

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

For

**Proposed Expansion of Steel Melting Plant and Rolling Mill  
from 23720 TPA to 2,00,000 TPA of MS Billets and 61,200 TPA  
to 2,00,000 TPA of Re-rolling Steel Angle & Flat Bars  
Channels, Patras & Hollow Sections.”**

By



**Chennai United Metal Industries Private Limited (CUMI)**

AT

**Sy. Nos: 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C,  
2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F,  
13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A,  
4B, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A,  
15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G,  
19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B,  
22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A,  
2B, 2C, 2D, 2E of Getnamalee Village**

**Village : Sirupuzhalpettai & Getnamalee**

**Taluk : Gummidipoondi**

**District: Tiruvallur**

**State: Tamil Nadu**

**[Terms of Reference : SEAC-TN/F.No.9877/SEAC/3(a)/ToR-1450/2023; 09.05.2023]**

**[Baseline Period : March 2024 – May 2024]**

**[Purpose of the report: Submission for Public Consultation]**

Consultant



**ASHOK NAGAR, CHENNAI-83**

**(NABET/EIA/22-25/IA 0098\_Rev 01 | Validity up to 24.06.2025)**

# PREFACE



Chennai United Metal Industries Private Limited

## DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**For**

Proposed Expansion of Steel Melting Plant and Rolling Mill from 23720 TPA to 2,00,000 TPA of MS Billets and 61,200 TPA to 2,00,000 TPA of Re-rolling Steel Angle & Flat Bars Channels, Patras & Hollow Sections.” at Sy. Nos: 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C, 2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F, 13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A, 15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B, 22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A, 2B, 2C, 2D, 2E of Getnamalee Village, Sirupuzhalpettai & Getnamalee village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu state.

For and on behalf of

**Approved by: Santhoshkumar A**

A-S

**Signature:**

**Designation: CEO**

**Date: 19.06.2024**


The report has been prepared in line with the prescribed ToR vide Lr. No. SEAC-TN/F.No.9877/SEAC/3(a)/ToR-1450/2023; 09.05.2023 issued by SEIAA-Tamil Nadu. This report has been prepared by EHS360 Labs Pvt Ltd with all reasonable skill, care, and diligence within the terms of the contract with the project proponent.

**Date: 19.06.2024**

**UNDERTAKING BY CONSULTANT**

We hereby certify that the contents (Information & Data) given in the EIA/EMP report for the Proposed Expansion of Steel Melting Plant and Rolling Mill from 23720 TPA to 2,00,000 TPA of MS Billets and 61,200 TPA to 2,00,000 TPA of Re-rolling Steel Angle & Flat Bars Channels, Patras & Hollow Sections of M/s Chennai United Metal Industries Private Limited (CUMI) at Village : Sirupuzhalpettai & Getnamalee, Taluk : Gummidipoondi, District: Tiruvallur, State: Tamil Nadu are correct & Based on the information provided by Project Proponent.

**for EHS360 Labs Pvt. Ltd.**

A. S. 

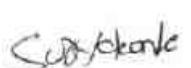
(Santhoshkumar A)  
CEO

## **DISCLOSURE OF CONSULTANT**

Declaration by Experts contributing to the EIA/EMP of " Proposed Expansion of Steel Melting Plant and Rolling Mill from 23720 TPA to 2,00,000 TPA of MS Billets and 61,200 TPA to 2,00,000 TPA of Re-rolling Steel Angle & Flat Bars Channels, Patras & Hollow Sections of M/s Chennai United Metal Industries Private Limited (CUMI) at Village: Sirupuzhalpettai & Getnamalee, Taluk: Gummidipoondi, District: Tiruvallur, State: Tamil Nadu “.

I hereby certify that I was a part of the EIA team in the following capacity that developed the above EIA.

**EIA coordinator: Suryakant Pradha**

Signature:  **Date:** 19.06.2024

**Team Member (As EIA coordinator): Tatiparthi Rajani**

Signature:  **Date:** 19.06.2024



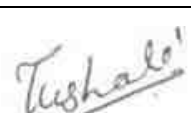


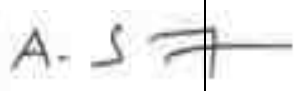



**Period of involvement:** January 2024-Till now




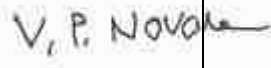





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**NABET/EIA/22-25/IA 0098 Rev. 01 valid up to June 24<sup>th</sup>, 2025**

**Functional area experts:**

| S. No | FAs          | Name of the Expert/s       | Involvement (Period &Task)  | Signature   |
|-------|--------------|----------------------------|---|---|
| 1.    | AP           | Mr. Santhosh Kumar A       | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Identification of Locations, interpretation of data wrt to standard, statistical analysis compilation etc  |    |
|       |              | Tatiparthi Rajani (TM)     | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Assisting with FAE during site visit and collection of air pollution sources, Identification of most suitable control device for reducing process emission at source and contribution to EIA documentation |    |
| 2.    | AQ           | Ms. Tushali Jagwani        | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Prediction of GLC by using AERMOD model etc. and contribution to EIA documentation   |    |
| 3.    | WP           | Mrs. Tatiparthi Rajani     | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Identification of Locations, interpretation of data wrt to standard, Compilation of report and contribution to EIA documentation   |    |
| 4.    | SHW (SW&H W) | Mrs. Tatiparthi Rajani     | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Identification of waste generation management & mitigation measures etc. . contribution to EIA documentation   |  |
|       |              | Mr. Santhosh Kumar. A (TM) | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Assistance to FAE during Studying adequacy of Mitigation measure for management of hazardous waste and other wastes and contribution to EIA documentation  |  |
| 5.    | SE           | Mrs. Anitha Reddy          | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Group discussion, designing of questionnaire, data analysis and interpretation   |  |
|       |              | Srimathi Velu (FAA)        | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Assistance to FAE during Group discussion, designing of questionnaire, data analysis and interpretation.   |  |
| 6.    | EB           | G. Raja Reddy              | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Conducted ecological survey, assessment of impacts, prepared report and compilation etc and contribution to EIA documentation  |  |

|     |     |                            |  |   |
|-----|-----|----------------------------|--|---|
|     |     | Tatiparthi Rajani (TM)     | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Assisting FAE during Site visit, ecological survey, assessment of impacts and contribution to EIA documentation   |    |
| 7.  | HG  | Mr. Mallikarjuna Rao       | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Validation and understanding representing groundwater conditions and Baseline results, identification of impacts, suggestion of mitigation measures and contribution to the EIA documentation.  |    |
| 8.  | GEO | Mr. Mallikarjuna Rao       | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Geological features & formations, topography & Lithology of the 10 km radius area and lease area  |    |
| 9.  | NV  | Mr. Vivek Prabhakar Navare | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Identification of locations, Data Interpretation (Leq), Compilations of report including impact assessment, vibration & impact etc. and contribution to the EIA documentation.  |    |
| 10. | LU  | Mrs. Anitha Reddy          | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Validation of analysis of data related to landuse pattern, development of landuse maps of study area using ArcGIS / related tools, site visit for ground truth survey, finalization of landuse maps contribution to EIA documentation |   |
| 11. | RH  | Mr. Surya Kanta Pradhan    | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Identification of Hazards, Hazardous substances. Preparation of on- site emergency plan etc and contribution to EtA documentation   |  |
|     |     | Mr. Santhosh Kumar. A (TM) | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Assisting FAE during Identification of Hazards, Hazardous substances. Preparation of on- site emergency plan etc and contribution to EtA documentation  |  |
| 12. | SC  | Dr. Aparna Chittajallu     | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Understanding and representing soil conditions, identification of impacts, suggestion of mitigation measures and contribution to the EIA documentation  |  |
|     |     | Ms. Soosan Steffy (TM)     | <b>Period:</b> Dec 2023 to Till date<br><b>Task:</b> Assisting FAE studies identification of impacts, suggestion of mitigation measures and contribution to the EIA documentation  |  |

**LU**-Land Use

**AP**-Air Pollution monitoring, prevention, and control

**AQ**-Meteorology, air quality modeling and prediction

**WP**-Water pollution monitoring, prevention, and control

**EB**-Ecology and biodiversity

**NV**-Noise & Vibration

**SE**-Socioeconomics

**HG**-Hydrology, ground water and water conservation

**GEO**-Geology

**RH**-Risk assessment and hazards management

**SHW**-Solid and hazardous waste management

**SC**-Soil Conservation

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## ABBREVIATIONS AND ACRONYMS

|      |  |                 |   |
|------|--|-----------------|---|
| AAQ  | Ambient Air Quality                            | MOEFCC          | Ministry of Environment, Forests and Climate Change |
| AAQM | Ambient Air Quality Monitoring                 | NAAQ            | National Ambient Air Quality                        |
| AGL  | Above Ground Level                             | NOx             | Oxides of Nitrogen                                  |
| ARL  | Above Roof Level                               | PCU             | Passenger Car Unit                                  |
| BOD  | Biological Oxygen Demand                       | PM              | Particulate Matter                                  |
| CPCB | Central Pollution Control Board                | PPE             | Personnel Protective Equipment                      |
| CER  | Corporate Environmental Responsibility         | R & D           | Research & Development                              |
| CSR  | Corporate Social Responsibility                | RET             | Rare Endangered and Threatened                      |
| CUMI | Chennai United Metal Industries                | RA              | Risk Assessment                                     |
| DMP  | Disaster Management Plan                       | STP             | Sewage Treatment Plant                              |
| EC   | Environmental Clearance                        | SW              | Surface Water                                       |
| EAC  | Expert Appraisal Committee                     | SEAC            | State Expert Appraisal Committee                    |
| EIA  | Environmental Impact Assessment                | SEIAA           | State Environmental Impact Assessment Authority     |
| EMC  | Environmental Management Cell                  | SO <sub>2</sub> | Sulphur Dioxide                                     |
| EMP  | Environmental Management Plan                  | TDS             | Total Dissolved Solids                              |
| ETP  | Effluent Treatment Plant                       | TFH             | Thermic Fluid Heater                                |
| GW   | Ground Water                                   | TNPCB           | Tamil Nadu Pollution Control Board                  |
| GLC  | Ground Level Concentration                     | TOR             | Terms of Reference                                  |
| IUCN | International Union for Conservation of Nature | TSDF            | Treatment, Storage and Disposal Facility            |
| ISO  | International Organization for Standardization | kVA             | kilovolt-ampere                                     |
| kWh  | Kilowatt Hour                                  | USEPA           | United States Environment Protection Agency         |
| KLD  | Kilo Liters per Day                            | VOC             | Volatile Inorganic Carbon                           |
| MSDS | Material Safety Data Sheet                     | ZLD             | Zero Liquid Discharge                               |

## LIST OF SYMBOLS / UNITS

|                     |                                |                   |  |
|---------------------|--------------------------------|-------------------|--|
| °C                  | : Degree Celsius               | MTA               | : Metric Ton per Anum                        |
| CO                  | : Carbon Monoxide              | µg/m <sup>3</sup> | : Microgram/Cubic Meter                      |
| dB(A)               | : Decibels(A-Weighted)         | PM10              | : Particulate Matter (Size less than 10 µm)  |
| gm/cc               | : Gram per Cubic Centimeter    | PM2.5             | : Particulate Matter (Size less than 2.5 µm) |
| Ha                  | : Hectare                      | ppm               | : Parts per Million                          |
| Kcal/Hr             | : Kilo Calorie per Hour        | Sq.km             | : Square kilometer                           |
| Kcal/m <sup>3</sup> | : Kilo Calorie per Cubic Meter | Sq. m             | : Square Meter                               |
| Km                  | : Kilo Meter                   | TPA               | : Ton Per Anum                               |
| kVA                 | : Kilo Volts Ampere            | TPM               | : Ton per Month                              |
| KW                  | : Kilo Watt                    | TOC               | : Total Organic Carbon                       |
| mg/lit              | : Milligram/ Liters            | TPD               | : Ton per Day                                |
| NOX                 | : Oxides of Nitrogen           | TPH               | : Ton per Hour                               |
| µs                  | : Micro Siemens                | TR                | : Tonnage of Refrigeration                   |
| m                   | : meters                       |                   |  |
| m/s                 | : Meters per Second            |                   |  |
| mg/m <sup>3</sup>   | : Milligram/cube meter of air  |                   |  |

## GLOSSARY

**Steel:** Commercial iron that contains carbon in any amount up to about 1.7 percent as an essential alloying constituent, is malleable when under suitable conditions, and is distinguished from cast iron by its malleability and lower carbon content.

**Steel Billet:** Freshly made steel, which is still in the form of a metal bar or rectangle, is called steel billet.

**Bars:** Long steel products that are rolled from billets.

**Bending:** The forming of metals into various angles.

**Rolling:** A metal forming process in which metal stock is passed through one or more pairs of rolls to reduce the thickness, to make the thickness uniform, and/or to impart a desired mechanical property.

**Re-rolling:** Plastically deforming the metal by passing it between a set of rolls revolving in opposite direction.

### **Continuous**

**Casting:** A method of pouring steel directly from the furnace into a billet, bloom, or slab directly from its molten form.

**Rolling Mill:** Any of the mills in which metal undergoes a rolling process.

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Note: Annexure are given as Separate Book

# **Terms of Reference (TOR) Compliance**

| S. No                                | Terms of Reference   | Compliance  |
|--------------------------------------|--|---|
| <b>Additional Terms of Reference</b> |  |   |
| 1.                                   | The PP shall furnish the affidavit stating the there is no construction activity carried out after July 2022.  | The affidavit stating the there is no construction activity carried out after July 2022 will be submitted at the time of Final EIA Submission.  |
| 2.                                   | The PP shall include the actual material balance, water balance & scrap details etc., in EIA report.   | Actual material balance is provided in <b>Table 2-20 &amp; Table 2-21</b> .<br>Water Balance details are provided Chapter 2 <b>Table 2-11 and Figure 2-11</b> .   |
| 3.                                   | The PP shall study in detail about various operational measures to reduce the specific energy consumption in the induction furnaces and reheating furnaces.                              | The details are provided in <b>Chapter 2, Section 2.6.3.2</b> .   |
| 4.                                   | The PP shall furnish panel board calculation for the existing and proposed expansion activity.   | Panel calculation and estimated details for proposed expansion is provided in <b>Chapter 2, Section 2.6.3.2</b> .   |
| 5.                                   | The PP shall explore possibilities to utilize renewable energy with respect to total power consumption   | A partial building area will be designed to establish the solar panel and the project proponent explores the phase wise installation of solar panel to meet the lighting power required energy from renewal energy source.  |
| 6.                                   | The PP shall plant native trees 2 nos. of rows all along the site and within the proposed site adhering to 33% of Greenbelt of the total area and shall furnish photographs of the same. | CUMI is allocated for Greenbelt development in 22510.06 Sq.m (33%) of land and Layout plan of the project site is attached as an <b>Annexure -5</b> . Proponents have already planted 3840 nos of trees under Greenbelt Development. In addition to the existing 1000Nos of Plants are proposed. The list trees existing and proposed is provide in <b>Chapter 4 and Table 4-13</b> . |
| 7.                                   | The PP shall furnish details of scrap imported and composition of scrap obtained from laboratory to ensure free from toxic contaminants  | Test reports are enclosed as <b>Annexure-19</b> .   |
| 8.                                   | The PP shall adopt Environmental manager for effective compliance on mitigation measures & monitoring of proposed expansion activity.  | The Project proponent will be adopted a proper Environmental Management Cell (Environmental manager) for effective compliance on mitigation measures & monitoring of proposed expansion activity. The details are provided in <b>Chapter 10</b> .   |
| 9.                                   | The PP shall consult DFO, Thiruvallur for adopting conservation/mitigation measures for the nearby protected areas.  | DFO Tiruvallur Consen letter obtained with respective neaby protected areas will be submitted during the Final EIA submission.  |
| 10.                                  | Since the Periods of idling are inherent because of the following activities, the  | The detailed information with respective to Charging, Slagging, Sampling, change material,  |

| S. No | Terms of Reference  | Compliance  |
|-------|---|---|
|       | PP shall study in detail and the same shall be included in the EIA report. <ol style="list-style-type: none"> <li>i. Charging</li> <li>ii. Slagging</li> <li>iii. Sampling</li> <li>iv. Change material</li> <li>v. Molten Heel Practice</li> <li>vi. Furnace Cover Losses</li> </ol> | Molten Heel Practice & Furnace Cover Losses for proposed expansion is provided in <b>Chapter 2, Section 2.6.3.2.</b>  |
| 11.   | The PP shall study in detail about Charging and operation of Melting for better and efficient operation of induction furnaces.  | Detail about Charging and operation of Melting for better and efficient operation of induction furnaces is provided in <b>Chapter 2, Section 2.6.3.2.</b>   |
| 12.   | The proponent shall study in detail about various measures could be adopted during finishing and tapping of a heat.   | Detail about various measures could be adopted during finishing and tapping of a heat is in <b>Chapter 2, Section 2.6.3.2.</b>  |
| 13.   | The proponent shall study in detail about operational control measures to Minimize and control the refractory wear wearing.   | The proponent is being adopted the required operational control measures to Minimize and control the refractory wear wearing. The manufacturing details for Re Rolling and Billet manufacturing integrated details are provided in <b>chapter 2, Section 2.6.3.2.</b>   |
| 14.   | The proponent shall explore the possibilities to Change from mains frequency to medium frequency furnaces.  | The medium frequency electric furnace uses 200-2500Hz medium frequency power supply for induction heating, melting and heat preservation.<br><br>However, CUMI is providing LT Auxillary Transformer with Rated KVA 2000 Rated current- HV -34.99, LV-2666.82.<br><br>Phase-3: Frequency -50Hz. & Static Frequency Converter Panel 5000 KW/ 4000 V and Frequency -200-300 HZ.<br><br>The details of Panel details for the existing and proposed expansion is provided in <b>Chapter 2, Section 2.6.5, and Table 2-21.</b> |
| 15.   | Details of sand reclamation unit shall be incorporated in the EIA report.   | There is no requirement of sand reclamation in the proposed project.  |
| 16.   | The proponent shall explore the possibilities of utilizing state of the art technology with best global practice.   | CUMI' is being adopted Direct Hot Rolling (DHR) method as the best option, the same will be followed for the proposed expansion project   |
| 17.   | The proponent shall explore the possibilities of utilizing the industrial wastewater instead of Fresh water.  | The total water requirement during operational phase for proposed project is 95 KLD (Fresh water is 86 KLD and recycled 9.0 KLD).   |



| S. No | Terms of Reference   | Compliance  |
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|       |  | <p>The sewage of 2KLD from sanitary units will be disposed in septic tank-soak pit arrangement, Septic tank will be cleaned periodically by the authorized vendors.</p> <p>No Sewage will discharge into any surface water bodies or aquifers /inland surfaces.</p> <p>The wastewater from the cooling processes (Induction Furnace &amp; Re heating) is treated in the cooling pond followed by cooling tank and the treated water of 5 KLD will be recirculated for the processes. Effluent from Wet Scrubber 1.0 KLD is being sent to Solar Evaporation Pond, Sludge/salts from Solar Evaporation Pond is disposed through TSDF.</p> |
| 18.   | The proponent shall elaborate on the state-of-the-art technology for induction furnace to control emissions (Fumes).                       | CUMI' is being adopted Direct Hot Rolling (DHR) method as the best option, the same will be followed for the proposed expansion project.  |
| 19.   | The proponent shall submit the Certified Compliance Report for existing plant.   | Latest consent order's compliance is enclosed as <b>Annexure-8.</b>   |
| 20.   | The proponent must increase the solar and Wind Energy and must explore the possibilities of achieving Net Zero energy consumption.         | <p>A partial building area will be designed to establish the solar panel and the project proponent explores the phase wise installation of solar panel to meet the lighting power required energy from renewal energy source.</p> <p>Proponent will be explore the max possinilities of achieving Net Zero energy consumption during proposed expansion.</p>  |
| 21.   | The proponent shall submit the video and photograph of the operational details with reference to points of pollution in the existing plant | PP will be submitted the video and photograph of the operational with reference to points of pollution in the existing plant at the time of EC appraisal.   |
| 22.   | Material balance and Water balance shall be furnished in accordance with MoEF&CC guidelines.   | <p>Actual material balance is provided in <b>Table 2-20 &amp; Table 2-21.</b></p> <p>Water Balance details are provided Chapter 2 <b>Table 2-11 and Figure 2-11.</b></p>  |
| 23.   | A detailed report on Solid waste management, hazardous waste shall be furnished.   | <ul style="list-style-type: none"> <li>✓ The generated waste will be segregated at sources as Municipal Solid Waste, Hazardous and non-Hazardous.</li> <li>✓ No Liquid waste will be generated in manufacturing of Steel Billets and other structures.</li> </ul>   |

| S. No | Terms of Reference  | Compliance  |
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|       |   | <ul style="list-style-type: none"> <li>✓ Hazardous non-recyclable waste will be disposed to TSDF &amp; Hazardous recyclable waste will be sent to Authorized recycles.</li> <li>✓ Municipal solid waste generation from domestic activities is segregated, into organic, will be composted and inorganic waste will be disposed to local panchayat bins.</li> </ul> <p>Hazardous and Non-Hazardous Waste Generation and Management is provided in <b>Chapter 2, Section 2.8.5, and Table 2-25 &amp; Table 2-26.</b></p> |
| 24.   | Report on AAQ survey and proposed air pollution prevention and control measures shall be furnished in the EIA report.   | <p>Report on AAQ survey details is provided in <b>Chapter 3, Section Table 3-8.</b></p> <p>Proposed air pollution prevention and control measures are provided in <b>Chapter 2, Section 2.8.2.</b></p>  |
| 25.   | The project proponent shall do the stoichiometric analysis of all the involved reactions to assess the possible emission of air pollutants in addition to the criteria pollutants, from the proposed project. | Material balance for existing and proposed is provided in <b>Table 2-20 &amp; Table 2-21.</b>   |
| 26.   | Adequacy report for ETP &STP for the proposed project obtained from any reputed Government institution such as IU “, Anna University, NIT shall be furnished.   | Adequacy reports are not available Since, the proposed unit will be followed by existing facilities as Septic Tanks for the sewage disposal and Solar evaporation pon for Scrubber blow down treatment.   |
| 27.   | Land use classification shall be obtained from the DTCP for the Survey Numbers of this project. Further, the project proponent shall submit the planning permission obtained from the DTCP, if any.           | The proposed expansion activities are going to be implemented in the existing facaility only. The project area land use conversion certificate is enclosed as <b>Annexure-3.</b> Planning permission obtained from the DTCP is provided as <b>Annexure-20.</b>  |
| 28.   | The proponent shall conduct the EIA study and submit the EIA report for the entire campus along with layout and necessary documents such as “A” register and village map.                                     | Land documents are enclosed as <b>Annexure-2.</b> Layout and necessary documents such as “A” register and village map is provided as <b>Annexure-20.</b>  |
| 29.   | Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same   | Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement will be provided after Public Hearing.   |

| S. No | Terms of Reference   | Compliance  |
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|       | should be provided and incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.                       |   |
| 30.   | The Public hearing advertisement shall be published in one major National daily and one most circulated Tamil daily.   | Will be followed during the time of Public Hearing and provide as an annexure in Final EIA Submission.  |
| 31.   | The PP shall produce/display the EIA report, executive summary, and other related information with respect to public hearing in Tamil.   | Will be followed during the time of Public Hearing and provide as an annexure in Final EIA Submission.  |
| 32.   | The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non- forest purpose involved in the project | Not applicable, there is no forest land is involved in the project land/ area.  |
| 33.   | The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.  | Not Applicable since there is no WLS within 10km radius from the project area.  |
| 34.   | The project proponent shall explore the possibilities of treating and utilizing the trade effluent and sewage within the premises to achieve Zero liquid discharge.                                  | <p>The total water requirement during operational phase for proposed project is 95 KLD (Fresh water is 86 KLD and recycled 9.0 KLD).</p> <ul style="list-style-type: none"> <li>✓ The sewage of 2KLD from sanitary units will be disposed in septic tank-soak pit arrangement, Septic tank will be cleaned periodically by the authorized vendors.</li> <li>✓ The wastewater from the cooling processes (Induction Furnace &amp; Re heating) is treated in the cooling pond followed by cooling tank and the treated water of 12.5 KLD will be recirculated for the processes. Effluent from Wet Scrubber 1.0 KLD is being sent to Solar Evaporation Pond, Sludge/salts from Solar Evaporation Pond is disposed through TSDF.</li> </ul> <p>No Sewage &amp; No Effluents will not be discharged into any water bodies or aquifers under any circumstances by the project.</p> |

| S. No                               | Terms of Reference   | Compliance   |
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| 35.                                 | The layout plan shall be furnished for the greenbelt area earmarked with GPS coordinates by the project proponent on the periphery of the site and the same shall be submitted for CMDA/DTCP approval. The green belt width should be at least 3m wide all along the boundaries of the project site. The green belt area should be not less than 15 % of the total land area of the project. | Greenbelt area earmarked with GPS coordinates is provided in <b>Chapter 4 and Annexure-5 &amp; Figure 4-5.</b>   |
| 36.                                 | As the plant operation involves the sensitive processing, the medical officer and the supporting staff involved in the health centre activities shall be trained in occupational health surveillance (OHS) aspects through the outsourced training from the experts available in the field of OHS for ensuring the health standard of persons employed.                                      | Sanitary certificate from Department of Public Health and Preventive Medicine and is enclosed as <b>Annexure-12.</b><br><br>Occupational health surveillance (OHS) programme proposed in the <b>Chapter 4, Section 4.4.2.1 and Table 4-15.</b>   |
| 37.                                 | The proposal for Roof Top solar panel shall be included in the EIA Report.   | A partial building area will be designed to establish the solar panel and the project proponent explores the phase wise installation of solar panel to meet the lighting power required energy from renewal energy source. The details planning details will be provided in the Final EIA. |
| 38.                                 | As per the MoEF&CC Office Memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall furnish the detailed EMP.   | The proponent will be provided the required details after Public Hearing.  |
| <b>SEIAA Recommended Conditions</b> |  |  |
| 1.                                  | The proponent shall submit the green technologies deployed in the production to reduce carbon footprint, Green House Gas (GHG), COC and rise in temperature.   | Proponent is adopted the start of art technology DHR method to reduce carbon footprint, Green House Gas (GHG), COC and rise in temperature.  |
| 2.                                  | Details regarding strategies adopted for occupational health safety shall be submitted.  | The sanitary certificate from the department of Public Health and Preventive Medicine is enclosed as <b>Annexure-12.</b><br><br>Occupational health surveillance (OHS) programme proposed in <b>Chapter 4, Section 4.4.4, and Table 4-16.</b>  |

| S. No | Terms of Reference   | Compliance   |
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| 3.    | The proponent shall submit detailed report regarding temperature rise and climate change impacts due to the proposed project and control measures.   | Proponent is adopted the start of art technology DHR method to reduce carbon footprint, Green House Gas (GHG), COC and rise in temperature.  |
| 4.    | The PP shall study fugitive emissions and regular emission monitoring strategies to prevent their escape into the environment.   | Proponent is adopted the start of art technology DHR method to reduce carbon footprint, Green House Gas (GHG), COC and rise in temperature.<br><br>The Integrated plant, Manufacturing process and Futive emissions along with regular emission details and control measure are provided in <b>Chapter 2, Section 2.6.3.</b> |
| 5.    | Details regarding the transparency and accountability system in place during the operation period of the project.  | Transparency and accountability system will be placed during the operation period of the proposed project.   |
| 6.    | Details regarding the In-House environmental performance and evolution tools to evaluate the impacts of the project on the environment.  | In-House environmental performance and evolution tools will be provided during the implementation of proposed project.   |
| 7.    | Detailed study to be made on material flow analysis and Life Cycle Assessment (LCA) in the process of production and the report shall be submitted.  | Life Cycle Assessment (LCA) of the proposed products will be shown in the Cumulative Manufacturing Proecss <b>Chapter 2 &amp; Figure 2-12.</b><br><br>Life Cycle Assessment (LCA) report will be provided during Final EIA report.   |
| 8.    | Through a chart Illustration, clarify the cradle to grave approach for anticipated emissions and environmental threats in every stage and the mitigation strategy at every stage shall be submitted. | The cradle to grave approach for anticipated emissions and environmental threats in every stage and the mitigation strategy is provided in Cumulative Manufacturing Proecss given in <b>Chapter 2 &amp; Figure 2-12</b>  |
| 9.    | Project Proponent shall submit the action plan to study the impacts on human health viz respiratory impacts, toxicity impacts and radiation impacts.   | Details of Occupational Health Impacts and Safety Hazards and Proposed Occupational Health Surveillance Planning and proposed Fire & Occupational health surveillance (OHS) programme proposed in <b>Chapter 4, Section 4.4.4, and Table 4-16.</b>   |
| 10.   | The proponent shall submit a detailed study report regarding the chemical exposures and risks anticipated to environmental and human health  | Details of Occupational Health Impacts and Safety Hazards and Proposed Occupational Health Surveillance Planning are provided in <b>Occupational health surveillance (OHS) programme proposed in Chapter 4, Section 4.4.4, and Table 4-16.</b>   |

| S. No | Terms of Reference   | Compliance   |
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| 11.   | The proponent shall strictly adhere to the mitigation measures as committed regarding the emission of Green House Gas (GHG) and other gas emissions. | The existing facility is adopted the DHR Method to reduce the GHC and the same will be followed expansion also.  |
| 12.   | The proponent shall submit a detailed study report regarding the terrestrial and aquatic toxicity due to the proposed project                        | Terrestrial and aquatic toxicity details will be provided in the final EIA report. However, there is no terrestrial and aquatic toxicity impact due to proposed project.   |
| 13.   | The green belt area should be not less than 15% of the total land area of the project.   | CUMI is allocated for Greenbelt development in 22510.06 Sq.m (33%) of land and Layout plan of the project site is attached as an <b>Annexure -5</b> . Proponents have already planted 3840 nos of trees under Greenbelt Development. In addition to the existing 1000Nos of Plants are proposed. The capital cost of INR 2,50,000 Lakhs will be earmarked for this purpose and INR of 1.0 Lakhs will be allocated for recurring expenses towards green belt development and maintenance.   |
| 14.   | The proponent shall furnish details on the green practices adopted so as to support the circular economy   | As per Energy Efficiency in Steel Re-rolling Mills” (2004-2013): It has facilitated low carbon technologies in 34 steel re-rolling mills (model units) to bring down energy consumption and reduce GHG emissions by 25-50%. This has helped in replication of the energy efficient technological interventions in many other steel re-rolling mills. The Energy Efficiency in Steel Re-rolling Mills” will be implemented during the expansion of proposed project & to utilize the steel slag in other applications like construction & road making, soil conditioning, rail ballast etc. |
| 15.   | The proponent shall conduct a study and furnish details on the impact of the project on the communities in and around the project area               | This is already an established industry they have proposed expansion within the existing facility only and many industries are surrounded and the project is categorized Hazardous zone. CER & CSR and employments to the surrounding is additional benefits are generated by the proposed project.  |
| 16.   | The proponent shall furnish details on the impact on employee health due to the project activities.  | Details of Occupational Health Impacts and Safety Hazards and Proposed Occupational Health Surveillance Planning and proposed Fire & Safety measures and systems are provided in <b>Chapter 10, Table 10-8, Table-10-9 and 10-10.</b>  |

| S. No | Terms of Reference   | Compliance  |
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| 17.   | Details regarding strategies adopted for energy efficiency standards shall be submitted. | <p>Direct Heat rolling method is being adopted by the proposed project with the following benefits, in this method, the hot billets are directly transferred to the rolling unit by means of a high-speed roller table. This is termed as 'Direct Rolling' or 'Direct Hot Rolling' (DHR) process.</p> <ul style="list-style-type: none"> <li>▪ Primly, the pollution levels are kept in control by eliminating the fuel consumption which reduces the GHG emission.</li> <li>▪ The Plant brings profit and happiness to Industry, at the same time protects the environment and makes the steel industry more sustainable.</li> <li>▪ Reduction in the scale loss which would have been burned in the billet reheating furnace.</li> <li>▪ It will also help in reducing the manpower required in any unit and reduce the risks of lower production caused due to the manpower engaged in vital function of mould settings; Billet's finishing and loading in the billet reheating furnace etc.</li> <li>▪ It also Reduces the overall machinery and production cost.</li> <li>▪ It will reduce miss roll, cobbles, etc and improve the product quality, increase % yield etc.</li> </ul> |

**Standard TOR**

| S. No | ToR Point   | Compliance  |
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| 1     | Executive Summary   | Brief executive summary is enclosed as Separate Booklet   |
| 2     | <b>Introduction</b>   |   |
|       | Details of the EIA Consultant including NABET accreditation | <p>EHS360 Labs Pvt Ltd is an NABET Accredited consultant vide certificate number Certificate No.: NABET/EIA/22-25/IA 0098_Rev-01 valid up to June 24th, 2025.</p> <p>Office address is 10/2 - Ground Floor, 50th Street, 7th Avenue, Ashok Nagar, Chennai Tamil Nadu, Pin code 600083, Phone: 044 45493644:</p> |
|       | Information about the Project Proponent                     | M/s. Chennai United Metal Industries Private Limited  |

| S. No | Terms of Reference                     | Compliance  |
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|       |  | <p>Mr. Jitendrakumar Goel, The Director<br/>Plot No. 1842, 20th Main Road,<br/>Anna Nagar West,<br/>Anna Nagar, Chennai - 600 040<br/>Mobile No. 9840640057; email id<br/><a href="mailto:chennaiumi@yahoo.com">chennaiumi@yahoo.com</a></p> <p>M/s. Chennai United Metal Industries Private Limited is one of the leaders in steel manufacturing in South India. The company was incorporated on 27<sup>th</sup> June 2012 with Registrar of companies, Chennai, Tamil Nadu as a backward integration and set up an Induction furnace unit for manufacturing of Billets with installed capacity of 23,760 Tons/Annum and Rerolled Steel Angle &amp; Flat Bars &amp; Channels with capacity of 61,200 Tons/Annum to Manufacture the Billets with capacity 23,760 Tons/Annum is obtained CTE vide No. 2201145553551 dated on 18/06/2022 and to Manufacture of Rerolled Steel Angle &amp; Flat Bars &amp; Channels with capacity 61,200 Tons/Annum obtained CTE for the same, vide No. 2108239615131 dated on 10/08/2021 Since, Initially the project is not attracts the Environmental Clearance.</p> <p>the proposed project comes under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 &amp; its further amendments as per the MoEF&amp;CC Notification S.O 3250(E), dated: 20<sup>th</sup> July 2022 the unit requires Environmental Clearance.</p> |
|       | Importance and Benefits of the Project | <p>Steel has played a vital role in the development of the Indian economy.</p> <p>The country expects steel demand to grow 3x and reach 230 MT by 2030-31. According to the National Council of Applied Economic Research, the steel industry in India has the potential to contribute to overall economic development.</p>   |



| S. No | Terms of Reference  | Compliance   |
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|       |   | <p>The steel industry in India contributes about 2% to India's GDP and employs around 6 lakh people directly and 20 lakh people indirectly. With steel plants creating vast employment opportunities, especially in Tier3 cities, it has an employment multiplier effect of 6.8x and an output multiplier effect of 1.4x.</p> <p>The project benefits are provided in <b>Chapter 8</b>.</p>  |
| 3     | <b>Project Description</b>  |  |
|       | Cost of project and Time of completion  | <p>The cost of the proposed project is 36.25 crores, and the project will be completed in May-2025. The project implementation Tentative Schedule given in <b>Chapter 2 Table 2-6</b></p>  |
|       | Products with capacities for the proposed project   | <p>The list of proposed products and their capacities was given in <b>Chapter 1 Table1-1</b></p>   |
|       | <p>If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.</p> | <p>M/s. Chennai United Metal Private Limited has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle &amp; Flat Bars &amp; Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.</p> <p>The proposed project comes under Schedule 3(a) "Metallurgical Industries" under Category 'B' as per the EIA Notification 2006 &amp; its further amendments as per the MoEF&amp;CC Notification S.O 3250(E), dated: 20th July 2022 the unit requires Environmental Clearance.</p> <p>Material Balance for MS Billets (Existing) is provided in <b>Table 2-17</b>.</p> <p>Material Balance for Re-Rolled Steel Angle &amp; Flat Bars, Patras, Channels &amp; Hollow sections. (Existing) is provided in <b>Table 2-18</b>.</p> <p>Material Balance for MS Billets (Proposed) is provided in Table 2-19 and Material Balance for Re-Rolled Steel Angle &amp; Flat Bars, Patras,</p> |

| S. No | Terms of Reference  | Compliance   |
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|       |   | Channels & Hollow sections. (Proposed) are provided in <b>Table 2-20</b> .   |
|       | List of Raw materials required and their source along with mode of transportation   | Integrated plant material balance is provided in <b>Table 2-20 &amp; Table 2-21</b>  |
|       | Other chemicals and materials required with quantities and storage capacities   | The Proposed Project Summary is provided in <b>Chapter 1 and Table 1-2</b> .   |
|       | Details of emission, effluents, hazardous waste generation and their management   | Stack Emissions details are provided in <b>Chapter 2, Section 2.8.2</b> .<br>Effluent details are provided in <b>Chapter 2, Section 2.8.3</b> .<br><br>Solid and Hazardous Waste Generation and Management is provided in <b>Chapter 2, Section 2.8.5</b> .  |
|       | Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)   | The Proposed Project Summary is provided in <b>Chapter 1 and Table 1-2</b> .<br><br>Water balance diagram for existing and proposed is provided in <b>Chapter 2, Figure 2-10 &amp; Figure 2-11</b> .   |
|       | Process description along with major Equipment and machineries, process flow sheet (quantitative) from raw material to products to be provided  | A list of machinery & equipment's are shown in <b>Table 2-21</b> . List of proposed machineries & equipments for Re Rolling Mill is provided in <b>Table 2- 22</b> .<br><br>Integrated plant manufacturing process is shown in <b>Chapter 2, Section 2.6.3</b>   |
|       | Hazard identification and details of proposed safety systems  | Sanitary certificate from Department of Public Health and Preventive Medicine and is enclosed as <b>Annexure-12</b> .<br><br><b>Occupational health surveillance (OHS) programme proposed in Chapter 4, Section 4.4.4, and Table 4-16.</b>   |
|       | Expansion/ modernization proposals<br>Copy of all Environmental Clearance(s) including amendments thereto obtaining for the project from MoEFCC/SEIAA shall be attached as an Annexure. A certified copy of the latest monitoring report of the regional office of the Ministry of Environment and Forests as per circular dated 30th May 2012 on the status of compliance of | Initially the proponent operating Re-Rolling Mill plant with valid consent orders intime renewals and planned Billets manufacturing and applied for CTE on 1st June 2022 and obtained CTE for Billet plant on 18th June 2022, constructed shed for Billat plant which the project does not attract Environmental Clearance. As per MoEF&CC Notification S.O 3250(E), dated: 20th July 2022 and the existing & proposed plant required Environmental Clearance and the proposed |

| S. No | Terms of Reference   | Compliance  |
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|       | <p>conditions stipulated in all existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing existing operation of the project from SPCB shall be attached with the EIA-EMP report.</p> <p>In case the existing project has not obtained environmental clearance, reasons for not obtaining the provisions of the EIA notification 1994 and/or EIA notification 2006 shall be provided. Copies of Consent to Establish / No objection certificate and Consent to Operate (in case of units operating in prior to EIA notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further compliance report to the conditions of Consents from the SPCB shall be submitted.</p> | <p>project comes under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 &amp; its further amendments.</p> <p>In line with EIA notification dated 14.09.2006, The Environmental Clearance application was applied vide 06.03.2023v and TOR meeting was held for determining the Terms of Reference (TOR) on 19th April 2023 and obtained Terms of Reference vide SEAC letter no. TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023 for the carried-out Baseline studies and preparation of EIA report for the proposed expansion project. The copy of Terms of Reference (ToR) is attached as Annexure-I.</p> <p>The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing.</p> <p>Existing CTE and CTO Compliance will be submitted at the time of Final EIA.</p> |
| 4     | <p><b>Site Details</b></p> <p>Location of the project site covering village, Taluka/Tehsil, District and State, justification for selecting the site, whether other sites were considered.</p> <p>A Topo sheet of the study area of radius of 10Km and site location on 1:50,000/ 1:25,000 scale on an A3/A2 sheet (including all eco-sensitive areas and environmentally sensitive places).</p>   | <p>The proposed plant is located at Survey No’s. 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C, 2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F, 13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A, 15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B, 22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A, 2B, 2C, 2D, 2E of Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, TamilNadu. The total site area is 16.86 Acres (68212.31 Sq. m). The proposed project is for expansion within the existing facility</p> <p>Topo Map of the study area is given in <b>chapter 3 Section 2 Figure 3-2</b></p>   |

| S. No | Terms of Reference   | Compliance   |
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|       | Details with respect to option analysis for selection of site  | The proposed expansion will take place within the existing plant premises itself. Therefore, no additional land will be acquired for the proposed expansion. |
|       | Co-ordinates (Lat-long) of all four corners of the site.   | The site center coordinates are in a longitude 77°26'7.70"E and latitude 8°48'12.67"N.<br><br>Boundary coordinates are provided in <b>Table 2-2.</b>         |
|       | Google map Earth downloaded of the project site.   | Google satellite imagery of the project site is provided in <b>Chapter 2 Section 4 Figure 2-2.</b>   |
|       | Layout maps including existing units as well as proposed units indicating storage area, plant area, greenbelt area, utilities etc. If located within an industrial area/Estate/Complex, layout of Industrial indicating location of unit within the Industrial area/Estate.  | Layout plan of the proposed project is provided in <b>Chapter 2 Section 5 Figure 2-8</b>   |
|       | Photographs of the proposed and existing (if applicable) plant site, existing, show photographs of plantations/ greenbelt.   | Photographs of the project site is provided in <b>Chapter 2 Section 5 Figure 2-9</b>   |
|       | Land use break-up of total land of the project site (indicate and acquired), government/ private- agriculture, forest, wasteland, water bodies, settlements, etc. shall be included (not required for industrial area).  | Details of the Land requirements was provided in <b>Chapter 2 Section 6 Table 2-7</b>  |
|       | A list of major industries with name and type within the study area (10 km radius) shall be incorporated. Land use details of the study area.  | The major industries within 10km radius from the project site along with their distance and direction are given in <b>Chapter 2 Section 4.1 Table 2 3.</b>   |
|       | Geological features and Geo-hydrological status of the study area shall be included.   | Geological futures were provided in <b>Chapter3 Section 5.6</b>  |
|       | Details of drainage of the project up to 5km radius of the study area. If the site is within 1Km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum of Flood of the river shall also be provided (mega green field projects) | Drainage map of the project is shown <b>Figure 3-10.</b>   |
|       | Status of acquisition of land. If acquisition is not complete, the stage of  | The proposed project site is Patta land and classified as a Special Industrial Hazardous   |

| S. No | Terms of Reference  | Compliance  |
|-------|---|---|
|       | the acquisition process and expected time of complete procession of the land.   | Industrial Use Zone as per land conversion documents. Land breakup is given in <b>Table -2 7</b> . Land Conversion documents are enclosed as <b>Annexure-3</b> . The proposed expansion is for production capacity within the existing facility only.   |
|       | R&R details in respect of land in line with state Government policy   | The Rehabilitation and Resettlement are not applicable since the project site is already used for industrial purposes which is categorized as non-Planned land & it is patta land and the total project land belongs to the CUMi. Land documents are enclosed as <b>Annexure-2</b> . There are no R&R studies raised Hence, Social Impact Assessment is not conducted. Details provided in <b>chapter 7 Section 6</b> |
| 5     | <b>Forest and wildlife related issues (if applicable)</b>   |   |
|       | Permission and approvals for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department (if applicable)  | No forest land is involved  |
|       | Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forest land (in case of projects involving forest land more than 40 ha)  | Not applicable  |
|       | Status of application submitted for obtaining the stage of Forestry Clearance along with latest status shall be submitted   | Not applicable  |
|       | The projects to be located within 10 Km of the National parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon. | Environmental Sensitivity details along with provided in <b>Chapter 3, Section 3.3 and Figure no 3-3</b> .  |
|       | Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of schedule I fauna, if any exists in the study area.   | Nil within 10km radius  |
|       | Copy of application submitted for clearance under the Wildlife  | Not Applicable  |

| S. No | Terms of Reference  | Compliance   |
|-------|---|--|
|       | (Protection) Act, 1972 to the Standing Committee of the National Board for Wildlife.  |  |
| 6     | <b>Environmental Status</b>   |  |
|       | Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall   | Meteorological conditions and data is provided in <b>Chapter 3 Section 3.6.1.</b>  |
|       | AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO, and other parameters relevant to the project shall be collected. The monitoring stations shall be based on CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests. | AAQ data is collected in March-May 2024. Eight (08) monitoring locations have been identified as per annual wind predominance of Nungambakkam from IMD. AAQ monitoring locations are selected based on Annual wind predominance, map showing the Ambient Air Quality monitoring locations is given in Figure 3 14 and the details of the locations are given in Table 3 6. |
|       | Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM notification of Nov. 2009 along with-min-max, average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA report  | Ambient Air Quality Raw Data is enclosed as <b>Annexure-21.</b>  |
|       | Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEFCC guidelines.  | Surface water sampling Locations and Its results are given in <b>Chapter3 Section 8</b> Table 3 11 and Table 3 12 respectively.<br>Groundwater quality monitoring locations and results are given in <b>Chapter 3 Section 8 Table- 3 13 and Table 3 -14</b> respectively. A map showing the groundwater monitoring locations is given in Figure 3 17.                      |
|       | Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF& CC, if yes give details   | Nil  |
|       | Ground water monitoring at minimum 8 locations shall be included  | Groundwater quality monitoring locations and results are given in <b>Chapter 3 Section 8</b> Table 3 13 and Table 3 14 respectively. A map showing the groundwater monitoring locations is given in Figure 3 17.   |
|       | Noise level monitoring at 8 locations within the study area.  | A map showing the noise monitoring locations is given in <b>Chapter 3 Section 7 Figure 3-15.</b>   |

| S. No   | Terms of Reference   | Compliance  |
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|   | Soil characteristics as per CPCB guidelines  | Soil quality monitoring locations & results are given in <b>Chapter 3 Section 9 Table 3-16</b> and <b>Table 3-17</b> . Map showing the soil monitoring locations is given in <b>Figure 3 18</b> .   |
|   | Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.   | The Traffic Assessment and vehicular movement for the proposed project is given in <b>Chapter 4 Section 3.4 &amp; Table 4 6</b> .   |
|   | Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic, and endangered species. If schedule-I fauna and found within the study area, a Wildlife Conservation plan shall be prepared and furnished   | Details of flora and fauna was provided in <b>Chapter 3 Section 10</b>  |
|   | Socio-economic status of the study area  | Details on population profile within study area provided in Table3-23 and socio-economic indicator within the study area details provided in Table 3-24   |
| 7   | <b>Impact and Environment Management Plan</b>  |   |
|   | Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP modeling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed.<br>Details of the model used, and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of the project site, habitation nearby, sensitive receptors, if any. | It was observed that the maximum concentration of PM10, SO2, NOx observed due to proposed stacks are 0.671µg/m3, 0.625µg/m3, & 9.556 µg/m3 without control measures. So, it can be concluded that the impact envisaged is minimum and well within the CPCB standard. Total Maximum GLCs from the proposed Stack Emissions for March 2024 to May 2024 and summarized in <b>Chapter 4 Section Table 4 5</b> . |
|   | Water quality modelling- in case of discharge in water body  | Not applicable  |
| Impact of the transport of raw material and end products on the surrounding | Impacts due to traffic, Transportation and the Traffic Assessment and vehicular movement for   |   |

| S. No | Terms of Reference  | Compliance  |
|-------|---|---|
|       | environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.   | the proposed project is given in <b>Chapter 4 Section 3.4 Table -4 6.</b>   |
|       | A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment, characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) rules.  | <p>The various hazardous waste generated from the process are used or spent oil, ETP sludge from wastewater treatment. ETP sludge waste is stored within the premises and disposed of as per the guidelines of CPCB and TNPCB which will be sent to TSDF facility. Hazardous waste materials will be properly disposed of as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 1989 and subsequent amendment in 2016.</p> <p>The quantities of the solid waste generation before and after the proposed expansion are presented in <b>Chapter 4 Section 4.3.6.</b></p> |
|       | Details of stack emission and action plan for control of emissions to meet standards.   | Details of the stack emissions and Control of emissions provided in <b>Chapter 2 Section 8.2</b>  |
|       | Measures for fugitive emission control  | Measures for fugitive emission control provided in <b>Chapter 2 Section 8.2</b>   |
|       | Details of hazardous waste generation and their storage, utilization and management, Copies of MOU regarding utilization of solid and hazardous waste in cement plant also be included. EMP shall include the concept of waste-minimization, recycle/ reuse/recover techniques, Energy conservation, and natural resource conservation. | <p>The various hazardous waste generated from the process are used or spent oil, ETP sludge from wastewater treatment. ETP sludge waste is stored within the premises and disposed of as per the guidelines of CPCB and TNPCB which will be sent to TSDF facility. Hazardous waste materials will be properly disposed of as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 1989 and subsequent amendment in 2016.</p> <p>The quantities of the solid waste generation before and after the proposed expansion are presented in <b>Chapter 4 Section 4.3.6.</b></p> |
|       | Proper utilization of fly ash shall be ensured as per Fly Ash notification,   | The fly ash generated will be collected, stored in closed sheds within the plant site and disposed to   |



| S. No | Terms of Reference   | Compliance   |
|-------|--|--|
|       | 2009. A detailed plan of action shall be provided.   | cement manufacturer. Hence, no impact is envisaged on soil quality of the project site.  |
|       | Action plan for the green belt development plan in 33% area i.e., land with not less than 1500 trees per ha. Giving details of Species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated. | CUMI is allocated 33% (22510.06 Sq.m) of land for green belt development as per norms. The width of the greenbelt will be maintained as per CPCB guidelines and there shall be 3 rows of plants with a gap of 2m between the plants. There are many existing trees planted within the project site. Also, the applicant had proposed to plant some of the native species within the allotted area.<br><br>The list of existing trees within the plant premises is provided in <b>Chapter 4 Section 4.4 &amp; Table 4-13.</b> |
|       | Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.                                  | Rainwater Harvesting (RWH) comprises components of various stages-transporting rainwater through pipes or drains, filtration, and storage in tanks for reuse or recharge pits. Rainwater harvesting details and the Rainwater harvesting Calculation details provided in <b>Chapter 4 Section 4.3.5 &amp; Table 4-10.</b>  |
|       | Total capital cost and recurring cost /annum for environmental pollution control measures shall be included.   | The total capital cost of emp is 14,50,000/- and recurring cost is 13,20,000/- per annum. the Environmental plan details provided in Chapter 6, <b>section 6-12, Table 6-6.</b>  |
|       | Action plan for post-project environmental monitoring shall be submitted   | Details of post project Monitoring is provided in <b>Chapter 6 Section 6.5 Table 6-3</b>   |
|       | Onsite and offsite Disaster (natural and Man-made) preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster Management Plan should be linked with District Disaster Management Plan.  | Risk assessment details and disaster management plan details provided in <b>Chapter 7 Section 2</b>  |
| 8     | <b>Occupational Health</b>   |  |
|       | Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers   | Capital cost of 5,00,000/- is allocated to the occupational health and safety and 50,000/- of recurring cost per year. the Environmental plan details provided in Chapter 10 section 11, Table 10-19   |
|       | Details of exposure specific health status evaluation of worker. If the worker's health is being evaluated by pre-designed format, chest x-rays,   | The details of occupational health and safety is given in Chapter 10 Section 7.8.  |

| S. No  | Terms of Reference   | Compliance   |
|--|--|--|
|  | Audiometry, Spirometry, Vision testing (Far and near vision, colour vision and any other ocular defect), ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above-mentioned parameters as per age, sex, duration of exposure and department wise. |  |
|  | Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL) if these are not within PEL, what measures the company has adopted to keep them within PEL. So that health of the workers can be preserved.                              | Details of Occupational Health Impacts and Safety Hazards are provided in <b>Chapter 4 Section 4.4.4 Table 4-16.</b><br><br>A list of 29 notifiable diseases in Schedule III, permissible exposure limit (PEL) values in Schedule II, and list of dangerous operations is given in the Factories Act.  |
|  | Annual report of health status of workers with special reference to Occupational Health and Safety   | Employees undergo annual health check-ups. The details of the occupational health and safety is provided in <b>Chapter 4 Section 4.4.4 Table 4-16.</b>   |
| 9  | <b>Corporate Environment Policy</b>  |  |
|  | Does the company have a well laid down Environmental Policy approved by its Board of Directors? If so, it may be detailed in the EIA report  | Yes, in addition to the Environment Safety & Health policy, CUMI will have Environmental Policy to adhere with standard operating process to comply with the statutory and bring into focus any infringement of any norms and directives with regards to the SHE and to take further corrective actions. The Environmental Policy is enclosed as <b>Annexure-18.</b> |
|  | Does the Environment Policy prescribe for standard operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environment or forest norms/ conditions? If so, it may be detailed in the EIA   | es, The Environmental Policy is enclosed as <b>Annexure-18.</b>  |
|  | What is the hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.   | Environmental Management Cell is designed, and the details are provided in <b>Chapter 10, Section 10.3.</b>  |
| Does the company have a system of reporting non-compliances/ violations of environmental norms to the Board of Directors of the company and/or | Yes, the details are provided in <b>Chapter 10.</b>  |  |

| S. No   | Terms of Reference  | Compliance   |
|---|---|--|
|   | Shareholders or stakeholders at large?<br>This reporting mechanism shall be detailed in the EIA report  |  |
| 10  | Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.   | All types of infrastructure facilities are provided to the direct and indirect workers of the project. The development of CSR activities like drinking, sanitation and infrastructure facilities will be provided to the nearby habitation.  |
|   | <b>Enterprise Social Commitment (ESC)</b>   |  |
| 11  | Adequate funds (at least 2.5% of the project cost) shall be earmarked towards the Enterprise Social Commitment based on public Hearing issues and item-wise details along with the bound action plan shall be included. Socio-Economic development activities need to be elaborated upon.   | 1.0% of project cost (Rs 36.25 Lakhs) is allocated under CER to nearby villages/neighborhoods & 2.5 % of Annual profit will be provided for CSR & Development of surrounding region & Income generation of the large community of farmers. The amount of 36.25 Lakhs will be allocated to the requirement of villages and issues/opinions raised during Public Hearing. The development of CSR activities like drinking, sanitation and infrastructure facilities will be provided to the nearby habitation. |
| 12.   | Any litigation pending against the project and/ or any direction/ order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under section 5 of the Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance /ATR to the notice(s) and present status of the case. | Nil  |
| 13.   | A tabular chart with index for points wise compliance of above TOR.   | Noted  |
| <b>Specific Terms of Reference for EIA studies for Metallurgical Industries (Ferrous and Non-Ferrous)</b> |   |  |
| 1   | Complete Process flow diagram describing each unit, its processes, and operations, along with material and energy inputs & outputs (material and energy balance)  | M/s. Chennai United Metal Private Limited has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.                    |

| S. No | Terms of Reference   | Compliance  |
|-------|--|---|
|       |  | <p>The proposed project comes under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 &amp; its further amendments as per the MoEF&amp;CC Notification S.O 3250(E), dated: 20th July 2022 the unit requires Environmental Clearance.</p> <p>Material Balance for MS Billets (Existing) is provided in <b>Table 2-17</b>.</p> <p>Material Balance for Re-Rolled Steel Angle &amp; Flat Bars, Patras, Channels &amp; Hollow sections. (Existing) is provided in <b>Table 2-18</b>.</p> <p>Material Balance for MS Billets (Proposed) is provided in Table 2-19 and Material Balance for Re-Rolled Steel Angle &amp; Flat Bars, Patras, Channels &amp; Hollow sections. (Proposed) are provided in <b>Table 2-20</b>.</p> |
| 2     | Details on blast furnace/ open hearth furnace/ basic oxygen furnace/ladle refining, casting and rolling plants etc.. | The details are provided in <b>Chapter 2, Section 2.6.3</b>   |
| 3     | Details on installation/activation of copacity meters with recording with proper calibration system                  | Will be provided at the time of Final EIA Submission  |
| 4     | Details on toxic metals including mercury, arsenic, and fluoride emissions   | No  |
| 5     | Details on stack height requirement for integrated steel   | Stack details for the proposed integrated project is provided in <b>Chapter 2, Section 2.6.3</b>  |
| 6     | Details on ash disposal and management -Non-ferrous metal  | Solid And Hazardous Waste Generation and Management including -Non-ferrous metal is provided in <b>Chapter 2, Section 2.8.5</b> .   |
| 7     | Complete process flow diagram describing production of lead/zinc/copper/ aluminum, etc.                              | <p>A list of machinery &amp; equipment’s are shown in <b>Table 2-21</b>. List of proposed machineries &amp; equipments for Re Rolling Mill is provided in <b>Table 2- 22</b>.</p> <p>Integrated plant manufacturing process is shown in <b>Chapter 2, Section 2.6.3</b></p>   |
| 8     | Raw materials substitution or elimination  | Integrated plant material balance is provided in <b>Table 2-20 &amp; Table 2-21</b>   |
| 9     | Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation                                | Integrated plant manufacturing process is shown in <b>Chapter 2, Section 2.6.3</b>  |

| S. No  | Terms of Reference   | Compliance  |
|--|--|---|
| 10   | Details on Holding and de-gassing of molten metal from primary and secondary aluminum, materials pre-treatment, and from melting and smelting of secondary aluminum  | Integrated plant manufacturing process is shown in <b>Chapter 2, Section 2.6.3</b>                                  |
| 11   | Details on solvent recycling.  | Nil   |
| 12   | Details on precious metals recovery  | Nil   |
| 13   | Details on composition, generation, and utilization of waste/fuel gases from coke oven plant and their utilization.  | Not applicable  |
| 14   | Details on toxic metal content in the waste material and its composition and end use (particularly of slag).   | Test reports for scrap imported and composition of scrap obtained from laboratory is enclosed as <b>Annexure-19</b> |
| 15   | Trace metals Mercury, arsenic and fluoride emissions in the raw material.  | Test reports for scrap imported and composition of scrap obtained from laboratory is enclosed as <b>Annexure-19</b> |
| 16   | Trace metals in waste material especially slag.  | Test reports for scrap imported and composition of scrap obtained from laboratory is enclosed as <b>Annexure-19</b> |
| 17   | Plan for trace metal recovery  | Not applicable  |
| 18   | Trace metals in water.   | Nil   |
| <b>Additional ToR for Integrated Steel Plant</b> |  |   |
| 1  | Iron ore/coal linkage documents along with the status of environmental clearance of iron ore and coal mines  | Not applicable  |
| 2  | Quantum of production of coal and iron ore from coal & iron ore mines and the project they cater to. Mode of transportation to the plant and its impact  | Not applicable  |
| 3  | For Large ISPs, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated  | Digital Elevation Model will be provided during time of Final EIA submission.                                       |
| 4  | Recent land-use map based on satellite imagery. High-resolution satellite image data having 1 m-5m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc. for the 10 Km radius area from proposed site. The same shall be used for land used/land-cover mapping of the area | Land Use Pattern of the Study Area is provided as <b>Figure 3-6 in chapter 3.</b>                                   |
| 5  | Respirable Suspended particulate matter (R SPM) present in the ambient   | Eight (08) monitoring locations have been identified as per annual wind predominance of                             |

| S. No   | Terms of Reference   | Compliance  |
|---|--|---|
|   | air must be analysed for source analysis - natural dust/RSPM generated from plant operations (trace elements). The RSPM shall also be analysed for presence of poly-aromatic hydrocarbons (PAH), i.e., Benzene soluble fraction, where applicable. Chemical characterization of RSPM and incorporating of RSPM data. | Nungambakkam from IMD AAQ monitoring locations are selected based on Annual wind predominance, map showing the Ambient Air Quality monitoring locations is given in Figure 3 14 and the details of the locations are given in Table 3 6<br><br>Summary of the average baseline concentrations of pollutants is provided in <b>Table 3-8</b> . Poly-aromatic hydrocarbons (PAH), i.e., Benzene is found BDL. |
| 6   | All stockpiles will have to be on top of a stable liner to avoid leaching of materials to ground water.  | Not applicable  |
| 7   | Plan for the implementation of the recommendations made for the steel plants in the CREP guidelines.   | Yes   |
| 8   | Plan for slag utilization  | Most of the slag material will be reused in the process.  |
| 9   | Plan for utilization of energy in off gases (coke oven, blast furnace)   | Direct Heat Rolling method is adopted for proposed expansion activity   |
| 10  | System of coke quenching adopted with justification.   | No, coke quenching not adopted.   |
| <b>In addition to the above, the following shall be furnished Executive Summary of the EIA/EMP Report</b> |  |   |
| 1   | Project name and location (Village, District, State, and industrial Estate (if applicable)).   | Included in Executive summary of EIA  |
| 2   | Products and capacities. If expansion proposal, then existing products with capacities and reference to earlier EC.  | Included in Executive summary of EIA  |
| 3   | Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)  | Included in Executive summary of EIA  |
| 4   | Process description in brief specifically indicating the gaseous emission, liquid effluent, and solid and hazardous wastes.  | Included in Executive summary of EIA  |
| 5   | Measures for mitigating the impact on the environment and mode of discharge or disposal.   | Included in Executive summary of EIA  |
| 6   | Capital cost of the project, estimated time of completion.   | Included in Executive summary of EIA  |
| 7   | Site selected for the project-nature of land-Agricultural (Single/double crop), barren, Govt/private land, status of is  | Included in Executive summary of EIA  |

| S. No   | Terms of Reference   | Compliance  |
|---|--|---|
|   | acquisition, nearby (in 2-3 Km), water body, population, with in 10 km other industries, forest, eco-sensitive zones, accessibility, (note-I case of industrial estate this information may not be necessary)  |   |
| 8   | Baseline environmental data-air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population.  | Included in Executive summary of EIA  |
| 9   | Identification of hazards in handling. Processing and storage of hazardous material and safety system provided to mitigate the risk.   | Included in Executive summary of EIA  |
| 10  | Likely impact of the project, on air, water, land, flora-fauna, and nearby population.   | Included in Executive summary of EIA  |
| 11  | Emergency preparedness plan in case of natural or in plant emergencies.  | Included in Executive summary of EIA  |
| 12  | Issues raised during public hearing (If applicable) and response given.  | Included in Executive summary of EIA  |
| 13  | CSR plan with proposed expenditure.  | Included in Executive summary of EIA  |
| 14  | Occupational Health Measures.  | Included in Executive summary of EIA  |
| 15  | Post project monitoring plan.  | Included in Executive summary of EIA  |
| <b>Besides the above, the below mentioned general points should also followed</b> |  |   |
| 1   | Authenticated English translation of al material provided in regional languages.   | Yes will be followed the same   |
| 2   | The letter/application for EC shall quote the SEIAA. File No. and also attach a copy of the letter.  | Noted will be provided  |
| 3   | The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report.   | The Index map of the project site is provided in <b>Chapter-2 &amp; Figure 2-1.</b>   |
| 4   | Certificate of Accreditation issued by the QCI to the environmental consultant shall be included.  | Certificate of Accreditation issued by the QCI is Submitted in the <b>Chapter 12.</b> |
| 5   | The prescribed TORs would be valid for a period of Three years for submission of the EIA/EMP reports, as per the O.M. No. J- I 1013/41/2006-IA. 11(I) dated 22.08.2014. As per the Ministry of Environment, Forest and Climate Change Impact Assessment Division, Government of India, Circular Memo No. | Noted   |

| S. No | Terms of Reference  | Compliance |
|-------|---|------------|
|       | I- I 1013/4 1/2006-Ia-II (I) (Part) dated 7'h November, 2015  |            |
| 6     | After preparing the draft EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above-mentioned issues, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006. The final EIA / EMP shall be submitted to the SEIAA — Tamil Nadu for obtaining Environmental Clearance. | Noted      |
| 7     | The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.   | Noted      |
| 8     | <p>The TORs prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.I-1 1 013/41/2006-IA-11(I)(part) dated 29'h August 2017.</p> <p>The receipt of this letter may be acknowledged.</p>  | Noted      |



# **CHAPTER – 1**

## **PROJECT INTRODUCTION**

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*(The brief outline of the project as details of need of the EIA report, project proponent, nature and size of the project, location of the project, and need of project, scope of EIA study and applicable environmental regulations and standards)*

# 1 INTRODUCTION

## 1.1 Project Background

M/s. Chennai United Metal Industries Private Limited is one of the leaders in steel manufacturing in South India. The company was incorporated on 27<sup>th</sup> June 2012 with Registrar of companies, Chennai, Tamil Nadu as a backward integration and set up an Induction furnace unit for manufacturing of Billets with installed capacity of 23,760 Tons/Annum and Rerolled Steel Angle & Flat Bars & Channels with capacity of 61,200 Tons/Annum.

Project proponent has Initially the proponent operating Re-Rolling Mill plant with valid conset orders intime renewals and planned Billets manufacturing(23,760 Ton/Annum) and applied for CTE on 1<sup>st</sup> June 2022 and obtained CTE for Billet plant on 18<sup>th</sup> June 2022, constructed shed for Billat plant vide No. 2201145553551 dated on 18/06/2022 and along with Manufacture of Rerolled Steel Angle & Flat Bars & Channels (61,200 Tons/Annum) facility and obtained Renewal CTO for the same, vide No. 2108239615131 dated on 10/08/2021 which the project does not attract Environmental Clearance.

The demand for the billets for steel rolling mills is increasing day-by-day due to various development works proposed by the Government as well as the Private sectors resulting in vast construction activities in different fields such as building, village development programs, housing and irrigation, concrete roads, etc., So, the project proponent proposed expansion in production capacity within the existing premises.

M/s. Chennai United Metal Private Limited (herein after referred to as CUMI) has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.

As per MoEF&CC Notification S.O 3250(E), dated: 20th July 2022 and the existing & proposed plant required Environmental Clearance and the proposed project comes under Schedule 3(a) "Metallurgical Industries" under Category 'B' as per the EIA Notification 2006 & its further amendments.

In line with EIA notification dated 14.09.2006, The Environmental Clearance application was applied vide 06.03.2023 and TOR meeting was held for determining the Terms of Reference (TOR) on 19<sup>th</sup> Aprill 2023 and obtained Terms of Reference vide SEAC letter no. TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023 for the carried-out Baseline

studies and preparation of EIA report for the proposed expansion project. The copy of Terms of Reference (ToR) is attached as **Annexure-I**.

The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing.

The Final Environmental Impact Assessment study report after Public Hearing, has been prepared for obtaining Environmental Clearance (EC) from SEIAA of Tamil Nadu and to get further consents from the Tamil Nadu Pollution Control Board (TNPCB) for the proposed expansion project.

Project site is situated at Survey No's. 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C, 2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F, 13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A, 15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B, 22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A, 2B, 2C, 2D, 2E of Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.

The site is in a longitude 77°26'7.70"E and latitude 8°48'12.67"N. The project site is located adjacent to Satyavedu to Kavaraipettai (SH-52) in the North direction. The nearest railway station of Gummidipoondi Railway Station ~ 6.72km (ENE) and the nearest airport Chennai International Airport is located at ~ 42.34km (SSE) southeast direction. The proposed production details are given in **Table 1-1**.

**Table 1-1 List of Proposed Products**

| S. No        | Name of the product  | Quantity (TPA) |                 |                 |
|--------------|--|----------------|-----------------|-----------------|
|              |  | Existing       | Proposed        | After Expansion |
| 1            | Billets  | 23,760         | 1,76,240        | 2,00,000        |
| 2            | Re-Rolled Steel Angle & Flat Bars, Channels Patra & Hollow section | 61200          | 1,38,800        | 2,00,000        |
| <b>Total</b> |  | <b>84,960</b>  | <b>3,15,040</b> | <b>4,00,000</b> |

## 1.2 Categorization of the Project

The proposed project termed under Schedule 3(a) "Metallurgical Industries" under Category 'B' as per the EIA Notification 2006 & its further amendments as per the

MoEF&CC Notification S.O 3250(E), dated: 20th July 2022 the unit requires EC. Since, project site is in a non-Industrial area” so, attracting Public Hearing.

- ✓ It is a brown field project, M/s. Chennai United Metal Industries Private Limited is one of the leaders in steel manufacturing in South India. The company was incorporated on 27<sup>th</sup> June 2012 with Registrar of companies, Chennai, Tamil Nadu as a backward integration and set up an Induction furnace unit for manufacturing of Billets with installed capacity of 23,760 Tons/Annum and Rerolled Steel Angle & Flat Bars & Channels with capacity of 61,200 Tons/Annum to Manufacture the Billets with capacity 23,760 Tons/Annum is obtained CTE vide No. 2201145553551 dated on 18/06/2022 and to Manufacture of Rerolled Steel Angle & Flat Bars & Channels with capacity 61,200 Tons/Annum obtained CTE for the same, vide No. 2108239615131 dated on 10/08/2021 Since, Initially the project is not attracts the Environmental Clearance.
- ✓ Now, the proposed project comes under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 & its further amendments as per the MoEF&CC Notification S.O 3250(E), dated: 20<sup>th</sup> July 2022 the unit requires Environmental Clearance.
- ✓ As well as due to the demand for the billets for steel rolling mills is increasing day-by-day due to various development works proposed by the Government as well as the Private sectors resulting in vast construction activities in different fields such as building, village development programs, housing and irrigation, concrete roads, etc., So, the project proponent proposed expansion in production capacity within the existing premises.
- ✓ In line with the said notification, TOR application has been filed to SEAC/SEIAA on 6<sup>th</sup> March 2023 vide proposal No. SIA/TN/IND1/419918/2023 as an Integrate Plant. TOR meeting is held in SEAC-TN on 19.04.2022, ToR has granted with public hearing. Base line Studies are carried out during the period of March 2024 to May 2024 as per OM. No. J-11013/41/2006-IA-II (I) (Part) dated; 29<sup>th</sup> August 2017 & the draft EIA report has been prepared in line with the prescribed ToR vide Lr. No. SEIAA-TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023. The EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification for Public Consultation as per the said notification and SEIAA TN.

- ✓ The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing.

### **1.3 Purpose and Status of the Report and its importance**

The unit has been established in the year 2014 and was in operation with valid consent order from TNPCB since, Initially the project does not attract Environmental Clearance.

Now, the proposed project comes under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 & its further amendments as per the MoEF&CC Notification S.O 3250(E), dated: 20th July 2022 the unit requires Environmental Clearance.

In line with EIA notification dated 14.09.2006, a TOR meeting was held for determining the Terms of Reference (TOR) on 19<sup>th</sup> April 2023 and obtained Terms of Reference vide SEAC letter no. TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023 for the carried-out Baseline studies and preparation of EIA report for the proposed expansion project. The copy of Terms of Reference (ToR) is attached as **Annexure-I**.

This Environmental Impact Assessment study report will be prepared for obtaining Environmental Clearance (EC) from SEIAA of Tamil Nadu and to get further consents from the Tamil Nadu Pollution Control Board (TNPCB) for the proposed expansion project.

The demand for the billets for steel rolling mills is increasing day-by-day due to various development works proposed by the Government as well as the Private sectors resulting in vast construction activities in different fields such as building, village development programs, housing and irrigation, concrete roads, etc., So, the project proponent proposed expansion in production capacity within the existing premises.

### **1.4 Brief Description of Nature, Size, Location of the Project & Its Importance**

#### **1.4.1 Nature, Size & Location of the project**

##### **Nature of the project:**

The proposed project termed under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 & its further amendments as per the MoEF&CC Notification S.O 3250(E), dated: 20th July 2022 the unit requires EC. Since, project site is in a non-Industrial area” so, the project attract Public Hearing.

It is a brown field project, M/s. Chennai United Metal Industries Private Limited is one of the leaders in steel manufacturing in South India. The company was incorporated on 27<sup>th</sup> June 2012 with Registrar of companies, Chennai, Tamil Nadu as a backward integration and set up an Induction furnace unit for manufacturing of Billets with installed capacity of 23,760 Tons/Annum and Rerolled Steel Angle & Flat Bars & Channels with capacity of 61,200 Tons/Annum to Manufacture the Billets with capacity 23,760 Tons/Annum is obtained CTE vide No. 2201145553551 dated on 18/06/2022 and to Manufacture of Rerolled Steel Angle & Flat Bars & Channels with capacity 61,200 Tons/Annum obtained CTE for the same, vide No. 2108239615131 dated on 10/08/2021 Since, Initially the project is not attracts the Environmental Clearance.

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As well as due to the demand for the billets for steel rolling mills is increasing day-by-day due to various development works proposed by the Government as well as the Private sectors resulting in vast construction activities in different fields such as building, village development programs, housing and irrigation, concrete roads, etc., So, the project proponent proposed expansion in production capacity within the existing premises.

In line with the said notification, TOR application was filed to SEAC/SEIAA on 6<sup>th</sup> March 2023 vide proposal No. SIA/TN/IND1/419918/2023. TOR meeting is held in SEAC-TN on 19.04.2023, ToR has granted with public hearing. Base line Studies are carried out during the period of March 2024 to May 2024 as per OM. No. J-11013/41/2006-IA-II (I) (Part) dated; 29<sup>th</sup> August 2017 & the draft EIA report has been prepared in line with the prescribed ToR vide Lr. No. SEIAA-TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023. The EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification for Public Consultation as per the said notification and SEIAA TN.

