

Executive Summary

of

***Proposed Expansion of M.S. Billets from
10,000 TPM to 35,000 TPM and TMT Bars from
10,000 TPM to 35,000 TPM***

Proponent

M/s. Rajuri Steel Private Limited
At F-12, Additional MIDC Area Jalna, Maharashtra

By

Pollution & Ecology Control Services
NAGPUR

Executive Summary

PREAMBLE

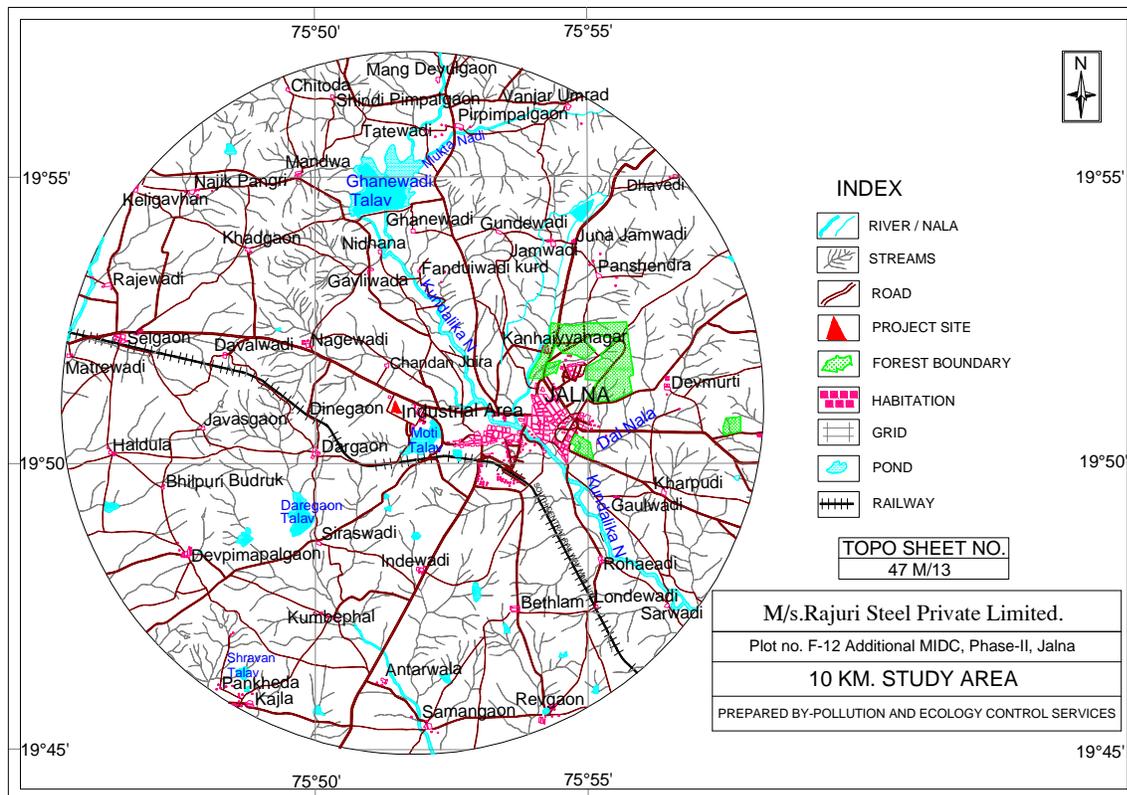
The iron and steel industry is one of the most important industries in India. During 2014 through 2015, India was the third largest producer of raw steel and the largest producer of [sponge iron](#) in the world. The industry produced 91.46 million tons of total finished [steel](#) and 9.7 million tons of [pig iron](#). Most iron and steel in India is produced from iron ore. In 2014-15, production for sale of total finished steel (alloy + non-alloy) was 91.46 Million Tonnes, a growth of 4.3% over 2013-14. Production for sale of Pig Iron in 2014-15 was 9.7 million tonnes, a growth of 22% over 2013-14. India is the largest producer of sponge iron in the world with the coal-based route accounting for 90% of total sponge iron production in the country.

