

Pre-Feasibility Report

of

Inland Metallics

{Category “A” – New}

for

**Establishment of Greenfield Steel Plant for
production of 400,000 TPA Pellets, 250,000
Sponge Iron, 250,000 TPA Pig Iron or 242,500
TPA Billets / Blooms, 30,000 TPA Ferro Alloys
and 16 MW Captive Power Plant along with
allied facilities**

at

**Vill. -Tonagatu, Tehsil -Gola,
Dist. –Ramgarh, Jharkhand**

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CONTENTS

Chapter	Description	Page no.
1.	EXECUTIVE SUMMARY	4
2.	INTRODUCTION OF PROJECT & BACKGROUND INFORMATION	
2.1	Identification of Project & Project Proponent	8
2.1.1	The project	8
2.1.2	Project Proponent	8
2.2	Need for the project and importance to the region	9
2.2.1	Imported Vs. Indigenous Production	9
2.2.2	Demand Supply Gap	9
2.2.3	Domestic / Export Market	10
2.2.4	Employment Generation due to the Project	10
3.	PROJECT DESCRIPTION	
3.1	Type of Project including Interlinked and Independent Project	12
3.2	Location	12
3.3	Details of Alternative Site Considerations	13
3.4	Size and Magnitude of Operations	18
3.5	Technical Description	18
3.6	Process Details	18
3.7	Raw Materials Requirement	21
3.8	Resource Optimization	23
3.9	Solid Waste Generation & Management	23
3.10	Plant Layout	24
4	SITE ANALYSIS	
4.1	Connectivity	25
4.2	Land Form, Land Use and Land Ownership	25
4.3	Topography of the Land	25
4.4	Land Use Pattern	25
4.5	Infrastructure	26
4.6	Soil Classification	27
4.7	Climate	27
5	PLANNING BRIEF	

Chapter	Description		Page no.
	5.1	Planning Concept	28
	5.2	Population Projection	28
	5.3	Land Use Planning	28
	5.4	Assessment of Infrastructure Demand	28
	5.5	Amenities / Facilities	28
	5.6	Demolition Plan and Waste Management	29
6	PROPOSED INFRASTRUTURE		
	6.1	Industrial Area (Processing Area)	31
	6.2	Residential Area (Non-processing Area)	31
	6.3	Greenbelt	31
	6.4	Connectivity	31
	6.5	Drinking Water Management	31
	6.6	Sewage System	31
	6.7	Industrial Waste management	32
	6.8	Power Requirement & Supply / Source	32
7.	REHABILITATION & RESETTLEMENT (R&R) PLAN		33
8.	PROJECT SCHEDULE & COST ESTIMATE		
	8.1	Project Schedule	34
	8.2	Cost Estimate	34
9.	ANALYSIS OF PROPOSAL		36

Chapter 1

EXECUTIVE SUMMARY

1.0 PREFACE

M/s Inland Metallics is planning to set up Greenfield steel plant at Village -Tonagatu, Tehsil -Gola, Dist. -Ramgarh, Jharkhand for production of 400,000 TPA Pellets, 250,000 TPA Sponge Iron, 250,000 TPA Pig Iron or 242,500 TPA Billets / Blooms (or in combination of any), 30,000 TPA Ferro Alloys (Si-Mn) along with installation of 16 MW Captive Power Generation through installation of following facilities:

- a) 2x0.5 MTPA Iron Ore Grinding Unit,
- b) 1x0.4 MTPA Iron Ore Pellet Plant,
- c) 2x0.125 MTPA Rotary Hearth Furnace for production of Sponge Iron,
- d) 2x25 Ton EIMF for production of 250,000 TPA Hot Metal or 247,500 TPA Liquid steel or in combination of any.
- e) 1x0.25 MTPA Pig Casting M/c for Pig Iron 250,000 TPA.
- f) 2x 25 Ton Ladle Furnace for liquid steel refining
- g) Bloom/Billet Casters - 6/11 x 2 strand – for Blooms/Billets 242,500 TPA
- h) 1x15 MVA Submerged Arc Furnace for production of 30,000 TPA Si-Mn
- i) 2x 8,250 TPA Oxygen Plant,
- j) 5x6,000 Nm³/hr. Producer Gas Plant and
- k) 16 MW Captive Power Plant

The project shall be installed on the 16.18 hectares (40.0 Acres) land already acquired by the company with central coordinates as Latitude: 23°29'9.93" N, Longitude: 85°39'35.21" E and elevation of 383 m. The proposed area of 16.18 hectares (40.0 Acres) is in possession of the project proponent.

The company is seeking prior environment clearance for installation of the above facilities.

2.0 THE PROJECT PROPONENT

Inland Metallics is a unit of Inland Power Ltd. a public limited company incorporated on 22nd of June 1993 at ROC Kolkata CIN: U51909WB1993PLC059205, with registered office at: P-221/2, Strand Bank Road, Kolkata-700001, West Bengal. The company has its sister concern as Inland Power Ltd. at Tonagatu near Gola, District Ramgarh, Jharkhand as an Independent Power Company to provide 63 MW power. The company supplies power to Jharkhand Bijli Vitran Nigam Limited (JBVNL). The Inland group has

its various ventures like Inland World Logistics, Inland Automate, Inland Courier, Inland Bearings Center, BE gold Pvt Ltd, Bharatiyam Foods and Beverages Pvt Ltd and The Gopalpur Tea Company.

The Company is governed by its Board of Directors, Mr. Laxmi Narayan Somani, Mr. Naveen Somani, Mr. H.K. Mohta, Mr. G.K. Dugar and Mr. G.K. Jhawar. The directors are well versed with transportation, Power, Iron and Steel, Pharmaceuticals and Automation sectors. The Board of Directors and Management has a strong understanding of various businesses in different sectors. The Board of Management for Inland Group focuses on project setup, corporate planning and business development, human resource development, planning, budgeting and related functions.

3.0 LOCATION & LAND

The proposed project will be located at Village -Tonagatu, Tehsil -Gola, Dist. –Ramgarh, Jharkhand on an area of 16.18 Ha (40.00 Acres). The proposed land area is Agricultural, but at present is not in agricultural use and will be converted for industrial use. The Entire proposed area of 16.18 Ha. is in possession of the project proponent. The proposed new facilities will be installed after receipt of Environmental Clearance and other statutory permissions.

4.0 MANPOWER

Proposed manpower of the plant will be 560 comprising Technical Managerial, Supervisory and workers. Indirect employment in the region will be generated in different sectors during the operation phase of the proposed plant.

5.0 POLLUTION CONTROL EQUIPMENT

Following pollution control measures will be taken up for the Proposed Greenfield project of Inland Metallics:

- Pellet Plant - 1 No. of Multicyclone with ESP has been proposed with Travelling Grate-Rotary Kiln.
- Dust extraction system with Bag Filter system – 1 no. will be provided combined for Annular Cooler & product handling section of Pellet Plant.
- Rotary Hearth Furnace – 1 No. of Multicyclone with ESP with independent stack in pre-heating section of each Rotary Hearth Furnace of 0.125 MTPA.
- 1 no. of Bag Filter System proposed at raw material mixer area.

- Cyclone cum spark arrester with Pulsejet Bag Filter along with fume extractor for 15MVA Submerged Arc Furnace.
- 1 No of Pulsejet Bag Filter with fume extraction system with each 25 Ton EIMF.
- Bag Filter shall be provided with Ash Silo of Captive Power Plant (WHRB).
- Dust suppression/water sprinkling/dry fog in Raw material handling areas. This will result in reduction in fugitive dust emission.
- Neutralization Pit for Softening plant and DM Plant backwash waste water
- Domestic wastewater shall be routed through septic tanks.
- Acoustic enclosure / Separate Rooms for housing TG Set and DG sets.

Water shall be mainly used for ore grinding unit and shall be recycled through thickeners and filter press. Softening Plant back wash water and Cooling Tower Blow down water shall be used for slag cooling and dust suppression after primary treatment like neutralization and settling. Zero effluent discharge (ZLD) shall be maintained.

6.0 PROJECT COST AND COMPLETION SCHEDULE

The cost for the project is envisaged as Rs. 400 Cr. After obtaining EC from MoEF&CC and CTE from JSPCB, tenders will be floated for purchase, installation and commissioning of equipment and earth work will start parallel. Estimated completion schedule of project is 36 months.

7.0 SALIENT FEATURES OF THE PROJECT

S. No.	Particulars	Details
1	The Project	Establishment of Greenfield Steel Plant by Inland Metallics for production of 400,000 TPA Pellets, 250,000 TPA Sponge Iron, 250,000 TPA Pig Iron or 242,500 TPA Billets / Blooms, 30,000 TPA Ferro Alloys and 16 MW Captive Power Plant along with allied facilities at Village - Tonagatu, Tehsil -Gola, Dist. -Ramgarh, Jharkhand
2	Location of the Project	Village -Tonagatu, Tehsil -Gola, Dist. -Ramgarh, Jharkhand
3	Topo-sheet Nos.	F45B10, F45B11, F45B14 & F45B15
4	AMSL	383 meters
5	Latitude	23°29'9.93" N,
6	Longitude	85°39'35.21" E

S. No.	Particulars	Details
7	Area of the Plant	Total area of the plant – 16.18 Ha.
8	Biosphere Reserve / National Park / Wildlife Sanctuary / Ecological sensitive area	None within 10 km radius study area
9	Reserve Forest / Protected Forest	None within 10 km radius study area
10	Proposed production capacities	<ol style="list-style-type: none"> 1. Pellets – 400,000 TPA 2. Sponge Iron – 250,000 TPA 3. Pig Iron – 250,000 TPA or Billets / Blooms – 242,500 TPA or in combination of any 4. Ferro-alloys (Si-Mn) – 30,000 TPA 5. Captive Power Generation (WHRB) – 16 MW
11	International/State Boundaries	None within 10 km radius study area
12	Water Body	Subarnarekha River at 3.5 km in South Bhairwa Reservoir at 2.1 km in North Bhera Nadi at 2.3 km in North Senegraha Nadi – 600 m in West
10	National/State Highways	MDR-101 at 1.2 km in North NH-23 at 8.1 km in North East
14	Estimated Cost of the proposed plant	Rs. 400 Crores
15	Manpower Requirement	Proposed: 560
16	Requirement of Make-up Water	Proposed: 1202 KLD Source: Senegarha Nadi
17	Requirement of Power / Fuel	<p>Power : 48 MW (CPP and DVC through grid)</p> <p>DG Sets</p> <p><u>Proposed</u> - 500, 700 and 250 KVA</p> <p>Fuel</p> <p>HSD: 10 KLD (Emergency Power only)</p> <p>Furnace Oil: 1000 kl/year</p>

Chapter - 2

INTRODUCTION OF PROJECT & BACKGROUND INFORMATION

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

2.1.1 The Project

Inland Group has been involved in different business ventures across different sectors. The company has its Thermal Power Plant at Ramgarh District of Jharkhand, which provides 63 MW power to Jharkhand Bijli Vitran Nigam Limited (JBVNL). The group is operated by Board of Directors having vast experience in Transportation, Iron and Steel and Power sectors.

