

EXECUTIVE SUMMARY OF DRAFT EIA-EMP REPORT

For

GREENFIELD PROJECT FOR IMPLEMENTATION OF DRI BASED STEEL PLANT TO PRODUCE SPONGE IRON 262500 TPA; MILD STEEL BILLETS 274400 TPA FOR ROLLED STEEL PRODUCTS 266168 TPA (THROUGH HOT CHARGING 201684 AND THRU BRP (BASED ON COAL GASIFIER) 64484 TPA ; FERRO ALLOYS PLANT 9 MVA X 2 NOS ; CAPTIVE POWER OF 30 MW (20 MW THROUGH WHRB AND 10 MW THROUGH AFBC); AND FLY ASH BRICKS 39,800 TPA

LOCATED AT

VILLAGES NATWARPUR AND DHUMABAHAL, TEHSIL AND DISTRICT RAIGARH (C.G.)

Terms of Reference File No. IA J 11011/132/2024 IA II(Ind I) dated 10th August 2024
Category A, Schedule 3 (a) Metallurgical Industries (Ferrous & Non-Ferrous) and
1(d) Thermal Power Plant

Baseline Monitoring Period: Winter Season (1st Dec 2023 – 29th Feb 2024)

PROJECT PROPONENT

M/S. SHREE REAL SPONGE AND POWER

ENVIRONMENTAL CONSULTANT



M/S. ANACON LABORATORIES PVT. LTD., NAGPUR

QCI - NABET Accredited EIA Consultant for
3 (a) Metallurgical Industries (Ferrous & Non Ferrous),
and 1(d) Thermal Power Plant

MoEF&CC (GOI) Recognized Laboratory
ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Lab. & Consultancy: FP-34, 35, Food Park,
MIDC, Butibori, Nagpur – 441122

Mob.: +91-9372960077

Email: ngp@anacon.in

Website: www.anaconlaboratories.com

Report No. ANqr/PD/20A/2024/243

SEPTEMBER - 2024

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The firm “**M/s. Shree Real Sponge and Power**” has proposed to set up an DRI based Steel plant along with captive power generation plant to implement new manufacturing facilities for production of Sponge Iron, MS Ingot Billet (as intermediate / Semi finished product), Rerolled Steel products, Ferro Alloys and/or Pig Iron; and Fly Ash Bricks/Block products comprising of Waste Heat Recovery Boiler (WHRB) and Atmospheric Fluidized Bed Combustion (AFBC) Boiler and Steam Turbine & Generator. This is a Greenfield project and will be established in 15.957 Ha. total land area.

As per Environmental Impact Assessment Notification dated 14th September, 2006 and subsequent amendment thereof, the Sponge Iron, and Ferro Alloys Plants falls under **Sector 3 (a) Metallurgical Industries** and the AFBC based power plant falls under **Sector 1 (d) Thermal Power Plant**. The overall project activity is categorized as **Category “A”** therefore require Environmental Clearance (EC) to be obtained from EAC (Industry –I), MoEFCC, New Delhi.

The application for prior Environmental Clearance (Form-1) for proposed metallurgical project was submitted to EAC, MoEF & CC (Online Proposal No. IA/CG/IND1/466978/2024 on 30 March 2024 whereas, ToR was granted by EAC (Industry –I) vide. no. **F. No. IA-J-11011/132/2024-IA-II(Ind-I)** on dtd. 10th August 2024.

Anacon Laboratories Pvt. Ltd., Nagpur, is QCI-NABET accredited in ‘**Category A**’ environment consultant organization has been assigned to undertake an Environmental Impact Assessment (EIA) study and preparation of Environment Management Plan (EMP) for various environmental components, which may be affected due to the impacts arising out of the proposed project.

EIA process requires the primary baseline data collection to know the information on the biophysical, social and economic backgrounds of Greenfield project. The Environmental Impact Assessment (EIA) report is prepared for obtaining Environmental Clearance (EC) from Ministry of Environment, Forest and Climate Change (MoEFCC), New Delhi and the Consent for Establishment from the Chhattisgarh Environment Conservation Board (CECB) for the proposed Greenfield project.

1.1 IDENTIFICATION OF PROJECT

The firm “**Shree Real Sponge and Power**” is a partnership firm with an objective to set up an DRI based Steel plant along with Captive power plant on 1st July 2023 with an objective to set up an integrated steel plant along with Power plant. The project is proposed to be located at Village-Natwarpur and Dhumabahal, Tahsil and District-Raigarh (Chhattisgarh) Pin Code – 496001. The proposal is to seek Environmental Clearance based on energy efficient as well as approved technology process. The product profile has been finalized based on the market demand and the technology process compatibility.

The detail of proposed plant facilities is as follows.

TABLE 1: PROPOSED PLANT DETAILS WITH CAPACITY

S. No.	Product	Configuration	Capacity (in TPA)
1	Sponge Iron	350 TPD X 1 Nos. 200 TPD X 2 Nos DRI Kiln	262,500
2	MS Ingot Billet (as intermediate/ Semi finished product)	20 MT X 4 Nos. Induction Furnace along with CCM	274,400
3.	Rerolled Steel products	2 Electrically Operated Rolling Mill	266,168

S. No.	Product	Configuration	Capacity (in TPA)
	(a) Rolled Steel product thru Hot charging	Direct Hot Charging facility and one No. Electrically Operated Rolling Mill	201,684
	(b) Rerolled Steel product thru BRP	Coal Gasifier (4200 Nm ³) based Billet Reheating Furnace	64484
4	Ferro Alloys - SiMn	9 MVA X 2 Nos. SAF	36,000
	And/or		And/or
	Ferro Alloy – FeMn		45,000
	And/or		And/or
	Ferro Alloy – FeSi		20,000
	And/or		And/or
	Pig Iron		72,000
5	WHRB based power	3 Nos of WHRB boiler with each of DRI Kiln connected to TG	20 MW
6	FBC based power	FBC based boiler connected to TG	10 MW
7	Fly Ash Brick/Blocks etc.	Fly Ash Brick/Block and other product making machine	39,800

1.2 LOCATION OF THE PROJECT

The project is proposed on the land of 15.957 Hectares, and the entire 100% land (i.e. 15.957 Ha) purchased and under ownership in the name of firm. Out of the above 33.07% (5.277 Ha.) area will be developed as Greenbelt area. The entire 100% land is already diverted to industrial purpose. The land is located at Kh. No. 240/5 and 198 at Village Natwarpur and Kh. No. 96 at Village Dhumabahal, Tehsil & District – Raigarh (CG – 496001).

The proposed project located at Village – Natwarpur and Dhumabahal, Tehsil - Raigarh and District - Raigarh (CG – 496001). The nearest city is Raigarh which is about 9.10 km/WSW direction. Nearest airport is OP Jindal Airport which is about 15.52 km in WSW direction. The project site can be reached through Sundargarh-Raigarh Road which is 3.50km in West direction. The project is well connected to all weather roads. Nearest railway station is Kotarlia Railway Station is 8.21 km from project site in SSW direction.

The study area of 10 km radial distance from the project site is shown in **Figure 1**.

1.3 EIA/EMP REPORT

In line with the approved ToR obtained from EAC (Industry –I), MoEF&CC, New Delhi, baseline environmental monitoring was conducted during winter season (1st December 2023 – 29th February 2024) for determining the status of ambient air quality, ambient noise levels, surface and groundwater quality, soil quality, status of flora, fauna and eco-sensitive areas and socio-economic status of the villages within 10 km radius study area from the project site (**Figure 1**). The observations of the studies are incorporated in the EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the report.

