

## ACKNOWLEDGEMENT

M/s. LAWN ENVIRO ASSOCIATES express sincere debt of gratitude to M/s. DECCAN CEMENTS LTD. for the opportunity given by assigning the preparation of Environmental Statement (Audit) Report for the financial year 2019–2020, for their Cement plant at Bhavanipuram, Janpahad, Suryapet District of Telanga. The Environmental statement (Audit) Report is prepared for the financial year 2019–2020 Special mention needs to be made of Executives of M/s. DECCAN CEMENTS LIMITED. Especially Mr. S. Venkateswarlu Director (Works) & Mr. KVL Narasimha Rao (PQC) & Team for their co-operation and assistance during the preparation of this statement. We also wish to acknowledge our gratitude to all of them who helped during the data collection and report preparation.

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FORM – V

(See Rule 14)

ENVIRONMENTAL STATEMENT (AUDIT) REPORT  
FOR THE FINANCIAL YEAR ENDING 31<sup>st</sup> MARCH, 2020

PART – A

i) Name and address of the owner/ occupier of the industry operation or process. : M/s. DECCAN CEMENTS LTD.,  
Bhavanipuram, Janpahad (PO),  
Palakeedu (M),  
Suryapet (Dist)–508 218.  
Telangana State.

ii) Date of the last environmental audit report submitted : September 2019

Unit – I

iii) Production Capacity (Units) : 1). Clinker –1,450 TPD  
2). Cement – 900 TPD

Unit – II

1). Cement – 5,450 TPD  
2). Clinker – 3,650 TPD  
3). Power Generation – 18 MW

iv) Year of Establishment : 1982

**PART - B  
WATER AND RAW MATERIAL CONSUMPTION**

	As per CFO In KLD	Actual 2019-20
<u>Water Consumption</u> (m <sup>3</sup> /day)	345	232
Cooling Water Makeup		
<u>Power Plant:</u>		
Filter Back Wash	7	1,117
DM Plant regeneration	7	
Cooling Water Makeup	1652	
Boiler Feed	40	
Service Water Wash	30	
Clarifier blow down	12	
Domestic	287	257
Gardening	40	
<b>Total Water Consumption</b>	<b>2420</b>	<b>1,606</b>

Name of Products	Water consumption per unit of products (KL/MT)	
	During the previous financial year (2018-2019)	During the current financial year (2019-2020)

Port Land Cement	0.40 (KL/MT)	0.42 (KL/MT)
Power	3.71 (KL/MW)	3.46 (KL/MW)

ii) Raw material consumption:

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Name of raw materials	Name of product	Consumption of raw material per unit of output (Ton/Ton)	
		During the previous financial year (2018-2019)	During the current financial year (2019-2020)
1. Lime Stone	Clinker	1.40	1.40
2. Iron Ore	Clinker	0.0008	0.000137
3. Laterite	Clinker	0.0477	0.052555
4. Gypsum	Portland Cement	0.057	0.050791
5. Coal	Clinker	0.183	0.181
6. Fly Ash	Portland Cement	0.3080	0.322
7. Coal	Power	1.045	0.99

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**PART - C**

**POLLUTION DISCHARGED TO ENVIRONMENT**

(Parameter's as specified in the consent issued)

Pollutants	Quantity of Pollutants Discharged (kg/day) 2019-2020	Concentrations Of Pollutants in Discharges (mg/l) 2019-2020	Percentage of variation from prescribed standards with reasons
a) Waste Water : There is no generation of Process waste water			

b) Air					
Stack Attached to	Pollutants	Pollutants in Emissions discharged (2019-2020) kg/day	Concentrations Of Pollutants in Emissions (2019-2020) mg/Nm <sup>3</sup>	prescribed standards mg/Nm <sup>3</sup>	Percentage of variation from prescribed standards with reasons
VRM Cement Mill	SPM	47.11	22.33	30	25.56 % Less
Crusher	SPM	24.29	23.67	30	21.10 % Less
Kiln / Raw Mill With PJBf - 1	SPM	36.04	12.00	30	60.00 % Less
	SO <sub>2</sub>	7.29	2.43	100	97.57 % Less
	NO <sub>x</sub>	1,357.62	452.00	800	43.50 % Less
Cooler With ESP-I	SPM	49.42	19.00	30	36.66 % Less
Cement Mill - 3	SPM	12.72	16.50	30	45.00 % Less
Cement Mill- 1&2	SPM	9.57	13.00	30	56.66 % Less
Coal Mill-1	SPM	6.77	21.50	30	28.33 % Less
Coal Mill-11	SPM	36.14	20.67	30	31.10 % Less
Packer - I	SPM	--	--	30	-- % Less
Packer - II	SPM	4.87	23.00	30	23.33 % Less
Packer - III	SPM	2.33	19.33	30	35.56 % Less
Kiln / Raw Mill With RABH - 2	SPM	135.44	12.67	30	57.76 % Less
	SO <sub>2</sub>	16.78	1.57	100	98.43 % Less
	NO <sub>x</sub>	4,536.33	424.33	800	46.95 % Less
Cooler With ESP-II	SPM	129.40	17.67	30	41.10 % Less
Power Plant With ESP	SPM	255.40	34.00	50	32.00 % Less

Note: All bag filter bags have been upgraded as per the new standards, all emissions are within the limits and we are operating with low sulphur Indian coal so low SO<sub>2</sub> and NO<sub>x</sub> emissions.



PART – D

HAZARDOUS WASTE

(As specified under Hazardous and other wastes Management and Transboundary Movement Rules, 2016)

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Hazardous Wastes	Total Quantity per year	
	During the previous financial year (2018–2019)	During the current financial year (2019–2020)
a) From Process		
1) Waste oil	9.380 KL	18.80 KL
2) Waste Grease	2.910 MT	2.39 MT
b) From Pollution control facilities	Not Applicable	Not Applicable

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PART – E

SOLID WASTES

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	Total quantity MT per year	
	During the previous financial year (2018–2019)	During the current financial year (2019–2020)
a) From Process	Not Applicable	Not Applicable
b) From Pollution Control Facility	Not Applicable	Not Applicable
c) Quantity recycled or re-utilized	Not Applicable	Not Applicable

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PART – F

Please specify the characteristics (in terms of concentration and quantum) of Hazardous as well as solid wastes and indicates disposal practice adopted for both these categories of wastes.

There is no hazardous waste as well as solid waste generated in the process. The dust collected in the pollution control equipment is taken back in to the process.

PART – G

Impact of the pollution control measures on conservation of natural resources and consequently on the cost of production.

Pollution dust emissions control from different stacks in cement plant results of natural resources conservation. Operation maintenance cost these equipment Rs. 70.00 lakhs during the financial year 2019–2020.

PART – H

Additional investment proposal for environmental protection including abatement of pollution.

Greenbelt development programmes for further increasing area under greenbelt. By adopting advance technologies under computer control and inter locking facilities for pollution control equipments are under progress.

PART – I

Any other particulars in respect of environment protection and abatement of pollution.

The Management's objective is to achieve the production without affecting the physical, chemical and biological environments of the nearby vicinity. Industry has taken lot of efforts to raise the plantation in and around the plant premises even though the land is unfavorable for plantation due to rocky nature of the soil.

## 1. INTRODUCTION

M/s. DECCAN CEMENTS LTD., has setup a cement plant to manufacture Portland cement at Bhavanipuram Near Janpahad (V), Palakeedu (M), Suryapet District of Telangana State. The Main Plant is established in the year of 1982 and present capacity of the plant i.e. Unit-I and Unit-II "Clinker (0.5 +1.2=1.7) MTPA and Cement (0.3+1.5=1.8) MTPA." Total plant area is about 53.8 Ha of land, out of which 5 Ha is plant area, 18.50 Ha had been developed as greenbelt.

