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## EXECUTIVE SUMMARY OF EIA REPORT

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Proposed Expansion of Mineral Ore Beneficiation at Kh.  
No. 307, Mouza Hardoli, Tahsil Tumsar, District  
Bhandara, Maharashtra - 441912.



By

M/s. Shri Sainath Manganese Processing &  
Trading.

**EIA Consultant –**

Ecomen Laboratories Pvt. Ltd., Lucknow

NABET Accreditation No. – NABET/EIA/2023/RA 0203 valid up to 21/09/2023

**Environmental Monitoring Laboratory -**

EHS Matrix Private Ltd

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| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

## Contents

|     |   |    |
|-----|---|----|
| 1.  | Introduction.....   | 2  |
| 1.1 | Location of the project .....                               | 2  |
| 2.  | Project Description .....                                   | 5  |
| 2.1 | Process Description .....                                   | 7  |
| 3.  | Description of Environment.....                             | 9  |
| 4.  | Anticipated Environmental Impacts.....                      | 12 |
| 5.  | Analysis of Alternatives.....                               | 13 |
| 6.  | Environmental Monitoring.....                               | 14 |
| 7.  | Additional Studies.....                                     | 18 |
| 8.  | Project Benefits .....                                      | 19 |
| 9.  | Environmental Management Plan .....                         | 20 |
| 9.1 | Environment Management Plan during Construction Phase ..... | 20 |
| 9.2 | Environment Management Plan for Operation Phase .....       | 21 |
| 9.3 | Implementation of EMP.....                                  | 32 |
| 9.4 | EMP Review and Amendments.....                              | 33 |
| 10. | Environment Management Cost.....                            | 34 |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

## EXECUTIVE SUMMARY

### 1. Introduction

M/s. Shri Sainath Manganese Processing and Trading is a leading manufacturer and supplier of Manganese Di-Oxide (MnO<sub>2</sub>). The industry is located Kh. No. 307, Mouza Hardoli, Tahsil Tumsar, District Bhandara, 441912.

Shri Sainath Manganese Processing & Trading, has proposed expansion in terms of a upgradation of its existing mineral beneficiation unit by manufacturing 300 MT/M of MnO (Manganese Oxide) in addition to its existing production of 300 MT/M of MnO<sub>2</sub> (Manganese Di-Oxide). The proposed expansion will be carried out within existing premises of industry. The existing manpower of 25 nos. workers is sufficient for the proposed expansion.

#### 1.1 Location of the project

The project site is located at Kh. No. 307, Mouza Hardoli, Tahsil Tumsar, District Bhandara 441912. Site can be approached by Mitewani Hardoli Road and it is located at 70 km away from Nagpur City. The nearest railway station is Mitewani railway station at 2.5 km. in the South east direction & nearest domestic airport is Nagpur airport at about 75 km in South-West direction. The proximity to the road is an advantage, since the company's raw materials and finished products will be transported easily by road.

