SRIKALAHASTHI PIPES LIMITED

Rachagunneri Village
Srikalahasthi Mandal
Chittoor District
Andhra Pradesh

Pre-Feasibility Report

(Expansion of production capacity of
Ductile Iron pipes from 3,50,000 TPA to 5,00,000 TPA,
Pig Iron from 3,50,000 TPA to 5,00,000 TPA,
LAM Coke from 2,80,000 TPA to 3,80,000 TPA
Captive power generation from 16 MW (BF & Coke oven) to 31 MW
&
produce DI fittings of capacity 19,500 TPA

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Chapter - 1

EXECUTIVE SUMMARY

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				mill to produce TMT Bars / Tor steel / Rounds / Angels / Channels / Flats / Wire rods / spring steel / Alloy steel / special steel.)	
			8.	Ferro Alloys (4 x 9 MVA)	FeSi-25,000 TPA or SiMn-60,000 TPA or FeMn-75,000 TPA
			9.	Captive power plant (WHRB -8 MW + FBC -4 MW)	12 MW
5.	Location				
	Survey no.s of existing plant	**274,279/1,281,279/3-8, 316/5,316/8,316/11,316/13,317/2,275/1,280/2,280/3,280/4,281/1,279/9&11,322,273/1, 282, 283/2& 207, 208, 209/18, 308/4, 317 (part) &364/1-4,365/2, 363/1,363/2,363/3, 365/1,366/3,368/3**		
	Survey no.s of additional land acquired	**272 of Rachagunneri village**		
	Villages	**Rachagunneri**		
	Mandal	**Srikalahasthi**		
	District	**Chittoor**		
	State	**Andhra Pradesh**		
6.	Nearest Railway station / Airport along with distance in km.	**Railway Station**	**:**	**Rachagunneri (0.5 Km.)**

		Airport	**:**	**Renigunta (15.0 Kms.)**
7.	Nearest Town, City, District Headquarters along with distance in km.	**Nearest town : Srikalahasthi (7.3 Kms.)** **District Head quarter: Chittoor –about 120 kms**		
8.	Village Panchayats, Zilla Parishad, Municipal corporation, Local body (complete postal addresses with telephone Nos. to be given)	**Rachagunneri Village & Panchayath, Srikalahasthi Mandal, Chittoor dist., A.P-517641** **Phone : 08578-286651-55,70**		
9.	Name of the applicant	**Srikalahasthi Pipes Ltd. [Expansion]**		
10.	Registered Address	**Rachagunneri (V) & (PO)** **Srikalahasthi (Mandal),** **Chittor District, Andhra Pradesh-517641**		

Chapter – 2
INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

2.1 Identification of project and project proponent

Srikalahasthi Pipes Limited – SPL is one of the leading manufacturers of Ductile Iron Pipes (DI Pipes) in India. SPL also offers superior quality foundry grade pig iron, cement and low ash metallurgical coke.

SPL is an Associate Company of Electrosteel Fittings Limited (ECL), which is a pioneer in production of DI Pipes in India and five-decade-old water Infrastructure Company, providing techno-economic solutions for water supply and sewerage systems. ECL group is India's largest and one of the few manufacturers in the world to make DI Pipes, DI Fittings and CI Pipes, having its facilities in Khardah & Haldia in West Bengal, Elavur in Tamil Nadu and Srikalahasthi Pipes Limited in Andhra Pradesh.

The unit is located at Rachagunneri Village, Srikalahasthi Mandal, Chittoor District, which is about 27 kms. from Tirupathi and 10 kms. from Srikalahasthi.

Now as part of expansion, SPL proposed to enhance the production capacity of

- Ductile Iron pipes
- Pig Iron & LAM Coke.
- Power generation

In addition to the expansion, the company proposed to produce DI fittings also.

2.2 Brief description of nature of the project

The proposed project involves manufacturing

Unit	**:**	**Description**
Ductile Iron Pipes	:	Using Blast Furnace Molten Metal along with scrap, Ferro silicon, cement, Sand, Silica sand, Bitumen paint, Zinc, Magnesium as raw materials for Ductile iron pipes manufacturing.
Pig Iron	:	Using Iron Ore, Sinter , Metallurgical coke, Lime stone, Dolomite, Quartzite & Manganese ore as raw materials in Blast Furnace
Low ash metallurgical coke	:	Using imported coking coal, semi-soft & Prime hard coal as a raw material in Coke oven Plant
Power	:	Utilizing clean Blast Furnace gas & hot waste gas (heat recovery)

Unit	:	Description
		from Coke oven batteries, power will be generated.
DI Fittings (Fittings, valves, Accessories, Manholes etc)	:	Using Iron scrap(Pig Iron, steel scrap, pipe scrap ,re-melt),Ferro alloys, Expanded polystyrene, paint(bitumen, Zinc rich, liquid epoxy, polyurethane, ceramic) Foundry additives, Resin binder, silica sand and cement as Raw material.

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

India is one of the fastest developing economies in the world. Infrastructure lacuna has been an anathema to India's growth. Not surprisingly, India lags behind water infrastructure and sewerage development with only 33% of the total population having access to improved sanitation. In rural areas, where 72% of India's population lives, only 22% has better coverage for sanitation.

The Indian pipes business has been growing rapidly since the past several years mainly due to increasing demand for pipes in the irrigation sector, for crude oil, real estate industry and growth in Gross domestic product (GDP) of the country. Among the several varieties of pipes available in the market, the demand for plastic pipes such as PVC, CPVC in particular, is on a rise due to its low cost, high quality and high durability. Other types of pipes, like steel pipes and ductile iron pipes also have major demand. Nationwide infrastructural development, urbanization, government's focus on real estate, irrigation to drive agricultural growth have been identified as major factors facilitating the growth of the pipes industry in the country.

The Government of India is launching new schemes in the irrigation and the real estate sector for significant investments. It is evident here that the focus of Indian government is on water supply for housing sector, which will only be fulfilled with effective use of pipelines. Therefore, this end-user is a major demand driver of pipes. Furthermore, strong demand for crude oil transportation is also adding to the demand of pipes across the country.

The major grades demanded in the Indian markets is the K7 and K9 series, the governmental authorities and waste water authorities majorly demand DN 80 mm to DN 1000 mm diameter or sizes of specifications. The major feature of this market is that it is 100 % organized as the commissioning of project is routed through EPC contractors

and vendor selection criteria by the government is completely based on Quality of the DI pipes and robust quality standards with regards to ISO and British Standards.

The Ductile Iron pipes market in India is set to grow in the short term and medium term (2 - 5 years) clocking consistent growth rates, with major players ramping up their operations along with a sudden surge in demand in the Indian markets as well as export markets like South Asia, Middle East and North Africa.

In the medium term and long term (7 to 10 years) we predict a demand supply gap in terms of excess supply in the Indian markets over demand as a result of established infrastructural waste water and water projects, and India would have prime focus to export to developing & underdeveloped regions which lacks infrastructural development in waste water & water infrastructure.

2.4 Demand And Supply Gap

The demand drivers for pipes in general and DI pipes in particular are:

- Economic growth
- Demand for water
- Urbanization
- Improvement in water supply and sanitation coverage
- Awareness on safety and hygiene
- Investment by the Central and State Governments in Water and Sanitation schemes
- Assistance from external agencies
- Inter-linking of rivers
- Export potential

2.5 Export Possibility

Total global DI pipe production is about 5.4 million TPA, out of which dependence on import by various countries is about 500,000 TPA. Export ratio is 10 - 40%. Middle East and Asia is everybody's target. Low domestic capacity and production has been

the major constraint that inhibited exports of DI pipes from India. India has the competitive advantage of being strategically located to cater to Asian, South Asian, and Middle East countries. The Middle East is a very prospective region for DI pipes because being water scarce, as the countries in the Middle East give special focus on water supply and sanitation.

During the last four years, India exported DI pipes to as many as 37 countries of which the regular destinations have been Algeria, Brunei, Hong Kong, Qatar, Singapore, Spain, Sri Lanka, Sultanate of Oman, and UK. Thus, DI pipes will continue to be in good demand in these countries in the forthcoming years as well.

Kharagpur being nearer to both Orissa and Jharkhand states, the select plant location is ideal for growing markets especially East & North East states. Further, proximity to the Haldia port is ideal for export of DI pipe to neighbouring country and Middle East. Also company has own private Railway siding for raw materials inwards and finished goods outwards.

2.6 Domestic/Export Markets

There are number of units engaged in the manufacture of DI pipes in India and the total installed capacity (as on June 2015) is around 2.42 MnT & the production during 2015- 16 is estimated to be 1.51 Million MT.

The average capacity utilization is around 57%, which may go up to 70% during 2016-17 and the production is likely to go up to 1.70 MnT during 2016-17.

The investment allocation to water supply & sanitation during the 12th five year plan is INR 255319 crores. Based on prior experience, it is estimated that 13% of this expenditure to be on DI pipes.

Considering domestic demand and the requirement from the export market, Pipes demand is expected to reach 1.99 MnT by 2016 – 17

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

The proposed expansion project creates employment to150 people during construction and 40 people during operation of the proposed expansion project.

SKILLED

Total skilled employment in the proposed plant will be around 25.

SEMI-SKILLED

Total Semi-skilled employment in the proposed project will be around 10. Priority will be given to local people for semi-skilled jobs.

UNSKILLED

Total Unskilled employment in the proposed project will be around 5. Top priority will be given to local people for unskilled jobs.

Chapter – 3
PROJECT DESCRIPTION

3.1 Type of project including interlinked and interdependent projects:

3.1.1. Type of Project:

The proposed expansion project involves manufacturing of the following Products

Unit	:	Description
Ductile Iron Pipes	:	Using Blast Furnace Molten Metal along with scrap, Ferro silicon, cement, Sand, Silica sand, Bitumen paint, Zinc, Magnesium, as raw materials for Ductile iron pipes manufacturing.
Pig Iron	:	Using Iron Ore, Sinter , Metallurgical coke, Lime stone, Dolomite, Quartzite & Manganese ore as raw materials in Blast Furnace
Low ash metallurgical coke	:	Using imported coking coal, semi-soft & Prime hard coal as a raw material in Coke oven Plant
Power	:	Utilizing clean Blast Furnace gas & hot waste gas (heat recovery) from Coke oven batteries, power will be generated.
DI Fittings (Fittings, valves, Accessories, Manholes etc)	:	Using Iron scrap(Pig Iron, steel scrap, pipe scrap, re-melt),Ferro alloys, Expanded polystyrene, paint(bitumen, Zinc rich, liquid epoxy, polyurethane, ceramic) Foundry additives, Resin binder, silica sand and cement as Raw material

3.1.2. Interlinked Project:

No interlinked project is envisaged.

3.2 General Location:

- Plant is located at Rachagunneri village, Sri Kalahasti Mandal, Chitoor District, Andhra Pradesh. (Earlier EC has been accorded for 230.85 acres of land in Rachagunneri & Merlapaka villages).
- Total land in possession of management is 242.17 acres (existing 230.85 acres & additional 11.32 acres)
- The above proposed expansion will be taken up in partly additional land of 11.32 acres and in existing plant premises falling under Rachagunneri village only.