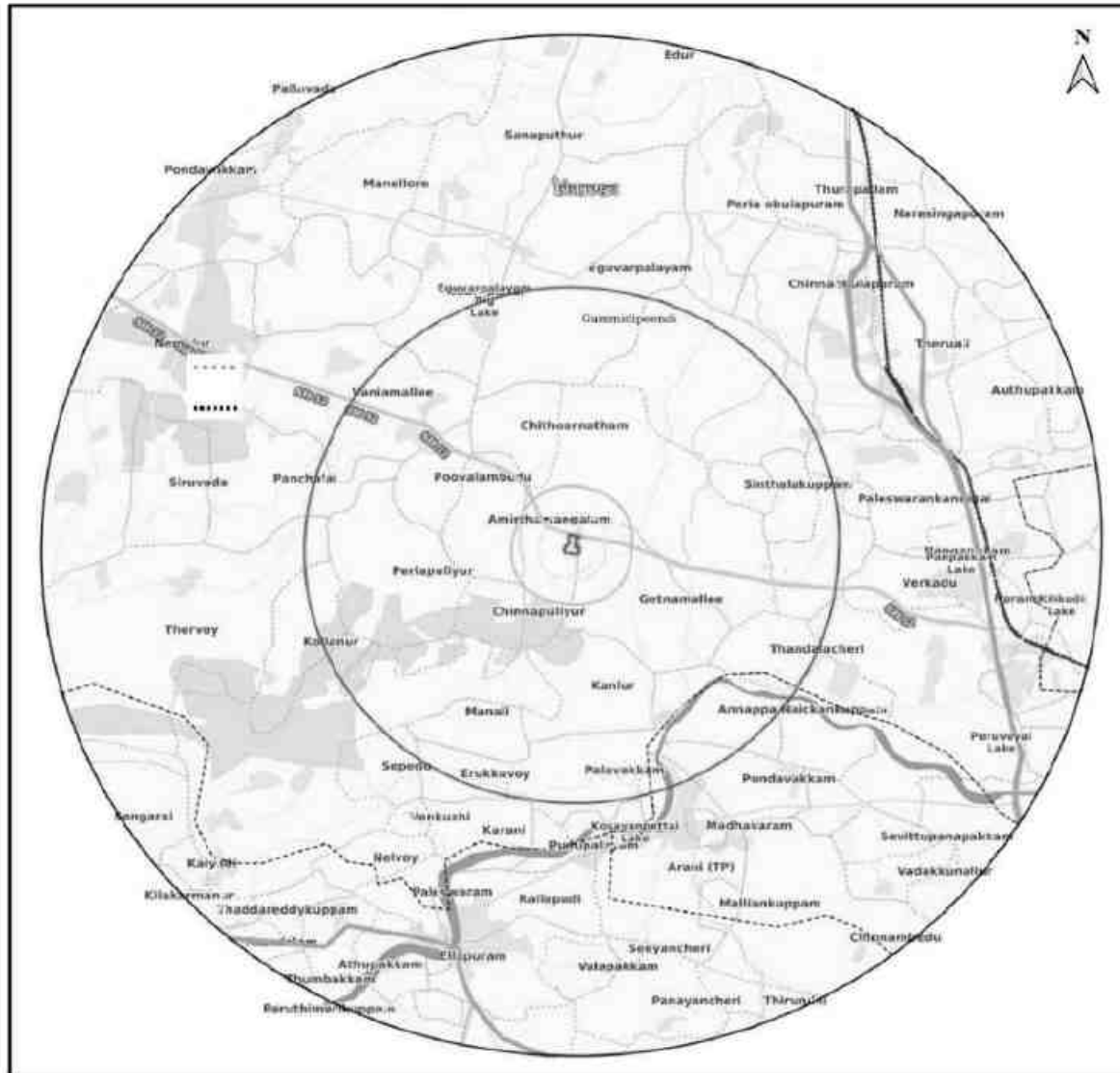
The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing.

#### **1.4.2 Size & Location of the project**

M/s. Chennai United Metal Private Limited has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000

Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.

The proposed plant is located at Survey No's. 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C, 2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F, 13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A, 15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B, 22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A, 2B, 2C, 2D, 2E of Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, TamilNadu. The total site area is 16.86 Acres (68212.31 Sq. m). The project location index map is shown in **Figure 2-1** and Satellite Image of the project location is appeared in **Figure 2-2**. Administrative Map of Project Study area is given in **Figure 1-1**. Google satellite Imagery of 1 km, 5km, 10km and Environmental sensitive areas within 15km radius of the project site given as **Figure 2-3** to **Figure 2-5**. Geographical Coordinates of the project site is given in **Table 2-2**.



## ADMIN MAP

**Legend**

- Project Site
- Settlements
- Forest
- River
- Tanks/ Lakes/ Ponds
- Roads
- Railway Track
- 0.5 Km Radius Boundary
- 1 Km Radius Boundary
- 5 Km Radius Boundary
- 10 Km Radius Boundary
- Village Boundary
- Mandal Boundary

Map No: EIA - 3a - CUMI - 006

Source: SOI Toposheets, Scale - 1:50000  
[Bhuvan.nrsc.gov.in/Thematic Layers](http://Bhuvan.nrsc.gov.in/Thematic Layers)

Client: M /S. Chennai United Metal Industries Pvt Ltd., Sirupuzhalpettai & Getnamalee Village, Gumudipoondi Taluk, Thiruvallur District, TN.

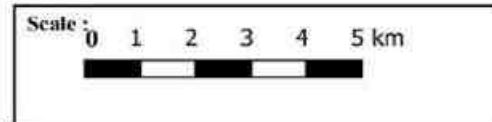




Figure 1-1 Administrative Map of Project Study area

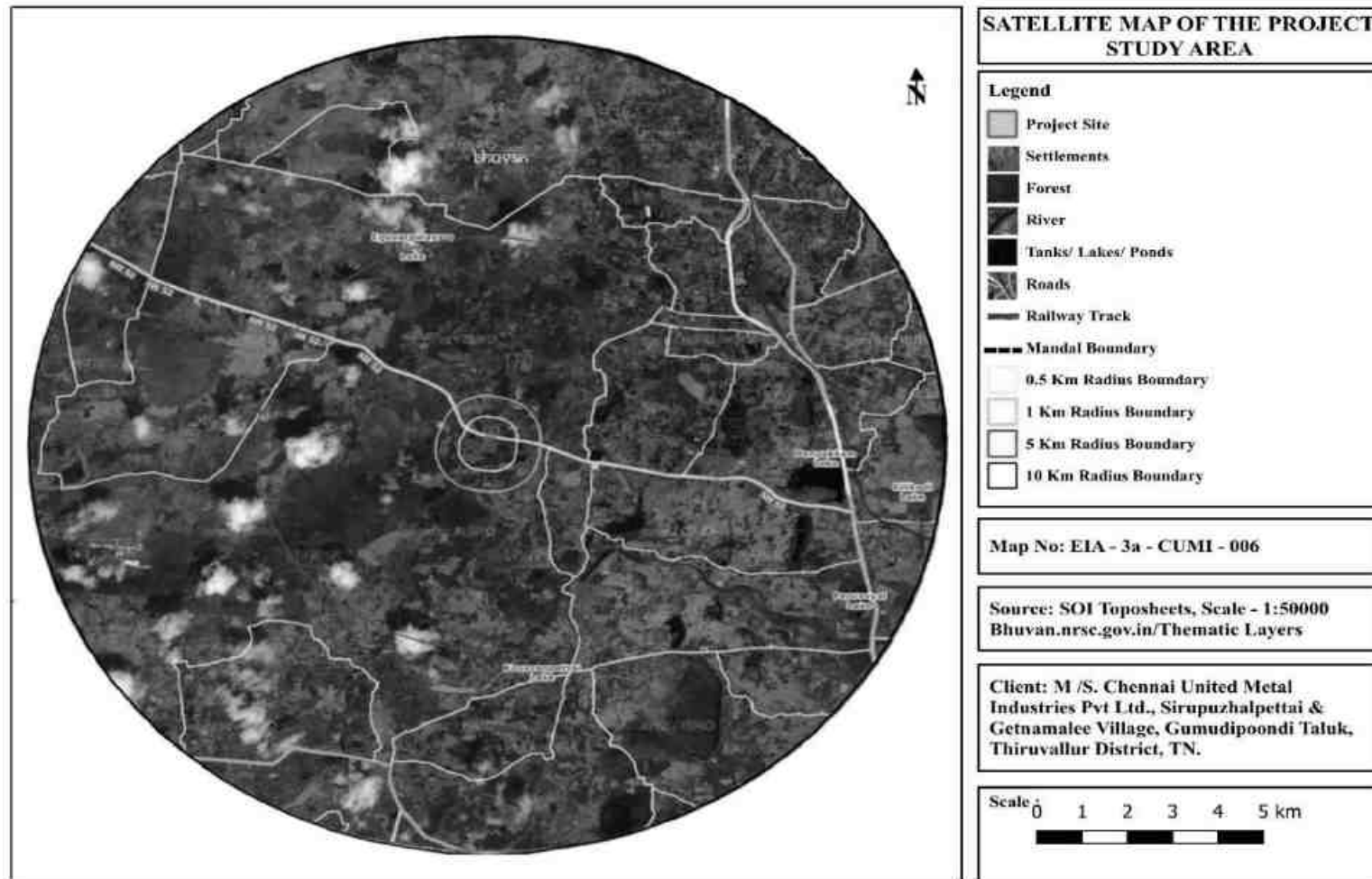


Figure 1-2 Map showing the Satellite Image of the study area

The Salient features of the project site are represented in **Table 1-2**.

**Table 1-2 Salient Features of the Project**

| S. No | Particulars                                  | Details  |                              |                         |                   |
|-------|--|--|------------------------------|-------------------------|-------------------|
| 1.    | Site Centre Co-ordinates of the project site | latitude: 13°22'52.67"N<br>Longitude: 80° 3'56.83"E  |                              |                         |                   |
| 2.    | Elevation                                    | 23 - 25m AMSL  |                              |                         |                   |
| 3.    | Present land use & Topography                | In Industrial use & Plain terrain  |                              |                         |                   |
| 4.    | Nearest Highway                              | SH-52: Satyavedu to Kavaraipettai = Adjacent (N)<br>NH-5: Chennai to Jharpokharia ~ 6.18km (ENE) |                              |                         |                   |
| 5.    | Nearest railway Station                      | Gummidipoondi Railway Station ~ 6.72km (ENE)   |                              |                         |                   |
| 6.    | Nearest Airport                              | Chennai International Airport ~ 42.34km (SSE)  |                              |                         |                   |
| 7.    | Nearest village                              | Rajulakandigai, 0.27Km, W  |                              |                         |                   |
| 8.    | Nearest Town                                 | Gummidipoondi, 4.45Km (NE)   |                              |                         |                   |
| 9.    | Nearest seaport                              | Ennore Kamarajar Port Limited-30.99 Km, ESE  |                              |                         |                   |
| 10.   | Defense Installations                        | Tambaram Air Force Station, 52.05km, S   |                              |                         |                   |
| 11.   | Nearest City                                 | Chennai - 29.44Km (SE)   |                              |                         |                   |
| 12.   | Hills & valleys                              | Nil within 15 Km radius of the project   |                              |                         |                   |
| 13.   | Nearest River/ Lakes/Dams                    | <b>S. No.</b>  | <b>Names</b>                 | <b>Distance. (~ Km)</b> | <b>Direction.</b> |
|       |  | 1  | TG Canal/SS Ganga Canal      | 12.93                   | WNW               |
|       |  | 2  | Canal                        | 7.95                    | WSW               |
|       |  | 3  | Arani River                  | 3.52                    | SE                |
|       |  | 4  | Pond                         | 0.99                    | S                 |
|       |  | 5  | Lake near Kanalur            | 2.21                    | S                 |
|       |  | 6  | Lake near malliyankuppam     | 6.41                    | SSE               |
|       |  | 7  | Lake near arani              | 5.88                    | SSE               |
|       |  | 8  | Lake near Melmudalambedu     | 4.92                    | ESE               |
|       |  | 9  | Lake near Kilmudalambedu     | 5.65                    | E                 |
|       |  | 10   | Panappakkam lake             | 6.43                    | E                 |
|       |  | 11   | Eri near kattavur            | 10.89                   | E                 |
|       |  | 12   | Lake near Sengattakolam      | 9.7                     | SSW               |
|       |  | 13   | Lake near Jayapuram          | 10.92                   | S                 |
|       |  | 14   | Lake near Erukuvay           | 2.8                     | SSW               |
|       |  | 15   | Lake near Tambunaidupalaiyam | 6.77                    | SW                |
|       |  | 16   | Sulameni Eri                 | 10.15                   | WSW               |
|       |  | 17   | Eri near Periyapuliyur       | 3.69                    | W                 |
|       |  | 18   | Lake near Thervoykandigai    | 8.64                    | W                 |
|       |  | 19   | Eri near Pettai              | 3.02                    | NW                |
|       |  | 20   | Eri near Madarpakkam         | 9.86                    | NW                |
|       |  | 21   | Pallavada Lake               | 9.84                    | NW                |
|       |  | 23   | Lake near Sittunnattam       | 3.3                     | NNW               |
|       |  | 24   | Eri near Surapundi           | 7.66                    | NNW               |
|       |  | 25   | Tank near Kannambakkam       | 13.04                   | NNW               |
|       |  | 26   | Pulicat Lake                 | 12.7                    | NNE               |
|       |  | 27   | Gummidipoondi Lake           | 6.57                    | E                 |
|       |  | 28   | Eri near Edapalaiyam         | 9.15                    | E                 |
|       |  | 29   | Lake near Ayanallurkandigai  | 10.94                   | ENE               |

| S. No | Particulars   | Details   |   |                        |                      |
|-------|---|---|---|------------------------|----------------------|
|       |   |   |   | 30                     | Eri near kumaranjeri |
|       |   | 31  | Eri near Edakuppam                                      | 14.36                  | E                    |
|       |   | 32  | Eri near Kattappavaram                                  | 12.98                  | NE                   |
|       |   | 33  | Tank near Ramanayakankandigai                           | 2.98                   | SE                   |
|       |   | 34  | Canal   | 7.95                   | WSW                  |
| 14.   | Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas & Archeologically Important Places/ Tourist/Religious importance | SH-52: Satyavedu to Kavaraipettai = Adjacent (N)<br>NH-5: Chennai to Jharpokharia ~ 6.18km (ENE)<br>Gummidipoondi Railway Station ~ 6.72km (ENE)<br>Chennai International Airport ~ 42.34km (SSE) |   |                        |                      |
| 15.   | Ecologically sensitive areas (National Parks/Wildlife sanctuaries/Biosphere reserves)   | Pulicat Birds Sanctuary located at 12.7km (NNE)   |   |                        |                      |
| 16.   | Monuments   | <b>S. No</b>  | <b>Names</b>  | <b>Distance (~ Km)</b> | <b>Direction</b>     |
|       |   | 1   | Urn Burials   | 12.5                   | WSW                  |
|       |   | 2   | Cairn Site  | 10.6                   | WSW                  |
|       |   | 3   | Megalithic Cists and cairns                             | 7.56                   | W                    |
|       |   | 4   | Megalithic Cists and cairns                             | 6.9                    | WNW                  |
|       |   | 5   | Megalithic Cists and cairns                             | 1.5                    | NW                   |
|       |   | 6   | Megalithic cists and cairns with bounding stone circles | 12.69                  | NNW                  |
|       |   | 7   | Megalithic cists  | 14.45                  | NW                   |
| 17.   | Reserved/Protected Forests within 15Km radius   | <b>S. No.</b>   | <b>Names</b>  | <b>Distance (~ Km)</b> | <b>Direction</b>     |
|       |   | 1   | Panchali RF   | 6.32                   | WNW                  |
|       |   | 2   | Sirvedu RF  | 7.76                   | WNW                  |
|       |   | 3   | Nemalur RF  | 7.42                   | WNW                  |
|       |   | 4   | TG Canal/SS Ganga Canal                                 | 12.93                  | WNW                  |
|       |   | 5   | Satyavedu RF  | 13.88                  | WNW                  |
|       |   | 6   | Irukulam RF   | 12.29                  | NW                   |
|       |   | 7   | Manali RF   | 0.99                   | SSW                  |
|       |   | 8   | Palavakkam RF   | 3.06                   | WSW                  |
|       |   | 9   | Senjiagaram RF  | 14.5                   | WSW                  |
|       |   | 10  | Vembedu RF  | 14.51                  | SSW                  |
| 18.   | <b>List of Industries available within 15 km radius from Project site boundary</b>  |   |   |                        |                      |
|       | <b>S. No</b>  | <b>Name of the Industries</b>   | <b>Distance (~ km)</b>                                  | <b>Direction</b>       |                      |
|       | 1.  | SMR Foods Mill  | 0.03  | N                      |                      |
|       | 2.  | Sri Chakra Industries   | 0.18  | WNW                    |                      |
|       | 3.  | Jindal Stainless Steelway Ltd.  | 0.80  | WNW                    |                      |
|       | 4.  | Shalimar Paints   | 0.94  | WNW                    |                      |
|       | 5.  | Sivanesan Company   | 0.48  | ENE                    |                      |
|       | 6.  | Houseware Industries U II   | 0.83  | NNE                    |                      |
|       | 7.  | Proconnect Integrated Logistics   | 1.52  | ESE                    |                      |

| S.<br>N<br>o | Particulars                                |       | Details |  |
|--------------|--|-------|---------|--|
|              |  |       |         |  |
| 8.           | Keld Ellentoft India Pvt Ltd               | 2.08  | E       |  |
| 9.           | Nordex India Pvt Ltd                       | 2.21  | E       |  |
| 10.          | Samkit imaging systems pvt ltd.            | 2.33  | E       |  |
| 11.          | Bridge N Bond Factory                      | 2.62  | E       |  |
| 12.          | Super Stahl India GMPD                     | 3.15  | E       |  |
| 13.          | Shree Shyama Traders                       | 3.99  | E       |  |
| 14.          | Aar Pee Jee Steel Industries               | 4.23  | E       |  |
| 15.          | Performance Products and Services          | 4.35  | E       |  |
| 16.          | Premium fats Pvt Ltd                       | 4.11  | E       |  |
| 17.          | ferromet steel pvt ltd                     | 4.74  | E       |  |
| 18.          | Jethwik Aqua Water Company                 | 4.52  | E       |  |
| 19.          | Suntex processing mill                     | 5.02  | E       |  |
| 20.          | Aachi Masala Foods Pvt Ltd                 | 5.17  | E       |  |
| 21.          | AGS Aluminium Alloys Pvt Ltd               | 5.32  | E       |  |
| 22.          | Madras Radiators and Pressings Ltd         | 5.92  | E       |  |
| 23.          | Don Construction Chemicals (India) Limited | 6.44  | E       |  |
| 24.          | Saran Machine Plaza                        | 9.41  | ESE     |  |
| 25.          | Yanmar Engine Manufacturing India          | 10.71 | ESE     |  |
| 26.          | Track Design India                         | 10.79 | ESE     |  |
| 27.          | Usui susira international pvt ltd          | 10.99 | ESE     |  |
| 28.          | Nissei electric India P ltd                | 10.78 | ESE     |  |
| 29.          | Varsha Forgings                            | 11.74 | ESE     |  |
| 30.          | Sri Vijayalakshmi Snuff Products           | 11.94 | ESE     |  |
| 31.          | Mod Forge Pvt Ltd                          | 11.6  | ESE     |  |
| 32.          | Quantum minerals                           | 10.96 | ESE     |  |
| 33.          | RMD Kwikform India Pvt Ltd                 | 10.3  | ESE     |  |
| 34.          | Hari Vishnu Dairy                          | 10.15 | ESE     |  |
| 35.          | Bushan Enterprises                         | 10.06 | ESE     |  |
| 36.          | Kannika aqua products                      | 9.96  | ESE     |  |
| 37.          | Adhitya Precast Products                   | 7.93  | SE      |  |
| 38.          | Astro Aquaculture                          | 8.5   | SE      |  |
| 39.          | BGR Energy Systems Ltd                     | 9.01  | ESE     |  |
| 40.          | Jayaram Earth Movers                       | 8.8   | ESE     |  |
| 41.          | Procam Logistics Private Limited           | 8.57  | ESE     |  |
| 42.          | Konkan speciality poly products            | 7.76  | SE      |  |
| 43.          | IndoSpace Logistic Park Pudukkottai        | 9.63  | SE      |  |
| 44.          | Sheenlac Paints (Unit 5)                   | 8.39  | SE      |  |
| 45.          | Madras Hardtools Pvt. Ltd.                 | 9.83  | SE      |  |
| 46.          | DB Schenker                                | 10.42 | SE      |  |
| 47.          | Agra Casting Pvt Ltd                       | 10.43 | SE      |  |

| S.<br>N<br>o | Particulars                              |       | Details |  |
|--------------|--|-------|---------|--|
|              |  |       |         |  |
| 48.          | Kamachi Foundries Ltd                    | 10.58 | SE      |  |
| 49.          | Farwood Industries Ltd                   | 10.8  | SE      |  |
| 50.          | Chopra Lam Products Pvt.Ltd.             | 9.71  | SE      |  |
| 51.          | Nice Steel                               | 9.62  | SE      |  |
| 52.          | Shuchi Friction Additives Pvt Ltd.       | 9.37  | SE      |  |
| 53.          | El Kay Ess                               | 11.74 | SE      |  |
| 54.          | DB Schenker Ind Pvt Ltd.                 | 11.87 | SE      |  |
| 55.          | MGTuff Toughened Glass Factory           | 11.64 | SE      |  |
| 56.          | VAS Agro                                 | 11.61 | SE      |  |
| 57.          | PMP Iron & Steels (India) Limited        | 11.89 | SE      |  |
| 58.          | GBR Metals Pvt Ltd                       | 11.81 | SE      |  |
| 59.          | Rubino Industries Pvt.Ltd                | 12.17 | SE      |  |
| 60.          | Vaigai Agri Tech                         | 12.1  | SE      |  |
| 61.          | Gnet Impex Pvt Ltd                       | 12.73 | SE      |  |
| 62.          | Uma snuff co                             | 11.66 | SE      |  |
| 63.          | Ragam Polymoulds pvt ltd                 | 11.57 | SE      |  |
| 64.          | Grofers India Pvt Ltd                    | 11.58 | SE      |  |
| 65.          | Arvensis Jayaam India Private Limited    | 2.02  | SSE     |  |
| 66.          | D2H PET Bottles                          | 5.8   | SSE     |  |
| 67.          | Linfox _ Hindustan Unilever Limited      | 9.09  | S       |  |
| 68.          | Nestle India Pvt.Ltd                     | 9.58  | S       |  |
| 69.          | Honda Motor India Pvt Ltd                | 9.83  | S       |  |
| 70.          | Flipkart Pvt Ltd.                        | 9.98  | S       |  |
| 71.          | Mahaveer Chemical                        | 10.24 | S       |  |
| 72.          | Adeshwara chemicals pvt. Ltd             | 10.31 | S       |  |
| 73.          | Ruchi Soya Industries Ltd.               | 10.45 | S       |  |
| 74.          | Sterling Doors & Ply Pvt. Ltd.           | 10.45 | S       |  |
| 75.          | NTC Logistics India Pvt. Ltd.            | 14.6  | SSE     |  |
| 76.          | Sabash Engineering Chennai pvt limited   | 14.45 | SSE     |  |
| 77.          | Neminath Wood industry Pvt Ltd           | 14.36 | SSE     |  |
| 78.          | Golden rock granite company              | 14.17 | SSE     |  |
| 79.          | Nadi Airtechnics Pvt. Ltd. - Unit - 5    | 14.46 | SE      |  |
| 80.          | Herrenknecht India Pvt. Ltd              | 14.57 | SE      |  |
| 81.          | Aadhiti Industries                       | 14.67 | SE      |  |
| 82.          | Grobest Plant                            | 14.08 | SE      |  |
| 83.          | BGR Energy                               | 13.89 | SE      |  |
| 84.          | Polyelastic private limited              | 13.95 | SE      |  |
| 85.          | HIL Ltd                                  | 12.5  | SSE     |  |
| 86.          | Pennar Industries Limited                | 12.9  | SSE     |  |
| 87.          | St peter paul seafoods exporting Company | 12.76 | SSE     |  |

| S.<br>N<br>o | Particulars |  | Details |     |
|--------------|-------------|--|---------|-----|
|              |             |  |         |     |
|              | 88.         | Butterfly Appliances Ltd.                            | 11.23   | S   |
|              | 89.         | Seiyoon Electronics India Private Limited            | 11.5    | SSE |
|              | 90.         | TNS Heavy Engineering U-2                            | 11.3    | SSE |
|              | 91.         | H&S Supply Chain Services Pvt Ltd                    | 11.12   | S   |
|              | 92.         | Kumar agro refinery pvt limited                      | 11.19   | S   |
|              | 93.         | Nordex India Blades PVT Ltd                          | 13.26   | SSW |
|              | 94.         | Michelin India Private Limited                       | 7.66    | WSW |
|              | 95.         | Harsha éxito Engineering Private Limited             | 7.42    | WSW |
|              | 96.         | Baettr India   | 8.1     | WSW |
|              | 97.         | Jesons Industries Ltd Chennai                        | 7.87    | WSW |
|              | 98.         | Wheels India Limited - EEPD                          | 8.07    | WSW |
|              | 99.         | Feed Mill - Sheng Long Bio-Tech (India) Pvt. Ltd.    | 8.27    | WSW |
|              | 100.        | Esthell Rubbers Factory                              | 8.52    | WSW |
|              | 101.        | Mepcrete AAC Blocks                                  | 8.71    | WSW |
|              | 102.        | SUPERGAS Filling Plant                               | 8.45    | W   |
|              | 103.        | Wheels India Ltd                                     | 9.22    | WSW |
|              | 104.        | Mico Plast Industries Pvt. Ltd. - U2                 | 1.16    | WNW |
|              | 105.        | CaplinPoint II (R & D Facility)                      | 1.23    | WNW |
|              | 106.        | J.R. Metal   | 2.56    | WNW |
|              | 107.        | Pashupati Metallics                                  | 3.81    | WNW |
|              | 108.        | Suryaans paper mill                                  | 4.41    | W   |
|              | 109.        | Chetna Steel Tubes Pvt. Ltd.                         | 6.56    | WNW |
|              | 110.        | Sri Venkatachalapathy Alloys P Ltd                   | 6.68    | WNW |
|              | 111.        | Balsara Engineering Products Limited                 | 7.12    | WNW |
|              | 112.        | Prakash Ferrous Industries Private Limited           | 9.76    | WNW |
|              | 113.        | VS Pressure vessels pvt. Ltd                         | 9.85    | WNW |
|              | 114.        | Capricorn Juice factory                              | 14.38   | NW  |
|              | 115.        | Shuchi Beverages Limited                             | 14.77   | NW  |
|              | 116.        | Shuchi Beverages Limited                             | 6.87    | NW  |
|              | 117.        | SL Packaging Industries                              | 7.21    | NW  |
|              | 118.        | Caplin Point Laboratories - CP-IV                    | 1.69    | N   |
|              | 119.        | RJN TRANSPORTS                                       | 2.56    | NWN |
|              | 120.        | Tulsyan NEC Limited                                  | 3.6     | NWN |
|              | 121.        | AGRA Coal Impex                                      | 3.13    | N   |
|              | 122.        | ADS Pro-shield                                       | 3.2     | N   |
|              | 123.        | Tinna Rubber and Infrastructure Limited              | 3.22    | N   |
|              | 124.        | Matsayanayagi Steel's and Foundries Private Limited. | 3.87    | N   |
|              | 125.        | Shree Sai Hanuman Smelters Pvt Ltd.                  | 4.16    | N   |
|              | 126.        | ARS Energy Private Limited                           | 4.19    | N   |
|              | 127.        | Akshara Industries Ltd                               | 5.39    | N   |

| S.<br>N<br>o | Particulars                                |       | Details |  |
|--------------|--|-------|---------|--|
|              |  |       |         |  |
| 128.         | Sonnamu engineering                        | 5.2   | N       |  |
| 129.         | Sri Varalakshmi Agro Tech Industries       | 6.35  | N       |  |
| 130.         | Kevin Steels Pvt Ltd                       | 7.31  | NNW     |  |
| 131.         | Panasonic Life Solutions India Pvt Ltd     | 14.52 | NNW     |  |
| 132.         | Orient Frozen Foods LLP                    | 11.47 | N       |  |
| 133.         | Oren Hydrocarbons Pvt Ltd                  | 1.23  | NNE     |  |
| 134.         | Bhatia Coke & Energy Limited               | 1.18  | NE      |  |
| 135.         | Cauvery Power Plant                        | 2.16  | N       |  |
| 136.         | Sindiya Aqua Mineral pvt. ltd.             | 3.34  | NNE     |  |
| 137.         | Malpani Alloy And Extrusions Pvt Ltd.      | 6.91  | NNE     |  |
| 138.         | Shree Shyam Enterprise                     | 7.1   | NNE     |  |
| 139.         | Apollo Distilleries Pvt Ltd                | 2.65  | N       |  |
| 140.         | Kamlesh Greencrete Private Ltd             | 4.56  | N       |  |
| 141.         | Jai Maruthi Polymers                       | 7.35  | N       |  |
| 142.         | Gea-Bgr Energy System India Ltd            | 12.45 | NNE     |  |
| 143.         | IKN Engineering India Pvt Ltd              | 12.32 | NNE     |  |
| 144.         | MTC Business Pvt. Ltd.                     | 7.32  | NNE     |  |
| 145.         | OPG C3 Plant                               | 6.38  | NNE     |  |
| 146.         | The pearls stone Pvt Ltd                   | 6.45  | NNE     |  |
| 147.         | Uniflow Copper Tubes                       | 6.27  | NNE     |  |
| 148.         | Kamatchi steel factory                     | 5.13  | NNE     |  |
| 149.         | Kamachi power plant                        | 4.96  | NNE     |  |
| 150.         | Kamachi Industries Limited                 | 4.5   | NNE     |  |
| 151.         | Jain Metals and Rolling Mills Pvt. Ltd.    | 4.61  | NNE     |  |
| 152.         | Dalmia Laminators Ltd                      | 4.72  | NNE     |  |
| 153.         | Commtrade Metals                           | 4.75  | NNE     |  |
| 154.         | SRF Limited                                | 4.36  | NE      |  |
| 155.         | Heaven Blanc Energy Private Limited        | 4.04  | NE      |  |
| 156.         | Malathi engineering work (Unit-4)          | 3.6   | ENE     |  |
| 157.         | Jana Engineering Industries                | 3.55  | ENE     |  |
| 158.         | Sri Karunamaye Beverages private limited   | 0.63  | E       |  |
| 159.         | Thirupathy Bright Industries               | 4.2   | E       |  |
| 160.         | Tamil Nadu Coke and Power pvt ltd          | 4.56  | E       |  |
| 161.         | Redington (India) Limited                  | 5.31  | E       |  |
| 162.         | Blendsteel Engineering Private Limited     | 5.59  | E       |  |
| 163.         | Rice Mill                                  | 5.3   | E       |  |
| 164.         | Nelcast Limited                            | 13.55 | SE      |  |
| 165.         | Rane Engine Valve Limited (REVL) - Plant 3 | 13.48 | SE      |  |
| 166.         | BPCL                                       | 3.87  | NE      |  |
| 167.         | HPCL LPG Bottling Plant                    | 4.56  | ENE     |  |

| S.<br>N<br>o | Particulars   |       | Details |  |
|--------------|---|-------|---------|--|
|              |   |       |         |  |
| 168.         | Sri Bharathi Roofing Industries Pvt Ltd                 | 4.48  | ENE     |  |
| 169.         | Kantaflex India Pvt Ltd factory                         | 4.63  | NE      |  |
| 170.         | Abref Private Limited                                   | 4.64  | NE      |  |
| 171.         | Ashok Mineral Enterprises                               | 4.71  | NE      |  |
| 172.         | Time Technoplast Ltd                                    | 4.81  | NE      |  |
| 173.         | Dannys Enterprises Private Limited                      | 4.96  | ENE     |  |
| 174.         | RBC Metal Fabs  | 5.15  | ENE     |  |
| 175.         | Capital Carbon  | 5.11  | ENE     |  |
| 176.         | TVS Sundram Fasteners Ltd Autolec Division Plant 4      | 5.27  | ENE     |  |
| 177.         | Powermax Rubber Factory                                 | 5.78  | ENE     |  |
| 178.         | Wim plast   | 6.03  | ENE     |  |
| 179.         | Alfa Rubber & Springs Pvt Ltd                           | 5.98  | ENE     |  |
| 180.         | Magnatherm Alloys Pvt. Ltd                              | 6.06  | ENE     |  |
| 181.         | Premier Industrial Corporation Ltd                      | 6.15  | ENE     |  |
| 182.         | Tamil Nadu Edible Oils Pvt. Ltd.                        | 6.21  | ENE     |  |
| 183.         | Govindaraja Mudaliar Sons Pvt Ltd                       | 6.02  | ENE     |  |
| 184.         | Sundram Fasteners Ltd. (Autolec Division-Bearing Plant) | 5.87  | ENE     |  |
| 185.         | P A Footwear P Ltd                                      | 5.61  | ENE     |  |
| 186.         | Magnum Polymers India Ltd                               | 5.5   | ENE     |  |
| 187.         | Mathi Engineering Work                                  | 5.46  | ENE     |  |
| 188.         | SAC Engine Components Pvt Ltd Foundry Division          | 5.39  | ENE     |  |
| 189.         | SFL Autolec division plant-IV                           | 5.29  | ENE     |  |
| 190.         | Chennai Crumb Industries                                | 4.42  | NE      |  |
| 191.         | Pravina Trading & Associates                            | 4.48  | NE      |  |
| 192.         | Tulsyan Refinery 1                                      | 4.61  | NE      |  |
| 193.         | Tulsyan NEC Limited                                     | 4.63  | NE      |  |
| 194.         | Mil Industries Ltd                                      | 4.67  | NE      |  |
| 195.         | Greaves' cotton Limited plant 5                         | 4.74  | NE      |  |
| 196.         | SGR 777 Foods Pvt Ltd                                   | 4.94  | NE      |  |
| 197.         | Sak Industries Pvt Ltd.                                 | 4.91  | NE      |  |
| 198.         | Madras Hydraulic Hose Pvt Ltd                           | 4.63  | NE      |  |
| 199.         | Jain Rubbers Private Limited                            | 4.666 | NE      |  |
| 200.         | Sri Narayana Metal industries                           | 4.96  | NE      |  |
| 201.         | Shri Plasto Packers Pvt. Ltd.                           | 5.06  | NE      |  |
| 202.         | Poseidon Lighting Pvt Ltd                               | 5.08  | NE      |  |
| 203.         | Gk metal alloys   | 5.1   | NE      |  |
| 204.         | Vaibhav Mercantile Limited                              | 5.16  | NE      |  |
| 205.         | Gupta Power Infrastructure limited                      | 5.32  | ENE     |  |
| 206.         | Sun Extrusions  | 5.36  | ENE     |  |
| 207.         | Jayaam Galvanizers Pvt. Ltd.                            | 5.32  | NE      |  |



| S.<br>N<br>o | Particulars                             |      | Details |  |
|--------------|---|------|---------|--|
|              |   |      |         |  |
| 208.         | Pon Surya TMT Re-bars                   | 5.66 | ENE     |  |
| 209.         | Sai Supreme Chemicals                   | 5.76 | ENE     |  |
| 210.         | Sfl Autolec                             | 5.82 | ENE     |  |
| 211.         | TVS Sundram Fasteners Ltd               | 5.93 | ENE     |  |
| 212.         | Autotech Industry india Pvt Limited     | 5.96 | ENE     |  |
| 213.         | MSK Engineering Works                   | 6.06 | ENE     |  |
| 214.         | RO Care India                           | 6.01 | ENE     |  |
| 215.         | tvm edible oil refineries               | 6.22 | ENE     |  |
| 216.         | Shinsung Petrochemical Pvt Limited      | 6.25 | ENE     |  |
| 217.         | Casting Workshop Limited                | 6.27 | ENE     |  |
| 218.         | Vanta Bioscience Limited                | 4.78 | NE      |  |
| 219.         | Kemin Industries                        | 4.94 | NE      |  |
| 220.         | Tamilnadu Air Products Private Limited  | 4.9  | NE      |  |
| 221.         | Poddar global private limited           | 4.94 | NE      |  |
| 222.         | Lehry Industries PVT LTD                | 5.02 | NE      |  |
| 223.         | Durai Shipping and services             | 5.11 | NE      |  |
| 224.         | JR Furnace And Ovens (P) Limited        | 5.77 | NE      |  |
| 225.         | Hiflo Global Green Solutions Pvt Ltd    | 5.63 | NE      |  |
| 226.         | SK Engineering Works                    | 5.87 | NE      |  |
| 227.         | Detergeo chem pvt ltd                   | 5.9  | NE      |  |
| 228.         | Censtar Packagin (India) Pvt Ltd        | 6.01 | NE      |  |
| 229.         | Sri sai Ram Engineering Works           | 5.87 | NE      |  |
| 230.         | S R Fabricators Private Limited         | 5.76 | NE      |  |
| 231.         | Poddar Global Limited                   | 5.87 | NE      |  |
| 232.         | Tamil Nadu Waste Management Limited     | 5.63 | NE      |  |
| 233.         | PMR Interlinings Pvt Ltd                | 5.3  | NE      |  |
| 234.         | Srivari Enterprises                     | 5.17 | NE      |  |
| 235.         | IEC Fabchem Limited                     | 5.23 | NE      |  |
| 236.         | Danblock Brakes India Pvt Ltd           | 5.17 | NE      |  |
| 237.         | Green Signal Bio Pharma Private Limited | 4.91 | NE      |  |
| 238.         | VBK Fibreo Tech Industries              | 5.03 | NE      |  |
| 239.         | JAK Industries Unit III                 | 4.9  | NE      |  |
| 240.         | Hi-Tech Carbon                          | 5.01 | NE      |  |
| 241.         | Arun Vyapar Udyog Ltd                   | 6.29 | NE      |  |
| 242.         | Western Thomson India Limited           | 5.98 | NE      |  |
| 243.         | Pneus Exim                              | 5.73 | NE      |  |
| 244.         | Greaves Cotton Limited                  | 6.39 | NE      |  |
| 245.         | Aachi Masala Foods Pvt Ltd              | 6.52 | NE      |  |
| 246.         | Nippon Thermostat India Limited         | 6.21 | NE      |  |
| 247.         | Shree Thirumalaa Industries             | 6.17 | NE      |  |

| S.<br>N<br>o | Particulars                                    |      | Details |  |
|--------------|--|------|---------|--|
|              |  |      |         |  |
| 248.         | Ars Steels & Alloys International Pvt Ltd      | 5.99 | NE      |  |
| 249.         | Manchu Toughend Glass Pvt Ltd                  | 5.88 | NE      |  |
| 250.         | Monsoon Bounty foods Pvt Ltd                   | 5.83 | NE      |  |
| 251.         | Val-Met Engineering Private Limited            | 5.76 | NE      |  |
| 252.         | Anjan Drug Private Limited                     | 5.88 | NE      |  |
| 253.         | Precision Hydraulics Private Limited           | 5.84 | NE      |  |
| 254.         | Fumitec Minerals Pvt Ltd                       | 5.65 | NE      |  |
| 255.         | Enrique Keller India                           | 5.97 | NE      |  |
| 256.         | Madras Door Company                            | 6.04 | NE      |  |
| 257.         | RBA Exports Private Limited                    | 6.01 | NE      |  |
| 258.         | Infra Engineers India                          | 6.15 | NE      |  |
| 259.         | Mabel Engineers Private Limited                | 6.23 | NE      |  |
| 260.         | Asia Tech Auto Forgings                        | 6.29 | NE      |  |
| 261.         | Vaishnavi Metals                               | 6.31 | NE      |  |
| 262.         | H. M. Conductors & Engineers (P) Ltd.          | 6.38 | NE      |  |
| 263.         | Loyds industrial work                          | 6.72 | NE      |  |
| 264.         | Automotive Coaches & Components Ltd            | 6.77 | NE      |  |
| 265.         | Mitsuba India Private Limited                  | 6.63 | NE      |  |
| 266.         | VIKI Steels                                    | 6.4  | NE      |  |
| 267.         | Xmold Polymers Pvt Ltd                         | 6.37 | NE      |  |
| 268.         | SAC Engine Components Camshafts Unit           | 6.39 | ENE     |  |
| 269.         | SAC MD-I Material Get                          | 6.43 | ENE     |  |
| 270.         | Tri Electric Private Limited                   | 6.25 | ENE     |  |
| 271.         | Vedha Enterprises                              | 6.57 | ENE     |  |
| 272.         | thai evergreen industries private limited      | 6.64 | ENE     |  |
| 273.         | Kanishk Steel Industries Limited               | 6.69 | ENE     |  |
| 274.         | Leo Prime                                      | 7.31 | NE      |  |
| 275.         | Emerald Resilient Tyre Manufacturers Pvt. Ltd. | 6.21 | NE      |  |
| 276.         | Abirami Soap Works                             | 6.36 | NE      |  |
| 277.         | Millenium Industries                           | 6.51 | NE      |  |
| 278.         | Virogreen India Private Limited                | 6.81 | NE      |  |
| 279.         | P A Footwear P Ltd.                            | 7.06 | NE      |  |
| 280.         | Panvo Organics                                 | 7.08 | NE      |  |
| 281.         | Jfn Fishnet Manufacturer                       | 7.74 | NE      |  |
| 282.         | Doosan Bobcat Pvt Ltd                          | 7.97 | NE      |  |
| 283.         | KOBELCO  | 8.25 | NE      |  |
| 284.         | Hydraguard International Pvt Ltd               | 8.35 | NE      |  |
| 285.         | Leeboy India Construction Equipments Pvt Ltd   | 8.42 | NE      |  |
| 286.         | Century plyboards india                        | 8.67 | NE      |  |
| 287.         | Suryadev Alloy & Power Pvt zLtd.               | 4.19 | E       |  |

| S.<br>N<br>o | Particulars  |                                    | Details  |      |
|--------------|--|------------------------------------|--|------|
|              |  | 288.                               | TCP Limited  | 4.61 |
|              | 289.   | Chennai Minerals Processers        | 4.73   | E    |
|              | 290.   | Chitrakoot Steels & Power Pvt Ltd. | 5.13   | E    |
| 19.          | <p>Areas susceptible to natural hazard which could cause the project to present environmental problems.<br/>(Earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)</p> |                                    | <p>The area comes under seismic Zone-III (Moderate Risk).<br/>There is no susceptible to natural hazards like subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions.</p> <p>Note:<br/>Seismic Zone-II: Low risk<br/>Seismic Zone-III: Moderate Risk<br/>Seismic Zone-IV: High Risk<br/>Seismic Zone-V Very high Risk</p> |      |

### **1.4.3 Importance to the Country and Region**

#### **Importance to the Country, Region:**

Steel has played a vital role in the development of the Indian economy. Affordable housing in urban and rural areas, railway network expansion, domestic shipbuilding integrated with the Sagarmala project, opening the defense sector for private participation and growth in the automobile sector opens the path to economic recovery. The country expects steel demand to grow 3x and reach 230 MT by 2030-31. According to the National Council of Applied Economic Research, the steel industry in India has the potential to contribute to overall economic development. Housing construction, car manufacturing, daily use utensils and packaging materials are some of the many applications the steel sector touches. Consumption of special steel is increasing in fabrication and engineering industries like power generation, petrochemicals, and fertilizers.

The steel industry in India contributes about 2% to India's GDP and employs around 6 lakh people directly and 20 lakh people indirectly. With steel plants creating vast employment opportunities, especially in Tier3 cities, it has an employment multiplier effect of 6.8x and an output multiplier effect of 1.4x.

#### **1.4.4 Demand-Supply Gap**

Infrastructure is a key index of a country's economic position at the global stage. Developing infrastructure augments a country's productivity, making firms more competitive and boosting the overall economy of a region. To that end, countries need steel to build new infrastructure like roads, railway lines, buildings, and bridges, and also need it to lay new pipelines for gas, water and sanitation, etc.

Evidently then, steel consumption is widely taken to be an indicator of economic development. As a fast-developing country aiming to become a 5 trillion-dollar economy in few years, India's economic growth is closely linked to the growth of its steel industry. It is the ultimate article of trade which can potentially fuel the rise of India as a global manufacturing hub and give the much-needed boost to its 'Make in India' campaign.

The crucial role of steel in India's growth and its future has been captured in a report prepared by the National Council of Applied Economic Research (NCAER). Its findings suggest that the steel sector in India has a very high potential of contributing to India's overall development. Indeed, it is the one commodity that has multifarious applications spanning diverse sectors of economic activity. It is used in building houses, manufacturing cars, making daily use utensils as well as in for packaging. Special steels

are increasingly being used in packaging, fabrication, and engineering industries such as power generation, petrochemicals, and fertilisers.

The fact that steel plants present huge employment opportunities, especially in Tier III cities, is another fact that cannot be ignored. Steel has an employment multiplier effect of 6.8x while it has an output multiplier effect of 1.4x. Further, India has now overtaken Japan to become the world's second largest producer of crude steel, producing more than 100 MT of it each year. Steel now contributes about 2% to India's GDP and employs some 6-lakh people directly and 20 lakh people indirectly.

#### **1.4.5 Import Possibility**

The technology adopted is the most modern technology available with state-of-the-art machinery suitably developed for Steel industry.

### **1.5 Domestic/Export Markets**

The following factors give India a competitive advantage in steel production:

Indigenous availability of high-grade iron ore and non-coking coal, the two key inputs of steel production:

- ⊕ A growing domestic and global market
- ⊕ A vibrant MSME sector
- ⊕ A young workforce and competitive labour costs

India's current per capita consumption of steel stands at 69 kg, which is very low compared with the global average of 208 kg. The number drops to 10 kg if we concentrate on the rural areas. This indicates a strong growth potential that India can reach in terms of consumption.

In terms of demand, India is expected to see a huge growth in the coming decade, due to government initiatives like affordable housing in urban and rural areas, expansion of the railway network, development of the domestic shipbuilding industry as part of the Sagarmala project, opening of defence sector for private participation as well as growth in the automobile sector. In fact, the demand is expected to grow threefold and reach 230 MT by 2030-31.

### **1.6 EIA Study**

M/s. Chennai United Metal Private Limited, as a part of compliance to the regulatory requirement i.e., to obtain Environmental Clearance from SEIAA-TN, has appointed

Environmental Consultants accredited by National Accreditation Board for Education and Training (NABET)-Quality Council of India (QCI), New Delhi.

The work of undertaking field studies and preparation of Form-1, PFR, and Baseline studies & EIA/EMP report under B category, was assigned initially to Eco Chem Sales and Services, Surat, after ToR application project proponent has been Changed the Consultants and assigned for field studies and preparation of EIA, Public Hearing and Appraisal of the project to M/s EHS360 Labs Pvt Ltd, Chennai is accredited by NABET, for Schedule 3(a) "Metallurgical industries (ferrous & non-ferrous), Category B.

## **1.7 EIA Cost**

The EIA study including baseline monitoring was undertaken by M/s EHS360 Labs Pvt Ltd for an amount of Rs. 5 Lakhs.

### **1.7.1 Objectives of the Study**

- ⊕ To ensure environmental considerations are explicitly addressed and incorporated into the development decision-making process.
- ⊕ To anticipate and avoid, minimize, or offset the adverse significant biophysical, social, and other relevant effects of the above project proposal.
- ⊕ To protect the productivity and capacity of natural systems and the ecological processes which maintain their respective functions.
- ⊕ To promote development that is sustainable and optimizes resource use as well as management opportunities.
- ⊕ To fully recognize the scope and requirements of the ToR and comply with the same.
- ⊕ The major objective of this study is to prepare a detailed Environmental Impact Assessment Study within the study area i.e., 10km radius from the project site boundary.

### **1.7.2 Methodology adopted for the Study**

An Environmental Impact Assessment (EIA) is an assessment of the possible impact, whether positive or negative, that a proposed project may have on the environment, together consisting of the natural, social and economic aspects, i.e., aiming at "Sustainable Development" due to the project activities.

### **1.7.3 The basic structure of EIA report**

| <b>Chapter No.</b> | <b>Description of Content</b> |
|--------------------|-------------------------------|
|--------------------|-------------------------------|

|                   |  |
|-------------------|--|
| <b>Chapter 1</b>  | <b>Introduction</b><br>Give the brief outline of the project as details of need of the EIA report, project proponent, nature and size of the project, location of the project, and need of project, scope of EIA study and applicable environmental regulations and standards  |
| <b>Chapter 2</b>  | <b>Project Description</b><br>The chapter gives details about the type and capacity of the project, need of the project, project location, layout & area break up, details of product, raw materials, manufacturing process and technology description, details of machineries and equipment, resource requirements, details on aspects of the project causing environmental impacts and mitigation measures incorporated to meet the standards.   |
| <b>Chapter 3</b>  | <b>Description of the Environment</b><br>The chapter describes the study area, study period, methodology and components selected for baseline studies, baseline status for ambient air, water, soil, socioeconomic, land use and meteorology of the study area within 10.0 km radius.  |
| <b>Chapter 4</b>  | <b>Anticipated Environmental Impacts and Mitigation Measures</b><br>In this chapter, the anticipated environmental impacts due to proposed project activities are identified, analyzed, and assessed and thereafter the mitigation measures for the adverse impacts are proposed. The significance of impacts is determined. This chapter is prepared based on Chapter-2 & Chapter-3 by correlating the activities under proposed project and their impacts on receiving environmental attributes. |
| <b>Chapter 5</b>  | <b>Analysis of Alternatives (Technology/site)</b><br>The chapter describes the alternative sites and the proposed factors for locating at the mentioned location. This would also describe the alternative technologies if any for manufacturing proposed products.  |
| <b>Chapter 6</b>  | <b>Environmental Monitoring Programme</b><br>The chapter proposes the post project monitoring plan and the budgetary provisions for the various environmental components.  |
| <b>Chapter 7</b>  | <b>Additional Studies</b><br>This chapter would highlight any additional studies required for the proposed project i.e Public Consultation, Risk Assessment, Disaster Management Plan, R&R Studies and any additional recommended during the Scope stage/ToR.  |
| <b>Chapter 8</b>  | <b>Project Benefits</b><br>Highlights the direct and indirect benefits on the physical infrastructure and social infrastructure due to proposed projects.  |
| <b>Chapter 9</b>  | <b>Environmental Cost Benefit Analysis</b><br>Highlights environmental value enhancement and benefits thereof if recommend in scoping stage only if recommended during scoping stage.  |
| <b>Chapter 10</b> | <b>Environmental Management Plan</b>   |

|                   |   |
|-------------------|---|
|                   | The chapter proposes the Environmental Management Plan highlighting the mitigation measures and roles and responsibilities of the management. This would include specific time frames for completion, resources required and specific responsibility. |
| <b>Chapter 11</b> | <b>Summary and Conclusion</b><br>Summarize the entire report and conclude the summary of the EIA report.  |
| <b>Chapter 12</b> | <b>Disclosure of Consultants Engaged</b><br>Provides the brief profile of the EIA consultant organization and EIA project team for the current study.   |

## 1.8 Applicable Regulatory Framework

**The following Acts and Rules are applicable to the proposed project:**

The details of Acts and Rules with applicability to the proposed project are given in **Table 1-3**.



**Table 1-3 Applicable Acts and Rules**

| S. No | Act and Rules applicable   | Purpose  | Objective   | Applicability   |
|-------|--|--|---|---|
| 1     | EIA Notification 2006 and its amendments.  | New projects, Expansion modernization, change in product mix of the existing project                       | Protection and Improvement of the Environment         | As the proposal is for new project scheduled under category 5(f), Environmental clearance from Ministry of Environment, Forest & Climate Change is applicable |
| 2     | The Water (Prevention and Control of Pollution) Act, 1974 and its amendments.                                  | New projects, Expansion modernization, change of product mix of the existing project, Existing plants      | Prevention, control, and abatement of water pollution | Consent to Establish and Consent to Operate from State Pollution Control Board to be obtained for new product   |
| 3     | The Air (Prevention and Control of Pollution) Act, 1981 and its amendments.                                    | New projects, Expansion /modernization, change of product mix of the existing project, Existing industries | Prevention, control, and abatement of air pollution   | Consent to Establish and Consent to Operate from State Pollution Control Board to be obtained for new product   |
| 4     | The Hazardous and other waste (Management, Handling and Transboundary Movement Rules) 2016 and its amendments. | Management, Handling and Transboundary Movement of Hazardous waste   | Prevention, Control, and abatement of pollution       | Hazardous waste Authorization from State Pollution Control Board to be obtained   |
| 5     | The solid Waste Management Rules, 2016   | Management of solid (non-hazardous) waste as per the provisions of the Rule                                | Prevention control and resource conservation          | Proper collection, segregation, and disposal as per Rules   |

| S. No | Act and Rules applicable                                    | Purpose  | Objective   | Applicability   |
|-------|---|--|---|---|
| 6     | The Environmental (Protection) Act, 1986 and its Amendments | New projects, Expansion/modernization change of product mix of the existing project, Existing industries | Protection and Improvement of the Environment   | Environmental Standards as specified are to be complied with.<br><br>Submission of Environment Statement on yearly basis to TNPCB |
| 7     | The Noise Pollution (Regulation and Control) Rules, 2000    | New projects, Expansion/modernization change of product mix of the existing project, Existing industries | To protect the workers and public from noise related problems                         | Noise control measure.<br>Comply with Noise standards and submission of monthly report to TNPCB                                   |
| 8     | The Factories Act 1948 and its amendments.                  | New projects, Expansion/modernization change of product mix of the existing project, Existing industries | Control of workplace environment, and providing for good health and safety of workers | Factory License from Factory inspectorate.  |
| 9     | The Indian Boiler Act, 1923                                 | New projects, Expansion/modernization change of product mix of the existing project, Existing industries | Boiler act contain the law related to registration and inspection is steam boiler     | The Act is applicable to all Boiler (Water tube and fire tube boilers)  |

| S. No | Act and Rules applicable            | Purpose  | Objective   | Applicability  |
|-------|-------------------------------------|--|---|--|
| 10    | The Central Motor Vehicle Act, 1988 | New projects,<br>Expansion/modernization<br>change of product mix of<br>the existing project,<br>Existing industries | Check the pollution load<br>of vehicles inside the<br>plant | Adequate environmental measures are<br>put in place to check the vehicular<br>emissions. |

# **CHAPTER – 2**

## **PROJECT DISCRPTION**

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*(The chapter have the details about the type and capacity of the project, need of the project, project location, layout & area break-up, details of product, raw materials, manufacturing process and technology description, details of machineries and equipment, resource requirements, details on aspects of the project causing environmental impacts and mitigation measures incorporated to meet the standards.)*

## 2 PROJECT DESCRIPTION

### 2.1 Introduction

This chapter presents the salient features of the project including process description, raw material requirement, utilities and services, infra-structure facilities and likely environmental impacts due to proposed Rerolling plant.

### 2.2 Type Project

M/s. Chennai United Metal Private Limited (herein after referred to as CUMI) has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.

Initially the proponent operating Re-Rolling Mill plant with valid consent orders intime renewals and planned Billets manufacturing and applied for CTE on 1<sup>st</sup> June 2022 and obtained CTE for Billet plant on 18<sup>th</sup> June 2022, constructed shed for Billet plant which the project does not attract Environmental Clearance. As per MoEF&CC Notification S.O 3250(E), dated: 20<sup>th</sup> July 2022 and the existing & proposed plant required Environmental Clearance and the proposed project comes under Schedule 3(a) “Metallurgical Industries” under Category ‘B’ as per the EIA Notification 2006 & its further amendments.

In line with EIA notification dated 14.09.2006, The Environmental Clearance application was applied vide 06.03.2023 and TOR meeting was held for determining the Terms of Reference (TOR) on 19<sup>th</sup> Aprill 2023 and obtained Terms of Reference vide SEAC letter no. TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023 for the carried-out Baseline studies and preparation of EIA report for the proposed expansion project. The copy of Terms of Reference (ToR) is attached as **Annexure-I**.

The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing. Project summary is provided in Table 2-1.

**Table 2-1 Proposed Project Summary**

| S. No | Particulars  | Proposed details  |
|-------|--|---|
| 1.    | Category of products   | Manufacturing of Steel Billets & Re-rolling Steel Angle, Flat Bars Channels, Patra & Hollow Sections  |
| 2.    | Product & Capacity   | 1. Steel Billets - from 23760 TPA to 2,00,000 TPA<br>2. Re-rolling Steel Angle, Flat Bars Channels, Patra & Hollow Sections – 61,200 TPA to 2,00,000 TPA<br><b>Total Production: 4,00,000 TPA</b> |
| 3.    | Total Land area (Ha)   | 6.85 (68212.03 Sq. m)   |
| 4.    | Total Built up area (sq .m)                                    | Existing: 11,153.73<br>Proposed: Nil<br><b>After expansion: 11,153.73</b>   |
| 5.    | Total Water Requirement (KLD)                                  | Existing: 87<br>Proposed: 8<br><b>After expansion: 95</b>   |
| 6.    | Fresh water Requirement (KLD)                                  | Existing: 84<br>Proposed: 2<br><b>After expansion: 86</b>   |
| 7.    | Effluent Generation  | Existing: 6.50<br>Proposed: 6.0<br><b>After expansion: 12.5</b>   |
| 8.    | Recycled Water (KLD)   | Existing: 3<br>Proposed: 6<br><b>After expansion: 9</b>   |
| 9.    | Source of Water  | Local Panchayat   |
| 10.   | Sewage Generation (KLD)  | Existing and Proposed 2.0   |
| 11.   | Wastewater Treatment System & capacity                         | 2 KLD of Solar Evaporation Pond for Existing and after expansion  |
| 12.   | Domestic Wastewater treatment system                           | Septic Tank followed by soak pit  |
| 13.   | Power (kVA)  | Existing: 5000<br>Proposed: 19000<br>After expansion: 24000   |
| 14.   | Source of Power  | TANGEDCO  |
| 15.   | Power Backup-DGs (kVA)   | Existing: 1 x 500<br>Proposed: Nil<br>After Expansion 1 x 500   |
| 16.   | Air Compressor (HP)  | Existing and proposed: 30HP.  |
| 17.   | Diesel for DG Sets (Liters/Month)<br>During power failure only | Existing: 250<br>Proposed: 50<br>After Expansion: 300   |

|     |  |   |
|-----|--|---|
| 18. | Coal (Tonne/Month)                                   | Existing: 150<br>Proposed: Nil (Reduced to 75)<br>After Expansion: 75 |
| 19. | Grease (Kg/Year) as a lubricant                      | Existing: 25<br>Proposed: 15<br>After Expansion: 40                   |
| 20. | Permanent Manpower (Nos)                             | Existing: 30<br>Proposed 20<br>After expansion: 50                    |
| 21. | Municipal Solid Waste (kg/day)-<br>Operation phase   | Existing: 13.5<br>Proposed: 9.0<br>After Expansion: 22.5              |
| 22. | Project Cost in crores (INR)                         | 36.25   |
| 23. | Environmental Management Plan<br>(EMP) Cost (Crores) | 1.40  |
| 24. | CER cost (Lakhs)                                     | 36.25   |

### 2.3 Need for the project.

Steel has played a vital role in the development of the Indian economy. Affordable housing in urban and rural areas, railway network expansion, domestic shipbuilding integrated with the Sagarmala project, opening the defense sector for private participation and growth in the automobile sector opens the path to economic recovery. The country expects steel demand to grow 3x and reach 230 MT by 2030-31. According to the National Council of Applied Economic Research, the steel industry in India has the potential to contribute to overall economic development. Housing construction, car manufacturing, daily use utensils and packaging materials are some of the many applications the steel sector touches. Consumption of special steel is increasing in fabrication and engineering industries like power generation, petrochemicals, and fertilizers.

The steel industry in India contributes about 2% to India's GDP and employs around 6 lakh people directly and 20 lakh people indirectly. With steel plants creating vast employment opportunities, especially in Tier3 cities, it has an employment multiplier effect of 6.8x and an output multiplier effect of 1.4x.

### 2.4 Project Location (maps showing general location, Specific Location, Project Boundary & Project site Layout.

The proposed plant is located at Survey No's. 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C, 2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F, 13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B,

5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A, 15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B, 22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A, 2B, 2C, 2D, 2E of Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, TamilNadu. The total site area is 16.86 Acres (68212.31 Sq. m). The layout of the project site is enclosed as **Annexure-4**. The location map of the Project site is shown in **Figure 2-1** and Google imageries of 1km, 5Km & 10Km radius of the project site is shown in **Figure 2-2** to **Figure 2-5**.

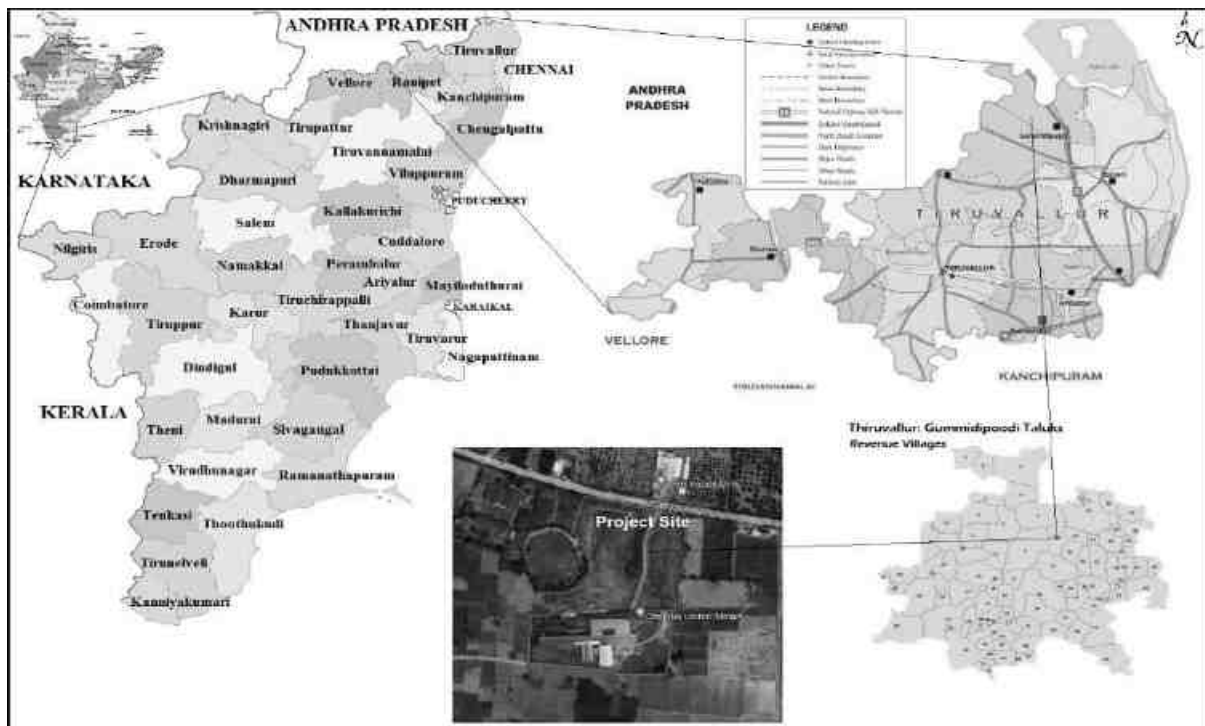


Figure 2-1 Location map of the Project site





Figure 2-2 Satellite Imagery of the Project Site

**Table 2-2 Tentative Boundary Coordinates of the project site**

| <b>B.P Number</b> | <b>Latitude</b> | <b>Longitude</b> |
|-------------------|-----------------|------------------|
| 1                 | 80.06702        | 13.38167         |
| 2                 | 80.06693        | 13.38051         |
| 3                 | 80.06674        | 13.38061         |
| 4                 | 80.06602        | 13.38069         |
| 5                 | 80.06547        | 13.38087         |
| 6                 | 80.06559        | 13.38149         |
| 7                 | 80.06522        | 13.38126         |
| 8                 | 80.06522        | 13.38126         |
| 9                 | 80.06522        | 13.38126         |
| 10                | 80.0653         | 13.38186         |
| 11                | 80.0653         | 13.38186         |
| 12                | 80.0653         | 13.38186         |
| 13                | 80.0653         | 13.38186         |
| 14                | 80.06563        | 13.38236         |
| 15                | 80.06563        | 13.3827          |
| 16                | 80.06563        | 13.3827          |
| 17                | 80.06563        | 13.3827          |
| 18                | 80.06563        | 13.3827          |
| 19                | 80.06563        | 13.3827          |
| 20                | 80.06595        | 13.38363         |
| 21                | 80.06595        | 13.38363         |
| 22                | 80.06595        | 13.38363         |
| 23                | 80.06662        | 13.3832          |
| 24                | 80.06662        | 13.3832          |
| 25                | 80.06662        | 13.38233         |
| 26                | 80.06662        | 13.38233         |
| 27                | 80.06662        | 13.38233         |
| 28                | 80.06662        | 13.38233         |
| 29                | 80.06658        | 13.38191         |



Figure 2-3 Google Satellite Imagery of 1km radius



Figure 2-4 Google Satellite Imagery of 5 km radius



**Figure 2-5 Google Satellite Imagery of 10 km radius**



Figure 2-6 Environmental sensitive areas within 15 km radius of the project site

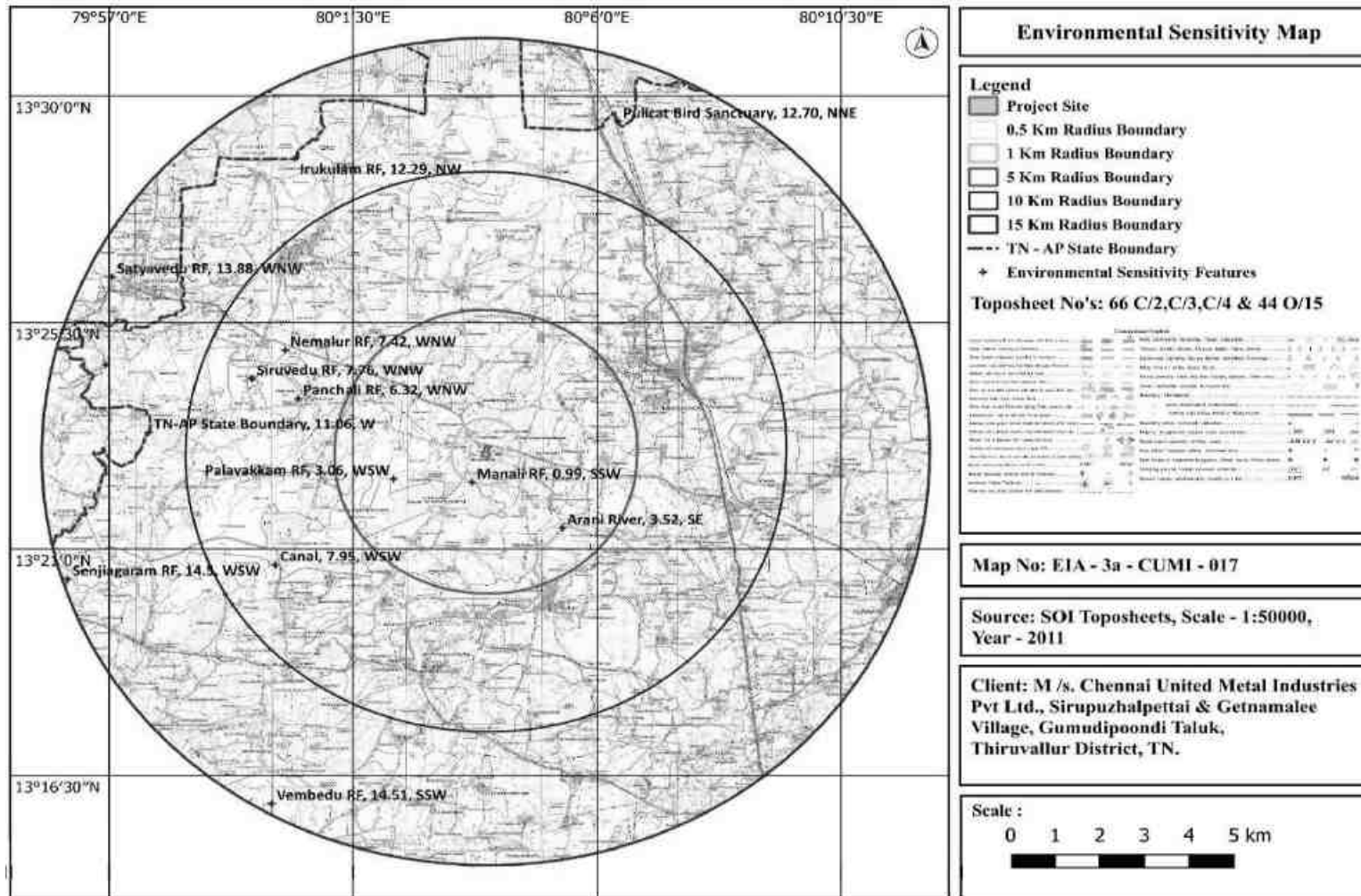


Figure 2-7 Environmental Sensitive areas demarcated in 10km radius Topo map of the project

**Table 2-3 Environmental Setting of the project site (within the 15km radius)**

| S. No | Particulars   | Details   |
|-------|---|---|
| 1     | Plant site latitude   | 13°22'52.67"N (Centre co-ordinate)                        |
| 2     | Plant site longitude  | 80° 3'56.83"E (Centre co-ordinate)                        |
| 3     | Elevation of Project site   | 23 - 25m AMSL Above MSL                                   |
| 4     | Nearest Highway   | SH-52: Satyavedu to Kavaraipeetai = Adjacent (N)          |
| 5     | Nearest railway Station   | Gummidipoondi Railway Station $\approx$ 6.72km (ENE)      |
| 6     | Nearest Airport   | Chennai International Airport $\approx$ 42.34km (SSE)     |
| 7     | Nearest Port  | Ennore Kamarajar Port Limited $\approx$ 30.99 Km, ESE     |
| 8     | Nearest Village   | Rajulakandigai, $\approx$ 0.27Km, W                       |
| 9     | Nearest Town  | Gummidipoondi, $\approx$ 4.45Km, NE                       |
| 10    | Nearest City  | Chennai - $\approx$ 29.44Km (SE)                          |
| 11    | Ecologically sensitive areas (National Parks/Wildlife sanctuaries/Biosphere reserves) | Pulicat Birds Sanctuary located at $\approx$ 12.7km (NNE) |

|   |             |               |                               |                         |                   |
|---|-------------|---------------|-------------------------------|-------------------------|-------------------|
| 9 | Waterbodies |               |                               |                         |                   |
|   |             | <b>S. No.</b> | <b>Names</b>                  | <b>Distance. (~ Km)</b> | <b>Direction.</b> |
|   |             | 1             | TG Canal/SS Ganga Canal       | 12.93                   | WNW               |
|   |             | 2             | Canal                         | 7.95                    | WSW               |
|   |             | 3             | Arani River                   | 3.52                    | SE                |
|   |             | 4             | Pond                          | 0.99                    | S                 |
|   |             | 5             | Lake near Kanalur             | 2.21                    | S                 |
|   |             | 6             | Lake near malliyankuppam      | 6.41                    | SSE               |
|   |             | 7             | Lake near arani               | 5.88                    | SSE               |
|   |             | 8             | Lake near Melmudalambedu      | 4.92                    | ESE               |
|   |             | 9             | Lake near Kilmudalambedu      | 5.65                    | E                 |
|   |             | 10            | Panappakkam lake              | 6.43                    | E                 |
|   |             | 11            | Eri near kattavur             | 10.89                   | E                 |
|   |             | 12            | Lake near Sengattakolam       | 9.7                     | SSW               |
|   |             | 13            | Lake near Jayapuram           | 10.92                   | S                 |
|   |             | 14            | Lake near Erukkuvay           | 2.8                     | SSW               |
|   |             | 15            | Lake near Tambunaidupalaiyam  | 6.77                    | SW                |
|   |             | 16            | Sulameni Eri                  | 10.15                   | WSW               |
|   |             | 17            | Eri near Periyapuliyur        | 3.69                    | W                 |
|   |             | 18            | Lake near Thervoykandigai     | 8.64                    | W                 |
|   |             | 19            | Eri near Pettai               | 3.02                    | NW                |
|   |             | 20            | Eri near Madarpakkam          | 9.86                    | NW                |
|   |             | 21            | Pallavada Lake                | 9.84                    | NW                |
|   |             | 23            | Lake near Sitturnattam        | 3.3                     | NNW               |
|   |             | 24            | Eri near Surapundi            | 7.66                    | NNW               |
|   |             | 25            | Tank near Kannambakkam        | 13.04                   | NNW               |
|   |             | 26            | Pulicat Lake                  | 12.7                    | NNE               |
|   |             | 27            | Gummidipoondi Lake            | 6.57                    | E                 |
|   |             | 28            | Eri near Edapalaiyam          | 9.15                    | E                 |
|   |             | 29            | Lake near Ayanallurkandigai   | 10.94                   | ENE               |
|   |             | 30            | Eri near kumaranjeri          | 13.56                   | ENE               |
|   |             | 31            | Eri near Edakuppam            | 14.36                   | E                 |
|   |             | 32            | Eri near Kattappavaram        | 12.98                   | NE                |
|   |             | 33            | Tank near Ramanayakankandigai | 2.98                    | SE                |
|   |             | 34            | Canal                         | 7.95                    | WSW               |
|   |             |               |                               |                         |                   |



|    |                  |               |   |                        |                  |
|----|------------------|---------------|---|------------------------|------------------|
| 10 | Reserve Forests  | <b>S. No.</b> | <b>Names</b>  | <b>Distance (~ Km)</b> | <b>Direction</b> |
|    |                  | 1             | Panchali RF   | 6.32                   | WNW              |
|    |                  | 2             | Sirurvedu RF  | 7.76                   | WNW              |
|    |                  | 3             | Nemalur RF  | 7.42                   | WNW              |
|    |                  | 4             | TG Canal/SS Ganga Canal                                 | 12.93                  | WNW              |
|    |                  | 5             | Satyavedu RF  | 13.88                  | WNW              |
|    |                  | 6             | Irukulam RF   | 12.29                  | NW               |
|    |                  | 7             | Manali RF   | 0.99                   | SSW              |
|    |                  | 8             | Palavakkam RF   | 3.06                   | WSW              |
|    |                  | 9             | Senjiagaram RF  | 14.5                   | WSW              |
| 10 | Vembedu RF       | 14.51         | SSW   |                        |                  |
| 11 | Monuments        | <b>S. No.</b> | <b>Names</b>  | <b>Distance (~ Km)</b> | <b>Direction</b> |
|    |                  | 1             | Urn Burials   | 12.5                   | WSW              |
|    |                  | 2             | Cairn Site  | 10.6                   | WSW              |
|    |                  | 3             | Megalithic Cists and cairns                             | 7.56                   | W                |
|    |                  | 4             | Megalithic Cists and cairns                             | 6.9                    | WNW              |
|    |                  | 5             | Megalithic Cists and cairns                             | 1.5                    | NW               |
|    |                  | 6             | Megalithic cists and cairns with bounding stone circles | 12.69                  | NNW              |
| 7  | Megalithic cists | 14.45         | NW  |                        |                  |

#### 2.4.1 Existing Environmental Setup

The major industries within 10km radius from the project site along with their distance and direction are given in **Table 2-4**. The site does not fall within the CRZ area. The details of nearest human settlement from the project site are provided below in the **Table 2-5**.