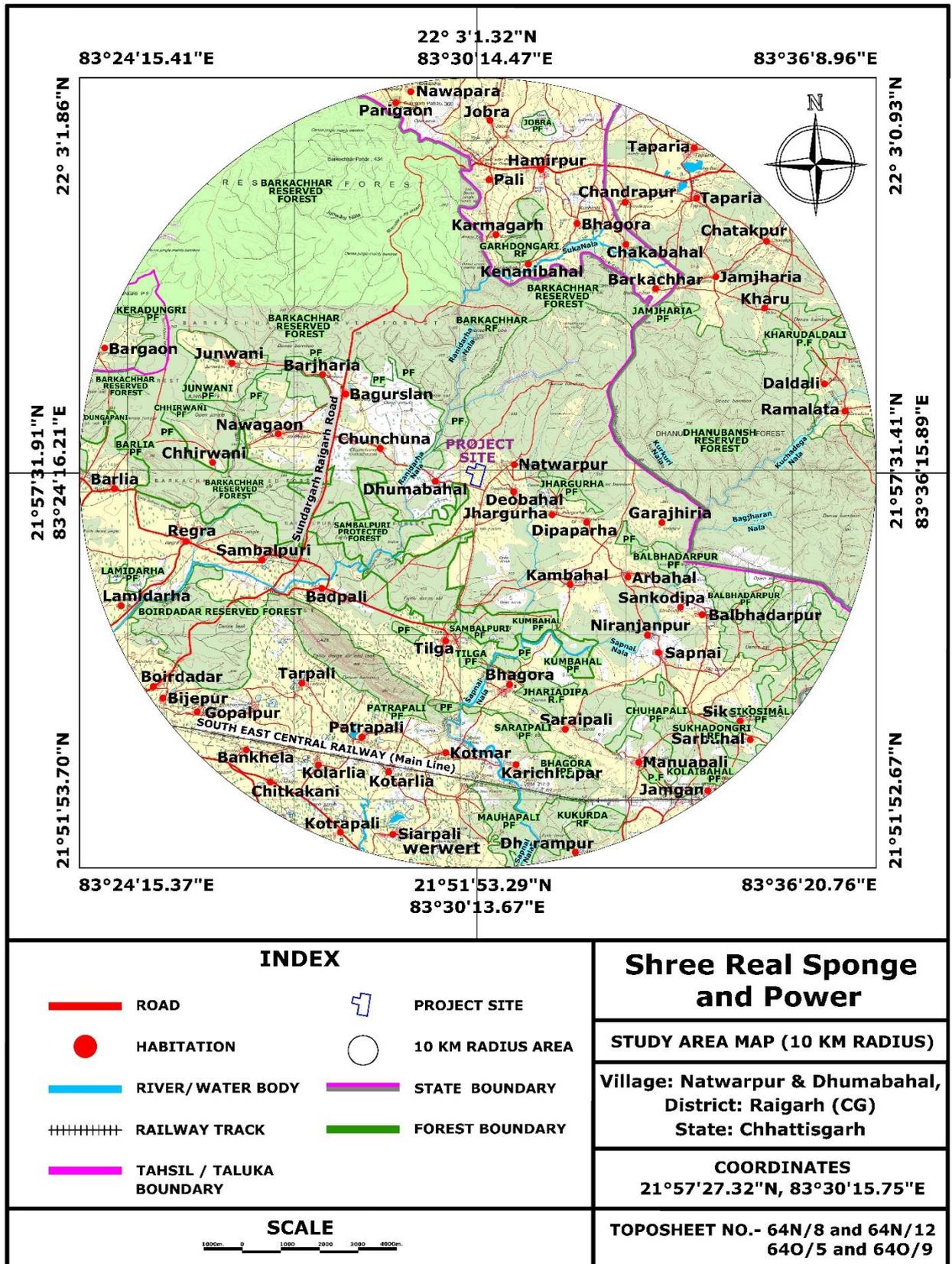


FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)

TABLE 2: DETAILS OF ENVIRONMENTAL SETTINGS

Sl.	Particulars	Details																														
1.	Project Location	Village-Natwarpur and Dhumabahal District-Raigarh State-Chhattisgarh 496001																														
2.	Latitude/ Longitude	<table border="1"> <thead> <tr> <th>Sl.</th> <th>Latitude</th> <th>Longitude</th> <th>Sl.</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>21°57'34.20"N</td> <td>83°30'12.37"E</td> <td>5</td> <td>21°57'25.02"N</td> <td>83°30'9.95"E</td> </tr> <tr> <td>2</td> <td>21°57'32.48"N</td> <td>83°30'20.26"E</td> <td>6</td> <td>21°57'26.83"N</td> <td>83°30'3.85"E</td> </tr> <tr> <td>3</td> <td>21°57'15.02"N</td> <td>83°30'16.11"E</td> <td>7</td> <td>21°57'31.47"N</td> <td>83°30'5.07"E</td> </tr> <tr> <td>4</td> <td>21°57'16.92"N</td> <td>83°30'7.98"E</td> <td>8</td> <td>21°57'29.90"N</td> <td>83°30'11.17"E</td> </tr> </tbody> </table>	Sl.	Latitude	Longitude	Sl.	Latitude	Longitude	1	21°57'34.20"N	83°30'12.37"E	5	21°57'25.02"N	83°30'9.95"E	2	21°57'32.48"N	83°30'20.26"E	6	21°57'26.83"N	83°30'3.85"E	3	21°57'15.02"N	83°30'16.11"E	7	21°57'31.47"N	83°30'5.07"E	4	21°57'16.92"N	83°30'7.98"E	8	21°57'29.90"N	83°30'11.17"E
Sl.	Latitude	Longitude	Sl.	Latitude	Longitude																											
1	21°57'34.20"N	83°30'12.37"E	5	21°57'25.02"N	83°30'9.95"E																											
2	21°57'32.48"N	83°30'20.26"E	6	21°57'26.83"N	83°30'3.85"E																											
3	21°57'15.02"N	83°30'16.11"E	7	21°57'31.47"N	83°30'5.07"E																											
4	21°57'16.92"N	83°30'7.98"E	8	21°57'29.90"N	83°30'11.17"E																											
3.	Location covered in Toposheet No	64N/8, 64N/12, 64O/5 and 64O/9																														
4.	Nearest representative IMD Station	IMD Jharsuguda – 60 KM E IMD Raigarh - 14.66 km/WSW (Presently not working)																														
5.	Site elevation above Mean Sea Level	287m to 299m																														
6.	Nearest roadway	1.Sundargarh-Raigarh Road - 3.50 km/W 2.Road connecting village Dhumabahal and Deobahal- Adjoining/S																														
7.	Nearest Railway Station	Kotaria Railway Station-8.21km/SSW Raigarh Railway Station-13.58km/WSW																														
8.	Nearest Air Port	1.OP Jindal Airport - 15.52 km/WSW 2.Veer Surendra Sai Airport, Jharsuguda - 56km/ESE 3. Raigarh Air Port (Air Strip) Kodatarai - 20.73km/SW																														
9.	Nearest village	Natwarpur - 0.50 km/ENE Dhumabahal – 0.67 KM/W																														
10.	Nearest Port	Gopalpur Port-331km/SSE																														
11.	Distance from Sea Coast	Bay of Bengal - 324.7km/SSE																														
12.	Nearest major city with 2,00,000 population	Raigarh - 9.10 km/WSW																														
13.	Nearest State/National Boundaries	Odisha - 3.50km/ENE																														
14.	Hills/Valleys	Hills observed near Patrapali village - 5.2 KM (SW)																														
15.	Ecologically sensitive zone	None within study area. Stray Elephants movement reported in forest in the study area																														
16.	National Parks, Wildlife Sanctuaries, etc.	None within study area																														
17.	Nearest Reserved / Protected forests	1.Barkachhar Reserved Forest-1.60km/N 2.PF-0.56km/W 3. Sambalpur Protected Forest-0.18km/SW 4.Kharudaldali P.F-8.64/ENE 5.Dhanubansh Reserved Forest-6.04km/ENE 6.Jhargurha PF-1.40km/E 7.Balbahadarpur PF-4.74km/ESE 8.Kumbahal PF-3.54km/SSE 9.Sambalpur PF-3.40km/S 10.Jhariadipa R.F-4.50km/SSE 11.Saraipali PF-5.87km/S 12.Chuhapali PF-6.58km/SE 13.Sikosimal PF-8.86km/SE 14.Sukhadongri RF-8.41km/SE 15.Kolaibahal PF-9.45km/SE 16.P.F near Manuapali village-9.3km/SSE																														

