EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION

M/s. Maithan Steel & Power Limited has obtained Environmental Clearance (EC) for expansion of existing 0.064 MTPA Sponge Iron to 0.17MTPA Sponge Iron, 2x9 MVA Arc Furnace for manufacturing of Ferro Alloys of 30,000 TPA (Fe-Mn, Si-Mn, Fe-Si & Pig Iron combined), Iron Ore Sinter Plant of 80,000 TPA, 1x40 TPH Iron Ore Washery of 2,40,000 TPA and 20 MW Power Plant [WHRB-12 MW & AFBC-8 MW] from MoEF&CC, New Delhi vide File No. J-11011/554/2017-IA. II (I) dated 26.07.2021. Consent to Establish for the same has been obtained for the EC accorded project vide NOC No. 164590, Memo No. 658-2N-52/2018 (E) dated 08.10.2021 from West Bengal Pollution Control Board and all the units are currently under construction phase. The company has been operating 5000 MT/month Sponge Iron Plant (2 x 100 TPD) for which Consent to Operate permission has been obtained vide CFO No. 110150, Memo No. 1877-WPBA/red (Prl)/ Cont (82)/02 dated 28.08.2018 valid upto 31.08.2023.

Now, the company is proposing for an expansion of Sponge Iron Plant from 1,76,000 TPA to 4,20,000 TPA, Ferro Alloy Plant from 30,000 TPA to 70,000 TPA & Captive Power Plant from 20 MW to 32 MW along with existing Iron Ore Sinter Plant (80,000 TPA) & Iron Washery Plant (2,40,000 TPA) at Village-Bonra, P.O-Bonra, P.S-Neturia, Tehsil Neturia, District Purulia, West Bengal. The existing plant area is 13.78 hectares; additional area required for expansion is 4.37 hectares which is completely under the possession of the company, hence after expansion, the total plant area will be 18.15 hectares.

As per EIA Notification dated 14th Sept., 2006 and subsequent amendments, the project falls under Category "A" S. No. 3 (Material Production), Project Activity '3 (a)' Metallurgical Industries (ferrous & non-ferrous)& '1 (d)' Thermal Power Plants.

ToR Letter was issued by MoEFCC, New Delhi for the preparation of EIA/EMP Report vide their letter no. J-11011/554/2022-IA.II (I) dated, 2 July 2022. Draft EIA/ EMP Report has been prepared on the basis of ToR issued by MoEFCC, New Delhi.

1.1 PROJECT NAME & LOCATION DETAILS

Project Name	Expansion of Sponge Iron Plant (1,76,000 TPA to 4,20,000 TPA), Ferro Alloy Plant (30,000 TPA to 70,000 TPA) & Captive Power Plant (20 MW to 32 MW) along with existing Iron Ore Sinter Plant (80,000 TPA) & Iron

	Washery Plant (2,40,000 TPA)
Location Details	
Village	Bonra
Tehsil	Neturia
District	Purulia
State	West Bengal
Latitude	23°37'47.17"N to 23°38'10.82"N
Longitude	86°49’57.13"E to 86°50’12.58"E
Toposheet No.	73I/14 & 73I/10

Source: Pre-Feasibility Report

2.0 PRODUCTS AND CAPACITIES OF PROPOSED PROJECT

Project proposal with products:

Units	Configuration as per EC dated 26.07.2021	Capacity in TPA as per EC dated 26.07.2021	Proposed configuration	Proposed capacity in TPA	Final configuration	Final capacity in TPA	Status of units	End use
Sponge Iron Plant	2 x 100 TPD DRI & 1 x 350 TPD DRI Kilns	1,76,000 Sponge Iron	--	--	3 x 100 TPD DRI, 1 x 350 TPD & 1 x 400 TPD DRI Kilns	4,20,000 (Pellet used as raw material) 3,36,000 (Iron ore used as raw material)	2 x 100 TPD DRI operational & 1 x 350 TPD DRI Kilns under construction	Sent to SMS of the other unit of the company/ Sale in market
	-	-	1 x 400	1,60,000*****			-	

			TPD & 1 x 100 TPD DRI Kilns			Sponge Iron*		
Ferro Alloy Plant	2 x 9 MVA	30,000 (Ferro-Manganese, Silico-Manganese, Ferro Silico, Pig Iron)**	2 x 10.5 MVA (Modification)	5,000 (Ferro-Manganese, Silico-Manganese, Ferro Silico, Pig Iron) **	4 x 10.5 MVA	70,000 (Ferro-Manganese, Silico-Manganese, Ferro Silico, Pig Iron)**	2 x 9 MVA under construction	Sent to SMS of the other unit of the company/ Sell in market
	-	-	2 x 10.5 MVA	35,000 (Ferro-Manganese, Silico-Manganese, Ferro Silico, Pig Iron)**			-	
Captive Power Plant	20 MW (12 MW WHRB+ 8 MW AFBC)	20 MW Power	-	-	32 MW CPP [24 MW WHRB+8 MW AFBC]	32 MW Power	20 MW CPP Under construction	Captive Use
	-	-	(10+2) MW WHRB	12 MW			-	
Iron Ore Sinter	1 x 250 TPD	80,000 Iron Ore Sinter	--	--	1 x 250 TPD	80,000	Under construction	Used in Ferro Alloy

Plant								Plant for Pig Iron making & sale
Iron Ore Washery Plant	1 x 40 TPH	2,40,000 Iron Ore Concentrate	--	--	1 x 40 TPH	2,40,000 Iron Ore Concentrate	Under construction	Used in DRI plant

***Note:** We may produce Sponge Iron either by iron ore or by pellets depending upon the market scenario. However, for raw material estimation for this project we have considered 50 % sponge iron production from pellet and another 50 % sponge iron production from iron ore.*

****Note**: Ferroalloys Namely Fe-Mn, Si-Mn, Fe-Si & Pig Iron have been proposed to be manufactured from Submerged Arc Furnace as per market demand. The production will therefore vary from time to time depending the product manufactured. But for estimation of raw material requirement it is proposed to give equal weightage to all these four products.*

3.0 REQUIREMENT OF LAND, RAW MATERIAL, WATER, POWER, FUEL WITH SOURCE OF SUPPLY (QUANTITATIVE)

a) Land Requirement

The existing plant area is 13.78 hectares (34.05 acres) additional area required for expansion is 4.37 hectares, hence after expansion, the total plant area will be 18.15 hectares (44.85). Complete land is under the possession of company.

