling and reuse envisaged in the project, if any, should be briefly outlined.**

- Bagasse generated from the Sugar Unit will be completely reused within the same premises as fuel for Boiler in Co-generation Unit.
- Treated effluent from the ETP will be completely reused for onland for irrigation/gardening/greenbelt development.

- Condensate recovery techniques helps in reducing the fresh water consumption.

### **3.8. Availability of water its source, Energy/power requirement and sources should be given.**

#### **Water Requirement:**

Source of water is from Ghataprabha river.

During off-season : 1673 KLD additional water is required

#### **Power Requirement**

The power requirement will be met through co-generation unit. DG sets are also provided as a backup.

#### **Normal Generation**

Season : 106.8 MW

Off season : 55 MW

#### **In-house consumption**

Season (Sugar + Cogen) : 32.3 MW

Off season : 6 MW

#### **Power Export**

Season : 74.5 MW

Off season : 49 MW

### **3.9. Quantity of wastes to be generated (liquid and solid) and scheme for their Management/disposal.**

From the expansion proposal, 31 KLD of additional effluent will be generated which will be treated in the ETP. Currently 1X500 KLD and 1X1000 KLD exists and construction of 2000 KLD ETP is in progress and will be completed by October, 2017 from then the total effluent from sugar and cogeneration will be diverted to new 2000 KLD ETP. The 500 KLD ETP will be kept as standby and 1000 KLD ETP will be utilised for the treatment of Nirani Distillery wastewater. The treated effluent after complying with KSPCB discharge standards for re-use will be reused for On-land for Irrigation/gardening/Greenbelt Development.

### Solid Waste Management- from the expansion

SI No	Solid waste	Quantity TPD	Method of collection	Method of Storage	Mode of disposal
1	Boiler ash	10	Mechanical conveyor into common silo for further disposal	Ash storage yard	Mixed in required proportions and used as manure.

- Domestic Solid waste (Garbage/ Trash/ garden litters) will be stored in Garbage collection pits and disposed to nearby municipality
- Used Oil generated from the industry will be collected and stored in barrels/drums and later disposed to the Karnataka State Pollution Control Board approved waste oil reprocessors/dealers.
- Any other solid waste generated from the facility will be disposed off by using proper disposal mechanism.

#### **3.10. Schematic representations of the feasibility drawing which give information of EIA purpose**

Site layout enclosed.

#### **4. Site Analysis**

M/s Nirani sugars Ltd proposes to expand co-generation plant from 94 MW to 117 MW capacity. The proposed project is located at Sy.No. 166 at Kulali cross, Jamakhandi road, Mudhol Taluk, Bagalkot district, Karnataka state.

Within 10 km Influence Zone, there is no Tropical Forest, Biosphere Reserve, National Park, Wild Life sanctuary and Coral Formation Reserve. The river Ghataprabha is 2.25Kms away from the proposed site and the State Highway (SH-34) is around 0.45 Kms from the project site.

The factory site is well connected by roads. Bijapur – Belgaum road (SH-34) is at a distance 0.45 kms from the factory. It is well connected by roads to Bijapur, Belgaum cities. The nearest airport is situated at 88 kms from the factory at Belgaum City. The

nearest townships with residential areas are Mudhol, Jamakhandi & Mahalingapur which are 2.5, 20 and 18 kms away from the plant respectively.

#### Location features of the proposed project site

Sl.No	Features	Particulars
1	Location	Sy Nos. 166, Kulali Cross, Jamakhandi road, Mudhol, Bagalkot district, Karnataka state.
2	Present Land use	Industrial
3	Temp., Max and Min	27°C to 42°C and 14°C to 26°C
4	Average Humidity	65%
5	Annual Rainfall	586 mm (average of 10 years)
6	Soil Type	Black Cotton Soil
7	Topography	Plain
8	Nearest Village	Malapur
9	Nearest Town	Mudhol
10	Latitude	16°21'01.44" N
11	Longitude	75°16'12.76" E

#### Environmental Settings around the proposed project site (Within 10 Kms Radius)

Sl.No	Description	Details
1	Nearest Highway	SH - 34 located at a distance of 0.45 Kms from the plant in Eastern Direction. SH - 18 is located at a distance of 0.65 Kms from the plant in the Southern Direction.
2	Nearest Water body	Ghataprabha River located at a distance of 2.25 Kms from the plant.
3	Nearest Village	Malapur Village is located at a distance of 1.75 Kms from the plant.
4	Nearest Taluk	Mudhol Taluk is located at a distance of 2.5 Kms from the plant.