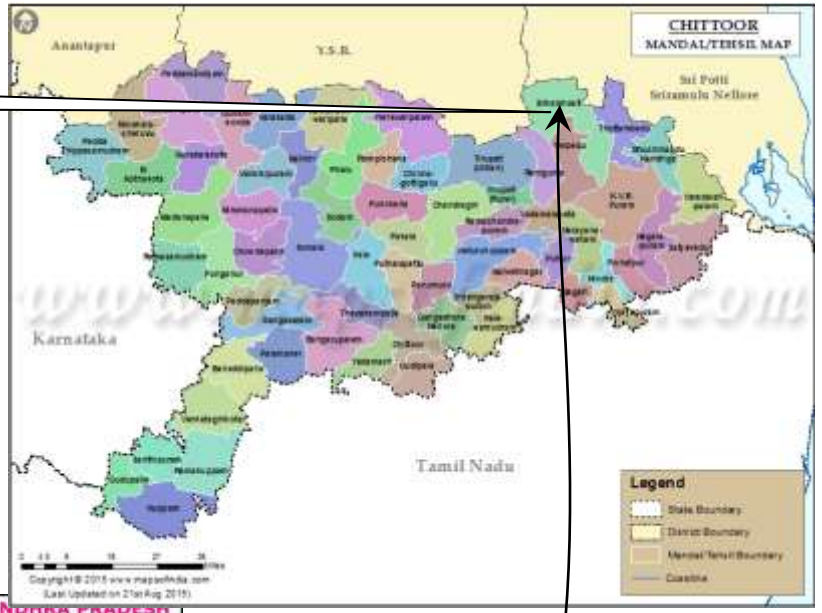
- The coordinates of the Project site area

S.No.	Latitude	Longitude
1.	13°42'59.3394",	079°38'03.2486"
2.	13°43'00.9018",	079°38'09.5812"
3.	13°42'59.5983",	079°38'09.7157"
4.	13°42'45.8089",	079°37'19.9003"
5.	13°42'50.2672",	079°37'19.9702"
6.	13°42'50.5786",	079°37'18.5171"
7.	13°42'49.0990",	079°37'18.6999"
8.	13°42'47.8872",	079°36'59.5644"
9.	13°42'39.6864",	079°36'58.3160"
10.	13°42'38.8098",	079°36'54.9513"
11.	13°42'59.8610",	079°36'54.1895"
12.	13°42'59.9946",	079°37'02.8369"
13.	13°42'53.9594",	079°37'06.3815"
14.	13°42'52.2843",	079°37'18.5673"
15.	13°42'51.2616",	079°37'18.4802"
16.	13°42'50.7129",	079°37'20.3927"
17.	13°43'25.4167",	079°37'34.1385"
18.	13°43'25.7716",	079°37'40.0792"
19.	13°43'12.8749",	079°37'47.7620"
20.	13°43'07.4270",	079°37'45.3726"
21.	13°43'10.9666",	079°37'56.5830"

- The entire project area will fall in the Survey of India topo sheet no. 56 O/10
- The index map of the project site is shown in Figure - 1

Figure – 1 : Google Earth Map showing boundary of the Plant site

Plant site



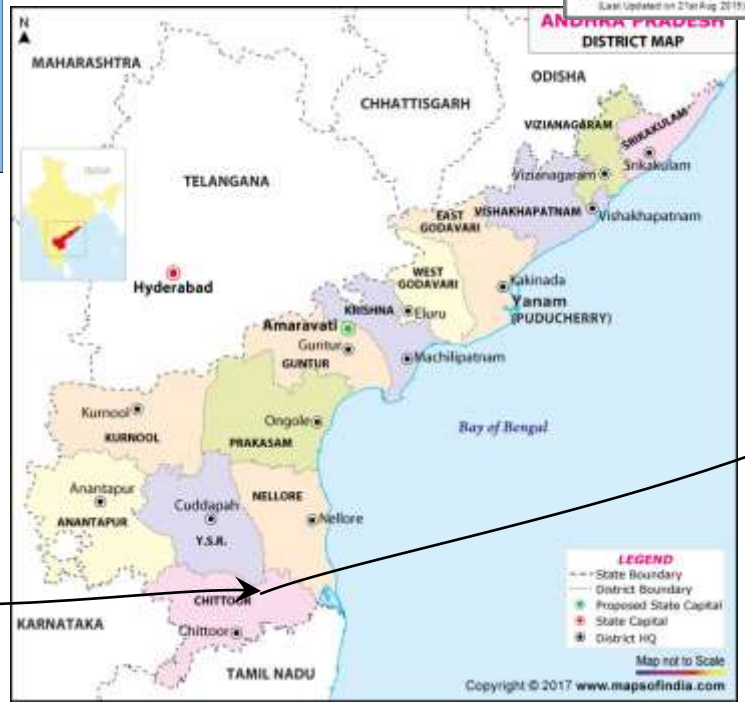
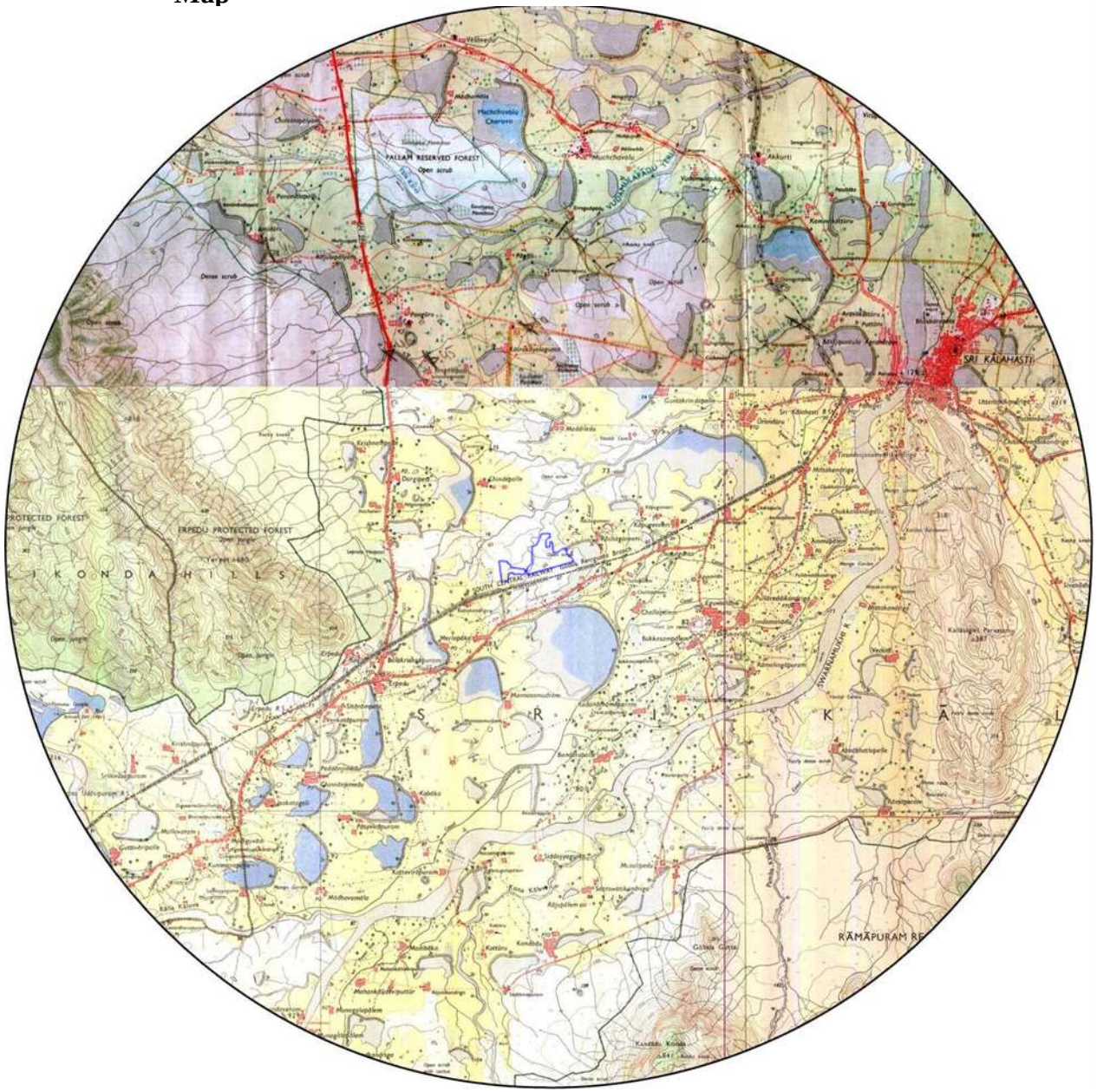


Figure – 2 : General Location map

Figure – 3 : Topographical Map



PLANT SITE

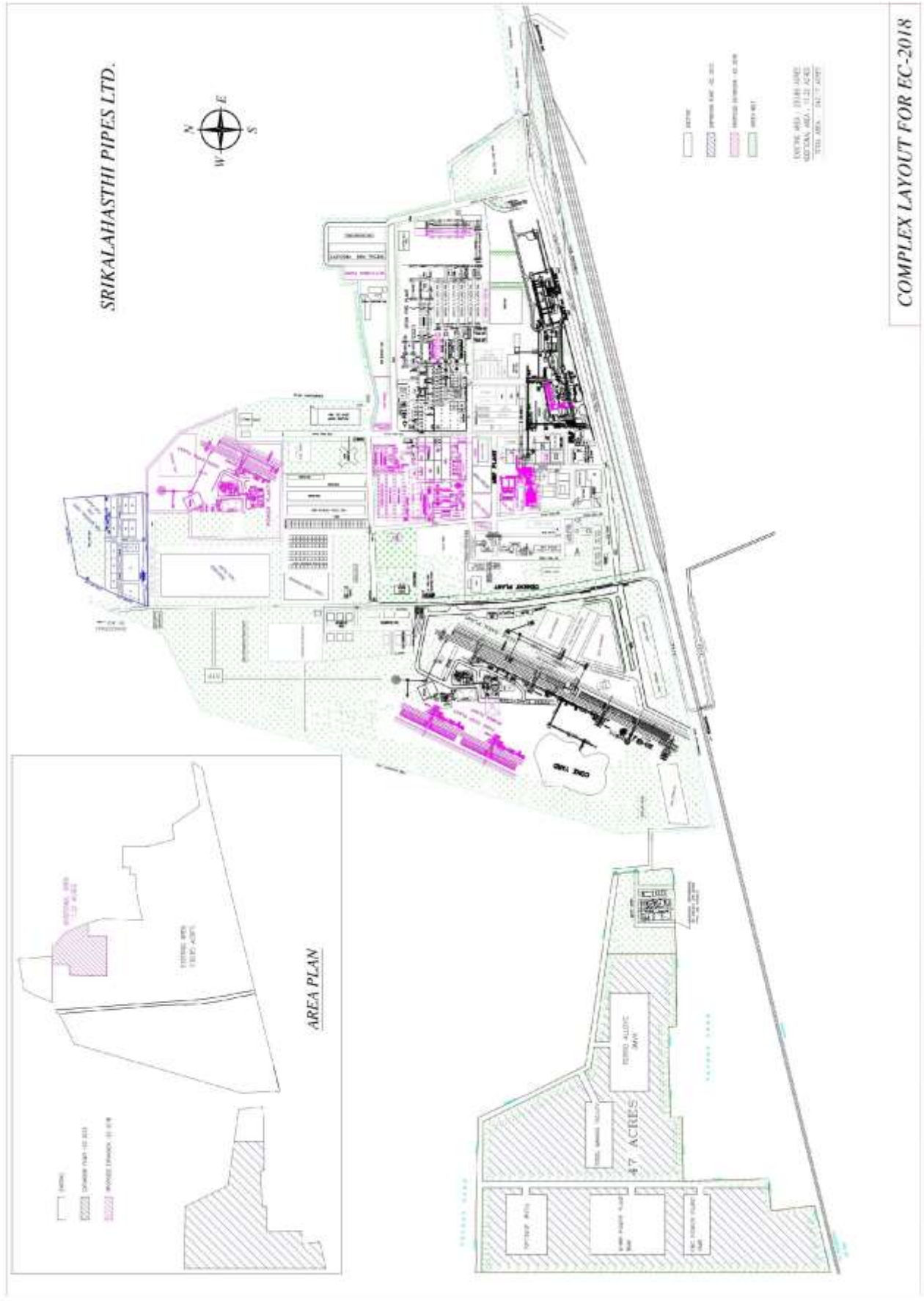
Scale : 1: 1,25,000

LEGEND

Roads, metalled; according to importance; distance stone
„ unmetalled: do. do. : bridge
Cart-track. Pack-track and pass. Foot-path with bridge
Bridges: with piers; without. Causeway. Ford or Ferry
Streams: with track in bed; undefined. Canal
Dams: masonry or rock-filled; earthwork. Weir
River banks: shelving; steep, 3 to 6 metres; over 6 metres
„ dry with water channel; with island & rocks. Tidal river
Submerged rocks. Shoal. Swamp. Reeds
Wells: lined; unlined. Tube-well. Spring. Tanks; perennial; dry
Embankments: road or rail; tank. Broken ground
Railways, broad gauge: double; single with station; under constrn.
„ other gauges: do. ; do. with distance stone; do.
Mineral line or tramway. Telegraph line. Cutting with tunnel
Contours with sub-features. Rocky slopes. Cliffs
Sand features

Towns or Villages: inhabited; deserted. Fort
Huts: permanent; temporary. Tower. Antiquities
Temple. Chhatri. Church. Mosque. Idgāh. Tomb. Graves
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage
Mine. Vine on trellis. Grass. Scrub
Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees.
Boundary, international
„ state: demarcated; undemarcated
„ district; subdivision, tahsil or tāluk; forest
„ village: pillars: surveyed; unlocated
Heights, triangulated: station; point; approximate △200 .200 200
Bench-mark: geodetic; tertiary; canal BM 63·3 BM 63·3 63
Post office. Telegraph office. Combined office. Police station PO TO PTO PS
Bungalows: dāk or travellers'; inspection. Rest-house DB IB (Canal) RH (Forest)
Circuit house. Camping ground. Forest: reserved; protected CH CG RF PF
Spaced names: administrative; locality or tribal KIKRI NĀGA

Figure – 4 : Plant Layout



3.3 Details of alternate sites considered:

No alternative site has been considered, as present proposal will be taken up partly in the existing plant premises and partly in the additional land of 11.32 acres acquired adjacent to the site.

