

Pre Feasibility Report

For

Bhagyalaxmi Metals Pvt. Ltd.

For establishment of

[Greenfiled Project comprising of establishment of DRI Kilns (Sponge iron – 7,00,000 TPA), Induction Furnace with LRF & CCM (Hot Billets / MS Billets / MS Slab – 6,72,000 TPA), Rolling Mill (TMT Bars, Structural Steel - Angle, Channels, Gutters, Coils, Flat Bars, Strips, MS Pipes, MS Tubes, Galvanized Pipes and angles (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO/Producer Gas as fuel – 7,00,000 TPA), Coal Gasifier for Rolling Mill (6,300 NM³/ Hr), (FeSi – 21,000 TPA / FeMn-75,600 TPA / SiMn-43,200 TPA / FeCr-45,000 TPA / Pig Iron – 75,600 TPA), WHRB based Power Plant – 60 MW, FBC based Power Plant - 20MW, Galvanizing Plant (1,00,000 TPA), Brick Manufacturing unit (70,000 Bricks/day) & Briquetting Plant (Briquettes – 300 Kg/Hr.)]

at

**Plot No: B-1, Mul Growth Center Mul Village & Tehsil,
Chandrapur District, Maharashtra**

Submitted to

Ministry of Environment, Forests & Climate Change, New Delhi

Prepared by



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Chapter –1:EXECUTIVE SUMMARY

1.1 SALIENT FEATURES OF THE PROJECT

Bhagalaxmi Metals Pvt Ltd is proposed to establish a Steel Plant at Plot No. B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra. Following is Plant configuration and Production Capacity:

Table No. 1.1 :Plant configuration and production capacity

S.No.	Unit (Product)	Configuration	Capacity	
1.	DRI Kilns (Sponge Iron)	4 x 500 TPD	7,00,000 TPA	
2.	Induction Furnaces (Hot Billets / MS Billets / MS Slab)	4 x 40 T	6,72,000 TPA	
3.	Rolling Mills (TMT Bars, Structural Steel - Angle, Channels, Gutters, Coils, Flat Bars, Strips, MS Pipes, MS Tubes, Galvanized Pipes and angles) (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO / Producer Gas as fuel)	1 x 1300 TPD & 1 x 700 TPD	7,00,000 TPA	
4.	Coal Gasifier for Rolling Mill	6,300 NM ³ / Hr	6,300 NM ³ / Hr	
5.	Submerged Electric Arc Furnaces – Ferro Alloys (FeSi / FeMn / SiMn / FeCr/Pig Iron)	3 x 9 MVA	FeSi – 21,000 TPA / FeMn-75,600 TPA / SiMn-43,200 TPA / FeCr-45,000 TPA/ Pig Iron - 75,600 TPA	
6.	Power plant (80 MW)	WHRB Based Power Plant	4 x 15 MW	60 MW
		FBC Based Power Plant	1 x 20 MW	20 MW
7.	Galvanizing Unit	---	1,00,000 TPA	
8.	Bricks manufacturing Unit	70,000 Bricks /Day	70,000 Bricks /Day	
9.	Briquetting plant	300 Kg/Hr.	300 Kg/Hr.	

Total land identified for the proposed project is **29.44 Ha. (72.74 Acres)** of land and has been allotted by Maharashtra Industrial Development Corporation (MIDC) vide no. MIDC/RO/Mul/B-1/4333/2010 dt. 13.09.2010 and subsequently the same land has been reallocated vide letter No. MIDC/RO(NAGPUR)/Mul/LMS-72/1691/2022 dt. 09/05/2022 and copy of lease deeds is enclosed as **Annexure – 1**.

Estimated Project Cost for the proposed project is **Rs. 615.0 Crores**.

Water required for proposed project (for process and domestic) is **2800 KLD** & Water required for proposed project will be supplied by Maharashtra Industrial Development Corporation (MIDC). In case of any shortfall from MIDC, it is proposed to source remaining quantity of water through Borewells in the company owned private land of 10 acres, proximate to the proposed project site (which not part of the MIDC land). A pipeline will be laid to bring water to the proposed project site. Approval will be obtained from CGWA for drawl of Ground water.

Power required for the proposed project will be **121 MW** and same will be sourced from **80.0 MW** Captive Power Plant & remaining **41.0 MW** is from State Grid.

1.2 PROJECT PROPONENT

Bhagalaxmi Metals Private Limited is a Private incorporated on 27 October 2004. It is classified as Non-govt company and is registered at Registrar of Companies, Mumbai.

Directors of Bhagalaxmi Metals Private Limited are

Mr. Satish Kashmirilal Agrawal:

55 years of age successful businessman having vast experience of steel industry. He is engaged in the business of manufacturing of M.S. Bars, He is the main promoter of Bhagalaxmi Steel Alloy Pvt. Ltd; a company engaged in the manufacturing of M.S. Billets. Mr. Satish Agrawal Comes with almost 29 years of Rich experience of steel business and he is a successful businessman with excellent track record. His vast experience in the industry has aided in building a strong relation with various intermediaries such suppliers and buyers in the steel industry. It is under his leadership that the company has scaled new heights and established a presence as a leading steel manufacturing unit in Maharashtra.

Mr. Sunil Banarasidasji Goyal:

52 years of age is one of the chief promoters of Bhagalaxmi Group Business Experience He started his career in the year 1986 with his family business of dealing in Scrap. In year 2000 he started a new business in the name of M/s Virat Sales Corporation engaged in trading of ACC cement His firm is appointed as a dealer for ACC Cement for Jalna District. In the year 2004, He formed Bhagalaxmi group along with other family members and entered into steel manufacturing business. The basic vision of the company is laid by him and still forms the foundation of the group with strength. With time his vision kept expanding and he kept

exploring new avenues to express his entrepreneurship and contribution to the society. In the year 2009, He created new business named as Kalpavat Securities & Human Resource Consultants, employing more than 500 staff as on date. In the year 2009, He appointed as Distributor of Honda Two wheeler named as Devaashva Automotives for Jalna. In the year 2011, he started new partnership firm named as “Simplified Technologies for Life” of solar systems like Solar cooker, Solar Water heater, Solar lights etc. A Part of his extensive and involved social commitments, Shri. Goyal is a founder member of “Arya Chanakya Vidya Dham”, Jatwada, Aurangabad. It is non- profitable, residential school devoted for education of children. He has been involved in social reforms like Development programs of underperformed sections of society like slum rehabilitation. Till now about 50 families are brought back to main lines by creating a respected employment option for them. He is extensive traveller haven taken of exploring places from Andaman Nikobar to Lakshadweep, From Leh to Meghalaya. He has visited Bhutan (1986), Singapore (1990) and Israel (2008 for study tour), China (2010), African continent (9 countries 2011), far east Asian countries like Indonesia, Japan (2016 for study tour) and Egypt in 2018 etc exploring more than 25 countries of the world.

Chief Promotor:

Mr Praveen Sadhuram Goyal:

Mr. Praveen Sadhuramji Goyal 43 years of age dynamic and successful technocrat with B.E. Mechanical with master’s degree in Business Administration and he is also one of the chief promoter and presently looking day to day production of Bhagyalaxmi Group; a company engaged in the manufacturing of M.S. Billet & TMT Bars. He also has sound experience in steel industry. Mr. Goyal’s family business is steel and having very good social standing and excellent family background.

Mr. Nitin Kabra:

He has excellent technical and commercial experience of steel industry since he is an engineer and having vast experience of steel Industries at Jalna and Nashik. He possesses expert knowledge in the field of erection, designing, production and quality control for steel industries.

Mr. Vishal Agrawal:

He is 49, another personality with good accounting ability. Having good knowledge of Accounting, Costing and other related works and currently he is looking towards Accounts Section and Cost control division of Bhagyalaxmi Steel Alloy Pvt. Ltd. a company manufacturing M.S Billet a sister unit of the group.

Mr. Shivshankar Sangnath Khichade:

44 years of age has been recently appointed as the Director of the company. He holds Diploma in Engineering. He has experience of Staff recruitment and training and looks after the Human Resource and Development of the company Bhagyalaxmi Rolling Mill Pvt. Ltd. manufacturing TMT bars in the brand name of 'POLAAD' is situated at Jalna. Unit is earning profit from first year of operation.

Chapter – 2: INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

Bhagalaxmi Metals Pvt. Ltd. is a Private incorporated on 27th October 2004. It is classified as Non-govt company and is registered at Registrar of Companies, Mumbai.

2.2 BRIEF DESCRIPTION OF THE NATURE OF THE PROJECT

It is proposed to setup a Steel Plant with the following facilities:

- Establishment of 4 x 500 DRI Kilns to manufacture 7,00,000 TPA of Sponge Iron.
- Establishment of 4 x 40 T of Induction Furnaces to manufacture 6,72,000 TPA of Hot Billets / MS Billets / MS Slabs.
- Establishment of 1 x 1300 TPD & 1 x 700 TPD of Rolling Mills to manufacture 7,00,000 TPA of TMT Bars, Structural Steel - Angle, Channels, Gutters, Coils, Flat Bars, Strips, MS Pipes, MS Tubes, Galvanized Pipes and angles (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO / Producer Gas as fuel) along with 6,300 NM³/Hr. Coal gasifier.
- Establishment of 3 x 9 MVA Submerged Electric Arc Furnaces to manufacture FeSi – 21,000 TPA / FeMn-75,600 TPA / SiMn-43,200 TPA / FeCr-45,000 TPA / Pig Iron – 75,600 TPA.
- Establishment of 4 x 60 TPH Waste Heat Recovery Boilers to produce 60 MW Electricity.
- Establishment of 1 x 80 TPH Fluidized Bed Combustion (FBC) Boiler to produce 20 MW Electricity.
- Establishment of Brick manufacturing unit to manufacture 70,000 Bricks /Day.
- Establishment of Briquetting Plant to manufacture Briquettes 300 Kg /Hr.

2.3 NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY AND OR REGION

Steel is a basic commodity for economic growth of any country and the per capita consumption is a measure of prosperity of a country. The per capita steel consumption has risen from 38 kg in 2005-06 to 61 kg in 2017-18, compared to global average of 208 kg. The per capita steel consumption in rural sector is only 10 kg. The crude steel production capacity had increased from 22 million tons per annum (MTPA) in 1991-92 to 91 MTPA in 2015-16 (installed capacity is 122 MTPA) and 101 MTPA in 2016-17. The Indian steel industry is ranked 3rd in the world and has tremendous potential for growth. The government of India has set

pragmatic target of achieving per capita steel consumption of 160kgs by 2030-31 requiring crude steel production of 255MT and capacity of 300MT.

The proposed project will bridge the demand supply gap of steel in the country. The project will add revenue to the Government by way of direct and indirect taxes.

Importance of the Project to the Region: The project will contribute to government treasury by way of direct and indirect taxes. The project will employ direct employment of 350 persons during operation stage & indirect employment of 500 persons.. The local persons will be given preference in employment as per the qualification and technical competencies.

Considering the recent trend in production and consumption of steel globally and in India, the National Steel Policy, 2005 had projected 110 MTPA steelmaking capacity in India by 2019-2020 at 7.3% growth rate. It was noted subsequently in year 2006-07 that domestic production grew at 10.9% and domestic consumption by 11%. Ministry of Steel has revised the goal and projected a capacity of 180 MTPA by 2019-20. This creates huge opportunity for investment in steel industry with high returns.

2.4 DEMAND/SUPPLY GAP

As per the National Steel Policy (NSP) 2017, in order to achieve expected demand of 200MT and per capita consumption of 160 kg of finished steel by 2030-31, steel demand would need to grow at a CAGR of around 7-7.5% during the period against a CAGR of 3.5% ~ 4% over the last 5 years. This would mean that capacity additions planned by most of the major players need to come on stream in next few years.

As per NSP 2017, it is aimed to domestically produce value added steel special steel and alloys and focuses on palletization based on BF / DR-IF/EAF technology.

Major factors which carry the potential of raising the per capita steel consumption in the country are listed below:

- a) Infrastructure improvement initiatives, such as “Smart Cities project”, “Housing for all by 2022”, “Atal Mission for Rejuvenation and urban Transformation (AMRUT)”,
- b) Manufacturing growth driven by Make-in-India initiative,
- c) Encouraging use of Made in India steel for various projects and levying of anti-dumping duties on certain steel products from Brazil, Russia, China, Korea, Japan and Indonesia, Imports & Indigenous Production.

- d) National Mineral Development Corporation expected to increase the iron ore production favoring steel production and
- e) Emergence of the rural market for steel buoyed by projects like MGNREGS, development of Urban Clusters under the Shyama Prasad Mukherjee Urban Mission, Pradhan Mantri Gram Sadak Yojana among others.

2.5 IMPORT VS INDIGENOUS PRODUCTION

Proposed steel plant will meet the Indigenous demand of quality steel and reduce the import requirement of steel.

2.6 EXPORT POSSIBILITY

India has enormous potential and necessary resources, capabilities to become a global supplier of quality steel. Also, there exists ample market opportunities in the neighboring regions of Asia, Africa and the Middle East. The policy framework while according top priority to meet domestic demand should also take into account the large export possibilities.

2.7 DOMESTIC/ EXPORT MARKETS

While the demand for steel will continue to grow in traditional sectors such as infrastructure, construction, housing automotive, steel tubes and pipes, consumer durables, packaging, and ground transportation, specialized steel will be increasingly used in hi-tech engineering industries such as power generation, petrochemicals, fertilizers, etc. The new airports and railway metro projects will require a large amount of steel. Hence the domestic and export markets for steel sector will rise.

2.6 EMPLOYMENT GENERATION (DIRECT AND INDIRECT) DUE TO THE PROJECT

The local areas will be benefited by way of generation of employment opportunities, increased demand for local products and services. There will be an overall improvement in the income level of the local people.

The proposed project will generate direct employment **250 nos.** which will be employed officials, staff, skilled, semi -skilled labour & **500 nos.** indirectly employed in contract works & transport.

Bhagyalaxmi Metals Pvt. Ltd.

(Proposed Steel Plant)

Plot No: B-1, Mul Growth Center, Mul Village
& Taluka, Chandrapur District, Maharashtra

Top priority will be given to locals for Semi-Skilled and Unskilled jobs. With the development of this Plant there will be lot of scope for more ancillary development, which in turn will benefit the nation.