## 2. OBJECTIVE OF THE STUDY

The objective of the present study is to review the performance of pollution control systems installed by the industry so as to identify efficient pollution prevention and control systems, which could be beneficial to both environment and its components. And also Inserted by rule 2 of the Environment (Protection) second Amendment & Rules, 1992 vide G.S.R. 329 (E), dated:13-3-1992. Every person carrying on an Industry, operation or process requiring consent under section 25 of the water (prevention and control of pollution) Act 1974 (6 of 1974) or under section 21 of the Air (Prevention and Control of Pollution), Act 1981 (14 of 1981) or both or authorization under the Hazardous wastes (Management and Handling) Rules, 1989 issued under the Environmental (Protection)Act 1986 (29 of 1986) shall submit an environmental audit report for the financial year ending 31<sup>st</sup> March in Form - V to the concerned state pollution control board on or before the 30<sup>th</sup> day of September every year beginning 1993.

### 3. BENEFITS OF ENVIRONMENTAL AUDIT

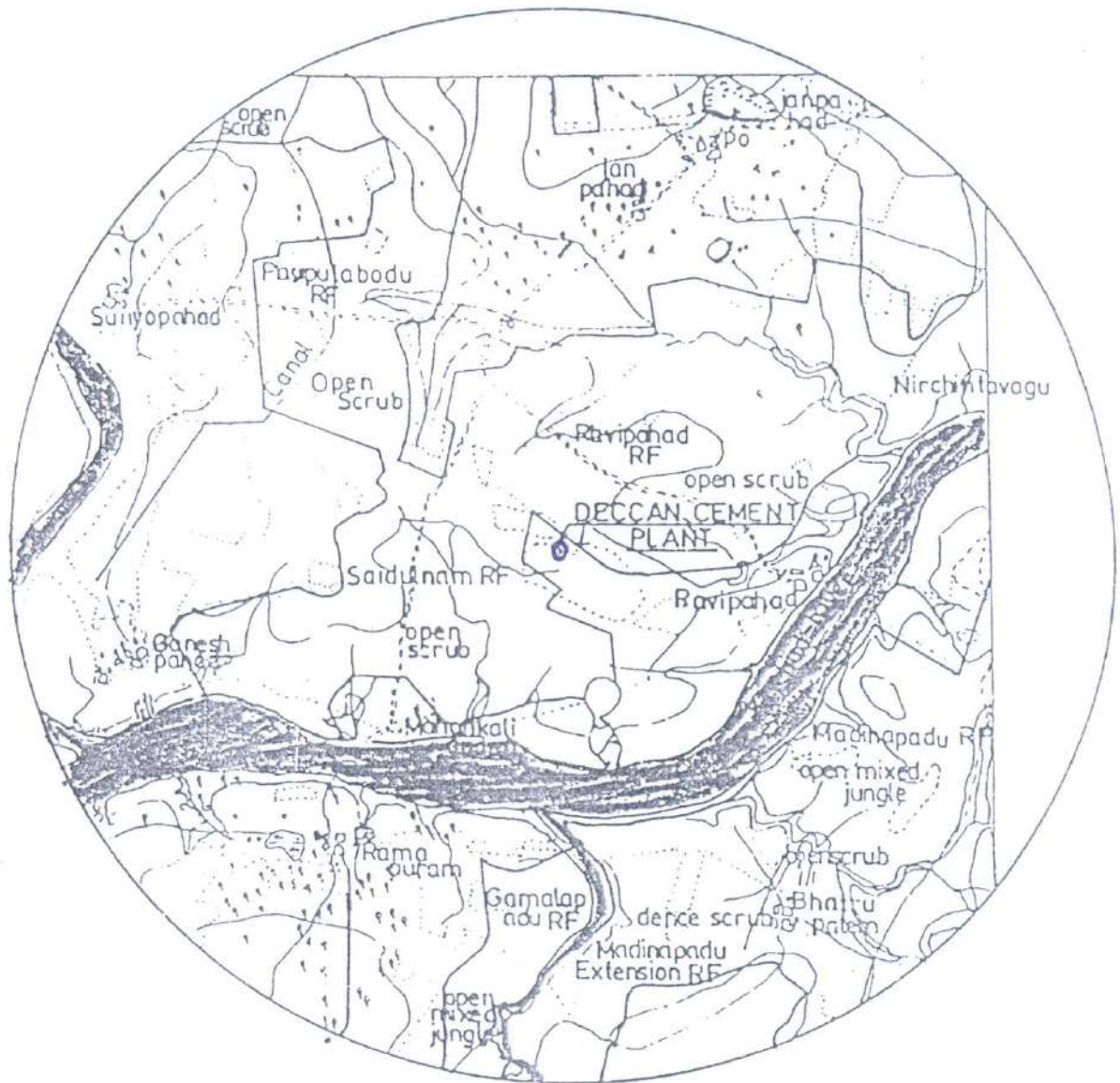
Environmental audit creates awareness in the conservation of natural resources and helps to improve production safety and health. The benefits of audits are:

1. It helps in reduction of raw material consumption by way of waste minimization and adoption of recovery of waste and recycle the same.
2. Determined the performance of process systems and helps to improve the systems.
3. Efficiency of pollution control systems can be calculated.
4. This gives the awareness of environmental organization in the industry.
5. Data available will help the management for use in the plant modification and adopting pollution control for different types of technology.
6. It helps to identify pollution creating systems and exposure to it by the employees for taking remedial measures.
7. The management will be assisted in complying with local, regional and national laws regulations by adopting standards.
8. It helps to identify hazardous wastes, handling measures taken and exposure to litigation can be reduced.
9. To determine the impact on the surrounding environment due to the disposal of its pollutants and identify suitable preventive measures.
10. Energy saving systems can be adopted by considering fuel consumption data.

M/s. DECCAN CEMENTS LIMITED, has entrusted the task of preparation of Environmental Statement (Audit) to M/s. LAWN ENVIRO ASSOCIATES (LEA), Hyderabad. An in-depth study was conducted by LEA, to review the process efficiency, waste water generated and the present treatment systems, emissions generated and air pollution control equipment provided, mode of solid waste collection and disposal and the other associated problems leading to the pollution and impact on environment.

#### 4. LOCATION

M/s Deccan Cements Limited is located at Bhavanipuram near Janpahad village, Palakeedu Mandal, Suryapet District. The site is 12 km from nearest State Highway which is connecting Narkatpally and Medarametla. The total requirement is Water from River Krishna water used for plant utilities. The location map is shown in Fig.1. The land is flat terrain sloping towards Southeast. No major hills or mountains are there in the area.



**FIG. 1 LOCATION MAP OF M/S. DECAN CEMENTS LTD.,**

## 5. RAW MATERIAL AND PRODUCTS

Raw material and products used/produced in the financial year 2019–2020 are as follows:

### 5.1 Raw Materials

1.	Lime Stone	-	17,43,406 MT/year
2.	Laterite	-	96,515 MT/year
3.	Iron Ore	-	252 MT/year
4.	Gypsum	-	74,923 MT/year
5.	Coal	-	2,25,299 MT/year
6.	Fly ash	-	1,86,651 MT/year
7.	Clinker	-	12,25,253 MT/Year
8.	Coal (Power)	-	1,17,967 MT/year

### 5.2 Moisture losses

1.	Fly ash	-	Nil
2.	Gypsum	-	11,692 MT/year
3.	Coal	-	24,866 MT/year
4.	Laterite	-	3,694 MT/Year

### 5.3 Products

1.	PPC	-	5,80,455 MT/year
2.	OPC	-	8,91,765 MT/Year
3.	SRC	-	2,915 MT/Year

### 2. Intermediate Product

Clinker	-	12,45,290 MT/year
Power CPP	-	11,79,67,000 Units/Year

## 6. PROCESS DESCRIPTION

The plant uses dry manufacturing process which when compared to the wet process is very energy efficient. The cement manufacturing involves mostly unit operations and does not involve any hazardous chemical reactions. Plant operations are controlled through Computer based distributed control system upto Kiln and coal mill to ensure high degree of operability and safety.