**Table 2-4 List of Industries within 10km radius of the project site**

| <b>S. No.</b> | <b>Name of the Industries</b>   | <b>Distance (~ km)</b> | <b>Direction</b> |
|---------------|---------------------------------|------------------------|------------------|
| 1.            | SMR Foods Mill                  | 0.03                   | N                |
| 2.            | Sri Chakra Industries           | 0.18                   | WNW              |
| 3.            | Jindal Stainless Steelway Ltd.  | 0.80                   | WNW              |
| 4.            | Shalimar Paints                 | 0.94                   | WNW              |
| 5.            | Sivanesan Company               | 0.48                   | ENE              |
| 6.            | Houseware Industries U II       | 0.83                   | NNE              |
| 7.            | Proconnect Integrated Logistics | 1.52                   | ESE              |
| 8.            | Keld Ellentoft India Pvt Ltd    | 2.08                   | E                |
| 9.            | Nordex India Pvt Ltd            | 2.21                   | E                |

|     |  |       |     |
|-----|--|-------|-----|
| 10. | Samkit imaging systems pvt ltd.            | 2.33  | E   |
| 11. | Bridge N Bond Factory                      | 2.62  | E   |
| 12. | Super Stahl India GMPD                     | 3.15  | E   |
| 13. | Shree Shyama Traders                       | 3.99  | E   |
| 14. | Aar Pee Jee Steel Industries               | 4.23  | E   |
| 15. | Performance Products and Services          | 4.35  | E   |
| 16. | Premium fats Pvt Ltd                       | 4.11  | E   |
| 17. | ferromet steel pvt ltd                     | 4.74  | E   |
| 18. | Jethwik Aqua Water Company                 | 4.52  | E   |
| 19. | Suntex processing mill                     | 5.02  | E   |
| 20. | Aachi Masala Foods Pvt Ltd                 | 5.17  | E   |
| 21. | AGS Aluminium Alloys Pvt Ltd               | 5.32  | E   |
| 22. | Madras Radiators and Pressings Ltd         | 5.92  | E   |
| 23. | Don Construction Chemicals (India) Limited | 6.44  | E   |
| 24. | Saran Machine Plaza                        | 9.41  | ESE |
| 25. | Yanmar Engine Manufacturing India          | 10.71 | ESE |
| 26. | Track Design India                         | 10.79 | ESE |
| 27. | Usui susira international pvt ltd          | 10.99 | ESE |
| 28. | Nissei electric India P ltd                | 10.78 | ESE |
| 29. | Varsha Forgings                            | 11.74 | ESE |
| 30. | Sri Vijayalakshmi Snuff Products           | 11.94 | ESE |
| 31. | Mod Forge Pvt Ltd                          | 11.6  | ESE |
| 32. | Quantum minerals                           | 10.96 | ESE |
| 33. | RMD Kwikform India Pvt Ltd                 | 10.3  | ESE |
| 34. | Hari Vishnu Dairy                          | 10.15 | ESE |
| 35. | Bushan Enterprises                         | 10.06 | ESE |
| 36. | Kannika aqua products                      | 9.96  | ESE |
| 37. | Adhitya Precast Products                   | 7.93  | SE  |
| 38. | Astro Aquaculture                          | 8.5   | SE  |
| 39. | BGR Energy Systems Ltd                     | 9.01  | ESE |
| 40. | Jayaram Earth Movers                       | 8.8   | ESE |
| 41. | Procam Logistics Private Limited           | 8.57  | ESE |
| 42. | Konkan speciality poly products            | 7.76  | SE  |
| 43. | IndoSpace Logistic Park Puduvoyal          | 9.63  | SE  |
| 44. | Sheenlac Paints (Unit 5)                   | 8.39  | SE  |
| 45. | Madras Hardtools Pvt. Ltd.                 | 9.83  | SE  |
| 46. | DB Schenker                                | 10.42 | SE  |
| 47. | Agra Casting Pvt Ltd                       | 10.43 | SE  |
| 48. | Kamachi Foundries Ltd                      | 10.58 | SE  |
| 49. | Farwood Industries Ltd                     | 10.8  | SE  |
| 50. | Chopra Lam Products Pvt.Ltd.               | 9.71  | SE  |
| 51. | Nice Steel                                 | 9.62  | SE  |

|     |   |       |     |
|-----|---|-------|-----|
| 52. | Shuchi Friction Additives Pvt Ltd.        | 9.37  | SE  |
| 53. | El Kay Ess                                | 11.74 | SE  |
| 54. | DB Schenker Ind Pvt Ltd.                  | 11.87 | SE  |
| 55. | MGTuff Toughened Glass Factory            | 11.64 | SE  |
| 56. | VAS Agro                                  | 11.61 | SE  |
| 57. | PMP Iron & Steels (India) Limited         | 11.89 | SE  |
| 58. | GBR Metals Pvt Ltd                        | 11.81 | SE  |
| 59. | Rubino Industries Pvt.Ltd                 | 12.17 | SE  |
| 60. | Vaigai Agri Tech                          | 12.1  | SE  |
| 61. | Gnet Impex Pvt Ltd                        | 12.73 | SE  |
| 62. | Uma snuff co                              | 11.66 | SE  |
| 63. | Ragam Polymoulds pvt ltd                  | 11.57 | SE  |
| 64. | Grofers India Pvt Ltd                     | 11.58 | SE  |
| 65. | Arvensis Jayaam India Private Limited     | 2.02  | SSE |
| 66. | D2H PET Bottles                           | 5.8   | SSE |
| 67. | Linfox _ Hindustan Unilever Limited       | 9.09  | S   |
| 68. | Nestle India Pvt.Ltd                      | 9.58  | S   |
| 69. | Honda Motor India Pvt Ltd                 | 9.83  | S   |
| 70. | Flipkart Pvt Ltd.                         | 9.98  | S   |
| 71. | Mahaveer Chemical                         | 10.24 | S   |
| 72. | Adeshwara chemicals pvt. Ltd              | 10.31 | S   |
| 73. | Ruchi Soya Industries Ltd.                | 10.45 | S   |
| 74. | Sterling Doors & Ply Pvt. Ltd.            | 10.45 | S   |
| 75. | NTC Logistics India Pvt. Ltd.             | 14.6  | SSE |
| 76. | Sabash Engineering Chennai pvt limited    | 14.45 | SSE |
| 77. | Neminath Wood industry Pvt Ltd            | 14.36 | SSE |
| 78. | Golden rock granite company               | 14.17 | SSE |
| 79. | Nadi Airtechnics Pvt. Ltd. - Unit - 5     | 14.46 | SE  |
| 80. | Herrenknecht India Pvt. Ltd               | 14.57 | SE  |
| 81. | Aadhiti Industries                        | 14.67 | SE  |
| 82. | Grobest Plant                             | 14.08 | SE  |
| 83. | BGR Energy                                | 13.89 | SE  |
| 84. | Polyelastic private limited               | 13.95 | SE  |
| 85. | HIL Ltd                                   | 12.5  | SSE |
| 86. | Pennar Industries Limited                 | 12.9  | SSE |
| 87. | St peter paul seafoods exporting Company  | 12.76 | SSE |
| 88. | Butterfly Appliances Ltd.                 | 11.23 | S   |
| 89. | Seiyoon Electronics India Private Limited | 11.5  | SSE |
| 90. | TNS Heavy Engineering U-2                 | 11.3  | SSE |
| 91. | H&S Supply Chain Services Pvt Ltd         | 11.12 | S   |
| 92. | Kumar agro refinery pvt limited           | 11.19 | S   |
| 93. | Nordex India Blades PVT Ltd               | 13.26 | SSW |

|      |  |       |     |
|------|--|-------|-----|
| 94.  | Michelin India Private Limited                       | 7.66  | WSW |
| 95.  | Harsha éxito Engineering Private Limited             | 7.42  | WSW |
| 96.  | Baettr India   | 8.1   | WSW |
| 97.  | Jesons Industries Ltd Chennai                        | 7.87  | WSW |
| 98.  | Wheels India Limited - EEPD                          | 8.07  | WSW |
| 99.  | Feed Mill - Sheng Long Bio-Tech (India) Pvt. Ltd.    | 8.27  | WSW |
| 100. | Esthell Rubbers Factory                              | 8.52  | WSW |
| 101. | Mepcrete AAC Blocks                                  | 8.71  | WSW |
| 102. | SUPERGAS Filling Plant                               | 8.45  | W   |
| 103. | Wheels India Ltd                                     | 9.22  | WSW |
| 104. | Mico Plast Industries Pvt. Ltd. - U2                 | 1.16  | WNW |
| 105. | CaplinPoint II (R &D Facility)                       | 1.23  | WNW |
| 106. | J. R. Metal  | 2.56  | WNW |
| 107. | Pashupati Metallics                                  | 3.81  | WNW |
| 108. | Suryaans paper mill                                  | 4.41  | W   |
| 109. | Chetna Steel Tubes Pvt. Ltd.                         | 6.56  | WNW |
| 110. | Sri Venkatachalapathy Alloys P Ltd                   | 6.68  | WNW |
| 111. | Balsara Engineering Products Limited                 | 7.12  | WNW |
| 112. | Prakash Ferrous Industries Private Limited           | 9.76  | WNW |
| 113. | VS Pressure vessels pvt. Ltd                         | 9.85  | WNW |
| 114. | Capricorn Juice factory                              | 14.38 | NW  |
| 115. | Shuchi Beverages Limited                             | 14.77 | NW  |
| 116. | Shuchi Beverages Limited                             | 6.87  | NW  |
| 117. | SL Packaging Industries                              | 7.21  | NW  |
| 118. | Caplin Point Laboratories - CP-IV                    | 1.69  | N   |
| 119. | RJN TRANSPORTS                                       | 2.56  | NWN |
| 120. | Tulsyan NEC Limited                                  | 3.6   | NWN |
| 121. | AGRA Coal Impex                                      | 3.13  | N   |
| 122. | ADS Pro-shield                                       | 3.2   | N   |
| 123. | Tinna Rubber and Infrastructure Limited              | 3.22  | N   |
| 124. | Matsayanayagi Steel's and Foundries Private Limited. | 3.87  | N   |
| 125. | Shree Sai Hanuman Smelters Pvt Ltd.                  | 4.16  | N   |
| 126. | ARS Energy Private Limited                           | 4.19  | N   |
| 127. | Akshara Industries Ltd                               | 5.39  | N   |
| 128. | Sonnamu engineering                                  | 5.2   | N   |
| 129. | Sri Varalakshmi Agro Tech Industries                 | 6.35  | N   |
| 130. | Kevin Steels Pvt Ltd                                 | 7.31  | NNW |
| 131. | Panasonic Life Solutions India Pvt Ltd               | 14.52 | NNW |
| 132. | Orient Frozen Foods LLP                              | 11.47 | N   |
| 133. | Oren Hydrocarbons Pvt Ltd                            | 1.23  | NNE |
| 134. | Bhatia Coke & Energy Limited                         | 1.18  | NE  |

|      |  |       |     |
|------|--|-------|-----|
| 135. | Cauvery Power Plant                                | 2.16  | N   |
| 136. | Sindiya Aqua Mineral pvt. ltd.                     | 3.34  | NNE |
| 137. | Malpani Alloy And Extrusions Pvt Ltd.              | 6.91  | NNE |
| 138. | Shree Shyam Enterprise                             | 7.1   | NNE |
| 139. | Apollo Distilleries Pvt Ltd                        | 2.65  | N   |
| 140. | Kamlesh Greencrete Private Ltd                     | 4.56  | N   |
| 141. | Jai Maruthi Polymers                               | 7.35  | N   |
| 142. | Gea-Bgr Energy System India Ltd                    | 12.45 | NNE |
| 143. | IKN Engineering India Pvt Ltd                      | 12.32 | NNE |
| 144. | MTC Business Pvt. Ltd.                             | 7.32  | NNE |
| 145. | OPG C3 Plant                                       | 6.38  | NNE |
| 146. | The pearls stone Pvt Ltd                           | 6.45  | NNE |
| 147. | Uniflow Copper Tubes                               | 6.27  | NNE |
| 148. | Kamatchi steel factory                             | 5.13  | NNE |
| 149. | Kamachi power plant                                | 4.96  | NNE |
| 150. | Kamachi Industries Limited                         | 4.5   | NNE |
| 151. | Jain Metals and Rolling Mills Pvt. Ltd.            | 4.61  | NNE |
| 152. | Dalmia Laminators Ltd                              | 4.72  | NNE |
| 153. | Commtrade Metals                                   | 4.75  | NNE |
| 154. | SRF Limited  | 4.36  | NE  |
| 155. | Heaven Blanc Energy Private Limited                | 4.04  | NE  |
| 156. | Malathi engineering work (Unit-4)                  | 3.6   | ENE |
| 157. | Jana Engineering Industries                        | 3.55  | ENE |
| 158. | Sri Karunamaye Beverages private limited           | 0.63  | E   |
| 159. | Thirupathy Bright Industries                       | 4.2   | E   |
| 160. | Tamil Nadu Coke and Power pvt ltd                  | 4.56  | E   |
| 161. | Redington (India) Limited                          | 5.31  | E   |
| 162. | Blendsteel Engineering Private Limited             | 5.59  | E   |
| 163. | Rice Mill  | 5.3   | E   |
| 164. | Nelcast Limited                                    | 13.55 | SE  |
| 165. | Rane Engine Valve Limited (REVL) - Plant 3         | 13.48 | SE  |
| 166. | BPCL   | 3.87  | NE  |
| 167. | HPCL LPG Bottling Plant                            | 4.56  | ENE |
| 168. | Sri Bharathi Roofing Industries Pvt Ltd            | 4.48  | ENE |
| 169. | Kantaflex India Pvt Ltd factory                    | 4.63  | NE  |
| 170. | Abref Private Limited                              | 4.64  | NE  |
| 171. | Ashok Mineral Enterprises                          | 4.71  | NE  |
| 172. | Time Technoplast Ltd                               | 4.81  | NE  |
| 173. | Dannys Enterprises Private Limited                 | 4.96  | ENE |
| 174. | RBC Metal Fabs                                     | 5.15  | ENE |
| 175. | Capital Carbon                                     | 5.11  | ENE |
| 176. | TVS Sundram Fasteners Ltd Autolec Division Plant 4 | 5.27  | ENE |

|      |   |       |     |
|------|---|-------|-----|
| 177. | Powermax Rubber Factory                                 | 5.78  | ENE |
| 178. | Wim plast   | 6.03  | ENE |
| 179. | Alfa Rubber & Springs Pvt Ltd                           | 5.98  | ENE |
| 180. | Magnatherm Alloys Pvt. Ltd                              | 6.06  | ENE |
| 181. | Premier Industrial Corporation Ltd                      | 6.15  | ENE |
| 182. | Tamil Naadu Edible Oils Pvt. Ltd.                       | 6.21  | ENE |
| 183. | Govindaraja Mudaliar Sons Pvt Ltd                       | 6.02  | ENE |
| 184. | Sundram Fasteners Ltd. (Autolec Division-Bearing Plant) | 5.87  | ENE |
| 185. | P A Footwear P Ltd                                      | 5.61  | ENE |
| 186. | Magnum Polymers India Ltd                               | 5.5   | ENE |
| 187. | Mathi Engineering Work                                  | 5.46  | ENE |
| 188. | SAC Engine Components Pvt Ltd Foundry Division          | 5.39  | ENE |
| 189. | SFL Autolec division plant-IV                           | 5.29  | ENE |
| 190. | Chennai Crumb Industries                                | 4.42  | NE  |
| 191. | Pravina Trading & Associates                            | 4.48  | NE  |
| 192. | Tulsyan Refinery 1                                      | 4.61  | NE  |
| 193. | Tulsyan NEC Limited                                     | 4.63  | NE  |
| 194. | Mil Industries Ltd                                      | 4.67  | NE  |
| 195. | Greaves' cotton Limited plant 5                         | 4.74  | NE  |
| 196. | SGR 777 Foods Pvt Ltd                                   | 4.94  | NE  |
| 197. | Sak Industries Pvt Ltd.                                 | 4.91  | NE  |
| 198. | Madras Hydraulic Hose Pvt Ltd                           | 4.63  | NE  |
| 199. | Jain Rubbers Private Limited                            | 4.666 | NE  |
| 200. | Sri Narayana Metal industries                           | 4.96  | NE  |
| 201. | Shri Plasto Packers Pvt. Ltd.                           | 5.06  | NE  |
| 202. | Poseidon Lighting Pvt Ltd                               | 5.08  | NE  |
| 203. | Gk metal alloys   | 5.1   | NE  |
| 204. | Vaibhav Mercantile Limited                              | 5.16  | NE  |
| 205. | Gupta Power Infrastructure limited                      | 5.32  | ENE |
| 206. | Sun Extrusions  | 5.36  | ENE |
| 207. | Jayaam Galvanizers Pvt. Ltd.                            | 5.32  | NE  |
| 208. | Pon Surya TMT Re-bars                                   | 5.66  | ENE |
| 209. | Sai Supreme Chemicals                                   | 5.76  | ENE |
| 210. | Sfl Autolec   | 5.82  | ENE |
| 211. | TVS Sundram Fasteners Ltd                               | 5.93  | ENE |
| 212. | Autotech Industry india Pvt Limited                     | 5.96  | ENE |
| 213. | MSK Engineering Works                                   | 6.06  | ENE |
| 214. | RO Care India   | 6.01  | ENE |
| 215. | tvm edible oil refineries                               | 6.22  | ENE |
| 216. | Shinsung Petrochemical Pvt Limited                      | 6.25  | ENE |
| 217. | Casting Workshop Limited                                | 6.27  | ENE |

|      |   |      |    |
|------|---|------|----|
| 218. | Vanta Bioscience Limited                  | 4.78 | NE |
| 219. | Kemin Industries                          | 4.94 | NE |
| 220. | Tamilnadu Air Products Private Limited    | 4.9  | NE |
| 221. | Poddar global private limited             | 4.94 | NE |
| 222. | Lehry Industries PVT LTD                  | 5.02 | NE |
| 223. | Durai Shipping and services               | 5.11 | NE |
| 224. | JR Furnace And Ovens (P) Limited          | 5.77 | NE |
| 225. | Hiflo Global Green Solutions Pvt Ltd      | 5.63 | NE |
| 226. | SK Engineering Works                      | 5.87 | NE |
| 227. | Detergeo chem pvt ltd                     | 5.9  | NE |
| 228. | Censtar Packagin (India) Pvt Ltd          | 6.01 | NE |
| 229. | Sri sai Ram Engineering Works             | 5.87 | NE |
| 230. | S R Fabricators Private Limited           | 5.76 | NE |
| 231. | Poddar Global Limited                     | 5.87 | NE |
| 232. | Tamil Nadu Waste Management Limited       | 5.63 | NE |
| 233. | PMR Interlinings Pvt Ltd                  | 5.3  | NE |
| 234. | Srivari Enterprises                       | 5.17 | NE |
| 235. | IEC Fabchem Limited                       | 5.23 | NE |
| 236. | Danblock Brakes India Pvt Ltd             | 5.17 | NE |
| 237. | Green Signal Bio Pharma Private Limited   | 4.91 | NE |
| 238. | VBK Fibreo Tech Industries                | 5.03 | NE |
| 239. | JAK Industries Unit III                   | 4.9  | NE |
| 240. | Hi-Tech Carbon                            | 5.01 | NE |
| 241. | Arun Vyapar Udyog Ltd                     | 6.29 | NE |
| 242. | Western Thomson India Limited             | 5.98 | NE |
| 243. | Pneus Exim                                | 5.73 | NE |
| 244. | Greaves Cotton Limited                    | 6.39 | NE |
| 245. | Aachi Masala Foods Pvt Ltd                | 6.52 | NE |
| 246. | Nippon Thermostat India Limited           | 6.21 | NE |
| 247. | Shree Thirumalaa Industries               | 6.17 | NE |
| 248. | Ars Steels & Alloys International Pvt Ltd | 5.99 | NE |
| 249. | Manchu Toughend Glass Pvt Ltd             | 5.88 | NE |
| 250. | Monsoon Bounty foods Pvt Ltd              | 5.83 | NE |
| 251. | Val-Met Engineering Private Limited       | 5.76 | NE |
| 252. | Anjan Drug Private Limited                | 5.88 | NE |
| 253. | Precision Hydraulics Private Limited      | 5.84 | NE |
| 254. | Fumitec Minerals Pvt Ltd                  | 5.65 | NE |
| 255. | Enrique Keller India                      | 5.97 | NE |
| 256. | Madras Door Company                       | 6.04 | NE |
| 257. | RBA Exports Private Limited               | 6.01 | NE |
| 258. | Infra Engineers India                     | 6.15 | NE |
| 259. | Mabel Engineers Private Limited           | 6.23 | NE |

|      |  |      |     |
|------|--|------|-----|
| 260. | Asia Tech Auto Forgings                        | 6.29 | NE  |
| 261. | Vaishnavi Metals                               | 6.31 | NE  |
| 262. | H. M. Conductors & Engineers (P) Ltd.          | 6.38 | NE  |
| 263. | Loyds industrial work                          | 6.72 | NE  |
| 264. | Automotive Coaches & Components Ltd            | 6.77 | NE  |
| 265. | Mitsuba India Private Limited                  | 6.63 | NE  |
| 266. | VIKI Steels                                    | 6.4  | NE  |
| 267. | Xmold Polymers Pvt Ltd                         | 6.37 | NE  |
| 268. | SAC Engine Components Camshafts Unit           | 6.39 | ENE |
| 269. | SAC MD-I Material Get                          | 6.43 | ENE |
| 270. | Tri Electric Private Limited                   | 6.25 | ENE |
| 271. | Vedha Enterprises                              | 6.57 | ENE |
| 272. | thai evergreen industries private limited      | 6.64 | ENE |
| 273. | Kanishk Steel Industries Limited               | 6.69 | ENE |
| 274. | Leo Prime                                      | 7.31 | NE  |
| 275. | Emerald Resilient Tyre Manufacturers Pvt. Ltd. | 6.21 | NE  |
| 276. | Abirami Soap Works                             | 6.36 | NE  |
| 277. | Millenium Industries                           | 6.51 | NE  |
| 278. | Virogreen India Private Limited                | 6.81 | NE  |
| 279. | P A Footwear P Ltd.                            | 7.06 | NE  |
| 280. | Panvo Organics                                 | 7.08 | NE  |
| 281. | Jfn Fishnet Manufacturer                       | 7.74 | NE  |
| 282. | Doosan Bobcat Pvt Ltd                          | 7.97 | NE  |
| 283. | KOBELCO  | 8.25 | NE  |
| 284. | Hydraguard International Pvt Ltd               | 8.35 | NE  |
| 285. | Leeboy India Construction Equipments Pvt Ltd   | 8.42 | NE  |
| 286. | Century plyboards india                        | 8.67 | NE  |
| 287. | Suryadev Alloy & Power Pvt zLtd.               | 4.19 | E   |
| 288. | TCP Limited                                    | 4.61 | E   |
| 289. | Chennai Minerals Processers                    | 4.73 | E   |
| 290. | Chitrakoot Steels & Power Pvt Ltd.             | 5.13 | E   |

**Table 2-5 Nearest Human Settlement**

| S. No | Villages      | Distance (~km) | Direction | Population (Census 2011) |
|-------|---------------|----------------|-----------|--------------------------|
| 1.    | Gummidipoondi | 6.72           | ENE       | 32,665                   |
| 2.    | Kavaraipettai | 7.76           | ESE       | 26,212                   |
| 3.    | Ponneri       | 14.04          | ESE       | 31,025                   |
| 4.    | Satyavedu     | 12.55          | WNW       | 52,979                   |



## 2.4.2 Project Cost

The budget for 'Proposed expansion in the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The total estimated cost for the proposed expansion project is Rs. 36.25 crores. Project cost and break up is given in **Table 2-6**.

**Table 2-6 Total Capital investment of project cost**

| S. No | Description                          | Existing and Proposed Cost (Rs.) |
|-------|--------------------------------------|----------------------------------|
| 1     | Land Hold (20 years of lease period) | 96,00,000                        |
| 2     | Building                             | 7,67,92,789                      |
| 3     | Plant & Machinery                    | 23,04,85,391                     |
| 4     | Environmental Management Cost        | 1,40,50,000                      |
| 5     | Other Assets                         | 3,15,39,630                      |
|       | <b>Total</b>                         | <b>36,24,67,810</b>              |

## 2.5 Proposed schedule for approval and implementation

Tentative project implementation schedule with respect to various activities after Environmental Clearance is issued from SEIAA-TN is given in **Table 2-7**.

**Table 2-7 Project Implementation Tentative Schedule**

| S. No | Activity   | Project Implementation Schedule |        |        |        |        |        |        |        |        |        |        |        |        |
|-------|--|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|       |  | May-25                          | Jun-25 | Jul-25 | Aug-25 | Sep-25 | Oct-25 | Nov-25 | Dec-25 | Jan-25 | Feb-25 | Mar-25 | Apr-25 | May-25 |
| 1     | ToR obtaining from SEAC  |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 2     | Obtaining Environmental Clearance (EC)                             |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 3     | Obtaining Statutory Permissions (CTE)                              |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 4     | Site Development & Greenbelt development                           |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 5     | Construction of Building/Shed                                      |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 6     | Procurement of Resources & Utilities                               |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 7     | Procurement of additional Equipments & Machineries                 |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 8     | Installation of additional Equipments & Machineries                |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 9     | Instrumentation Control  |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 10    | Piping, Mechanical & Electrical work if any                        |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 11    | Maintanance of existing ETP, APCM & Stacks & other control systems |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 12    | Installation of Fire & Safety equipments                           |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 13    | Recruiting technical team for operations                           |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 14    | Obtaining Statutory Permissions (CTO)                              |                                 |        |        |        |        |        |        |        |        |        |        |        |        |
| 15    | Commissioning of the project                                       |                                 |        |        |        |        |        |        |        |        |        |        |        |        |





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Figure 2-9 Project Site Photographs

## 2.6 Magnitude of Operation (Including Associated activities required for the project.

### 2.6.1 Resource Requirements

#### 2.6.1.1 Land requirements

The total land available under the leasehold of the CUMI is 68212.03 Sq. m (6.85 Ha). The land Sale deed document is enclosed in **Annexure -2** proposed land breakup details is tabulated in **Table 2-8**. Greenbelt area and Layout plan of the project site is attached as an **Annexure-5**. The detailed Ground coverage and block wise built-up area details are given in Error! Reference source not found.. Project site layout is shown in **Figure 2-8**.

**Table 2-8 Land area breakup details**

| S. No.                     | Description           | Existing Area   |              |               |
|----------------------------|-----------------------|-----------------|--------------|---------------|
|                            |                       | Sq. m           | Acres        | (%)           |
| 1                          | Factory Area          | 10353.03        | 2.558        | 15.2          |
| 2                          | Tube Mill             | 2044            | 0.505        | 3.0           |
| 3                          | Finished Goods        | 2250            | 0.555        | 3.25          |
| 4                          | Steel Melting Section | 1408            | 0.347        | 2.04          |
| 5                          | Weighing Bridge Room  | 64              | 0.015        | 0.095         |
| 6                          | Lab & Store           | 153             | 0.037        | 0.225         |
| 7                          | Security Room         | 9.3             | 0.002        | 0.135         |
| 8                          | Office Room           | 125.3           | 0.030        | 0.184         |
| 9                          | Labour Shed           | 375             | 0.092        | 0.55          |
| 10                         | Toilet/Rest Room      | 74.1            | 0.018        | 0.11          |
| 11                         | Parking               | 700             | 0.172        | 1.04          |
| 12                         | Greenbelt Zone        | 22510.06        | 5.562        | 33.0          |
| 13                         | Total Road Extent     | 10504.64        | 2.595        | 15.4          |
| 14                         | Future Extension      | 17641.6         | 4.359        | 25.86         |
| <b>Total</b>               |                       | <b>68212.03</b> | <b>16.85</b> | <b>100.00</b> |
| <b>Total built-up Area</b> |                       | <b>11153.73</b> | <b>2.756</b> |               |

### 2.6.1.2 Water requirement

The water requirement for the proposed project is 95 KLD (Fresh water is 86 KLD and recycled 9.0 KLD). Water requirements for the proposed project will be met through Panchayat supply. Total water requirement is given in **Table 2-9**. Total Water requirement and Breakup is shown in Table 2-10 Water balance charts for the proposed project is given as Figure 2-11

**Table 2-9 Total water requirement for existing and proposed for expansion.**

| S. No | Description                   | Existing | Proposed/ After expansion |
|-------|-------------------------------|----------|---------------------------|
| 1     | Total water requirement (KLD) | 87.0     | 95.0                      |
| 2     | Fresh water requirement (KLD) | 84.0     | 86.0                      |
| 3     | Recycled water (KLD)          | 3.0      | 9.0                       |

**Table 2-10 Total Water Requirement and Breakup for Existing**

| S. No        | Water requirement  | Total       | Input (KLD) |            | Output (KLD) |             | Remarks   |
|--------------|--------------------|-------------|-------------|------------|--------------|-------------|---|
|              |                    |             | Fresh       | Recycled   | Loss         | Effluent    |   |
| 1            | Domestic Usage     | 2.5         | 2.5         | 0          | 0.5          | 2.0         | Disposal through Septic tank                    |
| 2            | Induction Furnace  | 2.0         | -           | 2.0        | 1.0          | 1.0         | Will be sent to Colling tower for process reuse |
| 3            | Con-Caster Cooling | 3.0         | 3.0         | 0          | 2.0          | 1.0         | Will be sent to Colling tower for process reuse |
| 4            | Re-Rolling system  | 2.5         | 1.5         | 1.0        | 1.0          | 1.5         | Will be sent to Colling tower for process reuse |
| 5            | Scrubber system    | 1.5         | 1.5         | 0          | 0.5          | 1.0         | Evaporation Loss at Solar Pan                   |
| 6            | Greenbelt          | 74.0        | 74.0        | 0          | 74.0         | 0           | Percolation & Evaporation Loss                  |
| 7            | Fire Hydrant       | 1.50        | 1.50        | 0          | 1.50         | 0           | Evaporation Loss                                |
| <b>Total</b> |                    | <b>87.0</b> | <b>84.0</b> | <b>3.0</b> | <b>80.5</b>  | <b>6.50</b> |   |

**Table 2-11 Total Water Requirement and Breakup for after expansion.**

| S. No        | Water requirement                        | Total       | Input (KLD) |            | Output (KLD) |             | Remarks   |
|--------------|--|-------------|-------------|------------|--------------|-------------|---|
|              |  |             | Fresh       | Recycled   | Loss         | Effluent    |   |
| 1            | Domestic Usage                           | 2.5         | 2.5         | 0          | 0.5          | 2.0         | Disposal through Septic tank                    |
| 2            | Induction Furnace                        | 5.0         | 0           | 5.0        | 1.0          | 4.0         | Will be sent to Colling tower for process reuse |
| 3            | Con-Caster Cooling (Primary & Secondary) | 7.0         | 5.0         | 2.0        | 3.0          | 4.0         | Will be sent to Colling tower for process reuse |
| 4            | Re-Rolling system                        | 3.5         | 1.5         | 2.0        | 2.0          | 1.5         | Will be sent to Colling tower for process reuse |
| 5            | Scrubber system                          | 1.5         | 1.5         | 0          | 0.5          | 1.0         | Evaporation Loss at Solar Pan                   |
| 6            | Greenbelt                                | 74.0        | 74          | 0          | 74.0         | 0           | Percolation & Evaporation Loss                  |
| 7            | Fire Hydrant                             | 1.5         | 1.5         | 0          | 1.50         | 0           | Evaporation Loss                                |
| <b>Total</b> |  | <b>95.0</b> | <b>86.0</b> | <b>9.0</b> | <b>82.5</b>  | <b>12.5</b> |   |

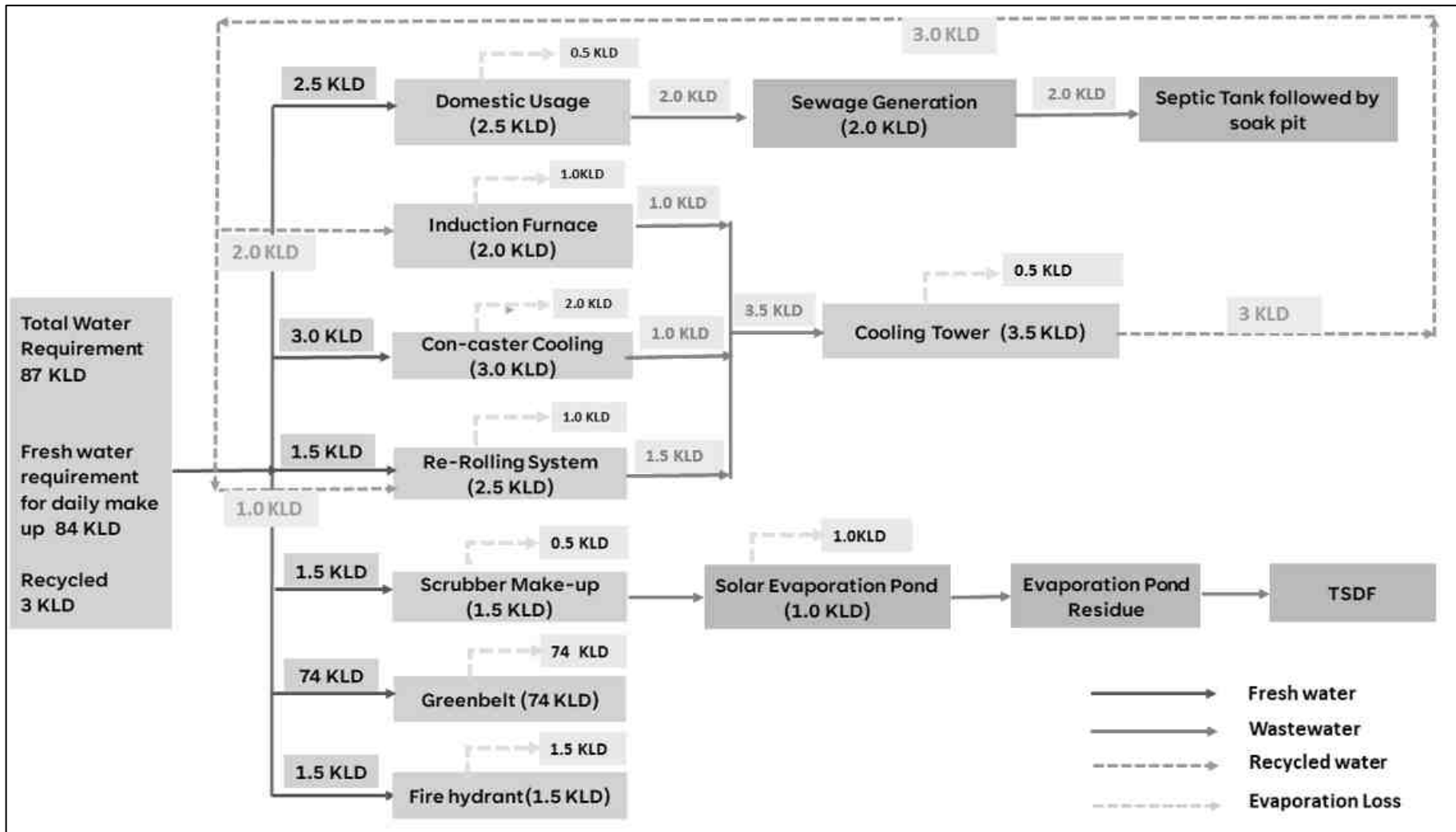


Figure 2-10 Water Balance Chart for existing project



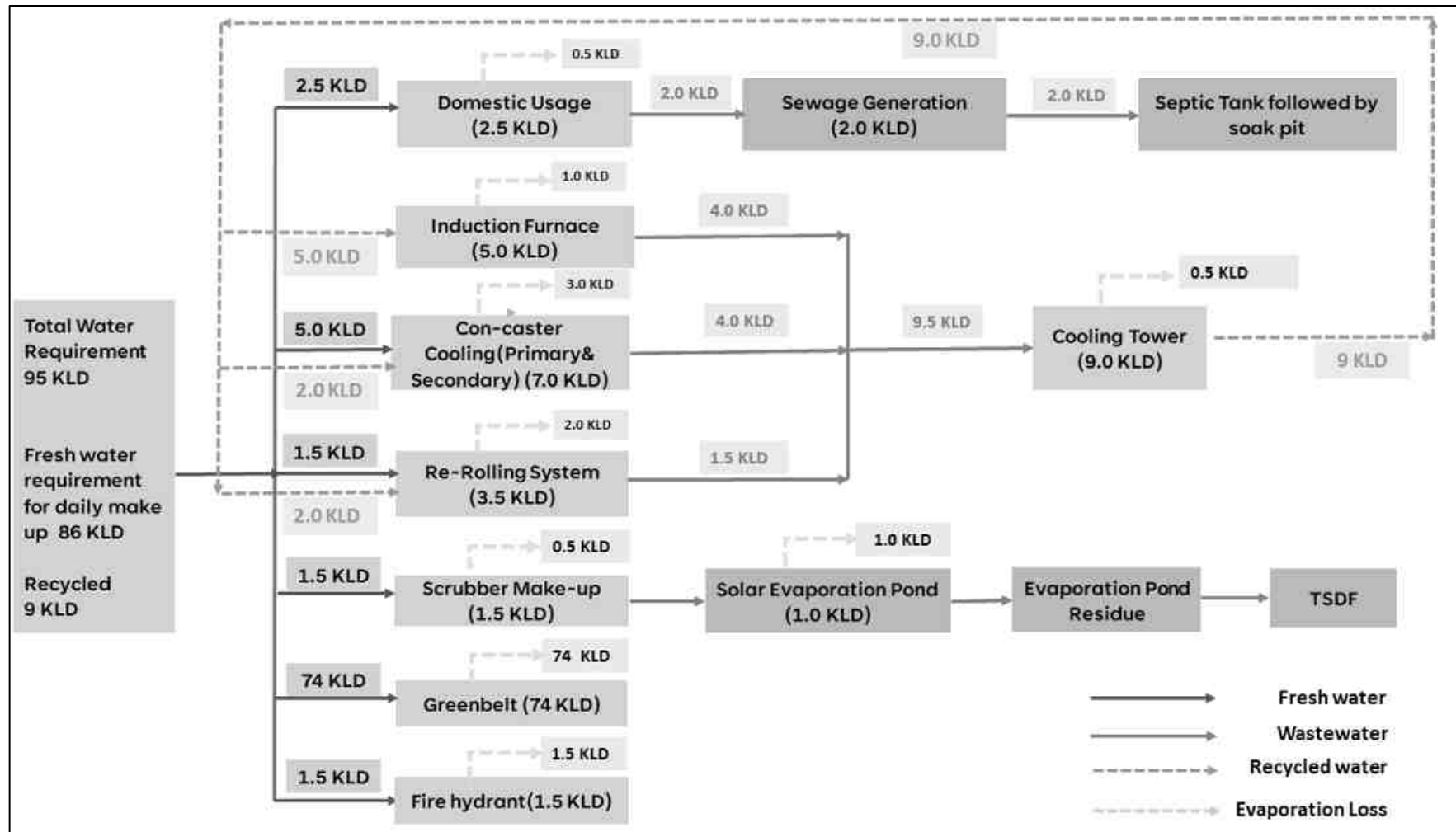


Figure 2-11 Water Balance Chart for proposed expansion project

### 2.6.1.3 Power & Energy Requirement

The power requirement is sourced from TANGEDCO. DG sets will act as the standby facilities and will be utilized in case of power failures. The details of power requirement and backup power facilities are given in **Table 2-12** & Fuel requirement is given in **Table 2-13**.

**Table 2-12 Power requirement and Backup power facilities**

| S. No | Description             | Existing | Proposed | After expansion | Source   |
|-------|-------------------------|----------|----------|-----------------|----------|
| 1     | Power requirement (kVA) | 5000     | 19000    | 24000           | TANGEDCO |
| 2     | Backup_ (KVA)           | 1 x 500  | -        | 1 x 500         | DG Sets  |
| 3     | Air Compressor          | -        | 30HP     | 30HP            | In-House |

Note: Existing 125KVA DG Set will be replaced during expansion

**Table 2-13 Fuel requirement**

| S. No | Fuel type   | Existing | Proposed | After Expansion | Source                       |
|-------|---|----------|----------|-----------------|------------------------------|
| 1     | HSD for DG Sets (Liters/Month)                              | 250      | 50       | 300             | Nearby petrol pumps/ outlets |
| 2     | Coal (Tonnes/Month) for Re Rolling Heater & Coal pulveriser | 150      | -75      | 75              | Nearby petrol pumps/ outlets |
| 3     | Grease (Kg/Month)   | 25       | 15       | 40              | Nearby outlets               |

Note: Coal Pulverizer is for standby

### 2.6.1.4 Manpower requirements

The total manpower will be 50 nos' during operation phase. During construction phase 50 nos. Plant facilities run on all three shifts with a staggered weekly off. The breakup is given in **Table 2-14**.

**Table 2-14 Total manpower breakup**

| S. No        | Description       | Construction Phase |           | Operation Phase |           |
|--------------|-------------------|--------------------|-----------|-----------------|-----------|
|              |                   | Temporary          | Existing  | Existing        | expansion |
| 1            | Skilled workers   | 0                  | 12        | 12              | 8         |
| 2            | Unskilled workers | 50                 | 18        | 18              | 12        |
| <b>Total</b> |                   | <b>50</b>          | <b>30</b> | <b>30</b>       | <b>20</b> |

### 2.6.1.5 Raw Material requirements

The raw materials for Billet Manufacturing are Sponge Iron, Silico Manganese, Ferro Silicon, MS Scrap and for Re-Rolled Steel Angle & Flat Bars & Channels are Billets. All the raw materials required in manufacturing are procured either from local markets or imported. The raw materials and finished products will be transported by road. Raw Material Requirement, Storage Capacity, Source and Mode of Transportation is given in Table 2-15

**Table 2-15 List of Raw Material Requirement, Storage Capacity, Source and Mode of Transportation**

| S. No.  | Raw Material     | Quantity (T/Annum) |                 | Source          | Mode of Transport |
|---|------------------|--------------------|-----------------|-----------------|-------------------|
|   |                  | Existing           | Proposed        |                 |                   |
| <b>Billets</b>  |                  |                    |                 |                 |                   |
| 1.  | Sponge Iron      | 4,500              | 37,879          | Local Suppliers | Trucks            |
| 2.  | Silico Manganese | 156                | 1,313           | Local Suppliers | Trucks            |
| 3.  | Ferro Silicon    | 24                 | 202             | Local Suppliers | Trucks            |
| 4.  | MS Scrap         | 19,080             | 1,60,606        | Local Suppliers | Trucks            |
| <b>Total</b>  |                  | <b>23760</b>       | <b>2,00,000</b> |                 |                   |
| <b>Re-Rolled Steel Angle &amp; Flat Bars &amp; Channels</b> |                  |                    |                 |                 |                   |
| 1.  | Billets          | 61,200             | 2,00,000        | within the Unit | Conveyer belt     |
| <b>Total</b>  |                  | <b>61,200</b>      | <b>2,00,000</b> |                 |                   |

**Table 2-16 Existing other Raw Materials & Fuels for main Plant Requirement, Storage Capacity, Source & Mode of Transportation**

| S. No | Name of the material           | Total for proposed Quantity (TPA) | Physical state | Total Storage capacity (MT)                           | Mode of storage | Material of Construction | Mode of Transportation |
|-------|--------------------------------|-----------------------------------|----------------|---|-----------------|--------------------------|------------------------|
| 1     | HSD for DG Sets (Liters/Month) | 300                               | Liquid         | Vendors are nearby only will maintain stock of 2 Days | Drums           | MS                       | By Road                |
| 2     | Grease (Kg/Month)              | 40                                | Solid          |   | Drums/Cans      | MS                       | By Road                |
| 3     | Coal (Tonnes /Month)           | 75                                | Solid          | 75  | Bags            | Bags                     | By Road                |

### 2.6.2 Proposed Products Details

The proposed products are presented in the table given below.

**Table 2-17 List of proposed products**

| S. No | Name of the product  | Existing TPA | Proposed TPA | After Expansion TPA |
|-------|--|--------------|--------------|---------------------|
| 1     | Billets  | 23,760       | 1,76,240     | 2,00,000            |
| 2     | Re-Rolled Steel Angle & Flat Bars, Patras, Channels & Hollow section | 60,000       | 1,40,000     | 2,00,000            |

### 2.6.3 Process Description

The conversion of iron scrap into billets does not require any sophisticated technology. Various grades of scrap such as super melting scrap, bazaar melting scrap, commercial scrap, sponge iron etc., are melted in electrically operated induction furnace and will be poured into the billets using a Continuous Casting Machine (CCM). Then the billets are used to the desired finishing section in the hot condition by way of passing the material between a pair of grooved rolls and providing suitable drafts at various stages. The whole operation is conducted at a particular temperature range and within a limited time span. The stages of rolling operation are comprised of heating of feed stock to rollable temperature, rolling the feeding stock in different mill stands, cropping the hot bar during the process of roiling between mill stands as applicable and subsequently finishing in form of hot rolled deformed bar in straight length.

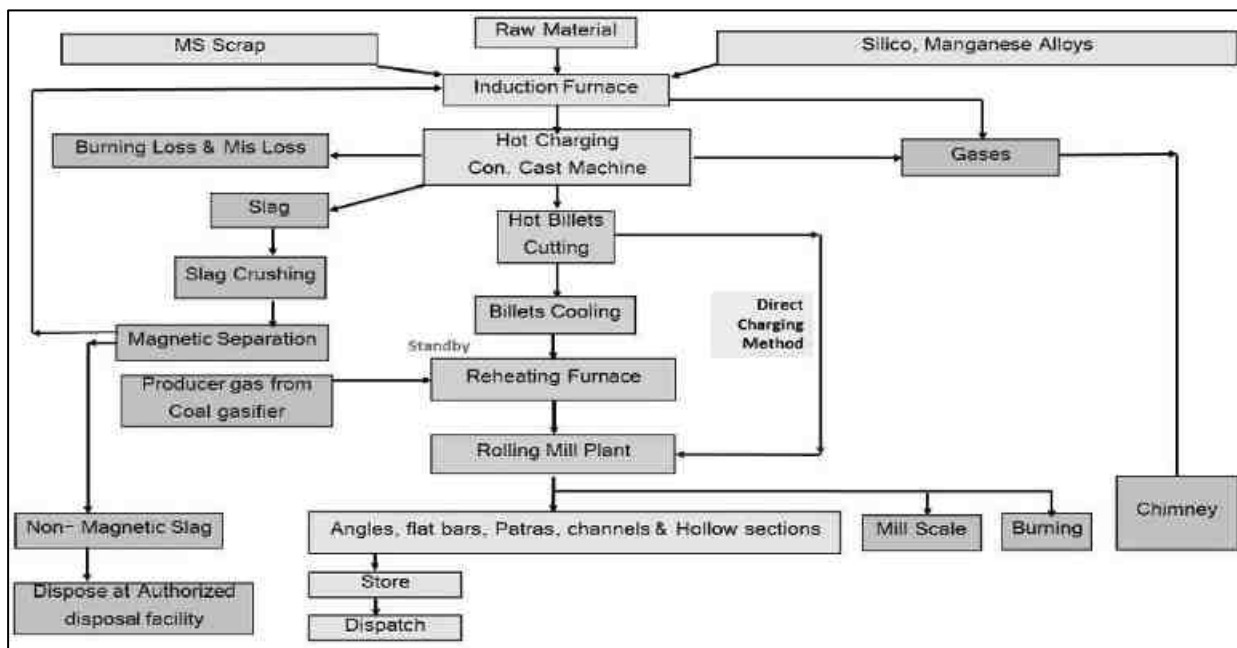


Figure 2-12 Cumulative Manufacturing Process of the proposed project

#### 2.6.3.1 Process description of MS Billets

Selective steel and iron scraps of different varieties are charged into the Induction Furnace Crucible by Electromagnets. These crucibles are already lined with Refractory Ramming Mass. The solid-state inverter converts the three-phase supply at normal frequency to DC supply and the DC supply is converted to AC at medium frequency of 1000 cycles in the inverter with the help of water-cooled capacitor of suitable rating and capacity. The induction heating is aided by the flow of Medium Frequency Current in the coil which is supplied using Static Frequency Convertor, DC choke, Capacitor Bank and Water-cooled power cables.

Due to the high frequency, an induced current develops a heating effect inside the crucible in which the scrap is charged, and the scrap will be melted by induction heating into a liquid form. The liquid metal is tested in the laboratory and necessary ingredients such as

Sponge Iron and Silico Manganese are added in required proportions. The temperature of the liquid metal is allowed to rise in the furnace and samples are collected for testing the final composition in the laboratory after removal of slag. The temperature is constantly checked with the help of the optical thermometer in the refractory lined crucible.

After the temperature has reached about 1680°C, the furnace is tilted with the help of the hydraulic system. The liquid metal is poured in the ladle and is sent to the Continuous Casting Machine, wherein the Billets are manufactured in the length and sizes required. The process flow chart of MS Billets is shown in **Figure 2-13**.



**Figure 2-13 Manufacturing Process Flow Diagram of Billets**

**2.6.3.2 The manufacturing process of MS Billets involves the following steps in sequence.**

**a) Charging**

- MS Scrap & Sponge Iron form the major raw materials for steel making in the induction furnace. Selected scrap of consistent quality is to be used.
- After the furnace is switched on, current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located.

## b) Slagging

Steel slag (SS) is a by-product obtained during the separation process of molten steel from impurities in steel-melting furnaces. The slag occurs as a molten liquid melt and is a complex solution of silicates and oxides that solidifies upon cooling. Depending on the used production technology, the steel slag can be divided into a basic oxygen steel slag, an electric arc furnace slag and a ladle furnace slag. The steel slag is used as a secondary cementitious binder, or aggregates for road construction.

The slag in Induction furnace slag, is generated when iron scrap is melted and refined. The slag removal process is carried out by dispersing natural granular perlite on top of the molten metal. The coagulating, encapsulating effect of the perlite allows slag to be easily removed from ladles and furnaces.

Cleanliness of the scrap is very important since dirty or contaminated scrap tends to deposit a slag layer on the furnace refractory. This occurs at, or just below, the liquid level in the crucible and restricts the quantity of power which is drawn by the furnace. An effective reduction in the internal diameter of the furnace can also be there which makes the charging more difficult and protracted. This again affects the energy efficiency of the furnace. Further, rusty scrap takes more time to melt. It also contains less metal per charge. Dirty metallics charge results into higher volume of slag which means higher specific consumption of power. For every 1 % slag formed at 1500 deg C energy loss is 10 kWh per ton.

## c) Sampling

Slag deposited on the bottom of a steel making furnace, especially a soaking pit for steel lumps, is difficult to remove. To enable this to be done while the furnace is hot, adding a substance, e.g., ferro-silicon, which lowers the melting point of the slag, and a substance which reacts exothermically to initiate melting of the slag. When the slag is sufficiently liquefied, it is removed by means of a mechanical grab.

## d) Change Material

Charge materials used for making a heat are important for controlling the quality of steel being made in the induction furnace. The materials ensure that the liquid steel made has the aimed mechanical properties and chemical composition after its casting and is free from defects.

Besides the quality of steel, the charge materials also affect.

- Volume of slag produced.
- Life of refractory lining
- Safety of both the plant and the working personnel.

Further, the charge materials along with the charging practice have a considerable influence on the specific consumption of electrical energy and the furnace productivity.

In induction furnace, the main charge materials are metallics consisting of scrap and sponge iron. Both steel scrap and iron scrap are used. Iron scrap brings carbon to the furnace bath. smelting iron ore is also sometimes used in some furnaces for the purpose of introducing carbon to the bath. The ratio of these materials used for producing heat depends on their relative availability at the economic cost at the plant location. Metallics are charged in the furnace either mechanically or manually.

#### **e) Molten Heel Practice**

For effective furnace operation and maximum energy efficiency it is vital to balance the demand for, and the supply of, molten iron. While mains frequency furnaces generally operate with a molten heel, medium frequency units may be completely drained before re-charging, resulting in thermal cycling of the refractory lining. To maximize lining life and minimize energy consumption, medium frequency furnaces should be re-charged, and power applied immediately following tapping. The furnace should be maintained full during melting and the tapping time be minimized to maximize energy efficiency.

To improve energy consumption is to quantify the amount of energy used and metal charged. Surprisingly, it is not uncommon for coreless furnaces to be operated without energy consumption being measured, either because meters are not fitted or because usage is not monitored.

The condition of the feedstock can make a substantial difference to the energy needed to melt it. If unsuitable materials are used, an investigation will verify whether there are any hidden costs that outweigh the apparent savings achieved by purchasing cheaper raw materials.

Excessive superheating or long holding times at high temperatures is wasteful and can lead to metallurgical problems.

#### **f) Furnace Cover Losses**

The induction furnace uses the transformer principle of induction, i.e., when an electrical conductor is placed in a fluctuating magnetic field then a voltage is induced in the conductor. In crucible furnaces, this voltage causes strong eddy currents, which due to the resistance of the material, cause it to be heated and ultimately to melt. The water is used for the cooling of the coil. The cooling water lines are monitored regarding volume and temperature.

During the production of steel, a substantial quantity of electrical energy is needed. Besides the theoretical energy required for producing steel, energy is also required for

compensating the losses which are taking place while producing steel. The energy losses increase the specific energy consumption and decrease the furnace efficiency. The losses which take place during the production of steel are

- (i) Thermal losses,
- (ii) Furnace coil losses,
- (iii) Capacitor bank losses,
- (iv) Convertor losses, and
- (v) Losses on main side transformer.

Thermal losses are the main losses and contribute maximum towards loss of energy. The major thermal losses in induction furnace:

- (i) radiation loss from the furnace top,
- (ii) Conduction losses from the refractory lining,
- (iii) Heat losses in the cooling water of the coil,
- (iv) Heat carried by the removed slag,
- (v) Heat carried by the gases being emitted from the furnace top.

Further, during the making of a heat, the furnace is constantly losing heat both to the cooling water and by radiation from the shell and the exposed metal surface at the top. Electrical energy is required to be spent to substitute these heat losses. Hence the longer the heat time the greater the energy consumption and lower is the furnace inefficiency.

The factors which affect the consumption of electrical energy in the furnace include

- (i) Dirt going in the furnace with scrap,
- (ii) Rusty charge material
- (iii) Low bulk density of the scrap
- (iv) Recarburizing of steel when the steel is almost ready.
- (v) Not using full power for melting,
- (vi) Excessive formation of slag,
- (vii) Excessive generation of fumes and emissions,
- (viii) Excessive losses of metal due to spillage and splashing,
- (ix) Time of making a heat since longer production cycle means higher thermal losses due to radiation and conduction,
- (x) Holding of the completed heat in the furnace

Metal losses for metallic charge materials depend upon the physical size of the component and their quality, but are normally less than 5%, with a fair proportion of this loss being due to spillage and splash during the de-slagging and pouring operations. The one factor which has the maximum effect on energy consumption is the level of furnace utilization. Higher is the utilization means energy efficient production cycle.

**Working of Induction Furnace:**



After the furnace is switched on, current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. The induced fluxes thus generate a cut through the packed charge in the crucible. As the magnetic fluxes cut through the scraps and complete the circuit, they generate an induced current in the scrap. This induced current, as it flows through the highly resistive path of the scrap mix, generates tremendous amounts of heat and melting of scrap. As soon as the charge has melted clearly, any objectionable slag is skimmed off, and the necessary alloying elements are added. When these additives have melted completely, the power input may be increased to bring the temperature of metal up to the point most desirable for pouring. The current is then turned off and the furnace is tilted for pouring into a ladle. As soon as pouring has ceased the crucible is cleaned completely from any slag or metal droplets adhering to the wall of the crucible and the furnace is now ready for charging again.

#### Specifications of the Induction Furnace:

| S. No | Description of the feature | Unit            | Specification  |   |
|-------|----------------------------|-----------------|--|---|
|       |                            |                 | Existing   | Proposed after expansion  |
| 1.    | Capacity                   | (T/heat)        | 8T/H   | 25T/H x 3Nos  |
| 2.    | Alloys to be melted        | --              | MS Steel   | MS Steel  |
| 3.    | Melt Temperature           | °C              | 1650   | 1650  |
| 4.    | Main Panel                 | KW              | 5000X1   | 8000X3  |
| 5.    | Furnace Transformer        | KVA             | 5500X1   | 10000X3   |
| 6.    | Rated Converter Capacity   | KW              | 5000X1   | 8000X3  |
| 7.    | Maximum Inverter Capacity  | KW              | 5000X1   | 8000X3  |
| 8.    | Nominal Furnace Frequency  | Hz              | 380  | 380   |
| 9.    | Line Power Factor          | --              | 0.98   | 0.98  |
| 10.   | KVA required at Input      | kVA             | 5000   | 24000   |
| 11.   | Melt rate at proposed KW.  | (kg/hour–Steel) | 2750   | 23000   |
| 12.   | Power connection           | V & Hz          | 33KV/50Hz  | 110/50Hz  |
| 13.   | Style of Furnace           | --              | Steel Frame  | Steel Frame   |
| 14.   | Pouring Mechanism          | --              | Hydraulic tilt   | Hydraulic tilt  |
| 15.   | Furnace lining             | --              | Silica   | Silica  |
| 16.   | Interlock system           | --              | Overheating could cause the decomposition of insulating material & produce flammable hydrogen, methane & propane gas. This could produce an explosion. To avoid this | Overheating could cause the decomposition of insulating material & produce flammable hydrogen, methane & propane gas. This could produce an explosion. To avoid this explosion, overheating will be avoided by circulating water in copper coil. To |

|  |  |  |   |  |
|--|--|--|---|--|
|  |  |  | explosion, overheating will be avoided by circulating water in copper coil. To control the overheating, safety interlock system will be provided to turn off power automatically & service door automatically open. This will be helpful to avoid any accident caused due to overheating. | control the overheating, safety interlock system will be provided to turn off power automatically & service door automatically open. This will be helpful to avoid any accident caused due to overheating. |
|--|--|--|---|--|

### 2.6.3.3 Continuous Con-Cast Machine (CCM):

The Liquid steel from the electric induction furnace is tapped in 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 a water-cooled copper mold. Solidification begins in the mold and continues through the first zone and strand guides. In this configuration the strand is straightened, torch-cut, then discharged for intermediate storage or hot charged for finished rolling.

#### Specification of the Con-Cast Machine:

| S. No | Description of the feature | Specification      |                        |                    |
|-------|----------------------------|--------------------|------------------------|--------------------|
|       |                            | Existing           | Proposed for expansion | After expansion    |
| 1     | Number of Machines         | 1                  | 0                      | 1                  |
| 2     | Number of Strands          | 1                  | 1                      | 2                  |
| 3     | Design Limits              | 1                  | 0                      | 1                  |
| 4     | Machine equipped to cast   | Copper mould tube  | Copper mould tube      | Copper mould tube  |
| 5     | Casting Radius             | 4/7                | -                      | 4/7                |
| 6     | Billet Lengths             | As per requirement | As per requirement     | As per requirement |
| 7     | Type of Ladle              | Bail arm ladle     | Bail arm ladle         | Bail arm ladle     |
| 8     | Ladle Support              | Bale Arm           | Bale Arm               | Bale Arm           |
| 9     | Ladle Capacity (Tonne)     | 8                  | 25                     | 25                 |
| 10    | Type of Cutting Device     | PLC Auto cutting   | PLC Auto cutting       | PLC Auto cutting   |
| 11    | Method of Discharge        | Roller conveyor    | Roller conveyor        | Roller conveyor    |
| 12    | Steel Quality              | MS                 | MS                     | MS                 |
| 13    | Casting Practice           | Pouring            | Pouring                | Pouring            |

|    |                  |                             |                             |                             |
|----|------------------|-----------------------------|-----------------------------|-----------------------------|
| 14 | Tundish Practice | Continues flow of liquid    | Continues flow of liquid    | Continues flow of liquid    |
| 15 | Mold Support     | Short Lever arm oscillation | Short Lever arm oscillation | Short Lever arm oscillation |

## 2.6.4 Manufacturing Process of Re- rolled Steel Products

The Unit proposes to increase its manufacturing capacity of Re-rolled steel products by optimum utilization of the existing plant and machinery in the re-rolling mill. In this Process, the hot billets are cooled to room temperature and kept in store and checked for scratches and defective locations; they are then repaired before being heated in the reheating furnace prior to rolling. This is conventional rolling (CR) process.

To minimize fuel usage and gaseous emission, an alternative technology has been followed in the manufacturing process. This would be achieved by direct charging technology, in which the Hot M.S. Billets are fed directly into the re-rolling mill from the Continuous casting Machine CCM. After charging, the hot billet will be drawn into Re-rolled Steel product of desired dimensions and dispatched to the market after proper bundling and inspection.

The hot billets are pushed out by the mechanism provided to the rolling machine to deform the diameters. The rolling temperature of about 1100°C to 1200°C is maintained throughout the process. The deformed rods are passed through a finish the rolling line and when the required size is achieved it is passed through the cooling bed/ water quenching bed.

### 2.6.4.1 Induction Furnaces

The existing plant is already equipped with the induction furnaces of 8 T/Heat with two crucibles. To meet the manufacturing capacity of 23,760 TPA of MS Billets, 3 Numbers of 25 T/Heat of furnace has been proposed to install. For controlling the gaseous pollutants, the proposed induction furnaces will be provided with wet scrubbers. The benefit of the proposed induction furnaces includes the following:

1. Optimized Consistency
2. Maximized Productivity
3. Improved Product Quality
4. Extended Fixture Life
5. Environmentally Sound
6. Reduced Energy Consumption

### 2.6.4.2 Reheating Furnace

Traditionally billets are cast in a continuous casting machine (CCM) and are stored in inventory. Then billets are transferred to the reheating furnace and subsequently rolled through a series of rolling stands for the final desired size and shape. There are a few reasons for using reheating furnaces in rolling plants including:

- Obtaining a homogeneous microstructure.
- Softening of steel for subsequent rolling.
- Acquiring a desired initial temperature and dissolving any carbides and nitrides present.

During this reheating process, steel microstructure transforms into austenitic structure and small grains. If any small grains were present, they would be consumed by continuous static grain growth. The existing rolling mill is attached to 1 X 15T capacity of Reheating furnace for which Indonesian coal has been used as a fuel. The annual consumption of coal is about 150 Tonnes/Month. After the Proposed expansion Reheating furnace will be used as standby only since, Direct charging/Hot Rolling technique will be followed.

The burning of coal, oil, and gas in steel plants produces an excess amount of carbon dioxide which in turn increases the Greenhouse effect. The emission of CO<sub>2</sub> adds to the supply already in the atmosphere thereby increasing the temperature of the Earth. To control the emission rate of polluting gases an alternate technology has been proposed in the expansion process.

The main component of Rolling Mill is the Reheating Furnace. Charging in the furnace is then transferred to the Rolling mill sections. The RHF is designed to accept billets from the furnace charging table and to reheat them to a uniform rolling temperature level.

Based on the chemical composition, billets are pushed into reheating furnace where two types of zones are available, first is the heating zone (1050 °C) and the other is soaking zone (1250 °C). The temperature is monitored by a temperature display system. Once the billets attain the required temperature, they are ejected into roughing mill. The other way of passing billing into rolling mill is hot charging directly from CCM through conveyor transformation at around 1050°C to 1100°C. The billet goes into roughing mill where the rolling process takes place, in which the deformation of billets will commence. Then these billets will be passed into the intermediate mill and then into the continuous mill for further deformation based on the required size of the bar.

Then after getting the required size, the material will be passed on to the pre pinch roll and then to Thermax quenching system, where the material temperature will be around 950°C and after quenching it will be around 330°C. Then the material will be passed through post pinch roll and then through flying shear where the material gets cut using diverter. Material then passes through the tail breaker and moves into twin channel and finally gets dropped onto the cooling bed where the material temperature will be 600°C and the phase of material will change from marten site phase to ferrite pearlite phase.

The steel ladle with liquid steel will be brought to the continuous casting section, with overhead crane and placed on the ladle stand on the casting platform.

The tundish lined with cold insulating boards will be brought to the casting position through a tundish car running on rails. The tundish will be positioned accurately above the copper molds. The ladle slide gate will be nonstop, and the nozzles are blocked before the start of pouring of liquid steel. After the liquid steel rises to the required level the tundish nozzles will be opened manually, and liquid steel will start flowing into the mold.

Prior to the start of casting operation, the dummy bar will be introduced into the mold from bottom for temporarily plugging the mold. When the metal level in the mold reaches its top, the drives of the mold oscillating mechanism as well as the withdrawal of the dummy bar will begin at the medium speed and will be gradually increased to the normal casting speed within a few minutes. During casting, the metal level in the mold will be maintained within predetermined limits by adjusting the strand withdrawal speed.

Partially solidified strand after leaving the mold will pass through strand guide roller segments where intensive and controlled cooling will be affected by means of direct spray of water through nozzles. As a result, the strand will be fully solidified before entering the withdrawal and straightening unit. The dummy bar will be separated from the hot strand just after the withdrawal and straightening unit and lifted away from the run-out roller table by a hydraulically actuated device. The cast strand will be cut into required lengths by oxy-acetylene gas cutting torch.

The cut billets will travel on the run-out roller table up to the cross-transfer area for further transferring to the cooling bed through billet pushers. During emergency, the ladle will be shifted to the casting area, where the steel will be poured into ingots. After the ladle is emptied, the slag left therein will be poured out in slag pot kept on the ground and the ladle will be sent back for circulation repair.

At the end of each casting operation, the tundish nozzles will be plugged, and the tundish car moved away from the casting position. The tundish will then be lifted by the overload crane and placed in the tundish preparation area for repair and preparation.

#### **2.6.4.3 Direct Hot Rolling Technology**

Direct Hot Rolling technology is one of the advanced production management technologies in steel sector, which represents awareness of green and energy-saving ideology. Contrary to the conventional process of storage and cooling of the billet, the sensible heat from the continuous - cast billets are utilized by charging them directly into the rolling unit.

In Direct Hot Rolling, the melt, tapped at approximately 1660-1700°C, is transferred to the continuous casting machine quickly without any significant heat loss and is poured into mould at around 1590°C. The melt is solidified and cooled down to a temperature of 1050 to 1100°C by controlled water cooling and secondary direct spray cooling. The

solidifying billet is cut immediately and is passed to the rolling mill, ensuring a minimal heat loss.

A solution to the above-mentioned problems can charge the billets from CCM directly to the reheating furnace prior to rolling, bypassing billet storage at ambient temperature. More ambitiously, another solution can be sending billets from CCM directly to rolling mill, bypassing reheating furnace and billet inventory.

As outlined above, there can therefore be three approaches for hot rolling of rebar:

- ✓ Hot billets from CCM are stored separately and then moved for heating in reheating furnace prior to rolling.
- ✓ Placing hot billets from CCM into a reheating furnace and raise the temperature before transferring them to the rolling unit.
- ✓ Transferring hot billets from CCM directly to the rolling unit.

#### **Conventional Rolling Process:**

In this Process, the hot billets are cooled to room temperature and kept in store and checked for scratches and defective locations; they are then repaired before being heated in the reheating furnace prior to rolling. (i) This is conventional rolling (CR) process.



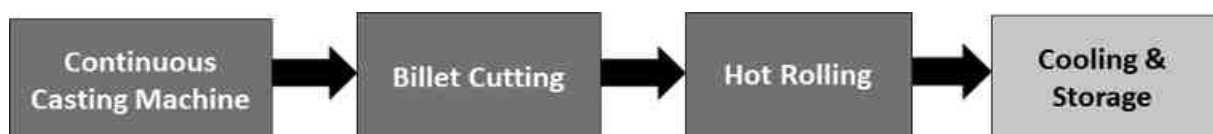
#### **'Hot Charging' or 'Hot Charge Rolling' (HCR):**

In Method (ii), the hot billets are directly transferred, via reheating furnace, to the rolling unit without the cooling process mentioned for Method (i). This is termed as 'Hot Charging' or 'Hot Charge Rolling' (HCR) process.



#### **'Direct Rolling' or 'Direct Hot Rolling' (DHR):**

In this method, the hot billets are directly transferred to the rolling unit by means of a high-speed roller table. This is termed as 'Direct Rolling' or 'Direct Hot Rolling' (DHR) process.



This route is an advanced and upgraded practice of the former processes. This system has been instigated by modernizing rolling technology, practices of heat control and casting techniques. These modifications ensure that heat of billets in CCM is not substantially reduced.

In Hot charge rolling route, the billet is guided to reheating furnace before the billet cools off below 650°C, reducing the time in reheating furnace. Conversely, in Direct Hot Rolling route, the cast billet is sent directly to rolling mill.

**Advantages of Direct Charging:**

- ✓ Primly, the pollution levels are kept in control by eliminating the fuel consumption which reduces the GHG emission.
- ✓ The Plant brings profit and happiness to Industry, at the same time protects the environment and makes the steel industry more sustainable.
- ✓ Reduction in the scale loss which would have been burned in the billet reheating furnace.
- ✓ It will also help in reducing the manpower required in any unit and reduce the risks of lower production caused due to the manpower engaged in vital function of mould settings; Billet's finishing and loading in the billet reheating furnace etc.
- ✓ It also Reduces the overall machinery and production cost.
- ✓ It will reduce miss roll, cobbles, etc and improve the product quality, increase % yield etc.

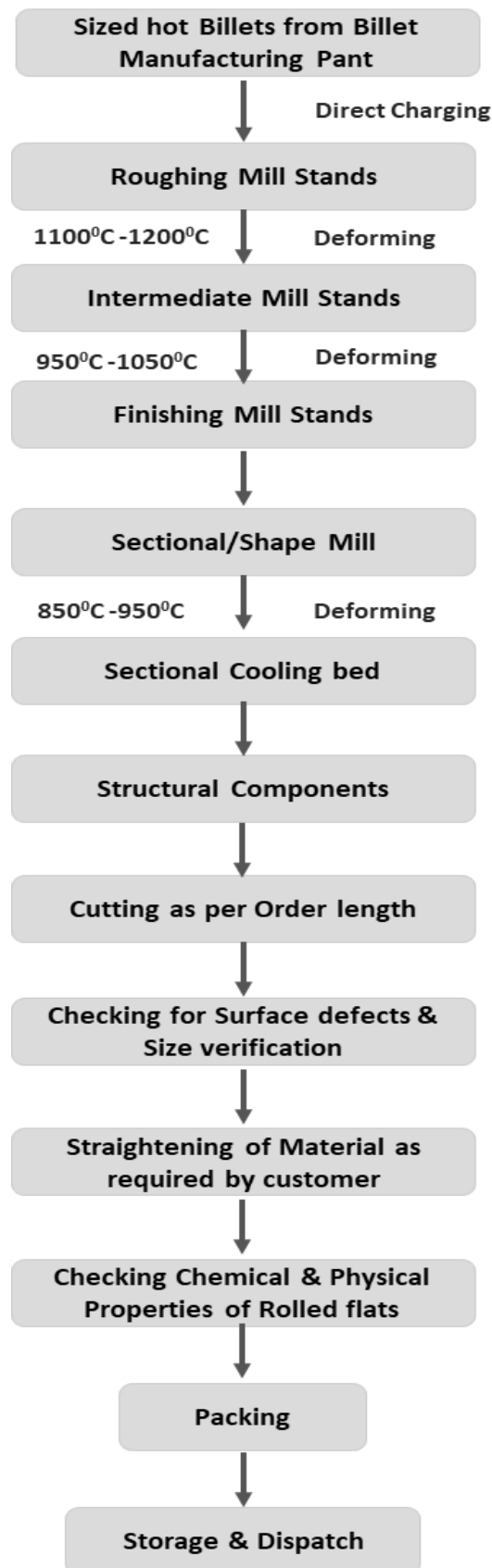


Figure 2-14 Proposed Re-Rolling Manufacturing process.



#### 2.6.4.4 Section Mill

In section mill, billets are progressively bent into complex shapes suitable for producing molded sections such as Angles, flat bars, Patras, channels & Hollow sections. The bent metal passes through the cooling bed and comes as products.

**Table 2-18 Material Balance for MS Billets (Existing)**

| S. No | Input   | Tonnes (TPA)  | Output            | Tonnes (TPA)  |
|-------|---|---------------|-------------------|---------------|
| 1     | Sponge Iron                                   | 4,500         | MS Billets        | 23,760        |
| 2     | Silico Manganese                              | 156           | Slag (14%)        | 3,696         |
| 3     | Ferro Silicon                                 | 24            | Burning Loss (2%) | 528           |
| 4     | Ms Scrap (Local Market + from slag and scale) | 23,304        |                   |               |
|       | <b>Total</b>                                  | <b>27,984</b> | <b>Total</b>      | <b>27,984</b> |

**Table 2-19 Material Balance for Re-Rolled Steel Angle & Flat Bars, Patras, Channels & Hollow sections. (Existing)**

| S. No | Input                     | Tonnes (TPA)  | Output  | Tonnes (TPA)  |
|-------|---------------------------|---------------|---|---------------|
| 1     | MS Billets (Inhouse)      | 23,760        | Re-Rolled Steel Angle & Flat Bars, Patras, Channels & Hollow sections (97.5%) | 60,000        |
| 2     | MS Billets (Local market) | 39,356        | Mill Scale (3%)   | 1,870         |
|       |                           |               | Burning Loss (2%)   | 1,246         |
|       | <b>Total</b>              | <b>63,116</b> | <b>Total</b>  | <b>63,116</b> |

**Table 2-20 Material Balance for MS Billets (Proposed)**

| S. No | Input   | Tonnes (TPA)    | Output            | Tonnes (TPA)    |
|-------|---|-----------------|-------------------|-----------------|
| 1     | Sponge Iron                                   | 40879           | MS Billets (90%)  | 2,00,000        |
| 2     | Silico Manganese                              | 2313            | Slag (8%)         | 17,924          |
| 3     | Ferro Silicon                                 | 302             | Burning Loss (2%) | 4,481           |
| 4     | Ms Scrap (Local Market + from slag and scale) | 178911          |                   |                 |
|       | <b>Total</b>                                  | <b>2,22,405</b> | <b>Total</b>      | <b>2,22,405</b> |

**Table 2-21 Material Balance for Re-Rolled Steel Angle & Flat Bars, Patras, Channels & Hollow sections. (Proposed)**

| S. No | Input                | Tonnes (TPA)    | Output  | Tonnes (TPA)    |
|-------|----------------------|-----------------|---|-----------------|
| 1     | MS Billets (Inhouse) | 2,22,405        | Re-Rolled Steel Angle & Flat Bars, Patras, Channels & Hollow sections (97.5%) | 2,00,000        |
|       |                      |                 | Mill Scale (8%)   | 17,792          |
|       |                      |                 | Burning Loss (2%)   | 4,613           |
|       | <b>Total</b>         | <b>2,22,405</b> | <b>Total</b>  | <b>2,22,405</b> |

## 2.6.5 Utilities Details

List of machineries & equipment's are shown in **Table 2-22**. List of proposed machineries & equipments for Re Rolling Mill is provided in **Table 2-23**.