Sl.	Particulars	Details			
		17.Patrapali PF-5.14km/SW 18.Jamjharia PF-5.57km/NE 19.Boirdadar Reserved Forest-6.86km/SW 20.Lamidarha PF-8.71km/WSW 21.Barlia PF-8.38km/W 22.Dungapani PF-9.34km/WNW 23.Chhirwani PF-7.48km/WNW 24.Junwani PF-6.50km/WNW 25.Keradungri PF-9.05km/WNW 26. Garhdongari Reserved Forest-5.37km/NNE 27.Jobra PF-8.65km/NNE			
18.	Historical/Tourist places	Sr. No.	Name	Distance (Km)	Direction
		1	Kharkhari River Picnic Spot	9.80	SSE
19.	Nearest Industries	Sr. No.	Name	Distance (Km)	Direction
		1	Maa Mangla Ispat Pvt Ltd.	0.900	S
		2	Maa Mani Industries Pvt. Ltd.	1.05	SSW
		3	Rolling Mill Division (TMT)	8.93	SSE
		4	Jindal Food Products, Sambalpur, Raigarh (C.G.)	5.13	WSW
		5	Blast furnace and sinter, ISL	8.92	SSW
		6	Shiv Shakti Steel Pvt. Ltd.	3.70	WNW
		7	IND Synergy Limited	8.60	SSW
		8	M/s. Black Diamond fly ash bricks Industries	8.50	NNE
		9	Maa Shakambari Steel Ltd Sambalpur Raigarh CG	3.16	WSW
20.	Nearest Water Bodies	Sr. No.	Name	Distance (Km)	Direction
		1	Ranidarha Nala	0.92	WNW
		2	Bagjharan Nala	5.74	ESE
		3	Kuchadega Nala	5.84	ESE
		4	Suka Nala	4.88	N
		5	Sapnai Nala	4.52	SSE
21.	Archaeological Sites	None			
22.	Religious Places	Sr. No.	Name	Distance (Km)	Direction
		1	Ma Banjari Mandir	4.32	NE
		2	Mahadev Mandir	7.18	WSW
		3	Ram Janaki Temple Tarpali	7.05	SW
		4	Bhikharimal, Shiv Mandir	8.53	SW
23.	Hospitals and Education Institutions (Sensitive Manmade Landuse)	HOSPITALS			
		Sr.No.	Name	Distance (Km)	Direction
		1	Primary Health Centre Bangursiya	3.81	WNW
		2	Shri Dental Clinic, Raigarh, Chhattisgarh	9.85	SW
		3	Primary Health Center Sambalpur	5.13	SW
		4	Raigarh Ayurvedic Hospital	9.5	SSW
		5	Primary Health Center Bhagora	7.12	SSE
		6	Maa Manakesri Temple	6.74	N
		EDUCATIONAL INSTITUTIONS			
		Sr. No.	Name	Distance (Km)	Direction
		1	Govt. PS.Dhumabahal	0.76	WSW

Sl.	Particulars	Details			
		2	Govt.PS.Natwarpur	0.76	ENE
		3	Raigarh College of Education	9.84	SSW
		4	College of Agriculture & Research Station IGKV, Boirdadar, Raigarh	9.65	WSW
		5	Raigarh College of Pharmacy	9.78	SSW
		6	Higher Sec School Kotarliya	8.66	SW
		7	GMS Bhagora	5.42	SSE
		8	Govt HSS Tilaga	3.95	SSW
		9	Middle School Bhagora	7.41	NNE
		10	Primary Government School Manuwapali	9.07	SSE
		11	Govt. Middle School Gopalpur Raigarh	9.27	SW
		12	Govt. School Darramuda Mohalla Regda	7.6	WSW
		13	Tarpali School	7.67	SW
		14	Government Higher Secondary School Sambalpur, Raigarh, Chhattisgarh	5.27	WSW
24.	Community Places	Sr. No.	Name	Distance (Km)	Direction
		1	Utsav Island	9.30	SW
		2	Community Hall Nawagaon	5.90	WNW
25.	Seismic zone	Zone-II (Least Active)			

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION

2.1.1 Manufacturing process of Sponge Iron (DRI)

- Iron ore, coal, dolomite/limestone is fed in the weighed quantity and the kiln is rotated at 0.5 RPM speed. A temperature between 1000°C to 1050 °C is maintained in about 70% of the kiln length towards discharge end side for required reaction.
- After the reaction, the product is taken into an indirect cooling drum cooler. The product is cooled to 100°C and taken for product separation and then taken for final use.
- The kiln has three functions; heat exchange, chemical reaction in vessel and conveying solids.

2.1.2 Manufacturing process of Steel Melting Shop with CCM and Hot Charging Rolling Mill

- The manufacturing process installed in the unit is one which is well established and proven technology presently being followed by majority of similar manufacturing units mostly in small or medium scale sector.
- The melting process involves taking sample of Sponge Iron & Pig Iron; Iron Powder and mild steel scrap, end cutting from rolling mills or scrap from user units is taken from raw material storage. This is then tested for its chemical composition and noted..
- Melting of steel along with other alloying element is accomplished in the crucible of coreless M.F. Induction Furnace.
- After completion of melting cycle of an hour the homogeneous molten mass is poured hydraulically into the ladle.

➤ CCM

- The ladle containing liquid steel is placed on the Continuous Casting Machine platform and continuous casting of hot billet is carried out in the same.
- In the CCM section hot billet shearing machines will be installed with each casting strand, so as to facilitate the cutting of billets to proper length for feeding in to the rolling mill.

2.1.3 Manufacturing process of Rolling Mill (BRF with Coal Gassifier)

- Raw Material i.e., Cold Billet is cut to size; either by Gas Cutting.
- The sized billets are then Pushed into Billet reheating furnace; fired with Coal Hot Producer Gas
- After the Billet is Red Hot 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., MS Channel, Structures and other rerolled product are produced.

2.1.4 Manufacturing Process for Ferro Alloys

- High Carbon Ferro/ Silico Manganese and other Ferro Alloys like Ferro Silicon; Ferro Manganese as a finished product will be produced through a conventional submerged arc electric furnace having Soderberg electrodes the furnace hood will be having fourth hole for exhaust of flue gases to be treated through APCEs.
- Pig Iron is also proposed to be produced alternately from the same submerged arc furnace by using lower grades Iron ore and Magnetite Iron ores and the Pig Iron will be sold to Induction Furnaces for production of steel.

2.1.5 Process of Power Generation

WHRB based Power Generation

- The Waste heat Recovery boilers are attached with DRI Kiln. The flue gases released from DRI Kilns will be passed through Waste Heat Recovery Boiler, where waste heat will be recovered and steam will be generated in required temperature and pressure. The source of energy is the heat content in waste flue gases released from DRI Kilns.

AFBC Based Power Generation:

- In an AFBC boiler, the fluidized bed media, which consists of ash, sand, limestone and other such materials is heated to the ignition temperature of the fuel.
- Fuel, such as char, is continuously supplied to the bed as it burns very quickly in the high bed temperatures of almost 1000°C.
- The heat generated from this combustion is used to produce steam which, like in WHRB systems, will produce power through a steam generator.

2.1.6 Process of brick making from waste

- To make Fly ash bricks Fly ash, Lime, Sand and Gypsum along with slag from the induction and arc furnaces are fed into a pan mixer, where water is added in the appropriate proportion before mixing it all together.
- After mixing; the mixture is shifted to hydraulic presses for where the mixture is given its brick like shape.
- The molded bricks are then carried into the open area where they are air dried and cured in an autoclave to give them its rigidity.

2.2 LAND REQUIREMENT

The project is proposed on the land of 15.957 Hectares, and the entire 100% land (i.e. 15.957 Ha) purchased and under ownership in the name of firm. Out of the above **33.07% (5.277 Ha.)** area will be developed as Greenbelt area. The entire 100% land is already diverted to industrial purpose. The land is located at Kh. No. 240/5 and 198 at Village Natwarpur and Kh. No. 96 at Village Dhumabahal, Tehsil & District – Raigarh (CG – 496001). The details of land use planning are provided **Table 3**.

TABLE 3: AREA STATEMENT

Land Use	Area	In %
Built Up Area	4.732	29.65%
Road and Paved area	1.836	11.51%
Storage Area	0.760	4.76%
Green Belt area	5.277	33.07%
Open Area	3.352	21.01%
Total	15.957	100%

2.3 RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

Availability of raw material is abundant within 500 km area of Raigarh District of Chhattisgarh. Required Fuel will be sourced mainly from open markets. Iron ore and coal are the basic bulk raw materials, which will be purchased from different suitable mines and open market as well through negotiation and open bidding. Bulk Material like Iron Ore, Mn Ore; Coal, etc. are proposed to be brought by Rail up to nearest railway siding and from there materials will be transported by covered truck through road to the plant. Whereas the other raw material required for the project like, Coke; Charcoal; Dolomite, Refractory material, manganese, quartz, gypsum, electrode paste, etc. are readily available within 100 km - 500 km radius and these will be transported through covered trucks.