Registered office of Inland Metallics is at P-221/2, Strand Bank Road, Kolkata-700001, West Bengal and Corporate office at Gola, District Ramgarh, Jharkhand.

Now, the company wishes to install Greenfield steel plant at Village -Tonagatu, Tehsil - Gola, Dist. -Ramgarh, Jharkhand. The details of proposed facilities for Inland Metallics are provided in the below table:

Table-2 Details of proposed facilities and production capacities

Sl. No.	Proposed Units	Configuration	Final Production Capacity	Product
1	Iron Ore Grinding Unit	2x0.5 MTPA	1,000,000 TPA	Iron Ore Green Balls
2	Iron Ore Pellet Plant	1x0.4 MTPA	400,000 TPA	Pellets
3	Rotary Hearth Furnace	2x0.125 MTPA	250,000 TPA	DRI/Sponge Iron
4	Electric Iron Making Furnace	2x25 Ton	250,000 TPA	Hot Metal
	4a) Pig Casting M/c	1x0.25 MTPA	250,000 TPA	Pig Iron
	4b) Ladle Furnace	2x25 Ton	247,500 TPA	Liquid Steel
5	Castors	2 x (6/11, 2 strand)	242,500 TPA	Billets / Blooms
6	Submerged Arc Furnace	1x15 MVA	30,000 TPA	Ferro Alloys (Si-Mn)
7	Oxygen Plant	2x 8250 TPA	16,500 TPA	Oxygen
8	Producer Gas Plant	5x6000 Nm ³ /hr	30,000 Nm ³ /hr	Producer Gas

Sl. No.	Proposed Units	Configuration	Final Production Capacity	Product
9	Captive Power Plant (WHRB)	16 MW	16 MW	Power

The project activity is listed at Sl.no. 3(a), Primary Metallurgical Industry, under Category 'A', as per the EIA Notification, 2006. The project shall be appraised by the Expert Appraisal Committee at Ministry of Environment, Forest & Climate Change (Industry-1) for prescribing TOR for undertaking detailed EIA Study for the proposed project.

2.1.2 Project Proponent

Inland Group is one the major group having different business ventures from different sectors. The company is rapidly increasing its prominence in the state of Jharkhand and West Bengal by providing highly efficient service and high-quality products. The company has well established 63 MW Thermal Power Plant at Ramgarh district of Jharkhand. Chairman and Directors of the Company are as follows:

a. Shri Laxmi Narain Somani (Chairman & Director)

Shri Laxmi Narain Somani (aged 68 years) has business experience of more than four decades. He had graduated from Calcutta University in 1970. After successful career as a courier service provider in the Eastern and North Eastern parts in India, he started Inland Road Transport (P) Ltd. in 1983.

b. Shri Naveen Somani (Executive Director)

Shri Naveen Somani (aged 40 years) graduated from Indian School of Business, a premier business school in Hyderabad in April 2005. He has completed his engineering degree along with a dean's list from University of Michigan, Ann Arbor in the year 2002. Since April 2007 he has been actively involved in setting up the proposed power project.

c. Shri Hari Kishan Mohta (Director Technical)

Shri Hari Kishan Mohta (aged over 70 Years) is a M.Sc. in chemistry with President's Gold Medal from BITS Pilani. He is a technocrat having more than four decades of industrial experience. He Started his first industrial unit in copper wire

drawing in 1972 and has promoted and established several plants related to iron and steel, chemical, mineral beneficiation & Power.

2.2 NEED FOR THE PROJECT AND IMPORTANCE TO THE REGION

All the products proposed to be manufactured have high market demand. Steel is crucial to the development of any modern economy and is considered to be the backbone of the human civilization. The Iron & steel industry has tremendous forward and backward linkages in terms of material flow, income and employment generation. The level of per capita consumption of steel is treated as one of the important indicators of socio-economic development and living standard of the people in any country. All major industrial economies are characterized by the existence of a strong steel industry and the growth of many of these economies has been largely shaped by the strength of their steel industries in their initial stages of development. The demand and production have been growing at a healthy rate for the last few years and the forecast for the next decade and a half is also very promising.

India's annual per capital steel consumption is 74 kg and is one-third the global average (224.5 kg). India currently utilizes less steel intensive construction methodologies for buildings, roads and bridges and hence does not fully utilize the numerous benefits of steel intensive construction. A transition to steel intensive construction will also support India's rise to a \$5 trillion economy by 2024-25. The steel industry in India is well established and has recorded a steady growth over the past 5 years. The demand for finished steel has consistently grown at 5.6% over the past 5 years reaching 99 MTPA in 2018-19. In accordance with this, crude steel capacity in the country has also increased to 142 MTPA.

2.2.1 Import Vs Indigenous Production

As per Indian Iron and Steel annual report, During February 2020, steel sector witnessed production in crude steel at previous month's levels. While finished steel production and consumption witnessed a decline, prices of finished steel products increased owing to increase in coking coal prices, iron ore prices remaining firm and substantial decline in imports from China. Both, export and import of finished steel declined. However, India remained a net exporter consecutively for seven months in a row since August 2019 to February 2020. Indian iron ore exports witnessed decline by 28% during the month of February 2020.

2.2.2 Demand-Supply Gap

India was the world’s second-largest steel producer in 2019. India surpassed Japan to become the world’s second-largest steel producer in 2019, with crude steel production of 111.2 million tonnes (MT). In India, as per Indian Steel Association (ISA), steel demand is estimated to grow 7% in FY20 and FY21. In FY20, crude steel production and finished steel production in India was 108.5 MT and 101.03 MT, respectively. Between April 2020 and January 2021, India’s cumulative production of crude steel stood at 87.21 MT and finished steel at 76.04 MT. In November 2020, the Steel Authority of India Limited (SAIL) reported 7% YoY growth in crude steel production. India’s per capita consumption of steel grew at a CAGR of 4.43% from 46 kgs in FY08 to 74.10 kgs in FY19. India is also the largest producer of Direct Reduced Iron (DRI) or Sponge Iron in the world in January-December 2019, producing 36.86 Million Tonnes Sponge Iron with growth rate 7.7% over the corresponding period of 2019.

The Government’s National Steel Policy 2017 aims to increase the per capita steel consumption to 160 kgs by 2030-31. The Government has also promoted policy which provides a minimum value addition of 15% in notified steel products covered under preferential procurement.



Domestic prices of both iron ore lump as well as fines remained stable during February, 2020 after a sharp increase in the previous months. In anticipation of supply disruption due to expiry of mining leases by March 2020, the production of iron ore witnesses an increase. Smooth and cheap availability of iron ore kept domestic iron ore prices at previous month level. International iron ore prices decreased by around 6% in February, 2020 as compared to previous month. This decline in prices may be on account of the demand constrained and low consumption of steel due to the outbreak of Corona virus/Covid-19.

In order to meet the increasing steel demand post Covid era, new Steel plants shall be established. It has been observed that a combination of small, medium and large

capacity ferro alloy plants can contribute in big way in achieving the national interest of self-reliance.

Considering the demand for Steel products in these sectors Inland Metallics has planned to establish greenfield project for production of Pig Iron, Pellet, Ferro Alloys and Billets at Ramgarh district, Jharkhand.

The State can be benefited from the project as there will be direct employment of large people in the plant. Preference will be given to the people of the state possessing requisite skill and qualification criteria. Also, there will be lot of scope for indirect employment of the people of the state in and around the project site.

2.2.3 Domestic / Export Market

The industry proposes to produce Pig Iron, Pellets, Billets and Ferro Alloys (Si-Mn) in a most energy efficient and cost-effective manner. The Pig Iron, Ferro Alloys, Pellets and Billets are always in high demand in the Steel sector. The finished product will be sold in the Steel Markets of Major states in India especially West Bengal, Jharkhand, Bihar, Sikkim, Uttar Pradesh and North Eastern States. The products will be produced indigenously and will be consumed in the country and also outside the country as per the demand.

In the export market, the present and future DRI / HBI producers in Southeast Asia and the Middle East / North African regions are the potential destinations, as they would be natural markets for pellets. Supplies from Bahrain, Brazil and Sweden are meeting the present DR pellet requirements Middle East/North African countries. With transportation costs being a competitive factor, Inland Metallics proximity to Southeast Asia, Middle East and North Africa have given a definite advantage over the suppliers from Brazil, North America and Sweden. DR pellet supply position to SE Asia, Middle East and North Africa is given below:

Country	DRI / HBI	DR Pellet	DR pellet	Pellet
	Capacity (MT)	Requirement (MT)	Capacity (MT)	Deficiency (MT)
SE Asia	4.90	4.60		
Middle East	9.95	5.75	3.70	(-) 2.05
North Africa	4.10	4.55		(-) 4.55
Total	18.95	14.90	3.70	(-) 10.360

The pellet deficiency in the target market is being currently met by South America (CURD, Samarco) and Europe. M/s Inland Metallics can replace part of these supplies, as the location advantage of the plant to the end users will provide a minimum freight advantage of US\$ 5 to US\$ 7 per metric ton. Further, Indian pellet producers will grant the customer the benefit of lower lead-time for supplies, lower voyage time and lesser inventory holding costs

2.2.4 Employment Generation (Direct and Indirect) Due to the Project

The unit will need Technical qualified personals for organizing the Production and then several skilled workers for operating the unit and for working in workshop, etc. Besides all these types of workers a number of semiskilled and unskilled workers will also be required for peripheral activities like transport, logistics, engineering, Services, commercial services etc.

The total manpower requirement of the plant is 560. The manpower will comprise of administrative, technical, non-technical, skilled and unskilled workforce. Approx. 100 persons will be employed during construction phase.

The total requirement of manpower in the plant will be available without much difficulty as the area has industrial exposure in Iron & Steel sector. However, specialized training for operation and maintenance will have to be given to selected candidates well in advance before commissioning of the plant.

In addition to this there shall be indirect requirement of manpower in transportation sector for transportation of raw material. Development of nearby industries/Mines also envisaged with supply of Billets, Pellet, Pig Iron and Ferro alloys as per demand.