As per accorded EC, 4.5 hectares (33 % of the total area) is demarcated as Green Belt Area. Tree Plantation is going on parallel with the implementation of the project. Additional greenbelt area as part of expansion will be 1.5 hectares. Hence after expansion, more than 33% of total area will be developed as greenbelt (6.0 hectares). The present land use of the proposed project site is industrial.

b) Raw Material Requirement

The basic raw material for the manufacturing of Steel is Iron ore, Pellet, Iron ore fine, Lime stone, Dolomite & Coal which is being/will be sourced from Other unit of the company, Barbil Orissa by rail or road, nearby local market by road. Details regarding quantity of raw materials required their source along with mode of transportation for expansion project have been tabulated below

Name of the Raw Materials	Estimated Quantity (TPA)			Source	Mode of Transportation
	As per accorded EC (TPA)	For proposed expansion (TPA)	Total (TPA)		
Iron Ore	2,97,000	(-) 13,500	2,83,500	Barbil, Orissa	Rail, Road
Iron Ore Fines	2,40,000	---	2,40,000		
Pellet	--	2,94,000	2,94,000	Local	Rail, Road
Mn Ore	35,950	10,200	46,150	Local, South Africa	Rail, Road
Coal-process	1,61,400	1,73,935	3,35,335	Orissa	Rail, Road
Coal-Power Plant	36,600	(-) 11,558	25,042	Imported/ North East	Rail, Road
Coke & F/A Coal & Coke Breeze	38,160	45,740	83,900	Imported/ North East	Rail, Road
Lime Stone & Dolomite	31,400	21,330	52,730	Local	Road
Quartz	17,080	9,210	26,290	Other unit of the company & Purchase	Road

(c) Basic Requirements of the project

Other basic requirements for the project are given in Table below.

S. No.	Particulars	Existing (After Revamping)	Additional for Expansion	Total after expansion	Source
1.	Fresh Water (KLD)	1800 KLPD	950 KLD	2750 KLPD	Damodar river through Damodar Valley Corporation (DVC)
2.	Power (MW)	20 MW	20 MW	40 MW	Own Captive Power Plant (32 MW) & balance from India Power Corporation Limited
3.	Manpower (Persons) (Operational phase)				
	Regular	250	200	450	Source: Unskilled/ Semi-skilled- local area; skilled- nearby areas & outside areas also.
	Contractual	200	100	300	
	Total	450	300	750	

***Source**: Pre-feasibility Report*

4.0 PROCESS DESCRIPTION OF UNITS

Sponge Iron Plant:

In DRI making, a Rotary Kiln is used for direct reduction of ore. The rotary kiln is a refractory lined vessel on which several blowers are mounted. From the blowers, air pipes go through the shell and refractory, vertically and deliver the required amount of air, required for the process axially. The kiln has conical out let and inlet holds the material in the kiln. The Kiln is placed in a slope from feed end side at a slope of 2½ %. Iron ore, coal, dolomite/limestone is fed in the weighed quantity and the kiln

is rotated at a speed of about 0.5 rpm. A temperature between 1000^0C to 1100^0C 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 cylindrical cooler. The product is cooled to 100^OC and taken for product separation. The product is separated from the coal ash and coal char and then taken for final use. The waste gas from the kiln contains lot of combustibles like coal volatiles, unused CO, about 10 to 12% carbon particles and other dust. The gas is taken to an after-burner chamber and the combustibles are burnt. The temperature of gas is about 1600^0C and the gas is feed to waste heat recovery boiler for generation of power. The flue gas is taken to ESP for final dust separation, before going to stack via ID Fans.

WHRB based CPP (From Sponge Iron Plant):

Waste gases generated from DRI (Sponge Iron) plant contain carbon monoxide and other volatile matter which after combusted releases significant heat. This heat contains significant calorific value (GCV of mixed fuel - about 2200 kcal/Nm3). This heat will be used to produce steam through Waste Heat Recovery Boilers. The high-pressure steam will be used to run turbines and generate electricity.

Ferro Alloy Plant:

Ferroalloys are alloys of iron with a high percentage of one or more of other elements. Ferroalloys industry is very closely related to iron and steel industry since ferroalloys are used in steel making, alloying of steels and in iron or steel foundries. In the production of steel, ferro- alloys are used for de oxidation of steels as well as for introduction of the alloying elements in the steel.

Submerged Arc Furnace Technology" is used for producing Ferro Alloys & Pig Iron Production The electric arc furnaces are based on the principle of heat generated by an electric arc. The electric arc heating may be used in the following different ways. By striking the arc between the charge and electrode the heat is directly conducted and taken by the charge. The furnaces operating on this principle are known as direct arc furnace. These furnaces are used for production and refining of various grade of steel. By striking the arc between electrodes the heat is transferred to the charge by radiations. Arc does not touch the charge. The furnaces operating on this principle are known as indirect arc furnaces. These types of furnaces are used for melting of non-ferrous metals such as brass, copper and zinc.

In direct arc furnace of steel making since the arc is in direct contact with the charge so it is possible to produce highest temperatures by direct electric arc furnace. As the arc passes through the charge, it will produce automatic stirring action.

There is a charging door from where the charge is supplied and also there is an outlet for molten metal. For melting 1 ton of steel 1000 units of energy are consumed. The arc voltage is low i.e.

between 50-150 KV. When the electrodes are short-circuited, the total input to the furnace is almost zero. On the other hand, when the electrodes are far away arc is extinguished and there is no power drawn from the supply mains.

A typical SAF with slag operation comprises a circular or rectangular shaped furnace shell with separated tap holes for slag and metal. The furnace shell is refractory lined and – if additional shell cooling is required by the process – water cooled by a special sidewall cooling system. The shell bottom is usually cooled by forced air ventilation. The electrodes are consumed by the furnace bath. The self-baking electrodes with casings or prebaked electrodes are periodically extended by new pieces.

Pig Iron making in SAF

The modern trend is to manufacture Pig iron in submerged Arc furnace usually meant for ferroalloy production against usual costly Blast furnace. Sponge Iron of metallization >80% is melted along with coke and lime stone in semi closed SAF.

The liquid Iron contains 3 to 4% carbon, which can be reduced as per requirement. This molten metal is casted and cooled down to pig Iron slabs.

The typical reduction reaction is $2Fe_2O_3 + 3C = 4Fe + 3CO_2$

Jigging Plant:

The Metal Recovery Plant is being used to recover this portion of metal from slag. This process involves the following three steps;

- Crushing and screening of metal containing slag.
- Separation of metal from slag.
- Re-crushing of middling to realize additional metal.

Crushing and Screening: This circuit produces a crushed slag having a narrow size distribution, which would aid the metal liberation in further stages. Cone crushers are used to maximize shear at metal-slag interfaces. Wherever possible, the multiple cycles of crushing are maintained in a close circuit so that the minimum crushed size is achieved. To minimize fines, the reduction ratios are maintained as low as possible.

Separation of Metal from Slag: This involves two – stage recovery jigging process; known as the 'Coarse Jigging' and 'Fine Jigging'. During the course jigging stage, the cut density is set with an aim to recover clean metal and not with a focus on recovery. The coarse fraction is crushed to have an output in the form of saleable coarse alloy. An under-bed air pulsated jig with a float control system is on the discharge gates. A hydro-dynamically stable float is positioned in the jigging bed.

Later during the Fine Jigging, the cut density is lowered to focus on recovery. Since the material is fine, a strongly pulsed Jig is not required here. Only a single stage is required to utilize 'through the bed' Jigging as the material quantity reaching this stage is only about 5% of the total feed. The output of this stage is in form of fine tailings and slimes. The final disposed middling from coarse jigging and very fine metal from fine jigging are used for furnace feed.

6Re-crushing of Middling: The re-crushed middlings are returned for re-jigging to recover additional material.