Chapter – 3 : PROJECT DESCRIPTION

3.1 TYPE OF PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS

3.1.1 TYPE OF THE PROJECT

It is proposed to setup a Steel Plant with the following facilities:

- Establishment of 4 x 500 DRI Kilns to manufacture 7,00,000 TPA of Sponge Iron.
- Establishment of 4 x 40 T of Induction Furnaces to manufacture 6,72,000 TPA of Hot Billets / MS Billets / MS Slabs.
- Establishment of 1 x 1300 TPD & 1 x 700 TPD of Rolling Mills to manufacture 7,00,000 TPA of TMT Bars, Structural Steel - Angle, Channels, Gutters, Coils, Flat Bars, Strips, MS Pipes, MS Tubes, Galvanized Pipes and angles (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO / Producer Gas as fuel) along with 6,300 NM³/Hr. Coal gasifier.
- Establishment of 3 x 9 MVA Submerged Electric Arc Furnaces to manufacture FeSi – 21,000 TPA / FeMn-75,600 TPA / SiMn-43,200 TPA / FeCr-45,000 TPA / Pig Iron – 75,600 TPA.
- Establishment of 4 x 60 TPH Waste Heat Recovery Boilers to produce 60 MW Electricity.
- Establishment of 1 x 80 TPH Fluidized Bed Combustion (FBC) Boiler to produce 20 MW Electricity.
- Establishment of Brick manufacturing unit to manufacture 70,000 Bricks /Day.
- Establishment of Briquetting Plant to manufacture Briquetts 300 Kg /Hr.

Ministry of Environment, Forest & Climate Change (MoEF&CC) has made prior Environmental Clearance (EC) for certain developmental projects mandatory through its notification issued on 14th September 2006 and its subsequent amendments.

As per the EIA notification dated 14th September, 2006 & its subsequent amendments, all Primary metallurgical processing industries are listed under S.No. 3(a), under Category 'A'.

3.1.2 INTERLINKED PROJECT

No interlinked project is envisaged.

3.2 LOCATION OF THE PROJECT

The proposed project site is located at Plot No: B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra. Total land identified for the proposed project is 29.44 Ha. (72.74 Acres) and has been allotted by Maharashtra Industrial Development Corporation (MIDC) vide no. MIDC/RO/Mul/B-1/4333/2010 dt. 13.09.2010 and subsequently the same land has been reallocated vide letter No. MIDC/RO(NAGPUR)/Mul/LMS-72/1691/2022 dt. 09/05/2022 and copy of lease deeds is enclosed as **Annexure – 1**.

The project site falls in Survey of India Topo sheet no. 55P/12, 55P/16, 56M/9 & 56M/13.

Table No. 3.1 :Coordinates of the project site

Point	Coordinates
Point # 1	20°5'30.08"N 79°42'53.91"E
Point # 2	20°5'30.64"N 79°43'01.40"E
Point # 3	20°5'30.36"N 79°43'10.56"E
Point # 4	20°5'12.87"N 79°43'12.50"E
Point # 5	20°5'11.21"N 79°42'51.96"E
Point # 6	20°5'15.93"N 79°42'51.96"E
Point # 7	20°5'15.93"N 79°42'56.13"E
Point # 8	20°5'18.42"N 79°42'56.13"E
Point # 9	20°5'18.70"N 79°42'53.07"E

3.3 DETAILS OF THE ALTERNATE SITES

Proposed project is located in Mul Growth Centre developed for Maharashtra Industrial Development Corporation (MIDC) for development of Industrial Unit by providing infrastructure facilities like land, roads, water supply, drainage facilities and street lights etc.

Bhagalaxmi Metals Pvt. Ltd. has been allotted **29.44 Ha. (72.74 Acres)** of land by Maharashtra Industrial Development Corporation (MIDC) vide no. MIDC/RO/Mul/B-1/4333/2010 dt. 13.09.2010 and subsequently the same land has been reallocated vide letter No. MIDC/RO(NAGPUR)/Mul/LMS-72/1691/2022 dt. 09/05/2022 and copy of lease deeds is enclosed as Annexure – 1.

As proposed land Govt. allotted land, no alternate sites have been identified for the proposed project.

Bhagyalaxmi Metals Pvt. Ltd.

(Proposed Steel Plant)

Plot No: B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra

Figure : 3.1 – General Location of Project Site

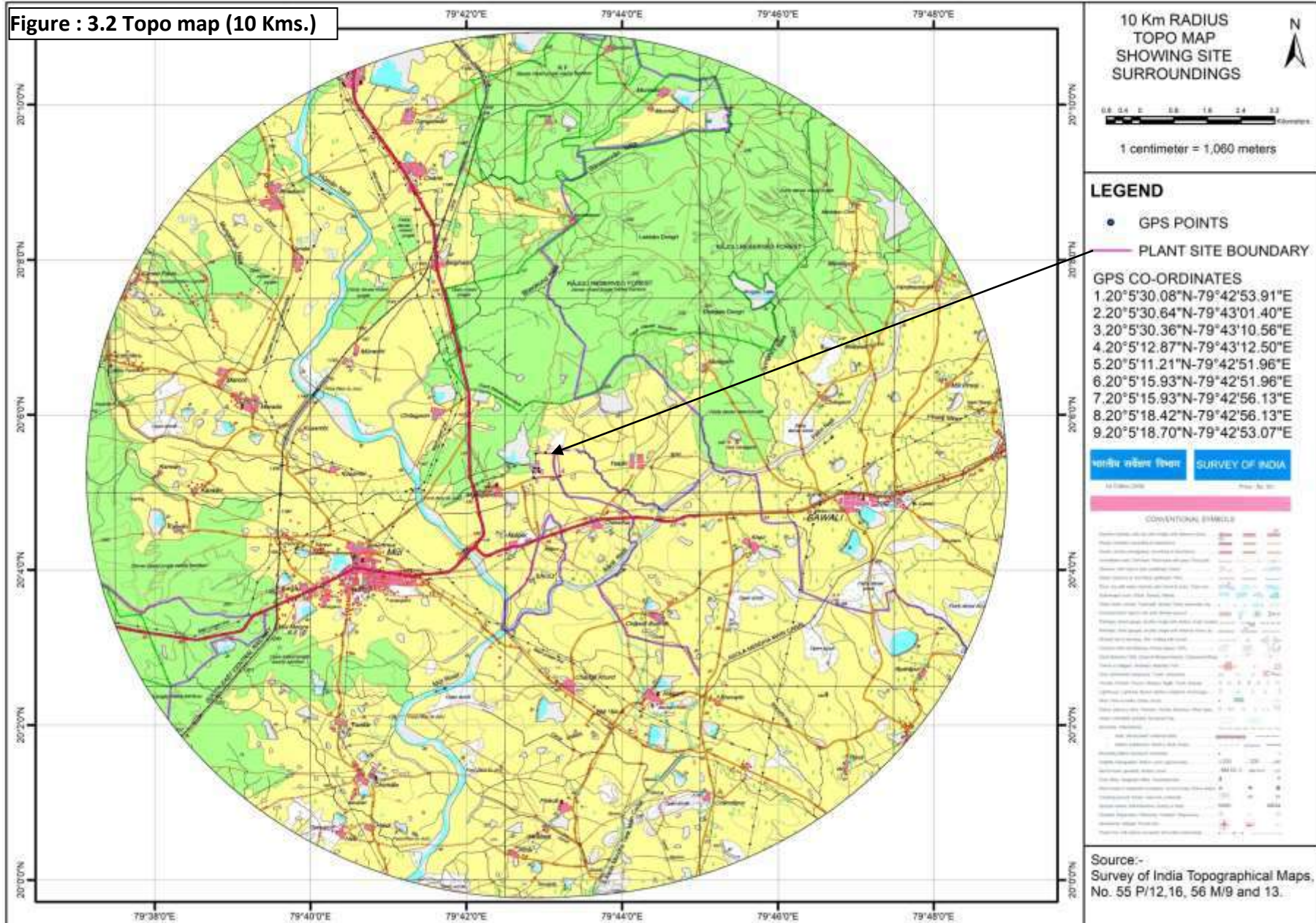


Bhagyalaxmi Metals Pvt. Ltd.

(Proposed Steel Plant)

Plot No: B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra

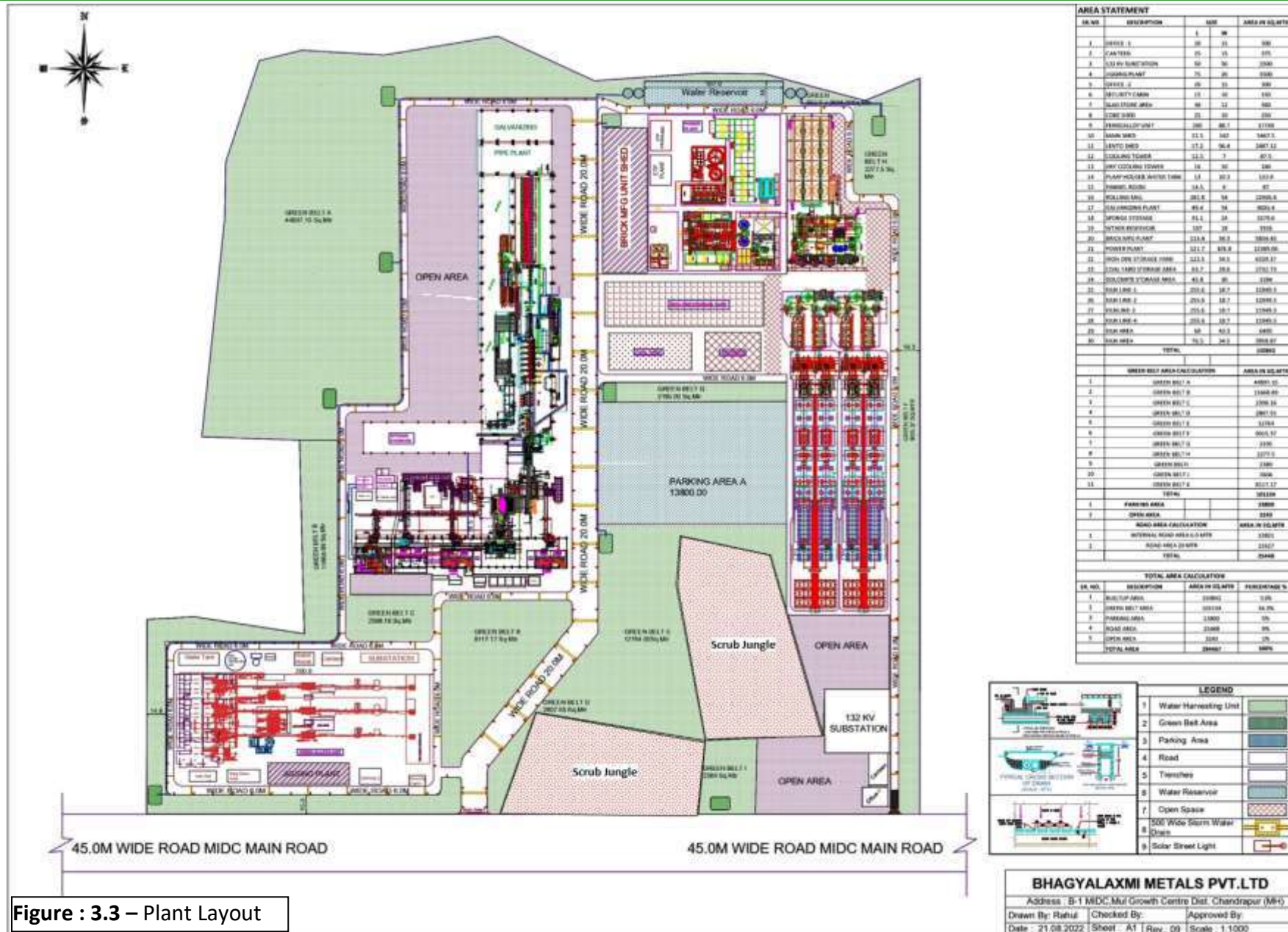
Figure : 3.2 Topo map (10 Kms.)



Bhagalaxmi Metals Pvt. Ltd.

(Proposed Steel Plant)

Plot No: B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra



AREA STATEMENT			
Sl. No.	DESCRIPTION	SIZE	AREA IN SQUARES
1	GREEN BELT A	4800 X 10	48000
2	CANTEEN	15 X 15	225
3	CLIP PU FABRICATION	50 X 50	2500
4	CONCRETE PLANT	70 X 30	2100
5	GREEN BELT B	15 X 15	225
6	SECURITY CAMP	15 X 30	450
7	BLAST FURNACE AREA	80 X 12	960
8	STORE ROOM	20 X 20	400
9	PERMANENT UNIT	200 X 60.1	12020
10	BARAN ROAD	55.5 X 162	9000
11	BLAST FURNACE	17.5 X 36.4	637
12	STEELING TOWER	22.5 X 7	157.5
13	UNIT COOLING TOWER	15 X 10	150
14	PLANT HOLDING AREA: TOWER	12 X 30.3	363.6
15	FRAMING ROOM	14.5 X 8	116
16	ROLLING MILL	205.8 X 14	2881.2
17	SLAB FABRICATION PLANT	85.4 X 14	1195.6
18	SPONGE IRON	85.4 X 14	1195.6
19	WATER RESERVOIR	100 X 10	1000
20	BRICK MFG UNIT	121.8 X 30.3	3690.54
21	POWER PLANT	121.7 X 121.8	14800.06
22	IRON ORE STORAGE TOWER	22.5 X 30.3	681.75
23	STEEL TUBE STORAGE AREA	81.7 X 18.8	1536.16
24	COIL COIL STORAGE AREA	41.8 X 30	1254
25	ROAD AREA 1	255.8 X 18.7	4783.26
26	ROAD AREA 2	255.8 X 18.7	4783.26
27	ROAD AREA 3	255.8 X 18.7	4783.26
28	ROAD AREA 4	18 X 50.2	903.6
29	ROAD AREA 5	70.3 X 34.3	2411.41
30	ROAD AREA 6	70.3 X 34.3	2411.41
TOTAL			108865
GREEN BELT AREA CALCULATION		AREA IN SQUARES	
1	GREEN BELT A	4800 X 10	48000
2	GREEN BELT B	15 X 15	225
3	GREEN BELT C	200 X 14	2800
4	GREEN BELT D	15 X 15	225
5	GREEN BELT E	15 X 15	225
6	GREEN BELT F	15 X 15	225
7	GREEN BELT G	15 X 15	225
8	GREEN BELT H	15 X 15	225
9	GREEN BELT I	15 X 15	225
10	GREEN BELT J	15 X 15	225
11	GREEN BELT K	15 X 15	225
12	GREEN BELT L	15 X 15	225
TOTAL			53100
PARKING AREA		AREA IN SQUARES	
1	PARKING AREA		13800
2	OPEN AREA		2240
ROAD AREA CALCULATION		AREA IN SQUARES	
1	INTERNAL ROAD AREA CALCULATION		13800
2	ROAD AREA 1 TO 6		24117
TOTAL			37917
TOTAL AREA CALCULATION			
Sl. No.	DESCRIPTION	AREA IN SQUARES	PERCENTAGE %
1	BUILDUP AREA	108865	100
2	GREEN BELT AREA	53100	48.78
3	PARKING AREA	13800	12.5
4	ROAD AREA	24117	22.15
5	OPEN AREA	2240	2.05
TOTAL AREA		222022	100%