Table 3: Manpower Requirement

Plant Units	Proposed Manpower
Iron ore Palletization plant	250
Rotary Hearth Furnace	90
Pig Casting Machine	30
Electric Iron Making Furnace	50
Bloom/ Billet caster	25
Oxygen Plant	25
Producer Gas Plant	15

Plant Units	Proposed Manpower
Captive Power Plant (WHRB)	25
Ferro Alloys plant	50
Total	560

Chapter 3

PROJECT DESCRIPTION

3.1 TYPE OF THE PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS, IF ANY

The project is Industrial project listed under activity 3(a) Metallurgical Industries (Ferrous & Non-ferrous) as per EIA Notification, 2006 and falls under Category 'A'.

The project is for establishment of Greenfield Steel plant at Village -Tonagatu, Tehsil -Gola, Dist. –Ramgarh, Jharkhand on plot area of 16.188 Ha. The proposed land is in possession of the project proponent.

The project envisages for installation of 2x0.5 MTPA Iron ore Grinding unit, 0.4 MTPA Pellet Plant, 2x0.125 MTPA Rotary Hearth Furnace, 2x25 Ton Electric Iron Manufacturing Furnace, 1x0.25 MTPA Pig Casting Machine, 2x25 TPD Ladle Refining Furnace with Blooms / Billets Caster, 15 MVA Submerged Arc Furnace, 16 MW Captive Power Plant, 5x6,000 Nm³/hr Producer Gas Plant and 2x 8,250 TPA Oxygen Plant.

There is no interlinked project or interdependent project.

3.2 LOCATION

The proposed plant will be installed at the Agricultural land near to its Parent Plant of Inland Power Limited located at Village -Tonagatu, Tehsil -Gola, Dist. –Ramgarh, Jharkhand.

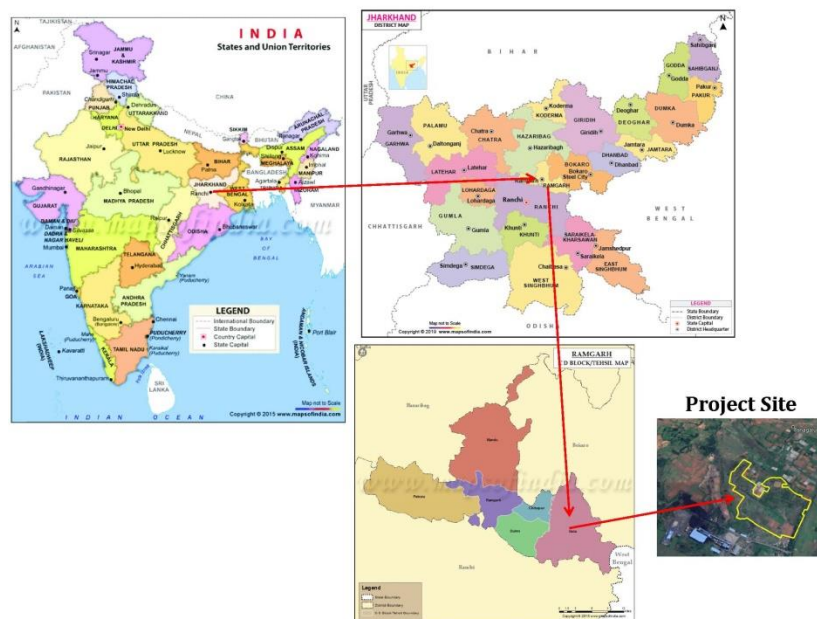


Fig.1 Location map of Inland Metallics.

3.3 DETAILS OF ALTERNATE SITE CONSIDERED

Before finalizing the proposed site for establishment of the Steel plant at Vill. -Tonagatu, Tehsil -Gola, Dist. –Ramgarh, Jharkhand numbers of alternative sites was considered. Feasibility of site for the proposed project was examined on various parameters road and rail connectivity, water and power availability, distance from densely populated area, protected forests, sensitive locations, Availability of Logistic support, Manpower, etc.

Site options were preferably identified in Jharkhand and West Bengal states due to its location advantage and land availability.

Alternative Sites: The company was offered number of alternative sites in Jharkhand and West Bengal states as per the details given below:

Table 4: Details of Alternative Sites Considered

Sl. No.	Particulars	Site-1 (Ambatola)	Site-2 (Tonagatu)	Site-3 (Kumirdiha)	Site-4 (Kurha)
1.	Location	Village Ambatola, Bokaro district, Jharkhand	Vill. -Tonagatu, Tehsil -Gola, Dist. – Ramgarh, Jharkhand	Village- Kumirdiha, Purulia district, West Bengal	Village- Kurha, Hazaribagh district, Jharkhand
2.	Geographical Coordinates	23°44'21.25"N 85°53'32.27"E	23°29'09.55"N 85°39'35.47"E	23°13'50.37"N 86°15'27.69"E	23°04'51.71"N 85°26'43.47"E
3	Site Elevation	236 m	383 m	275 m	586 m
3.	Area Falling under critically polluted Area	None within 10 km radius	Area falls under Severely polluted area	None within 10 km radius	Area falls under Severely polluted area
4.	National Park/ Wildlife Sanctuary/ Tiger Reserve/ Elephant corridor	None within 10 km radius	None within 10 km radius	None within 10 km radius	Hazaribagh National Park is at 3.2 km in NW
5.	Reserve Forest	Jharutola forest is at 900 m from site	None within 10 km radius	Ajodhya Hill and reserve forest at 1.9 km in West	Canary Hills at 7.3 km in South
6.	Type of land	Agriculture	Agriculture	Agriculture	Agriculture
7.	Road Connectivity	Angwali MDR road at 40 m	Village road connecting to MDR-101. NH-23	Village road at 0.51 km in North connecting to NH-	Village road is at 0.27 km in North

Sl. No.	Particulars	Site-1 (Ambatola)	Site-2 (Tonagatu)	Site-3 (Kumirdiha)	Site-4 (Kurha)
			is at 8.1 km in NE	32 in East	
8.	Rail Connectivity	Jarangdih railway station at 4.62 km in North East	Gola Road Railway Station at 7.5 km in North East	Kantadih railway station at 3.88 km in East	Hazaribagh railway station at 13.93 km in South west
9	Airport	Birsa Munda Airport, Ranchi at 68.76 km in South West	Birsa Munda Airport, Ranchi at 38 km in South West	Birsa Munda Airport, Ranchi at 96.8 km in West	Birsa Munda Airport, Ranchi at 84.2 km in South
10	Nearest Habitation	Ambatola village at 0.3 km in West	Bamni village at 360 m in South	Kumirdih village at 0.56 km in East	Kurha village at 0.32 km in North
11	Water Bodies	Damodar river is at 800 m in North	Subarnarekha river at 3.5 km in South Bhairwa reservoir at 2.1 km in North Bhera nadi at 2.3 km in north	Kangsabati river at 9.3 km in NE	Sawana river at 4.5 km in South west
12	Seismic Zone	Zone-3	Zone-2	Zone-2	Zone-3
13	Archeological/ Historical/ Ancient Monument	None within 10 km radius	None within 10 km radius	None within 10 km radius	None within 10 km radius
14	Rehabilitation and Resettlement	Not required	Not required	Approx. 20 PAF's will be Rehabilitated	Not required
15	Villagers Willing for New Industry	Village panchayat didn't want the industry near their villages	Village Panchayat is having no objection in installation of the plant	Village panchayat didn't want the industry near their villages	Village Panchayat is having no objection in installation of the plant

The selection and rejection of site was based on the following facts

Site -1 (Ambatola) – This site was rejected because village panchayat didn't agreed for installation of the industry in their region. Also, ecologically sensitive locations like Jharutola forest and Damodar river are in close proximity of the site.



Fig. 2 Site-1 Location map

Site -2 (Tonagatu) – This site was selected, as it was located adjacent to company’s Thermal Power Plant. Residents or village panchayat has no problem with the setting up of the industry. Road and Rail connectivity is very top-notch in the subjected region.



Fig. 3 Site-2 Location map

Site -3 (Kumirdiha) – This site was rejected because the local residents and village panchayat didn’t agree for installation of industry in their region. It also involved the Rehabilitation and Resettlement of approx. 20 PAF’s (Project Affected Families) of village Kumirdiha.



Fig. 4 Site-3 Location map

Site-4 (Kurha) - This site was rejected because of its proximity to Hazaribagh National Park and due to its low transportation connectivity in the surrounding region.

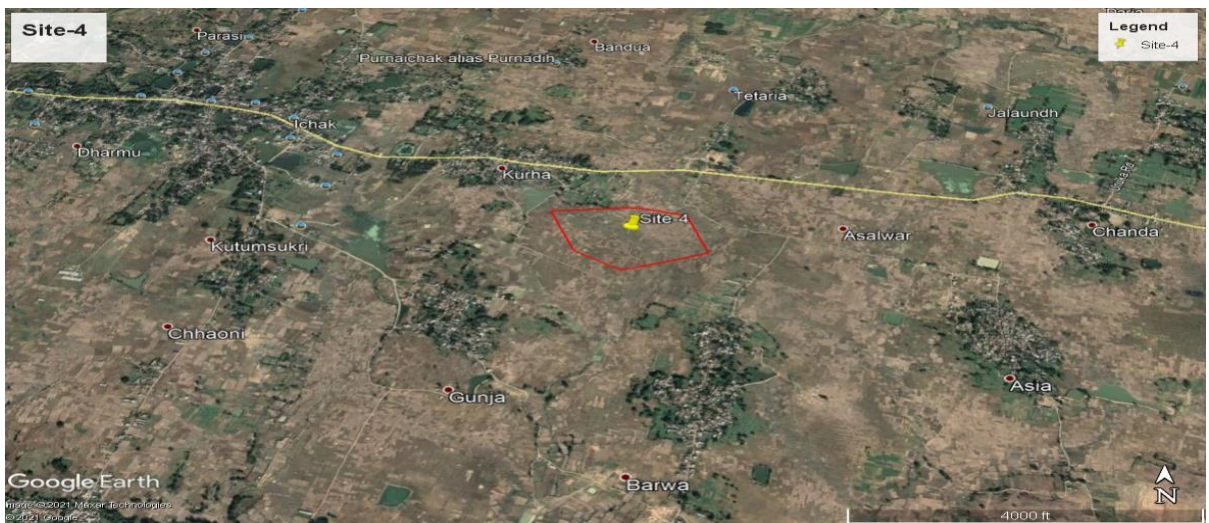


Fig. 5 Site-4 Location map

The project proponent has its well-established power plant near to the proposed site therefore, it will be easier to manage the operation of both the plants. The proposed site has good infrastructure facilities like Road and Rail network, Airline facility and Water & Power availability. Hence, it will be more economically and environmentally adequate to install the project in the nearby area. The proposed project will be installed in the land of 16.18 Ha. area

