EXECUTIVE SUMMARY

1.0 INTRODUCTION

The company "**AGRASEN STEEL AND POWER PVT. LTD.**" (M/s. ASPPL) is a newly incorporated company created on 4th November 2019 under the Companies Act 1956 with an objective to set up a DRI based integrated Steel Plant along with Captive Power Plant.

M/s. Agrasen Steel And Power Pvt. Ltd. has proposed to establish a DRI based Integrated Steel plant to produce Sponge Iron 385000 TPA; Iron Ore beneficiation 1200000 TPA, Iron Ore Pellet 1200000 TPA, Rotary Hearth Furnace to produce nugget / briquet of Sponge Iron 210000 TPA, Mild Steel Billets 514500 TPA, Rolled Steel Products 800000 TPA (through Hot Charging 500000 and thru BRF (based on Coal Gasifier- 15000 Nm^3/Hr) - 300000 TPA; SAF 12 MVA X 2 No to produce SiMn-48000 TPA and/or FeMn- 60000 TPA and/or FeSi-26000 TPA and /or Pig Iron 96000 TPA); Captive Power of 50 MW (32 MW through WHRB and 18 MW through FBC); GI Pipe 200000 TPA; GI Wire 200000 TPA and Fly Ash Bricks 72,700 TPA, unit. This Greenfield project will be established on a total land area of 25.958 hectares.

Above facilities are proposed in an area of 25.958 hectares (Government land already allotted by CSIDC in favor of the company 17.173 Ha, while the remaining 8.785 Ha. are under active consideration and are expected to be allotted shortly), at Kh. No. 443/8 at Village Deori, Kh. No. 648/2 and 648/3 at Village - Ghulghul - Tahsil - Tilda, District Raipur (CG): -

As per Environmental Impact Assessment Notification dated 14th September, 2006 and subsequent amendment thereof, the Sponge Iron, Steel Melting Shop (Induction Furnace) and Ferro Alloys Plants falls under **Sector 3 (a),** the AFBC based power plant falls under **Sector 1 (d)**. and Mineral Beneficiation come under **Sector 2 (b)**. The overall project activity is categorized as **Category "A"**; therefore, it will require Environmental Clearance (EC) to be obtained from EAC (Industry –I), MoEF&CC, New Delhi.

The application for prior Environmental Clearance (Form-1) for proposed project was submitted to EAC, MoEF&CC, New Delhi (Online Proposal No. IA/CG/IND1/538449/2025) on 28/05/2025. The proposal was considered by the Expert Appraisal Committee (EAC) and ToR was granted on 14th July 2025 (vide. file no.: IA-J-11011/198/2025-IA-II(Ind-I).

Anacon Laboratories Pvt. Ltd., Nagpur, is QCI-NABET accredited (NABET Certificate No.- NABET/EIA/23-26/RA 0304 - Rev. 01; Issue date 13.03.2024; Validity 29.09.2026) 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 project.

The Environmental Impact Assessment (EIA) report is prepared for obtaining Environmental Clearance (EC) from Ministry of Environment, Forest and Climate Change (MoEF&CC), New Delhi and the Consent for Establishment from the Chhattisgarh Environment Conservation Board (CECB) for the proposed Greenfield project.

1.1 IDENTIFICATION OF PROJECT

M/s. Agrasen Steel and Power Pvt. Ltd. proposes Greenfield project involving for production of Sponge Iron, Iron ore pellet, Nugget/Briquet of Sponge Iron, Iron Ore Beneficiation, MS Ingot Billet, Rerolled Steel products, Ferro Alloys (SiMn/FeMn/FeSi) and/or Pig Iron, GI Pipe, GI Wire

and Fly Ash products along with captive power generation plant comprising of Waste Heat Recovery Boilers (WHRB) and Atmospheric Fluidized Bed Combustion (AFBC) Boiler along with Steam Turbine & Generator. The project is proposed to be located at Village – Deori and Ghulghul, Tehsil - Tilda, District - Raipur (C.G.) 493 221. The proposal is to seek Environment Clearance based on energy efficient as well as well proven technology process.

The proposal is to seek Environment Clearance based on energy efficient as well as well proven technology process.

TABLE 1: PROPOSED PLANT DETAILS WITH CAPACITY

S. No.	Product	Configuration	Capacity (in TPA
1	Sponge Iron	350 TPD X 2 Nos. and 200 TPD X 2 No. DRI Kilns	385,000
2	Iron Ore Beneficiation (throughput)	Beneficiation plant with 3429 TPD capacity	1200000
3	Iron Ore Pellet	Pellet plant with 3429 TPD capacity	1200000
4	Nugget/Briquet of Sponge Iron	Rotary Hearth Furnace with 600 TPD	210000
5	MS Ingot Billet (as intermediate/ semi-finished product)	25 MT X 6 Nos. Induction Furnace along with CCM	514500
6.	Rerolled Steel products	2 Electrically Operated Rolling Mill	800,000
	(a) Rolled steel product thru Hot charging	Direct Hot Charging facility with one No. Electrically Operated Rolling Mill	500,000
	(b) Rerolled steel product thru BRF	Coal Gasifier (total 15000 Nm^3) based Billet Reheating Furnace	300,000
7	Ferro Alloys - SiMn	Submerged Arc Furnace 12 MVA X 2 Nos	48,000
	And/or		And/or
	Ferro Alloys - FeMn		60,000
	And/or		And/or
	Ferro Alloys - FeSi		26,000
	And/or		And/or
	Pig Iron		96,000
8	GI Pipe	Pipe making with Galvanizing unit 2380 TPD	200,000
9	GI Wire	Wire drawing with Galvanizing unit 2380 TPD	200,000
10	WHRB based power	WHRB boiler 44 TPH X 2 Nos 20 TPH X 2 Nos; 4 Nos. of WHRB boiler with each of DRI Kiln connected to TG	32 MW
11	FBC based power	FBC based boiler 72 TPH connected to TG	18 MW
12	Fly Ash Brick/Blocks etc.	Fly Ash Brick/Block and other product making machine	72,700

1.2 LOCATION OF THE PROJECT

The proposed greenfield project located at Village - Deori and Ghulghul, Tahsil - Tilda District - Raipur (CG) Pin code – 493 221. The nearest city is Raipur. Nearest airport is Swami Vivekananda Airport, Raipur which is around 41.40 km at SSW direction. The project site can be reached from nearest town Tilda through a connecting road to Simga - Kharora Road, which is connected to National Highway No. 30. The project is well connected to all weather roads. Nearest Railway station Neora about 6.54 KM in W direction from the project site.

1.3 EIA-EMP REPORT

As per approved ToR obtained from EAC (Industry –I), MoEFCC, New Delhi, baseline environmental monitoring was conducted during **pre-monsoon season (1st March, 2025 – 31st May 2025)** 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 EIA-EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the EIA- EMP report.