Source: <https://en.wikipedia.org>

DETAILS OF THE PROJECT SITE (10km RADIUS)

Sr No	Particulars	Details
1	Project Site	Plot no. F-12 Additional MIDC , Phase-II , Jalna
2	Latitude	19°50'41.89"N
3	Longitude	75°50'33.66"E
4	Elevation above MSL	534m
5	Toposheet	47 M/13
6	Present landuse	Industrial land
7	Climatic conditions (Based on nearest IMD station data Aurangabad)	Annual Average Maximum Temperature : 40 ⁰ C Annual Average Minimum Temperature : 12 ⁰ C Annual Average Humidity : 19-24 % Annual Average Rainfall : 600-700mm
8	Nearest Highway State Highway	Nearest State Highway is Aurangabad- Jalna- Nagpur Highway 2 kms NE
9	Nearest Airport	Aurangabad : 60 kms W.
10	Nearest Railway Station	Railway Station: Jalna is at a distance of 6 Kms SE
11	Nearest Town	Jalna 5.0 kms E.

12	Forest	Reserved Forest : 8.5 km (E) Reserved Forest : 5 km (NE)
13	Sanctuaries / National Parks / Biosphere etc	Nil
14	Hills/ Valleys	Nil
15	Streams / Rivers	Kundalika River : 2.5 km (NE), Mukta River : 7 kms (N) Moti Talav : 1 km SE Ghanewadi Talav : 5.5 Km N Daregaon Talav : 3.5 Km SW Shravan Talav : 8.5 Km SW
16	Defense Installations	Nil
17	Historical Places	Nil



Source: SOI Toposheet

Topographical Map (10 km Radius)

DESCRIPTION OF PROCESS

Manufacturing Process of M.S. BILLETS & TMT BARS

Induction Furnace

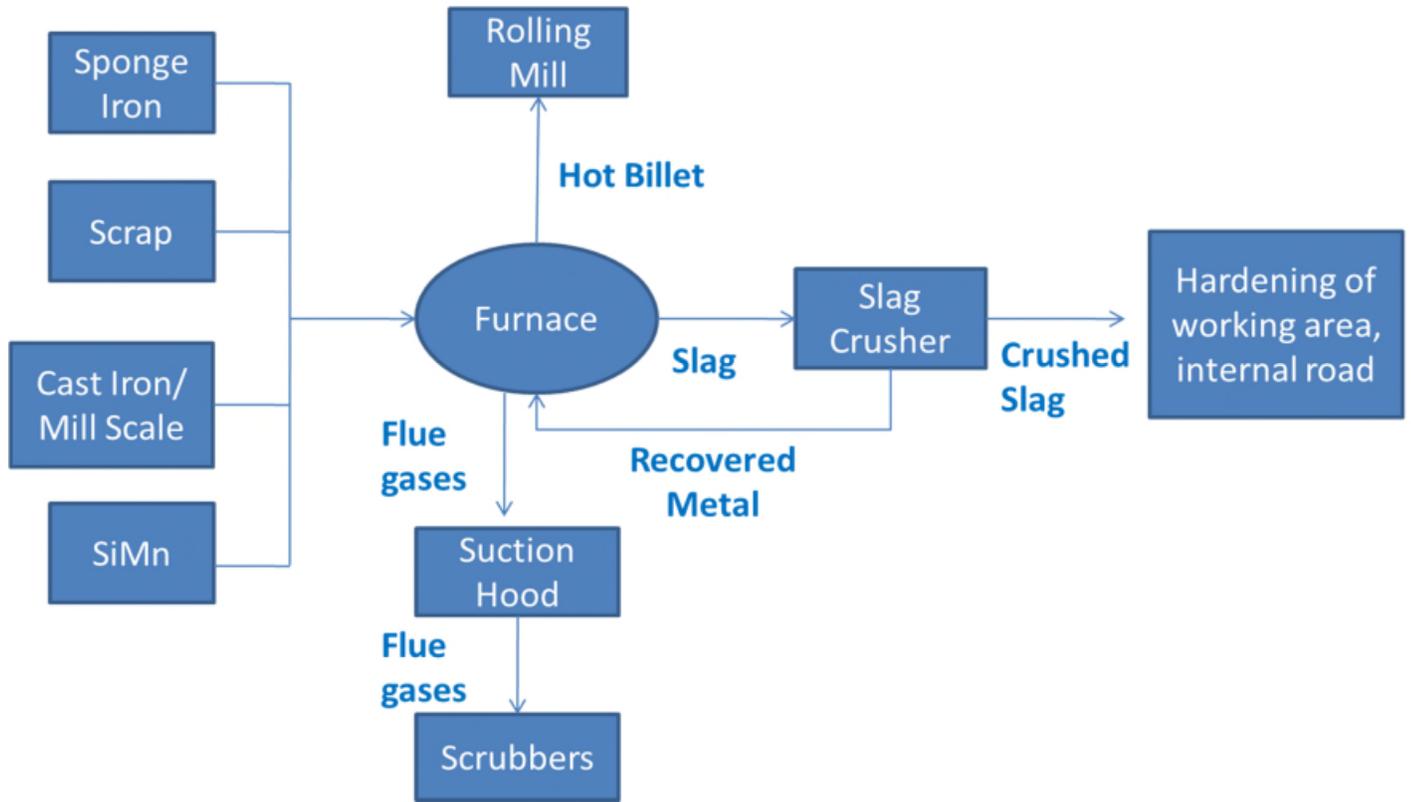
The induction furnace is used to melt many different sorts of metals, from common steel to more exotic alloys or precious metals. The greatest advantage of the induction furnace is its low capital cost, its easier installation, simpler operation, no noise generation and there is very little heat loss due to radiation from the furnace. The raw material (Sponge Iron, MS scrap, Ferro Manganese and Ferro Silicon) is charged into the induction furnace. As soon as the furnace is charged, the switches admitting power current to the induction coil are closed.