LEGEND	
1	Water Harvesting Unit
2	Green Belt Area
3	Parking Area
4	Road
5	Trashers
6	Water Reservoir
7	Open Space
8	500' Wide Storm Water Drain
9	Solar Street Light

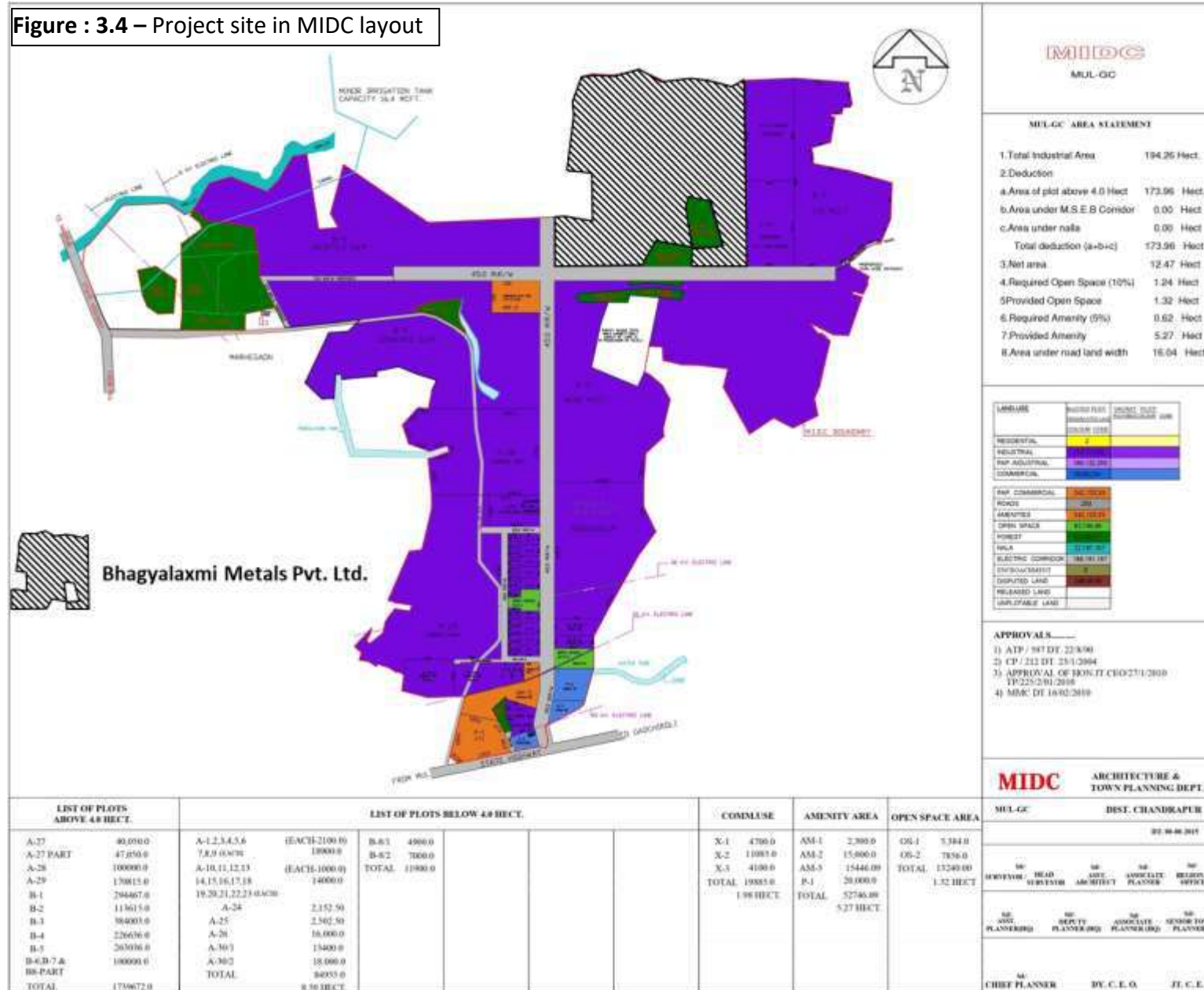
BHAGYALAXMI METALS PVT.LTD
 Address: B-1 MIDC, Mul Growth Centre Dist. Chandrapur (MH)
 Drawn By: Rahul | Checked By: | Approved By: |
 Date: 21.08.2022 | Sheet: A1 | Rev: 09 | Scale: 1:1000

Bhagalaxmi Metals Pvt. Ltd.

(Proposed Steel Plant)

Plot No: B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra

Figure : 3.4 – Project site in MIDC layout



3.4 SIZE OR MAGNITUDE OF OPERATION

Following is the plant configuration and production capacity of proposed project:

Table No. 3.3 :Plant configuration and production capacity

S.No.	Unit (Product)	Configuration	Capacity	
1.	DRI Kilns (Sponge Iron)	4 x 500 TPD	7,00,000 TPA	
2.	Induction Furnaces (Hot Billets / MS Billets / MS Slab)	4 x 40 T	6,72,000 TPA	
3.	Rolling Mills (TMT Bars, Structural Steel - Angle, Channels, Gutters, Coils, Flat Bars, Strips, MS Pipes, MS Tubes, Galvanized Pipes and angles) (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO / Producer Gas as fuel)	1 x 1300 TPD & 1 x 700 TPD	7,00,000 TPA	
4.	Coal Gasifier for Rolling Mill	6,300 NM ³ / Hr	6,300 NM ³ / Hr	
5.	Submerged Electric Arc Furnaces – Ferro Alloys (FeSi / FeMn / SiMn / FeCr/Pig Iron)	3 x 9 MVA	FeSi – 21,000 TPA / FeMn-75,600 TPA / SiMn-43,200 TPA / FeCr-45,000 TPA/ Pig Iron - 75,600 TPA	
6.	Power plant (80 MW)	WHRB Based Power Plant	4 x 15 MW	60 MW
		FBC Based Power Plant	1 x 20 MW	20 MW
7.	Galvanizing Unit	---	1,00,000 TPA	
8.	Bricks manufacturing Unit	70,000 Bricks /Day	70,000 Bricks /Day	
9.	Briquetting plant	300 Kg/Hr.	300 Kg/Hr.	

3.5 MANUFACTURING PROCESS

3.5.1 DRI KILN BASED SPONGE IRON PLANT

It is a coal-based plant for converting Iron Ore to Iron through direct reduction. The Oxide Ore Fe₂O₃ (Hematite) is reduced to 'Fe' by using Carbon as reductant. The process can take place at 900-1000°C. Coal provides the heat as well as reducing gases. Dolomite chips of size (-3 mm) are used as flux to Scavenge Sulphur content from coal and preventing the combining of this impurity with iron. The process is carried out in a Rotary Kiln.

The Direct Reduced Iron (DRI) plant will comprise of **4 x 500 TPD** and related accessories including Waste Heat Recovery power generating unit.

The major plant facilities for the Sponge Iron plant envisaged are as follows:

- Day bins
- Rotary Kiln & Cooler

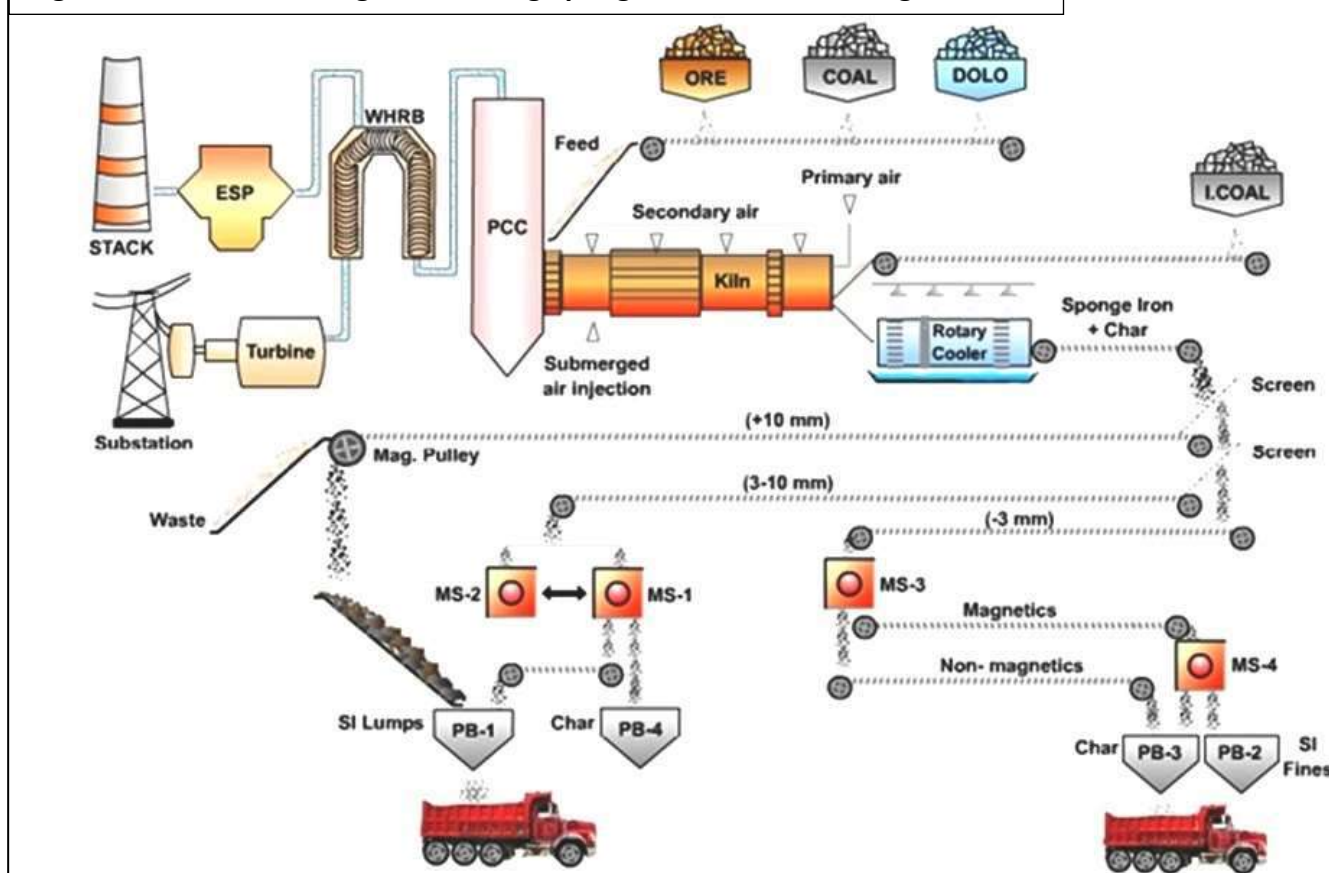
- Central Control Room
- Product processing and product storage
- Off gas system including waste heat recovery power generation

There will be one day bin building for kiln. The day bin building will have bins for meeting raw material required for kiln. This bin will have the storage facility for pellets, feed coal, dolomite etc.

A refractory lined rotary kiln will be used for reduction of Iron ore in solid state. A central Burner located at the discharge end will be used for initial heating of the kiln. Iron ore or Pellets will be continuously fed into the kiln along with coal which has dual role of fuel as well as reductant. Dolomite will be added to scavenge the Sulphur from the coal. A number of air tubes will be provided along the length of the kiln.

The desired temperature profile will be maintained by controlling the volume of the combustion air through these tubes. The Carbon monoxide generated due to the combustion of coal, reduces the iron ore and converts it into sponge iron. The rotary kiln is primarily divided into two zones viz. the pre heating zone and the reduction zone. The preheating zone extends over 30 to 50 % of the length of the kiln and in this the moisture in the charge will be driven off and the volatile matter in the coal will be burnt with the combustion air supplied through the air tubes. Heat from the combustion rises the temperature of the lining and the bed surface. As the kiln rotates, the lining transfers the heat to the charge. Charge material, pre-heated to about 1000°C enters the reduction zone. Temperature of the order of 1050°C will be maintained in the reduction zone, which is the appropriate temperature for solid state reduction of iron oxide to metallic iron. This hot material will be transferred to rotary cooler. In rotary cooler the material will cool from 1000°C to 100°C in cooler by spraying water. The cooler discharge material consists of sponge iron lumps, sponge iron fines and char. Magnetic and non-magnetic material will be separated through magnetic separators and stored in separate bins.

Figure3.6: Schematic Diagram showing Sponge Iron Manufacturing Process



3.5.2 STEEL MELTING SHOP (INDUCTION FURNACE – HOT BILLETS / BILLETS / MS SLABS)

Electric Steel Making through Melting in Induction Furnace (IF), secondary refining in a Ladle Furnace (LF) and Slab Casting in a Continuous Casting Machine has been selected as the process route of converting the charge mix of Sponge Iron and Scrap to Slabs required for the Rolling Mill by Hot charging method.

Provision will be made in the Caster to produce billets also in case of market demand. The proposed process is well established and is most environment friendly and energy efficient. The Slabs from the Caster shall be hot charged to the Rolling Mill without reheating furnace to reduce fuel consumption. Provision has been made for reheating furnace with furnace oil which shall be used in case of emergency.

i) IF Melting:

- a. The Charge-Mix shall comprise 80-85% Sponge Iron & balance Pig Iron and scrap.
- b. The material shall be charged to the IF through a Vibro Feeder at desired rate matching the melting rate in crucible.

- c. The Scrap is melted first to create a molten bath. Sponge Iron is then charged continuously through Vibro-Feeder. Slag formed is removed periodically.
- d. After the completion of charging and melting, a sample will be drawn to determine the composition of the liquid steel. Adjustment in composition is made by adding right quality of scrap or petroleum coke for achieving the necessary carbon content in the bath.
- e. After achieving the desired melt analysis, the temperature is raised to the required tapping temperature and the furnace is then tilted rapidly to discharge the liquid steel into a preheated refractory lined ladle.

Advantages of IF melting are:

- ◆ Better yield of liquid steel from charge as no oxygen is used.
- ◆ Better homogenization of temperature and composition due to stirring effect of eddy currents.
- ◆ Less fume generation.
- ◆ Low operating cost as expensive graphite electrodes are not used.

ii) Ladle Furnace

- a. The Molten Steel Ladle shall be transferred to a Ladle Car for carrying out secondary refining in the Ladle Furnace.
- b. The Ladle has a porous refractory plug at the bottom to purge Argon gas to keep the molten metal in vertical stirring movement.
- c. The Ladle is covered by a water cooled roof which has openings for three graphite electrodes, a fume outlet connected to FES system and a door for charging fluxes & alloying elements. Electric heating is done by arcing under the reducing slag.
- d. Lime is used as flux for refining the steel.
- e. Ferro Alloys are added to achieve de-oxidation and required composition of steel.

