EXECUTIVE SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

For

Modification/Enhancement in the existing configuration of induction furnaces within the existing steel plant to achieve total capacity of 5, 15,666 TPA at Village Siltara, District Raipur, Chhattisgarh

BASELINE PERIOD: 15th MARCH to 15th JUNE 2019

Project Proponent

M/s. SKS Ispat and Power Ltd.

At

Village Siltara, District Raipur, Chhattisgarh

Environmental Consultant

M/s Anacon Laboratories Pvt. Ltd., Nagpur

QCI-NABET Accredited EIA Consultant for Metallurgical Industries (Sector 8)

MoEF&CC (GOI) and NABL Recognized Laboratory

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Project No. : ANqr /PD/20A/2016/50

AUGUST 2020

EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s SKS Ispat & Power Ltd., a company incorporated on April 17th 2000, with registrar of companies, Mumbai, Maharashtra to carry out the business of manufacturing and trading of all kinds of steel alloys.

SKS Ispat & Power Ltd are committed to be part of Chhattisgarh state for industrialization progress undertaken by the Government of Chhattisgarh for optimum utilization of natural and human resources available in the state.

The group is specialized in manufacturing & marketing of "long products" and over the period and has emerged as one of the leading traders in structural steel in India.

The project proponent has following facilities at their existing integrated steel plant with an investment of around Rs.1000 Crores at Village- Siltara, Tehsil & District Raipur, Chhattisgarh.

- Sponge Iron plant - 2, 70,000 TPA (2x100 TPD and 2x350 TPD).
- Captive power plant - 85 MW (25 MW Waste Heat Recovery Boilers (WHRB) and 2x30 MW CFBC & AFBC boilers),
- Steel Melting Shop (SMS) – 3,31,500 TPA
- Ferro Alloy plant (29,400 TPA).
- Rolling Mill (4 Nos.) - 3, 84,000 TPA.
- Gasifire (5 Nos.) - 5 x 8000 Mm^3/Hr.
- Oxygen/Nitrogen Plant – 170 NM^3/Hr.

SKSIPL has now proposed modification/enhancement of production capacity of its Steel Division from 3, 31,500 TPA to 5, 15,666 TPA after installation of additional 4Nos. more 15 T Capacity furnaces along with CCM within the premises of existing Steel plant. It is thus a brownfield project.

As per Environmental Impact Assessment Notification dated 14th September, 2006 and subsequent amendment thereof, the proposed project falls under "Category A", Schedule 3 (a), and requires Environmental Clearance (EC) from the EAC (Industry – I), MoEF&CC, New Delhi and Consent to Establish (CTE) from Chhattisgarh Environment Conservation Board, Chhattisgarh.

Online application in prescribed format Form- I, Pre-feasibility report along-with proposed TORs for undertaking detailed EIA study for the proposed modification/enhancement project was submitted to EAC (Industry – I), MoEF&CC, New Delhi on 29th March, 2016. The proposal was considered by Expert Appraisal Committee (Industry – I), MoEF&CC, New Delhi during its 9th meeting held on 28th July, 2016. The committee approved the Terms of Reference Vide F. No. J-11011/99/2006-IA.II (I) dated 20th October, 2016. Further Terms of Reference Vide F. No. J-11011/99/2006-IA.II (I) validity extension has been granted by MOEFCC vide letter dated 24th February 2020. The public hearing will be conducted by the Chhattisgarh Pollution Conservation Board (CECB) and minutes of meeting along with point wise compliance of public hearing will be incorporated in the EIA report after public hearing.

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

Environmental baseline studies were carried out during in Pre-Monsoon Season 2019. This EIA report is prepared based on the ToR conditions recommended by EAC, New Delhi and project related technical details provided by M/s. SKS Ispat & Power Ltd.

1.1 IDENTIFICATION OF PROJECT

SKS Ispat & Power Ltd. has proposed modification/enhancement of production capacity of steel melting shop from 3,31,500 TPA to 5,15,666 TPA after installation of additional 4x15 T Capacity furnaces within existing Steel Division located at Siltara, Tehsil & District Raipur, Chhattisgarh. The estimated cost of project modification/enhancement is Rs. 30.00 Cr.

The case of M/s SKS Ispat & Power Ltd. was presented before the EAC committee (Industry - I) during its 6th meeting held on 3rd - 4th May, 2016 and 9th meeting held on 27th -29th July, 2016. The committee approved the Terms of Reference Vide F. No. J-11011/99/2006-IA.II (I) dated 20th October, 2016.

Existing EC for Integrated Steel Complex was granted by MoEF dated. August 25th, 2006 (F.No. J-11011/99/2006 – IA II(I) for production of Sponge Iron (2,70,000 TPA), Steel Billets production Unit (SMS) (3,31,500 TPA), Palletization Plant (3,00,000 TPA), Structural/re-rolled products (3,84,000 TPA) and Captive Power Plant (85 MW). Consent to establish was obtained vide order no.4987/TS/CECB/2006 dated 12/10/2006, amended Consent to Establish was obtained vide order no.1689/TS/CECB/2013 dated 01/07/2013 and Renewal of Consent was obtained vide order No. 10428/TS/CECB/2020 dtd. 20.02.2020 valid till 31.01.2023.

1.2 LOCATION OF THE PROJECT

Plant is located at Village Siltara, Tehsil & District Raipur of Chhattisgarh State. The nearest city is Raipur which is around 11 km from the project site. Nearest airport is Swami Vivekananda Airport, Raipur which is around 24.28 km at south east direction. The nearest roadway is Raipur-Bilaspur-Kolkata Highway (NH-200) about 1.89 km in the east direction. The nearest railway stations are Mandhar (8 km, south east) & Raipur (12 km, east).The proposed unit is located near Siltara Industrial Area which will make the site most appropriate for this project. The proposed expansion project will be coming up within the existing premises. The study area of 10 km radial distance from the project site is shown in **Figure 1**.