3.4 Size or magnitude of operation:

The following is the size of the proposed expansion Project

S.No.	DESCRIPTION	UOM	EXISTING	PROPOSED EXPANSION	TOTAL
1.	Pig Iron	TPA	350000	150000	500000
2.	Ductile Iron Pipes	TPA	350000	150000	500000
3.	Slag cement	TPA	99000	--	99000
4.	Coke Oven plant	TPA	280000	100000	380000
5.	Captive power plant	MW	16	15	31
6.	DI Fittings (Fittings, valves, Accessories, Manholes etc)	TPA		19500	19500
7.	Ferro Alloys (4 * 9 MVA)-FeSi / SiMn / FeMn	TPA	160000	--	160000
8.	Sponge Iron Plant(4*100TPD)	TPA	130000	--	130000
9.	Steel products	TPA	125000	--	125000
10.	Ferro Alloys (4 * 9 MVA)-FeSi / SiMn / FeMn	TPA	FeSi-25,000 TPA or SiMn-60,000 TPA or FeMn-75,000 TPA	--	FeSi-25,000 TPA or SiMn-60,000 TPA or FeMn-75,000 TPA
11.	Captive power plant (WHRB-8MW+FBC-4MW)	MW	12	--	12

3.5 Manufacturing Process

3.5.1 Manufacturing Process Pig Iron

The blast furnace shop will comprise of one furnace of 450 m3 working volume. The blast furnace is envisaged to operate with sized lump iron ore, Sinter, coke and fluxes. The hot metal produced will be sent to DI Pipe division for manufacturing pipes or cast at pig casting machines to produce cold pigs when ever pipe division is not operation. The liquid slag will be granulated at cast house granulation unit and sent to cement plant for converting into slag cement. The BF top gas will be cleaned in dust catcher and gas cleaning system and distributed to the stoves, burners for ladle heating, annealing furnace in DI pipe processing, boilers for power generation and Sinter Plant process. The excess gas can be flared through flare stack.

The following are the specifications of Blast Furnace

No. of blast furnace	1
Useful volume, m^3	450
Working volume, m^3	643
Productivity on working vol., t/d/ m^3	2 - 2.85
Production, t/d	1286
Coke rate (dry), kg/thm	700
Slag rate, kg/thm	350
Slag basicity, CaO / SiO_2	0.85 to 1.2
Top pressure, kg/cm^2	0.4 – 1.2
Hot blast temperature, deg. C	1000 -1050
Blast humidification, gm/Nm^3	56
Blast volume, Nm^3 /thm	1277

Pig Iron will be manufactured using Chinese technology. Pig Iron / molten metal is made with its state-of-the-art facilities conforming to national & international standards. The process of manufacturing of Pig Iron is detailed in this section to give an insight about the world class manufacturing facilities available at the plant.

RAW MATERIAL HANDLING SYSTEM

Basic raw materials used for production of pig iron are Sinter, Iron ore, Metallurgical coke, Limestone, Dolomite, Quartzite and Manganese-ore.

These raw materials are stored / heaped in the respective yards with proper identification, based on the raw material specification / supplier.

Raw materials are transported from respected yards to ground hopper by means of trucks or tippers and dumped into the ground hopper, they are sent to respective day bins through conveyors.

BATCHING & CHARGING SYSTEM

Automatic batching & charging system has been envisaged through PLC. The batching will be done automatically as per the burden set by the operation. The burden will be decided by the operation based on the required quality of the pig iron. The material, which is weighed, will be sent to the blast furnace via conveyors as per the recipe. Charging will be done to MBF by means of bell less top(BLT) system.

PREPARATION OF HOT BLAST

There are HT fans installed for generating blast required for blast furnace operation. Based on the requirement of pressure and flow, the fans will be switched on to operate in series to maintain the pressure. The cold blast generated from the blower fans is preheated in hot blast stoves before sending to blast furnace.

There are three stoves envisaged for pre-heating the cold blast. Based on the process requirement, stoves will be started & taken in to service. Stoves will be lighted with oil and finally changed over to blast furnace as fuel for firing. The cold blast will be indirectly heated in stoves up to required temperature as per process requirement. This hot blast will be sent to Blast furnace.

BLOWING SYSTEM

There are 12 tuyers and blowpipes envisaged for blowing hot air in to the furnace. The hot blast will flow upward in the blast furnace opposite to the direction of movement of the raw material. The iron ore gets pre-heated, reduction process takes place and iron start melting at different zones & finally become hot metal. It is collected in the hearth. The hot metal collected will be tapped from blast furnace at regular intervals. The hot metal tapped will be collected in ladles and weighed. The weighed ladles will be sent to spun pipe division through trucks / EOT crane as per the requirement. The excess hot metal will be converted into pigs through Pig Casting Machine (PCM). The pigs will be collected in trucks and dumped at pig iron yard with batch identification.

BY PRODUCT / WASTE GENERATION FROM MINI BLAST FURNACE

A. SLAG GENERATION

Slag is a bi-product from blast furnace, which will be granulated by means of slag granulation system. A part of the granulated slag is sent to cement plant for making Portland Slag Cement (PSC).

B. FLUE GAS

The flue gas from Stoves will be used at cement plant for slag drying. Remaining flue gas will be released to atmosphere.

C. BLAST FURNACE GAS

The blast furnace gas coming-out from the furnace will be used as fuel for stoves, Boiler, Ladle, annealing furnace and Sinter plant process. Any excess gas will be let out to atmosphere through flare stack chimney, after burning the gas using flare ignition system.

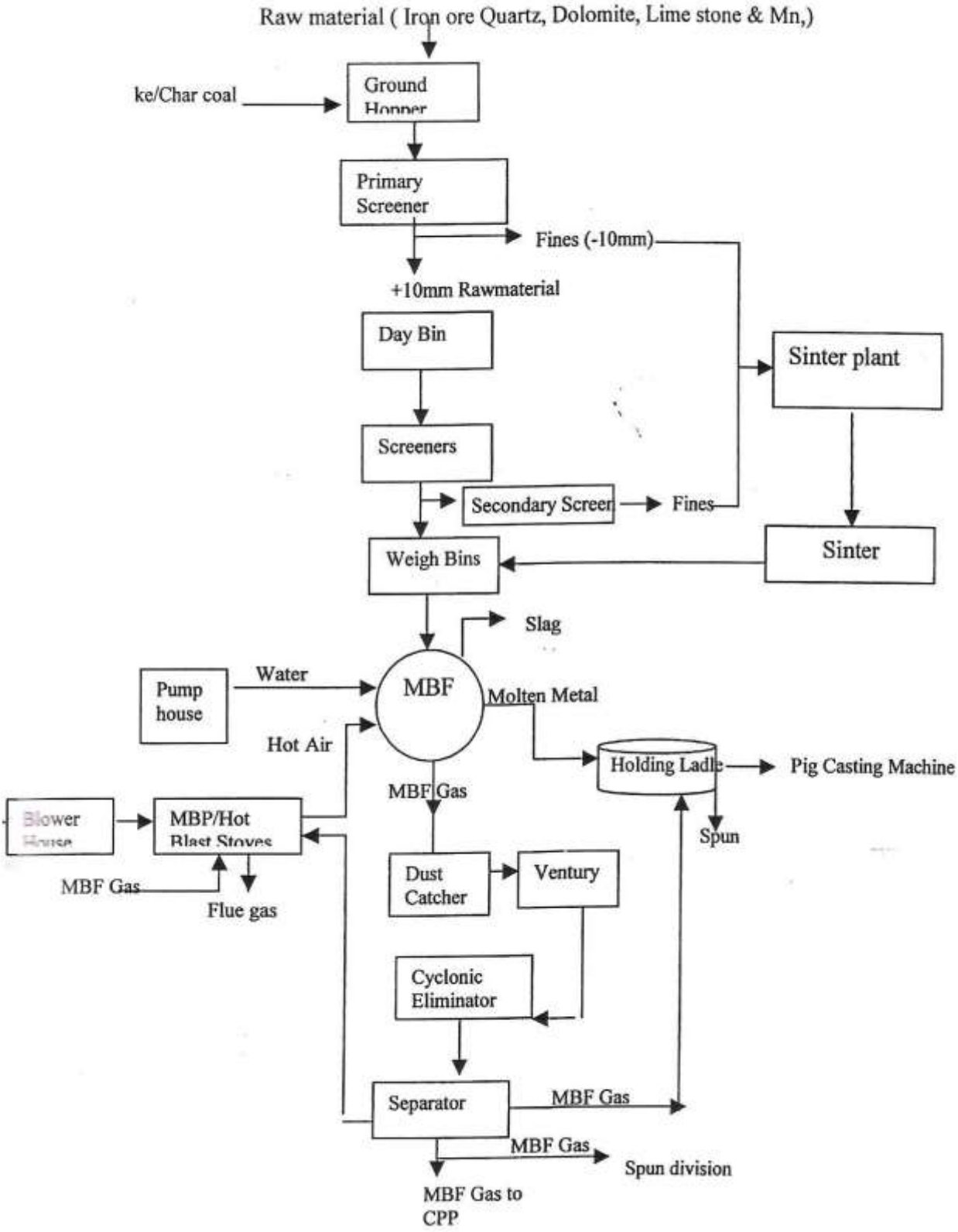
D. FLUE DUST FROM DUST CATCHER

The flue dust generated will be collected at dust catcher. It is periodically loaded to trucks and dumped at designated places from where it is used for making sinter in sintering plant.

E. CAPTIVE POWER PLANT

2 x 7.5 MW TG's will be installed to utilize BF gas generated from the furnace & Coke oven waste heat recovery boilers. This will reduce the power cost and also saves the environment from emission of gas to atmosphere which will act as pollution control equipment also.

Pig Iron Process



3.5.2 Manufacturing Process DI pipes

Liquid metal will be directly received from Blast Furnace (BF).

Ladles will transfer the molten metal from BF to pipe plant by trolley/ trailer and with the help of EOT cranes, poured into Induction Furnace.

The temperature of the liquid metal is raised (superheated) to required level in the Induction Furnaces and composition is further homogenized. Ladles then transfer the metal to a magnesium treatment chamber, where solid lumps of pure magnesium or an alloy of Ferrosilicon Magnesium are added to the liquid metal. The magnesium reacts with the liquid and goes into solution forming what is known as Nodular Iron or Ductile Iron (Ductile Iron, has anticorrosive properties of Cast iron with excellent strength and bending properties of steel. It is thus superior to any other material for producing pipes).

Treated metal after removing small amount of magnesium sulfide slag is poured in the casting machines for formation of pipes using State Of Art “de Lavaud” process. The casting machines house steel moulds, cylindrical in shape and rotate them at required speeds. The high centrifugal force thus generated helps to form the pipes and imparts a soundness not achieved by any other process. The steel moulds are encased in water jackets that keep them cool and assist solidification of liquid metal after casting thus accelerating the production process. The pipes, after solidification, are removed from the moulds in hot condition with the help of automatic tongs/pincers and fed mechanically into the heat treatment furnace.

The heat treatment furnace is long chamber , about 47 meters long by 7 meters wide, through which pipes are rolled from the entry end to the exit at a predetermined speed and at controlled temperature. The flue gases pass through an adequately designed Recuperator, which heats up the inlet air for reducing fuel combustion by facilitate more efficient combustion. Low NOx burners ensure that emissions are under control.