The Site no. 2 (Vill. -Tonagatu, Tehsil -Gola, Dist. -Ramgarh, Jharkhand) is selected for establishment of the proposed project

3.4 SIZE OR MAGNITUDE OF OPERATION

The proposed project is installation of Steel plant at Ramgarh district of Jharkhand. The project size is as follows:

Table 5: Project Configuration and production details

Sl.	Proposed Units	Configuration	Final Production Capacity	Product
1	Iron Ore Grinding Unit	2x0.5 MTPA	1,000,000 TPA	Iron Ore Green Balls
2	Iron Ore Pellet Plant	1x0.4 MTPA	400,000 TPA	Pellets
3	Rotary Hearth Furnace	2x0.125 MTPA	250,000 TPA	DRI/Sponge Iron
4	Electric Iron Making Furnace	2x25 Ton	250,000 TPA	Hot Metal
	4a) Pig Casting M/c	1x0.25 MTPA	250,000 TPA	Pig Iron
	4b) Ladle Furnace	2x25 Ton	247,500 TPA	Liquid Steel
5	Castors	2 x (6/11, 2 strand)	242,500 TPA	Billets / Blooms
6	Submerged Arc Furnace	1x15 MVA	30,000 TPA	Ferro Alloys (Si-Mn)
7	Oxygen Plant	2x 8,250 TPA	16,500 TPA	Oxygen
8	Producer Gas Plant	5x6,000 Nm ³ /hr	30,000 Nm ³ /hr	Producer Gas
9	Captive Power Plant (WHRB)	16 MW	16 MW	Power

Final Saleable Products

Sl. No.	Final Product	Quantity (TPA)	
1.	Pellets	400,000	
2.	Sponge Iron	250,000	
3.	Pig iron or	Or combination of	250,000
	Billets / Blooms		242,500
4	Ferro Alloys (Si-Mn)	30,000	

3.5 TECHNICAL DESCRIPTION

3.5.1 Plant Technical Feature

M/s Inland Metallics is planning to set up Greenfield steel plant at Village -Tonagatu, Tehsil -Gola, Dist. -Ramgarh, Jharkhand for production of 400,000 TPA Pellets, 250,000 TPA Sponge Iron, 250,000 TPA Pig Iron or 242,500 TPA Billets (or in combination of any), 30,000 TPA Ferro Alloys (Si-Mn), through installation of following facilities:

- a) 2x0.5 MTPA Iron Ore Grinding Unit,
- b) 1x0.4 MTPA Iron Ore Pellet Plant,
- c) 2x0.125 MTPA Rotary Hearth Furnace for production of Sponge Iron,
- d) 2x25 Ton EIMF for production of 250,000 TPA Hot Metal or 247,500 TPA Liquid Steel or in combination of any.
- e) 1x0.25 MTPA Pig Casting M/c. for Pig Iron 250,000 TPA
- f) 2x 25 Ton Ladle Furnace for refining of liquid steel
- g) Bloom/Billet Casters - 6/11 x 2 strand for Blooms/Billets 242,500 TPA
- h) 1x15 MVA Submerged Arc Furnace for production of 30,000 TPA Si-Mn
- i) 2x 8,250 TPA Oxygen Plant,
- j) 5x6,000 Nm³/hr. Producer Gas Plant and
- k) 16 MW Captive Power Plant.

3.6 PROCESS DETAILS

Iron making technology that uses a Rotary Hearth Furnace to turn iron ore fines and pulverized coal into iron nuggets of similar quality as blast furnace pig iron. This new iron making technology is able to effect reduction, melting, and slag separation in only about 10 minutes.

The Process is a simple process with a one-step furnace operation that requires less energy, capital, and operating costs than existing pig iron technology. Consequently, a high-quality iron product at a substantially lower cost is produced. The quality of the iron nuggets is far superior to direct reduced iron (DRI) and equivalent to blast furnace pig iron. Moreover, the size and shape of the iron nuggets allows them to be melted easily in a furnace (EAF, BOF) and to be fed continuously.

3.6.1 Preparation for Raw Materials

In the process, iron ore, coal, binder and some fluxes are combined to make green pellets (wet pellets).

Iron ores which have suitable chemical composition and particle size will be delivered in the iron ore silo for pre-treatment in Iron Ore Grinding Unit.

The reductant coal is crushed to the required size by the Coal Pulverizing System before storing in the Pulverized Coal Silo to secure the rapid reducing-melt reaction of pellets in the RHF.

3.6.2 Iron Ore Grinding Unit

Material Handling Area:

Iron ore is fed to the ground hopper and then conveyed to the day bin by a conveyor. Belt weigh feeder is provided under the bin to control the feed to the plant. The feeder delivers the ore to the screen feed conveyor which conveys the ore to screen.

Grinding Area:

The Material through a launder onto the Ball mill feed conveyor (if required), there shall be a belt scale installed beneath the conveyor. Measured quantity of water in proportion to the belt scale reading shall be added so as to ensure pulp density of about 70% in the Ball Mill. The slurry discharging from the Ball Mill is received into the Ball Mill discharge sump box. Suitable quantity of process water is added into the sump to maintain the pulp density as desired to be fed to the Stack Sizer.

The slurry from the Ball Mill discharge sump box is pumped to the stack Sizer which is in closed circuit with the Ball Mill. The Undersize material is collected in the stack Sizer underflow collection sump and then slurry from the stack Sizer underflow collection sump is pumped to the Concentrate Thickener. And over size of stack Sizer will feed again to ball mill because of this system is based on close circuit.

Thickening Area:

Concentrate: The underflow from the concentrate thickener at 60–65% solids w/w basis is sent to the holding tank. The overflow from the thickener will be taken to water complex then pumped to the process water tank. Slurry from the concentrate thickener is pumped to holding tanks which are fitted with suitable agitators to prevent the slurry in the tank from settling. The slurry is then pumped by suitable pumps to the filter area.

Filter Area:

Concentrate: The slurry from the holding tanks is dewatered using pressure filters. The cake is discharged in batches from the filter at the end of each cycle and is collected by a cake collection conveyor and dropped on to a reversible conveyor. While travelling on one side, the cake will be conveyed to pellet plant and while travelling the other

direction, the cake will be transported to a temporary cake storage area. The filtrate along with cloth wash water and core flush water is collected in filtrate tank & then pumped to the concentrate thickener.

Proportioning Room

Proportioning Room is complete with bunkers for different feed materials. The Iron ore filter cake is transferred from grinding unit through belt conveyor into the high level of proportioning room. Dust collected from multi cyclone dust catchers and ESP is fed into the proportioning dust bunkers through channel pneumatically by air. Bentonite, dust & LCD bunkers are installed with discharge holes for each.

Mixing: The iron ore concentrate is mixed with additives like coke fines, limestone powder and Bentonite in high intensity mixer and with required quantity of water for ideal moisture for next stage of process called balling.

Balling: The homogeneous feed is fed to balling discs. Green balls are formed in an inclined pan of 7.5m diameter, driven by variable frequency drives.

3.6.3 Pellet Plant

The pellet plant will produce oxide pellets. Pellets are heat hardened balls produced from concentrates and natural iron ores of different mineralogical and chemical composition. The pellets have improved properties for iron making. Palletization process involves feed preparation, green ball formation, pellet Indurations and product dispatch.

The Company proposes to install 1x0.4 million tons per annum Palletization Plant with annual production capacity of 400,000 TPA.

3.6.2.1 Process technology

There are four stages involved in the production of pellets. They are:

- a) Raw material preparation.
 - b) Formation of green balls or pellets.
 - c) Induration of the pellets.
 - d) Cooling, storage and transport of pellets.
- a) Raw Material Preparation

Mixing of Raw Materials

Iron ore fines, Bentonite, flux, coke and ESP dust are all mixed uniformly in a mixer. As

per water content of material, some certain quantities of water are added so as to maintain water content before balling process ranged from 9 to 10%.

b) Formation of Green Balls & Pellets

Production of Green Balls

Mixed material is transferred through belt conveyor into the high level of balling room, where the material mix is discharged through plough-type dumper above belt conveyor separately into mixed material bunker, under which, balling discs are installed. Green ball produced from balling disc is transferred from collective belt conveyor into the green ball distribution system for material distribution.

Distribution of Green Balls

Green ball from balling room is fed into the distribution system through belt conveyor. In reciprocating process, head swinging belt conveyor feed the green ball into large ball roll screen for screening. Unqualified green ball of more than 16 mm is separated out and then fed back into the balling room through return material system. Green ball of less than 16mm is fed onto wide belt conveyor, which transfers the green ball onto roll distributor through AC frequency converter. Roll distributor fed qualified green ball of 5-16 mm onto travel grate machine. Undersized balls less than 5 mm are recycled to the balling system.

c) Induration of the pellets.

Travel grate machine, rotary kiln and annular circular machine are designed to formulate baking system. Green balls are dried and preheated in the travel grate machine, and then baked, solidified in the rotary kiln, cooled in the annular cooler

Travel Gate Machine

Effective length of travel grate machine is 37.5 meters. Length of wind box is 2.5 meters. The travel grate machine is divided into 4 zones, which are separately for suction drying zone I & II, preheating zone I and preheating zone II.

Drying Zone 1 & 2

In suction drying zone, recoverable hot waste gas suctioned by heat resistant fans from wind boxes in preheating zone II penetrates material layer downward from up, to keep green all free of water and dried. A set of main suction blower is provided to exhaust waste gas from wind box into the air through ESP.

Pre-heating Zone I

Hot waste gas flow in the preheating zone I is utilized to keep drying green ball through material layer, in order to assure pellet to sustain high temperature in Preheating Zone II. Hot waste gas in preheating zone I is merged through main pipes at a side of wind box with hot waste gas from suction drying zone to be discharged into air all together through ESP, Main suction blowers and chimney.

Pre-heating Zone-II

In preheating zone II, pellet is further heated. Pellet is partially solidified and hardened to achieve certain strength to sustain impact caused by pellet falling from travel grate machine into the rotary kiln to avoid being crushed in process of rotation of the kiln.

The fuel used in the Traveling Grate is combination of Producers Gas and Furnace Oil.