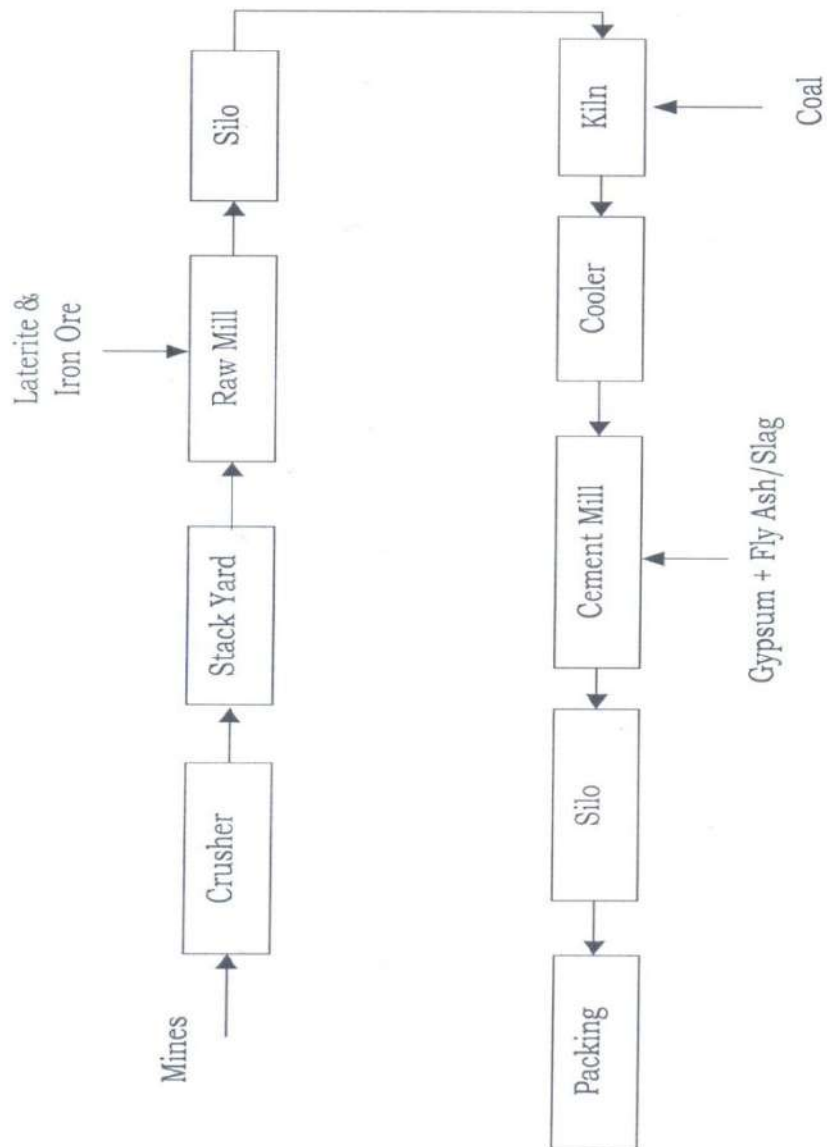


Fig.2 Process Flow Sheet of M/s. DECCAN CEMENTS LTD.,

A brief description of manufacturing process is given in the following sections. The manufacturing process involves mining of limestone and crushing, raw material blending i.e., grinding of limestone along with laterite and iron ore, grinding of raw coal, clinker formation, clinker grinding and cement packing. The manufacturing process flow sheet is shown in fig.2.

### 6.1. Limestone Mining and Crushing

Limestone is mined from the captive mines located near the cement plant. Open cast mining technique is used and mining operations are fully mechanized. The rock is blasted using ammonium nitrate explosives and the blasted material is loaded into Dumpers (30–33 tons) for transport to crusher. Latest techniques like Multi delay firing is adopted excel non–electrical initiating system are being used to control fly rock as well as vibrations. A single rotor impactor type and hammer type crusher is used to crush limestone less than 25 mm in size, while crushing most sophisticated water spray system installed for dust separation which is supplied by M/s. F Harely & Co. Calcutta. The system work specially designed nozzles and chemical dosing to atomize spray for effective dust separation all the belt transfer points and hopper dumps are connected with water spray system which controls dust emission very effectively. The crushed limestone is transported to stacking pile by a belt conveyer. The crushed limestone is stacked in such a way to get a homogenized material while it is reclaimed for raw meal grinding.

## 6.2 Raw material grinding & Preparation

Limestone, Laterite and Iron ore are the required raw materials for the manufacturing of clinker. They are reclaimed from the respective storage areas and fed into ball mills through weigh feeders in predetermined composition for grinding. When mill is rotating with material due to impact of grinding media material is grind in to powder. The grind material called raw meal is then sent to a blending cum storage silos through airlift or belt bucket elevators. Coal is used as a fuel in the rotary kiln, Coal is grind finely in a ball mill and fed to the kiln. Electro Static Precipitator is provided for the kiln & raw mill-I. Bag filter is provided to coal mill and coal crusher to control dust.

## 6.3 Clinker Formation

The Homogenized raw meal is fed to kiln through pre-heater and calciner system. The raw meal is passed through six stages preheater with pre-calciner and raw mix is calcined to 90% to 95% of calcination. The raw mix then passes through rotary kiln, where it is further calcined at a temperature of around 1400°C to form clinker. After complete calcination, the hot clinker is passed through Grate cooler with air pumping for rapid cooling to cool down to 100°C and transported to clinker yard by bucket elevators. The grate cooler is provided with Electro Static Precipitator (ESP) to control the emissions.

#### 6.4 Clinker Grinding

Clinker is reclaimed from the storage silo and fed into the cement mill through intermediate hoppers. Clinker mixed with 3–5% gypsum and fed into the Mills (Manufactured by Walchand Nagar Industries Ltd., Pune 2 nos, Loesche Germany and Cement Mill–3 KHD Humbolt ) where both the materials are inter grind to a suitable fineness for better compressive strength. The cement mill consists of a closed grinding system comprising of grinding and separator. The coarse particles are returned to the Mills, while the finely grind cement is sent to silo for bulk storage. The mill and separator are provided with bag filter.

#### 6.5 Cement Packaging

Cement from storage silos is transported to cement packing machines called packers through air slides and bucket elevators. That is one electronic rotary packer of capacity 90 T/hr, 90 T/hr and 250 T/hr are used to pack cement in  $50 \pm 0.05$  kg capacity in HDPE and paper bags. The packed cement bags are then sent to dispatch by Road and Rail movements. The packer is provided with bag filter for dust control.

#### 6.6. PROCESS DISCRIPTION OF POWER PLANT:

##### 18 MW CAPACITY POWER PLANT:

##### POWER GENERATION PROCESS:

Power generation process is based on Rankine Steam cycle. The steam generated in the boiler when expanded through a turbine, turns the turbine shaft, which is tandem coupled to an electric power generator.

