ENVIRONMENTAL IMPACT ASSESSMENT REPORT

For

PROPOSED PROJECT
(Production of Sponge iron 1000 TPD, Captive Power 50 MW,
Billets 1000 TPD/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 and NABET Accredited

August 2016
Revision 01

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

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

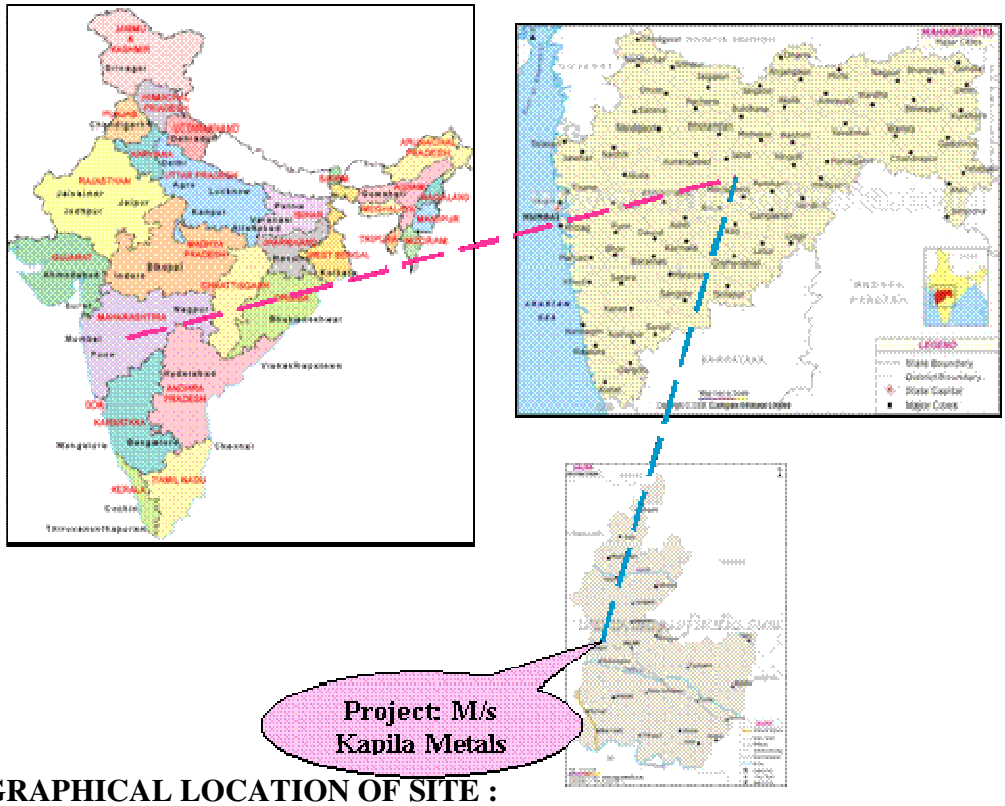
M/s Kapila Metals Pvt. Ltd. (KMPL)is a Medium Scale Industry, in secondary metallurgical sector. As per EIA Notification S. O. 1533 Sept 14, 2006, the Project falls under entry 3(a), and 1(d) category "A" & "B". It is proposed for production of Sponge iron 1000TPD, Captive Power 50 MW, Billets 1000TPD/TMT 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



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.

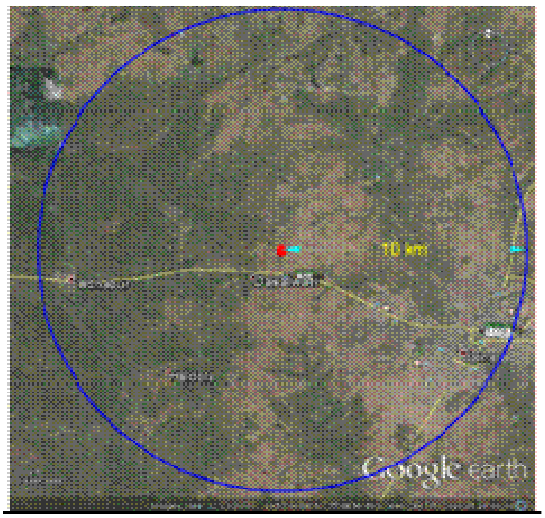


Figure 1: Google Image 10 km

The present plot utilization is as under:

Table: Area Utilization

Plot Size	1,16,000 m^2
Total BUA	~57,334 m^2
Green Belt	38,774 m^2 (33%)
Parking Area	10,000 m^2 Parking area marked by MIDC. Map attached.
Constructed area	15,645 m^2

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:

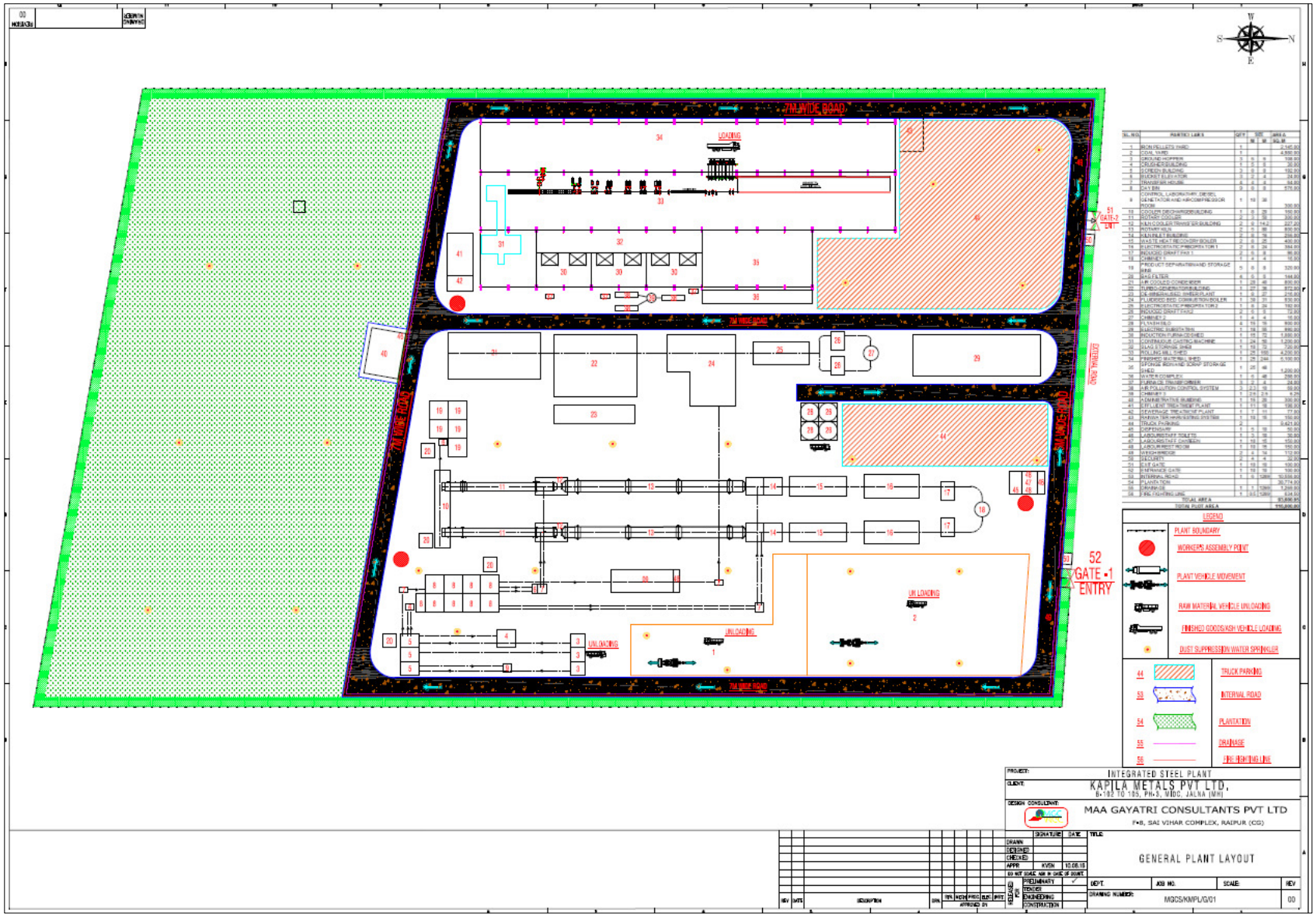
Raw Materials (Generic ToR point No. 10)

Raw Material / ton of the product	
Name	**Quantity TPD**
For DRI (Sponge Iron)	
Iron Ore pellets	1450
Coal	1200
Dolomite	50
TMT Bars and billets	
MS Scrap	100
Sponge Ironpellets	1000
Pig Iron	80
Silico manganese	18
For Power Plant	
Dolochar + char	420
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	100 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
4.	Built-Up Area m^2	57,334
5.	Furnace	3 Nos. 40 T each
6.	Furnace temperature ^0C	1600-1630 - Furnace 1100- 1200- DRI kiln
7.	Stack	3 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	65 MW
13.	Water Requirement m^3/d	712
14.	Man Power	290
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, forced 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, SO2 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 (18 m^3/day) with overflow being used for green belt. Water from the process will be treated in ETP (20 m^3/day)

Total water requirement will be 712 m^3/day

Pollution Control -- Water and Wastewater

Water Quality:

Total water requirement is 712 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. Overflow 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 712 m^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

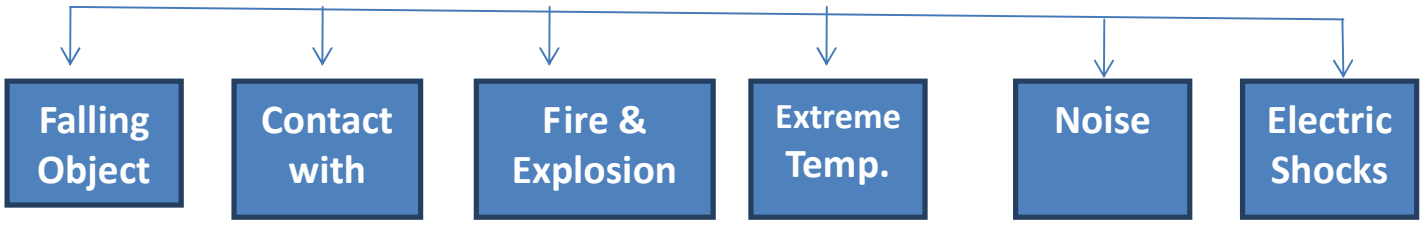
Sr. No.	Waste	Quantity	Disposal
1	Office waste	~44 kg/day	Dry waste mainly paper waste will be recycled
2	STP sludge	~1 kg/day	Own garden
3	Packing waste	Nominal	Sale, Recycle
4	Process waste- Ash	300-400 MTD	Will be sent to cement Industry
5	Slag	~170 MTD	Resale, Can be used for Building construction 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 1: 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**.

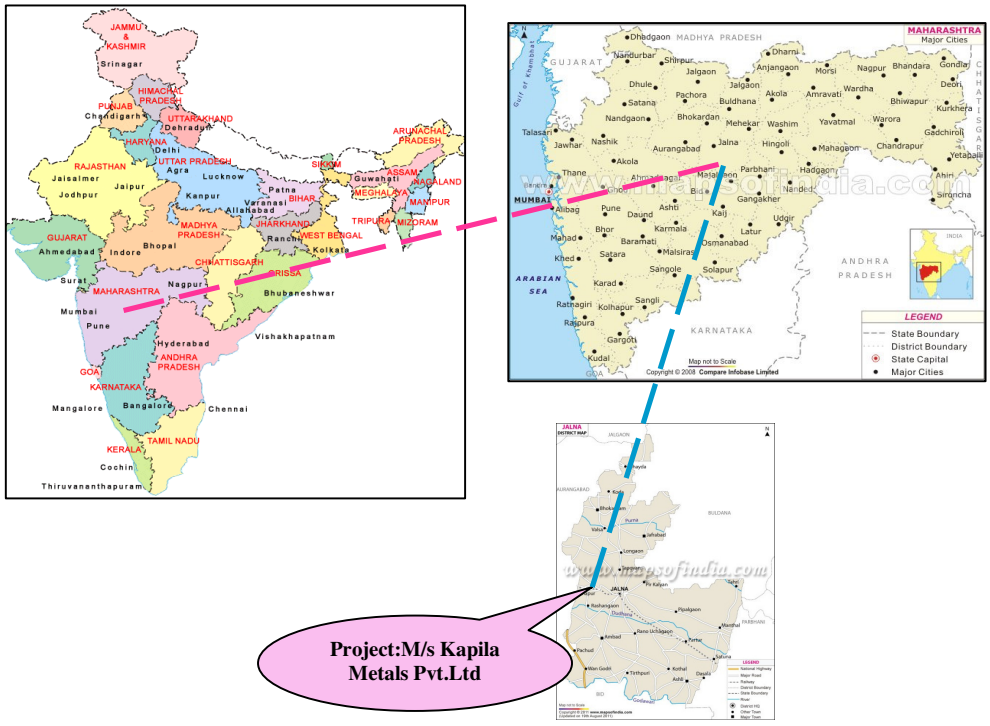
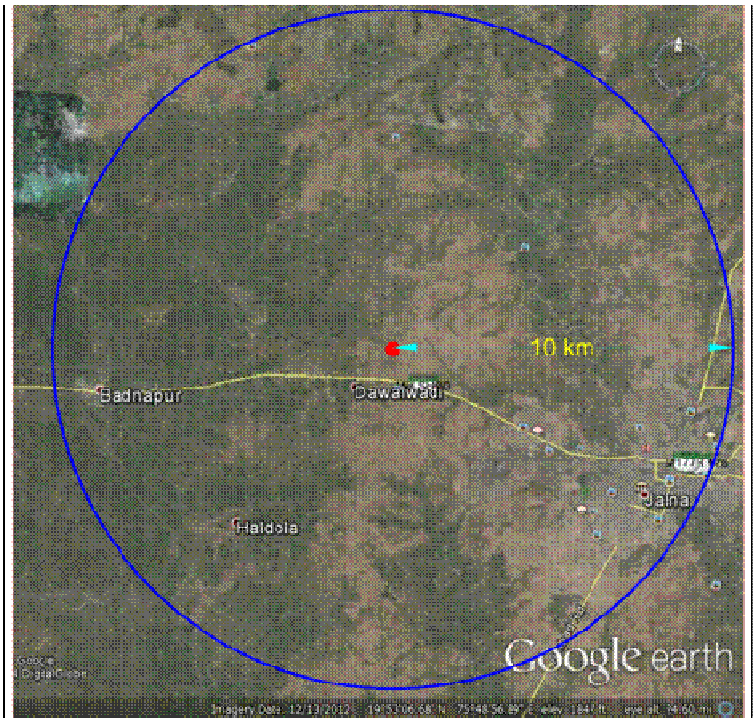


Figure 2: Location Map

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 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	Forest and wildlife related issues:	
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 (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife	Not Applicable

Sr. No.	ToR Description	Covered in
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 be included.	Chapter 3 (3.7)
19	Details of Drainage of the project upto 5km radius of study area. If the site is	Chapter 3

Sr. No.	ToR Description	Covered in
	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.	(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 PM10, PM2.5, SO2, NOX, 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 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	Chapter 4 (4.2)

Sr. No.	ToR Description	Covered in
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 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	Chapter 4 (4.3.2)

Sr. No.	ToR Description	Covered in
	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 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	

Sr. No.	ToR Description	Covered in
	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 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.	Noted
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	Chapter 10

Sr. No.	ToR Description	Covered in
	per requirements in TOR condition No. (1).	
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

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**
For DRI (Sponge Iron)	
Iron Ore pellets	1450
Coal	1200
Dolomite	50
TMT Bars and billets	
MS Scrap	100
Sponge Ironpellets	1000
Pig Iron	80
Silico manganese	18
For Power Plant	
Dolochar + char	420
Coal	350
Mode of Transportation will be by road	

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

Description	**B grade coal (sponge iron)**	**F grade coal (power plant)**
Carbon content	45 %	30%
moisture	6-10 %	7-8%
Volatile matter	20-30 %	17 %
ash	15-40 %	7 %
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

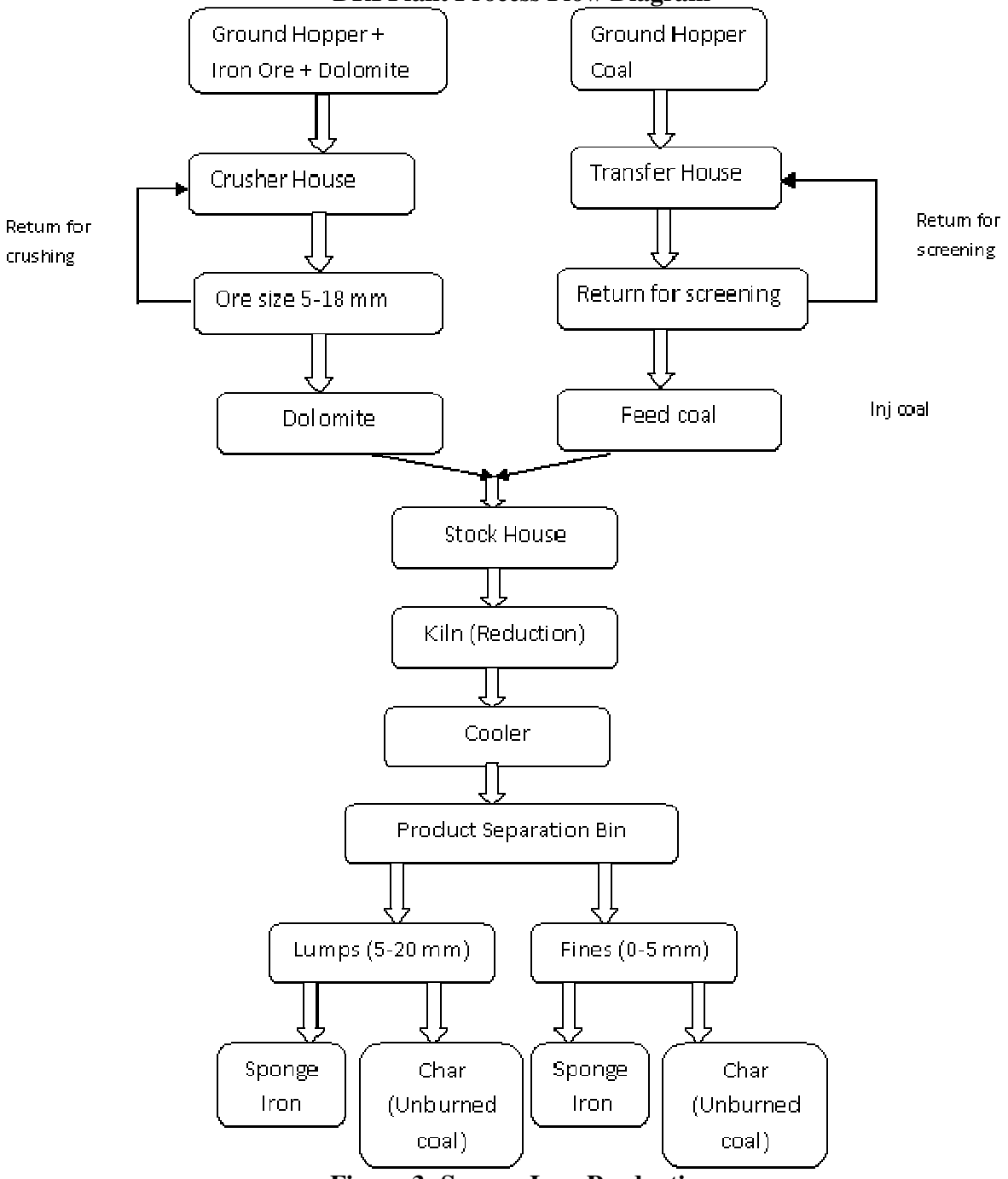


Figure 3: Sponge Iron Production

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

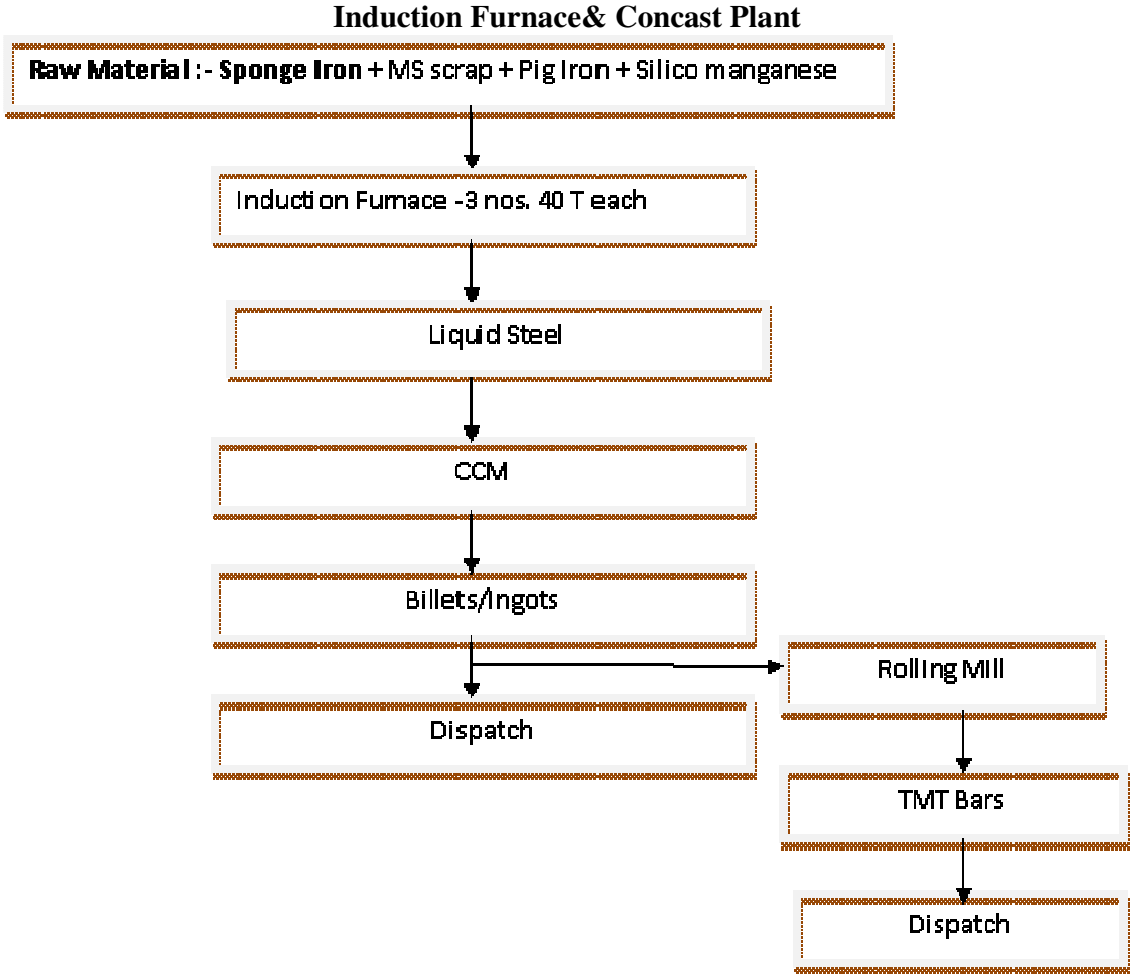


Figure 4: Billets Production

2.1.4 Manufacturing Process of Rolled Products:

The process of rolling involves several steps: -

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.

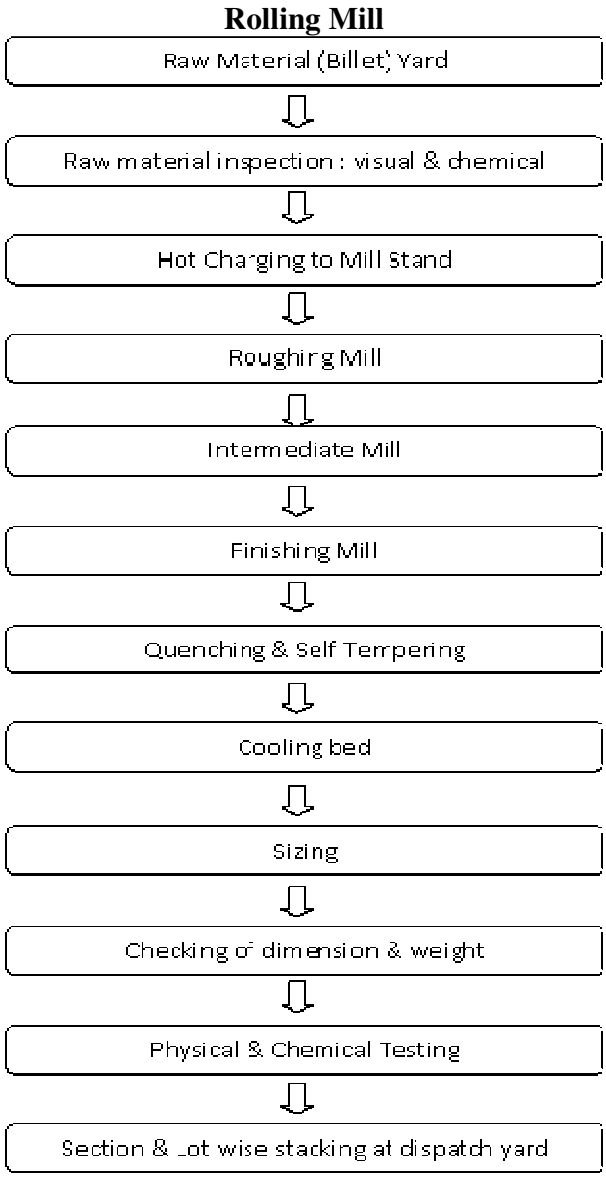


Figure 5: Rolling mill production

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.