Rotary Kiln

The size of the kiln is $\Phi 3.2\text{Mtr.} \times 30\text{ Mtr.}$ Pellet, after preheated by the traveling grate machine, is discharged into the end of the kiln through scrapper and chute. The kiln is provided with Pulverized Coal Injection (PCI) & Producer Gas (PG) spraying gun in its head. The well baked pellet, is discharged, after large sizes of pellet is sieved out by fixed screen at the head of the rotary kiln, into the material receiving hopper of annular cooler.

d) Cooling, storage and transport of pellets

Annular Cooler

Effective area of annular cooler is 35 SqM. The annular cooler consists of Rotary mechanism, Wind Box, Driving Device, Frame, Upper Cover and etc. The pellet, after cooled down to below 100 centigrade in the annular cooler, is discharged outside through discharging hopper.

Main air suction blowers

Waste gas from preheating zone I merge with those from Wind Box of Suction drying zone is discharged through ESP and main chimney into the air. Dust content of waste gas to be discharged into the air will be maintained below 30 mg/Nm^3 .

Finished Product

Cooled pellet, after discharged from material discharging hopper of annular cooler, is transferred through belt conveyor into the Junction Box, where the cooled pellet 100 to

150 deg C is transferred through metal belt conveyor into the finished product transportation system. Then pellet is withdrawn by the reclaimer when necessary, and they are loaded by truck and transported outside.

3.6.4 Rotary Hearth Furnace

The industry proposes for installation of 2x0.125 MTPA Rotary Hearth Furnace for the production of DRI. The following describes its process

Materials preparation

Green pellets are prepared from finely ground iron-bearing materials and a carbon based reluctant, such as coal or coke. A wet blend is prepared in a mixer where these materials are carefully dosed with the addition of water and a small quantity of binder (Bentonite). The resulting mixture is pelletized on a rotating disk, adding further water. Green pellets are then screened to remove the under-size fraction that is recycled, while the sized product is loaded to a metallic belt dryer.

Preparation of Coal

Granular coal with size 5-20 mm, it is transformed into coal gas in RHF. The granular coal is conveyed to hopper for standby application.

Lump coal with size 25-50 mm as heat source, the lump coal is conveyed to coal gas generator for standby application.

Preparation of Raw Material

Granular iron ore is crushed and ground into -200 meshes, the iron ore powder is conveyed to hopper for standby application.

Coal Gas Generator

Coal gas produced as heat source is supplied to rotary hearth furnace, its output is above 22,000 Nm³/hr.

Green pellet dryer

This dryer has been considered with two main reasons:

1. To avoid sticking problems at the RHF feeding system.
2. To prevent decrepitating of green pellets in the RHF.

The heat required for drying is provided by the same RHF off-gas, with a resulting improvement of the overall energy efficiency of the process.

Rotary Hearth Furnace (DR Plant)

RHF technology is advanced and mature; its products may be DRI and granular iron. RHF technology is fit for several of high grade or low-grade iron ore and Iron-containing waste. RHF technology has these advantages of less investment, high productivity and high degree of automation.

Dry green pellets are then charged into the furnace through a vibrating feeder and distributed across the hearth as a uniform layer of one to three pellets. The furnace side walls, the roof and the hearth are refractory lined to allow an operating temperature up to 1400 °C. Fuel gas and combustion air are introduced via several side burners, grouped in three control zones. In zone 1 and 2, secondary air may be introduced via separate “air wickets” for the combustion of CO released by the reduction process. After charging, pellets are quickly heated up to the reduction temperature. Their total residence time on the furnace hearth to reach a final metallization degree of 70-90% is between 10 and 18 minutes. Depending on the different raw materials properties, the DRI specific production ranges between 60 and 80 kg/m² h. The DRI pellets are discharged via a water-cooled screw into a chute and then moved by a metallic belt conveyor to the Electric Iron Making Furnace (EIMF) smelting furnace. The off gas leaving the RHF and the dryer post combustion, is taken to WHRB for power generation.

Surge Bunker

After reduction, the hot DRI and a little residual coal together are discharged into a surge bunker.

Off Gas System

The off gas is adopting from the rotary hearth furnace which is high efficiency gas. Some amount of gas charge in the green ball dryer and some amount goes for the WHRB boiler.

3.6.5 Electric Iron Making Furnace

The project proponent has envisaged for installation of 2x25 Ton EIMF furnace for production of molten liquid metal.

This furnace is a non-tilting vertical vessel. The bottom part (hearth) is equipped with a siphon tap hole similar to those adopted in furnaces. In the plant, hot metal is just tap into ladles. Suitable lances are placed at the side walls to inject oxygen and coal. The position and the orientation of these lances are aimed at generating the proper chemical and fluid dynamic conditions for the process. In particular, the system is

designed to enhance the heat transfer between the upper oxidizing zone, where the CO post combustion occurs, and the reducing zone, where FeO direct reduction and other endothermic reactions take place. Hot DRI is charged by gravity from the top by a water-cooled chute. Lump fluxes are charged via a separate feeding port. Cooling of the vessel in the slag and metal-slag interface area is done by special copper cooling elements. The roof of the vessel and the off-gas duct are made of water-walls with pipe to-pipe welding.

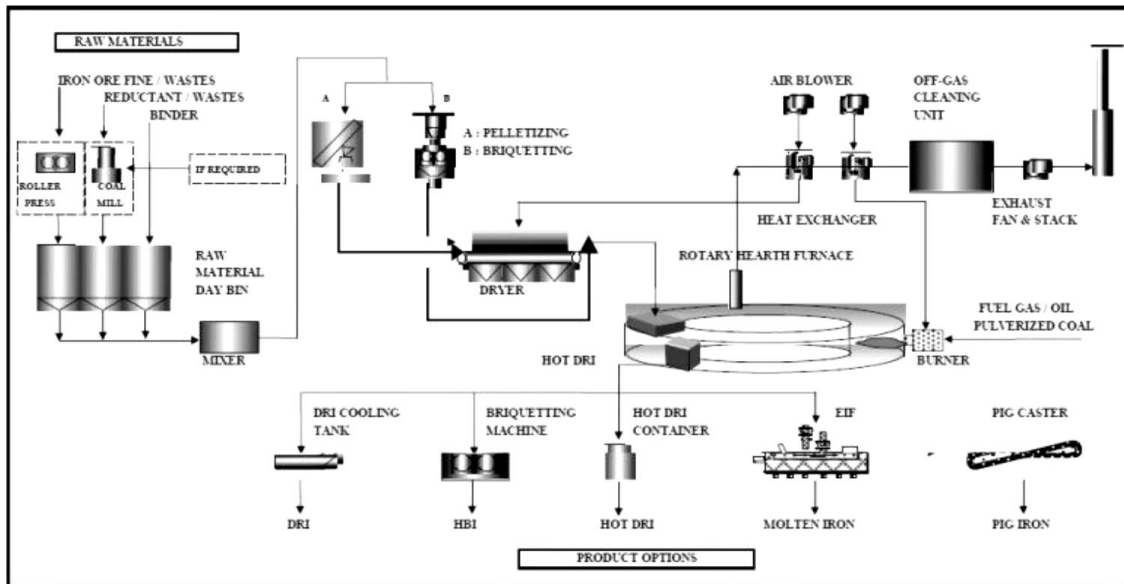


Fig. 2 Process flow diagram for Rotary Hearth Furnace & EIMF for Iron Making

Off-gas from EIMF will be exhausted through fume extraction system with Bag filter.

The EIMF can be used for manufacturing both the products – pig iron, through pig casting machine or liquid steel by alloying and oxygen lancing. Liquid steel manufactured will be taken to Blooms/Billet Casters through Ladle Refining Furnace.

3.6.6 Pig Casting Machine

The Pig iron will be manufactured through Pig Casting Machine of 1x0.25 MTPA

The process starts with receipt of molten metal in Furnace. Pig iron is cast in pig iron casting machine using molten metal.

In Steel Industries iron is produced in Blast Furnace by reducing iron ore (iron oxide) with carbon (coke) at temperature of 1200°C to 1300°C. The iron metal collects at the bottom of blast furnace and is tapped out from time to time. About 50 to 300 ton of

molten metal can be tapped at a time in hot metal ladle. The iron in the molten form is transferred to steel melting shop for conversion to steel. Parts of the iron metal are converted to small pieces called as Pigs in continuous casting machine called as Pig Casting Machine (PCM). The Pig Iron is used as raw material for production of big size iron casting and other application such as conversion to steel of different grade.

These pieces of iron produced in PCM are marketed in sizes of 10 to 45 kg/pc. Such small sizes of pieces are produced in PCM by pouring the hot molten metal into the mould having small pockets. The metal is there after solidifies by cooling with air followed by water cooling. This solidifies pieces called as Pigs if they are big in size & piglets if they are small in size. The Pig Iron is used as raw material for production of big size iron casting.

3.6.7 Ladle Furnace

2x25 Ton Ladle Furnace has been considered for handling liquid steel produced in EIMF. Liquid steel production envisaged is 247,500 TPA.

3.6.8 Blooms/Billet Caster

Two sets of Casters of 6/11m, 2 Strand will be installed for production of 242,500 TPA Billets / Blooms. The Caster is complete with ladle stand, mould assembly, Strand guide segments and supports withdrawal and straightening system, mould cooling system, Cut- off equipment incl. length measuring device, marking machine etc.

3.6.9 Oxygen Plant

The Oxygen Plant for Electric Iron Making Furnace to improve lance, which reduces the Electricity consumption and also reduces considerable tap to tap time of Electric Iron Making Furnace besides increasing productivity. To meet the oxygen and argon requirement of the EIMF, tonnage oxygen plants of capacity 8250 TPA in Phase-I and 8250 TPA in Phase II will be set up for integrated steel complex. Occasional purging need of the steel plant will be met by nitrogen, which will also be generated from the oxygen plant.

3.6.10 Producer Gas Plant

The producer gas plant of 5x6,000 Nm³/hr. will be installed in the proposed project.

The process stages for Producer Gas are as follows:

1. Crushed coal of the specified quality and size is carried to the top of the bunker by means of Bucket Elevator and is put to the bunker. The screen between the bunker

and the Bucket Elevator separates out fines from the feed stock of Coal which is taken down through a chute.