**Table 2-22 List of Machineries & Equipments for Billet plant**

| S. No | Particulars   | Existing | Proposed | After expansion          |
|-------|---|----------|----------|--------------------------|
| 1     | Outdoor HT Breaker (Outdoor)<br>Rated voltage 36KV<br>Rated Current 1250 A<br>PT 33 kV /110 V<br>CT-250A/1-1A   | 1        | Nil      | 1                        |
| 2     | HT Incomer Breaker (Indoor)<br>Rated Voltage-26KV<br>Rated current-1250 A<br>PT-33KV/110 V<br>CT-250A/1-1A  | 1        | Nil      | 1                        |
| 3     | Furnace Transformer HT Breaker (Indoor)<br>Rated Voltage -36KV<br>Rated Current 1250 A<br>PT-33Kv/110 V<br>CT-120 A/1-1A  | 1        | 2        | 3                        |
| 4     | SMS Auxillary Transformer HT Breaker (Indoor)<br>Rated Voltage -36KV<br>Rated Current 1250 A<br>PT-33Kv/110 V<br>CT-60-30 A/1-1A  | 1        | 2        | 3                        |
| 5     | Rolling mill Transformer HT (Indoor)<br>Rated Voltage -36KV<br>Rated Current 1250 A<br>PT-33Kv/110 V<br>CT-60-30 A/1-1A   | 1        | Nil      | Removed during expansion |
| 6     | Harmonic Filter HT Breaker (Indoor)<br>Rated Voltage -36KV<br>Rated Current 1250 A<br>PT-33Kv/110 V<br>CT-50-25 A/1-1A  | 1        | 3        | 4                        |
| 7     | Furnace Transformer<br>Rated KVA HV-5500 (2X2750)<br>LV-LV4-4 X 1375<br><br>Reted Volt HV 33 KV<br>LV-LV4- 4 X 500<br><br>Rated Line Amps HV-96.22 on 5.5 MVA<br>LV1-LV2-1587.7 ON 1375 MVA<br>LV3-LV4-1587.7 ON 1375 MVA | 1        | 2        | 3                        |
| 8     | LT Auxillary Transformer<br>Rated KVA 2000<br>Voltage at No Load -HV-33 KV<br>LV-433 V  | 1        | 2        | 3                        |

|    |  |   |     |   |
|----|--|---|-----|---|
|    | Rated current-HV -34.99<br>LV-2666.82<br>Phase-3: Frequency -50Hz<br>Vector symbol-DyN11 |   |     |   |
| 9  | Static Frequency Convertor Panel<br>5000 KW<br>4000 V<br>Frequency -200-300 HZ           | 1 | 2   | 3 |
| 10 | Crucible coil  | 2 | 2   | 4 |
| 11 | Pollution motor drive panel 315 KW/450 HP  | 1 | 2   | 3 |
| 12 | Pollution motor 300 KW   | 1 | Nil | 1 |
| 13 | LT Incomer AVB 1250A   | 1 | Nil | 1 |
| 14 | Generator Incomer ACB 1250 A   | 1 | Nil | 1 |
| 15 | APFC Panel ACB 1000A   | 1 | Nil | 1 |
| 16 | 765 KVAR detuned APFC Panel 525 V with 1000A<br>ACB                                      | 1 | 2   | 3 |
| 17 | Furnace motor starter panel  | 1 | Nil | 1 |
| 18 | CCM Drive Panel  | 1 | Nil | 1 |
| 19 | CCM Motor Starter panel  | 1 | Nil | 1 |
| 20 | CCM Operating panel  | 1 | Nil | 1 |
| 21 | CCM Hydraulic Power pack unit  | 1 | Nil | 1 |
| 22 | Furnace Hydraulic power pack unit  | 1 | 2   | 3 |
| 23 | Furnace platform scrap hydraulic pusher unit   | 1 | 2   | 3 |
| 24 | Bundle Machine unit  | 1 | 2   | 3 |
| 25 | 35/10 T Laddle Crane   | 1 | Nil | 1 |
| 26 | 10 Ton Magnet crane  | 2 | 2   | 4 |
| 27 | Pump House Panel   | 1 | Nil | 1 |
| 28 | 20 Ton Laddle  | 2 | 3   | 5 |
| 29 | Pump house furnace CT 50 HP  | 2 | 2   | 4 |
| 30 | Pump house CCM Primary motor 50HP  | 2 | Nil | 2 |
| 31 | Pump house CCM Secondary motor 40HP  | 2 | Nil | 2 |
| 32 | Pump house emergency pump 15 HP  | 2 | Nil | 2 |
| 33 | Pump house scale pit pump 20HP   | 2 | Nil | 2 |
| 34 | CCM Hydraulic power pack motor 25HP  | 2 | Nil | 2 |
| 35 | Shearing machine 50HP Motor  | 1 | 2   | 3 |
| 36 | Mould Oscillator Motor 10 HP   | 2 | Nil | 2 |
| 37 | Tundish Car motor 5HP  | 1 | Nil | 2 |
| 38 | Roller Motor 5 HP  | 4 | Nil | 4 |
| 39 | Stream exhaust CCM 10HP  | 1 | Nil | 1 |
| 40 | Scrap Charging Magnet  | 2 | 1   | 3 |
| 41 | Air Compressor   | 2 | Nil | 2 |
| 42 | Compressor air dryer   | 2 | Nil | 2 |
| 43 | Air storage Tank   | 2 | Nil | 2 |
| 44 | 10 T Crane LT Motor 6HP  | 4 | Nil | 4 |
| 45 | 10 T Crane LT Motor 2.4 HP   | 2 | Nil | 2 |
| 46 | 10 T Crane LT Motor 33 HP  | 2 | Nil | 2 |

|    |                                 |   |     |   |
|----|---------------------------------|---|-----|---|
| 47 | 500 KVA Generator with retrofit | 1 | Nil | 1 |
| 48 | Furnace capacitor bank          | 1 | Nil | 1 |

**Table 2-23 List of proposed machineries & equipments for Re Rolling Mill**

| S. No        | Particulars                | Existing (No&HP) | Proposed (No &HP)     | After Expansion (No &HP) |
|--------------|----------------------------|------------------|-----------------------|--------------------------|
| 1            | Roughing Mil               | 1X1006           | Replace with 1X 2000  | 1X 2000                  |
| 2            | Intermediate Mill DC Motor | 2 x 671          | Replace with 2 X 1000 | 2 X 1000                 |
| 3            | Finishing Mill DC Motor    | 1 x 671          | Nil                   | 1 x 671                  |
| 4            | Furnace Charging Table     | 1 x 40           | Nil                   | 1 x 40                   |
| 5            | Ejector                    | 1 x 40           | Nil                   | 1 x 40                   |
| 6            | Furnace Discharge Table    | 1 x 101          | Nil                   | 1 x 101                  |
| 7            | Skew Table                 | 1 x 40           | Nil                   | 1 x 40                   |
| 8            | Roller Table               | 10 x 40          | Nil                   | 10 x 40                  |
| 9            | Roller Table               | 2 x 20           | Nil                   | 2 x 20                   |
| 10           | Y- Table                   | 1 x 13           | Nil                   | 1 x 13                   |
| 11           | Hot Raw                    | 1 x 150          | Nil                   | 1 x 150                  |
| 12           | Skew Tabke                 | 1 x 50           | Nil                   | 1 x 50                   |
| 13           | Lubrication Station        | 1 x 30           | Nil                   | 1 x 30                   |
| 14           | Coal Pulveriser            | 1 x 134          | Nil                   | 1 x 134                  |
| 15           | Coal Shear                 | 1 x 107          | Nil                   | 1 x 107                  |
| 16           | Water Pumps                | 1 x 90           | Nil                   | 1 x 90                   |
| 17           | Workshop & Gen.lighting    | 1 x 201          | Nil                   | 1 x 201                  |
| 18           | Borewell & Fresh water     | 1 x 30           | Nil                   | 1 x 30                   |
| 19           | 5 MT EOT Crane             | 1 50             | Nil                   | 1 50                     |
| 20           | Hot Saw                    | 1 x 50           | Nil                   | 1 x 50                   |
| 21           | Blower                     | 1 x 67           | Nil                   | 1 x 67                   |
| 22           | Pusher                     | 1 x 34           | Nil                   | 1 x 34                   |
| 23           | Rope skid                  | 1x 162           | Nil                   | 1x 162                   |
| <b>Total</b> |                            | <b>4949</b>      | <b>4000</b>           | <b>8949</b>              |

## 2.6.6 Resource Optimization and/ Recycling and Reuse

### 2.6.6.1 Billet Plant

Slag will generate after melting in the Induction Furnace, it will be removed and Segregated Ferrous and non-Ferrous material. Ferrous material will be reused in the melting process. No ferrous material in the slag will be send to the cement industries for reuse in their process.

#### 2.6.6.1.2 Upgrading of old induction melting furnaces – a contribution to saving energy and increasing melting rates

Proponent will be checked the possibilities for Change from main frequency to medium frequency furnaces. Since the advanced medium-frequency converter technology in

conjunction with today's sophisticated process control systems offer following major avenues to cutting energy costs and increasing melting rates of old equipment.

- The conversion of mains frequency furnaces to medium frequency technology supports melting without heel, meaning that you can start the furnace in batch operation with solid charge materials. For the melting of iron materials this provides improved electro-magnetic coupling, resulting in energy savings of about 8 %.
- The efficiency of modern converters is between 96 and 97.5 %, whereas older converter systems (e.g., quintuplers) are hard-pressed to reach values of up to 88 %.
- Advanced converters with digital control systems are characterised by a largely automatic operation of the switchgear and enhanced control and monitoring of all sequences of operations. Any faults which may occur are reported and diagnosed in a timely manner. Also, the installation of a modem permits remote monitoring and instant troubleshooting from the manufacturer's site.
- The elimination of all mechanical switches implies a significant reduction in maintenance and the possibility of infinitely variable power control.

About upgrades and extensions of existing induction furnaces, following possibilities are available more specifically for the units which determine the furnace capacity:

- Conversion of mains frequency furnaces to medium-frequency technology
- Replacement of old converter systems (quintuplers etc.) by advanced medium frequency switchgear
- Use of a more powerful converter system

#### **2.6.6.2 Re-Rolling Plant**

CUMI Re-Rolling Process will generate Mill Scale & waste material during Sizing/Edging, Roughing & Crop shearing sections. The generated material will be reused in the furnace.

### **2.7 Pollution Potential and Control Measures & Description of mitigation measures to meet the environmental standards.**

Based on the overall process study/manufacturing details, etc., The following are the details of pollution potential v/s. mitigation measures implemented by the company in areas of wastewater management, air pollution, hazardous waste handling, occupational health etc.,

The various types of pollution from the expansion project are categorized under the following types:

- Land Environment
- Air Pollution
- Water Pollution
- Solid waste
- Noise Pollution

### **2.7.1 Land Environment**

The proposed project site is Patta land and classified as a Special Industrial Hazardous Industrial Use Zone as per land conversion documents. Land breakup is given in **Table 2-8**. Land Conversion documents are enclosed as **Annexure-3**. The proposed expansion is for production capacity within the existing facility only.

### **2.7.2 Air Environment (Sources and Mitigation Measures)**

The source of air emission from the expansion project is dust and gaseous emission from the proposed Induction Furnaces in melting unit and reheating furnaces in the rolling mill. Air pollution management is presented in **Chapter-4** of this report. Sources and Proposed APC Measures are given in Error! Reference source not found..

Melting metals and alloys in the induction furnaces generates dust and metal oxide fumes. These dust and fumes are extracted from the furnace, and they passed an air pollution control system consisting of spark arrestor, dilution damper, Suction Hood over the furnace, 3 roof top suction hood with blower gravity settling chamber followed by wet Scrubber with dust collector and stack with height of 33m etc. and then it would be released into the atmosphere through of individual stack of height 33m for Induction Furnace 25 Ton - 2 No with Six Crucibles (3 Crucible are in standby).

Coal Fired 15 T Reheating Furnace is provided Wet Scrubber with Stack with height of 15m. 2 No. of Coal Pulverier are provided Individual Bag filters.

Fugitive Emissions are generated from vehicular movements for transporting the raw material and end products to and from the plant premises. The emission generated by the diesel generator sets of size (1x 500 KVA) is released into the atmosphere through a retrofit followed by stack with height of 11m.

#### **Fugitive Emission Control Measures:**

- ✓ Water sprinkling systems will be installed to suppress dust emission from loading & unloading activities and roads will be paved to minimize the dust emission during transportation activities.
- ✓ Raw materials will be transported in closed trucks only.
- ✓ Adequate ventilation systems will be provided in the Manufacturing area.
- ✓ Separate inward & outward paved roads for movement of trucks with segregated raw material storage area to minimize dust pollution.
- ✓ Greenbelt will be developed around the plant to arrest the fugitive emissions.

## Stack Emissions

| Description of details                   | Coal fired Re heater furnace.          | Induction furnace (will removed during expansion)   | Induction furnace (proposed & after expansion)  | Coal Pulveriser (2 Nos)              | 500 KVA DG Set      |
|--|--|---|---|--------------------------------------|---------------------|
| Material of Construction                 | M.S                                    | M.S   | M.S   | M.S                                  | M.S                 |
| Stack attached to                        | Reheater Furnace (15T/Heat)            | Induction furnace (8Ton/Heat) - 2 Crucibles   | Induction furnace (25Ton/Heat) -6 Crucibles   | Coal Pulveriser (2 Nos)<br>1 Standby | 500 KVA DG          |
| Inside dimensions of the stack at top, m | 0.90                                   | 1.00  | 1.00  | 0.6                                  | 0.3                 |
| Gas quantity – m <sup>3</sup> /hr        | 20,160                                 | 20,664  | 20,664  | --                                   | 3,735               |
| Flue gas temperature, °C                 | 90                                     | 100   | 100   | 100                                  | 160                 |
| Sulphur content (% w/w)                  | 0.055                                  | 0.055   | 0.055   | 0.02                                 | 0.1                 |
| Pollution control measures               | Wet Scrubber followed by Stack 15m AGL | Suction Hood over the furnace, 3 roof top suction hood with blower gravity settling chamber followed by wet Scrubber with dust collector and stack with 33m | Suction Hood over the furnace, 3 roof top suction hood with blower gravity settling chamber followed by wet Scrubber with dust collector and stack with 33m | Individual Bag Filter (2 Nos)        | Acoustic enclosures |
| PM                                       | 0.29                                   | 0.29  | 0.29  | -                                    | 0.05                |
| SO <sub>2</sub>                          | 1.29                                   | 1.41  | 1.41  | -                                    | 0.07                |
| NO <sub>x</sub>                          | 0.27                                   | 0.28  | 0.28  | -                                    | 0.05                |

### 2.7.3 Water Environment

The quantity of wastewater generation depends on the quantity of water used for various purposes. As the steel melting plant is a dry process, water is mainly used only for heat management in machinery, for cooling purposes and domestic usage.

The total water requirement during operational phase for proposed project is 95 KLD (Fresh water is 86 KLD and recycled 9.0 KLD). Water requirement for proposed project will be met through from local Panchayat supply. Existing Water requirement and breakup is given in **Table 2-10**. Proposed water requirement and break up is shown in **Table 2-11**.

Existing Water Balance is show in **Figure 2-10**. Proposed Water Balance is shown in **Figure 2-11**.

- ✓ The sewage of 2KLD from sanitary units will be disposed in septic tank-soak pit arrangement, Septic tank will be cleaned periodically by the authorized vendors.
- ✓ No Sewage will discharge into any surface water bodies or aquifers /inland surfaces.
- ✓ The wastewater from the cooling processes (Induction Furnace & Re heating) is treated in the cooling pond followed by cooling tank and the treated water of 12.5 KLD will be recirculated for the processes. Effluent from Wet Scrubber 1.0 KLD is being sent to Solar Evaporation Pond, Sludge/salts from Solar Evaporation Pond is disposed through TSDF.
- ✓ Effluents/Sewage will not be discharged into any water bodies or aquifers under any circumstances.
- ✓ CUMI will implement Rainwater harvesting by adopting following measures:
  - Roof-top Rainwater Harvesting
  - Storage Ponds/Tanks
  - Recharge pits
  - Storm Water Management

Rainwater estimation summarized in Error! Reference source not found. and typical structures are given in Chapter 10, Section 10.14.1.

**Table 2-24 Details of Wastewater Generation and Management**

| S. No | Description   | Quantity (KLD) |                 | Treatment                                  |
|-------|---|----------------|-----------------|--|
|       |   | Existing       | After expansion |  |
| 1     | Sewage  | 2.0            | 2.0             | Septic tank followed by soak pit           |
| 2     | Blow down from Cooling processes (Induction furnace, Con Caste cooling and Re-Rolling System) | 3.5            | 9.5             | Cooling tower and recycled back to process |
| 3     | Scrubber bleed  | 1.0            | 1.0             | Solar Evaporation Pond                     |

#### 2.7.4 Noise Environment

The major noise generating sources from different plant facilities are Cooling Tower, steel melting section, rolling mill section, Transformer, machine shop, DG sets etc. and vehicular movements during operation phase for loading/unloading activities, feed pumps, ID fans, FD fans and other noise generating units like process equipment may increase noise level. The noise levels at the existing plant are listed in **Table 2-25**.

**Table 2-25 Noise Levels for Machineries**

| S. No | Name of the location/Source | Noise Level dB (A) |
|-------|-----------------------------|--------------------|
| 1     | Cooling Tower               | 75                 |
| 2     | Steel Melting Section       | 78                 |
| 3     | Rolling Mill Section        | 76                 |
| 4     | Transformer                 | 78                 |
| 5     | Machine Shop                | 77                 |
| 6     | DG Sets                     | 76                 |



|   |                               |    |
|---|-------------------------------|----|
| 7 | Loading & Unloading Operation | 75 |
| 8 | Air Compressor                | 78 |

**Proposed Control Measures:**

- ✓ DG sets and air compressors are provided with integral acoustic enclosures.
- ✓ The ambient noise levels will be ensured within the ambient standards by inbuilt design of mechanical equipment and buildings.
- ✓ 33 % of Greenbelt & Land scaping around the factory building and premises to control the intensity of noise to the surrounding area.
- ✓ Providing personal protective equipment as a safety measure.
- ✓ Training will be imparted to personnel to generate awareness about the effects of noise and importance of using PPEs.
- ✓ Noise monitoring will be carried out to check the efficacy of maintenance schedules undertaken to reduce noise levels and noise protection measures.

**2.7.5 Solid and Hazardous Waste Generation and Management**

Solid/Hazardous Wastes generated from the various plant activities. It is observed that adequate mitigation measures are implemented by proponents to avoid accidental due to spillage or leakage of wastes, during operation phase. Treatment, Storage and Disposal mode for the same is followed as per Hazardous Waste (Storage, Handling and Trans-Boundary Movement) Amendment Rules, 2016. Hazardous and Non-Hazardous waste generation and Management during operational phase is given **Table 2-26**. MSW Generation and Management is shown in

**Table 2-27.**

- ✓ The generated waste will be segregated at sources as Municipal Solid Waste, Hazardous and non-Hazardous.
- ✓ No Liquid waste will be generated in manufacturing of Steel Billets and other structures.
- ✓ Hazardous non-recyclable waste will be disposed to TSDF & Hazardous recyclable waste will be sent to Authorized recycles.
- ✓ Municipal solid waste generation from domestic activities is segregated, into organic, will be composted and inorganic waste will be disposed to local panchayat bins.

**Table 2-26 Hazardous and Non-Hazardous Waste Generation and Management**

| S. No                | Name of the waste details                  | HWM 2016 Category | Qty (TPA) |                           | Treatment or Disposal   |
|----------------------|--|-------------------|-----------|---------------------------|---|
|                      |  |                   | Existing  | Proposed/ After Expansion |   |
| <b>Non-Hazardous</b> |  |                   |           |                           |   |
| 1                    | Furnace Slag                               | --                | 3,696     | 17,924                    | Sold to Brick Manufactures / Road Laying and refilling or Cement industries |
| 2                    | CCM, Mill Scale, Mis rolls & End cuttings/ | --                | 1,870     | 17,792                    | Re-melted in induction furnace  |

|                        |                          |      |     |     |  |
|------------------------|--------------------------|------|-----|-----|--|
| 3                      | Ash                      | --   | 0.5 | 1.5 | Sold to ash brick manufacturers                  |
| <b>Hazardous Waste</b> |                          |      |     |     |  |
| 1                      | Solar Pan residue        | 37.3 | 50  | 150 | Collected and transported to CTSDF Gummidipoondi |
| 2                      | Oil bearing cotton waste | 33.2 | 10  | 30  |  |
| 3                      | Waste oils               | 5.7  |     |     |  |

**Table 2-27 Municipal Solid Waste Generation and Management**

| S. No        | Description       | Solid Waste Generation Kg/Day |                 |
|--------------|-------------------|-------------------------------|-----------------|
|              |                   | Existing                      | After expansion |
| 1            | Biodegradable     | 8.0                           | 13.5            |
| 2            | Non-Biodegradable | 5.5                           | 9.0             |
| <b>Total</b> |                   | <b>13.5</b>                   | <b>22.5</b>     |

### 2.7.6 Biological Environment

- ✓ There is no eco- sensitive and there are no wildlife sanctuaries or national parks or biosphere reserves or wetlands, or important bird areas or migratory corridors of wildlife within 10km from the project site.
- ✓ The core area is a non-planned land. It is sparsely covered by isolated thorny bushes and invasive weeds. There are no timber trees or any of the threatened taxa of the BSI. There are few reserve forests within 5km to from the core area. (Manali Reserve Forest is located at  $\approx 0.99$ Km (SSW), Palavakkam RF  $\approx 3.06$ Km (WSW), Panchali RF  $\approx 6.32$  Km (WNW), Nimalur RF  $\approx 7.42$ Km (WNW), Siruvedu RF  $\approx 7.76$ Km (WNW), Irukulam RF  $\approx 12.29$ Km (NW), Senjiagaram RF  $\approx 14.5$ Km (WSW) and Vembedu RF  $\approx 14.51$ Km (SSW).
- ✓ Greenbelt is being developed in the existing facility to improve the aesthetic value in the area and to screen out the fugitive dust generated during construction & will be minimized through paving and water sprinkling.
- ✓ Implementing Soil Conservation methods like, Windbreaks are composed of shrubs, plants and trees in garden/lawn areas, Regular watering soil along with plants, adding earthworms to soil for improvement of soil fertility and perennial fodder production.

### 2.7.7 Green belt Development

- ✓ CUMI is allocated 33% (22510.06 Sq.m) of land for green belt development as per norms.
- ✓ The width of the greenbelt will be maintained as per CPCB guidelines and there shall be 3 rows of plants with a gap of 2m between the plants.
- ✓ There are many existing trees planted within the project site and is listed herby. Also, the applicant had proposed to plant some of the native species within the allotted area.

**Table 2-28 Existing trees within the plant premises**

| S. No.       | Name of the tree     | No. of Trees Existing | No. of Trees proposed | No. of Tree after expansion |
|--------------|----------------------|-----------------------|-----------------------|-----------------------------|
| 1            | Banyan Trees         | 36                    | -                     | 36                          |
| 2            | Ashoka Trees         | 373                   | 200                   | 573                         |
| 3            | Arasa Trees          | 78                    | -                     | 78                          |
| 4            | Red Bird of Paradise | 300                   | 300                   | 600                         |
| 5            | Neem Trees           | 315                   | 200                   | 515                         |
| 6            | Pungai Trees         | 365                   | 200                   | 565                         |
| 7            | Narra Trees          | 300                   | -                     | 300                         |
| 8            | Babbool Trees        | 350                   | -                     | 350                         |
| 9            | Coconut Trees        | 15                    | -                     | 15                          |
| 10           | Badam Trees          | 365                   | 100                   | 465                         |
| 11           | Banana Trees         | 220                   | -                     | 220                         |
| 12           | Fren Trees           | 196                   | -                     | 196                         |
| 13           | Aristocrat Trees     | 210                   | -                     | 210                         |
| 14           | Palm Trees           | 350                   | -                     | 350                         |
| 15           | Indian Beal Trees    | 367                   | -                     | 367                         |
| <b>Total</b> |                      | <b>3840</b>           | <b>1000</b>           | <b>4840</b>                 |

The capital cost of INR 2,50,00 Lakhs will be earmarked for this purpose and INR of 1.0 Lakhs will be allocated for recurring expenses towards green belt development and maintenance.

The proposed Greenbelt layout is enclosed as **Annexure-5**. Geographic Coordinates in the google image for proposed Greenbelt is shown in Figure 2-15.





Figure 2-16 Existing Greenbelt photos

## 2.7.8 Rainwater Harvesting

Rainwater Harvesting (RWH) comprises components of various stages-transporting rainwater through pipes or drains, filtration, and storage in tanks for reuse or recharge pits. The catchments of a water harvesting system are the surface which directly receives the rainfall and provides water to the rainwater harvesting system. The rainwater run-off from all the un-paved areas shall be routed to rainwater harvesting pits, provided at strategic locations within the project area. The first flush shall be checked from entering collection system, using diversion valves to ensure that runoff from the first spell of rain is flushed out and does not enter the system. This needs to be done since the first spell of rain carries a relatively larger number of pollutants from the air and catchments surface. Rainwater from paved and roof areas, landscaped, paved area and rest of the area within project premises will be harvested to ground through rainwater recharge pits. The overflow from the pits will be connected to storm water drainage system of the project area.

Run off from the plant site is calculated using rational formula.

$$Q = C \times I \times A$$

Where,

Q = Run-off (cu.m/hr)

A = Catchments Area (Roof area, Landscaped area, Road & parking area)

C = Coefficient of Runoff

I = Intensity of rainfall = 25mm for 15 min

**Table 2-29 Rainwater Harvesting Calculation**

| S. No        | Category of land pattern                  | Area (Sq.m)      | Impermeability Factor | Harvestable water (Intensity x Area x Imp. Factor) cum/hr | constant co-efficient factor | Harvestable water (m <sup>3</sup> ) |
|--------------|---|------------------|-----------------------|---|------------------------------|-------------------------------------|
| 1            | Building area                             | 11153.73         | 0.6                   | 167.3   | 0.80                         | 133.84                              |
| 2            | Landscaped area (Green area, Vacant area) | 22510.06         | 0.3                   | 22.51   | 0.80                         | 18.01                               |
| 3            | Road/ Surface parking area                | 10504.64         | 0.9                   | 168.8   | 0.80                         | 135.04                              |
| <b>Total</b> |   | <b>44,168.43</b> |                       | <b>358.61</b>   |                              | <b>153.05</b>                       |

**Source:** Considering the constant co-efficient factor of 0.80 (for all situations) for evaporation, spillage, and first flush wastage (Source: CPWD Manual, 2002)

- ⊕ From Building area = 167.3 cu.m x 0.80 (for all time) = 133.84 cu.m
- ⊕ The water will be collected, treated with sand filter, and stored in Under Ground storage tank of 500 m<sup>3</sup>.
- ⊕ Storm runoff from open area, greenbelt area and paved area = 153.04 cu.m x 0.80 (for all time) = 122.4 m<sup>3</sup>.

All the water shall be routed to rainwater harvesting pits:

- ⊕ The run-off from terraces, roads, paved area & greenbelt & vacant area will be diverted through storm water network to individual percolation pits proposed along the project periphery and the rainwater will be re-charged into underground aquifers.
- ⊕ A percolation rate of 0.51 is considered with percolation depth as 10m.
- ⊕ Run-off =  $122.4 \times (1.0 - 0.51) = 60 \text{ m}^3$
- ⊕ Size of percolation pit = 1.20 x 1.20m and 4.0m depth.
- ⊕ Storage volume in each pit:  $5.76 \text{ m}^3$
- ⊕ Quantity of storm water run-off:  $60 \text{ m}^3$
- ⊕ Number of Storage pits required:  $60 \text{ m}^3 / 5.76 \text{ m}^3 = 10.42$  (Considered 11 Nos)
- ⊕ 11 Nos. of percolation pits will be constructed along the project site periphery for rainwater recharge.

### 2.7.9 Socio Economic Environment

The proposed project area is patta land, total project land belongs to the CUMI. There are no R&R issues envisaged. The Land classified as Special Industrial Hazardous Industrial Use Zone. The Land conversion documents are enclosed as **Annexure-3**. The project site shall require no displacement of habitation as it is located away from the habitation area. Manpower requirement is given in **Table 2-14**.

**The following benefits will be envisaged by the proposed project.**

- ✓ Due to proposed project the socio-economic scenario of the area will be changed & Development of surrounding region.
- ✓ Socio-economic benefit to the locals as it would provide both direct employment (50 Nos) and indirect beneficiary (100 Nos) during operational phase and during construction phase (50 Nos).
- ✓ Employment generation for local people, farmers, transporters, carpenters, labourers and other businesses and ancillary industry in the state
- ✓ Establishment of small and medium scale engineering ancillaries
- ✓ CER and CSR benefits to the local region people/Environment & Revenue to Government

### 2.8 Assessment of new and untested technology for the risk of technological failure

The industry will be involved in the manufacture of Steel Billets. Manufacturing involves only reactions and heating, Melting, Molding, cooling, and mixing as physical operations for which industry has adopted the latest and best technology. The manufacturing process for these products will be tried and tested method. Therefore, there is no risk of technological failure. Also, trial experiments will be conducted for proposed products and all safety measures will be taken during the implementation phase itself.

# **CHAPTER – 3**

## **DISCRIPTION OF ENVIRONMENT**

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*(This chapter describes the study area, study period, methodology and components selected for baseline studies, baseline status for Meteorology, Ambient air, Noise Levels, Water, Soil, Socioeconomic & Land use and of the study area within 10.0 km radius.)*



## 3 DESCRIPTION OF ENVIRONMENT

### 3.1 Preamble

This chapter depicts the establishment of baseline for environmental components, as identified in and around the “Proposed Metallurgical Industry has Production Capacity of 4 lakh Tons per Annum for Manufacturing of Billets & Re-rolling Steel Angle & Flat Bars Channels, Patra & Hollow Section’ at Sy. Nos: 997/1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 998/1A1, 1B, 2A, 2B, 2C, 2D, 3, 5A, 5B, 6, 7A, 7B, 8A, 8B, 9, 10, 11, 12A, 12B, 12C, 12D, 12E, 12F, 13A, 13B, 14, 15A, 15B, 16, 17, 1002/1, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 8B, 9, 10A, 10B, 11, 12, 13, 15, 15A, 15B, 16, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 20, 21, 22, 23, 1019/1, 2A, 2B, 3A, 3B, 13A1, 13A2, 14A, 22A, 22B, 22C, 23, 24, 25 of Sirupuzhalpettai and 501/1, 2, 3A, 3B, 3C, 502/1A, 2A, 2B, 2C, 2D, 2E of Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The primary baseline data has been conducted by M/s. Ekdant Enviro Services (P) Limited, Chennai. The baseline data monitored covered three (3) months i.e., from March 2024 –May 2024 and secondary data was collected from Government and Semi-Government organizations. The primary baseline data has been conducted for the following Terrestrial environmental components.

| S. No | Description of Section | Section   | Parameters  |
|-------|------------------------|---|---|
| 1     | Meteorology            | Section 3.6.2   | Temperature, Relative Humidity, Rainfall, Wind Speed & Direction  |
| 2     | Ambient Air Quality    | Section 3.6.4   | As per NAAQS, 2009  |
| 3     | Ambient Noise Levels   | Section 3.7   | Day equivalent noise levels, Night equivalent noise levels (As per CPCB Standards)                                  |
| 4     | Water Quality          | Surface water – Section 3.8.2<br>Ground water – Section 3.8.3 | Ground Water – IS 10500:2012<br>Surface Water – IS 2296 (Class – A)   |
| 5     | Soil Quality           | Section 3.9   | ICAR (Indian Council of Agricultural research)  |
| 6     | Ecology                | Section 3.10  | Flora and Fauna   |
| 7     | Social Economic Status | Section 3.11  | Socio Economic Profile of Study area (Population Profile, Employment and Livelihood, Education and Literacy, etc.,) |

### **Sampling Methodology:**

Appropriate methodologies have been followed in developing the EIA/EMP report. The methodology adopted for the study is outlined below:

- ⊕ Conducting reconnaissance surveys for knowing the study area; and Selecting sampling locations for conducting various environment baseline studies.
- ⊕ The sampling locations have been selected based on the Predominant wind directions recorded by the India Meteorological Department (IMD), Chennai observatory.
- ⊕ Existing topography
- ⊕ Drainage pattern and location of existing surface water bodies like lakes/ponds, rivers, and streams.
- ⊕ Location of villages/towns/sensitive areas; and Areas, which represent baseline conditions.

#### **The field observations have been used to:**

- ⊕ Assess the positive and negative impacts due to the proposed expansion activity.
- ⊕ Suggest appropriate mitigation measures for negating the adverse environmental impacts, if any.
- ⊕ Suggesting post-project monitoring requirements and the suitable mechanism for it.

### **3.2 Description of Study Area**

A 10 Km radial distance from the proposed project site boundary has been identified as the general study area for assessing the baseline environmental status. The core study area is the project area and its immediate surroundings to the tune of 1.0 Km radius from the boundary. Further the Project Impact/Influence Area (PIA) is 10Km from the boundary of the project. The map showing the satellite image of the study area is given in **Figure 3-1** and Topo Map of the study area is given in **Figure 3-2**.

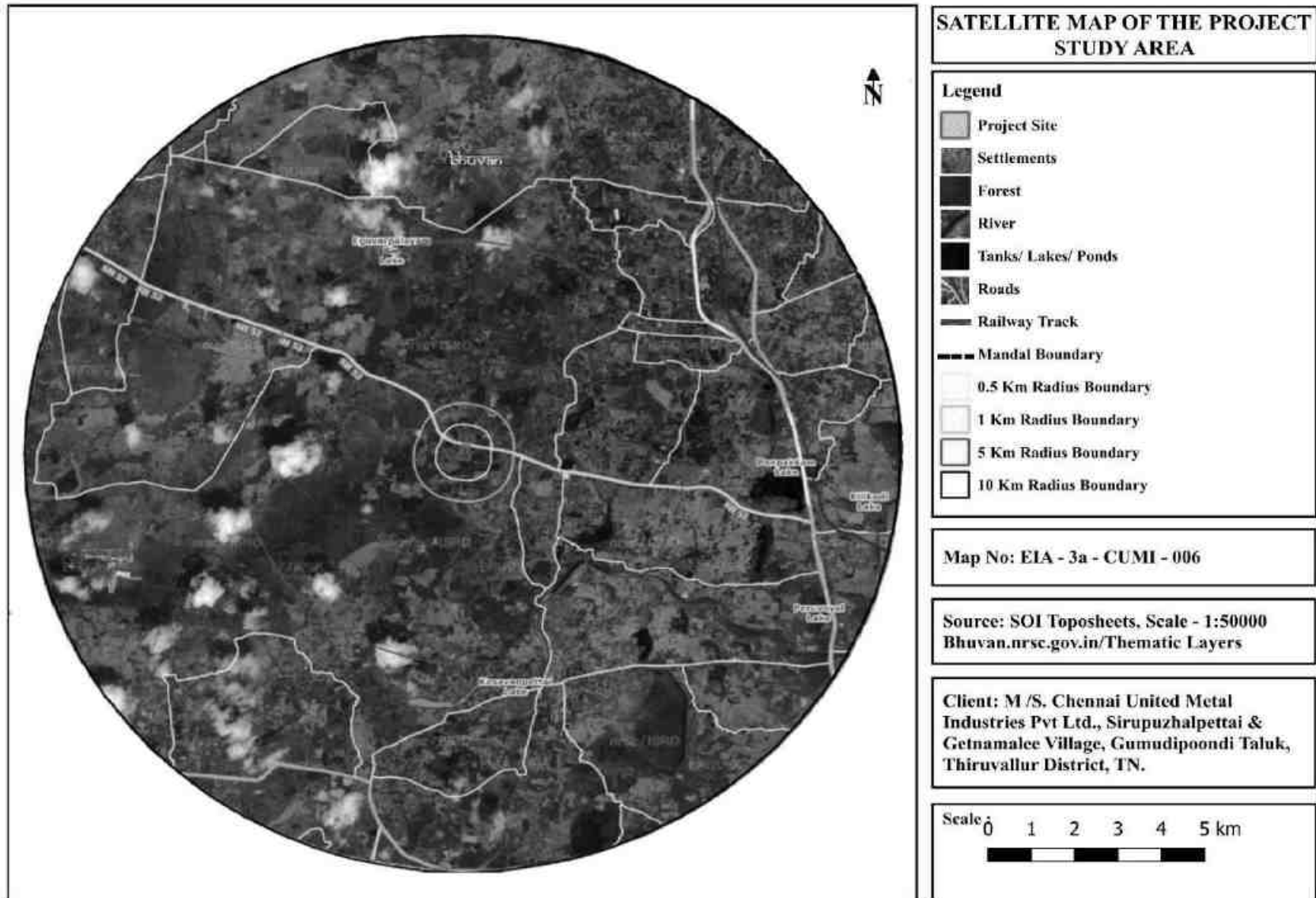
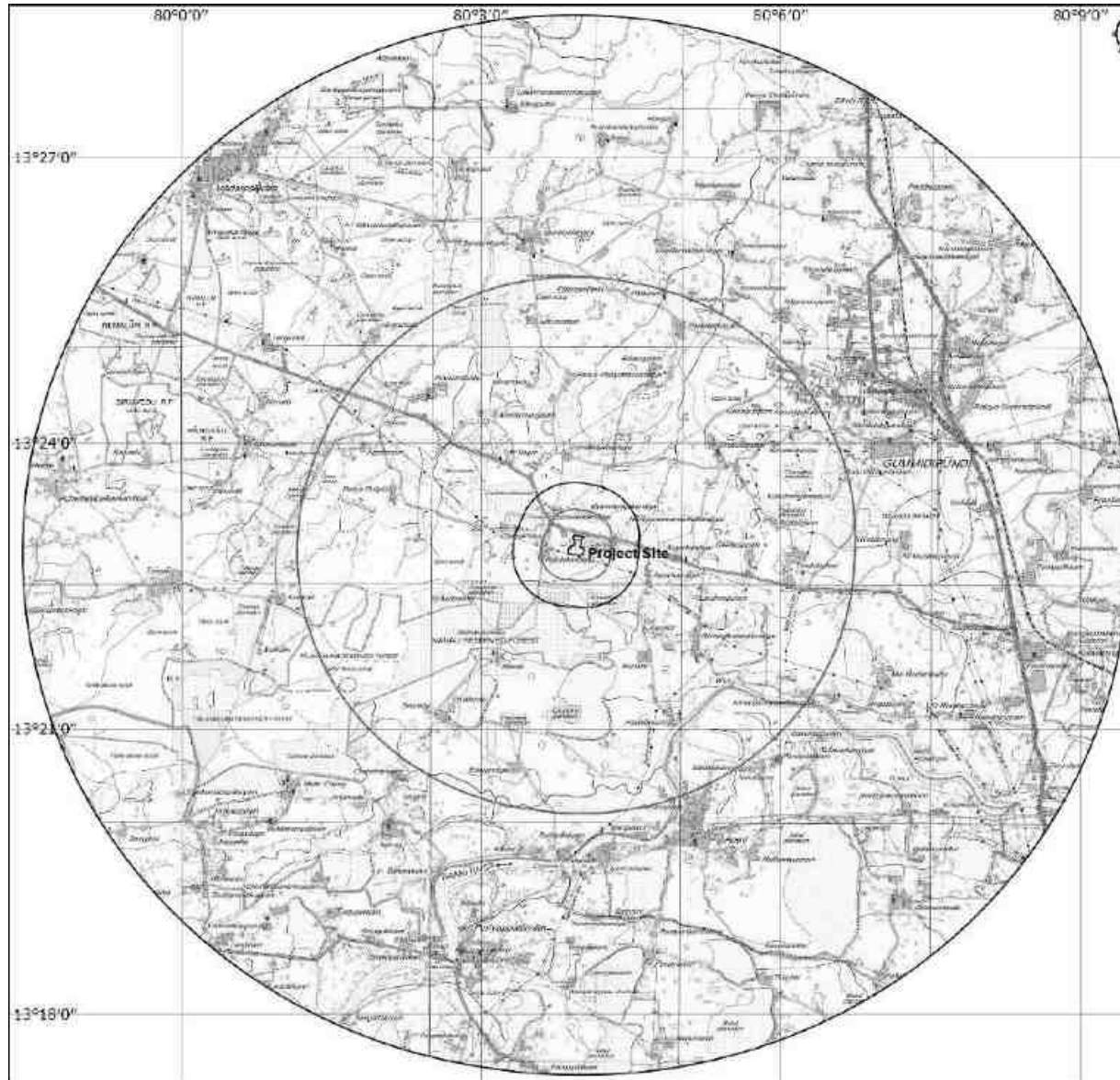


Figure 3-1 Satellite Image of the study area of Project



**Topo Map**

**Legend**

- Project Site
- 0.5km Radius Boundary
- 1km Radius Boundary
- 5km Radius Boundary
- 10km Radius Boundary

Toposheet Nos: D44 N/15, D44O/03

CONVENTIONAL SYMBOLS

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### 3.3 Environmentally/Ecologically Sensitive areas

The environmental sensitive areas covering an aerial distance of 15km from the project boundary is given in **Table 3-1** and Map showing Environmental sensitive areas within 15km from project boundary is given in **Figure 3-3**.

**Table 3-1 Environmentally Sensitive areas within 15km from Project site boundary**

| S. No. | Areas                           | Distance & Direction from project boundary |   |               |           |
|--------|---------------------------------|--|---|---------------|-----------|
|        |                                 | S. No                                      | Description   | Distance(~km) | Direction |
| 1      | List of Monuments and Heritages | <b>List of Monuments</b>                   |   |               |           |
|        |                                 | 1  | Urn Burials   | 12.5          | WSW       |
|        |                                 | 2  | Cairn Site  | 10.6          | WSW       |
|        |                                 | 3  | Megalithic Cists and cairns                             | 7.56          | W         |
|        |                                 | 4  | Megalithic Cists and cairns                             | 6.9           | WNW       |
|        |                                 | 5  | Megalithic Cists and cairns                             | 1.5           | NW        |
|        |                                 | 6  | Megalithic cists and cairns with bounding stone circles | 12.69         | NNW       |
|        |                                 | 7  | Megalithic cists  | 14.45         | NW        |
| 2      | List of Sanctuaries             | <b>List of Sanctuaries</b>                 |   |               |           |
|        |                                 | S. No                                      | Description   | Distance(~km) | Direction |
|        |                                 | 1  | Pulicat Bird Sanctuary                                  | 12.7          | NNE       |
| 3      | List of Water Bodies            | <b>List of Water Bodies</b>                |   |               |           |
|        |                                 | S. No                                      | Description   | Distance(~km) | Direction |
|        |                                 | 1  | TG Canal/SS Ganga Canal                                 | 12.93         | WNW       |
|        |                                 | 2  | Canal   | 7.95          | WSW       |
|        |                                 | 3  | Arani River   | 3.52          | SE        |
|        |                                 | 4  | Pond  | 0.99          | S         |
|        |                                 | 5  | Lake near Kanalur                                       | 2.21          | S         |
|        |                                 | 6  | Lake near malliyankuppam                                | 6.41          | SSE       |
|        |                                 | 7  | Lake near arani   | 5.88          | SSE       |
| 8      | Lake near Melmudalambedu        | 4.92                                       | ESE   |               |           |
|        |                                 | 9  | Lake near Kilmudalambedu                                | 5.65          | E         |

|   |                          |              |                               |                      |                  |
|---|--------------------------|--------------|-------------------------------|----------------------|------------------|
|   |                          | 10           | Panappakkam lake              | 6.43                 | E                |
|   |                          | 11           | Eri near kattavur             | 10.89                | E                |
|   |                          | 12           | Lake near Sengattakolam       | 9.7                  | SSW              |
|   |                          | 13           | Lake near Jayapuram           | 10.92                | S                |
|   |                          | 14           | Lake near Erukkuvay           | 2.8                  | SSW              |
|   |                          | 15           | Lake near Tambunaidupalaiyam  | 6.77                 | SW               |
|   |                          | 16           | Sulameni Eri                  | 10.15                | WSW              |
|   |                          | 17           | Eri near Periyapuliyur        | 3.69                 | W                |
|   |                          | 18           | Lake near Thervoykandigai     | 8.64                 | W                |
|   |                          | 19           | Eri near Pettai               | 3.02                 | NW               |
|   |                          | 20           | Eri near Madarpakkam          | 9.86                 | NW               |
|   |                          | 21           | Pallavada Lake                | 9.84                 | NW               |
|   |                          | 23           | Lake near Sitturnattam        | 3.3                  | NNW              |
|   |                          | 24           | Eri near Surapundi            | 7.66                 | NNW              |
|   |                          | 25           | Tank near Kannambakkam        | 13.04                | NNW              |
|   |                          | 26           | Pulicat Lake                  | 12.7                 | NNE              |
|   |                          | 27           | Gummidipoondi Lake            | 6.57                 | E                |
|   |                          | 28           | Eri near Edapalaiyam          | 9.15                 | E                |
|   |                          | 29           | Lake near Ayanallurkandigai   | 10.94                | ENE              |
|   |                          | 30           | Eri near kumaranjeri          | 13.56                | ENE              |
|   |                          | 31           | Eri near Edakuppam            | 14.36                | E                |
|   |                          | 32           | Eri near Kattappavaram        | 12.98                | NE               |
|   |                          | 33           | Tank near Ramanayakankandigai | 2.98                 | SE               |
|   |                          | 34           | Canal                         | 7.95                 | WSW              |
| 4 | List of Reserved Forests | <b>S. No</b> | <b>Description</b>            | <b>Distance(~km)</b> | <b>Direction</b> |
|   |                          | 1            | Panchali RF                   | 6.32                 | WNW              |
|   |                          | 2            | Sirivedu RF                   | 7.76                 | WNW              |
|   |                          | 3            | Nemalur RF                    | 7.42                 | WNW              |
|   |                          | 4            | Satyavedu RF                  | 13.88                | WNW              |
|   |                          | 5            | Irukulam RF                   | 12.29                | NW               |
|   |                          | 6            | Manali RF                     | 0.99                 | SSW              |

|       |  | <table border="1"> <tr> <td>7</td> <td>Palavakkam RF</td> <td>3.06</td> <td>WSW</td> </tr> <tr> <td>8</td> <td>Senjiagaram RF</td> <td>14.5</td> <td>WSW</td> </tr> <tr> <td>9</td> <td>Vembedu RF</td> <td>14.51</td> <td>SSW</td> </tr> </table>   | 7         | Palavakkam RF            | 3.06           | WSW       | 8                        | Senjiagaram RF | 14.5          | WSW  | 9   | Vembedu RF | 14.51 | SSW           |      |     |        |    |         |       |     |        |    |           |       |     |        |
|-------|--|--|-----------|--------------------------|----------------|-----------|--------------------------|----------------|---------------|------|-----|------------|-------|---------------|------|-----|--------|----|---------|-------|-----|--------|----|-----------|-------|-----|--------|
| 7     | Palavakkam RF                              | 3.06   | WSW       |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 8     | Senjiagaram RF                             | 14.5   | WSW       |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 9     | Vembedu RF                                 | 14.51  | SSW       |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 5     | Nearby Town, City and Head Quarters        | Town: Gummidipoondi: ~ 4.45km, NE<br>City: Chennai: ~ 29.44km, SE<br>District HQ – Tiruvallur: ~ 30.45km, SSW  |           |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 6     | Nearby State Boundaries                    | TN-AP State Boundary: ~ 11.06-W  |           |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 7     | Nearby Highways                            | SH 52-Satyavedu to Kavaraipettai: Adjacent - N<br>NH 5-Chennai to Jharpokharia: ~6.18 - ENE  |           |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 6     | Nearest Airport, Port and Railway Stations | Airport: Chennai International Airport: ~ 42.34km, SSE<br>Railway station: Gummidipoondi: ~ 6.72km, ENE<br>Port: Ennore Kamarajar Port Limited-30.99 Km, ESE   |           |                          |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 7     | Nearest Densely Populated Habitations      | <table border="1"> <thead> <tr> <th>S. No</th> <th>Villages</th> <th>Distance (~km)</th> <th>Direction</th> <th>Population (Census 2011)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Gummidipoondi</td> <td>6.72</td> <td>ENE</td> <td>32,665</td> </tr> <tr> <td>2.</td> <td>Kavaraipettai</td> <td>7.76</td> <td>ESE</td> <td>26,212</td> </tr> <tr> <td>3.</td> <td>Ponneri</td> <td>14.04</td> <td>ESE</td> <td>31,025</td> </tr> <tr> <td>4.</td> <td>Satyavedu</td> <td>12.55</td> <td>WNW</td> <td>52,979</td> </tr> </tbody> </table> | S. No     | Villages                 | Distance (~km) | Direction | Population (Census 2011) | 1.             | Gummidipoondi | 6.72 | ENE | 32,665     | 2.    | Kavaraipettai | 7.76 | ESE | 26,212 | 3. | Ponneri | 14.04 | ESE | 31,025 | 4. | Satyavedu | 12.55 | WNW | 52,979 |
| S. No | Villages                                   | Distance (~km)   | Direction | Population (Census 2011) |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 1.    | Gummidipoondi                              | 6.72   | ENE       | 32,665                   |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 2.    | Kavaraipettai                              | 7.76   | ESE       | 26,212                   |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 3.    | Ponneri                                    | 14.04  | ESE       | 31,025                   |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |
| 4.    | Satyavedu                                  | 12.55  | WNW       | 52,979                   |                |           |                          |                |               |      |     |            |       |               |      |     |        |    |         |       |     |        |    |           |       |     |        |



Figure 3-3 Environmental sensitive areas within 15km radius from project site boundary



### 3.4 Physical Conditions of PIA district

In this section, the physical conditions of PIA district are discussed in general and wherever possible references to the conditions prevailing in the study area are also provided.

#### 3.4.1 PIA District Profile

Tiruvallur district is located in north-east Tamil Nadu and lies between 12°15' and 13°15' north latitude and 79°15' and 80°20' east longitude. The district is surrounded by Kancheepuram district in the south, Vellore district in the west, Bay of Bengal in the east and Andhra Pradesh in the north. The total geographical area of the district is 342,243 hectares or about 3,422 square kilometers and with a total population of 2,754,761 in 2001. Tiruvallur district is having administrative divisions of 8 taluks, 14 blocks, 539 Panchayats and 805 villages.

**Source:** [https://spc.tn.gov.in/Exe\\_Summary\\_DHDR/Thiruvallur.pdf](https://spc.tn.gov.in/Exe_Summary_DHDR/Thiruvallur.pdf)

#### 3.4.2 Climatic Conditions

The district enjoys a tropical climate. The period from April to June is generally hot and dry. The weather is pleasant during the period from November to January. Usually, mornings are more humid than afternoons. The relative humidity varies between 65 and 85% in the mornings while in the afternoon it varies between 40 and 70%. The annual mean minimum and maximum temperature are 24.3 ° and 32.9°C respectively. The daytime heat is oppressive, and the temperature is as high as 41.2°C. The lowest temperature recorded is of the order of 18.1°C.

The district receives rain under the influence of both southwest and northeast monsoons. Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal chiefly during Northeast monsoon period. The southwest monsoon rainfall is highly erratic and summer rains are negligible. Rainfall data analysis shows that the normal annual rainfall varies from 950mm to 1150mm. It is a minimum around Chengam (982.1mm) in the southeastern part of the district. It gradually increases towards west and a maximum around Vandavasi (1117.1mm) is noticed.

**Source:** [http://cqwb.gov.in/District\\_Profile/TamilNadu/TIRUVALLUR.pdf](http://cqwb.gov.in/District_Profile/TamilNadu/TIRUVALLUR.pdf)

### 3.5 Natural Resources of PIA District

#### 3.5.1 Forest Resources of PIA district

Tiruvallur district has a forest area of 12,890.56 hectares of the total area of 301,964.99 hectares. The forest area is scattered throughout the district. They do not have any valuable trees. Trees of poor height and deciduous type and fuel trees and low scrub jungle are generally found in the reserved forest of the district.

**Source:** [\*District Census Handbook, Thiruvallur, Part XII-A, Series-33\*](#)

### **3.5.2 Irrigation of PIA district**

The agricultural operation in the district depends mainly on tanks and lakes. The tanks and lakes of this district are rainfed. They get water mainly during two monsoon periods viz. South-west monsoon (June to September) and North-East monsoon (October to December). The North-East monsoon brings more water compared to the other. During the year 1998-99, an area of 1, 09,161 hectares was used for irrigation. Out of this the main source of irrigation was by tube well in 42,616 hectares and irrigation from lakes in 25,894 hectares which works out to 39% and 23% respectively.

**Source:** *District Census Handbook, Thiruvallur, Part XII-A, Series-33*

### **3.5.3 Agricultural Resources of PIA district**

As this district is adjoining to Chennai, the district has several industrial units. Agriculture remains the major occupation of the people of this district. It is evident from the fact that 40% of the total area of the district is utilized for cultivation of various food and non-food crops apart from the fact that 29% of this net cultivated area was brought for cultivation for more than once. Moreover the 3, 84,552 persons engaged in agriculture as cultivators and 46% of the main workers reported as agricultural labours this district.

**Source:** *District Census Handbook, Thiruvallur, Part XII-A, Series-33*

### **3.5.4 Mineral Resources of PIA district**

The district does not contain any precious minerals. However, it has a few varieties of major/minor minerals. Minor minerals present in the district are Lime Shell (in Pulicat Lake, Sunnambukulam, and Annamalaicherry), Silica Sand (in Elavoor, Eravanoor, Ennore, Gummidipoondi and Ponneri) and Stoneware Clay (in Adhigathur, Odhapal, and Gudapakkam Kandigai). Major minerals present in the district are River Sand (in Kosasthallyar, Araniar, Kallar, Nandi, and Coovam), Blue Metal (in Pallipattu and Tiruttani Taluks), Gravel (in Ponneri and Gummidipoondi Taluks) and Brick Clay (in Tiruvallur and Ponneri Taluks).

**Source:** *District Census Handbook, Thiruvallur, Part XII-A, Series-33*

### **3.5.5 Land Use & Land Cover of PIA district**

Total geographic area of Tiruvallur district is 3423.00 Sq.Km. Urban Built-up area is 295.16 Sq. Km and Rural Built-up area is 272.76 Sq.Km. Details of land use/land cover statistics for Tiruvallur district were given in Table 3-2. Land Use pattern of Tiruvallur is given in **Figure 3-4**.

**Table 3-2 District land use/land cover statistics (2015-16) for Tiruvallur district**

| S. No | Division of Land Use/Land Cover                     | Area (Sq. Km)  | Area (%)   |
|-------|---|----------------|------------|
| 1.    | Agriculture Fallow                                  | 115.92         | 3.39       |
| 2.    | Agriculture, Plantation                             | 87.77          | 2.56       |
| 3.    | Agriculture, Crop land                              | 1834.25        | 53.59      |
| 4.    | Barren/unculturable/ Wastelands, Barren rocky       | 2.39           | 0.07       |
| 5.    | Barren/unculturable/ Wastelands, Gullied / Ravinous | 0.11           | 0.00       |
| 6.    | Barren/unculturable/ Wastelands, Salt affected land | 7.42           | 0.22       |
| 7.    | Barren/unculturable/ Wastelands, Sandy area         | 12.83          | 0.37       |
| 8.    | Barren/unculturable/ Wastelands, Scrub land         | 190.58         | 5.57       |
| 9.    | Built up Mining                                     | 7.54           | 0.22       |
| 10.   | Built up Rural                                      | 272.76         | 7.97       |
| 11.   | Built up Urban                                      | 295.16         | 8.62       |
| 12.   | Forest, Deciduous                                   | 68.13          | 1.99       |
| 13.   | Forest, Evergreen / Semi Evergreen                  | 18.22          | 0.53       |
| 14.   | Forest, Forest Plantation                           | 10.57          | 0.31       |
| 15.   | Forest, Scrub Forest                                | 0.03           | 0.00       |
| 16.   | Forest, Swamp / Mangrove                            | 3.03           | 0.09       |
| 17.   | Wetlands / Water bodies, Inland wetland             | 0.65           | 0.02       |
| 18.   | Wetlands / Water bodies, Coastal wetland            | 86.74          | 2.53       |
| 19.   | Wetlands / Water bodies, River / Stream / Canals    | 67.33          | 1.97       |
| 20.   | Wetlands/Water Bodies, Reservoir/Lakes/Ponds        | 341.57         | 9.98       |
|       | <b>Total</b>  | <b>3423.00</b> | <b>100</b> |

**Source:** <https://bhuvan-app1.nrsc.gov.in/thematic/thematic/index.php>

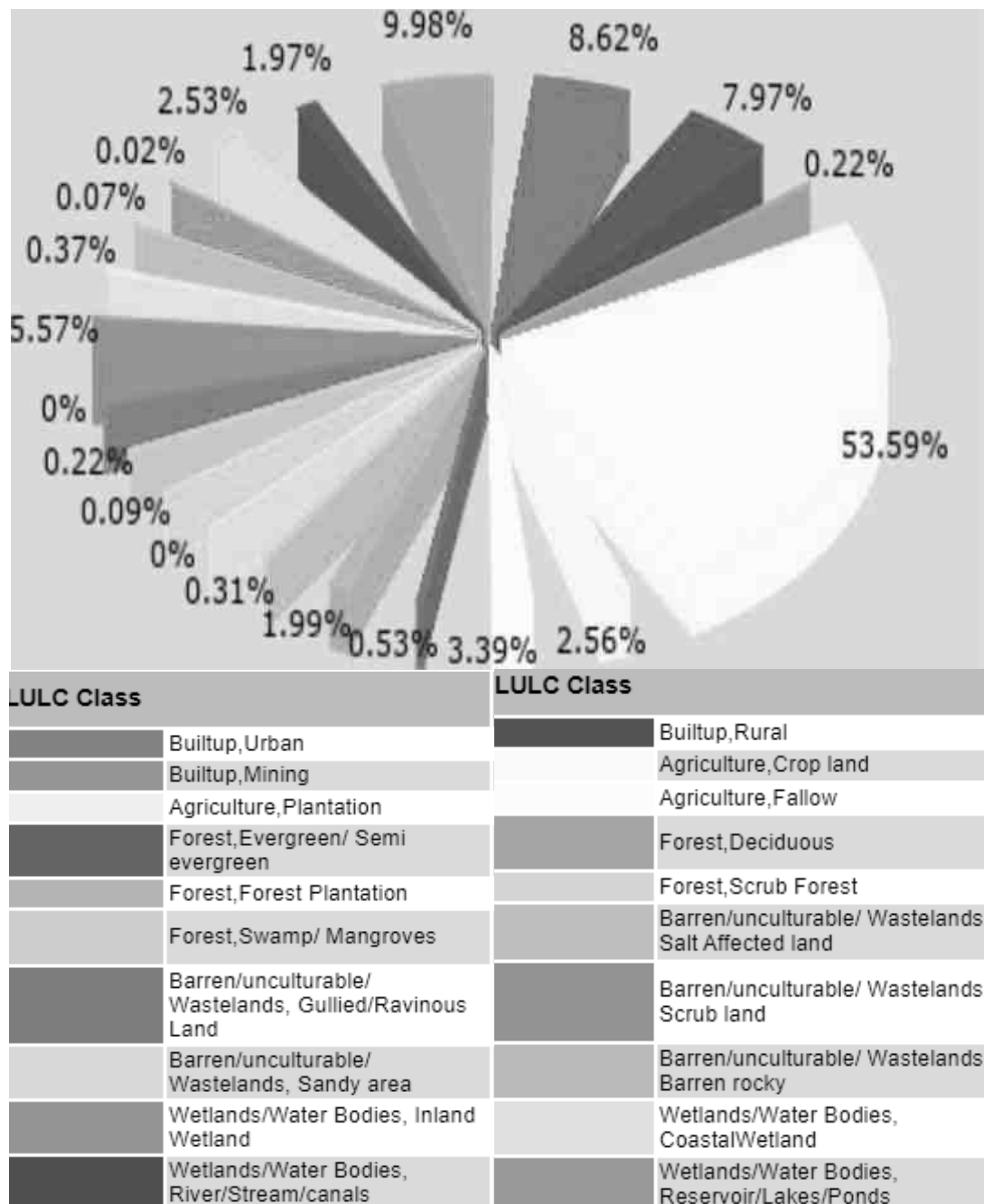


Figure 3-4 Land Use pattern of Tiruvallur district

### 3.5.5.1 Land Use and Land Cover of the Study Area

The total Project Study area is 335.13 Sq.km. The Land Use Pattern is given in Table 3-3. The Land Use Pattern and Land Use Map of the Study area are given in Figure 3-5 & Figure 3-6 respectively.

**Table 3-3 Land Use Pattern of the Study Area**

| <b>S. No</b> | <b>Description</b>      | <b>Area (Sq.km)</b> | <b>Area (Acre)</b> | <b>Area (Ha)</b> | <b>Percentage</b> |
|--------------|-------------------------|---------------------|--------------------|------------------|-------------------|
| 1            | Urban                   | 14.14               | 3494.06            | 1414             | 4.21              |
| 2            | Industry                | 5.98                | 1477.69            | 598              | 1.78              |
| 3            | Rural                   | 28.85               | 7128.98            | 2885             | 8.60              |
| 4            | Crop land               | 196.45              | 48543.78           | 19645            | 58.55             |
| 5            | Fallow                  | 10.3                | 2545.18            | 1030             | 3.07              |
| 6            | Plantation              | 4.24                | 1047.73            | 424              | 1.26              |
| 7            | Deciduous               | 10.83               | 2676.15            | 1083             | 3.23              |
| 8            | Forest Plantation       | 3.69                | 911.82             | 369              | 1.10              |
| 9            | Scrub land              | 19.07               | 4712.29            | 1907             | 5.68              |
| 10           | Gullied/Ravinous Land   | 0.4                 | 98.84              | 40               | 0.12              |
| 11           | Sandy area              | 0.78                | 192.74             | 78               | 0.23              |
| 12           | Waterbodies             | 34.67               | 8567.13            | 3467             | 10.33             |
| 13           | River / Stream / Canals | 5.42                | 1339.31            | 542              | 1.62              |
| 14           | Coastal wetland         | 0.71                | 175.44             | 71               | 0.21              |
| <b>Total</b> |                         | <b>335.13</b>       | <b>82812.30</b>    | <b>33513</b>     | <b>100.00</b>     |

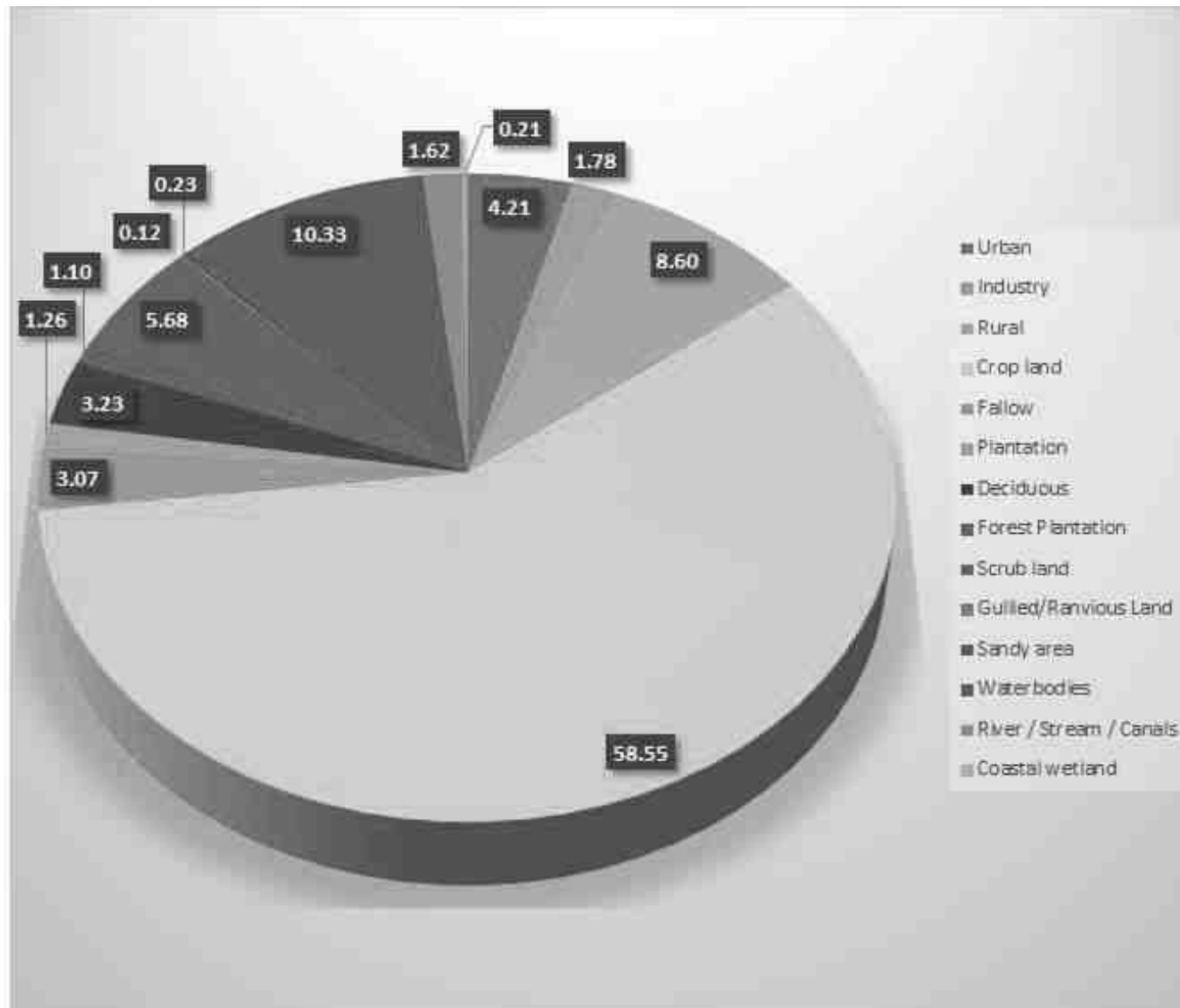


Figure 3-5 Land Use Pattern of the Study Area

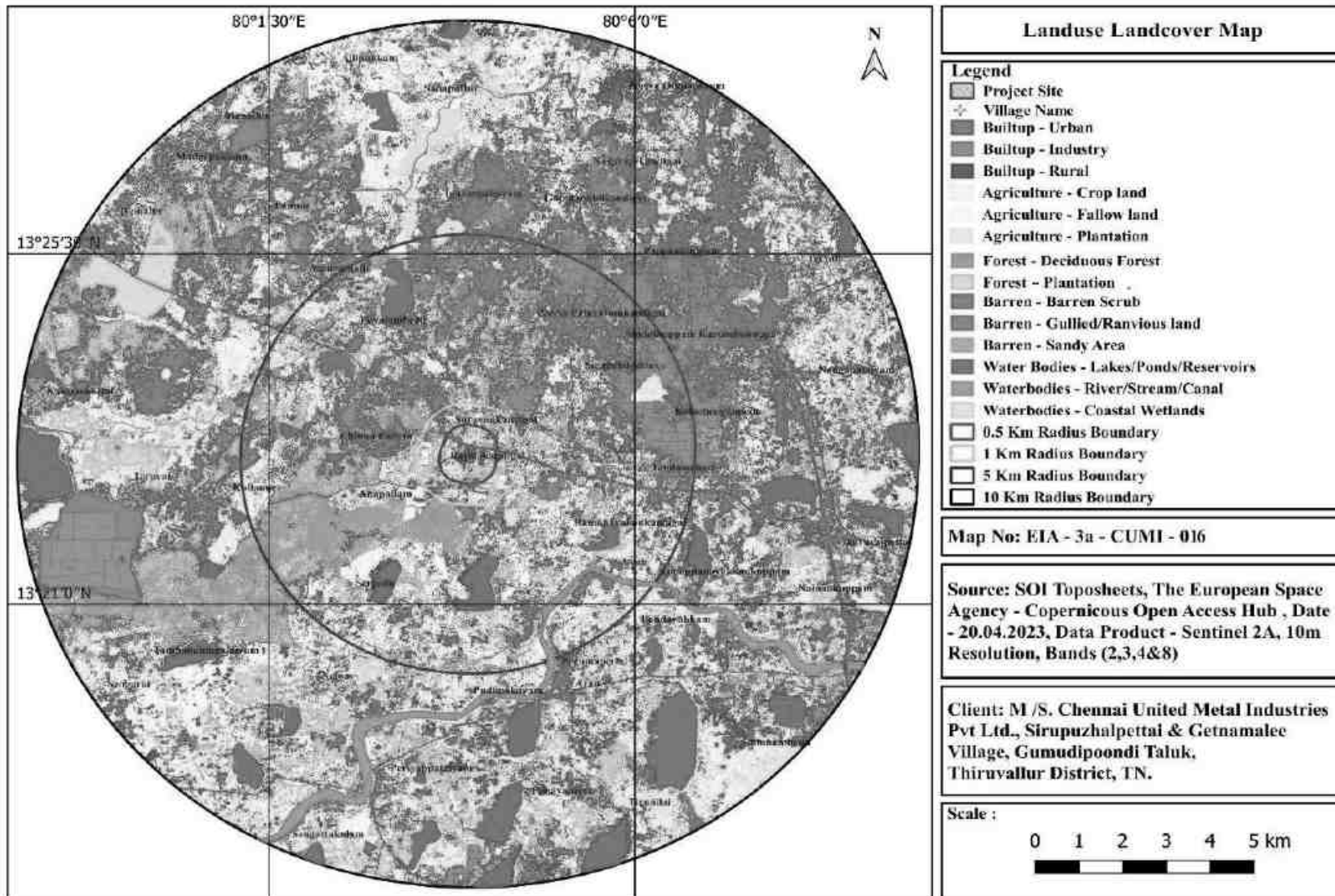


Figure 3-6 Land Use Land Cover map of the study area

### **3.5.6 Geology of PIA district**

The Tiruvallur district can be geologically classified into hard rock and sedimentary (alluvial) formation. This district is principally made up of Archaean, upper Gondwana and the tertiary formations. These are overlaid by laterites and alluvium. The oldest of the crystalline rocks of Archaean age are Biotite and Hornblende Gneiss, Charnockite and granite. These are intruded by Amphibole dykes, and occasionally with veins of quartz and pegmatites. Granites and gneisses of the Archaean age are mainly seen in Tiruthani taluk. These crystalline rocks have undergone weathering to variable extent. Contour map of the study area is given in **Figure 3-7**.

**Source :** <https://nwm.gov.in/sites/default/files/Notes%20on%20Thiruvallur%20District.pdf>



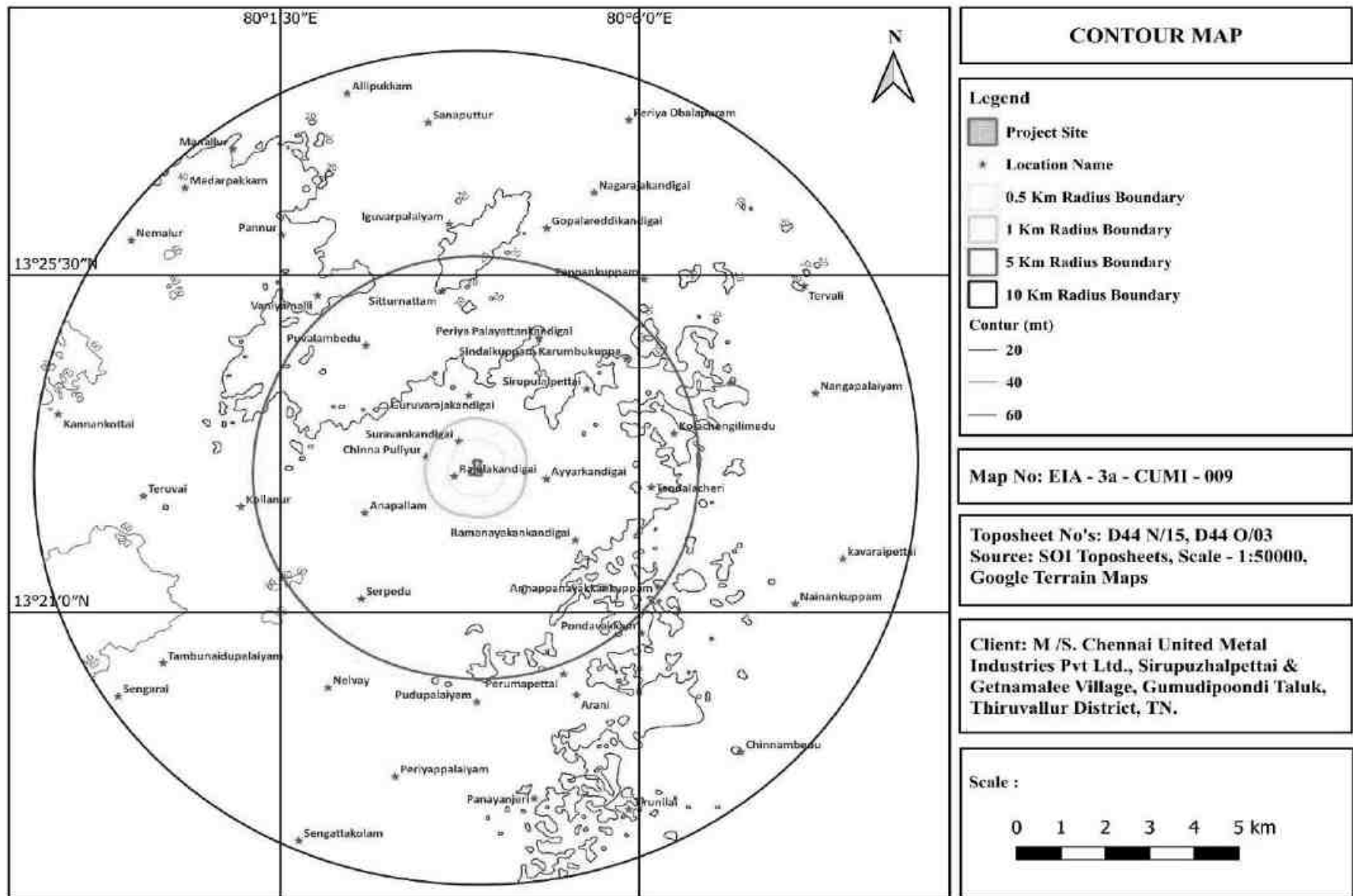


Figure 3-7 Contour map of the study area

### 3.5.7 Geomorphology of PIA district

The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Alluvial Plain, 2) Old River Courses 3) Coastal plains 4) Shallow & deep buried Pediments, 5) Pediments and 6) Structural Hills. The elevation of the area ranges from 183 m amsl in the west to sea level in the east. Four cycles of erosion gave rise to a complex assemblage of fluvial, estuarine, and marine deposits. A major part of the area is characterised by an undulating topography with innumerable depressions which are used as irrigation tanks. The coastal tract is marked by three beach terraces with broad inter-terrace depressions. The coastal plains display a lower level or gently rolling surface and only slightly elevated above the local water surfaces or rivers. The straight trend of the coastal tract is resultant of development of vast alluvial plains. There are a few dunes in the coastal tract.

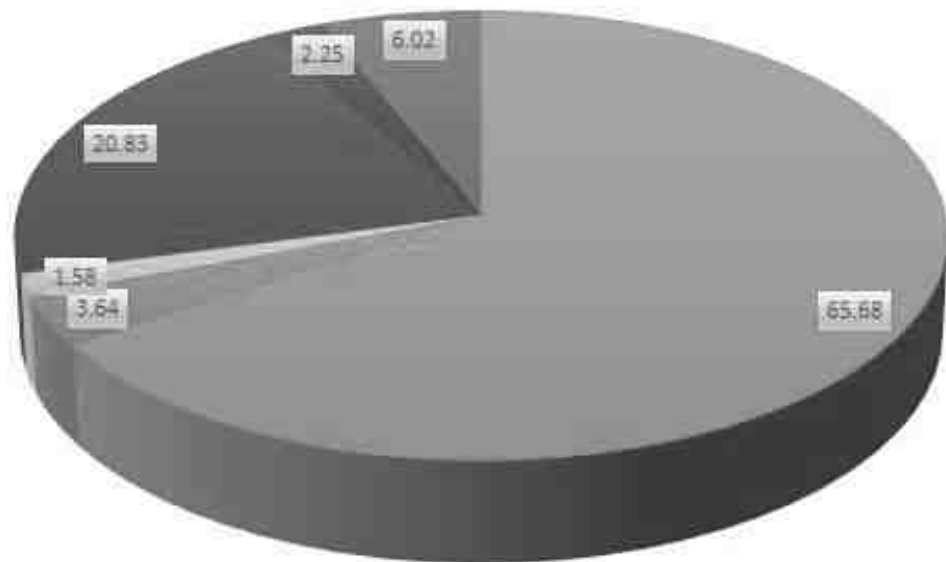
**Source:** [http://cgwb.gov.in/District\\_Profile/TamilNadu/TIRUVALLUR.pdf](http://cgwb.gov.in/District_Profile/TamilNadu/TIRUVALLUR.pdf)

### 3.5.8 Geomorphology of the Study Area

The total Geographical area of the study area is 335.53 Sq.Km. The Geomorphology of the study area is given in **Table 3-4** and Geomorphology pattern and Geomorphology Map of the study area is given in **Figure 3-8** & **Figure 3-9** respectively.