2.3.1 Solid and Hazardous Waste Generation

The details of solid and hazardous waste generations are given in **Table 4** and **5**, respectively.

TABLE 4: SOLID AND HAZARDOUS WASTE GENERATION AND ITS DISPOSAL

Name of Waste generated	Qty (TPA)	Proposed Disposal Plan
Char / Dolochar (SID)	65625	Captive use in Captive Power plant
Kiln Accretion & Refractory waste (SID)	500	Sold to authorized recyclers
Bottom Flue Dust Ash (SID)	52500	Used for Road making and Land filling.
Mill Scale (IF and RM)	5888	Captive use in Ferro Alloys Plants / sold to other units
Refractory & Ramming Mass waste (IF)	350	Sold to authorized recyclers
Defective Billets (IF)	2800	Reused in own Induction furnace
Slag from Induction Furnace	50750	Captive use in own Fly Ash Brick unit and remaining (after recovery of metal) used for Road making and Land filling
Slag from Ferro Alloy Plan	36000	Used for brick making / land fill/ road making etc
Defective and Miss Roll (RM)	5144	Reused in own Induction furnace
Fluidized Bed Material (PP)	150	Used in own Fly Ash Brick making unit
Fly Ash (Power Plant)	49218	Captive use in own Fly Ash Brick unit/ sold to Cement plant
Ash from Coal (PP and PGP)	17099	Sold to nearby Cement plants.
Slag from manufacturing of SiMn thru SAF	36000	Will be used for Road making and land fill

Name of Waste generated	Qty (TPA)	Proposed Disposal Plan
Slag from manufacturing of FeMn thru SAF	22050	Use for Silico Manganese production in own unit or sold to other Silico Manganese production unit.
Slag from manufacturing of FeSi thru SAF	1200	Will be used for Road making and land fill
Slag from manufacturing of Pig Iron thru SAF	14400	Will be used for Road making and land fill

TABLE 5: HAZARDOUS WASTE GENERATION

Type of Hazardous Waste	H.W Category /Rule	Quantity	Disposal
Waste Oil/Used Oil	5.1(as per HWM Schedule I)	4 KL/Annum	Will be given to authorized recycler having
Oil Soaked Cotton rags/jute	Sch. I (5.2)	2 TPA	Safely collected and stored and shall be disposed through authorized recycler.
ETP Lime Sludge	35.3	425 TPA	Given to Cement Plants or used in Brick making. The sludge will not have any Toxic Chemicals. Mostly it will be composed of Calcium; Magnesium; Silica Hardness Salts and Iron Oxide.
STP Sludge		32 TPA	Used for Composting and then applied for Green Belt
Used Lead Acid batteries	Covered under The Batteries (Management and Handling) Rules, 2001	—	The lead acid battery or dry battery will be given to authorized recycler having authorization from competent Authority.
E-waste generation (Computers, laptops, televisions, printers, and other electronic appliances)	e-waste Management rule 2022	0.5 TPA	Shall be disposed through authorized recyclers as per e-waste Management rule 2022

2.4 WATER REQUIREMENT & SOURCE

Total water requirement estimated is 1640 KLD out of which it is proposed to use 70 KLD recycled water thus total fresh water requirement will be 1500 KLD. Total Yearly water requirement will be 1570 KLD * 350 days = 594,500 KLA. which will be sourced thru ground water., CGWA NOC will be obtained.

Further, the management had decided to implement a 50,000 KL Rain water collection Tank which will be able to collect sufficient rain water during rainy days which would continuously be collecting rain water during the rainy days. Which extends to almost 75 days. Thus, water requirement will be met through rain water collections from it for 75 days. The balance water after the rain days will be sufficient to cater water requirement of 15 days. Therefore, it is considered that about 105 days (141,300 KL) water requirement will be met through rain water and rain water collection. Therefore, the net requirement of fresh ground water will be about 408,200 KLA.

2.5 POWER REQUIREMENT & SUPPLY

Total power requirement will be 50 MW out of which 30 MW will be met through captive power plant and 20 MW will be sourced through State Grid (CSPDCL). In addition to this emergency DG sets (total capacity 3300 KVA) are also provided.

2.6 MANPOWER REQUIREMENT

M/s. SRSP will provide employment to 400 peoples as direct employment which includes 35 people as administrative staff and 365 people will be production staff. Preference will be given to local people, depending upon their qualification and skill.

2.7 FIRE FIGHTING FACILITIES

In order to combat any occurrence of fire in plant premises, fire protection facilities are envisaged for the various units of the plant. All plant units, office buildings, laboratories, etc. will be provided with adequate number of portable fire extinguishers to be used as first aid fire appliances.

2.8 PROJECT COST

The project cost of the project is estimated as **Rs. 19500.00 Lakhs**

3.0 EXISTING ENVIRONMENTAL SCENARIO

3.1 BASELINE ENVIRONMENTAL STUDIES

Baseline environmental studies were conducted at project site along with 10 km radial distance from the project site. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, and Land were monitored during **winter season (1st December 2023 – 29th February 2024)**

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated at Site (1st Dec 2023 – 29th Feb 2024)

Predominant Wind Direction	Pre-monsoon Season
First Predominant Wind Direction	NE (14.51%)
Second Predominant Wind Direction	NNE (11.78%)
Calm conditions (%)	3.43
Avg. Wind Speed (m/s)	2.03

The status of ambient air quality within the study area was monitored for pre-monsoon season at 8 locations. All these 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind, cross wind directions and reference point. The levels of Respirable Particulate Matter (PM₁₀), Fine Particulates (PM_{2.5}), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and carbon monoxide (CO), Ammonia, Ozone, Benzene and BAP were monitored. The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 6**.

TABLE 6: SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
1	Project Site	Min	52.7	18.3	6.2	11.3	0.224	7.6	4.9
		Max	63.1	25.2	9.7	16.2	0.336	13.7	8.9
		Avg	59.1	22.4	7.7	13.7	0.278	10.7	6.8
		98 th	63	24.9	9.3	16	0.329	13.5	8.7
2	Dumabahal	Min	51.3	20.9	7.5	13.8	0.274	8.1	6.2
		Max	70.5	30.1	11.4	21.6	0.347	14.2	8.8
		Avg	61.6	25.2	9	17.2	0.317	11.2	7.4
		98 th	69.9	29.4	11.1	21.2	0.345	13.8	8.7
3	Natwarpur	Min	49.8	19.2	6.4	12.4	0.205	6.4	4.7
		Max	64.7	27.4	10	17.6	0.445	12.6	8.6
		Avg	57.3	23.5	8.2	15.6	0.295	9.5	6.5
		98 th	64.3	27.1	9.8	17.6	0.438	12.5	8.4

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
4	Patrapali	Min	61.3	24.8	10.3	16.6	0.337	10.3	6.9
		Max	81.4	38.6	14.8	22.7	0.507	16.9	13.3
		Avg	71.1	31.2	12.4	19.5	0.412	14.3	10.2
		98 th	79.6	37.4	14.3	22.6	0.489	16.9	12.8
5	Tilga	Min	56.5	20.6	9.8	14.5	0.313	10.5	7.7
		Max	77.2	34.6	12.9	20.6	0.422	15.8	11.5
		Avg	67.4	28.6	11.4	17.1	0.371	13	9.8
		98 th	76.1	34.2	12.9	20.1	0.415	15.6	11.5
6	Badpali	Min	56.1	20.2	9.1	13.4	0.293	9.8	6.7
		Max	76.1	31.5	13.1	19.5	0.403	14.6	10.5
		Avg	65.2	26.4	10.8	16.5	0.351	12.4	8.2
		98 th	75.2	31.3	13	19.2	0.4	14.5	10.1
7	Deobahal	Min	49.7	17.9	6.1	10.8	0.227	7.4	5.1
		Max	62.8	25.2	9.1	14.7	0.295	10.8	8.6
		Avg	56.7	21.7	7.3	12.6	0.258	9.1	6.5
		98 th	62.3	24.9	8.8	14.4	0.291	10.8	8.2
8	Jhargurha	Min	48.2	15.7	5.8	9.5	0.187	6.8	4.6
		Max	60.9	27.1	8.1	14.2	0.252	10.1	6.8
		Avg	54.5	20.5	6.8	11.7	0.215	8.5	5.7
		98 th	59.9	26	7.9	13.9	0.249	9.9	6.7
CPCB Standards			100 (24hr)	60 (24hr)	80 (24hr)	80 (24hr)	2 (8hrs)	100 (8hr)	400 (24hr)

Location	Pb(µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Benzene (µg/m ³)	BaP(ng/m ³)
Project Site	0.13	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Dumabahal	0.16	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Natwarpur	0.12	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Patrapali	0.25	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Tilga	0.21	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Badpali	0.17	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Deobahal	0.14	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
Jhargurha	0.10	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.01)	BDL (DL-0.01)
CPCB Standard	1 (24 hrs)	6 (Annual)	20 (Annual)	5 (Annual)	1 (Annual)

BDL: Below Detectable Limit

From the above results, it is observed that the ambient air quality at all the monitoring locations was within the permissible limits specified by CPCB.