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

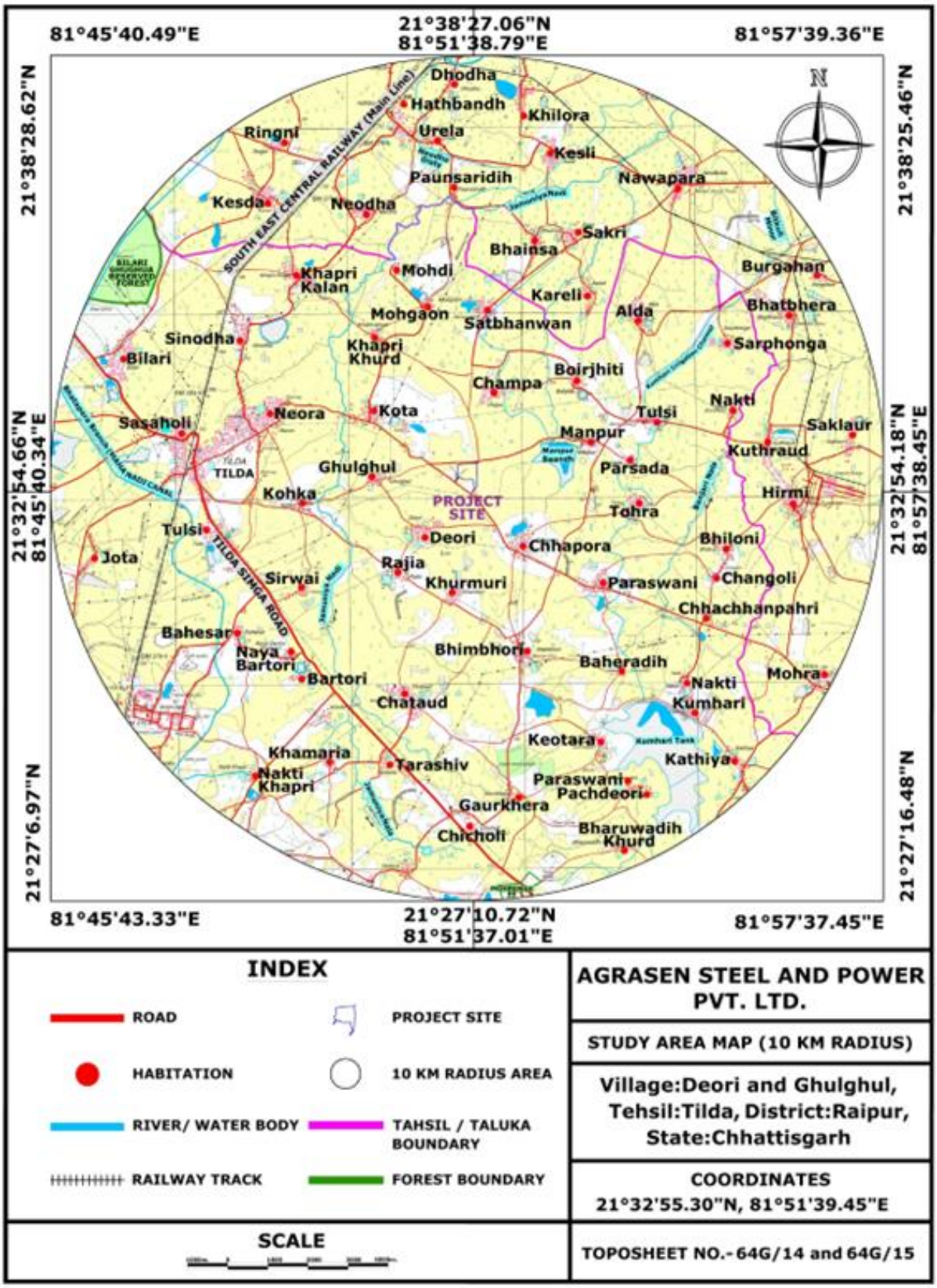

FIGURE 1 A: STUDY AREA (10 KM RADIAL DISTANCE)

TABLE 2: DETAILS OF ENVIRONMENTAL SETTINGS

<table>
<tr><th>Sl.</th><th>Particulars</th><th>Details</th></tr>
<tr><td>1.</td><td>Location</td><td>Village - Deori and Ghulghul, Tahsil- Tilda District - Raipur (Chhattisgarh) Pin Code – 493221</td></tr>
<tr><td>2.</td><td>Registered Office</td><td>4th Floor, Flat No. 402, Block-B, Harshit Jewels,
Tatibandh, Raipur (CG) 492001</td></tr>
<tr><td>3.</td><td>Geo coordinates</td><td>
<table>
<tr><th>PTS.</th><th>Latitude</th><th>Longitude</th><th>PTS.</th><th>LATITUDE</th><th>LONGITUDE</th></tr>
<tr><td>1</td><td>21°33'0.50"N</td><td>81°51'30.01"E</td><td>17</td><td>21°32'40.28"N</td><td>81°51'45.80"E</td></tr>
<tr><td>2</td><td>21°33'0.95"N</td><td>81°51'34.58"E</td><td>18</td><td>21°32'43.47"N</td><td>81°51'44.53"E</td></tr>
<tr><td>3</td><td>21°33'1.22"N</td><td>81°51'37.26"E</td><td>19</td><td>21°32'47.23"N</td><td>81°51'44.11"E</td></tr>
<tr><td>4</td><td>21°33'1.56"N</td><td>81°51'41.11"E</td><td>20</td><td>21°32'47.18"N</td><td>81°51'41.39"E</td></tr>
<tr><td>5</td><td>21°33'1.85"N</td><td>81°51'44.85"E</td><td>21</td><td>21°32'47.51"N</td><td>81°51'41.30"E</td></tr>
<tr><td>6</td><td>21°33'2.22"N</td><td>81°51'49.82"E</td><td>22</td><td>21°32'46.77"N</td><td>81°51'39.22"E</td></tr>
<tr><td>7</td><td>21°33'1.73"N</td><td>81°51'49.80"E</td><td>23</td><td>21°32'48.03"N</td><td>81°51'33.09"E</td></tr>
<tr><td>8</td><td>21°33'1.56"N</td><td>81°51'47.96"E</td><td>24</td><td>21°32'48.97"N</td><td>81°51'32.99"E</td></tr>
<tr><td>9</td><td>21°32'53.26"N</td><td>81°51'48.69"E</td><td>25</td><td>21°32'48.48"N</td><td>81°51'31.20"E</td></tr>
<tr><td>10</td><td>21°32'41.17"N</td><td>81°51'47.88"E</td><td>26</td><td>21°32'45.24"</td><td>81°51'27.98"E</td></tr>
<tr><td>11</td><td>21°32'38.56"N</td><td>81°51'46.82"E</td><td>27</td><td>21°32'45.57"N</td><td>81°51'27.62"E</td></tr>
<tr><td>12</td><td>21°32'38.30"N</td><td>81°51'46.00"E</td><td>28</td><td>21°32'50.19"N</td><td>81°51'30.68"E</td></tr>
<tr><td>13</td><td>21°32'35.58"N</td><td>81°51'44.23"E</td><td>29</td><td>21°32'50.19"N</td><td>81°51'29.21"E</td></tr>
<tr><td>14</td><td>21°32'36.08"N</td><td>81°51'43.18"E</td><td>30</td><td>21°32'52.76"N</td><td>81°51'28.47"E</td></tr>
<tr><td>15</td><td>21°32'38.78"N</td><td>81°51'44.76"E</td><td>31</td><td>21°32'52.86"N</td><td>81°51'29.51"E</td></tr>
<tr><td>16</td><td>21°32'38.74"N</td><td>81°51'45.03"E</td><td>32</td><td>21°32'54.35"N</td><td>81°51'30.41"E</td></tr>
</table>
</td></tr>
<tr><td>4.</td><td>Land Khasara Details</td><td>Kh,No. 443/8 at Village Deori, Kh.No. 648/2 and 648/3 at Village- Ghulghul- Tahsil- Tilda, District Raipur (CG)</td></tr>
<tr><td>5.</td><td>Location covered in Toposheet No</td><td>Toposheet No.: 64G/14 and 64G/15.</td></tr>
<tr><td>6.</td><td>Nearest representative IMD Station</td><td>IMD Raipur-42.30km/SW</td></tr>
<tr><td>7.</td><td>Site elevation above Mean Sea Level</td><td>303m to 325m</td></tr>
<tr><td>8.</td><td>Nearest roadway</td><td>1.Road connecting village Kota and village Chhapora - Adjoining/SW
2.Road connecting village Ghulghul and village Manpur - Adjoining/N
3.Tilda Simga Road - 5.35 km/SW
4.NH30 -16.45 km/W
5.NH200 -16.94 km/NW</td></tr>
<tr><td>9.</td><td>Nearest Railway Station</td><td>Tilda Neora Railway Station - 6.54 km/W
Baikunth Railway Station - 9.66 km/SW</td></tr>
<tr><td>10.</td><td>Nearest Air Port</td><td>Swami Vivekananda Airport, Raipur - 41.40 km/SSW</td></tr>
<tr><td>11.</td><td>Nearest village</td><td>Deori - 0.92 km/SW
Chhapora - 1.10 km/SE
Ghulghul - 1.45 km/W
Kota - 1.12 km/NW
Champa - 1.37 km/N</td></tr>
<tr><td>12.</td><td>Nearest Port</td><td>Gopalpur Port - 407.4 km/SE</td></tr>
<tr><td>13.</td><td>Distance from Sea Coast</td><td>Bay of Bengal - 407.40 km/SE</td></tr>
<tr><td>14.</td><td>Nearest major city with 2,00,000 population</td><td>Raipur</td></tr>
<tr><td>15.</td><td>Nearest State/ National Boundaries</td><td>Odisha - 88.42 km/SE</td></tr>
<tr><td>16.</td><td>Hills/Valleys</td><td>None within study area</td></tr>
<tr><td>17.</td><td>Ecologically sensitive zone</td><td>None within study area</td></tr>
<tr><td>18.</td><td>National Parks, Wildlife Sanctuaries,</td><td>None within study area</td></tr>
</table>

