ENVIRONMENTAL IMPACT ASSESSMENT REPORT

For

PROPOSED PROJECT
(Production of Sponge iron 1000 TPD, Captive Power 50 MW,
Billets 1000 TPD and / or TMT Bar 1000 TPD)

By

M/s. KAPILA METALS PVT.LTD.
At Additional MIDC, Phase –III,
Plot No: B-102 to 105, ,Dist : Jalna
Maharashtra

Prepared by

ULTRA-TECH
Environmental Consultancy & Laboratory
Recognized by MoEF&CC and NABET Accredited

November 2016
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EXECUTIVE SUMMARY (Generic ToR 1, Point No. 2)

Introduction (Generic ToR 1, Point No. 3 (i))

M/s Kapila Metals Pvt. Ltd. (KMPL)is a Medium Scale Industry, in secondary metallurgical sector. As per EIA Notification S. O. 1533 Sept 14, 2006, as amended thereafter the Project falls under entry 3(a), and 1(d) category "A" & "B" resp. It is proposed for production of Sponge iron 1000TPD, Captive Power 50 MW, Billets 1000TPDand / or TMT Bar 1000 TPD at plot admeasuring ~11.60 ha (1,16,000 m^2) at Additional MIDC, Phase –III, Plot No: B-102 to 105, , Dist : Jalna, Maharashtra

The projects covered under entry

Sponge iron	3(a) Category A
Captive Power Generation	1(d), Category B
Billets / TMT Bar	3(a) Category B

Location:

The project is located at Plot No: B-102 to 105, Dist: Jalna, Maharashtra

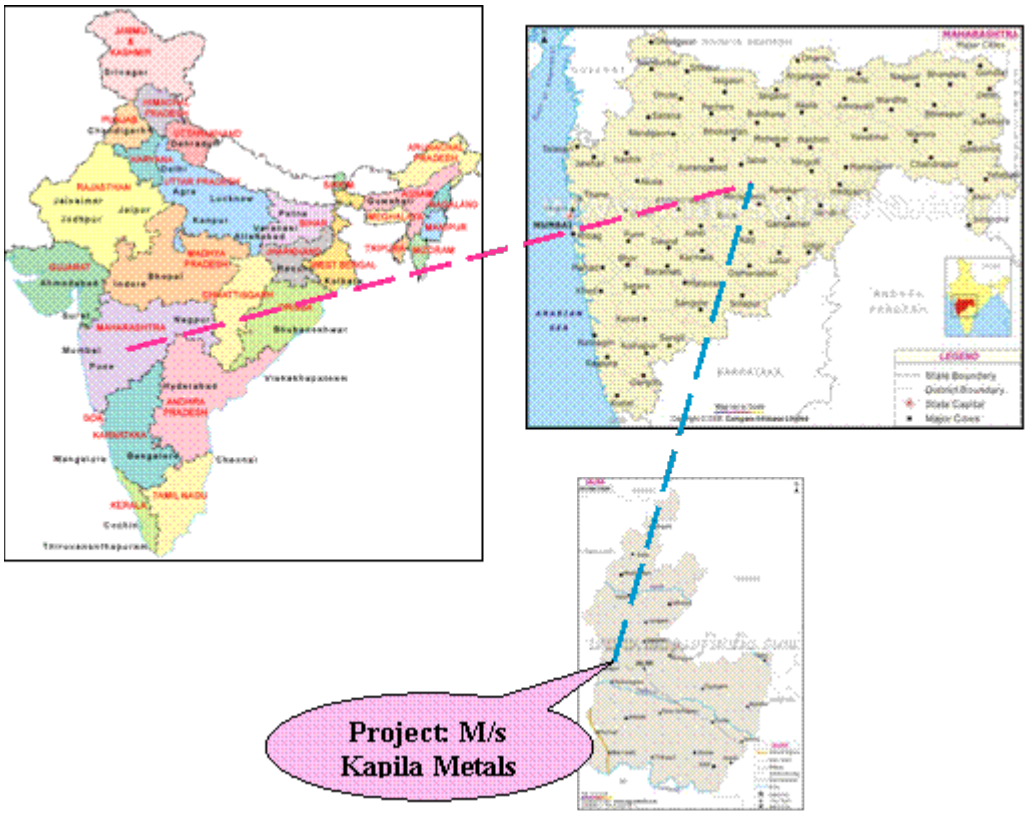


Figure: Location Plan

GEOGRAPHICAL LOCATION OF SITE:

- Latitude: Approx: 19°52'53.46"N
- Longitude: Approx: 75°48'50.51"E
- Nearest River- Kundalika 4.5 km
- Nearest Town-Jalna 06 km
- Nearest Railway Station Jalna 10 km
- Nearest State Highway Nagpur Mumbai 1.4 km

- No protected Areas / Critically Polluted areas / Eco- sensitive areas / inter-State boundaries within 15 km.

Figure 1: Google Image 10 km

The present plot utilization is as under:

Table 1: Area Utilization

Description	**Area in m^2**	**Area in ha.**
Total Plot Size	1,16,000	11.6
Total BUA	57,334	5.7
Green Belt	38,774	3.8
Parking Area	10,000 Remaining Parking area provision made at MIDC. Map attached.	1.0
Other miscellaneous	9892	0.9

Project details:

KMPL has planning to manufacture sponge iron by using iron ore and coal, M S Billet, TMT bar using Induction furnaces and the power generation from Waste Heat Recovery Boiler (WHRB), coal and dolochar. We propose to install three induction furnace of capacity 40 T (8 heats/day). The future raw material requirement is given in below Table:

Raw Materials (Generic ToR point No. 10)

Raw Material / ton of the product

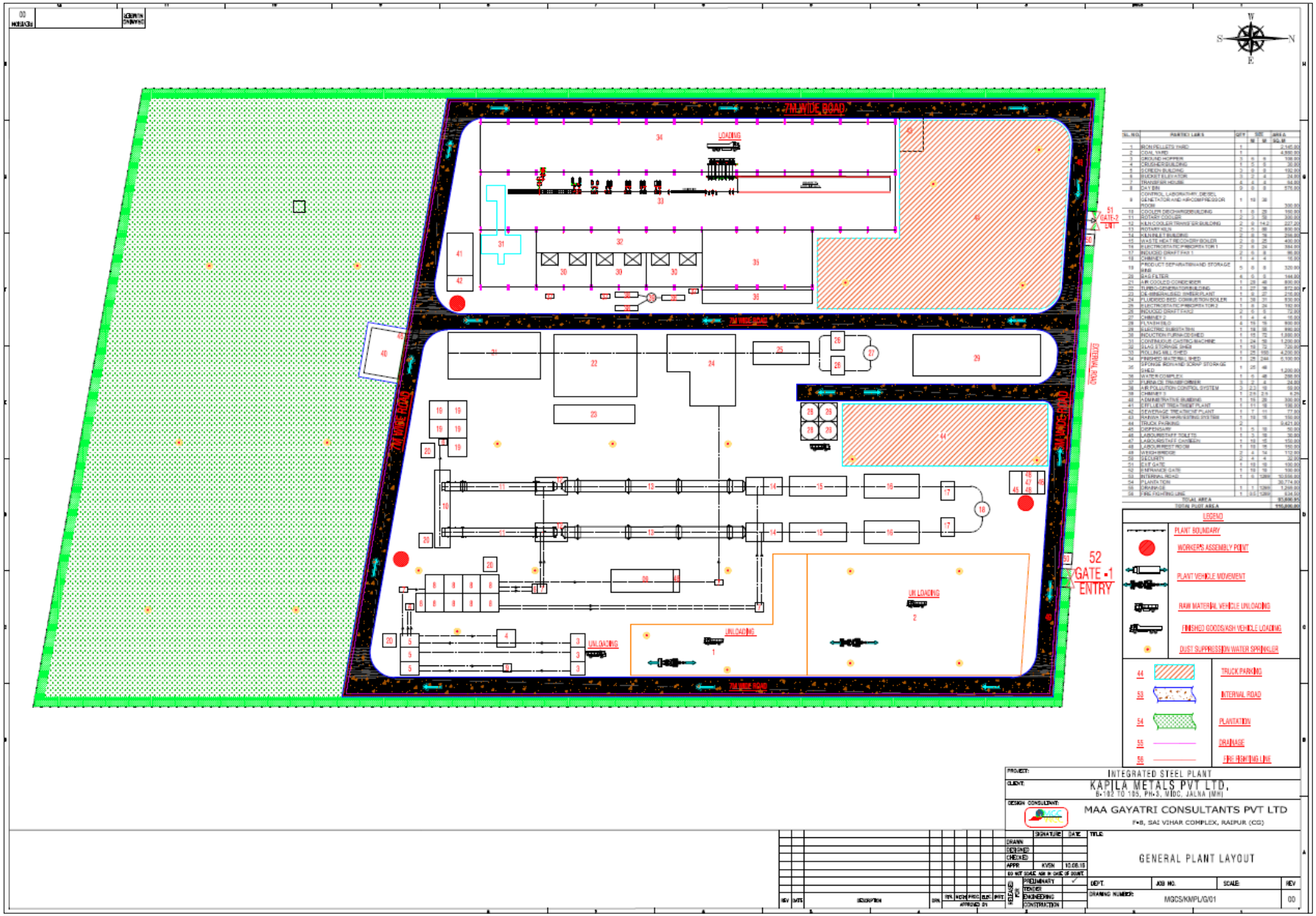
	Name	Quantity TPD
1	**For DRI (Sponge Iron)**	
i	Iron Ore pellets	1450
ii	Coal	1200
iii	Dolomite	50
2	**TMT Bars and billets**	
i	MS Scrap	100
ii	Sponge Ironpellets	1000
iii	Pig Iron	80
iv	Silico manganese	10
3	**For Power Plant**	
I	Dolochar + char	420
ii	Coal	350

Mode of Transportation will be by road

Table 2: Project at Glance

S No.	Description	Details
1.	Sponge iron CPP Billets, Angles, TMT Bar	1000 TPD 50 MW 1000 TPD
2.	Location	Additional MIDC, Phase –III, Plot No: B-102 to 105, dist: Jalna, Maharashtra
3.	Area m^2	1,16,000 (11.60 ha.)
4.	Built-Up Area m^2	57,334
5.	Furnace	3 Nos. 40 T each
6.	Furnace temperature ^{0}C	1600-1630 – Furnace, 1100- 1200- DRI kiln
7.	Stack	3 Nos.(80m 2 No. and 40m 1 Nos.)
8.	Pollution Control Equipment	3 ESP (2 for DRI, 1 for Boiler), Stack – 3 nos. 1) 1 for DRI 2) 1 for furnace 3) 1 for boiler
9.	Geographical location of site	Latitude: Approx: 19^{0}52’53.46” N Longitude: Approx:75^{0}48’50.51” E Nearest River-Kundalika 8.5 km Nearest Town-Jalna - 06 km Nearest Railway Station Jalna 10 km Nearest State Highway Nagpur Mumbai 1.4 km No protected, critically polluted, Eco sensitive, sanctuary/ forest area or interstate boundary within 15 km.
10.	Energy source	Electricity and CPP
11.	DG set Power kVA	750 kVA – 2 Nos.
12.	Power	58 MW MSEDCL and self
13.	Make up Water Requirement m^3/d	737
14.	Man Power	590
15.	Waste Water Treatment	Pre fabricated STP for sewage treatment and process effluent to ETP
16.	Investment Rs Cr.	540
17.	Litigation	No litigation pending against the project/any direction

Project Layout:



Process:

Sponge Iron:

- This process utilizes non-cooking coal as reducing agent along with lumpy rich grade iron ore.
- The reduction is carried out in an inclined horizontal rotary kiln, which rotates at a predetermined speed. A temperature profile ranging from 800-1050^0 C is maintained along the length of the kiln at different zones and as the material flows down due to gravity the ore is reduced.
- The hot reduced sponge iron along with semi-burnt coal, discharged from kiln is cooled in water-cooled cylindrical rotary cooler to a temperature of 100–200^0 C.
- The discharge from cooler consisting of sponge iron, char other contaminations are passed on through magnetic separators so that sponge iron can be separated from other impurities.

Captive Power:

Total 50 MW power will be generated from the project.

24 MW power will be generated from Waste heat recovery boiler and 26 MW from coal based power plant.

Billets &TMT Bars:

Raw material, basically iron scrap, is charged from the top of the furnace. Once charged to the capacity, the furnace is switched on. High current flows at a comparatively low voltage through the induction coils of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. The induced magnetic flux heats the scrap resulting in melting. The molten metal is circulated automatically by electromagnetic action so that when additions are made, a homogeneous product is ensured in minimum time. This hot billet will be transferred to the rolling mill, and rolled in various sizes.

Steel production using Induction furnace is basically low pollution process as no fuel, except electricity, is used in the process.

Baseline Monitoring:

We have conducted baseline monitoring for Air, water, soil & noise for various locations within 10 Km.

Air – 9 locations, results within the prescribed limit.

Surface Water: 8 locations, results are found to be satisfactory.

Ground Water: 8 locations, results are found to be satisfactory.

Soil: 9 locations

Noise: 9 locations, results within the prescribed limit.

Biological Environment:

Five stations each were surveyed for flora and fauna studies in the 10 km radius. The project site exhibits some varieties of plants like *Calatropisprocera, Cassia tora, Micheliachampaca,*

Cocosnucifera, etc. There is no aquatic body within the project site. 29 genera and 29 species from 20 families were found during field studies. None of these animals are endangered (Schedule I) as per Wildlife (Protection) Act 1972.

Socio Economic:

The data is collected and analysed using secondary sources viz. Census Reports, District Statistical Abstract etc. The 10 km radius area is known as the Study Area, and it consists of 31 villages, 1 town spread over the talukas of Badnapur and Jalna in the district. The demographic profile, infrastructure facilities and socio-economic condition is being described under different classifications.

Out of the total population of study area, 83.32% lives in urban regions and only 16.68% lives in rural areas of villages. In total 2,85,577 people lives in urban areas of which males are 147,092 and females are 30,075, whereas 57,183 people live in rural areas of which males are 30,075 and 27,108 are females.

Infrastructure:

Educational facilities, medical facilities, drinking water, road and rail connectivity are good.

Impact & mitigation measures:

Air Environment:

The air pollution caused by this industry is mainly from dust as SPM and fumes. The dust is due to the composition and handling of raw material and fumes are from furnace level as well as from ladle and roof level.

Pollution Control measures -- Air:

The air pollution is caused mainly by particulate matter and fumes during charging operation. 3 ESP, 3 Stack, air draft cooler; bag filter will be provided to minimize the air pollution.

Fugitive:

Fugitive emission will be controlled by:

- Regular water sprinkling
- Rubber tired trolleys for material handling
- Adopting layout to minimize manual material movement
- Tree plantation

Ground level concentrations (GLCs) have been predicted using AERMOD Cloud software. The application incorporates popular U.S. EPA air dispersion models AERMOD and ISCST3 into one integrated graphical interface. The model follows rural dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998).

Ambient air quality in study area w.r.t. PM, SO_2 and NOx is within NAAQS 2009 as seen. Hence, any significant impact is not envisaged within study area.

Water Environment:

Water is required for cooling water makeup and domestic purposes. Domestic wastewater is treated in STP (25 m^3/day) with overflow being used for green belt. Water from the process will be treated in ETP (5320 m^3/day)

Total water requirement will be 737 m^3/day

Pollution Control -- Water and Wastewater

Water Quality:

Total water requirement is 737 m^3/day, which will be provided by MIDC.

Water is required for cooling purpose and boiler. Only domestic wastewater will be generated in the project and it shall be treated in Sewage Treatment Plant. Treated water will be reused for landscaping after disinfection.

The water used for this plant will be made available by Jalna MIDC. Total water requirement is estimated at 737m^3/day. An application is be made to Jalna MIDC Water Works for the permission.

Mitigation:

As additional mitigation measures are as under:

- To spread awareness to the workers about the importance of water conservation.
- Shop-floor supervisors are encouraged for mopping up, dry collection and good house-keeping.

Solid Waste

The only solid waste produced by the induction furnace is about 170 MT slag per day. It will be used for road making and land leveling. In addition, office waste generated shall be disposed off to local authority.

Non Hazardous Solid Waste:

Solid Waste Details

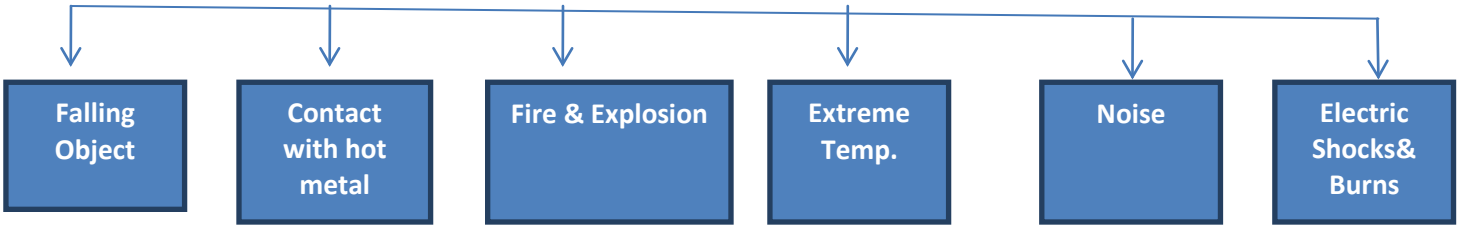
Sr. No.	Waste	Quantity	Disposal
1	Office waste	~50 kg/day	Dry waste mainly paper waste will be recycled
2	STP sludge	~1 kg/day	Own garden
3	Packing waste	Nominal	Sale, Recycle
4	Process waste- Ash	300-400 MTD	Will be sent to cement Industry
5	Slag	~170 MTD	Resale, Can be used for Building construction material, road making

(b) Hazardous Waste:
Empty oil drum shall be sold to recyclers.

Risk Assessment
Following safety measures are proposed:

- Limiting the vehicles speed within the premises to 15 km/hr.
- Raw materials other than scrap are brought in closed containers to minimize dust generation. No hooks shall be used for lifting bags. Cranes, tackles and forklift trucks shall be used for unloading and loading bags.
- Before storage all units are to be inspected for cleanliness and for damage.
- All bags are to be stacked on pallets.
- Dyke walls, smooth sloping floors provided around storage tanks.
- Use of PPE is mandatory for all floor personnel

Following scenario emerged during HAZOP and measures to make operations safe have been defined. Risk can be due to:



The use of process equipment, including machinery may result in accidents; some of these could be serious and fatal. The particular areas of concern include:

- Lack of guards or inadequate guards on machines that may lead to accidents caused by entanglement, sheering, crushing, trapping, etc.
- Insufficient strength of materials and improper design of machines,
- failure to provide the right information, instructions and training to operators using the equipment;

All power tools will be used with appropriate shields, guards and attachments and in accordance with the recommendations of the manufacturers.
Workers shall be trained in the use of power tools and safety requirements.

Disaster Management Plan and off-site emergency plan will be in place. Consulting Physician is available in case of emergency.
Environment Monitoring Program during construction and operational phase is given in Chapter 6.

Conclusion
The industry will manufacture steel TMT bars and/or structural which has good demand for infra-structural facilities in the region. The proposed project does not change the land use as the area falls in MIDC.

- This project will add to the waste reuse i.e. wealth from waste.
- Provide employment opportunity to local skilled man power
- Will improve socio-economic condition of the area
- Minimal air pollution and water pollution
- Green belt development

1 CHAPTER – INTRODUCTION

1.1 Introduction:

M/s Kapila Metals Pvt. Ltd. (KMPL) is a mini steel industry in secondary metallurgical sector. It proposes to produce

1. sponge iron 1000 TPD,
2. Power 50 MW,
3. Billets/TMT bars 1000 TPD,

at Additional MIDC, Phase –III, Plot No: B-102 to 105, , Dist : Jalna, Maharashtra

1.2 Size Location and Nature of the project:

Industry occupies a MIDC plot of about~11.60 ha (1,16,000 m^2). The Project falls under entry 3 (a), and 1(d) category "A" & "B". It proposes to produce Sponge iron 1000 TPD, Captive Power 50 MW, Billets 1000TPD, TMT Bar 1000 MTPD.
The projects covered under entry;

Table 2: Project Category Details

Sponge iron	3(a) Category A
Captive Power Generation	1(d), Category B
Billets, TMT Bar	3(a) Category B

It is planned to have 38,774 m^2 for green belt development.
The plant is accessible by all-weather road. The MIDC layout in Jalna is shown below.

Following facilities will be installed to produce billets/ingots:

1. Boiler
2. Induction furnace shed,
3. Transformer,
4. Laboratory,
5. Caster,
6. Rolling mill shade and
7. Off site facilities.

The plant is accessible by all-weather road. The MIDC layout in Jalna is shown in **Figure 1**.

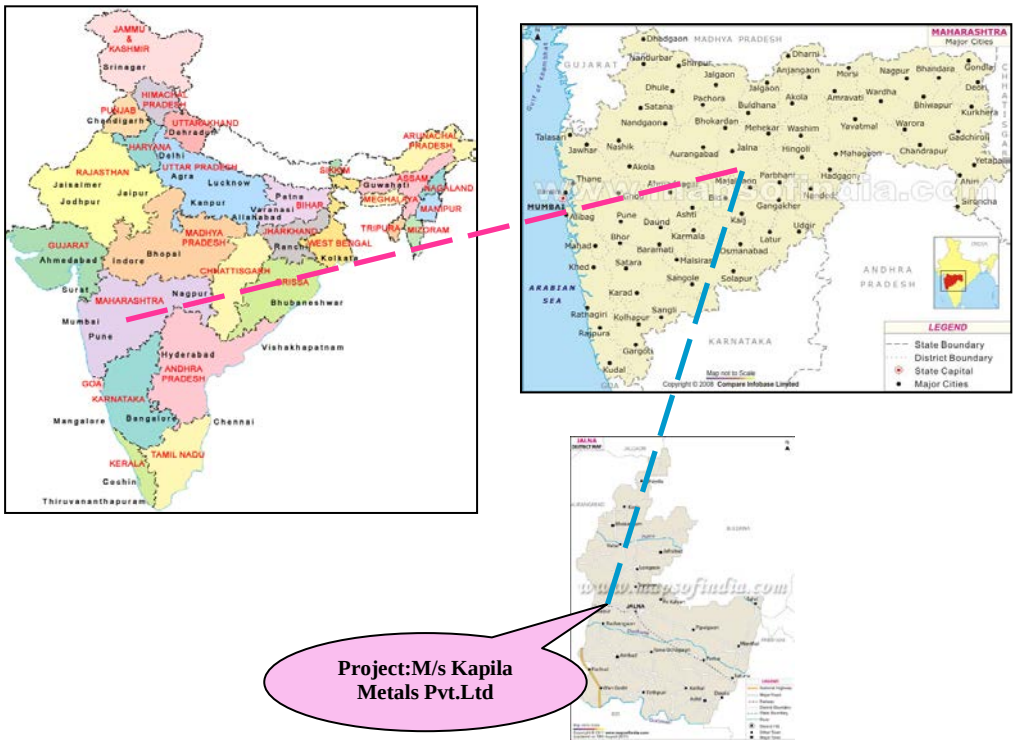
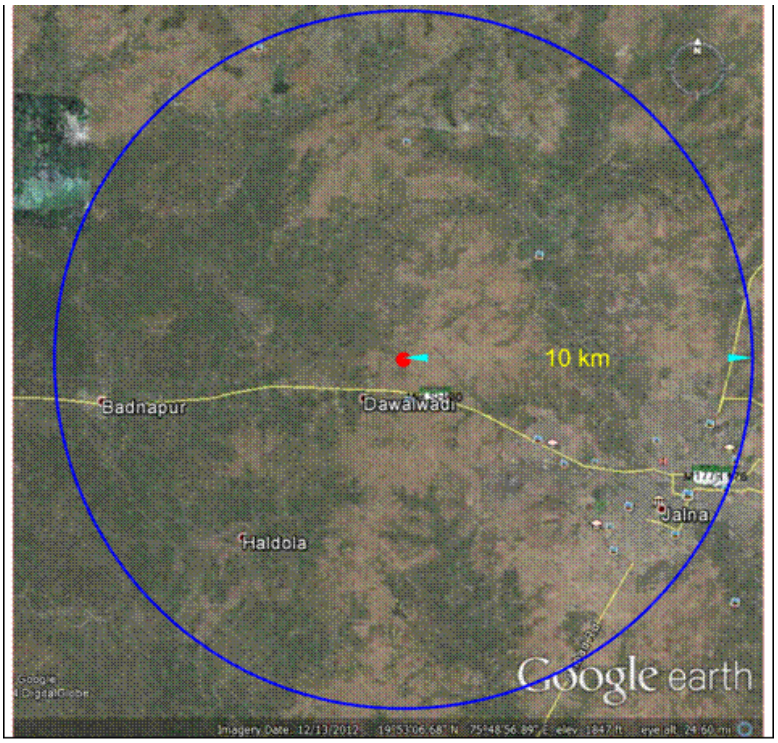


Figure 2: Location Map

1.3 Geographical location of site: (Generic ToR point 3 (iii, iv,v))

- Latitude: Approx: 19°52'53.46"N
- Longitude: Approx: 75°48'50.51"E
- Nearest River- Kundalika 4.5 km
- Nearest Town-Jalna - 06 km
- Nearest Railway Station Jalna 10 km
- Nearest State Highway Nagpur Mumbai 1.4 km
- No protected Areas / Critically Polluted areas / Eco- sensitive areas / inter-State boundaries/ sanctuaries/forest within 15 km.