1.3 EIA/EMP REPORT

As per approved ToR obtained from Expert Appraisal Committee (Industry – I), MoEF&CC, New Delhi (Vide F. No. J-11011/99/2006-IA.II(I) dated 20th October, 2016), baseline environmental monitoring was carried out during Pre-monsoon season (15th March 2019 to 15th June 2019) for determining the status of ambient air quality, ambient noise levels, surface and groundwater quality, soil quality, status of flora, fauna and eco-sensitive areas and socio-economic status of the villages within 10 km radius study area from the project site **(Figure 1).** The observations of the studies are incorporated in the draft EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the draft.

EIA/EMP report alongwith the proposed management plan to control / mitigate the impacts. Environmental Management Plan is suggested to implement the pollution control in the project.

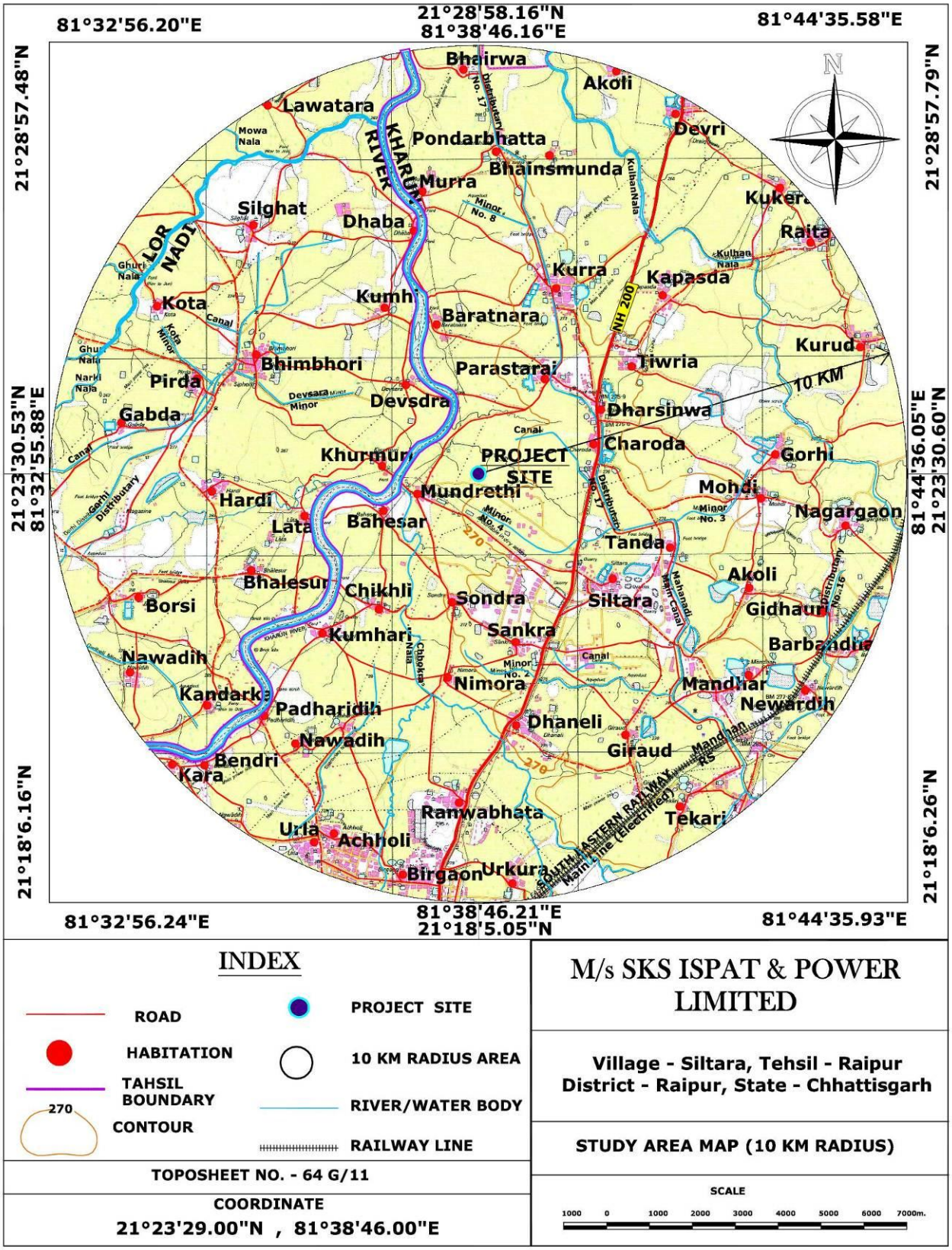

FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)

TABLE 1
DETAILS OF ENVIRONMENTAL SETTINGS

Sr. No.	Particulars	Details
1.	Project Location	Village: Siltara, (Near Industrial Growth Centre Siltara) Tehsil-Raipur, Dist.- Raipur (Chhattisgarh)
2.	Co ordinate	Latitude : $21^0$23'9.37"N to $21^0$23'47.68"N Longitude: $81^0$38'25.40"E to $81^0$39'0.04"E
3.	Toposheet No.	64 G/11
4.	Climatic Conditions	Mean annual rainfall is 1252.8 mm Temperature : Pre monsoon 20.6^0 C (Min.) 41.7^{0}C (Max.) : Winter 13.3^{0}C (Min.) 31.0^{0}C (Max) : Post monsoon 17.3^0 C (Min.) 31.8^{0}C (Max.) Source: IMD, Raipur
5.	Nearest IMD station	Raipur ~24.28 km, SE
6.	Land Form, land Use and Ownership	Private Industrial Land
7.	Site topography	Project site located at 272 m above MSL Flat Terrain
8.	Nearest roadway/ Highway	Raipur-Bilaspur-Kolkata Highway (NH-200) about 1.89 km, E
9.	Nearest Railway Station	Mandhar, 8km (SE) & Raipur, 12 km (E)
10.	Nearest Air Port	24.28 km (SE)
11.	Nearest Port	NA
12.	Nearest lake	NA
13.	Nearest State/National Boundaries	NA
14.	Nearest major city with 2,00,000 population	Raipur, 11 km (nearest city)
15.	Distance for sea coast	NA
16.	Hills/valleys	NA
17.	Nearest Reserved/ Protected forests	--
18.	Nearest water bodies	River Kharun – 1.22 KM (W) ChokraNala – 0.90 km (SW) River Lor – 8.43 km (WNW)
19.	Seismic zone	Project site falls in zone-II as per IS 1893 (Part-I):2002 classification. Hence, seismically it is a stable zone.