After the furnace is switched on, current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. As the magnetic fluxes cut through the scraps and complete the circuit, they generate an induced current in the scrap which is known as eddy current, this eddy current flows through the highly resistive path of the scrap mix, generates tremendous amounts of heat and melting of scrap starts. Soon a pool of molten metal forms in the bottom causing the charge to sink. The induced current which is generated in the charge mixed and heated more homogeneously. As soon as the charge has melted clearly, any objectionable slag is skimmed off, and the necessary alloying elements are added. When these additives have melted completely, the power input may be increased to bring the temperature of metal up to the point most desirable for pouring. The current is then turned off and the furnace is tilted for pouring into a crucible. As soon as pouring has ceased the crucible is cleaned completely from any slag or metal droplets adhering to the wall of the crucible and the furnace is now ready for charging again. The temperature of the furnace will be 1650⁰C. When the total scrap as per the capacity of the crucible is molten, the sample is taken from liquid steel and tested for the composition of steel and the carbon contents. Therefore some additives of ferro-alloys like Silico-manganese, silicon, aluminum shots and are added to the liquid steel to maintain the composition and quality. The billets in the molten stage are transferred to rolling line for the production of TMT Bars bypassing

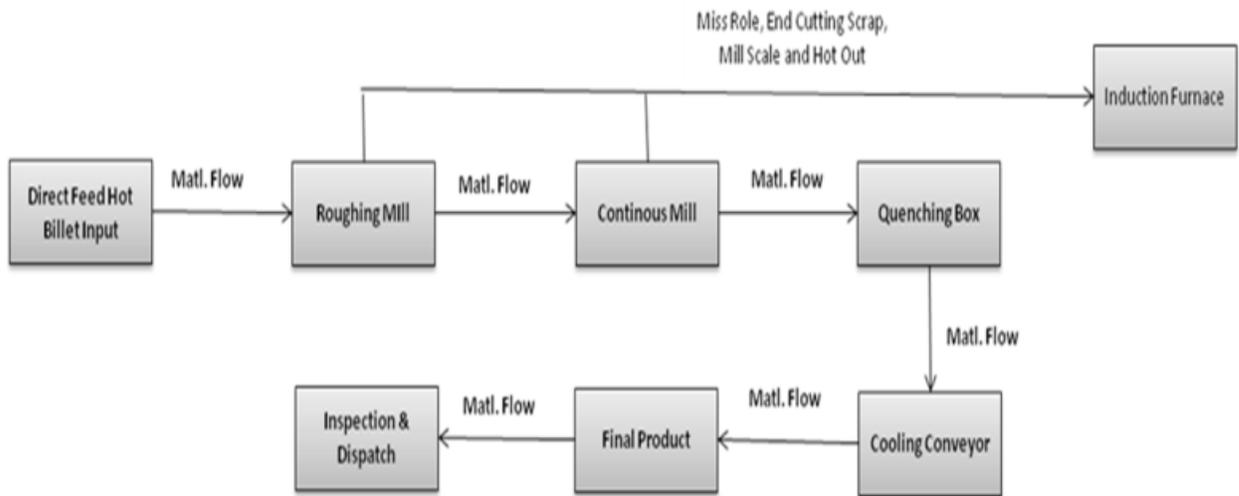
the reheating furnace. The cooled TMT Bars are then inspected and dispatched. The process flow chart is presented in the **Figure 2.2**.

Advantages of Hot Billet Rolling Process

- ❖ Energy saving is the main benefit as it consists in avoiding the normal cooling of the billet down to room temperature and the reheating for initiating the rolling. Thus the process is of less energy and more environmentally friendly.
- ❖ Billets in molten condition will be directly fed to Hot Billet Rolling machine thus saving of fuel & electricity.
- ❖ No additional increment in GLC for PM & SO₂.
- ❖ No need of storing fuel required in Gasifier for conventional Re-heating Furnace in rolling mill
- ❖ No generation of Fly Ash.
- ❖ No space will be required for storage of Billets and fly ash.
- ❖ Easy handling of Process.
- ❖ Low operational cost of rolled steel depending on unit costs
- ❖ Reduced civil works and infrastructure costs
- ❖ Reduced energy consumption
- ❖ Less man power required.



Process flow Chart for Hot Billet Rolling Process



Process flow Chart for Rolling Mill

DESCRIPTION OF ENVIRONMENT

Air Environment

The baseline environmental quality for the September, October, November and December 2017 was assessed in an area of 10 km radius around the proposed project site.

It has been observed that about 35.78% of total time, the wind was calm i.e. the speed was less than 1 km/hr. The predominant wind directions were E (16%) and ESE (12%).

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM ₁₀	-	59.0 to 83.8 µg/m ³ .
PM _{2.5}	-	40.8 to 53.2 µg/m ³
SO ₂	-	22.7 to 33.6 µg/m ³
NO _x	-	19.9 to 33.0 µg/m ³

Industrial Area				
Residential, Rural Area (CPCB Norms)	100 µg/m ³	60 µg/m ³	80 µg/m ³	80 µg/m ³

The concentrations of PM₁₀, PM_{2.5}, SO₂ and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 14 samples including ten surface & four ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (IS 10500 – 2012) except high concentration of total coli form in surface water, which may be due to the human activities.

Noise Environment

Noise levels measured at eight stations are within limit of 55.0 dB (A) for Residential Area or 75.0 dB (A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

Area Code	Category of Area	Limits in dB(A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

** Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones

Land Environment

The characteristics of the soil sample were compared with different depths for respective parameters.