1.4 ToR Compliance

The proposed project was appraised by the Expert Appraisal Committee, (EAC (I)) in meeting of Dec 11-12, 2014 and granted TOR for the project. Table below describes the ToR points and compliance:

Sr. No.	ToR Description	Covered in
1	Details of the EIA Consultant including NABET accreditation (including sector details and whether A/B and Accreditation No. shall be provided on the cover the EIA-EMP Report as well as in the Hard Copies of the presentation made before the Expert Appraisal Committee. Copy of NABET Accreditation for the period of preparation until submission of the EIA-EMP Report to MOEF&CC and for presentation made before the EAC should be provided in the Annexes. If more than one consultant has been engaged, details thereof, including details of NABET accreditation as mentioned above.	Chapter 10
2	Executive summary (maximum 8-10 sheets in A4 size paper) of the project covering project description, description of the environment, anticipated environmental impacts & its mitigation measures, environmental management plan, environmental monitoring program, public consultation, project benefits, Social impacts including R&R.	--
3	Site Details	
i	Location of the project site covering village, Taluka/ Tehsil, district and State on map of 1:1000,000 scale.	Chapter 1 (1.3)
ii	A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet	Chapter 3 (3.6)
iii	Co-ordinates (lat-long) of all four corners of the site.	Chapter 1 (1.3)

Sr. No.	ToR Description	Covered in
iv	Google map-Earth downloaded of the project site.	Executive Summary (fig.1)
v	A map showing environmental sensitivity [land use/land cover, water bodies, reserved forests, wildlife sanctuaries, national parks, tiger reserve etc.] and from critically/ severely polluted area(s) and Eco-sensitive Areas within 10km radius of the project site vis-à-vis shortest (aerial) distance from the project. If the project is located within 10km of CPAs/severely Polluted Areas, confirm whether moratorium has been imposed on the area.	Chapter 1 (1.3)
vi	Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. In addition, if located within an Industrial area/Estate/Complex, layout of Industrial Area and location of unit within the Industrial area/Estate/Complex, layout of Industrial Area.	Chapter 2 (Fig.7) LO indicating green belt, storage, utilities etc.
vii	Photographs of the proposed and existing (if applicable) plant site. If existing, in addition to site map, provide photographs of plantation/greenbelt in the existing project. If fresh EC application, photographs	Chapter 2 (Fig.8) Photos provided.
4	Landuse break-up of total land of the project site (identified and acquired) – agricultural, forest, wasteland, water bodies, settlements, etc shall be included.	Chapter 3 (3.6.1)
5	A copy of the mutual agreement for land acquisition signed with land oustees.	Annexure
6	Proposal shall be submitted to the Ministry for environment clearance only after acquiring at least 60% of the total land required for the project. Necessary documents indicating acquisition of land shall be included.	Annexure
7	<u>Forest and wildlife related issues:</u>	
i	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department.	NA
ii	Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forest land (*in case of projects involving forest land more than 40 ha)*	Chapter 3 (3.6)
iii	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.	NA
iv	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	Chapter 1 No ecologically sensitive area in 10 km
v	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area	Not Applicable
vi	Copy of application submitted for clearance under the Wildlife	Not Applicable

Sr. No.	ToR Description	Covered in
	(Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife	
8	Expansion/modernization proposals:	
I	Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing *I*existing operation of the project from SPCB shall be attached with the EIA-EMP report.	Not Applicable
ii	In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.	Not Applicable
9	Details of Industrial Operations: A list of major industries with name and type within study area (10km radius) shall be incorporated.	Chapter 7 (7.5), Similar industries operating
10	Details of proposed raw materials and products along with production capacity. If expansion project, details for existing unit, separately for existing and new (proposed) unit	Chapter 2 (2.1.1)
11	Details of manufacturing process, major equipment and machinery. If expansion project, details of existing unit, separately for existing and new (proposed) unit.	Chapter 2 (2.1)
12	List of raw materials required and its source along with mode of transportation shall be included. All the trucks for raw material and finished product transportation must be "Environmentally Compliant"	Chapter 2 (2.1.1)
13	Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished	
14	Project site layout plan to scale using AutoCAD showing raw materials, fly ash and other storage plans, bore well or water storage, aquifers (within 1 km) dumping, waste disposal, green areas, water bodies, rivers/drainage passing through the project site shall be included.	Chapter 2 (Fig.7)
15	Manufacturing process details of all the plants including captive power plant if any along with process flow chart shall be included.	Chapter 2 (2.1,2.1)
16	Mass balance for the raw material and products shall be included.	
17	Energy balance data for all the components of the plant shall be incorporated.	
18	Geological features and Geo-hydrological status of the study area shall	Chapter 3 (3.7)

Sr. No.	ToR Description	Covered in
	be included.	
19	Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of RL of the project site and mRL of the river shall also be provided.	Chapter 3 (3.7)
20	If the site is within 1 km radius of any major river, Flood Hazard Zonation Mapping is required at 1:5000 to 1:10,000 scale indicating the peak and lean River discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years.	Not Applicable
21	One season site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall. AAQ data (except monsoon) at 8 locations for PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO and HC (methane & non- methane) shall be collected. The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16th November, 2009 and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.	Chapter 3 (3.2.1)
22	Determination of atmospheric inversion level at the project site and assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ.	Chapter 4 (4.2)
23	Surface water quality including trace elements of nearby River (60m upstream and downstream) and other surface drains at eight locations to be provided.	Chapter 3 (3.3)
24	Ground water monitoring including trace elements at minimum at 8 locations shall be included.	Chapter 3 (3.3)
25	Noise levels monitoring at 8 locations within the study area.	Chapter 3 (3.5.1)
26	Coal Characteristics – of indigenous and imported coal to be used in the project in terms of Calorific value, ash content and Suplhur content.	Chapter 2 (2.1.1)
27	Traffic study of the area for the proposed project in respect of existing traffic, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc	Chapter 7 (7.6)
28	Detailed description on flora and fauna (terrestrial and aquatic) exists in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.	Chapter 3 (3.8.1)
29	Emissions (g/second) with and without the air pollution control measures.	Chapter 4 (4.2)
30	Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details	Chapter 4 (4.2)

Sr. No.	ToR Description	Covered in
	of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any	
31	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.	Chapter 4 (4.2)
32	Details of water requirement, water balance chart for new unit or for existing unit as well as proposed expansion (in case of expansion).	Chapter 4 (4.3)
33	Source of water supply and quantity and permission of withdrawal of water (surface/ground) from Competent Authority.	Chapter 4 (4.3)
34	Details regarding quantity of effluents generated, recycled and reused and discharged to be provided. Methods adopted/to be adopted for the water conservation shall be included. Zero discharge effluent concepts to be adopted.	Chapter 4 (4.3.1)
35	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.	Chapter 4 (4.3)
36	Action plan for control of ambient air quality parameters as per NAAQM Standards for PM_{10}, $PM_{2.5}$, SO_2 and NO_X, etc as per GSR 826(E) dated 16th November, 2009.	Chapter 4 (4.1)
37	An action plan to control and monitor secondary fugitive emissions from all the sources as per the latest permissible limits issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008	Chapter 4 (4.1)
38	Action plan for solid/hazardous waste generation, storage, utilization and disposal. Copies of MOU regarding utilization of solid waste shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.	Chapter 4 (4.4.1)
39	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 1999 and subsequent amendment in 2003 and 2009. A detailed plan of action shall be provided.	Chapter 4 (4.4.1)
40	Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated. All rooftops/terraces shall have some green cover.	Chapter 4 (4.5)
41	Action plan for rainwater harvesting measures at plant site shall be	Chapter 4 (4.3.2)

Sr. No.	ToR Description	Covered in
	submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources. Rain water harvesting and groundwater recharge structures may also be constructed outside the plant premises in consultation with local Gram Panchayat and Village Heads to augment the ground water level. Incorporation of water harvesting plan for the project is necessary, if source of water is bore well.	
42	Environment Management Plan (EMP) to mitigate the adverse impacts due to the project along with item wise cost of its implementation. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	Chapter 6 (6.2)
43	Details of Rehabilitation & Resettlement (R & R) involving the project. R&R shall be as per policy of the State Govt. and a detailed action plan shall be included.	Chapter 7 (7.5)
44	Action plan for post-project environmental monitoring shall be submitted.	Chapter 6 (6.2)
45	Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control needs to be addressed and included.	Chapter 7 (7.3)
46	Occupational health:	
i	Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,	Chapter 7 & Annexure
ii	Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.	Chapter 7 (7.2)
iii	Annual report of heath status of workers with special reference to Occupational Health and Safety.	Chapter 7 (7.2)
iv	Action plan for the implementation of OHS standards as per OSHAS/USEPA.	Chapter 7 (7.2)
v	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.	Chapter 7
47	Corporate Environment Policy	Chapter 7 (7.3)
	i) Does the company have a well laid down Environment Policy	

Sr. No.	ToR Description	Covered in
	approved by its Board of Directors? If so, it may be detailed in the EIA report. Ii) Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	
48	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.	Chapter 7 (7.2)
49	At least 5 % of the total cost of the project shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.	Chapter 8 (8.2)
50	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	No
51	The questionnaire for industry sector (available on MOEF website) shall be submitted as an Annexure to the EIA-EMP Report.	Attached as Annexure
52	'TORs' prescribed by the Expert Appraisal Committee (Industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. Where the documents provided are in a language other than English, an English translation shall be provided. The draft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing/public consultation, district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be	Noted

Sr. No.	ToR Description	Covered in
	included separately in EIA-EMP Report in a separate chapter and summarised in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance.	
53	A tabular chart with index for point wise compliance of above TORs.	Chapter 1
54	Name of the Consultant and the Accreditation details shall be printed on the cover page of the EIA-EMP Report in the Introduction as well as on the cover of the Hard Copy of the Presentation material for EC presentation as per requirements in TOR condition No. (1).	Chapter 10
55	The TORs prescribed shall be valid for a period of two years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated).	Noted
	ADDITIONAL TORS FOR INTEGRATED STEEL PLANT	
1	Iron ore/coal linkage documents along with the status of environmental clearance of iron ore and coal mines	Attached annexure
2	Quantum of generation of coal and iron ore from coal & iron ore mines and the projects they cater to	Chapter 2
3	For Large ISPs, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.	Chapter 4
4	Recent land-use map based on satellite imagery. High-resolution satellite image data having 1m- 5m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc. for the 10 Km radius area from proposed site. The same shall be used for land used/land-cover mapping of the area.	Chapter 3
5	Repairable Suspended particulate matter (RSPM) present in the ambient air must be analysed for source analysis – natural dust/RSPM generated from plant operations (trace elements). The RSPM shall also be analysed for presence of poly-aromatic hydrocarbons (PAH), i.e. Benzene soluble fraction, where applicable. Chemical characterization of RSPM and incorporating of RSPM data.	NA
6	All stock piles will have to be on top of a stable liner to avoid leaching of materials to ground water.	Noted
7	Plan for the implementation of the recommendations made for the steel plants in the CREP guidelines must be prepared.	Noted

1.5 8th EAC Compliance

During 8th EAC meeting following points were raised:

Sr. o.	MOM	Covered In
1	The layout plan was not to the scale and there is no provision of parking for vehicles in the layout plan. The Internal circulation roads are not oriented properly	Covered in executive summary & chapter 2

2	The green belt suggested in EIA report is also on adhoc basis which should be planned as per the guideline of CPCB	Covered in executive summary & chapter 2
3	The Effluent discharge standards were also incorrect	Chapter 2
4	The water balance statement and Air quality data and analysis is also vague	Chapter 2 & 3

2 CHAPTER - PROJECT DESCRIPTION

2.1 Process Description: (ToR point No. 11, 15)

2.1.1 List of Raw Material:

Raw Materials (Generic ToR point No. 10, 12 & Addl.TOR Point No.1 & 2)

	Raw Material / ton of the product	
	Name	**Quantity TPD**
1	**For DRI (Sponge Iron)**	
i	Iron Ore pellets	1450
ii	Coal	1200
iii	Dolomite	50
2	**TMT Bars and billets**	
i	MS Scrap	100
ii	Sponge Ironpellets	1000
iii	Pig Iron	80
iv	Silico manganese	10
3	**For Power Plant**	
I	Dolochar + char	420
ii	Coal	350
	Mode of Transportation will be by road	

Coal Characteristics: (Generic ToR point No. 26) B to F grade coal will be used.

S. No.	Description	B grade coal (sponge iron)	F grade coal (power plant)
1)	Carbon content	45 %	30%
2)	Moisture	6-10 %	7-8%
3)	Volatile matter	20-30 %	17 %
4)	Ash	15-40 %	7 %
5)	Sulphur content	7-8 %	0.5 %

2.1.2 **Process Description of DRI (Sponge Iron) SL/RN Process:**

Generally in any sponge iron process, reduction is conducted in a refractory lined rotary kiln. The kiln of suitable size, generally inclined at 2.5 % slope rest on two-four support stations, depending on the kiln size. The transport rate of materials through the kiln can be controlled by varying its slope and speed of rotation. There are inlet and outlet cones at opposite ends of the kiln that are cooled by individual fans. The kiln shell is provided with small sampling ports, as well as large ports for rapid removal of the contents in case of emergency or for lining repairs. The longitudinal positioning of the kiln on its riding rings is controlled hydraulically.

The coal and iron ore are metered into the high end of the inclined kiln. A portion of the coal is also injected pneumatically from the discharge end of the kiln. The burden first passes through a pre-heating zone where coal de-volatilization takes place and iron ore is heated to pre-heating temperature for reduction.

Temperature and process control in the kiln are carried out by installing suitable no. of air injection tubes made of heat-resistant steel spaced evenly along the kiln length and countercurrent to the flow of iron ore. Tips of the air tubes are equipped with special internal swirlers to improve uniformity of combustion.

A central burner located at the kiln discharge end is used with LDO for heating the cold kiln. After initial heating, the fuel supply is turned off and the burner is used to inject air for coal combustion.

The kiln temperatures are measured with fixed thermocouples and Quick Response Thermocouples (QRT). Fixed thermocouples are located along the length of the kiln so that temperatures at various sections of the kiln can be monitored. Fixed thermocouples, at times may give erratic readings in case they get coated with ash, ore or accretion. In such cases QRT are used for monitoring the kiln temperatures.

The product (DRI) is discharged from the kiln at about 900 to 1000°C. An enclosed chute at the kiln discharge end transfers the hot DRI to a rotary cooler. The cooler is a horizontal revolving cylinder of appropriate size. The DRI is cooled indirectly by water spray on the cooler upper surface. The cooling water is collected in troughs below the cooler and pumped to the cooling tower for recycling along-with make-up water.

Solids discharged to the cooler through an enclosed chute are cooled to about 100°C. without air contact. A grizzly in the chute removes accretions that are large to plug up or damage the cooler discharge mechanisms. The undersize – a mix of DRI, dolo char and coal ash are screened into +/- 3mm fractions. Each fraction passes through a magnetic separator. The non-magnetic portion of the plus 3mm fraction is mostly char and can be recycled to the kiln if desired. The non-magnetic portion of – 3mm fraction mostly spent lime, ash and fine char is discarded. The magnetic portion of each fraction is DRI. The plus 3mm fraction can be used directly for steel making and the finer fraction can be briquetted / collected in bags.

The kiln waste gases at about 850-900°C pass through a dust settling chamber where heavier dust particles settle down due to sudden decrease in velocity of gases. The flue gases then pass through an after burning. The flue gases after the after burning chamber pass through an elbow duct to waste heat boiler where sensible heat of the gases is extracted. The gas is then let off into the atmosphere after passing through pollution control equipment like ESP, ID fan and stack.

Reaction mechanism

There are two major temperature zones in the kiln. The first pre-heat zone is where the charge is heated to 900 – 1000°C. The second metallization zone is held fairly constant at 1000-1050°C.

The charge into the kiln consists of a mixture of iron oxide lump, fluxes such as limestone and/or dolomite (amount depending of sulfur content of the coal) and medium volatile non-coking coal. In the pre-heating zone, the moisture is driven off first, and then the hydrocarbons and hydrogen evolve by thermal decomposition of the coal.

As the combustible gases rise from the bed of solid material, a portion of the gases is burnt in the free board above the bed by controlled quantities of air introduced through the air tubes. As the kiln

rotates, the primary mode of heat transfer is by radiation to the tumbling charge and subsequently by internal solids mixing and renewal of the exposed bed surface.

In the pre-heat zone, the reduction of iron oxide proceeds only to ferrous oxide (FeO) (Equation I).

$Fe_2O_3 + CO = 2\ FeO + CO_2$ ..... (I)

Final reduction to metallic iron occurs in the metallization zone by reaction of CO with FeO to form CO_2 and metallic iron (Equation II).

$FeO + CO = Fe + CO_2$ ..... (II)

Most of the CO_2 reacts with the excess solid fuel in the kiln and is converted to CO according to the Boudouard reaction (Equation III).

$CO_2 + C = 2\ CO$ ..... (III)

Coals with higher reactivity are preferred as they provide rapid conversion of CO_2 to CO, thereby maintaining reducing conditions in the kiln metallization zone. The highly endothermic reaction of coal with CO_2 prevents the bed from over heating and attaining high temperature that could lead to melting or sticking of the charge.

DRI Plant Process Flow Diagram

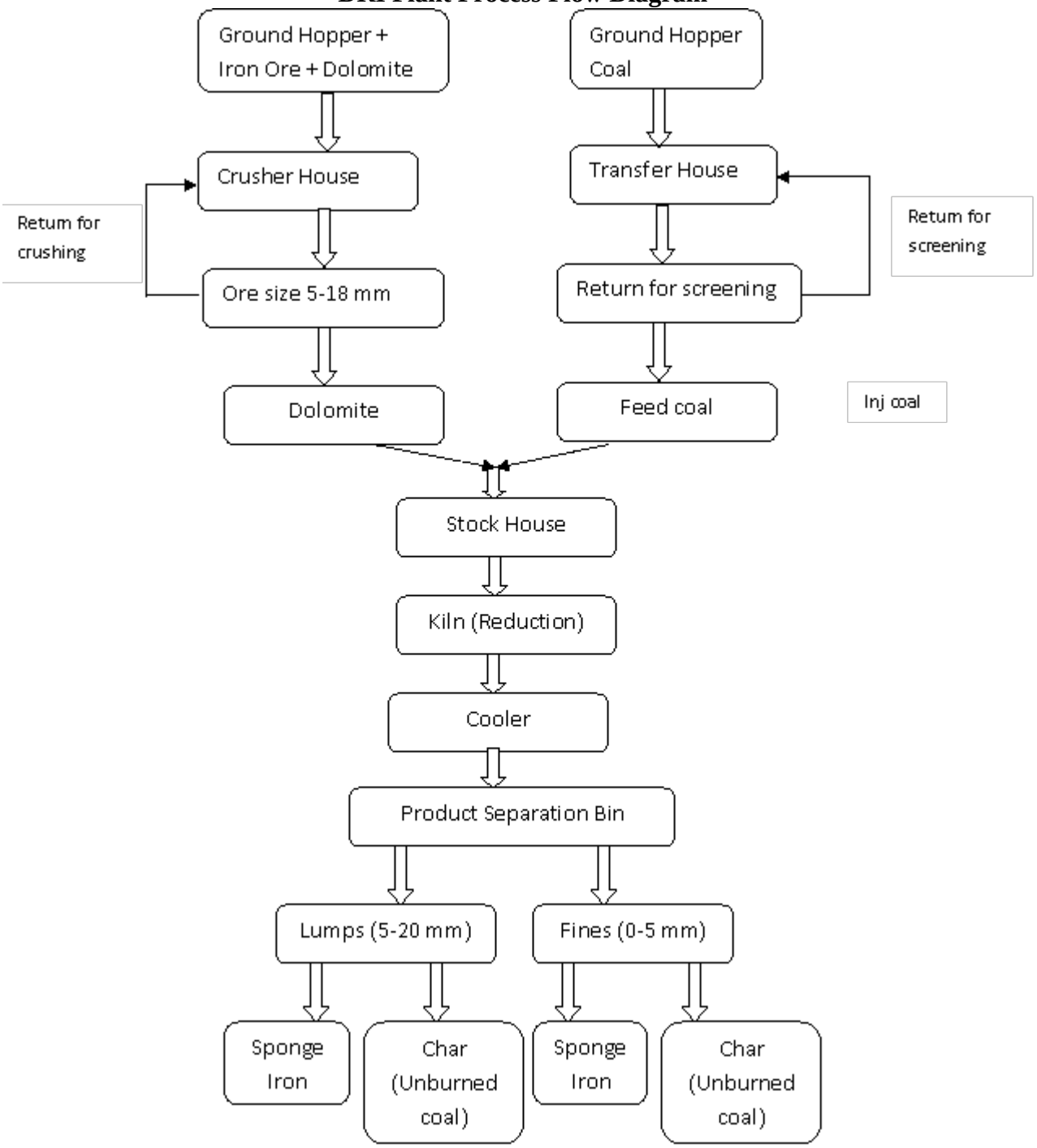


Figure 3: Sponge Iron Production

2.1.3 **Process Description for Billet Production:**

The greatest advantage of the Induction Furnace is its low capital cost compared with other types of Melting Units. Its installation is relatively easier and its operation simpler. Among other advantages, there is very little heat loss from the furnace as the bath is constantly covered and there is practically no noise during its operation. The molten metal in an Induction Furnace is circulated

automatically by electromagnetic action so that when alloy additions are made, a homogeneous product is ensured in minimum time. The time between tap and charge, the charging time, power delays etc. are items of utmost importance are meeting the objective of maximum output in tones/hour at a low operational cost. The process for manufacturing steel may be broadly divided into the following stages:

- Melting the charge mixed of steel & Iron scrap.
- Ladle teeming practice for Casting (OR)
- Direct teeming practice for Ingot Casting unloadable teeming machine.

(i) Melting the charge

The furnace is switched on, current starts flowing at a high rate and a comparatively low voltage through the induction coils of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. The induced magnetic fluxes thus generated out through the packed charge in the crucible, which is placed centrally inside the induction coil.

As the magnetic fluxes generated out through the scraps and complete the circuit, they generate and induce eddy current in the scrap. This induced eddy current, as it flows through the highly resistive bath of scrap, generates tremendous heat and melting starts. It is thus apparent that the melting rate depends primarily on two things (1) the density of magnetic fluxes and (2) compactness of the charge. The magnetic fluxes can be controlled by varying input of power to the furnace, especially the current and frequency.

In a medium frequency furnace, the frequency range normally varies between 150-10K cycles/second. This heat is developed mainly in the outer rim of the metal in the charge but is carried quickly to the center by conduction. Soon a pool of molten metal forms in the bottom causing the charge to sink. At this point any remaining charge mixed is added gradually. The eddy current, which is generated in the charge, has other uses. It imparts a molten effect on the liquid steel, which is thereby stirred and mixed and heated more homogeneously. This stirring effect is inversely proportional to the frequency of the furnace and so that furnace frequency is selected in accordance with the purpose for which the furnace will be utilized.

The melting continues till all the charge is melted and the bath develops a convex surface. However as the convex surface is not favorable to slag treatment, the power input is then naturally decreased to flatten the convexity and to reduce the circulation rate when refining under a reducing slag. The reduced flow of the liquid metal accelerates the purification reactions by constantly bringing new metal into close contact with the slag. Before the actual reduction of steel is done, the liquid steel which might contain some trapped oxygen is first treated with some suitable deoxidizer. When no purification is attempted, the chief metallurgical advantages of the process attributable to the stirring action are uniformity of the product, control over the super heat temperature and the opportunity afforded by the conditions of the melt to control de-oxidation through proper addition.

As soon as the charge has melted and de-oxidizing ions have ceased, any objectionable slag is skimmed off, and the necessary alloying elements are added. When these additives have melted and diffused through the bath of 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 ladle. As soon as pouring has ceased, any slag adhering to the wall of the crucible is rapped out and the furnace is readied for charging again.

As the furnace is equipped with a higher cover over the crucible very little oxidation occurs during melting. Such a cover also serves to prevent cooling by radiation from the surface heat loss and protecting the metal is unnecessary, though slags are used in special cases. Another advantage of the induction furnace is that there is hardly any melting loss compared with the arc furnace.

(ii) Ladle Teeming Practice

The molten metal from crucible taken out in a ladle by tilting the crucible and crucible is made free for further charge of next batch.

(iii) Direct Teeming Practice

In addition to the bottom pouring Ladle Teeming process, Direct Teeming process can also be used as and when required. Direct teeming of liquid metal from induction furnace to mould assemble is another process of the Billet casting practice. In this process the mould assemble comprising bottom plate; Billet mould and trumpet properly lined with refractories are placed on top of a rail bound transfer trolley moving across in front of the crucible which is supported properly from the furnace structure.

While teeming the mould bogie transfer car is so positioned that the trumpet of the mould assembly is properly aligned with the outlet nozzle of the tundish. The liquid metal from the spout is directed through the tundish to the trumpet for casting of Billets. After the teeming is over, the car is moved aside for stripping and removal of Billets. Normally two (2) such transfer cars are provided. While one is engaged for casting purposes the other is kept ready for next melt. Direct teeming practice obviates the use of stopper sleeve, stopper head and ladle refractory and requires only a nominal quantity of refractory for lining the tundish and thus affects substantial savings in refractory costs.

CONTINUOUS CASTING MACHINE

The molten steel from the IF or the ladle metallurgical facility is cast in a continuous casting machine (6/11 2 stand Billet Caster) to produce cast shapes including billets. In some processes, the cast shape is torch cut to length and transported hot to the hot rolling mill for further processing. Other steel mills have reheat furnaces. Steel billets are allowed to cool, and then be reheated in a furnace prior to rolling the billets into bars or other shapes.

Castings operations consist of following: -

- Preparation.
- Match Plates (Patterns)
- Preparation of Moulds
- Pouring of molten steel into prepared moulds
- Solidification of molten steel
- Knocking of moulds
- Removal of runners & risers.
- Finishing of castings/Ingots

1. The process is continuous because liquid steel is continuously poured into a 'bottomless' mould at the same rate as a continuous steel casting is extracted.
2. Before casting begins a dummy bar is used to close the bottom of the mould.
3. A ladle of molten steel is lifted above the casting machine and a hole in the bottom of the ladle is opened, allowing the liquid steel to pour into the mould to form the required shape.
4. As the steel's outer surface solidifies in the mould, the dummy bar is slowly withdrawn through the machine, pulling the steel with it.
5. Water sprays along the machine to cool/solidify the steel.
6. At the end of the machine, the steel is cut to the required length by gas torches

Induction Furnace& Concast Plant

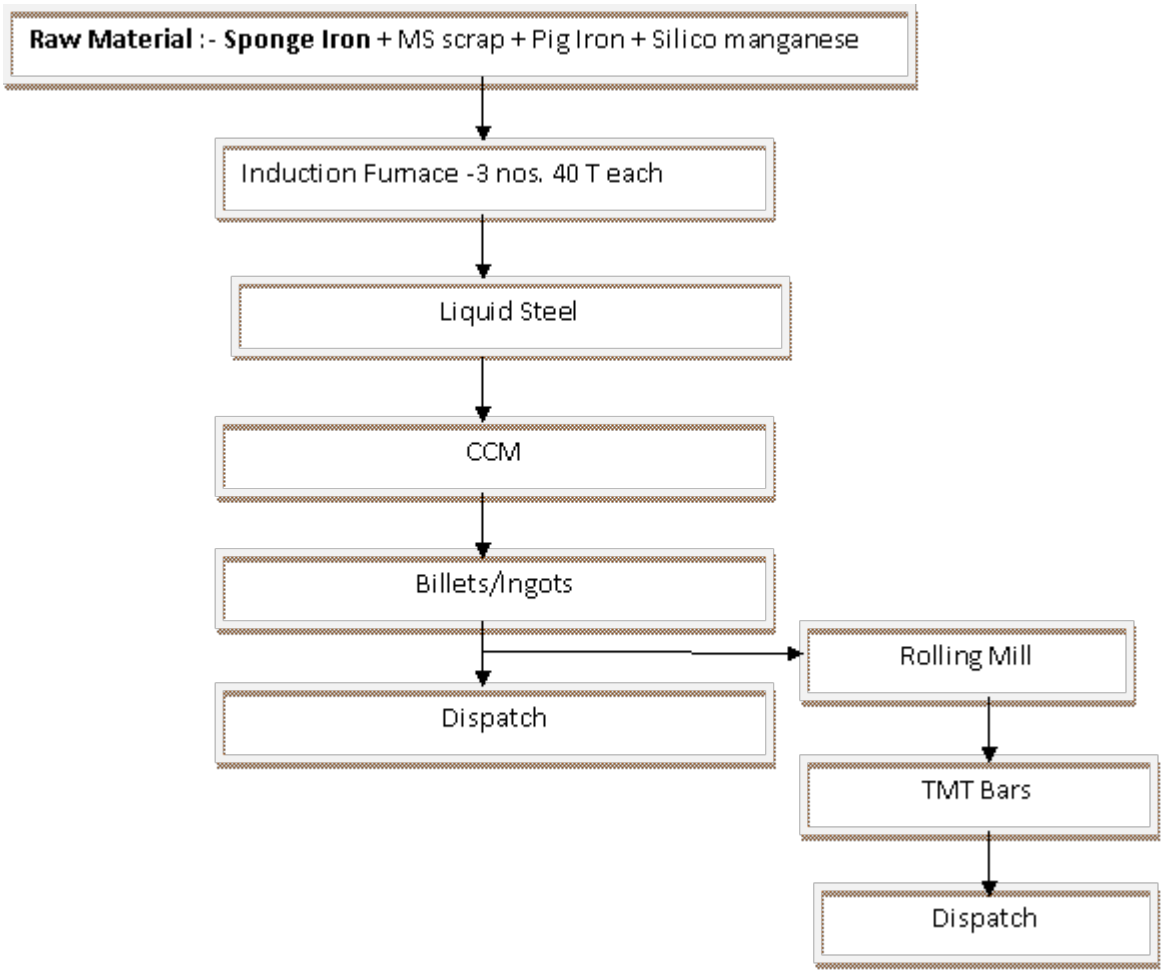


Figure 4: Billets Production

2.1.4 Manufacturing Process of Rolled Products:

<u>The process of rolling involves several steps: -</u>

1. Shearing and preparing.
2. Rolling.
3. Quality Control.
4. Dispatch.

The raw material for the proposed unit is billet bloom, slab etc are collected from Billet Caster. The material passed for rolling will be hot-charged to rolling stands. Basically, the heating operation is intended to raise as uniformly as possible, the temperature of the ingot/billet/blash etc., to the level appropriate for hot rolling. Optimum temperature for rolling semi-finished products depends upon their compositions. Preferred rolling temperature for high carbon steels reached in oxidizing atmosphere are usually in the rate of 1100ºC. The adequately heated work pieces are introduced into re-rolling mills in which a number of carbon steels are chilled steel rolls works successively.

These cross-sections of the material decrease to a fixed value after every pass. Adjusting the roll passes and designs can obtain the Products of desired cross section. The desired shaped produce is obtained from last or finishing rolls. Thus the Ingot / Billets after testing are processed through a shearing machine so as to cut them into required size depending upon the section to be rolled.

The material is then inducted into reheating furnace, where it is heated at a temperature of 1100 to 1200ºC. Reduction by compression in rollers and mills stands. This operation is normally carried out in a roughing mill stand intermediate stand and finishing mill stand in total seven stands it passes. The hot rolled products are then cooled on a cooling bed i.e. platform open to atmosphere.

The edges of the rolled products are trimmed and normal grinding operations are carried out. The output is now finished goods. Quality control measures include dimensional check-up in shares and sizes, tensile testing, chemical analysis to conform to the desired specification, etc. The processing time in the furnace takes about 5 to 6 hours. No by-products are generated except the wastage due to end cuttings. Burning loss has been assumed at 8% based on similar unit operations.