The power plant is aimed at generation of 18MW of electric power. The power plant consists of one AFBC boiler of 70 TPH capacity connected to Turbo Generator set to produce an output of 18MW.

#### SALIENT FEATURES OF POWER PLANT

CAPACITY (MW)	18.0
Steam Generators Capacity	Boiler – 70 TPH
Steam Turbine – Capacity	Power Plant –18.0 MW
Fuel	Indian Coal
Fuel Consumption	400 – 450 TPD
Calorific Value of Coal	2500 –3200 kcal/kg
Ash Content in Coal	25–45%
Sulphur content in coal	0.6%
Fuel supply	Singareni collieries coal fields.
Height of Chimney	75 m
Source of Water	River Krishna
Water consumption in captive power plant m <sup>3</sup> /day	2,420
Type of cooling	Closed circuit cooling

#### TECHNICAL FEATURES OF POWER PLANT:

In order to take advantage of efficient steam generators having greater flexibility in using low grade and reduce emissions, it is proposed to use Atmospheric Fluidized Bed Combustion type boilers. The following paragraphs detail the technical features of proposed units of the power plant.

**STEAM GENERATOR AND AUXILIARIES:**

The steam generator is coal fired, atmospheric fluidized bed combustion type and semi outdoor unit. In this process the mixture of coal and primary air is fed in to the boiler furnace by pneumatic underfeed system. The major advantage of FBC system is getting ash with low unburned carbon on one hand and collecting less bottom ash rather than flyash.

The rating of steam generators would be 70 TPH at a pressure of 64 ata and temperature of 510 +/- 5<sup>o</sup> C at the superheated outlet when supplied with feed water at a temperature of 190<sup>o</sup> C. The steam generator is provided with fuel oil system using HSD, which would be used during start-up of steam generator.

**STEAM TURBINE GENERATOR:**

The Steam turbine is single casing, non-reheat, and regenerative, condensing type. The turbine is rated for 18.0 MW with rated steam inlet condition of 64 ata and 500<sup>o</sup>C and 0.12 ata condenser backpressure with associated feed water heaters in service. The turbine would be complete with all the accessories customarily supplied by the manufactures such as governing and protection system, turbine oil system and its auxiliaries, turbine gland seal system, turning gear, supervisory and operating instruments with all necessary indicating and control devices to permit the unit to be placed on turning gear, rolled accelerated and synchronized from the central control room.

**7. WATER REQUIREMENT**

The total water consumption and the break up details are given below:

	As per CFO In KLD	Actual 2019-20
<u>Water Consumption</u> (m <sup>3</sup> /Day)	345	232
Cooling Water Makeup		
<u>Power Plant:</u>		
Filter Back Wash	7	1,117
DM Plant regeneration	7	
Cooling Water Makeup	1652	
Boiler Feed	40	
Service Water Wash	30	
Clarifier blow down	12	
Domestic	287	257
Gardening	40	
<b>Total Water Consumption</b>	<b>2420</b>	<b>1,606</b>

Most of the process and cooling water will be evaporated/consumed. The domestic requirement includes requirements of colony, plantation, drinking as well as sanitation. The water requirement is being met by pumping water from the Krishna River.

## 8. POLLUTION CONTROL IN THE PLANT

The industry has given top priority of pollution prevention and control. Therefore all the sources that release particulate matter are provided with bag filters/ESP for the control of particulate emissions into atmosphere. With respect to the gaseous pollutants like sulphur dioxide and nitrogen oxides their emissions are significant from only the diesel generators. Currently there are no standards for either the emission loads or emission concentrations of gaseous pollutants from diesel engines. Further their control at the source of generation is not technologically feasible and their treatment is difficult and expensive. Therefore all stacks are provided as an effective measure for good atmospheric dispersion of the pollutants and air pollution control.

It is found from the data generated that the flue gas emissions from the stacks and the ambient air quality data for SPM, SO<sub>2</sub> and NO<sub>x</sub> are well within the limits and comply with the standards prescribed by Telangana State Pollution Control Board (TSPCB).

### 8.1 Waste water Sources and Monitoring

Most of the water consumed for process as well as cooling is consumed / evaporated. The only source of waste water is from sanitary facilities of the plant is presently being sent to septic tank followed soak pits Domestic waste water from colony is treated in STP and treated water is used for green belt in plant and colony.

### 8.2 Air Pollution Control

The sources of air emissions are from kiln, Cement mills, coal mill and cooler. The stack details are furnished in Table 8.1 Stack emissions monitoring is carried out once in a quarterly for the parameters Suspended particulate matter. It is noticed



from the collected emissions data that the parameters monitored are within the limits prescribed by T.S. Pollution Control Board.

### 8.2.1 Stack Emissions

The emission from Kiln and Raw mills are passed through ESP and RABH which reduces the particulate matter to the minimum levels. The emission from cooler is passed through ESP which reduces the particulate matter to the lower levels. Bag filters are attached to Cement Mills, Coal Mills, and Packing Plants curtails the particulate matter to the minimum levels.

Table 8.1  
Average values of Stack Emissions monitoring data

Source	Stack Height (m)	Stack Dia (m)	Velocity	Emissions passes through	SPM Concentration (mg/Nm <sup>3</sup> )	SO <sub>2</sub> Concentration (mg/Nm <sup>3</sup> )	NO <sub>x</sub> Concentration (mg/Nm <sup>3</sup> )
Kiln /Raw Mill with PJBF – 1	50	2.0	14	Bag Filter	12.00	2.43	452
Kiln / Raw Mill with RABH – 2	128	4.2	14	RABH	12.67	1.57	424.33
Cement Mill 1 & 2	30	1.0	12.2	Bag Filter	13.00	--	--
VRM Cement Mill	35	2.0	11.42	Bag filter	22.33	--	--
Cement Mill – 3	41	1.2	12.21	Bag filter	13.00	--	--
Cooler with ESP – 1	50	2.0	12.75	ESP	19.00	--	--
Cooler with ESP – 2	35	4.0	9.21	ESP	17.67	--	--
Coal Mill – 1	31	0.7	12.2	Bag filter	16.50	--	--
Coal Mill – 2	58	1.6	12.2	Bag filter	20.67	--	--
CPP	74.70	3.50	8.95	ESP			

### 8.2.2 Ambient Air Quality

Ambient air quality monitoring is carried out once in a quarterly at the following locations in the factory premises to know the status of the ambient air quality.

1. Near Main Gate
2. Near Commercial Gate
3. Railway Track Dead End.
4. CPP Main Gate

Ambient air quality is monitored for 8 hours at each station for the estimation of particulate matter-PM<sub>10</sub> and particulate matter PM<sub>2.5</sub>. Estimated average values for the parameters monitored are represented in the Table 8.2 the analyzed values for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are within the limits prescribed by T.S.P.C.B. for residential and rural area.

Table 8.2  
Average values of Ambient air quality data

Location	MAIN GATE	COMMERCIAL GATE	RAILWAY TRACK DEAD END	CPP MAIN GATE
Particulate Matter-PM <sub>10</sub> Concentration	74.00	80.33	70.33	77.67
Particulate Matter-PM <sub>2.5</sub> Concentration	26.00	29.67	25.00	29.33
Sulfur dioxide Concentration	9.67	11.00	9.67	12.33
Oxides of Nitrogen Concentration	24.00	22.67	22.00	23.00

Note: All the values are expressed as (µg/m<sup>3</sup>)

### 8.2.3 Ambient Noise Levels Monitoring:

Noise levels are measured at various places in the factory once in quarterly. High noise levels may have adverse impact on the workers and the surrounding environment. Noise levels are measured using sound level meter. The results are given in table 8.3 and the measured values are within the limits prescribed by Pollution Control Board.