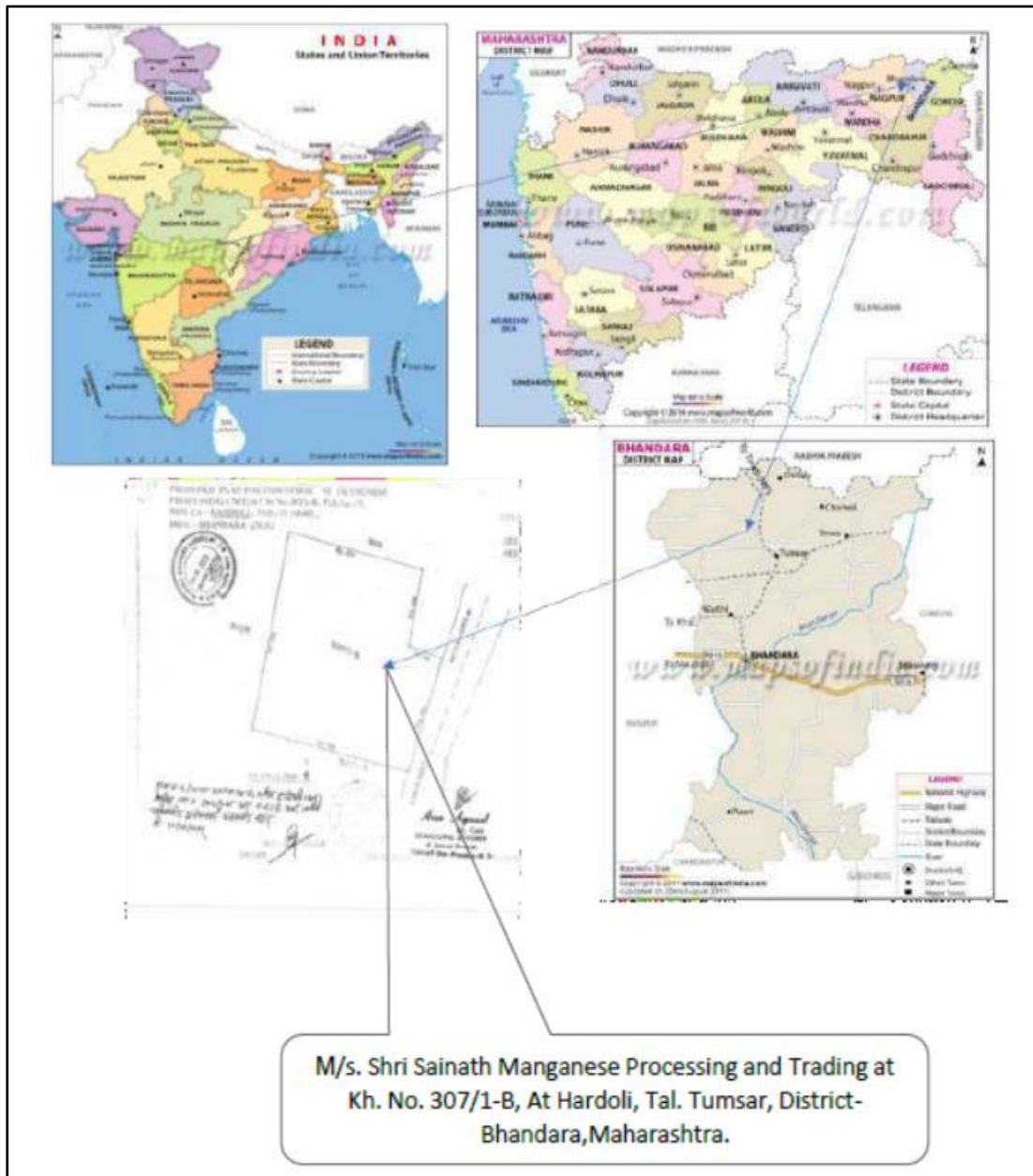


Figure 1: Index Map of Project Site



Figure 2: Google Image of Project Site with Coordinates

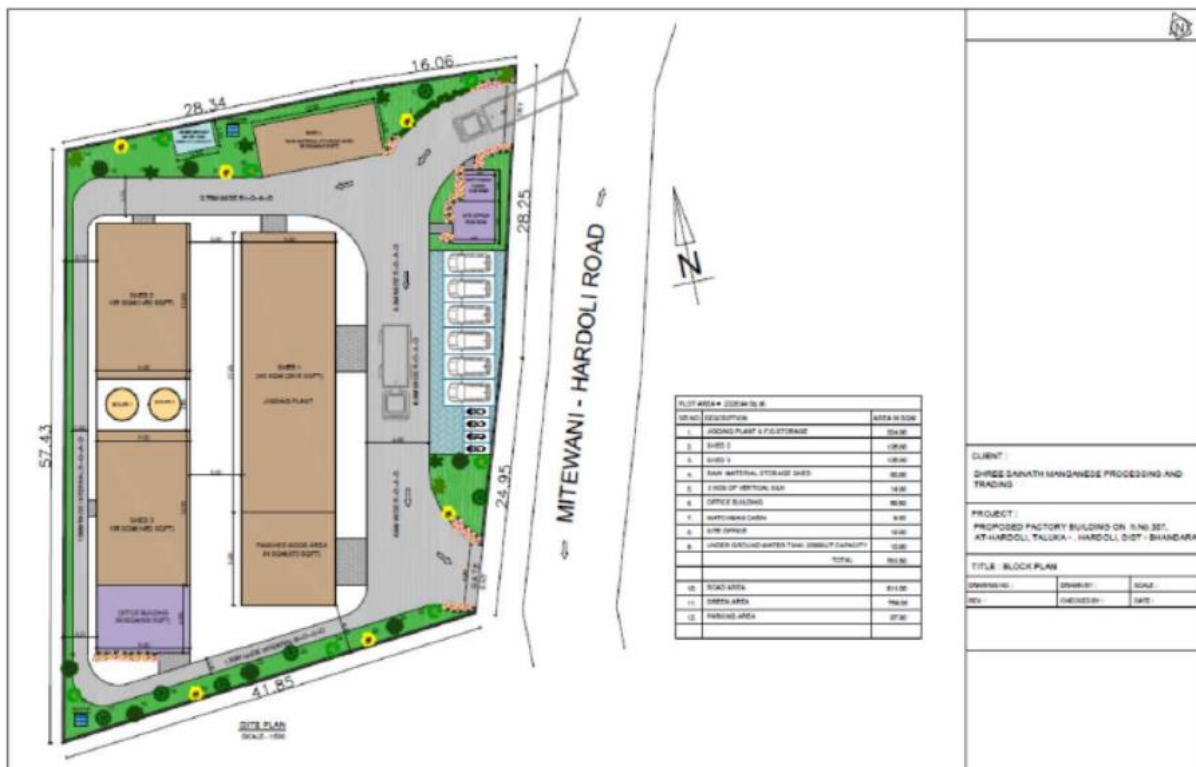


Figure 3: Master Layout Plan

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

**Table 1: Area Statement**

| Particulars                               | Area in Sqm. |
|---|--------------|
| <b>Total Plot area</b>                    | <b>2300</b>  |
| Existing BUA                              | 761.5        |
| Jigging Plant & F.G.Storage               | 324          |
| Shed 2                                    | 135          |
| Shed 3                                    | 135          |
| Raw Material Storage Shed                 | 60           |
| Boiler 1, Boiler 2                        | 14           |
| Office Building                           | 58.5         |
| Watchman Cabin                            | 9            |
| Site Office                               | 16           |
| Under Ground Water Tank 20000lit Capacity | 10           |
| Proposed Construction Area                | 300          |
| <b>Green Area (33%)</b>                   | <b>759</b>   |
| <b>Parking</b>                            | <b>87</b>    |
| <b>Road Area</b>                          | <b>611</b>   |

## 2. Project Description

**Table 2: Project Description in Brief**

| Sr. No. | Particulars           | Details   |  |                                 |                                 |              |
|---------|-----------------------|---|--|---------------------------------|---------------------------------|--------------|
| 1       | Ownership of land     | M/s Shri Sainath Manganese Processing & Trading.  |  |                                 |                                 |              |
| 2       | Type/Category         | 2 (b)- Mineral Beneficiation, Category-B1   |  |                                 |                                 |              |
| 3       | Production details    | <b>Sr No</b>  | <b>Particulars</b>   | <b>Existing Capacity (MT/M)</b> | <b>Proposed Capacity (MT/M)</b> | <b>Total</b> |
|         |                       | 1   | MnO <sub>2</sub>   | 300                             | 0                               | 300          |
|         |                       | 2   | MnO  | 0                               | 300                             | 300          |
|         |                       | <b>Total</b>  |  |                                 |                                 |              |
| 4       | Water Consumption     | <b>Construction Phase –</b><br>Water Requirement – 5 CMD<br><b>Operation Phase –</b><br>Existing – 2 CMD<br>Proposed – 3 CMD<br>Total – 5 CMD |  |                                 |                                 |              |
| 5       | Wastewater generation | Sewage  | 0.4 KLD- Construction Phase<br>Operation Phase- Sewage: No additional sewage is generated due to proposed expansion. Existing 1 CMD of sewage generated. |                                 |                                 |              |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