Captive Power Plant:

As per accorded EC, Capacity of Captive Power Plant is 20 MW (12 MW WHRB based CPP & 8 MW AFBC based CPP) and as per proposal, after expansion will be 32 MW (24 MW WHRB based CPP & 8 MW AFBC based CPP).

Basic Function of Thermal Power Plant:

AFBC Boiler

Fluidized bed combustion is a "Clean Technology for a better tomorrow" where technology and economy have been interwoven harmoniously in quest of a better. The environmentally friendly perspectives of this technology are as follows:

At the low combustion temperature of 900°C / 950°C, no Nitrogen Oxides result from the Nitrogen in the combustion air, with the end result of extremely low NOx emissions even with fuels rich in Nitrogen Formation of SOx is essentially prevented by the addition of limestone and / or selecting suitably to meet the CPCB norms. This is both mixed into the fuel and blown into the combustion chamber. Due to the favorable conditions in the fluidized bed, about 85% of the resulting Sulphur Oxides can be removed. Balance 15 % will be taken care of through suitable Stack height as per formula of Central Pollution Control Board. In the instant case Sulphur content being less i.e. within 0.43% in fuel, no lime stone feeding has been envisaged. 100% S0x effect will be nullified by Stack height only.

Broad selection of primary fuel is possible; even combination of low gross calorific value (GCV) fuels can be used in adequate proportion so that minimum average GCV does not fall below 2500 Kcal / Kg. Facility of using wastes like Char / Dolo-Char from Sponge Iron Plant can very well be used in combination of Coal.

Better Plant flexibility at partial loads of about 25% and quick load changes Low Auxiliary Power consumption compared to other coal fired Boiler versions. Sectionalized bed of AFBC Boilers will render operational flexibility for output steam flow generation, thereby AFBC Boiler would be semi-outdoor type, natural circulation, balanced draft designed for firing different grades of coal.

Capacity of AFBC coupled with associated WHRBs has been selected to ensure adequate margin over the requirement of turbine at 100% MCR. AFBC would be designed to operate with "The HP heaters out of service" condition (resulting in lower feed water temperature at Economizer inlet) and deliver Steam to meet the Turbo-Generator requirement at 100% MCR. Economizer section of the Boiler would be non-Steaming type. Super heater sections would be convection type and designed so as to maintain rated Steam temperature of 540ºC at super heater outlet over the control range of 60% to 100%, MCR. Attemperator is provided at the outlet of convection super heater for temperature control at Steam Generator outlet.

AFBC Boiler's furnace and flue gas passages would be designed for appropriate low velocities in order to minimize erosion. Suitable balanced draft System would be provided with two (2) forced draft and two (2) induced draft fans. Each of these fans would be capable of meeting the air requirement at 100% Boiler MCR load. The forced draft fans would be radial type with inlet vane control for regulation of airflow. The induced draft fans would be radial type with multi louver damper control the regulation. The forced draft fans would control total air flow to Boiler and the induced draft fan would control furnace draft of the Boiler through automatic control loops. In addition to the FD fan, two (2) primary air fan of 100% capacity each shall be provided for transportation of fuel with one working and one standby.

AFBC Boiler would be top supported type and would be provided with all supporting Steel platforms, galleries and stairways for easy approach and Maintenance of the Unit. Adequate weather protection would be provided for instruments and operating personnel. Necessary insulation along with skin casing to limit outside surface temperature to the safe level would be provided.

Iron ore Sinter Plant:

Sintering is a process of thermal agglomeration of fine mineral particles into a porous and lumpy mass by incipient fusion caused by heat produced by combustion of solid fuel within the mass itself. Sintering process is applied to a mixture of iron ore fines, secondary iron oxide wastes (collected dusts, mill scale etc.) along with fluxes (lime, limestone and dolomite) recycled iron making products, slag-forming agents, and solid fuel like coke or coal. Iron ore fines after washing contains about 62-63% Fe. This is mixed with fines of Lime stone/Dolomite and coal and subjected to heating.

A brief description of major facilities for the sinter plant is given below.

Proportioning unit: Suitable capacity of storage and proportioning bins has been envisaged for the sinter plant. The blended mix, corrective additions and in-plant returns will be fed to the common collecting conveyor by electronic belt weigh feeders, whereas, lime will be fed to common collecting belt conveyor by loss in weigh feeder. Proportioned material from belt weigh feeders below

respective proportioning bins shall be transported to a combined mixing and nodulizing drum by a common belt conveyor.

Combined mixing and nodulizing unit: Material from belt weigh feeders below respective proportioning bins will be transported to a combined mixing and nodulizing drum by a belt conveyor where the various raw materials will be moistened and mixed in drum mixer. Lime from lime bins will be discharged onto common collecting conveyor through lime dosing equipment. A fixed quantity of water of about 60% of requirement will be added in the mixing part and the rest variable quantity will be added in the nodulizing part depending on requirement. The raw mix discharged from mixing and nodulizing drum will be transported to sinter plant main building by a belt conveyor.

Sinter plant main building: The sinter plant main building will mainly consist of hearth layer and raw mix feeding units, ignition furnace, sinter machine, hot sinter breaker. The sintering machine will comprise charging and discharging sprockets, drive unit, spring loaded pallet cars with high chrome cast steel grate bars, rails, curved guides at charging and discharge ends, grate bar cleaning device, automatic lubrication system, provision for thermal expansion, wind boxes, wind main with dust hoppers and double cone dust valves, machine Spillage hoppers, sinter machine support structures. The hearth layer will be spread onto the sintering machine first, followed by sinter mix. The height of the sinter mix bed onto the machine will be 650 mm including 50 mm protective hearth layer height.

The hearth layer is provided for the following reasons:

- Prevent plugging of the passage between grate bars
- Prevent the scaling and overheating of the grate bars
- Prevent the adhesion of fused sinter to grate bars
- Ensure uniform gas distribution through the sinter mix bed

The ignition furnace with post heat hood and pre-heating (before ignition furnace) will be installed just after the sinter mix drum feeder. The ignition furnace will have suitably located energy efficient type gas firing burner. The ignition temperature will be 1200 – 1300ºC RC Lot burners will be provided for start-up and safety.

Circular sinter cooler will be used to cool the sinter to less than 100^0C after it is discharged from hot sinter breaker at approximately 800^0C up to (-) 150 mm size, so that it can be transported through conventional conveyor system. Forced draught fans will be provided to cool the sinter in sinter cooler. Deep bed dip rail circular cooler of adequate capacity will be provided to match the sinter machine production with all the associated facilities like cooler fans, heat etc. Retention time for the coolers will be of approx. 60 minutes. Cooling of sinter is achieved by up-drafting ambient air through the bed of hot sinter to be cooled. The sinter after being cooled in the sinter cooler is transported to the

screening house. In the screening house, sinter screening will be carried out in single deck screens arranged vertically in series. The screen house in sinter plant is a separate building in which all the vibrating screens will be located. These screens are arranged one above the other in order to facilitate successive screening of the gross sinter.

The size fraction +25 mm, 15 - 25 mm, 6 - 15 mm and - 6 mm will be separated out from cold sinter screens. The size fraction of (+) 6 mm to (-) 15 mm, (+) 25 mm and the excess amount of (+) 15 mm to (-) 25 mm will be used in SAF for Pig Iron making and -6 mm fraction will be transported back to proportioning building through belt conveyors and flexo-well conveyors.