Sl.	Particulars	Details
	etc.	
19.	Nearest Reserved / Protected forests	Bilari Ghughua Reserved Forest - 8.61 km/NW
20.	Historical/Tourist places	

Sr. No.	Name	Distance (Km)	Direction
1	Children Garden/ Elephant Garden	9.15	SW

21. Nearest Industries

Sr. No.	Name	Distance (Km)	Direction
1	Krishnam Industry Pvt. Ltd.	0.01	NNE
2	Gravity Iron and Power Pvt. Ltd.	0.18	N
3	Vidyasri Rice Mills, Kota	1.21	WNW
4	Phoenix Phoultry Farm Tilda Unit, Champa	1.48	ENE
5	Vakrangee Solar Plant, Khudmudi	2.72	SE
6	Orchestrate Solar Plant	2.89	E
7	Tirupati Balaji Foods Pvt. Ltd., Kohka	4.24	WSW
8	Swastik Agro Industries, Kohka	4.78	WSW
9	Food Corporation of India, Tilda	4.90	W
10	Agrawal Oil Extractions Ltd, Neora, Tulsi	5.48	WSW
11	Chaitanya Solvex Pvt Ltd, Bahesar	5.48	WSW
12	Avinash Solar Plant	6.82	S
13	Century Cement Limestone Mine, Bahesar	7.33	SW
14	Sanjay Chemicals, Bartori	7.4	SW
15	Vyora Herbals Private Limited, Tilda	7.38	SW
16	Aditya Birla Renewables Pvt Ltd., Bahesar	7.64	SW
17	Ultratech Solar Power Plant, Hirmi	8.15	E
18	Ultratech Cement Limited, Hirmi Cement Works	8.23	E
19	Agrasen Rice Industries, Parsada	8.55	W
20	Ultratech Cement Limited, Baikunth Cement Works, Baikunth	9.03	SW
21	BlackRock Steel and Power Pvt. Ltd., Raikheda	9.72	SSW
22	APL Apollo Building Products Pvt Ltd, Kesda	9.78	NW
23	Adani Power Limited Raipur, Raikheda, Tilda	9.86	S
24	BPCL LPG Bottling Plant	9.84	SSW

22. Nearest Water Bodies

Sr. No.	Name	Distance (Km)	Direction
1	Manpur Baandh	1	E

<table>
<tr><th>Sl.</th><th>Particulars</th><th>Details</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>2</td><td>Jamuniya Nadi</td><td>2.6</td><td>W</td></tr>
<tr><td>3</td><td>Kumhari Irrigation Channel</td><td>3.56</td><td>E</td></tr>
<tr><td>4</td><td>Banjari Nala</td><td>5.16</td><td>SE</td></tr>
<tr><td>5</td><td>Bhatapara Branch (Mahanadi Canal)</td><td>6.51</td><td>W</td></tr>
<tr><td>6</td><td>Kumhari Tank</td><td>6.48</td><td>SE</td></tr>
<tr><td>7</td><td>Neoda Disty</td><td>7.26</td><td>N</td></tr>
</table>
</td></tr>
<tr><td>23.</td><td>Archaeological Sites</td><td>None within study area</td></tr>
<tr><td>24.</td><td>Religious Places</td><td>
<table>
<tr><th>Sr. No.</th><th>Name</th><th>Distance (Km)</th><th>Direction</th></tr>
<tr><td>1</td><td>Banjari Mata Mandir, Nakati</td><td>6.28</td><td>E</td></tr>
<tr><td>2</td><td>HCW Shri Ram Temple, Hirmi, Kuthraud</td><td>7.56</td><td>E</td></tr>
<tr><td>3</td><td>Rajim Lochan Mandir Khilora</td><td>9.09</td><td>NNE</td></tr>
<tr><td>4</td><td>Banjari Mata Mandir GSP</td><td>6.62</td><td>SSE</td></tr>
</table>
</td></tr>
<tr><td>25.</td><td>Hospitals and Education Institutions (Sensitive Manmade Landuse)</td><td>
HOSPITALS
<table>
<tr><th>Sr. No.</th><th>Name</th><th>Distance (Km)</th><th>Direction</th></tr>
<tr><td>1</td><td>Primary Health Sub Centre Deori</td><td>1.45</td><td>SW</td></tr>
<tr><td>2</td><td>Primary Health Sub Centre Champa</td><td>1.73</td><td>NNE</td></tr>
<tr><td>3</td><td>Jyoti Hospital, Tilda Newra</td><td>5.14</td><td>WSW</td></tr>
<tr><td>4</td><td>Khushi Hospital</td><td>5.75</td><td>W</td></tr>
<tr><td>5</td><td>Suna Hospital, Tilda Newra, Tilda</td><td>6.42</td><td>W</td></tr>
<tr><td>6</td><td>Evangelical Mission Hospital, Sasaholi, Tilda</td><td>7</td><td>W</td></tr>
<tr><td>7</td><td>Sub Health Centre, Hirmi</td><td>7.8</td><td>E</td></tr>
<tr><td>8</td><td>Up Swasthya Kendra Kathiya Hospital, Bharuwadih Kalan</td><td>9.83</td><td>SE</td></tr>
</table>
EDUCATIONAL INSTITUTIONS
<table>
<tr><th>Sr. No.</th><th>Name</th><th>Distance (Km)</th><th>Direction</th></tr>
<tr><td>1</td><td>Govt. Higher Secondary School Deori</td><td>1.17</td><td>SW</td></tr>
<tr><td>2</td><td>Primary School, Ghulghul</td><td>1.60</td><td>W</td></tr>
<tr><td>3</td><td>Primary School Champa, Tilda Newra</td><td>1.71</td><td>NNE</td></tr>
<tr><td>4</td><td>High School Satbhawa</td><td>3.27</td><td>N</td></tr>
<tr><td>5</td><td>Art & Science College Kohka</td><td>4.68</td><td>W</td></tr>
<tr><td>6</td><td>J. B. International School, Sirwe</td><td>4.61</td><td>SW</td></tr>
<tr><td>7</td><td>Satyanarayan Agrawal Art & Comm. College Kohka Tilda</td><td>4.5</td><td>W</td></tr>
<tr><td>8</td><td>Govt.H.S. School, Alda, Tilda</td><td>5.06</td><td>NE</td></tr>
<tr><td>9</td><td>Carmel Public School</td><td>5.93</td><td>W</td></tr>
<tr><td>10</td><td>Govt. HSS Khaprikala</td><td>6.51</td><td>NW</td></tr>
<tr><td>11</td><td>Govt. High School Tarashiv</td><td>7.35</td><td>SSW</td></tr>
<tr><td>12</td><td>The Aditya Birla Public School Baikunth</td><td>9.18</td><td>SW</td></tr>
<tr><td>13</td><td>Century Cement College, Baikunth Tilda Baikunth</td><td>9.19</td><td>SW</td></tr>
</table>
</td></tr>
<tr><td>26.</td><td>Community Places</td><td>Mahesh Sanskritik Bhawana, Neora - 4.92 km/WNW</td></tr>
<tr><td>27.</td><td>Seismic zone</td><td>Zone II (Least Active Zone) (Source: Indian Standard IS 1893 (Part 1): 2016)</td></tr>
<tr><td>28.</td><td>Area subject to environmental degradation, if any.</td><td>Nil
No CPA or SPA reported within 10 km study area.</td></tr>
</table>

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION

2.1.1 Manufacturing process of Sponge Iron (DRI)

Sponge iron is produced in a rotary kiln by reducing iron ore with coal and dolomite/limestone at 1000–1050°C. The kiln, slightly inclined and rotating at ~0.5 RPM, facilitates heat transfer, chemical reactions, and material movement. Air is injected to support combustion; CO_2 reacts with coal to form CO, the main reducing agent.

The product is cooled and magnetically separated. Waste gases are combusted, heat is recovered via WHRB, cleaned in ESP, and discharged through a stack under positive pressure.

Key Factors:

- **Reductant**: 0.45–0.50 MT carbon/ton Fe
- **Temperature**: 850°C (heating), 1000–1050°C (reduction)
- **Residence Time**: Controlled by kiln speed and feed rate

Proper tuning ensures efficient reduction with minimal emissions.

2.1.2 Manufacturing process of Iron Ore Beneficiation Plant

The iron ore beneficiation process involves crushing, screening, washing, grinding, followed by gravity separation, magnetic separation, and flotation techniques.