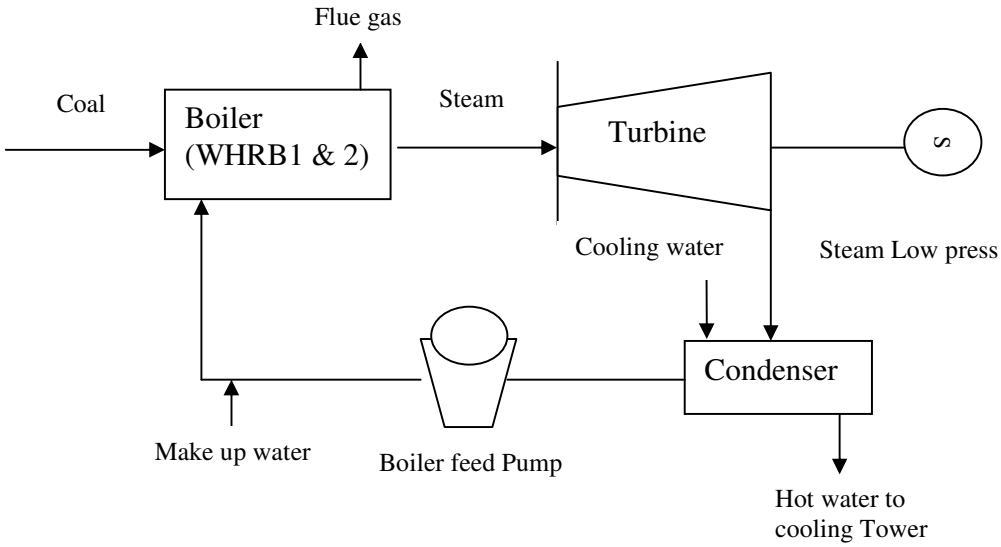


Figure 6: Process Flow Chart for Power generation

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

Mass Balance:

Input, MT		**Output, MT**	
Coal	0.947 - 1.203	Sponge iron	1
Iron Ore	1.55-1.612	Flue Gas	4.41-4.292
Dolomite	0.001-0.004	Char	0.37-0.48
Air	3.28-2.951	Losses	0.003-0.004

Energy Balance

Input million kcal		Output million kcal	
Coal	3.890-4.863	H_2+H_2O	0.17-0.213
		Flue Gases	1.410 - 1.763
		Char	1.280 - 0.160
		Sponge iron	0.124 - 1.550
		Radiation Loss	0.500 - 0.625
		Convection Loss	0.362 - 0.453
		Loss thru Door	0.040 - 0.050
		Misc	0.004 - 0.005

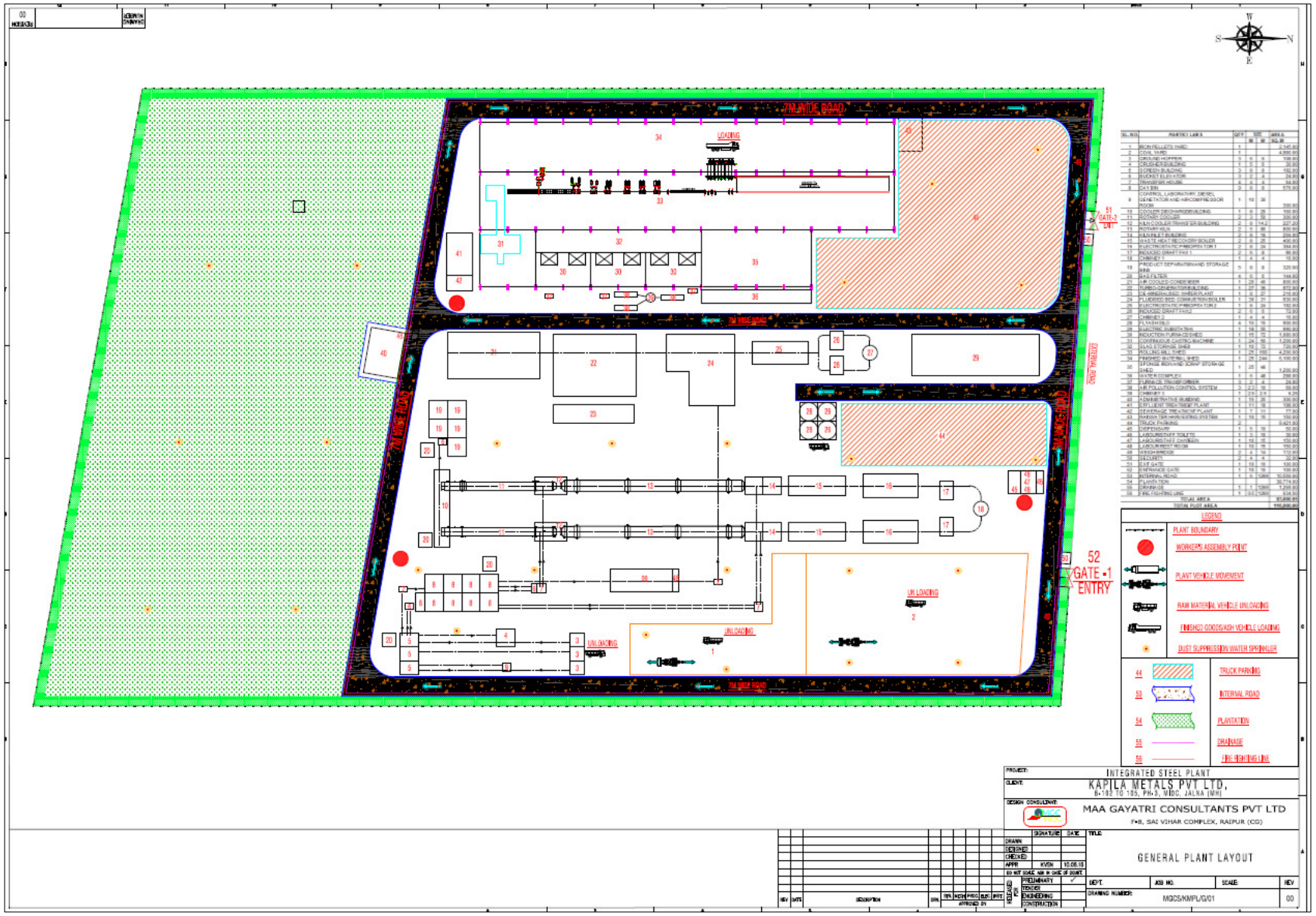


Figure 7: Project Layout (Generic ToR point 3 (vi), 14)

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 2: 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	1500TPD
Coal	1000TPD
Dolomite	50TPD
For Power Plant	
Dolochar	210TPD
Coal	816TPD
For Pellet Plant	
Iron Ore Fine	1500TPD
Lime Stone	22TPD
Coal/Coke	18TPD
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

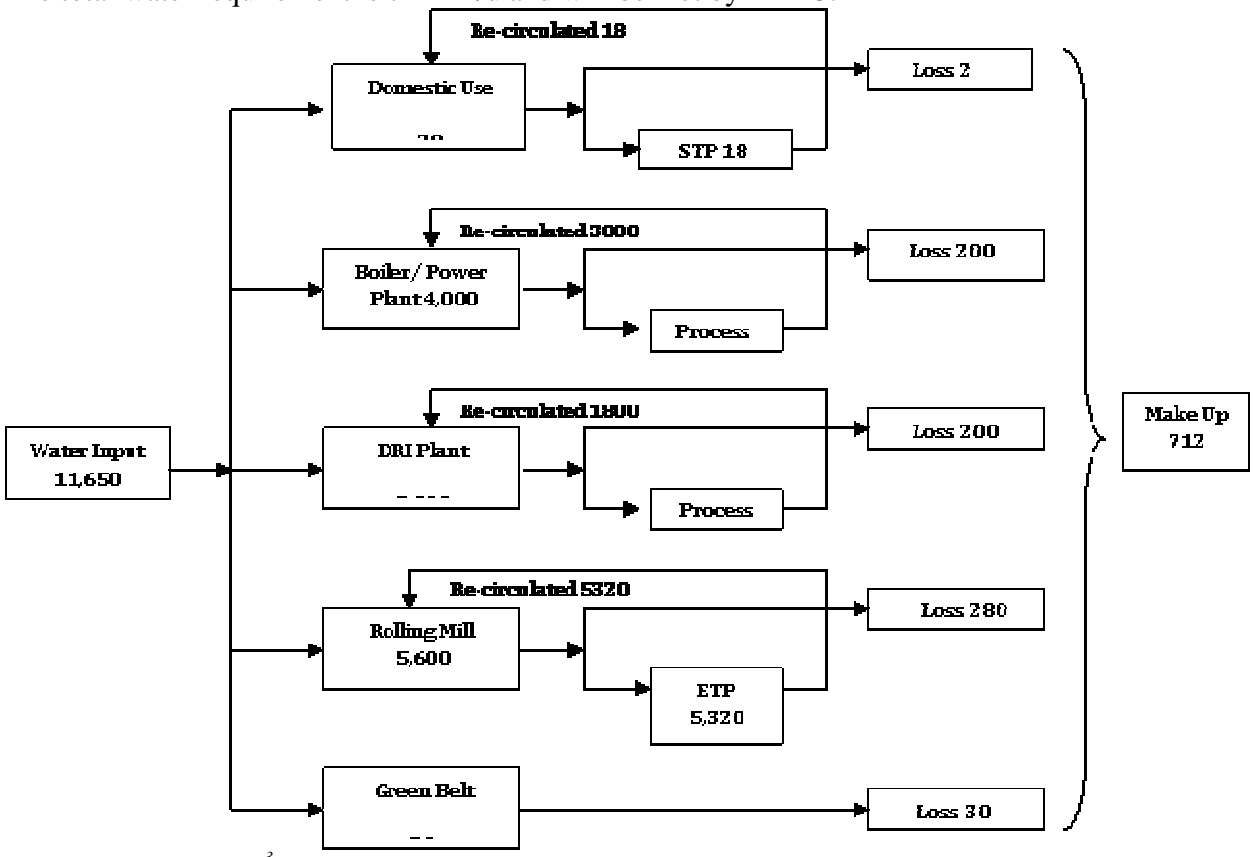
2.4.1 **Power:**

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 712 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 12 m^3/day.

Domestic sewage will be treated in Extended Aeration System STP of capacity 15 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,

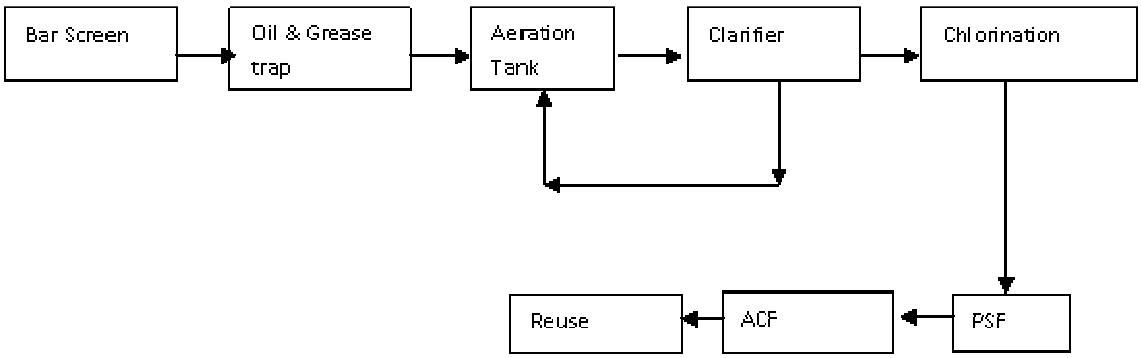


Figure 10: Extended Aeration System

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 ~ 44 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 290 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 3. The main sources of air pollution in the region are small scale industries and traffic.

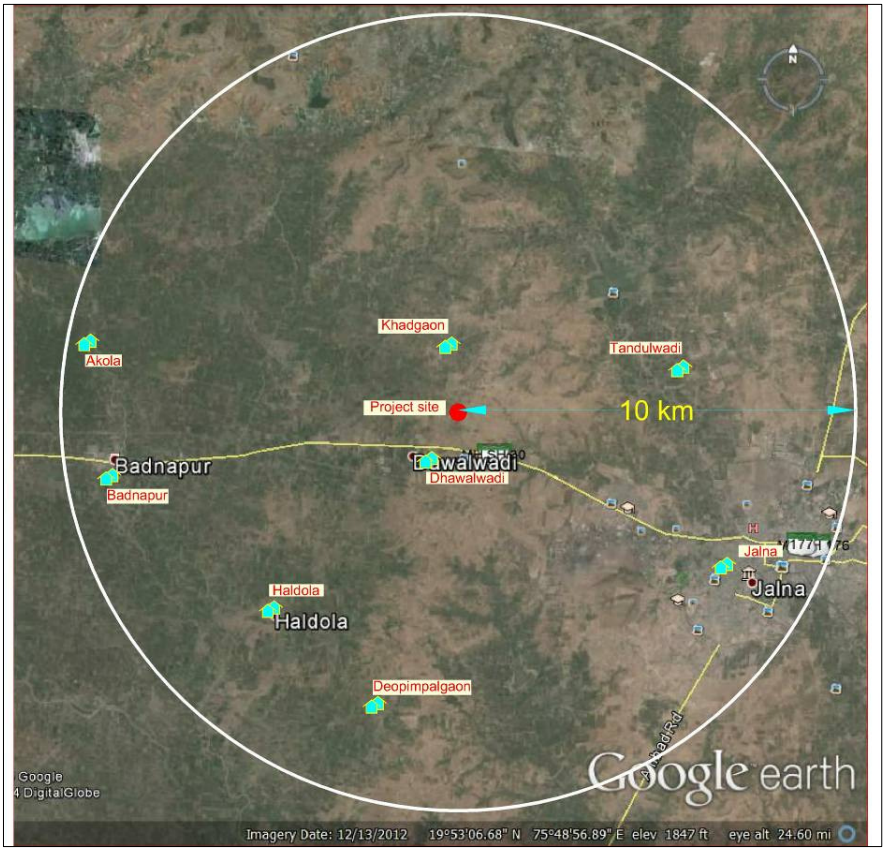


Figure 11: Monitoring stations (Air, Noise, Soil)

Table 3: 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 4**.

Table 4: 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 5.** The results are summarized and presented in **Table 6 & 7**

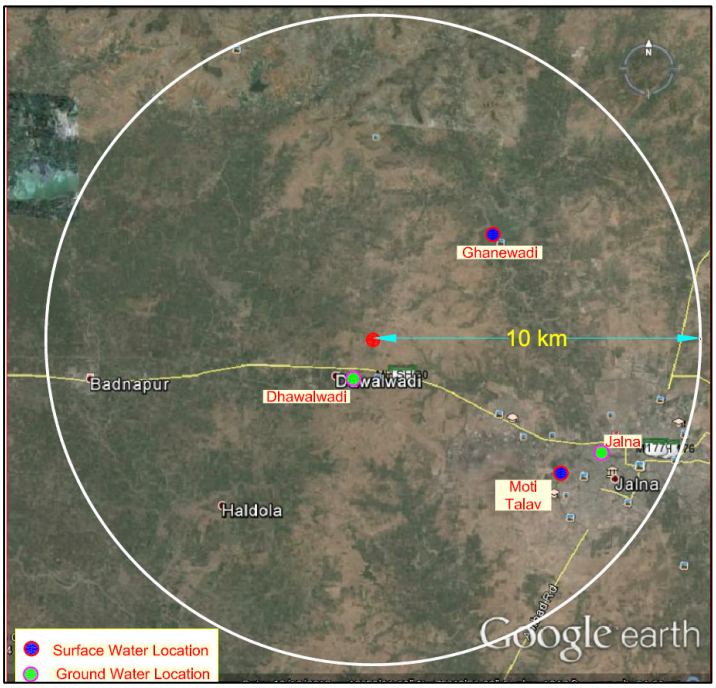


Figure 12: Location Surface and Ground Water stations

Table 5: Surface Water stations

Station	Locations	Distance (km)	Direction
SW1	Moti Talav	1.53	SE
SW2	Ghanewadi dam	6.54	N

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

Table 6: Surface Water Quality Results for Dec. 2014 to Feb. 2015

Sr. No.	Parameter	SW1-Moti Talav			Limit IS:10500
		Dec. 2014	Jan.20105	Feb.2015	
1	Colour	3.2	3.1	2.8	300
2	pH	7.38	7.31	7.45	6.5-9.0
3	Conductivity µmhos/cm	594	587	527	--
4	DO mg/l	2.6	2.3	2.1	4
5	COD mg/l	11.68	10.92	9.86	-
6	BOD(3 days at 270C) mg/l	5.4	5.1	4.8	3
7	TDS mg/l	537	528	512	1500
8	Chlorides as Cl mg/l	128	124	117	600
9	Free Ammonia	0.5	0.4	0.3	--
10	Total Hardness as CaCO3 mg/l	428	421	417	300
11	Calcium as Ca^{++} mg/l	84	79	68	75
12	Magnesium as Mg^{++} mg/l	2.94	2.64	2.38	30
13	Sodium as Na mg/l	64	60	52	--
14	Potassium as K mg/l	27	25	23	--
15	Sulphate as SO_4 mg/l	23	22	21	400
16	Nitrate as NO_3 mg/l	3.8	3.5	2.9	50
17	Sodium Adsorption Ratio meq/l	8.4	8.2	7.8	26
18	Total Coliform MPN/100ml	400	350	300	5000

Table 7: Surface Water Quality Results for Dec. 2014 to Feb. 2015

Sr. No.	Parameter	SW2-Ghanewadi Dam			Limit IS:10500
		Dec. 2014	Jan.20105	Feb.2015	
1	Colour	4.2	3.8	3.5	300
2	pH	7.12	7.22	7.31	6.5-9.0
3	Conductivity µmhos/cm	564	557	547	--
4	DO mg/l	1.8	1.5	1.2	4
5	COD mg/l	7.18	7.08	6.93	-
6	BOD(3 days at 270C) mg/l	2.4	2.1	2.0	3
7	TDS mg/l	521	514	504	1500
8	Chlorides as Cl mg/l	114	111	102	600
9	Free Ammonia	0.1	0.1	0.01	--
10	Total Hardness as CaCO3 mg/l	398	389	368	300
11	Calcium as Ca^{++} mg/l	0.73	0.68	0.64	75
12	Magnesium as Mg^{++} mg/l	2.98	2.74	2.63	30
13	Sodium as Na mg/l	54	48	44	--
14	Potassium as K mg/l	21	20	16	--
15	Sulphate as SO_4 mg/l	17	15	14	400
16	Nitrate as NO_3 mg/l	3.1	2.8	2.3	50
17	Sodium Adsorption Ratio meq/l	7.8	7.4	7.1	26
18	Total Coliform MPN/100ml	240	250	350	5000

Discussion

Surface water samples analyzed during the study period indicate that the water is free from heavy metals and industrial pollution such as fluoride, copper, iron, zinc, boron, arsenic and lead. These elements are found to be below detectable levels in the analyzed water samples. However, both surface water samples showed presence of coliform bacteria making it unfit for drinking purposes. This also indicates contamination by fecal matter.. All the other parameters are found within the prescribed limits

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

Station	Location	Direction	Distance km
1	Project site	--	
2	Dawalwadi	NW	5.6
3	Jalna	SE	2.24

Table 9: Ground Water Quality Results

Sr. No.	Parameter	Project site (GW1)	Dhawalwadi (GW2)	Jalna (GW3)	Standards IS - 10500:2012
1.	Colour Hazen	1.0	1.0	1.0	5
2.	pH	26	25	26	6.5-8.5
3.	Conductivityμmhos/cm	6.73	7.00	7.36	--
4.	DO mg/l	4.10	3.98	4.23	--
5.	Residual Chlorine mg/l	Nil	Nil	Nil	0.2
6.	TDS mg/l	120	92	103	500
7.	Chlorides (as Cl) mg/l	56	38	47	250
8.	Alkalinity mg/l	68	42	57	200
9.	Total Hardness (as $CaCO_3$) mg/l	139	124	99	200
10.	Sodium (as Na) mg/l	110	88	56	--
11.	Potassium (as K) mg/l	0.06	0.04	0.03	--
12.	Sulphate (as SO_4) mg/l	41	26	35	200
13.	Nitrate (as NO_3) mg/l	15	20	17	45
14.	Fluoride (as F) mg/l	0.2	0.13	0.2	1.0
15.	Copper (as Cu) mg/l	0.07	0.04	0.02	0.05
16.	Iron (as Fe) mg/l	0.15	BDL	0.09	0.3
17.	Zinc (as Zn) mg/l	1.5	0.5	1.3	5
18.	Boron (as B) mg/l	BDL	BDL	BDL	0.5

19.	Lead (as Pb) mg/l	BDL	BDL	BDL	0.01
20.	Total Coliform MPN/100 ml	Absent	Absent	Absent	0

Discussion

Ground water samples analyzed during the study period indicate that the metals like copper, iron, zinc, lead etc. are within limits. Coliform bacteria are also absent in the analyzed samples. Total dissolved solids and hardness are also within the IS 10500:2012 limits.

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

	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			7.64	7.68	7.58	7.54	7.55	7.48	7.52	7.64
4	Electrical conductivity	ms/cm		0.38	0.39	0.4	0.36	0.32	0.3	0.31	0.37
5	Chlorides as Cl	mg/kg		432.17	412	432.68	456.32	458.72	447.52	453.22	448.94
6	Iron as Fe	mg/kg		847	794	847.63	848.79	874.59	807.45	817.91	807.52
7	Sulphate as SO4	mg/kg		3.89	2.6	5.11	3.64	3.38	3.04	3.09	305
8	Sodium as NA	kg/ha		224	203.24	227.85	229.63	212.98	211.23	228.52	219.63
9	Potassium as K	kg/h		149	127.85	143.67	147.51	143.21	137.42	149.85	147.84

		a									
10	Phosphorous as PO4	mg/ kg		2.93	2.37	348	3.17	2.73	2.48	2.33	2.41
11	Calcium as Ca	mg/ kg		1.19	1.07	1.55	1.37	1.33	1.24	1.62	1.67
12	Magnesium as Mg	mg/ kg		2.32	1.88	2.66	2.41	2.38	2.37	2.81	3.11
13	Nitrogen as N	kg/h a		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
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 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)

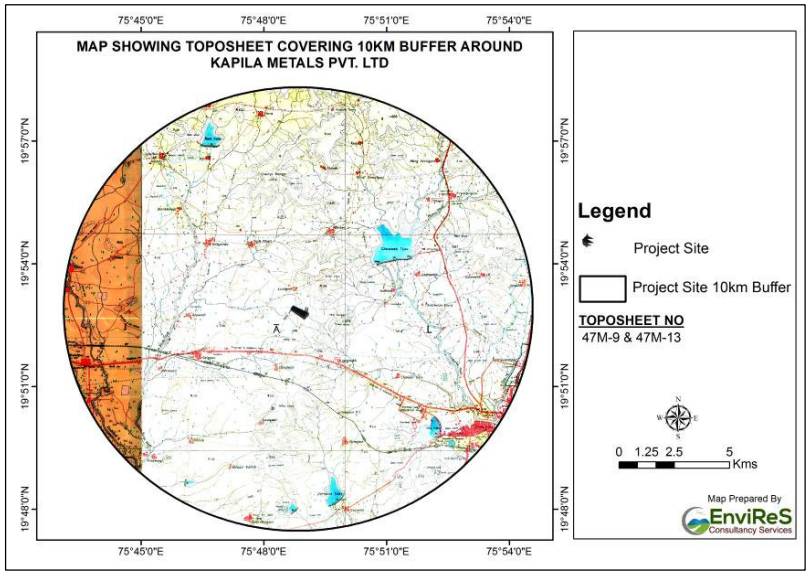


Figure 13: Toposheet of Study area within 10 Km

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.

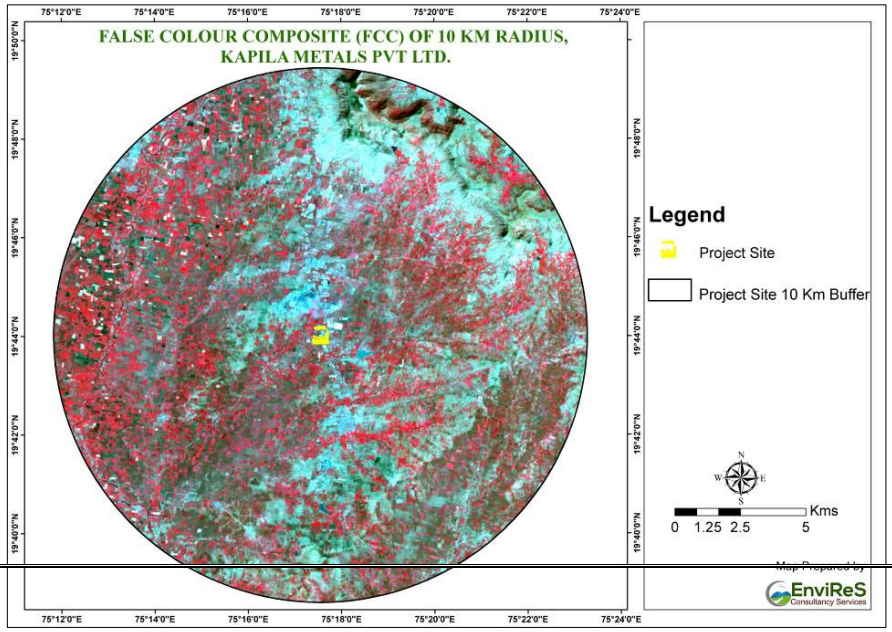


Figure 14: Satellite Image (Addl. ToR Point No.4)

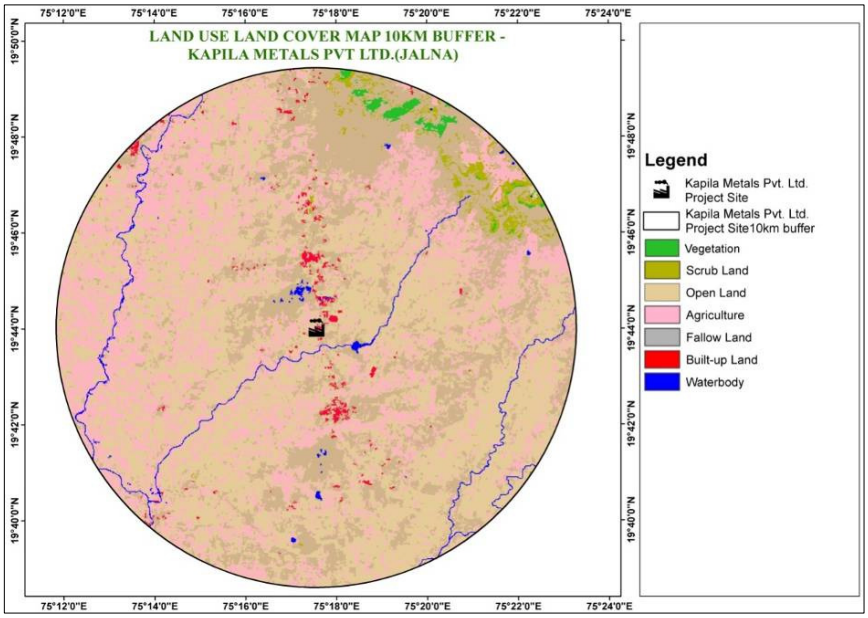


Figure 15: Land use/land cover map of study area

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.