2. Coal from the bunker is fed into the Extended Shaft of the Gasifier through a Sector Gate and two Bell Cones operated by pneumatic power cylinders which open out the Sector Gate and Bell Cones sequentially after getting signal from the LTC temperature whenever it touches the set temperature of 140°C or so.
3. Fed coal travels downwards and gets dried first and then gradually preheated up to a distillation temperature of about 450°C by the product gas moving upwards which itself gets gradually cooled down and picks up the volatile matter of coal and gets auto-carbureted to a much higher calorific value before it comes out to the L.T.C off take pipes. The coal, on the other hand, gets carbonized to nearly coke stage and its reactivity increases for a faster gasification.
4. When the coal enters through the generator bottom shaft, reaction between coal and (air + steam) occurs
5. The distillation zone starts from the top of Secondary Reduction Zone and extends upward to about 2500 mm or so in which considerable quantity of volatile matter (about more than 75%) gets stripped and picked up by gas.
6. At the top, there is preheating zone and above all there is drying zone.

3.6.11 WHRB Based Captive Power Plant

16 MW waste heat recovery boilers-based power plant is proposed to utilize the heat from gases exiting RHF. The waste gases emanating from RHF at 1000 °C will be utilized for generating power through WHRBs.

The fuel gases contain substantial sensible heat (average temperature 950°C), it is proposed to utilize the heat for power generation through waste heat recovery boilers.

The waste heat recovery boilers consist of radiation chambers with water walls just like conventional boiler with a drum to evaporate steam at 34 kg/cm² pressure. The steam is carried to super heater system where the temperature is maintained at 485°C.

The boiler has an economizer, which utilizes the heat of outgoing gases to raise the temperature of feed water from 100 to 200°C. The steam is used to rotate the turbine and to generate power. The condensed steam is collected and recycled to the boilers as boiler feed water. A DM water plant is provided for preparation of de-mineralized water for make-up to the steam-condensate cycle.

The output of the boilers will be used to generate electricity through Steam Turbo Generator Sets of capacities as mentioned above. The flue gases leave the economizer zone at about 150°C. The gases are passed through ESPs, where the dust concentration is reduced and then the waste gases are let out through Chimney.

3.6.12 Ferro Alloys Plant

Ferro alloys are consumables required to manufacture steel. Ferro alloys are used to manufacture various types of carbon and steel, essentially to impart certain physical and chemical properties in a particular grade of steel viz change of tensile strength, ductility, hardness, corrosion resistance, wear resisting or abrasion resistance properties etc. Ferro alloys are also commonly used for de-oxidation and refining of quality steel.

Manufacturing Process of Silico Manganese

Physico-Chemical Conditions of the Process: The above products are smelted by a continuous process with the electrodes submerged deep into the charge. The smelting processes include the following stages:

1. Removal of volatiles and moisture from the charge and heating of the charge by the heat of burning
2. Gases which leave the furnace and after-burn at the top;
3. Reduction of iron and ores with simultaneous formation of metal carbides;
4. Melting of the elements reduced with the formation of molten metal;
5. Formation and melting of slag;
6. Reduction of Manganese and Silicon from the slag.

Hygroscopic moisture of the charge materials is removed in 10-15 minutes upon charging, while the volatile matters are run-off in the temperature range of between 200-1000°C. The iron contained in the manganese ore is reduced to a high extent in the process. Ferric oxides are reduced with carbon monoxide and hydrogen at low temperatures. Ferrous oxide is first reduced with carbon monoxide and hydrogen at 500-600°C temperature and after that with solid carbon in the deeper zones of the bath.

The reduction of manganese from pyrolusite occurs stepwise: $MnO_2 \rightarrow Mn_3O_4 \rightarrow MnO \rightarrow Mn_3C$ with a reducing atmosphere in the furnace, the dissociation of manganese oxides can take place at low temperatures. Carbon monoxide and hydrogen can also reduce Mn_3O_4 to MnO at low temperatures. The process of smelting silico manganese essentially consists in Manganese and Silicon being simultaneously reduced from

manganese silicates, slag, ore and quartz. The process relies on a higher temperature; the temperature at tapping is 1500°C. Apart from the high temperature, for successful reduction of silicon the process requires high concentration of silica in the slag. The metal and slag are tapped from the furnace every two hours. The metal and slag are tapped through two tap holes into a ladle or onto casting pans. The slag over flows and collected into another ladle or in casting pans.

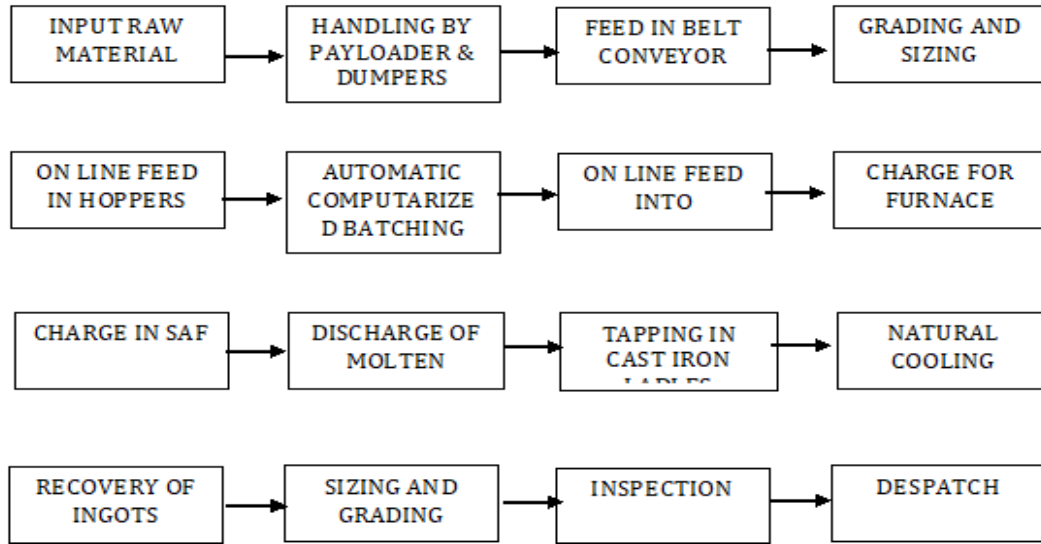
General: Mixed charge is delivered to the furnace from furnace bays along four movable chutes. Three chutes serve to deliver the charge to spaces between the electrodes and the fourth, into the space between the central electrode and furnace wall. Charging is done periodically to allow the previous charge settled at the top, to move down. With normal run of the furnace, yellow flames shoot up evenly all over the surface of the furnace top. The following measures are essential to maintain the top in normal conditions:

The charge should always have the specified composition;

- The charge should be given evenly to each phase electrode;
- Consumption of electric energy should strictly correspond to the number of unit charges without letting the top overheat;
- Charge cones should be pierced periodically.

Disturbances in the furnace run may be caused by various factors. Most often they are linked with an inappropriate consumption of the slag and with a deficiency or excess of the reducer in the charge. Each type of disturbance has quite typical external features: deep or shallow position of the electrodes, an increase or decrease in the content of carbon or silicon, overheating or chilling of the top, evolution of white smoke at the electrodes, ejects of coke breeze, intense slagging at the electrodes etc. The electrodes are slipped every shift or sometimes twice a day. The metal and slag are tapped simultaneously three times a shift. The ladle for tapping is mounted on a carriage under the tap hole, the slag flows over the ladle nose into a slag pot installed on a parallel railway. During tapping, the top hole is often poked with an iron bar so as to let out the metal and slag completely from the furnace. The tap hole is packed with thick clay as soon as metal appears at the ladle nose (i.e. when the ladle is filled with metal).

Flow Chart for Ferro Alloys Plant



3.6.13 Other Facilities

Plant Water System: Water required in Cooling Tower as make up water to maintain its ppm or hardness or conductivity, increased due to contamination in cooling line. The plant water system comprises a make-up water system, drinking water and firefighting water system as well as emergency water supply system for the vital units of the plant.

Quality Control Laboratory: Suitable Testing Facilities required at each step of manufacture. A full-fledged testing laboratory will be in place for each production unit to check the quality of the raw materials and the finished product.

Fire Protection System: Adequate fire-fighting equipment has been provided for each production unit. Following systems of fire protection has been provided in the steel plant:

- Water hydrants network around all the shops.
- Smoke detectors in critical areas such as control rooms
- CO₂ type portable fire extinguishers for electrical rooms flooding system and
- Foam type fire extinguishers near lubrication, hydraulic and fuel oil installation.

Adequate number of portable fire extinguishers will be provided at various locations in the plant shed, control room & DG set room.

Plant Electrical System: Plant Electrical System will have a 33 or 132 kV outdoor type sub-station. The power supply through furnace transformers will be supplied to furnace whereas power supply through auxiliary transformer which will be used for EOT crane

operations, Billet Casting operations, furnace auxiliaries, pumps for cooling water, lighting etc.

Storage Yard: Raw material shall be brought to the yard in trucks are unloaded and stacked in different piles by pay loaders.

3.7 RAW MATERIAL REQUIREMENT

The proposed site is located near the MDR and Highways. The Raw materials and products can easily be transported to the site. The site is also close to the raw material availability area for the project. The connectivity of the site is very good through MDR (Gola Charu bypass Rd) and National Highway-23 Road connecting the site. Nearest Railway Siding is at Gola located at 7.5 km from the proposed project. The Raw Materials will be transported through Road and Rail route.