Iron Washery Plant:

For beneficiation of Iron ore on 40 TPH washery will be installed. Washing ensures clean and calibrated feed which improves productivity of kilns and reduces coal consumption. Further Lower grade of Iron ore can be washed and used in the sponge iron kilns. Overall making the sponge making process more flexible in terms of raw material grade and cost competitiveness.

Stage 1 (Feeding Circuit): The (-) 30 mm iron ore will be received in a hopper, fitted with belt feeder, for effectively feeding 50 TPH of Iron Ore to the circuit. The Hopper will be equipped with Grizzly of suitable size to eliminate oversized material to Screen. The belt feeder is provided with a VSD and a belt weighed system and thus feed to the system can be controlled and monitored continuously. The belt feeder transfers the Iron Ore to the Feed conveyor. The conveyor feeds the Iron Ore washery system which is an integrated and compact washing unit where both coarse material washing & separation as well as fines washing & dewatering takes place and the whole arrangement is housed in one single frame including required sump, heavy duty pump, hydro cyclones, piping etc. The process is described in Stages 2&3.

Stage 2: The feed conveyor discharges in to washing system where the feed is scrubbed by water jets and discharges into a single deck Rinsing Screen. This offers a number of tangible benefits including primary attrition to liberate bonded clay and fines. The screen has spray jets which greatly improve overall screening efficiency, the unit works as a rinser, removing the liberated fines from –20 + 3mm efficiently. This stage gives the first product on to the stockpile via mobile conveyors.

All <3mm material reports to the sump below the rinsing screen and secondary attrition is offered to the minus 3mm material by the heavy-duty slurry pump and is fed to the first stage of cyclone with high velocity thereby offering more scrubbing. This first cyclone pass will remove a high percentage of the slimes in the overflow of cyclone.

Stage 3: The underflow of the first stage cyclone reports to the sump in the fines section and is fed to the secondary cyclone via a heavy-duty slurry pump; this offers tertiary attrition and removes rest of

the slimes and improves the product grade. The material is discharged to a dewatering screen, which ensures a low moisture content of the final product. The slimes report to the overflow of the cyclone.

Stage 4: The combined slurry from the washing circuit (hydro cyclones overflow) will pass to High-Rate Thickener to rapidly settle and control the tailings. Dense sludge of about 800g/liter will be issued from the integrated heavy-duty pump for discharge to a remote designated settlement area. Clean recycled water (thickener overflow) is immediately released from the Thickener and will be sent to the water tanks, ready for recycle to the washing system. The Thickener is highly preferable to the majority of other mechanical settlement aids as there is virtually no agitation of the sludge bed and polyelectrolyte usage is kept to a minimum; about 5 to 7 times less than some other well-known systems. Furthermore, the ability of the Thickener to pump waste solids to a press filter for final removal of water from tailing, so that tailings are obtained in the form of cakes for disposal.

5.0 CAPITAL COST OF THE PROJECT, ESTIMATED TIME OF COMPLETION

COST DETAILS	
Total Cost of the Project	Rs. 142 Crores
Cost for Environment Management Plan	○ Capital Cost: Rs. 5.68 Crores ○ Recurring Cost: Rs. 0.6 Crores/annum
ESTIMATED TIME OF COMPLETION	60 months

6.0 SITE SELECTED FOR THE PROJECT-NATURE OF LAND- agricultural (single/double crop), barren, Govt. /private land, status of its acquisition, nearby (in 2-3 km) water body, population, within 10 km other industries, forest, eco-sensitive zones, accessibility (Note- in case of industrial estate this information may not be necessary).

a) Nature of land

The existing plant area is 13.78 hectares; additional area required for expansion is 4.37 hectares, which is completely under the possession of the company, hence after expansion, the total plant area will be 18.15 hectares which is already industrial in nature due to existing operational plant activities.

As per accorded EC, 4.5 hectares (33 % of the total area) is demarcated as Green Belt Area. Tree Plantation is going on parallel with the implementation of the project. Additional greenbelt area as part of expansion will be 1.5 hectares. Hence after expansion, more than 33% of total area will be developed as greenbelt (6.0 hectares).

The study area mainly comprises of agricultural land (66.97 %) followed by 9.56 % of human settlement. Surface Water Bodies occupies 4 %, Vegetation/Plantation area is 2.51 % and forest

area occupies 8.09 %. Industry covers 1.56 % of total area. 3.91 % of the total area falls under open scrub land and 0.35 % only falls under others (Brick Kilns). Road & Railway line cover 2.25 % & 0.80 % respectively.

Status of its acquisition

The existing plant area is 13.78 hectares; additional area required for expansion is 4.37 hectares, which is completely under the possession of the company hence after expansion, the total plant area will be 18.15 hectares.

b) Nearby (in 2-3 km) water body, forest, eco-sensitive zones, accessibility

Environmental Setting Details (with approximate aerial distance and direction from the plant site)

1.	Nearest Town & City	Burnpur town (~8.8 km in NE direction) & Asansol City (~12.0 km in NE direction)
2.	Nearest National/ State Highway	SH 5 (~2.5 km in NW direction) NH-19*(Formerly known as NH 2)*(~10.0 km in NNE direction)
3.	Nearest Railway station	• Madhukunda RS (~3.8 km in NW direction) • Damodar Junction (~5.3 km in NE direction) • Burnpur Junction (~6.81 km in NE direction)
4.	Nearest Airport	Kazi Nazrul Islam Airport, Andal(~41 km in East direction)
5.	National Parks, Wildlife Sanctuaries, Reserved Forests (RF)/ Protected Forests (PF), Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	No National Parks, Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. lies within 10 km radius. Some Reserved Forests (RF) & Protected Forests (PF) are present namely: • Panchet RF (~4.5 km in West direction) • Dandahit PF (~6.0 km in SSE direction) • Bheti PF (~6.5 km in South direction) • Muktipur PF (~8.0 km in SW direction) • Dubrajpur PF (~8.0 km in SSW direction) • Lediam PF (~8.5 km in SSE direction) • Nimtikuri PF (~9.0 km in SSE direction) • Pirargoriya PF (~9.5 km in SSE direction) • Brindabanpur PF (~9.5 km in SW direction)
6.	Water Body (within 10 km radius)	• Machkanda Jora (~0.8 km in East direction) • Damodar River (~1.0 km in NE direction) • Ramchandrapur Reservoir (~4.5 km in South direction) • Barakar River (~7.5 km in NNW direction) • Uttala Nadi(~8.5 km in WNW direction) • Khudiya Nadi(~9.0 km in NNW direction)

7.	Interstate Boundary	Jharkhand-West Bengal Interstate Boundary (~7.0 km in NNW direction)
8.	Seismic Zone	Zone - III [as per Vulnerability Atlas of India – 3rd Edition, BMTPC]