#### Environmental Settings around the proposed project site

Sl.No	Description	Details
1	Nearest Reservoir	Almatti Dam Located at a distance of 66 Kms from the plant in the Eastern direction.
2	Nearest Railway lines	Ghataprabha railway station is located at a distance of 55 Kms from the plant in Western direction. Mugalolli railway station located at a distance of 56 Kms from the plant in Eastern direction.
3	Nearest Heritage site	Gol Gumbaz (Bijapur) located at a distance of 72 Kms from the plant in Northeast direction.
4	Nearest National park /	Nil

	Reserved Forest	
5	Nearest Biosphere Reserve	Nil
6	Nearest Wildlife Sanctuary	Nil
7	Nearest Defense Installation	Nil
8	Nearest Highway	State Highway 34 - Located at a distance of about 0.45 kms from the proposed project site in East direction.
9	Nearest Water body	Ghataprabha River- Located at a distance of about 2.25 Kms from the project site in the Southern direction.
10	Nearest densely populated place	Mudhol Taluk located at a distance of 2.5 Kms from the plant.
11	Nearest High Level Canal	Almatti Dam Located at a distance of 66 Kms from the plant in the Eastern direction.
12	Nearest Village	Malapur Village located at a distance of 1.75 Kms from the plant.

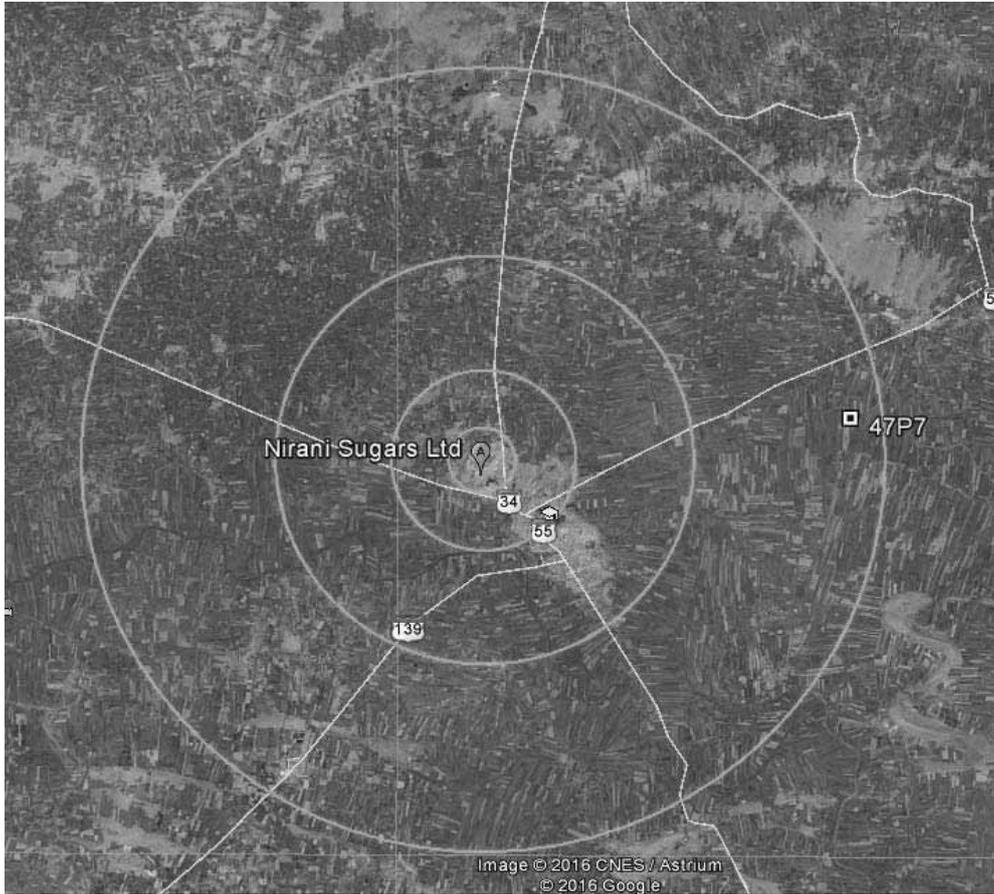
#### 4.2. Land form, land use and land ownership.