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION OF STEEL MELTING SHOP

➢ **Induction Furnaces**

- The various types of Induction Furnaces used for Steel making are medium frequency and high frequency. Mild steel, Stainless Steel and low and high alloy Steel can be made from these furnaces. Raw materials used are Steel melting Scrap and Direct Reduced Iron. Alloying elements added as per requirement.
- The scrap is charged into the crucibles for generating the hot heel for DRI charging. Necessary carbon in the form of pig iron/ petroleum coke is added into the crucibles to ensure the availability of necessary carbon in the bath. Once the molten bath has been formed and minimum temperature of the bath has been achieved, sponge iron is charged in small batches and the slag formed is removed periodically. After the completion of charging of sponge iron, a sample is drawn to determine the composition of the bath. After achieving the desired melt

analysis, the temperature is raised to the tapping temperature taking into account additions of predetermined amount of ferro-alloys to achieve the required tapping composition of the melt.

- **Continuous Casting Machine (CCM):**
  - Steel from the electric arc furnace is tapped into a ladle and taken to the continuous casting machine. The ladle is raised onto a turret that rotates the ladle into the casting position above the tundish. Liquid steel flows out of the ladle into the tundish and then into water-cooled copper mold.
  - Solidification begins in the mold, and continues through the first zone and strand guide. The partially solidified billets after leaving the mould pass through strand guide roller segment where intensive but controlled cooling of billets is affected by water spray nozzles.
  - The solidified billets are guided through withdrawal and straightening units before entering the gas cutting zone. The dummy bar is separated from the billet for the gas cutting unit and is stored till its introduction is required for the next hit. The cast billet is cut to predetermine length by gas cutting torches.
  - The size billets are delivered to the cooling bed through run out roller table and cross transfer mechanism. The billets are marked on cooling bed by the marking unit for identification/tracking. In this configuration, the strand is straightened, torch-cut and then discharged for intermediate storage or hot charged for finished rolling.
  - The melting /casting/ rolling processes are linked while casting a shape that substantially conforms to the finished product. The complete chain from liquid metal to finished rolling can be achieved within two hours.
  - The Product end-use dictates the quality, grade and shape of the cast product (billet, bloom, slab, beam blank, and/or round).
  - The existing continuous caster will be utilized for producing steel billets, which is equipped with moulds, mould oscillating mechanism, secondary cooling segments, withdrawals and straightening unit, gas cutting unit, dummy bar insertion system, run out roller tables, cross transfer mechanism and cooling bed.

- **Some of the important assumptions relating to the production of billet are as under :**

No. of Working days	-	320 Days

Furnace Capacity:

No. of Furnace	-	4 Nos.
Capacity per Charges	-	15 MT
Total heats per day	-	10 nos.
Total capacity	-	600 tons per day
(140 minutes per heat)		

Capacity Utilization:

1st year of operation	-	80 %
From 2ndyear and ahead	-	90 to 100 %

For uninterrupted operation of the plant the raw material to be kept in the raw material yard is as given under. These holdings period is suggested taking into account the availability, transit period and any unforeseen interruptions in the supply channel.

Sponge iron	-	2 Months
Pig Iron	-	2 Months
Scrap	-	2 Months
Ferro Alloys	-	2 Months
Work in Progress	-	15 Days
Finished Outputs	-	22 Days
Stores and Spares	-	3 Months

The above holding periods have been specified taking into account the activity in stand alone basis.

2.2 LAND REQUIREMENT

SKSIPL is established inside the plant boundary of land area 190.76 Acres including proposed land of 02 acres (0.809 ha) within existing premises located in Siltara. The land is already acquired by the company.The proposed activities will be within the existing integrated steel complex. Around 70 Acres land out of the total land area is already covered under Green belt. The land details are provided as follows:

TABLE 2
LAND UTILIZATION PATTERN

Khasra No	Land Schedule	Area of land
Khasra No. 102/1-9	Own Private Industrial Land	02 acres (0.809 ha)
Total		**02 acres (0.809 ha)**

2.3 RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

Raw material for proposed SMS unit will be in captive generated or will be transported from source to the plant site by means of covered tarpaulins to prevent spread of dust from it during transportation. It is estimated that approximately 5 trucks/hour required for transportation of raw materials and finished products of the plant.

2.3.1 Solid and Hazardous waste generation

SOLID WASTE GENERATION (TPA)

S. No.	Unit	Solid Waste	T/T OF PRODUCT	Existing	Modification/ Enhancement	Total
A	**SPONGE IRON PLANT**					
	1	Char-Dolo Char	0.731	197370	Nil	197370
	2	Dust from DSE	0.013	3510	Nil	3510
B	**BILLETS**					
	1	Slag	0.131	43426.5	24125.74	67552.24
C	**ROLLING MILL**					
	1	End Cutting Scrap	0.03	11520	Nil	11520
D	**FERRO ALLOY PLANT**					
	1	**Slag**	0.848	24931.2	Nil	24931.2
E	**COAL BASED POWER PLANT**					
	1	Coal Ash	46% Ash in Coal	158814	Nil	158814
	2	Char Ash	52% Ash in Char	183518	Nil	183518

Hazardous waste generation

SKSIPL has been granted authorization Hazardous Waste and Wastes (Management Handling and Transboundry Movement) Rules, 2016. Used/Spent Oil is the major hazardous waste generated average generation is about 2.5-2.8 KL per year and is used as lubricant at existing Rolling Mills

2.4 WATER REQUIREMENT & SOURCE

The total water requirement for entire production units is 4730 m^3/day, including 397m^3/day (proposed expansion SMS 300 m^3/day + proposed coal washery 90 m^3 + 07m^3 for domestic purposes for additional manpower). No waste water generation through process. Water required for domestic purposes will be 7m^3/day, considering 10% losses the domestic wastewater will be 6 m^3/day generated. Sanitary waste water will be treated in proposed STP in future moreover presently sewage routed through septic tank and soak pit. SKSIPL already having the permission from WRD, Govt. of Chhattisgarh to draw 4800 m^3/day from Kharun river. The proposed water requirement will be fulfilled through existing water allocation i.e. 4734 m^3/day by WRD, Govt. of Chhattisgarh. The project site is situated near to Kharun River about 1.22 km (W).As per CGWB data the Plant area falls in 'Semi-critical' category.