**Table 3-4 Geomorphology of the Study Area**

| S. No | Geomorphology                                  | Area (Sq.km)  | Area (Acr)      | Area (Ha)    | Total Area (%) |
|-------|--|---------------|-----------------|--------------|----------------|
| 1     | Denudational Origin-Pediment-PediPlain Complex | 220.36        | 54452.06        | 22036        | 65.68          |
| 2     | Fluvial Origin-Older Flood Plain               | 12.21         | 3017.15         | 1221         | 3.64           |
| 3     | Fluvial Origin-Active Flood Plain              | 5.29          | 1307.19         | 529          | 1.58           |
| 4     | Coastal Origin-Older Deltaic Plain             | 69.90         | 17272.64        | 6990         | 20.83          |
| 5     | Coastal Origin-Younger Coastal Plain           | 7.56          | 1868.11         | 756          | 2.25           |
| 6     | Waterbodies                                    | 20.21         | 4993.99         | 2021         | 6.02           |
|       | <b>Total</b>                                   | <b>335.53</b> | <b>82911.14</b> | <b>33553</b> | <b>100.00</b>  |



- Denudational Origin-Pediment-PediPlain Complex
- Fluvial Origin-Older Flood Plain
- Fluvial Origin-Active Flood Plain
- Coastal Origin-Older Deltaic Plain
- Coastal Origin-Younger Coastal Plain
- Waterbodies

**Figure 3-8 Geomorphology Pattern of the Study Area**

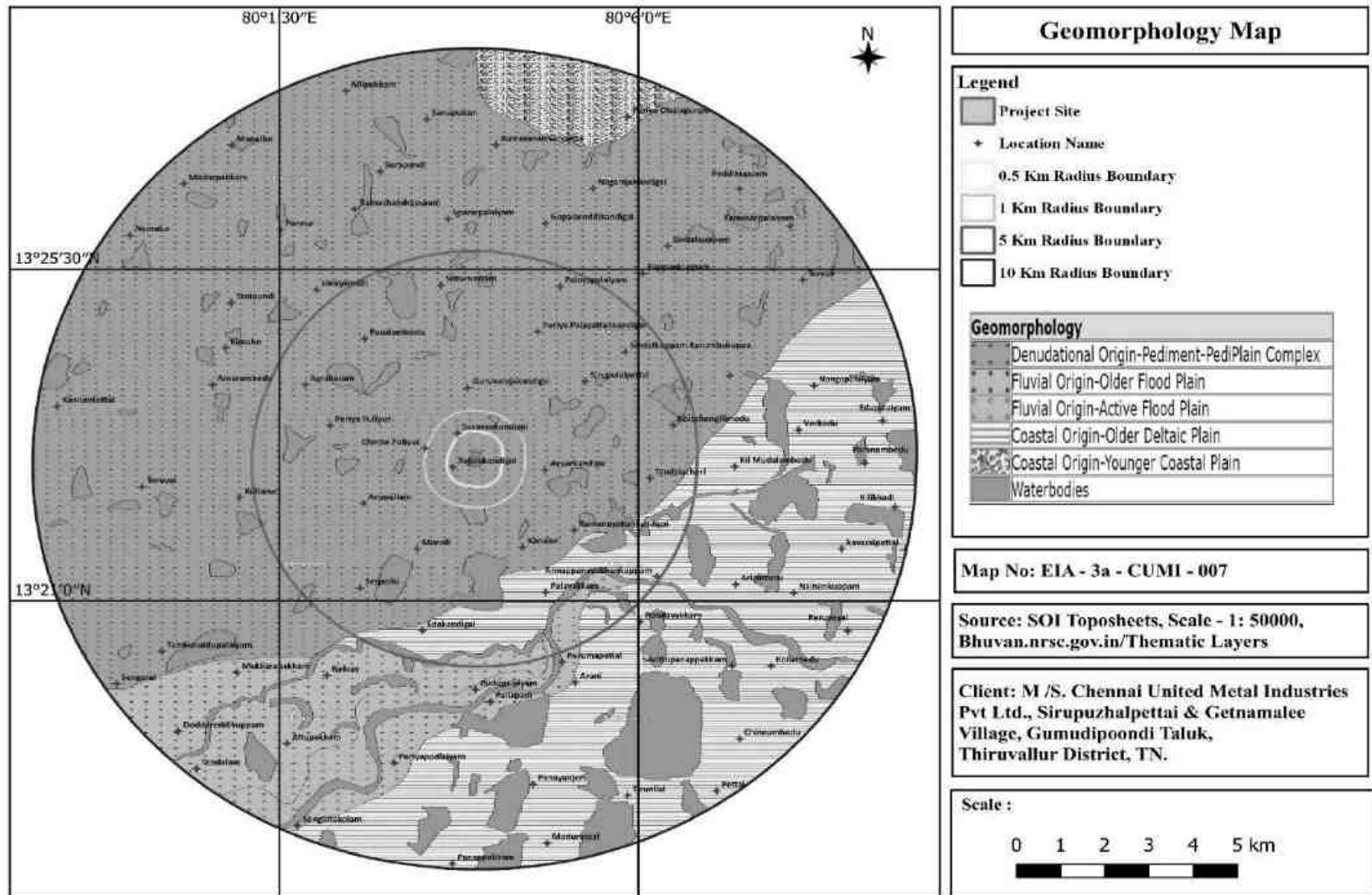


Figure 3-9 Geomorphology map of the study area

### 3.5.9 Hydrogeology of PIA district

The district is underlain by both porous and fissured formations. The important aquifer systems in the district are constituted by i) unconsolidated & semi-consolidated formations and ii) weathered, fissured, and fractured crystalline rocks.

The porous formations in the district include sandstones and clays of Jurassic age (Upper Gondwana), marine sediments of Cretaceous age, Sandstones of Tertiary age and Recent alluvial formations. As the Gondwana formations are well-compacted and poorly jointed, the movement of ground water in these formations is mostly restricted to shallow levels. Ground water occurs under phreatic to semi-confined conditions in the inter-granular pore spaces in sands and sandstones and the bedding planes and thin fractures in shales. In the area underlain by Cretaceous sediments, ground water development is rather poor due to the rugged nature of the terrain and the poor quality of the formation water. Quaternary formations comprising mainly sands, clays and gravels are confined to major drainage courses in the district. The maximum thickness of alluvium is 30.0 m. whereas the average thickness is about 15.0m. Ground water occurs under phreatic to semi-confined conditions in these formations and is being developed by means of dug wells and filter points.

**Source:** [http://cgwb.gov.in/District\\_Profile/TamilNadu/TIRUVALLUR.pdf](http://cgwb.gov.in/District_Profile/TamilNadu/TIRUVALLUR.pdf)

### 3.5.10 Drainage Pattern of PIA district

Araniyar, Korattalayar, Cooum, Nagari and Nandhi are the important rivers. The drainage pattern, in general, is dendritic. All the rivers are seasonal and carry substantial flows during monsoon period. Korattaliar river water is supplied to Cholavaram and Red Hill tanks by constructing an Anicut at Vellore Tambarambakkam. After filling a few tanks on its further course, the river empties into the Ennore creek a few kilometres north of Chennai. The Cooum River, flowing across the southern part of the district, has its origin in the surplus waters of the Cooum tank in Tiruvallur taluk and receives the surplus waters of a number of tanks. It feeds the Chembarambakkam tank through a channel. It finally drains into the Bay of Bengal. The drainage map of Study area is given in **Figure 3-10**.

**Source :** [http://cgwb.gov.in/District\\_Profile/TamilNadu/TIRUVALLUR.pdf](http://cgwb.gov.in/District_Profile/TamilNadu/TIRUVALLUR.pdf)

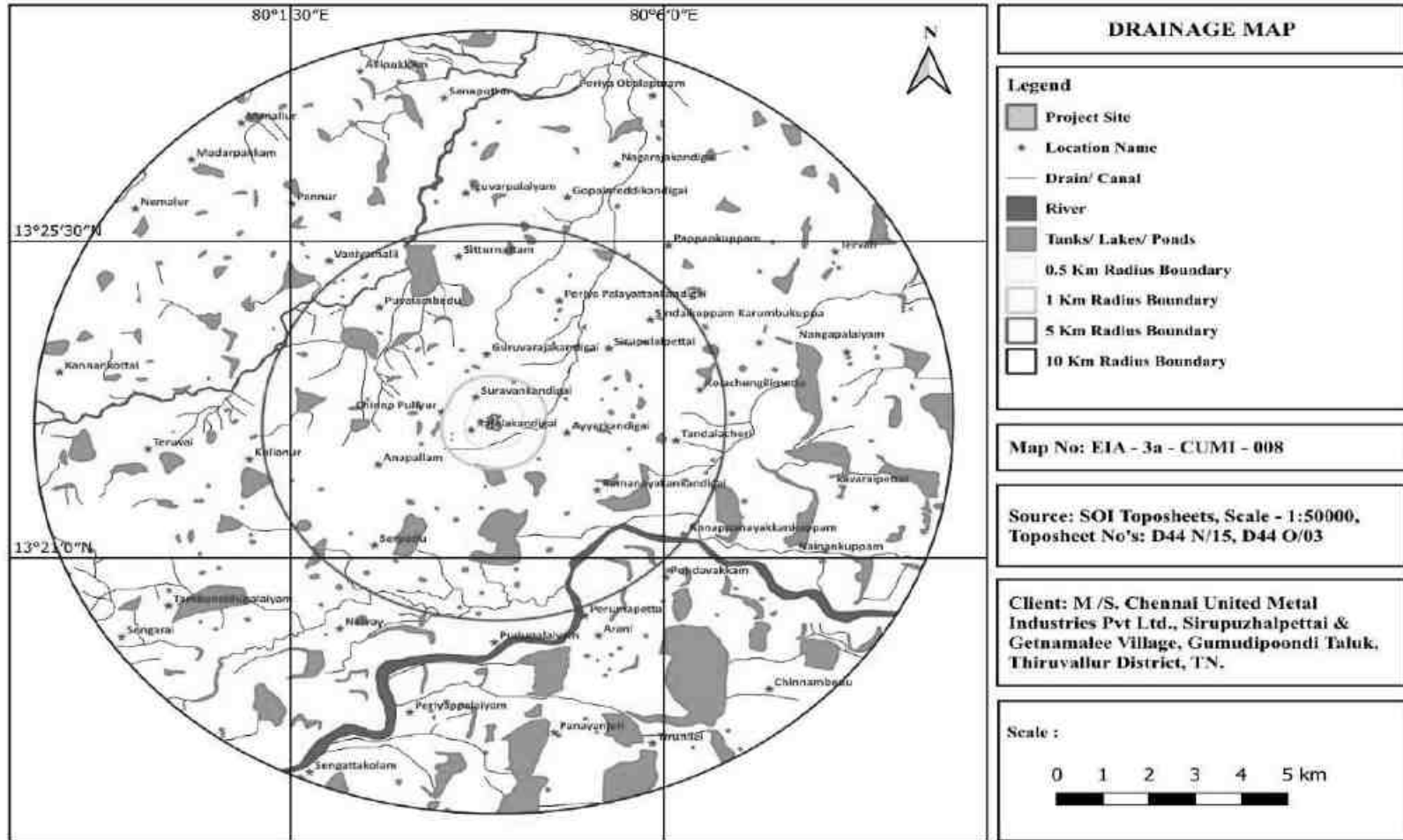


Figure 3-10 Drainage map of the study area

### 3.5.11 Seismicity

As per Seismicity Map of India, the project location/study area falls in Zone III, which is categorized as a Moderate Zone. The Seismicity Map of India is shown in **Figure 3-11**.

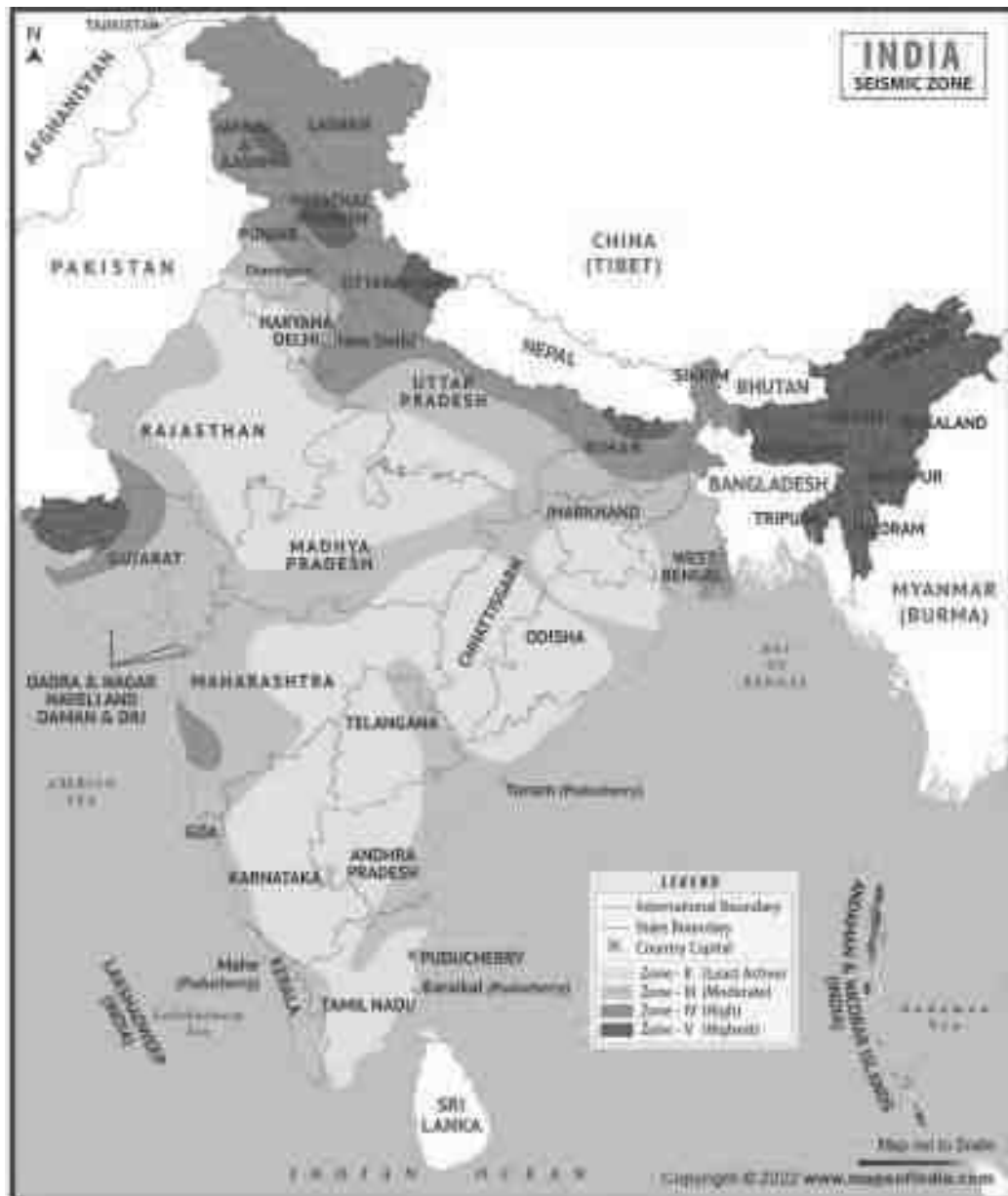


Figure 3-11 Seismicity map of India

### 3.5.12 Soils of PIA District

Soils in the area have been classified into i) Red soil ii) Black soil iii) Alluvial soil iv) colluvial soil. The major part is covered by red soil of red sandy/clay loam type. Ferruginous red soils are also seen in places. Black soils are deep to very deep and generally occur in the depressions adjacent to hilly areas, in the western part. Alluvial soils occur along the river courses and eastern part of the coastal areas. Sandy coastal alluvium (arenaceous soil) are seen all along the seacoast as a narrow belt.

**Source:** [http://cgwb.gov.in/District\\_Profile/TamilNadu/TIRUVALLUR.pdf](http://cgwb.gov.in/District_Profile/TamilNadu/TIRUVALLUR.pdf)

## 3.6 Air Environment

Baseline ambient air quality assessment gives the status in the vicinity of site and is an indispensable part of environmental impact assessment studies. The baseline status of air environment in the study area is assessed through a systematic air quality surveillance program.

### 3.6.1 Meteorological Conditions

The regional air quality is influenced by the meteorology of that region. The principal weather parameters that influence the concentration of the air pollutants in the surroundings are wind speed, wind direction and temperature. Meteorological data is useful for proper interpretation of the baseline data. It is used as input for air quality dispersion models for predicting the post project environmental scenario i.e., ground level concentrations.

### 3.6.2 General Meteorological Scenario based on IMD Data

The nearest Indian Meteorological Department (IMD) station located to project site is Nungambakkam. The Climatological data of Nungambakkam (13° 3'33.94"N and 80°14'32.55"E), published by the IMD, based on daily observations at 08:30 and 17:30 hour IST for a 30-year period (1971-2000), is presented in the following sections on the meteorological conditions of the region. The monthly variations of the relevant meteorological parameters are reproduced in **Table 3-5**.

**Table 3-5 Climatological Summary –Nungambakkam (1971-2000)**

| Month | Temp (°C)  |            | Rainfall   |             | Mean Wind Speed (Kmph) | Predominant Wind Directions (From)* |       |
|-------|------------|------------|------------|-------------|------------------------|-------------------------------------|-------|
|       | Daily Max. | Daily Min. | Total (mm) | No. of days |                        | 08:30                               | 17:30 |
| Jan   | 28.8       | 20.9       | 22.5       | 1.3         | 4.8                    | N                                   | NE    |
| Feb   | 30.5       | 22.0       | 2.2        | 0.4         | 5.1                    | W                                   | E     |
| Mar   | 32.5       | 23.8       | 4.0        | 0.3         | 5.8                    | SW                                  | SE    |
| Apr   | 34.3       | 26.4       | 7.7        | 0.6         | 6.9                    | SW                                  | SE    |
| May   | 36.8       | 27.9       | 43.9       | 1.4         | 7.9                    | SW                                  | SE    |



| Month             | Temp (°C)  |            | Rainfall   |             | Mean Wind Speed (Kmph) | Predominant Wind Directions (From)*    |       |
|-------------------|------------|------------|------------|-------------|------------------------|--|-------|
|                   | Daily Max. | Daily Min. | Total (mm) | No. of days |                        | 08:30                                  | 17:30 |
| Jun               | 36.9       | 27.5       | 55.9       | 4.0         | 8.7                    | W                                      | SE    |
| Jul               | 35.0       | 26.3       | 100.3      | 6.9         | 7.4                    | W                                      | SE    |
| Aug               | 34.3       | 25.7       | 140.4      | 8.5         | 7.0                    | W                                      | SE    |
| Sep               | 33.9       | 25.5       | 137.3      | 7.1         | 6.0                    | W                                      | SE    |
| Oct               | 31.8       | 24.5       | 278.8      | 10.6        | 4.4                    | W                                      | NE    |
| Nov               | 29.6       | 23.0       | 407.4      | 11.7        | 5.3                    | N                                      | NE    |
| Dec               | 28.5       | 21.9       | 191.1      | 6.3         | 6.3                    | N                                      | NE    |
| Max.              | 36.9       | 27.9       | 407.4      | 11.7        | 8.7                    | The Predominant wind direction is West |       |
| Min.              | 28.5       | 20.9       | 2.2        | 0.3         | 4.4                    |  |       |
| Annual Avg/Total. | 32.8       | 24.4       | 1391.5     | 59.1        | 6.3                    |  |       |

Source : IMD

### 3.6.3 Meteorological Scenario during Study Period

The meteorological scenario in and around the project site is an essential requirement during the study period for proper interpretation of baseline air quality status. Meteorological data was collected during the study period (March 2024 – May 2024) and is enclosed as **Annexure-17**. The wind rose for the study period is given in **Figure 3-13**.

**Figure 3-12 Meteorological Data for the Study Period (March 2024 – May 2024)**

| S. No | Parameter                                      | Observation   |
|-------|--|---|
| 1.    | Temperature                                    | Max Temperature: 38 °C<br>Min Temperature: 21 °C<br>Avg Temperature :28.05 °C |
| 2.    | Average Relative Humidity                      | 74.5 %  |
| 3.    | Average Wind Speed                             | 2.99 m/s  |
| 4.    | Predominant Wind Direction during study period | South   |

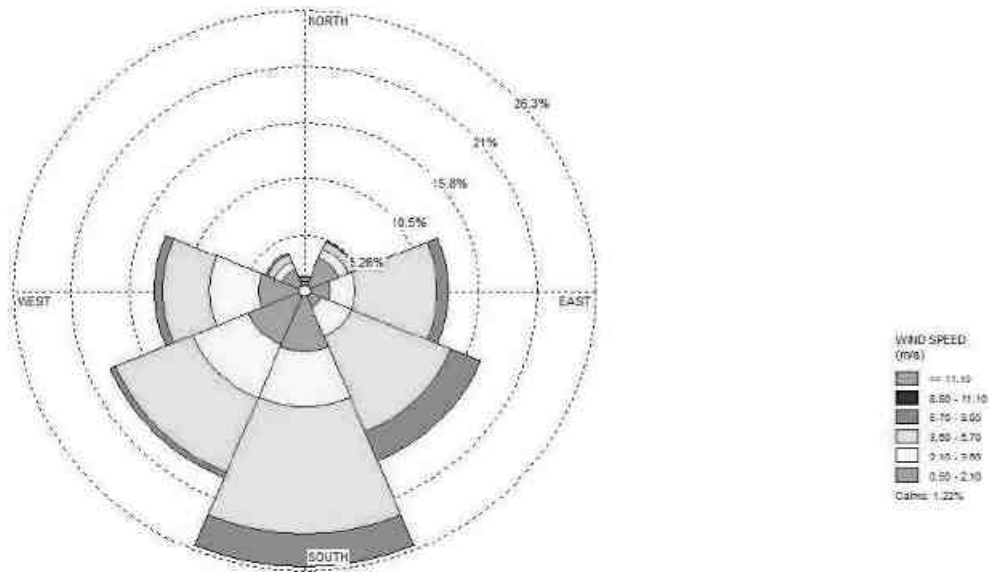


Figure 3-13 Wind rose for the study period (March 2024 – May 2024)

### 3.6.4 Ambient Air Quality

#### 3.6.4.1 Ambient Air Quality Monitoring Stations

Eight (08) monitoring locations have been identified as per annual wind predominance of Nungambakkam from IMD. AAQ monitoring locations are selected based on Annual wind predominance, map showing the Ambient Air Quality monitoring locations is given in **Figure 3-14** and the details of the locations are given in **Table 3-6**.

Table 3-6 Details of Ambient Air Quality Monitoring Locations

| Code | Location Name       | Distance (~Km) | Direction | Wind Pattern |
|------|---------------------|----------------|-----------|--------------|
| A1   | Project Site        | -              | -         | -            |
| A2   | Gummidipoondi       | 6.48           | ENE       | c/w          |
| A3   | Near Geetanamalli   | 3.08           | E         | d/w          |
| A4   | Ayyarkandigai       | 1.21           | E         | d/w          |
| A5   | Ramanayakankandigai | 2.47           | SE        | c/w          |
| A6   | Arani               | 5.97           | SSE       | c/w          |
| A7   | Rajulakandigai      | 0.46           | W         | u/w          |
| A8   | Near Tidir Nagar    | 1.46           | NNW       | c/w          |

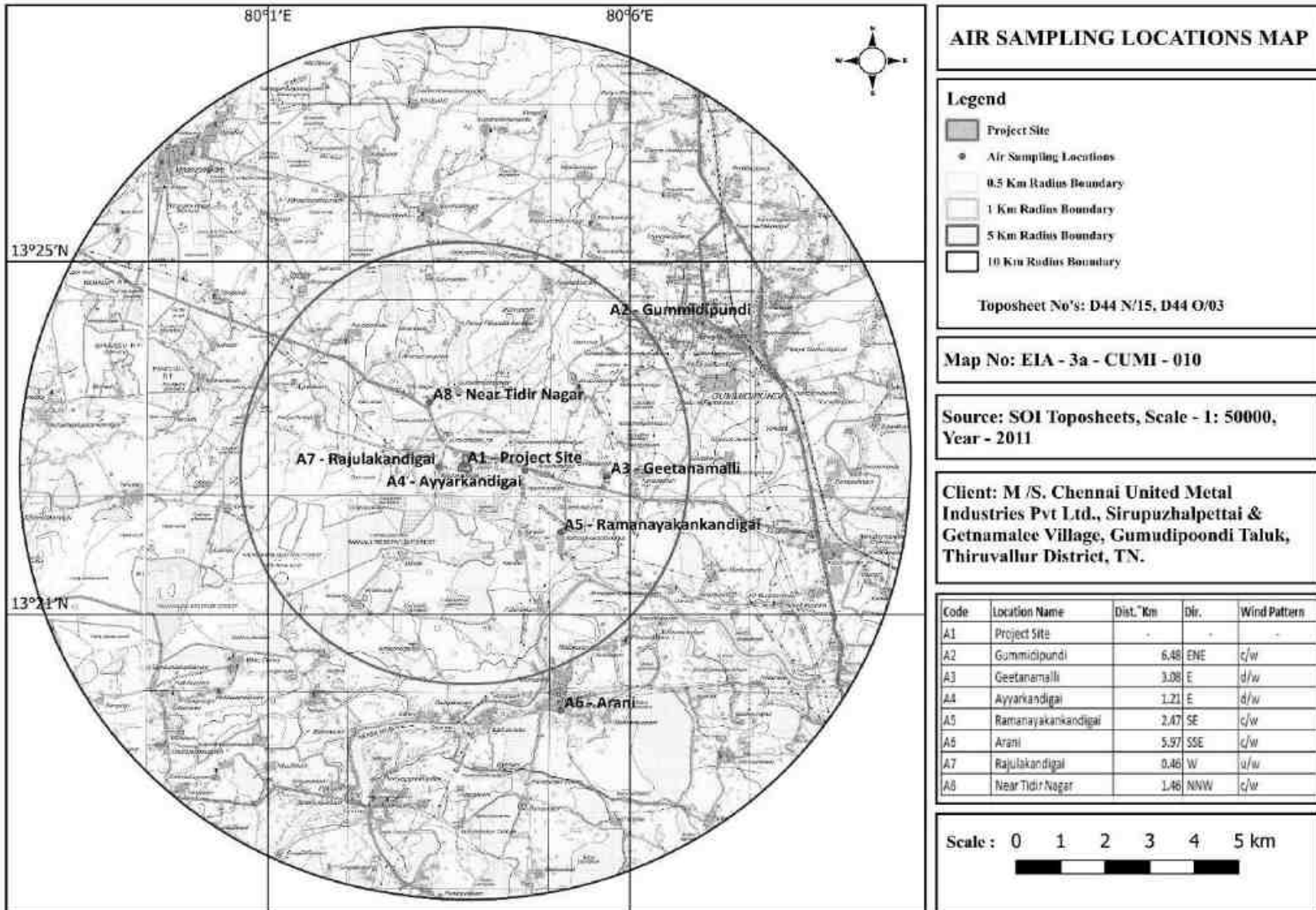


Figure 3-14 Ambient Air Quality monitoring locations

### 3.6.5 Ambient Air Quality Monitoring Techniques and Frequency

Ambient air quality was monitored twice in a week for One (01) season (shall cover 12 weeks), i.e., 3 months (March 2024 – May 2024). PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO and TVOC were monitored. Sampling was carried out as per Central Pollution Control Board (CPCB) monitoring guidelines at each location. Analytical methods used for analysis of parameters are given in **Table 3-7** and the Summary of the average baseline concentrations of pollutants is given in **Table 3-8**.

**Table 3-7 Analytical Methods for Analysis of Ambient Air Quality Parameters**

| S. No | Parameters   | Analytical method  |
|-------|--|--|
| 1     | Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>      | IS 5182(Part 2) : 2001 RA  |
| 2     | Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>     | IS 5182(Part 6) : 2006 RA  |
| 3     | Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup> | SOP – EA -001- In house validated method / Issue No/Date : 03 / 04.08.2014:                        |
| 4     | Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>  | IS 5182 (Part 23) : 2006 RA  |
| 5     | CO mg/m <sup>3</sup>                                       | NIOSH- 6014  |
| 6     | Pbµg/m <sup>3</sup>  | IS 5182(Part 22): 2004 RA  |
| 7     | O <sub>3</sub> , µg/m <sup>3</sup>                         | IS 5182(Part 9): 1974 RA   |
| 8     | NH <sub>3</sub> , µg/m <sup>3</sup>                        | SOP – EA -009 - In house validated method / Issue No/Date: 03/04.08.2014 (Based on CPCB Method)    |
| 9     | Benzene, µg/m <sup>3</sup>                                 | IS 5182(Part 11): 2006 (RA 2012)   |
| 10    | Benzo (a) pyrene, ng/m <sup>3</sup>                        | IS 5182(Part 12) :2004 RA  |
| 11    | Arsenic, ng/ m <sup>3</sup>                                | SOP – EA -010 - In house validated method / Issue No/Date :03/04.08.2014 (Based on CPCB Method)    |
| 12    | Nickel ng/ m <sup>3</sup>                                  | SOP – EA -011 - In house validated method / Issue No/Date :03/04.08.2014 (Based on CPCB Guideline) |
| 13    | TVOC   | USEPA Method   |

**Table 3-8 Summary of the average baseline concentrations of pollutants**

| Parameters                               | Conc.      | NAAQ Standards | Locations    |              |                    |               |                      |       |                |                  |
|--|------------|----------------|--------------|--------------|--------------------|---------------|----------------------|-------|----------------|------------------|
|  |            |                | Project Site | Gummidipundi | Near Geetana malli | Ayyarkandigai | Ramanay akankandigai | Arani | Rajulakandigai | Near Tidir Nagar |
|  |            |                | AAQ 1        | AAQ 2        | AAQ 3              | AAQ 4         | AAQ 5                | AAQ 6 | AAQ 7          | AAQ 8            |
| PM10 Conc. ( $\mu\text{g}/\text{m}^3$ )  | Min.       | 100 (24 Hours) | 56.2         | 60.0         | 55.4               | 58.2          | 46.3                 | 44.9  | 55.2           | 48.1             |
|  | Max        |                | 80.1         | 85.6         | 79.0               | 82.9          | 65.9                 | 64.0  | 78.7           | 68.5             |
|  | Avg.       |                | 67.4         | 72.0         | 66.5               | 69.8          | 55.5                 | 53.9  | 66.2           | 57.7             |
|  | 98th 'tile |                | 79.6         | 85.1         | 78.6               | 82.5          | 65.5                 | 63.7  | 78.2           | 68.1             |
| PM2.5 Conc. ( $\mu\text{g}/\text{m}^3$ ) | Min.       | 60 (24 Hours)  | 28.9         | 34.1         | 31.6               | 32.6          | 27.4                 | 26.4  | 31.1           | 24.5             |
|  | Max        |                | 41.2         | 48.6         | 45.1               | 46.5          | 39.0                 | 37.6  | 44.4           | 35.0             |
|  | Avg.       |                | 34.6         | 40.9         | 38.0               | 39.2          | 32.8                 | 31.6  | 37.4           | 29.4             |
|  | 98th 'tile |                | 40.9         | 48.3         | 44.8               | 46.3          | 38.8                 | 37.4  | 44.1           | 34.8             |
| SO2 Conc. ( $\mu\text{g}/\text{m}^3$ )   | Min.       | 80 (24 Hours)  | 10.5         | 13.1         | 11.9               | 12.4          | 9.9                  | 8.9   | 11.5           | 10.4             |
|  | Max        |                | 15.0         | 18.7         | 16.9               | 17.7          | 14.0                 | 12.6  | 16.4           | 14.8             |
|  | Avg.       |                | 12.6         | 15.7         | 14.2               | 14.9          | 11.8                 | 10.6  | 13.8           | 12.4             |
|  | 98th 'tile |                | 14.9         | 18.6         | 16.8               | 17.6          | 14.0                 | 12.5  | 16.3           | 14.7             |
| NO2 Conc. ( $\mu\text{g}/\text{m}^3$ )   | Min.       | 80 (24 Hours)  | 25.6         | 27.1         | 25.5               | 26.1          | 23.8                 | 20.3  | 24.5           | 21.0             |
|  | Max        |                | 36.5         | 38.6         | 36.3               | 37.1          | 33.9                 | 28.9  | 35.0           | 29.9             |
|  | Avg.       |                | 30.7         | 32.4         | 30.5               | 31.2          | 28.5                 | 24.3  | 29.4           | 25.1             |
|  | 98th 'tile |                | 36.3         | 38.3         | 36.1               | 36.9          | 33.7                 | 28.7  | 34.8           | 29.7             |
| CO ( $\text{mg}/\text{m}^3$ )            | Avg.       | 4 (1hour)      | 0.36         | 0.52         | 0.33               | 0.41          | 0.29                 | 0.3   | 0.44           | 0.31             |
| Pb ( $\mu\text{g}/\text{m}^3$ )          | Avg.       | 1 (24 hour)    | BDL          | BDL          | BDL                | BDL           | BDL                  | BDL   | BDL            | BDL              |

| Parameters                             | Conc. | NAAQ Standards | Locations    |              |                    |               |                      |       |                |                  |
|--|-------|----------------|--------------|--------------|--------------------|---------------|----------------------|-------|----------------|------------------|
|  |       |                | Project Site | Gummidipundi | Near Geetana malli | Ayyarkandigai | Ramanay akankandigai | Arani | Rajulakandigai | Near Tidir Nagar |
|  |       |                | AAQ 1        | AAQ 2        | AAQ 3              | AAQ 4         | AAQ 5                | AAQ 6 | AAQ 7          | AAQ 8            |
| O <sub>3</sub> (µg/m <sup>3</sup> )    | Avg.  | 180 (1hour)    | BDL          | BDL          | BDL                | BDL           | BDL                  | BDL   | BDL            | BDL              |
| NH <sub>3</sub> (µg/m <sup>3</sup> )   | Avg.  | 400 (24 hours) | 15.7         | 18.2         | 16.4               | 14.4          | 16.9                 | 14.2  | 11.7           | 12.9             |
| Benzene (µg/m <sup>3</sup> )           | Avg.  | 5 (Annual)     | BDL          | BDL          | BDL                | BDL           | BDL                  | BDL   | BDL            | BDL              |
| Benzo (a) pyrene, (ng/m <sup>3</sup> ) | Avg.  | 1 (Annual)     | BDL          | BDL          | BDL                | BDL           | BDL                  | BDL   | BDL            | BDL              |
| Arsenic (ng/ m <sup>3</sup> )          | Avg.  | 6 (Annual)     | BDL          | BDL          | BDL                | BDL           | BDL                  | BDL   | BDL            | BDL              |
| Nickel (ng/m <sup>3</sup> )            | Avg.  | 20 (Annual)    | BDL          | BDL          | BDL                | BDL           | BDL                  | BDL   | BDL            | BDL              |

Note: BDL (Below detectable limit), DL (Detectable limit)

### 3.6.6 Interpretations of Results:

The monitoring results of ambient air quality were compared with the National Ambient Air Quality Standards (NAAQS) Prescribed by MoEFCC; GoI Notification dated 16.11.2009. The baseline levels of PM<sub>10</sub> (44.9 – 85.6 µg/m<sup>3</sup>), PM<sub>2.5</sub> (24.5 – 48.6 µg/m<sup>3</sup>), SO<sub>2</sub>(8.9 – 18.7 µg/m<sup>3</sup>), NO<sub>2</sub> (20.3 – 29.9 µg/m<sup>3</sup>), While thus it was found that concentration of pollutants was within the limits of NAAQ standards.

All the results of ambient air quality parameters have been found within the limit as per NAAQS. Based on comparison study of results for tested parameters with NAAQS, it is interpreted that ambient air quality of studied locations is average. This interpretation narrates the results found for corresponding locations and study period.

### 3.7 Noise Environment

The ambient noise level at a location varies continuously depending on the type of surrounding activities. Ambient noise levels have been established by monitoring noise levels at Eight (08) locations in and around 10 Km distance from project area during the study period using precision noise level meter. Noise levels were recorded on an hourly basis for one complete day at each location using pre-calibrated noise levels. an hourly basis for one complete day at each location using pre- calibrated noise levels. A map showing the noise monitoring locations is given in **Figure 3-15**.

#### 3.7.1 Results and Discussions

Based on the recorded hourly noise levels at each monitoring location, the day equivalent (Ld) and night equivalent (Ln) were calculated.

- Ld: Average noise levels between 6:00 hours to 22.00 hours.
- Ln: Average noise levels between 22:00 hours to 6.00 hours.

The comparison of day equivalent noise levels (Ld) and night equivalent noise levels (Ln) with the respective CPCB stipulated noise standards for various land use categories are shown in the **Table 3-9**.

**Table 3-9 Day and Night Equivalent Noise Levels**

| S. No | Location            | Location Code | Distance (~km) from Project boundary | Azimuth Direction | Noise level in dB(A) Leq |       | CPCB Standard |             | Environmental Setting |
|-------|---------------------|---------------|--------------------------------------|-------------------|--------------------------|-------|---------------|-------------|-----------------------|
|       |                     |               |                                      |                   | Day                      | Night | Lday (Ld)     | LNight (Ln) |                       |
| 1     | Project Site        | N1            | -                                    |                   | 54.9                     | 44.2  | 75            | 70          | Industrial            |
| 2     | Gummidipundi        | N2            | 6.48                                 | ENE               | 55.3                     | 45.2  | 75            | 70          | Industrial            |
| 3     | Geetanamalli        | N3            | 3.08                                 | E                 | 52.4                     | 41.5  | 55            | 45          | Residential           |
| 4     | Ayyarkandigai       | N4            | 1.21                                 | E                 | 50.1                     | 42.2  | 55            | 45          | Residential           |
| 5     | Ramanayakankandigai | N5            | 2.47                                 | SE                | 51.6                     | 40.3  | 55            | 45          | Residential           |
| 6     | Arani               | N6            | 5.97                                 | SSE               | 52.6                     | 41.5  | 55            | 45          | Residential           |
| 7     | Rajulakandigai      | N7            | 0.46                                 | W                 | 51.1                     | 42.7  | 55            | 45          | Residential           |
| 8     | Near Tidir Nagar    | N8            | 1.46                                 | NNW               | 50.4                     | 40.9  | 55            | 45          | Residential           |

**3.7.2 Interpretations of Results:**

The observations of day equivalent and night equivalent noise levels at all locations are given below.

- In Industrial areas daytime noise levels varied from 54.9 dB(A) to 55.3 dB(A) and nighttime noise levels varied from 44.2 dB(A) to 45.2 dB(A), which is within prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Nighttime).
- In residential areas daytime noise levels varied from 50.1 dB (A) to 52.6 dB(A) and nighttime noise levels varied from 40.3 dB(A) to 42.7 dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise levels are well within the prescribed limit by CPCB (55 dB (A) Day time & 45 dB(A) Nighttime).

The Noise levels recorded during the daytime (6:00 a.m to 10:00 p.m) and night-time (10:00 p.m to 6:00 a.m) at all stations are within the CPCB limits.



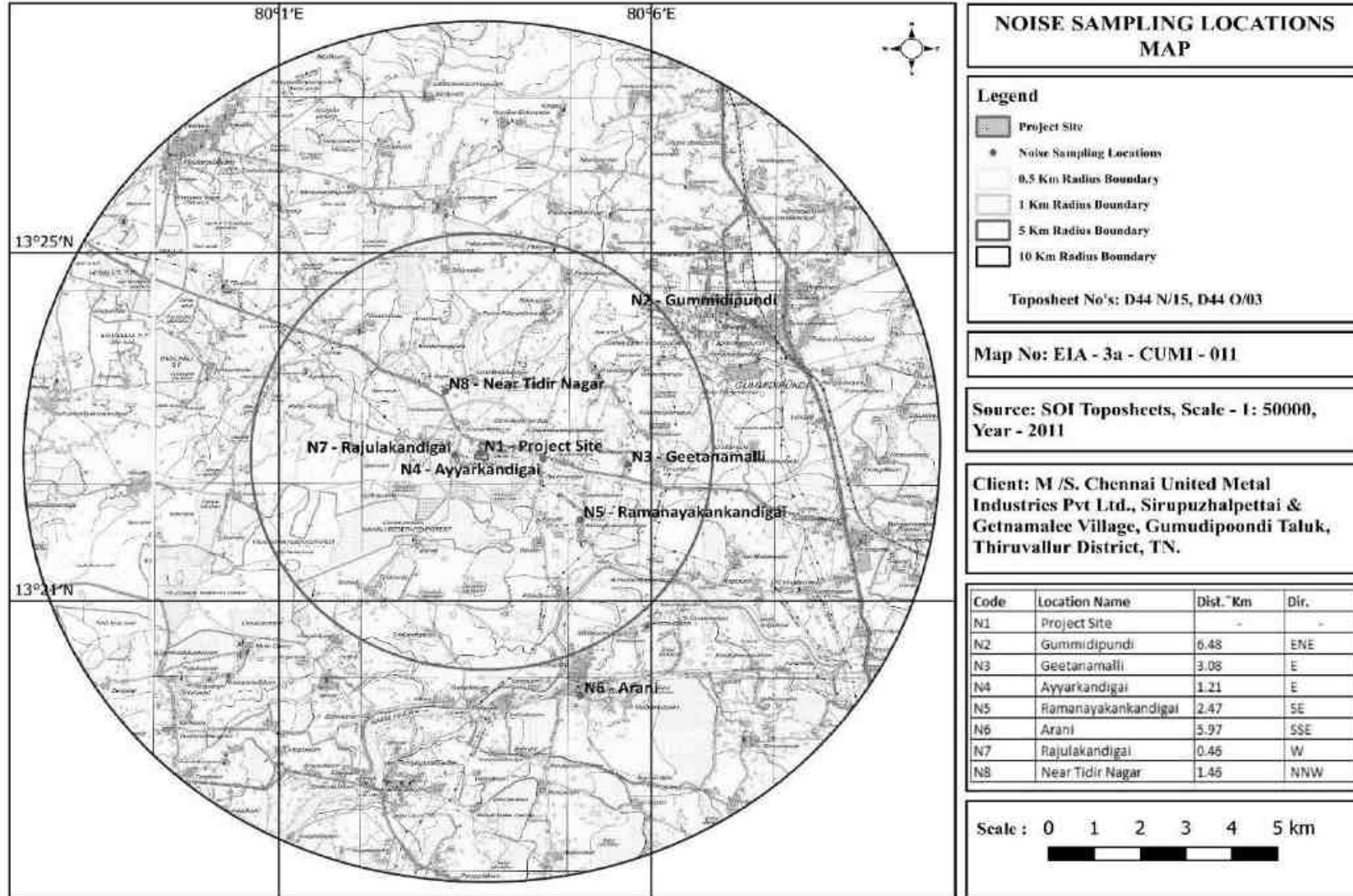


Figure 3-15 Noise Monitoring locations

## 3.8 Water Environment

### 3.8.1 Surface Water Resources of PIA district

The district is part of the composite east flowing river basin having ArniarKorattaliar and Cooum sub basins. Araniyar, Korattalayar, Cooum, Nagari and Nandhi are the important rivers. The drainage pattern, in general, is dendritic. All the rivers are seasonal and carry substantial flows during monsoon period. Korattaliar river water is supplied to Cholavaram and Red Hill tanks by constructing an Anicut at Vellore Tambarambakkam. After filling a few tanks on its further course, the river empties into the Ennore creek a few kilometers north of Chennai. The Cooum River, flowing across the southern part of the district, has its origin in the surplus waters of the Cooum tank in Tiruvallur taluk and also receives the surplus waters of a number of tanks. It feeds the Chembarambakkam tank through a channel. It finally drains into the Bay of Bengal.

**Source:** [http://cgwb.gov.in/District\\_Profile/TamilNadu/TIRUVALLUR.pdf](http://cgwb.gov.in/District_Profile/TamilNadu/TIRUVALLUR.pdf)

### 3.8.2 Surface Water Quality Assessment

To establish the baseline status of water environment, the representative sampling locations for surface water within a radial distance of 10 Km from project site have been selected as per CPCB guidelines of Water Quality Monitoring through an adequate survey of the project area. Test methods used for the analysis of water quality parameters is given in **Table 3-10**.

**Table 3-10 Test methods used for the analysis of water quality parameters.**

| S. No | Parameter Measured                  | Test Method  |
|-------|-------------------------------------|--|
| 1     | Turbidity                           | APHA 23rd Edition 2017 /2130B/P 2-9 Nephelometric Method/ IS 3025(Part 10): 1984 RA                                |
| 2     | Color                               | APHA 23rd Edition 2017 2120B /P2-2 Visual Comparison Method / IS 3025(Part 4): 1983 RA                             |
| 3     | pH                                  | APHA 23rd Edition 2017 4500 H+ / P 4-90 Electrometric Method/IS 3025(Part 11): RA                                  |
| 4     | Conductivity                        | APHA 23rd Edition 2017/ 2510 B /P 2 – 47 Electrometric Method/IS3025(Part 14): 2013 RA                             |
| 5     | Total Dissolve Solids               | APHA (23rd Edition) 2017/ 2540 C / P 2-58 Gravimetric Method/IS 3025 (part 16) :1984 RA                            |
| 6     | Total Suspended Solids              | APHA 23rd Edition 2017/ 2540 D /2 -58 / IS 3025(Part 17) : 1984 (RA 2012) Gravimetric Method                       |
| 7     | Alkalinity as CaCO <sub>3</sub>     | APHA 23rd Edition 2017/2320 B / P 2 – 27 Titrimetric Method/IS3025(Part 23) : 1986 RA                              |
| 8     | Total Hardness as CaCo <sub>3</sub> | APHA 23rd Edition 2017 /2340 C / P 2 – 37 EDTA Titrimetric Method/IS 3025(Part 21): 2009 RA                        |
| 9     | Sodium                              | APHA 23 <sup>rd</sup> Edition 2017/ 3500 Na B / P 3-98 Flame Emission Photometric Method/IS 3025(Part 45): 1993 RA |
| 10    | Potassium                           | APHA 23 <sup>rd</sup> Edition 2017/ 3500 K B / P 3-98 Flame Emission Photometric Method/IS 3025(Part 45): 1993 RA  |
| 11    | Calcium as Ca                       | APHA 23 <sup>rd</sup> Edition 2017 3500 Ca B /P 3-65 Calculation Method /IS 3025(Part 40): 1991 RA                 |

| S. No | Parameter Measured                  | Test Method  |
|-------|-------------------------------------|--|
| 12    | Magnesium as Mg                     | IS 3025(Part 46): RA /APHA 23rd Edition 2017 2340 C / P 3-84 Calculation Method  |
| 13    | Chloride                            | IS 3025(Part 32): 1988 / APHA 23rd Edition 2017 4500 Cl-B / P 4-70 Argenometric Method                                     |
| 14    | Sulphate SO4                        | APHA 23 <sup>rd</sup> Edition 2017 4500 SO42- E / P 4-188 Turbidity Method/IS 3025(Part 24): 1986 RA                       |
| 15    | Nitrate as NO3                      | APHA 23 <sup>rd</sup> Edition 2017 4500 NO3 B Ultraviolet Spectro Photometric Screening Method                             |
| 16    | Phosphate                           | IS 3025 Part 31: 1988 Chapter-12   |
| 17    | Fluorides as F                      | APHA23 <sup>rd</sup> Edition F-D: 2017   |
| 18    | Cyanide                             | APHA 23 <sup>rd</sup> Edition 2017 4500- CN- E/ P 4-42 Calorimetric Method   |
| 19    | Arsenic                             | APHA 23 <sup>rd</sup> Edition 2017 3500- As / P 3-61 Silver Diethyldithiocarbamate Method                                  |
| 20    | Boron                               | APHA 23 <sup>rd</sup> Edition 2017 :4500 BB/P4-23  |
| 21    | Cadmium                             | IS 3025 (Part - 41)1991  |
| 22    | Total Chromium                      | IS 3025(Part 52) RA / APHA 23rd Edition 2017/3500 Cr / P 3- 67 1,5Diphenylcarbazide Method                                 |
| 23    | Copper                              | APHA 23 <sup>rd</sup> Edition 2017 3500 Cu B/P 3-72 Atomic Absorption Spectrometric Method / IS 3025(Part 42): 1992 RA     |
| 24    | Iron                                | APHA 23 <sup>rd</sup> Edition 2017 3500 Fe- B/ P 3-77 1,10 Phenanthroline Method /IS 3025(Part 53): 2003 RA                |
| 25    | Lead                                | APHA 23 <sup>rd</sup> Edition 2017 3500 Pb B / P 3 -80 Atomic Absorption Spectrometric Method / IS 3025(Part 47): 1994 RA  |
| 26    | Manganese                           | IS 3025(Part 46): RA /APHA 23 <sup>rd</sup> Edition 2017 2340 C / P 3-84 Calculation Method                                |
| 27    | Mercury                             | IS 3025 (Part48):1994 RA 1999  |
| 28    | Nickel                              | IS 3025:(Part-54):2003(Reaff 2009)   |
| 29    | Selenium                            | IS 3025 Part (56)2003  |
| 30    | Zinc                                | APHA 22 <sup>nd</sup> Edition 2017/ 3500 Zn B / P 3 – 106 Atomic Absorption Spectrometric Method/IS 3025(Part 49): 1994 RA |
| 31    | Dissolved Oxygen                    | IS:3025 (Part - 38)1989 (Reaff 2009)   |
| 32    | BOD at 27 <sup>o</sup> C for 3 days | IS:3025 (Part – 58): 2006  |
| 33    | COD                                 | IS:3025 (Part – 44): 1993  |

**Classification of Surface Standard- IS 2296:**

Class A – Drinking water without conventional treatment but after disinfection.

Class B – Water for outdoor bathing.

Class C – Drinking water with conventional treatment followed by disinfection.

Class D – Water for fish culture and wildlife propagation.

Class E – Water for irrigation, industrial cooling, and controlled waste disposal

The prevailing status of surface water quality has been assessed during the study period. Surface water sampling Locations and Its results are given in **Table 3-11** and **Table 3-12** respectively.

**Table 3-11 Details of Surface water sampling locations**

| <b>S. No</b> | <b>Water bodies</b>    | <b>Location Code</b> | <b>Distance from project boundary (~Km)</b> | <b>Direction from project boundary</b> |
|--------------|------------------------|----------------------|---|--|
| 1            | Arani River d/s        | SW1                  | 4.68  | SE                                     |
| 2            | Chinnamedu Lake        | SW2                  | 8.36  | SSE                                    |
| 3            | Arani River u/s        | SW3                  | 4.49  | SSE                                    |
| 4            | Lake near siyenjeri    | SW4                  | 7.03  | S                                      |
| 5            | Lake near Manali       | SW5                  | 2.8   | SSW                                    |
| 6            | Lake near Mettu colony | SW6                  | 6.88  | SW                                     |
| 7            | Pond near Project site | SW7                  | 0.02  | W                                      |
| 8            | Lake near Pettai       | SW8                  | 3.17  | NW                                     |

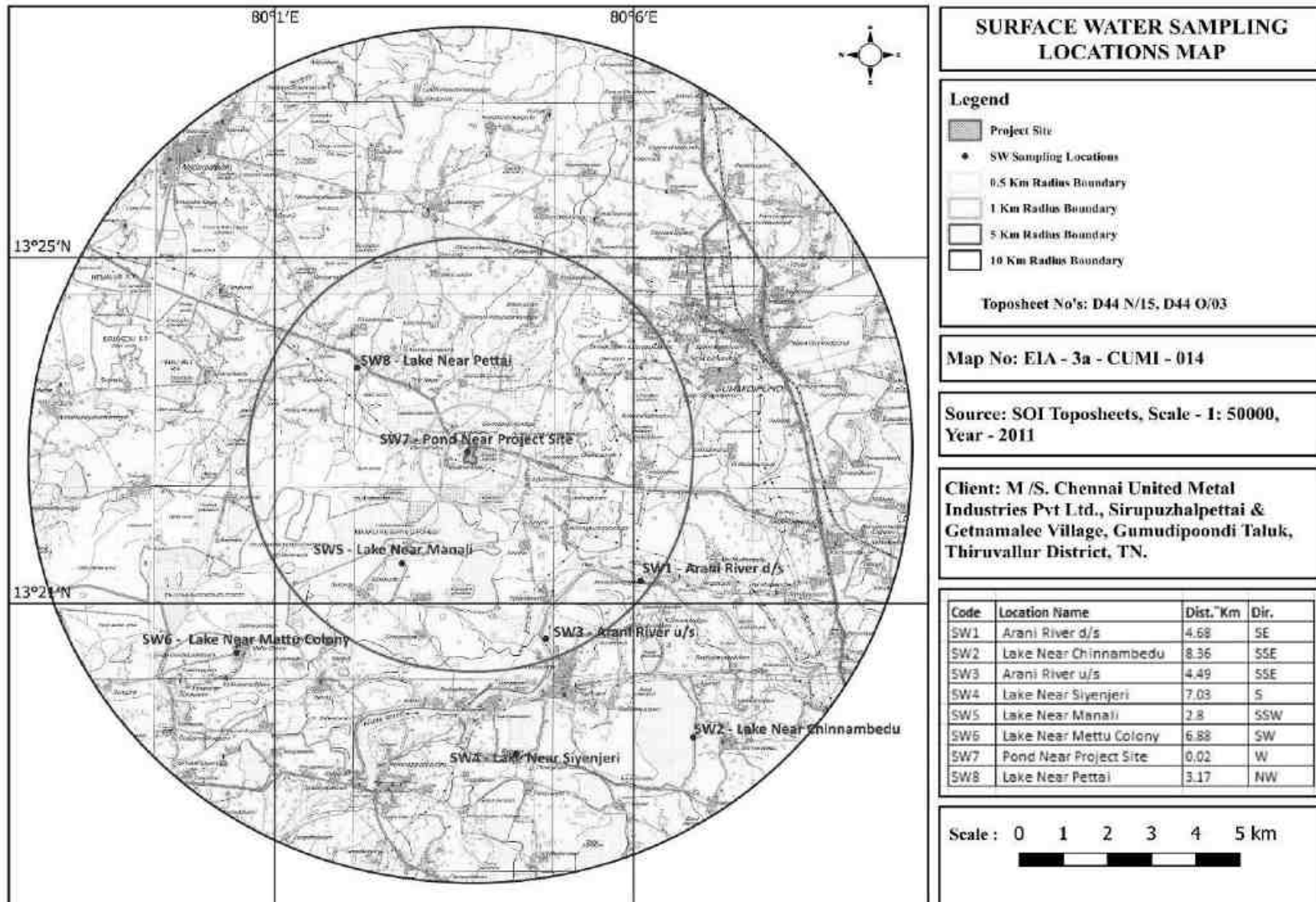


Figure 3-16 Surface water monitoring locations map

**Table 3-12 Surface water Monitoring Results**

| S. No | Parameter             | Unit  | Surface water Standard (IS 2296 Class-A) | Arani River d/s | Chinnambedu Lake | Arani River u/s | Lake Near siyenjeri | Lake Near Manali | Lake near Mettu colony | Pond near Project site | Lake near Pettai |
|-------|-----------------------|-------|--|-----------------|------------------|-----------------|---------------------|------------------|------------------------|------------------------|------------------|
|       |                       |       |  | SW1             | SW2              | SW3             | SW4                 | SW5              | SW6                    | SW7                    | SW8              |
| 1     | pH                    | -     | 6.5-8.5                                  | 7.52            | 6.94             | 7.22            | 7.09                | 7.58             | 7.64                   | 7.19                   | 7.75             |
| 2     | EC                    | µS/cm | -  | 948             | 583              | 912             | 806                 | 846              | 715                    | 625                    | 824              |
| 3     | Total Dissolve Solids | mg/l  | 500                                      | 587             | 402              | 549             | 489                 | 571              | 432                    | 408                    | 534              |
| 4     | Total Alkalinity      | mg/l  | -  | 164.8           | 101.6            | 162.3           | 112.3               | 141.8            | 130.3                  | 124.6                  | 201.6            |
| 5     | Total Hardness        | mg/l  | 200                                      | 247.5           | 172.7            | 232.0           | 237.3               | 295.7            | 203.9                  | 182.9                  | 277.1            |
| 6     | Sodium                | mg/l  | -  | 62.4            | 34.2             | 41              | 40.3                | 52.7             | 29.4                   | 31.5                   | 49.8             |
| 7     | Potassium             | mg/l  | -  | 14.9            | 9.7              | 24.3            | 21.5                | 20.1             | 11.2                   | 10.4                   | 10.2             |
| 8     | Calcium ++            | mg/l  | -  | 71.2            | 48.5             | 52.3            | 64.3                | 81.4             | 34.8                   | 44.2                   | 72.8             |
| 9     | Magnesium ++          | mg/l  | -  | 16.9            | 12.5             | 24.6            | 18.6                | 22.4             | 28.4                   | 17.6                   | 23.1             |
| 10    | Chloride              | mg/l  | 250                                      | 124.9           | 94.6             | 116.5           | 104.8               | 134.7            | 86.4                   | 82.7                   | 69.5             |
| 11    | Sulphate              | mg/l  | 400                                      | 92.4            | 76.4             | 89.2            | 97.8                | 82.5             | 77.5                   | 66.4                   | 58.6             |
| 12    | Nitrate as NO3        | mg/l  | 20                                       | 3.2             | 2.4              | 2.9             | 4.3                 | 3.8              | 5.1                    | 2.8                    | 4.4              |
| 13    | Fluorides as F        | mg/l  | 1.5                                      | 0.26            | 0.38             | 0.19            | 0.25                | 0.37             | 0.22                   | 0.28                   | 0.43             |
| 14    | Cyanide               | mg/l  | 0.05                                     | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 15    | Arsenic               | mg/l  | 0.05                                     | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 15    | Boron                 | mg/l  | -  | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 17    | Cadmium               | mg/l  | 0.01                                     | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 18    | Chromium, Total       | mg/l  | 0.05                                     | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 19    | Copper                | mg/l  | 1.5                                      | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 20    | Lead                  | mg/l  | 0.1                                      | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |
| 21    | Manganese             | mg/l  | 0.5                                      | BDL             | BDL              | BDL             | BDL                 | BDL              | BDL                    | BDL                    | BDL              |

|    |                  |      |       |      |      |      |      |      |      |      |      |
|----|------------------|------|-------|------|------|------|------|------|------|------|------|
| 22 | Mercury          | mg/l | 0.001 | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  |
| 23 | Nickel           | mg/l | -     | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  |
| 24 | Selenium         | mg/l | 0.01  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  |
| 25 | Zinc             | mg/l | 15    | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  | BDL  |
| 26 | Dissolved Oxygen | mg/l | 6     | 5.8  | 4.8  | 5.5  | 4.4  | 5.2  | 5.7  | 5.3  | 5.1  |
| 27 | COD              | mg/l | -     | 24.3 | 38.1 | 32.5 | 39.2 | 29.4 | 19.7 | 22.5 | 20.6 |
| 28 | BOD              | mg/l | 2     | 9.1  | 13.4 | 10.3 | 18.7 | 12.7 | 6.9  | 10.6 | 13.9 |

**Note:** BDL - Below Detectable Limit

### Interpretations of Results:

The surface water results were compared with IS 2296:1992 standard and in respect of CPCB water Quality Criteria for designated best use. Based on comparison study of test results with Surface water Quantity Standards (Is 2296 Class A), it is interpreted that water qualities of studied locations are classified under Class E, which can be used for irrigation industrial cooling, and controlled waste disposal.

- The pH value ranges from 6.94 to 7.75 and within the limits (6.5 – 8.5) of IS 2296:1992.
- The Electrical Conductivity (EC) of the collected surface water ranges from 583  $\mu\text{S/cm}$  to 948  $\mu\text{S/cm}$ .
- The chloride content in the collected surface water ranges from 69.5 mg/l to 134.7 mg/l.
- The sulphate content in the collected surface water sample ranges from 58.6 mg/l to 97.8 mg/l.
- COD of the collected surface water sample ranges from 19.7 mg/l to 39.2 mg/l.
- BOD of the collected surface water sample ranges from 6.9 mg/l to 18.7 mg/l.

### 3.8.3 Ground Water Quality

Total **Eight (08)** ground water monitoring locations were identified for assessment in different villages around the project site. The groundwater results are compared with the acceptable and permissible water quality standards as per IS: 10500 (2012) for drinking water. Groundwater quality monitoring locations and results are given in **Table 3-13** and **Table 3-14** respectively. A map showing the groundwater monitoring locations is given in **Figure 3-17**.

**Table 3-13 Details of Groundwater Quality Monitoring Locations**

| Station Code | Location Name       | Distance (~km) from Project boundary | Azimuth Directions |
|--------------|---------------------|--------------------------------------|--------------------|
| GW1          | Project Site        | -                                    |                    |
| GW2          | Gummidipundi        | 6.48                                 | ENE                |
| GW3          | Geetanamalli        | 3.08                                 | E                  |
| GW4          | Ayyarkandigai       | 1.21                                 | E                  |
| GW5          | Ramanayakankandigai | 2.47                                 | SE                 |
| GW6          | Arani               | 5.97                                 | SSE                |
| GW7          | Rajulakandigai      | 0.46                                 | W                  |
| GW8          | Near Tidir Nagar    | 1.46                                 | NNW                |



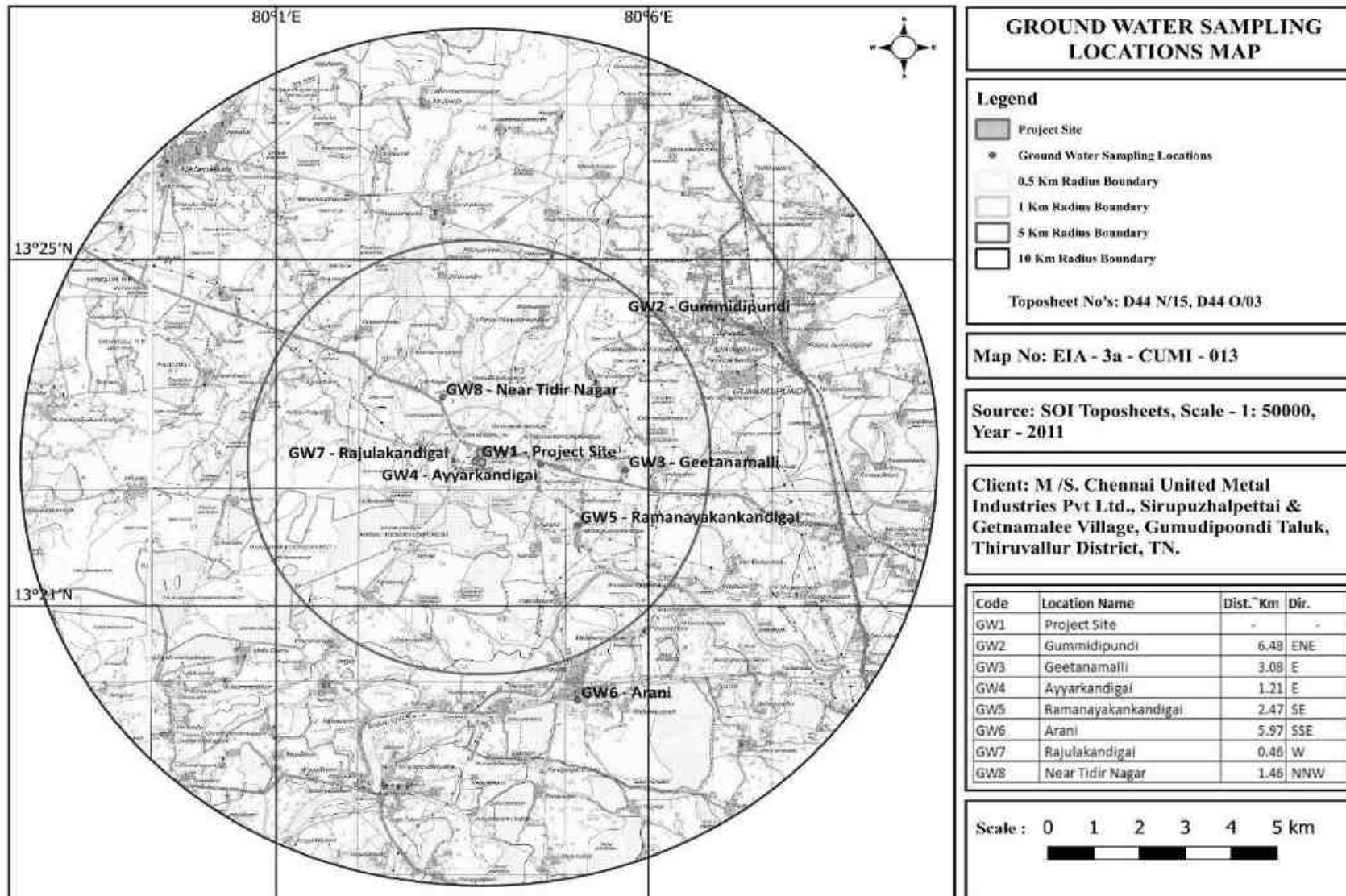


Figure 3-17 Groundwater monitoring locations map

**Table 3-14 Ground Water Monitoring Results**

| S. No | Parameters                          | Unit  | Drinking water Standard (IS 10500: 2012) Permissible Limit | Drinking water Standard (IS 10500: 2012) Acceptable Limit | Project Site | Gummidi pundi | Geetan amalli | Ayyarkandigai | Ramanay akankandigai | Arani | Rajulakandigai | Near Tidir Nagar |
|-------|-------------------------------------|-------|--|---|--------------|---------------|---------------|---------------|----------------------|-------|----------------|------------------|
|       |                                     |       |  |   | GW1          | GW2           | GW3           | GW6           | GW8                  | GW4   | GW5            | GW7              |
| 1     | Colour                              | Hazen | 15   | 5   | BDL          | BDL           | BDL           | BDL           | BDL                  | BDL   | BDL            | BDL              |
| 2     | Turbidity                           | NTU   | -  | 1   | BDL          | BDL           | BDL           | BDL           | BDL                  | BDL   | BDL            | BDL              |
| 3     | pH                                  | -     | No relaxation  | 6.5-8.5   | 7.26         | 7.09          | 7.94          | 6.9           | 7.56                 | 7.4   | 7.22           | 7.39             |
| 4     | EC                                  | µS/cm | -  | -   | 1276         | 1429          | 1411          | 1648          | 1724                 | 1889  | 1009           | 1792             |
| 5     | Total Dissolve Solids               | mg/l  | 2000   | 500   | 836          | 959           | 937           | 1118          | 1131                 | 1286  | 676            | 1189             |
| 6     | Total Suspended Solids              | -     | -  | -   | BDL          | BDL           | BDL           | BDL           | BDL                  | BDL   | BDL            | BDL              |
| 7     | Alkalinity as CaCO <sub>3</sub>     | mg/l  | 600  | 200   | 197.5        | 210.7         | 249.2         | 232.8         | 249.2                | 254.9 | 162.3          | 257.4            |
| 8     | Total Hardness as CaCO <sub>3</sub> | mg/l  | 600  | 200   | 355.1        | 463.9         | 391.1         | 530.1         | 478.6                | 546.4 | 296.8          | 488.6            |
| 9     | Sodium                              | mg/l  | -  | -   | 86.4         | 118.2         | 99.4          | 127.6         | 108.3                | 211.4 | 76.4           | 186.4            |
| 10    | Potassium                           | mg/l  | -  | -   | 5.9          | 7.4           | 4.2           | 9.4           | 4.9                  | 5.1   | 2.9            | 6.9              |
| 11    | Calcium as Ca                       | mg/l  | 200  | 75  | 104.5        | 129           | 116           | 147           | 129.4                | 152.4 | 86.3           | 137.5            |

|    |                 |      |      |       |      |       |      |       |       |       |       |       |
|----|-----------------|------|------|-------|------|-------|------|-------|-------|-------|-------|-------|
| 12 | Magnesium as Mg | mg/l | 100  | 30    | 22.8 | 34.6  | 24.7 | 39.4  | 37.7  | 40.2  | 19.7  | 35.2  |
| 13 | Chloride        | mg/l | 1000 | 250   | 197  | 219   | 209  | 276.3 | 288.4 | 306.4 | 156.4 | 276.3 |
| 14 | Sulphate SO4    | mg/l | 400  | 200   | 97.3 | 104.8 | 89.6 | 127.6 | 154.2 | 140.5 | 70.3  | 124.5 |
| 15 | Nitrate as NO3  | mg/l | -    | 45    | 5.50 | 4.30  | 7.30 | 9.10  | 5.20  | 7.70  | 3.40  | 4.80  |
| 16 | Fluorides as F  |      | 1.5  | 1     | 0.43 | 0.52  | 0.27 | 0.33  | 0.24  | 0.29  | 0.38  | 0.46  |
| 17 | Cyanide         | mg/l | -    | 0.05  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 18 | Arsenic         | mg/l | 0.05 | 0.01  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 19 | Boron           | mg/l | -    | 0.5   | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 20 | Cadmium         | mg/l | -    | 0.003 | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 21 | Chromium, Total | mg/l | -    | 0.05  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 22 | Copper          | mg/l | 1.5  | 0.05  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 23 | Lead            | mg/l | -    | 0.01  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 24 | Manganese       | mg/l | -    | 0.1   | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 25 | Mercury         | mg/l | -    | 0.001 | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 26 | Nickel          | mg/l | -    | 0.02  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 27 | Selenium        | mg/l | -    | 0.01  | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |
| 28 | Zinc            | mg/l | 15   | 5     | BDL  | BDL   | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   |

**Note:** BDL - Below Detectable Limit; NR-No Relaxation

### Interpretations of Results:

Physio-chemical characteristics of ground water samples collected from the selected villages during Pre-monsoon 2022. The Ground water results were compared with drinking water standards (IS 10500:2012).

- The ground water results of the study area indicate that the pH range varies between 6.9 and 7.94. It is observed that the pH range is within the limit of IS 10500:2012.
- The Total Dissolved Solids range is varied between 676 mg/l – 1286 mg/l for the ground water. All the samples are well within the permissible limit of IS 10500: 2012.
- The acceptable limit of the chloride content is 250 mg/l and permissible limit is 1000 mg/l. The chloride content in the ground water for study area ranges between 156.4 mg/l – 306.4 mg/l. It is observed that all are well within the permissible limit of IS 10500:2012.
- The desirable limit of the sulphate content is 200 mg/l and permissible limit is 400 mg/l. The sulphate content of the ground water of the study area varies between 70.3 mg/l – 154.2 mg/l. It is observed that all the samples are within the permissible limit of IS 10500: 2012.

Based on comparison study of test results with drinking water standard, it is interpreted that water qualities of studied locations meet with the drinking water standards as per IS 10500: 2012. These interpretations relate to the sample tested for location only. To prevent ground water contamination and improving the quality and Quantity, rainwater harvesting, and groundwater recharging may be helpful.

### 3.9 Soil quality

Eight locations in and around the proposed project were selected for soil sampling. At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm, and 90 cm below the surface. Soil analysis was carried out as per IS: 2720 methods. The methodology adopted for each parameter is described in **Table 3-15**. Soil quality monitoring locations & results are given in

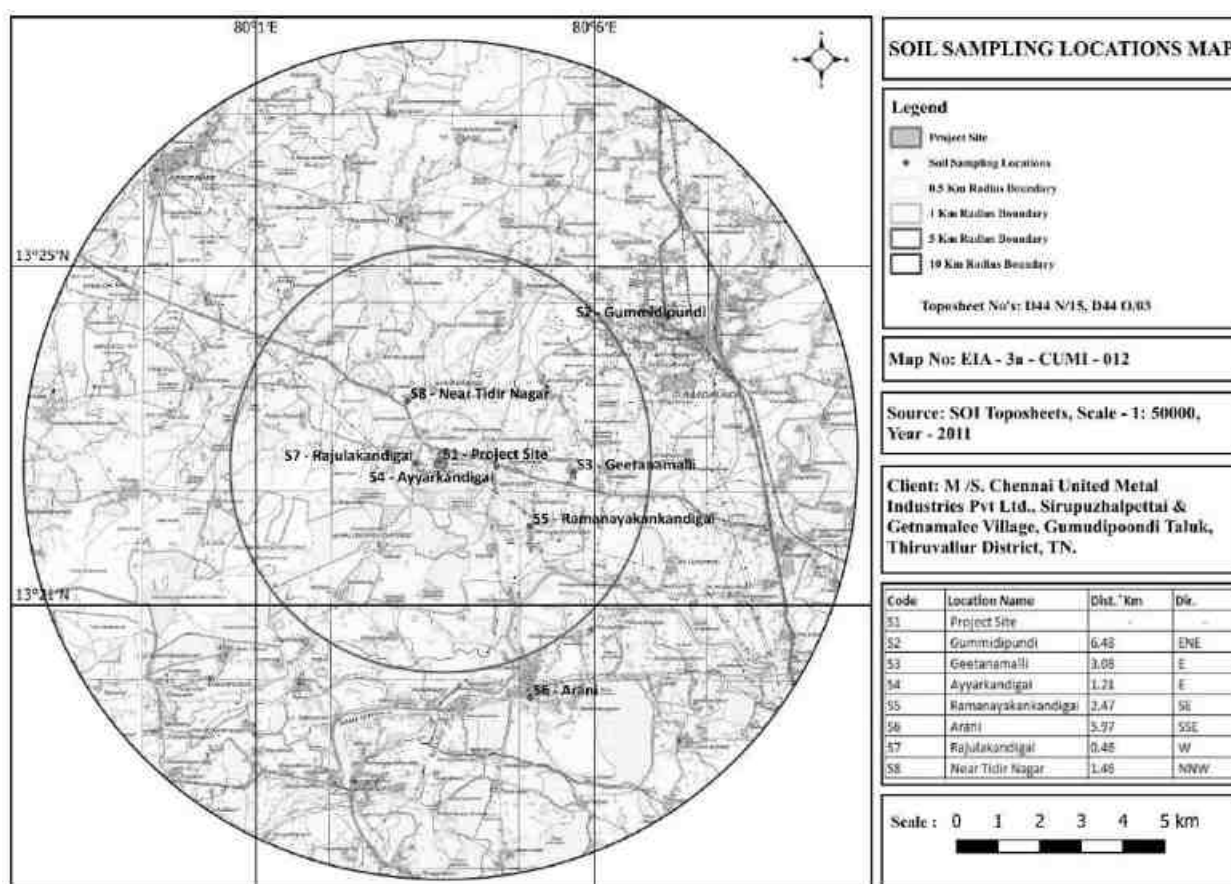
**Table 3-16** and **Table 3-17**. Map showing the soil monitoring locations is given in **Figure 3-18**.