Aims of LF Treatment are:

- ◆ De-sulfurization of steel
- ◆ De-oxidation of steel

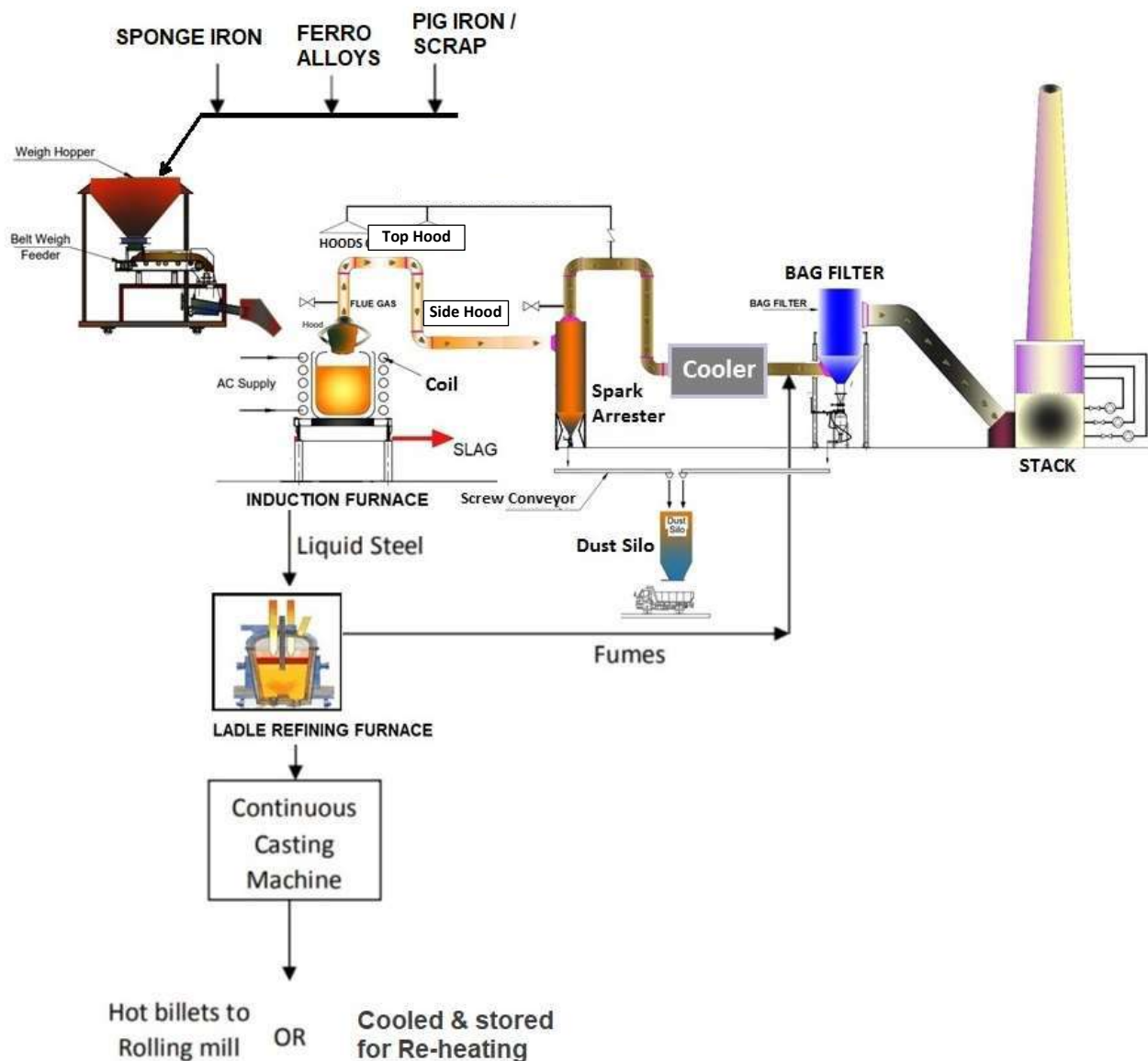
- ◆ Inclusion removal to slag by floating through argon purging.
- ◆ Achieving right composition and temperature required for casting at CCM.
- ◆ Act as a buffer for achieving sequence casting.

Fumes generated during the process extracted through a collection hood. The IF fumes will be sucked through a cyclone-cum-spark arrestor & Cooler and LF fumes will be sucked through its roof outlet. These fumes then pass through a pulse-jet type bag filter to remove the dust particles. ID Fans installed after the bag filter are used for suction of fumes and discharge the clean gas into atmosphere through stacks. Particulate emission at Stack outlet will not exceed 30 mg/Nm³. The complete machine shall have PLC controls.

There will be 6 x 30 T Induction Furnaces. Hot Billets / Ingot / Billet will be produced in Continuous Casting Machine.

Process Flow for Hot Billets / Ingot / Billet manufacturing is shown in Figure No. 3.7.

Figure 3.7 : Schematic Diagram showing MS Ingots / Billets Manufacturing Process



3.5.3 ROLLING MILL

The Rolled products will be manufactured using the following methods:

- i. Direct Hot Rolling / Hot Charging
- ii. Rolling Mill With Re-Heating Furnace / Conventional Rolling Mill

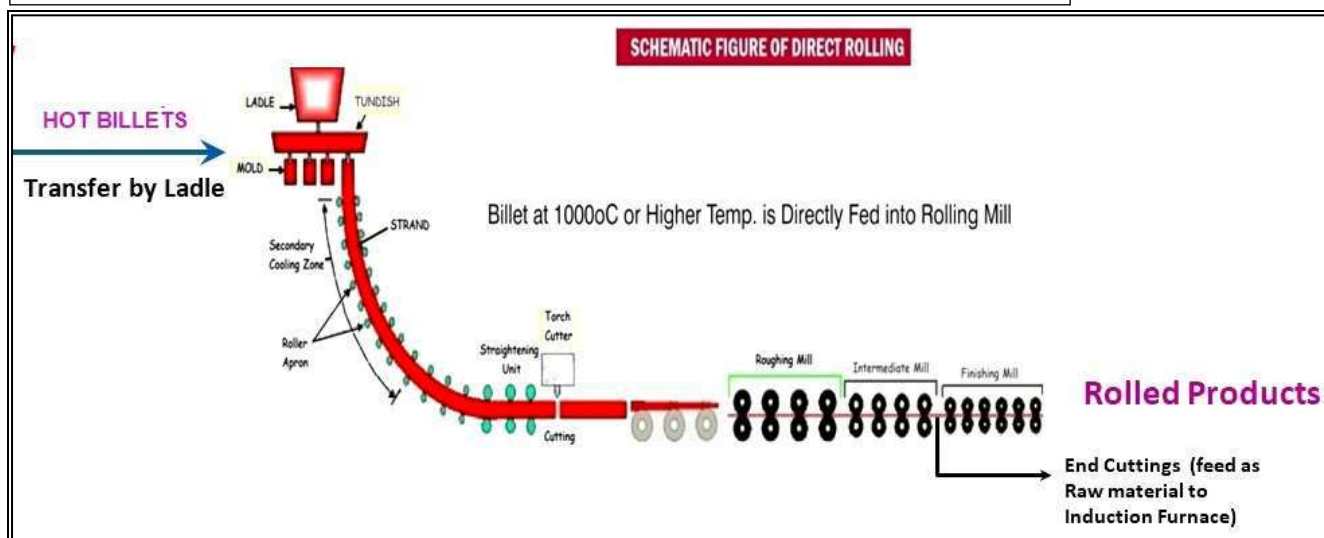
Direct Hot Rolling / Hot Charging

Raw Material i.e. Hot Billets from Ladle in red hot condition is cut by automatic hot metal Shearing Machine. In the proposed plant automatic hot metal shear machines are going to be

installed with each strand. The gas cutting facility will be maintained as a backup to the hot metal shearing machine.

After the Hot Metal is cut into required length, then pushed out to rolling stands for re-rolling. Steel Pieces are rolled through all stands in order to get required shape of finished goods i.e. Rolled products. Process flow chart of Direct Rolling is shown below:

Figure 3.8 :Schematic Diagram showing Hot Charging Manufacturing Process



Rolling Mill With Re-Heating Furnace / Conventional Rolling Mill

A pusher type furnace has been envisaged for the heating of Ingots / Billets. The furnace will be end charging and side discharging. It will have single row as well as double row charging facility. The furnace will be heated with LDO. The furnace combustion system will comprise of air blowers, LDO storage, supply and preheating system and other associated facilities. The product of combustion will leave the furnace at charging end and exhausted through underground flue tunnel and passed through a metallic tubular recuperator before finally let off to a self-supporting steel chimney of sufficient height. A set of instrument will be used for smooth operation of the furnace.

Bar and Round mill

A cross country type mill has been envisaged for the plant. The stands have been grouped into roughing, intermediate and finishing groups. Roughing group will have 4 (four) stands, intermediate group will have 8 (eight) stands and finishing mill will have 8 (eight) stands. Roughing group of stands will be driven by one motor. 4 nos. of intermediate stands will be driven by two motors and balance 4 nos. will be driven by a separate motor. Each stand of

finishing group will be driven by single motor. Necessary guides and troughs will be provided at entry and exit of mill stands.

One wire rod outlet has been provided in the mill. The wire rod line will have 4 stand blocks driven by a single motor through gear box. Coil forming and handling of coil is provided.

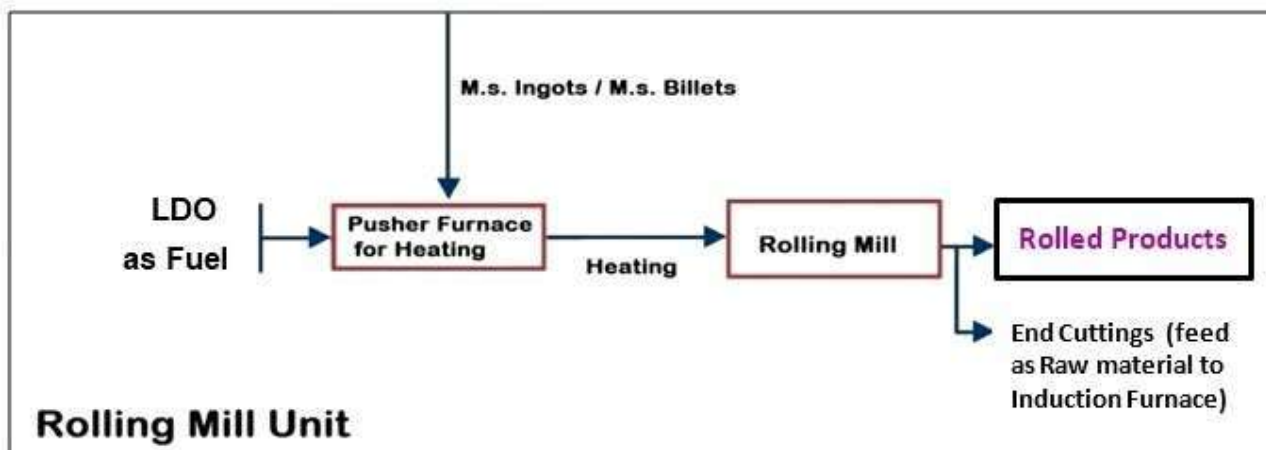
Automated tilting, drop type tilter and feeding arrangement will be provided in roughing group of stands. Repeaters have been provided in roughing / intermediate stands as necessary.

Design provision has been made for introduction of slit rolling facility in future to roll 5.5 mm to 32 mm rebars in two strands. The rebars discharged from the mill will pass through a water cooling system comprising cooling pipes with high pressure water nozzles for rapid water quenching. At the cooling pipes the bar skin temperature will be reduced to about 600°C. The core of the bar still remains hot. This entrapped heat tempers the bar. This thermo-mechanical treatment of the bars increases tensile strength without adversely effecting weldability and elongation properties. This process eliminates requirement of cold twisting of bars for production of rebars.

A dividing shear, to cut the products to cooling bed length, will be located immediately after the water cooling system. This shear will divide all products to cooling bed lengths. Rake type cooling beds have been envisaged to receive the rolled product. Cooling bed will be provided with incoming and outgoing roller tables. One cold shear has been provided to cut the bars coming out of cooling bed into commercial length of 6 to 12 m. The bar products will be formed into bundles and will be strapped by strapping machine manually.

The finished products will be removed by overhead EOT crane and stored in the storage area or dispatched through road vehicles.

Figure 3.9 :Schematic Diagram showing Rolled Product Manufacturing Process



3.5.4 POWER PLANT

Its is proposed to install 60 MW WHRB & 20 MW FBC based power plant in the proposed project to meet the power requirement for various processes of integrated plant including auxillaries of power plant.

WHRB Power Plant

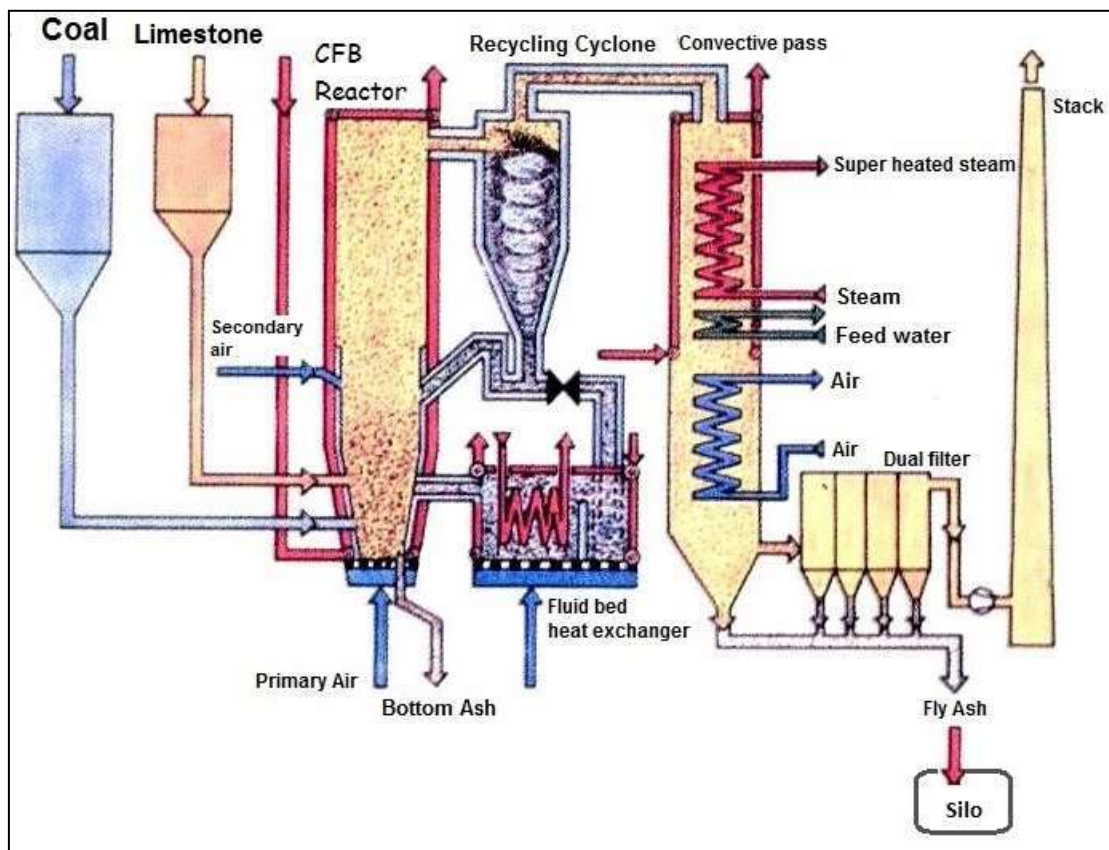
Production of sponge iron in DRI kilns generates huge quantities of hot flue gases carrying considerable sensible heat. The energy content of these gases can effectively be used to generate electric power as well as steam for meeting various process requirements. Thus a WHRB (Waste Heat Recovery Boiler) power plant would be an ideally suited proposition to effectively make use of this waste gas. This WHRB Power plant would not only make the plant independent of external source of electric power to some extent but would also result in energy conservation and environment protection.