2.5 POWER REQUIREMENT & SUPPLY

The power requirement for the project will be fulfilled from 85 MW Captive Power plant. The power requirement for SKSIPL integrated steel plant is being met by the waste heat recovery and captive coal based power plant providing a clean environment by restricting the emission of gases in the environment.

2.6 MANPOWER REQUIREMENT

Existing manpower for SMS division is 322 and proposed manpower required will be 170 for expansion. Thus, the total manpower will be 492 people after proposed expansion activities. Preference will be given to local people, depending upon their qualification and skill. Marginal employment will also generate during construction phase.

2.7 FIRE FIGHTING FACILITIES

In order to combat any occurrence of fire in plant premises, fire protection facilities are envisaged for the various units of the plant. All plant units, office buildings, laboratories, etc. will be provided with adequate number of portable fire extinguishers to be used as first aid fire appliances. Already 02 nos. of Ambulance & a fire tender is available at plant premises.

2.8 PROJECT COST

The total project cost after expansion of the project is estimated as Rs. 1030 Cr (existing: Rs.1000.00 Cr.(Approx) and proposed: Rs. 30.00 Cr. (Approx)).

3.0 EXISTING ENVIRONMENTAL SCENARIO

3.1 BASELINE ENVIRONMENTAL STUDIES

Baseline environmental studies were conducted at project site along with 10 km radial distance from the project site. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land were monitored during Pre-monsoon season (15th March 2019 to 15th June 2019).

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated At Site (15th March 2019 to 15th June 2019)

Predominant Wind Direction	**Pre monsoon season**
First Predominant Wind Direction	W (13.78 %)
Second Predominant Wind Direction	WNW (11.90 %)
Calm conditions (%)	0.46
Avg. Wind Speed (m/s)	2.40

The status of ambient air quality within the study area was monitored for pre-monsoon season for at 8 locations covering project site, Munrethi, Bhimbhori, Chikhli, Mohdi, Siltara, Charoda and Tekari. Total 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind, cross wind directions and reference point. The levels of Respirable Particulate Matter (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,), Oxides of Nitrogen (NO_X) and carbon monoxide (CO), Ammonia, Ozone, Benzene and BAP were monitored. The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 3**.

TABLE 3
SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	**Location**		**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_2**	**CO**	**Ozone**	**NH_3**
			µg/m^3	**µg/m^3**	**µg/m^3**	**µg/m^3**	**mg/m^3**	**µg/m^3**	**µg/m^3**
1.	Project Site	Min	59.0	19.7	11.1	15.8	0.214	11.0	8.7
		Max	96.7	31.4	15.0	23.7	0.319	16.1	16.2
		Avg	73.7	24.8	12.4	19.6	0.282	13.3	12.7
		98th	92.9	30.8	14.3	22.9	0.318	15.5	15.5
2.	Mundrethi	Min	50.4	17.4	8.0	10.0	0.204	9.2	10.3
		Max	76.6	25.5	15.4	16.5	0.299	16.1	14.7
		Avg	63.9	21.8	10.5	12.7	0.253	12.7	11.6
		98th	76.5	25.2	13.7	15.7	0.296	15.4	13.7
3.	Bhimbhori	Min	47.6	17.1	10.5	16.3	0.181	7.9	9.0
		Max	64.0	23.4	21.4	25.7	0.257	17.2	15.4
		Avg	55.7	20.0	14.2	19.9	0.218	12.7	11.6
		98th	62.7	23.0	19.2	24.2	0.255	17.0	14.8
4.	Chikhli	Min	44.5	20.3	10.1	10.1	0.238	12.1	10.1
		Max	68.5	29.1	15.5	19.8	0.324	20.7	18.7
		Avg	59.6	25.7	12.0	13.8	0.279	15.9	14.4
		98th	67.6	28.5	14.7	18.7	0.323	19.7	17.8
5.	Mohdi	Min	48.2	17.3	9.8	11.5	0.176	8.4	10.5
		Max	67.8	24.7	13.5	17.8	0.243	13.6	16.8
		Avg	58.5	20.9	11.8	14.5	0.214	11.2	13.0
		98th	67.8	24.3	13.5	17.5	0.239	13.4	16.2
6.	Siltara	Min	82.9	28.7	12.5	13.0	0.231	10.6	11.0
		Max	112.6	39.1	23.1	28.0	0.307	15.4	16.4
		Avg	104.7	35.8	20.4	20.8	0.273	12.6	13.4
		98th	112.0	38.5	22.5	27.4	0.300	14.7	15.7
7.	Charoda	Min	62.1	20.7	12.0	19.6	0.203	11.5	10.1
		Max	76.5	26.3	16.4	28.1	0.258	18.3	17.8
		Avg	70.4	23.8	13.7	23.4	0.236	14.8	12.6
		98th	76.0	26.0	15.7	27.6	0.257	18.1	16.8
8.	Tekari	Min	42.0	15.0	8.1	12.1	0.257	8.3	9.5
		Max	65.2	22.8	11.6	18.6	0.314	14.9	15.9
		Avg	49.1	18.4	9.5	15.2	0.284	11.2	11.6
		98th	64.3	22.8	11.2	17.8	0.313	14.3	14.8
CPCB Standards			**100 (24hr)**	**60 (24hr)**	**80 (24hr)**	**80 (24hr)**	**2 (8hr)**	**100 (8hr)**	**400 (24hr)**

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

3.3 AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 8 monitoring locations; those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 4.**

TABLE 4
SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq_{Day}	Leq_{Night}
Residential Area			
1.	Mundrethi	54.2	41.3
2.	Charoda	51.5	43.0
3.	Devsdra	53.0	41.5
CPCB Standards dB(A)		**55.0**	**45.0**
Commercial Area			
4.	Parastarai	53.2	46.2
5.	Sondra	55.6	45.1
CPCB Standards dB(A)		**65.0**	**55.0**
Silence Zone			
6.	Khurmuri	49.8	38.2
CPCB Standards dB(A)		**50.0**	**40.0**
Industrial Area			
7.	Project Site	73.6	61.4
8.	Siltara	62.1	50.3
CPCB Standards dB(A)		**75.0**	**70.0**

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

3.4 SURFACE AND GROUND WATER RESOURCES & QUALITY

3.4.1 Local Geology

The 10 km study area falls in two districts i.e. Durg & Raipur District. Kharun River marks the boundary of Raipur district in the West of project area.