After the pipes cool down, if the customers so desire, they are coated with metallic zinc on outside. The purpose is to give additional protection against corrosion of the pipes in poor soil condition. Two strands of zinc wire of high purity are fed through a small “pistol” under strong electric current. This starts an arc of molten zinc, which is blown at a high velocity on the surface so that extremely expensive zinc does adhere to the pipe. A small amount rebounds from the surface of the pipe and is lost. The coating process takes place in a closed chamber to avoid fugitive emissions of zinc dust. An Induced Draft Fan sucks the waste zinc from coating chamber and passes them through a cyclone and a

battery of bag filters and clean air is let out through the stack. Zinc dust is collected into drums, sealed, and sold for re-melting into metallic zinc of high purity (reprocessing).

The inside of the pipe barrel are cleaned by grindings / scouring and deburring operation is carried out to remove sharp edges. The pipes are then subjected to high-pressure water test to determine soundness of Fittings and leakage. Pipes failing the pressure test are rejected, broken into pieces. Good pipes are weighed, marked and are passed on for lining inside the barrel with Cement-Sand slurry.

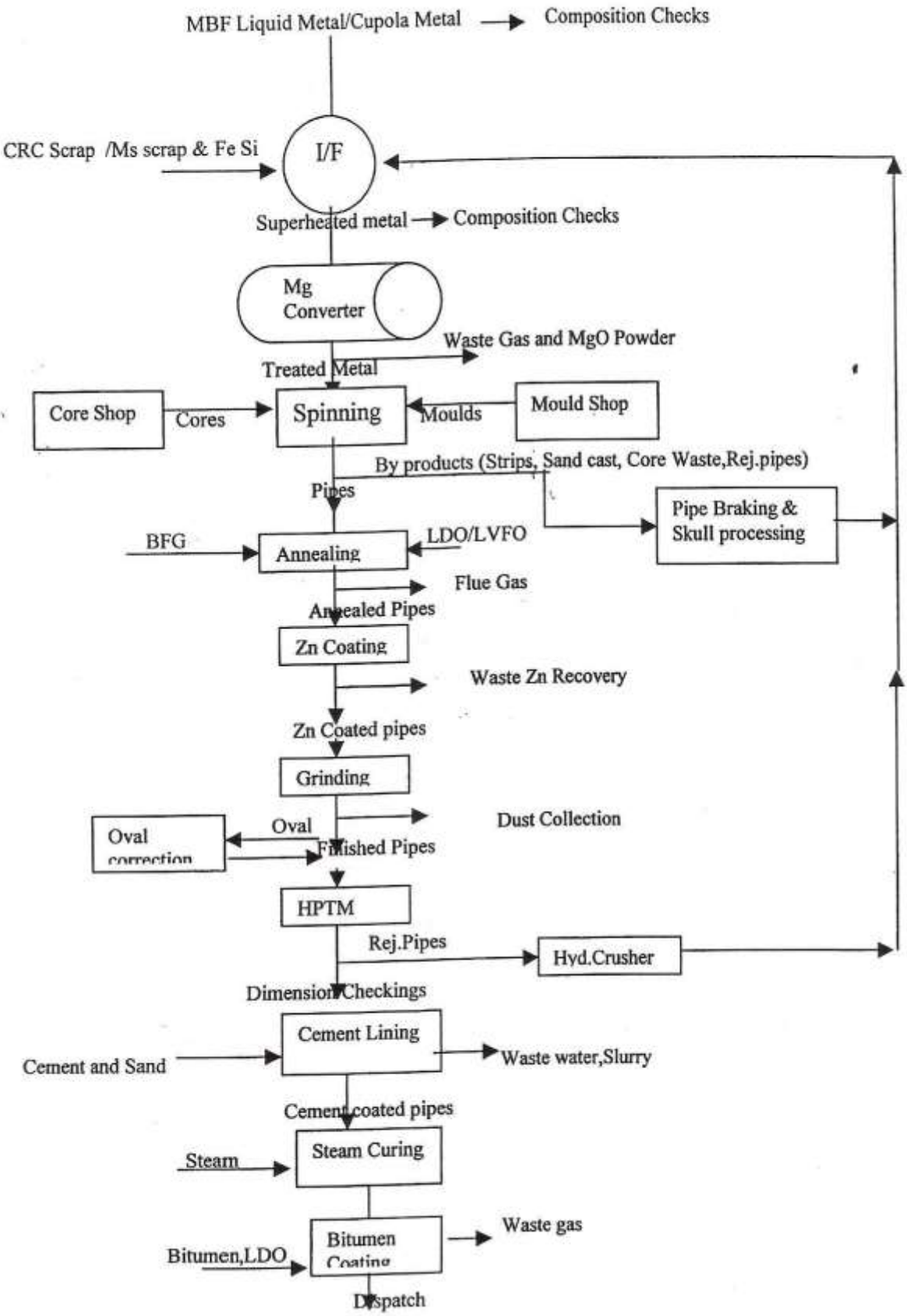
Exact quantities of sand and cement are measured in automatic weighing machines and fed into a high-speed inclined plane mixer. Measured quantity of water is added and slurry is prepared. This slurry is poured into the barrel of the pipes, which rotating station where they are rotated at extremely high speed. The high centrifugal force makes the slurry adhere to the inner wall of the pipes, and excess water is squeezed out. A very smooth lining is thus achieved which will reduce the friction of water, power consumption of pumping station and will help in increasing the longevity of the pipe line. This line also prevents deposition and reduction of the bore over a period of time as experienced with unlined pipes.

The freshly lined pipes are passed through a tunnel where low pressure steam is fed. This accelerates the curing process, and helps in developing the strength of the lining.

The warm pipes from the curing chamber are fed into preheating chamber and bitumen painting, where the inner surface (cement lined) is given a seal coat of the required specification if desired by the customer. The exterior of the pipes is subsequently given a coat of bitumen of the desired thickness. The coated pipes with wet paint are passed through a post heating chamber to facilitate the hardening of the freshly painted pipes and then cooled by a spray of water.

The pipes with the protective coating are either bundled for ease of handling or stacked loose, depending on the size and the final destination are kept ready for dispatch.

DUCTILE IRON PIPES



3.5.3 Manufacturing Process Sinter

The proposed sinter plant complex will consist of one sinter Machine of 65 m^2 grate area along with associated services facilities. The sinter plant is rated for a total production of 8,00,000 MT of BF Sinter at a rated productivity of 1.47 $t/m^2/hr$. The basic design and operating parameters as given in table below

DESIGN AND OPERATING PARAMETERS

S.NO.	ITEM DESCRIPTION	UNIT	VALUE
1	No. of sinter machine x area	No. x m^2	1x 65
2	Productivity (Rated)	$t/m^2/h$	1.47
3	Annual sinter demand	t/y	800000
4	Size of finished sinter	mm	5-50
5	Annual working regime	D/y	350
6	No. of working hours/day	H/d	24
7	Gaseous energy consumption for ignition / ton of BF sinter	kcal/t	45000
8	Coke breeze consumption / ton of BF sinter	Kg/t	71
9	Under-grate suction	mm WC	1200
10	Sinter m/c bed height (including 30-50 mm hearth layer)	mm	400
11	Cooler type/ bed height	mm	Round/Straight line cooler having 1x65m^2 area 700 mm bed height
12	Temperature of cooled sinter	deg.C	Below 100
13	Dust content in exhaust gases at	mg/Nm^3	Below 50

PROCESS DESCRIPTION

STORAGE OF RAW MATERIAL

The raw materials received in the sinter plant are iron ore, fluxes (limestone, dolomite), flue dust, calcined lime, coke fine and BF fine. These are stored in a number of bins in the sinter plant building.

RAW MIX COLLECTION AND CONVEYING

The outlets of the bins for iron ore, spare, flux and coke are equipped with angle stage vibrating cones, which start vibrating if flow of material should be interrupted.

The above-mentioned materials will be discharged from bins in the pre-determined quantities by means of weigh feeder.

The amount of flux, coke, flue dust, BF fines and return fines added will be in proportion of the quantity of sum of iron ore. The material from the return fines is discharged with the aid of weigh feeder.

The outlets of the BF fines and return fines hoppers are equipped with quick acting gate valves, which in the event of an excessive material discharge automatically close the hopper outlets.

The weigh feeder unit will discharge the iron ore, Flue Dust, Coke, BF fines and return fines, in that order, onto the conveyor located directly underneath the feeders.

MIXING AND NODULIZING DRUM

The combined mixing and nodulizing drum permits a retention time of the raw mix up to 5 minutes. In to this drum the required amount of process water will be added by means of spray nozzles in order to adjust the optimum permeability of feed mix. The first third of the inner drum shell is fitted with lifters for ensuring intensive mixing of the various raw mix constituents. The other two thirds of the drum length are equipped with bars to assist the nodulizing the mix.

The sinter plant process starts with the preparation of the raw mix consisting of iron ores, fluxes, in-plant materials, fuel and return fines.

These materials are mixed and granulated in mixing & nodulising unit where in water is added in order to assist the raw mix granulation. The raw mix is further conveyed and fed into the sinter machine.

The top surface of the raw is ignited. Air is sucked through the ignited layer and sintering process proceeds in vertical direction through the material bed on the sinter strand. Subsequently, the sinter is cooled.

The cooled sinter is crushed to a predetermined maximum particle size. Undersize sinter not suitable for the blast furnace is recycled as return fines. A certain quantity usually in the size range of 15-25 mm is screened out recirculated to the sinter machine and serves as hearth layer to protect the grate bars during the sintering process.

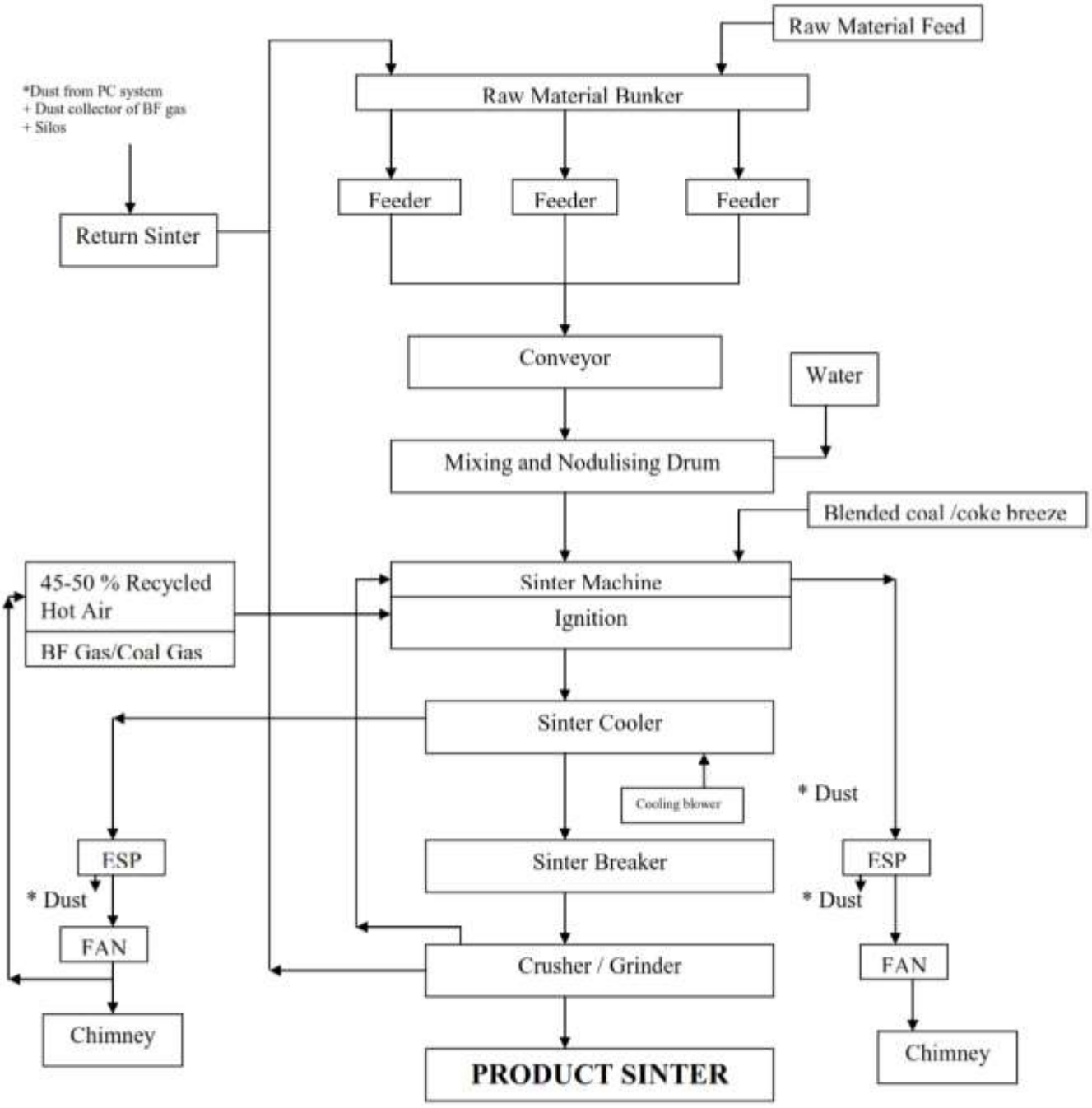
The product obtained from the sintering process is a Blast furnace feed of well-defined quality characteristics ensuring the following parameters

- Chemical analysis
- Grain size distribution
- Reducibility

- Sinter strength

A modern Sinter Plant is designed to fulfill all aspects of environmental protection. Appropriate de-dusting units are provided for cleaning the waste gas, cooling air and the ambient atmosphere of the plant by sucking dust air from the transfer points with in the sinter plant. Further, state of art process control systems is incorporated to ensure the product quality and plant availability.