M/s. Nirani Sugars Ltd, located at Sy No. 166, Kulali cross, Jamakhandi road, Mudhol taluk, Bagalkot district, Karnataka state, India. Land use of the site is industrial converted & ownership lies with M/s Nirani Sugars Ltd.

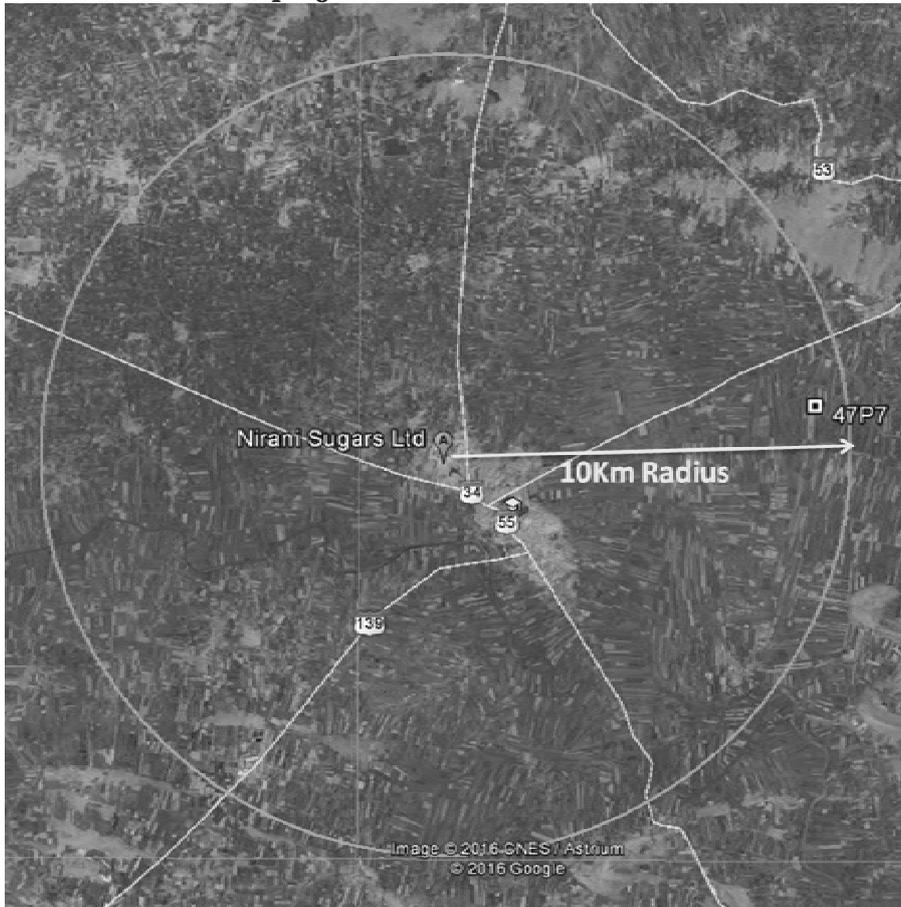
#### 4.3. Topography (along with map)