The study area is monotonously plain with very scanty exposures & is covered by the rocks of Chandi Formation. Lithological boundaries are concealed under laterite or soil cover. On correlating subsurface exposures seen in well cuttings, it is observed that the Raipur limestone - shale belonging to Chandi Formation of Chhattisgarh Super group occupies the whole area of Samodanala basin. The Chandi limestone showing stromatolitic form, at places, occurs along with dolomites. Apart from Chandi Formation rocks of Chopardih Formation belonging to the Chandrapur Group also present. The Chopardih Formation mainly consists of reddish-brown and olive-green sandstone.

3.4.2 Local Hydrogeology and Aquifer Systems

The study area comes under Mahandi river basin. Sedimentary rocks (cavernous Limestone, fractured, shales and weathered Sandstones) of Chandi& Gunderdehi Formation form the principal aquifer system within study area. As per CGWB, data, the study area falls in “Semi critical” category of Non-Notified area with groundwater development of 36.7%. However, no ground water would be utilized for project related activity. Dendritic type of drainage pattern is observed in study area which usually follows the regional slope towards North.

Pre-monsoon water levels range from: 9.5 -13.88 mbgl

Post-monsoon water level range from: 2.32- 3.59 mbgl

(Reference: WRIS portal data)

3.4.3 Geomorphology

Geomorphologically entire study area lies on structural plains of Proterozoic rocks. Flood plains are seen along Kharun River course. In entire study area no major geomorphological features are present.

3.4.4 Water Quality

Groundwater and surface water quality was assessed by identifying 8 groundwater (Borewell/ handpump) locations in different villages and 4 surface water samples.

A. Groundwater Quality

The analysis results indicate that the pH ranged between 7.55-7.94. The TDS was ranging from 392-1026 mg/l. Total hardness was found to be in the range of 196.4-607.3 mg/l. The fluoride concentration was found in the range of 0.12-0.24 mg/l. The nitrate and sulphate were found in the range of 6.32-96.02 mg/l and 16.28-88.92 mg/l respectively.

Sr. No.	Locations	WQI	Quality	Remark
1	Project Site	49.92	Good	**Water quality assessed based upon above physico-chemical parameters and most samples are physico-chemically good**
2	Munderthi	85.38	Good	
3	Khurmuri	54.51	Good	
4	Charoda	84.44	Good	
5	Siltara	58.58	Good	
6	Parastarai	48.79	Good	
7	Nawadih	46.78	Good	
8	Bendri	81.30	Good	

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.35-7.77 which are well within the specified standard of 6.5 to 8.5. pH is a measure of the hydrogen ion concentration of the water. The pH of water indicates whether the water is acid or alkaline. The TDS was observed to be 476-492 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 154.38-174.61 mg/l as $CaCO_3$ which is also within the permissible limit of 600 mg/l. The levels of chloride and sulphate were found to be in the range of 122.74-146.53 mg/l and 20.44-26.83 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O_2) dissolved in water. Because fish and other aquatic organisms cannot survive without oxygen, DO is one of the most important water quality parameters. The reported value of range of 5.9-6.1 mg/lt. Phosphorus (as PO_4) is an important nutrient for plants and algae. Because phosphorus is in short supply in most fresh waters, even a modest increase in phosphorus can cause excessive growth of plants and algae that deplete dissolved oxygen (DO) as they decompose.

C. Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. Bacteriologically, all surface water samples were contaminated and water treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose whereas groundwater samples were not bacteriologically contaminated.

3.5 LAND USE LAND COVER CLASSIFICATION

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-1 (IRS-P6), sensor-LISS-3 having 23.5m spatial resolution and date of pass 18th April 2018 satellite image with reference to Google Earth data. In order to

strengthen the baseline information on existing land use pattern, the following data covering 10 km radius is approximate about N 21°23'09.6" to N 21°23'47.6" latitude and E 81°38'25.4"to E 81°39'07.02" longitude and elevation 270 – 272 meter are used as per the project site confined within that area.

The Land Cover classes and their coverage are summarized in **Table 5.**

TABLE 5
LAND COVER CLASSES

S.No.	Level-I	Level-II
1	Built-up land	Settlement
		Industrial Settlement
		Rail Infrastructure
		Road Infrastructure
2	Agricultural Land	Cropland
3	Scrubs/Wastelands	Open Scrub
4	Waterbodies	Canal
		River/Pond/Tank
		Drainage
5	Others	Mining/Stony Waste/Brick Kline

3.6 SOIL QUALITY

For studying soil profile of the region, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land-use conditions. The physical, chemical and heavy metal concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 30 cm. Total 8 representative samples were collected from different locations within the study area and analyzed.