The observations of soil characteristics are discussed parameter wise below;

- a) Texture of soil samples from agriculture lands are silty loam and silty clay, sample from Waste land are silty clay loam and sample from barren lands are sandy-loam in Texture Classification
- b) Colour of soil samples from agriculture land is faint gray and sample from waste land is dark gray and sample from Barren land is brown-red in colour.
- c) The bulk density of soil samples from agriculture land is in the range of 1.1 to 1.4 gm/cc and sample from waste land is of 1.1 to 1.2 gm/cc and sample from Barren land is of 1.2 to 1.3 gm/cc.
- d) Soil samples from agriculture land have pH values between 7.5 to 7.7 and sample from waste land have 7.2 to 7.5 and sample from Barren land have 7.7 to 8.1 ranges of pH values. The pH values are indicating nature of soil samples as between slightly neutral to slightly alkaline.

- e) Soil samples from agriculture land have Organic Matter between 1.1 to 1.9 % and sample from waste land have between 0.5 to 0.6 % and sample from Barren land have between 0.4 to 0.6 Organic Matter. These values represent average fertility of soils.
- f) Soil samples from agriculture land have concentration of Available Nitrogen values ranged between 456 to 992.9 kg/ha and samples from waste land have range between 382.3 to 467.9 samples from Barren land range between 117 to 166 kg/ha.
- g) Soil samples from Agriculture land have concentration of Available Phosphorous values ranged between 77.9 to 132 kg/ha, waste land values ranged between 40.3 to 46.5 kg/ha and Barren land have concentration values ranges from 21 to 35 kg/ha.
- h) Soil sample from agriculture lands have concentration of Available Potassium values range between 203 to 493.7 kg/ha, it have good concentration of available Potassium, whereas sample from waste land have concentration of Available Potassium values range between 112.7 to 134.8 kg/ha and sample from Barren lands concentration of Available Potassium as its values range between 72 to 97 kg/ha.
- i) Characteristic of Barren land and waste land soil is a little deficient in nutrients concentration. Whereas, agricultural land soil is moderately suitable for cultivation of climatic crops and have good fertility.

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The impacts on air quality due to source of the air pollutant in the proposed facilities have been identified.

Sources of Emissions

Emissions released from the stack during operation phase will get dispersed in the atmosphere and finally reach the ground at a specified distance from the sources. From the proposed activities the possible environmental impact on air quality has been envisaged due to the following sources.

Raw Material Handling / Transport System

The possible pollutants are fugitive dust emissions from raw materials handling areas viz. loading / unloading, fuel stockyard, crushing units etc. Raw materials will be fed to hopper with the help of pay-loader / tipper.

Mitigation Measures

M/s. Rajuri Steel Pvt. Ltd. shall provide dust suction system which will control fugitive emission due to material handling. Dust suppression system will be provided in the form of water sprinklers. All vibrating screens and weigh feeders below the hopper; day bins etc are totally covered to prevent leakages of dust. The entire length of conveyors is covered to prevent dust pollution. All bins are totally packed and covered so that there is no chance of dust leakage. All discharge and feed points wherever the possibility of dust generation is there is provided with dust suppression system. All material transfer points are connected with dust suppression water nozzles to avoid air pollution.

Wet scrubbers and Bag filters will be provided for the extraction of dust particles. The continuous casting operation is selected for the production of billets in induction furnace, where there is less attack on refractory lining, the changing need drastically comes down by 87%. This process results in the low gases emission.

Mitigation Measures

- Installation of Wet Scrubber followed by Stack of 30m height.
- The particulate matters and air borne metallic particles are generated from the transfer of molten steel to the mold and from the cutting of the product by oxy-fuel torches during continuous casting.
- Exhaust should be fitted to filters and other relevant abatement equipment, especially in the casting and finishing shops, wherever it is applicable.

Prediction of Air quality

Ground Level Concentration (GLC) of SPM has been calculated for multi-stack dispersion modelling using double Gaussian diffusion equation : IS 8829-1978 and as per 'Assessment of Impact to Air Environment : Guidelines for Conducting Air Quality Modelling' by CPCB, Delhi, (PROBES/70/1997-98). The predicted values in respect to PM₁₀, and NO_x were found to be below the Ambient Air Quality Standard of CPCB.