The final concentrate, with Fe content >63% and ~10% moisture, is filter pressed for dryness.

Water used in the process is recycled, while tailings (Fe <36.5%) are thickened, filter pressed, and stored within the plant premises.

No effluent is discharged during the process. Dust suppression systems minimize fugitive emissions in crushing and grinding zones, which are further controlled as the process is wet-based.

No hazardous chemicals are used. The final product quality includes Fe >63%, SiO_2 + Al_2O_3 at 4–5%, LOI at 3.5–4.5%, and ~10% moisture.

The plant is designed to produce 1.2 MTPA of iron ore concentrate.

2.1.3 Manufacturing process of Pellet Plant

Iron ore pellets are produced for steelmaking through five main stages:

1. **Pre-treatment**: Iron ore fines are ground (dry/wet) for pellet formation; additives like coal, lime, and bentonite are also ground.
2. **Mixing**: Ground materials are proportioned and mixed with water and binders.
3. **Balling**: Green pellets are formed using disc or drum pelletizers.
4. **Induration**: Pellets are fired at 1,250–1,350°C for strength via sintering and slag bonding.
5. **Screening**: Final pellets are screened for size and quality.

Additives include limestone, dolomite, coke, anthracite, and quartzite, tailored to enhance pellet quality.

2.1.4 Manufacturing process of Sponge Iron Nuggets thru Rotary Hearth Furnace (RHF)

The RHF process produces sponge iron nuggets or briquettes by reducing iron ore using a

carbonaceous reductant such as non-coking coal fines in a rotating, doughnut-shaped hearth furnace.

The process includes several temperature-zoned stages: (1) Raw material preparation, where iron ore (pellets/briquettes) is mixed with coal/coke fines and fed into the furnace; (2) Preheating zone, where the charge is gradually heated to remove moisture and volatiles; (3) Reduction zone, where iron ore is chemically reduced to metallic iron via reaction with carbon, producing CO gas; (4) Slag/metal separation, where at higher temperatures, impurities melt as slag and iron forms nuggets that separate due to density differences; and (5) Cooling and separation, where the final metallic product is cooled and recovered using techniques like magnetic separation to isolate sponge iron or nuggets from slag and residual material.

2.1.5 Manufacturing process of GI Pipe making with Galvanizing

The manufacturing of GI (Galvanized Iron) pipes begins with mild steel (MS) strips of required thickness, which are obtained in coils and then de-coiled and cut to specific dimensions. No thickness reduction is needed, so rolling mills or furnaces are not required. The strips are passed through forming sections to take a circular shape and are welded continuously using high-frequency electric current. The pipes then undergo sizing to correct dimensional variations and are cut to required lengths for dispatch.

The galvanizing process involves coating the pipes with zinc through hot-dip galvanizing. This includes several steps: (a) Degreasing—usually avoided due to clean in-house pipes, but provisioned when necessary; (b) Rinsing—pipes are washed with plain water to remove dust and mill scale; (c) Fluxing—pipes are dipped in ammonium zinc chloride solution; (d) Drying—fluxed pipes are dried on a platform; (e) Galvanizing—pipes are dipped in molten zinc at ~460°C to form a protective coating; (f) Water quenching—hot pipes are cooled in water post-galvanizing; and (g) Hydro-testing—pipes are checked for leakage before final dispatch. The zinc layer forms a protective, corrosion-resistant coating, making GI pipes ideal for applications requiring rust resistance.

2.1.6 Manufacturing process of GI Wire making with Galvanizing

The manufacturing of GI (Galvanized Iron) wire starts with wire drawing, where steel rods or bars are pointed, threaded through a die, and drawn using a motorized block, reducing their diameter and increasing their length. Fine wires are produced using multiple-block machines, as single-step reduction isn't sufficient.

The galvanizing process involves coating the wire with a zinc layer using hot-dip galvanization at ~460°C. This provides corrosion resistance through the formation of a protective zinc carbonate layer. The process involves several steps: (h) Degreasing—usually skipped due to clean in-house rods, but available when needed; (i) Rinsing—to remove dust and scale; (j) Fluxing—dipping in ammonium zinc chloride solution; (k) Drying—fluxed wires are dried before dipping; (l) Galvanizing—wires are immersed in molten zinc; (m) Water quenching—to cool and stabilize the coating. After cooling, the GI wires are ready for dispatch, offering strong rust resistance and durability.

2.1.7 Manufacturing process of Steel Melting Shop with CCM and Hot Charging Rolling Mill Induction Furnaces:

The manufacturing process begins in the Steel Melting Shop (SMS), where Induction Furnaces (IFs) of 6.5–7.5 MVA capacity with automatic charging and electronic monitoring systems are used.

Raw materials like sponge iron, pig iron, iron powder, MS scrap, and alloying elements (e.g., Ferro Manganese, Ferro Silicon) are chemically tested and charged into the crucible. Using high-frequency AC current, the charge is melted by induction heating up to 1600–1650°C. The homogeneous molten metal is hydraulically poured into a ladle.

Post melting, Ladle Refining Furnace (LRF) is used for quality refining processes like desulphurization and dephosphorization, with 3-electrode arc facilities. After refinement, the ladle is transferred to the Continuous Casting Machine (CCM).

In the CCM, liquid steel is cast into billets while maintaining a temperature above 1050°C to enable hot charging. Billets are cut to size using hot shearing machines and directly conveyed (without cooling) to the Rolling Mill or Wire Rod Mill.

In the Rolling Mill, hot billets pass through roughing, intermediate, and finishing stands. If wire rods are to be produced, billets are further processed in the Block Mill and then into coilers or bending machines. Finally, the cooled wire rods are dispatched to the market by truck. Slag generated during melting and refining is either removed manually or poured into slag pots, and often reused for landfilling.

2.1.8 Manufacturing process of Rolling Mill (BRF with Coal Gassifier)

The rolling mill process using Billet Reheating Furnace (BRF) with a Coal Gasifier starts with cold billets that are first cut to size using gas cutting.

The sized billets are then pushed into the reheating furnace, which is fired using coal-based producer gas from the gasifier.

Once the billets are red hot, they are transferred to a series of rolling stands, where they are re-rolled into finished products such as MS channels, structural steel sections, and other rerolled items, as per required shapes and sizes.

2.1.9 Manufacturing process of Ferro Alloys Plant

The Ferro Alloys Plant primarily produces High Carbon Ferro Manganese and Silico Manganese using Submerged Arc Electric Furnaces operating at temperatures of 1600–1700°C. The furnace contains three carbon electrodes, hydraulically adjusted, and is lined with firebricks, silicon carbide, and carbon tamping paste. Raw materials are thoroughly mixed and charged into the furnace. As smelting occurs, the heavier molten alloy settles at the bottom, while the lighter slag floats on top. Tapping is done periodically using oxygen lancing, and the molten metal is collected in cast iron (C.I.) pans. Slag overflows into sand moulds, and after cooling, the alloy cake is broken manually into lumps, while the slag is dumped after ensuring it's metal-free.

Additionally, Pig Iron production is proposed as an optional future product using the same Submerged Arc Furnace setup, replacing alloy oxide minerals with iron ore or magnetite ore. The hot metal (liquid iron) produced could be fed directly to induction furnaces, reducing overall power consumption significantly—less than half compared to Ferro Alloys production. This alternative has been considered primarily for environmental impact assessment and energy efficiency planning.

2.1.10 WHRB based Power Generation

In the WHRB (Waste Heat Recovery Boiler)-based power generation system, waste heat from DRI Kilns is utilized as the energy source. The flue gases emitted from the DRI kilns, which contain significant heat energy, are directed through the Waste Heat Recovery Boilers.

These boilers capture the heat to generate steam at the required temperature and pressure. This

steam can then be used for power generation, effectively utilizing waste energy and enhancing overall energy efficiency without additional fuel consumption.

2.1.11 AFBC Based Power Generation

The AFBC (Atmospheric Fluidized Bed Combustion) boiler system generates power by efficiently burning fuel in a fluidized bed, and recovering heat through a structured pressure part arrangement. The boiler includes key components such as water walls, bed coils, superheater, economizer, steam drum, risers, and downcomers. Flue gas heat is first used to heat feedwater in the economizer, and then steam is separated from water in the steam drum, with moisture removed before entering the superheater, which raises the steam temperature to 510 ± 5°C. A de-superheater maintains steam temperature by water spray.