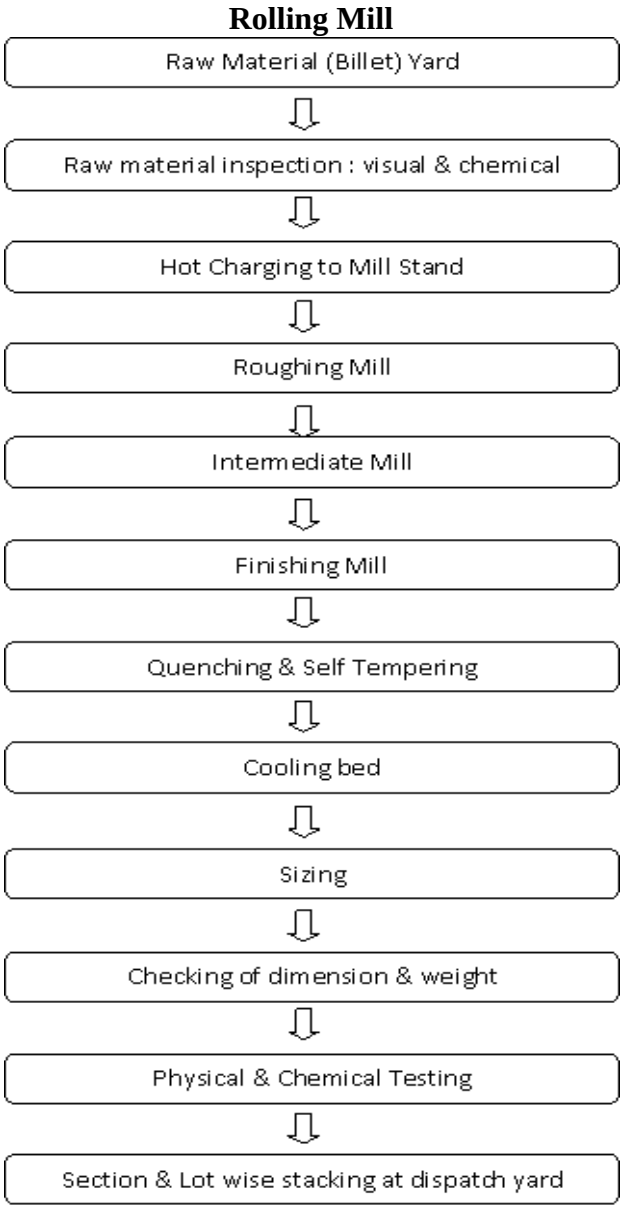


Figure 5: Rolling mill production

2.2 Power Generation Process: (ToR point No.15)

Waste Heat Recovery Boilers will be installed behind the After Burning Chamber (ABC) of DR kiln in bypass configuration. The flue gases after ABC will be taken to unfired furnace chamber and then flow over banks of super heater, convective evaporator and economizer before being discharged to atmosphere through ESP, ID fan and stack. In the Fluidized Bed Combustion boiler envisaged, combustion of fuel particles is achieved in suspension with an inert aggregate i.e. sand. Combustion air will be fed through air nozzles from underneath into the sand fuel bed. Oil burner will be provided for start-up and low load flame stabilization.

The fuels proposed in FBC Boiler are coal washery rejects & Middling and dolochar. The flue gases will pass over various heat transfer surfaces to ESP and then finally discharged into chimney by ID fan. The condensate after condenser of STG will be pumped to a common dearator by

condensate extraction pumps. Feed water from the dearator will be pumped to the waste heat recovery boiler as well as FBC boiler by boiler feed pumps. The steam generated from both the WHRB and FBC boilers will drive the steam turbine through a Separate steam headers.

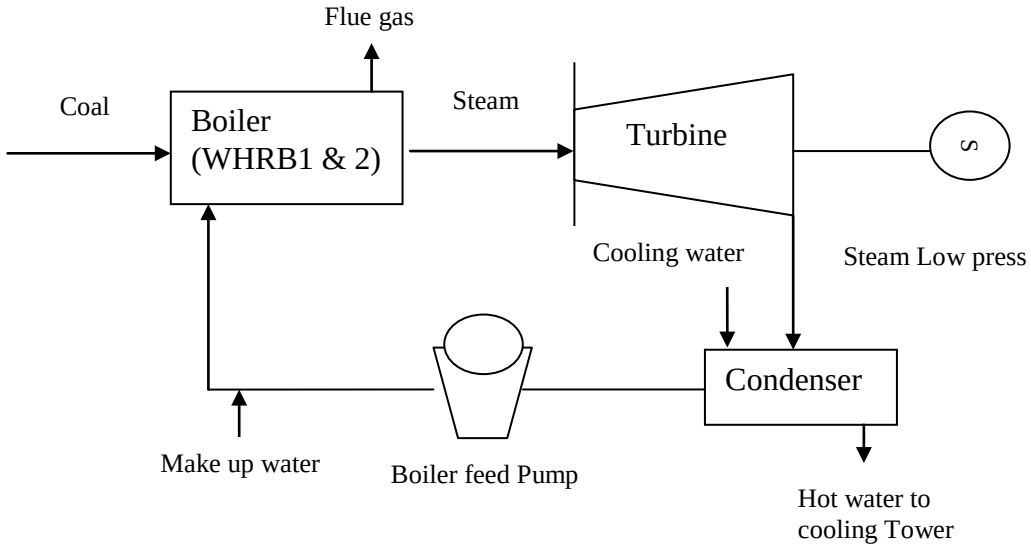


Figure 6: Process Flow Chart for Power generation

2.3 Energy & Mass Balance (Generic ToR 16 & 17)

Mass Balance:

MASS BALANCE PER METRIC TON OF SPONGE IRON						
FEED				**OUTPUT**		
COAL	1.205	MT		SPONGE IRON	1.00	MT
IRON ORE	1.451	MT		FLUE GAS	4.351	MT
DOLOMITE	0.0025	MT		CHAR	0.42	MT
				PROCESS LOSS	0.0035	MT
AIR	3.116	MT				
Total	**5.7745**			**Total**	**5.7745**	**MT**
MT - Metric Ton						

Energy Balance

ENERGY BALANCE PER METRIC TON OF SPONGE IRON						
FEED THROUGH				**LOSS THROUGH**		
COAL	4.1395	Mkcal		FLUE GAS	1.58	Mkcal
				CHAR	0.72	Mkcal
				SPONGE IRON	0.83	Mkcal
				SURFACE RADIATION	0.56	Mkcal
				SURFACE CONVECTION	0.40	Mkcal
				DOOR OPENINGS	0.045	Mkcal
				OTHER	0.0045	Mkcal
Total	**4.1395**	**Mkcal**		**Total**	**4.1395**	**Mkcal**
Mkcal - Million kilo calorie						

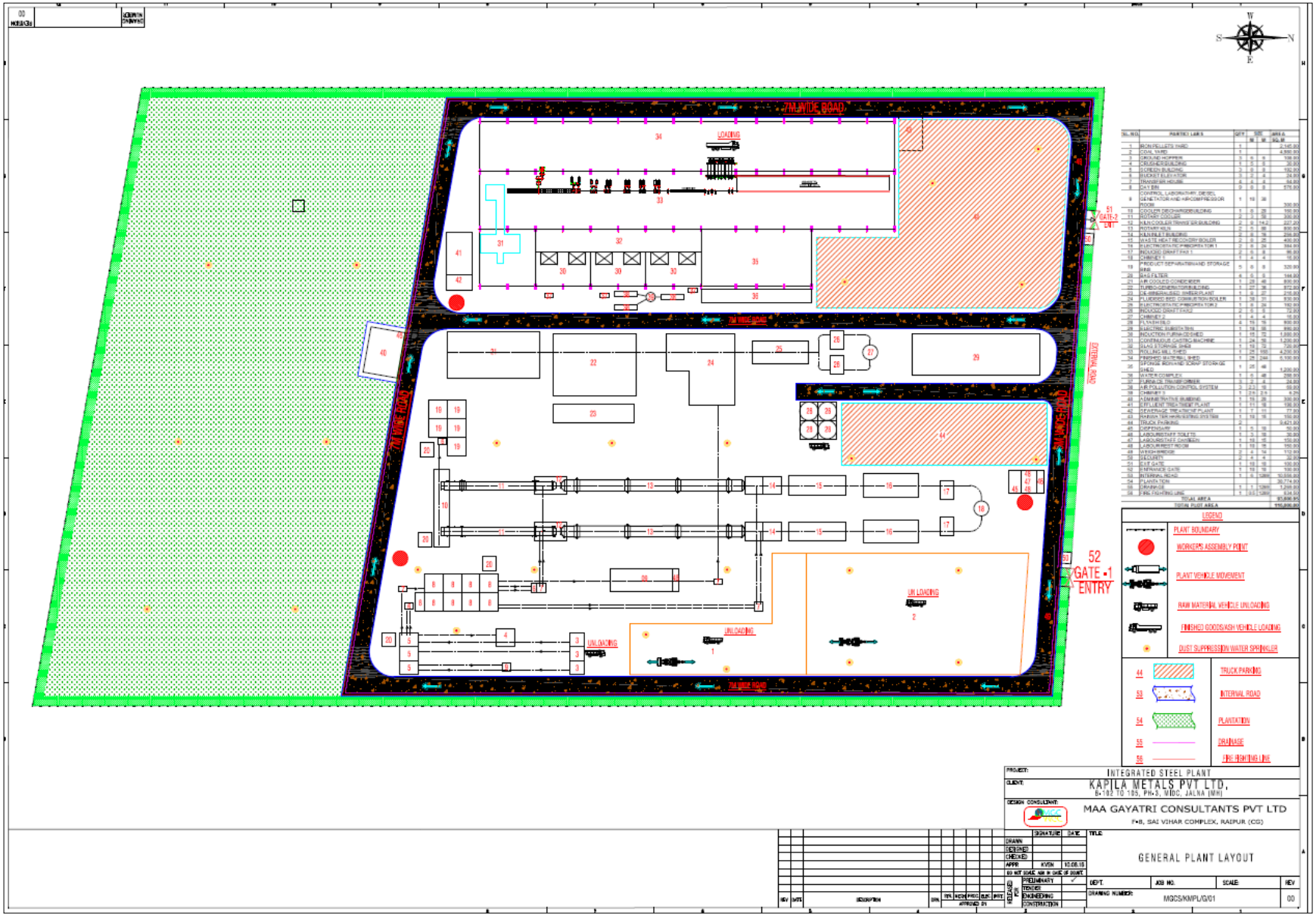


Figure 7: Project Layout (Generic ToR point 3 (vi), 14)

Photograph of proposed site (Generic ToR point No. 3 (vii)

Figure 8: Photograph of proposed site

The raw materials for this industry are mainly MS Scrap and other materials like Sponge Iron, Manganese, Ferrous silicon, Aluminum, pig iron etc. Table 2 describes the raw materials requirement:

Table 3: Raw Materials

Raw Material / ton of the product	
Name	**Quantity ton**
TMT Bars and billets	
MS Scrap	420 TPD
Sponge Iron	650 TPD
For DRI (Sponge Iron)	
Iron Ore	1500 TPD
Coal	1000 TPD
Dolomite	50 TPD
For Power Plant	
Dolochar	210 TPD
Coal	816 TPD
For Pellet Plant	
Iron Ore Fine	1500 TPD
Lime Stone	22 TPD
Coal/Coke	10 TPD
Bentonite	15TPD

2.4 Process Equipment:

A) Induction Furnace:

Total 3 induction furnaces of capacity 40 T each (8 heats/day) will be used. An induction furnace is an electrical furnace in which the heat is applied by induction heating of metal. Induction furnace capacities range from less than one kilogram to one hundred tons capacity and are used to melt iron and steel, copper, aluminium and precious metals.

The advantage of the induction furnace is a clean, energy-efficient and well-controllable melting process compared to most other means of metal melting.

B) Stack

Total three stacks will be provided 1 stack for 2 DRI unit, 1 for furnace & 1 for boiler

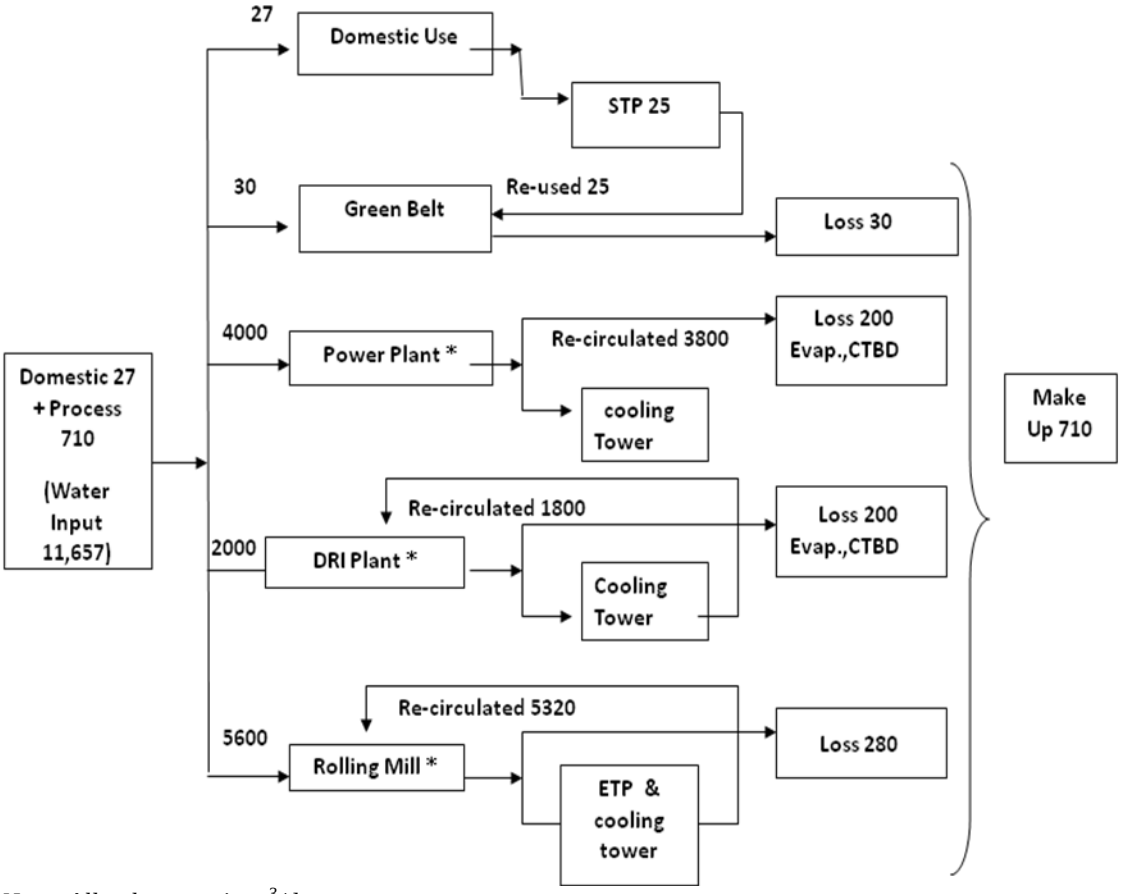
2.4.1 **Power:**

The total Power requirement will be 58 MW out of which 50 MW will be generated by us and 8 MW will be obtained from MSEDCL.

DG Set: Standby of 750 KVA-2 Nos.

2.4.2 **Water:**

The total water requirement is 737 m^3/d and will be met by MIDC.



Note: All values are in m^3/day

Figure 9: Water Balance

2.4.3 **Sewage generation:**

Total sewage generation will be approx 25 m^3/day.

Domestic sewage will be treated in Extended Aeration System STP of capacity 25 m^3/d which includes tertiary treatment i. e. multi grade filter and charcoal filter. The treated wastewater shall be used for gardening resulting to achieve zero discharge, except in monsoon.

Process of STP as follows,

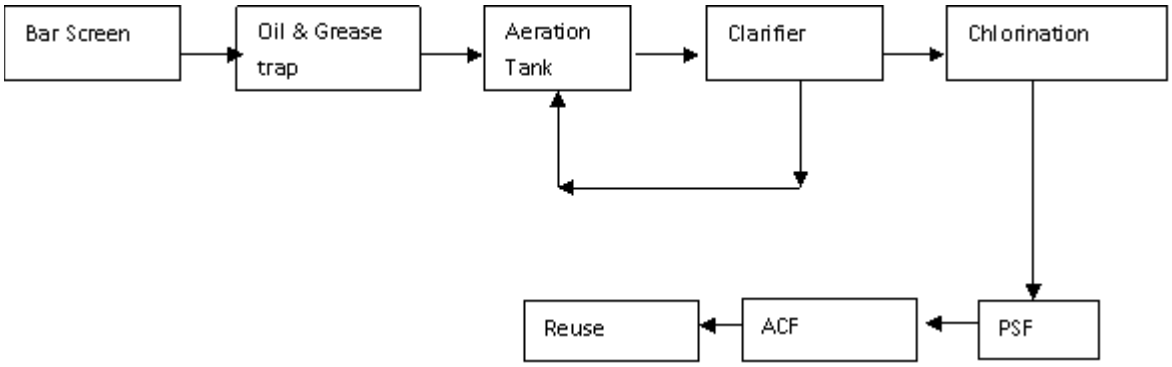


Figure 10: Extended Aeration System

Design Parameters are as follows:

Table 3:Design Parameter

Design Parameter	Inlet Value	Outlet Value
pH	6.5-8.5	7-8
BOD_5	250-300 mg/lit	≤30
COD	350-450 mg/lit	≤250
Suspended Solids	200-300 mg/lit	≤100
Oil & Grease	10-15 mg/lit	≤10

2.4.4 **Total solid waste generation:**

Total Solid waste has been estimated at ~ 50 kg/day

Slag: Total slag generated form process will be 170 TPD, which is collected and stored on paved area, after separation of iron particle by magnetic separator

2.4.5 **Manpower:**

The manpower required for administration and production purposes will be recruited locally. The unit will have work-force of skilled workers and office staff personnel total 5 workers.

3 CHAPTER – BASELINE ENVIRONMENTAL STATUS

3.1 Introduction:

This chapter describes the existing environmental status of the study area with reference to air, water, soil, meteorology, climate, hydro-geological, ecology and socio-economic profile of people in the study area. Primary data (air, water, soil and noise) was collected during winter season: **December 2014 to February 2015** and the secondary data was collected for other attributes like ecology, socio-economics, etc.

3.2 Air Quality

Nine ambient air quality monitoring stations were established in the study zone of 10 km radius around the project site as shown in **Figure 11**. The location of stations and its distance from site are presented in Table 4. The main sources of air pollution in the region are small scale industries and traffic.

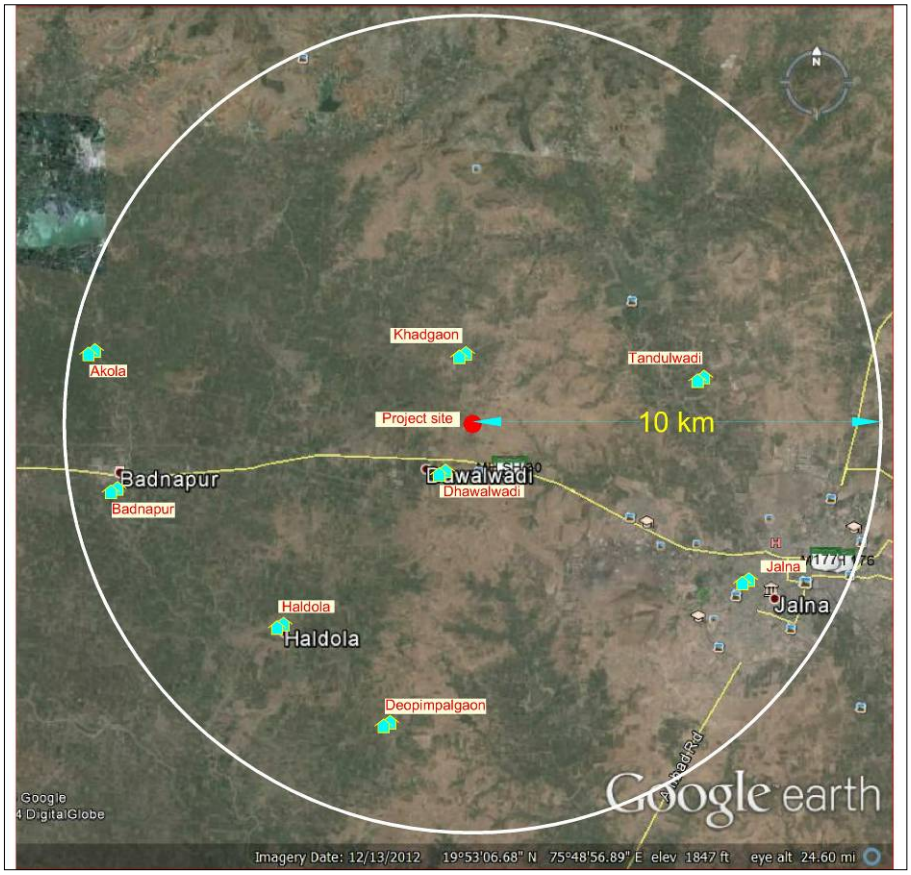


Figure 11: Monitoring stations (Air, Noise, Soil)

Table 4: Location of AAQ stations

Sr. No.	Locations Air	~ Distance, km	Direction
AAQ1	Project site	--	--
AAQ2	Haldola	6.7	SW
AAQ3	Dhawalwadi	1.9	SW
AAQ4	Khadgaon	1.5	N
AAQ5	Akola	9.9	W
AAQ6	Jalna	7.5	SE
AAQ7	Deopimpalgaon	8.5	S
AAQ8	Badnapur	9.2	W
AAQ9	Tandulwadi	5.6	E

3.2.1 Selection of sampling Locations (Generic ToR point No. 21)

The location of the station was selected on following considerations:

Predominant wind direction as per IMD data

Sensitivity of the area, if applicable

24 hourly monitoring was done for $PM_{2.5}$, PM_{10}, SO_2 and NO_X at twice a week and the results are presented in **Table 5**.

Table 5: Results for Location of AAQ stations

	Parameter		AAQ 1	AAQ 2	AAQ 3	AAQ 4	AAQ 5	AAQ 6	AAQ 7	AAQ 8	AAQ 9
$PM_{2.5}$ µg/m^3	Std	Min	22.03	23.15	20.07	22.66	22.48	22.85	20.77	20.51	20.94
	80	Max	28.21	27.43	27.31	27.6	28.98	28.53	27.99	27.59	27.82
		Avg	22.52	24.99	24.91	24.84	25.46	24.79	24.95	24.30	25.03
PM_{10} µg/m^3	100	Min	61.73	62.59	65.07	62.28	64.35	65.26	63.23	63.06	64.23
		Max	70.40	67.87	72036	71.15	73.27	71.65	71.82	71.98	72.14
		Avg	65.85	65.31	65.81	67.45	69.18	68.40	67.66	68.28	68.43
SO_x µg/m^3	80	Min	11.20	11.66	10.05	9.88	11.34	11.24	11.03	11.02	11.57
		Max	14.78	15.60	14.55	14.68	15.13	14.55	15.71	15.75	15.56
		Avg	13.12	13.61	11.89	12.45	13.37	12.94	13.38	13.85	14.88
NO_X µg/m^3	80	Min	14.39	15.81	14.36	13.72	14.39	14.71	14.58	15.33	15.51
		Max	19.54	19.31	19.28	19.76	18.35	18.25	19.45	19.66	20.01
		Avg	17.49	17.63	16.46	16.24	17.05	16.47	16.97	18.06	18.82

Note: All values within NAAQS-2009

The full sets of monitoring results for winter season are presented in **Annexure 1**.

Discussions

The maximum and minimum $PM_{2.5}$ in the study area was recorded at 25.46 µg/m^3 and 22.52µg/m^3 respectively. The maximum concentration was recorded at Akola the minimum at Project site.

The PM_{10} maximum and minimum were recorded at 69.18 µg/m^3 and 65.31 µg/m^3 respectively in the study area with maximum at Akola and minimum at Haldola

The SO_x maximum and minimum were recorded at 14.88 µg/m^3 and 11.89 µg/m^3 respectively in the study area with maximum at Tandulwadi and minimum at Dhawalwadi

The NOX maximum and minimum were recorded at 18.82 µg/m3 and 16.24 µg/m3 respectively in the study area with maximum at Tandulwadi and minimum at khadgaon.

3.3 Water Environment (Generic ToR point No. 23)

Selected water quality parameters for surface and ground water resources were studied within 10 km radius for assessing the water environment. The location of the SW sampling stations is presented in **Figure 12** and the distance from the Project site is given in **Table 6.** The results are summarized and presented in **Table 7**

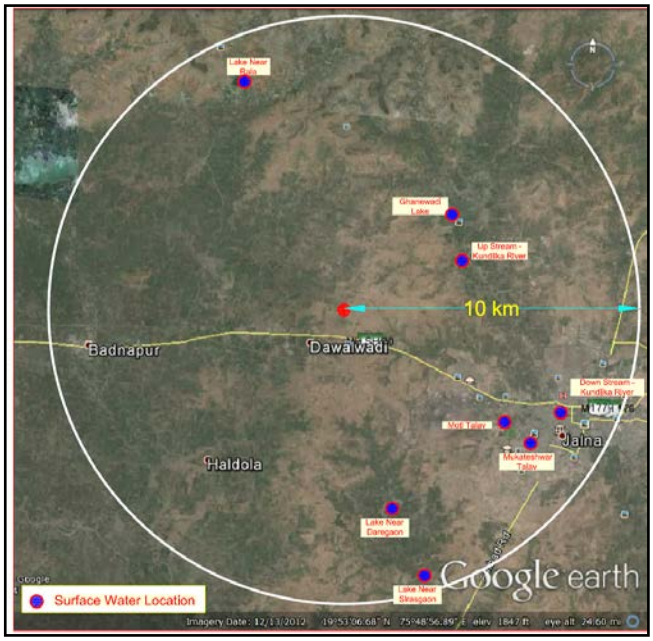


Figure 12: Location Surface and Ground Water stations

Table 6: Surface Water stations

Station	Locations	Distance (km)	Direction
SW1	Moti Talav	6.50	SE
SW2	Ghanewadi dam	4.40	NW
SW3	Kundalika River upstream	4.30	NW
SW4	Kundalika River downstream	7.80	SW
SW5	Mukteshwar Talav	7.60	SW
SW6	Lake near Daregaon	6.00	S
SW7	Lake near Rala Gaon	8.00	N
SW8	Lake near Shirasgaon	8.70	S

Eight surface water sources were selected for collecting water samples within the study area

Table 7: Surface Water Analysis Reports

Sr. No.	Parameter	SW1 Moti Talav	SW2 Ghanewadi Lake	SW3 Kundalika River upstream	SW4 Kundalika River downstream	SW5 Mukteshwar Talav	SW6 Lake near Daregaon	SW7 Lake near Rala Gaon	SW8 Lake near Shirasgaon
1	Colour, Hazen	3.2	4.2	2.8	4.8	3.8	3.5	3.1	4.5
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeabl	Agreeable
3	pH	7.38	7.12	7.45	7.5	7.22	7.31	7.31	7.2
4	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeabl	Agreeable
5	Conductivity µmhos/cm	594	286	756	692	332	260	401	435
6	Dissolved Oxygen mg/l	2.6	3.4	2.6	2.1	3.8	4.2	4.6	3.8
7	Chemical Oxygen Demand mg/l	11.68	7.18	9.86	11.33	7.08	6.93	10.92	11.3
8	Biochemical Oxygen Demand (3 days at 27^0C) mg/l	2.3	<2	4.8	5.2	2.1	<2	<2	<2
9	Total Dissolved Solid mg/l	143	168	256	325	195	232	277	187
10	Chlorides as Cl mg/l	32	25	117	136	40	35	29	42
11	Ammonical Nitrogen NH_3-N* mg/l	<2	<2	<2	<2	<2	<2	<2	<2
12	Total Hardness as $CaCO_3$ mg/l	182	208	358	421	168	230	186	321
13	Calcium as Ca^{++} mg/l	98	123	164	186	78	115	99	80
14	Magnesium as Mg^{++} mg/l	15	24	12	22	15	19	17	18
15	Sodium as Na mg/l	64	48	55	63	45	35	28	55
16	Potassium as K mg/l	27	23	32	22	19	33	25	22
17	Sulphate as SO_4 mg/l	15	18	27	20	31	19	22	15
18	Nitrate as NO_3 mg/l	2.0	2.4	8.6	9.9	1.8	2.0	3.5	2.9
19	Iron as fe mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
20	Boron as B	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
21	Mercury as Hg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
22	Total Coliform MPN/100ml	15	22	165	298	18	35	20	25

Water Quality Criteria - CPCB		
Drinking Water Source without conventional treatment but after disinfection	**A**	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 6mg/l or more • Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organised)	**B**	• Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/l or more • Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	**C**	• Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4mg/l or more • Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	**D**	• pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more • Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	**E**	• pH between 6.0 to 8.5 • Electrical Conductivity at 25°C micro mhos/cm Max.2250 • Sodium absorption Ratio Max. 26 • Boron Max. 2mg/l

Discussion:

Surface water samples compare with water quality criteria designed by CPCB (as above table)

Lake water near Talagaon and lake water near Daregaon samples comes under category C, drinking water source after conventional treatment and disinfection.

Moti Talav, Ghanewadi Lake, Mukteshwar Talav, Kundalika River (upstream/downstream) samples undergoes Category D, propagation or wild life and fisheries.