3.3 AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 8 monitoring locations. The monitoring results are summarized in **Table 7**.

TABLE 7: SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq _{Day}	Leq _{Night}
Residential Area			
1	Deobahal	51.6	42.9
2	Dumabahal	53.4	41.7

Sr. No.	Monitoring Locations	Equivalent Noise Level	
CPCB Standards dB(A)		55.0	45.0
Commercial Area			
3	Badrpali	56.3	48.1
4	Tilga	57.1	49.7
CPCB Standards dB(A)		65.0	55.0
Silence Zone			
5	Government Primary School Natwarpur	46.3	37.9
6	Primary Health Center Sambalpuri	48.1	38.4
CPCB Standards dB(A)		50.0	40.0
Industrial Area			
7	Project Site	50.2	39.5
8	Nr. Maa Mani Industries main gate	63.1	51.6
CPCB Standards dB(A)		75.0	70.0

Source: Field monitoring and analysis by Anacon Laboratories Pvt. Ltd., Nagpur

3.4 SURFACE AND GROUND WATER RESOURCES & QUALITY

3.4.1 Regional Geology

Site Specific Geology

The study area is mainly covered by rocks of Archaean to Cretaceous age, with some isolated pockets of Recent to Sub-recent alluvium. Based on the water bearing property, the rocks of the district can be divided into (i) hard rock comprising crystalline and metamorphic and consolidated sedimentary rocks of Chhattisgarh Super group (ii) Soft rock comprising semi consolidated rocks belonging to Gondwana Super group. The crystalline and metamorphic rocks comprise of quartzite with granite gneiss of Chhotanagpur- gneissic complex occur in the south and south western part of the study area. The Chandrapur Group consists of Orthoquartzitic to subarkosic sandstone.

The Gondwana rocks of the area are divided into (1) Talchir Formation (2) Karharbari Formation and (3) Kamthi Formation. The Talchir Formation in the district is mainly represented by shale and silty shale with occasional boulder bed at the base. Talchir Formation is overlain by Karharbari Formation, which consists of sandstone and shale intercalation. Kamthi occupies the second largest area within Gondwana covered area. Being the youngest member Kamthi Formation occupies the hilltops of Gondwana hills. Sandstones and shales mainly represent them. These sandstones are rich in iron contents, dirty to brownish colour.

Geomorphology

Broadly, the entire study area can be divided into two physiographic regions: the Mahanadi Plain (Chhattisgarh Plain) and the northern hills of the Chhotanagpur Plateau. A moderately dissected plateau runs from the northeast to the northwest. The study area has a general slope towards the south. The hilly tract and intermediate plains, flanked by high mounds or hillocks, are primarily concentrated in the northern part of the study area. Ridges, homoclines, hills, and valleys are also scattered in some parts of the southern sector of the study area. The foothills are characterized by pediments and pediplains.

3.4.2 Hydrogeology and Aquifer Systems

The occurrence of groundwater and its distribution in space are highly influenced by the underlying geological formations and hydrogeological characteristics of the surroundings. The porous, weathered, jointed, and fractured zones present in the rocks or formation provide scope for groundwater occurrence, storage, and movement. The hydrogeology of the area broadly describes the disposition of water-bearing formations, occurrence of groundwater and its yield potential, groundwater regime conditions, depth to water levels in different seasons, etc.

The aquifer material controlling ground water flow in the study area can be broadly divided into two major media (1) Porous media (Phreatic Aquifer) and (2) Fractured media (Deeper Aquifer). The major aquifer group are:

- I. Chhotnagpur Granite Gneiss
- II. Chandrapur Sandstone
- III. Gondwana Sandstone

The phreatic aquifer both in hard and soft rocks is wide spread and largely in use. This aquifer is being tapped mainly through dug well upto a depth of 20 m broadly. However, extraction of ground water is done at many places by tapping dug cum bore wells or shallow bore wells drilled to a depth of 60 m that generally represents shallow aquifer which is generally connected to phreatic aquifer. The weathered mantle and shallow fractures mainly constitute the shallow aquifers. The thickness of weathered mantle varies from 5 to 20m bgl. The deeper aquifers have been identified in both hard and soft rocks.

Pre-monsoon depth to water level varies from 9-12 mbgl.

Post-monsoon depth to water level varies from 3-6 mbgl.

3.4.3 Water Quality

A] Surface Water Quality

Parameters	Unit	Baseline Monitoring Period (1 st Dec, 2023 – 29 th Feb, 2024)	IS 2296:1992; Class C (Drinking water source after conventional treatment and disinfection)
		Range	
pH	-	7.14 – 8.26	No relaxation (6.0 to 9.0)
EC	µs/cm	435.55 – 562.75	-
TDS	mg/l	272 – 321	1500
Total hardness	mg/l	139.71 – 196.78	-
DO	mg/l	5.7 – 6.4	4.0
BOD	mg/l	2.39 – 3.56	3.0
COD	mg/l	12.34 – .74	-
Chloride	mg/l	13.68 – 36.57	600
Sulphate	mg/l	18.31 – 36.62	400
Nitrate	mg/l	2.61 – 4.54	50
Fluoride	mg/l	0.16 – 0.42	1.5
Iron	mg/l	0.13 – 0.26	0.5
Cadmium	mg/l	BDL (DL - 0.001)	0.01
Arsenic	mg/l	BDL (DL - 0.01)	0.2
Zinc	mg/l	0.11 – 0.24	15
Lead	mg/l	BDL (DL - 0.001)	0.1
Chromium	mg/l	BDL (DL - 0.03)	0.05

Parameters	Unit	Baseline Monitoring Period (1 st Dec, 2023 – 29 th Feb, 2024)	IS 2296:1992; Class C (Drinking water source after conventional treatment and disinfection)
		Range	
Total Coliform	MPN/100 ml	46 – 171	5,000

B] Groundwater Quality

Parameters	Unit	Baseline Monitoring Period (1 st Dec, 2023 – 29 th Feb, 2024)	Permissible Limit
		Range	
pH	-	7.02 – 7.76	No relaxation (6.5 to 8.5)
EC	µs/cm	498.23 – 605.59	-
TDS	mg/l	321 – 360	2000
Total hardness	mg/l	155.28 – 220.16	600
Chloride	mg/l	71.43 – 107.43	1000
Sulphate	mg/l	27.91 – 47.92	400
Nitrate	mg/l	2.51 – 4.17	No relaxation (45)
Fluoride	mg/l	0.15 – 0.26	1.5
Iron	mg/l	0.13 – 0.32	No relaxation (1.0)
Cadmium	mg/l	BDL (DL - 0.001)	No relaxation (0.003)
Arsenic	mg/l	BDL (DL - 0.01)	No relaxation (0.01)
Zinc	mg/l	BDL (DL - 0.1)	15
Lead	mg/l	BDL (DL - 0.001)	No relaxation (0.01)
Chromium	mg/l	BDL (DL - 0.03)	No relaxation (0.05)

C] Location wise Water Quality Assessment

S. N.	Locations	WQI	Quality	Remark
1.	Chunchuna	50.39	Good	Assessment of water quality based on the above physico-chemical parameters revealed that the quality of groundwater samples was good.
2.	Dumabahal	54.10	Good	
3.	Natwarpur	51.68	Good	
4.	Patrapali	51.90	Good	
5.	Tilga	54.27	Good	
6.	Badpali	52.62	Good	
7.	Deobahal	53.32	Good	
8.	Jhargurha	51.26	Good	

D] Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. All surface water samples were found to be bacteriologically contaminated. Presence of total coliforms in surface water indicates that a contamination pathway exists between any source of bacteria (septic system, animal waste, etc.) and the surface water stream. A defective well can often be the cause when coliform bacteria are found in well water. For surface water, treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose. Groundwater samples were not found to be bacteriologically contaminated.