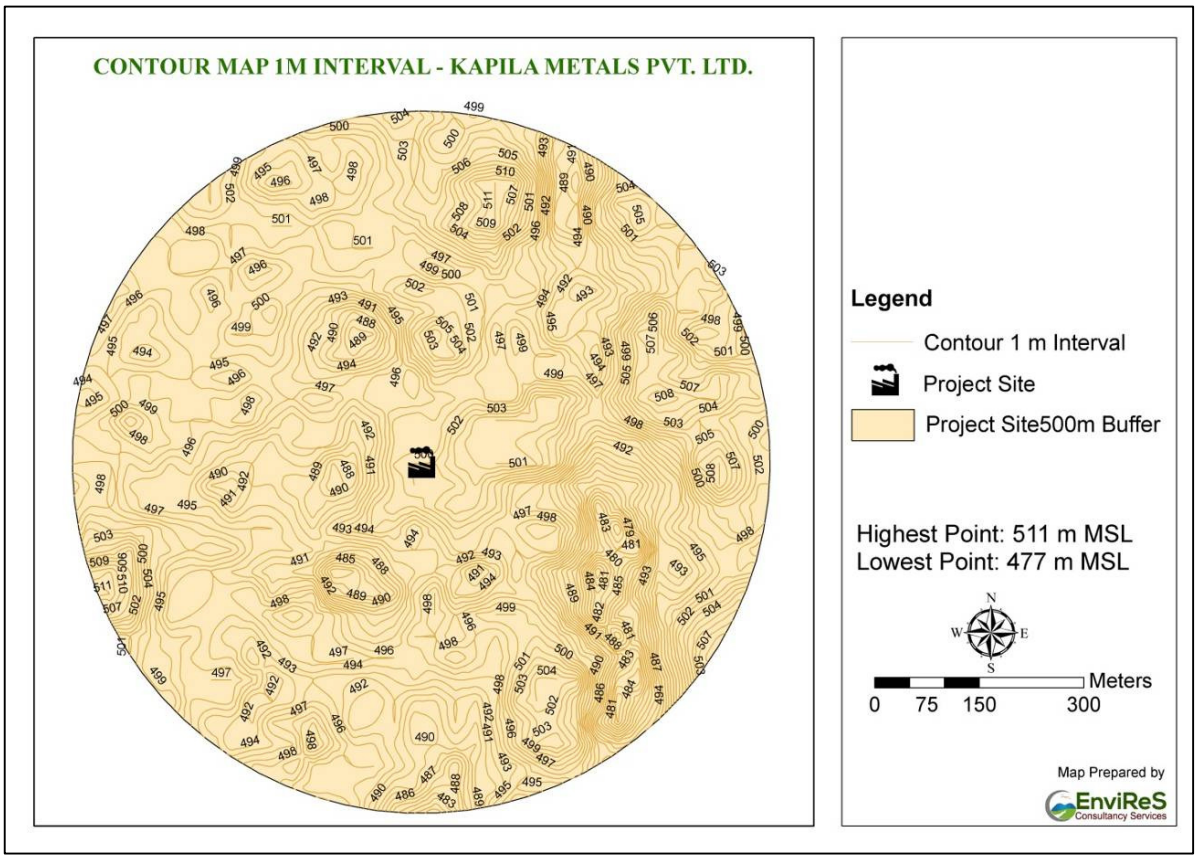


Figure 16: Contour map of 500 m buffer

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.

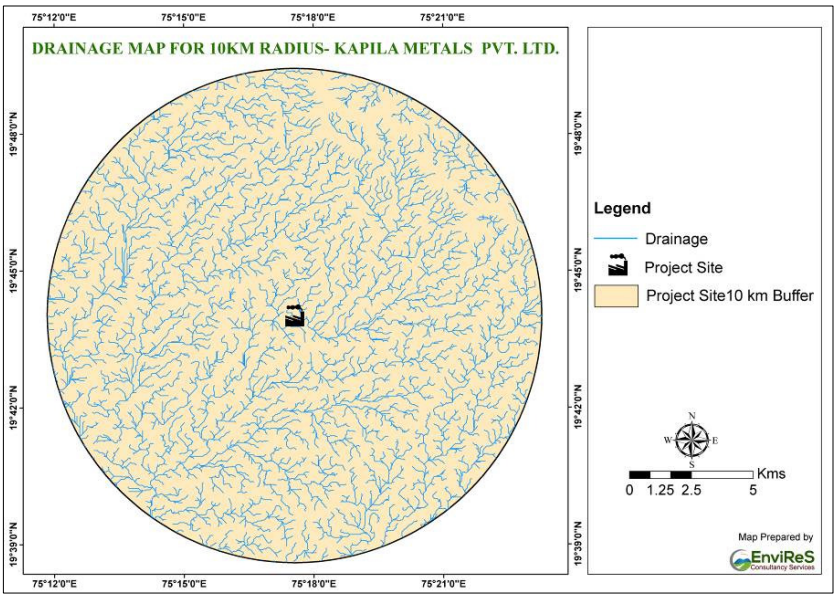


Figure 17: Drainage Layout for 10 km study area

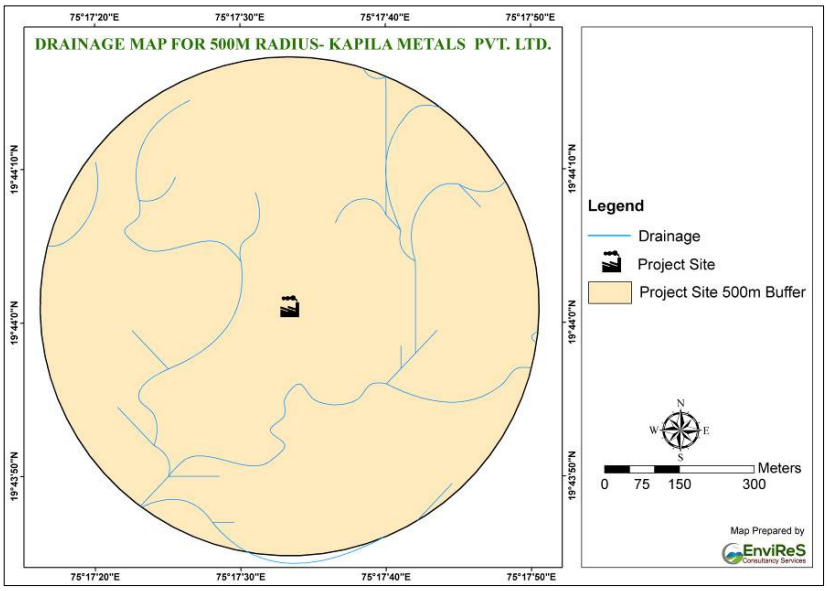


Figure 18: Drainage Layout for 500m study area

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
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:**

Depressions in the Arabian Sea during May and June, which move northwards, near the coast and depressions from the Bay of Bengal during the monsoon season moving across Madhya Pradesh affect the weather over the district causing local winds. Occasionally depressions from Bay of Bengal during October move westwards across the peninsula emerge into the Arabian Sea and move forwards the Gulf of Cambay. Such depressions also affect the district. Winds are generally light to moderate with increase in speed during half of summer and in monsoon season. The predominance is W and NW in summer months, SW and W in monsoon and post monsoon months and S and SE in winter months. The wind speed and percent number of days of wind direction are presented in a tabular form below:

Table 17:-Hourly Meteorology Data used for Model

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

3.7.6 **Windrows:**

Met data collected during December. 2014 to February 2015 has been used for modeling input while CPCB document PROBES/88/2002-2003 is followed for site-specific mixing heights. Wind speed and direction is presented as wind rose in **Figure-19.**

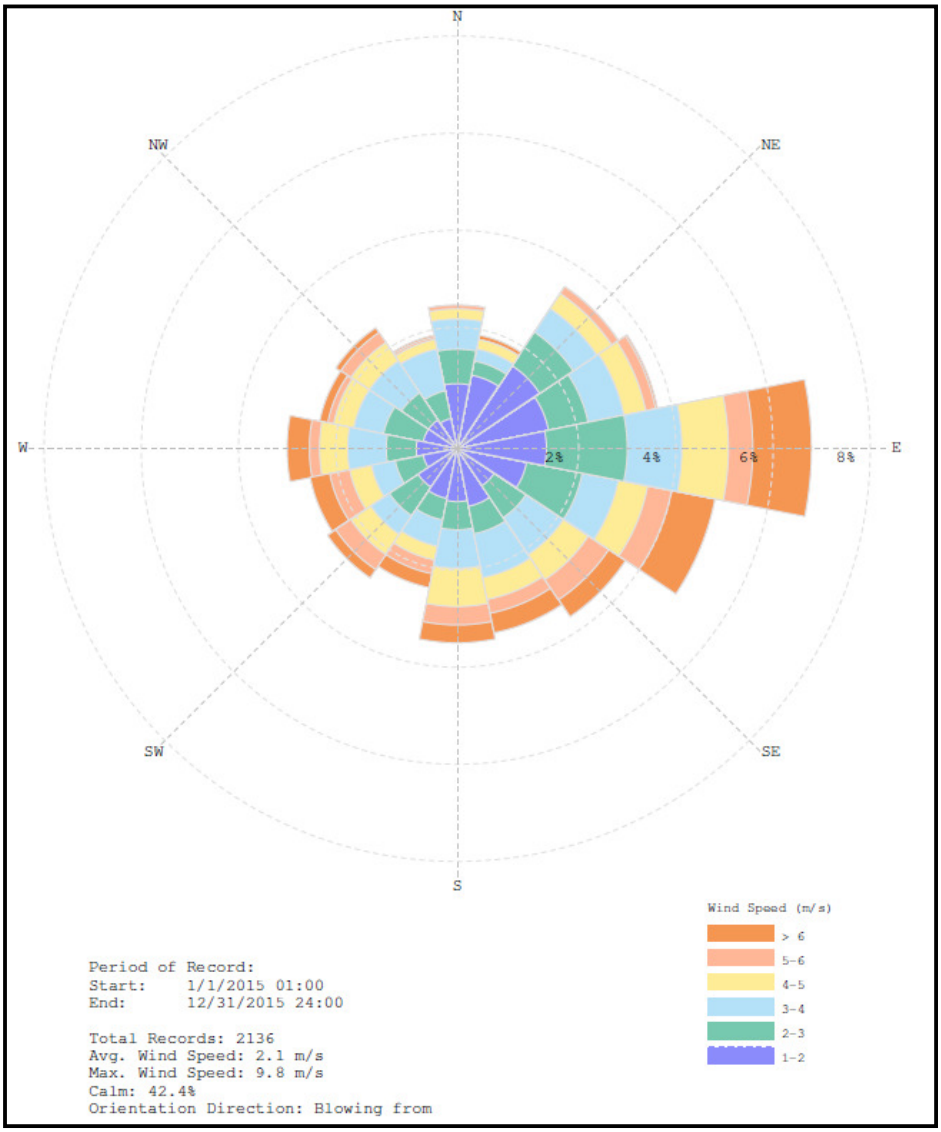


Figure 19: Wind Rose (Dec. 2014 to Feb. 2015)

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 18: 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

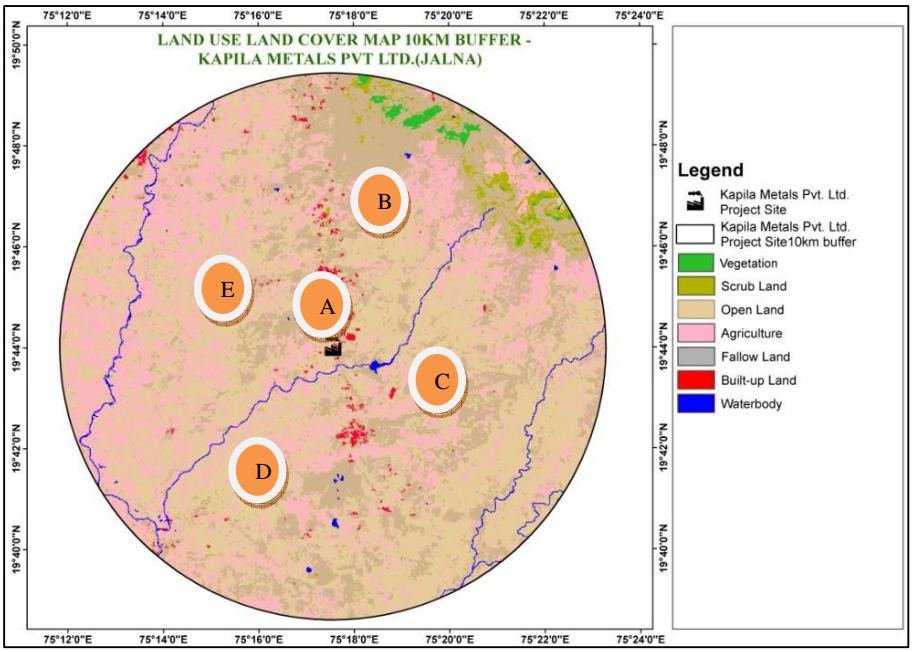


Figure 20: Locations of Avifauna survey and Vegetation, A-E

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.

Methodology

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 *Fragillaria, 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 19: 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 20: 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 21: 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 22: 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 23: 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 24: 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
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.

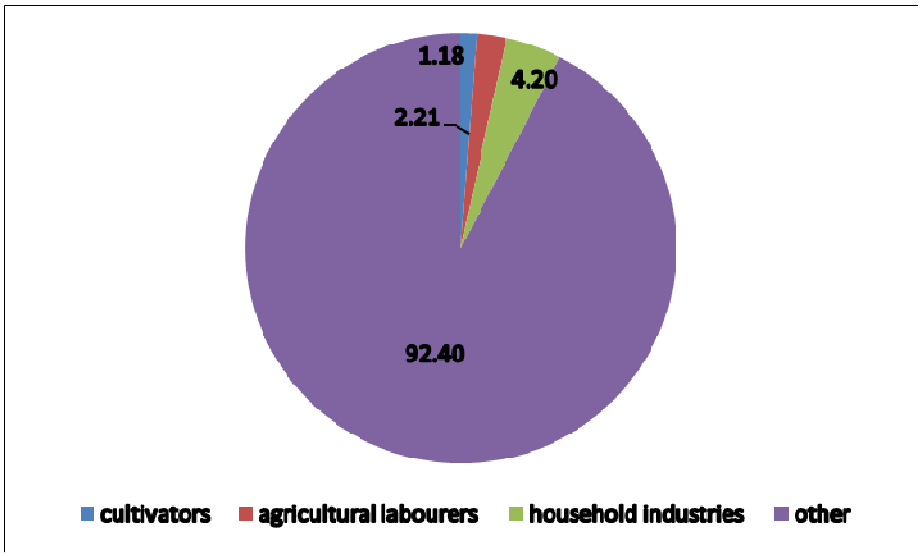


Figure 21: Distribution of Main Workers in urban and rural area

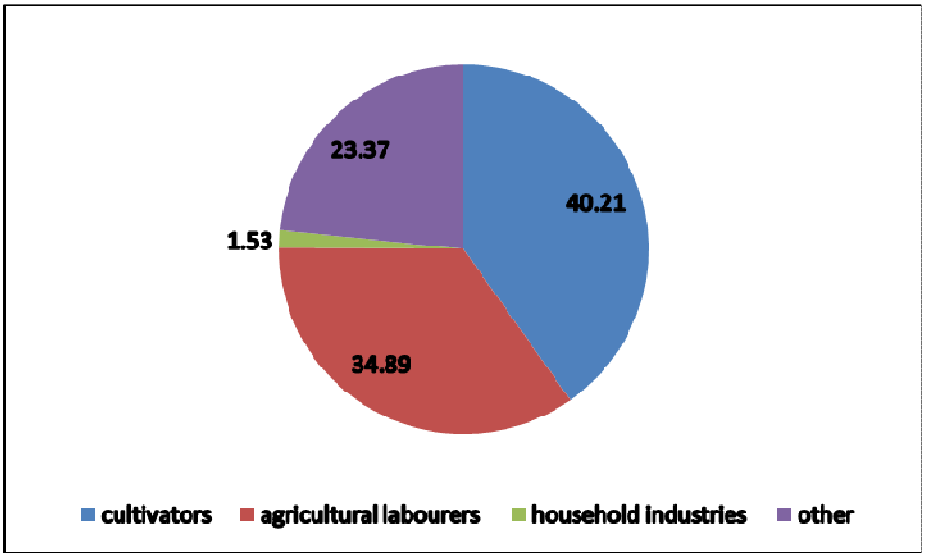


Figure 22: Rural Main workers

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, out of which 4 are sugar factories.

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.

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 negligible 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. Additional recommendations include the following

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.

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.

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 of pollutants into the air. The main source of air pollution during construction phase will be due to from the Project is:

1. Emission from SL/RN Kiln namely particulate matter
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 xxx

Table XXX 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 xxx. 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
Diameter	
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 yyy.

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 50 -60 mg/Nm^3 PM, maximum permissible 100 mg/Nm^3 has been used for modeling purpose.

100 mg/Nm^3 SOx and NOx emission from 80 m tall stack, attached to sponge iron plant and power plant has been considered for modeling purpose.

Prediction of impacts on air environment has been carried out employing, **Industrial Source Complex-Short Term [ISCST3]** 1993 dispersion model based on steady state Gaussian plume dispersion,

designed for multiple point sources for short term and developed by United States Environmental Protection Agency [USEPA].

4.1 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).

4.1.1 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 xxx

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-27**.

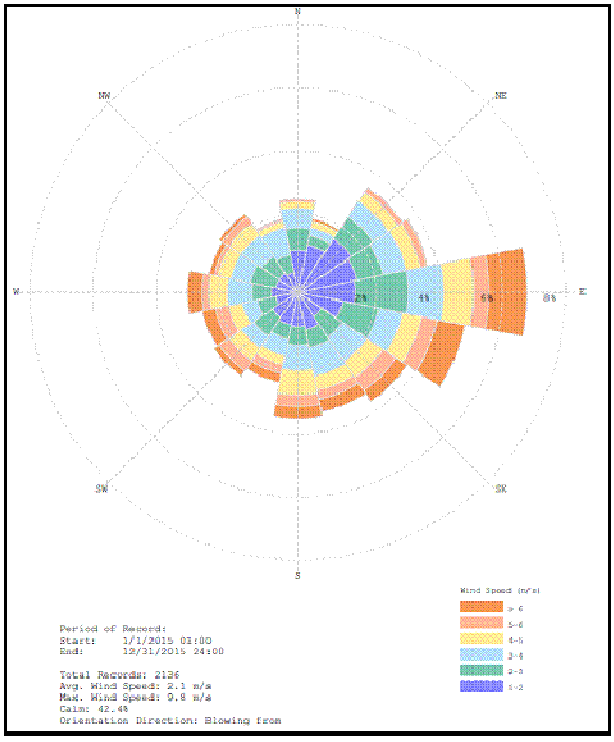


Figure 23: Site Specific Wind Rose for Winter Season

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.

4.1.2 **Prediction:**

The predicted results are tabulated below in **Table-28** 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-28**) 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-29** while resultant concentrations at ambient air quality monitoring (AAQM) locations are tabulated in **Table-30**.

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 $\mu g/m^3$*

4.1.3 **Impact Assessment**

Ambient air quality in study area w.r.t. PM, SO_2 and NOx is within NAAQS 2009 as seen from Table 4 and 5. 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 alongwith tall stacks are proposed as air pollution control measures.

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**
AQ1-Project site	2.98	0.95	0.20	65.85	13.12	17.49	68.83	14.07	17.69
AQ2- Haldoli	1.11	1.57	0.35	65.31	13.61	17.63	66.42	15.18	17.98
AQ3- Dhawalwadi	1.29	5.32	1.14	65.81	11.89	16.46	67.10	17.21	17.60
AQ4- Khadgaon	2.18	10.17	2.23	67.45	12.45	16.24	69.63	22.62	18.47
AQ5- Akola	1.09	4.52	0.38	69.18	13.37	17.05	70.27	17.89	17.43
AQ6-Jalna	0.36	1.10	0.25	68.40	12.94	16.47	68.76	14.04	16.72
AQ7-Deopimpalgaon	1.90	2.89	0.65	67.66	13.38	16.97	69.56	16.27	17.62
AQ8-Badnapur	1.14	4.90	1.09	68.28	13.85	18.06	69.42	18.75	19.15
AQ9-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

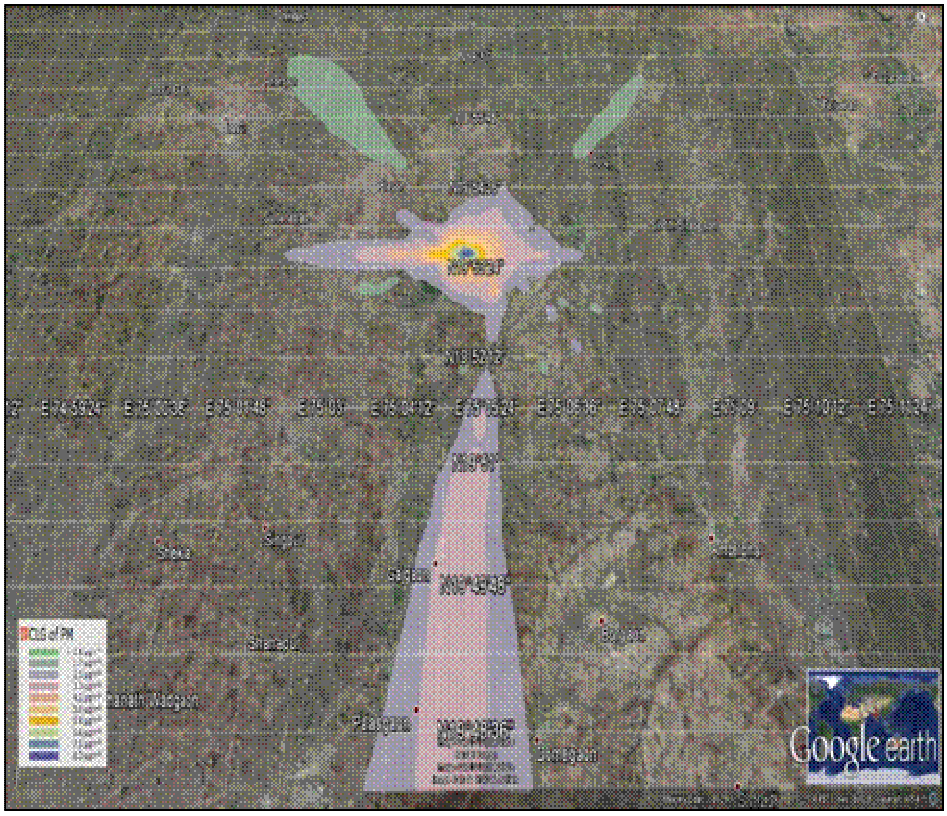


Figure 24: Short Term 24 Hourly Incremental GLCs of PM

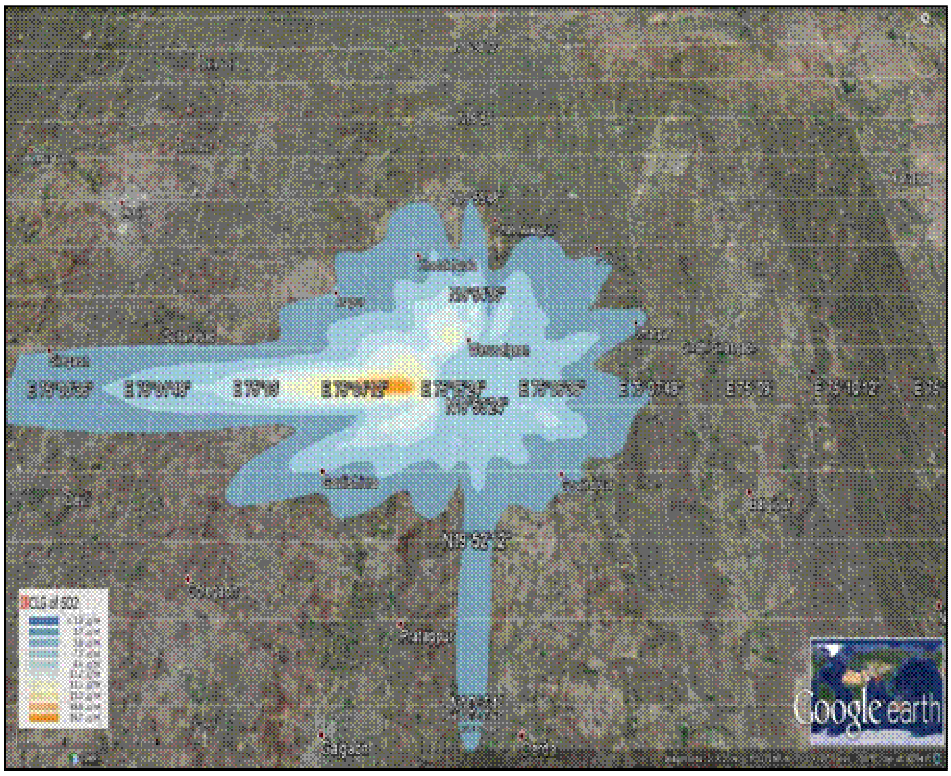


Figure 25: Short Term 24 Hourly Incremental GLCs of SO_2

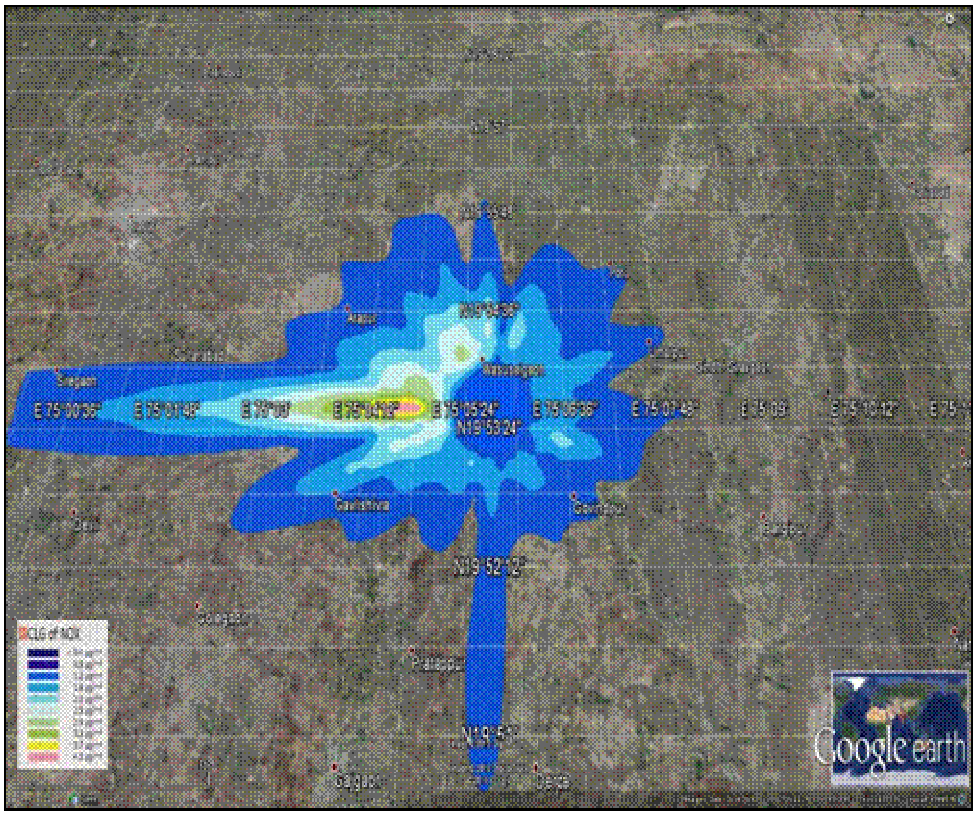


Figure 26: Short Term 24 Hourly Incremental GLCs of NOx

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

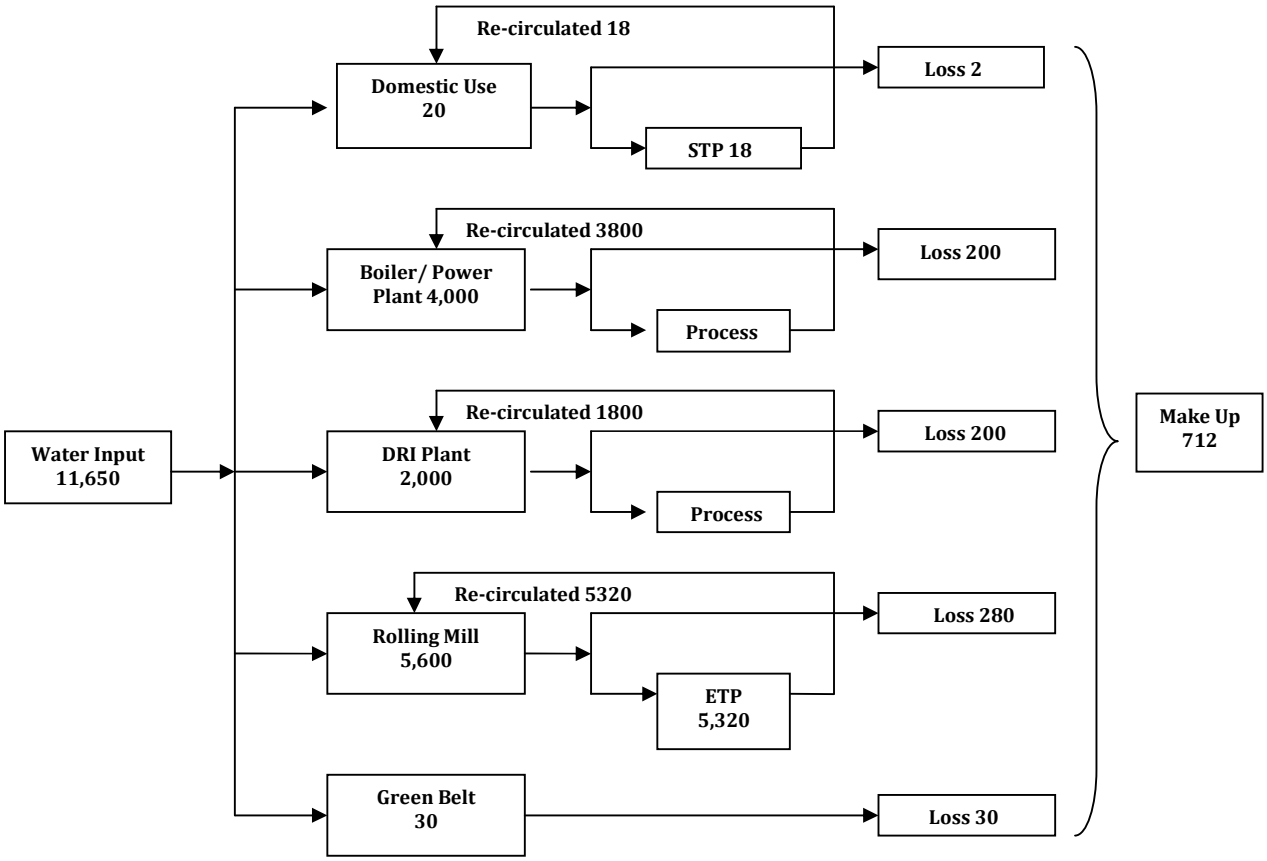
Stack Height for 3X40MT Induction Furnace:-