Physical Characteristics of Soil

From the analysis results of the soil samples, it was observed, Bulk density of the soil in the study area ranged between **1.41-1.61 g/cc** which indicates favorable physical condition for plant growth. The water holding capacity is between **21.32-24.21 %.** Infiltration rate, in the soil is in the range of **18.57-30.76 mm/hr.**

Chemical Characteristics of Soil

pH is an important parameter indicative of alkaline or acidic nature of soil. pH is found to be neutral to moderately alkaline **(6.85-7.73)** in reaction. Electrical conductivity, a measure of soluble salts in the soil is in the range of **91.34 - 409.0 µS/cm.** The important soluble cations in the soil are calcium and magnesium whose concentration levels ranged from **245.98-508.69 mg/Kg** and **200.74-408.69 mg/Kg** respectively. Chloride is in the range of **402.71 - 913.24 mg/Kg.**

3.7 BIOLOGICAL ENVIRONMENT

Floral composition in Study Area

The baseline study for existing biological environment was carried out during March 2019. The tree species, herbs and shrubs and major crops, were documented during this baseline study. The comparative details about the floral composition are as follows:

Habit	Core	Buffer-I	Buffer-II
Tree (T)	20	45	48
Herb (H)	6	19	19
Shrub (S)	4	10	10
Grass (G)	3	9	9
Climber (C)	1	3	3

RET STATUS

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. Among the enumerated flora in the study area, none of them were assigned any threat category, by RED data book of Indian Plants. (Nayar and Sastry, 1990) and Red list of threatened Vascular plants (IUCN, 2010; BSI, 2003).

Fauna Details:

- **As per IUCN RED (2013) list**

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. Among the reported animals, all are categorized under least concern category as per IUCN.

- **As per Indian Wild Life (Protection) Act, 1972**

Wild Life (Protection) Act, 1972, as amended on 17thJanuary 2003, is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country.

Some of the sighted fauna were given protection by the Indian Wild Life (Protection) Act, 1972 by including them in different schedules. Among the Avifauna in the study area, all birds observed in the study area are protected in schedule IV as per Wild life protection Act (1972) and subsequent amendments thereof.

Among mammals; *Presbytis entellus* (Hanuman/Common Langur), *Herpestes edwardsi* (Common Mongoose) are protected in schedule –II, Lepus nigricollis (Black-naped hare), are protected under Schedule IV and *Funambulus pinnatii* (Palm squirrel) protected in Schedule IV and Rats are protected in Schedule V

Among the reptiles, Indian Cobra (*Naja naja*), and Common Rat Snake (*Ptyas mucosus*), Russell's Viper (*Daboia russelii*) were provided protection as per Schedule-II of Wild life protection act, (1972) and Common Indian Krait (*Bungarus caerulus*) were provided as per Schedule – IV of Wildlife protection act.

3.8 SOCIO-ECONOMIC ENVIRONMENT

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data collection from census 2011 & District Census hand book 2011. Summary of the socio-economic status of the study area is given in Table 6. Details regarding education and infrastructure facilities 2011 are presented in Table 7 respectively

TABLE 6

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

No. of villages	49
Total households	42803
Total population	104755

Male Population	97356
Female population	33168
SC Population	24778
ST Population	7803
Total literates	131579
Total Illiterates	70532
Total workers	76162
Total main workers	65294
Total marginal workers	12903
Total non-workers	123914

Source: Primary census abstract 2011, District Raipur, state Chhattisgarh

TABLE 7
INFRASTRUCTURE FACILITIES AVAILABLE IN THE STUDY AREA

Education	Medical	Drinking water	Drainage	Communication	Transportation	Bank	Recreation	Electricity
100	**57.45**	**100**	**59.57**	**93.62**	**85.11**	**14.89**	**93.62**	**100**

Source: District Census handbook 2011, District Raipur, state Chhattisgarh

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

- **Employment:** Main occupation in the study area was agriculture and Labor Work its allied activities eg. Cattle rearing, dairy farming etc. Other income generation sources of the area, small business; private jobs etc. The labors were getting daily wags in the range of 300-350 Rs, depending on type of work they set. It is observed that the Raipur District is having huge scope for employment as industrialization is more in this area. But due to lack of Vocational training centers in the area the Industries are outsourcing some of the key employees from other areas.
- **Agriculture Labour and wage rates**: The wages of agriculture labour are varied from Rs. 100 (2010) to Rs. 235 (2011). The prevailing labour charges of agriculture operations are varied with the operations of cultivations of crops i.e. ploughing, leveling, weeding, transplanting, harvesting and winnowing. The actual wage rates of agriculture labour varied from Rs. 252 to 270 per man day in different operations of the crops. The rates are higher in peak operation periods i.e. ploughing of seeds and harvesting of crops.
- **Fuel:** The primary sources of cooking fuel were LPG, cow dung and coal etc.
- **Major crops of study area, production & yield**: The various crops are grown by the cultivators in Study area. The paddy (70.8%) was found to be major crop of the state. The cultivators are also found to be tivra (pulse) (6.5%), gram (4.6%), and wheat (6.5%). The soybean, arhar, groundnut are grown in small proportion by the cultivators in the Study Area.
- **Migration from other states**: During survey it was found that local population were not migrating for employment purpose, they prefer only local employment
- **Language:** Official language Hindi As well As Hindi is spoken and understood by most of the population. Chhattisgarhi is also widely spoken here by the locals.
- **Sanitation:** Toilet facility is one of the most basic facilities required in a house. There was no proper drainage line in the villages, open and kachha drainage which was not working properly seen in most of the villages. Various villages in study area now actively involved in open defecation free (ODF) in the

community level under which toilet facilities developed within several villages. The overall position of cleanliness was near to satisfactory