Impact on Water Environment

Operation phase

The total water requirement for the proposed activities is 198 m³/day. The wastewater generated from cooling purpose and Air Pollution Control Devices will be treated in settling tank and reused in process. The sewage generated from the toilets and bathroom of the proposed facility will be 17.6 m³/day which will be treated in Packaged Type STP and reused for gardening.

Impact on Noise Environment

Operation phase

During operation, the major noise generating sources are crushing mill, auto loading section, electric motors etc. These sources will be located far off from each other. Under any circumstances the noise level from each of these sources will not exceed 85 dB (A).

Noise levels generated in the project site will be confined to the noise generating plant units hence the impact of noise levels on surroundings will be insignificant.

Mitigation Measures

The noise levels stipulated by Central Pollution Control Board at any point of time will not exceed the standards. The equipments will have inbuilt noise control devices. The measured noise level produced by any equipment will not exceed 85 dB(A) at a distance of 1.0-m from its boundary in any direction under any load condition. The noise produced in valves and piping associated with handling compressible and incompressible fluids will be attenuated to 75 dB(A) at a distance of 1.0 m from the source by the use of low noise trims, baffle plate silencers/line silencers, acoustic lagging (insulation), thick-walled pipe work as and where necessary. The general mitigation for the attenuation of the noise are given below:

- ❖ By providing padding at various locations to avoid sharp noise due to vibration.
- ❖ Encasement of noise generating equipment where otherwise noise cannot be

controlled

- ❖ Providing noise proof cabins to operators where remote control for operating noise generating equipment is feasible.
- ❖ In all the design/installation precautions are taken as specified by the manufacturers with respect to noise control will be strictly adhered to;
- ❖ High noise generating sources will be insulated adequately by providing suitable enclosures;
- ❖ Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment
- ❖ Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- ❖ All the openings like covers, partitions will be designed properly
- ❖ Inlet and outlet mufflers will be provided which are easy to design and construct.
- ❖ All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Extensive vibration monitoring system will be provided to check and reduce vibrations. Vibration isolators will be provided to reduce vibration and noise wherever possible;
- ❖ The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Impact on Terrestrial ecology

The reserved forest in the study area is in patches. There is no designated ecological park or Bio Reserve/Wild life sanctuary in the 10 km radius of the proposed plant site. The impact on terrestrial ecology will be negligible and shall be insignificant.

SOLID WASTE

The solid waste generation in the proposed activities is given in following table.

Solid Waste Generation & Mitigation Measures

Sr. No	Waste	Existing Quantity TPM	Proposed Increase TPM	Total After Expansion TPM	Disposal
1	Slag	400	1000	1400	Hardening of working area, internal road and cement, brick manufacturers, concreting. Possibilities are being explored to use this slag for making internal village roads.
2	Tail Cuttings	300	750	1050	100 % Reused in Induction Furnace

The solid waste which will generate from the proposed project is tail cutting; this will be 1050 TPM and will be completely used in Induction furnace. The slag generated from induction furnace which is non-hazardous and non-toxic in nature, is being used for hardening of internal roads, working area, concreting and will continue the same after expansion. Slag generated 1400 TPM is crushed at site. Iron particles are separated by using magnetic separator. Crushed slag (Sand) is being used in hardening of working area.

Since slag contains 32- 34 % of iron it will be always feasible & economically viable to extract maximum iron. Magnetic Separator will be used to separate the iron. The slag crusher that will be installed will be capable of crushing slag to 2 mm.

Slag Analysis

Sr. no.	Parameter	Slag-sample	Concentration
1.	Iron (as Fe) mg/kg	32.13	-
2.	Arsenic (as As), PPM	<25	50
3.	Copper (asCu), mg/kg	9.6	5000
4.	Zinc (as Zn), mg/kg	7.4	20000
5.	Lead (as Pb), mg/kg	14.6	5000
6.	Nickel (as Ni), mg/kg	14.1	5000
7.	Trivalent Chromium (as Cr+3), mg/kg	7.8	5000
8.	Hexavalent Chromium (as Cr+6), mg/kg	8.9	50
9.	Boron (asB), mg/kg	4.6	-

Sr. no.	Parameter	Slag-sample	Concentration
10.	Mercury (as Hg), mg/kg	BDL	-
11.	Cynide (as CN), mg/kg	BDL	-

SOCIO-ECONOMIC ENVIRONMENT

Operation phase

The impacts of the proposed project, during its operation, on demography and socio-economic condition can be identified as follows.