Table 8.3  
Average values of Ambient Noise Levels

S.No.	Location	Noise Levels in dB(A)	
		Day Time	Night Time
1.	MAIN GATE	63.35	57.65
2.	GUEST HOUSE	55.70	50.65
3.	KILN	69.00	63.35
4	COLONY	56.00	51.30
5	COAL MILL	69.35	64.30
6	CEMENT MILL	72.00	66.60
7	RAW MILL	71.00	66.00

Note: 1. Day time is reckoned in between 6 am and 10 pm - Limit 75 dB (A).  
2. Night time is reckoned in between 10 pm and 6 am - Limit 70 dB (A).

### 9. GREENBELT DEVELOPMENT

Greenery / plantation recharges oxygen into environment. Greenbelt development may have the following benefits.

- a. Mitigation of fugitive emissions including odor
- b. Noise pollution control
- c. Improving the local echo-system
- d. Arresting the soil erosion
- e. Improving the landscape of the area
- f. Aesthetics

The greenbelt development program in this rocky strata area is as follows:

Trees are planted extensively; Lawns, avenue plantation, ornamental plantation are also developed in plant, mines, colony and surround area.

#### 10. PROPOSED BUDGET FOR POLLUTION CONTROL & ENVIRONMENT PROTECTION.

The budgetary allocation for the financial year 2020-2021 is Rs. 100 Lakhs (Rupees One hundred lakhs only) which includes maintenance expenditure for pollution control facilities.

#### 11. HOUSE KEEPING

Proper cleaning of the different sections is required to maintain healthy environment, to avoid unnecessary loss and a good quality product. Stores to be maintain property. Factory premises are to be clean and green to have good housekeeping. M/s. DECCAN CEMENTS LTD is keeping their plant and premises neat and tidy. Housekeeping has been found to be well.

#### 12. AUDITORS COMMENTS

1. The audited figures show that compared to year 2018-19, the water consumption has decreased marginally.
2. The consumption of basic raw materials on the whole has decreased marginally compared to 2018-19.
3. Emissions from the stacks are within the prescribed limits of T.S.P.C.B.
4. The unit has complete testing facility of Stack emissions and Ambient air quality monitoring.
5. The unit does not generate any hazardous waste.

6. About Rs. 70.00 Lakhs spent for annum for operation and maintenance of pollution control facilities and environmental protection.
7. The audit activities have enabled the plant authorities to run efficiently pollution control facilities.
8. M/s. DECCAN CEMENTS LIMITED is developed abundant lime stone quarry into a water pond.
9. Safety Programmes which are being conducted regularly by M/s. DECCAN CEMENTS LIMITED, has helped in bringing awareness amongst the work force.
10. Under T.S.P.C.B Haritha Haram programme M/s. DECCAN CEMENTS LIMITED is maintaining 18.50 Ha land under greenbelt, Gap plantation is under taken to improve the green belts.
11. Implementation of Environmental Management Standards in Deccan Cements Limited in the under process as per ISO 14000:2015 standards and accreditation body is DNV -GL.

  
Auditors Signatory



**APPENDIX-A**  
**MINISTRY OF ENVIRONMENT AND FORESTS**  
**NOTIFICATION**

New Delhi, the 16<sup>th</sup> November, 2009.

**NATIONAL AMBIENT AIR QUALITY STANDARDS**

G.S.R. 826 (E) In exercise of the powers conferred by section 6 and section 25 of the Environment (Protection) Act, 1986, (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:-

1. (1) These rules may be called the Environment (Protection) seventh Amendment Rules, 2009.  
 (2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, (hereinafter referred to as the said rules), In rule 3, in sub-rule (3B), for the words, brackets, figures and letters, "In columns (3) to (5) of Schedule VII" the words, brackets figures and letters "in columns (4) and (5) of Schedule VII" shall be substituted.

3. For Schedule VII to the said rules and entries relating thereto, the following Schedule and entries shall be substituted, namely:--

S. No.	Pollutant	Time weighted average	Concentration in Ambient Air		
			Industrial , Residential, Rural and Other area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
1.	Sulphur dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Annual Average*	50 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	1. Improved West and Gaeke Method 2. Ultraviolet Fluorescence
		24 hours**	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	
2.	Nitrogen Dioxide (NO <sub>2</sub> ) µg/m <sup>3</sup>	Annual Average*	40 µg/m <sup>3</sup>	30 µg/m <sup>3</sup>	1. Modified Jacob & Hochheiser (Na-Arsenite) Method 2. Chemiluminescence
		24 hours**	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	
3.	Particulate Matter (Size less than 10 µm) or PM <sub>10</sub> µg/m <sup>3</sup>	Annual Average*	60 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>	1.Gravimetric 2. TOEM 3. Beta attenuation
		24 hours**	100 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>	
4	Particulate Matter (size less than 2.5 µm) or PM <sub>2.5</sub> µg/m <sup>3</sup>	Annual Average*	40 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>	1. Gravimetric 2. TOEM 3. Beta attenuation
		24 hours**	60 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>	
5.	Ozone (O <sub>3</sub> ) µg/m <sup>3</sup>	8 hours	100 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>	1. UV photometric 2. Chemiluminescence 3. Chemical Method
		1 hour	180 µg/m <sup>3</sup>	180 µg/m <sup>3</sup>	
6.	Lead (Pb) µg/m <sup>3</sup>	Annual Average*	0.50 µg/m <sup>3</sup>	0.50 µg/m <sup>3</sup>	1. AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper 2. ED-XRF using Teflon filter
		24 hours**	1.0 µg/m <sup>3</sup>	1.0 µg/m <sup>3</sup>	

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7.	Carbon Monoxide (CO) mg/m <sup>3</sup>	8 hours**	02 mg/m <sup>3</sup>	02 mg/m <sup>3</sup>	Non dispersive infra Red (NDIR) spectroscopy
		1 hour	04 mg/m <sup>3</sup>	04 mg/m <sup>3</sup>	
8.	Ammonia (NH <sub>3</sub> ) µg/m <sup>3</sup>	Annual Average*	100 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>	1. Chemiluminescence 2. Indophenol blue method
		24 hours**	400 µg/m <sup>3</sup>	400 µg/m <sup>3</sup>	
9.	Benzene (C <sub>6</sub> H <sub>6</sub> ) µg/m <sup>3</sup>	Annual Average	05 µg/m <sup>3</sup>	05 µg/m <sup>3</sup>	1. Gas chromatography based continuous analyzer 2. Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP) particulate phase only, ng/m <sup>3</sup>	Annual Average	01 ng/m <sup>3</sup>	01 ng/m <sup>3</sup>	Solvent extraction followed by HPLC/GC analysis
11.	Arsenic(As) ng/m <sup>3</sup>	Annual Average	06 ng/m <sup>3</sup>	06 ng/m <sup>3</sup>	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni), ng/m <sup>3</sup>	Annual Average	20 ng/m <sup>3</sup>	20 ng/m <sup>3</sup>	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

- Annual Arithmetic mean of minimum 104 measurements in a year at particular site taken twice a week 24 hourly at uniform intervals.