- Drinking water Facilities: During study area it has been observed that, the water supply in this region is mostly through taps, wells and hand pumps. For drinking purpose people are using Tap water and water tanker is also provided by panchayat in summer, but supplied water quantity is not sufficient. For treating water, the Panchayat of village does not take any actions. Overhead Water Tanks are also installed in few villages.
- **Education facilities**: Educational facilities are available of the villages in the study area. Literacy rate of the study area is quite good that is about 80%. Primary, schools are available in the villages whereas College facility is available in nearby town i.e. Raipur. Female literacy is also good; In terms of female education, the villagers has positive attitude.
- **Transportation facility**: For transportation purpose auto, jeep and private bus services were available in the study area; however villagers reported that transportation facilities were not frequently available. Private vehicles like bicycles & motor cycles were also used by villagers for transportation purpose.
- **Road connectivity:** It was observed that only 27 villages have Pucca Road facilities. It means nearly 75 % of the villages have road facility.
- **Communication facilities**: For communication purpose mainly mobile phones, newspapers & post offices were present in the villages.
- **Medical facilities**: There were healthcare facilities available in the study area. The Primary & secondary data reveals that there are only 13 nos. of Maternity And Child Welfare Centre, 12 nos. of Sub Health Centers & 01 nos. of PHC's in the Study area. Hospitals and other better health centers were available in the range of 5-10 km at town/city place.. No major diseases were reported by local people in the study area except routine cough, cold and fever etc. Local people mentioned about the lack of equipment's, infrastructure and poor coverage of the existing health services. The PHCs in the study area are lack of basic equipment's and trained staffs and hence people are expecting health infrastructure with adequate staff.
- **Electricity**: All villages were availing electricity facility for domestic and agriculture purposes. Solar Street lights were seen in some of the villages.
- **Market facility:** Study area was predominantly rural. In villages, small shops were available for daily need things. Weekly market facility was available in some villages. Wholesale market was available Siltara city.
- **Banking facility:** The study area has almost all the schedule commercial banks with ATM facility at urban areas and the district HQ.
- **Recreation facilities**: Television and radio were the main recreation facilities in the study area. Newspaper/magazine facilities were also used by villagers. Internet based Mobile usage has gained the highest popularity. Most of the youth are found to be using the Mobile based applications. At some places video parlors are also seen. Cinema houses are not found in the rural area. It is only found in Raipur City which is also one of the main sources of recreation. It is observed that there is no encouragement for sports as there are less Schools & Colleges in the Study area. Raipur is the only place where Sports training facilities are available in entire District.

3.7.1 Awareness and opinion of the respondents about the project

Public opinion is the aggregate of individual attitudes or beliefs. It is very important to take opinion of the villagers about the project. The awareness will not only promote community participation but also

enable them to understand the importance of the project and encourage them to express their view. To know the awareness and opinion of the villagers about the project, group discussion, meeting with school teachers/village leaders were carried out in the study area. Almost all respondents were aware about the SKS Project area but some respondents were unaware about the project activity. Major problems in study area are employment opportunities, Water, Medical and Irrigation facility. Village leaders suggested the development in needy areas which will improve village conditions.

While giving information about project of SKS respondents gave positive opinion and they strongly believe that it will help to develop quality of life in the study area with employment Respondents were ready to welcome the project because study area was main centre for employment in industrial area. Migration from other stats for employment was common in the area.

3.7.2 Interpretation

Socioeconomic survey was carried out to know the infrastructural activities amenities available within 10 km radius from Project Site. The information regarding facilities available and the opinion of the people was sought by floating questionnaires and interaction with the people. This is done for observing the impact due to the project wrt social aspects so that proper actions / measures could be taken up for the benefit of the people (economically and wrt quality of life) and the project.

During the primary survey it was observed that almost pakka road facility is available in all villages within 10 km radius. Literacy rate of the study region is from 65.10%. On the basis of survey for literacy rate data it is interpreted that there is need to promote educate more and more people. Almost all the villages have more than 61.31% people as non-workers. It indicates that the problem of unemployment can be solved by providing proper training and education. There is also need to establish more industries so that maximum number of employment can be generated. Basic amenities like Education facilities Health care facilities, water supply, electric power supply, mode of transportation etc. are available in all villages.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Air Environment

The proposed expansion will have impact on the air quality parameters like PM_{10}, $PM_{2.5}$, SO_2, NO_X and CO. The raw material handling plant, IF's, steel melting shops will emit dust and fumes. Apart from the above, there will be fugitive dust emissions due to transportation, storage and processing of raw materials.

Although, the quantity of production will be increased but ground level concentrations will not be increased as the process of sponge and pig iron melting in induction furnace does not cause any SO_x emission, even the NO_x formation is negligible it only emits some particulate matter with carbon loss gases exiting from top of induction furnace crucible. Emission limit of Particulate matter will be kept less than 50 mg/NM^3. By use of better quality raw material carbon loss based flue gas generation will also get reduced. Hence it is inferred that considering cumulative concentration levels based on Air (ISCST3) Modeling Studies, the pollution load exerted due to proposed expansion project will be insignificant.

The mitigation measures adopted are:

- The primary & secondary emissions from the Induction furnaces, and continuous casting machine area will be extracted and treated in a fume extraction system.
- Adequate capacity dust extraction measures with swivel hood, ID fan shall be provided at different loading, unloading and transfer points in the raw material handling section.

- Fumes will be evacuated directly from induction furnaces through hoods with swiveling mechanism and ducting.
- Material transfer points, discharge points and raw material storage area coupled with Dust suppression system consisting dust extraction, water sprinkling, suction hoods, dry fog system and bag filters Closed Conveyer System is provided for transport of raw materials, After Burning Chamber (ABC)
- Almost 99 % of the roads (inside and outside the premises) are concreted. Concreting of road from SKS plant site to Bilaspur-Raipur road.
- Ferro Alloys Plant will be provided with Multi cyclone de - dusting system with heat exchanger.
- The duct carrying fumes from Induction furnaces will join in a mixing chamber from where the gases will be led to the bag house by means of ID fan.
- Electrostatic precipitator is being already installed at Coal based (AFBC/CFBC) thermal power plant, Rerolling Mill Plant coupled with after burning chamber (ABC), suction hoods, dust de-dusting system, dry fog system have been installed in RMP in order to restrict the particulate matter less than 50 mg/m^3.
- Adequate dust suppression system in the form of water sprinklers shall be provided at raw material yard, temporary solid waste dump site and along the vehicular roads.
- Induction Furnaces provided with Bag filter with central dust collection system.
- There will be dedicated roads for vehicles carrying raw materials and products.
- Stacks are being already provided with porthole and working platform so that stack monitoring can be done as per norms of statutory authority.