Ground Water Sampling Locations: (Generic ToR point No. 24)
Water samples were collected from bore/open wells located within 10 Km. radius. The location of the monitoring stations is presented in **Figure 12** and **Table 8**. The region receives limited rains (water shortage area), but has considerable groundwater presence. The quality of groundwater is examined by drawing samples from open dug wells as well as from deep wells from the study area. Analysis was done by Standard Methods. The results are summarized and presented in **Table 9**:

Table 8: Ground Water Quality Locations

Sr. No.	Locations Air	~ Distance, km	Direction
GW1	Project site	--	--
GW2	Haldola	6.7	SW
GW3	Dhawalwadi	1.9	SW
GW4	Khadgaon	1.5	N
GW5	Akola	9.9	W
GW6	Jalna	7.5	SE
GW7	Deopimpalgaon	8.5	S
GW8	Badnapur	9.2	W
GW9	Tandulwadi	5.6	E

Table 9: Ground Water Quality Results

Sr. No.	Parameter	GW1 PROJECT SITE	GW2 HALDOLA	GW3 DHAWAL-WADI	GW4 KHADGAON	GW5 AKOLA	GW6 JALNA CITY	GW7 DEOPIMPAL-GAON	GW8 BADNAPUR	DRINKING WATER STANDARDS IS 10500:2012
1.	Colour , Hazen	<5	<5	<5	<5	<5	<5	<5	<5	5.0
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	7.2	7.32	7.10	7.65	7.24	7.36	7.21	7.81	6.5-8.5
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0
6.	Conductivity µmhos/cm	568	298	365	250	752	532	652	457	--
7.	TDS mg/l	120	121	158	92	368	103	320	257	500
8.	Free Residual Chlorine mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.2
9.	Chlorides (as Cl) mg/l	56	78	38	65	72	47	42	50	250
10.	Total Alkalinity as $CaCO_3$ mg/l	68	123	42	75	83	57	66	96	200
11.	Total Hardness (as $CaCO_3$) mg/l	139	235	124	108	124	99	103	154	200
12.	Sulphate (as SO_4) mg/l	41	72	26	21	27	35	30	47	200
13.	Nitrate (as NO_3) mg/l	3.2	4.2	2.8	3.3	2.0	2.4	3.2	2.8	45
14.	Fluoride (as F) mg/l	0.27	0.32	0.13	0.24	0.31	0.24	0.41	0.35	1.0
15.	Copper (as Cu) mg/l	0.03	<0.02	<0.02	<0.05	0.02	0.03	0.01	0.01	0.05
16.	Iron (as Fe) mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.3
17.	Zinc (as Zn) mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5
18.	Boron (as B) mg/l	0.18	0.22	<0.1	0.12	0.17	<0.1	<0.1	0.14	0.5
19.	Lead (as Pb) mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.01
20.	Total Coliform MPN/100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	0

***BDL-Below Detectable Limit**

Discussion: After detailed assessment of off-site bore well water sample, it was concluded that in comparison to IS 10500:2012 (drinking water), the water is used for drinking purpose except Total hardness in Haldola gaon.

3.4 Soil Environment:

The soil in and around the proposed site is formed due to weathering of rocks and can be classified as reddish gray / brown silky type. Rocks underneath are of volcanic origin. The rocks are dark colored of basaltic composition and mainly comprise of plagioclase, pyroxenes iron ores, primary glass and some secondary minerals. The location of the sampling stations is marked in **Figure 12**. The names and the distance from Project are presented in **Table 10**. The results of soil analysis are presented in **Table 11**

Table 10: Soil sample Stations

Sr. No.	Locations Soil	Direction	Distance km
SS1	Project site	--	--
SS2	Haldola	SW	6.7
SS3	Dawalwadi	SW	1.9
SS4	Khadgaon	N	1.5
SS5	Akola	W	9.9
SS6	Jalna	SE	7.5
SS7	Deopimpalgaon	S	8.5
SS8	Badnapur	W	9.2
SS9	Tandulwadi	E	5.6

Table 11: Soil Analysis for December 2014 to Feb 13

Sr. No.	Soil Results	Unit	S1	S2	S3	S4	S5	S6	S7	S8	S9
	Dec. 2012		**Results**								
1	Colour		Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
2	Texture		Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam
3	pH		7.58	7.64	7.55	7.64	7.78	7.62	7.45	7.58	7.66
4	Electrical conductivity	ms/cm	0.27	0.32	0.29	0.38	0.44	0.39	0.29	0.32	0.41
5	Chlorides as Cl	mg/kg	420	434	412	438.97	474.52	468.72	444.25	454.26	464.53
6	Iron as Fe	mg/kg	824	894	830	871.45	921	897.56	786.39	812.38	849.21
7	Sulphate as SO4	mg/kg	3.18	3.98	3.34	4.22	3.97	3.48	2.88	3.08	324
8	Sodium as NA	kg/ha	218	224	211.94	232.63	241.28	227.54	214	228.63	234.79
9	Potassium as K	kg/ha	137	149	138	151.28	159.63	152.28	138.62	149.24	157.69
10	Phosphorous as PO4	mg/kg	3.21	2.98	2.99	342	3.48	3.11	2.77	2.37	2.58
11	Calcium as Ca	mg/kg	1.38	1.12	1.17	1.59	1.59	1.41	1.32	1.64	1.86
12	Magnesium as Mg	mg/kg	2.88	2.14	2.07	2.84	2.79	2.63	2.48	2.79	3.12
13	Nitrogen as N	kg/ha	287	264	257.16	281.25	291.17	287.14	267.54	278.19	289.35
	Jan. 2014		**Results**								
1	Colour		Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
2	Texture		Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam
3	pH		7.49	7.57	7.62	7.68	7.6	7.54	7.52	7.61	7.62
4	Electrical	ms/c	0.24	0.3	0.32	0.42	0.41	0.36	0.32	0.35	0.4

Sr. No.	Soil Results	Unit	S1	S2	S3	S4	S5	S6	S7	S8	S9
	conductivity	m									
5	Chlorides as Cl	mg/kg	407	418	421	448.65	465	462.38	458	459.83	454.38
6	Iron as Fe	mg/kg	794	839	817	885.27	887	894.21	812	824.72	817.24
7	Sulphate as SO4	mg/kg	2.94	3.74	2.98	5.17	3.84	3.42	3.08	3.19	308
8	Sodium as NA	kg/ha	211	219	209.82	238.42	234.91	224.18	219	232.41	225.38
9	Potassium as K	kg/ha	129	142	134.17	153.28	154.22	147.52	142.17	154.17	152.18
10	Phosphorous as PO4	mg/kg	2.07	2.85	2.84	352	3.38	2.95	2.62	2.44	2.47
11	Calcium as Ca	mg/kg	1.22	1.1	1.13	1.64	1.43	1.37	1.28	1.78	1.76
12	Magnesium as Mg	mg/kg	2.48	2.08	1.97	2.78	2.61	2.49	2.41	2.94	3.09
13	Nitrogen as N	kg/ha	278	258	246.38	284.19	283.28	279.33	262.19	282.17	281.37
	Feb. 2014		**Results**								
1	Colour		Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
2	Texture		Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam
3	pH		7.5	7.64	7.68	7.58	7.54	7.55	7.48	7.52	7.64
4	Electrical conductivity	ms/cm	0.24	0.38	0.39	0.4	0.36	0.32	0.3	0.31	0.37
5	Chlorides as Cl	mg/kg	410	432.17	412	432.68	456.32	458.72	447.52	453.22	448.94
6	Iron as Fe	mg/kg	784	847	794	847.63	848.79	874.59	807.45	817.91	807.52
7	Sulphate as SO4	mg/kg	2.84	3.89	2.6	5.11	3.64	3.38	3.04	3.09	305
8	Sodium as NA	kg/h	215	224	203.24	227.85	229.63	212.98	211.23	228.52	219.63

Sr. No.	Soil Results	Unit	S1	S2	S3	S4	S5	S6	S7	S8	S9
		a									
9	Potassium as K	kg/ha	130	149	127.85	143.67	147.51	143.21	137.42	149.85	147.84
10	Phosphorous as PO4	mg/kg	2.01	2.93	2.37	348	3.17	2.73	2.48	2.33	2.41
11	Calcium as Ca	mg/kg	1.25	1.19	1.07	1.55	1.37	1.33	1.24	1.62	1.67
12	Magnesium as Mg	mg/kg	2.5	2.32	1.88	2.66	2.41	2.38	2.37	2.81	3.11
13	Nitrogen as N	kg/ha	272	267	241.63	278.52	279.83	267.42	257.41	278.92	280.63

All values in mg/kg except pH and conductivity

It has been observed that the average pH of the soil in the study area ranged from 7.5-7.6.

The average Electrical Conductivity was observed to be in the range of 0.3- 0.4ms/cm,

The Potassium values range between 132-153.8 mg/kg. Maximum observed at Akola (S5) & the minimum observed project site (S1)

The chlorides were found to be in the range of 412.3 – 465.3 mg/kg of soil. Maximum observed at Akola (S5) & the minimum observed project site (S1)

3.5 Noise Environment:

3.5.1 Noise Levels (Generic ToR point No. 25)

The noise levels measured at the existing plant facility, proposed project site and villages located within study area. The location of the stations is presented in **Figure 12**. The station details are given **Table 12** whereas results of monitoring are presented in **Table 14**

Table 12: Noise monitoring Location

Sr. No.	Locations Soil	Direction	Distance km
N1	Project site	--	--
N2	Haldola	SW	6.7
N3	Dawalwadi	SW	1.9
N4	Khadgaon	N	1.5
N5	Akola	W	9.9
N6	Jalna	SE	7.5
N7	Deopimpalgaon	S	8.5
N8	Badnapur	W	9.2
N9	Tandulwadi	E	5.6

Table 13: Ambient Noise Level Standards

Category of Area	Limits in dB (A) Leq	
	Day Time (6.00 am to 10.00 pm)	Night Time (10.00 pm to 6.00 am)
Industrial Area	**75**	**70**
Commercial Area	65	55
Residential Area	**55**	**45**
Silence Zone	50	40

Table 14: Result of Noise Monitoring

	Dec. 2014		Jan-15		Feb. 2015	
	Day Time dB(A)	Night Time dB(A)	Day Time dB(A)	Night Time dB(A)	Day Time dB(A)	Night Time dB(A)
Project site	51.4	42.8	52.8	43.5	53.1	44.2
Haldola	52.4	43.5	53.1	44.2	52.9	43.8
Dawalwadi	54.2	44.1	54.5	44.4	53.6	44.2
Khadgaon	53.2	43.3	52.7	42.8	51.8	42.3
Akola	50.8	42.8	51.8	43.6	52.4	44.5
Jalna	51.2	43.4	52.4	42.9	53.2	43.5
Deopimpalgaon	49.8	40.7	50.7	41.2	52.8	42.7
Badnapur	52.3	42.5	51.6	43.1	51.9	43.8
Tandulwadi	50.8	44.1	50.9	44.2	51.4	43.6

Observation: It has been observed that during day time highest noise level found at Dhawalwadi 54.10 dB(A) and lowest at Tandulwadi 51.03 dB(A) ,during night time highest noise level found at

Dhawalwadi 44.23 dB(A) and lowest at Deopimpalgaon 41.53 dB(A) which are within the prescribed CPCB limit.

3.6 Land use Studies:

Toposheet of study area covering 10 Km radius indicating project site is shown below: (Generic ToR point no. 3 (ii)

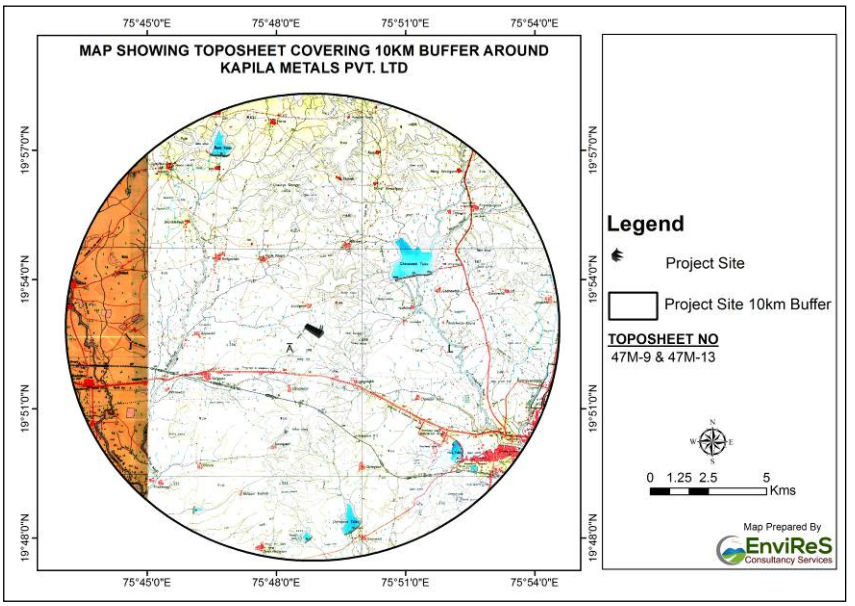


Figure 13: Toposheet of Study area within 10 Km

Satellite Data: **RESOURCESAT-2** cloud free data has been used for Land use / land cover analysis. (Generic ToR Point No. 7 (ii))

PC based GIS and image processing software's are used for the purpose of image classification and for delineating drainage and other features in the study area. Number of peripheral devices such as scanner, plotter, printer etc. has also been interfaced with the system.

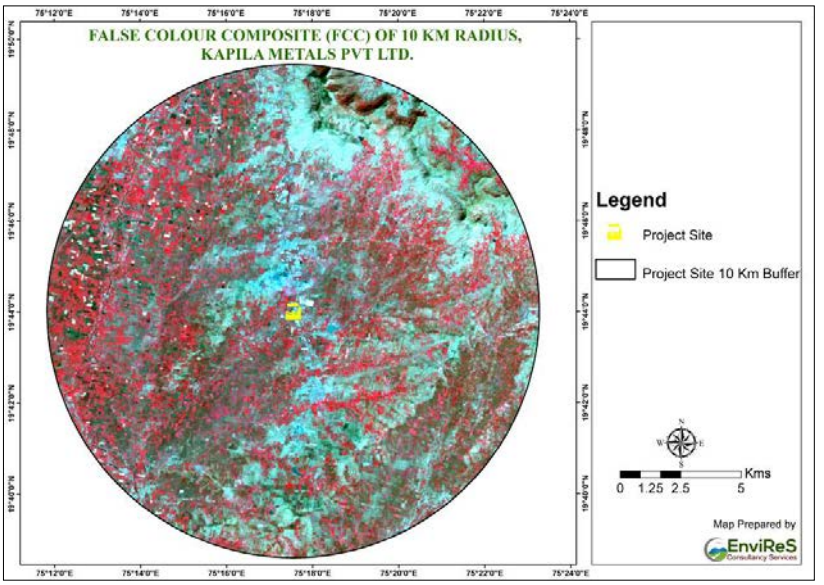


Figure 14: Satellite Image (Addl. ToR Point No.4)

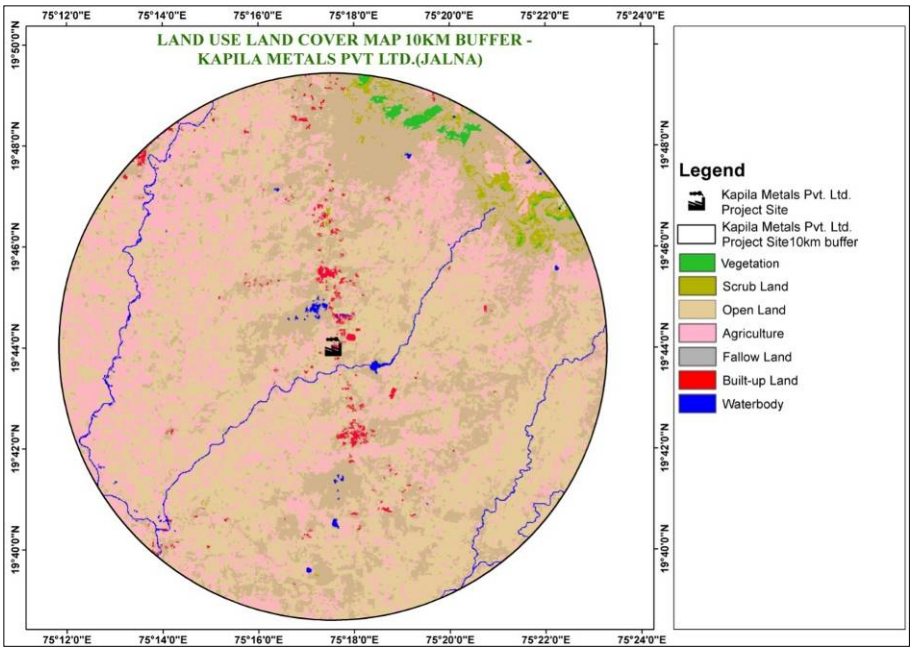


Figure 15: Land use/land cover map of study area

3.6.1 Land use/Land cover Classification System :

The present Land use/Land cover maps were prepared based on the classification system of National standards. Break up of land use (within 10 km) (Generic ToR point No. 4) is given in Table-15

Table 15: Land use/ Land cover break up

LULC Class	Area(ha)	Area sq km	%
Vegetation	169.2	1.692	0.54
Scrub Land	434.43	4.344	1.38
Open Land	7918.83	79.188	25.16
Agriculture	8648.37	86.484	27.47
Fallow Land	13756.14	137.561	43.70
Built up Land	236.34	2.363	0.75
Waterbody	314.55	3.146	1.00
Total	31477.86	314.779	100.00

The most significant part of the Jalna district is that about 27 % of the geographical area is under agricultural use. Out of the total 31477.86 Hectares of the geographical area, 8648.37 Hectare of land is under agricultural use.

The details of the land use (within 500m) in Jalna district are given in below tables.

LULC Class	Area, ha	Area km^2	%
Scrub Land	0.18	18.16	22.47
Open Land	0.22	22.43	27.76
Fallow Land	0.28	27.74	34.34
Built up Land	0.12	12.47	15.43
Total	0.81	80.80	100.00

3.6.2 **Topography:**

The district has moderately to gently sloping undulated topography. The Northern part of the district is occupied by Ajanta and satmala hill ranges. The 95 % area of the district falls in the Godavari basin. The river Godavari flows along the Southern boundary from West to East direction. The rivers Dudhana, Gulati, Purna are the principal tributaries of river Godavari, which flow through the district. The major part of the district falls in the Purna sub basin. The river Purna flows from the central part of the district and meets river Godavari in the neighboring district. The river Khelna, and Girja are other important tributaries of river Purna which flow through the district. The southern part of the district falls in Godavari sub basin. A very small part of the district located North East of the district falls in the Tapi basin.

The general slope of the area is towards Southeast. The average altitude above mean sea level is 534 m.

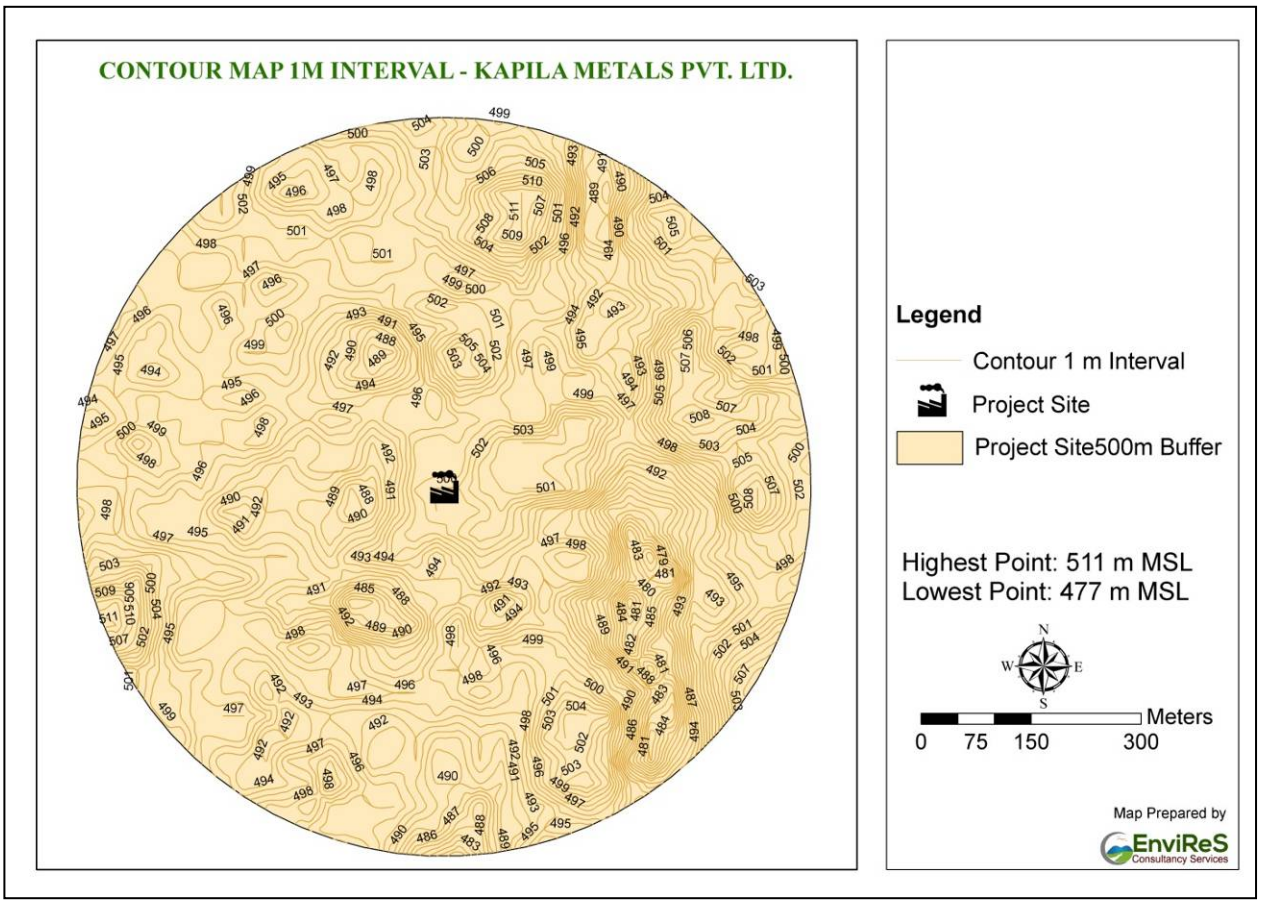


Figure 16: Contour map of 500 m buffer

3.7 Geology: (Generic ToR point No. 18)

The entire district is occupied by basaltic lava flows of the Deccan traps of upper cretaceous to Eoceneage. The lava flows are piled over one another. The individual flow thickness ranges between 20 to 30mtrs. The individual flow has two distinct units. The upper part is vesicular in nature and vesicles are filled with secondary minerals like zeolite and quartz (e.g. Moss Agate, Zebra Agate and Green Agate) which is often called as zeolitic trap. The lower part of the lava flow forms the massive basalt, and often called as massive trap. Alluvial deposits along the major rivers overlie the Deccan traps.

The alluvium consists of clay, silt and sand. The thickness ranges between 10 to 20mtrs. The alluvium forms a very fertile land.

Drainage map around the project site: (Generic ToR point No. 19)

Kundalika river is located at 8.5 km of project site.

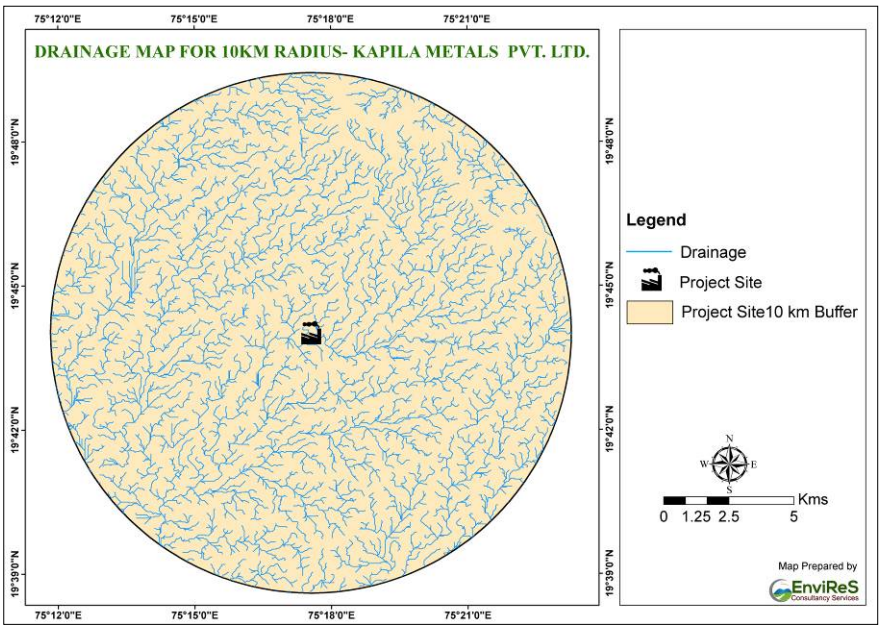


Figure 17: Drainage Layout for 10 km study area

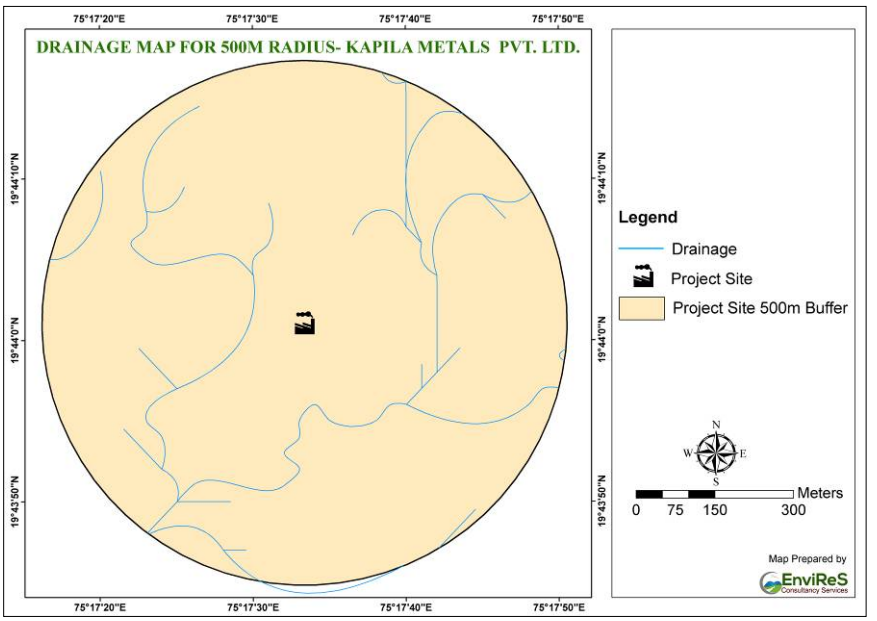


Figure 18: Drainage Layout for 500m study area

3.7.1 Meteorology:

Meteorology is dealt first. The climate of the district is characterized by a hot summer and general dryness except during the south-west monsoon. The year can be divided into four seasons. The cold season from December to February is followed by the hot season from March to the first week of June. The south West monsoon season is from the second week of June till the end of September while October and November constitute the post monsoon or retreating monsoon season.

3.7.2 Temperature:

The district has a sub-Tropical climate, in which the bulk of rainfall is received from the southwest monsoon, between June to September. The average annual rainfall of the district ranges between 650 to750mm.The district often experiences drought with rainfall recording as low as 400 to 450 mm.

The rainy season is followed by Winter, which last up to February, during which the minimum temperature ranges between 9 to 10 c and maximum temperature ranges between 30 and 31C.

The winter is followed by hot summer, which continues up to June. The maximum day temperature ranges between 42 & 43 C's during summer.

Table 16: Temperature Observation

Date	Nov		Dec		Jan	
	Min	Max	Min	Max	Min	Max
Time	8.30	17.30	8.5	30	15	27.5
1	15.5	33	10.1	28.7	16.7	27
2	17.2	32	9.4	28.5	15.6	31
3	17	32.7	8.5	28.7	14.2	32.5
4	14.2	31.5	7.5	29.5	12.1	30

Date	Nov		Dec		Jan	
	Min	**Max**	**Min**	**Max**	**Min**	**Max**
5	11	32.5	7	31	14.7	30.5
6	11.4	31	9.5	30.2	11.7	29.5
7	12.7	33.5	8.7	30	10	31.2
8	20	29.5	8.8	32	10.5	30.2
9	19	29	8.2	32.5	8.5	29
10	19	31.5	7.9	31	7	27
11	19.5	30.5	7.2	29	7.4	26
12	19	32.5	8	29	6.3	29.5
13	18	33.2	7.5	28.2	6.5	30.3
14	17.5	33	7.6	30	8.2	31.5
15	18.7	32.5	8.5	30.7	9	29.3
16	17.6	32.2	8.2	30.7	10	28.5
17	15.3	33.8	8	30	7.13	26
18	15.5	32	6.9	29	5.3	27.5
19	13	32.2	8	28.1	6	29.5
20	11.2	31.5	9.3	30	8.7	30
21	12	31.5	12	30.7	12.7	31.5
22	11	31.2	10	30.7	11	29.5
23	10.5	31	10.1	30	9.5	31
24	9.5	30.3	11.8	29	13	32
25	11	30	11	28.5	14	30.5
26	10.6	30	11	28	13.2	29
27	9	29.5	13.5	27	16	25.5
28	12	29	12.5	27.7	14	27.5
29	9.5	30.5	11.5	29.5	16.5	25.6
30	9.6	30	14.3	30	15.4	27
31	9.4	29	11.4	30.3	15.7	26.3

(Data source Hydrology Department Ahmednagar)

From the table one finds that:

In the month of November & January The maximum temperature at Jalna is 33.8 and 5.3,

3.7.3 **Humidity:**

The air is generally dry during the months from February to May and particularly so in the afternoons when the humidity is about 20 percent on the average. The relative humidity during south-west monsoon period is between 60 and 80 percent. Thereafter they decrease rapidly. Except during the south-west monsoon season the air generally dry particularly so in the afternoons. Skies are generally clear or lightly clouded during most of the year. During the south-west monsoon season the skies are heavily clouded to overcast. Winds are generally light to moderate in force with some strengthening during the monsoon season.

3.7.4 **Cloudiness:**

During the monsoon season the skies are generally heavily clouded or overcast. During the rest of the year the skies are mostly clear or lightly clouded. However, in the cold season, for brief spells of a

day or two, occasionally, passing western disturbances cause cloudy weather. In the latter part of the summer season, especially the afternoons, clouding increases. In the post-monsoon months the cloudiness decreases. In the rest of the year the skies are clear or lightly clouded.