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\*\* 24 hourly / 8 hourly or 01 hourly monitored values, as applicable, shall be complied with the 98% of the time in a year. 2 % of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits Specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

**APPENDIX-B**

standards for stack emissions

<b>PARAMETERS</b>		<b>(mg/Nm<sup>3</sup>)</b>
1. Suspended particulate matter concentration	(SPM)	115
2. Sulphur dioxide concentration	(SO <sub>2</sub> )	800
3. Oxides of Nitrogen Concentration	(NO <sub>x</sub> )	600
4. Ammonia concentration	(NH <sub>3</sub> )	50
5. Hydrochloric acid fume (Acidmist) concentration	(HCL)	35
6. Chlorine concentration	(Cl <sub>2</sub> )	07



**APPENDIX-C  
AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE**

**G.S.R. 158 (E) dt. 09-3-2009**

**The Environment (Protection) Rules, 1986 (See rule 3)**

Area Code	Category of Area	Limits in dB(A)	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

- Note :
1. Day time is reckoned in between 6 am and 10 pm.
  2. Night time is reckoned in between 10 pm and 6 am.
  3. Silence Zone is defined as areas upto 100 m around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority. Use of vehicular horns, loud speakers and bursting of crackers shall be banned in these zones.
  4. Mixed categories of areas should be declared as one of the four above mentioned categories by the competent authority and the corresponding standards shall apply.

**APPENDIX-D  
GENERAL STANDARDS FOR DISCHARGE OF EFFLUENTS  
[Schedule II inserted vide G.S.R. 919 (E) dt. 12-9-1988 Published in the  
Gazette No. 488 dt. 12-9-1988]  
The Environment (Protection) Rules, 1986 (See rule 3)**

Sl. No.	Parameter	Standards			
		Inland Surface Water	Public Sewers	Onland for Irrigation	Marine Coastal areas
1	2	3			
		a.	b.	c.	d.
1	Colour and Odour	See Note 1	---	See Note 1	See Note 1
2	Suspended Solids, mg/L, max	100	600	200	a. For process waste water 100 b. For cooling water effluent-10% above total suspended matter of influent cooling water
3	Particle size	Shall pass 850 micron IS sieve	---	---	a. Floatable solids max- 3 mm b. Settleable solids max-850 $\mu$
4	Dissolved Solids (inorganic), mg/L, max	2100	2100	2100	---
5	p <sup>H</sup> value	5.5 – 9.0	5.5 – 9.0	5.5 – 9.0	5.5 – 9.0
6	Temperature °C, max	Shall not exceed 40 in any section of the stream within 15 m downstream from the effluent outlet	45 at the point of discharge	---	45 at the point of discharge
7	Oil & Grease, mg/L, max	10	20	10	20
8	Total Residual Chlorine, mg/L, max	1.0	---	---	1.0
9	Ammonical Nitrogen (as N), mg/L, max	50	50	---	50
10	Total Kjeldahl Nitrogen (as N), mg/L, max	100	---	---	100
11	Free Ammonia (as NH <sub>3</sub> ) mg/L, max	5.0	---	---	5.0
12	Biochemical Oxygen Demand (5 day at 20 °C), mg/L, max	30	350	100	100
13	Chemical Oxygen Demand, mg/L, max	250	---	---	250
14	Arsenic (as As), mg/L, max	0.2	0.2	0.2	0.2
15	Mercury (as Hg), mg/L, max	0.01	0.01	---	0.01
16	Lead (as Pb), mg/L, max	0.1	1.0	---	1.0
17	Cadmium (as Cd), mg/L, max	2.0	1.0	---	2.0

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Sl. No.	Parameter	Standards			
		Inland Surface Water	Public Sewers	Onland for Irrigation	Marine Coastal areas
1	2	3			
		a.	b.	c.	d.
18	Hexavalent Chromium (as Cr <sup>+6</sup> ), mg/L, max	0.1	2.0	---	1.0
19	Total Chromium (as Cr), mg/L, max	2.0	2.0	---	2.0
20	Copper (as Cu), mg/L, max	3.0	3.0	---	3.0
21	Zinc (as Zn), mg/L, max	5.0	15.0	---	15.0
22	Selenium (as Se), mg/L, max	0.05	0.05	---	0.05
23	Nickel (as Ni), mg/L, max	3.0	3.0	---	5.0
24	Boron (as B), mg/L, max	2.0	2.0	2.0	---
25	Percentage Sodium, max	---	60.0	60.0	---
26	Residual Sodium Carbonate, mg/L, max	---	---	5.0	---
27	Cyanide (as CN), mg/L, max	0.2	2.0	0.2	0.2
28	Chloride (as Cl), mg/L, max	1000	1000	600	---
29	Fluorides (as F), mg/L, max	2.0	15.0	---	15.0
30	Dissolved Phosphate (as P), mg/L, max	5.0	---	---	---
31	Sulphate (as SO <sub>4</sub> ), mg/L, max	1000	1000	1000	---
32	Sulphide (as S), mg/L, max	2.0	---	---	5.0
33	Pesticides	Absent	Absent	Absent	Absent
34	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/L, max	1.0	5.0	---	5.0
35	Radio Active Materials:	10 <sup>-7</sup>	10 <sup>-7</sup>	10 <sup>-8</sup>	10 <sup>-7</sup>
	a. Alfa Emitters µc/mL, max b. Beta Emitters µc/mL, max	10 <sup>-6</sup>	10 <sup>-6</sup>	10 <sup>-7</sup>	10 <sup>-6</sup>

- Note :
1. All efforts should be made to remove colour and unpleasant odour as far as practicable.
  2. The standards mentioned in this notification shall apply to all the effluents discharged, such as industrial mining and mineral processing activities, municipal sewage, etc.
  3. Omitted by Rule 2 of the Environment (Protection) Fourth Amendment Rules, 1992 vide Notification G.S.R. 797 (E) dated 01-10-1992, Gazette No. 396 dated 01-10-1992.

**APPENDIX-E  
TEST CHARACTERISTICS FOR DRINKING WATER (IS:10500-2012)**

Sl. No.	Substance of Characteristic	Require-ment (Acceptable Limit)	Permissible Limit in the Absence of Alternative Source	Methods of Test (Ref. To IS)	Remarks
1	2	3	4	5	6
i.	Colour, Hazen units, max	5	15	3025 (Part 4)	Extended to 15 only if toxic substances are not suspected, in absence of alternative sources.
ii.	Odour	Agreeable	Agreeable	3025 (Part 5)	a. Test cold and when heated b. Test at several dilutions
iii.	Taste	Agreeable	Agreeable	3025 (Part 7 & 8)	Test to be conducted only after safety has been established
iv.	Turbidity, NTU, max	1	5	3025 (Part 10)	---
v.	p <sup>H</sup> value	6.5 – 8.5	No relaxation	3025 (Part 11)	---
vi.	Total Hardness (as CaCO <sub>3</sub> ) mg/L, max	200	600	3025 (Part 21)	---
vii.	Iron (as Fe), mg/L, max	0.3	No relaxation	3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
viii.	Chlorides (as Cl), mg/L, max	250	1000	3025 (Part 32)	---
ix.	Residual, free Chlorine, mg/L, min	0.2	1	3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be min. 0.5 mg/L
x.	Dissolved Solids, mg/L, max	500	2000	3025 (Part 16)	---
xi.	Calcium (as Ca), mg/L, max	75	200	3025 (Part 40)	---
xii.	Copper (as Cu), mg/L, max	0.05	1.5	3025: 1964 (Part 42)	---
xiii.	Manganese (as Mn), mg/L, max	0.1	0.3	3025:(Part 59)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiv.	Sulphate (as SO <sub>4</sub> ), mg/L, max	200	400	3025 (Part 24)	May be extended to 400 provided that magnesium does not exceed 30
xv.	Nitrate (as NO <sub>3</sub> ), mg/L, max	45	No relaxation	3025 (Part 34)	---
xvi.	Fluoride (as F), mg/L, max	1.0	1.5	3025: (Part 60)	---