Noise Environment:

During the normal operation of manufacturing process noise will be generated due to Induction Furnaces, Rolling mill, ID Fan, Blower/air Fan, Cutting/Shearing Machine and DG Set, etc. the ambient noise levels are expected to increase significantly with the attributes of the respective equipment, but this noise will be restricted close to the concerned equipment. The preventive measures are given below:

- Equipment will be standard and equipped with silencer. The equipment will be in good working conditions, properly lubricated and maintained to keep noise within permissible limits.
- High noise zone will be marked and earplugs will be provided to the workmen near high noise producing equipment. The workmen will be made aware of noise and vibration impacts on their health and mandatory use earplugs.
- Proper shifting arrangement will be made to prevent over exposure to noise and vibration.
- Tall trees with heavy foliage shall be planted along the boundary of camp / project site / plantation area, which will act as a natural barrier to propagating noise.
- Silent DG sets shall be used at construction camp / project site.
- Speed limits shall be enforced on vehicle.
- Use of horns / sirens will be prohibited.
- Use of loud speakers will be complying with the regulations set forth by CPCB.

- Regular noise monitoring will be carried at construction camp / project site to check compliance with prevailing rules.

Water Environment:

The proposed modification/enhancement may have some impact on the water environment. The impact may be on the source of water in the form of depletion of water resources of the area and in the form of deterioration of quality of natural water resources due to discharge of plant effluent. The total entire plant units water requirement is 4734 m^3/day including 397m^3/day (proposed expansion SMS 300 m^3/day + proposed coal washery 90 m^3+ 07m^3 for domestic purposes for additional manpower). SKSIPL already having the permission from WRD, Govt. of Chhattisgarh to draw 4800 m^3/day from Kharun river. The proposed water requirement will be fulfilled through existing water allocation by WRD, Govt. of Chhattisgarh. The project site is situated near to Kharun River about 1.22 KM (W). To minimize fresh water drawn, extensive waste water treatment system is developed and recycling has is done with rain water harvesting to meet requirement during lean period. No discharge is proposed from the plant.

The various control measures that will be adopted are:

In order to minimize consumption of fresh water from the source, industrial water after treatment is to be recycled and reused. After cooling and suitable treatment makeup water will be added to compensate for the losses in closed circuit circulation system. Rain water will be harvested and charged to ground water/ used in river water lean period. Moreover,

- No pre-treatment of raw water is required. As the water will be used for cooling purpose only.
- No wastewater generation from the process
- No groundwater required for Industrial Cooling. Water will be provided through pipeline network.
- Water requirement for domestic purposes only fulfilled through ground water.
- Waste water generated through sanitary/toilet activities. This will be treated in STP and treated water will be used for plantation purposes and dust suppression.
- All stock piles will be on pucca flooring to prevent for any ground water contamination.

Vehicular Movement

All the major raw materials and finished products will be transported through trucks by road.

Biological Environment

There is no ecological sensitive area like national park, sanctuary, biosphere reserve, within 10 km radial distance from the project site. The project site located near to Siltara Industrial area, no forest land involved in the project activities. Thus, no significant impact envisaged on biological environment.

An area of around 70 Acres of land (more than 33%) is dedicated for green belt development. The existing green belt is having 32 different species including trees, shrubs, herbs and climber. The overall plantation carried out by M/s. SKS Ispat and Power Ltd. at inside the plant premises, labour colony, bachelor's hostel along with approach road from Bilaspur-Raipur road to SKS plant, etc. Plantation also carried out at nearby villages, approach road from Bilaspur-Raipur road to SKS plant etc. No major wild fauna were observed in the vicinity of expansion site.

Socio-economic Impacts:

The land use is not going to be significantly change as the proposed expansion will be carried out within existing plant premises, thus there will be no issue of involvement of any agriculture land or

settlement on the contrary there will be positive impact on the socio economic environment of the area. Increase in direct/indirect job opportunity shall take place. Services in the locality shall be used and accordingly growth in economic structure of the area will take place.

5.0 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed expansion project under the control of Whole Time Director followed by General Manager. The EMC will be headed by an Environmental Manager having adequate qualification and experience in the field of environmental management. Environmental monitoring of ambient air quality, surface and ground water quality, ambient noise levels, etc. will be carried out through MoEF&CC accredited agencies regularly and reports will be submitted to MoEF&CC.

6.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

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

A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons is prepared and incorporated in the draft EIA/EMP report for ensuring 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 Disaster Management Plan, it will be widely circulated and personnel training through rehearsals. Site facilities, procedures, duties and responsibilities, communications, etc. are considered in details in the Disaster Management Plan.

7.0 PROJECT BENEFITS

Proposed Social Welfare Arrangement

The proposed project would provide development of area and consequent indirect and direct job opportunities which would finally result in improvement in the quality of life of people in the central region. M/s. SKS Ispat and Power Ltd. will carry community welfare activities in the following areas:

- Community development
- Education
- Health& medical care
- Drainage and sanitation
- Roads

The project proponent will comply with its obligation for CSR as per Company's Act.

M/s SKSIPL has earmarked 2.5% of the total project cost i.e. appox Rs.0.75 Cr.(Rs. 75 Lakhs) as capital estimated for the Social Welfare Activities in future.

8.0 ENVIRONMENTAL MANAGEMENT PLAN

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

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

Judicious use of the environmental management plan addressing the components of environment, which will be likely affected by the different operations in the project, will be implemented. The capital cost required to implement the EMP for proposed expansion is estimated to be around Rs. 160 Lakhs. The annual recurring expenses will be around Rs. 30 Lakhs has been allocated for implementation of the Environmental Management Plan for proposed expansion project.

9.0 CONCLUSION

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

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed expansion project will not add significant pollution level than existing being it is hot charging process, it will be beneficial to the society and will help to reduce the demand-supply gap of steel to some extent and will contribute to the economic development of the region in particular and country in general.

10.0 DISCLOSURE OF CONSULTANTS

The environmental studies for proposed project of M/s. SKS Ispat and Power Ltd. are carried out by M/s Anacon Laboratories Pvt. Ltd., Nagpur (M/s ALPL). Anacon established in 1993 as an analytical testing laboratory and now a leading Environmental Consultancy firm backed by testing lab for environment and food in Central India region. M/s. ALPL is accredited for Accredited Consultant for Sector No. 8 (Metallurgical Industries) in Category - A as per vide Accreditation Certificate No.: NABET/EIA/1922/RA 0150 dtd. 03 Feb 2020 Valid till September 30, 2022.