3.5 LAND USE LAND COVER CLASSIFICATION

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-1 (IRS-P6), sensor-LISS-3 having 23.5m spatial resolution and date of pass 25th March 2024 satellite image with reference to Google Earth data. In order to strengthen the baseline information on existing land use pattern, the following data covering 10 km radius is approximate about 21°51'50.13"N to 22° 2'57.75"N latitude and 83°24'12.33"E to 83°36'15.20"E longitude and elevation 205 to 436 meters are used as per the project site confined within that area. The Land Cover classes and their coverage are summarized in **Table 8**.

TABLE 8: LU/LC CLASSIFICATION SYSTEM WITHIN 10 KM STUDY AREA

LU/LC Classification System				
Sl. No.	Level-I	Level-II	Area (Sq. Km ²)	Percentage (%)
1	Built-up land	Settlement	3.93	1.15
		Industrial Settlement	1.02	0.30
		Road Infrastructure	2.21	0.65
		Railway Line	0.45	0.13
2	Agricultural Land/ Crop Land	Single Crop	75.45	22.12
		Double Crop	18.48	5.42
3	Forest Area	Reserved Forest	110.14	32.30
		Protected Forest	28.40	8.33
		Fairly Dense Jungle	24.48	7.18
		Dense Mixed Jungle	24.65	7.23
		Open Jungle	24.35	7.14
4	Scrubs/Wastelands	Open Scrub	18.53	5.43
		Barren Land	2.36	0.69
5	Waterbodies	River/Nala/Stream/Canal	4.28	1.26
		Dam/Pond/Lake	2.29	0.67
		Total	341.02	100

3.6 SOIL QUALITY

The project site and its terrain consist of flat to moderately steep slopes. The terrain is characterized by forest, agricultural land, various settlements, waterbody and open scrub/wasteland. It is also observed that the open scrub area and barren land are dominant in North and North West Portion of the study area. The following observations are as follows:

Parameters	Unit	Results	Fertility Status
pH	-	6.52 – 6.91	Neutral
Organic Carbon	%	1.16 – 2.39	More than sufficient
Nitrogen	Kg/hect	216.59 – 359.64	Better to sufficient
Phosphorus	Kg/hect	28.94 – 64.73	Less to average sufficient
Potassium	Kg/hect	101.37 – 204.51	Less to medium
Sodium Absorption Ratio	-	2.49 – 3.26	Excellent (Little or No Hazard)

3.7 BIOLOGICAL ENVIRONMENT

Floral composition in Study Area:

Total 170 plant species were enlisted within the study site out of which habitat wise details are given as follows: Trees: 79, Shrubs: 33, Herbs: 14, Climbers: 19, Grasses & Bamboos: 23, and Parasite/epiphyte: 2 species observed in the study area.

Endemic Plants of the Study Area

Among recorded plant species none were assigned the status of endemic plant of this region.

RET (Rare, Endangered and Threatened species) Status

According to IUCN Status report 2024-1 out of total 170 plant species identified with study area. Among the observed species *Tectona grandis* (Teak) is listed in Endangered (EN). *Chloroxylon swietenia* (Bhirra) and *Cleistanthus collinus* (Karra/Garadi) are listed in Vulnerable (VU) while *Aegle marmelos* (Bel) and *Pterocarpus marsupium* (Beeja) are listed in Near Threatened (NT) as per IUCN RED list 2024-1. While remaining 111 species belongs to the Least Concern (LC), 4 species belongs to Data Deficient (DD) and 48 species are Not Evaluated (NE), as per latest IUCN status report 2024-1.

Fauna Details:

- **As per IUCN RED (2024-1) List**

Among the reported animals, the categorization of species as per IUCN is as follows:

Mammals: *Elephas maximus* – Asiatic Elephant (Endangered), *Melursus ursinus* – Sloth Bear (Vulnerable), *Hyaena hyaena* – Hyena (Near Threatened)

Reptiles: *Python molurus* – Indian Python (Threatened), *Varanus bengalensis* - Bengal Monitor Lizard (Near Threatened)

Avifauna: All species are Least Concern as per IUCN.

- **As per Indian Wild Life (Protection) Amendment Act, 2022**

Among the Avifauna; Indian peafowl (*Pavo cristatus*) is protected under Schedule-I; while, rest of the birds observed in the study area are protected in Schedule-II as per Wild Life Protection Amendment Act (2022) and subsequent amendments thereof.

Among mammals; Asiatic elephant (*Elephas maximus*), Sloth bear (*Melursus ursinus*), Jackal (*Canis aureus*), Common mongoose (*Herpestes edwardsi*), Jungle cat (*Felis chaus*), Indian fox (*Vulpes bengalensis*), Hyena (*Hyaena hyaena*) are protected in Schedule-I. Whereas, Rhesus macaque (*Macaca mulatta*), Wild boar (*Sus scrofa*), Black-Naped Hares (*Lepus nigricollis*) and Common langur (*Semnopithecus entellus*) are protected under Schedule-II animals of Wild Life Protection Amendment Act 2022. Palm Squirrels, Fruit bats & Rats dose not given protection under Schedules of Wild Life Protection Amendment Act 2022.

Among the Herpetofauna; Bengal Monitor Lizard (*Varanus bengalensis*), Indian Python (*Python molurus*), Indian Cobra (*Naja naja*), Russell's viper (*Daboia russelli*) and Common Rat Snake (*Ptyas mucosa*) were provided protection as per Schedule-I; While Common Indian Krait (*Bungarus caeruleus*), Indian Toad (*Bufo parietalis*) were provided as per Schedule-II of Wildlife protection (Amendment) Act 2022 and as amended.

A Biological Conservation Plan has been prepared for Schedule-I species. The development of greenbelt within plant premises will definitely helpful to develop ecological layout and helpful for local avifauna for perching and breeding ground, provided pollutants specific environmental management plan should be implemented before commissioning of project.

3.8 SOCIO-ECONOMIC ENVIRONMENT

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data collection from census 2011 & District Census hand book 2011. Summary of the socio-economic status of the study area is given in **Table 9**. Details regarding education and infrastructure facilities 2011 are presented in **Table 10** respectively

TABLE 9: SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA

Total households	11319
Total population	45839
Male Population	23075
Female population	22764
SC Population	6055
ST Population	16226
Total literates	30909
Total Illiterates	14930
Total workers	18473
Total main workers	13288
Total marginal workers	5185
Total non-workers	27366

Source: Primary census abstract 2011, District Raigarh State Chhattisgarh.

Predicted population in study area (2020) as per GeolQ website (<https://geoiq.io/places/Chhattisgarh/>): **Total Population: 57696, Male: 28879, Female: 28819**

TABLE 10: IN PERCENTAGE DETAILS REGARDING INFRASTRUCTURE FACILITIES WITHIN 10 KM RADIUS STUDY AREA

Infrastructure Facilities	Availability (In Percentage) As per Year 2011, Census District Raigarh
Educational Facilities	96
Drinking water	100
Road	94
Electricity	100
Communication	85
Transportation	60
Medical	21
Bank & Society	25
Drainage	58
Recreation	67

Source: Primary census abstract 2011, District Raigarh, State C.G

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 AIR ENVIRONMENT

Impact on Air Environment

The impact on air environment mainly depends on magnitude of operation and threshold limit of the project. The source of emission will be mainly in form of fugitive emission and point source.

The mathematical **Model AERMOD** was used for predicting the GLCs, which is entirely in line with the requirement of Central Pollution Control Board, New Delhi. In 1991, the U.S. Environmental Protection Agency (EPA) in conjunction with the American Meteorological Society (AMS) formed the AERMOD. AERMOD is a steady-state plume model aimed at short-range (up to 50 km) dispersion from stationary industrial-type sources.

The impact of a source or group of sources on air quality is evaluated using mathematical models. The widely accepted interpretation models simulate the relationships between air pollutant

emissions and its impact on air quality. For the present study, this model is used for the prediction of maximum ground level concentrations.