Steam Turbo-generators (STGs) envisaged for the Power plant will be single cylinder, multistage, extraction – cum – condensing type complete with condenser, air evacuation system, 2 x 100% condensate extraction pumps, electronic governing system, lubricating oil system, regenerative feed heating system etc. The turbine will be fed with steam generated from HRSG in DR kiln. The STGs will be located in the machine hall of the power plant.

4 x 60 TPH Boilers will be installed to 4 x 500 TPD DRI Kilns to generate 60 MW Power.

FBC Power Plant

The unit will have FBC boiler (1 x 80 TPH Capacity) to generate 20 MW Power. The boiler will be designed for continuous operation at Turbine Maximum Continuous Rating (TMCR). A margin of 10% over TMCR shall be taken into account to arrive at Boiler rated capacity. The boiler will be natural circulation, circulating fluidized bed combustion, two pass, non reheat, single drum, balanced draft, semi-outdoor type. The boiler will have continuous evaporation rating of approx. 360 tonnes/hr. (BMCR shall not be less than 110% of TMCR) with steam parameters at super heater outlet as 66 kg/cm² and 490⁰C . The feed water temperature at MCR at inlet to economizer is expected to be around 120⁰C. Steam parameter are to be fine tuned at Boiler outlet based on actual plant layout and piping arrangement. The boiler will be complete with ash /solid separator, economizer, air heater, ducting, FD fans, ID fans and PA fans. Air cooled condensers envisaged for Power plant to conserve water.

Figure 3.10: Schematic Diagram showing Power Generation Process

3.5.5 FERRO ALLOYS PLANT

Ferro Alloys will be smelted at about 1350 – 1500⁰C. This will be achieved by a conventional, Closed Submerged Electric Arc Furnace. The three carbon Electrodes, partially submerged in the charge, are supported on hydraulic cylinders for upward and down ward movements to maintain the desired electrical conditions.

The body of the furnace is cylindrical in shape, and is lined with firebricks, silicon carbide bricks and carbon tamping paste. Three tap – holes are provided at 120 degree apart for drawing out both the molten alloy and Slag. During the repair works one of the tap – holes the other will function as stand by.

The weighed raw materials will be thoroughly mixed in the proper proportion before charging into the furnace, through Skip, Telfer hoist and charging chutes. The charge will be pushed near to electrodes on Furnace top by a Charging Stoker.

As the charge enters the smelting zone, the alloy formed by chemical reactions of the oxides and the reductants, will be heavy, gradually settles at the bottom. At regular intervals the furnace will be tapped. The tap hole will be opened by Oxygen lacing pipe and after tapping is completed, it will be closed by clay plugs. The liquid Silico manganese and Slag will be

collected in a Ladle and Slag will be over flowed to sand beds. The metal being retained in the ladle having a Nozzle at bottom which allows metal flows on to C.I. Pans. After solidification the cakes will be broken manually to required lump size.

SILICO MANGANESE & FERRO MANGANESE PROCESS

Manganese ore is in the form of MnO, SiO₂, FeO, Al₂O₃, MgO and other Oxides. MnO is reduced to Mn and FeO is reduced to Fe taking Carbon from Coke / Coal and the product is produced as Si Mn/Fe Mn. The other oxides are simultaneously removed as Slag along with metal. The Slag and Metal are separated by virtue of its self-differential gravities after collecting in the ladle. The ladle will have a nozzle in the bottom portion through which the metal flows in to C.I. Pans.

Chemical Composition of Si Mn

S.No.	Constituent	Percentage
1.	Mn	60 – 65%
2.	Si	+ 15%
3.	C	2%
4.	S & P	0.03% Max

Chemical Composition of Fe Mn

S.No.	Constituent	Percentage
1.	Mn	70 - 75%
2.	Si	+ 1.5%
3.	C	7 - 8 %
4.	S	0.05% Max
5.	P	0.4 %

FERRO SILICON PROCESS

Ferro Silicon is a Slagless process. Quartz is the main raw material which contains 99%of SiO₂. Charcoal and a small percentage of Coal is used as reductants. Mill Scale / Iron Ore is added to obtain Ferro Silicon. FeO is reduced to Fe and SiO₂ is reduced to Si Combining with Carbon and produced as Fe Si.

Chemical Composition of Fe Si

S.No.	Constituent	Percentage
1.	Si	70 - 75%
2.	C	7 – 8 %
3.	S	0.05 %

4. P 0.4% Max

FERRO CHROME PROCESS

Chrome Ore is in the form of Cr_2O_3 , Fe_2O_3 , SiO_2 , Al_2O_3 , CaO and MgO . These oxides react with carbon in the coke and reduced to Fe, Cr, Si, C etc. Other oxides i.e Al_2O_3 , SiO_2 , CaO , MgO are removed in the form of Slag.

Chemical Composition of Fe Cr

S.No.	Constituent	Percentage
1.	Cr	60 – 65 %
2.	C	1 - 8 %
3.	Si	1 - 3 %
4.	S	0.04 %
5.	P	0.04%
6.	Cu	0.5 %

Ferro Alloys will be smelted at about $1350 - 1500^{\circ}C$ temperature. This will be achieved by a conventional, Closed Submerged Electric Arc Furnace. The three carbon Electrodes, partially submerged in the charge, are supported on hydraulic cylinders for upward and down ward movements to maintain the desired electrical conditions.

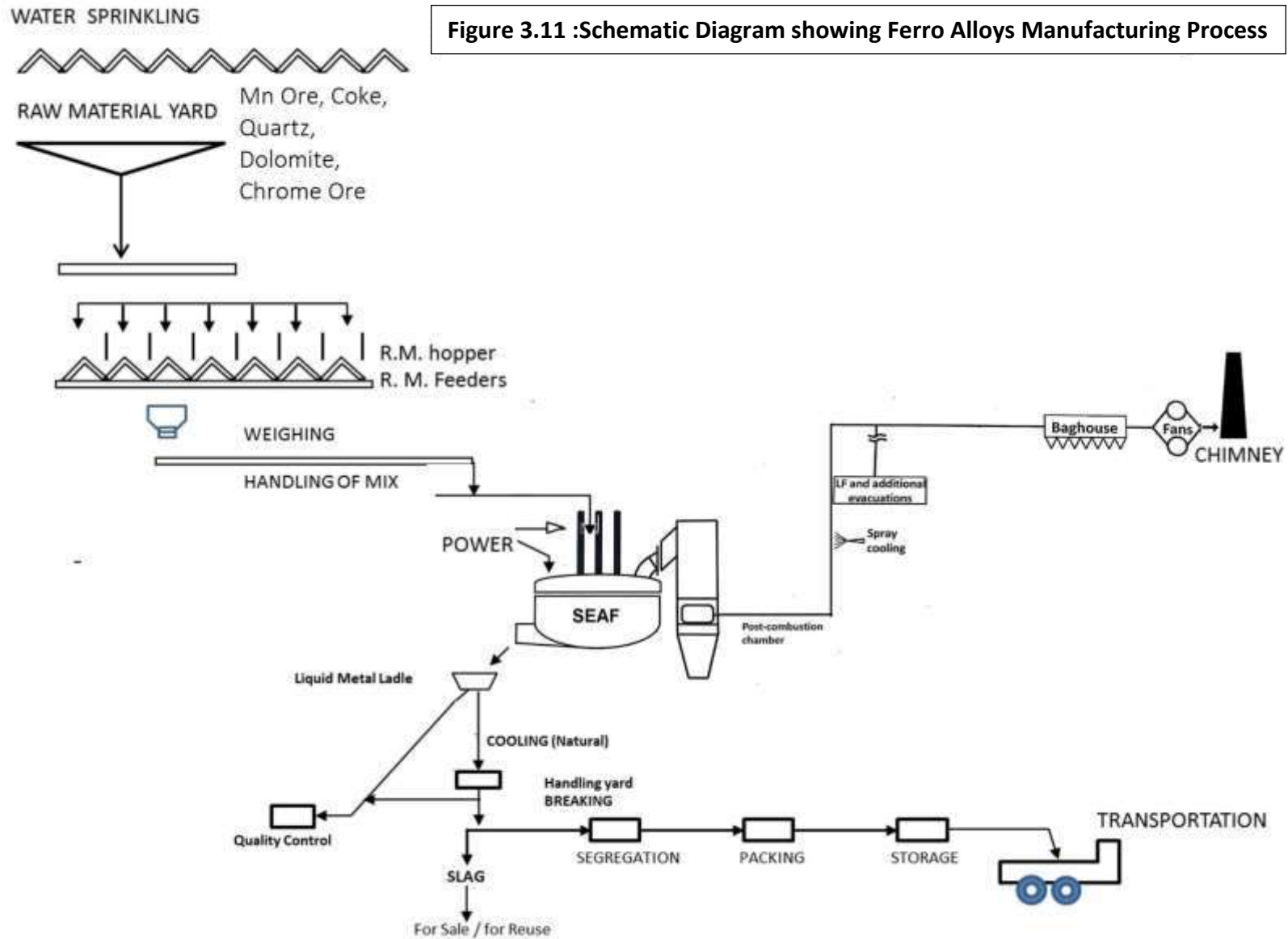
The body of the furnace is cylindrical in shape, and is lined with firebricks, silicon carbide bricks and carbon tamping paste. Three tap – holes are provided at 120 degree apart for drawing out both the molten alloy and Slag. During the repair works one of the tap – holes the other will function as stand by.

The weighed raw materials will be thoroughly mixed in the proper proportion before charging into the furnace, through Skip, Telfer hoist and charging chutes. The charge will be pushed near to electrodes on Furnace top by a Charging Stoker.

As the charge enters the smelting zone, the alloy formed by chemical reactions of the oxides and the reductants, will be heavy, gradually settles at the bottom. At regular intervals, the furnace will be tapped. The tap hole will be opened by Oxygen lacing pipe and after tapping is completed, it will be closed by clay plugs.

The liquid Silico manganese and Slag will be collected in a Ladle and Slag will be over flowed to sand beds. The metal being retained in the ladle having a Nozzle at bottom which allows metal flows on to C.I. Pans. After solidification, the cakes will be broken manually to required lump size.

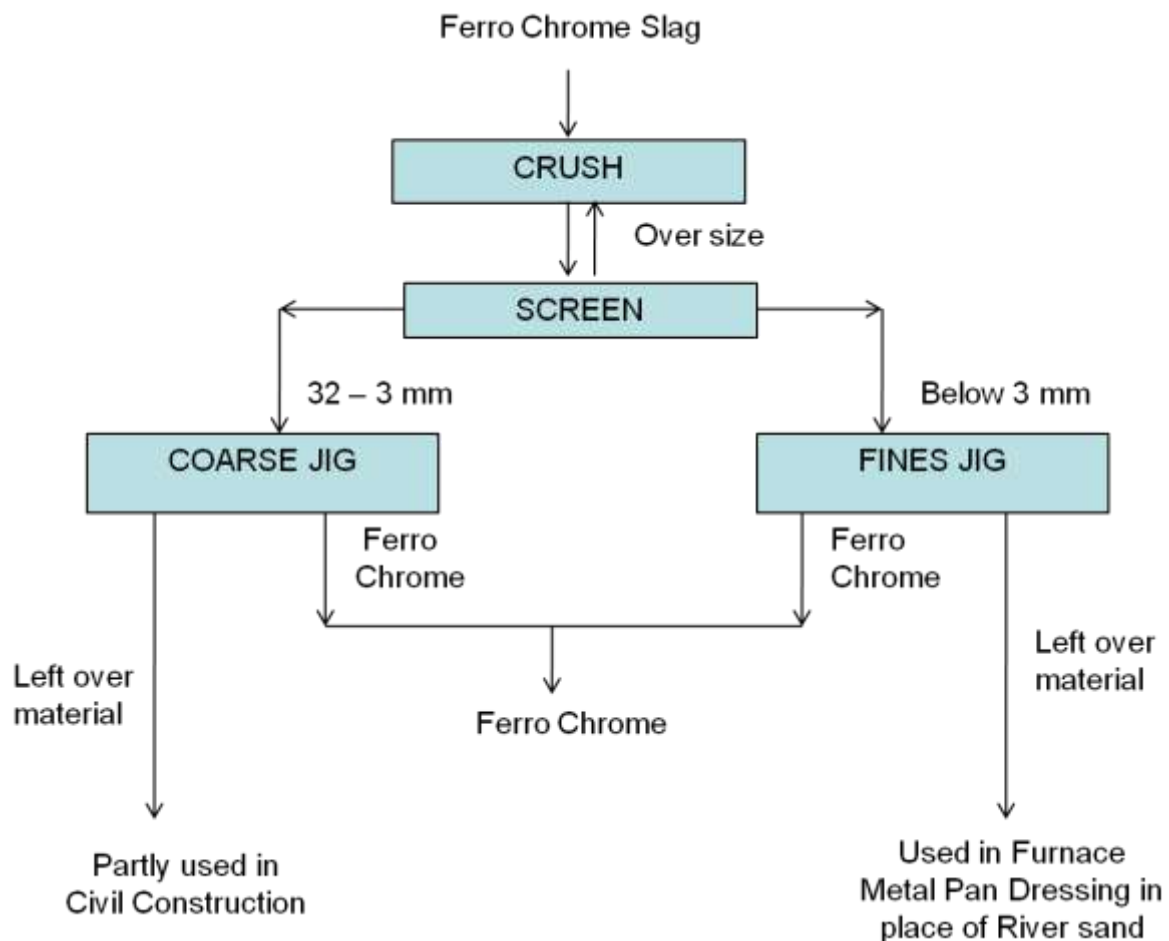
Figure 3.11 :Schematic Diagram showing Ferro Alloys Manufacturing Process



PROCESS OF FERRO CHROME RECOVERY (ZIGGING PLANT)

Ferro chrome recovery process involves the following steps:

- i. Crushing & screening: In this slag is crushed to smaller size particles as close as possible
- ii. Coarse jigging: In this particles having coarse fraction (approximately -32 to -3mm) is separated through two stage air pulsated jig for recovery of metal.
- iii. Fine jigging: In this particles of fine fraction (-3mm) is separated through diaphragm pulsed (through the bed' jigs for recovery of metal.)
- iv. The recovered metal will be reused in the process.