**Table 3-15 Test methods used for the analysis of Soil.**

| S. No | Parameter Measured             | Test Method                  |
|-------|--------------------------------|------------------------------|
| 1     | pH @ 25°C                      | IS 2720 (Part 26): 1987      |
| 2     | Electrical conductivity        | IS 14767: 2000               |
| 3     | Nitrogen as N                  | IS 14684: 1999 / FAO 2007 RA |
| 4     | Phosphorus                     | IS 14684: 1999 RA            |
| 5     | Potassium                      | FAO-UN 2007 RA               |
| 6     | Organic Carbon/ Organic Matter | IS 2720 (Part 22): 1972      |

**Table 3-16 Soil & Sediment Quality Monitoring Locations**

| Location Code | Location            | Distance (Km) w.r.t project site | Direction w.r.t. project site |
|---------------|---------------------|----------------------------------|-------------------------------|
| S1            | Project Site        | -                                |                               |
| S2            | Gummidipundi        | 6.48                             | ENE                           |
| S3            | Geetanamalli        | 3.08                             | E                             |
| S4            | Ayyarkandigai       | 1.21                             | E                             |
| S5            | Ramanayakankandigai | 2.47                             | SE                            |
| S6            | Arani               | 5.97                             | SSE                           |
| S7            | Rajulakandigai      | 0.46                             | W                             |
| S8            | Near Tidir Nagar    | 1.46                             | NNW                           |



**Figure 3-18 Soil monitoring locations map**

**Table 3-17 Soil & Sediment Quality Monitoring Results**

| S. No | Parameters              | Units    | Project Site | Gummidipundi | Geetana malli | Ayyarkan digai  | Ramanayakan kandigai | Arani      | Rajulakan digai | Near Tidir Nagar |
|-------|-------------------------|----------|--------------|--------------|---------------|-----------------|----------------------|------------|-----------------|------------------|
|       |                         |          | S1           | S2           | S3            | S4              | S5                   | S6         | S7              | S8               |
| 1     | Soil Texture            | -        | Sandy Loam   | Loam         | Sandy Loam    | Sandy clay loam | Sandy loam           | Sandy loam | Loam            | Sandy clay loam  |
| 2     | Sand                    | %        | 44.0         | 34.0         | 59.0          | 48.0            | 39.0                 | 51.0       | 54.00           | 43.0             |
| 3     | Silt                    | %        | 34.0         | 40.0         | 31.0          | 30.0            | 37.0                 | 30.0       | 28.00           | 40.0             |
| 4     | Clay                    | %        | 22.0         | 26.0         | 10.0          | 22.0            | 24.0                 | 19.0       | 18.00           | 17.0             |
| 5     | pH                      |          | 7.34         | 7.79         | 8.1           | 7.84            | 7.06                 | 7.66       | 7.49            | 7.92             |
| 6     | Electrical conductivity | umhos/cm | 186          | 157          | 162           | 144             | 129                  | 137        | 172             | 161              |
| 7     | Organic Carbon          | %        | 0.660        | 0.720        | 0.620         | 0.640           | 0.610                | 0.740      | 0.610           | 0.630            |
| 8     | Organic matter          | %        | 1.138        | 1.241        | 1.069         | 1.103           | 1.052                | 1.276      | 1.052           | 1.086            |
| 9     | Nitrogen as N           | kg/ha    | 217          | 294          | 314           | 228             | 249                  | 283        | 319             | 276              |
| 10    | Phosphorus              | kg/ha    | 82.0         | 64.0         | 73.0          | 94.0            | 45.0                 | 63.0       | 49.0            | 67.0             |
| 11    | Potassium               | kg/ha    | 91           | 104          | 94            | 83              | 76                   | 94         | 82              | 75               |

**Table 3-18 Standard Soil Classification as per Handbook of Agriculture**

| S. No | Parameter/Test   | Classification  |
|-------|--|---|
| 1     | PH   | <4.5 Extremely acidic<br>4.51- 5.00 Very strongly acidic<br>5.01-6.00 moderately acidic<br>6.01-6.50 slightly acidic<br>6.51-7.30 Neutral<br>7.31-7.80 slightly alkaline<br>7.81-8.50 moderately alkaline<br>8.51-9.0 strongly alkaline<br>>9.01 very strongly alkaline |
| 2     | Salinity Electrical Conductivity ( $\mu\text{S}/\text{cm}$ ) (1ppm = 640 $\mu\text{S}/\text{cm}$ ) | Upto 1.00 Average<br>1.01-2.00 harmful to germination<br>2.01-3.00 harmful to crops (sensitive to salts)  |
| 3     | Nitrogen (kg/ha)   | Upto 50 very less<br>51-100 less<br>101-150 good<br>151-300 Better<br>>300 sufficient   |
| 4     | Phosphorus (kg/ha)   | Upto 15 very less<br>16-30 less<br>31-50 medium<br>51-65 on an average sufficient<br>66-80 Sufficient<br>>80 more than sufficient   |
| 5     | Potassium (kg/ha)  | 0 -120 very less<br>120-180 less<br>181-240 medium<br>241-300 average<br>301-360 better<br>>360 more than sufficient  |

## Interpretations of Results:

### Summary of analytical results

- The pH of the soil samples ranged from 7.06 to 8.1. Indicating that the soils are slightly neutral to moderately alkaline in nature.
- Conductivity of the soil samples ranged from 129 mmhos/cm to 186 mmhos/cm.
- Nitrogen content ranged from 217 kg/ha to 319 kg/ha, and it is good and sufficient in nature.
- Phosphorous ranged from 45 kg/ha to 94 kg/ha. These ranges are classified as average sufficient and few areas more than sufficient.
- Potassium content ranges from 75 kg/ha to 104 kg/ha. The ranges are classified as very less of Pottasium content.

## 3.10 Biological Environment

Biodiversity encompasses the variety and variability of life on Earth. It refers to the differences between and between all living organisms at their different levels of biological organization – genus, individuals, species, and ecosystems. Diversity depends not only on the rate of species input (by immigration and speciation), species output (emigration and extinction) but also on the ecological history of the region. Terrestrial flora and fauna are important features of the environment. Each plant and animal in the world bring something to the environment that another plant or animal including man will rely on. This creates a balance of life that enables the life cycle to survive. The flora and fauna are imperative because they form the fine net of life, where each life has something to contribute even if in a very small way.

### 3.10.1 Flora

To characterize vegetation of the study area, the primary data was collected and analyzed to describe the properties of vegetation with reference to species composition and structural attributes expressed. The identification of the flora in the radius of 10 km was done based on personal observations, management plan of Forest Division, authentic secondary literature, and in-depth exploration of the entire area. List of flora reported/observed during the study period are listed in **Table 3-19**. There are no rare and endangered species identified in the study area.



**Table 3-19 List of flora reported/observed in the study area.**

| S. No        | Botanical Name                        | Family Name   | Local Name (Tamil)   | IUCN Red List of Threatened Species |
|--------------|---------------------------------------|---------------|----------------------|-------------------------------------|
| <b>Trees</b> |                                       |               |                      |                                     |
| 1.           | <i>Acacia auriculoformis</i>          | Fabaceae.     | Kaththi Savukku      |                                     |
| 2.           | <i>Acacia nilotica</i>                | Fabaceae      | Karuvelamaram        | LC                                  |
| 3.           | <i>Albizia lebbek</i>                 | Fabaceae      | Siridam              | VU                                  |
| 4.           | <i>Alstonia scholaris</i>             | Apocynaceae   | Ezhilai pillai       | LC                                  |
| 5.           | <i>Annona squamosa</i>                | Annonaceae    | Sitapalam            | NA                                  |
| 6.           | <i>Azadirachta indica</i>             | Meliaceae     | Veppamaram           | NA                                  |
| 7.           | <i>Cocos nucifera</i>                 | Arecaceae     | Thennai              | NA                                  |
| 8.           | <i>Ficus religiosa</i>                | Moraceae      | Arasamaram           | NA                                  |
| 9.           | <i>Fluggea leucopyrus</i>             | Malvaceae     | Mulluppulatti        | NA                                  |
| 10.          | <i>Mangifera indica</i>               | Anacardiaceae | Mamaram              | DD                                  |
| 11.          | <i>Manilkara zapota (L.) P. Royen</i> | Sapotaceae    | Sappotta             | NA                                  |
| 12.          | <i>Prosopis juliflora</i>             | Fabaceae      | Seemai karuvel       | LC                                  |
| 13.          | <i>Psidium guajava L.</i>             | Myrtaceae     | Koiyya               | NA                                  |
| 14.          | <i>Spondias mangifera</i>             | Anacardiaceae | Pulicha kaai         | NA                                  |
| 15.          | <i>Syzygium cumini</i>                | Myrtaceae     | Navva Pazham         | NA                                  |
| 16.          | <i>Tamarindus indica</i>              | Legumes       | Puliyamaram          | NT                                  |
| 17.          | <i>Terminalia arjuna</i>              | Combretaceae  | Marudha maram        | EW                                  |
| 18.          | <i>Thespesia Populnea</i>             | Mallows       | Poovarasu            | NA                                  |
| 19.          | <i>Thevetia peruvannia</i>            | Apocynaceae   | Ponnarali            | NA                                  |
| 20.          | <i>Ziziphus mauritiana</i>            | Rhamnaceae    | Elenthai             | LC                                  |
| <b>Grass</b> |                                       |               |                      |                                     |
| 21.          | <i>Digitaria bicornis</i>             | Poaceae       | Menmaiyana kutai pul | DD                                  |
| 22.          | <i>Chloris montana</i>                | Poaceae       | -                    | LC                                  |
| 23.          | <i>Heteropogan contortus</i>          | Poaceae       | -                    | LC                                  |
| 24.          | <i>Saccharum officinarum</i>          | poaceae       | Karumpu              | LC                                  |
| <b>Herbs</b> |                                       |               |                      |                                     |
| 25.          | <i>Solanum trilobatum</i>             | Nightshade    | Thoodhuvalai         | NA                                  |
| 26.          | <i>Crotolaria verrucose</i>           | legume        | Salangaichedi        | DD                                  |
| 27.          | <i>Barringtonia acutangula</i>        | Lecythidaceae | Samudra Pazham       | LC                                  |
| 28.          | <i>Abutilon indicum</i>               | Mallows       | Thuthi               | CR                                  |
| 29.          | <i>Abrus precatorius</i>              | Legumes       | Kundumani            | DD                                  |
| 30.          | <i>Asparagus racemosus</i>            | Asparagaceae  | Thannir-vittan       | LC                                  |

(Note: LC-Least Concern, DD-Data deficient, CR-Critically Endangered, VU-Vulnerable, NA-Not yet assessed, EN- Endangered, NT-Near Threatened, EW- Extinct in the Wild)

### 3.10.2 Fauna

This area hosts common animals. Indian Dogs, Jungle and Domestic cat, Rhesus macaque, Domestic Cows, Buffaloes, Bullocks, and Goat etc. are found amongst mammals. Bande Kraits and other common snakes, and lizards like garden lizards are commonly found amongst reptiles. List of animals observed during the field survey are provided in **Table 3-20**.

**Table 3-20 List of Fauna observed in the study area.**

| S. No              | Botanical Name                        | Family Name                 | Common Name                 | IUCN Red List of Threatened Species |
|--------------------|---------------------------------------|-----------------------------|-----------------------------|-------------------------------------|
| <b>Amphibians</b>  |                                       |                             |                             |                                     |
| 1.                 | <i>Bufo melanostictus</i>             | <i>Bufo</i> idae            | Toad                        | LC                                  |
| 2.                 | <i>Hyla arborea</i>                   | <i>Hyla</i> idae            | Tree frog                   | LC                                  |
| 3.                 | <i>Rana cyanophlyctis</i>             | <i>Bufo</i> idae            | Frog                        | LC                                  |
| 4.                 | <i>Hoplobatrachus tigerinus</i>       | <i>Bufo</i> idae            | Bull Frog                   | LC                                  |
| 5.                 | <b><i>Rhacophorus bimaculatus</i></b> | <b><i>Rhacophoridae</i></b> | <b>Asiatic Tree Frog</b>    | <b>VU</b>                           |
| <b>Mammals</b>     |                                       |                             |                             |                                     |
| 6.                 | <i>Bandicota bengalensis</i>          | <i>Muridae</i>              | Sind Rice Rat               | LC                                  |
| 7.                 | <i>Cynopterus sphinx</i>              | <i>Megabat</i>              | Short-nosed Fruit Bat       | LC                                  |
| 8.                 | <i>Funambulus palmaram</i>            | <i>Sciuridae</i>            | Three striped palm Squirrel | LC                                  |
| 9.                 | <i>Herpestes edwardii</i>             | <i>Herpestidae</i>          | Indian Grey Mongoose        | LC                                  |
| 10.                | <i>Rattus norvegicus</i>              | <i>Muridae</i>              | Field mouse                 | LC                                  |
| <b>Reptiles</b>    |                                       |                             |                             |                                     |
| 11.                | <i>Bungarus fasciatus</i>             | <i>Elapidae</i>             | Banded Krait                | LC                                  |
| 12.                | <i>Calotes ellioti</i>                | <i>Agamidae</i>             | Elliot's Forest Lizard      | LC                                  |
| 13.                | <i>Chameleo zeylanicus</i>            | <i>Chamaeleonidae</i>       | Indian chameleon            | LC                                  |
| 14.                | <b><i>Eryx johnii</i></b>             | <i>Boidae</i>               | Indian sand boa             | LC                                  |
| 15.                | <b><i>Ophiophagus hannah</i></b>      | <b><i>Elapidae</i></b>      | <b>Indian Rattle snake</b>  | <b>VU</b>                           |
| <b>Butterflies</b> |                                       |                             |                             |                                     |
| 16.                | <i>Graphium agamemnos</i>             | <i>Papilionidae</i>         | Tailed jay                  | NA                                  |
| 17.                | <i>Hypolimnas bolina</i>              | <i>Nymphalidae</i>          | Great egg fly               | NA                                  |
| 18.                | <i>Junonia almanac</i>                | <i>Nymphalidae</i>          | Peacock pansy               | LC                                  |
| 19.                | <i>Pachliopta hector Lin.</i>         | <i>Papilionidae</i>         | Crimson rose                | NA                                  |
| 20.                | <i>Papilio demoleu</i>                | <i>Papilionidae</i>         | Lime butterfly              | NA                                  |
| <b>Birds</b>       |                                       |                             |                             |                                     |
| 21.                | <i>Ardea purpurea</i>                 | <i>Ardeidae</i>             | Purple Heron                | LC                                  |
| 22.                | <i>Alcedo atthis</i>                  | <i>Alcedinidae</i>          | Common Kingfisher           | LC                                  |
| 23.                | <i>Athene brama</i>                   | <i>Strigidae</i>            | Spotted Owlet               | LC                                  |
| 24.                | <i>Bubulcus ibis</i>                  | <i>Ardeidae</i>             | Cattle egret                | LC                                  |
| 25.                | <i>Centropus sinensis</i>             | <i>Cuculidae</i>            | Crow Pheasant               | LC                                  |
| 26.                | <i>Chloropsis aurifrons</i>           | <i>Chloropseidae</i>        | Golden-fronted Leafbird     | LC                                  |

| S. No | Botanical Name                    | Family Name               | Common Name                 | IUCN Red List of Threatened Species |
|-------|-----------------------------------|---------------------------|-----------------------------|-------------------------------------|
| 27.   | <i>Clamator jacobinus</i>         | <i>Cuculidae</i>          | Pied Crested Cuckoo         | LC                                  |
| 28.   | <i>Copsychus saularis</i>         | <i>Muscicapidae</i>       | Magpie robin                | LC                                  |
| 29.   | <i>Dicrurus paradiseus</i>        | <i>Dicruridae</i>         | Racket tailed drongo        | LC                                  |
| 30.   | <i>Dicrurus adsimilis</i>         | <i>Dicruridae</i>         | King Crow                   | LC                                  |
| 31.   | <i>Egretta garzetta</i>           | <i>Ardeidae</i>           | Little egret                | LC                                  |
| 32.   | <i>Elanus caeruleus</i>           | <i>Accipitridae</i>       | Kite                        | LC                                  |
| 33.   | <i>Francolinus pondicerianus</i>  | <i>Phasianidae</i>        | Grey Francolin              | LC                                  |
| 34.   | <i>Galerida cristata</i>          | <i>Alaudidae</i>          | Crested Lark                | LC                                  |
| 35.   | <i>Gallus sonneratii</i>          | <i>Phasianidae</i>        | Grey jungle fowl            | LC                                  |
| 36.   | <i>Motacilla maderaspatensis</i>  | <i>Motacillidae</i>       | Large, pied Wagtail         | LC                                  |
| 37.   | <i>Nectarinia asiatica</i>        | <i>Nectariniidae</i>      | Purple Sun Bird             | LC                                  |
| 38.   | <i>Pavo cristatus</i>             | <i>Phasianidae</i>        | Indian Peafowl              | LC                                  |
| 39.   | <b><i>Psittacula eupatria</i></b> | <b><i>Psittacidae</i></b> | <b>Alexandrine Parakeet</b> | <b>NT</b>                           |
| 40.   | <i>Psittacula krameri</i>         | <i>Psittacidae</i>        | Rose ringed Parakeet        | LC                                  |
| 41.   | <i>Pycnonotus cafer</i>           | <i>Pycnonotidae</i>       | Red vented Bulbul           | LC                                  |
| 42.   | <i>Spilornis cheela</i>           | <i>Accipitridae</i>       | Crested Serpent-eagle       | LC                                  |

(Note: LC-Least Concern, DD-Data deficient, CR-Critically Endangered, VU-Vulnerable, NE-Not Evaluated, NA-Not assessed, EN- Endangered, NT-Near Threatened, EW- Extinct in the Wild)  
Socio Economic Profile

### 3.11 Socio Economic Profile

#### 3.11.1 Demographic details

In 2011, Tiruvallur had population of 3,728,104 of which male and female were 1,876,062 and 1,852,042 respectively. In 2001 census, Tiruvallur had a population of 2,754,756 of which males were 1,397,407 and remaining 1,357,349 were females.

**Source:** <https://www.census2011.co.in/census/district/20-thiruvallur.html>

#### 3.11.2 Population Density

The initial provisional data released by census India 2011, shows that density of Tiruvallur district for 2011 is 1,098 people per sq. km. In 2001, Tiruvallur district density was at 776 people per sq. km. Tiruvallur district administers 3,394 square kilometers of area.

**Source:** <https://www.census2011.co.in/census/district/20-thiruvallur.html>

#### 3.11.3 Sex Ratio

The Sex Ratio in Tiruvallur, it stood at 987 per 1000 male compared to 2001 census figure of 971. The average national sex ratio in India is 940 as per latest reports of Census 2011

Directorate. In 2011 census, child sex ratio is 946 girls per 1000 boys compared to figure of 957 girls per 1000 boys of 2001 census data.

**Source:** <https://www.census2011.co.in/census/district/20-thiruvallur.html>

### 3.11.4 Scheduled Castes and Scheduled Tribes

Schedule Caste (SC) constitutes 22% while Schedule Tribe (ST) were 1.3% of total population in Tiruvallur district of Tamil Nadu.

**Source:** <https://www.censusindia.co.in/district/thiruvallur-district-tamil-nadu-602>

### 3.11.5 Socio Economic Aspects

A socio-economic study was undertaken in assessing aspects which are dealing with social and cultural conditions, and economic status in the study area. The study provides information such as demographic structure, population dynamics, infrastructure resources, and the status of human health and economic attributes like employment, per-capita income, agriculture, trade, and industrial development in the study area. The study of these characteristics helps in identification, prediction, and evaluation of impacts on socio-economic and parameters of human interest due to proposed project developments. Socio economic Indicators of Tiruvallur District is given in **Table 3-21**.

**Table 3-21 Social Indicators of Tiruvallur District**

| S. No | Social Indicators                          | Tiruvallur District |
|-------|--|---------------------|
| 1     | Decadal variation %                        | 23.1                |
| 2     | Urban population %                         | 54.5                |
| 3     | Population density (Persons per square Km) | 805                 |
| 4     | Scheduled caste population %               | 21.8                |
| 5     | Scheduled tribe population %               | 1.4                 |
| 6     | Literacy rate %                            | 76.9                |
| 7     | Work Participation rate %                  | 37.6                |

**Source:** *District Census Handbook, Thiruvallur, Part XII-A, Series-33*

### 3.11.6 Education & Literacy

Average literacy rate of Tiruvallur in 2011 were 84.03 compared to 84.03 of 2001. If things are looked out at gender wise, male, and female literacy were 89.69 and 78.32 respectively. For the 2001 census, the same figures stood at 85.26 and 68.39 in Tiruvallur District. Total literate in Tiruvallur District were 2,791,721 of which male and female were 1,495,711 and 1,296,010 respectively. In 2001, Tiruvallur District had 1,865,707 in its district.

**Source:** <https://www.census2011.co.in/census/district/20-thiruvallur.html>

The educational infrastructure in the Tiruvallur district is given in **Table 3-22**.

**Table 3-22 Education Infrastructures in the Tiruvallur district**

| S. No | Type of school          | Total schools |
|-------|-------------------------|---------------|
| 1     | Primary school          | 944           |
| 2     | Upper Primary school    | 263           |
| 3     | Higher Secondary school | 118           |

**Source:** <https://tiruvallur.nic.in/education/>

### **3.11.7 Social Economic Profile of the study area**

The total population of the project area is 104348. The area has 52500 male (50.13%) and 51848 female (49.69%) population. The percentage of Scheduled caste is 30.27 and Scheduled tribe population is 3.14%. The child population (0 to 6 years) is 11.05 % of the total population of the area. **Table 3-23** provides the details on population profile within study area. **Table 3-24** show the socio-economic indicator within the study area.

**Table 3-23 Population profile within study area**

| Name                  | Household | Population | Male | Female | Children below 6 | Scheduled Caste | Scheduled Tribe |
|-----------------------|-----------|------------|------|--------|------------------|-----------------|-----------------|
| <b>0-5 km</b>         |           |            |      |        |                  |                 |                 |
| Amirthamangalam       | 169       | 627        | 301  | 326    | 75               | 321             | 25              |
| Annappa Naickankuppam | 624       | 2424       | 1215 | 1209   | 277              | 1006            | 0               |
| Chinnapuliyur         | 76        | 291        | 143  | 148    | 34               | 16              | 0               |
| Chithoornatham        | 176       | 668        | 325  | 343    | 91               | 191             | 25              |
| Erukuvoy              | 198       | 711        | 363  | 348    | 102              | 321             | 19              |
| Getnamallee           | 383       | 1465       | 712  | 753    | 151              | 3               | 0               |
| Kanlur                | 208       | 858        | 430  | 428    | 135              | 193             | 87              |
| Kollanur              | 164       | 525        | 262  | 263    | 52               | 0               | 0               |
| Manali                | 88        | 311        | 166  | 145    | 35               | 118             | 0               |
| Palavakkam            | 219       | 800        | 418  | 382    | 93               | 544             | 30              |
| Panchalai             | 417       | 1505       | 738  | 767    | 161              | 540             | 4               |
| Periapuliyur          | 195       | 683        | 345  | 338    | 50               | 405             | 0               |
| Poovalambedu          | 268       | 1056       | 547  | 509    | 110              | 692             | 0               |
| Thandalacheri         | 417       | 1574       | 794  | 780    | 169              | 555             | 0               |
| Vaniamallee           | 416       | 1518       | 755  | 763    | 165              | 672             | 112             |
| <b>5-10km</b>         |           |            |      |        |                  |                 |                 |
| Authupakkam           | 746       | 2576       | 1275 | 1301   | 308              | 255             | 51              |
| Chinnaobulapuram      | 915       | 3412       | 1812 | 1600   | 354              | 1000            | 0               |
| Eguvarpalayam         | 1130      | 4052       | 2033 | 2019   | 465              | 1843            | 305             |
| Manellore             | 1203      | 4534       | 2174 | 2360   | 483              | 1568            | 381             |
| Nangapallam           | 83        | 321        | 158  | 163    | 38               | 155             | 0               |
| Narasingaparam        | 626       | 2460       | 1235 | 1225   | 264              | 1155            | 0               |
| Paleswarankandigai    | 1360      | 5039       | 2815 | 2224   | 596              | 387             | 18              |
| Peria obulapuram      | 733       | 2810       | 1406 | 1404   | 347              | 587             | 4               |

|                   |      |       |      |      |      |      |     |
|-------------------|------|-------|------|------|------|------|-----|
| Pondavakkam       | 746  | 2891  | 1449 | 1442 | 277  | 972  | 47  |
| Sanaputhur        | 750  | 2891  | 1473 | 1418 | 340  | 1794 | 166 |
| Sevittupanapakkam | 77   | 314   | 155  | 159  | 41   | 206  | 0   |
| Theruali          | 1640 | 6216  | 3118 | 3098 | 686  | 362  | 123 |
| Thurapallam       | 877  | 3371  | 1658 | 1713 | 410  | 72   | 7   |
| Vadakkunallur     | 222  | 823   | 385  | 438  | 81   | 276  | 0   |
| Verkadu           | 227  | 794   | 423  | 371  | 96   | 9    | 4   |
| Nelvoy            | 476  | 1632  | 816  | 816  | 155  | 335  | 0   |
| Paleswaram        | 67   | 250   | 120  | 130  | 21   | 0    | 0   |
| Venkuzhi          | 13   | 45    | 22   | 23   | 6    | 9    | 1   |
| Sepedu            | 61   | 231   | 113  | 118  | 23   | 205  | 0   |
| Pudupalayam       | 200  | 741   | 352  | 389  | 86   | 130  | 0   |
| Madhavaram        | 205  | 788   | 394  | 394  | 114  | 217  | 23  |
| Malliankuppam     | 291  | 1056  | 513  | 543  | 118  | 0    | 0   |
| Chinnambedu       | 1051 | 4175  | 2201 | 1974 | 420  | 1885 | 87  |
| Arani (TP)        | 3328 | 12833 | 6392 | 6441 | 1372 | 2020 | 370 |
| Rallapadi         | 1030 | 4104  | 2067 | 2037 | 452  | 1122 | 158 |
| Ellapuram         | 113  | 448   | 219  | 229  | 41   | 320  | 0   |
| Seeyancheri       | 59   | 220   | 110  | 110  | 22   | 0    | 0   |
| Panayancheri      | 417  | 1582  | 816  | 766  | 178  | 642  | 0   |
| Thirunilai        | 242  | 957   | 452  | 505  | 112  | 238  | 0   |
| Karanai           | 491  | 1881  | 940  | 941  | 204  | 982  | 240 |
| Pallavada         | 512  | 1709  | 833  | 876  | 161  | 785  | 103 |
| Siruvada          | 196  | 795   | 393  | 402  | 82   | 524  | 0   |
| Kollanur          | 164  | 525   | 262  | 263  | 52   | 0    | 0   |
| Thervoy           | 792  | 3122  | 1558 | 1564 | 359  | 2433 | 4   |
| Sengarai          | 372  | 1368  | 670  | 698  | 178  | 427  | 123 |
| Athupakkam        | 254  | 922   | 458  | 464  | 101  | 0    | 0   |

|              |              |               |              |              |              |              |             |
|--------------|--------------|---------------|--------------|--------------|--------------|--------------|-------------|
| Kaiyadai     | 73           | 306           | 161          | 145          | 39           | 248          | 5           |
| Kilakarmanur | 166          | 633           | 309          | 324          | 69           | 463          | 0           |
| Thumbakkam   | 155          | 553           | 265          | 288          | 66           | 0            | 0           |
| Edur         | 760          | 2939          | 1480         | 1459         | 294          | 1169         | 30          |
| <b>Total</b> | <b>26841</b> | <b>101335</b> | <b>50999</b> | <b>50336</b> | <b>11211</b> | <b>30372</b> | <b>2552</b> |

(Source: Census 2011)



**Table 3-24 Summary of Socioeconomic indicators within the study area**

| S. No | Particulars                                | Study Area | Unit |
|-------|--|------------|------|
| 1     | Number of villages in the Study Area       | 54         | Nos. |
| 2     | Number of Towns/Municipality in study area | 1          | Nos. |
| 3     | Total Households                           | 26841      | Nos. |
| 4     | Total Population                           | 101335     | Nos. |
| 5     | Children Population (<6 Years Old)         | 11211      | Nos. |
| 6     | SC Population                              | 30372      | Nos. |
| 7     | ST Population                              | 2552       | Nos. |
| 8     | Total Working Population                   | 47051      | Nos. |
| 9     | Main Workers                               | 36700      | Nos. |
| 10    | Marginal Workers                           | 10351      | Nos. |
| 11    | Agricultural Workers                       | 25597      | Nos. |
| 12    | Household Industries                       | 2048       | Nos. |
| 13    | Other Workers                              | 18144      | Nos. |
| 14    | Literates                                  | 65885      | Nos. |

(Source: Census 2011)

### 3.11.8 Employment and livelihood

**Table 3-25** shows the classification of workers within the study area. Details of Literacy population in the study area is given in **Table 3-26**.

**Table 3-25 Classification of workers within study area**

| Name                  | Total Workers | Main Workers | Marginal Workers | Agriculture Workers |       |             |       | Main      |        | Marginal  |        |
|-----------------------|---------------|--------------|------------------|---------------------|-------|-------------|-------|-----------|--------|-----------|--------|
|                       |               |              |                  | Main                |       | Marginal    |       | Household | Others | Household | Others |
|                       |               |              |                  | Cultivators         | Agri. | Cultivators | Agri. |           |        |           |        |
| <b>0-5 km</b>         |               |              |                  |                     |       |             |       |           |        |           |        |
| Amirthamangalam       | 291           | 67           | 224              | 1                   | 2     | 10          | 136   | 0         | 64     | 0         | 78     |
| Annappa Naickankuppam | 1308          | 1022         | 286              | 185                 | 571   | 123         | 50    | 8         | 258    | 2         | 111    |
| Chinnapuliur          | 125           | 123          | 2                | 1                   | 67    | 0           | 1     | 1         | 54     | 0         | 1      |
| Chithoornatham        | 341           | 48           | 293              | 10                  | 5     | 17          | 151   | 2         | 31     | 13        | 112    |
| Erukkuvoy             | 436           | 401          | 35               | 86                  | 217   | 1           | 32    | 0         | 98     | 0         | 2      |
| Getnamallee           | 813           | 533          | 280              | 198                 | 277   | 10          | 147   | 2         | 56     | 66        | 57     |
| Kanlur                | 411           | 345          | 66               | 116                 | 164   | 4           | 54    | 2         | 63     | 1         | 7      |
| Kollanur              | 294           | 256          | 38               | 22                  | 163   | 12          | 12    | 9         | 62     | 3         | 11     |
| Manali                | 107           | 107          | 0                | 19                  | 56    | 0           | 0     | 0         | 32     | 0         | 0      |
| Palavakkam            | 404           | 238          | 166              | 16                  | 111   | 1           | 156   | 2         | 109    | 0         | 9      |
| Panchalai             | 817           | 426          | 391              | 67                  | 259   | 15          | 321   | 1         | 99     | 8         | 47     |
| Periapuliur           | 289           | 281          | 8                | 25                  | 156   | 1           | 4     | 2         | 98     | 0         | 3      |
| Poovalambedu          | 381           | 306          | 75               | 18                  | 150   | 2           | 3     | 18        | 120    | 5         | 65     |
| Thandalacheri         | 720           | 701          | 19               | 7                   | 594   | 2           | 14    | 0         | 100    | 0         | 3      |
| Vaniamallee           | 513           | 418          | 95               | 27                  | 183   | 2           | 36    | 10        | 198    | 6         | 51     |
| <b>5-10 km</b>        |               |              |                  |                     |       |             |       |           |        |           |        |
| Authupakkam           | 1177          | 1114         | 63               | 61                  | 549   | 6           | 19    | 20        | 484    | 3         | 3      |
| Chinnaobulapuram      | 1647          | 1308         | 339              | 263                 | 179   | 119         | 145   | 7         | 859    | 0         | 0      |
| Eguvarpalayam         | 1694          | 1192         | 502              | 158                 | 367   | 0           | 423   | 10        | 657    | 8         | 8      |
| Manellore             | 1916          | 971          | 945              | 26                  | 185   | 43          | 612   | 101       | 659    | 62        | 62     |
| Nangapallam           | 126           | 122          | 4                | 16                  | 33    | 0           | 2     | 1         | 72     | 0         | 0      |

|                    |      |      |     |     |     |     |     |     |      |     |     |
|--------------------|------|------|-----|-----|-----|-----|-----|-----|------|-----|-----|
| Narasingaparam     | 1175 | 944  | 231 | 31  | 596 | 8   | 179 | 3   | 314  | 7   | 7   |
| Paleswarankandigai | 2344 | 1884 | 460 | 15  | 48  | 19  | 99  | 51  | 1770 | 12  | 12  |
| Peria obulapuram   | 1213 | 1101 | 112 | 286 | 380 | 8   | 67  | 6   | 429  | 3   | 3   |
| Pondavakkam        | 1502 | 524  | 978 | 151 | 169 | 43  | 812 | 21  | 183  | 19  | 19  |
| Sanaputhur         | 1608 | 1249 | 359 | 215 | 852 | 2   | 282 | 7   | 175  | 0   | 0   |
| Sevittupanapakkam  | 139  | 131  | 8   | 9   | 60  | 0   | 3   | 1   | 61   | 0   | 0   |
| Theruali           | 2336 | 1795 | 541 | 392 | 229 | 68  | 260 | 38  | 1136 | 21  | 21  |
| Thurapallam        | 1390 | 804  | 586 | 50  | 178 | 28  | 312 | 22  | 554  | 24  | 24  |
| Vadakkunallur      | 385  | 345  | 40  | 51  | 182 | 0   | 32  | 18  | 94   | 0   | 0   |
| Verkadu            | 290  | 280  | 10  | 10  | 5   | 0   | 1   | 3   | 262  | 0   | 0   |
| Nelvoy             | 882  | 638  | 244 | 343 | 150 | 8   | 205 | 4   | 141  | 1   | 30  |
| Paleswaram         | 123  | 43   | 80  | 2   | 0   | 0   | 78  | 0   | 41   | 0   | 2   |
| Venkuzhi           | 17   | 17   | 0   | 3   | 10  | 0   | 0   | 3   | 1    | 0   | 0   |
| Sepedu             | 76   | 76   | 0   | 3   | 60  | 0   | 0   | 0   | 13   | 0   | 0   |
| Pudupalayam        | 315  | 294  | 21  | 39  | 204 | 1   | 17  | 1   | 50   | 1   | 2   |
| Madhavaram         | 331  | 305  | 26  | 20  | 59  | 0   | 1   | 0   | 226  | 0   | 25  |
| Malliankuppam      | 479  | 475  | 4   | 223 | 169 | 3   | 0   | 4   | 79   | 0   | 1   |
| Chinnambedu        | 1908 | 1839 | 69  | 288 | 852 | 3   | 21  | 83  | 616  | 6   | 39  |
| Arani (TP)         | 5661 | 5041 | 620 | 74  | 789 | 5   | 90  | 451 | 3727 | 115 | 410 |
| Rallapadi          | 1888 | 1820 | 68  | 28  | 314 | 0   | 40  | 470 | 1008 | 6   | 22  |
| Ellapuram          | 187  | 102  | 85  | 2   | 1   | 1   | 6   | 0   | 99   | 1   | 77  |
| Seeyancheri        | 130  | 130  | 0   | 1   | 109 | 0   | 0   | 1   | 19   | 0   | 0   |
| Panayancheri       | 801  | 660  | 141 | 53  | 352 | 119 | 10  | 17  | 238  | 2   | 10  |
| Thirunilai         | 531  | 507  | 24  | 55  | 399 | 1   | 15  | 2   | 51   | 1   | 7   |
| Karanai            | 826  | 661  | 165 | 7   | 422 | 1   | 128 | 4   | 228  | 1   | 35  |
| Pallavada          | 1038 | 940  | 98  | 95  | 696 | 3   | 67  | 3   | 146  | 0   | 28  |
| Siruvada           | 442  | 310  | 132 | 11  | 258 | 0   | 130 | 0   | 41   | 0   | 2   |

|              |      |      |      |     |     |    |     |    |     |     |     |
|--------------|------|------|------|-----|-----|----|-----|----|-----|-----|-----|
| Kollanur     | 294  | 256  | 38   | 22  | 163 | 12 | 12  | 9  | 62  | 3   | 11  |
| Thervoy      | 1638 | 499  | 1139 | 14  | 206 | 47 | 984 | 2  | 277 | 5   | 103 |
| Sengarai     | 616  | 514  | 102  | 162 | 181 | 0  | 78  | 6  | 165 | 0   | 24  |
| Athupakkam   | 525  | 513  | 12   | 103 | 352 | 1  | 9   | 23 | 35  | 0   | 2   |
| Kaiyadai     | 179  | 176  | 3    | 2   | 148 | 0  | 1   | 0  | 26  | 0   | 2   |
| Kilakarmanur | 332  | 325  | 7    | 4   | 260 | 0  | 7   | 4  | 57  | 0   | 0   |
| Thumbakkam   | 382  | 305  | 77   | 42  | 177 | 0  | 76  | 0  | 86  | 0   | 1   |
| Edur         | 1258 | 1218 | 40   | 363 | 671 | 3  | 25  | 21 | 3   | 163 | 9   |

(Source: Census 2011)

**Table 3-26 Details of Literacy population in the study area**

| Name                  | Literates Population | Male Literates | Female Literates | Literates % |
|-----------------------|----------------------|----------------|------------------|-------------|
| <b>0-5 km</b>         |                      |                |                  |             |
| Amirthamangalam       | 373                  | 201            | 172              | 0.57        |
| Annappa Naickankuppam | 1480                 | 858            | 622              | 2.25        |
| Chinnapuliyur         | 178                  | 104            | 74               | 0.27        |
| Chithoornatham        | 344                  | 175            | 169              | 0.52        |
| Erukuvoy              | 353                  | 203            | 150              | 0.54        |
| Getnamallee           | 884                  | 493            | 391              | 1.34        |
| Kanlur                | 480                  | 265            | 215              | 0.73        |
| Kollanur              | 369                  | 203            | 166              | 0.56        |
| Manali                | 160                  | 96             | 64               | 0.24        |
| Palavakkam            | 477                  | 274            | 203              | 0.72        |
| Panchalai             | 784                  | 441            | 343              | 1.19        |
| Periapuliyur          | 427                  | 241            | 186              | 0.65        |
| Poovalambedu          | 688                  | 412            | 276              | 1.04        |
| Thandalacheri         | 1108                 | 616            | 492              | 1.68        |
| Vaniamallee           | 710                  | 409            | 301              | 1.08        |

| 5-10 km            |      |      |      |       |
|--------------------|------|------|------|-------|
| Authupakkam        | 1520 | 894  | 626  | 2.31  |
| Chinnaobulapuram   | 2327 | 1392 | 935  | 3.53  |
| Eguvarpalayam      | 2440 | 1358 | 1082 | 3.70  |
| Manellore          | 3006 | 1616 | 1390 | 4.56  |
| Nangapallam        | 195  | 109  | 86   | 0.30  |
| Narasingaparam     | 1964 | 1032 | 932  | 2.98  |
| Paleswarankandigai | 3639 | 2201 | 1438 | 5.52  |
| Peria obulapuram   | 1693 | 994  | 699  | 2.57  |
| Pondavakkam        | 1814 | 1033 | 781  | 2.75  |
| Sanaputhur         | 1589 | 900  | 689  | 2.41  |
| Sevittupanapakkam  | 191  | 108  | 83   | 0.29  |
| Theruali           | 4438 | 2442 | 1996 | 6.74  |
| Thurapallam        | 2312 | 1275 | 1037 | 3.51  |
| Vadakkunallur      | 515  | 279  | 236  | 0.78  |
| Verkadu            | 649  | 354  | 295  | 0.99  |
| Nelvoy             | 1028 | 599  | 429  | 1.56  |
| Paleswaram         | 153  | 79   | 74   | 0.23  |
| Venkuzhi           | 20   | 9    | 11   | 0.03  |
| Sepedu             | 101  | 52   | 49   | 0.15  |
| Pudupalayam        | 401  | 227  | 174  | 0.61  |
| Madhavaram         | 560  | 295  | 265  | 0.85  |
| Malliankuppam      | 623  | 356  | 267  | 0.95  |
| Chinnambedu        | 2841 | 1608 | 1233 | 4.31  |
| Arani (TP)         | 9240 | 5066 | 4174 | 14.02 |
| Rallapadi          | 2854 | 1585 | 1269 | 4.33  |
| Ellapuram          | 299  | 160  | 139  | 0.45  |
| Seeyancheri        | 138  | 73   | 65   | 0.21  |
| Panayancheri       | 923  | 536  | 387  | 1.40  |

|              |              |              |              |               |
|--------------|--------------|--------------|--------------|---------------|
| Thirunilai   | 605          | 317          | 288          | 0.92          |
| Karanai      | 1195         | 673          | 522          | 1.81          |
| Pallavada    | 979          | 540          | 439          | 1.49          |
| Siruvada     | 520          | 284          | 236          | 0.79          |
| Kollanur     | 369          | 203          | 166          | 0.56          |
| Thervoy      | 1906         | 1060         | 846          | 2.89          |
| Sengarai     | 811          | 438          | 373          | 1.23          |
| Athupakkam   | 556          | 338          | 218          | 0.84          |
| Kaiyadai     | 167          | 98           | 69           | 0.25          |
| Kilakarmanur | 399          | 213          | 186          | 0.61          |
| Thumbakkam   | 366          | 207          | 159          | 0.56          |
| Edur         | 1724         | 997          | 727          | 2.62          |
| <b>Total</b> | <b>65885</b> | <b>36991</b> | <b>28894</b> | <b>100.00</b> |

(Source: Census 2011)

### Interpretation of Results:

The literacy rate of the study region is 65.02%. The study area has more than 50% non-workers. There is a need to establish more industries so that the maximum number of employments can be generated.

### 3.11.9 Summary:

| Ambient Air Quality Monitoring |                     |                   |               |               |                                   |                     |
|--------------------------------|---------------------|-------------------|---------------|---------------|-----------------------------------|---------------------|
| S. No                          | Criteria Pollutants | Unit              | Maximum value | Minimum Value | 98 <sup>th</sup> Percentile Value | Prescribed Standard |
| 1                              | PM <sub>10</sub>    | µg/m <sup>3</sup> | 85.6          | 44.9          | 85.1                              | 100                 |
| 2                              | PM <sub>2.5</sub>   | µg/m <sup>3</sup> | 48.6          | 24.5          | 48.3                              | 60                  |
| 3                              | SO <sub>2</sub>     | µg/m <sup>3</sup> | 18.7          | 8.9           | 18.6                              | 80                  |
| 4                              | NO <sub>x</sub>     | µg/m <sup>3</sup> | 38.6          | 20.3          | 38.3                              | 80                  |

All the results of ambient air quality parameters have been found within the limit as per NAAQS. Based on comparison study of results for tested parameters with NAAQS, it is interpreted that ambient air quality of studied locations is good. This interpretation relates to the results found for corresponding locations and study period.

| Noise Monitoring |                               |       |               |               |   |
|------------------|-------------------------------|-------|---------------|---------------|---|
| S. No            | Parameters                    | Unit  | Maximum Value | Minimum value | Prescribed standard (residential areas) |
| 1                | Leq (day)- residential areas) | dB(A) | 52.6          | 50.1          | 55                                      |
| 2                | Leq(Night) residential areas) | dB(A) | 42.7          | 40.3          | 45                                      |

In Industrial area daytime noise levels was about 45.2 dB(A) and 44.2 dB(A) during nighttime, which is within prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Nighttime). The field observations during the study period indicate that the ambient noise levels are well within the prescribed limit by CPCB (55 dB(A) Day time & 45 dB(A) Nighttime).

| Surface Water |            |      |               |               |                 |
|---------------|------------|------|---------------|---------------|-----------------|
| S. No         | Parameters | Unit | Maximum Value | Minimum Value | IS 2296 Class A |
| 1             | pH         | -    | 7.75          | 6.94          | 6.5-8.5         |
| 2             | TDS        | mg/l | 587           | 402           | 500             |
| 3             | DO         | mg/l | 5.8           | 4.4           | 6               |
| 4             | COD        | mg/l | 39.2          | 19.7          | -               |
| 5             | BOD        | mg/l | 18.7          | 6.9           | 2               |

The surface water results were compared with IS 2296:1192 standard and in respect of CPCB water Quality Criteria for designated best use. Based on comparison study of test results with Surface water Quantity Standards (Is 2296 Class A), it is interpreted that water qualities of studied locations are classified under Class E, which can be used for irrigation industrial cooling, and controlled waste disposal

| Ground Water |                |      |               |               |                  |                   |
|--------------|----------------|------|---------------|---------------|------------------|-------------------|
| S. No        | Parameters     | Unit | Maximum Value | Minimum Value | Acceptable Limit | Permissible Limit |
| 1            | pH             | -    | 7.94          | 6.83          | 6.5-8.5          | -                 |
| 2            | Total Hardness | mg/l | 546.4         | 296.8         | 200              | 600               |

|   |          |      |       |       |     |      |
|---|----------|------|-------|-------|-----|------|
| 3 | Chloride | mg/l | 306.4 | 156.4 | 250 | 1000 |
| 4 | Fluoride | mg/l | 0.52  | 0.24  | 1.0 | 1.5  |
| 5 | Sulphate | mg/l | 154.2 | 70.3  | 400 | 200  |

Based on comparison study of test results with drinking water standard, it is interpreted that water qualities of studied locations meet with the drinking water standards as per IS 10500: 2012. These interpretations relate to the sample tested for location only. To prevent ground water contamination and improving the quality and Quantity, rainwater harvesting, and groundwater recharging may be helpful.

#### Soil Quality

| S. No | Parameters | Unit     | Maximum Value | Minimum Value |
|-------|------------|----------|---------------|---------------|
| 1     | pH         | -        | 8.1           | 7.06          |
| 2     | EC         | mmhos/cm | 186           | 129           |
| 3     | Nitrogen   | kg/ha    | 319           | 217           |
| 4     | Phosphorus | kg/ha    | 94            | 45            |
| 5     | Potassium  | kg/ha    | 104           | 75            |

As per the Indian Council of Agricultural research characterization all locations soils are having PH, Neutral to Slight Alkaline range, Electrical conductivity is Sensitive to salts, potassium as very less, Nitrogen as N is better range and Phosphorus range from medium to More than Sufficient range.

#### Ecology and Biodiversity

This area hosts common animals. Indian Dogs, Jungle and Domestic cat, Rhesus macaque, Domestic Cows, Buffaloes, Bullocks, and Goat etc. are found amongst mammals. There are no rare and endangered species, and a Near Threatened bird species (*Psittacula eupatria*) is identified in the study area.

#### Socio-Economic

The literacy rate of the study region is 65.02%. The study area has more than 50% non-workers. There is a need to establish more industries so that the maximum number of employments can be generated.



## **CHAPTER – 4**

# **ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

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*(This Chapter having, anticipated environmental impacts due to proposed project activities are identified, analyzed, and assessed and thereafter the mitigation measures for the adverse impacts are proposed. The significance of impacts is determined. This chapter is prepared based on Chapter-2 & Chapter-3 by correlating the activities under proposed project and their impacts on receiving environmental attributes.)*

# 4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

## 4.1 General

This chapter presents identification and appraisal of various impacts from the proposed expansion of the existing Rerolling plant during construction and Operational phases. The environmental impacts are categorized as either primary or secondary impacts. Primary impacts are those, which are attributed directly to the project and secondary impacts are those, which are indirectly induced and typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The impacts have been assessed for the proposed expansion project assuming that the pollution due to the existing manufacturing activities with their present capacities has already been covered under baseline environmental monitoring and continue to remain same till the operation of the project. Various impacts during the construction and operation phase on the environment parameters to estimate the impacts on the Environment due to the implementation of the project and discussed in the subsequent sections.

## 4.2 Impacts during Construction Phase

This includes the activities related to leveling of site, construction installation support related structures of related equipment. The existing plant of CUMI operates in an ownpatta area of 16.86 Acres (68212.31 Sq. m) in existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The proposed expansion activity will take place within the existing plant premises itself thus, no additional land will be acquired for the project expansion activity. The activity involves erection of machinery & small-scale civil works within the project premises.

The land area used for expansion will not be a part of the environmental or socio-economic sensitive area such as forest, ecologically sensitive area, habitation area hence likely there wouldn't be any issues in deforestation, wildlife dislocation, resettlement, and rehabilitation of people.

The impacts generated during erection phase would be temporary and are expected to gradually stabilize by the time of commissioning of proposed expansion activity. There are no sensitive locations such as national parks, critical pollution areas etc., within 10 km radial distance around the existing plant site.

No major changes in the land use pattern of study area (region) will occur due to the plant expansion activities. Hence, no major impact is envisaged on the land use pattern of the plant site.

#### **4.2.1 Impact on Soil:**

The soil at the plant site consists of clayey soil. The sub-stratum of this area consists of slight rocks and as such no blasting is envisaged for either levelling or during foundation work since the site is plain and needs very little grading, filling, and leveling. Apart from localized construction impact at the plant site, no adverse impacts on the soil in the surrounding area are anticipated.

#### **Mitigation Measures:**

The following mitigation measures will be adopted for soil environment:

- After completion of the construction phase, the surplus earth will be utilized to fill up the low-lying areas, the rubble shall be cleared, and all unbuilt surfaces will be reinstated.
- Greenbelt development and related activities will be taken up during construction phase itself so that plantation will grow to adequate height by the time of plant commissioning. Thus, greenbelt will be effective in containing the fugitive emissions during operation, if any.
- Species selected in this plantation will be fast growing and they will be adaptable to local conditions. Their ability to combat localized pollution is the prime factor for their selection and placement in the planting grid/pattern.
- Most of the varieties is being eco-friendly i.e., generate a lot of oxygen while helping reduce/absorb gases and dust.
- Entire plant will be aesthetically landscaped and as much as possible natural gradient will be maintained.
- There will be minimum concreting of the top surfaces so that there is a scope for maximum groundwater recharge due to rainfall.
- Plantation outside the plant premises, in the nearby villages will be encouraged by supplying free saplings to the villagers.

#### **4.2.2 Impact on Topography:**

The proposed expansion project will be implemented within the existing facility only. In view of the above, there will not be any major impacts on the topography of the project site.

### **4.2.3 Impact on Air Quality:**

The main sources of emission during the construction phase are the movement of equipment's at site and dust emitted during the levelling, grading, earthwork, foundation works and exhaust emissions from vehicles. Equipment deployed during the construction phase is also likely to result in marginal increase in the levels of SO<sub>2</sub>, NO<sub>x</sub>, PM and CO. The impact will be for a short duration and confined within the project boundary and is expected to be negligible outside the plant boundaries.

The impact will be marginal and temporary in nature. Proper maintenance of vehicles and construction equipment will help in controlling the gaseous emissions. Water sprinkling on roads and construction sites will prevent fugitive dust.

#### **Air Pollution Control Measures:**

There will not be major leveling operation required as the entire plant site is already leveled. Hence, no significant excavation of the area is needed. However, during dry weather conditions, it is necessary to control the dust generated by excavation and transportation activities. This will be achieved by regular water sprinkling.

Ambient air quality levels of SO<sub>2</sub> and NO<sub>x</sub> do not change much as there will not be any operation of construction machinery such as bulldozers, pay loaders, trucks etc. However, these levels are expected to be significant. Since, these machines will be operated intermittently. Moreover, most of the items are movable.

Hence, there will not be any concentration of emissions at any single point. It shall be ensured that both gasoline and diesel-powered construction vehicles are properly maintained to minimize smoke in the exhaust emissions.

#### **Additional recommendations include the following:**

- Sprinkling of water at frequent intervals by preferably using truck-mounted sprinklers.
- Sprinkling of water will be done along the roads and work zone areas to reduce the fugitive dust.
- Green belt area has been grown with evergreen trees helps to reduce the fugitive emissions generated in the industrial premise.
- Company owned vehicles are being used for transporting raw material and end products. The vehicles are maintained with good management practices to reduce the air pollution in the premise.

### **4.2.4 Impact on Water Quality:**

Impact on water quality during construction phase may be due to the non-point discharge of solids from the soil loss and sewage generated from the construction workforce stationed at the site. Further, the construction will be more related to mechanical fabrication, assembly, and erection; hence the water requirement would be small. The overall impact on water environment during construction phase is likely to be short term and insignificant.

#### 4.2.5 Noise Environment

The major sources of noise are Machineries, Generators, Compressors, Boiler, Rolling Plant and Vehicular movements during operation phase for loading/unloading activities, feed pumps, ID fans, FD fans and other noise generating units like process equipment may increase noise level. Vehicular traffic, loading and unloading of construction material, handling of equipment and materials are likely to cause an increase in the ambient noise levels. The areas affected are those close to the site. However, the noise will be temporary and will be restricted mostly to plant areas.

##### **Mitigation Measures:**

Equipment is maintained appropriately to keep the noise level within 80-85 dB (A). Wherever possible, equipment has been provided with silencers and mufflers. Construction activities will be restricted to daytime only. Further, workers working in high noise areas have been provided with necessary protective devices e.g., earplugs, earmuffs etc.

The following measures are proposed to mitigate the negative impact of the operation phase of the project on the surrounding noise environment.

- ✓ All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to.
- ✓ High noise generating sources will be insulated adequately by providing suitable enclosures, acoustic louvers, slots etc.
- ✓ All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- ✓ The air compressor, DG sets, transformer etc. will be provided with acoustic enclosure.
- ✓ Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units; and
- ✓ Furnace operators will be protected by enclosing the source of noise with sound deadening material or by providing sound-proofed shelters.
- ✓ Construction of noise protection wall at the scrap yard.
- ✓ Adequate greenbelt development is also being developed in the plant boundary of the steel plant.
- ✓ DG sets and air compressors are provided with integral acoustic enclosures.
- ✓ The ambient noise levels will be ensured within the ambient standards by inbuilt design of mechanical equipment and buildings.
- ✓ 33% of Greenbelt & Land scaping around the factory building and premises to control the intensity of noise to the surrounding area.
- ✓ Providing personal protective equipment as a safety measure wherever required.

- ✓ Training will be imparted to personnel to generate awareness about effects of noise and importance of using PPEs.

Noise monitoring will be carried out to check the efficacy of maintenance schedules undertaken to reduce noise levels and noise protection measures.

#### **4.2.6 Ecology**

The ecology of the area does not have much impact due to the proposed expansion. The expansion activities will be carried out within the existing plant premises itself. In addition, the topographical map shows that the surroundings of the plant area are barren lands which may not be fit for cultivation. Therefore, it's envisaged that the construction activities do not make a significant impact on the biotic and abiotic environment.

#### **4.2.7 Demography and Socioeconomics**

As per census 2011 data, non-workers constitute more than 50% of the total population in the 10km radius study area. Some of them will be available for employment in the proposed expansion project during the construction activities. As the labours are generally un-skilled, the locals would get opportunities for employment during the construction activities. In addition to the opportunity of getting employment as construction labours, the local population will also have employment opportunities in related service activities like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc. Consequently, this will contribute to economic upliftment of the area.

##### **Facilities for Construction Work force:**

**First Aid:** At the workplace, first aid facilities shall be maintained at a readily accessible place with necessary appliances including sterilized cotton wool etc. shall be available. Ambulance facilities should be made readily available at the workplace to take injured people to the nearest hospital.

**Potable Water:** Sufficient supply of cold water fit for drinking shall be provided at suitable places.

**Sanitary Facility:** Within the precinct of the workplace, latrines and urinals shall be provided at accessible places. These shall be cleaned at least twice during working hours and kept in good sanitary condition. The contractor shall always conform to the sanitary requirements of local medical and health authorities.

**Security:** CUMI is being provided necessary security to work force in co-ordination with state authorities.

### 4.3 Impacts during Operation Phase

The proposed expansion project deals with increasing the manufacturing capacity of MS Billets and re-rolled products from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum respectively within the existing facility. The existing Induction furnace (8 T/H) will be replaced with 25T/H with Crucible (3 will be standby) and Coal Fired 15 T Reheating Furnace will be used to meet the demand of increased Production. Direct Hot Rolling technology is one of the advanced production management technologies in steel sector, which represents awareness of green and energy-saving ideology. Contrary to the conventional process of storage and cooling of the billet, the sensible heat from the continuous-cast billets is utilized by charging them directly into the rolling unit.

In Direct Hot Rolling, the melt, tapped at approximately 1660-1700°C, is transferred to the continuous casting machine quickly without any significant heat loss and is poured into mould at around 1590°C. The melt is solidified and cooled down to a temperature of 1050°C to 1100°C by PLC controlled water cooling and secondary direct spray cooling. The solidifying li billet is cut immediately and is passed to the rolling mill, ensuring a minimal heat loss. For impact assessment during the operational phase, the following components have been separately considered.

The mitigation measures to prevent adverse impact during the operation phase of the project shall focus on the following:

1. Topography
2. Impacts on Soil
3. Air Environment/Air Quality
  - a) Fugitive Emission Control
  - b) Odour control
4. Water Environment
5. Noise environment
6. Solid and Hazardous waste Management
7. Land environment
8. Ecology and Biodiversity
9. Socio Economic
10. Occupational Health and Safety
11. Budget For EMP

#### 4.3.1 Topography

The plant site is partially plain. There will be no tall structures except stacks in the plant. The topography of the plant will not be changed significantly during the operational

period. The exit temperatures from the stack and vents will be maintained in the range 65°C to 150°C, which is not likely to have any significant impact on the local over regional climate.

#### **4.3.2 Impact on Soil Quality**

The soil quality remains the same as the proposed expansion does not involve a change in land use pattern. The probable sources of degradation of soil quality will be due to generation and disposal of ash and fugitive dust emission. The airborne fugitive dust from the plant is likely to be deposited on the topsoil in the immediate vicinity of the plant boundary. However, the fugitive emissions are likely to be controlled to a great extent through pollution control measures like water sprinkling and the greenbelt development. The fly ash generated will be collected, stored in closed sheds within the plant site and disposed to cement manufacturer. Hence, no impact is envisaged on soil quality of the project site.

#### **4.3.3 Impact on Air Quality**

Being a steel melting plant, the major air pollutants are Particulate Matter (PM), Sulphur dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>). The fugitive dust and gaseous emissions expected are from raw material handling area, melting unit, casting area, coal storage yard, ash dumping area, transportation of fuel and solid waste. The dust emissions, if any from the above areas will be fugitive in nature and maximum during summer season (when the wind velocities are likely to be high) and almost nil during the monsoon season. The dust emissions are likely to be confined to the place of generation only. The quantification of these fugitive emissions from the area sources is difficult as it depends on lot of factors such as dust particles size, specific gravity of dust particles, wind velocity, moisture content of the material and ambient temperature etc. Also, there is a high level of variability in these factors. Hence, these are not amenable for mathematical dispersion modeling. However, by proper usage of dust suppression measures, dust generation and dispersion will be reduced.

##### **4.3.3.1 Air Quality- Prediction Modelling (AERMOD View)**

Prediction of impacts on air environment has been carried out by employing mathematical model based on a steady state Gaussian Plume Dispersion model designed for multiple point sources for short term. In the present case, AERMOD- designed for multiple point sources for short term and developed by United States Environmental Protection Agency (USEPA) has been used for simulations from point sources.

The model simulations deal with dispersion of three major pollutants viz., Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) and Particulate matter emitted from the stacks.

AERMOD is an air dispersion-modeling package, which seamlessly incorporates the popular USEPA Models, ISCST3, ISC-PRIME and AERMOD into one interface without any



modifications to the models. These models are used extensively to assess pollution concentration and deposition from a wide variety of sources.

The AMS/EPA REGULATORY MODEL (AERMOD) was specially designed to support the Environmental Regulatory Modeling Programs. AERMOD is a regulatory steady-state modeling system with three separate components.

- AERMOD (AERMIC Dispersion Model)
- AERMAP (AERMOD Terrain Preprocessor)
- AERMET (AERMOD) Meteorological Pre-processor.

#### **AERMET:**

To conduct a refined air dispersion modeling project using the AERMOD short-term air quality dispersion model, it is necessary to process the meteorological data representative of the study area being modeled. The AERMET program is a meteorological pre-processor, which prepares hourly surface data and upper air data for use in the AERMOD air quality dispersion model. AERMET is designed to allow future enhancements to process other types of data and to compute boundary layer parameters with different algorithms. AERMET processes meteorological data in three stages and from this process two files are generated for use with the AERMOD model. A surface file of hourly boundary layer parameters estimates a profile file of multiple-level observations of wind speed, wind direction, temperature, and standard deviation of the fluctuating wind components.

#### **Application of AERMOD:**

AERMOD model with the following options has been employed to predict the cumulative ground level concentrations due to emissions from the proposed expansion activity.

- All terrain dispersion parameters are considered.
- Predictions have been carried out to estimate concentration values over radial distance of 10km around the project area.
- Uniform polar receptor network has been considered.
- Emission rates from the sources were considered as constant during the entire period.
- The ground level concentrations computed without any consideration of decay coefficient.
- Calm winds recorded during the study period were also taken into consideration.
- 24 hourly mean ground level concentrations were estimated using the entire meteorological data collected during the study period; and
- The study area is used to represent the graphical output of the GLC's using the terrain processor.

## Meteorological Data

The hourly meteorological data recorded at site is converted to the mean hourly meteorological data as specified by CPCB and the same has been used in the model. Hourly mixing heights are taken from the “Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India” published by India meteorological department, 2008, New Delhi.

The meteorological data recorded during the study period continuously on wind speed, wind direction, temperature etc., have been processed to extract the data required for simulation by AERMOD using AERMET.

The site-specific meteorological data for three months from March 2024 to May 2024 was obtained from secondary sources and Wind rose was plotted and shown in **Figure 4-1**. Other data included for AERMET were daily wind speed, wind direction, temperature, relative humidity, air pressure, precipitation, and solar radiation recorded during the period. AERMET reformats meteorological data so that it can be used as input for AERMOD model.

### Model Input Data:

The main pollutants from the proposed expansion will be Particulate Matter (PM 10 & PM2.5), Sulphur dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>). The pollutants are dispersed adequately by providing suitable stack heights. The stack emission details of CUMI have been considered for stack analysis. The industries are shown below.

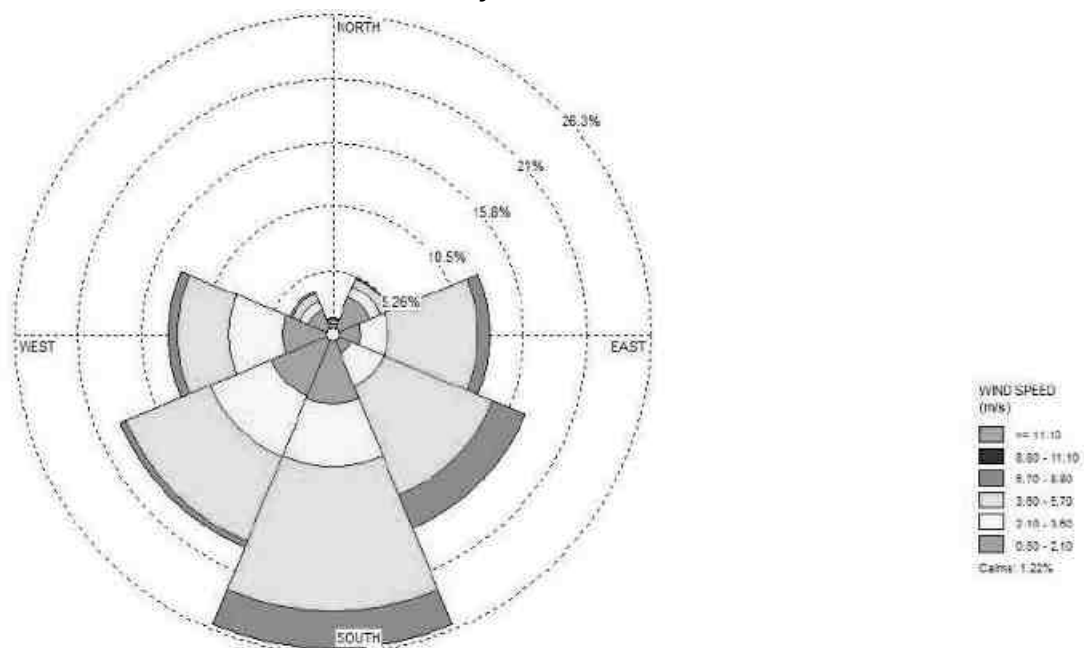


Figure 4-1 Wind rose of meteorology considered for modelling (March 2024 to May 2024)

### AERMET Process:

For the 3 phase AERMET processing of the meteorological data, specifications of the land use in the area are required to determine the terrain roughness for modelling. The land use was characterized in and around the site. The surface characteristics for the site and surroundings were selected and used to calculate the Albedo, Bowen ratio and surface roughness parameter.

The meteorological data were processed in the AERMET software to generate wind flow pattern & to generate surface meteorological data and profile meteorological data in a prescribed format that can be fed to AERMOD for modelling.

### AERMOD Process:

AERMOD Software Version 11.0.1/22112 was used for air dispersion modelling. AERMOD MPI is Lakes Environmental parallel version of the AERMOD model. AERMOD MPI Version 22112 is the parallel version for the US EPA AERMOD model dated 22112 released by the US EPA on June 27, 2022, and is applicable to a wide range of buoyant or neutrally buoyant emissions up to a range of 50km. In addition to more straightforward cases, AERMOD is also suitable for complex terrain and urban dispersion scenarios.

Maximum concentration value for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> obtained through modelling without control measures are shown in **Figure 4-2**, **Figure 4-3** & **Figure 4-4** respectively and first ten highest values of Ground Level Concentration (GLC) as uncontrolled for proposed stacks is given in **Table 4-2** to **Table 4-5**. respectively.

**Table 4-1 Stack Emission details (Uncontrolled)**

| Source               | Fuel used | Stack Details |            |         |           |                     | Emission (g/s)   |                 |                 |
|----------------------|-----------|---------------|------------|---------|-----------|---------------------|------------------|-----------------|-----------------|
|                      |           | No of Stacks  | Height (m) | Dia (m) | Temp (°C) | Exit Velocity (m/s) | PM <sub>10</sub> | SO <sub>2</sub> | NO <sub>x</sub> |
| DG                   | HSD       | 1             | 20         | 0.3     | 200       | 10                  | 0.00611          | 0.00569         | 0.08703         |
| Total Emission (g/s) |           |               |            |         |           |                     | 0.00611          | 0.00569         | 0.08703         |

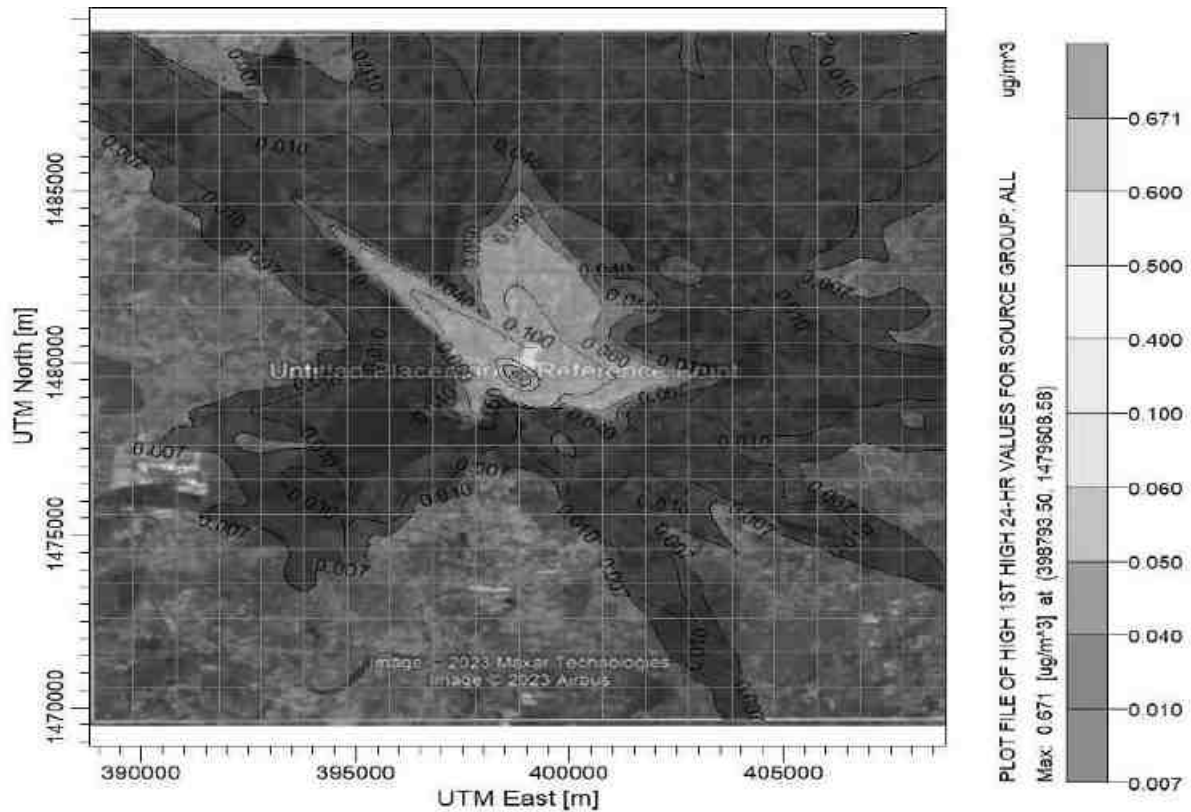


Figure 4-2 Ground level concentrations of PM<sub>10</sub> during March 2024 to May 2024

Table 4-2 Top 10 highest concentrations of PM<sub>10</sub> Controlled estimated through modelling.

| S. No | UTM coordinates (m) |         | Conc. (µg/m <sup>3</sup> ) | Distance from Centre of Sources (Km) | Direction from Source Centre |
|-------|---------------------|---------|----------------------------|--------------------------------------|------------------------------|
|       | E                   | N       |                            |                                      |                              |
| 1     | 398793.5            | 1479609 | 0.671                      | -                                    | -                            |
| 2     | 397793.5            | 1480609 | 0.21019                    | 1.4                                  | NW                           |
| 3     | 399793.5            | 1479609 | 0.15629                    | 1.03                                 | E                            |
| 4     | 396793.5            | 1481609 | 0.12864                    | 2.8                                  | NW                           |
| 5     | 398793.5            | 1481609 | 0.1212                     | 2.01                                 | N                            |
| 6     | 400793.5            | 1479609 | 0.11347                    | 2.0                                  | E                            |
| 7     | 399793.5            | 1480609 | 0.10164                    | 1.37                                 | NE                           |
| 8     | 398793.5            | 1482609 | 0.09445                    | 2.96                                 | N                            |
| 9     | 398793.5            | 1480609 | 0.08567                    | 1.05                                 | N                            |
| 10    | 395793.5            | 1482609 | 0.08196                    | 4.21                                 | NW                           |

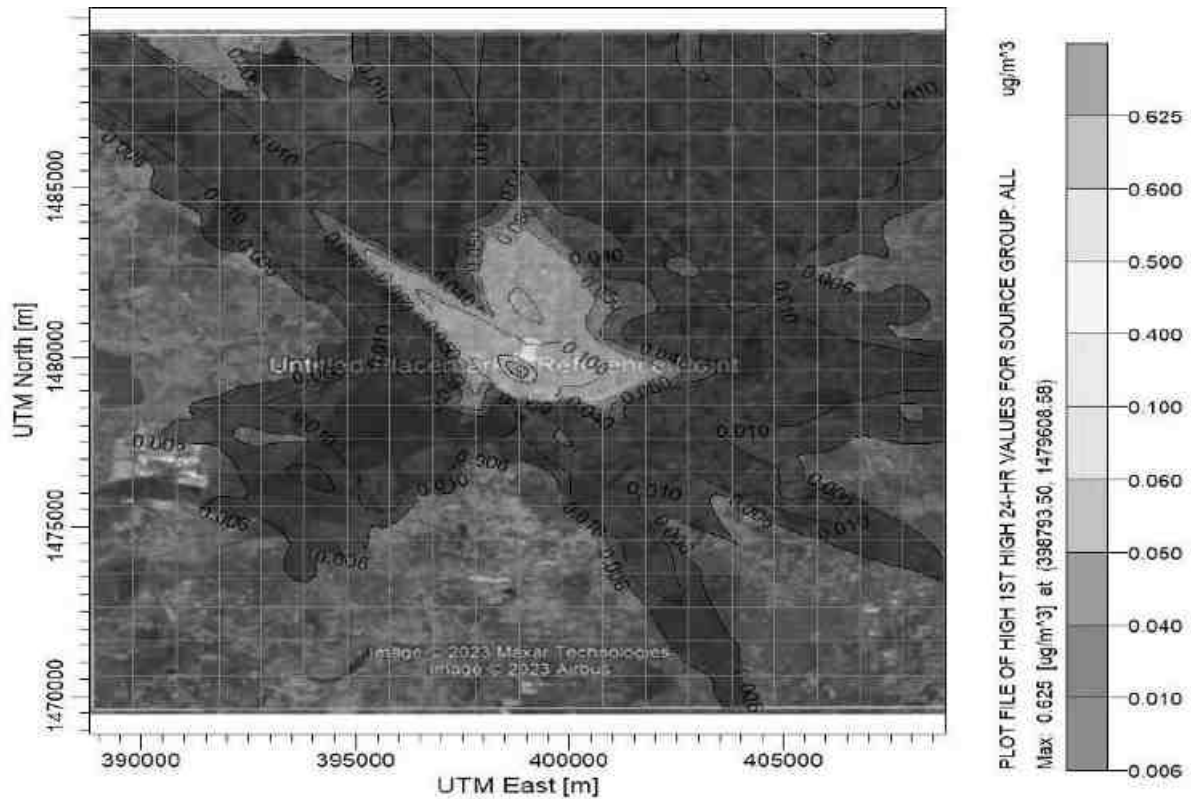


Figure 4-3 Ground level concentrations of SO<sub>2</sub> (uncontrolled) during March 2024 to May 2024

Table 4-3 Top 10 highest concentrations of SO<sub>2</sub> estimated through modelling.

| S. No | UTM coordinates (m) |         | Conc. (µg/m <sup>3</sup> ) | Distance from Centre of Sources (Km) | Direction from Source Centre |
|-------|---------------------|---------|----------------------------|--------------------------------------|------------------------------|
|       | E                   | N       |                            |                                      |                              |
| 1     | 398793.5            | 1479609 | 0.62526                    | -                                    | -                            |
| 2     | 397793.5            | 1480609 | 0.19586                    | 1.4                                  | NW                           |
| 3     | 399793.5            | 1479609 | 0.14563                    | 1.03                                 | E                            |
| 4     | 396793.5            | 1481609 | 0.11987                    | 2.8                                  | NW                           |
| 5     | 398793.5            | 1481609 | 0.11294                    | 2.01                                 | N                            |
| 6     | 400793.5            | 1479609 | 0.10573                    | 2.0                                  | E                            |
| 7     | 399793.5            | 1480609 | 0.09471                    | 1.37                                 | NE                           |
| 8     | 398793.5            | 1482609 | 0.08801                    | 2.96                                 | N                            |
| 9     | 398793.5            | 1480609 | 0.07983                    | 1.05                                 | N                            |
| 10    | 395793.5            | 1482609 | 0.07637                    | 4.21                                 | NW                           |

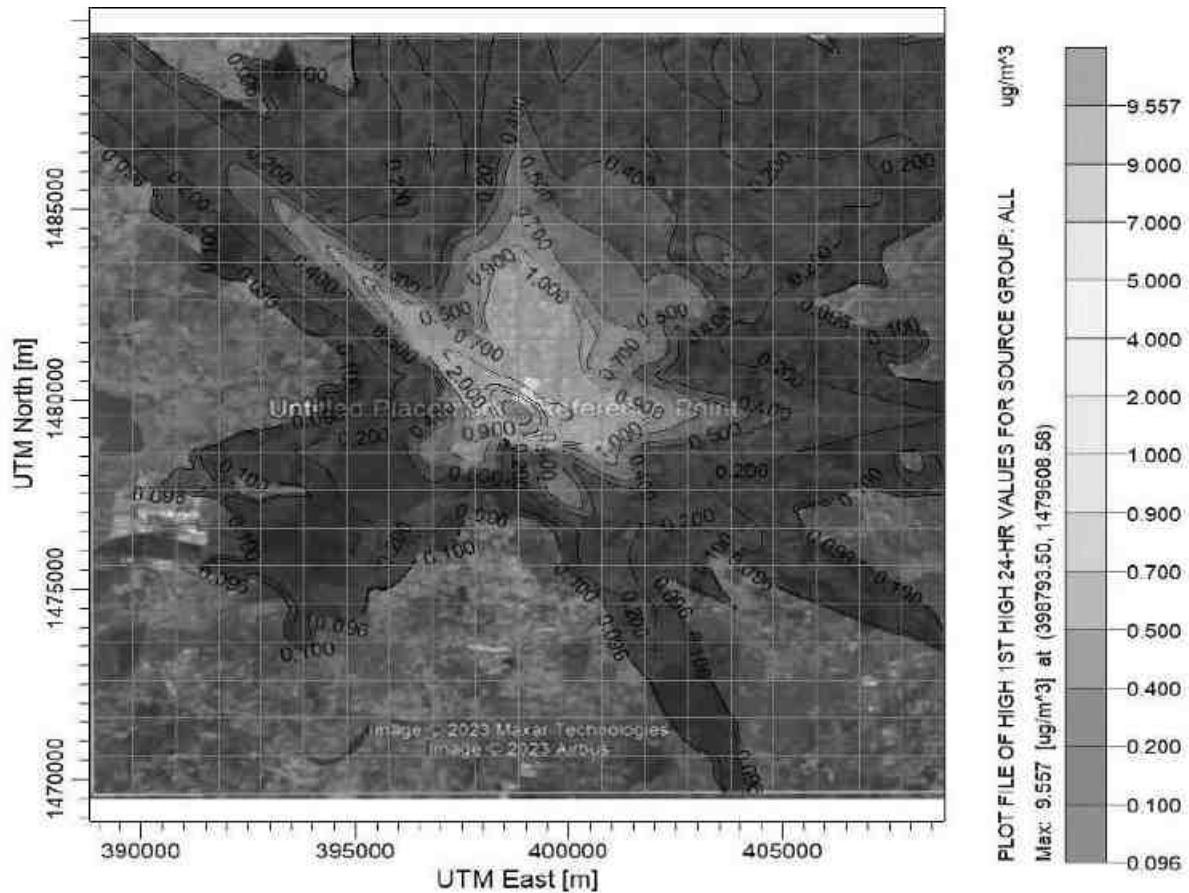


Figure 4-4 Ground level concentrations of NO<sub>x</sub> during March 2024 to May 2024

Table 4-4 Top 10 highest concentrations of NO<sub>x</sub> estimated through modelling.

| S. No | UTM coordinates (m) |         | Conc. (µg/m <sup>3</sup> ) | Distance from Centre of Sources (Km) | Direction from Source Centre |
|-------|---------------------|---------|----------------------------|--------------------------------------|------------------------------|
|       | E                   | N       |                            |                                      |                              |
| 1     | 398793.5            | 1479609 | 9.55684                    | -                                    | -                            |
| 2     | 397793.5            | 1480609 | 2.99372                    | 1.4                                  | NW                           |
| 3     | 399793.5            | 1479609 | 2.22594                    | 1.03                                 | E                            |
| 4     | 396793.5            | 1481609 | 1.83223                    | 2.8                                  | NW                           |
| 5     | 398793.5            | 1481609 | 1.72619                    | 2.01                                 | N                            |
| 6     | 400793.5            | 1479609 | 1.6161                     | 2.0                                  | E                            |
| 7     | 399793.5            | 1480609 | 1.44768                    | 1.37                                 | NE                           |
| 8     | 398793.5            | 1482609 | 1.34525                    | 2.96                                 | N                            |
| 9     | 398793.5            | 1480609 | 1.22011                    | 1.05                                 | N                            |
| 10    | 395793.5            | 1482609 | 1.16734                    | 4.21                                 | NW                           |

**Modelling Results:**

It was observed that the maximum concentration of PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> observed due to proposed stacks are 0.671µg/m<sup>3</sup>, 0.625µg/m<sup>3</sup>, & 9.556 µg/m<sup>3</sup> without control measures. So, it can be concluded that the impact envisaged is minimum and well within the CPCB standard. Total Maximum GLCs from the proposed Stack Emissions for March 2024 to May 2024 and summarized in **Table 4-5**.