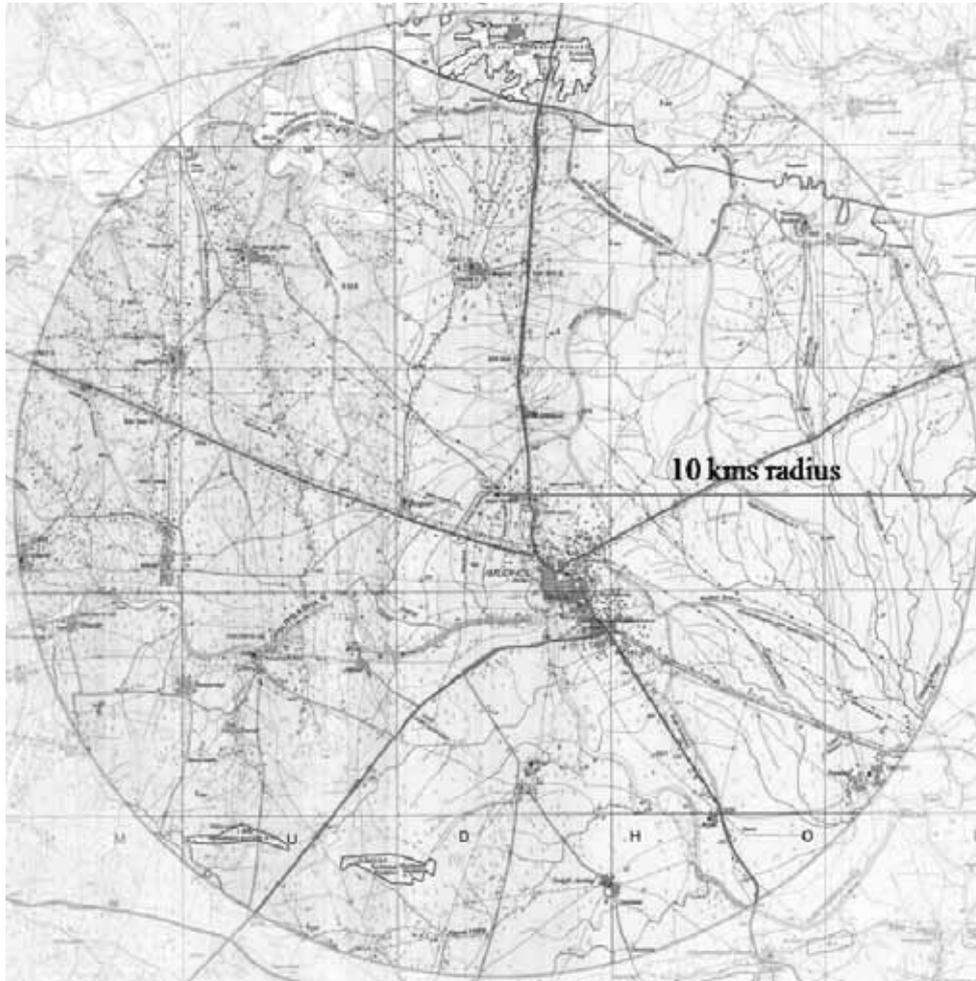
**Map of the proposed project site (showing salient features)**



**Aerial View of the project site (500m, 2km, 5 km, 10km Radius)**



**Aerial view of the Project Site showing 10 Kms radius demarcation**



**Location of the Proposed Project site on Toposheet with 10 Kms radius demarcation  
(Toposheet No: 47 P/3, 47 P/7 Scale: 1:50,000)**

**4.4. Existing land use pattern (agriculture, non agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forest, national parks, wild life sanctuary, eco sensitive areas, water bodies (distance from, the HFL of the river)). In case of notified industrial area a copy of the Gazette notification should be given.**

**Details of the land use of study area**

SL No	LU/LC	Area		
		Ha	Km	%
1	Agricultural Plantation	14.54	0.15	0.05
2	Backwater	7.50	0.08	0.02
3	Barren rocky/Stony waste	1307.52	13.08	4.36
4	Built-up	449.83	4.50	1.50
5	Crop-Land	27315.00	273.15	90.99

6	Eucalyptus Plantation	58.57	0.59	0.20
7	Land with/without scrub	146.93	1.47	0.49
8	Scrub-Forest	298.55	2.99	0.99
9	Water body	284.71	2.85	0.95
10	Waterlogged	135.66	1.36	0.45
	Total	30018.82	300.19	100.00

Nearest Reserved Forest	Siddapura RF (Eucalyptus plantation) is located on the left bank of Ghataprabha Left bank canal at a distance of 9 Km (Northern direction) and Ranjanagi & Uttur RF (stony waste) and Jaliber RF (Eucalyptus plantation) are found in the southern direction of the industry at a distance 9 Km, Manthur reserved Forest is at a distance of 9.25 kms.
Nearest Heritage site	Gol Gumbaz (Bijapur) located at a distance of 72 Kms from the plant in Northeast direction.
Nearest Biosphere Reserve	Nil
Nearest Wildlife Sanctuary	Nil
Nearest Defense Installation	Nil
Nearest Highway	State Highway 34 - Located at a distance of about 0.45 kms from the proposed project site in East direction.
Nearest Water body	Ghataprabha River- Located at a distance of about 2.25 Kms from the project site in the Southern direction.

#### 4.5. Existing Infrastructure

The factory site is well connected by roads. Bijapur – Belgaum road (SH-34) is at a distance of 0.45 kms from the factory. It is well connected by roads to Bijapur, Belgaum cities. The nearest airport is situated at 88 kms from the factory at belgaum City. The nearest townships with residential areas are Mudhol, Jamakhandi & Mahalingapur which are 2.5, 20 and 18 kms away from the plant respectively.