PIG IRON PROCESS

The process of manufacturing Pig iron in SAF includes smelting of various raw materials in SAF. Power to the furnace is supplied from furnace transformer to furnace through three Nos. Soderburg Electrodes.

Reducing agents and fluxing materials are charged into the Furnace from Top. High current at low voltage is passed through the raw material charged with the help of self baking Soderburg Electrodes.

Raw material mix charged into the furnace gets heated up due to I²R effect of high current passing through the charge from the three electrodes. When temperature of charge reaches to chemical reaction temperature, carbon present in reductants gets reacts with the oxides of Iron ore, Limestone & quartz. Thus metallic, Iron and Silicon are extracted as metal from the ores. Unreacted materials, impurities and residual oxides formed as slag. Metal and Slag in molten form gets collected at the bottom of furnace after each interval of 3-4 hours. Tapped molten mass consists of mixture of metal and slag. Metal is separated out from slag by gravity separation method.

Production process is continuous. Load of the furnace during smelting and tapping period more or less remains same.

Following chemical reactions take place:-



Oxides of Iron present in the ore get reduced to metallic Iron with the help of carbon from reducing agents and Carbon Monoxide is liberated.

Silicon is present in the raw materials in the form of SiO₂. SiO₂ is present in Iron ore, reducing agents, quartz..... etc. Silicon is smelted from SiO₂ as per following reaction :-



Thus, in smelted molten metal, Fe, Si are present in molten form. Metal so smelted is called Pig iron. This metal contains some carbon in dissolved state as carbides of metal. Certain amount of Phosphorus is also present in metal. This is smelted from phosphates present in Iron ore and reducing agents.

It may be noted that entire oxides of Iron do not get reduced to metallic Iron. Certain amount of Iron in FeO form remains unreacted and forms a part of slag. Similarly, certain amount of SiO₂ remains unreacted and forms a part of slag. Dolomite Flurspar and lime Stone is added to

provide proper fluidity to slag. Hence, CaO and MgO of these fluxing materials are also a part of slag.

Thus, during smelting of Pig iron, metal produced contains elements of Fe, Si, C & P etc., as impurities. Slag consists of FeO, SiO₂, Al₂O₃, CaO, MgO etc.

3.5.6 GALVANISING PLANT

Galvanizing of Pipes

Pre-treatment

The requirement for successful galvanizing is that the item to be dipped must be free from contaminants prior to dipping. Pre-treatment to achieve the surface required for galvanizing may include cleaning, pickling and fluxing. Some items, e.g. structural steel, may arrive on site in a clean state and not require any cleaning. The cleaning of iron and steel items may include any of the following physical or chemical treatments.

Shot blasting

Shot blasting removes contamination such as paint, sand, or grease. It may also be used to create a greater surface area allowing a thicker zinc coating when galvanizing.

Degreasing

Degreasing removes surface oils and grease using proprietary solutions which may be alkaline, neutral or acidic. Some galvanizers use surfactant additives in the acid pickling bath for degreasing. Although it is not normal practice, vapor degreasing with organic solvents may be undertaken. In this event PG6/23 (coating of metal) should be consulted for the appropriate standards of control and emission limits. Rinsing may be used after alkaline degreasing to minimize carryover of alkaline solution into the acid pickling tank.

Pickling

Pickling is a process whereby the surfaces of the items are prepared for galvanizing. It involves removal of surface oxidation products (e.g. rust) and mill scale (arising from the steel rolling process). Generally hydrochloric acid (36% or 28%) is bought in bulk and diluted on site for use in pickling baths at ambient temperature, (concentrations up to 18% acid is generally used).

The acid used is co-product acid, which means it is derived from a commercial process involving chlorination of an organic compound, (if the co-product acid meets then the organic content is controlled. It is not a necessary requirement however.) It is possible on occasion

that co-product acid may have an odour associated with its organic content. This should be acceptable provided it is not noticeable outside the process boundary (Sometimes 15% sulphuric acid is used for pickling at 40°C. In combination with a pickling inhibitor, emissions from use of sulphuric acid are not problematic).

The reaction in the pickling bath is slightly exothermic. Use of heated pickling solutions reduces pickling times. Stronger acids or heated acids may generate more fume and may require arrestment and control under COSHH Regulations.

The acid needs to be at about 10°C to start the pickling process. If the temperature falls below this it is acceptable to apply indirect heating to raise the temperature (Direct injection of steam may give rise to unacceptable fuming and should not be used).

An acid inhibitor may be added to the pickling bath which prevents the acid from attacking the steel itself. Fume suppressants may also be used.

As pickling proceeds, the iron content of the acid builds up and the acid strength decreases.

When the bath liquid reaches a composition of approximately 5% acid and 150 g/l of iron it is no longer effective as a pickling solution and is described as "spent". The rate at which this occurs depends upon the work being pickled. Operators may top up an acid bath with fresh acid from time to time. There is usually a number of acid pickling baths that range in strength from fresh acid to spent acid. When a tank is spent and can no longer be used for pickling it may be used for stripping the zinc from any rejected galvanized work. Some operators have a dedicated acid bath for zinc stripping only. Waste acid is tankered off site for treatment.

Good practice when taking delivery of acid directly into an acid bath or when re making acid baths is to secure the discharge hose to the bath. As delivery of acid from the tanker is usually air pressure assisted there may be an air surge caused by the release of pressure towards the end of a delivery. Good control of the delivery rate and pressure release is required. This is managed by the tanker driver. There are developments towards vehicle mounted or ground mounted pump delivery which avoids this problem and reduces fuming. The INEOS-chloroHydrochloric Acid Bulk Storage document provides guidance for acid storage and fume minimization, which may be useful where acid is stored on site prior to use.

Rinsing

Rinsing after pickling washes off acid and prevents carryover of iron salts on the surface of the work piece. Such carryover would cause additional dross to be formed in the zinc bath. Water is used for rinsing. Two rinse tanks may sometimes be used.

Fluxing

A flux is usually applied to the work surface in order to prevent any oxidation of the work piece before it is dipped. It covers the whole surface and enhances the zinc "wetting" of the steel allowing a uniform coating to be achieved.

Zinc chloride can be used as a flux but most fluxes consist of zinc ammonium chloride (ZAC). This is a mixture of zinc chloride and ammonium chloride salts. The proportions of each may vary. They are sometimes described as double or triple salts, where double salt is made of 55% zinc chloride 45% ammonium chloride and triple salt is made of 45% zinc chloride 55% ammonium chloride. (These salts comprise a molecular mix which is crystallised out during manufacture - "double salt" has 1 molecule of zinc chloride to 2 molecules of ammonium chloride, "triple salt" has 1 molecule of zinc chloride to 3 molecules of ammonium chloride - they store much better than a mixture of zinc chloride and ammonium chloride which goes very hard as zinc chloride is deliquescent). Ammonium chloride from the flux is one of the main components of the fume when the workpiece is dipped.

The prepared items are then ready to be galvanized.

Coating

The galvanizing bath contains molten zinc or zinc alloy at about 440 - 460°C. Specialist plants operate at about 555°C. Alloy formation is different at this temperature. (98.5% zinc is the lowest grade of zinc that is usually used). Metal additives in small quantities are used to enhance the characteristics of the galvanizing process. Such techniques are continually being developed world-wide within the industry.

The galvanizing process is a metallurgical reaction which creates zinc/iron alloy layers. The composition of the alloy layers changes. The layers closest to the base metal are iron rich with the percentage of zinc increasing through the layers until there is 100% zinc layer at the surface. The quality of the final product can be affected by the make-up of the steel article.

Where ammonium chloride or ZAC type of fluxes are used, fume is created instantaneously at the point of dipping. The content includes ammonium chloride, zinc oxide, zinc chloride and steam. These arise from the flux and the molten zinc.

Containment of the fume from dipping is usually affected by the use of enclosures which may be fixed or mobile. During dipping the enclosure should be in place and the extractor fans switched on.

Double dipping is a technique which is sometimes used for extremely large work pieces. Where the length of the item is such that one door of the enclosure cannot be closed during dipping, then fugitive fume emissions should be contained in the building. (Note: items may be double dipped for reasons other than that the work is too large for the bath. In these cases, the issue of doors being left open does not arise).

When semi-automatic tube galvanizing, full enclosure is impractical and a canopy is considered BAT in these circumstances, provided that there is sufficient extraction so that there is not significant escape of fume into the workplace. Tube blowing is carried out to remove zinc oxide build-up on the inner surface of the tube.

Dusting (also described as hand salting) - ammonium chloride is occasionally sprayed as a powder or a solution, or hand applied to work as it is withdrawn from the bath, in order to remove excess zinc or impurities that may have adhered to the work surface. This gives rise to fumes and should be avoided wherever possible. The use of a spray gun allows more control over the process and is to be preferred to hand application. The extraction should be operational during dusting.

The ash, which is mainly zinc oxide, forms on the surface of the molten zinc and is skimmed back before the work is withdrawn from the bath to avoid it contaminating the coating.

The dross is a solid consisting of about 95% zinc/5% iron alloy. It is heavier than zinc and sinks to the bottom of the zinc bath. It is removed periodically with perforated grabs or spoons.

Post treatment

The work may be left to air cool to room temperature but often it is quenched in water (bossed) after galvanizing.

Galvanizing process of Wire

Wire galvanizing is normally a continuous process and can involve some or all of the following pre-treatment processes - annealing, degreasing, pickling, rinsing and fluxing before the actual galvanizing.

A similar process is used for galvanizing fabricated welded wire mesh and for hexagonal wire netting.

Galvanized wire can be divided into two types, mild steel and high carbon steel. Mild steel galvanized wire is used for the manufacture of barbed wire, hexagonal netting, field fencing etc. High carbon steel galvanized wire is used for the manufacture of springs, ropes, cables etc (items requiring its high tensile strength). The mild steel galvanizing process generally

requires a soft wire, which is achieved by annealing through molten lead baths or furnaces of several different types. The high carbon steel galvanizing process requires a re-crystallized structure which is achieved by heating through a furnace and quenching in a lead bath or other medium (can be specially designed water quench) in order to freeze the re-crystallized structure and provide a ductile and workable finished product, this process is known as "patenting". Any of the above wires may be galvanized hard in which process the wire will pass through a low temperature lead bath or furnace in order to stress relieve the wire and degrease.

The galvanizing process itself is achieved by passing the wires through the zinc bath under a sinker. The sinker may be a roller which rotates with the wire or a solid block of ceramic or refractory concrete under which the wire skids. The wire exits the zinc normally vertically as this gives the simplest conditions for a concentric coating. It is then wiped by a range of techniques in order to achieve the required coating weight. The most common today are "jet wiping" which uses nitrogen gas to achieve heavier coat weights and "pad wiping" which uses mineral fibre pads to achieve light coating weights. The zinc bath itself will be run at about 450°C

Surface Finish

The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible, and free from any defect that is detrimental to the stated end use of the coated article. On silicon killed steels, the coating may be dull grey, which is acceptable provided the coating is sound and continuous. Any reparation is to be carried out as per the requirement of market.

The integrity of the coating shall be determined by visual inspection and coating thickness measurements. Where slip factors are required to enable high strength friction grip bolting, where shown, these shall be obtained after galvanizing by suitable mechanical treatment of the faying surfaces.



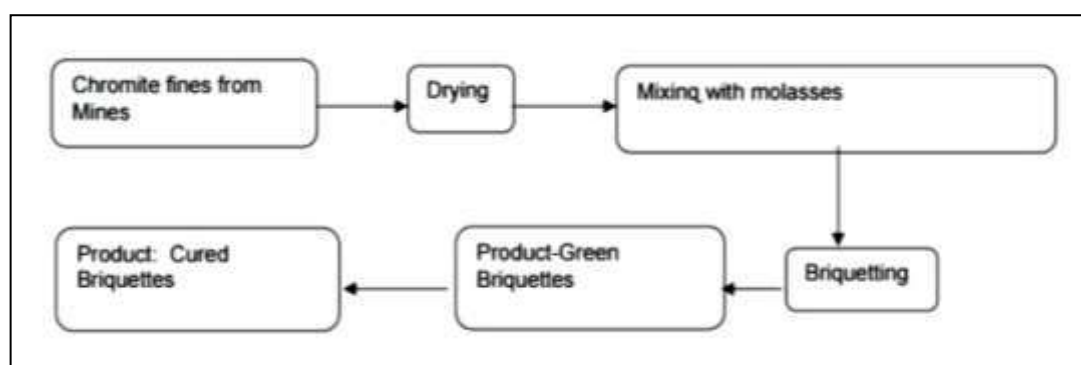
3.5.7 BRICK MANUFACTURING

It is proposed to establish Fly Ash / Slag brick making unit of 70,000 bricks/day capacity. Fly ash (70%), Gypsum (5%), cement (10%) and Slag, Stone dust etc. (15%) are manually feed into a pan mixer where water is added to the required proportion for homogeneous mixing. The proportion of raw material may vary depending upon quality of raw materials. After mixing, the mixture is allowed to belt conveyor through feed in to automatic block making machine where the blocks are pressed automatically. Then the blocks/ blocks are placed on wooden pallets and kept as it is for two days there-after transported to open area where they are water cured for 10 -15 days. The blocks are sorted and tested before dispatch.

3.5.8 BRIQUETTING PLANT

Chromites ore Fines and concentrates cannot be charged directly into the smelting furnace, especially closed top submerged arc furnace for reason of safety and bad performances. The fines are therefore agglomerated for improving the smelting condition. Various processes are available for agglomeration- sinter pellet, briquettes and chrome ore sinter, the first two process being most widely used. As explained in Figure below, the chrome ore fines received from mines are first dried in dryer. The dry ore is mixed with molasses, and the green mix is then fed to the briquetting presses. The presses compact the mixture at high pressure to form green briquettes. The green briquettes are stored in the storage yard for curing. After curing at ambient temperature for 24- 48 hrs, the briquettes become stronger and are fed into Submerged Arc Furnaces.