Table 4 Raw Material Requirement of the proposed project

Raw Material	Quantity (TPA)	Type of Storage	Source	Transportation	
				Rail (km)	Road (km)
<i>Iron Ore Grinding Unit – 10,00,000 TPA (throughput)</i>					
Iron Ore	10,00,000	Yard	Iron Ore belt of Joda-Barbil, Odisha	280	7.5 km (Gola Railway Siding)
<i>Iron ore Pellet Plant – 400,000 TPA</i>					
Iron Ore cake	398,800	Yard	In-house	-	-
Bentonite	4,000	Shed	From local traders of Bhuj, Gujarat	2100	7.5 km (Gola Railway Siding)
Limestone + Dolomite	5,470	shed	Sundergarh, Odisha	350	7.5 km (Gola Railway Siding)
Coal / Coke	12,900	shed	Dhanbad, Ramgarh, Jharkhand	-	30-150
Return Pellets (Fines/Conglomerates)	12,280	shed	In-house	-	-
ESP & Bag Filter Dust	9,280	Shed	In-house	-	-

Raw Material	Quantity (TPA)	Type of Storage	Source	Transportation	
				Rail (km)	Road (km)
Total	442,730				
Rotary Hearth Furnace – 250,000 TPA					
Iron Ore cake	404,100	Yard	In-house	-	-
Bentonite	3,120	Shed	From local traders of Bhuj, Gujarat	2,100	7.5 km (Gola Railway Siding)
Coal	156,200	Shed	Dhanbad, Ramgarh, Jharkhand	-	30-150
Dolomite	12,500	Yard	Local Market/ Sundergarh, Odisha	350	7.5 km (Gola Railway Siding)
Bag Filter Dust & Fines	21,640	Shed	In-house	-	-
Total	592,340				
Electric Iron Making Furnace – 250,000 TPA (Pig Casting M/c – Pig Iron)					
Sponge Iron	250,000	Shed	In-house	-	-
Iron Scrap	29,978	Shed	In-house + Purchased local market	-	30-150
Total	279,978				
Or Electric Iron Making Furnace – 247,500 TPA (LRF – Liquid Steel)					
Sponge Iron	250,000	Shed	In-house	-	-
MS Scrap	27,778	Shed	In-house + Purchased local market	-	30-150
Ferro-alloys	7,500	Shed	In house	-	-
Total	285,278				
Ferro Alloy Plant (Si-Mn) – 30,000 TPA					
Manganese ore	21,600	Yard	Barbil \ Joda \ Nagpur	200-750	7.5 km (Gola Railway Siding)

Raw Material	Quantity (TPA)	Type of Storage	Source	Transportation	
				Rail (km)	Road (km)
Low Grade High Silicon Moil	25,950	Shed	Open Market from Nagpur\Mumbai	200-750	7.5 km (Gola Railway Siding)
Fe-Mn Slag + Dust	21,600	Bins	From Local Producers Bokaro\Ramgarh\Giridih	-	50-150
Quartz	4,500	Shed	Sundergarh, Odisha	200	7.5 km (Gola Railway Siding)
Charcoal/Coke	14,400	Shed	Dhanbad, Ramgarh, Jharkhand	-	30-150
Coal	6,900	Shed	Dhanbad, Ramgarh, Jharkhand	-	30-150
Iron ore/ Mill scale	390	Shed	Mill Scale - Inhouse Bokaro, Chaibasa, Barbil (Odisha)	200	7.5 km (Gola Railway Siding)
Dolomite	3,000	Shed	Sundergarh, Odisha	350	7.5 km (Gola Railway Siding)
Electrode Paste	750	Bins	Gomia, Jharkhand	-	50-150
Total	99,090				
FUEL					
<i>Producer Gas Plant - 5x6000 Nm³/hr.</i>					
Coal	95,100	Yard	Dhanbad, Ramgarh, Jharkhand	-	30-150
Anthracite coal (for PCI)	10,400	Yard	Dhanbad, Ramgarh, Jharkhand	-	30-150
Furnace Oil	1,000 KL	Tank	IOCL, Paradeep	490	7.5 km (Gola Railway Siding)

Table 5: Consolidated List of Raw Material Requirement of the proposed project

Sl.No.	Raw Materials	Quantity in TPA
1	Iron Ore	10,00,000
2	Coal	281,500
3	Charcoal / Coke	14,400
4	Limestone / Dolomite	20,970
5	Iron Scrap /MS Scrap	29,978
6	Mn Ore	21,600
7	Low grade high silicon moil	25,950
8	Fe-Mn Slag	21,600
9	Quartz	4,500
10	Bentonite	7,120
11	Electrode Paste	750
Total		14,28,368

3.8 RESOURCE OPTIMISATION

3.8.1 Water Requirement

The requirement of makeup water for industrial and domestic purposes for the proposed production will be 1,202 KLD. The requirement will be met from Senegarha Nadi. Permission for the same shall be obtained from Damodar Valley Reservoir Regulatory Committee (DVRRC). The water requirement details are provided below:

Table- 6: Water Requirement for the proposed Project

Sl. No.	Particulars	Water Requirement (KLD)
1	Grinding Unit	80
2	Pellet Plant	200
3	Rotary Hearth Furnace	440
4	Captive Power Plant	203
5	Pig Casting Machine	40
6	EIMF	120
7	CCM	35
8	Ferro Alloy Plant	72
9	Domestic	12
Total		1,202

3.9 SOLID WASTE GENERATION AND MANAGEMENT

The solid waste generated from the proposed plant is provided in the following table

Table- 7: Solid waste generation details

Type of Waste	Quantity in Tons (TPA)	Mode of Disposal
Pallet Plant		
Return Pellets (Fines/Conglomerates)	12,280	Will be reused in Pellet plant
ESP & Bag Filter Dust	9,280	Will be reused in Pellet plant
Rotary Hearth Furnace		
ESP Dust	59,400	Supplied to ash blocks / bricks manufacturers
Bag Filter Dust	9,940	Recycled in process
Fines	11,700	Recycled in process
EIMF		
Slag (from Pig)	22,380	Granulated & sold to cement plants
Or Slag (From Steel)	29,400	Supplied to outside parties for road construction
Bag Filter dust	6,000	Recycled in RHF process
CCM		
Mill Scale	1,650	Recycled in RHF process or Ferro alloys
Scrap / End Cut	3,350	Recycled in EIMF
Producer Gas Plant		
Ash	10,080	Supplied to Fly-ash Brick/Blocks Plants
Tar	2,851	Supplied to authorized Coal tar processing units
Ferro-alloys Plant (Si-Mn)		
Slag	33,000	Supplied to outside parties for road construction
Bag Filter Dust	750	Recycled in the process

Chapter 4

SITE ANALYSIS

4.1 CONNECTIVITY

Particulars	Details	Distance and direction
Site Location	Tonagatu, Gola, Ramgarh, Jharkhand	-
Height above MSL	383 m	-
Road Connectivity	NH-23 MDR	8.1 km in NE 1.21 km in North
Rail Connectivity	Gola Road Railway Station	7.5 km in North East
Nearest Airport	Birsa Munda Airport, Ranchi	38 km in South West
Nearest Habitation	Bamni Village	500 m in South
Nearest River	Subarnarekha River	3.5 km in South
	Bhera Nadi	2.3 km in North
	Senegarha Nadi	600 m in West

4.2 LAND FORM, LAND USE AND LAND OWNERSHIP

The land use is Agricultural. The proposed land of the plant is 16.18 Ha. The Land is in the possession of the project proponent for installation of proposed project. Land use of the entire project area will be changed from waste & barren and low-yield agricultural land to industrial use.

4.3 TOPOGRAPHY OF THE LAND

The general topography of Ramgarh is undulating. The physiographic characteristics of the district are rich with waterfalls, hills, and land with avalanches. Southern fringes of Ramgarh are surrounded by green forest. The district is a part of Chotanagpur Plateau. Important physiographic feature of the district is the Damodar Trough/ Basin/Rift zone. River Damodar flows through the town. Mainly two type of soil found -Red Soil and Sandy loam. Three soil orders namely Entisols, Inceptisols and Alfisols were observed in the district.

4.4 PROPOSED LAND USE PATTERN

Land use details of the project are as follows:

Table 8: Land Use breakup of the project

S. No.	Proposed Land Use	Total area	
		Acres	Hectare
1	Plant and Facilities	18.48	7.48
2	Stock Yard	1.25	0.507
3	Water Reservoir & Complex	0.85	0.345
4	Roads & Buildings	2.68	1.083
5	Truck Parking	0.74	0.3
6	Greenbelt and Plantation	15.99	6.472
	TOTAL	40.00	16.18

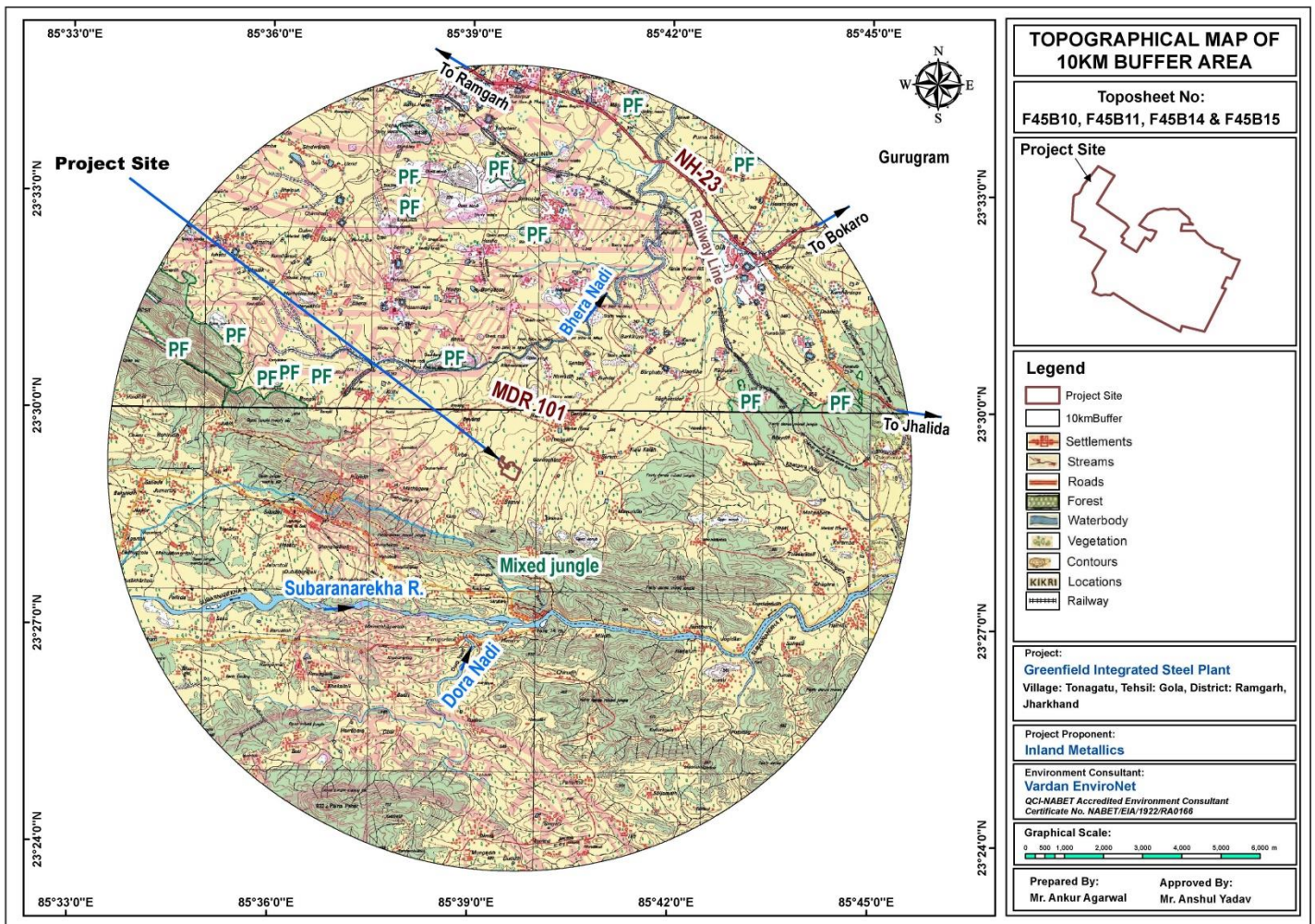


Fig 8 Topographic map of 10 km study area

4.4 INFRASTRUCTURE

Office building, canteen, roads waste or waste water treatment arrangement, guest house, store etc. will be established at the site. Tonagatu village has a primary school from which power supply for domestic use will be utilized. Besides this the villages also have bank, post office and cultural facilities. Drinking Water, Rest Room, Toilets for construction phase shall be established on temporary basis.