#### 4.6. Soil Classification

The proposed project site has Black Cotton Soil and is suitable for agriculture and horticulture crops.

The soil of the bagalkot mainly of two types i.e. Black & Red soil. Black soil also referred as “regur” have black colour due to the presence of black coloured minerals

titanic magnetite with a high percentage of humus and high basicity. The depth and colour varies from place to place according to topographic and climatic conditions. The block soil are rich in chemical properties and rich in iron, lime, calcium Magnesium, carbonates and aluminum but are poor in nitrogen, phosphorous and best suited for the cultivation of cotton. Black soils are very fertile but they do not require heavy irrigation. Due to slight alkaline reaction, deep cracks appear during summer season. Sugar cane, cotton, Maize, Chilies, and pulses are the chief crops of the black soil. Red soils are formed by the basic granite, Gneisses and schist, which are rich in iron and magnesium and it contains a small amount of humus. The red soil is light in texture. They are deficient in nitrogen, humus, lime and Phosphoric acid. They are relatively poor in fertility large varieties of crops can be raised on a large scale. These soils are ideal for the growth of Ragi, Millets and some other food grains, groundnut, other oil seeds, tobacco, cotton and other commercial crops also raised on such soils.

#### **4.7. Climatic and Rainfall data from secondary sources**

The climate of the district is hot and dry. Hot season starts from middle of the February to end of May. Post monsoon is during October and November. Cold season is from December to middle of February. The normal average rainfall is 586

#### **4.8. Social Infrastructure available**

Average literacy rate of Bagalkot in 2011 were 68.82% compared to 57.30% of 2001. If things are looked out at gender wise, male and female literacy were 79.23% and 58.40% respectively (Census, 2011). Total literacy rate in the sampled villages are 55.11% constituting 31.95% male which is considerably higher than female of 23.16% respectively (Census, 2011)

The Land use pattern of Bagalkot district is predominantly agricultural land. The geographical area is 658777 Ha and 'Net Sown area' is 469783 Ha which is 71.3% of the geographical area. The major crops grown are Jowar, maize, wheat, bajra, sugarcane, sunflower, pulses and groundnut. Net Irrigated area is 212872 Ha which constitutes 45.3% of the Net Sown area and the remaining 54.7% of the area is rainfed. The unprecedented horizontal growth of Bagalkot city slowly occupy Bagalkot Rural Districts Taluks in which the entire agricultural land use of Rural District is turned out be industrial and commercial land use over the period of last 10 years

The Agriculture is the main occupation of the people in the district. Bagalkot district is basically agriculture-dominated district where it is the main occupation of the rural population which constitutes 71 % of the total population (2011 census)

The health care facility is available at Mudhol taluk which is at 10 km radius in SE direction near proposed project. Hospitals in the study area is Kubsad(1.36km), Basaraddi hospital(2.58km), Government hospital (1.99km) and Chetana hospital(2.25km).

All the villages and wards in the project area are endowed with electricity, drinking water, post office, roads, etc. Socially sensitive receptors such as Ganapati temple (1.91km), Durga devi temple (2.40km), Hanuman temple(2.05km), and schools such as RMG High School(2.04km), Government Primary high school(2.01km), Kavi Ranna School Mudhol(4.31km) and Gavimatha School(4.31km).

Majority of them are from agricultural background, many of the respondents are depend on secondary occupations such as petty shop, labour work, tailoring, driving, etc for their livelihood. Education levels and awareness on environmental issues are found to be high among the respondents of the region and most of the basic infrastructures such as improvement of road, providing drinking water facility, green belt development ,waste management and public health system were lacking in the region.

## 5. Planning

### 5.1. Planning concept (type of industries, facilities, transportation, etc.) Town and Country Planning Development authority classification.

**The proposed area is industrial converted land and accordingly Sugar Unit and Cogeneration Unit is being operated.**

### 5.2. Population Projection:

Total populace of the study area 3,55,033 belongs to 68,310 households (Census, 2011). In the study area, Scheduled Caste (SC) population constitutes around 19.48% and 3.6% of Scheduled Tribes (ST) which is considered to be the lowest among other castes.