Figure 2.11 : Schematic Diagram showing Process of Ferro Chrome Briquettes Chrome Briquettes



3.6 RAW MATERIAL REQUIREMENT

The following will be the raw material requirement for the proposed project:

Table No. 3.3 : Raw Material Requirement, Source & Mode of Transport

S.No.	Raw Material		Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
1.	For DRI Kilns (Sponge Iron) – 7,00,000 TPA					
a)	Pellets (100 %)		10,15,000	Maharashtra / Chhattisgarh	~ 500 Kms.	Through covered conveyers
	or					
	Iron ore (100%)		11,20,000	Maharashtra / Chhattisgarh	~ 500 Kms.	By rail & road (through covered trucks)
b)	Coal	Indian	9,10,000	Maharashtra	~ 500 Kms.	By rail & road (through covered trucks)
		(or)				
		Imported	5,82,400	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (through covered trucks)
c)	Dolomite		35,000	Maharashtra	~ 100 Kms.	By road (through covered trucks)
2.	For Steel Melting Shop (Hot Billets / MS Billets / MS Slabs) – 6,72,000 TPA					
a)	Sponge Iron		6,79,000	Inhouse Generation	---	Through covered conveyers
b)	MS Scrap / Pig Iron		1,01,000	Maharashtra	~ 100 Kms.	By road (through covered trucks)
c)	Ferro alloys		34,000	Inhouse Generation	---	By road (through covered trucks)
3.	For Rolling Mill through Hot charging (Rolled Products) – 7,00,000 TPA					
a)	Hot Billets (for Hot charing)		5,95,000	Inhouse Generation	---	---
b)	Billets (for Reheating furnace)		1,05,000	Inhouse Generation	---	---
c)	LDO		3400 KL/annum	Nearby IOCL Depot	~ 100 Kms.	By road (through Tankers)
d)	Coal for gasifier (Producer Gas) 6,300 Nm ³ /Hr	Indian	18,900	Maharashtra	~ 500 Kms.	By rail & road (through covered trucks)
		Imported	12,096	Indonesia / South Africa /	~ 600 Kms. (from Vizag	Through sea route, rail route & by road

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S.No.	Raw Material		Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
				Australia	Port)	
4.	For FBC Boiler [Power Generation 20 MW]					
a)	Indian Coal		1,18,800	Maharashtra	~ 500 Kms.	By rail & road (through covered trucks)
	OR					
b)	Imported Coal		76,000	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (through covered trucks)
	OR					
c)	Dolochar + Indian Coal	Dolochar	1,40,000	Inhouse Generation	---	through covered conveyors
		Indian Coal	48,800	Maharashtra	~ 500 Kms.	By rail & road (through covered trucks)
	OR					
d)	Dolochar + Imported Coal	Dolochar	1,40,000	Inhouse Generation	---	through covered conveyors
		Imported Coal	31,232	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (through covered trucks)
5.	For Ferro Alloys (3 x 9 MVA)					
5 (i)	<i>For Ferro Silicon – 21000 TPA</i>					
a)	Quartz		31,920	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
b)	LAM coke		11,760	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
c)	Mill scales/ MS Scrap		5,670	Inhouse Generation	---	By road (through covered trucks)
d)	Electrode paste		420	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
e)	Bagfilter dust		798	Inhouse Generation	---	---
5 (ii)	<i>For Ferro Manganese – 75,600 TPA</i>					
a)	Manganese Ore		1,71,990	MOIL / OMC	~ 500 Kms.	By Rail & Road (through covered

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S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
					trucks)
b)	LAM coke	27,594	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
c)	Dolomite	12,852	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	MS Scrap / Mill scales	11,340	Inhouse Generation	---	By road (through covered trucks)
e)	Electrode Paste	983	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
f)	Bagfilter dust	3,780	In house generation	---	---
5 (iii)	<i>For Silico Manganese – 43,200 TPA</i>				
a)	Manganese Ore	70,416	MOIL / OMC	~ 500 Kms.	By Rail & Road (through covered trucks)
b)	FeMn Slag	45,708	In house generation	---	----
c)	LAM Coke	16,200	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	Dolomite	9,720	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
e)	Electrode paste	864	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
f)	Quartz	10,368	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
g)	Bag filter dust	648	In house generation	---	---
5 (iv)	<i>For Ferro Chrome – 45,000 TPA</i>				
a)	Chrome Ore	90,000	Sukinda, Odisha Import, South Africa	~ 500 Kms. ~ 600 Kms. (from Vizag Port)	By road (through covered trucks) From Port By Road (through covered Trucks)
b)	LAM Coke	14,850	Andhra Pradesh	~ 500 Kms.	By road

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S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
					(through covered trucks)
c)	Quartz	7,875	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	MS Scrap / Mill Scale	6,750	Inhouse Generation	---	By road (through covered trucks)
e)	Magnetite / Bauxite	7,605	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
f)	Electrode Paste	1,350	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
g)	Bagfilter dust	2,880	Own generation	---	---
5 (v)	For Pig Iron – 75,600 TPA				
a)	HG Iron ore	111,510	Maharashtra / Chhattisgarh	~ 500 Kms.	By rail & road (through covered trucks)
b)	LAM Coke	36,666	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
c)	Lime stone	9,450	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	Quartz	4,536	Maharashtra / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
e)	Electrode Paste	1,512	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
f)	Briquetted Bag filter dust	2,268	Own generation	---	---
6	Galvanizing Plant (1,00,000 TPA)				
a)	Tube, Wires, Pipes etc.	1,00,000	Own generation	---	---
b)	Zinc	4,200	Maharashtra	~ 200 Kms.	By road (through trucks)
c)	HCl	302,400 KI/annum	Maharashtra	~ 200 Kms.	By road (through trucks)
d)	Ammonium Chloride	300	Maharashtra	~ 200 Kms.	By road (through trucks)
e)	Sodium Dichromate	1,680	Maharashtra	~ 200 Kms.	By road (through trucks)

3.6.1 MODE OF TRANSPORT OF RAW MATERIAL AND FINISHED PRODUCTS

- Major raw materials will be transported through railway rakes up to the nearest railway station (i.e. Mul-Maroda Railway – 8.0 kms – By Road) and then to the site through road by covered trucks.
- All the trucks used for the transport of raw materials, products and wastes will be completely covered with tarpaulin and ensured no spillage during transportation.
- No. of trucks required for proposed project will be 313 trucks /day.
- Internal roads in the proposed project will be made pucca.
- All the raw material required for the proposed steel plant will be stored on pucca platform above ground level.
- All the raw material yards are equipped with water sprinkling system, so as to avoid fugitive emission during the material handling.

3.6.2 MARKET OF FINAL PRODUCTS

Final product i.e. Rolled products (7,00,000 TPA), will be sold local market & may also be exported.

3.7 WATER REQUIREMENT AND ITS SOURCE

- Water required for the proposed project will be 2800 KLD. This includes make up water for DRI Kiln, Induction Furnace, Rolling Mill, Coal Gasifier, Ferro Alloys, Galvanizing Unit, Brick Manufacturing unit, Briquetting Unit & Domestic.
- Air cooled condensers will be provided Power plant.
- Water required for proposed project (for process and domestic) is 2800 KLD & Water required for proposed project will be supplied by Maharashtra Industrial Development Corporation (MIDC). In case of any shortfall from MIDC, it is proposed to source remaining quantity of water through Borewells in the company owned private land of 10 acres, proximate to the proposed project site (which not part of the MIDC land). A pipeline will be laid to bring water to the proposed project site. Approval will be obtained from CGWA for drawl of Ground water.

Table No. 3.4 :WATER REQUIREMENT BREAKUP

S.No.	Unit	Quantity in KLD
1.	Make-up water for DRI plant	500
2.	Make-up water for SMS plant	400
3.	Make-up water for Rolling mill	450
4.	Make-up water for Ferro Alloy plant	90
5.	Make-up water for Coal Gasifier	10
6.	Make-up water for Galvanisation Plant	10
7.	Bricks manufacturing Unit	10
8.	Briquetting plant	10
9.	Captive Power Plant	1300
	• Cooling Tower Make-up	545
	• Boiler make-up	605
	• D.M. plant regeneration water	150
10.	Domestic	20
	Total	2800

3.8 WASTEWATER GENERATION & ITS MANAGEMENT

- There will be no effluent discharge in the Sponge Iron, unit as closed circuit cooling system will be adopted.
- Effluent generated from Induction Furnace Unit, Ferro Alloys, Galvanisation Plant will be sent to Effluent Treatment Plant (ETP) for treatment and after ensuring compliance with SPCB norms, it will be utilized for dust suppression, ash conditioning and for greenbelt development.
- Effluent from power plant will be treated in ETP and after ensuring compliance with SPCB norms, it will be utilized for dust suppression, ash conditioning and for greenbelt development.
- Effluent generated from Coal Gasifier will be used in ABC Chamber of DRI Kilns.
- Air cooled condenser will be provided in the power plant, which will reduce the water consumption significantly. Hence wastewater generation will be also be minimized.
- Sanitary waste water will be treated in STP and after treatment it will be utilized for greenbelt development.
- Zero liquid effluent discharge practice will be maintained in the proposed project.
- During monsoon the treated effluent will be utilized as makeup water in Rolling Mill. Accordingly, the makeup water for Rolling mill also reduces during the rainy period.

Table No. 3.5 :WASTEWATER GENERATION AND ITS BREAKUP

S.No.	Source	Generation (KLD)
1.	From Induction Furnace	20
2.	From Rolling Mill	22
3.	From Ferro Alloys	6
4.	From Coal Gasifier	8
5.	From Galvanisation Plant	5
6.	Power Plant	365
	a) Cooling Tower blowdown	125
	b) Boilers blowdown	90
	c) D.M. plant regeneration water	150
7.	Sanitary Wastewater	16
	Total	442

EFFLUENT TREATMENT PLANT

pH of the boiler blowdown will be between 9.5 to 10.5. Hence a neutralization tank will be constructed for neutralizing the boiler blow down. DM plant regeneration water will be neutralized in a neutralization tank. After neutralization, these two effluent streams will be mixed with Cooling Tower blowdown in a Effluent Treatment Plant (ETP). Service water will be treated in an oil separator and after treatment it will be taken to ETP. The treated effluent will be utilized for dust suppression, ash conditioning and for Green belt development. No effluent will be let out of the plant premises. Hence Zero discharge concept will be implemented.

9.78 Ha (24.16 Acres) of greenbelt will be developed within the plant premises by using the treated effluent. A dedicated pipe distribution network will be provided for using the treated effluent for greenbelt development.

3.9 POWER REQUIREMENT AND ITS SOURCE

Power required for the proposed project will be 121 MW and same will be sourced from 80.0 MW Captive Power Plant & remaining 41.0 MW is from State Grid.

Table No. 3.6 :POWER REQUIREMENT AND ITS BREAKUP

S.No.	Plant	Power Consumption	Power Requirement (in MW)
1.	DRI	85 Kwh/ton	6.6
2.	SMS	700 Kwh/ton	68.6
3.	Rolling Mill	150 Kwh/ton	8.4
4.	Gasifier	----	1.0

S.No.	Plant	Power Consumption	Power Requirement (in MW)
5.	Ferro Alloys	3000 - 8,000 Kwh/ton	27
6.	Galvanising Plant	---	0.9
7.	Bricks manufacturing Unit	----	1.0
8.	Briquetting plant	----	1.0
9.	Power Plant – WHRB	Aux. Consumption @ 10%	4.5
10.	Power plant – FBC	Aux. Consumption @ 10%	2.0
Total			121.0

3.10 SOLID WASTE GENERATION & ITS MANAGEMENT

Following solid waste / by product will be generated from proposed project:

Table No. 3.7: SOLID WASTE GENERATION AND ITS MANAGEMENT

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
1.	Ash from DRI	1,26,00	Will be utilized in the proposed Brick Manufacturing Unit
2.	Dolochar	1,40,000	Will be used in proposed CFBC power plant as fuel.
3.	Kiln Accretion Slag	6,300	Will be utilized in the proposed Brick Manufacturing Unit
4.	Wet scrapper sludge	28,000	Will be utilized in the proposed Brick Manufacturing Unit
5.	SMS Slag	67,200	Slag from SMS will be crushed and iron will be recovered & then remaining non -magnetic material being inert by nature will be used in proposed Brick Manufacturing Unit
6.	End Cuttings from Rolling Mill	20,730	Will be reused in the SMS
7.	Mill scales from Rolling Mill	2,100	Mill scales will be recycled to Ferro alloys unit.
8.	Ash from Power Plant (Indian Coal + Dolochar)	1,05,960	Will be utilized in the proposed Brick Manufacturing Unit
9.	Slag from FeMn	45,708	Will be reused in manufacture of SiMn as it contains high SiO ₂ and Silicon.
	(or)		
10.	Slag from FeSi	5,057	Will be given to Cast iron foundries
	(or)		
11.	Slag from SiMn	38,481	will be used for Road construction / will be given to slag cement manufacturing
	(or)		
12.	Slag from FeCr	26,136	Will be processed in Zigging plant for Chrome recovery. After Chrome recovery, the left-over slag will be analysed for Chrome content through TCLP

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
			test, if the Chrome content in the slag is within the permissible limits, then it will be utilised for Road laying /brick manufacturing. If Chrome content exceeds the permissible limits, it will be sent to nearest TSDF.
	(or)		
13.	Slag from Pig Iron	32,508	Will be given slag based cement manufacturing units
14.	Zinc Dross	650	Will be given to SPCB approved vendors / TSDF
15.	ETP Sludge	100	Will be sent to TSDF

3.11 SCHEMATIC REPRESENTATION OF THE FEASIBILITY DRAWINGS WHICH GIVE INFORMATION OF EIA PURPOSE

As per the Ministry of Environment, Forest & Climate Change (MoEF&CC), New Delhi, EIA notification dated 14th September, 2006 & its subsequent amendments, all Primary metallurgical processing industries (Sponge Iron > 200 TPD & Ferro Alloys) are falling under Sl. No. 3 (a), classified as Category 'A' for the grant of Environmental Clearance at Central Level.

As per the provision of the EIA notification 2006 & its subsequent amendment, it is necessary to get Environmental Clearance by applying to MoEF&CC along with the Environmental Impacts Assessment Study Report for the proposed project prior to commissioning of the project activities. Therefore the EIA is required to conduct to comply with provisions of EIA notification 2006 & its subsequent amendment made for Sl. No. 3 (a) "A" of schedule -I of the notification.

Chapter – 4 : SITE ANALYSIS

4.1 CONNECTIVITY

The proposed site is well connected with Road network. The following table gives brief regarding connectivity of the proposed site:

Component	Description
Road	: Maharashtra State Highway # 9 (Nagpur to Chandrapur Road) – 1.4 Kms by Road NH # 930 - 1.4 Kms by Road
Rail	: Mul-Maroda RS - 8.0 Kms by Road
Air	: Morwa Airport- 52.6 (by Aerial)

4.2 LAND FORM, LAND USE & LAND OWNERSHIP

Total land identified for the proposed project is 29.44 Ha. (72.74 Acres) of land and has been allotted by Maharashtra Industrial Development Corporation (MIDC) vide no. MIDC/RO/Mul/B-1/4333/2010 dt. 13.09.2010 and subsequently the same land has been reallocated vide letter No. MIDC/RO(NAGPUR)/Mul/LMS-72/1691/2022 dt. 09/05/2022 and copy of lease deeds is enclosed as **Annexure – 1**.