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Sl. No.	Substance of Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternative Source	Methods of Test (Ref. to IS)	Remarks
1	2	3	4	5	9
xvii	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/L, max	0.001	0.002	3025: (Part 43)	---
xviii.	Mercury (as Hg), mg/L, max	0.001	No relaxation	IS 3025 (Part 48)/ Mercury Analyser	---
xix.	Cadmium (as Cd), mg/L, max	0.003	No relaxation	IS 3025 (Part 41)	---
xx.	Selenium (as Se), mg/L, max	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	---
xxi.	Arsenic (as As), mg/L, max	0.01	0.05	3025 (Part 37): 1988	---
xxii.	Cyanide (as CN), mg/L, max	0.05	No relaxation	3025 (Part 27)	---
xxiii.	Lead (as Pb), mg/L, max	0.01	No relaxation	IS 3025 Part 47	---
xxiv.	Zinc (as Zn), mg/L, max	5	15	39 of 3025: 1964 (Part 49)	---
xxv.	Anionic detergents (as MBAS), mg/L, max	0.2	1.0	Annex K of IS 13428	---
xxvi.	Chromium (as Cr <sup>+6</sup> ), mg/L, max	0.05	No relaxation	IS 3025 (Part 52)	---
xxvii	Polynuclear aromatic hydrocarbons (as PAH), g/L, max	0.0001	No relaxation	APHA 6440	---
xxviii	Mineral Oil, mg/L, max	0.05	No relaxation	Clause 6 of IS 3025 (Part 39) infrared Partition Method	---
xxix	Pesticides, mg/L, max	Absent	0.001	---	---
xxx	Radioactive materials: a. Alpha emitters, Bq/L, max b. Beta emitters, pci/L, max	0.1 1.0	No relaxation No relaxation	Part – 2 Part - 1	---
xxxi	Alkalinity, mg/L, max	200	600	13 of 3025: 1964 (Part - 23)	---
xxxii	Aluminum (as Al), mg/L, max	0.03	0.2	31 of 3025: 1964(Part - 55)	---
xxxiii	Boron, mg/L, max	0.5	1.0	29 of 3025: 1964 (Part - 57)	---

Note: Atomic Absorption Spectrophotometer method, may be used.

**APPENDIX-F  
PLANT SPECIES FOR GREEN BELT DEVELOPMENT**

<b>SI. No.</b>	<b>BOTANICAL NAME</b>	<b>COMMON NAME</b>	<b>SIZE AND TYPE</b>	<b>SUITABLE SIZE</b>
1.	Acia auriculaeformis (Mimosaceae)	H: Vilaiti	M: Semi evergreen	fragrant white flowers. Suitable in green belts on road sides.
2.	Adina cordifolia (Rubiaceae)	T: Pasupukadamba H: Haldu	L: Deciduous	a light demander, suitable on open areas & near flares.
3.	Aequle marmelos (Rutaceae)	T: Bilavamu H: Bael	M: Deciduous,	good for green belts for green belts near temples.
4.	Anogeissus latifolia (Combretaceae)	T: Chirimanu H: Dhaura	M: Deciduous,	good for green belts near temples
5.	Artabotrys hexapetius (Annonaceae)	T: Monaranjani H: Hara Champa	S: Evergreen shrub	with fragrant flowers good for gardens & inside boundary wall and long canals.
6.	Averrhoa carambola (averrhoaceae, Oxalidaceae)	T: Kamaarakkarmel H: Kamrak	S: Semi evergreen	good in narrow belts (green belts <50m width) along channels
7.	Azadirachta indica (Meliaceae)	T: Vepachettu H: Nim	L: Evergreen,	suitable in green belts and out side office & hospital buildings
8.	Bauhinia Variiegata (Caesalpinhiaceae)	T: Devakanchanamu H: Rachanaram	M: Deciduous,	good in green belts, garden and as a second row avenue tree.
9.	Borassus flabellifer (Arecaceae; Palmae)	T: Taadi H: Tad	L: A tall deciduous,	palm, can be used as wind break when of different age.
10.	Bosellia serrata (Bursaceae)	T: Phirangi saambraani H: Kunder	M: Deciduous	suitable on green shallow soils.
11.	Burera serrata (Bureraceae)	T: Chitreka	M: Deciduous	suitable on shallow soils as a green belt or avenue tree.
12.	Butea monosperma (Fabaceae)	T: Mlduga H: Palas	M: Deciduous	for green belt and as a second row avenue tree.
13.	Caesalpinia pulcherrima (Leguminosae)	T: Pamiditangedu H: Gulutora	M: A large shrub	suitable for gardens outside office and along channels
14.	Callistemon lanceolatus ( Myrtaceae)	T: Bottle Brush	M: Deciduous	for some time, ornamental plant in garden
15.	Careva arobora (Lecythidaceae)	T: Araya H: Kumbi	L: Deciduous,	good in green belts.
16.	Carrisa carandas (Apocynaceae)	T: Vaka H: Karaunda	S: semi evergreen,	large bushy shrub, good as a hedge to protect against noise.
17.	Caryota urenus (Palmae)	T: Jilugujattu H: Mari	M: A lofty palm,	good as a wind break.
18.	Cassia fistula (Leguminosae)	T: Rela H: Amaltas	M: Deciduous	good ornamental tree in green belt.
19.	C. Siamea	T: Sima Tangedu	L: Evergreen	good as avenue tree
20.	Casuarina equisetifolia	T: Sarugudu H: Jungli s aru	M: Evergreen,	suitable for covering low-lying areas and in green belt.
21.	Cadrela toons	T: Nandichettu H: Mahanim	L: Deciduous,	good in open spaces, in green belts and along ponds.
22.	Cestrum diurnum	H: Din-ka-maja	S: A shrub with	white fragrant flowers, suitable (solanaceae) around boilers and waste disposal sites.