3.7.5 Wind speed and Wind direction:

The wind pattern as per the IMD observations shows that annual mean wind speed is 8.0 km/hr. The highest speed of 14.2 km/hr is observed in the month of June. The mean wind speeds up in velocity during monsoon season ranging between 7.6 – 14.2 km/hr. The winds are relatively low in the post monsoon and winter season and moderate in summer season. The monthly mean wind speed during post monsoon season ranges between 3.9-4.2 km/hr. In winter season the monthly mean wind speed is observed between 3.6-5.4 km/hr, while in summer season the wind speed varies from 6.8-12.9 km/hr. The predominance of wind direction is W followed by NW in summer months, predominantly W in monsoon, E followed by NE in post monsoon months and E and SE in winter months.

3.7.5 **Wind rose:**

Wind speed and direction is presented as wind rose in below **Figure-19.**

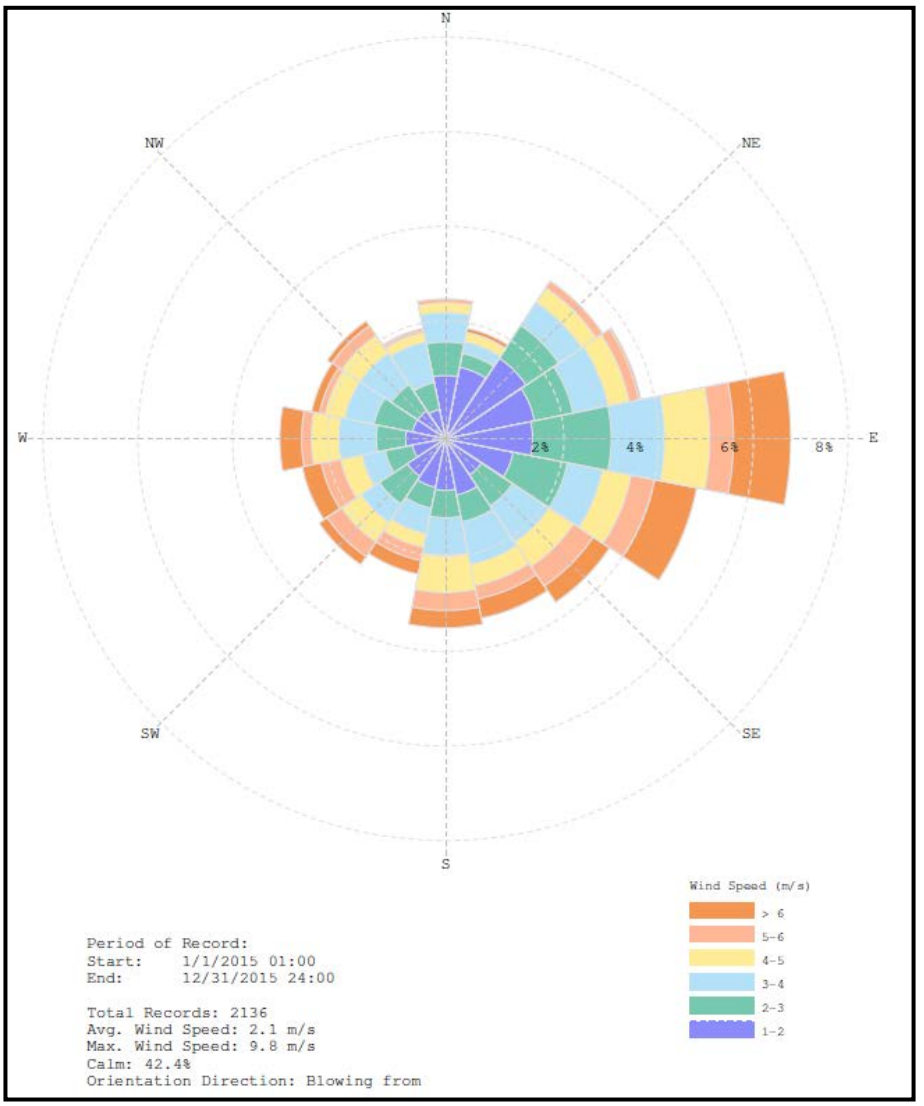


Figure 19: Wind Rose (Dec. 2014 to Feb. 2015)

3.8 Biological Environment:

3.8.1 **Biological assessment** (Generic TOR Point No. 28)

Five stations each were surveyed for flora and fauna studies in the 10 km radius. The location of these stations is shown in **Figure20**. The stations are as under Table 18:

Table 17: Flora and Fauna survey locations

Flora and Fauna	
Code	Name
A	Project site
B	Near Ghanewadi Dam
C	Near Motitalav
D	Near Shirswadi lake
E	Near Shelgaon village road

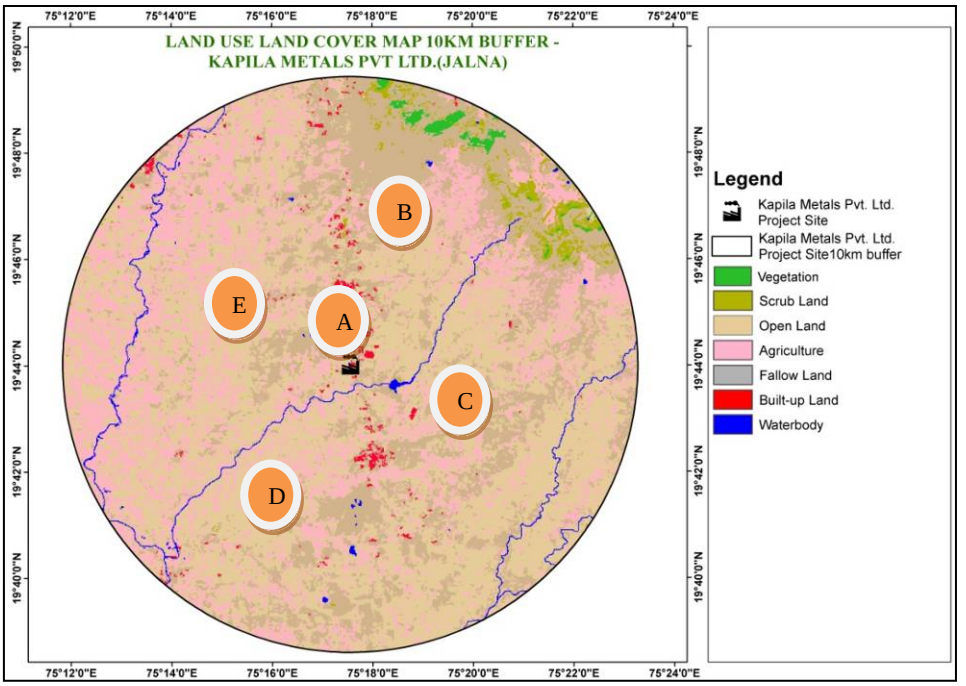


Figure 20: Locations of Avifauna survey and Vegetation, A-E

3.8.2 **Flora:**

The project site exhibits some varieties of plants like *Calatropisprocera, Cassia tora, Micheliachampaca,Cocosnucifera,* etc. There is no aquatic body within the project site. 29 genera and 29 species from 20 families were found during field studies .**Annexure I** provide the details collected by Ultra Tech during field visit.

<u>Methodology</u>

Field observations of avifauna were carried out during February 2015.The diversity of fauna basically depends upon density and diversity of flora. The existing fauna i.e. mammals, amphibians, reptiles,

butterflies, dragonflies and damselflies in and around project site were enumerated. Further, information towards faunal diversity from secondary sources was collected on interaction with the local people and Forest Dept officials.

Observations

The domestic animals in the study area mostly comprise of squirrel, goat, buffalo, dog and cow. The survey revealed that 10 species of mammals were recorded in and around study area (**Annexure II)**. Study area comprises of 13 species of butterflies, dominated by Small & common grass yellow, Common Indian crow, Lime butterfly, Common evening brown etc. Four species of dragonflies and three species of damselflies were recorded. Damselflies like *Ischnura aurora* and *Ischnurasenegalensis* were recorded in the periphery of the project site. Besides avifauna, which has been addressed separately, 3 species of amphibians and 4 species of reptiles were recorded. None of these animals are endangered (Schedule I) as per Wildlife (Protection) Act 1972.

3.8.3 **Avifauna in the study area:**

A total number of 37 species of birds were encountered in the surrounding areas during the survey (**Annexure III & Plate 3.1**). The birds like peafowl, crows, sparrows, bulbuls, babblers and pigeons were observed in and around villages. In areas with agriculture fields, the grain eating herbivorous species like, doves, sparrows and parakeets while Insectivorous bird species viz. green bee eater, white breasted kingfisher, cattle egrets, swallows etc. were found around water bodies and vegetation in low-lying areas. Indian peafowl is listed endangered (Schedule I) as per Wildlife (Protection) Act 1972.

Large Egret little cormorant

Long tailed shrike Little green bee eater Small blue kingfisher

Plate 3.1: Birds observed in and around study area

3.8.4 **Aquatic Flora:**

Preamble

Plankton is an important component of ecosystem, which responds to ecosystem alterations rather rapidly. It is due to the fact that planktonic organisms, which react to different types of water pollution, play a key role in turnover of organic matter and energy through the ecosystem. This reaction is very rapid because of relatively short lifetime and high reproduction rates of the organisms.

Water sample within 10km periphery were collected from Moti talav and Pankheda dam (**Plate 3.1**). Moti talav is main lake in the city and anthropogenic activities like vehicle washing, bathing etc. were carried out **(Plate 3.2)** which might be causes organic pollution in the lake. Samples were collected from the lake **(Plate 3.3)**. In view of low depth, only surface samples were collected. To enumerate phytoplankton, unfiltered surface waters were colleced from the water bodies. Phytoplankton samples were immediately fixed after collection in Lugols Iodine solution so as to prevent adverse effects of light and temperature which might cause rapid decay of organisms. Further microscopic analysis was undertaken in laboratory. For zooplankton, desired volumes of water were filtered through plankton net having mesh size of 75µ to represent all the available groups.

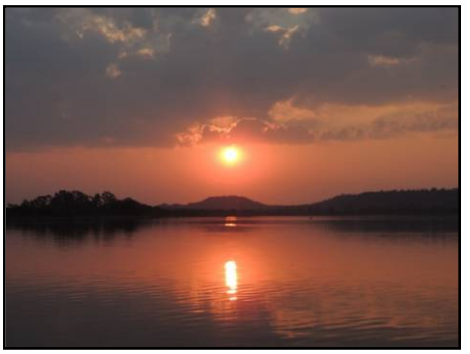


Plate 3.1: Panoramic view of MotiTalav and Pankheda dam

Plate 3.2: Anthropogenic activities in and around Motitalav

Plate 3.3: Collection of plankton from Motitalav

A] Phytoplankton Count: Phytoplankton counts recorded at different sampling stations, are presented in **Table 19**.Total algal population varied between 3970 and 5630 algal cells ml^{-1}. Motitalav showed highest count of phytoplankton.As the anthropogenic activities were carried out in and around the lake might be reason of high plankton count. The phytoplankton population comprised of 4 major groups, namelyBacillariophyceae, Chlorophyceae, Cyanophyceae and Cryptophyceae. Bacillariophyceae dominated all the samples indicating good water quality. Besides diatoms, the most common genera were *Fragillari*a, *Anabaena*,*Ulothrix*etc. The average scores of PPI varied within the range of 19 - 22, indicating probable organic pollution while the SWI values varied between 0.96 and 2.23 that suggest low to medium impact of pollution or adverse factor. Solid waste disposal and surface run off coming out from surrounding areas might be a reason for organic pollution in the lake.

Table 18: Enumeration of Phytoplankton in Motitalav and Pankheda dam

Sample No.	Name of River	Phyto-plankton (No/ml)	Percent Composition of algal groups				SWI	PPI
			Cyano-phyceae	Chloro-phyceae	Bacillario-phyceae	Crypto-phyceae		
	MotiTalav (South East side)	5630	60	20	10	10	2.23	22
	MotiTalav (South East side)	4620	50	20	20	10	1.56	20
	Pankheda dam(East side)	4500	65	20	15	-	0.96	19
	Pankheda dam(West side)	3970	55	15	20	10	1.69	21

Ranges of Palmer's Pollution index (PPI)

<15: Indicate absence of organic pollution
15 - <20: Indicate presence of organic pollution
>20: Indicate presence of high organic pollution

Ranges of Shannon Wiener Diversity Index (SWI)

<1: Indicate poor productive water
1-3 Indicate medium productive water
>3 Indicate good productive water

Ranges of Shannon Wiener Diversity Index (SWI)

<1: Indicate poor productive water
1-3 Indicate medium productive water
>3 Indicate good productive water

Table 19: Enumeration of Zooplankton in Motitalav and Pankheda dam

Location	Plankton Count No/m^3	% Composition of zooplanktons groups			SWI
		Rotifera	Copepoda	Cladocera	
MotiTalav (South East side)	10250	50	30	20	1.20
MotiTalav (South East side)	9250	40	30	30	1.98
Pankheda dam (East side)	6750	65	15	20	1.52
Pankheda dam (West side)	6500	50	20	30	0.96

B] Zooplankton

Zooplankton counts, recorded at different sampling stations, are shown in **Table 20** Density of zooplankton varied between 6500 and 10250 N/m^3. A large number of zooplankton, recorded in Motitalav could be due to the presence of ample amount of phytoplankton in the respective stations. Rotifera was dominant. The SWI, observed to vary from 0.96 to 1.98 indicated low to medium load of organic pollution or adverse factors.

3.9 Socio-Economic:

The present section addresses the socio-economic environment of the 10 km radius area for the M/s Kapila Metals Pvt. Ltd. It includes description of demography, available basic amenities such as housing, health care services, education, transportation etc.

3.9.1 Jalna District: Basic Information:

Jalna district is approximately situated in central part of Maharashtra. The boundaries of Jalna district are adjacent to Parbhani & Buldhana on east, Aurangabad on west, Jalgaon on north and Beed on south. It covers an area of 7,616 sq. km, which is 2.47% of the total state area. Out of the total geographical area 7616 sq. km. (98.68%) is rural and 34.5 sq. km. (1.32%) is urban.

There are 960 villages in the district with 4 towns. The district has a population of 1,959,046 representing 1.74% of the state population with a population density of 254 persons per sq. km. The decadal growth rate was 21.46%. The district has a sex ratio of 951 females for 1000 males and a literacy rate of 71.52%. Table 21 presents these details.

Table 20: Demographic Attributes for Jalna District

1.	Area	7616 sq. km.
2.	Population	1959 thousand

3.	Decadal Growth rate	21.46%
4.	Male population	826 thousand
5.	Female population	786 thousand
6.	Density of population (persons per km^2)	254
7.	Sex Ratio (females per 1000 males)	951
8.	Literacy	71.52%
9.	Male literacy	81.53%
10.	Female literacy	60.95%
11.	Urban Population	19.27%

Source: Provisional Population Totals, Census of India 2011

3.9.2 **Database and Methodology:**

The data is collected and analysed using secondary sources viz. Census Reports, District Statistical Abstract etc. The 10 km radius area is known as the Study Area, and it consists of 31 villages, 1 town spread over the talukas of Badnapur and Jalna in the district. The demographic profile, infrastructure facilities and socio-economic condition is being described under different classifications in the following section.

3.9.3 **Demography**

Summary of demographic information with reference to population, household, literacy, community structure and employment are presented in Table 24. There are 64,863 households in the study area and the average size of household is 5.28 members per household.

The details regarding the demographic aspect of the study area is taken from Census of India website.

Population size ranges from 221 persons in Pankheda to 5336 in Deomurti village and 285,577 in Jalna city. Population within the age class 0-6 year accounts for 13.80% of the total population in the study area.

Table 21: Demographic Characteristics of the Study Area

Name	No. of HH	Total Population	Male	Female	Sex Ratio	Population (0-6)	Size of HH
Total	**64863**	**342760**	**177167**	**165593**	**935**	**47324**	**5.28**

The demographic characteristics of the study area are depicted in **Table 22**. Average sex ratio for the study area is 935 females per 1000 males, which is lower than the sex ratio of the district (937) and higher than the sex ratio of the state (929). Some villages such as Kharpudi (587), Nidhona (839), and Antarwala (850) has a very low sex ratio, whereas Tatewadi (1020), Matarewadi (991) and Shelgaon (972) has higher sex ratio.

According to the 2011 census, the ratio of scheduled caste population in the study area to the total population is 13.80% and scheduled tribe population is 1.50%. This can be observed in **Table 23**.

Table 22: SC & ST population and Literacy Status of the study area

Name	Total Population	SC	ST	Literates	% SC	% ST	Literacy rate
Total	**342760**	**47300**	**5146**	**236763**	**13.80**	**1.50**	**80.14**

The average literacy rate is 80.14%, which is considerably higher in male population (86.26%) as compared to female population (73.63%). The average literacy rate is higher in the urban settlements of the study area (81.80%), as compared to the rural settlements (71.74%). The literacy rate of 80.14% is higher than district (71.52%) and slightly lower than state (82.34) averages.

3.9.4 Working Population:

About 36.29% of the total population is total workers in the study area, engaged as cultivators, agriculture labours, households industry, others etc (Table 24). Of the total workers, nearly 88.36% are main workers, of which male main workers are (75.35%).

Table 23: Status of working population in the study area

Name	Total Workers	Main workers				Marginal Workers	Non Workers
		Cultivators	Agricultural Laborers	Household Industry	Others		
Najik Pangri	1139	737	220	3	138	41	779
Mandwa	1582	915	331	7	117	212	1188
Rajewadi	1194	809	178	2	108	97	1289
Matarewadi	646	404	108	38	76	20	481
Shelgaon	1792	644	498	45	532	73	1827
Dawalwadi	723	212	296	9	172	34	562
Jawasgaon	456	289	94	3	52	18	369
Haldola	504	258	196	6	33	11	514
Pirsavangi	763	410	273	3	23	54	654
BhilpuriKh.	379	194	162	0	22	1	254
Deopimpalgaon	1097	794	134	3	55	111	1237
Pankheda	150	120	4	0	2	24	71
Pirpimpalgaon	1213	300	620	7	255	31	1057
Tatewadi	373	162	64	27	79	41	318
Ghanewadi	688	187	369	5	76	51	530
Ambedkarwadi	482	94	283	48	46	11	326
Nidhona	298	138	134	0	23	3	228
Tandulwadi	474	166	254	1	25	28	403
Gundewadi	579	98	149	12	137	183	499
Jamwadi	985	344	390	5	214	32	1054
Shrikrushnagar	704	105	192	12	359	36	865
Panshendra	971	311	318	12	275	55	927
Deomurti	1932	314	562	40	780	236	3404
Kharpudi	1084	255	317	10	487	15	2014
Rohanwadi	1162	377	570	2	206	7	781
Indewadi	1428	205	395	32	685	111	2326
Daregaon	1714	544	448	32	664	26	1635
Siraswadi	1151	393	528	10	54	166	1537

Name	Total Workers	Main workers				Marginal Workers	Non Workers
		Cultivators	Agricultural Laborers	Household Industry	Others		
Kumbephal Bk.	844	345	315	20	102	62	776
Antarwala	883	251	476	6	116	34	706
Bethlam	543	105	215	0	177	46	639
Jalna (M Cl)	96449	993	1854	3521	77470	12611	189128
Total	**124382**	**11473**	**10947**	**3921**	**83560**	**14481**	**218378**

Of the total main workers cultivators (10.44%) and agricultural labour (9.96%) together constitute 20.40% of the total main workers, whereas 76.03% of main workers are engaged in others category. It reflects that 76% of the main workers in the study area are engaged in other category such as manufacturing, processing, servicing and repairs, trade and commerce and agricultural sector has absorbed only 20% of the total workers.

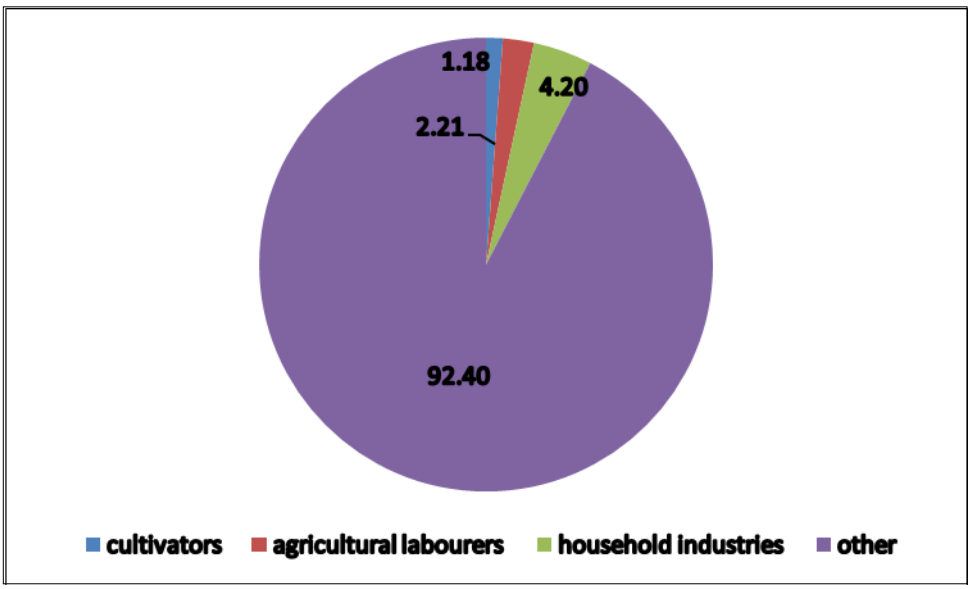
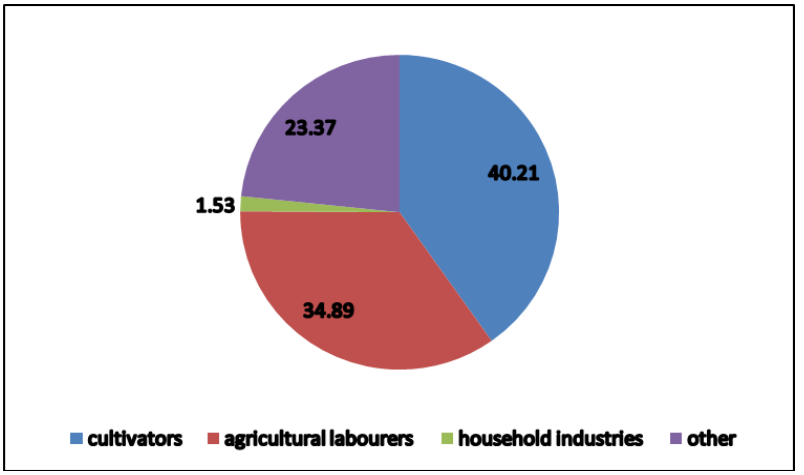


Figure 21: Distribution of Main Workers in urban and rural area



Rural & Urban Population

Out of the total population of study area, 83.32% lives in urban regions and only 16.68% lives in rural areas of villages. In total 285,577 people lives in urban areas of which males are 147,092 and females are 30,075, whereas 57,183 people live in rural areas of which males are 30,075 and 27,108 are females.

3.9.5 **Infrastructure:**

This section analyses the infrastructure facilities like water supply, roads, markets, banks, post offices, schools and electrification in the study area.

Educational facilities at the minimum level of primary education are available in all the villages of the study area. There are many villages having more than one primary school. Jalna town in the study area is renowned educational centre with top colleges and schools providing quality education. After the completion of school, students for higher education the go to the city like Jalna& Aurangabad.

Medical facilities of one or the other type are available in all the villages in the study area. There are about 40 primary health centres (PHCs) and 171 sub centres in the district. Public health facilities in the talukas of the district are majorly located in rural areas, excepting in Jalnataluka where 10 of the 17 facilities are in the urban areas. However, the distribution of private health facilities in the talukas is disproportionate to the percentage of urban population in them. In Jalnataluka, a whopping 87.67% of the private health facilities are in urban areas.

Post and Telegraph facility is available in all the villages and towns of study area. Although phone connections are available in most of the villages but people tend to use mobile phones for communication.

Drinking water is not a problem as most of the villages and towns have the facility of tap water and well water. Water is also sourced from bore wells & hand pumps. Although supply is good but there could be acute shortage in the summer months due to poor rainfall etc.

Road and Rail connectivity is good as all villages and towns have paved roads and connected by bus services. Jalna is primarily connected with the rest of India by railway and road. Jalna is a station located on the Kachiguda-Manmad railway. Jalna is connected to major towns of the state by state highways. Road connectivity is excellent, roads connecting to Aurangabad, Pune, Ahmednagar, Nagpur, Beed, Mumbai having been upgraded to four-lane highways. A New Nagpur-Aurangabad-Mumbai highway, passing through Jalna, is being developed. All villages and town (100%) are enjoying power supply facility for all the purposes.

3.9.6 **Historical/Archeological/Forest:**

No cultural heritage site (temple, mass bathing site during religious festivals, etc) is located close to the project site that could be affected during the construction stage.

3.9.7 **Industries:**

Jalna district is relatively industrially backward as compared to some of the other advanced districts of Maharashtra. The lack of good quality infrastructural facilities, inadequate local market, unavailability of skilled labour, immobility of local persons and lack of entrepreneurial environment are some of the major constraints for the lack of industrialization of the district. There is one large MIDC Jalna, consisting of large, medium, and small-scale industries. It has large number of steel rolling mills; agro-based units like dal mills and, most significantly, a large number of seed manufacturing units.

The industries are facing the major problems of frequent power cut-off, water shortage etc. There are 24 large and medium scale industries in Jalna district.

4 CHAPTER - ENVIRONMENTAL IMPACT ASSESSMENT, PREDICTION AND MITIGATION MEASURES

This chapter describes the identification, assessment and mitigation methods proposed for impacts on various components viz, air, water, soil, etc. during construction phase and operational phase.

4.1 Identification of Impacts

The environmental impacts will be identified during Construction and operation phase of the Projects and these impacts can be categorized as either primary or secondary. Primary impacts are those, which are due to the project whereas secondary impacts are induced and typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The impacts have been assessed for the proposed steel project assuming that the pollution due to the existing activities has already been covered under baseline environmental monitoring and continue to remain same till the operation of the project.

Impacts and mitigation during Construction phase

The construction of the proposed steel project comprises various activities each of which may have an impact on some or other environmental parameters. Various impacts during the construction phase on the environment parameters have been presented below:

Land use

The total project area is 11.6 ha consists of ~70% of fallow/waste/open land and ~33% scrub land. Clearing of trees/shrubs at some locations will be required during construction phase. It is proposed to develop greenbelt and landscaping (~33%) around plant boundary to improve the aesthetics of the area. Thus, the overall impact will be beneficial in nature. The land use remains unchanged as it is identified Industrial area.

Impact on Soil Quality

The soil at the project site predominantly consists of clay. The sub-strata of this area is rocky, however no blasting is envisaged for either leveling or during foundation since the site is almost plain with gentle slope and needs very little grading, filling and leveling.

The construction activities will result in loss of topsoil to some extent in the plant area and waste disposal area. The topsoil requires proper handling like separate stacking so that it can be used for green belt development. Apart from very localized construction impacts at the plant site, no significant adverse impact on soil in the surrounding area is anticipated.

Mitigation Measures

The following mitigation measures shall be adopted for soil and land environment:

- After completion of the construction phase, the surplus earth shall be utilized to fill up the low lying areas, the rubble shall be cleared
- The top soil from the excavated areas shall be preserved for re-use for green belt development during construction phase so that plantation will grow to adequate height by the time of plant commissioning. Thus, green belt will be effective in containing the fugitive emissions during operation, if any;
- Species selected in this plantation shall be fast growing and they shall be adaptable to local conditions. Most of the varieties shall be eco-friendly and help reduce/absorb gases and dust;

- Entire plant shall be aesthetically landscaped and as much as feasible natural gradient shall be maintained;
- There shall be minimum concreting of the top surface so that there is a scope for maximum ground water recharge during scanty rainfall; and

Impact on Air Quality

During construction phase, particulate matter will be the main pollutant, which would be generated during site development activities and vehicular movement. Further, concentration of NO_x and CO may also slightly increase due to increased vehicular traffic movement. However, the impact on ambient air quality will be very low and temporary. As most of the construction equipment will be mobile, the emissions are likely to be fugitive. The dust generated will also be fugitive in nature and will be controlled by sprinkling of water.

The impacts will be localized in nature and the areas outside the project boundary are not likely to have any major adverse impact with respect to ambient air quality.

Air Pollution Control Measures

There will be no major leveling operations required as the plant site is having a gradual gradient. Hence, no significant excavation of the area except for the purpose of foundations is envisaged. Regular water sprinkling will be done to minimize fugitive PM generation.

Ambient levels of SO_2 and NO_X are likewise expected to increase marginally due to operation of construction machinery such as bulldozers, pay loaders, trucks, etc. However, these levels are expected to be insignificant since these machines will be operated intermittently. It shall be ensured that construction vehicles are properly maintained with valid PUC.

Water Resources and Quality

Impact on Water Resources and Quality

The water requirement during construction phase is estimated at about 30 m^3/d and will be sourced through mainly tankers.

The wastewater generation during the construction period will be from the temporary sanitary units provided for the workers. This waste will be treated in septic tanks and discharged into soak pits. Hence, there will not be any impact on the water regime due to discharge of sanitary treated wastewater.

Water Quality Mitigation Measures

The earth work (cutting and filling) will be avoided during rainy season and will be completed during summer season. Also development of green belt in and around plant will be taken up during the monsoon season. All in-plant roads will be paved.