PROCESS FLOW CHART OF SINTER PLANT



3.5.4 Manufacturing Process of Coke

NON RECOVERY COKE OVEN

The Low ash metallurgical (LAM) Coke making process is basically carbonization of coal to higher temperature around 1200 ^{o}C in an Oxygen deficient atmosphere, which aids concentration of carbon. There are two types of manufacturing process available viz. byproduct (Recovery) and non-recovery types.

Srikalahasthi Pipes Limited has opted for non-recovery type coke making process with stamp charging / Top charging wherein coal is carbonized at 1200 ^{o}C under oxidizing atmosphere with negative pressure inside the ovens. Main advantage for non-recovery type ovens over by product (Recovery) type coke oven as listed below.

a. Less investment cost as no byproduct related equipments and related auxiliaries are required.
b. Low operation and maintenance cost.
c. Low conversion cost (No additional fuel, only waste heat).
d. Any oven in a battery can be isolated and cooled down to repair at any time without affecting the life of the oven.
e. No effluent generation, only emissions of burnt i.e clean flue gas resulting to minimal environmental impact.
f. Oven of non-recovery type is being operated under negative pressure, no fugitive emissions through the doors and hence no pollution problems.
g. Extensive flue path system ensures complete combustion of all hydrocarbons, resulting in clean stack discharges into the atmosphere.

The individual ovens are rectangular cross sections and horizontally positioned. A row of such ovens is called battery.

Srikalahasthi Pipes Limited is having two batteries, battery I & battery II, Each battery consist of 34 ovens and each battery is connected to separate stack or emissions are sent to each boiler of captive power plant. After passing through the boiler, the emissions are discharged into atmosphere through a common stack of both the boilers.

Srikalahasthi Pipes Limited proposes to install 70 nos. Non – Recovery type ovens to produce 1,00,000tons of coke per annum arranged in a single row divided into 2

batteries having 2 x 35 = 70 ovens. Imported coking coal (low ash coal) will be used for making LAM coke.

Imported coal from the port will be brought to SPL either by Truck or Railway wagons and will be tippled in ground receiving hoppers using Truck tippler or Wagon tippler. Coal will be stacked in yards using Pay-loaders / Bull Dozers and tippers.

Coal from the yard will be fed to the ground hoppers for blending with the help of belt weigh feeders fitted below the hoppers and then send to hammer mill by conveyors for fine crushing. From crushers coal will be send to blender by conveyors for mixing and moisture addition. From blender coal will be fed to coal bunker for storage and subsequent use.

Coal will be drawn as per requirement from the coal bunker on a Stamping Trolly and a coal cake will be made by hydraulic stamping on the charging plate. Charging plate with stamped coal coke will be drawn out from the stamping station and will be taken to the oven by the Pusher cum charging car. After charging into the oven, it will left for 70 hrs inside the oven for carbonization. Ready coke mass then will be pushed by the Pusher into the quenching car on the other side. Hot coke will be taken to the quenching car cooling with water and discharged into a hooper. Coke lumps then is cut to size in coke cutter and screened. 20 – 70 mm coke is send to MBF and < 20 mm coke is used for sinter making.

Combustion and temperature can be controlled to achieve required coke quality for the steel industry while assuring clean exhaust gas.

The primary air for combustion is introduced into the chamber through several ports located above the charge level in both the side doors. Partially combusted gas exits at the top chamber through down corner passages in the oven wall and enters the sole flue path thereby heating sole of the oven.

Since the air is drawn into the oven at upper end and off gases is combusted within the oven chamber itself, the oven has been provided with long flue path thus burning of all the exhaust gases from oven which contain various volatile organics etc. The fully combusted waste flue gases go through the chimney.

As the exhaust gases from oven battery are collected into common tunnel and exit through 2 nos. of chimneys 38 m height creates natural draft inside the oven and there will be no fugitive emissions/leaks through doors etc. of ovens.

For power generation, the hot exhaust gas is diverted into waste heat recovery boilers without letting into atmosphere through battery chimneys. The hot gas heats up the water and convert into steam where it generates 15 MW power, then cooled gas is discharged into atmosphere through chimney.

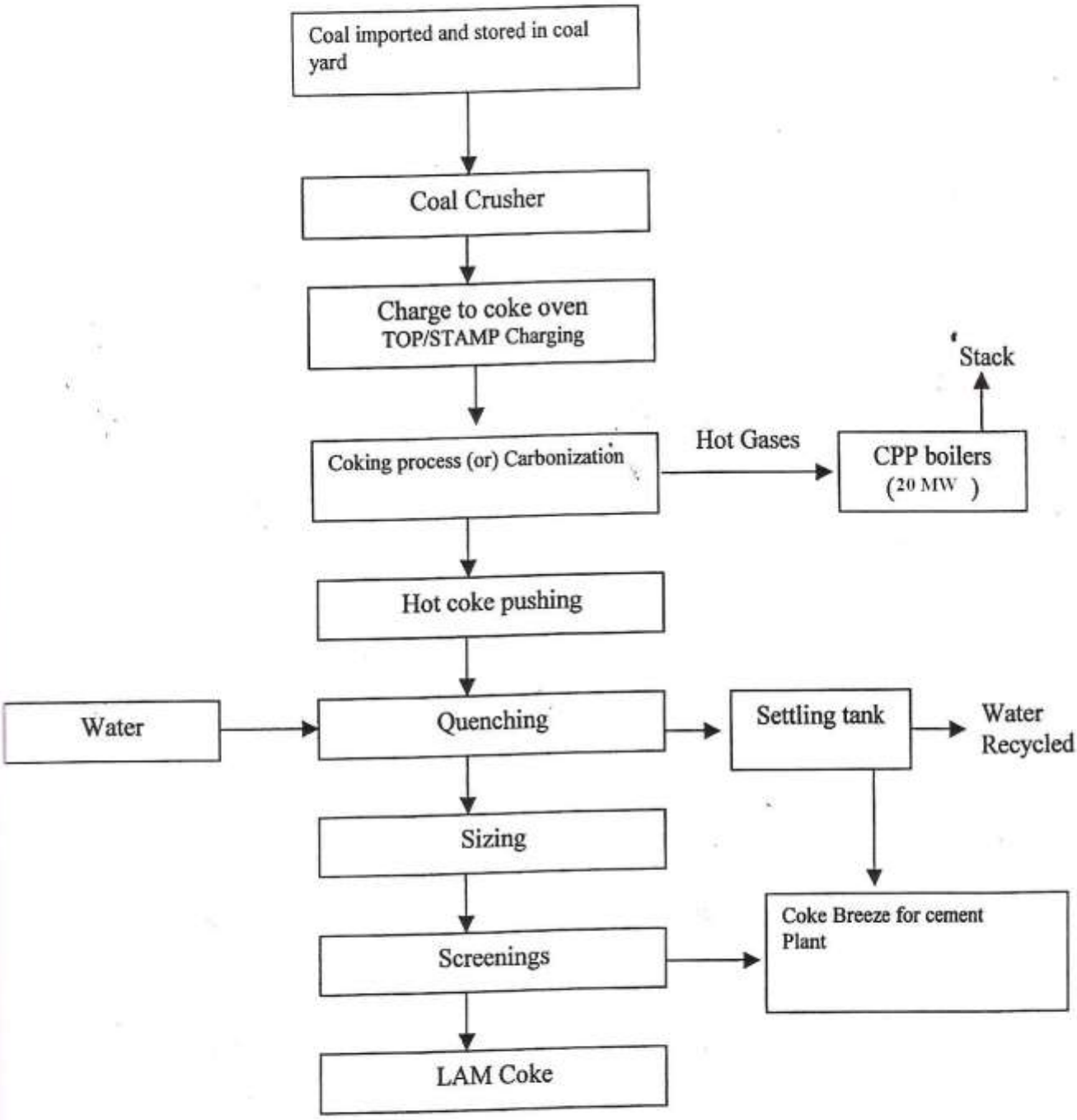
The new oven design ensures excellent thermal efficiency. Any one oven can be shut down for any fault without affecting the production. The emission of smoke from the chimney is without any harmful gas. The harmful gases that are generated in the process are reused as combustible material and the gasses are totally burnt within the oven battery itself. Hence gases free from pollution and discharged into atmosphere through stack. Process flow for coking coal to LAM coke manufacturing and power generation process is enclosed.

POWER GENERATION (Waste heat recovery boilers)

Waste Heat Recovery Boilers will be installed behind the batteries. Hot gases will be sucked to the waste heat boilers via a duct connecting the battery tunnel to the boiler inlet installed before the coke oven chimney by a I.D fan. Sensible heat of the waste gas will be recouped to generate steam. Super heated steam at 485 ^{o}C and 65 kg pressure will be fed to the turbine to produce power. Low pressure steam from the turbine will be passed through a condenser and the condensate will be pumped to the deaerator. Make up DM water for the boiler will be added to the deaerator. From deaerator, make up water for the boilers will be pumped by boiler feed pumps.

Process flow diagram of Coke & CPP

process flow chart for coal to coke



3.5.5 Manufacturing Process of DI fittings

- **Melting:** - Pig Iron, Own returns, pipe returns, clean steel scraps will be melted in Induction furnace to generate the liquid metal and it is further treated with magnesium in magnesium treatment chamber to produce the Ductile Iron liquid metal. The Induction Furnace and the magnesium treatment chamber are attached with dedusting system. The furnace coil is cooled with water and it will be re-circulated and evaporation losses are taken care of by makeup water.
- **Pattern making**: Formers of some DI Fittings will be made from lost foam process. These formers will be made by polystyrene bead bought from market. These beads will be pre expanded with the help of steam. Shape of pattern/formers will be given as per the shape of metal die. Steam will be generated in IBR boiler. The formers will be cooled with water and the water will be re circulated. These formers will be glued together to form the shape of DI Casting.
- **Refractory Coating**: Formers are assembled to produce pattern DI Fittings. These pattern Fittings are coated in water based refractory coating by manual dipping. Coated patterns are dried in oven. Dried coated pattern are attached with gating system and made ready for moulding.
- **Moulding:-** The proposal is to produce the sand mould of different size and shape of DI casting in different line as
  a. Vacuum Lost Foam Process: - Coated formers will be put in the box for casting and shall be filled by dry sand for application of vacuum.
  b. Green sand Line: The additive mixed sand will be used to make a cavity from Aluminium pattern and produce a box for casting.
  c. Nitrogen free furfural alcohol based sand: The sand will be used to make a cavity from Aluminium pattern and produce a box for casting.
- **Fittings:** The treated liquid metal will be poured in the moulding boxes. After being cooled, these will be knocked out; the Fittings will be separated from gating system. The cut gating system (re-melt) will be used for melting and sand will be recycled.
- **Heat treatment oven:** Some DI Fittings will be subjected to heat treatment in electrically operated furnace for better refinement of metal structure.