- Negative impacts can be depletion of natural resources like water and land, depletion in air quality if proper mitigative measures are not taken.
- Increase in employment opportunities and Reduction in migrants to outside for employment.
- Growth in service sectors.
- During operation phase 500 technical and nontechnical people will be employed.
- Increase in consumer prices of indigenous produce and services, land prices, house rent rates and Labour prices.
- Improvement in socio-economic environment of the study area.
- Improvement in transport, communication, health and educational services.
- Increase in employment due to increased business, trade commerce and service sector.
- The overall impact on the socio economic environment will be significant.

The management of M/s Rajuri Steels Pvt. Ltd has proposed to give preference to local people for recruitment in semi skilled and unskilled categories.

ENVIRONMENT MONITORING PROGRAMME

The environmental monitoring is important to assess performance of pollution control equipment installed in the proposed expansion project of M/s. Rajuri Steel Private Limited. It is proposed to expand the existing capacity of M.S. Billets from 10,000 TPM to 35,000 TPM and TMT Bars from 10,000 TPM to 35,000 TPM. The sampling and

analysis of environmental attributes including monitoring locations will be as per the guidelines of the State Pollution Control Board.

Environmental monitoring will be conducted on regular basis by M/s. Rajuri Steel Private Limited to assess the pollution level in the proposed expansion plant as well in the surrounding area. Therefore, regular monitoring program of the environmental parameters is essential to take into account the environmental pollutant of the study area. The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments;
- To follow the trend of parameters which have been identified as critical;
- To check or assess the efficiency of the controlling measures;
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical due to the commissioning of proposed facilities;
- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures;
- To establish a database for future Impact Assessment Studies for new projects.

The attributes, which needs regular monitoring, are specified below:

- Air quality
- Water and wastewater quality;
- Noise levels;
- Soil quality;
- Ecological preservation and afforestation; and
- Socio Economic aspects and community development

ENVIRONMENT MANAGEMENT PLAN

The sources of air pollution are raw material handling system, materials transportation, raw materials feeding to the operating equipments. The automatic process equipments will be employed for the raw material feeding system. Stacks of adequate height of 30 m is proposed for proper dispersion of flue gases. The following Environmental Management Plan will be implemented to control air emissions from Induction Furnace.

Action Plan to Control and Monitor Secondary Fugitive Emissions from all the Sources

- Wet scrubbers and Bag Filters followed by a stack will be installed.
- Fugitive emission from material unloading operations, material transfer points will be controlled fully with total enclosure.
- Fugitive as well ambient air quality monitoring shall be carried out on regular basis to ensure the compliance with National Ambient Air Quality Standards (NAAQS). The ambient air quality within the factory premises shall not exceed the standards (PM_{10} $100\mu\text{g}/\text{m}^3$, $PM_{2.5}$ $60\mu\text{g}/\text{m}^3$, SO_2 $80\mu\text{g}/\text{m}^3$, NO_x $80\mu\text{g}/\text{m}^3$ and CO $04\mu\text{g}/\text{m}^3$) prescribed by CPCB.
- Regular Stack Monitoring will be done. All the emissions from the plant will be controlled to meet the relevant standard set by CPCB/State Pollution Control Board
- Details regarding volumetric flow, temperature and emission rate of pollutants from stacks shall be collected and compiled regularly
- Effective steps shall be taken to control fugitive emission inside the plant. All internal roads will be Tar Roads. Efficient arrangements will be provided to control fugitive dust emission during handling/transportation of Raw materials / finished product etc
- The emission from induction furnace area will be extracted and treated in a fume extraction system.
- Fumes will be evacuated directly from induction furnaces through hoods with swirling mechanism and ducting.
- Avenue plantation will be strengthen further to control fugitive emissions & gaseous pollutants to keep clean and healthy environment.