***Source**: Pre-feasibility Report*

d) List of major industries within 10 km radius study area

S.No.	Industry Name	Product	Approx. Aerial distance from plant boundary	Direction From The Plant Boundary
1.	Geeta Manufacturing Industries	Iron	8.09 Km	NE
2.	Bibhu Poly Industries	Plastic Product Supplier	6.76 Km	North
3.	Rahul Aluminium Industries	Aluminium	4.60 Km	NW
4.	AIC Iron Industries Pvt. Ltd.	Iron	4.38 Km	NW
5.	Steel Authority of India Limited	Steel & Iron	8.85 Km	NE
6.	IISCO Steel Plant	Steel	9 km	NE
7.	Vision Sponge Iron Pvt. Ltd.	Sponge iron	3.01 Km	SE
8.	Rajen Enterprise (Sanu flyash brick)	Brick Manufacturer	1.90 Km	SW
9.	Ispat Damodar	Steel	5.8 Km	NW
10.	Ispat Damodar Pvt. Ltd.	Steel & Iron	4.29 Km	NW
11.	Shree Cement Ltd.	Cement	3.82 Km	SW
12.	M/s. Rabindra Enterprises Pvt. Ltd.	Steel & Iron	3.29 Km	SW

7.0 BASELINE ENVIRONMENTAL DATA - PRESENTATION OF RESULTS (AIR, NOISE, WATER AND SOIL)

Presentation of Results (Air, Noise, Water and Soil)

Baseline study of the study area was conducted during Summer Season (March, 2022 to May, 2022). Ambient Air Quality Monitoring reveals that the concentrations of PM_{10} and $PM_{2.5}$ for all the 8 AAQM stations were found between 62.8 to 91.8 µg/m^{3}and 31.9 to 52.4 µg/m^{3}respectively. The concentrations of SO_2 and NO_2 were found to be in range of 8.3 to 13.6 µg/m^{3}and 16.6 to 32.6 µg/m^3 respectively. PM Levels near Plant site are high due to existing operational activities

Ambient noise levels were measured at 8 locations within the 10 km radius area from the plant site. Noise levels vary from 51.1 to 61.4 Leq dB (A) during day time and 42.2 to 52.1 Leq dB(A) during night time. Maximum noise levels are seen at plant site unlike villages where there are minimal noise

inducing activities but at Radhanagar town the noise level is high due to densely populated area. The industry is operational and explains the generation of high noise level in plant site.

The pH values for surface water bodies are found out to be 7.04 and 7.55which means water is slight alkaline in nature. Value of Biochemical Oxygen Demand- 3.2 and 8.8 mg/l, Chemical Oxygen Demand- 16 and 32 mg/l, Dissolved Oxygen- 6.5 and 7.2 mg/l which is above optimum level of 4 mg/l.

The pH of the groundwater samples ranged from 7.06 to 7.60 which is within the permissible limit. The color and turbidity were below detectable limit and odor and taste were agreeable. The total dissolved solids ranged from 454.0 to 644.0 mg/l indicating medium to rich mineral nutrients. This observation is supported by moderate to high values of total hardness (123.7 to 326.7 /l). Total alkalinity values (200.0 to 405.0 mg/l) found to be above optimum range. The Fluoride concentration (0.27 to 1.07 mg/l) was low to optimum for all villages. Based on the conductivity values, the groundwater samples are good for irrigation purpose. The sodium (52.4 to 167.0 mg/l) concentration was found medium and potassium (0.6 to 2.7 mg/l) concentration are very low. Phosphate values are found BDL for all the monitored locations.

Soil monitoring was carried out at 7 locations. All the soil samples collected were varying in colour (Dark brown, brownish, and Blackish) and the texture was Silt Loam, Sandy clay or Sandy silt loam, which is acceptable to agriculture. The pH ranged from 6.76 to 7.24 which is neutral to slightly alkaline for agricultural soils. Water holding capacity (37.39 to 52.68 %) was favorable for the crops but showed tendency towards water logging. However, the bulk density (1.41 to 1.51 g/cc) was below the optimum level (1.6 g/cc) which is acceptable. Available organic matter (0.43 to 0.68 %) was medium, available potassium (440.17 to 533.91 kg/ha) was very high. Too much potassium can be unhealthy for plants because it affects the way the soil absorbs other critical nutrients. Available nitrogen (192.48 to 254.58 kg/ha) and available phosphorus (25.49 to 76.33 kg/ha) was sufficient. NPK fertilizer addition may be necessary during plantation and greenbelt development.

Biological Environment

Flora: Most common species found in the area are Akashmoni/Sonajhuri (*Acacia auriculiformis*), Mango (*Mangifera indica*), Amla (*Phyllanthus emblica*), Arjuna (*Terminalia arjuna*), Bel (*Aegle marmelos*), Chhatim/Chhatiwan (*Alstoniascholaris*), Dumur (*Ficus hispida*), Kadam (*Anthocephaluscadamba*), Khejur/Date Palm (Phoenix *sylvestris*), Mahua/Mahul/Mohul (*Madhuca latifolia*), Neem (*Azadirachta indica*), Sal (*Shorearobusta*), Palash (*Butea frondose*), Jak/Kanthal (Artocarpus integrifolia) etc.

Fauna: Commonly found species in the study area are were Indian Mynah *(Acridotheres tristis*), Indian Roller (Coracias benghalensis), Tree pie (Dendrocitta.Vagabunda), House Sparrow (Passer domesticus indicus), White-breasted kingfisher (Halcyon smyrnensis) etc.

Socio-Economic Environment

The population as per 2011 Census records is 95,153 (for 10 km radius). Census data suggests that the study area is composed of 51.54 % of male population while 48.16 % of female population. Scheduled Caste population is 25,174and Schedule Tribe are 17,485whereas remaining population is observed as others. Literacy rate of the area is 67.38 %. Census data of 2011 of study area suggested that only 35.01 % people are involved at working in defined sector despite literacy rate of 67.38 %. Filed survey suggests that most of these households are having family size of up to 4 members 60 %, while 34 % of people are 5 to 7 family members together. There are 4 % families citied with 8 or above family members. Surveyed information revealed that average basic annual income of a family is Rs. 2,00,000 where major expenses are borne on food, medical expenses and shelter.

8.0 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Anticipated environmental impacts due to operation of the proposed project along with mitigation measures are given in Chapter 4 of this EIA/EMP Report.