In the multi-tubular air preheater, outgoing flue gases heat the incoming air. This preheated air, supplied by forced draft (FD) fans, is distributed through air distributor nozzles to keep the bed fluidized. Part of this air is pressurized by primary air (PA) fans to carry fuel into the combustion chamber.

The firing system uses a distributor plate with nozzles to evenly distribute air across the bed. Bed coils immersed in the combustion bed absorb heat to maintain optimal bed temperatures of 850–900°C, ensuring complete combustion.

The draft system consists of ID (Induced Draft), FD, and PA fans, each 100% rated. It maintains a balanced draft with slightly negative furnace pressure using an automated control system, adjusting FD fan flow based on fuel input for stable combustion and efficient power generation.

2.1.12 Process of brick making from waste

In the fly ash brick manufacturing process, raw materials such as fly ash, lime, ground slag (from induction furnace), gypsum or cement, and optionally river sand, are manually fed into a pan mixer. Water is added in the required proportion for thorough mixing. The prepared mortar mixture is then transferred to hydraulic or mechanical presses for brick molding. Molded bricks are placed on wooden pallets and moved to an open area for drying and curing, typically using an autoclave machine. Finally, the cured bricks are tested, sorted, and dispatched for use.

2.2 LAND REQUIREMENT

The proposed project will be established on a total land area of 25.958 hectares. Out of this, 17.173 hectares (66.17%) of government land has already been allotted to the company, and the registered deed has been executed in the company's name. The remaining 8.785 hectares (33.83%) of government land is under the application process and is expected to be allotted shortly. The project site is located at Kh. No. 443/8 in Village Deori and Kh. Nos. 648/2 and 648/3 in Village Ghulghul, under Tahsil Tilda, District Raipur, Chhattisgarh – 493221.

The detail of land use planning in the project area is provided as follows:

TABLE 3: AREA STATEMENT

Land Use		Area (In Ha.)	In %
Built Up Area		9.416	36.27%
Main Shed and Building	6.819		
Storage	2.597		
Road and Paved including Parking		2.505	9.65%
Road and Paved	2.23		

Land Use		Area (In Ha.)	In %
Parking	0.28		
Green Belt area		8.798	33.89%
Open Area including Reservoir		5.239	20.18%
Reservoir	2.163		
Open area	3.075		
Total		**25.958**	**100%**

2.3 RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

The raw materials are abundantly available within a radius of 50 to 500 km from the project site. Fuel requirements will primarily be met from local sources and transported to the site using covered trucks.

2.3.1 Solid and Hazardous waste generation

The total estimated solid waste generation will be 1,091,526 TPA and 3 KLA Haz. Waste in the form of oil/ spent oil. Tailing will be sold to cement plants, while char/dolochar generated from the process will be utilized as raw material in the in-house captive power plant. Slag from the induction furnace will either be sent for metal recovery (internally or externally) or, if used internally, the grounded slag will be used in manufacturing bricks. FeMn slag from Submerged Arc Furnace (SAF) will be reused for making Silico Manganese, while other slag will be used for road construction and landfilling. Refractory waste like silica lining will be sold to authorized refractory recycling units.

Wastewater from the reverse osmosis system will be utilized for slag quenching and dust suppression. Mill scale will be sold to other ferroalloy or pellet plants as raw material. Fly ash and coal ash generated will be consumed in the in-house fly ash brick/block manufacturing unit or sold to cement plants. Grounded induction furnace slag will also be used in the fly ash brick/block unit. Defective billets, miss rolls, and end cuttings will either be reused in the induction furnace or sold.

Used oil and waste oil will be handed over to authorized recyclers. Lead-acid and dry batteries will be disposed of through authorized recyclers. E-waste will be sent to authorized recyclers as per regulations.

Domestic sewage from toilets will be treated in a septic tank followed by a sewage treatment plant, and the treated water will be reused for greenbelt irrigation and dust suppression. Plastic waste will be collected and sold to plastic recyclers. Domestic waste will be composted on-site and used in the greenbelt. No other solid or liquid waste is expected to be generated from the facility.

2.4 WATER REQUIREMENT & SOURCE

The total yearly water requirement for the proposed project is estimated to be 4,451 KLD, amounting to 1,557,850 KLA over 350 operational days. Out of this, 4,026 KLD will be sourced as fresh water from the nearest surface water body. An application for withdrawal of surface water has been submitted to the Water Resources Department (WRD) under Application No. WA00520 dated 04-07-2024. To reduce dependency on surface water, the management proposes to construct a rainwater harvesting tank with a capacity of 50,000 KL. This tank will collect rainwater during the monsoon season, which typically spans about 75 days. The collected rainwater will suffice for water demand during these 75 days and an additional 11 days afterward, totaling 86 days or approximately 383,825 KL. Therefore, the net fresh water requirement from surface water sources is reduced to 1,174,025 KLA. However, permission is being sought for the gross requirement of 1,557,850 KLA to ensure adequacy.

2.5 POWER REQUIREMENT & SUPPLY

The proposed project is power-intensive, with a total power requirement of 141 MW. Out of this, 50 MW will be generated through the in-house captive power plant, while the remaining 91 MW will be sourced from the State Grid (CSPDCL). Additionally, emergency DG sets with a combined capacity of 3,300 KVA are proposed to ensure uninterrupted supply to critical systems such as water, air, lighting, and other essential services. The state of Chhattisgarh is power-surplus and stable; hence, DG sets are intended solely for emergency backup purposes

2.6 MANPOWER REQUIREMENT

The total manpower required for the proposed project is estimated to be 2,700 personnel, which includes 150 administrative staff and 2,550 production staff. Preference will be given to local people, depending upon their qualification and skill.

2.7 FIRE FIGHTING FACILITIES

In order to combat any occurrence of fire in plant premises, a central firefighting facility is proposed which will have access to various units of the plant. In addition to this, 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.

2.8 PROJECT COST

The project cost is **Rs. 1050 Crores** (excluding CER budget). Estimated CER expenses Rs. 15.77 Crores.

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 (1st March, 2025 – 31st May 2025).**

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated at Site (1st March, 2025 – 31st May 2025)

Predominant Wind Direction	1st March, 2025 – 31st May, 2025
First Predominant Wind Direction	W (13.13%)
Second Predominant Wind Direction	WSW (12.55%)
Calm conditions (%)	1.22
Avg. Wind Speed (m/s)	2.55

The status of ambient air quality within the study area was monitored for Pre-Monsoon Season of the year 2025 at 8 locations covering project site. 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 RESULTS

(PERIOD – 1st March, 2025 – 31st May 2025)

Sr. No.	Location		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	Ozone µg/m³	NH_3 µg/m³
1.	Project Site	Min	56.6	23.1	9.7	14.4	0.255	7.2	5.9
		Max	72.5	30.9	15.7	20.9	0.386	12.9	10.1
		Avg	65.2	26.6	12.4	17.2	0.318	10.1	7.9
		98th	72.4	30.6	15.2	20.5	0.377	12.8	10.0
2.	Deori	Min	53.6	20.7	9.3	13.2	0.198	6.9	5.2
		Max	72.6	28.6	13.5	18.4	0.427	12.4	9.6
		Avg	63.3	24.7	11.2	16.3	0.285	9.4	7.2
		98th	71.8	28.5	13.2	18.4	0.421	12.4	9.1
3.	Ghulghul	Min	53.6	20.2	8.5	11.7	0.222	6.2	5.3
		Max	68.4	27.6	12.9	18.4	0.291	11.1	8.3
		Avg	62.7	23.9	10.3	14.8	0.257	8.7	6.7
		98th	68.3	27.2	12.6	18.0	0.286	11.0	8.3
4.	Sirwai	Min	64.9	27.2	13.4	18.3	0.351	10.7	8.4
		Max	83.3	41.2	17.5	25.3	0.753	15.1	11.8
		Avg	74.3	34.0	15.4	21.5	0.512	13.2	10.2
		98th	82.8	40.7	17.5	25.0	0.743	15.0	11.8
5.	Parsada	Min	61.7	26.5	12.2	15.6	0.373	8.7	6.7
		Max	80.4	38.6	17.1	23.6	0.561	14.6	12.7
		Avg	71.6	31.5	14.3	19.9	0.456	12.1	9.7
		98th	79.8	37.5	16.5	23.1	0.541	14.4	12.3
6.	Boirjhiti	Min	56.8	20.1	11.2	15.1	0.293	8.9	6.6
		Max	75.4	33.7	15.3	22.2	0.439	12.8	9.9
		Avg	67.7	28.5	13.7	18.4	0.358	10.7	8.5
		98th	74.9	33.2	15.3	21.7	0.423	12.7	9.8
7.	Champa	Min	61.4	22.5	10.5	14.6	0.326	7.8	6.6
		Max	74.7	38.6	14.7	20.3	0.441	12.4	9.8
		Avg	69.5	29.5	12.8	17.0	0.374	10.1	8.1
		98th	74.7	37.0	14.6	19.9	0.437	12.0	9.6
8.	Khurmuri	Min	58.1	22.4	9.7	15.7	0.341	9.1	7.3
		Max	73.4	31.5	14.3	21.7	0.514	13.3	12.4
		Avg	66.3	27.2	11.7	18.2	0.417	11.2	9.3
		98th	72.9	31.2	13.9	21.1	0.495	13.1	11.8
CPCB Standards			**100 (24hr)**	**60 (24hr)**	**80 (24hr)**	**80 (24hr)**	**2 (8hrs)**	**100 (8hr)**	**400 (24hr)**