- **Surface cleaning and fettling** : -Products will be cleaned in a shot-blasting chamber fitted with dedusting system. Fettling of DI casting will be done by hand grinders and table grinders. This will also have suitable dedusting system.
- **Hydro Testing**: -Some DI Fittings will be hydro tested under pressure where water will be recycled. Water to be used is of good quality and can be discharged into the drain subsequently collected for gardening purposes.
- **Cement Mortar Lining:** - Some Products will have inside lined with cement mortar. Inside cement mortar lining will be done with cement sand mortar applied manually with the help of spray gun and trowel. There will be no wastage of cement mortar.
- **Lining Curing:** - Steam will be used for an accurate curing of cement lining providing for providing high strength cement lined Fittings.
- **Coating**:- Coating will be either manual or by airless spraying. Coating can be Bitumen ,zinc rich, liquid epoxy, Polyurethane, Ceramic etc.
- **Fusion Bonded Epoxy:** - Some items will be coated with fusion bonded epoxy both internally and externally. These fittings will be shot blasted once again to get the required surface finish and preheated in oven and powder will be sprayed on the body in closed chamber connected with suitable dedusting unit. The coated fittings are again post heated to have better curing in another oven.
- **Stencilling and Marking & Inspection**: - Finished DI casting will be checked for markings of Nominal Diameter, DI, manufacturer name, nominal pressure rating, year of manufacture & size. In case of any abnormalities, stencilling is done. The Third party inspection will be done in case of customer requirement before packaging and dispatch.

3.6 Raw material requirement, Transport etc.:

3.6.1 Raw Material Requirement and its sources

S.No	Raw Material	Existing	Expansion	Source	Method of transportation
	Pig Iron				
1.	Sinter	411250	176250	In plant generation	Conveyor
2.	Iron Ore lumps	238000	102000	Hospet / Bellary, Karnataka	Railway rakes & Covered trucks
3.	Coke	238000	102000	In plant generation	Covered trucks
4.	Flux (Dolomite / lime stone / Mn ore lumps)	29750	12750	Open market	Covered trucks
5.	Coal fines	45500	19500	Imported/Indigenous	Railway rakes & Covered trucks
	Sinter Plant				
6.	Iron Ore Fines	458250	321750	Hospet / Bellary, Karnataka	Railway rakes & Covered trucks
7.	Lime Stone fines	70500	49500	In plant generation/Open market	Covered trucks
8.	Dolomite fines	61100	42900	In plant generation/Open market	Covered trucks
9.	Coke Fines	47000	33000	In plant generation	Covered trucks
10.	Coal fines	39950	28050	Australia	Railway rakes & Covered trucks
11.	Quick lime	18800	13200	Open market	Covered trucks with packing
	DIP				
12.	Molten Metal	420000	180000	In plant generation	EOT Crane / Trolly
13.	Steel scrap	40278	17262	Open market	Covered trucks
14.	Ferro Silicon	4375	1875	Open market	Covered trucks

S.No	Raw Material	Existing	Expansion	Source	Method of transportation
15.	Cement	36750	15750	In plant generation	Cement transfer poucher
16.	Sand-CML	43750	18750	Open market	Covered trucks
17.	Bitumen	1785	765	Open market	Covered trucks
18.	Magnesium	472.5	202.5	Open market	Covered trucks
19.	Silica Sand	8750	3750	Open market	Covered trucks
20.	Zinc	1487.5	637.5	Open market	Covered trucks
21.	Inopipe	1662.5	712.5	Open market	Covered trucks
	DI Fittings				
22.	Iron scrap (Pig iron, Steel scrap, Pipe scrap, re-melt etc)	--	25915.5	In plant generation	Covered trucks
23.	Expanded polystyrene	--	60.45	Open market	Covered trucks
24.	Refractory coating (Alumina + Silica etc)	--	239.85	Open market	Covered trucks
25.	Paint (Bitumen, zinc rich, liquid epoxy, polyurethane, ceramic etc)	--	122401.5	Open market	Covered trucks
26.	Ferro Alloys (Fe Si Mg, Pure Mg, Fe Si etc)	--	719.55	Open market	Covered trucks
27.	Foundry additives (clay, coal dust, bentonite etc)	--	3237	Open market	Covered trucks
28.	Resin Binder	--	959.4	Open market	Covered trucks
29.	Fusion bonded Epoxy power	--	239.85	Open market	Covered trucks
30.	Silica Sand	--	10198.5	Open market	Covered trucks
31.	Cement	--	251.94	In plant generation	Cement transfer poucher
	COP				
32.	Coking coal	436800	156000	Australia/ Indigenous	Railway rakes & Covered

S.No	Raw Material	Existing	Expansion	Source	Method of transportation
					trucks
	SPONGE IRON				
33.	Iron Ore	208000	--	Hospet / Bellary	Rail / Road
34.	Coal (DRI)	169000	--	Imported / Domestic	Rail / Road
35.	Dolomite	6500	--	A.P/Karnataka	Rail / Road
	SMS SHOP				
36.	DRI	1,15,000	--	In plant generation	Inter carting
37.	Hot metal	1,12,000	--	In plant generation	Inter carting
38.	Ferro Alloys	2500	--	In plant generation	Inter carting
39.	Calcined lime	12,000	--	Local market	Road
	FERRO ALLOYS PLANT				
40.	Manganese Ore	172500	--	Karnataka, Orissa, Madhya Pradesh, Andhra Pradesh	Rail / Road
41.	Coke	56250	--	In plant generation	Inter carting
42.	Quartz	50000	--	Andhra Pradesh	Rail / Road
	POWER PLANT (FBC)				
43.	Coal (100%)	20800	--	Hospet / Bellary	Rail / Road
44.	Dolochar	39000	--	In plant generation	Inter carting

3.6.2 Mode of Transport for Raw materials and finished products:

The aforesaid raw materials are transported through rail / road depending on the availability and quantity. Major raw materials will be transported by rail upto the site.

3.6.3 Market of Final Products:

As the DI pipe sector had huge demand and supply gap. Hence marketing of the product has no problem.

3.7 Availability of water its source, Energy / power requirement and source:

3.7.1 Water Requirement and its sources:

- Water required for the existing project is 5133 KLD and same is being sourced through Tirupathi Municipal Treated sewage water.
- Water required for the expansion project will be 2943 KLD and same will be sourced through Tirupathi Municipal Treated sewage water

Following is the breakup of water requirement:

S.No.	Unit	Quantity in KLD		
		Existing Plant	Proposed Expansion	Total after Expansion
1.	Make up water DI pipe division	1000	429	1429
2.	Make up water Blast furnace & Sinter	1625	696	2321
3.	Make up water for Coke oven plant	300	107	407
4.	Make up water Cement plant	60	--	60
5.	Captive Power plant	2148	1611	3759
6.	Make up water DRI, SMS, Rolling mill & Ferro alloy & Captive Power Plant	1910	--	1910
7.	DI Fittings	--	100	100
	Process Total	**5,133**	**2,943**	**9,986**

S. NO	SOURCE(Bore Well Water)	QUANTITY (KLD)		
		EXISTING	EXPANSION	AFTER EXPANSION
1	Domestic (Plant & Colony)	160	80	240
2	Gardening	55	--	55
	Total	**215**	**80**	**295**

3.7.2 Sources of Energy/ Power and its sources:

Power required for the existing plant is being met from partly from captive power plant and partly from APSPDCL. Power required for the proposed expansion project will be met partly from proposed captive power plant and remaining from APSPDCL.

The following will be the power consumption break-up for each unit

S.No.	Plant	Power Requirement		
		Existing	Expansion	After Expansion
1.	D.I Pipe division	16	8	24
2.	Blast furnace & Sinter	9	8	17
3.	Coke oven	0.5	0.5	1
4.	Cement plant	1.5	0	1.5
5.	Captive Power plant	1	1	2
6.	DI Fittings	0	1	1
7.	DRI	7		7
8.	SMS & Rolling mill	10		10
9.	Ferro alloy	8		8
10.	FBC Power plant	3		3
Total		**56**	**18.5**	**74.5**

Total Captive Power Generation : 43 MW

Total Power Consumption : 74.5 MW

Remaining power i.e. 31.5 MW will be sourced from APSPDCL.

3.8 Generation and disposal of Wastes [Waste Water and Solid Wastes]:

3.8.1 Waste Water Generation:

The total effluent quantity expected from the proposed expansion will be 790 KLD. Effluent generated from whole complex(including expansion) is 2,457 KLD.

The waste water generated from Blast furnace (Cooling tower blow down,DM Plant/Softner regeneration & RO rejects) will be sent to ETP. After treatment, It will be reused for Slag granulation process, Raw material yard sprinkling and Road sprinkling. DIP (Cooling tower blow down, DM Plant/Softener regeneration & RO rejects) effluent will be sent to ETP/BF Slag granulation for reuse. Captive Power Plant effluent (Cooling

tower blow down,DM Plant regeneration & RO rejects) will be neutralized in Neutralization pit, reused for Coke quenching and Raw material yard sprinkling and Road sprinkling. During slag granulation & coke quenching operation, the entire water gets evaporated.

The sanitary waste water will be treated in Sewage treatment plant.

S. NO	SOURCE	QUANTITY (KLD)		
		EXISTING	EXPANSION	AFTER EXPANSION
1.	DI pipe division	500	214	714
2.	Pig iron	375	161	536
3.	Captive Power Plant	554	415	969
4.	Power plant (DRI & FBC boiler)	238	--	238
	Total Generation	**1667**	**790**	**2457**
1	Sanitary waste water (Plant & Colony)	136	64	200
Total		**136**	**64**	**200**

3.8.2 Solid Waste Generation and its disposal

The following will be the solid waste generation and disposal from the existing and proposed expansion project

S.No	Waste	Quantity (TPA)			Method of disposal
		Existing	Proposed	Total	
DI pipe unit					
1.	Furnace waste (CI / DI scrap)	49000	21000	70000	Sold to the dealers/In house Re-Melt
2.	Burnt core sand	8400	3500	11900	Used for Cement bricks making /Reclaiming low lying areas in industry premises/Sold to outside
3.	Waste sand cement slurry	12250	5250	17500	Used for Cement Brick making/Used for civil construction/Sold to outside/Reclaiming low lying areas in industry premises
4.	Slag	2,450	1050	3500	Used for road laying/Sold to outside
5.	Zinc residue	1050	450	1500	Sold to the authorized dealers

6.	Mg converter waste	35	14	49	Used in Sinter plant
Sinter plant					
7.	Sinter return	151800	106590	258390	Used in Sinter plant
Pig iron unit					
8.	By product (Slag)	157500	67550	225050	Used to produce slag cement in house /Sold to outside
9.	Sludge	7350	3150	10500	Used for Cement brick making/ used in Sinter plant/Reclaiming low lying areas in industry premises
10.	Dust from settling chamber	12950	5600	18550	Used in sinter plant to produce sinter/Used in Cement plant /Sold to outside
Coke oven unit					
11.	Coke fines	20300	7350	27650	Used in sinter and cement plant
DI fittings unit					
12.	Rejected Product + Runner		6600	6600	In house Re- Melt
13.	Slag		330	330	Sold to Outside
14.	Rejected Formers		4950	4950	Sold to Outside
15.	Used Sand		8250	8250	Sold to Outside
16.	Mg Oxide		247	247	Reused in Sinter plant
DRI unit					
17.	Dolo Char	39000	---	39000	Completely utilized in FBC Boiler as fuel
18.	Accretion slag	1170	---	1170	Used in Road construction
19.	Wet scraper sludge	5980	---	5980	Given to brick manufacturers
20.	Ash(DRI)	39000	---	39000	Will be given to Cement plants /brick manufacturers.
21.	Ash(Power plant)	30713	---	30713	Will be given to Cement plants /brick manufacturers.
SMS unit					
22.	Slag from SMS	13160	---	13160	Used in Road construction
Rolling mill unit					

23.	Mill scales	6250	---	6250	Reused in SMS
Ferro alloy unit					
24.	Ferro silicon slag	750	---	750	Will be used existing Induction furnace units
25.	Silico manganese slag	45000	---	45000	Will be utilized in road construction
26.	Ferro manganese slag	60000		60000	Will be used in manufacture of Silico manganese as it contains high MnO_2.