**Table 4-5 Total Maximum GLCs from Stack Emissions (DG)**

| Pollutant        | Max. Base line Conc. ( $\mu\text{g}/\text{m}^3$ ) | Estimated Incremental Conc. at source obtained through modelling ( $\mu\text{g}/\text{m}^3$ ) | Total Conc. ( $\mu\text{g}/\text{m}^3$ ) | NAAQ standard | %Increase |
|------------------|---|---|--|---------------|-----------|
| PM <sub>10</sub> | 85.6  | 0.671   | 86.27                                    | 100           | 0.78      |
| SO <sub>2</sub>  | 18.7  | 0.625   | 19.32                                    | 80            | 3.34      |
| NO <sub>x</sub>  | 29.9  | 9.556   | 39.45                                    | 80            | 31.95     |

#### 4.3.4 Impacts due to Traffic and Transportation

##### Traffic Assessment for incremental concentration by the proposed project:

Traffic data collected continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two persons were deployed simultaneously at one station during each shift- one person on each of the two directions for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Total numbers of vehicles per hour under the three categories were determined. Traffic study is conducted on state highway 52.

The Traffic Assessment and vehicular movement for the proposed project is given in **Table 4-6**.

**Table 4-6 Traffic Assessment-Vehicle movement**

| S. No.       | Type of Vehicle | Vehicles trips/hr. at present at SH-52 | Before project PCU | Proposed vehicles trips/ hr. due to proposed project | Proposed PCU | Total Vehicles after project implementation | PCU Factors IRC (SP 41) | Total PCU after project implementation |
|--------------|-----------------|--|--------------------|--|--------------|---|-------------------------|--|
| 1            | Cars            | 10                                     | 10                 | 5  | 5            | 15  | 1                       | 15                                     |
| 2            | Buses           | 15                                     | 45                 | 2  | 6            | 17  | 3.0                     | 51                                     |
| 3            | Truck / Lorry   | 30                                     | 105                | 5  | 17.5         | 35  | 3.5                     | 122.5                                  |
| 4            | 2 wheelers      | 30                                     | 15                 | 10   | 5            | 40  | 0.5                     | 20                                     |
| 5            | 3-Wheeler       | 40                                     | 32                 | 5  | 4            | 45  | 0.8                     | 36                                     |
| <b>Total</b> |                 | <b>125</b>                             | <b>207</b>         | <b>27</b>  | <b>37.5</b>  | <b>152</b>                                  | <b>5.8</b>              | <b>244.5</b>                           |

Based on the traffic for the proposed project, the expected LOS due to the project is given in Table 4-7.

**Table 4-7 Traffic Volume after Implementation of the Project**

| NH-45 Traffic level          | Volume of Traffic | Total PCU/hr | LOS Category* | V/C  | Traffic Classification                   |
|------------------------------|-------------------|--------------|---------------|------|--|
| Present scenario             | 125               | 207          | C             | 0.60 | <i>Stable flow and acceptable delays</i> |
| After project implementation | 152               | 244.5        | C             | 0.62 | <i>Stable flow and acceptable delays</i> |

\*LOS categories are A-Free Flow, B- Reasonably Free Flow, C-Stable Flow, D-Approaching unstable flow, E- Unstable flow, F- Forced or breakdown flow Due to propose project there will be slight increment in the vehicle movement but the level of service (LOS) anticipated will be Free Flow.

**4.3.4.1 Fugitive Emission Control Measures:**

The fugitive emissions from the plant operations will be controlled through the following control measures:

- Raw material handling areas are major source for fugitive emissions. Most of the time, sources of fugitive emissions will be the transfer and junction points, product hopper area and loading points. Bag filter will be provided with appropriate suction devices to control the fugitive emissions.
- Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission.
- The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions; and Usage of respiratory protective equipment by all employees to be ensured.

The impact of fugitive emissions from the proposed expansion on air quality of the region is insignificant.

**4.3.4.2 Gaseous Emission Control Measures**

A 360° swing suction hood is provided just above crucible at required height to have effective suction of gases and fumes. Flue gases from the furnace will be passed through the hood into duct and through duct to spark arrestor. The exiting pollution control equipment of Wet scrubber will be replaced by bag filters to remove the pollutants from the proposed induction furnaces and for reheating furnace, the wet scrubber provided will remain the same.

The bag house will be equipment that will ensure filtration of particulates nuisances, dust from the induction furnace and will ensure that the system will give emission levels



less than 50 mg/Nm<sup>3</sup> well specified within the pollution control limits. The technical specification of bag filter is tabulated in the below table.

**Table 4-8 Technical Specifications of the bag filter**

| S. No | Specification                                      | Details                |
|-------|--|------------------------|
| 1     | Description  | Fume Extraction System |
| 2     | Suction hood with swivelling arrangement           | Provided               |
| 3     | Spark Arrestor                                     | Provided               |
| 4     | Emergency Dilution Damper                          | Provided               |
| 5     | Draft Balancing Damper                             | Damper Provided        |
| 6     | Gas volume (m <sup>3</sup> /hr)                    | 2 x 25000 = 50,000     |
| 7     | Inlet dust loading (gm/Nm <sup>3</sup> )           | 3-5                    |
| 8     | Anticipated flange to flange pressure drop (mm/wg) | 150                    |

**Transport of Materials:**

- ✓ Vehicles used for transportation will be equipped with novel engine for reducing emissions. Low sulphur-High Speed Diesel will be used for fueling vehicles. Periodical maintenance of vehicles with emission testing will be carried out.
- ✓ Additionally, the following measures will be taken as mitigative measures of air impact.
- ✓ Periodically monitoring of dust concentration level in the chimney and taking corrective steps if the concentration is not as per acceptable limit. The particulate concentration from the outlet of APC will remain within 30mg/Nm<sup>3</sup>.
- ✓ Raw material handling can cause dust generation at the point of storage and transportation. The fugitive dust can have an adverse impact on air quality inside the plant and its immediate surroundings. This would be prevented by spraying water at storage yard area and inside roads.
- ✓ Ambient air quality monitoring in and around the premises will be carried out as per direction by Tamil Nadu Pollution Control Board (TNPCB).
- ✓ All the internal roads shall be asphalted to reduce the fugitive dust due to truck movement.
- ✓ Transportation vehicles, generators, and machineries to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NOX and SOX within the limits established by CPCB.
- ✓ Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow.
- ✓ Attenuation of pollution/ protection of receptor through strengthening of greenbelt/ green cover.

### 4.3.5 Impact on Water Resources and Water Quality

#### 4.3.5.1 Impact on Water Resources

The entire water demand for the existing and proposed expansion will be met from Panchayat water supply. CUMI has estimated the water requirement for the proposed expansion to be 95 KLD. Out of this, 86 KLD will be the daily freshwater requirement.

#### Construction Phase:

- ✓ The sewage of 2.0 KLD from sanitary units will be disposed in septic tank-soak pit arrangement, Septic tank will be cleaned periodically by the authorized vendors.
- ✓ No Sewage will discharge into any surface water bodies or aquifers /inland surfaces.

#### Operation Phase:

- ✓ The sewage of 2KLD from sanitary units will be disposed in septic tank-soak pit arrangement, Septic tank will be cleaned periodically by the authorized vendors.
- ✓ No Sewage will discharge into any surface water bodies or aquifers /inland surfaces.
- ✓ The wastewater from the cooling processes (Induction Furnace & Re heating) is treated in the cooling pond followed by cooling tank and the treated water of 5 KLD will be recirculated for the processes. Effluent from Wet Scrubber 1.0 KLD is being sent to Solar Evaporation Pond, Sludge/salts from Solar Evaporation Pond is disposed through TSDF.
- ✓ Effluents/Sewage will not be discharged into any water bodies or aquifers under any circumstances.

Table 4-9 Details of Wastewater Generation and Its Mode of Disposal

| S. No | Description   | Quantity (KLD) |                 | Treatment                                  |
|-------|---|----------------|-----------------|--|
|       |   | Existing       | After expansion |  |
| 1     | Sewage  | 2.0            | 2.0             | Septic tank followed by soak pit           |
| 2     | Blow down from Cooling processes (Induction furnace, Con Caste cooling and Re-Rolling System) | 3.5            | 9.5             | Cooling tower and recycled back to process |
| 3     | Scrubber bleed  | 1.0            | 1.0             | Solar Evaporation Pond                     |

To minimize the impacts on groundwater table, CUMI has proposed to develop rainwater harvesting structures to recharge ground water table in plant site and to

enhance the ground water recharge potential in the region. The Proposed rainwater harvesting along with storm water management.

Provision of Storm water drainage system with adequate capacity, Proper maintenance of storm water drainage

Rainwater harvesting shall be promoted. Rainwater from the catchment area of the buildings and hardscape / paved area will be harvested and stored in the underground storage tank. Rainwater harvesting potential calculation is provided in Error! Reference source not found..

**Table 4-10 Rainwater Harvesting Calculation**

| S. No        | Category of land pattern                  | Area (Sq.m)      | Impermeability Factor | Harvestable water (Intensity x Area x Imp. Factor) cum/hr | constant co-efficient factor | Harvestable water (m <sup>3</sup> ) |
|--------------|---|------------------|-----------------------|---|------------------------------|-------------------------------------|
| 1            | Building area                             | 11153.73         | 0.6                   | 167.3   | 0.80                         | 133.84                              |
| 2            | Landscaped area (Green area, Vacant area) | 22510.06         | 0.3                   | 22.51   | 0.80                         | 18.01                               |
| 3            | Road/ Surface parking area                | 10504.64         | 0.9                   | 168.8   | 0.80                         | 135.04                              |
| <b>Total</b> |   | <b>44,168.43</b> |                       | <b>358.61</b>   |                              | <b>153.05</b>                       |

**Source:** Considering the constant co-efficient factor of 0.80 (for all situations) for evaporation, spillage, and first flush wastage (Source: CPWD Manual, 2002)

- ⊕ From Building area = 167.3 cu.m x 0.80 (for all time) = 133.84 cu.m
- ⊕ The water will be collected, treated with sand filter, and stored in Under Ground storage tank of 500 m<sup>3</sup>.
- ⊕ Storm runoff from open area, greenbelt area and paved area = 153.04 cu.m x 0.80 (for all time) = 122.4 m<sup>3</sup>.

All the water shall be routed to rainwater harvesting pits:

- ⊕ The run-off from terraces, roads, paved area & greenbelt & vacant area will be diverted through storm water network to individual percolation pits proposed along the project periphery and the rainwater will be re-charged into underground aquifers.
- ⊕ A percolation rate of 0.51 is considered with percolation depth as 10m.
- ⊕ Run-off = 122.4 x (1.0 - 0.51) = 60 m<sup>3</sup>
- ⊕ Size of percolation pit = 1.20 x 1.20m and 4.0m depth.
- ⊕ Storage volume in each pit: 5.76 m<sup>3</sup>
- ⊕ Quantity of storm water run-off: 60 m<sup>3</sup>
- ⊕ Number of Storage pits required: 60 m<sup>3</sup> / 5.76 m<sup>3</sup> = 10.42 (Considered 11 Nos)

- ⊕ 11 Nos. of percolation pits will be constructed along the project site periphery for rainwater recharge.

#### **4.3.6 Impact due to Solid Waste Generation**

The details of hazardous and non-hazardous waste generation with waste quantities and method of disposal are given in **chapter 2**. To avoid problems associated with solid waste disposal problems, an effective solid waste management system will be followed by the CUMI. The sludge from sewage treatment plant will be used as manure for green belt. The solar pan residue generated will be collected, stored, transported, and disposed in TSDF, Gummidipoondi. Hence, the impact due to solid waste generation from the plant operation is not envisaged.

##### **4.3.6.1 Solid waste management**

The collection, transportation and disposal of the solid waste generated during the operation phase of the proposed project will be done as per the Municipal Solid Wastes (Management & Handling) Rules, 2016 (MSW Rules). Recyclable items like paper, glass, iron bits, timber products etc. will be sold to local vendors. These generated solid wastes will be first segregated as plastic, glass, paper, and other waste separately and disposed of as per MSW Rule, 2016. The plastic, glass and paper waste may be collected by private vendors for recycling.

##### **4.3.6.2 Hazardous Waste Management**

The various hazardous waste generated from the process are used or spent oil, ETP sludge from wastewater treatment. ETP sludge waste is stored within the premises and disposed of as per the guidelines of CPCB and TNPCB which will be sent to TSDF facility. Hazardous waste materials will be properly disposed of as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 1989 and subsequent amendment in 2016.

Solid and hazardous wastes generated in the facility and their disposal methods are detailed in **Chapter 2 & Section 2.9**.

- ✓ Slag will be given to cement / bricks manufacturers.
- ✓ Spent oil is the only hazardous waste generating from the proposed expansion and it will be sold to TNPCB authorized recyclers.

The quantities of the solid waste generation before and after the proposed expansion are presented in below Table.

**Table 4-11 Hazardous and Non-Hazardous Waste Generation and Management**

| S. No                  | Name of the waste details                  | HWM 2016 Category | Qty (TPA) |                           | Treatment or Disposal   |
|------------------------|--|-------------------|-----------|---------------------------|---|
|                        |  |                   | Existing  | Proposed/ After Expansion |   |
| <b>Non-Hazardous</b>   |  |                   |           |                           |   |
| 1                      | Furnace Slag                               | --                | 3,696     | 17,924                    | Sold to Brick Manufactures / Road Laying and refilling or Cement industries |
| 2                      | CCM, Mill Scale, Mis rolls & End cuttings/ | --                | 1,870     | 17,792                    | Re-melted in induction furnace  |
| 3                      | Ash  | --                | 0.5       | 1.5                       | Sold to ash brick manufacturers   |
| <b>Hazardous Waste</b> |  |                   |           |                           |   |
| 1                      | Solar Pan residue                          | 37.3              | 50        | 150                       | Collected and transported to CTSDF Gummidipoondi                            |
| 2                      | Oil bearing cotton waste                   | 33.2              | 10        | 30                        |   |
| 3                      | Waste oils                                 | 5.7               | -         | 5.7                       |   |

#### 4.3.7 Impact on Noise level

The major noise generating sources are from the cooling tower, steel melting section, rolling mill section, transformer, machine shop, DG sets, loading & unloading operation. Considerable noise develops in the entire rolling mill section from the gearbox of the rolls and straightening machines, from pressure water pumps, from she ar and saws, from throwing finished products into a pit and from stopping movements of the material with metal plates. The noise levels at the source for these units will be in the range of 78-74 dB(A). The details of the major noise generating sources during the plant operational phase are listed in **Table 4-12**

**Table 4-12 Anticipated Noise Levels at Plant Boundary**

| S. No | Name of the Source            | Noise Level dB(A) |
|-------|-------------------------------|-------------------|
| 1     | Cooling Tower                 | 75                |
| 2     | Steel Melting Section         | 78                |
| 3     | Rolling Mill Section          | 74                |
| 4     | Transformer                   | 75                |
| 5     | Machine Shop                  | 77                |
| 6     | DG Sets                       | 76                |
| 7     | Loading & Unloading Operation | 75                |
| 8     | Air Compressor                | 78                |

#### Mitigation Measures:

The following control measures will be implemented for the proposed expansion project.

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to

- High noise generating sources will be insulated adequately by providing suitable enclosures, acoustic louvers, slots etc.
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, DG sets, transformer etc. will be provided with acoustic enclosure.
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units.
- Furnace operators will be protected by enclosing the source of noise with sound-deadening material or by providing sound-proofed shelters.
- Construction of noise protection wall at the scrap yard.
- Adequate (33%) greenbelt development is also being developed in the plant boundary of the steel plant.

#### **4.3.8 Biological Environment/Impact on Ecology**

There is no potential source of impact on terrestrial biology during the operational phase. The air pollution control devices along with greenbelt will control the release of air pollutants to a greater extent. It is expected that the ecology of the region will be preserved by these mitigation measures.

##### **4.3.8.1 Impacts on Terrestrial Ecology:**

The baseline flora and fauna has been depicted in Chapter-3. But there are no ecologically sensitive areas like Wildlife Sanctuaries within 10km radius from the plant and no migration route to avi-fauna is observed or recorded in study area. Similarly, as per the forest department, no endangered or rare species of flora and fauna are reported or observed in the study area. The impact on terrestrial ecology will be due to emission of pollutants like PM, NO<sub>x</sub> and SO<sub>2</sub>.

However, the incremental concentrations of these pollutants are very less and the impacts on the terrestrial ecology will be insignificant. Development of a thick green belt will reduce the pollution loads in the surroundings areas and contain the negative impact on forests and terrestrial ecology.

##### **4.3.8.2 Impact on Aquatic Ecology:**

Aquatic bodies are not found within the plant site. The treated sewage will be properly re-used and will not be discharged into any surface water streams outside the premise. The proposed expansion does not create any significant impact on aquatic bodies.

There is no potential source of impact on terrestrial biology during the operational phase. The air pollution control devices along with greenbelt will control the release of

air pollutants to a greater extent. It is expected that the ecology of the region will be preserved by these mitigation measures.

- ✓ There is no eco- sensitive and there are no wildlife sanctuaries or national parks or biosphere reserves or wetlands, or important bird areas or migratory corridors of wildlife within 5km from the project site.
- ✓ There are no timber trees or any of the threatened taxa of the BSI. There are no Reserve/Protected Forests within 5km of the core area.
- ✓ The existing flora and vegetation of the project site is going to be lost on account of construction activities (fabrication and erection of sheds, workshops, material handling and storage facilities).
- ✓ Greenbelt will be developed from the construction phase to improve the aesthetic value in the area and to screen out the fugitive dust generated during construction & will be minimized through paving and water sprinkling.
- ✓ Trees planted for green belt as per the guidelines issued by the Central Pollution Control Board's PROBES/1999-2000. Most of the trees planted in the Green Belt are native and indigenous to the area as recommended by CEPT's guidelines.
- ✓ Implementing Soil Conservation methods like, Windbreaks are composed of shrubs, plants and trees in garden/lawn areas, Regular watering soil along with plants, adding earthworms to soil for improvement of soil fertility and perennial fodder production.

#### **4.4 Greenbelt Development**

The main objective of the greenbelt is to provide a barrier between the plant and the surrounding areas. The greenbelt helps to capture the fugitive emissions and to attenuate the noise generated in the plant apart from improving the aesthetics of the plant site. In order to control industrial pollutants, dense tree plantations are necessary.

Selection of Species for Greenbelt Selection of plants for green belt plantation will be made on following criteria:

- ✓ The plant should be a fast-growing species.
- ✓ It should have deep root system.
- ✓ Should bear the leaves for a longer period.
- ✓ Should be a local species.
- ✓ Should have good survival rate.

CUMI is allocated 30% of land for green belt development as per norms. The width of the greenbelt will be maintained as per CBCB guidelines and there shall be 3rows of plants with a gap of 2m between the plants.

The capital cost of INR 10.0Lakhs will be earmarked for this purpose and INR of 0.5 Lakhs will be allocated for recurring expenses towards green belt development and maintenance.

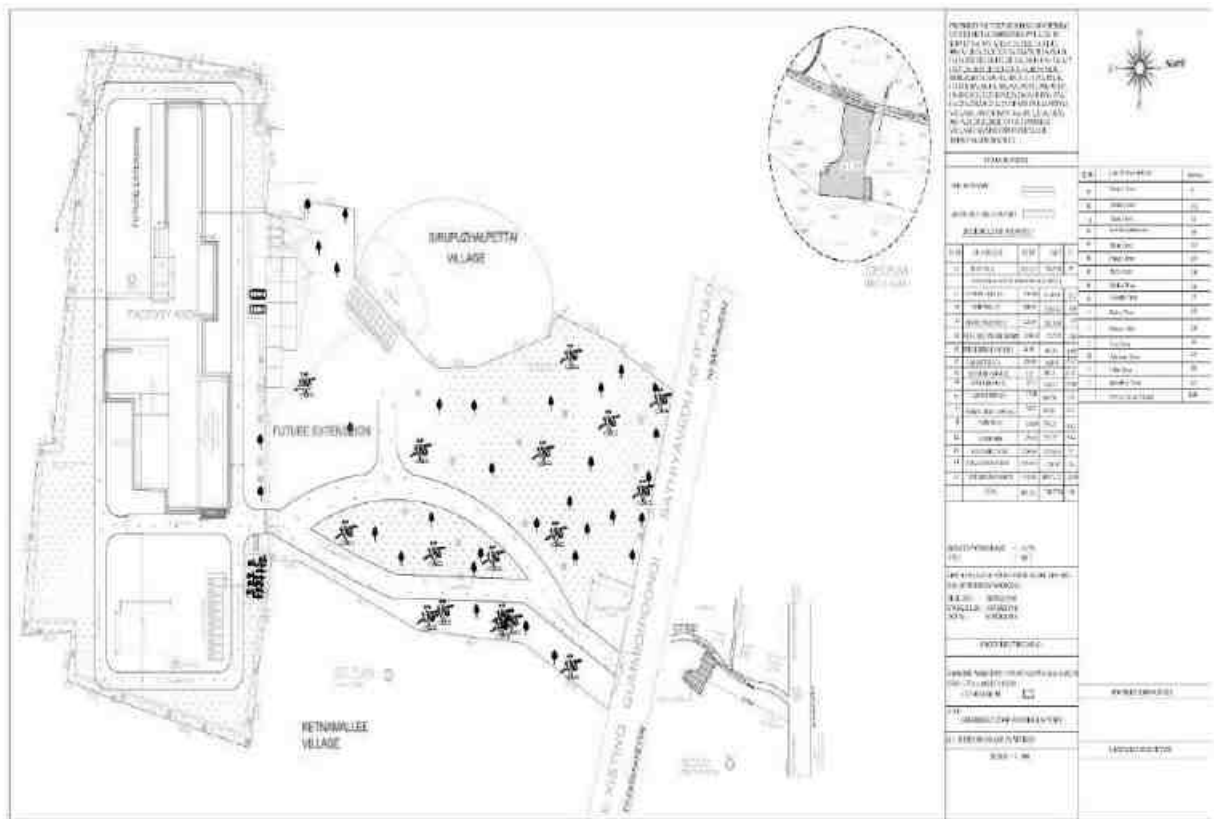


Figure 4-5 Proposed Greenbelt layout.

Table 4-13 List of Greenbelt plant existing and proposed for expansion.

| S. No. | Name of the tree     | No. of Trees Existing | No. of Trees proposed | No. of Tree after expansion |
|--------|----------------------|-----------------------|-----------------------|-----------------------------|
| 1      | Banyan Trees         | 36                    | -                     | 36                          |
| 2      | Ashoka Trees         | 373                   | 200                   | 573                         |
| 3      | Arasa Trees          | 78                    | -                     | 78                          |
| 4      | Red Bird of Paradise | 300                   | 300                   | 600                         |
| 5      | Neem Trees           | 315                   | 200                   | 515                         |
| 6      | Pungai Trees         | 365                   | 200                   | 565                         |
| 7      | Narra Trees          | 300                   | -                     | 300                         |
| 8      | Babbool Trees        | 350                   | -                     | 350                         |
| 9      | Coconut Trees        | 15                    | -                     | 15                          |
| 10     | Badam Trees          | 365                   | 100                   | 465                         |



|              |                   |             |             |             |
|--------------|-------------------|-------------|-------------|-------------|
| 11           | Banana Trees      | 220         | -           | 220         |
| 12           | Fren Trees        | 196         | -           | 196         |
| 13           | Aristocrat Trees  | 210         | -           | 210         |
| 14           | Palm Trees        | 350         | -           | 350         |
| 15           | Indian Beal Trees | 367         | -           | 367         |
| <b>Total</b> |                   | <b>3840</b> | <b>1000</b> | <b>4840</b> |

#### 4.4.1 Impact on Demography and Socio-Economics

As per 2011 census, the study area consists of 101335 persons inhabited in the 10km radial distance from the periphery of the plant. It is obvious to assume that the activities of the existing and the proposed increase in manufacturing will produce some improvements in the socio-economic levels in the study area.

- ✓ The proposed project area is a patta land, total project land is belonging to the CUMI., There are no R&R issues envisaged.
- ✓ The project site shall require no displacement of habitation as it is located away from the habitation area.
- ✓ Due to proposed project the socio-economic scenario of the area will be changed& Development of surrounding region.
- ✓ Socio-economic benefit to the locals as it would provide both direct employment (50Nos) and indirect beneficiary (150 Nos) during operational phase and during construction phase (100 Nos).
- ✓ Employment generation for local people, transporters, carpenters, labourer and other businesses and ancillary industry in the state
- ✓ Establishment of small and medium scale engineering ancillaries
- ✓ CER and CSR benefits to the local region people/Environment & Revenue to Government

Proposed Corporate Environmental Responsibility (2024-25 to 2026-27) is shown in Table 4-14.

**Table 4-14 Proposed Corporate Environmental Responsibility (2025-26 to 2027-28)**

| S. No                    | Details                             | Project Description   | Amount in Rs. (Lakh)  |            |            |
|--------------------------|-------------------------------------|---|---|------------|------------|
|                          |                                     |   | 2025-26   | 2026-27    | 2027-28    |
| 1                        | Sanitation public health            | Provide toilet facilities to Govt Schools & Solid waste disposal bins (10Nos) to Sirupuzhalpettai & Getnamalee villages (Each 30,000) | -   | 3.0        | -          |
|                          |                                     | Sanitary napkin vending machine 4 numbers (2 Nos for each village school) Each 50,000   | 2.0   | -          | -          |
| 2                        | Solar Street lighting               | Solar Street lighting for Sirupuzhalpettai & Getnamalee villages  | 5.0   |            | 5.0        |
| 3                        | Environmental Conservative Measures | Desiltation of existing water ponds in both villages (Sirupuzhalpettai & Getnamalee)  | -   | 1.0        | -          |
|                          |                                     | Greenbelt development (2000 plants) - at Schools & Public community areas Sirupuzhalpettai & Getnamalee Each plant (250/-)            | -   | 2.5        | 2.5        |
| <b>Sub Total (Lakhs)</b> |                                     |   | <b>7</b>  | <b>6.5</b> | <b>7.5</b> |
| <b>Total (Lakhs)</b>     |                                     |   | <b>21.0</b>   |            |            |
| <b>balance (Lakhs)</b>   |                                     |   | <b>15.25 Lakhs will be allocated for the opinions are raised during Public Consultation</b> |            |            |

**Note:** Above plan will be changes as per Public Consultation opinions and requirements.

#### **4.4.1.1 Impact on Literacy and Educational Facilities.**

The data of the study area reveals literacy rates of 65.02%. The better literacy rates are possible due to assumed better economic conditions of the people. Better literacy means better social status and thereby improved lifestyle. This will be a positive impact due to the existing and proposed expansion activity.

#### **4.4.1.2 Impact on Civic Amenities**

The positive impacts of plant activities on the civic amenities are substantial. The development of CSR activities like drinking, sanitation and infrastructure facilities in the nearby habitation could enhance the positive impact of the industry on people.

#### **4.4.1.3 Impact on Economic Aspects**

The impact of industrialization on the economic aspects can be clearly observed. The existing plant activities have already provided employment as directly 30 persons of different skills and trades. However, the proposed expansion also provides additional employment opportunities to the local population nearby 20Nos. During Construction phase 50Nos.

The employment has ameliorated the economic conditions of these families directly and has provided employment to many other families indirectly who are involved in business and service-oriented activities.

#### **4.4.2 Risk & Hazard**

Risk and Hazard will be identified during the operational activities and Odor generation from waste storage area. Product Handling & Storage during Product Manufacturing, Effluent discharge, and Solid/Hazardous Waste Generation.

The chances of accident may increase due to transportation activity. Spillages/leakages, discharge of fuels. Occupational health hazards due to handling of wastewater, gaseous emissions, and solid wastes, as well as process operations.

#### **Mitigation Measures**

- ✓ Loading and unloading equipment will be inspected and maintained regularly.
- ✓ External and internal visual inspections of the plant operations.
- ✓ Adequate ventilation will be provided at the manufacturing area.
- ✓ Fire extinguishers will be provided at designated places.
- ✓ PPEs will be provided to the workers.
- ✓ Risk assessment and DMP will be prepared and shall be followed.
- ✓ Greenbelt will be developed from the construction phase to improve the aesthetic value in the area and to screen out the fugitive dust generated during construction & will be minimized through paving and water sprinkling.
- ✓ Implementing Soil Conservation methods like, Windbreaks are composed of shrubs, plants and trees in garden/lawn areas, Regular watering soil along with plants, adding earthworms to soil for improvement of soil fertility and perennial fodder production.

#### **4.4.2.1 Impacts on Public Health and Safety:**

The discharge of waste materials (stack emission, wastewater, and solid wastes) from process operations can have potential impact on public safety and health. The impact from the discharge of waste products is not expected to be significant since, the adverse impacts on ambient air, water and soil quality are predicted to be low. It is predicted that the impacts on public safety will be very low, due to the effective safety system and safety management available in the plant. Overall, the impact on public safety and health from the expansion of steel plant activities are likely to be insignificant.

CUMI will provide a safe and healthy work environment for its employees by conducting annual medical check-ups for all the employees.

The main objectives are.

1. Maintenance and promotion of workers' health and working capacity.

2. Improvement of working environment by following well-being program for its employees.
3. Monitor the workplace to maintain industrial hygiene practices.
4. Development of work culture in a direction which will support health and safety at work and thereby promoting positive social climate for smooth operation that will enhance productivity. Area monitoring is done.
5. Employees undergo annual health check-up.
6. All personnel will be provided with personal protective equipments individually as required.

The general functions of the safety committee will be.

1. Identify workplace hazards.
2. Conduct routine workplace inspections.
3. Provide Personal Protective Equipment.
4. Develop and implement safe work procedures and rules.
5. Provide on-going safety training & Enforce safety rules and appropriate discipline.
6. Promote safety awareness and reduce the potential for injury/loss.
7. Enforce of safety rules, measure safety performance & reduce frequency/severity of injuries.

#### 4.4.3 Possible Occupational Health Hazards and Impacts

Details of Occupational Health Impacts and Safety Hazards are shown in **Table 4-15**.

**Table 4-15 Details of Occupational Health Impacts and Safety Hazards**

| S. No | Possibilities of Occupational Health Hazards | Occupational Health Impacts            |
|-------|--|--|
| 1     | Exposure to fire                             | Fall injury, electrocution,            |
| 2     | Exposure to chemical dust                    | Body injury, burns, skin sensitization |
| 3     | Slip/trip, fall, electric shock, etc.        | Severe irritation to eyes & skin       |
| 4     | Overflow                                     | Damage to nearby equipments            |
| 5     | Exposure to Heat                             | Fatality etc.                          |

#### 4.4.4 Occupational Health Surveillance Programme

Surveillance is an important core activity in the practice of occupational health. Two broad groups of surveillance are commonly performed **hazard surveillance** is given in **chapter 7, Section 7.2** under Risk Assessment, and **health surveillance**. Although the focus of the former is hazards at the workplace, the latter type of surveillance pertains to the health of a person from a particular group of workers.

Health surveillance is an important part of health-risk management and seeks to confirm whether employees are potentially exposed to existing workplace hazards, whether the control measures are effective and the workers.

The Factories Act, 1948 (as amended in 1987), and the rules framed thereunder provide for preemployment and periodical medical examinations of workers employed in industries with hazardous chemicals/processes and dangerous operations under Section 41-C and Section 87, respectively. A list of 29 notifiable diseases in Schedule III, permissible exposure limit (PEL) values in Schedule II, and list of dangerous operations is given in the Factories Act. The Proposed Occupational Health Surveillance Planning is shown in **Table 4-16**.

**Benefits of occupational health Programme:**

- ✓ Prevents cost of absence and ill-health redundancy
- ✓ Reduction in re-training and recruitment costs
- ✓ Helps in retention of staff and build employee loyalty.
- ✓ Increased productivity leading to increased profits.
- ✓ Decrease employer liability.
- ✓ Reduced risk and cost of litigation
- ✓ Rise in public profile of the company
- ✓ Helps to prevent occupational disease like deafness, cancers, asthma, etc.
- ✓ Protection of both physical and economic wellbeing of employees
- ✓ Corporate social responsibility
- ✓ Compliance with legislation
- ✓ Less insurance premium

Health program network will be proposed as below steps:

**I. Organize the Team**

- |                            |             |
|----------------------------|-------------|
| ✓ Dept / section head      | Team leader |
| ✓ Field HSE representative | Member      |
| ✓ Site medical officer     | Member      |
| ✓ Technical personal       | Member      |
| ✓ Any specialist           | Member      |

**II. Occupational Health Surveillance Planning:**

- ✓ **Pre-Employment Screening/Examinations:** All employees will be subjected to pre-placement medical examinations to determine their fitness for the jobs on site. Potential exposure to the work environment will be considered before placing an employee on the job. (**List of Tests:** Audiometric, Vision, Color Blindness, Chest, Urine, RBS, T.B., Cancer, AIDS, Liver Function Tests (LFT), Eye Test, CBC Urine, Chest X-Ray Glutamic Pyruvic Transaminase (SGPT) and Stool D/R etc.)
- ✓ **Periodic Medical Examinations:** Periodic medical examination is the same as the pre-employment screening and may be modified according to current conditions, such as changes in the employee's symptoms, site hazards or exposures. (**List of Tests:** Periodical Check-up– Audiometric Test, Liver Function Tests (LFT), Color

*Blindness, Eye Test, Urine, RBS, complete blood count, dental X ray, Anemia, X Ray, Serum Glutamic Pyruvic Transaminase (SGPT) and Stool D/R, Medical fit test for use of Breathing Apparatus, vision etc.)*

- ✓ Comparison of sequential medical reports with baseline data is essential to determine biologic trends that may mark early signs of adverse health effects, and thereby facilitate appropriate protective measures. The frequency and content of examinations are normally one year. Apart from this for workers working in Hazardous area, medical examination is conducted by Doctor Authorized by Factory Inspectorate.

### **III. Define Scope**

Occupational Health Surveillance Planning, Break down areas as for HRA Assessment matrix in Production area, storage areas, Workshop, Store, Control room, another department, etc.

**Table 4-16 Proposed Occupational Health Surveillance Planning**

| S. No | Cadre                              | Occupational Exposures   | Possible Hazards  | Surveillance Required   |             | Frequency            |
|-------|------------------------------------|--|---|---|-------------|----------------------|
|       |                                    |  |   | Screening   | Vaccination |                      |
| 1     | Production maintenance Technicians | Noise level above 85dB for 8 hrs a day   | Hearing loss  | Liver Function Tests (LFT)  | -           | Initially/Upon entry |
|       |                                    | During Electrical works  | Color blindness   | Audiometric Test, Liver Function Tests (LFT)  | -           | Annual               |
|       |                                    |  |   | Color Blindness (Only for electrical technicians)   | -           | Initially/Upon entry |
| 2     | Vehicle Operators                  | Driving for company business   | Vision& hearing loss  | Eye Test  | -           | Annual               |
|       |                                    |  |   | Audiometric Test  | -           | Initially/Upon entry |
|       |                                    |  |   | Color Blindness   | -           | Initially/Upon entry |
| 3     | Forklift/Crane Operators           | Loading/ unloading driving   | Vision& hearing loss  | Eye Test  | -           | Annual               |
|       |                                    |  |   | Audiometric Test  | -           | 2 - yearly           |
|       |                                    |  |   | Color Blindness   | -           | Initially/Upon entry |
| 4     | Occupational Health Centre Staff   | Infectious agents in blood and other body fluids, while handling the patients. | Transmission of contagious diseases from patients                             | -   | Hepatitis B | Complete Course      |
|       |                                    |  |   | -   | Tetanus     | 5 Yearly             |
| 5     | Staff                              | Preparation of food for PPL Staff  | Transmission of contagious diseases e.g. Typhoid, A and Parasitic infections. | X Ray, Serum Glutamic Pyruvic Transaminase (SGPT) and Stool D/R                           | .....       | Upon entry           |
|       |                                    |  |   | .....   | Hepatitis A | Upon entry           |
|       |                                    |  |   | .....   | Typhoid     | Upon entry           |
|       |                                    |  |   | Medical Review by Company Doctor based on medical screening results of SGPT and Stool D/R | .....       | Annually             |

|   |                        |  |  |   |             |   |
|---|------------------------|--|--|---|-------------|---|
| 6 | Janitorial Staff       | Exposure to effluent & hazardous wastes  | Susceptible to diseases like Typhoid, Hepatitis etc.                     | .....   | Hepatitis B | Complete Course   |
|   |                        |  |  | .....   | Tetanus     | 5 Yearly  |
| 7 | Security & Safety team | Use of breathing apparatus conditions of fire emergency Sirens of high pitch during emergency. | Susceptible to cardio-respiratory distress and syncope. Vision & hearing | Medical fit test for use of Breathing Apparatus | .....       | Annually  |
|   |                        |  |  | Vision  | .....       | Annual for Staff over 45 yrs.<br>Two yearly for Staff below 45 yrs. |
|   |                        |  |  | Audiometric                                     | .....       | Two Yearly for all Staff  |



#### **4.4.5 Environment, Health, and Safety policy**

CUMI is prepared Environment Health and Safety Policy (HSE) and will be placed it at appropriate places in the factory premises and record. The proposed Environmental Health and Safety Policy is enclosed as **Annexure-18**.

#### **4.4.6 Proposed safety systems and precautionary measures**

Personal protective equipment (IS approved) like safety helmet, safety shoes/ gumboots hand gloves, gas mask/ nose mask, PVC apron, SCBA Set, PVC pressure suit, goggles, hood, etc. will also be provided to the required personnel, the details are provided in the following sections. Regarding safety management and measures taken to maintain a safe working atmosphere in the factory. The following programmes will be arranged by PP.

**Safety Committee:** The Environmental Management Cell will act as Safety committee will be held once in the quarter.

**Operation Safety committee:** This committee consists of members of departmental in charges such as production, store, electrical and mechanical, security, and logistics. The meeting of this committee is conducted once a month.

#### **4.4.7 Details of Work Zone Monitoring**

Work zone monitoring will be carried out by a third party once every 6 months. Location for samplings shall be identified. Ambient air & noise monitoring shall be done as per requirements.

The unit will have multi gas / toxic gas and oxygen detectors/VOC Monitor in that multi gas detector can be used to check oxygen, LEL, VOC, CO and H<sub>2</sub>S concentration in atmosphere and in confined spaces like areas involved different process, overhead tanks, sumps etc., and oxygen detector can be used for checking oxygen concentration in atmosphere and in confined spaces like areas involved different process, overhead tanks & sump etc.

The following information will be incorporated in the format for maintaining records of work zone monitoring.

- ✓ Location/operation monitored.
- ✓ Identified contaminant.
- ✓ Sampling instrument used.
- ✓ Number of samples.
- ✓ Range of contaminant concentration as measured in sample.
- ✓ Average concentration.
- ✓ Reference method used for analysis.

- ✓ Number of workers exposed at the location being monitored.
- ✓ Signature of the person taking samples.

#### **4.4.8 Monitoring of the Occupational Injury & it's Impact on Workers**

Following action plan will be prepared & followed to monitor the occupational injury to workers:

- ✓ Each workplace will be evaluated for the existing work conditions.
- ✓ Unsafe act & unsafe practices will be identified.
- ✓ Unsafe equipment's, unsafe areas, etc., will be identified.
- ✓ Area will be checked for proper ventilation and illumination.
- ✓ Air-borne concentration of toxic chemicals will be measured, and records will be kept.
- ✓ Evaluation of training & on the job work
- ✓ Impact of the above-mentioned unsafe conditions on workers will be studied and remedial measures for the same will be adopted.

#### **4.4.9 Safety Trainings & Mock Drills**

Safety training (on safe material handling, first aid, & all safety aspects) shall be provided monthly by the safety officers to department wise.

Evaluate the effectiveness of emergency preparedness and to spread the awareness among employees' mock drill will be carried out at the interval of every six months. After completion of the mock drill, a summary report shall be made, and corrections will be made if any weakness has been observed.

CUMI is proposed an adequate SAFETY Systems details are provided in **Section 10.10.4** along with the above safety systems, the company also ensured the below safety features to ensure Zero Accident. Safety measures to remove hazards and use safety measures to handle those hazards. CUMI will adopt the following safety measures.

- ✓ No maintenance work or fabrication work is permitted hot permit are issued.
- ✓ No ignitable zones are declared and marked so.
- ✓ Work permit system with strict compliance.
- ✓ Body earthing provided to all equipment involved in the process, electrical earthing, static earthing, and instrument earthing provided wherever required.
- ✓ Safety posters are displayed at vital places of work.
- ✓ Safety slogans are conveyed on day-to-day basis by displaying on notice board.
- ✓ Housekeeping is maintained on top priority.
- ✓ Training programmes are conducted to create awareness about safety among staff/workers.

- ✓ Firefighting system is updated and maintained to meet any emergency at any time fire hydrant system and fire equipment are kept in serviceable condition. Firefighting training and mock fire drill are conducted monthly.
- ✓ Lifts, cranes, forklift will be examined in every six months by authorized agency.
- ✓ Safety of building and machinery is taken care of on top priority by concerned maintenance authority.

**In respect to health measures, following measures are being taken in the factory:**

- ✓ Housekeeping is carried out and maintained.
- ✓ Accumulation of dirt and refuse will be removed, flooring is kept clean, and waste is disposed.
- ✓ First aid boxes are kept and maintained at required places.
- ✓ Ambulance is kept in ready position to meet any case of emergency.

As per the provisions of factory Act'1948 and in exercise of powers conferred by section (40B), a medical officer assisted by one qualified subordinate. First aid training program will be conducted periodically. The following action to be considered in the programs.

- ✓ Surrounding areas, drainages are kept clean.
- ✓ State of art RIDGE ventilation systems will be provided at every workplace.
- ✓ Sufficient lighting will be provided at every workplace.
- ✓ Drinking water facilities will be provided for workers in the factory.
- ✓ Latrines, urinals, and spittoons will be provided for workers.
- ✓ Occupational Health monitoring will be provided as given in the following sections.

**4.4.10 Proposed Safety Systems**

Fire & Safety Systems for proposed project is provided in **Table 4-17**. Suitability of Extinguishing Media for Different Fires is summarized in **Table 4-18**.

**Table 4-17 Fire & Safety Systems for proposed project**

| S. No | Name of the Equipment            | Existing       | Proposed | After Expansion |
|-------|----------------------------------|----------------|----------|-----------------|
|       |                                  | Quantity (Nos) |          |                 |
| 1     | Fire Extinguishers               | 100            | 100      | 200             |
| 2     | Fire Alarm System                | 3              | 5        | 8               |
| 3     | Eye wash fountain/Safety Showers | 5              | 5        | 10              |
| 4     | Emergency PPE cupboards          | 10             | 15       | 25              |
| 5     | Wind Sack                        | 1              | 0        | 1               |
| 6     | Sand buckets                     | 40             | 0        | 40              |
| 7     | First Aid                        | 10             | 15       | 25              |

#### 4.4.11 Fire Extinguisher

Suitability of fire extinguisher depending on the combustible material, fires have been classified into four types. Suitability of extinguishing media for different fires is provided in **Table 4-18**.

**Table 4-18 Suitability of Extinguishing Media for Different Fires**

| S. No | Class of fire   | Suitable Fire Extinguisher               |
|-------|---|--|
| 1.    | <b>Class A:</b> Organic Material i.e., wood, papers, rubber & plastics.                               | DCP, Mechanical Foam                     |
| 2.    | <b>Class B:</b> Flammable Liquid and Flammable Gases i.e., Petroleum Products, Paints, Chemicals etc. | Mechanical Foam, CO <sub>2</sub> and DCP |
| 3.    | <b>Class C:</b> Electrical  | DCP and CO <sub>2</sub>                  |
| 4.    | <b>Class D:</b> Flammable Metals i.e., Lithium, Sodium, and Potassium etc.                            | Special DCP, Sand                        |

The company will have trained personnel for firefighting and intends to improve the firefighting skills of employee by conducting frequent training on Firefighting. The unit will have 200 Nos. of different types (CO<sub>2</sub>, ABC, Water Jet, Mechanical Foam, DCP and sand buckets) of portable fire extinguishers after expansion placed in all prominent places in the factory. Proposed fire extinguishers are given in **Table 4-19**.

**Table 4-19 Proposed Fire Extinguishers details.**

| S. No        | Type                    | Capacity | No's       |            |                 |
|--------------|-------------------------|----------|------------|------------|-----------------|
|              |                         |          | Existing   | Proposed   | After Expansion |
| 1            | ABC Fire Extinguishers  | 50 Lts.  | 20         | 30         | 50              |
| 2            |                         | 10 lts   | 30         | 10         | 40              |
| 3            | Foam Fire Extinguishers | 25 Kgs.  | 15         | 20         | 35              |
| 4            | CO <sub>2</sub>         | 9.5 Kgs. | 35         | 40         | 75              |
| <b>Total</b> |                         |          | <b>100</b> | <b>100</b> | <b>200</b>      |

#### 4.4.12 Emergency Equipments and PPEs

The unit will have total 10 numbers of Emergency cupboards. Each Emergency Cupboard will have the following items.

- Air suits / Air Line Respirators
- Nose Mask
- PVC / Acid Suit
- Helmet- Provided to individuals.
- Ear Plug
- Safety Glass & Face Shield
- Gum boots
- Safety Belt
- Manila Rope / Life Safety Rope
- Fire Axe
- Fire Proximity Suit
- Fire Gel Blankets / Water Gel Blanket
- Resuscitator
- Spill Kit
- Safety Ladder
- Emergency Flameproof Torches
- Hand gloves

**Details and Description of Safety equipment are shown below.**

**1. Fire Axe:**

A fire axe is a type of axe which has been designed specifically for the use of fire-fighters, and it includes several features which makes it ideally suitable to mitigate emergency services.



**2. Helmet:**

A helmet with face shield is a form of protective gear worn on head to protect head and face from hazards such as flying objects and chemical splashes or potentially infectious fluid.



**3. Fire Suit:**

Fire suit is a protective clothing designed to protect a firefighter from high temperatures, especially near fires of extreme temperature.



**4. Manila rope:**

Manila rope is very durable, salt water and damage resistant, flexible fiber which shall be used to access at height/Confined space during emergency



**5. Smoke escape mask:**

Smoke masks assist people in safe egress from fire emergencies. It will provide respiratory protection from particulate matter, carbon monoxide, and other toxic gases commonly produced by structural fires.



**6. Canvas Stretcher**

A stretcher is a medical device used to carry injured or an incapacitated person from one place to another during emergency.



**7. Compressed Air Pack**

An emergency air supply which will provide enough air to allow a worker to exit oxygen depleted or contaminated area.



**8. Powered Air purifying respirator**

PAPR utilizes a powered mechanism to move ambient air through an air-purifying element(s) to remove contaminants from the ambient air.



**9. Safety torch**

Compact and simple to use, this torch is designed for use in emergency situations or wherever the need arises for a handheld safety torch.



**4.4.13 Eye Wash Fountain and Safety Shower**

The unit proposed 5Nos. of Eye wash fountain / Safety showers. 2 nos will be in Billet manufacturing plant and, the remaining 3 will be arranged in Re rolling plant.

**4.4.14 Wind Sack / Wind Direction Indicator**

Wind sacks are placed above the Administration Block buildings.

#### **4.4.15 Occupational Health Centre (OHC)**

CUMI will have an agreement with nearby hospitals for their valuable service during emergencies along with 24/7 ambulance facility. Rs. **5,00,000/-** Fund will be allocated for occupational health & safety of all employees and implementation of Fire and safety systems as proposed.

#### **4.4.16 First aid Boxes**

First aid kit is a collection of supplies and equipment for use in giving first aid. First Aid boxes will be made available in the Security Room, Admin Block and OHC. First Aid items will be issued to injure only by authorized persons.

Following are the contents of First Aid Box

1. Dettol – Antiseptic solution
2. Ciplox – Eye Drops
3. Soframycin – Skin ointment
4. Silverex – Burn ointment.
5. Betadine – Microbicidal solution
6. Iodex – Pain reliever
7. Sterilized Cotton Wool
8. Surgical Paper Tape
9. Small Sterilized Dressings
10. Medium Sterilized Dressings
11. Roller Bandage – 5 cm wide
12. Roller Bandage – 10cm wide
13. Band Aid
14. Crocin / Paracetamol Tablet

#### **4.5 Summary**

Impacts on land environment, air environment, water environment, noise environment, biological environment, socioeconomic environment, and risk & hazard has been identified and mitigation measures for the same for both construction (Machinery Erections only) and operation phase are incorporated. AAQ modelling study It was observed that the maximum concentration of PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> observed due to proposed stacks are 0.671µg/m<sup>3</sup>, 0.625µg/m<sup>3</sup> and 9.556 µg/m<sup>3</sup> without control measures. So, it can be concluded that the impact envisaged is minimum and well within the CPCB standard (NAAQS). From the overall study and evaluation of impacts, it can be concluded that the overall negative impacts from various activities on different environmental parameters is negligible with proper EMP in place.

# **CHAPTER – 5**

## **ANALYSIS OF ALTERNATIVES**

### **(TECHNOLOGY/SITE)**

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*(The chapter describes the alternative sites and the proposed factors for locating at the mentioned location. This would also describe the alternative technologies, if any for manufacturing proposed products.)*

# 5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

## 5.1 Introduction

Analysis of alternative site study has been carried out for the following requirements.

1. Project site
2. Technology
3. Power

## 5.2 Alternative Study for Site

The proposed expansion will take place within the existing plant premises itself. Therefore, no additional land will be acquired for the proposed expansion.

Availability of additional open space in the existing industry which is sufficient to carry out the proposed expansion.

- No forest land is involved.
- No crop land or agricultural field located nearby.
- Nearest habitation Rajulakandigai village is located at ~0.27Km(W).
- The site has near connectivity to supplying industries.
- Located near to waste co-processing industries and disposal centre.
- Accessibility to Gummidipoondi railway line and Ennore seaport.
- State highway Satyavedu to Kavaraipettai (SH-52) is located adjacent to the plant site.
- Power connectivity from TANGEDCO.
- Manpower availability from nearby areas.
- No resettlement and rehabilitation issues
- Alternate site analysis is not required for the proposed expansion activity.

## 5.3 Alternative Technology

The steel rolling mill sector and electric induction sector forms the key segments of the secondary steel production in the country. In the existing plant, an induction Furnace of capacity 1x 8T/Heat is replaced with 3 X 25T/H with 6 Crucible (3 Crucible is in standby) used for melting raw materials such as Sponge iron, Scrap etc., the molten metal then carried to the tundish where the billets were drawn and cut to the required size. The produced billets are then cooled and stored for further processing. The reheating furnace of capacity 1 X 12T is used to melt the steel billets to produce the re-rolled products. Coal is used as a fuel for running the furnace, annually about 75 Tonne/Month of coal is



consumed during expansion time. The usage of fossil fuel leads to gaseous emissions such as SO<sub>x</sub>, NO<sub>x</sub>, PM etc.

Direct rolling, which is a revolutionary technology, introduced during early 2012, aims at utilizing the latent heat available in the continuous cast hot billets at the discharge of mould tube with a controlled cooling to ensure required solidification till the withdrawal of billet and thereby ensuring the maintenance of temperature required for re-rolling of steel through the existing rolling setup itself. Thus, the technology eliminates the use of re-heating furnace and forms a direct transfer mechanism for the hot billets from the continuous casting machine to the rolling mill directly.

### **Other hot rolling technology and Direct Hot Rolling:**

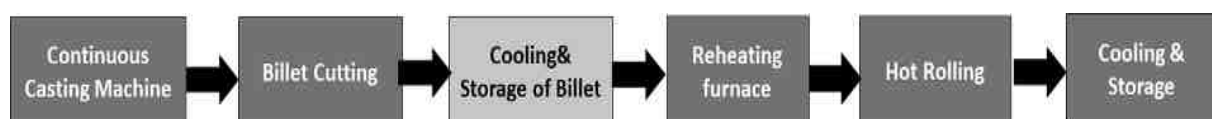
Reheating furnaces may encounter a few problems including non-uniform increase in temperature of the billet due to unjustified travel speed in the reheating furnace which produces a temperature gradient across the billet cross-section; uneven heating; larger surface to volume ratio near the edges compared to center and heat sink to the supportive members of the billet resulting in skid marks. Moreover, in energy-deprived countries like Bangladesh, where the use of gaseous fossil fuel is limited, gas-fired reheating furnaces cannot always be allowed to consume a large amount of fuel required for proper distribution of heat throughout the cross-section of billets for a prolonged period of time. A solution to the above-mentioned problems can be charging billets from CCM directly to the reheating furnace prior to rolling, bypassing billet storage at ambient temperature. More ambitiously, another solution can be sending billets from CCM directly to rolling mill, bypassing reheating furnace and billet inventory.

As outlined above, there can therefore be three approaches for hot rolling of rebar:

- Hot billets from CCM are stored separately and then moved for heating in reheating furnace prior to rolling.
- Placing hot billets from CCM into a reheating furnace and raise the temperature before transferring them to the rolling unit.
- Transferring hot billets from CCM directly to the rolling unit.

### **Conventional Rolling Process:**

In this Process, the hot billets are cooled to room temperature and kept in store and checked for scratches and defective locations; they are then repaired before being heated in the reheating furnace prior to rolling. (i) This is conventional rolling (CR) process.



### **‘Hot Charging’ or ‘Hot Charge Rolling’ (HCR):**

In Method (ii), the hot billets are directly transferred, via reheating furnace, to the rolling unit without the cooling process mentioned for Method (i). This is termed as ‘Hot Charging’ or ‘Hot Charge Rolling’ (HCR) process.



### **‘Direct Rolling’ or ‘Direct Hot Rolling’ (DHR):**

In this method, the hot billets are directly transferred to the rolling unit by means of a high-speed roller table. This is termed as ‘Direct Rolling’ or ‘Direct Hot Rolling’ (DHR) process.



This route is an advanced and upgraded practice of the former processes. This system has been instigated by modernizing rolling technology, practices of heat control and casting techniques. These modifications ensure that heat of billets in CCM is not substantially reduced.

In Hot charge rolling route, the billet is guided to reheating furnace before the billet cools off below 650°C, reducing the time in reheating furnace. Conversely, in Direct Hot Rolling route, the cast billet is sent directly to rolling mill.

### **Advantages of Direct Hot Rolling:**

- Most importantly, the pollution levels are kept in control by eliminating the fuel consumption which reduces the GHG emission.
- The Plant brings profit and happiness to Industry at the same time protects the environment and makes the steel industry as more sustainable.
- Reduction in the scale loss have been burned in the billet reheating furnace.
- The rolling hot billets will also improve the quality of rolled steel products and substantially reduce the rejections generated during rolling because of mould cast and Billets.
- It will also help in reducing the risks of lower production caused due to the manpower engaged in vital function of mould settings, finishing, and loading in the billet reheating furnace etc.
- It also Reduces the overall machinery and production cost; and it will reduce miss roll, cobbles, etc and improve the product quality, increase percentage of yield etc.

## 5.4 Summary

No Alternative Site was considered for the proposed project since the existing premises. CUMI' is being adopted **Direct Hot Rolling** (DHR) method as the best option, the same will be followed for the proposed expansion project. Apart from this, not Ecologically Sensitive, no National Park, no Wildlife Sanctuary, no Biosphere Reserve, and no Protected Forests are attracted to the project site. Also, some alternatives for technology were considered for the proposed project is being adopted tested technology. A partial building area will be designed to establish the solar panel and the project proponent explores the phase wise installation of solar panel to meet the lighting power required energy from renewal energy source.

# **CHAPTER – 6**

## **ENVIRONMENTAL MONITORING**

### **PROGRAMME**

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*(The chapter Describes the post project monitoring plan and the budgetary provisions for the various environmental components.)*

# 6 ENVIRONMENTAL MONITORING PROGRAMME

## 6.1 General

This chapter presents the details of environmental monitoring, schedule, institutional arrangements for pollution control, cost for environmental protection measures and details of greenbelt development for the proposed expansion project.

To ensure compliance with environmental regulation and to maintain healthy environmental conditions around the proposed expansion of steel melting plant and rolling mill, several measures have been proposed in the Environmental Management Plan (EMP) for mitigation of adverse environmental impacts. These shall be implemented as per the proposal and shall be monitored regularly.

Environmental monitoring is the measurement of environmental parameters at regular intervals over an extended period. Monitoring allows the assessment of environmental and biological changes in an ecosystem. All the project activities shall be monitored to ensure that appropriate environmental mitigation activities are being implemented and to identify areas where Environmental Management Plan compliance is not satisfactory. Hence, Environmental quality monitoring of critical parameter is very essential in the routine activity schedule of project operation.

A major part of the sampling and measurement activities will be concerned with long-term monitoring aimed at providing an early warning of any undesirable changes or trends in the natural environment that could be associated with the plant activity. This is essential to determine whether the changes are in response to a cycle of climatic conditions or due to plant activities. During the operation phase, Environment Monitoring Cell (EMC) will undertake all the monitoring work to ensure the effectiveness of environmental mitigation measures. The suggestions given in the environmental monitoring programme will be implemented by the EMC by following an implementation schedule. In addition to the monitoring programme, the following will also be done to further ensure the effectiveness of the mitigation measures:

- Environmental inspections will be carried out for the entire plant operation to check for compliance with standards / applicable norms by in-house experts; and
- The environmental aspects to be monitored will ensure proper implementation and effectiveness of various mitigation measures envisaged/adopted during the design and commissioning stage of the proposed expansion as described here under

For each of the environmental attributes, the monitoring plan specifies the parameters to be monitored, location of monitoring sites, frequency and duration of monitoring and

it also denotes the applicable standards, implementation, and supervising responsibilities. An Environmental Monitoring Programme shall be scheduled for the following major objectives:

- ✓ To verify the result of the impact assessment study with regards to new developments.
- ✓ To follow the trend of parameters which have been identified as critical to implement water quality, air quality and noise impact monitoring program.
- ✓ To check or assess the efficiency of controlling measures to provide an early indication and suggest appropriate additional or remedial measures should any of the environmental mitigation measures or controls fail to achieve acceptable standards.
- ✓ To determine project compliance with regulatory requirements, standards, and Government policies.
- ✓ To ensure that the areas of environmental concern identified during EIA process are carried through to, and appropriately considered and incorporated into the detailed design and tender stage of project.
- ✓ To take remedial action if unexpected problems or unacceptable impacts arise.
- ✓ To conduct regular reviews of monitored data as the basis for assessing compliance with defined criteria.

## 6.2 Implementation Schedule of Environmental Management Plan

The mitigation measures suggested in Chapter - 4 will be implemented to reduce the impact on environment due to the operations of the plant operation. To facilitate easy implementation, mitigation measures are phased in as per the priority of implementation. The priority of the implementation schedule is given in **Table - 6.1**.

**Table 6-1 Emp Implementation Schedule**

| S. No | Recommendations                  | Requirement                                 |
|-------|----------------------------------|---|
| 1     | Air pollution Control measures   | Before commissioning                        |
| 2     | Water pollution control measures | Before commissioning                        |
| 3     | Noise control measures           | Along with the commissioning of the project |
| 4     | Solid waste management           | During commissioning of the project         |
| 5     | Greenbelt development            | Stage wise implementation                   |

## 6.3 Environmental Monitoring and Reporting procedure

Regular monitoring shall check whether the commitments proposed are being met. This may take form of direct measurements and recording of quantitative information such as amounts and concentrations of discharge, emissions, and wastes, for measurements against corporate statutory standards, consent limits or targets. It may also require

measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators.

### **6.3.1 Objective Monitoring**

The objectives of environmental post-project monitoring are to:

- Verify effectiveness of planning decisions.
- Measure effectiveness of operational procedures.
- Confirm statutory and corporate compliance.
- Identify unexpected changes.

The attributes which require regular monitoring are specified underneath:

- Air quality.
- Water and wastewater quality.
- Noise levels.
- Soil quality.
- Green Belt Development.

The post project monitoring to be carried out at the industry level is discussed below:

### **6.3.2 Monitoring and Reporting Procedure**

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of the environment during operational phase. With the knowledge of baseline conditions, the monitoring program can serve as an indicator for any deterioration in environmental conditions due to operational phase and suitable mitigation steps could be taken in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. The following routine monitoring program will be implemented under the post project monitoring. The environmental attributes shall be monitored as given below:

#### **6.3.2.1 Air Pollution and Meteorological Aspects**

- Both ambient air quality and stack emissions will be monitored. The ambient air quality is to be monitored twice in a week in line with the guidelines of Central Pollution Control Board for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and CO.
- Online stack emissions monitoring to be carried out for the parameter of SO<sub>2</sub>. In addition, flow rate, temperature, velocity will also be monitored for better interpretation of the results.
- Automatic weather monitoring stations shall be provided to monitor wind speed, wind direction, temperature, relative humidity, atmospheric pressure, rainfall, evaporation rate, solar radiation, and cloud cover. The parameters will be recorded at one-hour frequency.

#### **6.3.2.2 Wastewater Quality**

- The domestic sewage emanating from the sewage treatment plant will be monitored once a month for physico-chemical characteristics.

#### **6.3.2.3 Noise Levels**

- Noise levels near the rolling mill section, melting section, machine shop, cooling tower and DG sets will be monitored once in three months.

#### **6.3.2.4 Monitoring Equipment and Consumables**

- A well-equipped laboratory with consumable items will be provided for monitoring of environmental parameters. Alternatively, monitoring can be outsourced to a recognized laboratory.

### **6.4 Monitoring Schedule**

Environmental monitoring schedules are prepared covering various phases of project advancement, such as erection phase and regular operational phase.

#### **6.4.1 Environmental Management Plan during Construction Phase**

The proposed expansion envisages setting up melting furnaces and rolling components. The construction activities require preparing land, mobilization of construction material and equipment to plant site. The generic environmental measures that need to be undertaken during the project construction stage are given in **Table - 6.2**.

Environmental impacts during the construction phase can be attributed to the site preparation activity and the mobilization of workforce. The impacts of the construction phase on the environment would be basically of transient nature and are expected to wear out gradually on completion of the construction program. However, once the construction of the project is completed and its operations started, these operation stage impacts would overlap the impacts due to the construction activities.

- ✓ All the construction activities will be confined to the plant area only.
- ✓ The proposed site is already used for industrial land-use hence no change in land use is envisaged due to the project. The green belt will also be strengthened to carry dust and noise due to various activities. Hence no noticeable impact on ecology is expected.
- ✓ Water sprinkling in the vulnerable areas to suppress the dust generated during excavation, levelling, and other operations. Implementation of suitable disposal methods of sediment/construction debris at designated places to avoid water logging at construction site.
- ✓ Provision of protective gears such as ear muffers etc. for construction personnel exposed to high noise levels and locating the temporary labour sheds for housing the construction labourers away from the construction site.



**Table 6-2 Environmental Monitoring Schedule during Construction Phase**

| S. No | Potential Impact                 | Action to be followed  | Parameters for Monitoring   | Frequency of Monitoring   |
|-------|----------------------------------|--|---|---|
| 1     | Air Emissions                    | All equipment to be operated within specified design parameters  | Random checks of equipment logs/ manuals  | Periodic  |
|       |                                  | Vehicle trips to be minimized to the extent possible   | Vehicle logs  | Periodic during site clearance & Construction activities                |
|       |                                  | Maintenance of DG set emissions to meet stipulated standards   | Gaseous emissions (SO <sub>2</sub> , HC, CO, NO <sub>x</sub> )  | Periodic emission monitoring  |
|       |                                  | Ambient air quality within the premises of the plant area to be monitored  | The ambient air quality will conform to the standards for PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , and CO | As per CPCB /SPCB requirement or on monthly basis whichever is earlier  |
| 2     | Noise                            | List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order.                                 | Equipment logs, noise reading.  | Regular during construction activities                                  |
|       |                                  | Night working is to be Minimized.  | Working hour records  | Daily records   |
|       |                                  | Generation of vehicular noise  | Maintenance of records of vehicles  | Daily records   |
|       |                                  | Noise to be monitored in ambient air within the plant premises.  | Spot Noise recording  | As per CPCB/SPCB requirement or on quarterly basis whichever is earlier |
| 3     | Wastewater Discharge             | No untreated discharge to be made to surface water, groundwater, or soil   | No discharge hoses shall be in vicinity of watercourses   | Periodic during construction Activities                                 |
| 4     | Soil Erosion                     | Protect topsoil stockpile wherever possible at edge of site  | Effective cover in place  | Periodic during construction Activities                                 |
| 5     | Drainage and Effluent Management | Ensure drainage system and specific design measures are working effectively. The design to incorporate existing drainage pattern and avoid disturbing the same | Visual inspection of drainage and records thereof   | Periodic during construction activities                                 |

|   |  |   |  |   |
|---|--|---|--|---|
| 6 | Waste Management                           | Implement waste management plan that identifies and characterizes every waste arising associated with proposed expansion activities, and which identifies the procedures for collection, handling & disposal of each waste arising. | Comprehensive Waste Management Plan should be in place and available for inspection on-site Compliance with MSW Rules, 2016 and Hazardous Wastes (Management and Handling Rules), 2016 | Periodic check during construction activities |
| 7 | Non-routine events and accidental releases | Plan to be drawn up, considering likely emergencies and steps required to prevent/limit consequences  | Mock drills and records of the same  | Periodic during construction activities       |
| 8 | Health                                     | Employees and migrant labour health check ups   | All relevant parameters including HIV  | Regular check ups                             |
| 9 | Environmental Management Cell/ Unit        | The Environmental Management Cell is to be set up to ensure implementation and monitoring of environmental safeguards   | Responsibilities and roles will be decided before the commencement of work   | During construction phase                     |

## 6.5 Environmental Monitoring Plan during Operation Phase/Post Project

The following attributes which merit regular monitoring based on the environmental setting and nature of project activities are listed below:

- Source emissions and ambient air quality.
- Groundwater levels and ground water quality.
- Water and wastewater quality (water quality, effluent & sewage quality etc).
- Solid and hazardous waste characterization.
- Soil quality.
- Noise levels (equipment and machinery noise levels, occupational exposures, and ambient noise levels); and
- Ecological preservation and afforestation. The following routine monitoring programme as detailed in Table - 6.3 shall be implemented at site. Besides this monitoring, the compliances to all environmental clearance conditions and regular permits from SPCB/MoEFCC shall be monitored and reported periodically (once every six months)

The control measures which will be imposed to mitigate the impacts caused during the operation phase of the project are as follows:

- Adequate protective measures will be provided in the form of earmuff/ear plugs to the. All the necessary noise protective equipment will be provided to the workers working in high noise areas workers exposed to high noise.
- DG sets will be maintained regularly to ensure stack emission quality within the desirable limit.
- Used spent oil from DG sets would be carefully stored in HDPE in isolated covered facility and disposed of according to the guidelines of hazardous waste (management, handling & Transboundary movement) rule 2016.
- Processed water will be re-circulated within the process where possible.
- No waste or waste material will be discharged to the ground.
- Adequacy greenbelt will be provided.

After commissioning of the project, post project monitoring of environmental parameters will be carried out at regular intervals. The monitoring program in different areas of the environment has been based on the findings of the impact assessment studies. The post project monitoring program is summarized in **Table 6-3**.

**Table 6-3 Post Project Environmental Monitoring Program**

| S. No. | Area of Monitoring | Number of Sampling Stations   | Frequency of Sampling  | Parameters to be Analyzed   |
|--------|--------------------|---|--|---|
| 1.     | Meteorology        | One Periodical monitoring using on-line weather station during operation phase  | Hourly and Daily basis.  | Wind speed and direction, Temperature, Relative Humidity, Atmospheric pressure, Rainfall.                                       |
| 2.     | Air Emissions      | <b>Stack Monitoring</b><br>Stack emissions from power boilers, melting furnaces to be optimized and monitored   | Periodical monitoring during entire operation phase                                    | Gaseous emissions (PM1 0, PM2 .5, PM size distribution, SO2, CO, NOx)   |
|        |                    | Stack emissions from DG set to be optimized and monitored   | Periodic during entire operation phase   | Gaseous emissions (SO2, HC, CO, NOx)  |
|        |                    | <b>AAQ Monitoring</b><br>Ambient air quality within the premises of the plant 2 Stations (In downwind) and nearby habitations to be monitored.  | As per CPCB/ SPCB Requirement Twice a week 24 hourly period<br><br>Periodic monitoring | PM1 0, PM2 .5, SO2, NOx, O3, CO, Lb, As, Ni, C6H6, B(a)P, NH3 and Hg<br><br>Vehicle logs to be maintained & Air                 |
|        |                    | <b>Vehicle Emissions:</b><br>Exhaust from vehicles to be minimized by use of fuel-efficient vehicles and well-maintained vehicles having PUC certificate  | Once every season/ Once every six months   | emission and noise, PCU   |
| 3.     | Noise              | <b>Industrial Noise Level</b><br>Noise generated from operation of power boilers to be optimized and monitored.<br><br><b>Ambient Noise Level</b><br>The noise generated from operation of DG set to be optimized and monitored and | Once every season/ Once every six months   | Spot Noise Level recording; Leq (night), Leq (day), Leq (dn)Noise levels to be recorded at 1m distance from the respective unit |

|    |                                  |  |  |  |
|----|----------------------------------|--|--|--|
|    |                                  | should be provided with acoustic enclosures.<br><br>4 (two within plant premises and two outside plant premises)   |  |  |
|    |                                  | Generation of vehicular noise  | Periodic during operation phase                                    | Maintain records of vehicles   |
| 4. | Liquid Effluents                 | Main Plant Effluents & Sewage Wastewater (treated and untreated) analysis  | Once in month  | As per CPCB /pH, Temp, Conductivity, TSS, TDS, BOD.                        |
| 5. | Drainage and effluent Management | Ensure drainage system and specific design measures are effective & working. Design to incorporate existing drainage pattern and avoid disturbing the same   | Periodic during operation phase                                    | Visual inspection of and cleaning of drainage before monsoon season        |
| 6. | Water Quality and Water Levels   | Monitoring of groundwater quality around ash pond and ground water levels  | Once in a month<br><br>Water level maintaining once every season   | Comprehensive monitoring as per IS: 10500 Groundwater level in meters BGL. |
|    |                                  | River water quality downstream to discharge  | Once in month  | As per IS: 10500   |
| 7. | Solid waste / Hazardous waste    | Check conformance to Waste Management rules.<br><br>Implement waste management plan that identifies and characterizes every waste arising associated with the plant activities and which identifies the procedures for collection, handling & disposal of each waste arising | Quantity and Quality monitoring in Periodic during operation phase | Records of solid waste generation, treatment and disposal                  |

|     |   |   |   |   |
|-----|---|---|---|---|
| 8.  | Soil  | Two Locations within the Project Site.<br>Maintenance of good soil quality  | Yearly Once   | Physico chemical properties, Nutrients, Heavy metals  |
| 9.  | Terrestrial Ecology                           | Within 10km, around the project   | Once in three years   | Symptoms of injuries on plants  |
| 10  | Maintenance of flora and fauna                | Vegetation, greenbelt / green cover development   | Once in summer and winter   | No. of plants, species  |
| 11. | Occupational Health                           | Employment checkup  | Entry level & yearly once   | <b>Pre-employment</b> Checkup – Audiometric, Vision, Color Blindness, Chest, Urine, RBS, T.B., Cancer, AIDS, Liver Function Tests (LFT), Eye Test, CBC<br>Urine, Chest X-Ray Glutamic Pyruvic Transaminase (SGPT) and Stool D/R etc.  |
|     |   |   | 1 time/1Year for <30 yr.<br>1time/ 4 years for 31- 40 yr.<br>1 time/2 years for 41- 50 yr.<br>1 time/year for >50 yr. | <b>Periodical Checkup</b> – Audiometric Test, Liver Function Tests (LFT), Color Blindness, Eye Test, Urine, RBS, complete blood count, dental X ray, Anemia, X Ray, Serum Glutamic Pyruvic Transaminase (SGPT) and Stool D/R, Medical fit test for use of Breathing Apparatus, vision etc |
| 12. | Emergency preparedness, such as fire fighting | Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention | Periodic during operation phase   | Mock drill records, on site emergency plan, evacuation plan   |

|     |                                       |  |                                    |  |
|-----|---------------------------------------|--|------------------------------------|--|
| 13. | Renewal of Consents and Authorization | As per orders                                      | 3 months before expiry of validity | Renewing consent to operate under applicable acts                      |
| 14. | Compliance of EC condition            | As per orders                                      | Once in 6 months                   | Submission of 6 monthly compliance reports                             |
| 13. | Socio Economic                        | As per Commitments give during public Consultation | Yearly                             | Workers, employment pattern, CSR/CER activities, Budget, expenses etc. |

## 6.6 Greenbelt development

Green belts are an effective mode of control of air pollution, where green plants act as absorbent for pollutants and act as a sink for pollution. Plants grown to function as pollution sink are collectively referred to as greenbelts. An important aspect of a greenbelt is that the plants are living organisms with their varied tolerance limit towards air pollutants. A green belt is effective as a pollutant sink only within the tolerance limit of constituent plants. Apart from functioning as a pollution sink, greenbelt would provide other benefits like aesthetic improvement of the area and providing suitable habitats for birds and animals. As per the rules and regulations laid by Ministry of Environment and Forest, Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB), it is legally mandatory to earmark 33% of the project area for greenbelt development to promote integration of environmental issues with industrial development projects.