Soil binding and fast growing vegetation will be grown within the plant premises to arrest the soil erosion. Toilets with septic tanks will be constructed at site for workers.

Noise Environment

Impact due to Noise Levels

The major sources of noise during the construction phase will be from 70-80 trucks and construction equipment. The operation of equipment will generate noise ranging between 85-90 dB (A) at 1 m from the source. However, it will attenuate in a short distance. Moreover, it will be during daytime only and for short construction phase only.

Baseline Data for Noise Levels :

1. This is a project with proposed production of Sponge Iron 1000 TPD, Captive Power 50 MW, Billets 1000 TPD, and TMT bars 1000 TPD. Since the project is located within designated industrial area, the allowable noise levels are 75 dB during the day and 70 dB during the night. Noise levels were measured at the project site and in the surrounding area

2. It can be observed that the baseline noise levels during the day are considerably lower than the allowable limit during the day for Industrial area as well as Residential area. During the night, noise levels at all locations are lower than the allowable CPCB limit during the night.

Sr. No.	Location	Leq Day (dB)	Leq Night (dB)	Distance from Project Boundary (meters)	CPCB Limit for Leq Day (dB)	CPCB Limit for Leq Night (dB)
1	Project Site	53.1	44.2	0	75	70
2	100 Meters from Project Site	51.4	42.8	100	75	70
3	150 meters from Project Site	52.8	43.5	150	75	70
4	Dhawalwadi	54.2	44.1	7000	55	45
5	Jalna	51.2	43.4	4500	55	45

Impact Due to Expansion in Operational Phase :

3. This is a proposed project with multiple type of different machinery which would be functional most of the 24 hours. Although there are 100s of different types of machinery, most of them would have noise levels lower than 85 dB, which would not require any additional mitigations to be done. However, certain machinery would create noise levels beyond 90 dB, and hence they need to be sorted from the list of machinery. Following are the major sources of noise identified from the list of machinery to be used during the Operational phase, received from the project proponent. Only the sources of noise with noise levels above 80~85 dB are considered in this list.
   1) Furnaces, 2 Nos, 20T Each – 100~105 dB Each, during operation.
   2) Bag Filters, Scrubbers- 85~90 dB
   3) Conveyor Belts (Pneumatic), Belt Bucket– 80~85 dB
   4) DG Sets for Stand-by power supply– 90 dB
   5) Dust Collection System (Blowers) – 90~95 dB
   6) ETP/STP (1 No Each)– 85~90 dB
   7) Compressors – 90 dB
   8) Boiler
   9) Steam Turbines

2. **Furnaces** : Due to the nature of operation, and turbulent flow of hot air/gas creates noise levels exceeding 100 dBA for Each of the furnaces. This noise is restricted to a certain extent of the furnaces are well insulated for Thermal Insulation. The Exhaust of high temperature gases needs to be silenced by using a high-temperature silencer with 20 dB Insertion loss rating. Usually, The noise level of furnace cannot be completely controlled at the source itself, and it is generally observed that the noise spreads throughout the industrial shade where the furnace is installed. Therefore, it is recommended that the furnace area to be isolated from the rest of the machinery by using Noise Barriers with 20 dB Transmission Loss Rating.
3. **Conveying systems (Pneumatic), Belts, Buckets :**The Pneumatic conveying system creates moderate noise levels due to release of pressurized are from nozzles. This noise is usually unavoidable because the function of nozzles is to push certain components by release of pressurized air which creates noise level of approximately 80~85 dB. Therefore, in the pneumatic conveyoy system, nozzles should be carefully chosen, to serve the purpose with creation of lower noise levels.

4. **Compressors:** The Compressors of larger capacity usually come with their own Acoustical Enclosures, but the Noise levels of large compressors usually exceed Sound Pressure Levels of more than 100 or 105 dB, because of the Motor noise as well as the noise due to air compression mechanism which may be screw type compressors or reciprocating compressors. It is strongly recommended that the Air compressors to be kept at one location (compressor House) and Acoustical Enclosures with Transmission Loss Rating of at least 30 dB should be provided for the Compressor House. This is necessary, because due to varying air consumption inside the whole plant, it cannot be predicted for how much time would the compressors run, therefore assuming that they will run for at least 6 hours in a day, it will definitely affect the surrounding Noise Levels.
5. **Effluent Treatment Plant / Sewage Treatment Plant:** STP/ETP consists of multiple pumps and Blowers. The Noise levels of the pump are usually in the range of 80~85 dB and since the pumps are installed in an enclosed building, usually no mitigations are required for the STP pumps. However, the blowers create noise levels exceeding 100 to 105 dB, which is very loud. Therefore, Acoustic Enclosures are required for the Blowers, with Transmission Loss Ratings of 30 dB.
6. **Boiler :**The boiler has many sources of sound including steam vents, safety valves, boiler feed pumps and many other machinery which are individual sources of noise contributing to an overall noise level of 100 dB. A Detailed study needs to be conducted at the boiler house after completion of the installation to bring down the noise level below 90 dB to comply with the factories act or below 85 dB if possible to provide a safer work environment. All steam vent exhausts need to be installed with Silencers with 20 dB Insertion Loss Rating. Boiler Feed pumps need to be installed with Acoustic Enclosures having 15 dB Transmission Loss Rating.
7. **Steam Turbines :** Steam turbines typically have noise levels in between 85 and 90 dB. Typically, Thermal insulation which is done on the steam turbine, also brings down the noise level of the steam turbine by about 5~6 dB, and therefore, no additional mitigations are necessary for the turbines for reduction of noise.

Noise Modeling Study :

8. A Noise modeling study was conducted to quantify the impact Machinery noise on the local noise environment during the operational phase of the project. Noise levels within the distances of 100~200 meters from the local project site were assumed to be that measured at the project site, and quantified impact was predicted as a result of Machinery noise onto the local noise environment (Leq Day). Below is the result of the Noise Modeling study.

Noise Modelling Study

S.No.	Noise Generating areas	Noise level at source (dBA)		Anticipated Noise level (dBA)				
				100 Meters from Project Site	150 meters from Project Site	Dhawalwadi	Jalna	200m
		(at 1 meter dist)	Distance from project site (m)	100	150	1900	7500	200
1	Furnaces, 2 No, 20T Each	105		65.0	61.5	39.4	27.5	59.0
2	Boiler	100		60.0	56.5	34.4	22.5	54.0
3	STP/ETP/Cooling Tower	90		50.0	46.5	24.4	12.5	44.0
	Cumulative Noise Levels			66.3	62.8	40.7	28.8	60.3
	Attenuation due to Green belt and other mitigations			20.0	20.0	20.0	20.0	20.0
	Existing Noise Levels (day-time)			51.4	52.8	54.2	51.2	55.0
	Cumulative Noise Levels (DAY)			**52.6**	**53.2**	**54.2**	**51.2**	**55.1**

9. From the Noise Modeling study, it can be observed that impact within 100 meters of the project site is predicted to be approximately 1.2 dB. The Increase over baseline noise levels at 150 meters is approximately 0.4 dB which is very negligible. The project site is located in a designated industrial area. Therefore, the predicted increase over the baseline noise levels is negligible, and nowhere near the allowable CPCB limit of industrial area during the day, which is 75 dB.
10. At 200 meters from the project site, increase at the assumed reading of 200 meters, with assumed noise level of 55 dB which is the limit for residential area, 0.1 dB of time averaged increase was predicted over the baseline noise levels, which is very negligible.

11. No increase was predicted at any of the noise monitoring locations, all of which were located outside 500 meters distance of the project boundary.

Summary of Quantified Impacts from Noise Modeling Study :

1. During the Operational Phase, Maximum increase in Sound Pressure Level was predicted at 0.4~1.2 dB at a distances of 100~150 meters from the project site, 0.1 dB at 200 meters (at assumed reading, with 55 dB background noise level).
2. This increase predicted, is very negligible as compared to the allowable CPCB limits for industrial area.
3. Mitigations Measures as listed below should be implemented for avoiding any potential impact on the Noise Environment.

Noise Levels Mitigation

Equipment will be maintained appropriately to keep the proper working condition. Wherever possible, equipment will be provided with silencers and mufflers. Construction activities will be restricted to day time only. Further, workers working in high noise areas will be provided with necessary protective devices e.g. ear plugs ear-muffs, etc.

Sr.	Machinery / Equipment Description	Predicted SPL at 1 meter distance	Mitigations Required
1.	Air Blowers (Multiple) (Dust Collection System)	95~100 dB	1. Air handling units or even the Dust collection systems usually comprise of Motors and Blowers (either axial fans or centrifugal blowers). Centrifugal blowers usually have larger Noise levels because of turbulence generated inside the blower. 2. The Motor and the Blower usually have combined Noise Level of 100 dB, hence Acoustical Enclosure with 20 dB Transmission Loss should be installed for All AHUs. 3. The ducting from each of the AHUs/Dust Collection system must have Acoustical Lining from inside or In-line Silencer installed after the blower in order to avoid the transmission of Noise through the ducts.
2.	Air Compressors (Or Compressor House)	> 100 dB	1. All compressors should be installed at a common location i.e. compressor house. 2. The Compressors should be provided with Acoustical Enclosure of at least 30 dB Transmission Loss Rating.
3.	Diesel Generator Set (Multiple)	85 dB~90 dB at Full Load condition.	1. DG sets are supposed to have Sound Pressure Levels of up to 75 dBA when measured at 16 different points around the dG Set at 75% of the full load condition. 2. Usually, the DG set comes with its own acoustical enclosure hence no other mitigations are necessary for this source of noise. In case there are multiple DG sets installed near one another, then 1 combined acoustical enclosures for all the DG Sets with 30 dB TL Rating works better than individual canopies.

4.	Vacuum Pumps (Multiple)	90~100 dB	1. Vacuum Pumps, electrical driven can generate noise levels exceeding 90~100 dBA. Acoustic Enclosures with 30 dB Transmission Loss Rating are recommended for the Vacuum pumps.
5.	Furnaces, 2 Nos, 20T Each	100~105 dB	Noise levels created during the operation of the furnaces would be exceeding 100 dB. Mostly the furnaces often run for 24 hours, creating this noise level continuously. Acoustical Noise Barriers with Shadow zone transmission loss Rating of 15 dB are recommended for surrounding the Furnace area. All operators working near the furnace area should wear protective ear muffs to prevent permanent hearing damage.
6	Effluent / Sewage Treatment plants	100 dB	1. STP consists of Blowers and Pumps. Pumps typically have noise levels lower than 85 dB, so no specific treatment is required. 2. The STP Blowers have noise levels exceeding 100 dB, therefore, Acoustic Enclosures with 30 dB Transmission loss Rating are recommended for the STP blowers.
7.	Boilers	90~95 dB	1. Boilers have many noise sources in them, which need to be studied separately. 2. One of the major issues with the boiler is the sound generated at regular intervals because of safety blow-off cock, which exceeds 105 dB and more importantly it has a large sound Power Level as well. This source can be controlled by installing a Blow-Off silencer for all the blow off safety valves of the boiler.
8.	Chilling Plant (Multiple) / Cooling Towers	90~95 dB	Expected Noise Levels of approximately 90~95 dB. Because of the Motors/Pumps involved in the Chilling plant to be installed with Acoustical Barriers on all sides of the chilling plant in case there are people working in the vicinity of the chilling plant.
9.	Additional Mitigations / Cares to take	N/A	1. All people working in the vicinity of the Equipment/Machinery with Sound Pressure Levels higher than 95 dB should wear protective ear plugs to avoid permanent hearing damage.

Ecology

The proposed project area is mostly barren/fallow land. Therefore, no major loss of biomass is envisaged during construction phase.

A good green belt and landscaping will be developed within the plant premises. Greenbelt as per CPCB guidelines will be developed.

Impacts and Mitigation Measures during Operational Phase

The proposed project operation will involve production of sponge iron 100 TPD, billets/TMT bars 1000 TPD and 50 MW power. For the purpose of impact assessment during the operational phase, the following components have been considered although some of these will be overlapping:

- Land use;
- Topography and climate;
- Air quality;
- Water resources and quality;
- Traffic and Noise levels;
- Solid waste management

Land use

The total project area of 11.6 ha is mostly waste land in MIDC area. Thus present land use will remain unchanged. The existing trees/shrubs/plantation will be retained to the extent possible in line with the plant design. Further, suitable greenbelt development will also be implemented.

Topography

The proposed project site is fairly flat with gentle slope and few trees/shrubs present at some places. There will not be much cutting and filling required for the proposed project. The additional structures such as industrial building, stacks, power plant, ETP, etc. will be constructed. The general appearance of the site will change into an industrial set up couple of tall structures like stacks.

<u>Air Quality</u>

The iron and steel industry from its various processes emits pollutants into the air. The main source of air pollution during operational phase will be due:

1. Emission from SL/RN Kiln
2. Fumes and dust from Induction furnace during charging and
3. PM, SO_2 from CPP

Details about the pollutants in stack emissions are given in Table 25

Table 24: Stack Emissions

Parameters	Stack Attached to		
	Kiln-WHRB	AFBC	Induction Furnace
Stack height, m	80	80	40
Stack diameter, m	2.5	2.8	0.6
Flue velocity, m/s	20.5	20.0	10.8
Flue temperature ^{0}C	80	100	80
Fuel type	Coal	Coal	--
Fuel Quantity, T/day	1200	350	--
% S	0.4	0.4	--
PM Emission, g/sec (mg/Nm^3)	1.78 (50)	2.33 (50)	3.47 (100)
SO_2 Emission, g/sec	27.78	32.41	--
NOx emission, g/sec	3.47	9.08	--
Air pollution control equipment	ESP	ESP	Bag Filter

Impact on Air Quality

The sources of air pollution in the process due to the proposed plant facilities have been quantified in Table 25. The contribution from the existing activities has been captured in the AAQ during baseline monitoring studies.

Stack details

Table 25: Stack details

Attached to	Induction Furnace, DRI palnt, Boiler
Height in meters	1 no. 40 m & 2 no. 80m
Emitting Gas Temperature C	70 – 80^{0}C
Exit Gas Velocity m/sec	Around 18 - 22 m/sec

Although, no emission is expected from the stack, nonetheless, dispersion modeling has been done assuming 100 mg/m^3 particulates. The isopleths are presented in Figure 24, 25, 26

Air quality impact is envisaged due to operation of three Induction Furnace of capacity 40 T each, sponge iron plant and power plant. Electricity will be used for by induction furnaces. Forced draft cooler, bag filter are proposed before stack as gas conditioning and control equipment for induction furnace. The only emission from 40 m tall stack shall be 100-50 -60 mg/Nm^3 PM.

4.2 Air Modeling: (Generic ToR point No. 22, 29, 30, 31)

Air quality impact is envisaged due to operation of this plant. Coal will be used in production as well as fuel in power generation. Hence, there will be emissions of Particulate Matter (PM), Sulphur Dioxide (SO_2) and Nitrogen oxides (NOx) from flue gases.

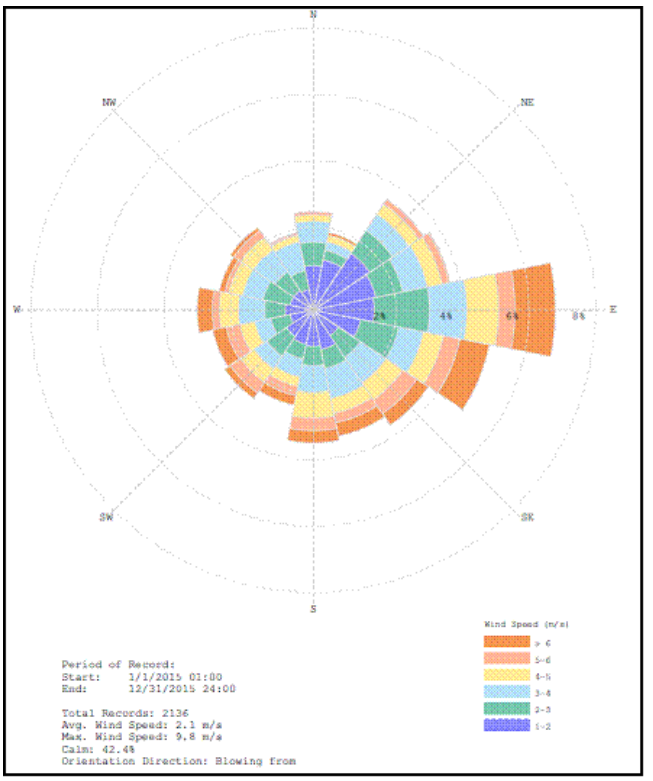
Incremental Ground level concentrations (GLCs) have been predicted using AERMODC loud software. The application incorporates popular U.S. EPA air dispersion models AERMOD and ISCST3 into one

integrated graphical interface. The model uses rural dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998).

4.2.1 **Input to Model**

There will be three main stacks attached Kiln-WHRB, IF and AFBC boiler. The stacks detail and flue gas characteristics are presented in Table 25

Hourly meteorological data recorded at site for winter season (Dec 2014 to Jan-Feb 2015) on wind speed, direction and temperature is used as input. Site specific wind-rose for this season is shown in **Figure23**. For the site-specific mixing heights CPCB document PROBES/88/2002-2003 is followed. Average hourly data for 24 hrs used for modeling is tabulated in **Table-25**.windrose ref. chap. 3



~~Figure 22: Site Specific Wind Rose for Winter Season~~

Table 26: Average Hourly Meteorological Data for 24 Hours used for Modeling

Time	W.D.	W.S.	Temp.	Stability	M.H.
Hr.	Deg.	m/s	Deg.K	Class	m
1	97	2.1	288	6	50
2	113	2.2	287	6	50
3	72	2.3	285	6	50
4	36	0.9	284	6	50
5	90	2.8	284	6	50
6	44	1.4	284	6	50
7	36	1.1	286	2	50
8	0	0.0	289	2	50
9	49	1.5	292	1	200
10	72	2.4	295	2	500
11	135	4.4	297	2	700
12	120	4.2	298	2	1000
13	130	4.6	299	2	1200
14	90	3.3	300	2	1200
15	113	3.8	301	2	1200
16	94	3.0	300	2	1200
17	113	3.3	299	3	1000
18	61	1.8	296	2	700
19	48	1.4	293	6	600
20	0	0.0	290	6	400
21	25	0.7	288	6	300
22	14	0.3	287	6	200
23	45	1.1	287	6	100
24	11	0.1	287	6	100

In the short-term simulations, the incremental ground level concentrations were estimated to obtain an optimum description of variations in concentrations within 10 km radius w.r.t. stack attached to Kiln-WHRB as centre.

4.2.2 **Prediction:**

The predicted results are tabulated below in **Table-26** and dispersion trend is shown as isopleths in **Figure-24, 25 and 26** respectively for PM, SO_2 and NOx.

Table 27: Predicted 24-Hourly Short Term Maximum Incremental Ground Level Concentration

Pollu-tants	Maximum Incremental Levels, µg/m^3	Distance, km	Direction
PM	8.3	1.0	W
SO_2	18.7	2.0	W
NOx	4.1	2.0	W

The maximum incremental GLC (Refer Table-26) of PM, SO_2 and NOx is superimposed on the baseline concentrations recorded during the study period to arrive at the likely resultant concentrations after 100% operation of the proposed plant. The cumulative concentration (baseline + incremental) is tabulated below in Table-27 while resultant concentrations at ambient air quality monitoring (AAQM) locations are tabulated in Table-28.

Table 28: Resultant Concentrations within Study area

Pollutant	Incremental Concentrations	Baseline Concentrations	Resultant Concentrations	CPCB Limit
PM	8.3	69.18	77.48	100
SO_2	18.7	14.88	33.58	80
NOx	4.1	18.82	22.92	80

*** -avg. Baseline concentration in study area. All values in $\mu g/m^3$*

Table 29: Resultant Concentrations at AAQM Locations

AAQM Locations	Incremental Concentrations			Baseline Concentrations			Resultant Concentrations		
	PM	**SO_2**	**NOx**	**PM**	**SO_2**	**NOx**	**PM**	**SO_2**	**NOx**
AAQ1-Project site	2.98	0.95	0.20	65.85	13.12	17.49	68.83	14.07	17.69
AAQ2- Haldoli	1.11	1.57	0.35	65.31	13.61	17.63	66.42	15.18	17.98
AAQ3- Dhawalwadi	1.29	5.32	1.14	65.81	11.89	16.46	67.10	17.21	17.60
AAQ4- Khadgaon	2.18	10.17	2.23	67.45	12.45	16.24	69.63	22.62	18.47
AAQ5- Akola	1.09	4.52	0.38	69.18	13.37	17.05	70.27	17.89	17.43
AAQ6-Jalna	0.36	1.10	0.25	68.40	12.94	16.47	68.76	14.04	16.72
AAQ7-Deopimpalgaon	1.90	2.89	0.65	67.66	13.38	16.97	69.56	16.27	17.62
AAQ8-Badnapur	1.14	4.90	1.09	68.28	13.85	18.06	69.42	18.75	19.15
AAQ9-Tandulwadi	0.77	2.59	0.59	68.43	14.88	18.82	69.20	17.47	19.41

** - Avg. Baseline concentration at each location

4.2.3 Impact Assessment

Ambient air quality in study area w.r.t. PM, SO_2 and NOx is within NAAQS 2009 as seen from Table 28. Hence, no significant impact is envisaged within study area.

Mitigation Measures

Ambient air quality will be within NAAQS 2009 as mentioned above. ESPs and Bag Filter along with tall stacks are proposed as air pollution control measures.

Ref. above table29 30

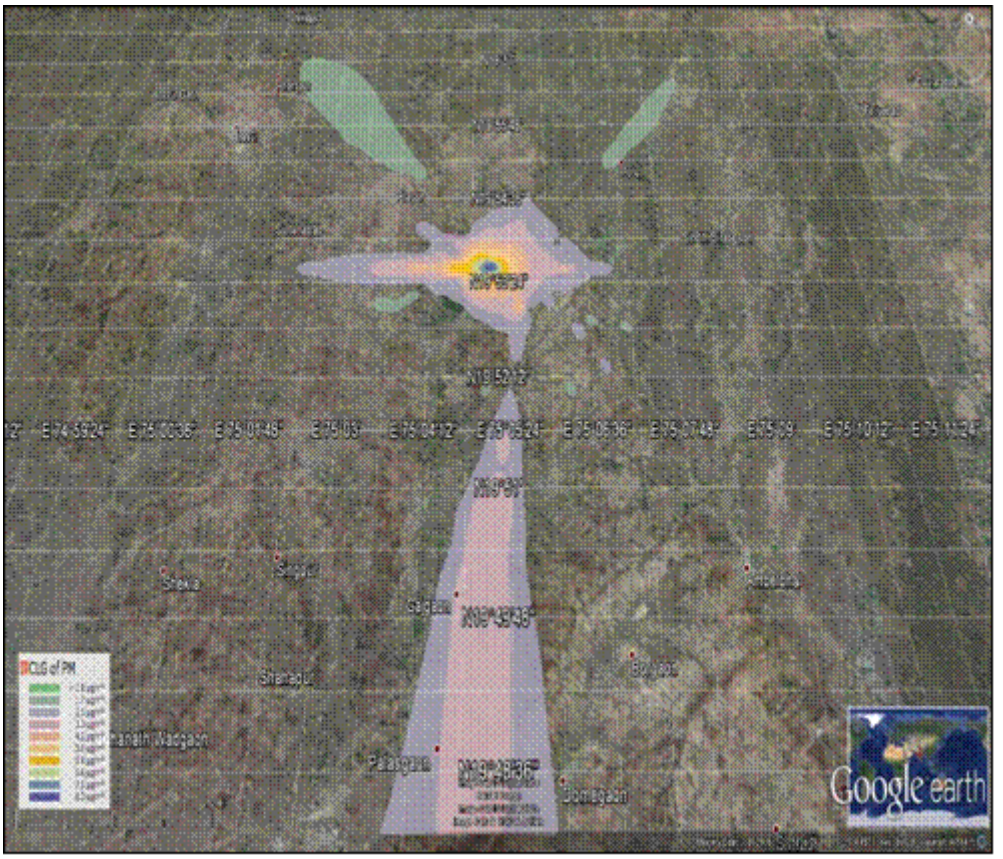


Figure 23: Short Term 24 Hourly Incremental GLCs of PM

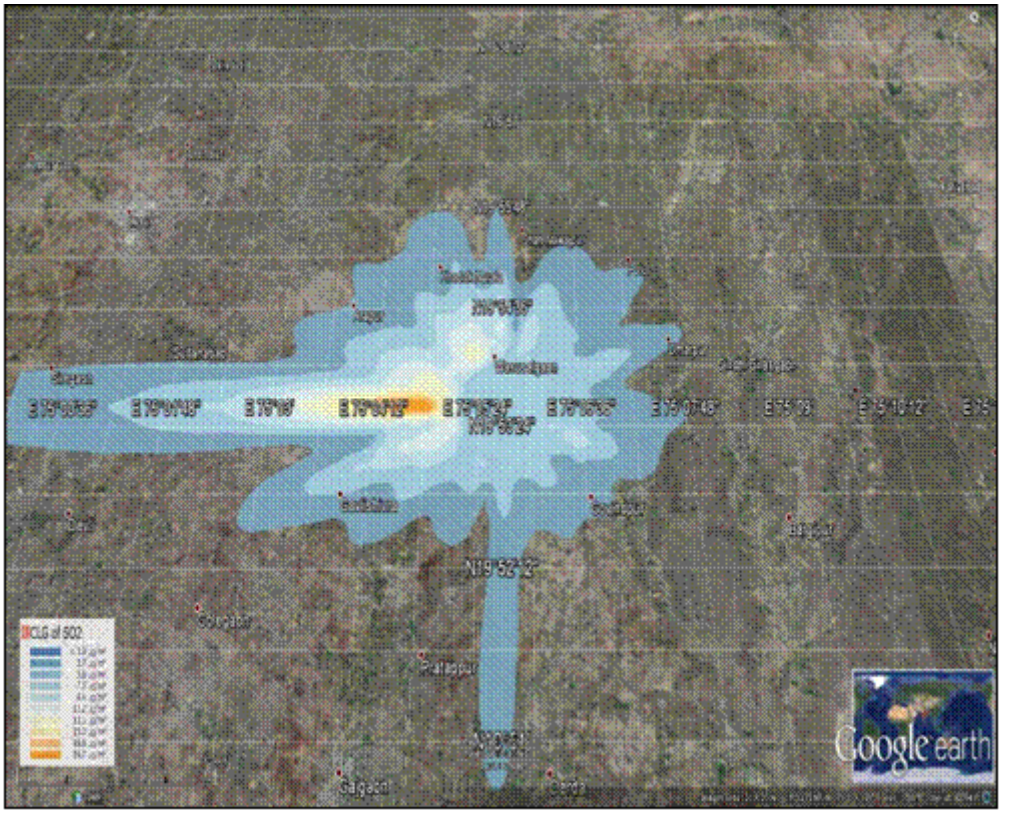


Figure 24: Short Term 24 Hourly Incremental GLCs of SO_2

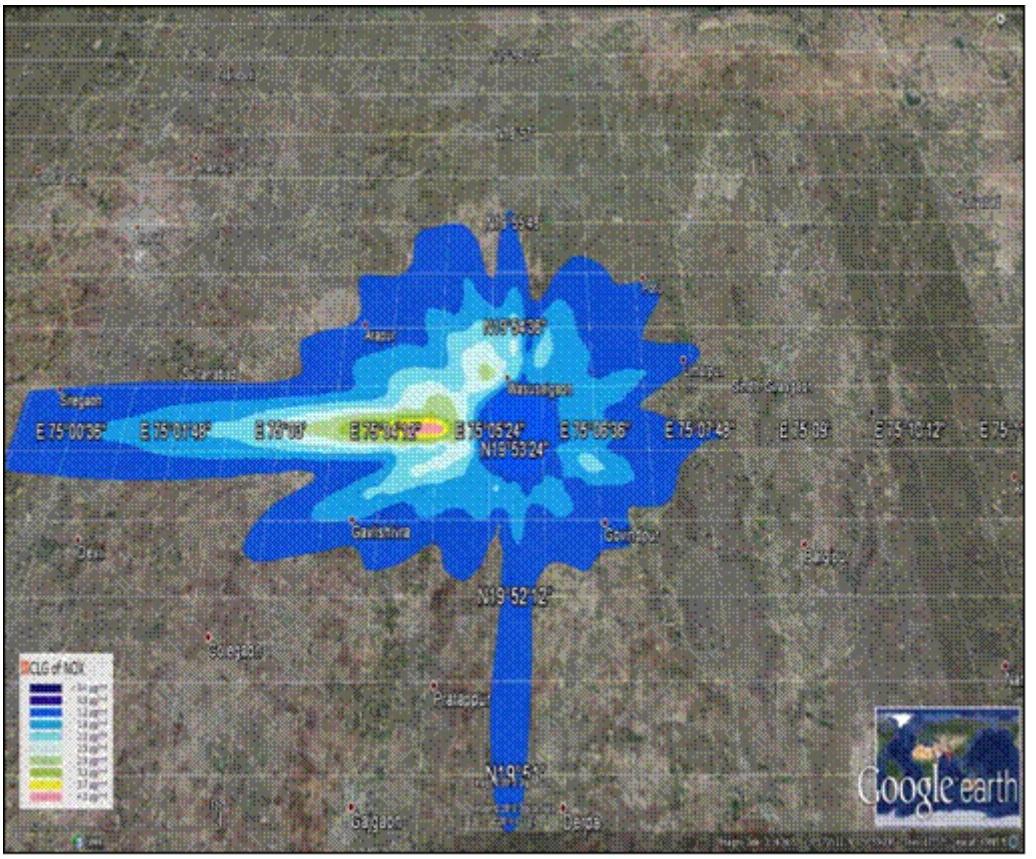


Figure 25: Short Term 24 Hourly Incremental GLCs of NOx

~~Stack height Calculation based on PM emissions:~~

~~Stack Height for 2 x 500 TPD DRI Kilns:~~

~~Coal Consumption (Indian coal)~~	:	~~1200 TPD (Common For 2x500 TPD Kiln)~~
~~Sulphur content in~~	:	~~0.5 % (max. by mass)~~
~~SO2 emission~~	:	~~1200 x 1000 x 0.5 x 2/2400: 500 Kg/hr~~
~~Stack Height H,~~	:	~~14 $(Q)^{0.3}$~~
	:	~~14 $(500)^{0.3}$ = 73.37 m~~
~~Considered Stack height~~	:	~~80 m~~