- During induction melting of steel scrap, lot of sparks gets generated. For the purpose of arresting sparks & flame, it is necessary to have a arrestor which arrests sparks. The device provided will be a centrifugal cyclone, which removes sparks and also collects coarser particles. The collected dust in the cyclone hopper can be drained periodically into a drum when the system is shut or a continuous motorized rotary air lock valve can be provided.

Noise Environment

- The industry will take care while procuring major noise generating machines/equipment to ensure that the manufactures have taken adequate measures to minimize generation of noise.
- The areas where noise levels are high will be partitioned off, noise levels will be minimized at the source, and noise reflection and transmission will be minimized.
- The workers working in the high noise areas will be provided with ear muffs/ear plugs.
- Acoustic laggings and silencers will be provided in equipment wherever necessary. Ventilation fans shall be installed in enclosed premises.
- Supply ducts and grills on the ventilation and air conditioning system will be suitably sized for minimum noise level.
- The silencers and mufflers of the individual machines shall be regularly checked
- The noise level shall not exceed the limit 75 dB (A) during the day time 70 dB (A) night time within the plant premises.
- Provision of insulating caps and lids at the exit of noise source and providing polystyrene, etc. as noise insulation material will be adopted. All the openings will be covered and partitions will be acoustically sealed.
- Avenue plantation around the plant area will reduce the noise level further. Training of personnel is recommended to generate awareness about damaging effects of high noise levels.

Water Environment

During plant operation no waste water will be generated from M.S. Billets and TMT Bars as the water is being used for cooling the products which will be evaporated and condensed, water if generated will be recycled. Provision for oil/grease separators will be made to skim oil / grease, if any in the waste water. After skimming of the oil, water will be stored in guard pond. Domestic waste will be disposed through Packaged STP of 20 m³/day.

Management Plan of Solid waste

- Process needs refractory lining and is being changed every month.
- Solid waste of slag generation will be about 1400 TPM after the expansion.
- Solid waste is non hazardous and non-toxic in nature.
- Solid waste will be use for land filled, in own premises.
- Tail Cuttings generation after expansion will be 1050 TPM and will be reused in the process.
- The slag which is generated during melting of scrap and sponge in induction furnace is mostly comprising of SiO₂ (silica) FeO (iron oxide) and Al₂O₃ (alumina). The analysis of slag is given in following table. These are fairly stable materials. Slag Crusher unit will be installed. After crushing slag is used for Hardening of working area, village internal roads.
- Since slag contains 32- 34 % of iron it will be always feasible & economically viable to extract maximum iron. Magnetic Separator will be used to separate the iron. The slag crusher that will be installed will be capable of crushing slag to 2 mm.

SOCIO-ECONOMIC ENVIRONMENT

The project proponent would aid in the overall social and economic development of the region. The plant will give employment to about 500 people of local area. In order to mitigate the adverse impacts likely to arise in the proposed project activities and also to minimize the apprehensions to the local people, it is necessary to formulate an affective EMP for smooth initiation and functioning of the project. The suggestions are given below:

- Communication with the local people will be established regular basis by project authority to provide an opportunity for local youth.
- Project authorities will undertake regular environmental awareness program on environmental management
- Job opportunities are the most demanding factor, the local people as per their education will be employed.
- For social welfare activities to be undertaken by the project authorities, collaboration should be sought with the local administration, gram panchayat, block development office etc for better coordination.

Occupational Safety & Health Management

Project proponent will provide all necessary provisions under Factory Act. In addition a Safety committee will be formed and manned by equal participants from Management and Workers. All personal protect equipments like Safety shoes, helmet & uniform will be issued to each employee based on the nature of job involved. In case a person inhales CO, he should be removed to fresh air and given mediated oxygen through a mask for 30 minutes and if required cardiopulmonary resuscitation should be performed.