**Selection of plants for Greenbelt:** The main limitations for plants to function as scavenger of pollutants are, plant's interaction to air pollutants, sensitivity to pollutants, climatic conditions, and soil characteristics.

The purpose of developing the greenbelt in and around the industrial site is for:

- ✓ Preventing land degradation and erosion of topsoil.
- ✓ Containment and Abatement of pollution in the industrial environment, capturing of fugitive emissions if any and thereby improving the quality of the surrounding environment.
- ✓ Substantially reducing the adverse environmental impacts due to the proposed industrial activity.
- ✓ Serving as a barrier for attenuating the intensity of noise generated.
- ✓ Enhancing the biodiversity index of the region.
- ✓ Adding aesthetic value to the project area.
- ✓ Maintaining the ecological equilibrium of the area.

The following general guidelines and measures will be adopted:

- ✓ The plantation of trees is initiated with start of the construction stage now, substantial growth is achieved. The greenbelt development programme is drawn to conform to natural climatic conditions and adaptability of the species.
- ✓ Species involved in afforestation should be indigenous, fast growing, and eco-friendly.
- ✓ Proper drainage system and proper plantation techniques is adopted.
- ✓ Plantation is being properly maintained and protected by fencing from grazing and felling. The plantations would consist of a mixture of carefully chosen locally available species of trees, shrubs, and herbs, preferably evergreen and resistant to pollution.



CUMI is allocated for Greenbelt development in 22510.06 Sq.m (33%) of land and Layout plan of the project site is attached as an **Annexure -5**. Proponents have already planted 3840 nos of trees under Greenbelt Development. In addition to the existing 1000Nos of Plants are proposed.

The capital cost of INR 250,000 Lakhs will be earmarked for this purpose and INR of 1.0 Lakhs will be allocated for recurring expenses towards green belt development and maintenance. Recommended species for greenbelt development is shown in **Table 6-4**. Geocoordinate google image for proposed Greenbelt is shown in **Figure 6-1**.

**Table 6-4 Proposed Green belt Species.**

| S. No.       | Name of the tree     | No. of Trees Existing | No. of Trees proposed | No. of Tree after expansion |
|--------------|----------------------|-----------------------|-----------------------|-----------------------------|
| 1            | Banyan Trees         | 36                    | -                     | 36                          |
| 2            | Ashoka Trees         | 373                   | 200                   | 573                         |
| 3            | Arasa Trees          | 78                    | -                     | 78                          |
| 4            | Red Bird of Paradise | 300                   | 300                   | 600                         |
| 5            | Neem Trees           | 315                   | 200                   | 515                         |
| 6            | Pungai Trees         | 365                   | 200                   | 565                         |
| 7            | Narra Trees          | 300                   | -                     | 300                         |
| 8            | Babbool Trees        | 350                   | -                     | 350                         |
| 9            | Coconut Trees        | 15                    | -                     | 15                          |
| 10           | Badam Trees          | 365                   | 100                   | 465                         |
| 11           | Banana Trees         | 220                   | -                     | 220                         |
| 12           | Fren Trees           | 196                   | -                     | 196                         |
| 13           | Aristocrat Trees     | 210                   | -                     | 210                         |
| 14           | Palm Trees           | 350                   | -                     | 350                         |
| 15           | Indian Beal Trees    | 367                   | -                     | 367                         |
| <b>Total</b> |                      | <b>3840</b>           | <b>1000</b>           | <b>4840</b>                 |



Figure 6-1 Geocoordinate google image for proposed Greenbelt.

## **6.7 Data analysis and Reporting Schedules**

The Environmental Management Cell in respect of operation of pollution control facility will maintain following records:

- ✓ Monthly and annual progress reports: Immediately upon the completion of monitoring as per the planned schedule, report shall be prepared & necessary documents shall be forwarded to the concerned person.
- ✓ Instruction manual for operation and maintenance of pollution control equipment.
- ✓ Instruction manual for monitoring of water & gaseous parameter and hazardous waste management.
- ✓ Records of medical check-up of employees.
- ✓ Regularly all documents & records shall be reviewed for necessary improvement of the monitoring plan/mitigation measures/environmental technologies as well as for necessary actions of Environmental Management Cell.
- ✓ Stationary records as per the Environmental Acts.

## **6.8 Procurement Schedule**

The proposed project is an existing project proposed expansion in existing facility. Thus, the procurement of different equipments for plant operation shall be planned to be procured in phase wise manner.

## **6.9 Infrastructural Requirement**

Laboratory has been set up with manpower and basic facilities for self-monitoring of pollutants generated in proposed plant. The laboratory will be equipped with preliminary instruments and chemicals required for monitoring of general parameters of wastewater to fulfill the reuse criteria within plant premises.

## **6.10 Updating of Environmental Monitoring Plan**

The directives from MoEF&CC and the regulations in force at any time shall govern the periodicity of monitoring. However, it is suggested that the implementation of various measures recommended in the EMP & be taken in the system to effectively implement the measures for continual improvement in environmental performance.

## **6.11 Proposed Budget for Environment Monitoring Programme**

Environment Management Cell shall inspect the necessity & availability of the materials, technologies, services, maintenance works and make appropriate budget for the purpose. Regular record review for change in financial requirement of environment management shall be done and appropriate budgetary provisions will be made. Budget

for environment management will be prepared and revised regularly up on requirement. The budget shall include provisions of:

- ✓ Environmental Monitoring Program
- ✓ Operation & Maintenance of Environmental Technologies/Equipment
- ✓ Laboratory works for Environmental management activities.
- ✓ Emergency Purchase of necessary material, equipment, tools, services, etc.

Environmental monitoring cost is estimated INR.15,75,000 /annum. The detail cost is shown in **Table 6-5**.

**Table 6-5 Budgetary Provision for Environment Monitoring Programme**

| S. No        | Description          | Amount (INR/Annum) |
|--------------|----------------------|--------------------|
| 1            | AAQ & Stack          | 2,00,000           |
| 2            | Water & Wastewater   | 1,00,000           |
| 3            | Soil                 | 50,000             |
| 4            | Noise                | 25,000             |
| 5            | Work Zone Monitoring | 2,00,000           |
| 6            | OH&S                 | 5,00,000           |
| 7            | Legal Compliances    | 5,00,000           |
| <b>Total</b> |                      | <b>15,75,000</b>   |

## 6.12 Proposed Budget for Environment Management Plan implementation

The cost estimate for Environmental Management Plan is given in **Table 6-6**.

**Table 6-6 Cost Estimate for Environmental Management Plan**

| S. No | Particulars                  | Cost in Rs.  |                   | Details   |
|-------|------------------------------|--------------|-------------------|---|
|       |                              | Capital Cost | Recurring Cost/Yr |   |
| 1     | <b>APC Measures</b>          |              |                   | Already facilitated in existing facility the same will be used for proposed expansion |
|       | Stack for Melting Furnace    | 100,00,000   | 5,00,000          |   |
|       | Bag Filters                  | 1,00,000     | 50,000            |   |
|       | Stack for Re-Rolling mill    | 15,00,000    | 50,000            |   |
| 2     | Re-Rolling Mill Scrubber     | 5,00,000     | 50,000            |   |
| 3     | ETP (Solar Evaporation Pond) | 1,00,000     | 20,000            |   |
| 4     | DG Stack with retrofit       | 5,00,000     | 50,000            |   |
| 5     | Solid Waste Management       | 1,00,000     | 1,50,000          | TSDf agreement and  |
| 6     | Rainwater Harvesting         | 5,00,000     | 50,000            | Proposed Rainwater harvesting including Recharge Pits and storage tank                |
| 7     | Green Belt Development       | 2,50,000     | 1,00,000          | Additional 1000 plants are proposed during expansion                                  |

|                          |                              |                   |                  |  |
|--------------------------|------------------------------|-------------------|------------------|--|
| 8                        | Occupational Health & Safety | 5,00,000          | 50,000           | Additional to the existing Occupational Health & Safety measures |
| 9                        | Environmental Monitoring     | --                | 2,50,000         | Existing plan revised for Proposed Environmental Monitoring plan |
| <b>Total Cost in Rs.</b> |                              | <b>140,50,000</b> | <b>13,20,000</b> |  |

### 6.13 Summary

The environmental monitoring plan enables environmental management system with early sign of need for additional action and modification of ongoing actions for environment management, improvement, and conservation. The environmental monitoring locations will be decided considering the environmental impacts likely to occur due to the operation of proposed project as the main aim of the monitoring program is to track, timely and regularly, the change in environmental conditions and to take timely action for protection of surrounding environment. Environmental sampling and monitoring will be done as per the guidelines provided by MoEF&CC & CPCB. Budget for environmental management will be prepared and revised regularly as per requirement. Budgetary Provision for **Environment Monitoring Programme is allocated Rs. 15,75,000 out of total project cost is Rs. 36.25 crores.** Cost Estimate for Environmental Management Plan is estimated under **capital cost INR Rs. 140,50,000/- & under Recurring cost 13,20,000/-** is allocated.

# **CHAPTER – 7**

## **ADDITIONAL STUDIES**

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*(This chapter would highlight any additional studies required for the proposed project i.e Public Consultation, Risk Assessment, Disaster Management Plan, R&R Studies and any additional recommended during the Scope stage/ToR.)*

## 7 ADDITIONAL STUDIES

This chapter describes the public consultation for the proposed expansion project, risk assessment, approach to study, hazards identification, hazards assessment and evaluation, disaster management plan, occupational health, and safety measures.

AS per EIA structure the required additional studies for the project are.

1. Public Consultation / Hearing
2. Qualitative Risk Assessment
3. Onsite & offsite Disaster Management Plan
4. SIA and R& R Studies

### 7.1 Public Consultation

The proposed project is in a Non-Notified Industrial area, So, the project attracts the public consultation as per EIA Notification 2006 and its Amendments & Office Memorandum, dated 3<sup>rd</sup> June 2009 and Terms of Reference obtained from SEIAA-TN.

The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing. The Public Hearing details of public views and Proponent action plan included in the EIA report and Final EIA Report will be submitted to SEAC/SEIAA Tamil Nadu for project appraisal.

### 7.2 Risk Assessment and Disaster Management Plan

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the plant. On the other hand, risk analysis deals with the identification and quantification of risks, the plant equipment and personnel are exposed to, due to accidents resulting from the hazards present in the plant. Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighbouring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, and vulnerability of population etc. In the sections below, the identification of various hazards, probable risks in the proposed modernization of Steel Rolling Mill, maximum credible accident analysis, consequence analysis are addressed which gives a broad identification of risks involved in the plant. Based on the risk estimation for fuel and chemical storage, a Disaster Management Plan (DMP) has been prepared.

#### 7.2.1 Approach of Study

Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of potential hazard areas.

- Identification of representative failure cases.
- Visualization of the resulting scenarios in terms of fire (thermal radiation) and explosion.
- Assessment of the overall damage potential of the identified hazardous events and the impact zones from the accidental scenarios.
- Assessment of the overall suitability of the site from hazard minimization and disaster mitigation points of view.
- Furnishing specific recommendations on the minimization of the worst accident possibilities; and Preparation of broad Disaster Management Plan (DMP), On-site and Off-site Emergency Plan, which includes Occupational and Health Safety Plan.

### 7.2.2 Hazard Identification

Identification and quantification of hazards in the steel industry modernization is of primary significance in the analysis, quantification, and cost-effective control of accidents. A classical definition of hazard states that hazard is in fact the characteristic of system/plant/process that presents potential for an accident. Hence, all the components of a system/plant/process need to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident. The following two methods for hazard identification have been employed in the study.

- Identification of major hazardous units based on Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989 of Government of India (GOI Rules, 1989); and
- Identification of hazardous units and storage units based on relative ranking technique, viz. Fire-Explosion and Toxicity Index (FE&TI).

### 7.2.3 Identification of Major Hazardous Units

Hazardous substances may be classified into three main classes such as flammable substances and unstable substances and toxic substances. The ratings for a large number of chemicals/substances based on flammability, reactivity and toxicity have been given in NFPA Codes 49 and 345 M. In the proposed project expansion, HSD will be stored in-built tank of DG set for generation of power in case of grid failure. The details of HSD storage and its classification as per GOI rules are given in Table 7-1. Hazardous characteristics of HSD are listed in **Table 7-2**.



**Table 7-1 Applicability of GOI Rules To Fuel**

| S.No. | Chemical/<br>Fuel | Listed in<br>Schedule | Storage                                    | Threshold Quantity (T)<br>for Application of Rules |        |
|-------|-------------------|-----------------------|--|--|--------|
|       |                   |                       |  | 5,7-9,13-15  | 10-12  |
| 1     | HSD               | 3(1)                  | 240 Lit – Inbuilt<br>storage within DG set | 25 MT  | 200 MT |

**Table 7-2 Properties of Storage Fuels**

| Chemical/<br>Fuel | Codes/Label | TLV                 | FBP | MP  | FP   | UEL | LEL |
|-------------------|-------------|---------------------|-----|-----|------|-----|-----|
|                   |             |                     | °C  |     |      |     |     |
| HSD               | Flammable   | 5 mg/m <sup>3</sup> | 369 | 338 | 32.9 | 7.5 | 0.6 |

TLV: Threshold Limit Value

FBP: Final Boiling Point

MP: Melting Point

UEL: Melting Point

FP: Flash Point

LEL: Lower Explosive Limit

### 7.2.4 Common Causes of Accidents

Based on the analysis of past accident information, common causes of accidents are identified as:

- Poor housekeeping.
- Improper use of tools, equipment, facilities.
- Unsafe or defective equipment facilities.
- Lack of proper procedures.
- Failure to follow prescribed procedures.
- Jobs not understood.
- Lack of awareness of involved hazards.
- Lack of guides and safety devices.
- Lack of protective equipment and clothing

#### Major causes of human failures reported are due to:

- Stress induced by poor equipment design, unfavourable environmental conditions, fatigue, etc.
- Lack of training in safety and loss prevention.
- Indecision in critical situations; and
- Inexperienced staff being employed in hazardous situations.

Often, human errors are not analysed while accident reporting and accident reports only provide information about equipment and/or component failures. Hence, a great deal of uncertainty surrounds analysis of failure of human systems and consequent damages.

### 7.3 Hazard Assessment and Evaluation

An assessment of the conceptual design is conducted for the purpose of identifying and examining hazards related to utility and support systems, environmental factors, facilities, and safeguards.

### 7.3.1 Preliminary Hazard Analysis (PHA)

A preliminary hazard analysis is carried out initially to identify the major hazards associated with storage and the processes of the plant. This is followed by consequence analysis to quantify these hazards. The various process activities involved in the plant are purely mechanical operations that are not complex or hazardous. Hence, no major hazards with potential for any emergency exist in the process plants. Preliminary Hazard Analysis for Process Areas are given below in **Table 7-3**.

**Table 7-3 Preliminary Hazard Analysis for Process Areas**

| Equipment                | Process  | Potential Hazard   | Provision   |
|--------------------------|--|--|---|
| Induction furnaces       | The MS scrap is charged into the furnace where it gets melted and is converted to liquid metal | <ul style="list-style-type: none"> <li>• Charging a furnace with impure or moist scrap metal and alloys.</li> <li>• Pouring or tipping the molten metal into a holding furnace or ladle.</li> <li>• Pouring the molten metal from ladles into moulds.</li> </ul> | <ul style="list-style-type: none"> <li>▪ Barriers and other protecting covering, including the mobile shields should be used.</li> <li>▪ Set up to protect workers against the splashes of molten metal and electromagnetic radiation.</li> <li>▪ Using of PPE (Personal Protective Equipment) must reduce or eliminate the risks associated with the handling of molten metal in melting unit</li> </ul> |
| Power Transformers       | Transmit the power from high tension to low tension  | Fire and explosion   | All electrical fittings and cables are provided as per the specified standards  |
| Switch Yard Control Room | -  | Fire in cable galleries and switch   | As above  |

**Table 7-4 Preliminary Hazard Analysis in General**

| PHA Category          | Description of Plausible Hazard                               | Description of Plausible Hazard           | Provision  |
|-----------------------|---|---|--|
| Environmental factors | If there is any leakage and eventuality of source of ignition | -   | All electrical fittings and cables will be provided as per the specified standards. All motor starters are flame proof |
|                       | Highly inflammable nature of fuels may                        | A well-designed fire protection including | Fire extinguishers of small size and big size  |

|  |  |  |   |
|--|--|--|---|
|  | cause fire hazard in the storage facility. | protein foam, dry powder, CO2 extinguisher should be provided. | are provided at all potential fire hazard places. In addition to the above, fire hydrant network is also provided |
|--|--|--|---|

### 7.3.2 Maximum Credible Analysis (MCAA)

Hazardous substances may be released because of failures or catastrophes, causing possible damage to the surrounding area. A disastrous situation may arise due to outcome of fire, explosion, or toxic hazards in addition to other natural causes, which eventually lead to loss of life, property, and ecological imbalance. Major hazards posed by flammable storage can be identified by taking recourse to MCA analysis. Depending upon the effective hazardous attributes and their impact on the event, the maximum effect on the surrounding environment and the respective damage caused can be assessed. The results of consequence analysis are useful for getting information about all known and unknown effects that are of importance when some failure scenario occurs in the proposed expansion activity and to get information as how to deal with the possible catastrophic events. It also gives the residents in the project and people living in the vicinity of the area, an understanding of their personal situation.

#### Damage Criteria

The Inbuilt storage of HSD in the DG Set and unloading facility may lead to fire and explosion hazards. The damage criteria due to accidental release of any hydrocarbon arise from fire and explosion. The vapours of these fuels are not toxic and hence no effects of toxicity are expected. Tank fire will occur if the radiation intensity is high on the peripheral surface of the tank leading to an increase in internal tank pressure. Pool fire will occur when fuel collected in the dyke due to leakage gets ignited.

- **Fire Damage**

A flammable liquid in a pool will burn with a large turbulent diffusion flame. This releases heat based on the heat of combustion and the burning rate of the liquid. A part of the heat is radiated while the rest is convinced away by rising hot air and combustion products. The radiation can heat the contents of a nearby storage or process unit to above its ignition temperature and thus result in a spread of fire. The radiation can also cause severe burns or fatalities of workers or fire fighters located within a certain distance. Hence, it will be important to know beforehand the damage potential of a flammable liquid pool likely to be created due to leakage or catastrophic failure of a storage or process vessel. This will help to decide the location of other storage vessels and decide the type of protective clothing the workers/fire fighter's need, the duration of time for which they can be in the zone, the fire extinguishing measures needed, and the protection methods needed for the nearby storage/process vessels. The damage

effects on people and equipment due to thermal radiation intensity are presented in **Table 7-5** and **Table 7-6** respective.

**Table 7-5 Damage Due to Incident Radiation Intensities**

| S. No | Incident Radiation (kW/m <sup>2</sup> ) | Type of Damage Intensity   |   |
|-------|---|--|---|
|       |   | Damage to Equipment  | Damage to People  |
| 1     | 37.5                                    | Damage to process equipment  | 100% lethality in 1 min. 1% lethality in 10 sec.  |
| 2     | 25                                      | Minimum energy required to ignite wood at indefinitely long exposure without a flame     | 50% Lethality in 1min. Significant injury in 10 sec.  |
| 3     | 19                                      | Maximum thermal radiation intensity allowed on thermally unprotected adjoining equipment | -   |
| 4     | 12.5                                    | Minimum energy to ignite with a flame; melts plastic tubing                              | 1% lethality in 1 min.  |
| 5     | 4.5                                     | -  | Causes pain if duration is longer than 20 sec, however blistering is un-likely (First degree burns) |
| 6     | 1.6                                     | -  | Causes no discomfort on long exposures  |

**Source:** *Techniques for Assessing Industrial Hazards by World Bank*

The effect of incident radiation intensity and exposure time on lethality is given in **Table-7.6**.

**Table 7-6 Radiation Exposure and Lethality**

| Radiation | Exposure Time (seconds) | Lethality (%) | Degree of Burns               |
|-----------|-------------------------|---------------|-------------------------------|
| 1.6       | --                      | 0             | No Discomfort even after long |
| 4.5       | 20                      | 0             | exposure                      |
| 4.5       | 50                      | 0             | 1st                           |
| 8.0       | 20                      | 0             | 1st                           |
| 8.0       | 50                      | <1            | 1st                           |
| 8.0       | 60                      | <1            | 3rd                           |
| 12.0      | 20                      | <1            | 3rd                           |
| 12.0      | 50                      | 8             | 2nd                           |
| 12.5      | --                      | 1             | 3rd                           |
| 25.0      | --                      | 50            | --                            |
| 37.5      | --                      | 100           | --                            |

The Diesel is stored within the in-built storage tank so external storage is fuel is not necessary hence risk assessment has not been carried.

### **7.3.3 Identification of Hazards, Assessment and their Management Disadvantages.**

The various hazards associated, apart from fuel storage with the plant process has been identified and has outlined in **Table 7-7**.

**Table 7-7 Hazard Analysis for Process in Steel Plant**

| S. No | Blocks/Areas          | Hazards Identified |
|-------|-----------------------|--------------------|
| 1     | Induction furnace     | Liquid metal       |
| 2     | Switch-yard Control   | Electrical         |
| 3     | Metal Handling cranes | Weightlifting      |
| 4     | Transportation        | Vehicle movement   |

### 7.3.4 Hazardous Events with Greatest Contribution to Fatality Risk

The hazardous event scenarios likely to make the greatest contribution to the risk of potential fatalities are summarized in **Table 7-8**. ‘Onsite facility’ refers to the operating site, whereas ‘offsite facility’ refers to transport and handling systems, which are away from the operating site.

**Table 7-8 Hazardous Events Contributing to On-Site Facility Risk**

| Hazardous Event                    | Risk Rank | Consequences of Interest                            |
|------------------------------------|-----------|---|
| Onsite vehicle impact on personnel | 3         | Potential for single fatalities, onsite impact only |
| Entrapment/struck by Machinery     | 3         | Potential for single fatalities, onsite impact only |
| Fall from heights                  | 3         | Potential for single fatalities, onsite impact only |
| Electrocution                      | 3         | Potential for single fatalities, onsite impact only |

### 7.3.5 Summary

The preliminary risk assessment has been completed for the proposed expansion of steel plant and associated facilities.

The industry operates with uninterrupted power supply & there is a petrol bunk within 2 km. There would not be necessity for bulk storage of Diesel hence the major impacts to community and environment are less. Proper handling of fuel systems and machineries would reduce the probability and the hazardous event scenarios and risks in general at this facility can be adequately managed to acceptable levels by performing the recommended safety studies as part of detailed design, applying recommended control strategies, and implementing a Safety Management System.

### 7.3.6 Recommended approach to conflict with the Possible accidents

Considering all possible accident scenarios as analysed in the risk analysis, it is established that there will not be any major potential hazards in the project causing major damage inside and outside the boundary. In spite of this, the project authorities should be well prepared to handle any such eventuality as described below.

#### **In case of Explosion:**

The following measures and actions are to be taken:

- Evacuate the area in vicinity.

- Take all necessary actions to avoid escalation of the accident.
- If problem appears to be out of control, call fire brigade and police. Report to the District collector; and
- Provide first aid to the victims as suggested in the Material Safety Data Sheets.

#### **Spillage due to Diesel Storage Tank Rupture:**

This accident scenario has considerable damage potential. In such scenario the following steps should be taken:

- Contain fuel supply to the tankers.
- Determine the extent of damage; and
- Undertake all the emergency actions mentioned above.

### **7.4 Disaster Management Plan**

The disaster management plan has been prepared in line with Tiruvallur District Disaster Management Plan, 2016. A disaster is a catastrophic situation in which suddenly, people are plunged into helplessness and suffering, and as a result, need protection, clothing, shelter, medical and social care, and other necessities of life.

Disasters can be divided into two main groups. In the first, disasters resulting from natural phenomena like earthquakes, volcanic eruptions, storm surges, cyclones, tropical storms, floods, avalanches, landslides, forest fires etc. The second group includes disastrous events occasioned by man, or man's impact upon the environment. Examples are armed conflict, radiation accidents, campus fires, and river pollution, air, sea, and rail and road transport accidents and can reach catastrophic dimensions in terms of human loss.

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

However, all disasters bring in their wake similar consequences that call for immediate action, whether at the local, national, or international level, for the rescue and relief of the victims. This includes the search for the dead and injured and removal of debris and social care, the provision of temporary shelter to the homeless food, clothing and medical supplies, and the rapid re-establishment of essential services.

The Disaster Management Plan (DMP) is a guide, giving detailed organizational responsibilities, actions, reporting requirements and support resources available to ensure effective and timely management of emergencies likely to arise from planned

operations. The DMP has been prepared for the production process based on the Risk Assessment and related findings covered in the foregoing topics in this report.

#### **7.4.1 Objectives of Disaster Management Plan (DMP)**

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

The Disaster Management Plan would reflect the probable, consequential severity of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further the management should be able to demonstrate that their assessment of the consequences uses good supporting evidence and is based on currently available and reliable information, incident data from internal and external sources and if necessary, the reports of outside agencies. To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a planned emergency document is prepared, called the "Disaster Management Plan."

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

- Effect the rescue and medical treatment of casualties.
- Safeguard other people.
- Minimize damage to property and the environment.
- Initially contain and ultimately bring the incident under control.
- Identify any dead.
- Provide for the needs of relatives.
- Provide authoritative information to the news media.
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

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

#### **7.4.2 Specific Emergencies anticipated.**

Fire consequences can be disastrous, since they involve huge quantities of fuel either stored or in dynamic inventory in pipelines or in nearby areas. Toxic releases can affect people working around. Preliminary hazard Analysis has provided a basis for consequence estimation.

### **7.4.3 Emergency Organization**

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

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

Emergency co-ordinators would be appointed who would undertake the responsibilities like firefighting, rescue, rehabilitation, transport and provide essential and support services. For these purposes, the Security In-charge, Personnel Department, Essential services personnel would be engaged. All these personnel would be designated as Key personnel.

In each shift, electrical supervisor, electricians, and other maintenance staff would be drafted for emergency operations. In the event of power or communication system failure, some of staff members in the office/plant offices would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

#### **7.4.3.1 Emergency Communication**

Whoever notices an emergency such as fire, escalation of fire, leakage etc. will inform his immediate superior and Emergency Control Centre. A place nearer to the security office shall be identified as Emergency Control Centre. The person on duty in the Emergency Control Centre would appraise the Site Controller. Site Controller verifies the situation from the Incident Controller of that area or the Shift In-charge and takes a decision about an impending On Site Emergency. This would be communicated to all the Incident Controllers, Emergency Co-ordinators. Simultaneously, the emergency warning system would be activated on the instructions of the Site Controller.

### **7.4.4 On-site Disaster Management Plan and response for accidents**

On-site plan will be the responsibility of the works management to formulate it. Plan must therefore be specific to the site. An onsite emergency plan is attributed to the response plan that contains and minimizes the effects due to emergencies within the installations which have a potential to cause damage to people and facilities within the installation premises.



#### **7.4.4.1 Emergency Responsibilities**

The responsibilities of the key personnel are appended below:

##### **Site Controller:**

On receiving information about emergencies, he would rush to Emergency Control Center (ECC) and take charge of ECC and the situations.

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

##### **Incident Controller:**

- Assembles the incident control team.
- Directs operations within the affected areas with the priorities for safety to personnel minimize damage to the plant, property and environment and minimize the loss of materials.
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency.
- Ensure that key personnel help is sought.

- Provides advice and information to the Fire and Security Officer and the Local Fire Services as and when they arrive.
- Ensures that all non-essential workers/staff of the affected areas evacuated to the appropriate assembly points, and the areas are searched for casualties.
- Has regard to the need for preservation of evidence to facilitate any inquiry into the causes and circumstances, which caused or escalated the emergency.
- Co-ordinates with emergency services at the site.
- Provides tools and safety equipment to the team members.
- Keeps in touch with the team and advise them regarding the method of control to be used; and
- Keeps the Site Controller of Emergency informed of the progress being made.

**Emergency Coordinator - Rescue, Fire Fighting:**

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

**Emergency Coordinator-Medical, Mutual Aid, Rehabilitation, Transport and Communication:**

- In the event of failure of electric supply and thereby internal telephone, sets up communication point and establishes contact with the ECC.
- Organizes medical treatment to the injured and if necessary, will shift the injured to nearby hospitals.
- Mobilizes extra medical help from outside, if necessary.
- Keeps a list of qualified first aid providers of the factory and seek their assistance.
- Maintains first aid and medical emergency requirements.

- Makes sure that all safety equipment is made available to the emergency team.
- Assists Site Controller with necessary data and to coordinate the emergency activities.
- Assists Site Controller in updating emergency plan, organizing mock drills verification of inventory of emergency facilities, and furnishing report to Site Controller.
- Maintains liaison with Civil Administration.
- Ensures availability of canteen facilities and maintenance of rehabilitation center.
- He will be in liaison with Site Controller/Incident Controller.
- Ensures transportation facility.
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure.
- Controls rehabilitation of affected areas on discontinuation of emergency; and
- Ensures availability of diesel/petrol for transport vehicles engaged in emergency operation.

**Emergency Coordinator - Essential Services:**

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

**General Responsibilities of Employees during an Emergency:**

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

#### **7.4.4.2 Emergency Facilities**

##### **Emergency Control Center (ECC):**

For the time being, Office Block or a place nearer to the security office is identified as Emergency Control Center. It would have external Telephone, Fax, and Telex facility. All the Site Controller/ Incident Controller Officers, Senior Personnel would be located here. Also, it would be an elevated place. The following information and equipment are to be provided at the Emergency Control Center (ECC).

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

##### **Assembly Point:**

Number of assembly points depending upon the plant location would be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water etc. would be organized. In view of the size of the plant, different locations are ear marked as assembly points. Depending upon the location of hazard, the assembly points are to be used.

##### **Fire Fighting Facilities:**

First Aid firefighting equipment suitable for emergencies should be maintained in each section in the plant. This would be as per statutory requirements. However, fire hydrant

lines covering major areas would be laid. It would be maintained at 6- kg/cm<sup>2</sup> pressure. Fire alarms would be in the bulk storage areas. The fire officer will be the commanding officer of firefighting services.

#### **Location of Windsock:**

On the top of the Administration block and the top of each production block, windsocks shall be installed to indicate direction of wind for emergency escape.

#### **Emergency Medical Facilities:**

Stretchers, gas masks and general first aid materials for dealing with fire burns would be maintained in the medical centre as well as in the emergency control room. The medical superintendent of the township will be the head of the causality services ward. Private medical practitioners' help would also be sought. Government hospitals would be approached for emergency help.

Apart from plant first aid facilities, external facilities would be augmented. Names of Medical Personnel, Medical facilities in the area would be prepared and updated. Necessary specific medicines for emergency treatment of Burns for Patients and for those affected by toxicity would be maintained. Breathing apparatus and other emergency medical equipment would be provided and maintained. The help of nearby industrial management in this regard would be taken on a mutual support basis.

#### **Ambulance:**

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

#### **7.4.4.3 Emergency Actions**

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

#### **Emergency Shutdown**

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

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

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

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

#### **Evacuation of Personnel:**

There could be a greater number of people in the storage area and other areas in the vicinity. The area would have an adequate number of exits and staircases. In the event of an emergency, unconnected personnel must escape to the assembly point. Operators must take emergency shutdown procedure and escape. The Time Office maintains a copy of deployment of employees in each shift, at ECC. If necessary, people can be evacuated by rescue teams.

#### **All Clear Signal:**

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

#### **7.4.4.4 General**

##### **Employee Information:**

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

##### **Public Information and Warning:**

The industrial disaster effects related to this plant may mostly be confined to the plant area. The detailed risk analysis has indicated that the pool fire effects would not be felt outside. However, as an abundant precaution, the information related to chemicals in use would be furnished to District Emergency Authority for necessary dissemination to public and for any use during an offsite emergency. Factories of this size and nature have been in existence in our state for a long time.

**Co-ordination with Local Authorities:**

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

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

**Mutual Aid:**

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

**Mock Drills:**

Emergency preparedness is an important step in planning Industrial Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel should be trained in the operations. Co-ordination meeting with the line Department officials for preparedness and implementation, viability and conduct of Mock Drill/ training should be conducted along with Divisional or Taluk level of Tiruvallur District.

**Important Information:**

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

**7.4.5 Off-site Emergency**

The Off-site emergency plan deals with measures to prevent and control emergencies affecting public and the environment outside the premises. Off-site plan is the responsibility of district emergency authority to integrate plans. Plan must therefore be specific to the area. The District Offsite Emergency Plan will be kept in the factory premises.

**Arrangement made for off- site emergency.**

Considering distance from district Head Quarters, other nearby external emergency control organization. Following arrangements will be arranged by the CUMI.

CUMI will prepare booklet and circulate among neighbouring organization and population containing hazardous operation and chemicals. First aid, emergency treatment, probable types of emergencies that can arise. Preventive steps will be taken to control emergency, Emergency warning siren code system, to make them aware in advance. CUMI will carry out group get together, acquaintance round, meeting with neighbouring public, population to train and make them aware about our operation and preparedness.

The same groups along with external emergency control organization were invited during mock drill, rehearsals for training and acquaintance.

#### **7.4.5.1 Introduction**

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency go beyond the plant boundaries, it becomes an off-site emergency. Off-site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum, and probable consequences on the neighbouring population. The off-site plan in detail will be based on those events, which are most likely to occur, but other less likely events, which have severe consequence, will also be considered. Incidents which have very severe consequences yet have a small probability of occurrence should also be considered during the preparation of the plan. However, the key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.

The roles of the various parties who will be involved in the implementation of an off-site plan are described below. Depending on local arrangements, the responsibility for the off-site plan should be either rest with the works management or, with the local authority. Either way, the plan should identify an emergency co-ordinating officer, who would take the overall command of the off-site activities. As with the on-site plan, an emergency control center should be setup within which the emergency co-ordinating officer can operate.

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors:



- a) In the case of a major fire but without explosion risk (e.g., an oil storage tank), only houses close to the fire likely need to be evacuated, although a severe smoke hazard may require this to be reviewed periodically.
- b) If a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people should be advised to stay indoors and shield them from the fire. This latter case particularly applies if the installation at risk could produce a fireball with very severe thermal radiation effects.
- c) For release or potential release of toxic materials, limited evacuation may be appropriate down wind, if there is time. The decision would depend partly on the type of housing "at risk". Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty house, which exist close to factories, offer little or no protection.

The major difference between releases of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say 300 m per minute covers a large area of land very quickly.

Any consideration of evacuation should take this into account. Although the plan will have sufficient flexibility built in to cover the consequences of the range of accidents identified for the on-site plan, it will cover in some detail the handling of the emergency to a particular distance from each major hazard works.

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

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

##### **Organization:**

Details of command structure, warning systems, implementation procedures, emergency control centres. Names and appointments of incident controller, site main controller, their deputies, and other key personnel.

##### **Communications:**

Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

##### **Specialized knowledge:**

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

##### **Voluntary organizations:**

Details of organizers, telephone numbers, resources etc.

**Chemical information:**

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

**Meteorological information:**

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

**Humanitarian arrangements:**

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

**Public information:**

Arrangements for dealing with the media press office and informing relatives, etc.

**Assessment of emergency plan:**

Arrangements for: (a) Collecting information on the causes of the emergency; (b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

**7.4.5.3 Role of the Emergency Co-ordinating Officer**

The various emergency services should be co-ordinated by an Emergency Co-ordinating Officer (ECO), who will be designated by the district collector. The ECO should liaison closely with the site main controller.

The Emergency Operation Center (EOC) functions at each Taluk office Collectorate, round the clock. Again, depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

**7.4.5.4 Role of the Local Authority**

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

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

**7.4.5.5 Role of Police**

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. Their functions should include controlling bystanders,

evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

#### **7.4.5.6 Role of Fire Authorities**

The control of a fire should normally be the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions and toxic release.

Fire authorities in the region should be appraised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They should be involved in on-site emergency rehearsals both as participants, and on occasion, as observers of exercises involving only site personnel.

#### **7.4.5.7 Role of Health Authorities**

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, should have a vital part to play following a major accident, and they should form an integral part of the emergency plan. For major fires, injuries should be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. For major toxic releases, the effects vary according to the chemical in question, and the health authorities should be apprised about the likely toxic releases from the plant, which will enable them in dealing with the aftermath of a toxic release with treatment appropriate to such casualties. Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical "mutual aid" scheme should exist to enable the assistance of neighbouring authorities to be obtained in the event of an emergency.

#### **7.4.5.8 Role of Government Safety Authority**

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

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

#### **7.4.6 Declaration of On-site Emergency and linking with off-site emergency Plan of respective district.**

The person responsible for declaring the emergency (Site Controller of CUMI) will assess the situation and in case its effects are likely to be felt outside the factory premises, he would get in touch forthwith with the district authorities who will at once take over the management of emergency and declare off-site emergency. The situation should also be immediately declared by Coded Siren which will help to inform the people in the vicinity of the industry / unit about the emergency. They should be helped to move to a safer area as prescribed in the off-site plan. The management of emergencies henceforth must be conducted by the District Crisis Management Group from a Control Room under the supervision of the District Collector.

#### **7.5 R&R Action Plans**

The Rehabilitation and Resettlement are not applicable since the project site is already used for industrial purposes which is categorized as non-Planned land & it is patta land and the total project land belongs to the CUMi. Land documents are enclosed as **Annexure-2**. There are no R&R studies raised Hence, Social Impact Assessment is not conducted.

#### **7.6 Summary of the Chapter:**

CUMI handles Diesel and small quantity of lubricants, about their storage, quantity to be stored, possible hazards and control measures are given in detail. Hazard Identification and Qualitative Risk Assessment have been developed to improve upon the integrity, reliability, and safety of industrial plants, the same has been discussed. Further CUMI has prepared the Disaster Management Plan (onsite emergency plan) to effectively utilize all the resources at its disposal for the protection of life, environment, and property.

# CHAPTER – 8

## PROJECT BENEFITS

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*(This chapter would highlight the direct and indirect benefits on the physical infrastructure and social infrastructure due to proposed projects.)*

## 8 PROJECT BENEFITS

M/s. Chennai United Metal Private Limited (herein after referred to as CUMI) has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. 36.25 crores.

The Major benefits of the project are as follows:

### 8.1 Financial Benefits:

- Revenue to Government
- Total project cost Rs. 36.25 crores.
- Expected Annual Turnover: Rs.700 Crores.
- Projected Annual Profit: INRRs. 10 Crores.

### 8.2 Social Benefits:

- There is no displacement of habitation since expansion in production capacity in existing facility only and the existing project site is located away from the habitation area.
- The total manpower will be 50 no during operation phase. 50 nos during construction phase as direct employment. Indirect employment generation (100 Nos) for local people, transporters, carpenters, labourers and other businesses and ancillary industry in that area.
- 1.0% of project cost (Rs 36.25 Lakhs) is allocated under CER to nearby villages/neighbourhoods & 2.5 % of Annual profit will be provided for CSR & Development of surrounding region & Income generation of the large community of farmers. The amount of 36.25 Lakhs will be allocated requirement of villages and issues/opinions araised during Public Hearing.
- Generation of employment and improved standard of living.
- Establishment of small and medium scale engineering ancillaries
- Increased revenue to the state by way of royalty, taxes, and duties
- Superior communication and transport facilities etc
- In addition to above, due to increase in purchasing power of local habitants.
- There shall be significant change in the socio-economic scenario of the area.
- The proposed expansion project shall enhance the prospects of direct and in direct employment during construction and in operation phases. Recruitment for the unskilled and semiskilled workers for the proposed expansion activity will be sourced from the nearby villages.

- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
- Overall, the expansion project will change living standards of the people and improve the socio-economic conditions of the area.

### **8.3 CSR Policy**

The CSR policy lays down the guidelines and mechanism to carry out CSR projects/programs by CUMI as per the rules under the Companies Act, 2013. CUMI have developed the policy in consonance with section 135, Companies Act, 2013 on CSR and in accordance with the CSR rules notified thereof by the ministry of Corporate Affairs, Government of India in 2014. CSR policy will be applied to all CSR projects/program undertaken by CUMI as per Schedule VII of the Companies Act 2013, within the geographical limits of India only, for the benefits of marginalized, disadvantaged, poor or deprived sections of the community and the environment. CUMI proposes to take part in various CSR activities like water supply, tree plantation, bus shelters, medical camp, road facilities and development of the villages and public views observed during the Public Hearing, 2.5% of yearly profits will be allocated for CSR activity.

### **8.4 Summary**

The proposed project will give major Financial and social & Environmental benefits due to development of infrastructure, Manufacturing of MS Billets, and Re rolling products as well as generation of employment. project would help in increasing revenue to the nation and the living standard of the near populations/ habitants through CER and CSR program.

# **CHAPTER – 9**

## **ENVIRONMENTAL COST BENEFIT ANALYSIS**

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*(Highlights environmental value enhancement and benefits thereof if recommend in scoping stage only if recommended during scoping stage.)*



# 9 ENVIRONMENTAL COST BENEFIT ANALYSIS

Not recommended during scoping stage.

# **CHAPTER – 10**

## **ENVIRONMENTAL MANAGEMENT PLAN**

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*(The chapter proposes the Environmental Management Plan highlighting the mitigation measures and roles and responsibilities of the management. This would include specific time frames for completion, resources required and specific responsibility.)*

# 10 ENVIRONMENTAL MANAGEMENT PLAN

## 10.1 Introduction

This Environmental Management Plan (EMP) for the M/s. Chennai United Metal Private Limited (CUMI), identifies the principles, procedures and methods that will be used to control and minimize the environmental impacts of the proposed operational activities associated with the proposed project development. It is intended to ensure that commitments made by the CUMI will minimize project related environmental and social impacts.

As part of our ongoing commitment to excellence in environmental and social performance we will ensure the following:

- ✓ Fulfil all environmental conditions associated with project approvals.
- ✓ Develop, promote, and foster a shared sense of responsibility for environmental and performance of the project.
- ✓ Promote environmental awareness and understanding among employees and contractors through training, identification of roles and responsibilities towards environmental management.
- ✓ Linking project performance to overall environmental performance.
- ✓ To monitor the environmental performance throughout the project and implement an adaptive management approach for continuous improvement and to meet the regulations.

## 10.2 Objectives of the EMP

The EMP has the following goals:

- ✓ Identifying project activities that may have a detrimental impact on the environment.
- ✓ Detailing the mitigation measures that will need to be taken, and the procedures for their implementation.
- ✓ Establishing the reporting system.
- ✓ An integrated plan for monitoring, assessing, and controlling potential impacts once the project has been approved and all permits and conditions granted.
- ✓ Facilitate a continual review of post operation activities.
- ✓ Preparation of Greenbelt Development.
- ✓ Preparation of rainwater harvesting scheme and energy conservation actions
- ✓ To prepare a detailed action plan for implementation of mitigation measures.
- ✓ Measure the effectiveness and success of proposed mitigation measures.
- ✓ Development of Environment Management Cell

The EMP also serves to highlight specific requirements that will be monitored during the development and should the environmental impacts not have been satisfactory prevented or mitigated; corrective action will have to be taken. The document should, therefore, be seen as a guideline that will assist in minimizing the potential environmental impact of activities.

### 10.3 Environmental Management Cell (EMC)

#### EMC roles and responsibilities

- ✓ All the activities will be monitored to ensure the appropriate implementation of all environmental mitigation activities and to identify areas where environmental management plan compliance is not satisfied.
- ✓ For effective implementation of the system, it is also necessary to have a permanent organizational set-up. Company has set-up permanent Environmental Management Cell (EMC) for the effective implementation and monitoring of environmental management system.
- ✓ The company assigned responsibility to the concerned for implementation of environmental control measures.
- ✓ The EMC will handle all issues related to different environmental attributes; it will be responsible for overall environmental and social management in project being undertaken by CUMI Ltd from investigation level to execution at project level.
- ✓ The EMC will be responsible for the technical planning, implementation and monitoring of all environmental mitigation and compensation measures. The Environmental Management Cell (EMC) set-up by the company is given in **Figure 10-1**.
- ✓ Existing EHS policy of CUMI enclosed as **Annexure-18**.



Figure 10-1 Environmental Management Cell

- ✓ This section describes the organizational structure and responsibilities for implementation of the EMP as shown in **Figure 10-1**.
- ✓ Executive Director of the company will be responsible for total environmental management.

**Table 10-1 EMC Responsibility**

| S. No. | Designation                         | Responsibilities   |
|--------|-------------------------------------|--|
| 1      | President /<br>GM-<br>Manufacturing | <ul style="list-style-type: none"> <li>• Establish an environment management cell.</li> <li>• Responsible for overall environmental management. Regularly coordinate with DGM, HR &amp;Admin and take feedback regarding all the activities performed under EM and give directions to succeeding component.</li> <li>• Provide sufficient funds for environmental management cell to reduce the environment impacts.</li> </ul>  |
| 2      | DGM - HR &<br>Admin                 | <ul style="list-style-type: none"> <li>• Keep aware the Management about all the activities performed under EMC.</li> <li>• To ensure and study the feasibility of ETP working considering the present and future requirements and to suggest for improvements if any.</li> <li>• To ensure, implement and follow all the required safety procedures &amp; facilities, avoid the unsafe act &amp; conditions, organizing safety trainings, mock drills, availability of onsite &amp;off-site emergency plans. Plan &amp;implement good safety committee.</li> <li>• Applying and getting the consent of operation of air &amp; water and authorization to store the hazardous waste.</li> </ul>  |
| 3      | Safety Head                         | <ul style="list-style-type: none"> <li>• Treatment and disposal of trade effluents and sewage effluents as per consent.</li> <li>• Carryout ambient air quality monitoring as per consent.</li> <li>• Monitoring the stack / chimney.</li> <li>• Hazardous waste management handling and disposal.</li> <li>• Plant and maintain adequate numbers of trees and gardens around the industry.</li> <li>• Prepare Management Information System (MIS) reports and budget for environment management program.</li> <li>• To deal with the environmental issues and for ensuring compliance with the conditions prescribed by TNPCB.</li> <li>• Non-compliance / violation of environmental norms, if any are reported to GM/DGM HR &amp;Admin and immediate required action is taken.</li> </ul> |
| 4      | Executive                           | <ul style="list-style-type: none"> <li>• Daily ETP/STP work plan execution.</li> <li>• Preparation of SOP for STP and ETP related documents.</li> <li>• Sampling the effluent at different stages and analysing to check the efficiency of the plant.</li> <li>• Record the readings in the log sheet and preparation of daily report.</li> </ul>  |

|  |  |  |
|--|--|--|
|  |  | <ul style="list-style-type: none"> <li>• Coordinating with outside agency to carry out the AAQ, stack, Fugitive emission, noise level monitoring and water quality parameters checking.</li> <li>• Preparation of monthly returns (Form No.1, Form No.3 &amp; analysis report), Form No.13, Form No.4, Form No.5 and compliance to TNPCB.</li> <li>• Ensuring Plant and Process Safety.</li> </ul> |
|--|--|--|

In addition to the above, company will have Safety, Health & Environment (SHE) policy to adhere with standard operating process to comply with the statutory and bring into focus any infringement of any norms and directives with regards to the SHE and to take further corrective actions

#### 10.4 Environmental Policy

In addition to the Environment Safety& Health policy, CUMI will have Environmental Policy to adhere with standard operating process to comply with the statutory and bring into focus any infringement of any norms and directives with regards to the SHE and to take further corrective actions. The Environmental Health and Safety Policy is enclosed as **Annexure-18**.

In addition to the above, company will have EHS policy to adhere with standard operating process to comply with the status and bring into focus any infringement of any norms and directives with regards to the Safety, Health & Environment and to take further corrective actions. The EHS Team will look after the operation of the Effluent Treatment Plant and monitor and control the environmental quality. Members of the EHS Team shall be well qualified and experienced in the concerned fields.

Routine tests of wastewater such as pH, solids, temperature etc. will be carried out in the laboratory that will be established on site. However, for additional tests of water, wastewater, soil, air etc., services of accredited laboratories as well as that of a consultant would be hired.

#### 10.5 Compliance against the Consent Condition

Compliance against the consented conditions shall be observed with respect to the following Acts,

- Water (Prevention & Control of Pollution) Act, 1974
- Air (Prevention & Control of Pollution) Act 1981
- Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules 2016.

**Table 10-2 Compliance against the consent condition**

| S. No. | Description                    | Frequency         | Remark  |
|--------|--------------------------------|-------------------|---|
| 1      | Six Monthly Post EC-Compliance | Twice in a Year   | Before end of June and Before end of December   |
| 2      | Renewal of Consent             | Once in 3/5 years | Application for renewal shall be done 60 days before the expiry date.                       |
| 3      | Environmental Statement        | Once in a year    | Would be submitted for every financial year before 30 <sup>th</sup> September of next year. |
| 4      | Hazardous Waste Returns        | Once in a year    | Would be submitted for every financial year before 30 <sup>th</sup> June of next year.      |

## 10.6 EMP for Construction Phase

The construction phase is for a short period hence the impacts will also be temporary and will be for short duration.

- ✓ During construction activities, mainly emission of dust and gases from movement of vehicles and construction activity is expected.
- ✓ Water will be sprinkled on loose topsoil to prevent re-suspension of dust into ambient air due to movement of vehicles etc.
- ✓ Separate civil construction material storage yard will be constructed within the site, and it will be covered.
- ✓ Possibility of raising green belt along with construction activity will also be explored.
- ✓ Transport vehicles and construction equipments / machineries will be properly maintained to reduce air emissions.
- ✓ Vehicles and equipment's will be periodically checked for pollutant emissions against stipulated norms. All vehicles' Pollution Under Control (PUC) Certificate shall be checked regularly.
- ✓ Exhaust vent of D.G. set will be kept at proper height to ensure quick dispersal of gaseous emissions.
- ✓ There shall not major housing facilities at site for construction workers and hence a major source of impact on water environment can be avoided.
- ✓ Proper and sufficient sanitary facilities shall be provided to construction workers to maintain all hygienic conditions at site.
- ✓ Care shall be taken during construction work and will not create any obstruction/dips in the topography which can lead to accumulation of water within premises leading to undesirable consequences like health and hygiene problems etc.
- ✓ The main solid waste generation during the construction phase includes rubble, brick bats, debris, steel scrap, wooden scrap, sand, gravel etc. However, these materials are inert in nature and will not result into leaching of any substance or constituent.
- ✓ Wooden scrap, steel scrap shall be given to scrap dealers.

- ✓ Acoustic enclosure shall be provided to all D.G. sets to control the noise during construction activity.
- ✓ All construction workers working in high noise areas will be provided appropriate PPEs like earmuffs and made to wear them during working hours.

## 10.7 EMP for Operational Phase

To mitigate the impacts due to capacity expansion of facility on various environmental components, the following environmental management measures are recommended.

Monitoring during the operation phase shall reflect those environmental and socio-economic issues that may persist upon completion of construction activities. Monitoring shall focus on evaluating the effectiveness of project mitigation measures and continue baseline monitoring and sampling. The mitigation measures to prevent adverse impact during the operation phase of the project shall focus on the following attributes.

12. Air Environment
  - c) Fugitive Emission Control
  - d) Odour control
13. Water Environment
14. Noise environment
15. Solid and Hazardous waste Management
16. Land environment
17. Ecology and Biodiversity
18. Socio Economic
19. Occupational Health and Safety
20. Cleaner Production Techniques
  - e) Resource Conservation
  - f) Energy Conservation
21. Budget For EMP

A detailed description of Mitigative Measures and Management of Impacts is provided in **Chapter 4**.

## 10.8 Cost Estimate for Environment Management Plan (EMP)

Capital cost of EMS estimates based on cost of air pollution control equipment 's, wastewater, waste management facility, greenbelt development and management plan, safety measures and other components of the EMP will be implemented along with the commissioning of the proposed project. Summary:

The main purpose of EMP is to minimize the identified potential environmental impacts to be generated from the proposed project and to mitigate the consequences. During construction phase materials will be transported through covered trucks. Greenbelt has



been developed and will be maintained to reduce noise impacts. Regular water sprinkling will be done to reduce PM concentration in the atmosphere. PPEs will be provided to workers and first aid facilities will be kept at designated locations. During operation phase the industry will maintain Environment Management Plan in place for the proposed unit which will cover all the environment protection measures to mitigate environmental impact. Solid/Hazardous waste management will be done as per HW (Management, Handling and Trans boundary Movement) – 2016. Noise level within the plant premises will be measured regularly and will try to maintain range within permissible limit. Cost Estimate for Environmental Management Plan is estimated under **capital cost INR Rs. 140,50,000/- & under Recurring cost Rs. 13,20,000/-** is allocated. The Breakup of Environmental Management Plan cost is provided in **Chapter 6** and **Table 6-6**

# **CHAPTER – 11**

## **SUMMARY AND CONCLUSION**

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*(Summarize the entire report and conclude the summary of the EIA report.)*

# 11 SUMMARY AND CONCLUSION

## 11.1 Introduction

M/s. Chennai United Metal Private Limited has planned to expand the production capacity of their Billets plant from 23,760 Tons/Annum to 2,00,000 Tons/Annum and Re-Rolled Steel Angle & Flat Bars & Channels plant from 61,200 Tons/Annum to 2,00,000 Tons/Annum within the existing facility located at Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.

The demand for the billets for steel rolling mills is increasing day-by-day due to various development works proposed by the Government as well as the Private sectors resulting in vast construction activities in different fields such as building, village development programs, housing and irrigation, concrete roads, etc., So, the project proponent proposed expansion in production capacity within the existing premises.

As per MoEF&CC Notification S.O 3250(E), dated: 20<sup>th</sup> July 2022 and the existing & proposed plant required Environmental Clearance and the proposed project comes under Schedule 3(a) "Metallurgical Industries" under Category 'B' as per the EIA Notification 2006 & its further amendments.

In line with EIA notification dated 14.09.2006, The Environmental Clearance application was applied vide 06.03.2023 as a Integrated plant and TOR meeting was held for determining the Terms of Reference (TOR) on 19<sup>th</sup> April 2023 and obtained Terms of Reference vide SEAC letter no. TN/F.No.9877/SEAC/3(a)/ToR-1450/2023 dated 09.05.2023 for the carried-out Baseline studies and preparation of EIA report for the proposed expansion project. The copy of Terms of Reference (ToR) is attached as **Annexure-I**.

The Draft EIA report has been prepared according to obtained ToR and as per generic structure described in EIA Notification 2006 for Public Consultation. The project will be appraised by the TNSEIAA after a Public Hearing.

The Final Environmental Impact Assessment study report after Public Hearing, has been prepared for obtaining Environmental Clearance (EC) from SEIAA of Tamil Nadu and to get further consents from the Tamil Nadu Pollution Control Board (TNPCB) for the proposed expansion project.

## 11.2 Project Description

The proposed plant is located at varies survey numbers in Sirupuzhalpettai and Getnamalee Village, Gummidipoondi Taluk, Tiruvallur District, TamilNadu. The total site area is 16.86 Acres (68212.31 Sq. m). Site Centre Co-ordinates of the project site latitude

13°22'52.67"N & Longitude: 80° 3'56.83"E. The elevation of the project area is 23-25m AMSL. The State Highway 52: Satyavedu to Kavaraipettai is located at adjacent (N), & NH-5: Chennai to Jharpokharia ~ 6.18km (ENE). Chennai International Airport is located at ~ 42.34km (SSE). Pulicat Birds Sanctuary is located at 12.7km (NNE). Manali RF is located at ~0.99km towards the SSW direction. The total estimated cost for the proposed expansion project is Rs. 36.25 crores.

### 11.2.1 Project Summary:

| S. No | Particulars                            | Proposed details  |
|-------|--|---|
| 25.   | Category of products                   | Manufacturing of Steel Billets & Re-rolling Steel Angle, Flat Bars Channels, Patra & Hollow Sections  |
| 26.   | Product & Capacity                     | 3. Steel Billets - from 23760 TPA to 2,00,000 TPA<br>4. Re-rolling Steel Angle, Flat Bars Channels, Patra & Hollow Sections - 61,200 TPA to 2,00,000 TPA<br><b>Total Production: 4,00,000 TPA</b> |
| 27.   | Total Land area (Ha)                   | 6.85 (68212.03 Sq. m)   |
| 28.   | Total Built up area (sq .m)            | Existing: 11,153.73<br>Proposed: Nill<br><b>After expansion: 11,153.73</b>  |
| 29.   | Total Water Requirement (KLD)          | Existing: 87<br>Proposed: 95<br><b>After expansion: 95</b>  |
| 30.   | Fresh water Requirement (KLD)          | Existing: 84<br>Proposed: 86<br><b>After expansion: 86</b>  |
| 31.   | Effluent Generation                    | Existing: 6.50<br>Proposed: 12.5<br><b>After expansion: 12.5</b>  |
| 32.   | Recycled Water (KLD)                   | Existing: 3<br>Proposed: 9<br><b>After expansion: 9</b>   |
| 33.   | Source of Water                        | Local Panchayat   |
| 34.   | Sewage Generation (KLD)                | Existing and Proposed 2.0   |
| 35.   | Wastewater Treatment System & capacity | 2 KLD of Solar Evaporation Pond for Existing and after expansion  |
| 36.   | Domestic Wastewater treatment system   | Septic Tank followed by soak pit  |
| 37.   | Power (kVA)                            | Existing: 5000<br>Proposed: 19000<br>After expansion: 24000   |
| 38.   | Source of Power                        | TANGEDCO  |
| 39.   | Power Backup-DGs (kVA)                 | Existing: 1 x 500   |

|     |  |   |
|-----|--|---|
|     |  | Proposed: Nil<br>After Expansion 1 x 500  |
| 40. | Air Compressor (HP)  | Existing and proposed: 30HP.  |
| 41. | Diesel for DG Sets (Liters/Month)<br>During power failure only | Existing: 250<br>Proposed: 50<br>After Expansion: 300                                       |
| 42. | Coal (Tonne/Month)   | Existing: 150<br>Proposed: Nil (Reduced to 75) due to DHR<br>method.<br>After Expansion: 75 |
| 43. | Grease (Kg/Year) as a lubricant                                | Existing: 25<br>Proposed: 15<br>After Expansion: 40   |
| 44. | Permanent Manpower (Nos)                                       | Existing: 30<br>Proposed 20<br>After expansion: 50  |
| 45. | Municipal Solid Waste (kg/day)-<br>Operation phase             | Existing: 13.5<br>Proposed: 9.0<br>After Expansion: 22.5                                    |
| 46. | Project Cost in crores (INR)                                   | 36.25   |
| 47. | Environmental Management Plan<br>(EMP) Cost (Crores)           | 1.40  |
| 48. | CER cost (Lakhs)   | 36.25   |

### 11.3 Description of the Environment

#### Meteorological Data for the Study Period (March 2024 – May 2024):

| S. No | Parameter   | Observation   |
|-------|---|---|
| 1.    | Temperature                                       | Max Temperature: 38 °C<br>Min Temperature: 21 °C<br>Avg Temperature :28.05 °C |
| 2.    | Average Relative Humidity                         | 74.5 %  |
| 3.    | Average Wind Speed                                | 2.99 m/s  |
| 4.    | Predominant Wind Direction during study<br>period | East  |

All the results of ambient air quality parameters have been found within the limit as per NAAQS. Based on comparison study of results for tested parameters with NAAQS, it is interpreted that ambient air quality of studied locations is good. This interpretation relates to the results found for corresponding locations and study period.

In Industrial area daytime noise levels was about 45.2 dB(A) and 44.2 dB(A) during nighttime, which is within prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Nighttime). The field observations during the study period indicate that the ambient noise levels are well within the prescribed limit by CPCB (55 dB(A) Day time & 45 dB(A) Nighttime).

The surface water results were compared with IS 2296:1192 standard and in respect of CPCB water Quality Criteria for designated best use. Based on comparison study of test results with Surface water Quantity Standards (Is 2296 Class A), it is interpreted that water qualities of studied locations are classified under Class E, which can be used for irrigation industrial cooling, and controlled waste disposal

Ground Water monitoring results were compared with drinking water standard, it is interpreted that water qualities of studied locations meet with the drinking water standards as per IS 10500: 2012. These interpretations relate to the sample tested for location only. To prevent ground water contamination and improving the quality and Quantity, rainwater harvesting, and groundwater recharging may be helpful.

As per the Indian Council of Agricultural research characterization all locations soils are having PH, Neutral to Slight Alkaline range, Electrical conductivity is Sensitive to salts, potassium as very less, Nitrogen as N is better range and Phosphorus range from medium to More than Sufficient range.

The Biological diversity of this area hosts common animals. Indian Dogs, Jungle and Domestic cat, Rhesus macaque, Domestic Cows, Buffaloes, Bullocks, and Goat etc. are found amongst mammals. There are no rare and endangered species, and a Near Threatened bird species (*Psittacula eupatria*) is identified in the study area.

In the part of Socioeconomic studies, found that the literacy rate of the study region is 65.02%. The study area has more than 50% non-workers. There is a need to establish more industries so that the maximum number of employments can be generated.

The proposed project has no major adverse impact on the surrounding environment since the proposed expansion will be implemented in the existing facility.

The proposed project has no major adverse impact on the surrounding environment. During the movement of trucks, fugitive emissions will be minimized by water sprinkling on roads and regular vehicular maintenance. Trucks used for transportation shall be covered with tarpaulin sheet to avoid dust dispersion at site. Only PUC vehicles will be used for transportation. An air pollution control device will be installed to mitigate the impact of air pollution. The electricity is being supplied by TANGEDCO and hence D.G.set will be used only in case of power failure. Water shall be sourced from private suppliers; hence no major impact will be envisaged on surface or ground water resources. A small quantity of Effluent (Scrubber bleed off) is being disposed through Solar Evaporation. Sewage generated disposed through septic tank followed by soakpit. There is no liquid discharge from the proposed project in any means. Proper sanitation facilities shall be provided within the premises to prevent contamination of water due to runoff. Solid/hazardous waste generated from the process and solar evaporation pond is being properly handled with adequate solid/hazardous waste management facilities. All the solid/hazardous waste generated shall be packed in HDPE bags and stored in Hazardous

Waste Storage Facility. The evaporation pond sludge will be sent to TSDF. Used oil will be collected and disposed of properly by selling it to registered refiners. Discarded containers will be sold to approved recyclers and recyclable scrap will be collected, stored in scrap yard, and reused. The collection, storage and disposal of solid/hazardous waste shall be carried out as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The adequate greenbelt developed in and around the plant shall greatly serve as an efficient barrier for prevention of air outside the plant premises.

No Alternative Site was considered for the proposed project since the existing premises. CUMI' is being adopted Direct Hot Rolling (DHR) method as the best option, the same will be followed for the proposed expansion project. Apart from this, not Ecologically Sensitive, no National Park, no Wildlife Sanctuary, no Biosphere Reserve, and no Protected Forests are attracted to the project site. Also, some alternatives for technology were considered for the proposed project is being adopted tested technology. A partial building area will be designed to establish the solar panel and the project proponent explores the phase wise installation of solar panel to meet the lighting power required energy from renewal energy source.

The environmental monitoring plan enables environmental management system with early sign of need for additional action and modification of ongoing actions for environment management, improvement, and conservation. The environmental monitoring locations will be decided considering the environmental impacts likely to occur due to the operation of proposed project as the main aim of the monitoring program is to track, timely and regularly, the change in environmental conditions and to take timely action for protection of surrounding environment. Environmental sampling and monitoring will be done as per the guidelines provided by MoEF&CC & CPCB. Budget for environmental management will be prepared and revised regularly as per requirement. Budgetary Provision for ***Environment Monitoring Programme is allocated 15,75,000 out of total project cost is Rs. 36.25 crores.***

CUMI handles Diesel and small quantity of lubricants, about their storage, quantity to be stored, possible hazards and control measures are given in detail. Hazard Identification and Qualitative Risk Assessment have been developed to improve upon the integrity, reliability, and safety of industrial plants, the same has been discussed. Further CUMI has prepared the Disaster Management Plan (onsite emergency plan) to effectively utilize all the resources at its disposal for the protection of life, environment, and property.

The proposed project will give major Financial and social & Environmental benefits due to development of infrastructure, Manufacturing of MS Billets, and Re rolling products as well as generation of employment. project would help in increasing revenue to the

nation and the living standard of the near populations/ habitants through CER and CSR program as follows:

- Revenue to Government
- Total project cost Rs. 36.25 crores.
- Expected Annual Turnover: Rs.700 Crores.
- Projected Annual Profit: INRRs. 10 Crores.
- There is no displacement of habitation since expansion in production capacity in existing facility only and the existing project site is located away from the habitation area.
- The total manpower will be 50 no during operation phase. 50 nos during construction phase as direct employment. Indirect employment generation (100 Nos) for local people, transporters, carpenters, labourers and other businesses and ancillary industry in that area.
- 1.0% of project cost (Rs 36.25 Lakhs) is allocated under CER to nearby villages/neighbourhoods & 2.5 % of Annual profit will be provided for CSR & Development of surrounding region & Income generation of the large community of farmers. The amount of 36.25 Lakhs will be allocated requirement of villages and issues/opinions araised during Public Hearing.

The main purpose of EMP is to minimize the identified potential environmental impacts to be generated from the proposed project and to mitigate the consequences. During construction phase materials will be transported through covered trucks. Greenbelt has been developed and will be maintained to reduce noise impacts. Regular water sprinkling will be done to reduce PM concentration in the atmosphere. PPEs will be provided to workers and first aid facilities will be kept at designated locations. During operation phase the industry will maintain Environment Management Plan in place for the proposed unit which will cover all the environment protection measures to mitigate environmental impact. Solid/Hazardous waste management will be done as per HW (Management, Handling and Trans boundary Movement) – 2016. Noise level within the plant premises will be measured regularly and will try to maintain range within permissible limit. Environment Monitoring Programme is allocated 15,75,000 out of total project cost is Rs. 36.25 crores. The Cost Estimate for Environmental Management Plan is estimated under **capital cost INR Rs. 140,50,000/- & under Recurring cost 13,20,000/-** is allocated. The breakup of Environmental Management Plan is provided in **Table 6-6**.

#### **11.4 Conclusion**

The proposed project is in a non-Notified industrial area, the proposed expansion will be implemented in existing facility with additional equipments and would not have any considerable impact on the environment with efficient mitigation measures implemented. The waste generation in form of gas (flue and process), effluent and solid



waste may have impacts on environmental parameters, but the proponent has planned & installed most efficient technologies for prevention of emission & treatment of effluent. Further, the solid/hazardous waste will be disposed of through TSDF site.

There is no liquid discharge from project in any means into the inland surfaces or water bodies. The proposed project activities will have a positive beneficial effect on the local population, economic output, and other related facilities viz. employment, development of business, transportation etc. Risk assessment including emergency response plan & DMP has been prepared to handle any sort of emergencies. The industry will be proposed 33 % green belt area. 1.0% of project cost (Rs 36.25 Lakhs) is allocated under CER to nearby villages/neighbourhoods & 2.5 % of Annual profit will be provided for CSR & Development of surrounding region & Income generation of the large community of farmers. The amount of 36.25 Lakhs will be allocated to the requirement of villages and issues/opinions raised during Public Hearing.

Hence looking to the overall project justification, process, pollution potential and pollution prevention measures, technological adoption and Environmental Management activities of the proponent has been concluded that, the proposed project would not have any significant impacts on environment as well as socio-economic and ecological conditions of the project area. Hence proposed project may be recommended, considering Environmentally safe.

# **CHAPTER – 12**

## **DISCLOSURE OF CONSULTANTS ENGAGED**

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*(Provides the brief profile of the EIA consultant organization and EIA project team for the current study.)*

## 12 DISCLOSURE OF CONSULTANTS ENGAGED

### 12.1 General

As a part of compliance to the regulatory requirement i.e., to obtain Environmental Clearance from SEIAA, Tamil Nadu, the Project Proponent has appointed Environmental Consultants accredited by National Accreditation Board for Education and Training (NABET)-Quality Council of India (QCI), New Delhi.

The work of undertaking field studies and preparation of Form-1, PFR, and Baseline studies & EIA/EMP report under B category, was assigned initially to Eco Chem Sales and Services, Surat, after ToR application project proponent has been Changed the Consultants and assigned for field studies and preparation of EIA, Public Hearing and Appraisal of the project to M/s EHS360 Labs Pvt Ltd, Chennai is accredited by NABET, for Schedule 3(a) "Metallurgical industries (ferrous & non-ferrous), Category B.

M/s EHS360 Labs Pvt Ltd is accredited by NABET for metallurgical processing industry, under Schedule 3(a), and Category B vide Certificate No. NABET/EIA/22-25/IA/0098\_Rev -01, valid up to 24.06.2025.

### 12.2 Brief and Nature of Consultancy

M/s EHS360 Labs Pvt Ltd (EHSL) is one of the pioneer companies in the field of Environmental Consultancy Service providers in India. We are NABET Accredited consultant for conducting Environmental Impact Assessment Studies (EIA) and obtaining Environmental Clearances for 1,7,8 21,38 &39 sectors. We also take up services which include Environment Monitoring and Testing, Environment Audit, Risk Assessment Studies, Turnkey solutions, Operation and Maintenance contracts and obtaining various statutory clearances from Ministry of Environment, Forest, and Climate Change (MoEF&CC) and State Pollution Control Boards. NABET certificate is attached at the end of this chapter.

### 12.3 Team Member for EIA Report

In addition to the approved experts for NABET, the following members are also involved in the EIA studies as Team Member for EC and FAEs to build their competencies for handling 8 sectors projects

| Name of Internal Team Member | Activity / Area                            | Involvement – Actual Work Performed   | Under Approved Expert |
|------------------------------|--|---|-----------------------|
| Mrs. Tatiparthi Rajani       | Team Member-EC                             | Site Visit, Activity plan preparation along with Scheduling of Field visit for EIA team. Primary data and Secondary data correlation checking EIA report Preparation. Compliance of ToR points. | Suryakanta Pradhan    |
| Mr. Santhosh Kumar A         | Risk and Hazard management (RH)            | Assisted FAE for Preparation of impacts diagrams & mitigation measures, preparation of Onsite Emergency Plan and disaster management plan.  | Suryakanta Pradhan    |
| Mrs. Tatiparthi Rajani       | Air Quality Modelling & prediction (AQ)    | Coordination for Meteorological data collection, data analysis, coordination with FAEs, team members and Running the AERMOD Modelling   | Tushali Jagwani       |
| Mrs. Tatiparthi Rajani       | Air Pollution, Prevention and Control (AP) | Assisted FAE for Identification of AAQ sampling stations; identification of impacts and relevant mitigation measures; preparation of management plan and report writing.                        | Mr. Santhosh Kumar A  |



## National Accreditation Board for Education and Training

# Certificate of Accreditation

### EHS360 Labs Private Limited, Chennai

Old No. 8/2, New No. 10/2, 50th Street, 7th Avenue, Ashok Nagar, Chennai, Tamil Nadu-600083

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3; for preparing EIA/EMP reports in the following Sectors.

| S. No | Sector Description                                       | Sector (as per) |           | Cat. |
|-------|--|-----------------|-----------|------|
|       |  | NABET           | MoEFCC    |      |
| 1.    | Mining of minerals including opencast/underground mining | 1               | 1 (a) (i) | A    |
| 2.    | Mineral beneficiation                                    | 7               | 2 (b)     | B    |
| 3.    | Metallurgical industries (ferrous & non-ferrous)         | 8               | 3 (a)     | B    |
| 4.    | Synthetic organic chemicals industry                     | 23              | 5 (f)     | B    |
| 5.    | Building and construction projects                       | 38              | 8 (a)     | B    |
| 6.    | Townships and Area development projects                  | 39              | 8 (b)     | B    |


*Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IAAC minutes dated September 2, 2022, and Supplementary Assessment minutes dated December 15, 2023 posted on QCI-NABET website.*

*The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/22/2564 dated October 21, 2022. The accreditation needs to be renewed before the expiry date by EHS360 Labs Private Limited, Chennai following due process of assessment.*

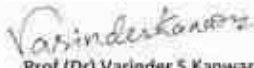
Issue Date:  
January 24, 2024



Valid up to  
June 24, 2025

  
Mr. Ajay Kumar Jha  
Sr. Director, NABET

Certificate No.  
NABET/EIA/22-25/IA 0098\_Rev.01

  
Prof. (Dr) Varinder S Kanwar  
CEO-NABET

*For the updated list of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.*

Figure 12-1 NABET Accreditation Certificate