~~Stack Height for FBC Boiler for 24 MW Power Plant:~~

~~Coal Consumption (Indian coal)~~	:	~~576 TPD~~
~~Sulphur content in~~	:	~~0.5 % (max. by mass)~~
~~SO_2 emission~~	:	~~576 x 1000 x 0.5 x 2/2400: 240 Kg/hr~~
~~Stack Height H~~	:	~~14 $(Q)^{0.3}$~~
	:	~~14 $(240)^{0.3}$ = 58.87 m~~
~~Considered Stack height~~	:	~~80 m~~

~~**Stack Height for 3X40MT Induction Furnace:**~~

~~Fuel Consumption (Sponge Iron) : 920 TPD~~

~~Sulphur content in : 0.025 % (max. by mass)~~

~~SO2 emission : 920 x 1000 x 0.025 x 2/2400: 19 Kg/hr~~

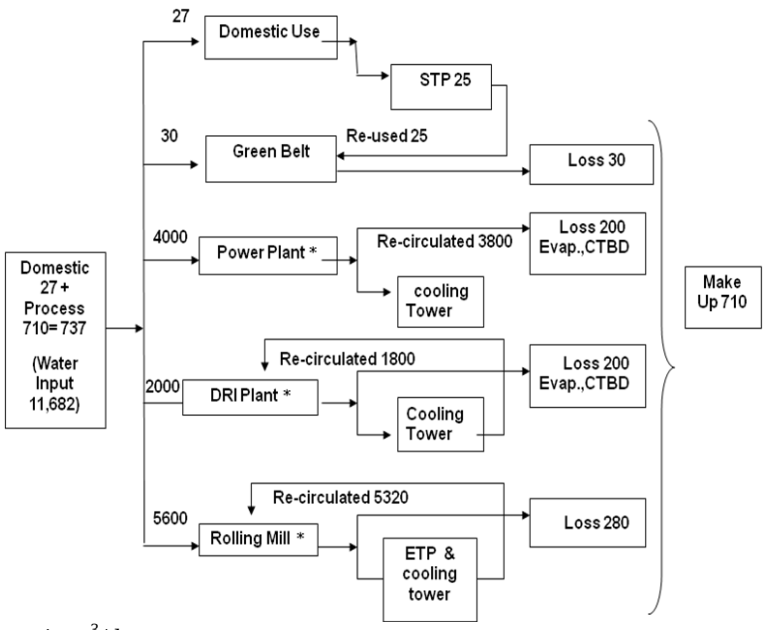
~~Stack Height H, : $14 (Q)^{0.3}$~~

~~: $14 (19)^{0.3} = 27.51$ m~~

~~Considered Stack height : 40 m~~

4.3 Water Environment: (Generic ToR point No. 32, 33,35)

Water is available from MIDC Jalna. Permission received for the same. Water is required for cooling water makeup and domestic purposes. Domestic wastewater is treated in septic tanks with overflow being used for green belt. Water input and effluent generation additionally can be summarized as:



Note: All values are in m^3/day

Figure 26: Water Balance

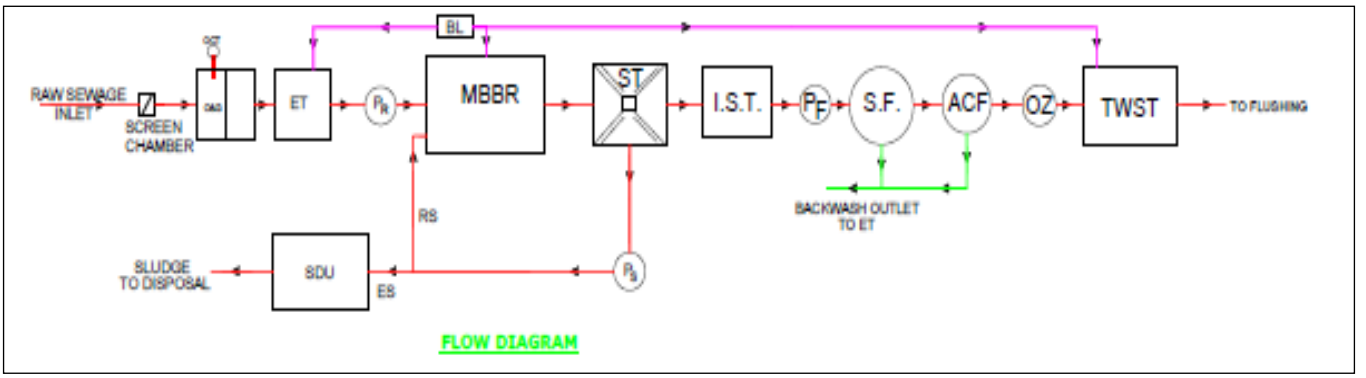
Sr. No.	Purpose	Use m^3/day	Recirculation m^3/day	Loss/Make up m^3/day
1	Domestic	27	25	2
2	Boiler	4000	3800	200
3	DRI Plant	2000	1800	200
4	Rolling Mill Cooling	5600	5320	280
5	Green Belt	30	0	30
Total		**11657**	**10945**	**712**

The quality of domestic wastewater is expected to be:

Table 30: Characteristics of domestic WW

Design Parameter	Inlet Value	Outlet Value
pH	6.5-8.5	7-8
BOD_5mg/l	250-300 mg/lit	≤30
COD mg/l	350-450 mg/lit	≤250
Suspended Solids mg/l	200-300 mg/lit	≤100
Oil & Grease mg/l	10-15 mg/lit	≤10

The sewage will be treated in STP (insert STP Flow sheet) of capacity 10 m^3/d designed as extended aeration unit which includes tertiary treatment as well and the overflow used for landscaping after disinfection.



4.3.1 **<u>ETP Capacity 5320 m^3/day:</u>** <u>(Generic ToR point No. 34)</u>

Waste water from Rolling mill will be treated in ETP and recirculated after cooling

Before and after treatment parameters are mentioned below:

No.	Parameters	Before Treatment	After Treatment
1	pH	6.0-9.0	6.0-9.0
2	TDS	~ 800	~ 800
3	TSS	150-800	< 100
6	O&G	30 - 100	< 10

4.3.2 **Rain water Harvesting:** (Generic ToR point No. 41)

Table 31: RWH Calculation

S. No.	Particulars	Area m^2	Coefficient	Intensity m	Quantity m^3
A	**Pre-project**				
1	Open land	116000	0.5	0.1	5800
B	**Post-project**				
1	Roof	57334	0.9	0.1	5160
2	Road/Parking area	11269	0.8	0.1	102
3	Green	38774	0.15	0.1	582
4	Other area	8623	0.8	0.1	690
B	**Total**	**116000**			**6534**

(B-A)= 6534 -5800 =734 m^3

Proposed two no. of rain water harvesting tank of size will be 10m X10m X 5m

Noise

Noise impact due to Transportation:

Approximately 100-150 trucks per day are expected to be deployed during operation phase for movement of raw material as well as finished good. The existing net work in MIDC can handle easily handle this load. Parking for these trucks will be provided within plant area and additionally, MIDC has already created a truck parking plot.

Mitigation:

- All vehicle entering premises shall have valid PUC
- Regular maintenance of equipment will be done
- Ear plug will provided to workers, working near noisy area
- Heavy transportation during day time will be avoided.

4.3.3 **Solid Waste Management:** (Generic ToR point No. 38)

Following mitigation practice is the policy for future:

- Minimization at all levels need be attempted for discarded products, packing surpluses, incoming raw material unloading spillages and fugitives. The factory has scrap materials. All these, however, be carefully stored on raised platform with dwarf toe walls all around, and a roof over-head.
- The solid in process generate only as slag. This is non-hazardous and in fact good building material. Other will be empty drums which can be used for refill or may be disposed to original vendors. The colony is very small the organic portion will be composted and inert sent for low land filling.
- These measures can easily be taken by **KMPL** because (1) they have no discards or off-specification products, and (2) the waste is fully recycled both in green stage and in dry stage.

Quantification in Cubic meters per day for the unit can be presented as follows:

Non Hazardous Solid Waste:

Based on above working, the summary is

Table 32: Solid Waste per Day

Sr. No.	Waste	Quantity	Disposal
1	Office waste	50 kg/day	Dry waste mainly paper waste will be recycled
2	STP sludge	~1 kg/day	Own garden
3	Packing waste	nominal	Sale, Recycle
4	Process waste-Ash	300-400 MTD	Will be sent to cement Industry
5	Slag	170 MTD	Resale, Can be used for Building construction material, road making

The municipal waste from the worker and canteen will be sent for composting and used as manure for green belt and lawns. Plastic use will be discouraged. STP sludge will be used for gardening purpose. Office and packing trash is kept to minimum and disposed by sales or reuse.

Slag Disposal:

Slag would be generated in the form of solid substance with SiO_2, Al_2O_3, Fe_2O_3 in a glassy matrix. Metal content of slag will be separated using electrical magnet. The remaining slag will be used as a substitute for road construction material. Since slag has glassy matrix, it does not leach. Nonetheless, we propose to store the slag on concrete floor prior to its disposal for filling in low lying area and road construction.

Ash Disposal: (Generic ToR point No. **39**)

Coal consumption	1550	TPD
Char + Dolochar	420	TPD
Iron ore Pellet	1450	TPD
Ash generation	300-400	TPD
Days of storage	2	days
Storage required	800	TPD
No. of Silos	4	Nos.
Capacity of each silo	200	T

Following points will be considered while designing of ash silos.

1. Ash silos of 200 MT of net ash capacity, 4 nos, will be provided.
2. The silo will have conical bottom with adequate slope for easy discharge of ash.
3. The bottom outlet elevation will be such that the truck should be able to load ash from the bottom.
4. The material of construction of Silos will be RCC.
5. Silos will be provided with dust suppression system to avoid any release of dust from the top.
6. Pneumatic bulk conveying system will be installed.

The ash produced from the boiler to be given brick manufacturers

4.4 Green belt: (Generic ToR point No. 40)

Objective:

To provide a measure of air pollution mitigation, fugitive dust control, shed for men, cooler atmosphere, camouflage the land-use, aesthetics of the region, absorption of green-house gas, utilization of NPK of the wastewater after treatment. 38774 m^2 (3.8 ha.) area is provided as green area with 5000 numbers of trees.

Methodology

Design of Plantation will be such as:
No interference for future activities
Locally grown species with large canopy
Be nearer to source of water and supervision.
Capability of securing maximum survival rate with an aim of 100%

Selection of species will be done by detailed considerations:
A large variety of species selected to have bio-diversity
Species that will grow rapidly under local dominant stress of soil salinity, high wind, water needs, sustainability in dry months

Sections will be at least four for greening drive:
Three row curtain on periphery
Avenue trees near approach road and internal roads
Ornamental trees in the garden

Table 33: List of Plants

Sr. No.	*Scientific Name*	Common Name	Nos.
1	*Mimusopes alengi*	Bakul	125
2	*Azadirctca indica*	Neem	200
3	*Citrus sp*	Lemon	200
4	*Saraca indica*	Sita ashok	700
5	*Syzygiam cumini*	Jambhul	500
6	*Neolamarkia cadamba*	Kadamba tree	535
7	*Mangifera indica*	Mango tree	85
8	*Bombax ceiba*	Savar	300
9	*Lagerstroemia flos-regineae*	Tamhan	500
10	*Vitex negundo*	Nirgudi	400
11	*Nyctanthes arbor-tristis*	Parijatak	350
12	*Ficus retusa*	Nandruk	445
13	*Moringa Olifera*	Shevga	110
14	*Carica Papaya*	Papaya	150
15	*Peltophorum pterocarpmum*	Sonmohar	130
16	*Psidium gujava*	Peru	120
17	*Pongamea pinnata*	Karanj	150
Total			**5000**

5 CHAPTER - ANALYSIS OF ALTERNATIVESTECHNOLOGY AND SITE

5.1 Raw materials and Technology:

KMPL has done Alternative Analysis for raw materials, Technology, Site and 'No-Project'.

The raw materials for the proposed project shall also be the same based on the experience and technology. The process for production of ingots/billets is simple and involves melting, casting and cooling. A simplified block diagram is given in **Figure No.28**

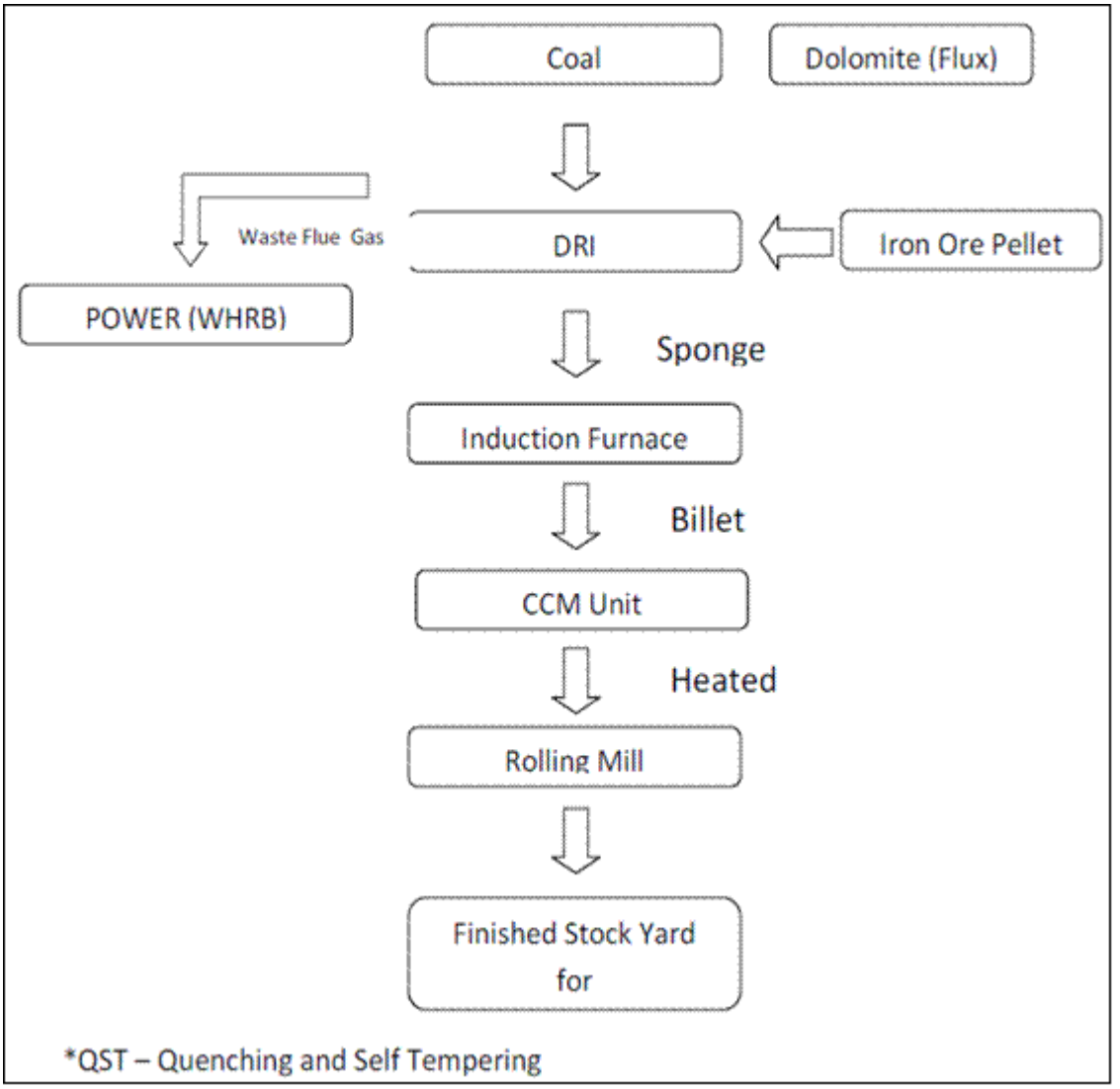


Figure 27: Block diagram

The process development and engineering design for the project has been done such that minimum emissions, effluents and solid waste generation will result.

5.2 Site Alternatives:

No other site has been examined as the existing MIDC plot has sufficient land for the installation of additional capacity. This will also help proponents to optimize the use of existing facilities.

It may also be noted that other industrial units are located on all sides of this plot, no habitation exists nearby. There are no sensitive receptors in the vicinity.

5.3 'NO-PROJECT' Option:

The district statistical Census report and Gazetteer of the District states that the socio-economic conditions in this district are very poor. To improve the status, industrialization will be a big boost. In this background, **KMPL** has proposed this Project to produce quality steel to meet the market demand.

6 CHAPTER – ENVIRONMENT MONITORING PLAN

6.1 Introduction:

The proposed project, though, has minimal environmental impact, nonetheless, to control and limit the pollution level to desired level; an effective EMP is a must.

In view of above, it is proposed to establish a monitoring protocol for air, water, noise and solid waste soil. The stations will be the same as where the samples are taken while preparing this EIA.

Table 34: Summary of Sampling

No.	**Attribute**	Location	**Parameters**	**Frequency**
1	Surface Water	9	22	Yearly
2	Ground Water	9	20	Yearly
3	Ambient Air	9	4	Yearly
4	Ambient Noise	9	2	Yearly
5	Soil	9	13	yearly

For the proposed expansion, as the entire water is used for evaporative cooling, no effluents are generated. Small quantity of domestic waste is generated and it will be disposed using STP.

6.2 EMP structure and funds (Generic ToR point No. 44)

KMPL will have a small environmental cell responsible for pollution control and for coordinating with monitoring laboratory. The cell shall be reporting to the promoter of KMPL,

The structure:

Table 35: Environment Management Cell

S No.	**Level**	**Designation**
1	Promoter	Managing Partner
2	Top	Gen Manager Works
3	Manager	Manager Env
4	Officer	Executive

Manager will report to Promoter/General Manager

Table 36: Functions of Environment Management Cell

S. No.	Aspect	Areas of work
1	Construction Phase	Waste minimization, General sanitation, Airborne dust control, noise and accident prevention.
	Post-construction	site remediation
2	Air	AP control system monitoring, Car/truck PUC, Noise mitigation, dust control.
	Water	Water budget, O & M of WTP and STP.
	Solid waste	Collection, segregation and proper disposal

	Greening	Green belt development, landscaping
	Monitoring	Coordinate with third party laboratory, interpretation & reporting to Promoter
3	Occupational Health	Routine surveillance, prevention, accident relief,
	Regulatory	Coordination with MPCB, filing analysis reports/ statements

For the purpose of Pollution Control, Resource Conservation and Environmental Protection, the Project Proponents will set aside suitable amount as capital expenditure and provision for recurring expenditure per year. It is proposed to earmark Rs 149.10 lakhs on pollution control system as detailed below: (Generic ToR point No. **42**)

Table 37: Environmental Funds

#	**Environmental Aspect**	**Capital Expenditure Rs in Lakh**	**Recurring Expenditure Rs in Lakh(PM)**
1	Emission control Engineering	1200.00	15.50
2	Water & Wastewater management	33.00	2.50
3	Solid Waste	65.00	5.00
4	Greening Drive	17.00	4.00
5	Monitoring	27.00	3.00
6	Environmental Cell & PR	05.50	1.50
7	Other aspects like Rain Water Harvesting, Safety, Security etc	16.50	0.50
8	Contingency	22.00	2.50
	Total	**1386**	**34.50**

6.3 Environmental Monitoring Schedule:

The monitoring schedule is decided as under (may be modified, if required)

6.3.1 Action Schedules:

There will be three facets to design and follow the schedules viz.: (A) for compliance of responsibilities, (B) for day-to-day operation and management of STP and control equipment and (C) for routine environmental monitoring, to assess the impact and take timely warning. The schedule, for third aspect is:

6.3.2 Daily Compliance:

Take the meter readings - initial and final, for checking the water consumption.
Maintain the electricity consumption record for pollution control.
Monitor ambient air periodically as per Consent.

6.3.3 **Monthly Compliance:**

Monitor the emission sources through the competent authority and submit the analysis reports to the board.

Monitor ambient/work zone noise levels & ensure conformance to standards.

6.3.4 **Quarterly Compliance:**

Monitor the ambient air quality at upwind and downwind locations of the factory.

Review the Water Reuse performance.

6.3.5 **Yearly Compliance:**

Carryout "Environmental Audit Statement" of various environmental aspects, reviews the environmental policies with the help of experts and make the up gradation /changes accordingly.

Submit the "Environmental Statement" to the State Pollution Control Board in Form V under Rule 14 of the Environment (Protection) Second Amendment Rules 1992 of the Environment (Protection) Act, 1986.

Renew the Consent to Operate under the Water and Air Acts.

File the Cess returns to the State PCB under the Water (Prevention and Control of Pollution) Cess Act, 1977.

Renew the Hazardous Waste Authorization under sub-rule 3 of the Hazardous Waste (Management and Handling) Rules, 1989.

7 CHAPTER - ADDITIONAL STUDIES

7.1 Public consultation:

This is a proposal for expanding an established Engineering industry of Small Size which is in a notified Government MIDC Industrial Estate, which on adjunct industrial area. This is mainly for one standard product of mild steel in form of billets and ingots but improving the process. The Proponents are **M/s Kapila Metal Pvt. Ltd.** presently at Jalna, Dist. Jalna, Maharashtra and running. However, in order to ascertain the concern of the local persons, who have plausible stake in the environmental impact of this project, the Proponents thought it fit to interview some people as sample survey basis. These interviews were oral and informal. This was not to meet any statutory requirement or a mechanical formality. Proponent really wanted to know as to whether this project is a welcome addition in the minds of surrounding people. They never wanted to force their presence.

The interviews generally brought out the following points –

- The workings of existing steel units of other proponents are working well to give benefit to the local people.
- The payment of materials and wages here will be satisfactory, as also the weighment
- There is a constant rapport, open corridors for discussion and transparency in transactions.
- No odour or noise nuisance is felt.
- Sons of soil are employed and benefited.
- Establishing new venture to convert waste into wealth is a step in right direction for the small suppliers.
- It is however, necessary to see that no water pollution and odour nuisance is created by the unit, for which the proposed arrangement appears to be satisfactory.
- The MIDC neighboring industrial units, local people and Proponents are generally comfortable with each other.

7.2 Risk assessment:

The Environmental risks are inherent in operation of any industry, or any human activity for that matter. Any system failure can lead to disaster.

Steel manufacturing is a simple three step process, as seen earlier. However Risk is posed by (1) Dust in various operational steps and (2) Fuel, which here is in the form of power only.

Dust is generated in many steps from raw material handling, transfer, heating, cooling, transporting out and waste treatment. In order to reduce this risk, steps like capturing the same, conveying through ducts, and controlling by Fly Ash Arrestors are attempted. Conveying by smooth internal roads, watering the roads, regular and quick sweeping and monitoring the efforts, are the minimum actions to be taken.

Fuel used here is Electricity.

Working place there is a risk of high temperature. Following measures are taken for safety – 1 safety shoes provided
2 Helmets to the all working personnel
3 Long handle equipments to protect from heat
4 Hand gloves for handling of Raw Material
5 EOT cranes provided
Following measures taken for Ventilation –
1 Fans at proper locations
2 increase shade height
3 half shade is open from ground level

- Vehicles bringing in the materials are run at slow speed. It is neatly tied and secured to the vehicles. Guards patrol the entire length, throughout day and night. There is no public traffic here and warning signals are painted on boards.
- For raw materials handling cranes, tackles and forklift trucks are used.
- Dyke walls, smooth sloping floors provided around storage tanks.
- Note on Risk assessment is attached as annexure

Stocking at work place, loading and maintenance of floor area:
The raw materials are to be placed very near to the feeding point.
Housekeeping is most important of all dust control methods.
Simply cleaning of all possible emission sources as quickly as possible.

Work Environment: (Generic ToR point No. 48)
Dust and Heat free work environment is maintained in view of workers' safety, Health and Hygiene. The efforts taken in this respect are:

Table 38: Work Environment Care

#	Source	Attenuation by
1.	Scrap Yard	Avoided by adopting smooth roads and yard.
2.	Plant	Avoided by adopting good foundation, good alignment, well lubricated.
3.	Generators	Fitted enclosure and tall stack
4.	Vibrations	Proper sturdy foundation provided for all the machines and equipments to avoid fugitive escapes.
5	Fumes	Closed and covered by swinging roof

The Risk Assessment note is attached as Annexure. (Generic ToR point No. 46 (i))

Occupational Health & Safety: (Generic ToR point No. 46 (ii), (iii), (iv))

During operation stage, dust, gas cutting, welding may cause hazards, micro-ambient conditions near border, platforms etc. Periodical examination of workers' occupational health is necessary.
Health evaluation should do:

S. No.	Occupation	Type of Evaluation	Frequency Pre-placement & Thereafter		
			For Age <30 every (years)	For Age 30-40 every (Years)	For Age 41-50 every (years)
1	Storage area	Chest X-ray, Spirometry & vision testing	5	4	2
2	Process area & Power Plant Area	Chest X-ray, Spirometry & vision testing	5	4	2
3	Main Control Room	Far & Near Vision, colour vision and hearing test	5	4	2
4	Ash & Slag handling area	Chest X-ray, Spirometry, vision & Hearing testing	5	4	2
5	Noise prone area	Audiometry	Annually		

Note: All workers engaged in material handling system will be regularly examined for lung diseases such as PFT (Pulmonary Function Test).

For future work, namely exposure specific health status evaluation of worker, we propose to conduct health evaluation on a pre-designed format for chest X rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect), ECG during pre placement and periodical examinations as per Factory Act & Rules, as detailed above. This will be for future working when manufacturing is involved, with an aim of maintaining OHS standards as per OSHAS/USEPA. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers is separately earmarked.

7.3 HAZOP:

HAZOP is commonly adopted. It is a systematic technique to identify the hazard and operability problems. In this the consequences of the process are assessed and the means available to detect and correct deviation are examined. Thus all credible deviation that could lead to hazardous events or its handling is identified and mitigative measure can thus look for.

No.	Process /Storage	Physical range of consequences propagation
2	Fire	Fire due to electrical cable burning/short circuit & propagated further.

7.3.1 Objectives

- To localize the emergency
- To minimize the consequences
- To ensure that following concepts are considered, namely rescue, first aid, evacuation, rehabilitation, spreading the information

7.3.2 **Elements of On-Site Plan:**

- Assess the size of event
- Plan formulation and liason
- Action like: Raise alarm, communication within and outside
- Appoint key personnel and deploy. Appoint Controller.
- Emergency Control Center
- Action on site
- Action off-site.
- Alarm and visual signals at strategic point, first alert sent to Incidence Controller.

Table 39: Possible Risk

S.No.	Area	Hazards identified
1.	Steam turbine generator building	Fires in a) Lube oil system b) Short circuit in control room / switch gears c) Cable galleries d) Fire in oil drum storage
2.	Transformer	Explosion & fire
3.	Boilers	Fire (mainly near oil burners) steam explosion, fuel explosion
4.	Coal handling plant	Fire and or dust explosion
5.	Coal storage	Fire, spontaneous combustion
6.	FO tank farms	Fire

Coal Handling Plant - Dust Explosion

Coal dust when dispersed in air and ignited will explode. Crusher houses and conveyor systems are most susceptible to this hazard. The minimum of explosive concentration of coal dust (33% volatiles) is 50 grams/m^3. Failure of dust extraction & suppression systems may lead to abnormal conditions and increasing the concentration of coal dust to the explosive limits. The sources of ignition are incandescent bulbs, electric equipment & cables, friction& spontaneous combustion in accumulated dust. Dust explosion may occur without any warning with maximum explosion pressure upto 6.4 bars. Another dangerous characteristic of dust explosions is that it sets off secondary explosions after the occurrence of initial dust explosion.

Stock pile area shall be provided with automatic garden type sprinklers for dust suppression as well as to reduce spontaneous ignition of coal stock piles, necessary water distribution net work will be provided for distributing water at all transfer points, crusher house, control room, etc.

A centralized control room with microprocessor based control system has been envisaged for operation of the coal handling plant. Except locally controlled equipment like travelling tripper, dust extraction/ dust suppression/ ventilation equipment, sump pumps, water distribution system all other in line equipment will have provision for local control as well. All necessary inter local control panels will be provided for safe and reliable operation of the Coal handling plant.