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	

4.2 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

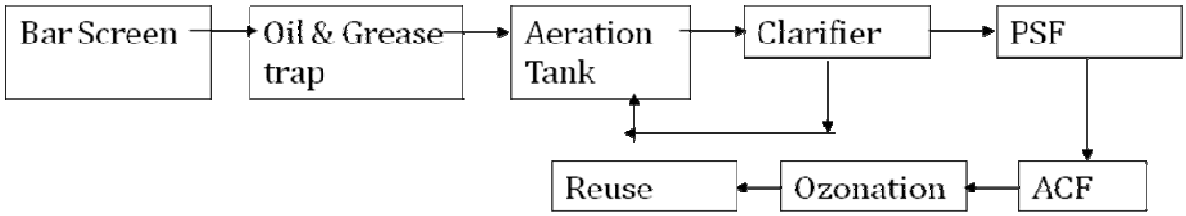
Figure 27: Water Balance

The quality of domestic wastewater is expected to be:

Table 30: Characteristics of domestic WW

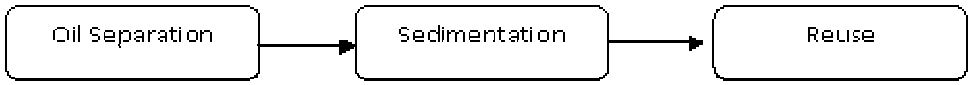
Design Parameter	Inlet Value	Outlet Value
pH	6.5-8.5	7-8
BOD_5mg/l	250-300 mg/lit	≤30
COD mg/l	350-450 mg/lit	≤250
Suspended Solids mg/l	200-300 mg/lit	≤100
Oil & Grease mg/l	10-15 mg/lit	≤10

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.



4.2.1 **ETP Capacity 20 KLD:** (Generic ToR point No. 34)

Waste water from Rolling mill will be treated in ETP for oil recovery and treated water will be reused in rolling mill.



4.2.2 **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.

4.2.3 **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	44 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 remainingslag 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	MT/Day
Char + Dolochar	420	MT/Day
Iron ore Pellet	1450	MT/Day
Ash generation	300-400	MT/Day
Days of storage	2	days
Storage required	800	MTD
No. of Silos	2	Nos
Capacity of each silo	100	MT

Following points will be considered while designing of ash silos.

1. Ash silos of 100 mt of net ash capacity, 2 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

4.3 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 area is provided as green area with 4975 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*	Katesavar	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	100
14	*Carica Papaya*	Papaya	150
15	*Calliandra Calothyrsus*		115
16	*Sesbania sesban*		120
17	*Acasia nilotica*		150
Total			**4975**

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**

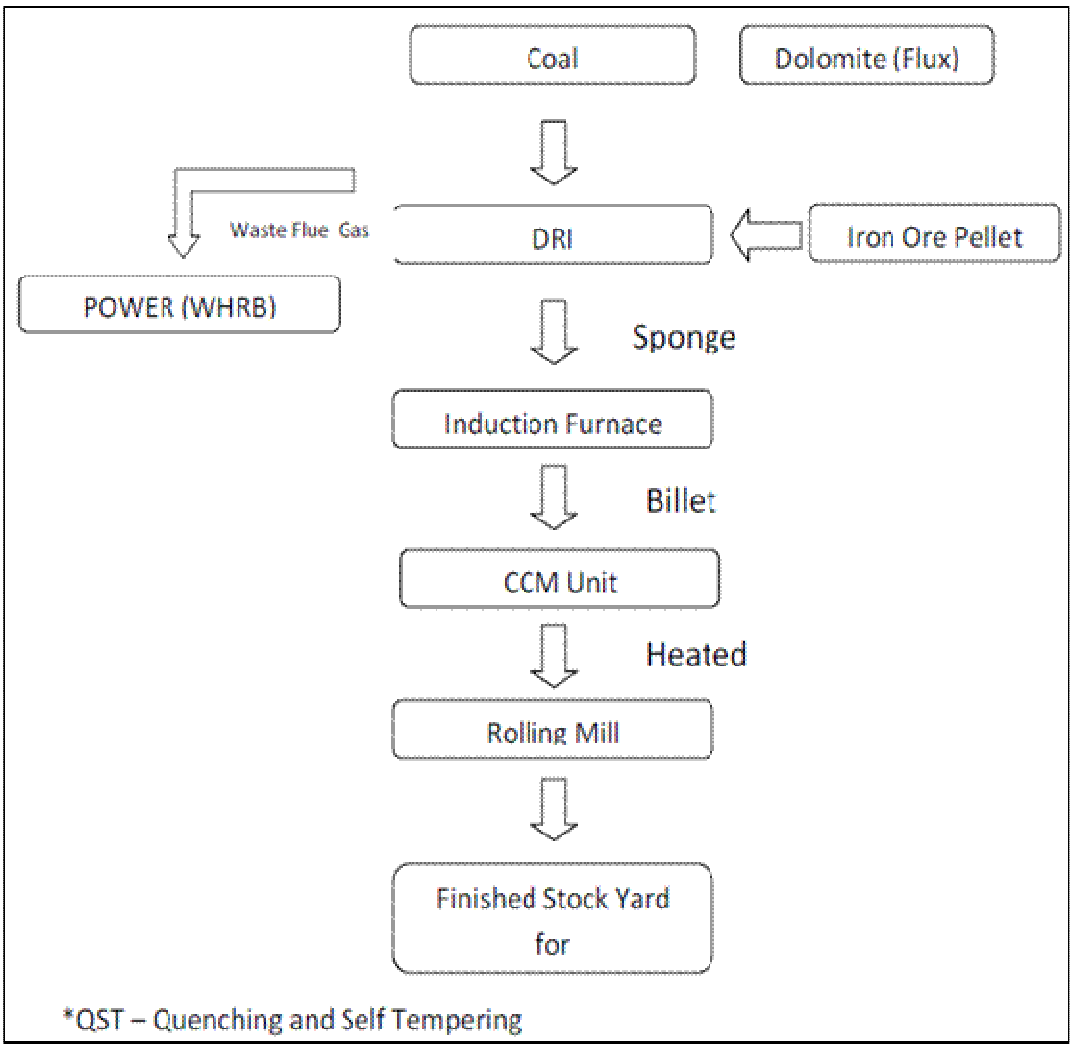


Figure 28: Block diagram

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 MANAGEMENT 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	8	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

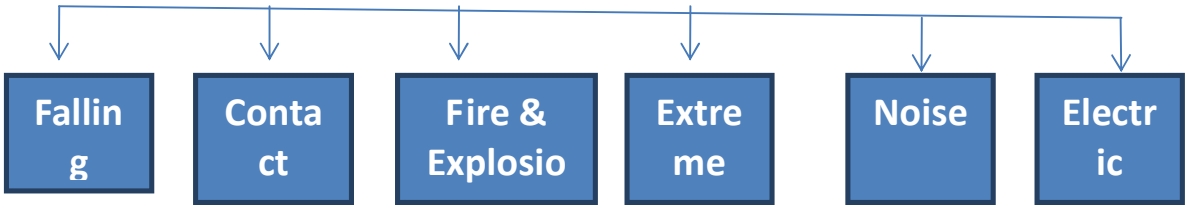
The entire quantity of coal will be stored in separate stack piles, with proper drains around to collect washouts during the monsoon. Water sprinkling system will be installed on stocks of pile to prevent spontaneous combustion and consequent fire hazards. The stack geometry will be adopted to maintain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

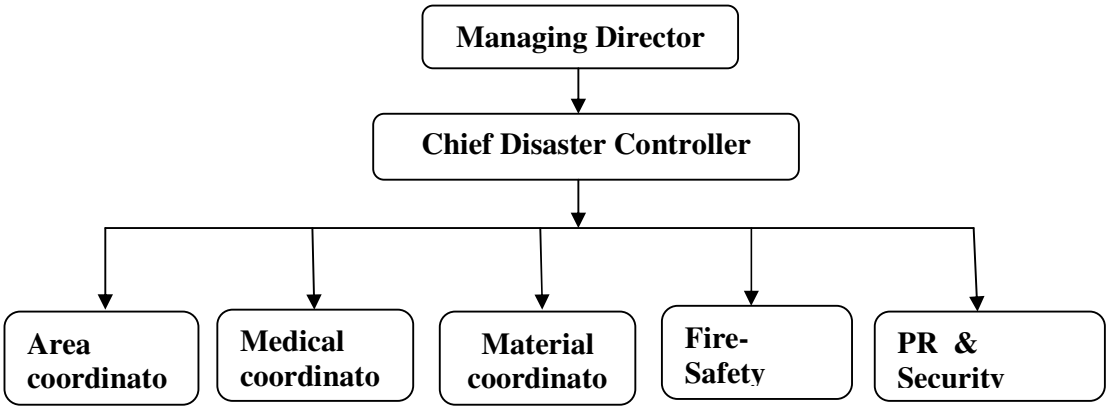
7.4 Disaster Management Plan:(Generic ToR point No. 45)

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



: 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 --: Emergency 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)

Total raw material required will be 3160 T/day & final production will be 1000 T/day, Coal ash 400T/Day, Slag, 180T/Day.

Overall total 80 trucks will entered in project site carrying raw material (1 truck capacity- 40 T) & 15 trucks will be going out with final product. For this sufficient will be parking provided & which is indicated on layout. There will be separate entry & exit for vehicles.

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.

We will earmark Rs. 6.8 Cr. for CSR activities.
List of CSR activities:

Corporate Social Responsibility: (Generic ToR point No. 49)

S. No.	Activity	Budget (Rs. In Lacs)
1	Provision of Drinking water facilities	150
2	Cultural Activities	100
3	Development of quality education	140
4	Development of technical skill and vocational training to 50 candidate	90
5	Developing the Green belt	100
6	Provision of Library facility	100
	Total	**680**

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 a distillery 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. <50 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 40: 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 41: 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
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. Timir Shah
					WP	Mrs. Sampada Shidid
					EB	Ms. Swati Bopinwar
					SE	Ms. Kishore Wankhede
					SHW	Mrs. Pradnya Parkhi AFAE: Ms. Shraddha Omble
					LU	Mr. Swapnil Avgade
					RH	Dr. Ravindra Kode
					NV	Mr. Chintan Athalye

Table 42:Team Member:

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

LABORATORY FOR ANALYSIS:

Table 43: 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

------XX000XX-----

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

F. No. J-11011/144/2014-IA II (I)
Government of India
Ministry of Environment, Forest and Climate Change
(I.A. Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Ali Ganj,
New Delhi - 110003

E-mail: satish.garkoti@nic.in
Tele fax: 011: 24695316

Dated: ~~31st March~~, 2015
1st April

To

Shri Rajendra S Bharuka
Director,
M/s Kapila Metals Pvt Ltd.,
Ajintha Nagar, Devalgaon Raja Road
Jalna – 431 203, Maharashtra

Email: Kapilametal@gmail.com,irbharuka@yahoo.com,Bskharche@gmail.com;
Fax No. Nil

Subject: Establishment of Industrial unit consisting of sponge iron (1000 TPD), Pellet plant (1500 TPD), MS Ingots/Billets (1000 TPD), structural TMT bar (1000 TPD) along with power generation (50 MW) of M/s Kapila Metals Pvt. Ltd. at B-102 to 105, Addl. MIDC Area, Phase III, Jalna, District Jalna, Maharashtra – Prescribing ToRs – regarding

Sir,

This has reference to your letter no 'nil' dated 22.03.2014 along with application in prescribed Form-I, Pre-feasibility report & Proposed TORs for undertaking detailed EIA study in accordance with EIA Notification, 2006.

2.0 The proposal is for setting up of a new metallurgical industry of large size in an industrial land in the Government industrial estate, namely Maharashtra Industrial Development Corporation (MIDC). This is an integrated project mainly for standard product of MS billet/ingot and MS structural TMT bars, angle & channels at Plot No. B-102 to 105, Addl. MIDC, Phase – III, Tehsil: Jalna, Dist: Jalna, Maharashtra. This project will be with an aim to produce mild steel billets and mild steel structural TMT bars. The required water, power and workforce are available. The total cost of the project is Rs. 540 crores. PP has purchased land in the already existing MIDC and infrastructure is available. This unit will have a capacity to produce the following:

1. Sponge (500x2 DRI Plant) 1000TPD
2. Power Generation 50MW
3. Billet/Ingot 1000TPD
4. TMT Bar, Angle & Channels 1000TPD

List and quantity of raw material required for the project is given below:

S. No	Name	Quantity
For Sponge Iron		
1	Iron Ore Pellet	1450MT
2	Coal B Grade	1200MT
3	Dolomite	30MT
For Power Plant (Fbc Boiler 24MW & WHR 26MW)		
4	Dolochar	48MT
5	Coal	75MT
6	Flue Gas From Dri Kiln	104 MT
Billets		
7	Sponge Iron	920MT
8	Scrap	100MT
9	Pig Iron	100MT
Rolling Mills		
10	Ingot/ Billets	1015MT

3.0 The above proposal was considered by the Reconstituted Expert Appraisal Committee (Industry) in its 29th EAC meeting held during 11th -12th December, 2014 for prescribing TORs for undertaking detailed EIA/EMP study.

4.0 After deliberations, the Committee prescribed following specific TORs for undertaking detailed EIA-EMP study in addition to the generic TOR enclosed at **Annexure I read with additional TORs at Annexure-2**:

i. The site is situated within the MIDC which is a Notified Industrial Area therefore Public Hearing for the project is exempted
ii. Management plan for Waste water treatment from rolling mill should be submitted
iii. Size and numbers of the bag filters should be submitted

5.0 Based on the information submitted and presentation made before the Committee the Ministry of Environment, Forest and Climate Change (MoEFCC) hereby accords ToRs for the above project under the provisions of EIA Notification dated 14th September 2006.

01/04/2015

(Dr. Satish.C. Garkoti)
Director

Copy to:-

1. The Additional Principal Chief Conservator of Forests (C) Ministry of Env. And Forests Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, ER-5 Arera Colon, Link Road-3, Ravishankar Nagar, Bhopal-462016.

2. The Chairman, Maharashtra Pollution Control Board, "Kalpataru Point, 3rd and 4th floor, Opp. Cine Planet, Sion Circle, Road Number 8, Jay BharatMata Nagar, Air Force Quarters, Sion, Mumbai, Maharashtra 400022".

ANNEXURE -I

GENERIC TERMS OF REFERENCE (TOR) IN RESPECT OF INDUSTRY SECTOR

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 and for presentation made before the EAC should be provided in the Annexures. If more than one consultant has been engaged, details thereof, including details of NABET accreditation as mentioned above.
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 programme, 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 Indian map of 1:1000,000 scale.
   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.
   iii. Co-ordinates (lat-long) of all four corners of the site.
   iv. Google map-Earth downloaded of the project site.
   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.
   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.
   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
4. Landuse break-up of total land of the project site (identified and acquired) – agricultural, forest, wasteland, water bodies, settlements, etc shall be included.
5. A copy of the mutual agreement for land acquisition signed with land oustees.
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.
7. **Forest and wildlife related issues:**
   i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department.

ii. Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (*in case of projects involving forest land more than 40 ha)*

iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

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

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

vi. Copy of application submitted for clearance under the Wildlife (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 /existing operation of the project from SPCB shall be attached with the EIA-EMP report.

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.

Details of Industrial Operations

9. A list of major industries with name and type within study area (10km radius) shall be incorporated.

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.

11. Details of manufacturing process, major equipment and machinery. If expansion project, details of existing unit, separately for existing and new (proposed) unit.

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".

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.

15. Manufacturing process details of all the plants including captive power plant if any along with process flow chart shall be included.
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.

Environmental Status

18. Geological features and Geo-hydrological status of the study area shall 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.
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.
21. One season site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall and 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.
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.
23. Surface water quality including trace elements of nearby River (60m upstream and downstream) and other surface drains at eight locations to be provided.
24. Ground water monitoring including trace elements at minimum at 8 locations shall be included.
25. Noise levels monitoring at 8 locations within the study area.
26. Coal Characteristics – of indigenous and imported coal to be used in the project in terms of Calorific value, ash content and Suplhur content.
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.
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.
29. Emissions (g/second) with and without the air pollution control measures.
30. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details 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.
32. Details of water requirement, water balance chart for new unit or for existing unit as well as proposed expansion (in case of expansion).
33. Source of water supply and quantity and permission of withdrawal of water (surface/ground) from Competent Authority.
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.
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.
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.
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.
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.
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.
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.
41. Action plan for rainwater harvesting measures at plant site shall be 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.
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.
44. Action plan for post-project environmental monitoring shall be submitted.

45. Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control needs to be addressed and included.

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,
    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.
    iii. Annual report of heath status of workers with special reference to Occupational Health and Safety.
    iv. Action plan for the implementation of OHS standards as per OSHAS/USEPA.
    v. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

47. Corporate Environment Policy
    i. Does the company have a well laid down Environment Policy 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.
    iii. 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.
    iv. 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.

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.

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.

51. The questionnaire for industry sector (available on MOEF website) shall be submitted as an Annexure to the EIA-EMP Report.

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 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.
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).
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).

The following general points shall be noted:

i. All documents shall be properly indexed, page numbered.
ii. Period/date of data collection shall be clearly indicated.
iii. Authenticated English translation of all material in Regional languages shall be provided.
iv. The letter/application for environmental clearance shall quote the MOEF file No. and also attach a copy of the letter.
v. The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.
vi. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report
vii. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.
viii. The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI) /National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.

****

Kapila Metals Pvt. Ltd.

WORKS : Plot No. B-102 to B-105 Phase III, Addl. MIDC, Jalna - 431 203. (M.S.)

REGD. OFFICE : Plot No. 1992 / 7, Ajintha Nagar, Beside Raj mangal Karayalaya, Jalna - 431 203 (M.S.)

Date:-20.10.2014

To,

Dy.Engineer

MIDC, Jalna

Sub:-Regarding water supply to our proposed industry

Ref:-Allotment letter No.MIDC/Ro (nnn)/Lms-6/2499 Dtd.26.04.2013

Dear Sir,

We are interested to start integrated steel project at MIDC Phase III Jalna on plot no.B-102 to 105.You have allotted plot to us with the condition to supply water of 25 M^3 per hec/D, it comes to on our plot 300 M^3 /D.

But we required water to our process & other use is 1200 M^3/D. You are requested to supply us 1200 M^3/D water. We are ready to pay additional charges for additional quantity of water required.

You are requested to give us quotation for payment of additional charges required to supply additional water.

Thanking You!

Office of the Dy. Engr. MIDC Sub-Division JALNA

Kapila Metals Pvt.Ltd.

R.S. Bhagmics

Director

Mob. No. 9822558174 / 9822558173 - CIN. U27100MH2009PTC195202 Dt. 25/08/2009
E-mail : kapilametal@gmail.com

Annexure II

Annexure II: List of plant species documented at project site and 10Km surroundings.

Sr. No.	Botanical Name	Local name	Family	Status
Trees				
1	*Acacia catechu*	Khair	Mimosaceae	Common
2	*Acacia chundra*	Lal-Khair	Mimosaceae	Common
3	*Acacia leucophloea``*	Hivar`	Mimosaceae	Common
4	*Acacia nilotica ssp. astringens*	Vedi-Babhul	Mimosaceae	Common
5	*Acacia nilotica ssp. cupressiformis*	Ramkathi`	Mimosaceae	Common
6	*Acacia nilotica ssp. indica*	Babhul	Mimosaceae	Common
7	*Albizia lebbeck*	-	Mimosaceae	Common
8	*Azadirachta indica*	Neem	Meliaceae	Common
9	Delonix regia	Gulmohar	Caesalpiniaceae	Cultivated
10	*Eucalyptus globulus*	Nilgiri	Myrtaceae	Cultivated
11	*Ficus religiosa*	Pimpal	Moraceae	Common
12	*Mangifera indica*	Aamba	Anacardiaceae	Cultivated
13	*Peltophorum pterocarpum*	Copper pod	Caesalpiniaceae	Cultivated
14	*Polyalthia longifolia*	Ashok	Annonaceae	Cultivated
15	*Ziziphus xylopyra*	Ghot-bot	Rhamnaceae	Common
Shrubs				
16	*Agave sisalana*	Ghaypat	Agavaceae	Cultivated
17	*Aloe vera*	Korphad	Liliaceae	Cultivated
18	*Annona squamosa*	Sitaphal	Annonaceae	Cultivated

19	*Calotropis gigantea*	Rui	Asclepiadaceae	Common
20	*Calotropis procera*	Rui	Asclepiadaceae	Common
21	*Cassia auriculata*	Tarvad	Caesalpiniaceae	Common
22	*Citrus sinensis*	Santra	Rutaceae	Cultivated
23	*Dendrocalamus strictus*	Velu	Poaceae	Cultivated
24	*Ipomoea carnea*	Besharam	Convolvulaceae	Common
25	*Lantana camara*	Ghaneri	Verbenaceae	Common
Herbs				
26	*Acanthospermum hispidum*	Shingada Kata	Asteraceae	Common
27	*Achyranthus aspera*	Aghada	Amaranthaceae	Common
28	*Alternanthera sessilis*	Chubukata	Amaranthaceae	Common
29	*Argemone mexicana*	Pivla-dhotra	Papavaraceae	Common
30	*Cassia tora*	Takla	Caesalpiniaceae	Common
31	*Celosia argentia*	Kurdu	Amaranthaceae	Common
32	*Tridax procumbens*	Dagdi-pala	Asteraceae	Common
33	*Xanthium indicum*	Landga	Asteraceae	Common
Grasses				
34	*Aristida funiculata*	Pandhri-Kusal	Poaceae	Common
35	*Aristida redacta*	Kusal	Poaceae	Common
36	*Cynadon dactylon*	Durva	Poaceae	Common

Note: observed By Ultratech field Team

Annexure III

Fauna and their conservation status in the study area

Sr. No.	Common Name	Scientific Name	Conservation status as per Wildlife (Protection) Act 1972
Mammals			
1.	Common cat	*Felis silvestris catus*	Not enlisted
2.	Common dog	*Canis lupus familiaris*	Not enlisted
3.	Cow	*Bos primigenius*	Not enlisted
4.	Domestic buffalo	*Bubalus bubalis*	Not enlisted
5.	Goat	*Capra hircus aegagrus*	Not enlisted
6.	Squirrel	*Funambulus palmarum*	Sch-IV
7.	Indian grey mongoose	*Herpestes edwardsii*	Sch - II
8.	Indian hare	*Lepus nigricollis*	Not enlisted
9.	The jungle cat	*Felis chaus*	Not enlisted
10.	Barking deer	*Muntiacus muntjak*	Sch III
Amphibians			
1.	Common Indian toad	*Bufo melanostictus*	Not enlisted
2.	Common tree frog	*Polypedates leucomystax*	Not enlisted
3.	Indian bullfrog	*Rana tigrina*	Not enlisted
Reptiles			
1.	Common garden lizard	*Calotes versicolor*	Not enlisted
2.	Rock lizard	*Psmmophilus blanfordanus*	Not enlisted
3.	Common rat snake	*Plyas mucosus*	Sch II, Part II
4.	Common Indian krait	*Bungarus caeruleus*	Not enlisted
Butterfly			
1.	Blue mormon	*Papilio polymnestor*	Not enlisted
2.	Blue pansy	*Junonia orithy*a	Not enlisted
3.	Blue tiger	*Tirumala limniace*	Not enlisted
4.	Common evening brown	*Melanitis leda*	Not enlisted
5.	Common grass yellow	*Eurema hecabe*	Not enlisted
6.	Common Indian crow	*Euploea core*	Sch – IV
7.	Common leopard	*Phalanta phalantha*	Not enlisted
8.	Common mormon	*Papilio polytes*	Not enlisted
9.	Gray pansy	*Junonia atlites*	Not enlisted
10.	Lime butterfly	*Papilio demoleus*	Not enlisted
11.	Plain tiger	*Danaus chrysippus*	Not enlisted
12.	Small grass yellow	*Eurema brigitta*	Not enlisted
13.	Zebra blue	*Leptotes plinius*	Not enlisted
Dragonflies and Damselflies			
1.	Crimson marsh glider	*Trithemis aurora*	Not enlisted
2.	Ditch jewel	*Brachythemis contaminata*	Not enlisted
3.	Ground skimmer	*Diplocodes trivialis*	Not enlisted
4.	Long legged marsh skimmer	*Trithemis pallidinervis*	Not enlisted
5.	Golden dartlet	*Ischnura aurora*	Not enlisted
6.	Yellow bush dart	*Copera marginipes*	Not enlisted
7.	Senegal golden dartlet	*Ischnura senegalensis*	Not enlisted