Resultant Concentrations after Implementation of the Project

The maximum incremental GLCs due to the proposed project for the above pollutants are superimposed on the maximum baseline concentrations of the respective pollutants recorded during the study period to arrive at the likely resultant concentrations after implementation of the proposed project. The resultant ground level concentrations (baseline + incremental) are tabulated in following table:

RESULTANT GLC's (BASELINE + INCREMENTAL)

Pollutant	Max Baseline Concentration at Project Site ($\mu\text{g}/\text{m}^3$)	Incremental Concentration ($\mu\text{g}/\text{m}^3$)	Resultant Concentration ($\mu\text{g}/\text{m}^3$)	NAAQ Std. ($\mu\text{g}/\text{m}^3$)
PM ₁₀	63.1	5.72	68.82	100 (24 hrs)
PM _{2.5}	25.2	1.87	27.07	60 (24 hrs)
SO ₂	9.7	19.8	29.50	80 (24 hrs)
NO _x	16.2	22.1	38.30	80 (24 hrs)

DG sets are likely to be used during power failure. Predictions have been made considering even DG set in operation and thus reflecting the worst-case scenario. The maximum predicted GLC of PM, CO & NO₂ are 0.47 $\mu\text{g}/\text{m}^3$, 0.89 $\mu\text{g}/\text{m}^3$ & 4.27 $\mu\text{g}/\text{m}^3$ respectively occurring at about 200 m in SW direction

4.1.1 Details of Air Pollution Control System/Mitigation measures

Facilities	Air Pollution Control equipment
DRI Kiln with WHRB's	I. Dust extraction system, Electro Static Precipitators (ESP) - 3 Nos. (with 4 field) with two Chimney II. Bag Filters for Product house; Kiln discharge end and transfer points.
Steel Melting Shop with hot charging rolling mill	Movable suction hood along with Bag Filters with a chimney
Reheating Furnace	Wet Scrubber with a chimney
Ferro Alloys and/or Pig Iron	2 Sets of Bag Filter with Chimney
AFBC Boiler	Electro Static Precipitators (ESP) with a Chimney and Bag Filters at Coal conveyors
	Lime Dosing
	Low NO _x burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided

4.1.2 Additional Measures to reduce/control pollution control

- Roads will be frequently sprinkled with water.
- Most of the materials like Sponge Iron ore, pig iron will be stored under covered shed.
- In case of storage of Sponge Iron, pig iron in open, it will be covered by tarpaulins to prevent spread of dust from it during transportation.
- Regular sweeping of road by using vacuum cleaner will be carried out
- Regular maintenance of vehicles and machineries will be carried out in order to control emissions.

- Green belt development will be taken up all along the roads, plant premises etc.
- Protective appliances will be provided to all the workers exposed in dusty atmosphere.
- Avoiding overloading of the trucks.
- Workers will be equipped with all personal protective devices like Gum Boot; hand gloves; Safety helmet; Safety goggles, earplugs at work place.
- By controlling the speed of the truck.
- Proper gradient of roads to reduce cumulative noise.
- Transportation of materials will be limited to day hours only.
- Periodical maintenance of process machinery.

4.2 NOISE IMPACTS

- Day and night sound pressure levels are often used to describe the community exposure. The nearest human settlement Natwarpur is 0.50 KM (ENE) away from project site and resultant noise level at this village near primary school will be 47.1 dB(A) & 41.7 dB(A) at day night respectively.
- Full body vibration and hand-arm vibration impacts will be felt by operators sitting in heavy machineries and operating vibrating devices, respectively. Necessary precautions in workplace environment shall be exercised to reduce workplace vibration impacts.

Mitigation Measures

- Site specific mitigation measures will be adopted at project site to attenuate noise levels to safe limits. It can be further concluded that in actual conditions due to presence of various topographical features in the path of sound propagation the noise levels will be further attenuated.
- Dense plantation will help to reduce noise pollution in the following ways –
 - The sounds that are produced by the leaves helps muffle the noise.
 - Hedging makes a thick front of the wall and blocks the noise.
 - Thick tree trunks create a sound-absorbing buffer zone.
 - They help in filtering the noise
- Equipment will be standard and equipped with silencer. The equipment will be in good working conditions, properly lubricated and maintained to keep noise within permissible limits.
- Most of the equipment's will be placed in closed room
- Equipment's will be placed on acoustic floor to reduce vibration and noise
- High noise zone will be marked, and earplugs will be provided to the workmen near high noise producing equipment.
- Use of PPE'S awareness program will be provided to all workers.
- Proper shifting arrangement will be made to prevent over exposure to noise and vibration.
- Silent DG sets will be used site.
- Speed limits will be enforced on vehicle.

- Regular noise & vibration monitoring will be carried for all equipment's to check compliance with prevailing rules.

4.3 IMPACT ON WATER ENVIRONMENT

The proposed implementation of the project may have some impact on the water environment. The impact may be on the source of water in the form of depletion of water resources of the area and in the form of deterioration of quality of natural water resources due to discharge of plant effluent.

Mitigation Measures

- The project will have a 120 KLD ETP Unit to treat Industrial waste water and 20 KLD STP for treatment of domestic waste water. The project site is located in an area classified as 'Safe Zone' as per the guidelines of CGWB, moreover the source of water will be surface water.
- Total 70 KLD treated water will be reused/recycled in process.
- 14 KLD treated domestic water through STP will be used green belt development.
- Raw material from the proposed project will be stored on concrete layer thus no seepage from the raw material piles anticipated.
- The material will be stored under adequate shed in order to prevent the leachate through runoff.
- Separate stockyards for storage of Raw materials, finish products and solid waste will be maintained.
- All stockyards will be designed with the impervious flooring to prevent leachate percolation.
- Garland drain will be provided to all stockyards area to prevent run-off containing suspended solids by routing the storm water drains through catch pits/sediment traps.
- Any spillage of hazardous waste (used oil/spent oil, ETP Slag, etc.) or contamination will be immediately removed.
- Periodic ground water monitoring at project site as well as nearby villages will be carried out.
- Rain water charged to ground water
- Closed circuit circulation system will be followed.

4.4 IMPACT ON BIOLOGICAL ENVIRONMENT

Ecology & Biodiversity: Aspect - Impact identification and mitigation measures suggestion for proposed Greenfield project.

Sl.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
1.	Transportation, unloading & storage of Material and Movement of vehicle inside plant, Dust and sound generation due to proposed activities	Impact on adjoining forest area in a scale of 4 out of 5 due to proposed project activity.	20 M thick greenbelt will be developed towards ENE and West direction from the project site.
2.	Gaseous emission from Stack, Movement of vehicle inside plant and Raw material & finished product transportation, Product manufacturing	Decline in photosynthetic activities, Stomatal index may be minimized, Crop yield will be reduced in absence of site-specific mitigation measures	Air quality modelling outputs study revealed that, the resultant concentrations of particulate matter, sulphur di-oxide and oxides of nitrogen are well within the prescribed limits. The impact due to proposed project would be minimal as project activity will be carried out within the

Sl.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
			<p>plant boundary limit with proper control measures.</p> <p>Greenbelt area of 5.277 Ha. (33.07%) will be proposed for project with local species with broad leaves and higher canopy and fast-growing tree species. Total plants are 13193 nos. are proposed. Indigenous species for plantation is recommended</p>
3.	Study of impact on Elephant and other Schedule – I animals	Stray elephant movement was reported forests within study area.	<p>Project activity will be confined to non-forest land.</p> <p>No National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, defined Migratory corridors, etc. within the 10 km radial distance from the project site.</p> <p>Moreover, elephant movement is reported in search of food and water in the study area. The proposed project does not involve destruction of habitat moreover in order to improve habitat of schedule – I species within 10 study area, Biological conservation plant is prepared with budgetary provision of Rs. 12 Lakhs allocated.</p>

4.5 IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

Positive Impacts

- There would be a multiplier effect on the creation of indirect employment through the local community establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores garages etc.
- Economic growth due to development of area and increase in quality of life.
- Improvement in green cover due to the plantation of trees in the Study area, also are leading to a decrease in environmental pollution.
- Improvement in social and infrastructural development by the industries as a part of CER and EMP.

Negative Impacts.

- Production of Sponge Iron and operation of Induction furnace can cause release of pollutants in the Air Environment and formation of tailing. Environmental pollution due to emission of pollutants may affect the health of the people.
- There may be increase in vehicles due to the proposed project leading to extra pressure on the traffic.
- During operation phase heavy vehicle movement lead to dispersed dust particles which affects the health of the workers and Local Peoples. Trucks, tankers and other vehicles may cause additional air pollution to the surrounding areas. The effects may be more prominent in nearby villages.
- Possibilities of Hazards and accident which may cause harm to the workers working or loss of life of the workers.