### 5.3. Land use planning (breakup along with green belt etc.)

Table showing Break up of present land use

Sr. No.	Break up of land requirement	Land, Acres
1.	Built-up area	20.1
2	Parking	10.0
2.	Future development	18.8

3.	Green belt area	25.0
<b>Total</b>		<b>73.9</b>

#### 5.4. Assessment of infrastructure Demand (Physical & Social).

No additional area is required for the present expansion proposal. However, the infrastructure demand (physical & social) has been assessed earlier under the CSR mechanism and the details are as given below:

Program / Activity	Proposed – Details	Budgetary Allocation for Next Two Financial Years
Health Sector	Free Medical check-up camps will be held at the neighbouring villages for all. i.e., Malapur, Uttur, Jaliber, Malali	3.0 lakh
	Holding of health awareness camp – drinking water, sanitation, malaria and dengue control in all the villages of cane area.	5.0 lakh
Education	Infrastructural support to the deserving local industrial training institutes and polytechnic institutions.	5.0 lakh
	Providing teaching aids and books to primary and high schools falling under cane area.	4.0 lakh
	Merit Awards, Cash Prize at the rate of Rs.10,000/- and Rs.15,000/- to highest marks scoring student at 10th and 12th standard respectively of cane notified area	2.5 lakh
Development of Rural Infrastructure	Construction of Primary/High school rooms in the villages of companies' cane notified area.	3.0 lakh
	Financial help to the panchayat in companies cane notified area	10.0 lakh
Social welfare	Financial help to the deserving vocational training centers for woman folk run by NGOs in the cane notified area of the factory.	5.0 lakh
	Infrastructural support to the NGO's which are successful in organizing Self-help groups (micro-finance) in the cane notified area of factory.	3.0lakh

#### 5.5. Amenities/facilities

Basic amenities and facilities such as canteen, first aid, rest rooms, ambulance, PPE are already provided for all workers working at site and the same will be continued for the expansion proposal.

## 6. Proposed Infrastructure

### 6.1. Industrial Area (Processing area)

<b>Sr. No.</b>	<b>Break up of land requirement</b>	<b>Land, Acres</b>
1.	Built-up area	20.1
2	Parking	10.0
2.	Future development	18.8
3.	Green belt area	25.0
<b>Total</b>		<b>73.9</b>

**6.2. Residential Area (non processing area)**

Housing facility are provided for working staff.

**6.3. Green Belt**

25 acres of area is provided for green belt development. Industry is regularly doing plantation continuously in & around the factory premises.

**6.4. Social Infrastructure**

Good infrastructure facilities seen around Bagalkot

**6.5. Connectivity Traffic and Transportation Road/Rail/Metro/Water ways etc**

The factory site is well connected by roads. Bijapur – Belgaum road (SH-34) is at a distance of 0.45 kms from the factory. It is well connected by roads to Bijapur, Belgaum cities. The nearest airport is situated at 140 kms from the factory at Belgaum. The nearest townships with residential areas are Mudhol, Jamakhandi & Mahalingapur which are 2.5, 20 and 18 kms away from the plant respectively.

**6.6. Drinking Water Management (Source & Supply of water)**

Ghataprabha River located at 2.25kms from the site.

**6.7. Sewerage System**

Domestic sewage is treated in septic tank and soak pit. Industrial effluent will be treated in the ETP through internal sewer network

**6.8. Industrial Waste Management**

Effluent generated will be treated in the ETP and treated water will be used within the plant premises.

**6.9. Solid Waste Management**

Solid waste generated from the expansion of cogeneration is ash from sugar industry which is used mixed in the required proportions and sold as manure.

**6.10. Power Requirement & Supply/Source**

Power requirement will be met through co-generation

## **7. Rehabilitation and Resettlement (R&R) Plan**

**7.1. Policy to be adopted (Central/State) in respect of the project affected persons including home oustees, land oustees, and landless labourers (a brief outline to be given).**

Not applicable.

## **8. Project Schedule & Cost Estimation**

### **8.1. Project Schedule**

The company is an established 20000 TCD sugar cane crushing, 94 MW cogeneration unit. Now proposes to expand the cogeneration unit from 94 MW to 117 MW within the same premises. Earlier expansion from 62 MW to 94 MW is not implemented. Hence earlier proposal for installation of 150 TPH is replaced by 200 TPH boiler for generation of 55 MW Power.

### **8.2. Cost Estimates**

Rs. 126.4 Crores as estimated for the expansion.

## **9. Analysis of proposal (Final recommendation)**

**9.1. Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area**

22 nos of additional employees will be required for the expansion, the company provides all necessary basic amenities to the workers of the industry.