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: AVERAGE NOISE LEVELS IN THE STUDY AREA

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq_{Day}	Leq_{Night}
Residential Area			
1	Deori	52.4	41.8
2	Ghulghul	53.1	42.5
3	Chhapora	51.7	43.2
CPCB Standards dB(A)		**55.0**	**45.0**
Commercial Area			
4	Kota	61.3	52.1
5	Manpur	62.8	53.6
CPCB Standards dB(A)		**65.0**	**55.0**
Silence Zone			
6	Primary School Champa	45.8	38.2
7	Parsada	46.2	37.5
CPCB Standards dB(A)		**50.0**	**40.0**
Industrial Area			
8	Project Site	54.7	46.4
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 Geology, Geomorphology & Hydrogeology

The study area falls under the Raipur Group of the Chhattisgarh Supergroup, primarily consisting of stromatolitic dolomitic limestone from the Chandi Formation, along with occasional laterite occurrences. Geomorphologically, it features gently undulating pediplains with a general northeast slope and includes features like pediplains, pediments, lateritic uplands, valley fills, and water bodies. Hydrogeologically, groundwater occurs mainly in weathered, fractured, and cavernous limestone and dolomite formations, under semi-confined and confined conditions. Pre-monsoon water depth ranges from 4 to 18.54 mbgl, while post-monsoon depths range from 3 to 6 mbgl, with groundwater yields of up to 5 lps. The area is categorized as "Safe" by CGWA for groundwater extraction.

3.4.2 Water Quality

Groundwater and surface water quality was assessed by identifying 8 groundwater (Borewell/ handpump) locations in different villages and 5 surface water samples.

A. Groundwater Quality

The analysis of groundwater samples revealed that the pH values ranged from 7.27 to 7.82, falling well within the acceptable range of 6.5 to 8.5. Electrical Conductivity (EC) values varied between 532.23 and 716.88 µs/cm, indicating low to moderate mineralization. Total Dissolved Solids (TDS) were recorded between 339 and 412 mg/l, significantly below the permissible limit of 2000 mg/l. Total hardness ranged from 197.84 to 292.48 mg/l, well within the acceptable limit of 600 mg/l.

Chloride concentrations ranged from 117.56 to 165.33 mg/l, and sulphate levels varied between 13.54 and 34.25 mg/l, both within their respective permissible limits. Nitrate concentrations were found in the range of 2.97 to 8.50 mg/l, much lower than the standard limit of 45 mg/l. Fluoride levels ranged from 0.16 to 0.41 mg/l, within the safe limit of 1.5 mg/l. Iron concentrations varied between 0.11 and 0.26 mg/l, below the acceptable limit of 1.0 mg/l. Heavy metals such as cadmium, arsenic, lead, and chromium were all below their respective limits of quantification (LOQ), adhering to the non-relaxable limits set by IS 10500. Zinc levels ranged between 0.13 and 0.21 mg/l, well within the permissible limit of 15 mg/l.

B. Surface Water Quality

The pH ranged from 7.29 to 7.85, staying well within the acceptable range of 6.0 to 9.0. Electrical Conductivity (EC) varied between 369.72 and 682.88 µs/cm, although no specific standard is prescribed under IS 2296:1992. Total Dissolved Solids (TDS) were found between 234 and 388 mg/l, much lower than the limit of 1500 mg/l. Total hardness ranged from 135.41 to 282.03 mg/l, remaining within acceptable levels. Dissolved Oxygen (DO) levels were between 5.5 and 6.7 mg/l, exceeding the required minimum of 4.0 mg/l. Biochemical Oxygen Demand (BOD) varied from 2.18 to 3.16 mg/l, mostly staying under the 3.0 mg/l permissible limit. Chemical Oxygen Demand (COD) was recorded between 12.74 and 21.18 mg/l, though no specific standard is provided. Chloride and sulphate levels were well below their respective limits, ranging from 104.61 to 173.21 mg/l and 4.44 to 25.17 mg/l, respectively. Nitrate was between 3.14 and 4.67 mg/l, significantly lower than the 50 mg/l limit, while fluoride content ranged from 0.16 to 0.36 mg/l, within the limit of 1.5 mg/l. Iron levels were recorded between 0.15 and 0.35 mg/l, below the permissible 0.5 mg/l limit. Toxic elements like cadmium, arsenic, zinc, lead, and chromium were all below the limit of quantification, indicating very low or non-detectable concentrations and well within permissible limits. Lastly, total coliform bacteria ranged from 58 to 120 MPN/100 ml, significantly below the limit of 5000 MPN/100 ml, indicating acceptable microbiological quality.

C. Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. All surface water samples were found to be bacteriologically contaminated. Presence of total coliforms in surface water indicates that a contamination pathway exists between any source of bacteria (septic system, animal waste, etc.) and the surface water stream. A defective well can often be the cause when coliform bacteria are found in well water. For surface water, treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose. Groundwater samples were not found to be 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 1st May 2024 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 21°27'7.40"N to 21°38'26.64"N latitude and 81°45'30.36"E to 81°57'39.91"E longitude and elevation 280 to 311 meters 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 : LU/LC CLASSIFICATION SYSTEM

LU/LC Classification System				
Sr. No.	**Level-I**	**Level-II**	**Area (Sq. Km²)**	**Percentage (%)**
1	Built-up land	Settlement	8.67	2.51
		Industrial Settlement	2.14	0.61
		Road Infrastructure	1.59	0.46
		Railway Line	0.9	0.26
2	Agricultural Land/ Crop Land	Single Crop	193.68	56.08
		Double Crop	63.32	18.33
3	Forest Area	Reserved Forest	2.53	0.73
		Open Jungle	1.12	0.32
4	Scrubs/Wastelands	Open Scrub	52.6	15.23
		Wasteland	8.72	2.52
5	Waterbodies	River/Nala/Stream/Canal	3.51	1.01
		Dam/Pond/Lake/Tank	6.32	1.83
6	Mines Area	Limestone Mines	0.21	0.06
Total			**345.31**	**100**

SOIL QUALITY

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

A. Physico-Chemical Characteristics

The physico-chemical analysis of the soil samples collected from the study area indicates that the pH ranged from 7.37 to 7.89, reflecting a slightly alkaline nature. The electrical conductivity (EC) varied between 160.90 and 209.20 µs/cm, indicating low salinity. The infiltration rate ranged from 22.31 to 28.09 mm/hr, suggesting good permeability of the soil. Bulk density values were recorded between 1.58 and 1.80 g/cm³, indicating moderately compact soils. The water holding capacity ranged between 31.98% and 50.84%, which is considered favorable for plant growth. Organic carbon content in the soil varied from 0.74% to 1.09%, indicating moderate to good fertility status.

B. Nutrient Status

Organic matter and organic carbon present in the soil play a crucial role in maintaining physical and chemical properties and contribute to soil structure stability. The macro-nutrient analysis shows that nitrogen content in the soil ranged from 209.63 to 411.67 kg/hectare, phosphorus ranged from 35.21 to 61.97 kg/hectare, and potassium varied between 317.88 and 477.37 kg/hectare. These values indicate a moderate to good fertility status of the soil.

C. Heavy Metal (Micronutrient) Content in Soil

Among the micro-nutrients, iron content ranged from 2.989 to 5.527 mg/kg, manganese from 3.518 to 13.472 mg/kg, zinc from 0.476 to 0.933 mg/kg, and copper ranged between 1.318 and 2.769 mg/kg. Nickel, cadmium, and lead were found to be absent in the analyzed soil samples, indicating no significant contamination from these heavy metals.