**(Contd..)**

**PLANT SPECIES FOR GREEN BELT DEVELOPMENT**

Sl.No.	BOTANICAL NAME	COMMON NAME	SIZE AND TYPE SUITABLE SIZE
23.	Cleistanthus collinus (Euphorbiaceae)	T: Kadishe H: Garari	S: Deciduous tree suitable in green belts.
24.	Cocos nucifera (palmae)	T: Kobbarichettu H: Nariyal	L: A tall stately palm suitable on sea shore river banks and hill slopes.
25.	Cleistanthus collinus (Leguminosae)	T: Errasissu H: Shisham	M: Deciduous, suitable on areas around flare sites and in green belts.
26.	Delonix regia (Leguminosae)	T: Shimasankesual H: Gulmohar	M: Deciduous ornamental, suitable on road sides.
27.	Dillenia indica	T: Peddakalinga H: Chalta	L: Evergreen, white fragrant flowers, good in green belts and around waste disposal sites.
28.	D. pentagyna	T: Chinnakalinga H: Aggai	L: Deciduous, good in green belts and onsite around flare.
29.	Emblina officianallis (Euphorbiaceae)	T: Amalakamu H: Amla	M: Deciduous, good as isolated trees in garden
30.	Erythrina suberosa (Leguminosae)	T: Barijama H: Dauldhak	M: Deciduous, good in green belts
31.	E. variegata	T: Badisa H: Dadap	M: Deciduous, good in gardens outside office buildings.
32.	Ficus bengalensis (Moraceae)	T: Marri H: Bargad	L: Deciduous, widely spread avenue tree (15 m apart)
33.	F. religiosa	T: Bodhi H: Pipal	L: Deciduous, widely spaced avenue tree also a single tree in isolated sites.
34.	Emelina arborea (Verbenaceae)	T: Gumartek H: Sewan	M: Deciduous, good in green belts around flare sites.
35.	Grewia tilioifolia (Tiliaceae)	T: Charachi H: Dhamim	M: Deciduous, good in green belts for use as timber
36.	Hamelen patens		S: Evergreen shrub with dense attractive foliage of greenish bronze leaves; good in gardens.
37.	Hardwickia binata (Leguminosae)	T: Yepi H: Anjan	M: Deciduous, good for green belts on shallow soils.
38.	Hibiscus mutabilis (Malvaceae)	H: Sthal Kamal	S: Large bushy shrub, semi evergreen good in green belts & in gardens, along channels.
39.	H. Rosa sinensis	T: Java Pusphamu	S: Evergreen woody showy shrub good for gardens.
40.	Lxora arborea	T: Korivipala H: Navari	S: Much branched evergreen, good in green belts and in gardens.
41.	Lxora coccinea	T: Mankana H: Rangan	S: Much branched evergreen, good in garden and in green belts.
42.	Jasminum sambur (Oleaceae)	T: Boddumalle H: Moghra	S: Much branched evergreen, good in garden and in green belts.
43.	Kydia calycina (Malvaceae)	T: Potri H: Pula	S: Deciduous, good along canals and in green belts.
44.	Lagersteoemia speciosa (Lythaceae)	T: Varagogu H: Jarul	M: Deciduous, good along road sides and in garden

**(Contd..)**

**PLANT SPECIES FOR GREEN BELT DEVELOPMENT**

<b>SI.No.</b>	<b>BOTANICAL NAME</b>	<b>COMMON NAME</b>	<b>SIZE AND TYPE SUITABLE SIZE</b>
45.	Lannea coramandelica (Anacardiaceae)	T: Appriyada H: Jhingan	L: Deciduous, good on well drained green belts and around flares.
46.	Lawsonia alba (Lythraceae)	T: Goranti H: Mehndi	S: Glabrous much branched shrub, good along canal sides.
47.	Lochnera rosea (Apocynaceae)	T: Bilaganuueru H: Sadabahar	S: An erect perennial herb; good in garden and along small channels.
48.	Madhuca indica (Sapotaceae)	T: Ippa H: Mahua	M: Deciduous, good in green belts
49.	Mallotus philippensis (Euphorbiaceae)	T: Kunkuma H: Sidur	S: small evergreen good along channels
50.	Melia azedarach (Meliaceae)	T: Turaka Vepa H: Bakain	M: Deciduous good along small roads, and canals.
51.	Millingtonia hortensis (Bignoniaceae)	T: Kavuki H: Akas Nim	L: Semi evergreen flowers fragrant, good along roadsides.
52.	Mimusops elengi (Sapotaceae)	T: Pogada H: Mauisari	M: Evergreen, good for avenues
53.	Moringa oleifera (Moringaceae)	T: Muluga H: Sainjna	M: Deciduous, with fragrant flowers, good in green belts.
54.	Murrava koenigi (Rutaceae)	T: Karepaku H: Mitha neem	S: Semi evergreen good in green belts and along small channels
55.	Oreodoxa regia (Palmae)	Royal palm	L: Semi evergreen good medium and small road sides as an ornamental plant.
56.	Pandanus odoratissimus (Pandanaeae)	T: Mugali H: Kewada	S: A densely branched shrub good in gardens near seashore
57.	Peltophorum inerme (Leguminosae, Caesalpinhiaceae)	T: Kondachinta	M: Semi evergreen, suitable on road sides, in in gardens & outside buildings.
58.	Plumeria acuminata (Apocynaceae)	T: Vaala Ganneru H: Golainchi	M: Semi evergreen, fragrant white flowers, good in green belts.
59.	Plumeria alba	T: Veyui Varahaalu	S: Semi evergreen good for gardens
60.	Plumeria rubra	T: Nurravarahalu H: Golainchi	S: semi evergreen good for gardens
61.	Pterocarpus marsupium (Leguminosae, Papilionaceae)	T: Vegi H: Bija	M: Deciduous, good on open areas with adequate light
62.	Pogamia pinnata (Leguminosae, Papilionaceae)	T: Ganuuga H: Karanj	M: Deciduous, good along roads & canals.
63.	Rauvolfia serpentina (Apocynaceae)	T: Paataalagani H: Chandrabhaga	S: An erect evergreen perennial shrub good along canal.
64.	Salmalia malabarica	T: Booruga H: Semul	M: Deciduous, Good for avenues
65.	Samanea saman (Leguminosae)	T: Nidraganneru	L: Deciduous, good tree along road sides for shade.
66.	Saraca indica (Leguminosae, Caesalpinaceae)	T: Ashoka H: Asok	M: Evergreen tree good on road sides within campus

**(Contd..)**



**PLANT SPECIES FOR GREEN BELT DEVELOPMENT**

SI.No.	BOTANICAL NAME	COMMON NAME	SIZE AND TYPE SUITABLE SIZE
67.	Spathodia campanulata (Bignoniaceae)	T: Patadiya H: Runugtora	L: In gardens and avenues and in green belts, it is deciduous.
68.	Sykzygium cumini (Myrtaceae)	T: Neeredu H: Jaman	L: Evergreen tree, good in green belts and within campus and road sides.
69.	Tabernamontana coronaria (Apocynaceae)	T: Gandhitagarapu H: Chandni	S: An evergreen shrub good in gardens and along canals.
70.	Tabebuia pentaphylla (Bignomiaceae)		M: Deciduous, good in gardens
71.	Tamarindus indica (Leguminosae,Caesalphiaceae)	T: Chintachettu H: Imli	L: Semi evergreen tree along state & national highways suitable site.
72.	Ticoma stans (Bignomiaceae)	T: Pachgotla	L: Evergreen tree, good in garden and along canals.
73.	Tectona grandis (Verbenaceae)	T: Adviteeku H: Sagwan	M: Deciduous, good in green belts and on inner sides of roads.
74.	Terminalia alata (Combretaceae)	T: Tani H: Sain	L: Deciduous, good in green belts near flare site
75.	Terminalia arjuna	T: Yerramadi H: Arjuna	L: Evergreen tree for road sides and in green belts.
76.	Terminalia bellirica	T: Tani H: Bahora	L: Deciduous, good in green belts.
77.	Terminalia bellirica	T: Badamchettu d H: Deshi Badam	L: Deciduous tree good near sea shore.
78.	Thespesia populanea (Malvaceae)	T: Gangaraavi H: Paras Pipal	M: Compact quick growing evergreen tree good along road sides.
79.	Thevetia peruviana (Apocynaceae)	T: Pachaganneru H: Pile, Kaner	S: An evergreen large shrub, has shady yellow, flowers, good around the waste treatment.
80.	Vitex negundo (Verbenaceae)	T: Vaavili H: Sambhaluu	S: A large shrub suitable on areas along channels and streams and on waste lands.
81.	Xylia xylicarpa (Eguminosae, Mimosaceae)	T: Eravalu H: Jambu	L: Deciduous is green belts and on waste lands
82.	Zanthoxyium (Rutaceae)	T: Rhetsamaramu H: Badrang	M: Deciduous in green belts and on waste lands

NOTE: H Denotes Name in Hindi  
T “ Name in Telugu  
S “ Small size  
L “ Large size  
M “ Medium size