Particulars	Impact	Mitigation Measures
Topography and land environment	• Loss of top soil due to leveling of land and cleaning and there will be change in upper surface of the land exposed to construction work. • Soil contamination can occur due to improper disposal activities of construction debris. • Intensity of land use will increase which will increase the commercial production and in turn revenues in the area as well as company. Besides, no adverse impact on the surrounding land	• **<u>Construction phase</u>** All earth work will be completed in such a way so that the soil erosion and carryover of the materials in other areas are protected. Excavated soil will be stored properly to avoid the spread of wind-blown dust and shall be reused for backfilling, landscape development and greenbelt development and its maintenance. Proper management of disposal of construction waste is to be implemented by the plant • **<u>Operation phase</u>** Any potential negative impact will be mitigated by adopting the following measures: a. Attempt would be made to utilise the solid wastes through practicable ventures. The solid wastes

	is anticipated. The project would have positive impact on the land valuation, benefitting private land owners.	management plan will be discussed separately under 'Impact due to solid wastes", where it is proposed how solid wastes dumping can be avoided. b. Greenbelt shall be developed over an area of 6.00 hectares i.e., 33.0% areas of total plant premises @ 2500 tress per hectare. c. All raw materials to be stockpiled on concreted areas with impervious flooring to avoid leaching and Stockyard will have garland drains. d. The greenbelt and plantation will increase the aesthetic beauty and prevent soil erosion.
Air Environment	• During construction phase, dust generation will be the main pollutant, which would generate from the site development activities and vehicular movement on the road. • During operation phase, the impact on air quality due emissions of PM, SO_2, NO_x from the various process stacks of the plant. The same has also been assessed for 8 sampling locations in nearby villages within 10 km study areas which ranges from 62.8 to 91.8 µg/m^3 for PM_{10}, 31.9 to 52.4 µg/m^3 for $PM_{2.5}$, 8.3 to 13.6 µg/m^3 for SO2 & 16.6 to 32.6 µg/m^3 for NOx.	• **<u>During Construction phase</u>** ➢ Proper maintenance of vehicle and construction equipment will help in controlling the emissions. ➢ Construction equipment having PUC Certificate will be deployed during the activity to restrict exhaust emission. ➢ Proper training of the drivers so as to ensure adherence to speed limit. ➢ Covered storage facilities. ➢ Water spraying on roads and construction site will prevent fugitive dust. ➢ Vehicles having construction materials will be covered with tarpaulin. ➢ Proper greenbelt development and plantation inside and outside the plant premises. ➢ A separate storage area will be demarcated for construction material to confine the dust dispersion. ➢ Proper PPEs will be provided to workers to avoid accumulation of dust in respiratory tracts and prevent air borne diseases.

		• **<u>During Operation phase</u>** ➢ All pollution control systems are connected to energy meters and the records are maintained for run hours, failure time and efficiency. ➢ Clean technologies/measures are implemented in the following way. ➢ De-dusting is provided for product handling area. ➢ Fugitive emissions are suppressed by using dust suppression system. ➢ Every possible effort is made to conserve the raw materials, energy and water consumption to match with the international standards. ➢ Good housekeeping practices are maintained. ➢ All vibrating screens are already covered to preventing the leakages of Dust. ➢ Dust suppression system is adopted to control the fugitive dust emanated during extra quantity of raw materials unloading operations. ➢ All discharge and feed points wherever the possibility of dust generation is there, are provided with dust suppression system. ➢ All material transfer points are connected with dust suppression water nozzles to avoid the pollution.
Noise & Traffic Density	• The noise generated will be high due to construction activities, high noise levels can cause irritation and gradual hearing loss to construction laborer's if high levels of noise exposure are continuously experienced. Sudden exposure can cause irritation in ear drums and	**Construction phase:** ➢ Selection of low noise generating machinery/equipment. ➢ Provision of rubber padding/noise isolators/silencers to modulate the noise generated by machinery/equipment, wherever possible; ➢ Information on noise, the risks of exposure to noise and the appropriate control measures shall be

	sudden loss in hearing whereas long term exposure will result in gradual ENT problems. • During operation, the noise will be generated mainly from Fan, Pump, Turbine, Compressor etc.at equipment within the plant. The equipment shall be designed to comply with the stipulated limit of 85 dB (A). • Traffic survey has been conducted for 24 hours at NH-19 (Formerly known as NH- 2). Both raw and finished materials will be transported mainly by rail and road but most of the transportation will be done by rail only. However, considering worst case scenario, there will be increase of 126 trips/day (06PCU/hour) after proposed expansion. Due to the project, there will be addition of 06vehicles in the existing traffic per hour. The LOS value for existing road traffic is "Whichis "Very Good". Hence, the additional load on the carrying Capacity of the concern roads is not likely to have any change in the LOS value. Thus, it can be concluded that the present road	displayed at the workplace; ➢ Appropriate training and education will be given to the workers; ➢ Regular monitoring of ambient noise level as per monitoring plan shall be carried out. **Operation Phase:** ➢ Persons working just close to machine and machine operators are being/will be provided with personal protective equipment viz. ear plugs/ ear muffs etc. ➢ D.G. sets are being /will be provided with acoustic enclosures to control the noise level within the prescribed limit. ➢ Proper maintenance, oiling and greasing of machines at regular intervals is being/ will be done to reduce noise generation. ➢ Greenbelt of appropriate width at the plant boundary is being developed and same will be maintained. ➢ Regular monitoring of noise level is being / will be carried out and corrective measures in concerned machinery are being/ will be adapted accordingly to the possible extent. ➢ Sound absorbing material is provided in rooms where both the noise source and plant personal is present so that the reflecting sound is absorbed. ➢ In order to mitigate the impact due to vehicular load, it is proposed to carry out water sprinkling on the roads which would reduce fugitive dust emissions from heavy vehicle movement by 30%. It is also proposed to ensure that vehicles moving within the study area shall meet the latest Emission Standards applicable in the region. Speed Limit/ Bumper will be imposed to regulate vehicle speed. Truck/tippers shall be parked

	network is good enough to bear the increased traffic load. • Increase in traffic density may lead to increased fugitive emissions. Exposure to fugitive dust poses the several health risks including decreased lung function, increased respiratory symptoms, such as aggravated asthma, irritation of the airways, coughing or difficulty breathing. People with heart or lung diseases, children, and older adults are prone to be affected by particle pollution exposure if without any control measure.	in designated parking area only, proper parking arrangements will be provided.Adequate parking area has been allocated for parking purpose which can accommodate approx.500 vehicles.Greenbelt has been/will be developed.
Water Environment	• **During construction phase** Impact on water quality during construction phase will be mainly due to sewage generated from the work station of construction workers. • **During operation** the requirement of water will be for process and sourced from Damodar River through Damodar Valley Corporation (DVC). • The effluents, cooling water generated during steel process, if not treated properly and discharged carelessly on ground, soil or water bodies can enter	• **During construction phase** ➢ Construction workers will be brought from nearby villages so that domestic water is saved in many ways due to temporary requirements only. ➢ The drains are/will be properly aligned in conformity with the site drainage pattern so that the alteration is kept to the minimum and flooding or soil erosion does not occur. ➢ No discharge of any kind will be done inside or outside plant premises in any water body. ➢ No discharge of waste water generated during construction activity will be done on soil or land area. ➢ ➢ Record of water consumption on daily basis will be maintained as per present practice. • **During Operation Phase:**