Chapter – 4
SITE ANALYSIS

4.1 Connectivity

The Plant site is located at Rachagunneri Village, Sri Kalahasthi Mandal, Chittoor District, Andhra Pradesh. Proposed expansion will be taken up in the existing Plant premises only. The Plant site is accessible through State Highway which is at a distance of 1.0 km followed by pucca road up to the site.

4.2 Land Form, Land use and Land ownership

4.2.1 Land Form:

Present land is industrial land.

4.2.2 Land Use of the Project Site

Present land use is industrial land as existing plant is already under operation.

4.3 Topography

Topography of land is more or less flat terrain without much undulation.

4.4 Existing land use pattern:

4.4.1 Land use pattern of the Project site

Total project area is 242.17 acres (existing – 230.85 acres & additional – 11.32 acres).

4.4.2 Environmental Setting of the Project Site:

Below mentioned table gives brief regarding environmental setting of the project site:

S.No	Particulars		Distance from the site
1.	National Park	=	Nil
2.	Wild life sanctuaries	=	Nil
3.	Reserve Forest	=	Pallam RF, Ramapuram RF, Yerpedu PF within 10 Km radius
4.	Eco Sensitive Areas	=	Nil
5.	Water bodies	=	Swarnamukhi river (4.5 Kms.)
6.	Costal Regulation Zone [CRZ]	=	Nil
7.	Nearest Village	=	Rachagunneri (1.0 Km.)
8.	Industrial Area	=	Nil

4.5 Existing Infrastructure

All required infrastructure is prevailing in the site.

4.6 Soil classification

According to the assessment made on the basis of village records, 57% of the district area is covered by Red loamy soils, 34% by red sandy soils. The remaining 9% is covered by black clay (3%), black loamy (2%), black sandy (1%) and red clayey (3%).

4.7 Climatic data from secondary sources

The climate of the district is dry and healthy. The upland mandals consist of 31 mandals in Madanapalle division and these are comparatively cooler than the eastern mandals except Chittoor where the climate is moderate. The district annual normal Rainfall is 934mms. The district has the benefit of receiving rainfall during both the south-west and north-east monsoon periods and the normal rainfall received during these periods is 438.0 MMs. and 396.0 MMs. respectively. The rainfall received from the south-west monsoons is more copious compared to north-east monsoons in the western mandals and in the central part of the district, whereas the rainfall received from north-east monsoons is comparatively copious in the eastern mandals of the district.

Chapter – 5

PLANNING BRIEF

5.1 Planning Concept:

The proposed project involves manufacturing

Unit	:	Description
Ductile Iron Pipes	:	Using Blast Furnace Molten Metal along with scrap, Ferro silicon, cement, Sand, Silica sand, Bitumen paint, Zinc, Magnesium as raw materials for Ductile iron pipes manufacturing.
Pig Iron	:	Using Iron Ore, Sinter , Metallurgical coke, Lime stone, Dolomite, Quartzite & Manganese ore as raw materials in Blast Furnace
Low ash metallurgical coke	:	Using imported coking coal, semi-soft & Prime hard coal as a raw material in Coke oven Plant
Power	:	Utilizing clean Blast Furnace gas & hot waste gas (heat recovery) from Coke oven batteries, power will be generated.
DI Fittings (Fittings, valves, Accessories, Manholes etc)	:	Using Iron scrap(Pig Iron, steel scrap, pipe scrap ,re-melt),Ferro alloys, Expanded polystyrene, paint(bitumen, Zinc rich, liquid epoxy, polyurethane, ceramic) Foundry additives, Resin binder, silica sand and cement as Raw material.

5.2 Population Projection:

There are no major human settlements in the vicinity of the project site. The manpower requirement will be sourced from the local areas to the extent possible; hence not much of settlement of outside people in the area. However population concentration may increase around the project site due to increase in ancillary activities.

5.3 Land use planning:

- Plant is located at Rachagunneri village, Sri Kalahasti Mandal, Chitoor District, Andhra Pradesh. (Earlier EC has been accorded for 230.85 acres of land in Rachagunneri & Merlapaka villages).
- Total land in possession of management is 242.17 acres (existing 230.85 acres & additional 11.32 acres)

- The above proposed expansion will be taken up in partly additional land of 11.32 acres and in existing plant premises falling under Rachagunneri village only.

  The following is the land use statement

S.No.	Item	Area in acres
1.	Built up area (existing)	45
2.	Built up area (expansion)	5
3.	Greenbelt	85
4.	Storage area	10
5.	Open area	97.17
	TOTAL LAND	**242.17**

5.4 Amenities/Facilities.

Facilities like canteen, rest room and indoor games facilities are already provided in the existing plant as basic facilities to workers. No other additional facilities are proposed.

Chapter – 6

PROPOSED INFRASTRUCTURE

6.0 Proposed Infrastructure

Total 242.17 acres of land is in possession of management (existing – 230.85 acres, additional – 11.32 acres). Present use of land is Industrial land. The proposed expansion will be carried out partly additional land of 11.32 acres and in existing plant premises falling under Rachagunneri village only

6.1 Industrial Area (Processing Area)

The following Plant and machinery will be installed in the Industrial processing area

List of Plant and Machinery (PROPOSED EXPANSION)

SNo	Description	Expansion
1	Blast Furnance	1x450m3
2	Blast Furnace Stove	1 Nos
3	Rotary sinter plant (Modifications from 33m2 to 65m2)	1x65m2
5	Oxygen Plant	1no.
6	DIP-Induction furnaces	5x15MT
7	DIP-Annealing furnaces	2no's.
8	DIP-Converters	3no's.
9	DIP-Finishing lines	4 no's.
10	Coke Ovens	70 no's(2 Batteries)
11	Coke Oven WHR Boilers	3X25 TPH
12	Steam Turbine	2x7.5 MW
13	DI Fittings-Plant & Machinery including Ind.F/C,Converter,Shot blasting etc.	2x6MT & 1x8 MT

6.2 Residential Area (Non Processing Area)

Facilities like canteen, rest room and indoor games facilities has already been provided in the Plant. No other additional facilities are proposed.

6.3 Green Belt.

About 1/3rd of total land availability will be developed with greenbelt i.e 85 acres of land will be allocated (including expansion).

Greenbelt development plan

- Local DFO will be consulted in developing the green belt.
- Greenbelt of 33% of the area will be developed in the plant premises as per CPCB guidelines.
- 10 m wide greenbelt is being maintained all around the plant.
- The tree species to be selected for the plantation are pollutant tolerant, fast growing, wind firm, deep rooted. A three tier plantation is proposed comprising of an outer most belt of taller trees which will act as barrier, middle core acting as air cleaner and the innermost core which may be termed as absorptive layer consisting of trees which are known to be particularly tolerant to pollutants.

6.4 Social Infrastructure.

Social infrastructure will be developed as per need based in the Villages of the vicinity of the project.

6.5 Connectivity:

The Plant site is accessible through State Highway road which is at a distance of 1.0 km followed by pucca road up to the site.

6.6 Drinking Water Management:

Drinking water supply will be maintained at the proposed project site.

6.7 Sewerage System.

Domestic effluent collected through toilet blocks will be collected through well designed sewer network and send to STP for treatment.

6.8 Industrial Waste Management.

The details of the waste water management are furnished in the section 3.8.1

6.9 Solid Waste Management

The details of the solid water management are furnished in the section 3.8.2

6.10 Power requirement & its source

Power required for proposed expansion project will be sourced from proposed Captive Power plant and APSPDCL.

Chapter – 7

Rehabilitation and Resettlement Scheme

No rehabilitation and resettlement is required as there are no habitations in the in the Plant site.

Chapter – 8

Project Schedule & Cost Estimates

8.1 Likely date of start of construction:

Construction activity pertaining to unimplemented units will be started within 12 months from the date of Environment Clearance.

8.2 Estimated project cost:

The estimated project cost for the proposed expansion is about Rs. 1250 crores. The following is the break-up

S.No.	Unit / Details	Estimated Cost (Rs. In Crores)
1.	Pig Iron(Including PCI & O_2 plant)	480
2.	Ductile Iron Spun Pipes	300
3.	Coke Oven plant	150
4.	Captive power plant	60
5.	DI Fittings	200
6.	Other Infrastructure(power/water etc)	60
	Total	**1,250**

Chapter – 9
Analysis of proposal

9.1 Financial and social benefits:

With the implementation of the proposed expansion project, the socio-economic status of the local people will improve substantially. The land rates in the area will improve in the nearby areas due to the proposed activity. This will help in upliftment of the social status of the people in the area. Educational institutions will also come-up and will lead to improvement of educational status of the people in the area. Primary health centre will also be developed by us and the medical facilities will certainly improve due to the proposed project.

9.2 Socio-Economic Developmental Activities

The management is committed to uplift the standards of living of the villagers by undertaking following activities / responsibilities as the part of Corporate Social Responsibility.

- Health & hygiene
- Drinking water
- Education for poor
- Village roads
- Lighting

HEALTH & HYGINE

- Personal and domestic hygiene,
- Maintaining clean neighborhood,
- health camps offering free-check up & medicines
- Ambulance services
- Education & drug de-addiction, aids.

DRINKING WATER

- Making drinking water available at centralized locations in the village,

SUPPORTING EDUCATION

- Providing books to all poor children,

Baseline Data Collection (March 2018 to May 2018)

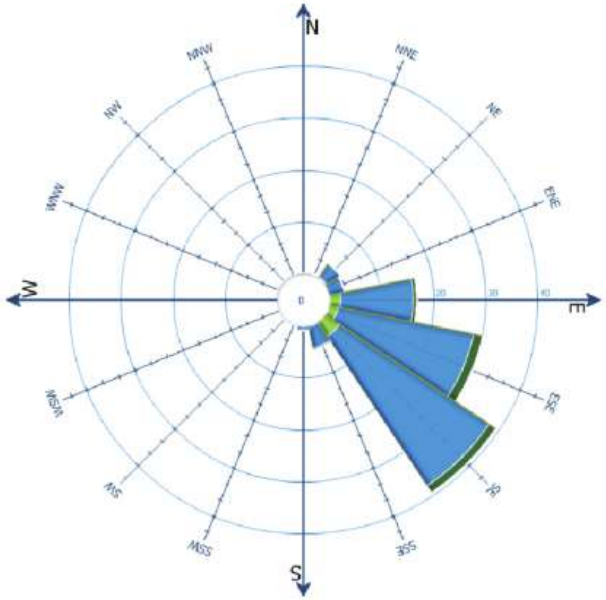
We have commenced Baseline Data Collection from 1st March 2018.

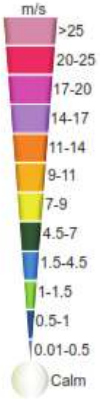
Wind data as per nearest IMD data (Nellore region) for the period (1971 – 2000) for March, April & May months is furnished below.

As per the IMD data the downwind direction is NW and upwind direction SE. Accordingly 8 monitoring stations have been chosen for monitoring of Ambient air quality data.