Note: Observation by Ultratech field team

Annexure III

Avifauna and their conservation status in the study area

Sr. No.	Common / English name	Scientific name	Conservation status as per Wildlife protection Act (1972)
1.	Common quail	*Coturnix coturnix*	Sch IV
2.	Rain quail	*Coturnix coromandelica*	Sch IV
3.	Bustard-quail	*Turnix suscitator*	Sch IV
4.	Indian peafowl	*Pavo cristatus*	Sch I
5.	Grey jungle fowl	*Gallus sonneratii)*	Sch IV
6.	Blue rock pigeon	*Columba livia*	Sch IV
7.	Indian bazzard	*Butex rufinus*	Not enlisted
8.	Jungle babbler	*Turdoides striata)*	Sch IV
9.	Indian pitta	*Pitta brachyura)*	Sch IV
10.	Crested serpent eagle	*Spilornis cheela*	Sch IV
11.	Blue rock pigeon	*Columba livia*	Sch IV
12.	Cattle egret	*Bubulcus ibis*	Sch IV
13.	Common babbler	*Turdoides caudatus*	Sch IV
14.	Common swallow	*Hirunds rustica*	Sch IV
15.	Crow pheasant	*Centropus sinensis*	Sch IV
16.	Grey heron	*Ardea cinerea*	Sch IV
17.	House crow	*Corvus splendens*	Sch IV
18.	House sparrow	*Passer domesticus*	Sch IV
19.	House swift	*Apus affinus*	Sch IV
20.	Indian black drongo	*Dicrurus adsimilis*	Sch IV
21.	Indian baya	*Ploceus philippinus*	Sch IV
22.	Indian myna	*Acridotheres tristis*	Sch IV
23.	Indian robin	*Saxicoloides fulicata*	Sch IV
24.	Indian cuckoo	*Cuculus micropterus*	Sch IV
25.	Indian roller	*Coracias benghalensis*	Sch IV
26.	Jungle crow	*Corvus macrorhynchus*	Sch V
27.	Little cormorant	*Phalacrocorax niger*	Sch IV
28.	Magpie robin	*Copsychus saularis*	Sch IV
29.	Pond heron	*Ardeola grayii*	Sch IV
30.	Purple sunbird	*Nactarinia asiatica*	Sch IV
31.	Redvented bulbul	*Pycronotus cafer*	Sch IV
32.	Redwattled lapwing	*Vanellus indicus*	Sch IV
33.	Redwhiskered bulbul	*Pycnonotus jocosus*	Sch IV
34.	Roseringed parakeet	*Psittacula krameri*	Sch IV
35.	Small blue kingfisher	*Alcedo atthis*	Sch IV
36.	Small green bee eater	*Merops orientalis*	Sch IV
37.	White breasted kingfisher	*Halcyon smyrnensis*	Sch IV

Note: Observation by Ultratech field team

ANNEXURE-

Risk Assessment Report

The risk assessment for the proposed secondary metallurgical industry is based on hazard identification followed by precautionary measures. The most common incidents or hazards that cause injuries, ill health and loss of property are mentioned as follows;

(i) Falls from height;

(ii) Unguarded machinery;

(iii) Falling objects;

(iv) Moving machinery, on-site transport, forklifts and cranes;

(v) Exposure to controlled and uncontrolled energy sources;

(vi) Inhalable agents (gases, vapours, dusts and fumes);

(vii) Contact with hot metal;

(viii) Fire and explosion;

(ix) Extreme temperatures;

(x) Noise

(xi) Electrical burns and electric shock;

(xviii) Inadequate accident prevention and inspection;

(xix) Inadequate emergency first-aid and rescue facilities;

(xx) Lack of medical facilities and social protection.

The hazards identified are discussed with respect to the nature and control strategies as follows;

- Noise

Hazard description: Exposure to noise levels exceeding those set by the EP act and factories act may result in noise-induced hearing loss. Exposure to high noise levels may also interfere with communication and may result in nervous fatigue with an increased risk of occupational injury.

Assessment of risk: The assessment shall, as appropriate, consider:

(a) The risk of hearing impairment;

(b) The degree of interference to communications essential for safety purposes; and

(c) The risk of nervous fatigue, with due consideration to the mental and physical workload and other non-auditory hazards or effects.

In order to prevent adverse effects of noise on workers, employers shall:

(a) Identify the sources of noise and the tasks that give rise to exposure;

(b) Occupational health service about exposure limits and other standards to be applied

(c) Seek the advice of the supplier of processes and equipment about expected noise emission.

Control Strategies: Based on the assessment of the exposure to noise in the working environment, the employer shall establish a noise-prevention programme with the aim of eliminating the hazard or risk, or reducing it to the lowest practicable level by all appropriate means.

Workers' health surveillance, training and information:

1. Workers who may be exposed to noise levels exceeding occupational standards shall receive regular audiometric testing.
2. The industry shall ensure that workers who may be exposed to significant levels of noise are trained in the effective use of hearing-protection devices and the role of audiometric examination.
3. If the elimination of noisy processes and equipment as a whole is impracticable, their individual sources shall be separated out and their relative contribution to the overall sound pressure level identified.
4. If reducing the noise at source or intercepting it does not sufficiently reduce workers' exposure, then the final options for reducing exposure shall be to:
    a. Install an acoustical booth or shelter for those job activities where workers' movement is confined to a relatively small area;
    b. Minimize by appropriate organizational measures the time workers spend in the noisy environment;
    c. Provide hearing protection;
    d. Offer audiometric testing.

- Heat and Cold Stress

Hazard Description: Risks arise when temperature and humidity are unusually high, high temperatures and humidity occur in combination with heavy protective clothing or a high work rate, or when the workers are exposed to high radiant heat.

If workers are exposed in all or some of their tasks to any of above conditions and the hazard cannot be eliminated, employers shall assess the hazards and risks to safety and health from extreme temperatures, and determine the controls necessary to remove the hazards or risks or to reduce them to the lowest practicable level.

The assessment for the thermal environment shall take into account the risks arising from working.

(a) A hot environment that makes respiratory protectors un-comfortable and less likely to be used, and necessitates re-structuring of jobs in order to reduce the risks.

Control Strategies:

1. Workers exposed to heat will be trained to recognize symptoms which may lead to heat stress or hypothermia, in themselves or others, and the steps to be taken to prevent onset and/or emergencies, in the use of rescue and first-aid measures; and in action to be taken in the event of increased risks of accidents because of high or low temperatures.
2. The importance of physical fitness for work in hot environments.
3. The importance of drinking sufficient quantities of suitable liquid and the dietary requirements providing intake of salt and potassium and other elements that are depleted due to sweating.
4. When the assessment reveals that the workers may be at risk of heat stress or hypothermia, employers shall eliminate the need for work in such conditions or take measures to reduce the risks from extreme temperatures.
5. Where workers are at risk from exposure to radiant heat by working near hot surfaces the employer may increase the distance between the equipment to reduce the temperature of the surface by changing plant-operating temperatures, insulating the surfaces or reduce the emissivity of the surface.
6. The industry shall take particular care with ventilation design where work is undertaken in enclosed spaces or areas. When fail-safe systems are not in operation, there will be adequate supervision of workers at risk to ensure that they can be removed from danger.

- Inhalable agents (gases, vapors, dusts and fumes)

Hazard Description: The production of billets/ingots & bars involves dusts, fumes, smokes and aerosols. The pulmonary system (lungs) can be affected by exposure to harmful agents through acute (short-term) injury to lung tissue, the development of pneumoconiosis, pulmonary dysfunction

Specific agents that may be found in the iron and steel industry include heavy metals (e.g. lead, chromium, zinc, nickel and manganese) in the form of fumes, particulates and adsorbates on inert dust particles.

Control Strategies:

1. Where it is not possible, exposure to harmful inhalable agents with which they work or may come in contact shall be minimized.

- Control of Energy

Hazard Description: The industry uses electrical energy. The safe control of energy shall be addressed by procedure and carried out by appropriately trained personnel in accordance with the nature of the energy source and the characteristics of the facilities. Energy sources for equipment shall be turned off or disconnected or de-energized and the switch locked or labeled with a warning tag.

Control Strategies:

1. All electrical installations shall be appropriately designed and shall include appropriate protection systems, such as automatic shut-off systems, interlocks and emergency controls.
2. Energy sources and facilities shall be appropriately labelled.
3. A risk assessment shall be conducted before isolating the energy source to ensure that the consequences have been evaluated.

- Work equipment and machinery guarding

Hazard Description: The use of work equipment, including machinery may result in accidents, many of which are serious and some fatal. Of the many factors that can cause risk, particular areas of concern include:

A lack of guards or inadequate guards on machines which can lead to accidents caused by entanglement, sheering, crushing, trapping, cutting, etc.; Insufficient strength of materials and inappropriate design of machines; failure to provide the right information, instruction and training for those using the equipment; All power tools shall 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.

Control Strategies: Controlling risks often means guarding those parts of machines and equipment that could cause injury. Many accidents happen because of the failure to select the right equipment for the work to be done.

1. The industry shall ensure that fixed guards are used wherever necessary, and properly fastened in place with appropriate fasteners including, screws or nuts and bolts which need tools to remove them; workers will be trained to operate equipment before they are directed to do so;
2. Regular maintenance of machinery and equipment is required to ensure that they are in a safe condition, and maintenance records are kept;
3. Workers shall be authorized to immediately stop the machine if it is not working safely or if any guards or protective devices are faulty, and inform the supervisor as soon as possible.

- Hazards in operating the furnace

Preventing fires and explosions

Fires and explosions in furnaces most often result from water coming into contact with molten metal. The water may be present in scrap material, damp moulds, from leaks in the furnace cooling systems or leaks in the building. Following precautions shall be taken to prevent fires:

a. Operators shall be trained in safe systems of work. The building shall be designed to be non-combustible, with automatic fire suppression engineered or designed into the process where appropriate.
b. Regular safety audits shall be undertaken to ensure that hazards are clearly identified and risk-control measures maintained at an optimum level. Furnaces shall not be operated beyond their safe lives.

- Dusts and Fibres

When a furnace is stripped for maintenance purposes, particular care shall be taken to avoid inhaling dusts or fibres from the insulating material. Dust and fume collectors shall be incorporated into the furnace design.

- Preventing steam explosion

Molten slag and metal shall be prevented from coming into contact with water, which will cause a steam explosion. Equipment and piping for furnace gas cleaning, and piping carrying gas in the air preheating system of the dry dust catchers, shall be built in such a way that they can be ventilated and cleaned.

- Handling molten metal, dross or slag

Hazard Description: Burns may occur at many points in the steel-making process: at the front of the furnace during tapping from molten metal or slag; from spills, spatters or eruptions of hot metal from ladles or vessels during processing, teeming (pouring) or transporting; and from contact with hot metal as it is being formed into a final product.

Assessment of risk: The likelihood of injury in the handling of molten metal shall be assessed at all stages in the process. This includes the integrity, stability and use of the furnace and transport ladles, the nature and use of vehicle/crane transport, and the systems in place for pouring molten metal.

Control Strategies:

1. Personnel handling molten metal shall be trained in the proper procedures to adopt, and in the relevant safety and health precautions, including use of appropriate PPE.
2. Only essential personnel shall be in the vicinity of pouring operations.
3. Moulds and tundishes shall not be damp, nor shall there be any means whereby water may enter the melt because of the risk of explosion.
4. The area will be cordoned off prior to the transport of molten metal if there is a possibility of spillage.
5. A competent person shall regularly inspect ladle buckets and their supporting, locking and tipping mechanisms.
6. Corrective repair measures that are recommended shall be planned and implemented on a timely basis.

- Rolling Mill

Hazard Description: In any rolling mill, there is a risk of trapping between the rolls. Severe injuries may be caused by shearing, cropping, trimming and guillotine machines,

unless the dangerous parts are securely guarded. Injuries may occur, especially in hot-rolling, if workers attempt to cross roller conveyors at unauthorized points. Even in automated works, accidents occur in conversion work while changing heavy rollers in the stands. In hot-rolling, burns, eye injuries or other injuries may be caused by flying mill scale and dust particles or by whipping of cable slings. Eyes may also be affected by glare.

Control Strategies:

1. Nips of rolls shall be effectively guarded based on an appropriate risk assessment, and strict supervision exercised to prevent any work which is in motion.
2. Dangerous parts shall be securely guarded to prevent severe injuries caused by shearing, cropping, trimming and guillotine machines.
3. Good planning often reduces the number of roll changes required. The change of heavy rollers in the stands shall not be done with time pressure and without suitable tools.

- Internal Transport

  Hazard Description: The hazards can be caused by interaction between vehicles, vehicles and other objects and personnel, or by loads falling off or from the vehicle.

  Control strategies:

1. Operators shall have the necessary knowledge of the hazards and potential risks concerning the transportation of cargo.
2. Operators of certain types of vehicles may require regular medical surveillance.
3. Contractors and other visitors shall be appropriately instructed about the hazards and potential risks. They shall be instructed about the rules of how to move in the area.
4. Transport routes shall be planned and constructed to minimize the risk of collision and with sufficient safe clearance to allow for aisles and turns, or other types of control area.
5. The safe operating speed for vehicles shall be posted and enforced. The operator shall be protected from cargo, such as molten metal splashes, chemicals and

unsecured cargo. Loads shall be lowered slowly and smoothly.

6. Lifting devices shall be made of steel that is not prone to hydrogen embrittlement and shall be shielded from radiant heat. Workstations shall not be located underneath the path of molten material.

- Personal Protective Equipment (PPE)
- General provisions

PPE shall be selected considering the characteristics of the wearer and additional physiological load or other harmful effects caused by the PPE. It shall be used, maintained, stored and replaced in accordance with the standards or guidance.

PPE shall be examined periodically to ensure that it is in good condition. Employer shall ensure that the workers who are required to wear PPE are fully informed of the requirements and of the reasons for them, and are given adequate training in the selection, wearing, maintenance and storage of this equipment. When workers have been informed accordingly, they shall use the equipment provided throughout the time they may be exposed to the risk that requires the use of PPE for protection.

The PPE shall not be used for longer than the time indicated by the manufacturer. Workers shall make proper use of the PPE provided, and maintain it in good condition, consistent with their training and be provided with the proper means for doing so. Before reissuing the clothing or equipment, employers shall provide for the laundering, cleaning, disinfecting and examination of protective clothing or equipment which has been used and may be contaminated by materials that are hazardous to health.

Employers shall ensure that workers do not take contaminated clothing home and shall provide for the cleaning of such clothing at no cost to the worker.

- Head protection

Helmets intended for use in the metallurgical industry shall be subjected to a test for resistance to splashes of molten metal. If splits or cracks appear, or if a helmet shows signs of ageing or deterioration of the harness, the helmet shall be discard

- Face and eye protection

Goggles, helmets or shields that give maximum eye protection for each welding and cutting process shall be worn by operators, welders and their helpers. Welding and cutting processes of furnaces emit radiation in the ultraviolet, visible and infrared bands of the spectrum, which are all able to produce harmful effects upon the eyes. In welding operations, helmet type protection and hand shield type protection shall be used. Protection is also necessary for the welder's assistant and those who may be exposed to the hazards shall be appropriately protected.

- Leg Protection

Shoes or boots shall be without tongues and trouser legs shall be pulled over the top of the boot and not tucked inside. Slip-resistance properties shall be taken into account when choosing footwear. Rubber or metallic spats, gaiters or leggings shall be used to protect the leg above the shoe line, especially from risks of burns. Knee protectors may be necessary, especially where work involves kneeling. Aluminized heat-protective shoes, boots or leggings shall be used near sources of intense heat. All professional footwear shall be kept clean and dry when not in use and shall be replaced as soon as necessary.

- Hearing protection

Hearing loss of speech frequencies may occur with elevated long-term exposure to noise. The use of hearing protectors gives the best results to users who are well informed of the risks and trained in their use. If earplugs are used, special attention shall be paid to the proper fitting technique.

Hearing protectors shall be made available at the entrance to the noisy area and they shall be put on before entering the noisy area. Noisy areas shall be indicated by appropriate signs.

- Work clothing

Where required on the basis of a risk assessment, workers shall wear the appropriate protective clothing provided by the employer.

The selection of protective clothing shall take into account:

(a) The adequacy of the design and the fit of the clothing, allowing freedom of movement to perform tasks, and whether it is suitable for the intended use;

(b) Te environment in which it will be worn, including the ability of the material from which it is made to resist penetration by chemicals, minimize heat stress, release dust, resist catching fire and not discharge static electricity; and

(c) Te special requirements of workers exposed to molten metal and associated hazards, such as the need for reflective clothing or insulated clothing with reflective surfaces during exposure to high radiant heat and hot air.

1.0 Impact on Air Quality

Kapila Metals Pvt. Ltd. is proposed in Additional Jalana MIDC-Phase III, near Jalana in Maharashtra. It is Mini Steel Plant of capacity Billets 1000 TPD/TMT Bar 1000 TPD, Sponge iron 1000 TPD with Power Plant of 50 MW (WHRB-24 MW and AFBC- 26 MW).

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 AERMODCloud 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).

1.1 Input to Model

There will be three main stacks attached Kiln-WHRB, IF and AFBC boiler. The stacks detail and flue gas characteristics are tabulated below:

Table-1: Stack Emission

Parameters	Unit	Stack Attached to		
		Kiln-WHRB	**AFBC**	**IF**
Stack height	m	80	80	40
Stack diameter at exit / top	m	2.5	2.8	0.6
Stack exit gas velocity	m/s	20.5	20.0	10.8
Stack gas temperature at exit	Deg. C	80	100	80
Fuel requirement	Type	Coal	Coal	--
	T/day	1200	350	--
	% S	0.4	0.4	--
PM Emission	g/sec	1.78 (50 mg/Nm^3)	2.33 (50 mg/Nm^3)	3.47 (100 mg/Nm^3)
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

Note: * Emissions as per Technical EIA Guidance Manual for Metallurgical Industry, April 2010.

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 **Figure-1**. 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-2**.

Figure-1: Site Specific Wind Rose for Winter Season

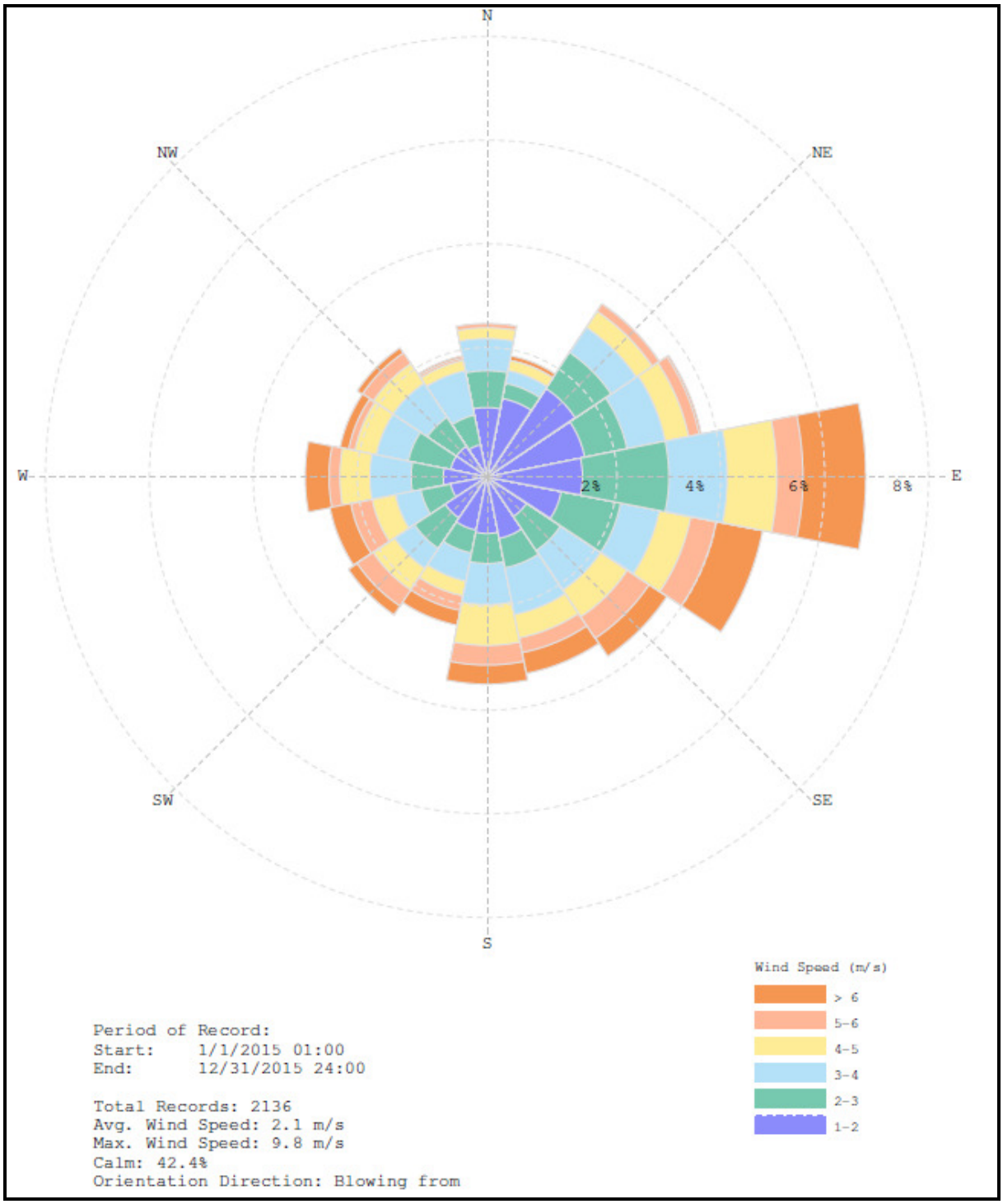


Table-2: Average Hourly Meteorological Data for 24 Hours used for Modeling

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.

1.2 Prediction

The predicted results are tabulated below in **Table-3** and dispersion trend is shown as isopleths in **Figure-2, 3 and 4** respectively for PM, SO_2 and NOx.

Table-3: Predicted 24-Hourly Short Term Maximum Incremental Ground Level Concentration

Pollu-tants	Maximum Incremental Levels, µg/m^3	Distance, km	Direction

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-3**) 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-4** while resultant concentrations at ambient air quality monitoring (AAQM) locations are tabulated in **Table-5**.

Table-4: Resultant Concentrations within Study area

Sce-nario	Incremental Concentrations, µg/m^3	Baseline Concentrations,** µg/m^3	Resultant Concentrations, µg/m^3	CPCB Limit for Industrial, Residential, Rural & Other Area, µg/m3
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

1.3 Impact Assessment

Ambient air quality in study area w.r.t. PM, SO_2 and NOx is within NAAQS 2009 as seen from Table-4 & 5. Hence, any significant impact is not envisaged within study area.

2.0 Mitigation Measures

Ambient air quality will be within NAAQS 2009 as mentioned above. ESPs and Bag Filter are proposed as air pollution control measures. Also, stacks of adequate height are proposed to disperse the flue gas.