4.5 SOIL CLASSIFICATION

According to Soil Resources and Agro-Climatic zones of Jharkhand, the soil of Jharkhand shows preponderance of red and yellow soils in Ramgarh district developed in situ on gentle to undulating plain intercepted by some hilly ranges from granite, gneisses and schists, sandstone and alluvium under a transitional tropical climate. Earlier, these soils have been described as red loamy, red sandy and red and yellow soils. Argillic horizon is met with in most matured soils and is placed in Alfisols. These soils have been formed on variety of rocks. Micaceous quartzite schists, phyllites, hornblende, schist and gneisses are some of the rocks giving rise to yellow soils.

4.6 CLIMATE DATA

The area lies in the sub-humid region of Chotanagpur Plateau and enjoys semi-extreme type of climate. The day temperature rises around 44°C during the summers and drops down to around 10°C during the winter.

Maximum dry bulb temperature	44°C
Minimum dry bulb temperature	10°C
Maximum Relative Humidity %	80%
Minimum Relative Humidity %	60%
Average Annual Rainfall	1315 mm

Chapter 5

PLANNING BRIEF

5.1 PLANNING CONCEPT

The project envisages for installation of 2x0.5MTPA Iron ore Grinding unit, 0.4 MTPA Pellet Plant, 2x0.125 MTPA Rotary Hearth Furnace, 2x25 Ton Electric Iron Manufacturing Furnace, 1x0.25 MTPA Pig Casting Machine, 2x25 TPD Ladle Refining Furnace with Blooms / Billets Caster, 15 MVA Submerged Arc Furnace, 16 MW Captive Power Plant, 5x6000 Nm³/hr Producer Gas Plant and 2x 8250 TPA Oxygen Plant over the land area of 16.18 Ha.

The project shall be implemented within 36 months after grant of Environmental Clearance from Ministry of Environment, Forest & Climate Change and Consent to Establish from Jharkhand State Pollution Control Board.

Material will be transported by Rail & Road. Nearest railway station, Gola Road is 7.5 km from the project site and MDR and NH-23 is 1.21 km and 8.1 km from the project site respectively.

5.2 POPULATION PROJECTION

Manpower requirement for the proposed plant shall be 560 and will be sourced from local population. Hence there will not be increase in population due to direct employment in the area due to the proposed plant.

5.3 LAND USE PLANNING

Out of total area of 16.18 ha of land, 6.472 ha (40%) will be kept for greenbelt development, as the area falls under Severely Polluted Area. 7.48 ha. of land will be required for installation of proposed production facilities.

5.4 ASSESSMENT OF INFRASTRUCTURE DEMAND

Project is located in area with temporary available infrastructure. The plant has well connected National Highway as mentioned in the above chapters. However, the existing land use of agriculture land shall be converted to industrial land after getting due permission from state authority. New infrastructure for the proposed plant will be developed including internal roads, parking, Admin building, Production sections and Storage yards.

5.5 AMENITIES / FACILITIES

The following facilities will be available at the project site during operation phase after the completion of construction phase:

- Administration Building
- Stores
- Time and security offices
- First aid and fire-fighting station
- Canteen and welfare center
- Toilets and Rest rooms
- Car parks and cycle / scooter stands

No other additional facilities are proposed.

Chapter 6

PROPOSED INFRASTRUCTURE

6.1 INDUSTRIAL AREA (PROCESSING AREA)

The processing area will comprise of various plant facilities within the proposed plant area they are – Raw Material Handling Plant, Pellet Plant, Grinding Unit, Rotary Hearth Furnace, EIMF, Pig Casting Machine, Billet Caster, Producer gas plant, Oxygen Plant, WHRB based Power Plant, Softening Plant, Cooling Towers and Water reservoir.

6.2 RESIDENTIAL AREA (NON PROCESSING AREA)

There is no proposal of any residential colony as the required manpower will be sourced from local population. Facilities like Canteen, Rest room, Toilets will be made available during the operational phase. Non-processing area will comprise of facilities within the premises such as – Store & administrative block, road & yards and vacant area.

6.3 GREEN BELT

Green Belt will be developed over 40% of the plant area. Indigenous trees will be planted in 6.472 Ha. out of the total area of 16.18 Ha. Tree density of 2500 trees per hectare with local board leaf specification will be planted. Out of total 500 trees, 100 trees will be shifted and transplant in green belt area and will be developed further as a part of Greenbelt within the proposed plant premises.

6.4 CONNECTIVITY

Project site is well connected by road and rail.

Road Connectivity through Gola-Charu Bypass Road and NH-23 are 1.2 km and 8.1 km in N and NE direction, respectively from the site.

Rail connectivity – Gola Road Railway Station is 7.5 km away

No further development is required

6.5 DRINKING WATER MANAGEMENT

Raw water from bore wells will be treated in Water Treatment Plant and will be supplied for drinking purpose in Offices, Canteen and Work place. Employees will be provided potable water for drinking.

6.6 SEWAGE SYSTEM

Sufficient and suitable toilet facilities of proper standard and hygiene will be provided. These facilities will be connected with Septic Tank.

6.7 INDUSTRIAL WASTE MANAGEMENT

There is no waste water discharge from the plant. Cooling water is being recycled after cooling in the Cooling Towers. Blow down water from Cooling Towers are being used for slag cooling and dust suppression. Zero discharge shall be maintained for the proposed plant. Solid waste generated from the plant will be suitably managed as per the requirement. The solid waste management details are provided in Table 8.

6.8 POWER REQUIREMENT & SUPPLY / SOURCE

Power Requirement

The plant requires 48 MW power, out of which 16 MW will be sourced from Captive Power Plant and remaining will be sourced from power utility company DVC. Substation with adequate capacity to supply necessary power for the project will be installed. The company will also install 1 x 250, 1x500 and 1x750 KVA DG set for meeting emergency requirements of the plant utilities such as circulating water for cooling critical furnace components, in case of power shutdown.

Table 9: Power Requirement details

Plant Units	Proposed (MW)
Grinding Unit	3.5
Iron ore Palletization plant	4.0
Rotary Hearth Furnace	4.5
Pig Casting Machine	0.015
Electric Iron Making Furnace	20.0
LRF & CCM	0.15
Oxygen Plant	0.02
Producer Gas Plant	1.0
WHRB (Captive Power Plant)	1.6
Ferro Alloys plant	12.0
Lighting and others	1.0
Total	47.785 ~ 48.0

Chapter 7

REHABILITATION AND RESETTLEMENT (R&R) PLAN

There is no need for any resettlement and rehabilitation as the land on which the project is proposed is land not in agricultural use and there is no settlement or any houses or habitation or livestock in the land.

Land is already in possession of the company.

Chapter 8

PROJECT SCHEDULE & COST ESTIMATE

8.1 PROJECT SCHEDULE

Inland Metallics has initiated actions to get statutory clearances to start the project. Clearances required are Environmental Clearance from Ministry of Environment, Forest & Climate Change and Consent to Establish from Jharkhand pollution Control Board.

Completion schedule of the project is 36 months. "Zero date" for a project is reckoned as the date on which the all-statutory clearance to start the project are received.

Sl.No.	Activity	Schedule in Months
1	Consent to Establish	Zero date
2	Placement of Order	4 months
3	Demolition work	4 months
4.	Civil & Structural work	10 months
5.	Procurement, Installation & Commissioning	18 months
Total		36 months

8.2 COST ESTIMATE

The cost for the project is Rs. 400 Cr. The cost breakup is provided in the following table:

Table 10: Total Project Cost breakup

Items/Particulars	Proposed Cost in Lakhs
Land	1000
Building	9450
Infrastructure	1500
Plant & Machinery	25650
ESP for RHF & Pellet	1500
Bag Filter for Pellet & RHF	300
Bag filter for Ferro Alloys Unit	100
Pollution control system for EIMF	500
Total	40000.00

Chapter 9

ANALYSIS OF PROPOSAL

Inland Group is involved in various business sectors like transportation, Courier, Power sectors. Now, the company plans to set up its Iron and Steel Plant at Ramgarh District of Jharkhand. The proposed plant will be installed in the Agricultural land of area 16.188 Ha. for production of 400,000 TPA Pellets, 250,000 TPA Sponge Iron Plant, 250,000 TPA Pig Iron or 242,500 TPA Billets / Blooms, 30,000 TPA Ferro Alloys and 16 MW Power Plant along with other allied facilities.

To contribute in the growing steel sector in present fluctuating market, Inland Metallics have decided to go for installation of Steel Plant for production of Pellets, Sponge Iron, Ferro Alloys (Si-Mn) and Pig Iron or Billets.

The Directors of Inland Metallics are experienced Industrialist, dynamic, practical, hardworking & self-made entrepreneur. They have excellent reputation in & around Jharkhand, West Bengal, Bihar, Uttar Pradesh and Orissa States. The products will be produced indigenously and will be consumed in the country and also outside the country as per the demand.

The management team consists of experienced and matured professionals. The team is quite capable of managing the business. Therefore, no financial problem is envisaged.

The technology involved in proposed project is well proven and reliable. All equipment purchased shall be brand new & latest in model and will be purchased from reputed suppliers. For O&M of the plant, experienced Engineers /Technicians are available in the region.

Profitability of project is quite attractive. Project is technically and financially viable with positive impact on the local infrastructure.

The region shall also be benefited from the project as local persons will be provided with either direct employment or indirect employment. M/s Inland Metallics would be recruiting unskilled, semi-skilled office assistant categories, etc. This will improve the economic condition of the local people. The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region. With the advancement in technology and the stringency in permissible limits of emission along with regular monitoring, it is possible to operate plants of this type by having minimal impact on the environment.

In view of the above the proposed Project of Inland Metallics is technically feasible and financially viable hence recommended for implementation. We request EAC to recommend TOR for conducting the EIA Study for obtaining Environmental Clearance from Ministry of Environment, Forest & Climate Change.