	into ground water through leaching.	➢ Company is/ will be completely based on Zero Liquid Discharge. Waste water generated from proposed plant and others will be 100% utilized inside the plant premises. ➢ Treated water after primary treatment is being/ will be used in greenbelt & dust suppression. ➢ Continuous attempt is being/ will be made to optimize/reduce the use of water and to avoid wastage and leakage of water. ➢ Proper storm water drainage network exists. ➢ Waste water generated from the domestic activities like from canteen, Toilet, Rest room & canteen will be treated in STP having 75 KLPD capacity. ➢ Rain Water Harvesting System shall be incorporated. Maximum use of harvested water will be for plant use.
Land Use	During construction activity, the excavated top soil will be stacked with grass turf and will be used for back filling/plantation. Impact on soil during construction would be mainly due to the left-out construction material. If construction material will be disposed off on land, then it can modify the soil quality to various extent and top soil will get affected which will result in loss of fertility. There will be deteriorating soil quality and decrease in vegetation abundance. During operational activity, changes in soil texture due to settling of air	Top soil would be used for greenbelt strengthening within the plant and its periphery, which would help in restricting the impacts due to the construction activities by creating a physical barrier. To minimize the impact from construction activity, in order to minimise such impacts, sprinkling of water shall be done. Litter disposal and collection points will be established around the work sites. Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, etc. will be disposed through local recyclers. The construction spoils will be temporarily stored at designated dumpsite located inside the plant premises. A horticulturist should be engaged who will ensure soil quality improvement in the plant area, by adequate manuring and fertilizing. Besides, soil samples are being/ will be collected and tested at regular intervals from the

	borne dust or due to wash off of solid particulates by surface or ground water. This will lead to change in porosity, permeability &other such physical characteristics of soil of the area. Changes in soil chemistry due to addition of foreign material from polluted air and water due to existing plant activities in the area. Soil will be majorly affected if any kind of waste is discharged without treatment and allowed to decompose on soil.Used oil and grease when disposed of incorrectly it can harm the land, waterways, underground reservoirs and the marine environment.	nearby areas. This helps in mitigation of any harmful impact on soil due to the operational activity, if any. No solid or liquid discharge will be disposed off in soil.
Ecology	Potential impact on ecology due to any pollution related to air, noise, release of untreated effluent, improper solid and hazardous waste storage.	As per accorded EC, 4.5 hectares (33 % of the total area) is demarcated as Green Belt Area. Tree Plantation is going on parallel with the implementation of the project. Additional greenbelt area as part of expansion will be 1.5 hectares. Hence after expansion, more than 33% of total area will be developed as greenbelt (6.0 hectares). Presently, trees i.e. ~3057 trees/ha have been planted so far. After expansion more than 33% i.e., 6.0 ha of the total plant area will be developed under greenbelt & plantation by planting trees to the tune of 2500 trees/ha. The greenbelt & plantation development in and all around the plant site help to attenuate the pollution level. Greenbelt will be developed as per Central Pollution Control Board (CPCB) guidelines. Plantation of selected

		tree species, which are suitable to area condition, will be done for attenuation of air & noise pollution. Native species will be planted in consultation with the local DFO.
Socio-economics	For the proposal, there will be displacement of people from the villages which has been detailed in Chapter III.	The company has already taken various steps for social & environmental development in the areas like renovations & donations in school, health check-ups & camps; construction of roads, donation of blankets, etc. expansion project will increase the employment potential.

9.0 IDENTIFICATION OF HAZARDS IN HANDLING, PROCESSING AND STORAGE OF HAZARDOUS MATERIAL AND SAFETY SYSTEM PROVIDED TO MITIGATE THE RISK

DRI Plant			
Equipment	Process	Potential Hazard	Mitigation
Sponge Iron Kiln	Reduction of Iron Ore	• Falling of Hot Mass & Dust • Air emission	• Ensuring before opening the kiln bottom door, first clean the inner surface of the stack cap, such that the dust particle and hard clinkers which deposited in the cap is fallen into the DSC. • Ensure before opening the DSC bottom door to check the DSC bar position and condition and to clean if big block of castable or any hard clinkers which is blocking the dust flow passage to wet scrapper chute. • Ensure to clean the dust by opening the man hole provided in the chute and check the spiking rods and the screen. In built safety system is provided in the construction of furnace with suitable refractory walls. • Allow the wet scrapper to run to remove the sludge, then open the drain pipe of the wet scrapper, which is located at bottom on either side, pour sufficient water to clean the sludge and the slurry dust to flow

			through drain pipe. • Adequately designed ESP and other Air Pollution control systems will be provided with interlock to the kiln feeding system in order to prevent by passing of emissions through safety cap and also during non-operation of ESP or any other pollution control devices.
Power plant			
Turbine	Convert pr essure in the flue gas into Mechanic al Energy	Mechanical & Fire Hazards Noise	Layout of Equipment / Machinery will be in accordance to factory and electrical inspectorate. Acoustic enclosure to Turbine.
Generator	Generator Convert Mechanic al energy into electrical energy	Mechanical & Fire Hazards a) Lube Oil System b) Cable galleries c) Short circuits (d) Noise	• Layout of Equipment / Machinery will be in accordance to factory and electrical inspectorate • Acoustic enclosure • Isolated panel rooms • Special foundation with vibration absorbing material
Power Transf ormers		Fire and explosion Automatic fire fighting system will be provided. Isolated with fencing and restricted entry.	• Automatic fire fighting system will be provided. Isolated with fencing and restricted entry.
Switch Yard control room	transforme r	Fire	All electrical fittings and cables are provided Switch Yard as per the specified standards. control room
Coal storage shed		Fire and dust explosions	Continuous water sprinkling
Compressor	Plant oper	Governor failure	The design precautions of safety will be followed in

House	ation	due to the failure of pins and springs leading to opening of safety valves	manufacture and erection of compressors.
Coal storage yard	Coal dust is combustible	explosion Hazard	• Coal piles shall not be located above heat sources such as steam lines. • All mechanical & electrical equipment insidethe coal storage area shall be approved for use in hazardous locations and provided with spark proof
LDO / FO storage area		Fire & explosion	Precautions as per TAC and OISD will be implemented.

10.0 EMERGENCY PREPAREDNESS PLAN IN CASE OF NATURAL OR IN PLANT EMERGENCIES

In case of emergency, the company has certain designated hierarchy of persons with specific responsibilities and duties allotted. The emergency communication system is provided and emergency sirens are used for informing. The emergency power supply and fire-fighting facilities are provided to deal with disasters related to fire. The medical facilities are provided for casualties or injured people, if any. There are certain emergency contact numbers displayed on main gate to be used during emergencies. Details of the same are incorporated in Chapter VII of the EIA/EMP Report.

12.0 ISSUES RAISED DURING PUBLIC HEARING (IF APPLICABLE) AND RESPONSE GIVEN

Public hearing is yet to be conducted.

13.0 CER PLAN WITH PROPOSED EXPENDITURE

As per OM dated 30th September, 2020 and 20th Oct., 2020, company will propose a detailed action plan along with budgetary allocation after conduction of Public Hearing considering the issues raised during public hearing. The funds allocated will be spent for various socio-economic development activities proposed to be undertaken in the study area with a priority to villages falling in the impact zone, which may be further extended to other villages depending upon the budget and requirement.