Table-5: Resultant Concentrations at AAQM Locations

AAQM Locations	Incremental Concentrations, µg/m^3			Baseline Concentrations,** µg/m^3			Resultant Concentrations, µg/m^3			CPCB Limit for Industrial, Residential, Rural & Other Area, µg/m3		
	PM	SO_2	NOx	PM	SO_2	NOx	PM	SO_2	NOx	PM	SO_2	NOx
AQ1-Project site	2.98	0.95	0.20	65.85	13.12	17.49	68.83	14.07	17.69	100	80	80
AQ2- Haldoli	1.11	1.57	0.35	65.31	13.61	17.63	66.42	15.18	17.98			
AQ3- Dhawalwadi	1.29	5.32	1.14	65.81	11.89	16.46	67.10	17.21	17.60			
AQ4- Khadgaon	2.18	10.17	2.23	67.45	12.45	16.24	69.63	22.62	18.47			
AQ5- Akola	1.09	4.52	0.38	69.18	13.37	17.05	70.27	17.89	17.43			
AQ6-Jalna	0.36	1.10	0.25	68.40	12.94	16.47	68.76	14.04	16.72			
AQ7- Deopimpalgaon	1.90	2.89	0.65	67.66	13.38	16.97	69.56	16.27	17.62			
AQ8-Badnapur	1.14	4.90	1.09	68.28	13.85	18.06	69.42	18.75	19.15			
AQ9-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

Figure-2: Short Term 24 Hourly Incremental GLCs of PM

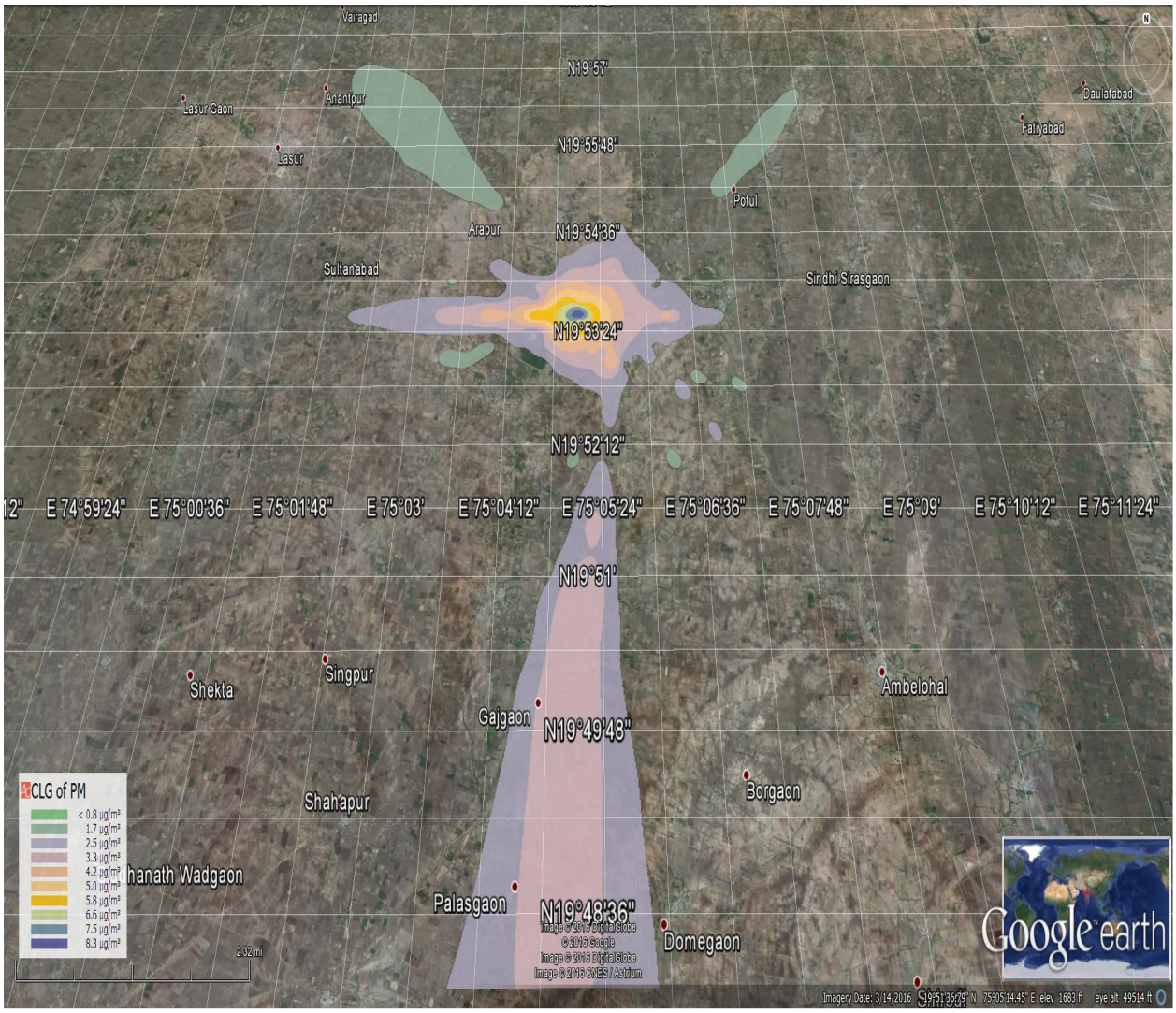


Figure-3: Short Term 24 Hourly Incremental GLCs of SO_2

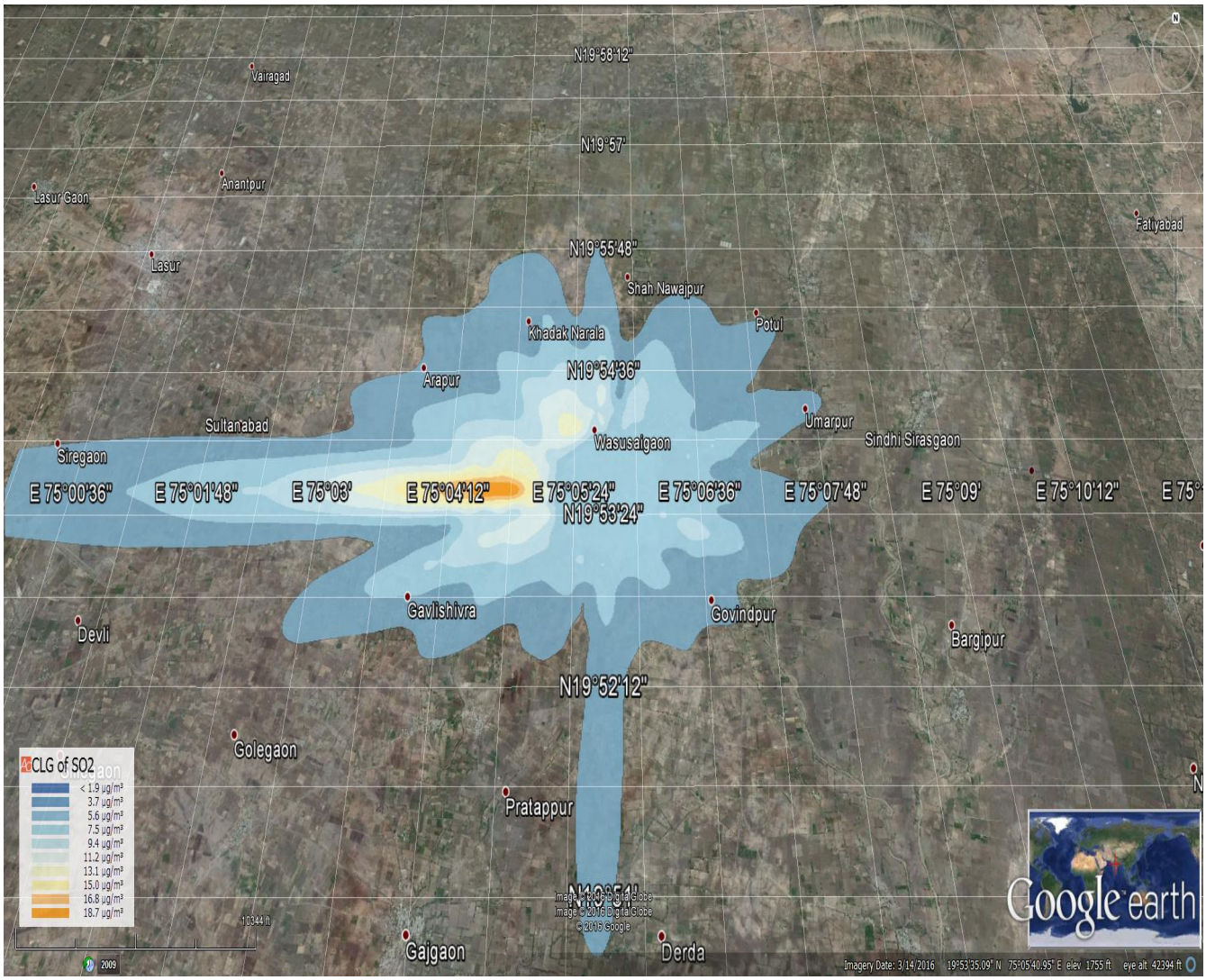
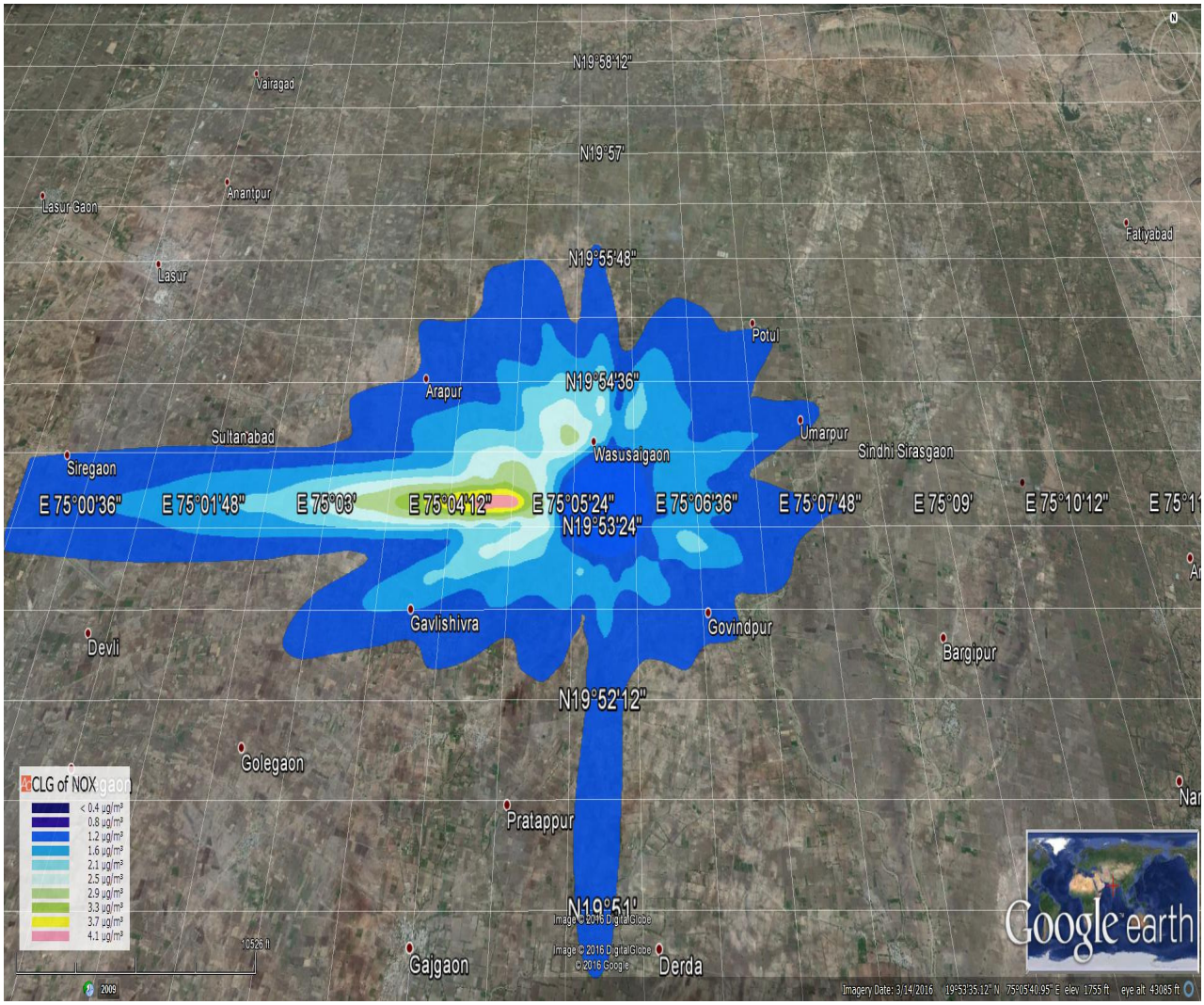


Figure-4: Short Term 24 Hourly Incremental GLCs of NOx



GIS Study report for M/S Kapila MetalsPvt Ltd., Jalna

The study area is proposed Project site is covered in survey of India Toposheet no. 47M9 &47M13of 1:50,000 scale. The project site is having Latitude- 19°44'00.992"N and Longitude- 75°17'33.293"E.

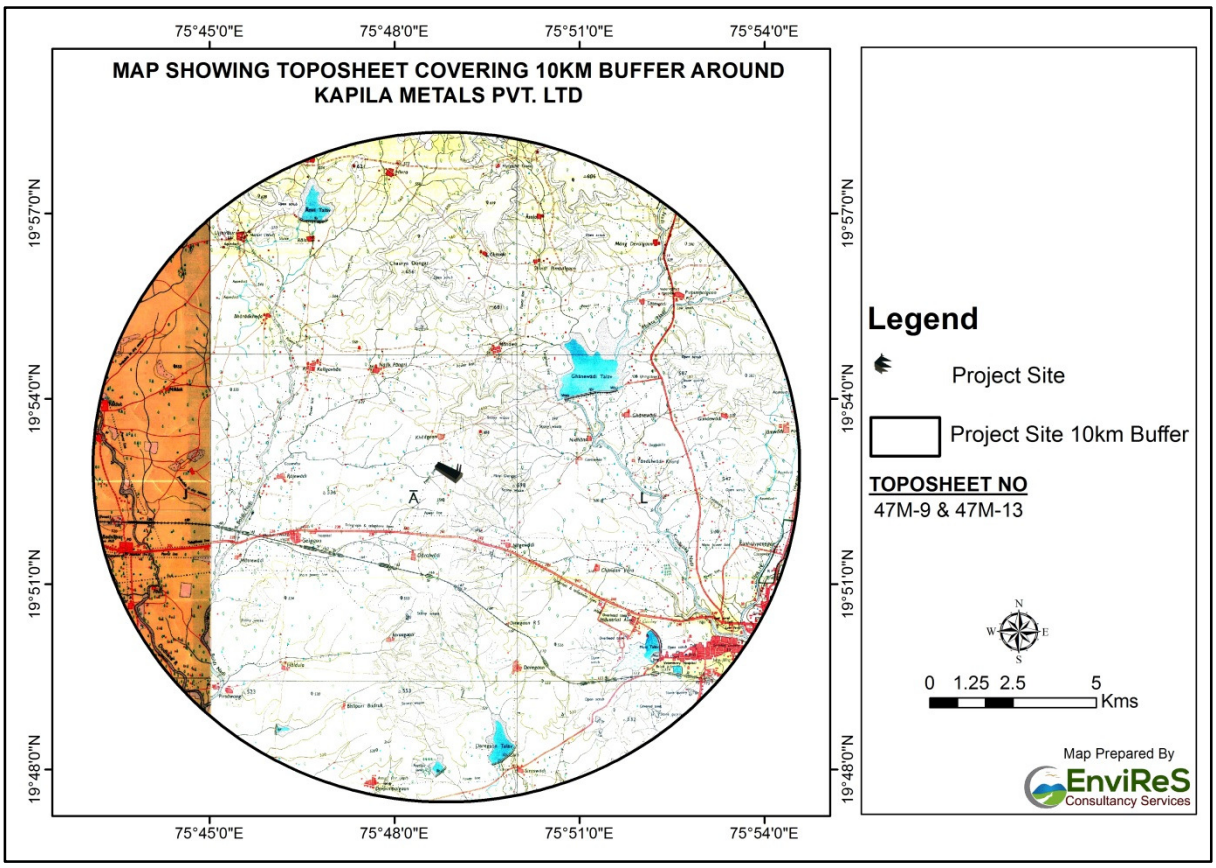


Figure 1.1 Toposheet image of area covering 10 km radius around project site.

Software and Hardware

Satellite Data: Landsat 8 cloud free data has been used for Landuse / landcover analysis.

Satellite Sensor – OLI_TIRS

Path and Row – Path 146, Row 46

Resolutions –Panchromatic 15 m Reflective 30 m

Date of Pass: 11 January 2015

GIS and image-processing software 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.

The satellite data is converted in the standard false colour composite by assigning blue, green and red to green, red and near infra-red band respectively. Image enhancement has been done by the technique called histogram stretching.

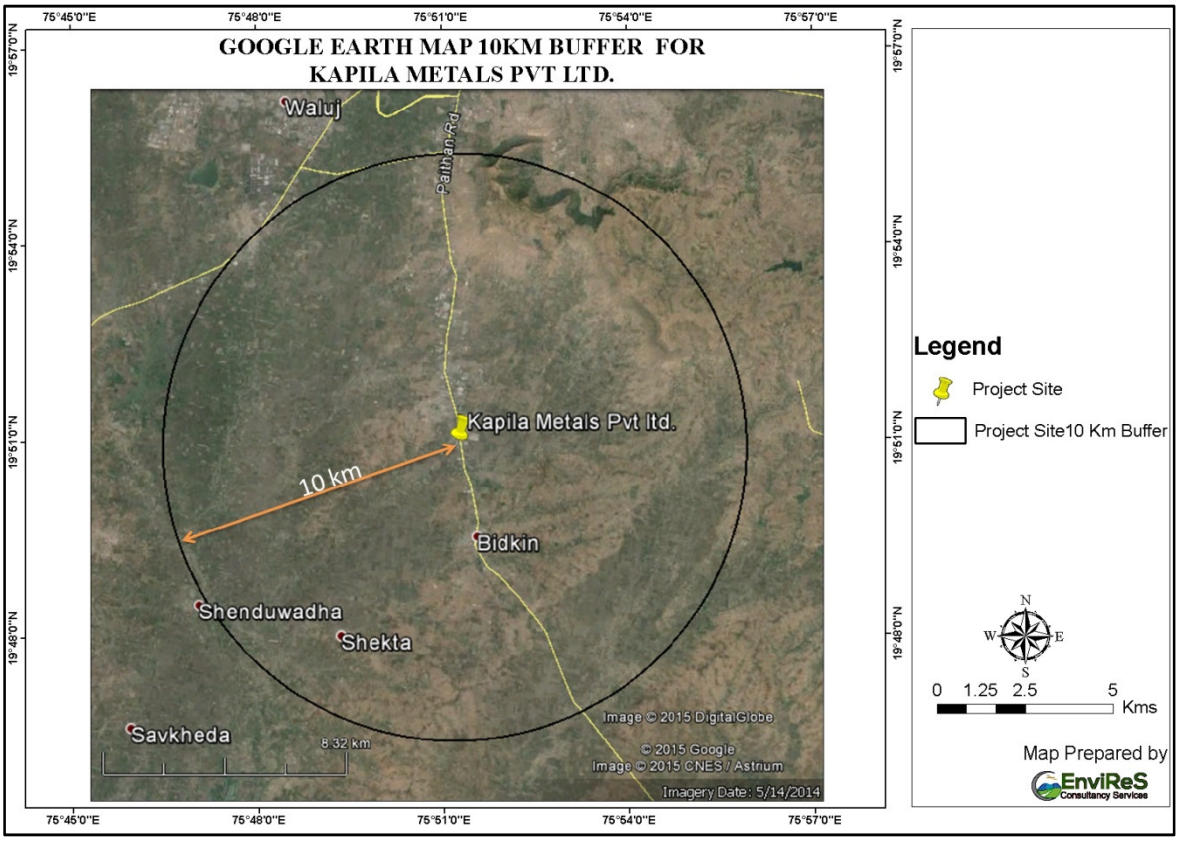


Figure 1.2 Google Earth image of area covering 10 km radius around project site.

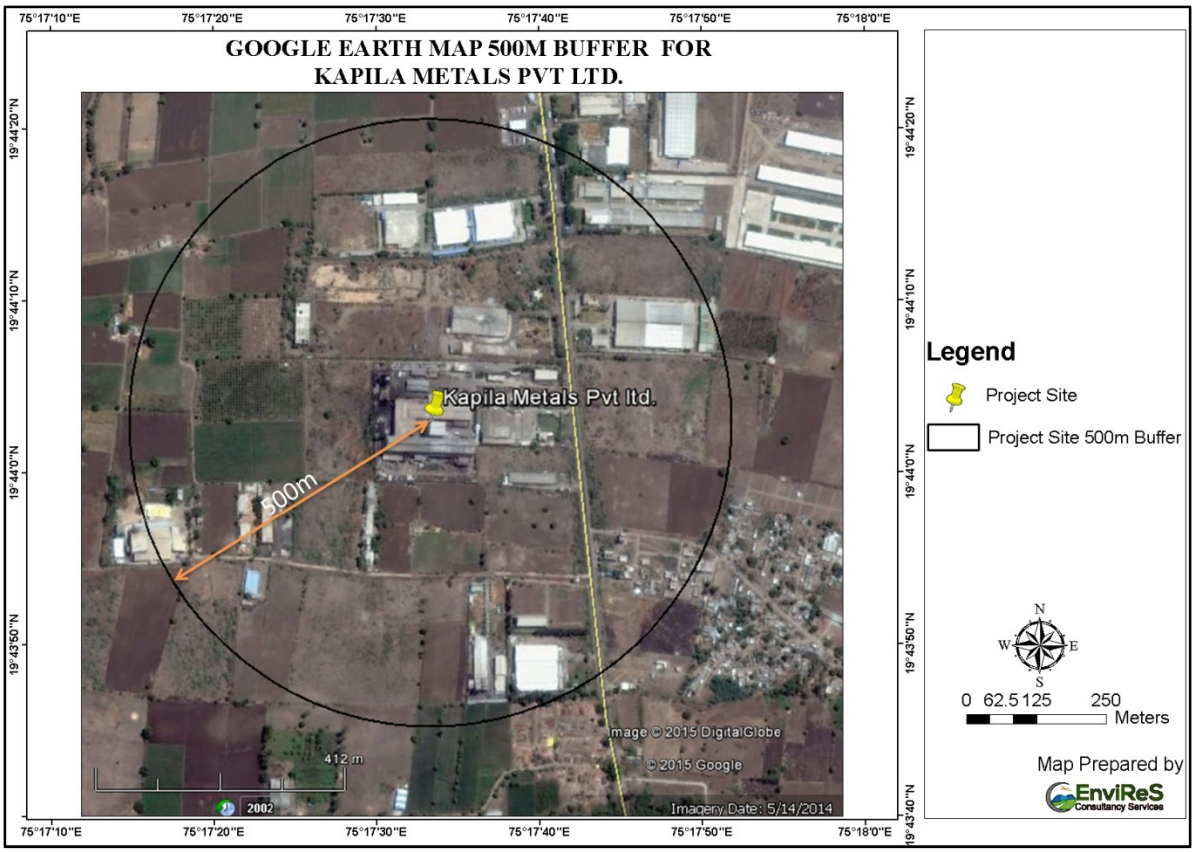


Figure 1.3 Google Earth image of area covering 500 m angular distance around project site.

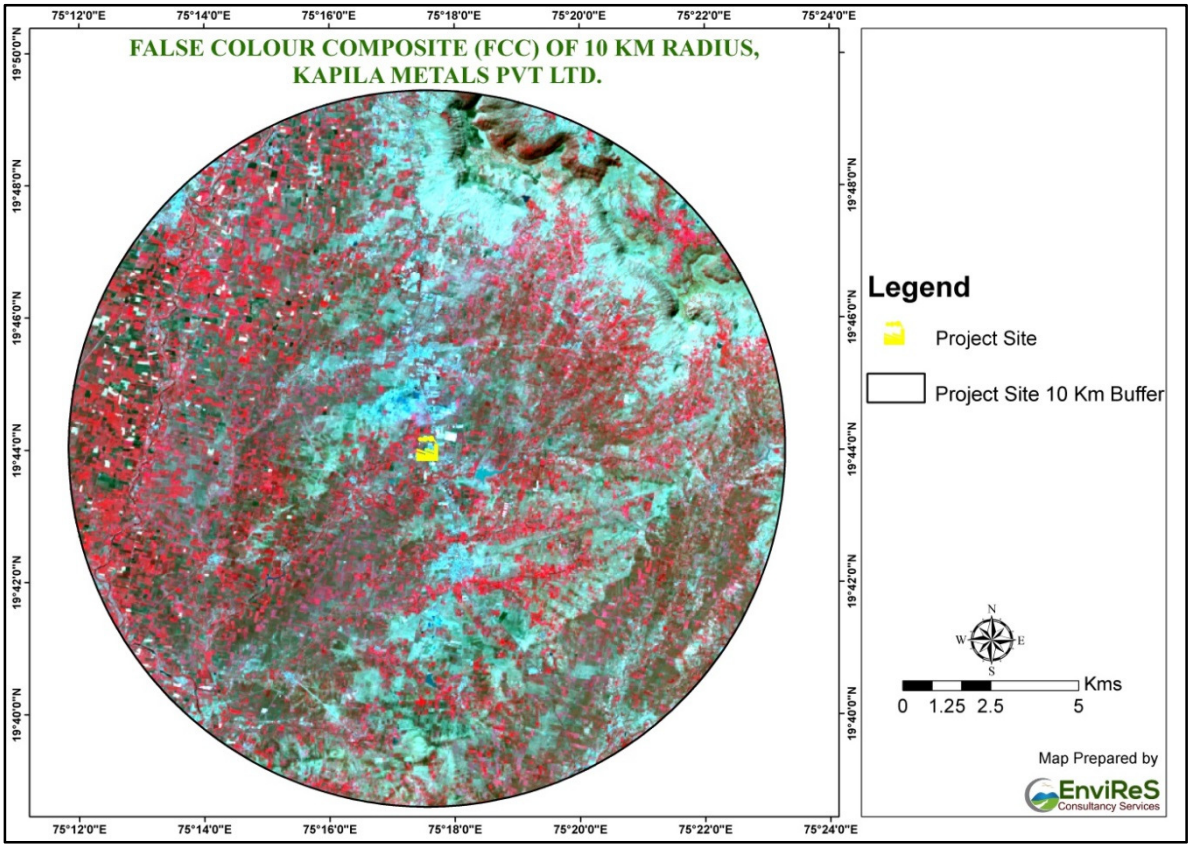


Figure 1.4 False Colour Composite (FCC) image of the area covering 10 km around project site

Landuse Landcover (LULC) Classes:

The digital classification technique has been used for the extraction of the landuse/landcover information from the imagery. A number of different landuse/landcover classes are identified in the area under study. Table 1.1 shows the information about the extent of landuse/landcover classes in the study area.

Satellite data was classified using supervised classification technique. Maximum likelihood algorithm classifier was used for the analysis. The scenes were individually classified and then were integrated to get a composite classified output. After aggregation, the final classified output was converted in raster format. Four and seven landuse/landcover classes are identified in total 500 m and 10 km radius area around Project Site, respectively. The area under each class, pie chart showing percentage of each classis calculated and given below.