Control Measures for Coal Storage Yard

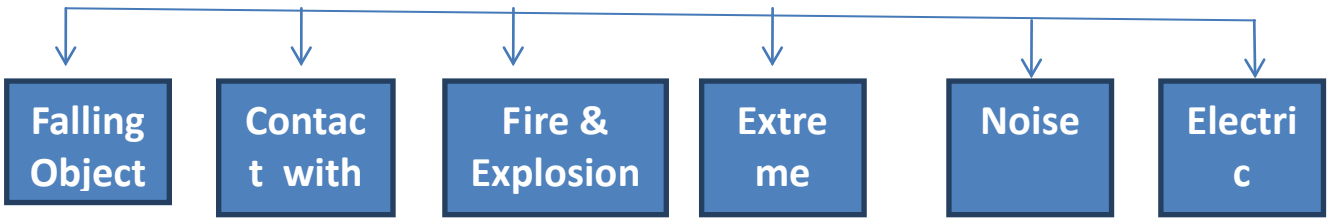
The entire quantity of coal will be stored in separate stack piles, with proper drains around to collect washouts during the monsoon. Water sprinkling system will be installed on stocks of pile to prevent spontaneous combustion and consequent fire hazards. The stack geometry will be adopted to

maintain minimum exposure of stock pile areas towards predominant wind direction temperature will be monitored in the stock piles regularly to detect any at normal rise in temperature inside the stock pile to be enabled to control the same.

7.4 Disaster Management Plan:(Generic ToR point No. 45)

Disaster is an undesirable occurrence of events of such magnitude and nature that adversely affects production and also causes damage to the environment. It is therefore, necessary to ensure the safety and reliability of any new plant by way of identification of possible failure and prevent there occurrence before they actually cause disaster or production losses. This is directly proportional to risk. Detail DMP is attached as **Annexure**

Following scenario emerged during HAZOP and measures to make operations safe have been defined. Risk can be due to:



Organization Chart

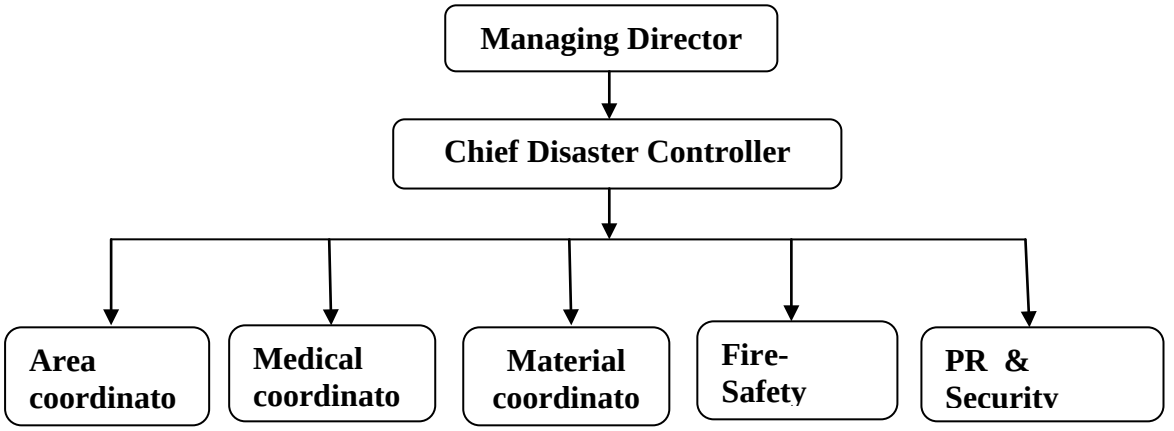


Table 40 Emergency Situation Clinics and Hospitals

Sr. No.	Names and Area of specialization	Location	Distance from the project site	Phone numbers
1.	Deepak. Hospital	Jalna	Approx. .4km	02482240486
2.	Panchshil Hospital	Jalna	Approx. 5 km	02482233291

Table 41Emergency Situation Government Agencies and Offices

Sr. No.	Names and Area of response	Location	Distance	Phone numbers
1.	Police (Law and Order)	Jalna	Approx. 2.0 km	0242 220651
2.	Fire Brigade	Jalna	Approx. 3.5 km	02482 230871-74
3.	Railways	Jalna	Approx. 5.0 km	--
4.	Government Hospitals	Jalna	Approx. 0.25 km	--

The proposed project is located at Additional MIDC, Phase III, Jalna. Now, there were no development, barren land surrounding the project site.24 m wide road at North side, Khadgaon Road at West side and East & South side there is barren land. (Generic ToR 9)

7.5 **Traffic Management:** (Generic ToR Point No. 27)

- Abutting Road of 9m wide will be used by Project Traffic, MIDC Road network will also developed in Future,
- Considering abutting Road, Level of Service (LOS) will be 'A' on Khadgaon-Jalna Road of 9m Wide Road even after added Project Traffic and Future Incremental Growth of Traffic.
- On NH6 Level of Service (LOS) will be 'B' even after added Project Traffic and Future Incremental Growth of Traffic.
- Hence There will be no vehicular Impact on the Existing Road Network.

Detail Traffic report is attached as Annexure

7.6 Conclusion:

Having analyzed the Project so far, in this Chapter it is shown that this project will meet the public acceptability (now and in future) as the proponent has kept cordial and pollution-free relations around. Whatever are the possible risks due to unforeseen act or events are apprehended now and a Management Plan prepared. Any damage to structures of Heritage importance can create sensitive situation. This is studied and results entered. Society needs such development based on the statistics assembled. It is seen that no R & R efforts are freshly required as the land is in peaceful possession of the Proponents.

8 CHAPTER - PROJECT BENEFITS

It is seen that the Project is aimed to fulfill the objective of Sustainable Development. It will improve economic status of the nearby area in the district.

8.1 Improvements in the physical infrastructure:

This Project will improve the physical infrastructure of this area:
As roof rain harvesting and recharging is proposed, there will not be any incremental run-off causing floods downstream. It will improve the water table in the long run. The nearby nalla is trained by good civil engineering practice and hence physical infrastructure will improve.
The industry is dependent on raw materials and helping chemicals, which arrives by road. The finished goods will be dispatched by road. All the labour force will come by road. The proponents will assist the administration to maintain the roads in good conditions. This improved physical infrastructure will be an added facility to the community for surface transport.
Greening drive in the premises will give a pleasant look to the land. It will absorb some portion of the CO_2 produced by fuel burning (utilities) as well as created by induction furnace (process). It is proposed to use treated domestic wastewater for green area development. Canopy of trees will arrest dust fugitive SPM as well as the noise.

8.2 Improvements in the social infrastructure:

The Project will aid in the improvement of the social infrastructure of this area:
In the District Similar industries are already running their units over the years. These are not only running with efficiency but are running with no disturbance to the local people. Local people have even encouraged the expansion of such mills for production. The same is the case for diversification.
PP will employ sons of the soil without discrimination, wherever feasible. The Proponent's management keeps the transparent account.
Education level goes along with flow of funds and avenue of livelihood. Dependence on Government subsidy also goes along with political stability of the area. The level of education and literacy (especially rural and women) is very poor, needing improvement. This activity by this Proponent will certainly play a catalytic role in this.
Likewise the health level goes along with flow of funds and avenue of livelihood. Dependence on Government institutes like PHC (Primary Health Centre) also goes along with political stability of the area. The level of health and medication (especially children and women) is very poor, needing improvement. This activity by this Proponent will certainly play a catalytic role in this.
Health awareness and economic independence may also help in Family Planning decision-making.
Living in harmony is an important aspect of the society. This can happen only if all the components are comfortably placed. Persons engaged in their respective vocation and accruing job satisfaction leads to this. This will become possible by this venture.

Corporate Social Responsibility: (Generic ToR point No. 49)
We will earmark Rs. 1370 Lakhs for CSR activities.

Funds

- The total project cost is Rs. 540 Crores
- 2.5 percent of it becomes Rs. 13.5 Crores
- We have provided Rs 13.70 Crores
- These will be spent within first 5 years as follows:

Year	1	2	3	4	5	**Total**
Rs. in Lakhs	292	335	273	243	227	**1370**

- 55% Spent in first 2 Years, 45% in next three.
- Commenced along with Construction phase 2-3 years.
- Three villages selected for spending of funds, in first instance.
- The activities that shall be considered are:

Attributes	**Utilization**
(a) For each village	
Health	1. Maternal Health & New-born child care 2. Medical camps for villagers
Utilities	1. Solar lighting, well sanitation, Night shelters, Municipal Compost making
Education	1. Hostel for less privileged children, Preparation of school ground, Vocational training for skill development -plumbers, carpenters, drivers 2. School material for economically weaker, Establishing school library
Livelihood Support	1. Give livelihood Avenue to deserving families (on advice of Collector) 2. Percolation tanks, Renting of tractors 3. Woman empowerment by supplying sewing machines 4. Assisting local farmers - improving crop yield, giving good seeds and sapling, rotating loan for drip irrigation. Cattle camps
Cultural Support	1. Building Village Library, Repairing roads/bridges, Developing green area 2. Conducting Religious tours for Old people, disabled children and study tours for farmers
(b) PM/CM / Emergency Funds	
(c) Ex -serviceman welfare fund	

Employment potential – skilled, semi-skilled and unskilled

The industry and its supporting activity need many types of people right from manual to managerial strength, in a pyramid. The raw material growing may need unskilled workers with people on tractors and tractor repairers as skilled ones. So in manufacturing activity all three types i. e. skilled, semi skilled and unskilled people are required. The overall potential including the garages, loading-unloading actions, eateries, small repair shops, etc is essential. The local people can get a good share out of this. If the second generation local people acquire that skill, they too will be able to fill the gap and accrue benefit of higher jobs.

8.3 Other tangible benefits:

Both tangible and non-tangible benefits will result from this activity and many of those are described above. Apart from direct employment, many other benefits will accrue like

Erosion control by nalla training, terracing and bunding

Flood control by rain-water arresting and harvesting

Groundwater level enhancing by recharging

Time saving by quicker transport

Aesthetics improvement by general greening with emphasis on biodiversity

Strengthened democratic set-up will bring weightage to secure better school-subsidy and health-institutes Improved safety-security in surrounding with better Law and Order.

9 CHAPTER - ENVIRONMENT MANAGEMENT PLAN (EMP)

9.1 Need:

The economic development of any country depends mainly on the core sector development such as infrastructure, agriculture, etc. Iron and steel products form the backbone of infrastructure development. This type of plant is likely to be more viable in view of present situation, when the steel has demand in the market and global inflow of money is permissible. This has a foreign-exchange saving potential.

9.2 Objectives:

To define the components of environmental management..
To prepare an environmental hierarchy.
To prepare a checklist for statutory compliance.
To prepare environmental organization.
To prepare a schedule for monitoring and compliance.
To establish a watchdog committee voluntarily with an ultimate aim to get ISO 14000 certification.

The Company has an environment policy, which basically includes all these objectives. The administrative hierarchy is so kept that any untoward incident will be reported directly to the Managing Director. This has avoided generation of complaints or environmental misbehavior like violations. For prevention, abatement and control, followed by mitigation, proper hierarchical system or Administrative order of the company is maintained with Director reporting to the Managing Director. For day to day control, General Manager & Environmental Scientist are responsible and they are supported by field officers, field inspectors, laboratory staff, garden supervisors, mechanical and electrical fitters and CSR/CER in-charge. For this purpose, adequate funds for capital cost & recurring cost/annum for environmental pollution control measures are earmarked and will be spent. This will also include Corporate Social Responsibility & Corporate Environment Responsibility**.**

9.2.1 Environment Components:

KMPL is aware that environmental management is not a job, which can be handled without a careful planning. The success lies if three components are simultaneously present viz. (1) management support, (2) efficiency of the environment management cell and (3) acceptability of resulting environmental quality, both by SPCB and by public. A structure of this plan and hierarchy of process flow for environmental management is prepared and enclosed as logics, which is self-explanatory. **KMPL** will adopt this structure and hierarchy, which is akin to principles and practice.

9.3 Environmental management plan: Construction Phase

Environment impacts during construction phase will be mainly due to civil works such as site clearing, foundation, construction, material and machinery transportation etc. The construction phase impact will be temporary in nature and localized phenomena except the permanent change in land-use pattern at the project site.

9.3.1 Site Preparation

The development of site for erections of plant structure, office building and other allied activities will require careful management planning as the construction activities shall be located in barren land owned by the project proponent. Therefore, construction site development process should incorporate certain precautions.

It is necessary to control the dust nuisance, through regular water sprinkling, that would be created by excavation, leveling and transportation activities so that impacts on the various components of environment would be minimized.

9.3.2 Construction Equipment and Waste

Transport vehicles as well as transport routes will be properly maintained during whole construction phase to minimize smoke / dust emission from vehicle exhausts and unpaved roads. Composite solid wastes including metal scrap, earthwork, other wastes, getting generated in construction process will be disposed off in safe manner.

9.3.3 Air Environment

The construction of proposed plant would result in the increase of SPM concentrations due to fugitive dust. Frequent water sprinkling in the vicinity of the construction sites would be undertaken and will be continued after the completion of plant construction as there is scope for heavy truck mobility. It will be ensured that both gasoline and diesel powered vehicles are properly maintained to comply with exhaust emission requirements.

9.3.4 Noise Environment

There will be marginal increase in noise levels during construction phase which is temporary. No construction activities are planned during night time which may contribute to the existing baseline.

9.3.5 Water Environment

During construction, provision for infra-structural services including water supply, sewage, drainage facilities and electrification will be made. The construction site would be provided with suitable toilet facilities for the workers to allow proper standards of hygiene. These facilities would be connected to a STP to ensure minimum impact on the environment.

9.3.6 Safety & Health

Adequate space will be provided for construction of temporary sheds for construction workers mobilized by the contractors. Potable water supply will be provided for the construction workers. The safety department will supervise the safe working of the contractor and their employees. Work spots will be maintained clean, provided with optimum lighting and enough ventilation to eliminate dust/fumes.

9.4 Environmental management plan: operation Phase

Environmental Management Plan is detailed under the following heads:

- Air Quality Management
- Noise Management
- Waste Water Management
- Solid & Hazardous Waste Management
- Energy Conservation
- Greenbelt Development & Plantation Programme
- Occupational Health & Safety Measures.

9.4.1 AIR QUALITY MANAGEMENT

The major pollutants of air in this project are the particulate matters from the stack and fugitive emissions due to material handling.

Stack Emission

To keep the PM emissions from stack below permissible limits (i.e. <150 mg/Nm^3), stack will be provided with ESP and care shall be taken as listed below:

- Regular cleaning of ESP
- Maintenance of boiler for optimum performance
- Emergency power supply to ESP in case of power failure

Fugitive Emission

Fugitive emissions are the air pollutants released in the air other than those from stacks or vents. Factors affecting emissions that are common to most operations include the following:

- Moisture content of the material
- Type of material processed
- Type of equipment
- Operating practices employed.

Sources of fugitive emission:

1) Material Storage

Dust may be generated here due to carryover by wind. However, to avoid this, material like coal, ash etc. will be kept in covered location, preferably in silos or covered shed.

2) Transportation

Transportation of material like coal and ash shall be done carefully, preferably in covered belt conveyor to avoid dust emission.

Movement of heavy trucks/vehicles on the non-metallic road generates substantial quantity of dust emission. This is due to the presence of dust over the road, which is carried away by wind. To control the generation of dust, all the roads inside the plant premises will be tar roads. Regular sweeping of all the roads and floors is being done by vacuum sweeper. Sprinkling of water through tankers is being done on bare lands and roads.

9.4.2 Noise Management

Exposure of high noise level to workers for long duration may lead to certain occupational diseases. To mitigate the high noise level, following measures are being adopted. The same will be practiced for proposed expansion also.

- Walls and ceilings of the concerned buildings are lined with sound absorbing materials.
- Properly insulated enclosures are provided to equipment making excessive noise.
- Improved silencers are provided in the equipment generating high noise.
- Proper maintenance, oiling and greasing of machines at regular intervals is being done to reduce generation of noise.
- Personal Protective Equipment (PPEs) like earplugs and earmuffs is being provided to the workers exposed to high noise level.
- Area having high noise level being displayed at site with Noise level and signage for usages of Personal Protective Equipments (PPE's).
- Green area (33774 m^2 and 4975 native trees) of appropriate width inside the plant premises and at the plant boundary has been developed and same will be maintained in future.

- Regular monitoring of noise level is being carried out and corrective measures in concerned machinery are being adapted accordingly to the possible extent.

9.4.3 Water Management

Waste Water Management

- Effluent generated during rolling process which will be treated in ETP.
- Domestic waste water generated from office / worker will be treated in STP and treated water will be utilized for greenbelt development / plantation.
- No effluent will be discharged outside the plant premises.

Water Conservation

The following measures will be adopted to minimize use of fresh water:

- Re-use of effluent and domestic wastewater
- Periodic preventive maintenance of water distribution systems
- Rain water harvesting at plant, 2 No. of rain water harvesting tank will be provided)
- Training and awareness on water conservation measures

9.4.4 Solid and hazardous Waste Management

Solid waste generated shall be recycled, reused or disposed off as per norms.

- Office waste mainly paper waste shall be sent to authorized recycler
- Waste oil drums shall be sent to authorized recyclers
- Waste oil shall be used for greasing
- Ash will be sent to Cement Industry & slag can be used for road making.

9.4.5 Concept of waste minimization - 3R (Reuse, recycle and recover), energy and resource conservation

Reuse and recycle

- Treated water from STP, ETP will be reused for greenbelt development and rolling mill.

Recover

- STP and ETP sludge will be used as manure
- Slag will be used as a substitute for road/building construction material.

Energy Conservation

- Installation of energy efficient lightings. Use of energy saving light fittings
- Procurement of energy efficient machineries
- Minimizing idle running of vehicle, machines and electrical appliances
- Optimizing loads and periodic preventive maintenance & lubrication
- Prevention of leakages
- Periodic energy audits
- Training, awareness and motivational programmers.

Natural Resource Conservation

- Rain water harvesting shall be done in the factory premises
- Wastewater shall be recycled so that fresh water requirement will be reduced

9.4.6 Biological Environment and green belt development

- Development & maintenance of green belt to be considered.
- No outside soil is brought for any building/ greenery developments.

Plantation Programme

33% of the land shall be brought under green belt. 6 m wide green belt shall be developed around the periphery of factory and 1-2 lines of trees shall be planted along the both sides of internal roads. Trees shall also be planted around plant, coal yard, ash storage, boiler room etc.

9.4.7 Occupational Health & Safety

Occupational Health

Occupational health needs attention both during construction & erection and operation & maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

Construction & Erection

The occupational health problems envisaged at this stage can mainly be due to constructional accident and noise. To overcome these hazards, in addition to arrangements to reduce it within TLV's personal protective devices should also be supplied to workers.

Operation and Maintenance

The problem of occupational health, in the operation and maintenance phase is due to respirable dust and noise. With suitable engineering controls the exposures can be reduced to less than TLV limits and proper personnel protective devices should be given to employees. The working personnel should be given the following appropriate personnel protective devices.

- Industrial safety helmet;
- Crash helmets;
- Face shield with replacement acrylic vision;
- Zero power plain goggles with cut type filters on both ends;
- Zero power goggles with cut type filters on both sides and blue colour glasses;
- Welders equipment for eye & face protection;
- Cylindrical type earplug;
- Ear muffs;
- Dust masks;
- Canister gas mask;
- Self contained breathing apparatus;
- Leather apron;
- Aluminized fiber glass fix proximity suit with hood and gloves;
- Boiler suit;
- Safety belt/lime man's safety belt;
- Leather hand gloves;
- Asbestos hand gloves;
- Canvas cum leather hand gloves with leather palm;
- Lead hand glove;
- Electrically tested electrical resistance hand gloves;
- Industrial safety shoes with steel toe;
- Rubber boots (alkali resistant); and
- Electrical safety shoes without steel toe and gum boots.

Full fledged hospital facilities should be made available round the clock for attending emergency arising out of accidents, if any. All working personnel should be medically examined at least once in every year and at the end of his term of employment. This is in addition to the pre-employment medical examination.

9.5 Environmental Monitoring Schedule:

A judgment can become truncated if it is not scientifically supported. This work is done by an appropriate monitoring which is a technique of drawing a sample and deriving inferences from the same for knowledge and improvements.

A judgment can become truncated if it is not scientifically supported. This work is done by an appropriate monitoring which is a technique of drawing a sample and understanding from it the universe. The sampling station, the parameters and frequency is of extreme importance as also the careful analysis, reporting and interpretation. The schedule decided for a small activity like that of **KMPL** is as given in chapter six:

Schedules:
There will be three facets to design and follow the schedules viz.: (A) for compliance of responsibilities, (B) for day-to-day operation and management of ECE, and (C) for routine environmental monitoring, to assess the impact and take timely warning. The schedule:

Daily Compliance:
Take the meter readings - initial and final, for checking the water consumption.
Maintain the electricity consumption record for pollution control.
Monitor ambient air periodically as per Consent.

Monthly Compliance:
Monitor the emission sources through the competent authority and submit the analysis reports to the board.
Monitor ambient/work zone noise levels & ensure conformance to standards.

Quarterly Compliance:
Monitor the ambient air quality at upwind and downwind locations of the factory.
Review the Water Reuse performance.

Yearly Compliance:
Carryout “Environmental Audit Statement” of various environmental aspects, review the environmental policies with the help of experts and make the up-gradation /changes accordingly.
Submit the “Environmental Statement” to the State Pollution Control Board in Form V under Rule 14 of the Environment (Protection) Second Amendment Rules 1992 of the Environment (Protection) Act, 1986.
Renew the Consent to Operate under the Water and Air Acts.

File the Cess returns to the State PCB under the Water (Prevention and Control of Pollution) Cess Act, 1977.
Renew the Hazardous Waste Authorization under sub-rule 3 of the Hazardous Waste (Management and Handling) Rules, 1989.

Consent Compliance

KMPL undertakes to comply the conditions prescribed by the Consent. In this direction, the following discipline will be followed:

Table 42: Consent Compliance

#	Condition Regarding	Mode of Compliance
1	Validity Period	Keeping a watch, Application for renewal will be submitted in advance
2	Production Quantity	Not to exceed the permitted quantity. Feed will be adjusted to recovery
3	Quantity of Effluent	To be measured daily and in-plant control. Not to exceed any time
4	Quantity of Sewage	To be measured periodically. Not to exceed
5	Total water input	To be measured daily. Repair meters. Not to exceed. Make break-up as per usages. Fill monthly Cess returns. Pay as per assessment
6	Quality of Effluents	By running treatment units in correct fashion. Monitor. Report
7	Disposal of treated effluent	Not over application. No percolation, no spillages. Monitor.
8	Fuel Quantity	Not to exceed permitted quantity
9	Emission System	Regular running, monitoring & maintenance
10	Ambient	Keep monitoring.
11	Noise levels	Check foundation for vibrations, Tree plantation
12	Solid Waste	Quantity to be measured & record kept.
13	Environ. Audit	To be complied every year before 30th Sept.
14	Inspections	Inspection Book to be opened. Instructions given by SPCB visiting officer to be complied and reported.

For above compliance Action will be taken by the Cell under the Managing Director himself.

9.6 Watch-dog Committee:

A high power watch dog committee will be set up which will have a power of sudden spot inspections, checking of documents and listening to complaints if any. This committee will supervise over the monitoring and environmental management cell as may be necessary, generally over the following facets of works:

Permit management
Construction management
Treatment and emission management

Transport management
Disposal management
Monitoring
Documentation
Law enforcement

9.6.1 **Construction Phase Management:**

Site Preparation:
The clearance of site may involve the movement of soil. No major leveling operations are envisaged. During dry weather conditions it is necessary to control dust nuisance created by excavation and transportation activities. However, because the proposed built-up area is of considerable low requirement, this problem should not be insurmountable, or else some water sprinkling will be resorted to.

Sanitation:
The construction site shall be provided with sufficient and suitable toilet facilities for construction workers to allow proper standards of personal hygiene. These facilities shall be connected to a septic tank and maintained to ensure minimum or no environmental impact.

Noise:
Though the noise effect on the nearest inhabitants due to construction activity will be negligible (being away) it is advisable that on site workers using high noise equipment adopt noise protection devices like earmuffs.

Construction Equipment and Waste:
It shall be ensured that both gasoline and diesel powered construction vehicles are properly maintained to minimize smoke in the exhaust emissions. The vehicle maintenance area shall be located in such a manner to avoid sources by accidental spillage of oil. Unauthorized dumping of waste oil should be prohibited. Wastes shall be disposed off at an approved site.

Site Security:
Construction site is a potential hazardous environment. To ensure that the local inhabitants and stray cattle are not exposed to these hazards, the site shall be secured by fencing and manned entry points. It will be fully illuminated.

Land Environment:
An inventory shall be prepared of standing trees and bushes of significance. To prevent unauthorized felling of trees by construction workers for their fuel needs it will be ensured that the contractor provides fuel to them.

9.7 Conclusion:

Commencing from Introductory, this EIA study has reported the details on Proponents, Project, natural and manmade facets of background environment, how and how much residual pollution will be added after prevention, abatement, control and mitigation. Whether the overall impact will be adverse, beneficial or marginal is found out by two accredited systems. Justification of the Project or "No Project" is also considered. This, however, is required to be manned properly. Unless an EMP is prepared in advance, as like production campaign the environmental protection will not automatically happen. Such EMP, and its implementation with commitment from the higher management is stated. This Study when scrupulously followed, will meet the objectives of fulfilling the legal requirements and not causing any hardships to people.

10 CHAPTER CONSULTANTS ENGAGED

This EIA report is prepared on behalf of the proponents, taking inputs from proponent's office staff, their R & D wing, Architects, Project Management Professionals etc. by Environmental Consultants M/s. Ultra-Tech Environmental Consultancy & Laboratory, Thane, Mumbai , who have been accredited *NABET Accreditation Certificate No. NABET/EIA/1417/RA010*

M/s Ultra-Tech Environmental Consultancy & Laboratory: (Generic ToR 1, Point No. 1, 54)

Ultra-Tech Environmental Consultancy & Laboratory [Lab Gazetted by MoEF – Govt. of India] not only give environmental solutions for sustainable development, but make sure that they are economically feasible. With innovative ideas and impact mitigation measures offered, make them distinguished in environmental consulting business. The completion of tasks in record time is the key feature of Ultra-Tech. A team of more than hundred environmental brigadiers consists of engineers, experts, ecologists, hydrologists, geologists, socio-economic experts, solid waste and hazard waste experts apart from environmental media sampling and monitoring experts and management experts , strive hard to serve the clients with up to mark and best services.

Ultra-Tech offers environmental consultancy services to assist its clients to obtain environmental clearance for their large buildings, construction, CRZ, SEZ, high rise buildings, township projects and industries covering sugar and distilleries from respective authorities. Ultra-Tech is in the process of getting QCI-NABET final accreditation for its EIA organization.

Ultra-Tech also provide STP/ETP /WTP project consultancy on turn-key basis apart from Operation and Maintenance of these projects on annual contract basis. Also, having MoEF approved environmental laboratory, Ultra-Tech provide laboratory services for monitoring and analysis of various environmental media like air, water, waste water, stack, noise and meteorological data to its clients all over India and abroad.

Functional area experts and assistance to FAE involved in the EIA study for M/s. Kapila Metal Pvt Ltd., at. Additional MIDC, Phase –III, Plot No: B-102 to 105, , Dist : Jalna, Maharashtra;

FUNCTIONAL AREA EXPERTS IN THE EIA:

Table 43: List of Functional Area Experts

S. NO.	NAME OF SECTOR	NAME OF PROJECT	NAME OF CLIENT	NAME OF EIA COORDINATOR	FUNCTIONAL AREA EXPERTS INVOLVED		
					FA	NAME/S	Signs
1.	Metallurgical 3(a) Cat. A & B2, 1 (d)	Secondary Metallurgical Project	M/s. Kapila Metal Pvt. Ltd. MIDC, Jalna, Maharashtra	Mr. Santosh Gupta Team Member: Mrs. Pradnya Parkhi	AP	Mr. Shekhar Tamhane FAE:Mr. Timir Shah	
					AQ	Mrs. Anjali Singam	
					WP	Mr. Santosh Gupta Mrs. Sampada Shidid	
					EB	Dr. T. K. Ghosh FAE: Ms. Swati Bopnwar	
					SE	Dr.. Kishore Wankhede	
					SHW	Mr. Santosh Gupta FAE : Mrs. Pradnya Parkhi. AFAE: Ms. Shraddha Omble	
					ISW	Mrs. Sampada Shidid	
					LU	Mr. Swapnil Avgade	
					RH	Dr. Ravindra Kode	
					NV	Mr. Chintan Athalye	

Table 44:Team Member:

No.	Name
1	Mrs. Pardnya Parkhi
2	Ms. Shraddha Omble

LABORATORY FOR ANALYSIS:

Table 45: Laboratory Details

NAME OF LABORATORY	SCOPE OF SERVICES	ACCREDITATION STATUS
ENalyse Recognized by Ministry of Environment and Forest (MoEF), Govt. of India ISO 9001: 2008 and OHSAS ISO 18001: 2007 Certified Company	Monitoring and Analysis of: Ambient Air Quality Monitoring Ground and Surface Water Quality Monitoring Noise Level Monitoring and Soil Quality Monitoring Metrological data collection	Gazetted by MoEF- Govt. of India

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List of Annexure:

Sr. No.	Annexure
1	ToR Letter
2	Water NOC
3	List of Flora & Fauna
4	Risk & Hazop & DMP Report
5	Mathematical Modeling Report
6	Electricity Application
7	GIS Report
8	Traffic Report