14.0 OCCUPATIONAL HEALTH MEASURES

During the construction and operations of the plant, regular medical check-ups of employees and workers would be conducted. All precautionary measures like providing safety gears and Personal Protective Equipments (PPE) to workers for use. Safety briefing by Safety Department personnel at each site will be conducted before start of Working shift. The following Safety measures will be undertaken to ensure good occupational health of workers:

S. No.	Occupational hazard	Measures
1.	**Dust**	▪ Implementation of adequate dust control systems and good housekeeping. ▪ Water sprinkling in the places where dust dispersion can occur. ▪ Regular sweeping of roads within plant premises ▪ Providing dust masks to employees working in handling and storage yards. ▪ Periodic work zone monitoring
2.	**Noise**	▪ Proper oiling & maintenance of machineries ▪ Installation of compressors and turbine in closed buildings ▪ Regular monitoring of noise level ▪ Display of noise level with permission level ▪ Display instruction to use of PPEs at high noise level area ▪ Periodic health checkup will be kept as audiometric records for the persons working in high noise area.
3.	**Heat stress**	▪ Schedule hot jobs for the cooler part of the day ▪ Monitor workers who are at risk of heat stress ▪ Provide rest periods with water breaks ▪ Use of personal protective equipment
4.	**Electrical Hazards**	▪ Proper earthing will be done as per IS 3043 ▪ Low Voltage Supply will be ensured ▪ Isolating Transformers ▪ Double Insulated Tools ▪ Over Load Protection ▪ Protection Against Leakages

		▪ Flame- Proof Equipment ▪ Lightning Protection
5.	**Fire and Explosion**	▪ Suitable fire extinguisher, fire hydrant system and fire buckets will be kept near transformer, cable, general store and office area. ▪ Oil and Flammable Gases storage area fenced and declared as Fire Hazardous Area-"No Smoking Area". ▪ Predictive interlock in transformers to give alarm and trip the system.
6.	**Physical hazards**	▪ Installation of light arrestors at all tall buildings ▪ Permit to work at height with work instruction to use safety belts etc. ▪ Testing of all lifting tools, tackles and vessel ▪ Safe working pressure is maintained in air receiver ▪ Safe working load for cranes and ropes etc. ▪ Good housekeeping & Speed limit of 20 km/hr in plant area ▪ Display of emergency number at all suitable location ▪ Ambulance and emergency staff ready at the plant main gate at all the time ▪ First aid kits are kept at the sites and training provided ▪ Use of mobile while driving, alcohol, smoking etc. are banned in plant area ▪ Proper illumination in office, plant area and road area

15.0 POST PROJECT MONITORING PLAN

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
CONSTRUCTION PHASE					
1.	Ambient Air Quality Monitoring	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Work Zone-Construction site	Manual work-zone ambient air quality monitoring will be conducted near the construction site of the plant area. - By MSPL in-house environment team-Quarterly. - By NABL Accredited Laboratory-Half Yearly	MSPL/NABL Accredited Laboratory

2.	Noise Level Monitoring	-	Work zone-construction site	Manual noise-level monitoring at construction site. - By MSPL in-house environment team-Monthly. - By NABL Accredited Laboratory-Half Yearly	MSPL/NABL Accredited Laboratory
3.	Ground water monitoring	As per IS : 10500-2012	Construction site	One location near construction site. By NABL Accredited Laboratory- Six Monthly	NABL Accredited Laboratory
	OPERATIONAL PHASE				
4.	Meteorological data	Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind direction and rainfall	Permanent station in plant premises. The wind sensor is preferably at 10 m height above the ground without any surrounding hindrances that may affect the free flow of wind	1 No. Online metrological station	MSPL
5.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2 CO, Ozone, Lead, Ammonia, Benzene, BaP, Arsenic and Nickel (As per NAAQS 2009)	Plant premises and In nearby villages	3 Nos. Online continuous air quality monitoring stations will be installed after getting site approval from SPCB. (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO at an angle of 120^0 each). Manual ambient air quality monitoring will be conducted at 04 different locations around the plant area by in-house Environment team. Manual monitoring at 04 locations outside the plant area within 05 kms radius of plant boundary to be conducted by MoEFCC recognised/NABL accredited third party	MSPL/NABL accredited lab

				laboratory-Six monthly	
6.	Stack Emission Monitoring	PM, SO_2, NO_X	At all major combustion based stacks.	Online continuous monitoring system will be there for proposed unit as per CPCB directions. In absence of online system, manual monitoring as per CTO condition.	Online continuous monitoring system/ NABL accredited lab
7.	Performance Evaluation of pollution control equipment		All pollution control devices	Yearly	MSPL
8.	Fugitive Emission		Locations across Raw Material Handling area, storage area, Silos, near control rooms, Kilns, crusher area, workshop, yards, junction houses, etc.	Six Monthly for every location	NABL accredited lab
9.	Noise Level Monitoring		Seven locations around the plant boundary and At five other locations in 05 kms radius of the plant boundary	Once every three months for each location by MSPL in-house Environment monitoring team. Once every six months for each location by NABL accredited laboratory.	MSPL/NABL accredited lab
10.	Water Quality/effluents	Water quality of surface and ground as per IS : 10500-2012 except radioactivity	**Ground water-** 4 locations in 4 kms radius of the plant boundary **Surface water-** As per availability	Six monthly.	NABL accredited lab
		Effluent- pH, TSS, TDS, BOD, COD	STP - Outlet	STP-effluent quality monitoring by own lab (pH, COD & TSS- Daily basis TDS & BOD – Weekly). Online water flow meter as per CPCB guideline will be installed.	MSPL
11.	Soil quality for fertility	N, P, K, organic	One location inside the plant area	Yearly	NABL accredited lab

		matter, water holding capacity, density, texture, etc.			
12.	Inventory of hazardous waste		Within plant	Yearly or as directed by SPCB	MSPL
13.	Medical check-up of employees		Nearby hospitals/ Health Centre/On-site Occupational health Centre	Yearly	MSPL
14.	Water Consumption		At all consumer points through water meter	Continuous through water meter	MSPL
15.	Environmental & Energy audit		Plant site	At regular interval	MSPL

16.0 ENVIRONMENT MANAGEMENT CELL

Environment Management Cell will implement the EMP of this project. All recommendations given in the EIA report including that of occupational health, risk mitigation and safety will be complied with. The capital cost required to implement the pollution control systems and EMP is Rs. 5.68 Crores. The annual recurring expenses will be Rs 0.6 crores. EMC will ensure that all air pollution control devices, combined effluent treatment plant including Sewage Treatment Plant and water re-circulating systems function effectively. Schemes for resource conservation (raw materials, water, etc.), rainwater harvesting and social forestry development will be taken up by EMC. Greenbelt and greenery development inside and outside the plant premises will be intensified by the EMC. Greenery on 33% land will be ensured. Guidelines issued by the Central Pollution Control Board (CPCB) on greenbelt development will be followed and district forest department will be consulted for selection of trees. Environmental awareness programs for the employees will be conducted. EMC will also ensure cleanliness inside the plant. All records shall be submitted to the regulatory authorities, displayed at relevant places like company gate and website and maintained by the EMC.

16.0 CONCLUSION

It is concluded to say that the proposed project is an environmentally friendly project, there will be no significant impact on the area, as adequate pollution control measures and preventive measures will be adopted to maintain the various pollutants within the permissible limits. Regular monitoring of all the components of environment will be done. Increased social welfare measures will be taken by the company that will bring development in the near-by villages. Development and maintenance of

Greenbelt around the area will be also taken up as an effective pollution mitigation technique, as well as to control the pollutants released from the plant premises.

Therefore, the proposed integrated steel plant steel plant will not degrade the environmental quality of surrounding environment. 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.