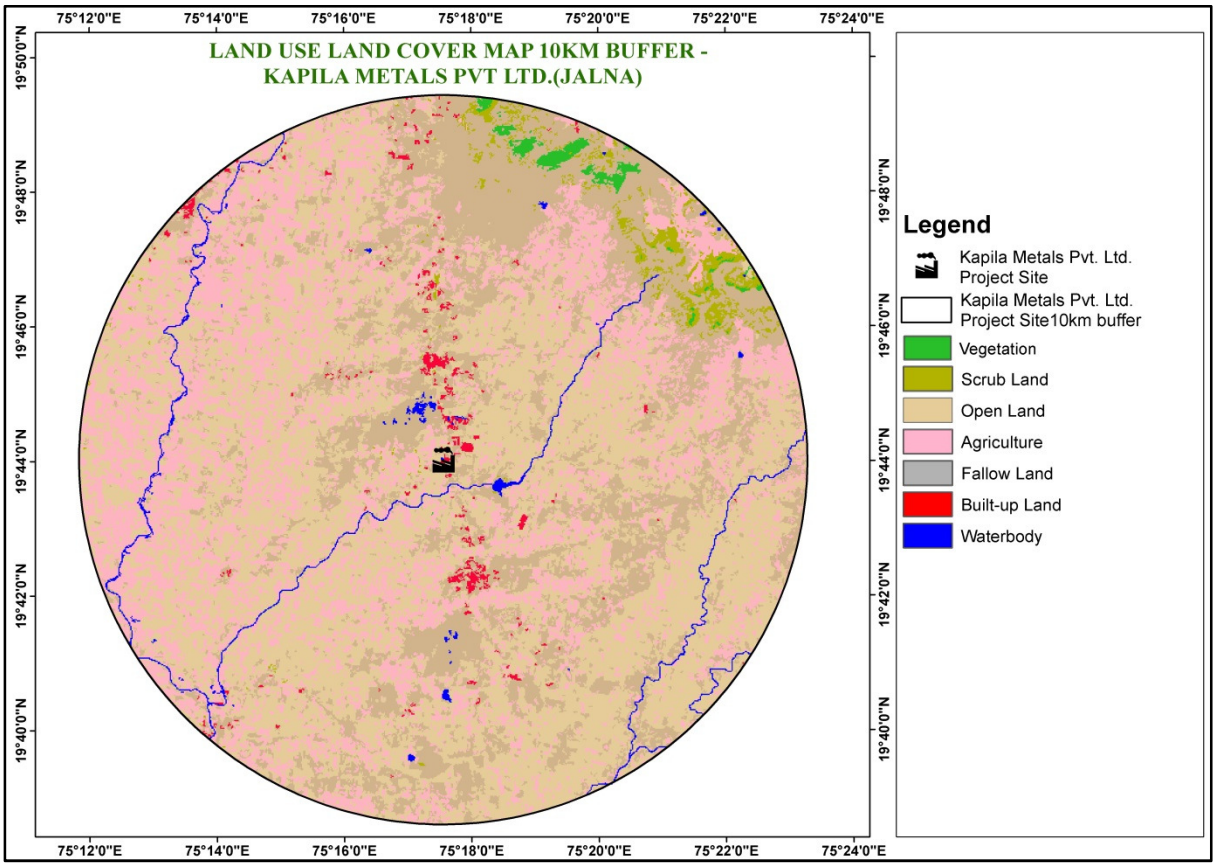


Figure 1.5 Landuse/Landcover map of 10 km radius around Kapila Metals Pvt Ltd

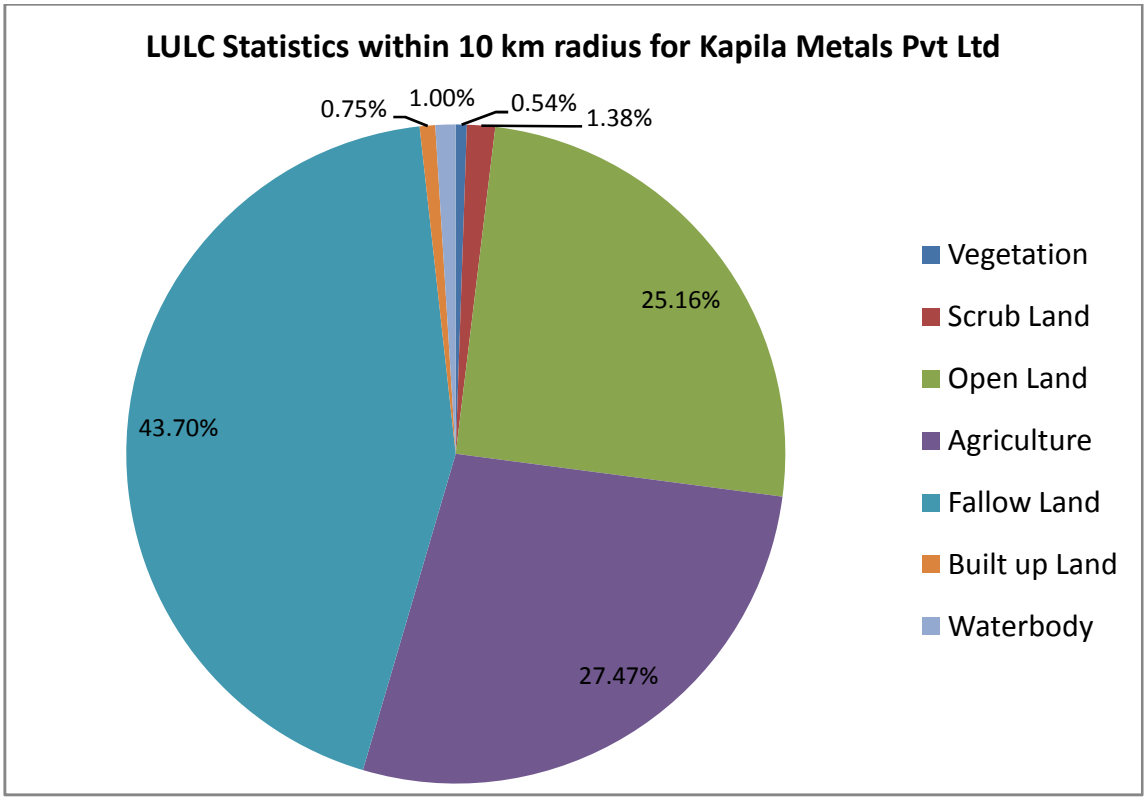


Figure 1.6 Pie chart of LULC classes around 10 km radius for Kapila Metals Pvt Ltd

Table 1.1 Landuse/Landcover areas in km^2 around 10 km radius aroundKapila Metals Pvt Ltd

Sr No.	LULC Class	Area in km^2	Percentage
1	Vegetation	1.692	0.54
2	Scrub Land	4.344	1.38
3	Open Land	79.188	25.16
4	Agriculture	86.484	27.47
5	Fallow Land	137.561	43.70
6	Built up Land	2.363	0.75
7	Waterbody	3.146	1.00
	Total	**314.779**	**100.00**

The study area of 10 km radius from the centre of project site shows eight different land use classes. Irrigation land dominates the land use pattern covering fallow land 43.70% and agriculture land (27.47%) of the area. Together it covers 71.17% of the land use. Scrub land and vegetation together constitute nearly 2% of landuse. This green area is predominant in North-Eastregion of study area. The open land is followed by irrigation land and constitutes 25.16% of land cover. Built-up land including industrial area covers (0.75%) of the land use

surrounding 10km radius. Kundalika River, BoldiNadi, Dushane River and an aquadust together constitute 1.00% of land use contributing to waterbodies.

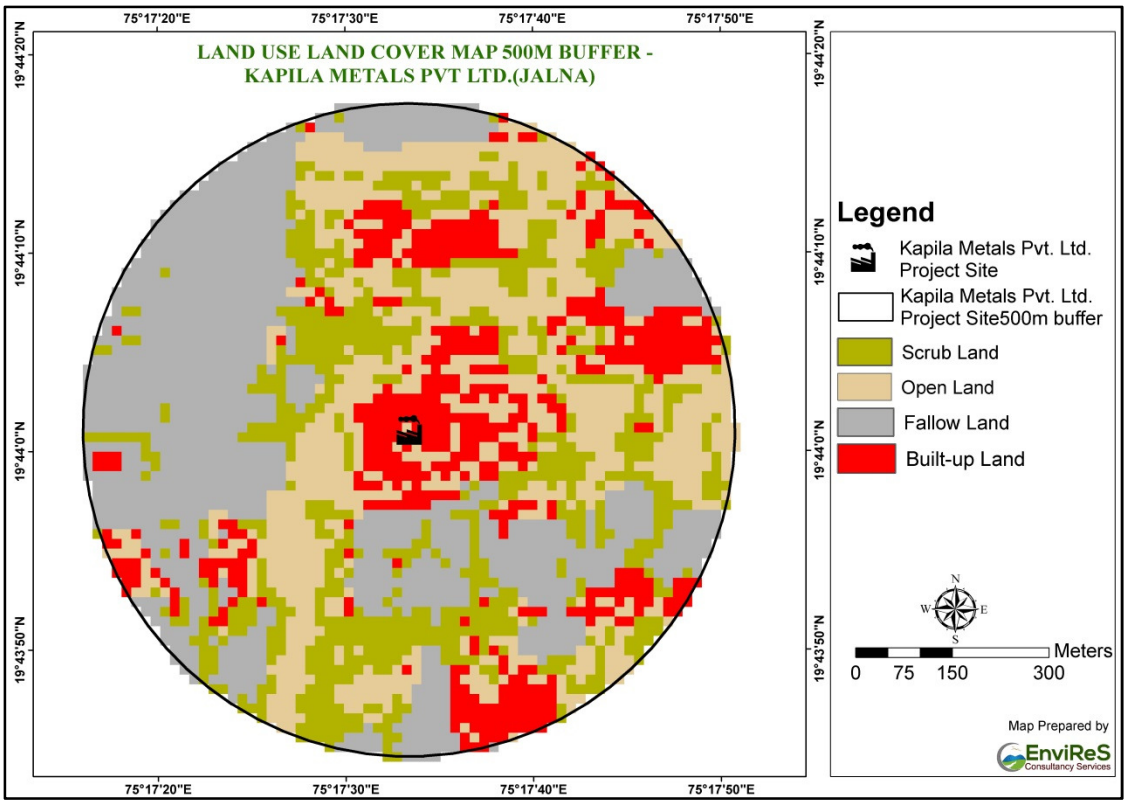


Figure 1.7 Landuse/Landcover map of 500 m angular distance around Kapila Metals Pvt Ltd

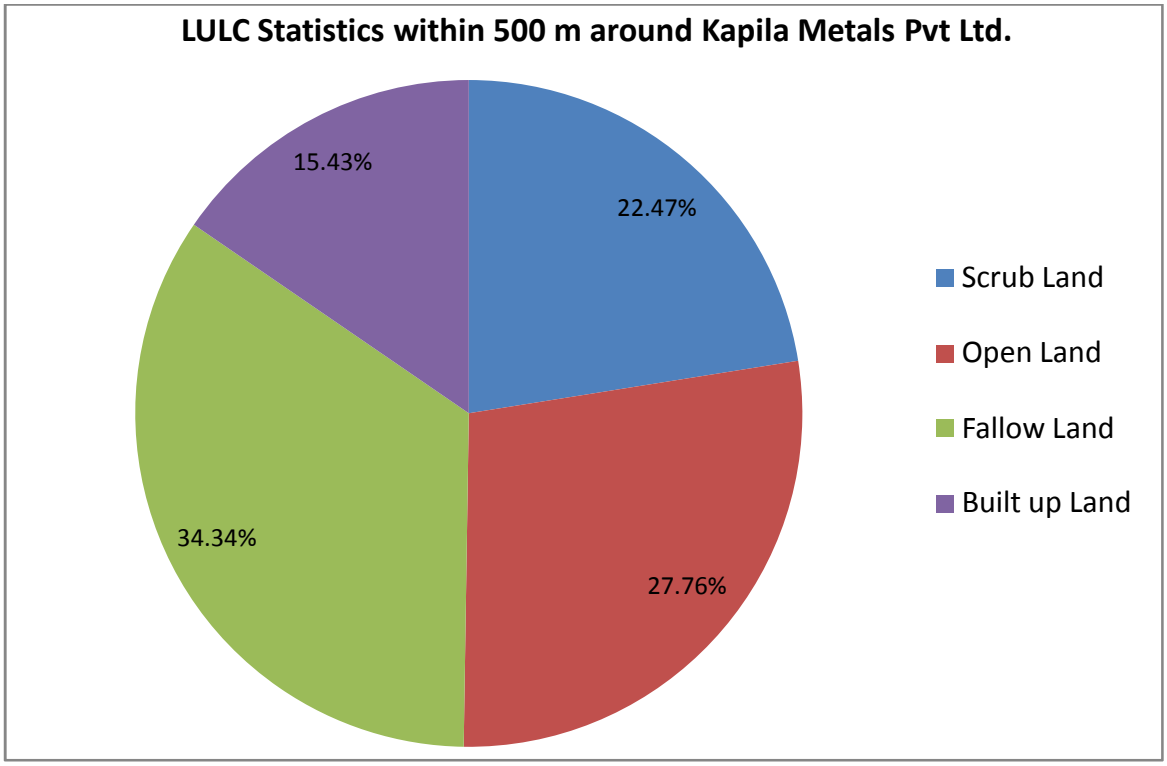


Figure 1.8 Pie chart of LULC classes for 500 m around Kapila Metals Pvt Ltd

Table 1.2 Landuse/Landcover areas in km^2 around 500 m radius aroundKapila Metals Pvt Ltd

Sr No.	LULC Class	Area in km^2	Percentage
1	Scrub Land	0.181575	22.47
2	Open Land	0.224325	27.76
3	Fallow land	0.277425	34.34
4	Built up Land	0.12465	15.43
	Total	**0.807975**	**100.00**

Fallow land rules the land use pattern in the study area covering 500 m angular distance around the project site. It covers 34.34% of the land use within the total area covering 500m around project site. Waste lands i.e. open land constituting 27.76% of the landuse and Scrub land (22.47%) dominates the landuse cover.Since the project site is located within the industrial zone, Built-up land (15.43%) is visible within 500 m distance around project site.

Data Input:

The function of data input is to convert the existing data from one into another that can be used in GIS. Georeferenced data are commonly provided as maps, satellite images, and associated attributes.

- **Drainage Map:** Drainage layer, which was generated after scanning the thematic manuscripts, was edited for line the errors. Two different layers were made separately for line drainage. Drainage order was given to all the drain lines in the layer's. Strahler method of ordering was used for giving order to drainage. Whenever two drains of any order joined the order of next drain was increase by one. The study area has an order of fourth. River name also attached as attribute to drainage layer. All the water bodies and river with sufficient width were put in polygon layer.

The area shows not much of undulating topography. The area covering 500 m angular distance around project site shows drainage lines passing towards South East of project site. Steep slope on the North side separates the drainage lines that flow towards north away from study area. Drainage pattern within 10 km radius around project site shows the sub-dendritic

type of drainage pattern of fourth order. A clear division of drainage pattern is observed due to a highly contoured structure located towards North East side of project site.

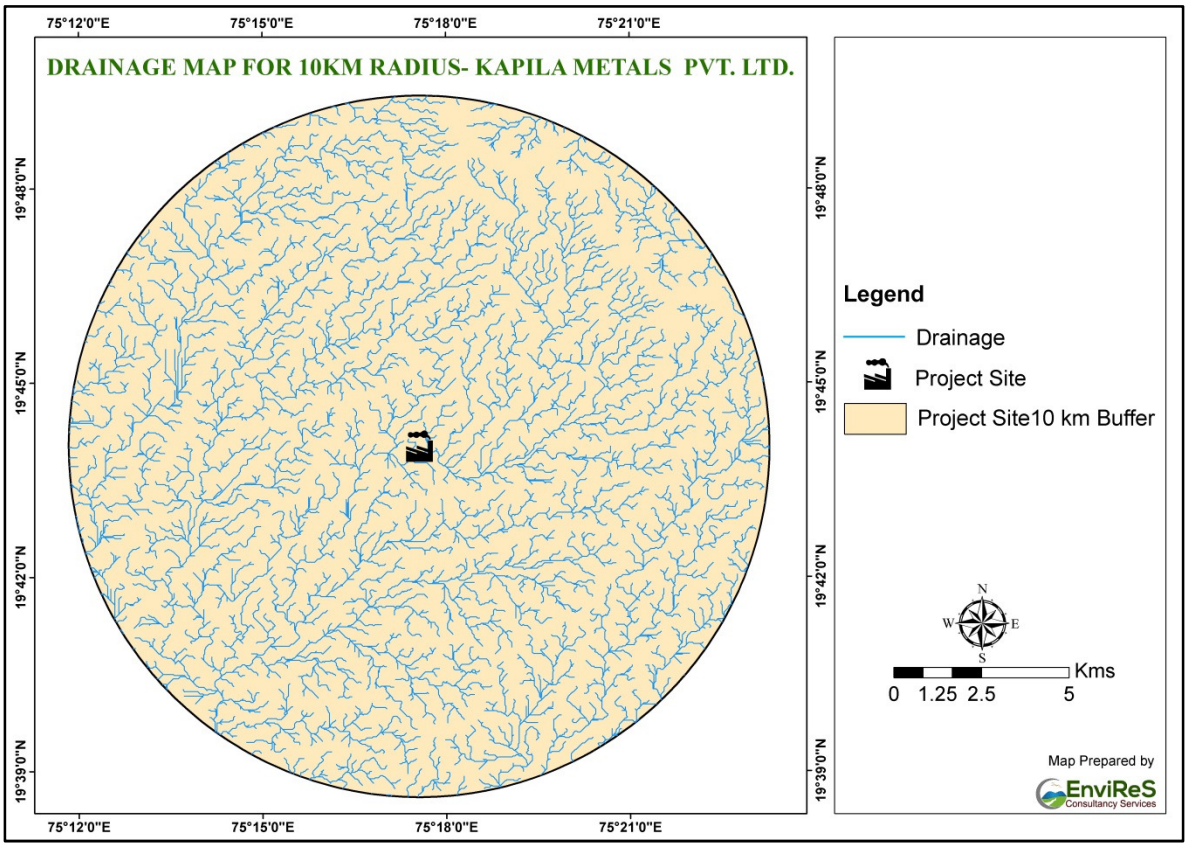


Figure 1.9 Drainage pattern within 10 km radius around Kapila Metals Pvt Ltd

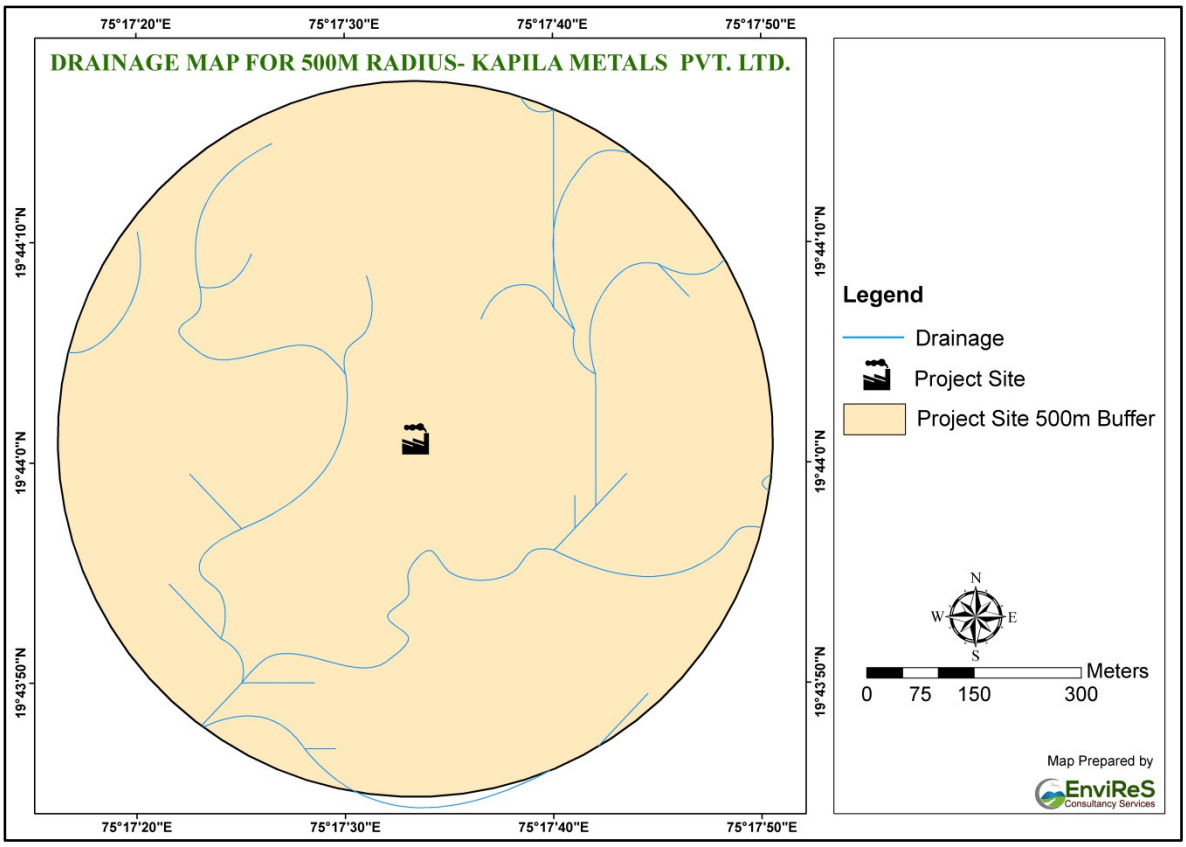


Figure 1.10 Drainage pattern within 500 m radius around Kapila Metals Pvt Ltd

Contour – Thematic manuscript for contour layer was generated from Digital Elevation Model (DEM). After scanning DEM coverage was generated. Coverage was edited to remove all errors of dangle. Attribute value was given to each contour in the coverage.

Contour map of 10 km radius around project site shows predominant contoured structure. Leaving aside this contoured feature rest of the area within 10km radius around project site does not exhibit major undulations. Highest point of the area covering 10 km radius around project site is 845 m whereas the lowest point is at 450 m. 500 m angular distance around project site clearly shows sparsely spaced contours. The terrain is not undulating and the highest point of the area covering 500 m angular distance around project site is 511 m whereas the lowest point is at 477 m.

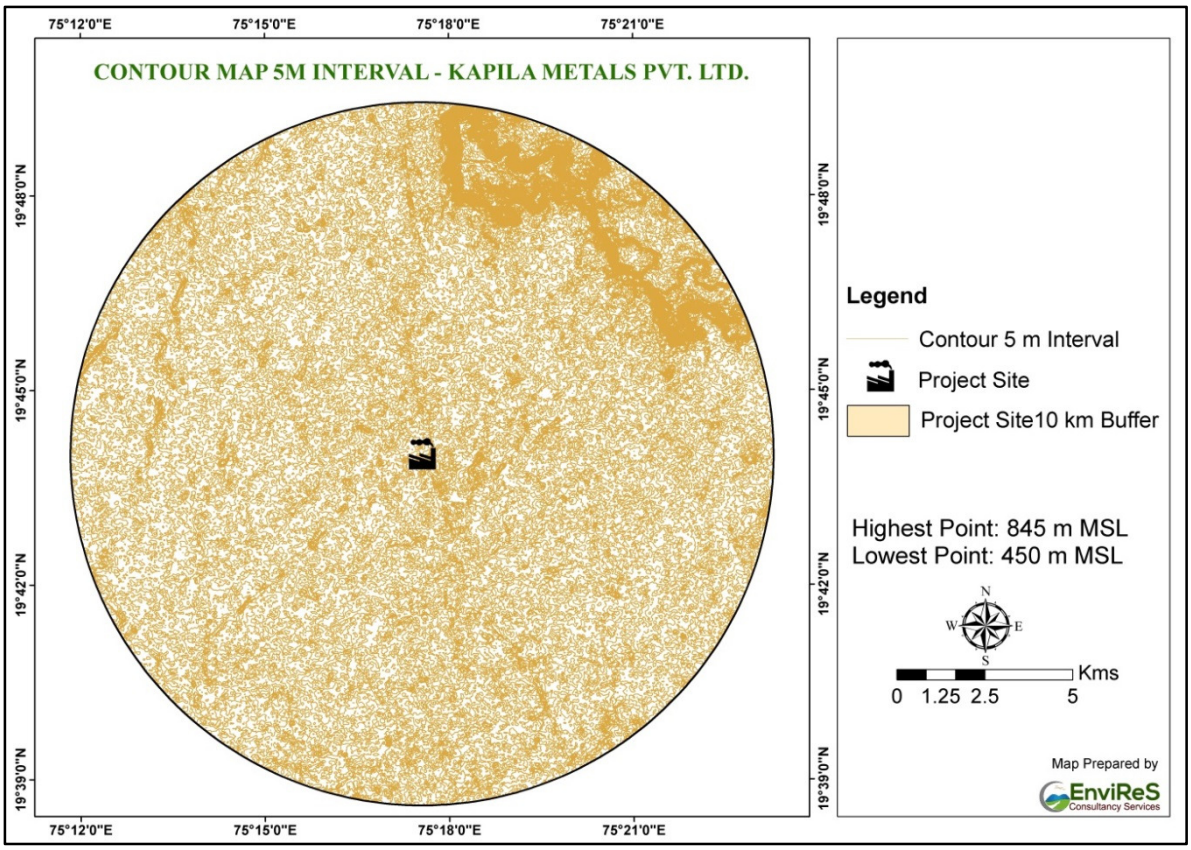


Figure 1.11 Contour patterns within 10 km radius around Kapila Metals Pvt Ltd

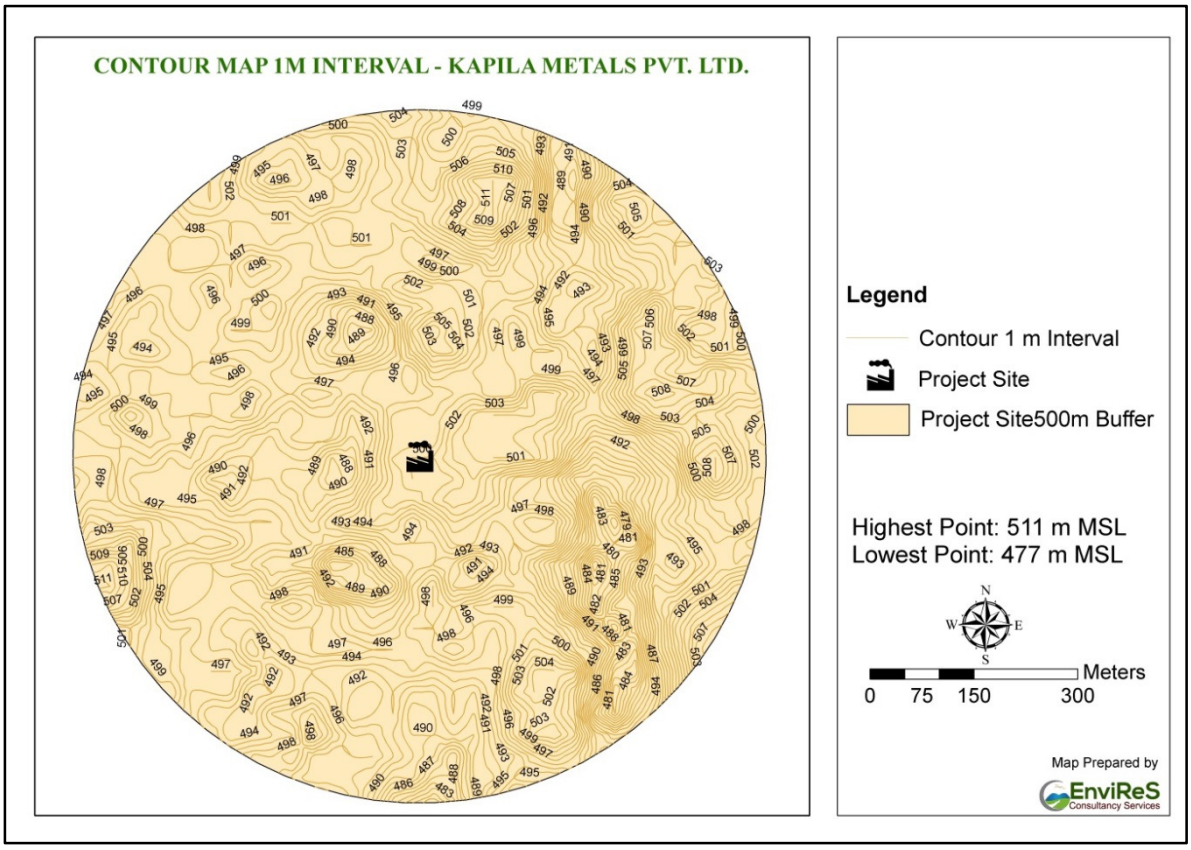


Figure 1.12 Contour patterns within 500 m around Kapila Metals Pvt Ltd

1. Disaster Management Plant

1.1 Disaster

A disaster is a catastrophic situation in which suddenly, people are plunged into helplessness and suffering, as a result, need protection, clothing, shelter, medical and social care and other necessities of life.