- Generation of Solid and Hazardous waste will be there, if the waste is not managed properly, it may cause contamination of the area, environment and health of the nearby population.
- If influx of workers from outside areas, then there may an increased pressure on residential accommodation the neighborhood.

Mitigation Measures

In order to mitigate the adverse impact likely to arise in social, cultural and economic aspects in the surrounding region due to the proposed project and improvement in quality-of-life following mitigation measures should be adopted:

- Adequate pollution control Equipment as per the CPCB Guidelines should be adopted and proper maintenance of industrial and pollution control equipment should be done to ensure minimum pollution.
- The efficiency of the pollution control equipment should be checked periodically to comply with the emission standards provided by CPCB and minimise the pollution levels.
- Ensure that roads are properly signed, vehicles are well maintained and drivers are well trained and safety conscious.
- A Safety Environment should be prepared and every worker has to be trained with all safety equipment. All health and safety measures should be adopted by the firm to ensure the safety of the workers and the surrounding society.
- Project proponent should take appropriate steps to keep environment clean and green belts development/ Plantation along with the internal Road.
- Transportation of hazardous waste should be done as per CPCB Guidelines. The heavy trucks are covered to prevent spillage or dusting. The drivers should be imparted training.
- Priority will be given to local people on employment.
- Social infrastructure development activities should be proposed by the firm.

5.0 ANALYSIS OF ALTERNATIVES (SITE AND TECHNOLOGY)

5.1 SITE SELECTION

The proposed site to establish green field integrated steel plant with captive power plant at Village - Natwarpur and Dhumabahal, Tahsil and District - Raipur (C.G.).

The entire land i.e. 15.957 Ha. are already purchased and under ownership of the firm. The site was selected after considering a number of alternative locations.

A number of factors influence the feasibility of location for such projects in which availability of adequate land, access to power, infrastructure, transport network and adequate water along with environmental considerations are important.

Thus, the availability of Logistic Support; availability of water; power; manpower; adequate land as well as back ground existing pollution levels and environmental considerations were some of the criteria for selecting the sites.

Alternative sites Evaluated : 4 locations 3 locations were not found suitable, it was found difficult to set up the proposed plant in the 3 alternative sites due to several reasons as explained in table above such as non-availability of adequate surface water, non-availability sufficient land in single patch or lack of willingness of Villagers to allow to set up sponge iron plant. Road and Rail connectivity was also observed to be inadequate in most of the alternative sites.

Thus, in view of the above study of alternative sites, Site no. 4 at Village Natwarpur and Dhumabahal, Tahsil and District- Raigarh (C.G.) has been selected as it meets most of the eligibility criteria.

Thus, in view of the above study of alternative sites, **Site no. 4 at Natwarpur, Dhumabahal, Tahsil and District- Raigarh (C.G.)** has been selected as it meets most of all the criteria.

5.2 SELECTION OF ALTERNATIVE TECHNOLOGY

The basic principle for selection of technology for proposed project is based on environmental applicability, technical and financial viability are followed. Selection of suitable production process and the capacity of the production units form the nucleus around which the basic concept of a plant is developed. While the selection of a process takes into account factors like type of product, availability of local raw material, process status, specific energy consumption, level of energy required, environment, and pollution etc., the capacity selection of major units would depend on the volume of production, available unit sizes, economies of scale, etc.

6.0 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed project under the control of by General Manager (Plant Head) with a direct reporting to Board of Directors.

The firm has proposed to Capital Cost of Rs. 5 Lakhs and Recurring Cost of Rs. 1 Lakhs towards Environment Monitoring Program. NABL/MoEFCC accredited lab (Third party) will engaged to monitor all the environmental components as per CPCB/CECB norms.

7.0 ADDITIONAL STUDIES

7.1 PUBLIC CONSULTATION

The Draft EIA-EMP report for greenfield project is prepared as per the TOR issued by EAC (Industry -I), MoEF&CC, New Delhi and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

After completing the public consultation process, the points raised and commitment of project proponent during the public hearing will be incorporated in the final EIA-EMP report for final submission to Environmental Clearance.

7.2 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The assessment of risk in the proposed project has been estimated for fire, explosion and toxicity and corresponding mitigation measures are suggested in the EIA/EMP report.

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the project site. On the other hand, risk analysis deals with the identification and quantification of risks occurring due to the plant equipment and personnel exposed, due to accident resulting from the hazards in the plant. The occupational and safety hazards and preventive measures, process hazards and their preventive measures, and storage hazards and preventing measures are provided in details in Chapter 7 of the EIA report.

The main objective of the risk assessment study is to determine damage due to major hazards having damage potential to life and property and provide a scientific basis to assess safety level of the facility. The secondary objective is to identify major risk in manufacturing process, operation, occupation and provide control through assessment and also to prepare on-site, off site plans to control hazards.

The assessment of risk in the proposed project has been estimated for material handling, movement of Trucks/Tipplers, Dust hazards, Hazards, shock hazards, etc. and corresponding mitigation measures are suggested in the EIA/EMP report.

8.0 PROJECT BENEFITS

The Social welfare/CSR activities will aim at strengthening the bond between the project authorities and the local population in the vicinity of project area. In line with CSR policy, M/s. Shree Real Sponge and Power will carry community welfare activities in the following areas:

- Community development
 - Education
 - Health & medical care
 - Drainage and sanitation
 - Roads
 - Drinking water supply occasionally in the event of water scarcity through tankers, etc.
- The provision under CER budget is of Rs. 300 Lakhs made towards the social and infrastructure development. The detailed action plan along with physical target will be provided after public hearing.
- The project benefits also entail revenue earnings to national and state exchequer through GST (Estimated Rs. 216.87 Crores Gross GST), road tax, income by registration of trucks & trailers, income tax, corporate tax, etc.
- It is estimated that Total 400 people will get direct employment due to proposed Greenfield project; the priority of management is to fulfill the requirement through local people.
- In addition, there will be indirect employment to more than 1000 persons (as drivers, conductors and attendants of new trucks, passenger carrying vehicles, technicians in workshops and garage besides the plumbers, electricians and masons).
- Transporters and Erection people will also get opportunity for manufacture their respective plant and Machinery and equipment. This will add to GDP of the Nation.
- The firm is likely to add about more than Rs 3097.98 Crores Turnover to the GDP due to which about Rs 216.87 Crores Gross GST will be payable to the Govt.
- The salary wages payment will be above Rs. 6.14 Crores per year. Payment towards power to the state grid will be more than Rs 748.52 Crore. All these will help to grow the National GDP and local area economy too.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan comprising following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.
- Minimization of natural resources and water.
- Ensure effective operation of all control measures.
- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.

- Control of waste generation and pollution.

The firm will invest about Rs. 2658 Lakhs Capital cost on environment management plan and spent about Rs. 62 lakhs per year for operation and maintenance.

10.0 CONCLUSION

The proposed project of M/s. SRSP will be beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater, traffic density, etc. will have to be controlled better than the permissible norms to avoid impacts on the surrounding environment. Necessary pollution control equipment like bag house, water sprinklers, enclosures, etc. are integral part of the plant infrastructure. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize impacts on the environment and socio-economic environment of the area. Measures like development of green belt and plantation in nearby village and along transport road, adoption of rainwater harvesting/recharging in the plant and in nearby villages will be carried out. The proposed CSR/CER activities to be initiated by the industry will be helpful to improve the social, economic and infrastructure availability status of the nearby villages.

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed project will not add adverse pollution levels to the environment, moreover, it will be beneficial to the society and will help to reduce the demand-supply gap of steel to some extent and will contribute to the economic development of the region and thereby the country.

11.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed project of M/s SRSP are carried out by M/s. Anacon Laboratories Pvt. Ltd., Nagpur (M/s. ALPL). Anacon established in 1993 as an analytical testing laboratory and now a leading Environmental Consultancy firm backed by testing lab for environment and food in Central India region. M/s ALPL is a group of experienced former Scientists from the Government Institutions and excellent young scientist of brilliant career with subject expertise. It is recognized by Ministry of Environment & Forests, New Delhi for carrying out environmental Studies & accredited by Quality Council of India (QCI) for conducting Environmental studies having Accreditation Certificate No.: NABET/EIA/23-26/RA 0304_Rev.01 dtd. 13th March, 2024 valid till 29th September 2026 as category 'A' consultant organization in 21 Sectors.