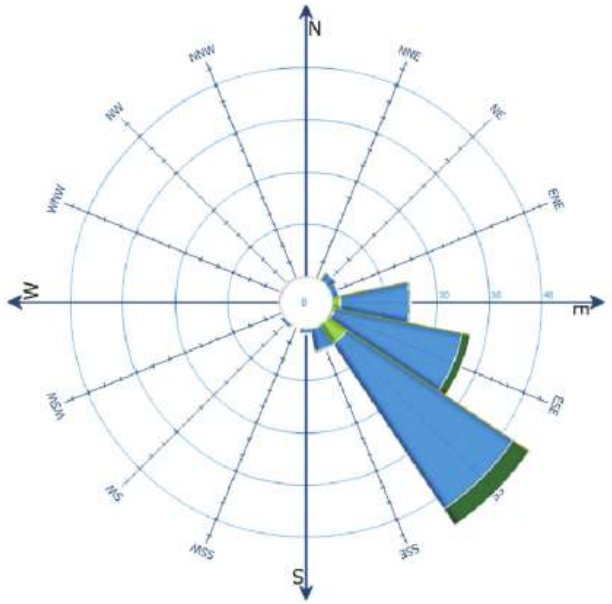
HOUR : 1200 UTC **NELLORE** **PERIOD :1971- 2000**

MARCH





APRIL



DIR. (Degrees)	SPEED OF 10-MN MEAN WIND meters per second												
	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 4.5	4.5 - 7.0	7.0 - 9.0	9.0 - 11.0	11.0 - 14.0	14.0 - 17.0	17.0 - 20.0	20.0 - 25.0	>=25.0	total
348-11				0.1									0.1
11-33			0.1	0.2									0.3
33-56		0.1	0.2	3.1									3.4
56-78				3.0									3.0
78-101		0.1	2.0	13.9	0.8								16.8
101-123		0.1	1.7	26.5	1.8								30.1
123-146			3.3	34.6	1.5	0.2							39.6
146-168			0.2	4.2	0.3								4.7
168-191			0.1	0.8									0.9
191-213				0.1									0.1
213-236				0.2									0.2
236-258													0.0
258-281													0.0
281-303				0.1									0.1
303-326													0.0
326-348													0.0
Total	0.0	0.3	7.6	86.8	4.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	99.5
Calm:	0.5	Total data used:930 Total missing data: 2											

DIR. (Degrees)	SPEED OF 10-MN MEAN WIND meters per second												
	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 4.5	4.5 - 7.0	7.0 - 9.0	9.0 - 11.0	11.0 - 14.0	14.0 - 17.0	17.0 - 20.0	20.0 - 25.0	>=25.0	total
348-11													0.0
11-33													0.0
33-56			0.1	1.8	0.1								2.0
56-78			0.1	1.3									1.4
78-101			1.6	13.1	0.4								15.1
101-123			0.6	24.9	1.7								27.2
123-146		0.1	4.3	38.2	3.8	0.2							46.6
146-168			0.2	4.3	0.3								4.8
168-191			0.1	0.9									1.0
191-213			0.1										0.1
213-236				0.9									0.9
236-258													0.0
258-281				0.1									0.1
281-303				0.2	0.1								0.3
303-326				0.1									0.1
326-348													0.0
Total	0.0	0.1	7.1	85.8	6.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	99.6
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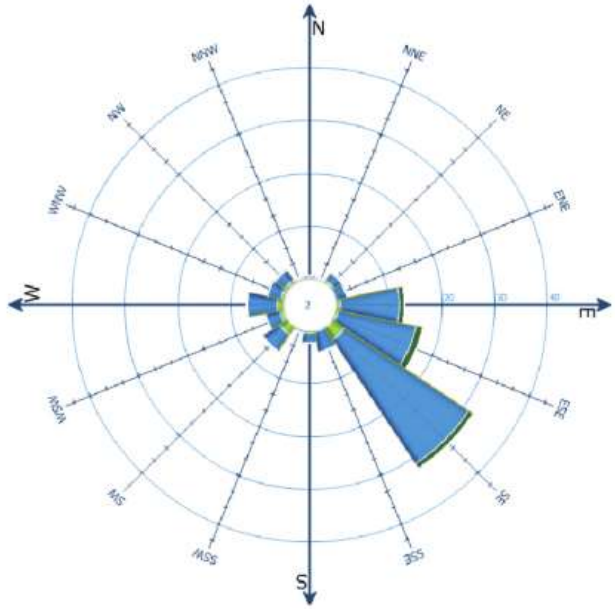
HOUR : 1200 UTC NEL

MAY



DIR. (Degrees)	SPEED OF 10-MN MEAN WIND meters per second												
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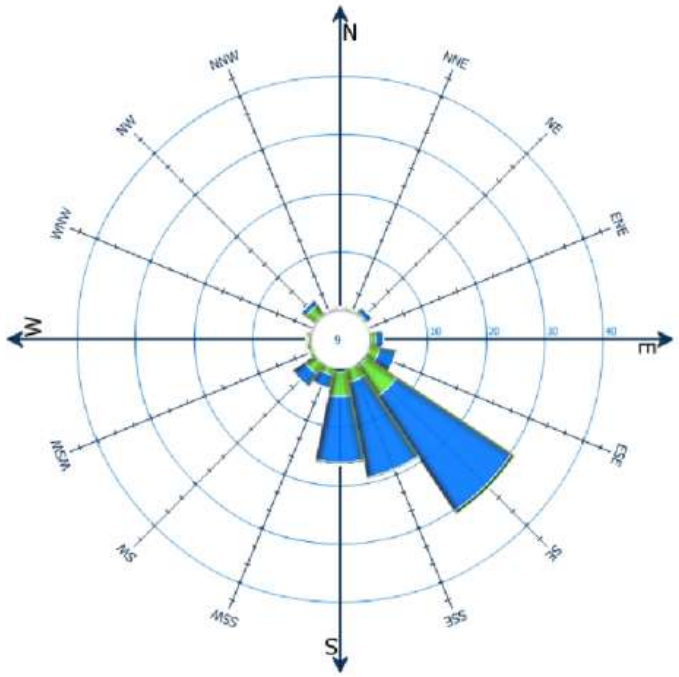
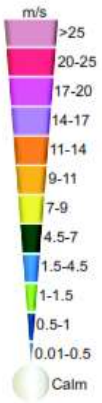
348-11	0.1			0.4									0.5
11-33				0.2	0.1								0.3
33-56		0.1	0.4	1.7									2.2
56-78			0.1	2.1	0.1								2.3
78-101			0.9	11.1	1.0								13.0
101-123			0.5	15.0	1.3						0.1		16.9
123-146		0.2	2.7	28.3	1.1								32.3
146-168			0.2	3.9									4.1
168-191			0.4	1.8									2.2
191-213				0.4									0.4
213-236			1.8	3.8									5.6
236-258		0.1	0.6	2.8									3.5
258-281			1.2	5.6	0.1								6.9
281-303			0.5	2.6								0.1	3.2
303-326			0.6	2.2	0.1	0.1		0.1					3.1
326-348			0.1	0.2		0.1							0.4
Total	0.1	0.4	10.0	82.1	3.8	0.2	0.0	0.1	0.0	0.0	0.1	0.1	97.3
Calm:	2.7	Total data used:930 Total missing data: 4											

HOUR : 0300 UTC **NELLORE** **PERIOD :1971- 2000**

MARCH





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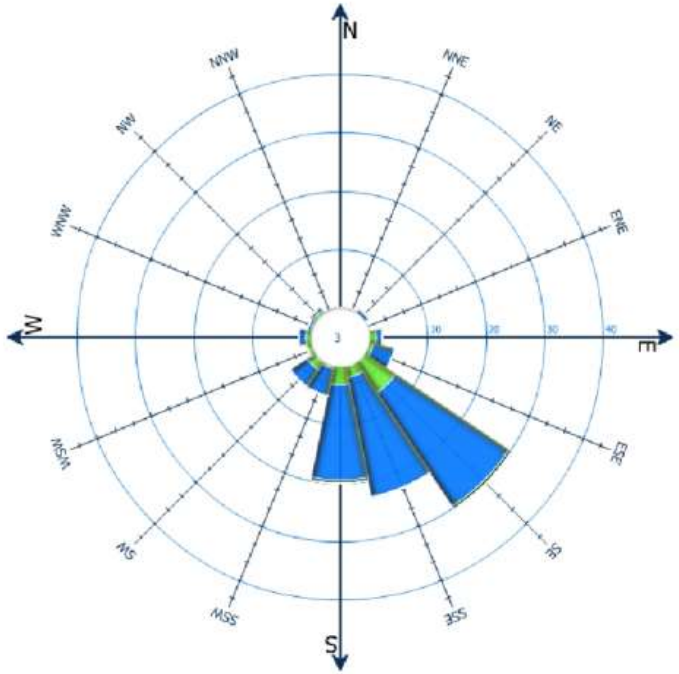

DIR. (Degrees)	SPEED OF 10-MN MEAN WIND meters per second												
	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 4.5	4.5 - 7.0	7.0 - 9.0	9.0 - 11.0	11.0 - 14.0	14.0 - 17.0	17.0 - 20.0	20.0 - 25.0	>=25.0	total
348-11		0.1	0.2	0.2									0.5
11-33			0.3	0.1									0.4
33-56		0.1	0.3	1.1									1.5
56-78				0.1									0.1
78-101		0.3	0.9	1.2									2.4
101-123		0.1	1.8	2.9									4.8
123-146		0.4	6.3	23.6	0.6	0.1							31.0
146-168		0.1	2.4	16.6	0.3								19.4
168-191		0.5	4.2	11.3	0.4								16.4
191-213			1.3	2.3	0.1								3.7
213-236			2.2	2.6									4.8
236-258		0.1	0.6										0.7
258-281		0.3	0.3	0.2									0.8
281-303													0.0
303-326		0.1	1.9	1.0									3.0
326-348			0.1	0.1									0.2
Total	0.0	2.1	22.8	63.3	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	89.9
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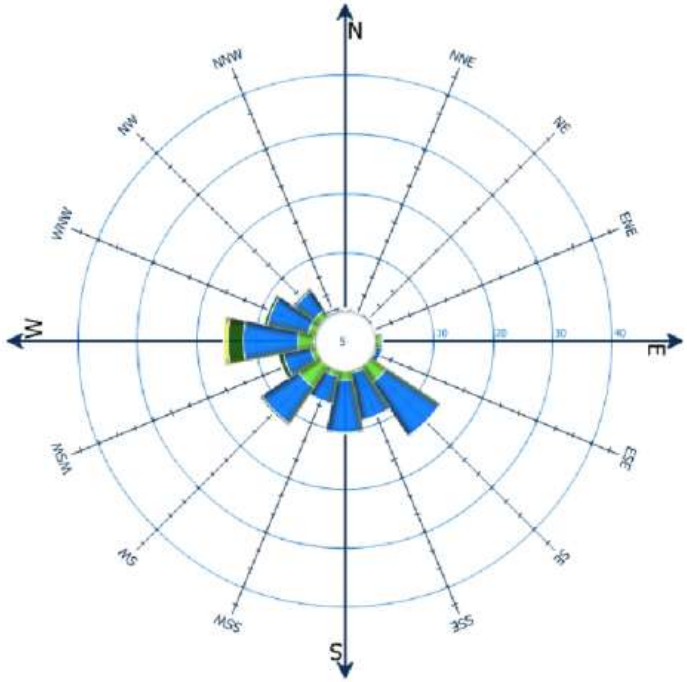
DIR. (Degrees)	SPEED OF 10-MN MEAN WIND meters per second												
	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 4.5	4.5 - 7.0	7.0 - 9.0	9.0 - 11.0	11.0 - 14.0	14.0 - 17.0	17.0 - 20.0	20.0 - 25.0	>=25.0	total
348-11				0.1									0.1
11-33			0.1										0.1
33-56				0.7	0.1								0.8
56-78													0.0
78-101			1.2	1.0									2.2
101-123			0.8	3.7									4.5
123-146		0.1	6.3	23.4	0.6								30.4
146-168		0.1	1.9	20.8	0.1								22.9
168-191			3.1	16.3	0.6								20.0
191-213			0.4	4.7	0.1								5.2
213-236		0.1	1.6	3.5									5.2
236-258			0.8	0.2									1.0
258-281			0.9	1.1									2.0
281-303			0.1	0.6									0.7
303-326			0.6	0.6									1.2
326-348													0.0
Total	0.0	0.3	17.8	76.7	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.1
Calm:	3.9	Total data used:899 Total missing data: 5											

HOUR : 0300 UTC **NEL**

MAY



DIR. (Degrees)	SPEED OF 10-MN MEAN WIND meters per second												
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348-11			0.2	0.3									0.5
11-33			0.1	0.1									0.2
33-56			0.1	0.4									0.5
56-78				0.2									0.2
78-101			0.9	0.4									1.3
101-123			0.3	1.1									1.4
123-146		0.1	3.2	10.9	0.1								14.3
146-168			0.5	8.1	0.2								8.8
168-191		0.1	1.5	8.8	0.3								10.7
191-213			1.1	4.8									5.9
213-236		0.1	4.3	7.4	0.4				0.1				12.3
236-258			1.0	4.7	0.9								6.6
258-281		0.2	2.7	9.2	2.6	0.8							15.5
281-303			1.3	7.0	0.5	0.1							8.9
303-326			1.3	3.9	0.4	0.1						0.1	5.8
326-348		0.1	0.2	0.5									0.8
Total	0.0	0.6	18.7	67.8	5.4	1.0	0.0	0.0	0.1	0.0	0.0	0.1	93.9
Calm:	6.1	Total data used:929 Total missing data: 6											