4.3 TOPOGRAPHY

The site is slightly slope towards North East side. Due to the proposed project, there will be some topographical change will occur due the excavations, construction activities pertaining to project. Contour maps showing elevation at the project site is shown Figure No. 4.1.

Kindly refer to **Annexure – 2** for Drainage disposal system with calculations and rain water harvesting details with calculations mentioning about GW recharge.

4.4 EXISTING LAND USE PATTERN**4.4.1 LAND USE PATTERN OF THE PROJECT SITE**

Total land identified for the proposed project is 29.44 Ha. (72.74 Acres) of land and has been allotted by Maharashtra Industrial Development Corporation (MIDC) vide no. MIDC/RO/Mul/B-1/4333/2010 dt. 13.09.2010 and subsequently the same land has been reallocated vide letter No. MIDC/RO(NAGPUR)/Mul/LMS-72/1691/2022 dt. 09/05/2022 and copy of lease deeds is enclosed as **Annexure – 1**.

No forest land is involved. There are no National Park, Wildlife Sanctuary, Eco-sensitive areas within 10 km of the Project site.

4.4.2 ENVIRONMENTAL SETTING OF THE PROJECT SITE

Below mentioned table gives brief regarding environmental setting of the plant:

Table No. 4.1: Environmental Setting within 10 Kms.radius of Project site

S.No.	Particulars	Aerial Distance from the site
1.	Nearest Village	: Maregaon Village – 0.8 Kms.
2.	Water bodies	: Mul river – 3.9 kms (S) Human Nadi – 2.5 kms (E) Saloli nadi – 2.7 kms (SSE)
3.	Reserve Forest / Protected Forest	: Scrub Forest (Zudpi Jungle) exists adjacent to the project site (South direction) Rajoli RF – Adjacent to the project site (NEE) Mul RF - 6.6 kms (SSW)
4.	Industrial areas / cluster (MoEF&CC Office Memorandum dated 13th January 2010) & its subsequent amendments	: Nil and also the project site area does not fall in the areas given in Hon'ble NGT order issued vide dated 10 th July 2019.
5.	National Park/ Wild life sanctuary / Biosphere reserve / Tiger Reserve / Elephant Corridor / migratory route for Birds	: There are no notified National Park/ Wild life sanctuary/Biosphere reserve/Tiger Reserve/migratory routes for Birds with in 10 Km. radius of the project site.
6.	Costal Regulation Zone [CRZ]	: Nil with in 10 Km. Radius.
7.	Nearest Highway (NH / SH)	: Maharashtra State Highway # 9 (Nagpur to Chandrapur Road) – 1.4 Kms by Road NH # 930 - 1.4 Kms by Road
8.	Nearest Interstate Boundary	: Nil with in 10 Km. Radius.
9.	Nearest Railway Station	: Mul-Maroda RS - 8.0 Kms by Road
10.	Nearest Port facility	: Nil with in 10 Km. Radius.
11.	Nearest Airport	: Nil with in 10 Km. Radius.

4.5 EXISTING INFRASTRUCTURE

Infrastructure like Internal Roads, Storage area, Parking areas etc. will be provided in the proposed project. For establishment and successful operation of plant, it is imperative to ensure availability of the following infrastructure:

- Availability of coal & iron ore and its proximity to the plant to reduce cost of transportation.
- Road/Rail head connection so that the raw materials and products can be easily and economically transported.
- Availability of water.
- Permanent and reliable source of power.
- Adequate land for the plant, storage of raw material and products & disposal of waste material.

Chapter – 5 : PLANNING BRIEF

5.1 PLANNING CONCEPT

Bhagalaxmi Metals Pvt Ltd is proposed to establish a Steel Plant at Plot No. B-1, Mul Growth Center, Mul Village & Taluka, Chandrapur District, Maharashtra. Following is Plant configuration and Production Capacity:

Table No. 5.1 :Plant configuration and production capacity

S.No.	Unit (Product)	Configuration	Capacity	
1.	DRI Kilns (Sponge Iron)	4 x 500 TPD	7,00,000 TPA	
2.	Induction Furnaces (Hot Billets / MS Billets / MS Slab)	4 x 40 T	6,72,000 TPA	
3.	Rolling Mills (TMT Bars, Structural Steel - Angle, Channels, Gutters, Coils, Flat Bars, Strips, MS Pipes, MS Tubes, Galvanized Pipes and angles) (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO / Producer Gas as fuel)	1 x 1300 TPD & 1 x 700 TPD	7,00,000 TPA	
4.	Coal Gasifier for Rolling Mill	6,300 NM ³ / Hr	6,300 NM ³ / Hr	
5.	Submerged Electric Arc Furnaces – Ferro Alloys (FeSi / FeMn / SiMn / FeCr/Pig Iron)	3 x 9 MVA	FeSi – 21,000 TPA / FeMn-75,600 TPA / SiMn-43,200 TPA / FeCr-45,000 TPA/ Pig Iron - 75,600 TPA	
6.	Power plant (80 MW)	WHRB Based Power Plant	4 x 15 MW	60 MW
		FBC Based Power Plant	1 x 20 MW	20 MW
7.	Galvanizing Unit	---	1,00,000 TPA	
8.	Bricks manufacturing Unit	70,000 Bricks /Day	70,000 Bricks /Day	
9.	Briquetting plant	300 Kg/Hr.	300 Kg/Hr.	

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.

The city has a Cosmopolitan and multicultural mix of people that have migrated from other areas of India. People from every state of India live here. People migrated from other parts of country love this city. The main languages spoken are Marathi, Hindi and English

5.3 LAND USE PLANNING

29.44 Ha. of land is envisaged for the proposed project. The following is land use planning/statement of the plant area:

Table No. 5.2 :LAND USE STATEMENT

S.No.	Land Use	Area (in Ha.)
1.	Builtup area	13.49
2.	Storage area	1.40
3.	Internal roads	2.54
4.	Parking area	1.38
5.	Greenbelt area	10.11
6.	Water reservoir & RWH	0.20
7.	Misc. areas	0.32
	Total	29.44

5.4 ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL)

Infrastructure like Toilets, Rest Rooms, Car and Truck parking, Time & security, Fire Fighting facilities etc. will be provided in the proposed project. The Company will assess the demand of infrastructure (Physical & Social) in the nearby area of the project site and development activities will be carried out under corporate social responsibilities program from time to time.

5.5 AMENITIES / FACILITIES

Facilities like canteen, rest room will be provided as basic facilities to workers. No other additional facilities are proposed.

Chapter – 6 : PROPOSED INFRASTRUCTURE

6.1 INDUSTRIAL AREA (PROCESSING AREA)

The main plant area comprises of DRI Kilns, Induction Furnaces with matching LRF & CCM, Rolling Mills with Hot Charging, Ferro Alloy Unit, WHRB based Power Plant, FBC based Power Plant, raw material storage and product storage etc.

6.2 RESIDENTIAL AREA (NON PROCESSING AREA)

No Township / Colony is proposed, however facilities like Admin building, canteen, rest room and indoor games facilities will be provided in the proposed project.

6.3 GREEN BELT

Out of total **29.44 Ha.**, of land, **10.11 Ha.** i.e. 34% of land is envisaged for greenbelt.

6.4 SOCIAL INFRASTRUCTURE

Proposed project will result in growth of the surrounding areas by increasing direct and indirect employment opportunities, which in turn will be develop their livelihood. Social infrastructure will be developed as per the local needs funds as fixed by the statutory authorities as per the per MoEF&CC notification.

6.5 CONNECTIVITY

The proposed site is well connected with Road network. The following table gives brief regarding connectivity of the proposed site:

Component	Description
Road	: Maharashtra State Highway # 9 (Nagpur to Chandrapur Road) – 1.4 Kms by Road NH # 930 - 1.4 Kms by Road
Rail	: Mul-Maroda RS - 8.0 Kms by Road
Air	: Morwa Airport- 52.6 (by Aerial)

6.6 DRINKING WATER MANAGEMENT

Proposed domestic water requirement is 20 KLD and same will be supplied by MIDC.

6.7 SEWARAGE SYSTEM

Toilet facilities will be provided. Domestic effluent collected through toilet blocks will be sent to proposed STP. In the proposed project, STP (will be designed for 20 KLD) will be established to treat Domestic waste water.

6.8 INDUSTRIAL WASTEWATER MANAGEMENT

- There will be no effluent discharge in the Sponge Iron, unit as closed circuit cooling system will be adopted.
- Effluent generated from Induction Furnace Unit, Ferro Alloys, Galvanizing Plant will be sent to Effluent Treatment Plant (ETP) for treatment and after ensuring compliance with SPCB norms, it will be utilized for dust suppression, ash conditioning and for greenbelt development.
- Effluent from power plant will be treated in ETP and after ensuring compliance with SPCB norms, it will be utilized for dust suppression, ash conditioning and for greenbelt development.
- Effluent generated from Coal Gasifier will be used in ABC Chamber of DRI Kilns.
- Air cooled condenser will be provided in the power plant, which will reduce the water consumption significantly. Hence wastewater generation will be also be minimized.
- Sanitary waste water will be treated in STP and after treatment it will be utilized for greenbelt development.
- Zero liquid effluent discharge will be maintained in the proposed project.
- During monsoon the treated effluent will be utilized as makeup water in Rolling Mill. Accordingly, the makeup water for Rolling mill also reduces during the rainy period.

6.9 SOLID WASTE MANAGEMENT

Following solid waste / by product will be generated from proposed project:

Table No. 6.1: SOLID WASTE GENERATION AND ITS MANAGEMENT

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
1.	Ash from DRI	1,26,00	Will be utilized in the proposed Brick Manufacturing Unit
2.	Dolochar	1,40,000	Will be used in proposes CFBC power plant as fuel.
3.	Kiln Accretion Slag	6,300	Will be utilized in the proposed Brick Manufacturing Unit
4.	Wet scrapper sludge	28,000	Will be utilized in the proposed Brick Manufacturing

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
			Unit
5.	SMS Slag	67,200	Slag from SMS will be crushed and iron will be recovered & then remaining non -magnetic material being inert by nature will be used in proposed Brick Manufacturing Unit
6.	End Cuttings from Rolling Mill	20,730	Will be reused in the SMS
7.	Mill scales from Rolling Mill	2,100	Mill scales will be recycled to Ferro alloys unit.
8.	Ash from Power Plant (Indian Coal + Dolochar)	1,05,960	Will be utilized in the proposed Brick Manufacturing Unit
9.	Slag from FeMn	45,708	Will be reused in manufacture of SiMn as it contains high SiO ₂ and Silicon.
	(or)		
10.	Slag from FeSi	5,057	Will be given to Cast iron foundries
	(or)		
11.	Slag from SiMn	38,481	will be used for Road construction / will be given to slag cement manufacturing
	(or)		
12.	Slag from FeCr	26,136	Will be processed in Zigging plant for Chrome recovery. After Chrome recovery, the left-over slag will be analysed for Chrome content through TCLP test, if the Chrome content in the slag is within the permissible limits, then it will be utilised for Road laying /brick manufacturing. If Chrome content exceeds the permissible limits, it will be sent to nearest TSDF.
	(or)		
13.	Slag from Pig Iron	32,508	Will be given slag based cement manufacturing units
14.	Zinc Dross	650	Will be given to SPCB approved vendors / TSDF
15.	ETP Sludge	100	Will be sent to TSDF

6.10 POWER REQUIREMENT & SUPPLY / SOURCE

Power required for the proposed project will be 121 MW and same will be sourced from 80.0 MW Captive Power Plant & remaining 41.0 MW is from State Grid.

Table No. 6.2 :POWER REQUIREMENT AND ITS BREAKUP

S.No.	Unit	Power Consumption	Power Requirement (in MW)
1.	DRI	85 Kwh/ton	6.6
2.	SMS	700 Kwh/ton	68.6
3.	Rolling Mill	150 Kwh/ton	8.4

S.No.	Unit	Power Consumption	Power Requirement (in MW)
4.	Gasifier	----	1.0
5.	Ferro Alloys	3000 - 8,000 Kwh/ton	27
6.	Galvanising Plant	---	0.9
7.	Bricks manufacturing Unit	----	1.0
8.	Briquetting plant	----	1.0
9.	Power Plant – WHRB	Aux. Consumption @ 10%	4.5
10.	Power plant – FBC	Aux. Consumption @ 10%	2.0
Total			121.0

Chapter – 7: REHABILITATION & RESETTLEMENT (R & R) PLAN

Proposed project is located in Mul Growth Centre developed for Maharashtra Industrial Development Corporation (MIDC) for development of Industrial Unit by providing infrastructure facilities like land, roads, water supply, drainage facilities and street lights etc.

Bhagalaxmi Metals Pvt. Ltd. has been allotted **29.44 Ha. (72.74 Acres)** of land by Maharashtra Industrial Development Corporation (MIDC) vide letter No. MIDC/RO(NAGPUR)/Mul/LMS-72/1691/2022 dt.09/05/2022 (same is enclosed as Annexure – 1).

No rehabilitation and resettlement is required as the proposed project site is not having any habitations.

Chapter – 8 : PROJECT SCHEDULE & COST ESTIMATES

8.1 PROJECT SCHEDULE

Proposed project will be implemented in 36 months from the date of receipt of Environmental Clearance from the MoEF&CC, New Delhi & Consent from SPCB.

8.2 ESTIMATED PROJECT COST

The estimated cost for the proposed project will be **Rs. 615.00 Crores.**

S.No.	Parameters	Estimated Cost (in Crores)
1.	Land & Site development	3.50
2.	Civil works	95.00
3.	Plant, Machinery & Electrical Installation	486.50
4.	Miscellaneous works	30.00
	Total	615.00

Chapter – 9 : ANALYSIS OF PROPOSAL

9.1 FINANCIAL AND SOCIAL BENEFITS

With the implementation of the proposed 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

Bhagyalaxmi Metals Pvt Ltd. will actively contribute to improve the Socio-economic conditions of the area by providing assistance for local persons preferable from the nearby villages. The continuing commitment by business to behave ethically and contribute to economic development while improve the quality of life of workforce and their families as well as that of the local community and society at large.

As per MoEF&CC Office Memorandum vide F.No.22-65/2017-IA.III dt. 30th September 2020, budgetary allocation for commitment made by Project Proponent to address the concern raised during public hearing, issues raised from Social Impact Assessment (SIA), which is part of Environment Management Plan (EMP) will be made.