3.6 BIOLOGICAL ENVIRONMENT

A total of 146 plant species were recorded within the study area, comprising 59 tree species, 30 shrubs, 14 herbs, 23 bamboo and grasses, 18 climbers/twiners, and 2 species each of parasites and epiphytes. According to the IUCN Red List 2025-1, *Tectona grandis* (Teak) is categorized as Endangered (EN), *Aegle marmelos* (Bel) as Near Threatened (NT), 85 species as Least Concern (LC), 2 as Data Deficient (DD), and 57 species are Not Evaluated (NE). No endemic plant species were reported from the region.

Additionally, 85 faunal species were recorded through primary and secondary data sources. As per the IUCN Red List 2025-1, all observed faunal species fall under the Least Concern category. However, under the Indian Wildlife Protection Act, 1972 (as amended in 2022 and enforced from April 2023), certain species are protected under different schedules. Among mammals, species like the Jackal, Common Mongoose, and Indian Fox are listed under Schedule I, while Rhesus Macaque, Wild Boar, Black-Naped Hare, and Common Langur are listed under Schedule II. Palm squirrels, fruit bats, and rats are not included in the protection schedules. Among reptiles and amphibians, Indian Cobra, Indian Python, and Common Rat Snake are protected under Schedule I, while Common Indian Krait and Indian Toad fall under Schedule II. All bird species observed in the study area are protected under Schedule II of the amended Act.

A detailed wildlife conservation and management plan is prepared for the conservation on Schedule-I species with budgetary provision and enclosed with EIA Report.

3.7 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 6** to **Table 8** respectively.

TABLE 6: SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN STUDY AREA

Zones	Total household	Total Population	Total Male	Total Female	Total 0-6 child	Total SC	Total ST	Population Literate	Population Illiterate	PREDICTED POPULATION DETAILS IN STUDY AREA (2021)		
										Total Population	Total Male	Total Female
0-2 km	1431	6659	3399	3260	913	1349	146	4529	2130	7685	3923	3762
2-5km	3778	18489	9144	9345	2541	3000	1295	12150	6339	17876	9085	8791
5-10km	14115	66726	33389	33337	9801	15188	4677	42264	24462	84249	42158	42091
10 km	19324	91874	45932	45942	13255	19537	6118	58943	32931	109810	55166	54644
In %	4.75		49.99	50.01	14.43	21.26	6.66	64.16	35.84		50.24	49.76

TABLE 7: EMPLOYMENT & MAIN EMPLOYMENT PATTERN IN THE STUDY AREA

Zones	Breakup of Total Employment		Breakup of total Workers		Breakup of total Main Worker			
	Total Workers	Total Non-Workers	Total Marginal Workers	Total main Workers	Cultivators	Agricultural workers	Household industry workers	Main other workers
2001	28043	37592	7473	20570	8959	5579	212	5820
2011	41665	50209	12138	29527	7915	13024	304	8284
2021	62,736	67,846	19,726	42,764	6,966	29,011	425	11,935

TABLE 8: INFRASTRUCTURE FACILITIES AVAILABLE IN THE STUDY AREA

Infrastructure facilities	Educational Facilities	Drinking water	Road	Power	Communication	Transportation	Govt. PHC & SC	Bank & Society	Drainage	Recreation
Availability (In percentage) As per year 2011, Census Dist. Raipur Chhattisgarh	**100**	**100**	**67.44**	**100**	**95.35**	**88.37**	**45**	**28.39**	**46.74**	**93.02**

Source: Primary census abstract 2011, State Chhattisgarh.

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

The proposed project site is in amid several moderately populated rural settlements, including Deori, Chhapora, Ghulghul, Kota, and Champa, each located within 1.5 km of the project boundary. This cluster of villages highlights an active socio-economic environment dominated by agriculture and local employment, with families primarily relying on paddy cultivation, supported by favourable monsoon conditions and irrigation. Additional crop diversity—such as wheat, bajra, maize, and a range of vegetables—reflects an adaptable farming community. Alongside agriculture, the presence of industries within a 10 km radius has not only diversified the local employment base, providing opportunities for both skilled and unskilled labour, but also fostered a transition in livelihoods towards manufacturing, trade, and commerce.

Infrastructure and public services in the area present a mixed scenario. Many villages face challenges in water supply, sanitation, and healthcare—PHCs are present but often lack staff and functional resources. Roads are typically poorly maintained, with unreliable public transport causing dependence on private vehicles, and electricity supply is sporadic with a lack of street lighting. Meanwhile, schools face deficiencies in basic infrastructure, and banking facilities are sparse, limiting financial inclusion. The anticipated integrated steel plant is expected to create around 2,700 jobs, opening significant opportunities for local and migrant labor, but also emphasizing the need for skill training and environmental safeguards to preserve agricultural productivity and community well-being.

The report underscores that the area's economic and social fabric is closely tied to its agricultural traditions yet is evolving due to industrial and commercial growth. While this shift promises greater resilience and improved standards of living, it also calls for sustained efforts in environmental management, targeted development of health, education, and sanitation infrastructure, skill development initiatives for local youth, and inclusive involvement of the affected communities in the project's planning and implementation.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 AIR ENVIRONMENT

The mathematical Model AERMOD was used for predicting the GLCs, which is entirely in line with the requirement of Central Pollution Control Board, New Delhi. In 1991, the U.S. Environmental Protection Agency (EPA) in conjunction with the American Meteorological Society (AMS) formed the AERMOD. AERMOD is a steady-state plume model aimed at short-range (up to 50 km) dispersion from stationary industrial-type sources.

The impact of a source or group of sources on air quality is evaluated using mathematical models. The widely accepted interpretation models simulate the relationships between air pollutant emissions and its impact on air quality. For the present study, this model is used for the prediction of maximum ground level concentrations.

The maximum ground level concentrations (GLCs) for particulate matter (PM_{10} & $PM_{2.5}$) and gaseous concentration SO_2, NOx due to proposed condition were carried out. The predicted resultant concentrations of above parameters are as follows:

TABLE 8: RESULTANT CONCENTRATIONS DUE TO PROPOSED PROJECT

Pollutant	Baseline Concentration at Project Site (µg/m³)	Incremental Concentration (µg/m³)	Resultant Concentration (µg/m³)	NAAQ Standards (µg/m³)
PM_{10}	72.5	4.98	77.48	100
$PM_{2.5}$	30.9	1.68	32.58	60
SO_2	15.7	8.07	23.77	80
NO_x	20.9	10.08	30.98	80

TABLE 9: DETAILS OF AIR POLLUTION CONTROL SYSTEM/ MITIGATION MEASURES

S. No.	Facilities	Air Pollution Control equipment	Emission Level
1	DRI Kiln with WHRB's	Dust extraction system, Electro Static Precipitators (ESP) - 4 Nos. (with 4 field) with two Chimney Bag Filters for Product house; Kiln discharge end and transfer points.	PM <30 mg/Nm³
2	Iron Ore beneficiation	2 Sets of Bag Filter with Chimney	PM <30 mg/Nm³
3	Iron Ore Pellet Plant	Electro Static Precipitators (ESP) with a Chimney	PM <30 mg/Nm³
4	Rotary Hearth Furnace	Dust extraction system, Electro Static Precipitators (ESP) - 1 Nos. (with 4 field) with two Chimney Dust Cyclone with Producer Gas Plant connected to common Stack of RHF	PM <30 mg/Nm³
5	Steel Melting Shop with hot charging rolling mill	Movable suction hood along with Bag Filters with a chimney	PM <30 mg/Nm³
6	Reheating Furnace	Wet Scrubber with a chimney	PM <30 mg/Nm³
7	Pipe Galvanizing unit	Fume Extraction system with Wet Scrubbers	PM - 30 mg/Nm³
8	Wire Galvanizing unit	Fume Extraction system with Wet Scrubbers	PM - 30 mg/Nm³
9	Submerged Arc Furnace	Bag Filters	PM <30 mg/Nm³
10	AFBC Boiler	Electro Static Precipitators (ESP) with a Chimney and Bag Filters at Coal conveyors	PM <30 mg/Nm³
		Lime Dosing	SOx <100 mg/Nm³
		Low NOx burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided	NOx <100 mg/Nm³

Additional Measures to reduce/control pollution control

- Dust Suppression System will be installed within plant premises along internal roads.
- Water sprinkling will be carried out at approach road.
- Most of the materials will be stored under covered shed.
- In case of storage of Sponge Iron/ Carbon Powder; Coal in open, it will be covered by tarpaulins to prevent spread of dust from it during transportation.
- Regular maintenance of vehicles and machineries will be carried out in order to control emissions.
- Green belt development would be taken up all along the roads, plant premises etc.
- Green belt will also be developed on the sides of approach road.