Disasters can be divided into two main groups. In the first, disasters resulting from natural phenomena like earthquakes, volcanic eruptions, storm surges, cyclones, tropical storms, floods, avalanches, landslides, forest fires etc.

The second group includes disastrous events occasioned by man, or man's impact upon the environment. Examples are armed conflict, industrial accidents, radiation accidents, factory fires, explosions and escape of toxic gases or chemical substances, river pollution, mining or other structural collapses, air, sea, rail and road transport accidents and can reach catastrophic dimensions in terms of human loss.

There can be no set criteria for assessing the gravity of a disaster in the abstract since this depends to a large extent on the physical, economic and social environment in which it occurs. What would be considered a major disaster in a developing country, ill equipped to cope with the problems involved, may not mean more than a temporary emergency elsewhere.

1.2 Objectives of Disaster Management Plan (DMP)

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Disaster Management Plan, it will be widely circulated and personnel training given through rehearsals/drills.

The Disaster Management Plan would reflect the probable, consequential severalties of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further, the management should be able to demonstrate that their assessment of the consequences uses good supporting evidence and is based on currently available and reliable information, incident data from internal and external sources and if necessary the reports of out side agencies.

To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a Disaster Management Plan has to be formulated and this planned emergency document is called "Disaster Management Plan".

The objective of the Industrial Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area; and

• Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

1.3 Emergencies

1.3.1 General, Industrial Emergencies

The emergencies that could be envisaged in the plant and tank farm are as follows:

A situation of fire at tank farm of storage;

- Slow isolated fires;
- Fast spreading fires;
- Structural failures;
- Contamination of food/water; and
- Sabotage/Social disorder.

1.3.2 Specific Emergencies Anticipated

- Fire and Explosion

Fire consequences can be disastrous, since they involve quantities of fuel either stored or in dynamic inventory in pipelines or in nearby areas. Toxic releases can affect persons working around. Preliminary hazard analysis has provided a basis for consequences estimation. Estimation can be made by using various pool fire, tank fire consequence calculations. During the study of Risk Assessment, the natures of damages are worked out and probability of occurrence of such hazards is also drawn up.

1.3.3 Emergency Organization

It is recommended to setup an Emergency Organization. A senior executive who has control over the affairs of the plant would be heading the Emergency Organization. He would be designated as Site Controller. As per the General Organization chart, would be designated as the Incident Controller. In the case of stores, utilities, open areas, which are not under the control of the Production Heads, Senior Executive responsible for maintenance of utilities would be designated as Incident Controller. All the Incident Controllers would be reporting to the Site Controller.

Each Incident Controller, for himself, organize a team responsible for controlling the incidence with the personnel under his control. Shift Incharge would be the reporting officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller.

Emergency Coordinators would be appointed who would undertake the responsibilities like fire fighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, Security Incharge, Personnel Department, Essential services personnel would be engaged. All these personnel would be designated as Key personnel.

In each shift, electrical supervisor, electrical fitters, pump house Incharge, and other maintenance staff would be drafted for emergency operations. In the event of power or communication system failure, some of the staff members in the office/plant offices

would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

1.3.4 Emergency Communication

Whoever notices an emergency situation such as fire, growth of fire, leakage etc. would inform his immediate superior and Emergency Control Centre. The person on duty in the Emergency Control Centre would appraise the Site Controller. Site Controller verifies the situation from the Incident Controller of that area or the Shift Incharge and takes a decision about an impending On Site Emergency. This would be communicated to all the Incident Controllers, Emergency Coordinators. Simultaneously, the emergency warning system would be activated on the instructions of the Site Controller.

1.3.5 Emergency Responsibilities

The responsibilities of the key personnel are appended below:

1.3.5.1 Site Controller

On receiving information about emergency he would rush to Emergency Control Centre and take charge of ECC and the situation;

- Assesses the magnitude of the situation on the advice of incident controller and decides;
- Whether the affected area needs to be evacuated;
- Whether personnel who are at assembly points need to be evacuated;
- Declares emergency and orders for operation of emergency siren;
- Organizes announcement by public address system about location of emergency;
- Assesses which areas are likely to be affected, or need to be evacuated or are to be alerted;
- Maintains a continuous review of possible development and assesses the situation in consultation with Incident Controller and other Key Personnel as to whether shutting down the plant or any section of the plant is required and if evacuation of persons is needed;
- Directs personnel for Rescue, rehabilitation, transport, fire, brigade, medical and other designated mutual support systems locally available, for meeting emergencies;
- Controls evacuation of affected areas, if the situation is likely to go out of control or effects are likely to go beyond the premises of the factory, informs to district emergency authority, police, hospital and seeks their intervention and help;
- Informs Inspector of Factories, Deputy Chief Inspector of Factories, PCB and other statutory authorities;
- Gives a public statement in necessary;
- Keeps record of chronological events and prepares an investigation report and preserves evidence; and
- On completion of On Site Emergency and restoration of normalcy, declares all clear and orders for all clear warning.

1.3.5.2 Incident Controller

- Assembles the incident control team;
- Directs operations within the affected areas with the priorities for safety to personnel, minimize damage to the plant, property and environment and minimize the loss of materials;
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency;
- Ensures that all key personnel help is sought;
- Provides advice and information to the Fire and Security Officer and the Local Fire Services as and when they arrive;
- Ensures that all non-essential workers/staff of the affected areas evacuated to the appropriate assembly points, and the areas are searched for causalities;
- Has regard to the need for preservation of evidence so as to facilitate any inquiry into the causes and circumstances, which caused or escalated the emergency;
- Co-ordinates with emergency services at the site;
- Provides tools and safety equipment to the team members;
- Keeps in touch with the team and advise them regarding the method of control to be used; and Keeps the Site Controller of Emergency informed of the progress being made.

1.3.5.3Emergency Coordinator - Rescue, Fire Fighting

- On knowing about emergency, rushes to ECC;
- Helps the incident Controller in containment of the emergency;
- Ensure fire pumps in operating conditions and instructs pump house operator to ready for any emergency with standby arrangement;
- Guides the fire fighting crew i.e. firemen, trained plant personnel and security staff;
- Organizes shifting the fire fighting facilities to the emergency site, if required;
- Takes guidance of the Incident Controller for fire fighting as well as assesses the requirements of outside help;
- Arranges to control the traffic at the gate and the incident area;
- Directs the security staff to the incident site to take part in the emergency operations under his guidance and supervision;
- Evacuates the people in the plant or in the nearby areas as advised by Site Controller;
- Searches for casualties and arranges proper aid for them;
- Assembles search and evacuation team;
- Arranges for safety equipment for the members of this team;
- Decides which paths the evacuated workers should follow; and
- Maintains law and order in the area, and if necessary seeks the help of police.

1.3.5.4 Emergency Coordinator-Medical, Mutual Aid, Rehabilitation, Transport and Communication

- In the event of failure of electric supply and thereby internal telephone, sets up communication point and establishes contact with the Emergency Control Center (ECC)
- Organizes medical treatment to the injured and if necessary will shift the injured to nearby hospitals
- Mobilizes extra medical help from outside, if necessary;
- Keeps a list of qualified first aiders of the factory and seek their assistance;
- Maintains first aid and medical emergency requirements;
- Makes sure that all safety equipment are made available to the emergency team;
- Assists Site Controller with necessary data and coordinate the emergency activities;
- Assists Site Controller in updating emergency plan, organizing mock drills verification of inventory of emergency facilities and furnishing report to the Site Controller;
- Maintains liaison with civil administration;
- Ensure availability of canteen facilities and maintenance of rehabilitation center;
- He will be in liaison with Site Controller/Incident Controller;
- Ensure transportation facility;
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure;
- Controls rehabilitation of affected areas on discontinuation of emergency; and
- Makes available diesel/petrol for transport vehicles engaged in emergency operation.

1.3.5.5 Emergency Coordinator - Essential Services

- He would assist Site controller and Incident Controller;
- Maintains essential services like Diesel Generator, Water, Fire Water, Compressed Air/Instrument Air, power supply for lighting;
- He would plan alternate facilities in the event of power failure, to maintain essential services such as lighting, refrigeration plant etc;
- He would organize separate electrical connections for all utilities and emergency services so that in the event of emergency or fires, essential services and utilities are not affected;
- Gives necessary instructions regarding emergency electrical supply, isolation of certain sections etc. to shift Incharge and electricians; and
- Ensures availability of adequate quantities of protective equipment and other emergency materials, spares etc.

1.3.5.6 General Responsibilities of Employees During an Emergency

During an emergency, especially it becomes more enhanced and pronounced when an emergency warning is raised, the workers if they are incharge of process equipment should adopt safe and emergency shut down and attend any prescribed duty as essential employee. If no such responsibilities assigned, he should adopt a safe course to assembly point and await instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

1.4 Emergency Facilities

1.4.1 Emergency Control Centre (ECC)

For the time being Office Block is identified as Emergency Control Centre. It would have external Telephone, Fax, Telex facility. All the Site Controller/Incident Controller Officers, Senior Personnel would be located here. Also, it would be an elevated place. Various other materials that are to be maintained in the Emergency Control Centre are:

The following information and equipment are to be provided at the Emergency Control Centre (ECC).

- Intercom, telephone
- P & T telephone
- Self contained breathing apparatus
- Fire suit/gas tight goggles/gloves/helmets
- Hand tools, wind direction/velocities indications
- Public address megaphone, hand bell, telephone directories
- (internal, P&T) factory layout, site plan
- Emergency lamp/torch light/batteries
- Plan indicating locations of hazard inventories, plant control room, sources of safety equipment, work road plan, assembly points, rescue location vulnerable zones, escape routes.
- Hazard chart
- Emergency shut-down procedures
- Nominal roll of employees
- List of key personnel, list of essential employees, list of Emergency Co-ordinators
- Duties of key personnel
- Address with telephone numbers and key personnel, emergency coordinator, essential employees.
- Important address and telephone numbers including Government agencies, neighbouring industries and sources of help, out side experts, chemical fact sheets population details around the factory.

1.4.2 Assembly Point

Number of assembly depending upon the plant location would be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water etc. would be organized.

1.4.3 Emergency Power Supply

Plant facilities would be connected to Diesel Generator and would be placed in auto mode. Thus water pumps, plants lighting and emergency control centre. Administrative building and other auxiliary services are connected to emergency power supply. In all the blocks flame proof type emergency lamps would be provided.

1.4.4 Fire Fighting Facilities

First aid fire fighting equipment suitable for emergency should be maintained in each section the plant. This would be as per statutory requirements as well as per TAC Regulations. However, fire hydrant line covering major areas would be laid. It would be maintained as 6 kg/sqcm pressure. Fire alarms would be located in the bulk storage areas. In order to combat any occurrence of fire in plant premises, the following fire protection facilities have been envisaged for the various units of the plant.

- ***Fire Station Building***

One fire station building has been envisaged, where all the fire personnel will be stationed. All fire related signal from various units shall receive in this building to take necessary action to extinguish and control the fire.

- ***Fire fighting Vehicles (Fire Tenders)***

To meet any eventuality of fire, fire-fighting vehicles (one crash fire tender and one dry power tender) have been considered.

- ***Portable Fire Extinguishers***

All plant units, office buildings, stores, laboratories etc will be provided with adequate number of portable fire extinguishers to be used as first aid fire appliances. The distribution and selection of extinguishers will be done in accordance with the requirement of IS: 2190-92.

- ***Hydrant System***

The fire hydrant network system has been envisaged for the plant. Internal hydrants will be provided at suitable locations and at different levels inside the major plant units. Yard hydrants will be provided normally along the road and in the close vicinity of the units to meet the requirement of water for extinguishing fire. Hydrant system shall have dedicated pump house, pumps, water storage and piping network etc.

- ***Automatic Fire Detection System***

Unattended and vulnerable electrical premises like electrical control rooms, cable tunnels, MCC, transformer rooms, switch gear room, oil cellers, etc will be provided with automatic fire detection and alarm system.

- ***Automatic Extinguishing System***

Installation like transformers of MSDS will be provided with fire detection and emulsifier (high velocity water spray) system. Water spray system (MVWS) shall be provided for the natural gas/LPG storage area.

1.4.5 Location of Wind Sock

On the top of the administration block, top of each production blocks, wind socks would be installed to indicate direction of wind for emergency escape.

1.4.6 Emergency Medical Facilities

Stretchers, gas masks and general first aid materials for dealing with chemical burns, and inhalations, fire burns etc. would be maintained in the medical centre as well as in the emergency control room. Private medical practitioners help would be sought. Government hospital would be approached for emergency help.

Apart from plant first aid facilities, external facilities would be augmented. Names of medical personnel, medical facilities in the surrounding area and near towns would be prepared and updated. Necessary specific medicines and antidotes for emergency treatment of Burns Patients and for those affected by toxicity would be maintained.

Breathing apparatus and other emergency medical equipment would be provided and maintained. The help of nearby industrial management in this regard would be taken on mutual support basis.

1.4.7 Ambulance

An ambulance with driver availability in all the shifts, emergency shift vehicle would be ensured and maintained to transport the injured or affected persons. A number of persons would be trained in first aid so that, in every shift first aid personnel would be available.

1.5 Emergency Actions

1.5.1 Emergency Warning

Communication of emergency would be made familiar to the personnel inside the plant and people outside. An emergency warning system would be established.

1.5.2 Emergency Shutdown

There are number of facilities, which can be provided to help deal with hazardous conditions, when a tank is on fire. The suggested arrangements are:

- Stop feed;
- Dilute contents;
- Remove heat;
- Deluge with water; and
- Transfer contents.

Whether a given method is appropriate depends on the particular case. Cessation of agitation may be the best action in some instances but not in others. Stopping of the feed may require the provision of by pass arrangements.

Methods of removing additional heat include removal through the normal cooling arrangements or use of an emergency cooling system. Cooling facilities which use vapouring liquid may be particularly effective, since a large increase in vaporization can be obtained by dropping pressure.

1.5.3 Evacuation of Personnel

There could be more number of persons in the storage area and other areas in the vicinity. The area would have adequate number of exits, stair cases. In the event of an emergency, unconnected personnel have to escape to assembly point. Operators have to take emergency shutdown procedure and escape. Time Office maintains a copy of

deployment of employees in each shift, at ECC. If necessary, persons can be evacuated by rescue teams.

1.5.4 All Clear Signal

Also, at the end of an emergency, after discussing with Incident Controllers and Emergency Co-ordinators, the Site Controller orders an all clear signal. When it becomes essential, the Site Controller communicates to the District Emergency Authority, Police, Fire Service personnel regarding help required or development of the situation into an Off-Site Emergency.

1.6 General

1.6.1 Employee Information

During an emergency, employees would be warned by raising siren in specific pattern. employees would be given training of escape routes, taking shelter, protecting from toxic effects. Employees would be provided with information related to fire hazards, antidotes and first aid measures. Those who would designated as key personnel and essential employees should be given training to emergency response.

1.6.2 Public Information and Warning

The industrial disaster effects related to this plant may mostly be confined to the plant area. The detailed risk analysis has indicated that the pool fire effects would not be felt outside. However, as an abundant precaution, the information related to chemicals in use would be furnished to District Emergency Authority for necessary dissemination to general public and for any use during an off site emergency.

1.6.3 Co-ordination with Local Authorities

Keeping in view of the nature of emergency, two levels of coordination are proposed. In the case of an On Site Emergency, resources within the organization would be mobilized and in the event extreme emergency local authorities help should be sought.

In the event of an emergency developing into an off site emergency, local authority and District Emergency Authority (normally the Collector) would be appraised and under his supervision, the Off Site Disaster Management Plant would be exercised. For this purpose, the facilities that are available locally, i.e. medical, transport, personnel, rescue accommodation, voluntary organizations etc. would be measured. Necessary rehearsals and training in the form of mock drills should be organized.

1.6.4 Mutual Aid

Mutual aid in the form of technical personnel, runners, helpers special protective equipment, transport vehicles, communication facility etc. should be sought from the neighbouring industrial management.

1.6.5 Mock Drills

Emergency preparedness is an important on that of planning in Industrial Disaster Management. Personnel would be trained suitably and prepared mentally and physically

in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel should be trained in the operations.

1.6.6 Important Information

Once the Plant goes into stream, important information such as names and addresses of key personnel, essential employees, medical personnel out side the plant, transporter's address, address of those connected with Off Site Emergency such as Police, Local Authorities, Fire Services, District Emergency Authority should be prepared and maintained.

1.7 Off-Site Emergency Preparedness Plan

The task of preparing the Off-Site Emergency Plan lies with the district collector, however the off-site plan will be prepared with the help of the local district authorities.

Aspects Proposed to be considered in the Off-Site Emergency Plan

The main aspects, which will be included in the emergency plan are:

- ***Organization***

Detail of command structure, warning systems, implementation procedures, emergency control centres.

Names and appointments of incident controller, site main controller, their deputies and other key personnel.

- ***Communications***

Identification of personnel involved, communication centre, call signs, network, lists of telephone numbers.

- ***Specialized Knowledge***

Details of specialist bodies, firms and people upon whom it may be necessary to call i.e. those with specialized chemical knowledge, laboratories.

- ***Voluntary Organizations***

Details of organizers, telephone numbers, resources etc.

- ***Chemical Information***

Details of the hazardous substances stored or procedure on each site and a summary of the risk associated with them.

- ***Meteorological Information***

Arrangements for obtaining details of whether conditions prevailing at the time and weather forecasts.

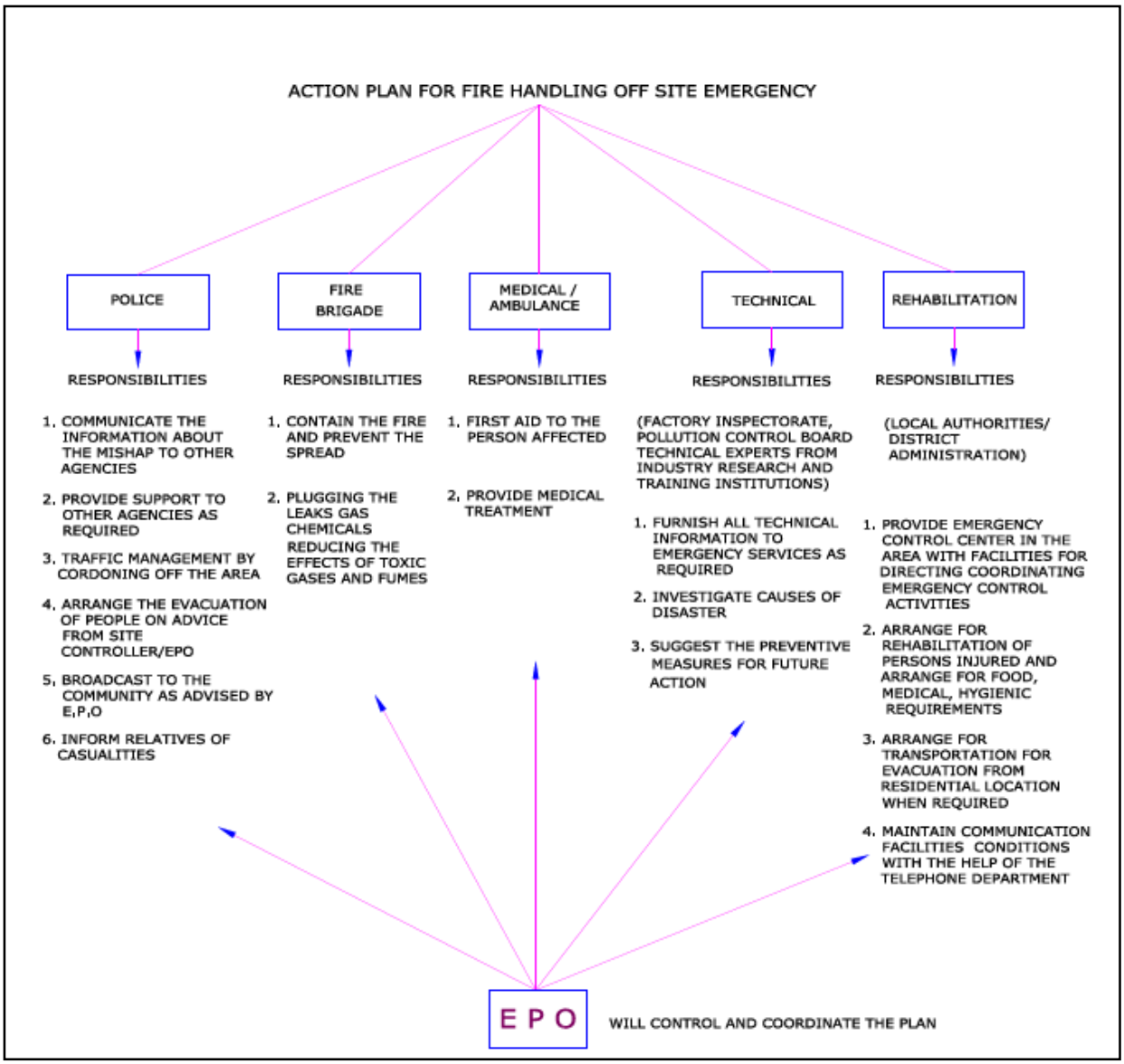


Figure 1: Action Plan during Emergency

- ***Humanitarian Arrangements***

Transport, evacuation centres, emergency feeding treatment of injured, first aid, ambulances, temporary mortuaries.

- ***Public Information***

Arrangements for

(a) Dealing with the media press office;

(b) Informing relatives, etc.

- ***Assessment of Emergency Plan***

Arrangements for:

a) Collecting information on the causes of the emergency;

b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

1.7.1 Role of the Emergency Co-ordinating Officer

The various emergency services will be co-ordinated by an emergency coordinating officer (ECO), who will be designated by the District Collector. The ECO will liase

closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control will be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

1.7.2 Role of the Local Authority

The duty to prepare the off-site plan lies with the local authorities. The emergency planning officer (EPO) appointed will carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO will liase with the works, to obtain the information to provide the basis for the plan. This liaison will ensure that the plan is continually kept up-to-date.

It will be the responsibility of the EPO to ensure that all those organizations which will be involved off site in handling the emergency, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off-site plans will be organized by the EPO.

1.7.3 Role of Police

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements.

Their functions will include controlling bystanders evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

1.7.4 Role of Fire Authorities

The control of a fire will be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer will also have a similar responsibility for other events, such as explosions and toxic release. Fire authorities in the region will be apprised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They will be involved in on-site emergency rehearsals both as participants and on occasions, as observes of exercises involving only site personnel.

1.7.5 Role of Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, will have a vital part to play following a major accident, and they will form an integral part of the emergency plan.

For major fires, injuries will be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. For major toxic releases, the effects vary according to the chemical in question, and the health authorities will be apprised about the likely toxic releases from the plant which will unable them in dealing with the aftermath of a toxic release with treatment appropriate to such casualties.

Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical " mutual aid " scheme should exist to enable the assistance of neighbouring authorities to be obtained in the event of an emergency.

1.7.6 Role of Government Safety Authority

This will be the factory inspectorate available in the region. Inspectors are likely to want to satisfy themselves that the organization responsible for producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well documented producers and evidence of exercise undertaken to test the plan.

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. These may vary from keeping a watching brief to a close involvement in advising on operations. In cases where toxic gases may have been released, the Factory Inspectorate may be the only external agency with equipment and resources to carry out tests.

1.8 Occupational Health and Safety

Large industries, in general, and chemical plants in particular where multifarious activities are involved during construction, erection, testing, commissioning, operation & maintenance, the men, materials and machines are the basic inputs. Along with the boons, the industrialization generally brings several problems like occupational health and safety.

1.8.1 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
- Chemical goggles
- 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
- Acid/Alkali proof rubberized 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)
- 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.

1.8.2 Safety Plan

Safety of both men and materials during construction and operation phases is of concern. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan. The disaster in the plant is possible due to leakage of hazardous chemicals, collapse of structures and fire/explosion etc.

Keeping in view the safety requirement during construction, operation and maintenance phases, steel plant has formulated safety policy with the following regulations:

- To allocate sufficient resources to maintain safe and healthy conditions of work;
- To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of plants, machinery and equipment;
- To ensure that adequate safety instruction are given to all employees;
- To provide wherever necessary protective equipment, safety appliances and clothing, and to ensure their proper use;
- To inform employees about materials equipment or processes used in their work which are known to be potentially hazardous to health or safety;

- To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experience and upto date knowledge;
- To provide appropriate facilities for fist aid and prompt treatment of injuries and illness at work;
- To provide appropriate instruction, training, retraining and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters;
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service;
- To organize collection, analysis and presentation of data on accident, sickness and incident involving personnel injury or injury to health with a view to taking corrective, remedial and preventive action;
- To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees;
- To publish/notify regulations, instruction and notices in the common language of employees;
- To prepare separate safety rules for each types of occupation/processes involved in a project; and
- To ensure regular safety inspection by a competent person at suitable intervals of all buildings, equipment, work places and operations.

1.8.3 Safety Organization

- Construction & Erection Phase

A qualified and experienced safety officer will be appointed. The responsibilities of the safety officers include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He is also responsible to ensure compliance of works Safety Rules/Statutory Provisions.

In addition to employment of safety officer by steel plant every contractor, who employs more than 250 workers, should also employ one safety officer to ensure safety of the worker, in accordance with the conditions of contract.

- ***Operation & Maintenance Phase***

When the construction is completed the posting of safety officers should be in accordance with the requirement of Factories Act and their duties and responsibilities should be as defined thereof.

1.8.4 Safety Circle

In order to fully develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety circles would be constituted in each

area of work. The circle would consist of 5-6 employees from that area. The circle normally should meet for about an hour every week.

1.8.5 Safety Training

A full fledged training centre will be set up. Safety training will be provided by the Safety Officer with the assistance of faculty members called from Corporate Centre, Professional Safety Institutions and Universities. In addition to regular employees, limited contractor labours are also provided safety training.

To create safety awareness safety films will be shown to workers and leaflets etc. will be distributed.

Some precautions and remedial measures proposed to be adopted to prevent fires are:

- Compartmentation of cable galleries, use of proper sealing techniques of cable passages and crevices in all directions would help in localizing and identifying the area of occurrence of fire as well as ensure effective automatic and manual fire fighting operations;
- Spread of fire in horizontal direction would be checked by providing fire stops for cable shafts;
- Reliable and dependable type of fire detection system with proper zoning and interlocks for alarms are effective protection methods for conveyor galleries;
- House keeping of high standard helps in eliminating the causes of fire and regular fire watching system strengthens fire prevention and fire fighting; and
- Proper fire watching by all concerned would be ensured.

1.8.6 Health and Safety Monitoring Plan

All the potential occupational hazardous work places such as iron ore handling, dolomite, limestone, coal handling and storage areas will be monitored regularly. The health of employees will be monitored once in a year for early detection of any ailment due to exposure to noise, respirable dust and hazardous chemicals. The audiometry and lung function tests will be included in this surveillance program.