- Protective appliances will be provided to all the workers exposed in dusty atmosphere.
- Avoiding overloading of the trucks.
- Workers will be equipped with all personal protective devices like Gum Boot; hand gloves; Safety helmet; Safety goggles, earplugs at work place.
- By controlling the speed of the truck.
- Proper gradient of approach roads to reduce cumulative noise.
- Transportation of materials will be in covered truck and limited to day hours.
- Periodical maintenance of process machinery.

4.2 NOISE ENVIRONMENT

During the normal operation of manufacturing process noise will be generated due to operational activities of 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.
- Most of the equipment's will be placed in closed room.
- Equipment's will be placed on acoustic floor to reduce vibration and noise.
- High noise zone will be marked, and earplugs will be provided to the workmen near high noise producing equipment.
- Use of PPE's awareness program will be provided to all workers.
- Proper shifting arrangement will be made to prevent over exposure to noise and vibration.
- Tall trees with heavy foliage will be planted along the boundary / project site / plantation area, which will act as a natural barrier to propagating noise.
- Silent DG sets will be used site.
- Speed limits will be enforced on vehicle.
- Regular noise & vibration monitoring will be carried for all equipment's to check compliance with prevailing rules.

Vehicular Movement

The LoS value from the proposed activity on – Approach Road, Tilda Simga Road and and Raipur Bilaspur Road will be **"C (0.4 to 0.6)" i.e. Good/ Average/ Fair**. The inclusion of additional vehicle carrying raw material and finished products to the existing traffic will not having much change in the traffic.

So, the additional load of (1292 trips/day) will be added on the carrying capacity of the concerned road. Hence it is concluded that it is not likely to have any significant adverse effect.

4.3 WATER ENVIRONMENT

The proposed implementation of the project 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. It is proposed that no effluent will be discharged outside the plant.

The various control measures that will be adopted are:

- Closed circuit cooling system will be adopted. Industrial waste water (407 KLD) will be treated in ETP (Cap. 450 KLD).
- Industry will get 390 KLD ETP Treated water out of this 385 KLD will be used in process as recycle water and rest 5 KLD will be used for dust suppression within plant premises.
- Domestic waste water (110 KLD) will be treated in STP (total 150 KLD). 102 KLD STP treated water will be generated & 40 KLD treated water used for flushing & Urinal as gray water and rest 62 KLD treated water used for plantation. Thus total 62 + 131 = 193 KLD water will be used for greenbelt development.
- Rain water harvesting will be carried out.
- All stock piles will be on pucca flooring to prevent for any ground water contamination.

4.4 BIOLOGICAL ENVIRONMENT

Ecology & Biodiversity: Aspect - Impact identification and mitigation measures suggestion for proposed Greenfield project.

Sl.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
1.	Transportation, unloading & storage of Material and Movement of vehicle inside plant, Dust and sound generation due to proposed activities	Impact on human habitation (Deori - 0.92 km/SW, Chhapora-1.10 km/SE, Ghulghul-1.45 km/W, 12km/NW, Champa-1.37km/N) in a scale of 3 out of 5 due to proposed project activity.	20 M thick greenbelt will be developed towards east as well as west direction from the project site.
2.	Gaseous emission from Stack, Movement of vehicle inside plant and Raw material & finished product transportation, Product manufacturing	Decline in photosynthetic activities, Stomatal index may be minimized, Crop yield will be reduced in absence of site-specific mitigation measures	Air quality modelling outputs study revealed that, the resultant concentrations of particulate matter, sulphur di-oxide and oxides of nitrogen are well within the prescribed limits. The impact due to proposed project would be minimal as project activity will be carried out within the plant boundary limit with proper control measures. Greenbelt area of 8.798 Ha. (33.89%) will be proposed for project with local species with broad leaves and higher canopy and fast-growing tree species. Total plants are 21,995 nos. are proposed. Indigenous

Sl.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
			species for plantation is recommended. **Control Measures to avoid impacts on agriculture crops** • Periodic maintenance of transport road in collaboration with PWD • Regular sprinkling of water through mobile tankers on raw material and finished product transportation road. • Covered Transport system • Plantation along the transportation route (both sides) • Monitoring of dust fall at agriculture land located in the vicinity of project site. • Green nets will be provided along the agriculture farm boundary facing in the vicinity of proposed plant and transport road • Apart from the above, monitoring will be carried out by Environmental Cell of the company to assess effectiveness of the dust control system and complaints of farmers regarding impact on crops productivity/damage, if any. The complaints will be verified through agriculture department and if found correct, crop damage compensation will be paid as per the suggestions and recommendations of District agriculture department.

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

4.5 SOCIO-ECONOMIC IMPACT

There is likely to be growth in the revenue generation and economy at local /regional. There will certainly be improvement in standard of living due to required facilities provided by management under CER. During operation phase heavy vehicular movements will lead to dispersed dust particles which will affects the health of the workers and Local Peoples. If influx of workers from outside areas, then there will be an increased pressure on residential accommodation the neighborhood during construction phase.

The existing land use pattern of proposed site is Govt. Land without significant natural vegetation. The 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

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 CECB/ MoEF&CC. The company has proposed to Capital Cost of Rs. 15 Lakhs and Recurring Cost of Rs. 12 Lakhs towards Environmental Monitoring Program.

Environment Management Department with suitably qualified and experienced staff and environmental laboratory to cater the routine monitoring requirement will be implemented in the plant.

As part of the Board structure, Audit & Compliance reporting team shall also oversee the environmental status inclusive of the conditions prescribed under various environmental consents and clearances, as and when obtained from various State and Central Govt. authorities, as well as the corporate norms, standards and targets that exceed the legal compliance requirements.

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 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 PUBLIC CONSULTATION

The draft EIA-EMP report for greenfield project is prepared as per the ToR issued by EAC (Industry -I), MoEF&CC, New Delhi and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

After completing the public consultation process, the points raised and commitment of project proponent during the public hearing will be incorporated in the final EIA-EMP report for final submission to Environmental Clearance.

8.0 PROJECT BENEFITS

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. Agrasen Steel and Power Pvt. 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 too.

A budgetary provision towards compliance of PH response, **Rs. 15.77 crores** will be spent.

9.0 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.

The company plans to invest approx. **Rs. 5421 Lakhs** in Capital Expenditure for the environment management plan, with an annual recurring cost (O & M) of around **Rs. 80 lakhs.**

10.0 CONCLUSION

The proposed Greenfield project by M/s. Agrasen Steel and Power Pvt. Ltd. is expected to contribute to the overall development of nearby villages. However, environmental factors such as dust emissions, noise, wastewater, and increased traffic will have to be managed more effectively than the prescribed standards to prevent negative impacts, particularly on local crops. The plant infrastructure will include essential pollution control systems like ESP, bag houses, industrial sweeping machines, wheel washing systems, industrial-grade vacuum cleaners, water sprinklers, and enclosures.

In addition, supplementary pollution control and environmental conservation measures will be implemented to minimize the project's impact on the environment and the socio-economic well-being of the area. These efforts include developing a green belt, planting trees in nearby villages and along transportation routes, and adopting rainwater harvesting and recharge initiatives both within the plant and in surrounding communities.

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed project will not add adverse pollution levels to the environment. As per employment point of view, it will be beneficial to the society and will help to reduce the demand-supply gap of steel to some extent and will contribute to the economic development of the region and thereby the country.

11.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed Greenfield project of M/s. Agrasen Steel and Power Pvt. Ltd. has been 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 company backed by testing lab for environment and food in Central India region. M/s. ALPL is a group of experienced former Scientists from the Government Institutions and excellent young scientist of brilliant career with subject expertise. It is recognized by Ministry of Environment & Forests, New Delhi for carrying out environmental Studies & accredited by Quality Council of India (QCI) for conducting Environmental studies having Accreditation Certificate No.: **NABET/EIA/23-26/RA 0304_Rev.01** dtd. 13 March, 2024 valid till Sept 29, 2026.