|    |                                     |   |   |
|----|-------------------------------------|---|---|
|    |                                     | Effluent  | Existing- 1 CMD<br>Proposed – 2 CMD<br>Total – 3 CMD  |
| 6  | Wastewater<br>Treatment<br>Facility | Sewage  | Construction Phase- Septic tank followed by<br>Soak Pit<br>Operation Phase- Existing treatment facility viz.<br>septic tank followed by soak pit is adequate.   |
|    |                                     | Effluent  | Operation Phase- The wastewater generated<br>from the Zigging process and air pollution<br>control devices will be treated in settling tank<br>and reused for jigging & quenching operation<br>within the plant premises. |
| 8  | Roasting Kiln                       | 2 nos. of Coal/ Wood fired Roasting Kiln of capacity 15 TPD and<br>20 TPD.  |   |
| 9  | Stack Details                       | <b>Stack<br/>Attached to</b>  | <b>Stack Height</b>   |
|    |                                     | Vertical Kilns  | 40m   |
|    |                                     | DG set  | 10m   |
| 10 | Fuel                                | Coal – 250 MT/M OR Wood – 325 MT/M<br>HSD – 100 lit/hr (DG set will be operated in case of power failure<br>only)   |   |
| 11 | Air Emissions                       | There will be emissions of PM, SO <sub>2</sub> & NO <sub>x</sub> from stack of kiln. Fuel<br>used for the kiln is Coal/ Wood. Stack height of 40 m along with<br>Wet Scrubber will be provided. Emission rate is as follows –<br>PM <sub>10</sub> – 0.9333 g/s<br>PM <sub>2.5</sub> – 0.6222 g/s<br>SO <sub>2</sub> – 4.889 g/s<br>NO <sub>x</sub> – 0.75 g/s<br>Fugitive emissions are envisaged such as dust in construction<br>phase only. which will be controlled by dust suppression method/<br>water sprinkling. |   |
| 12 | Power<br>Requirement                | Construction Phase-15 MVA<br>Operation Phase-Demand Load-50 KW<br>Connected Load-80 KW  |   |
| 13 | DG set                              | 125 kVA   |   |
| 14 | Manpower                            | During Construction Phase – approx. 7-10 nos.<br>Operation Phase –<br>Existing 25 nos. of workers are sufficient for proposed expansion.<br>No new manpower is proposed.  |   |
| 15 | Project Cost                        | Rs. 1.70 Cr.  |   |
| 16 | EMP Cost                            | Capital Cost – Rs. 21 lakh<br>Recurring Cost – Rs. 5.5 Lakh per Annum   |   |
| 17 | CER Cost                            | Rs. 2.5 Lakhs.  |   |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

## 2.1 Process Description

The detailed process description of is given below –

In the proposed manganese ore beneficiation project two processes are mainly carried out viz. - 1. Jigging 2. Roasting.

Low grade manganese ore of pyrolusite type containing 72-80% will be brought to the site with tarpaulin covered truck. Two operations are very important in the total process and are the essential steps for production of 'MnO<sub>2</sub>' & 'MnO' viz, jigging for removal of impurities (in the form of quartz) and roasting i.e., reduction for production of manganese oxide. If 'Fe' is more in the form of free iron i.e, Fe<sub>3</sub>O<sub>4</sub> (balance in the form of non-magnetic Fe<sub>2</sub>O<sub>3</sub>/FeO) the same may be removed by giving a pass on magnetic separator prior to roasting.

The magnetic material is accumulated to a bulk quantity and is periodically passed second time over magnetic separator, where the non-magnetic fraction is separated out of this material and is mixed with raw material which is used in roasting and the magnetic fraction is salvaged suitably and sold to iron /steel manufacturers.

To perform these operations effectively, disintegration of lumpy ore from 6 mm to maximum 10 mm size is necessary. However, this operation is not necessary in case of M/s Shri Sainath Manganese Production & Trading as 4/5 mm screened material is readily available- which can be jigged and roasted directly.

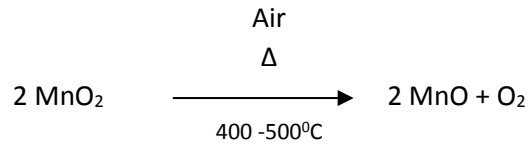
The Jigging is the simple washing process of ore by mechanical means. It will be carried out after crushing & screening. In the jigging process most of the impurities will be removed such as silica compound, aluminium compound etc. Then tailings from jigging operation containing more quartz are accumulated and periodically re-jigged to produce ore free from silica.

The roasting is carried out for production of manganese oxide (MnO) by providing heat to the jigged material (MnO<sub>2</sub>) in the vertical kiln. In order to maintain highly reducing atmosphere in the kiln, wood/coal will be charged from bottom window of vertical kiln & blower is started which will ignite the batch & resulting CO<sub>2</sub> gases will be led to scrubber. The objective of this process is to reduce MnO<sub>2</sub> to MnO by heating in the kiln at temperature of 400-500oC. Though wood/coal application rate is 15 to 20% of the ore charged but normally 25/30% wood/coal will be charged in the kiln. The un- burnt wood/coal which is 10/15%, is taken out of the kiln and is re-used for next batch. Hence, after establishing the production cycle, the

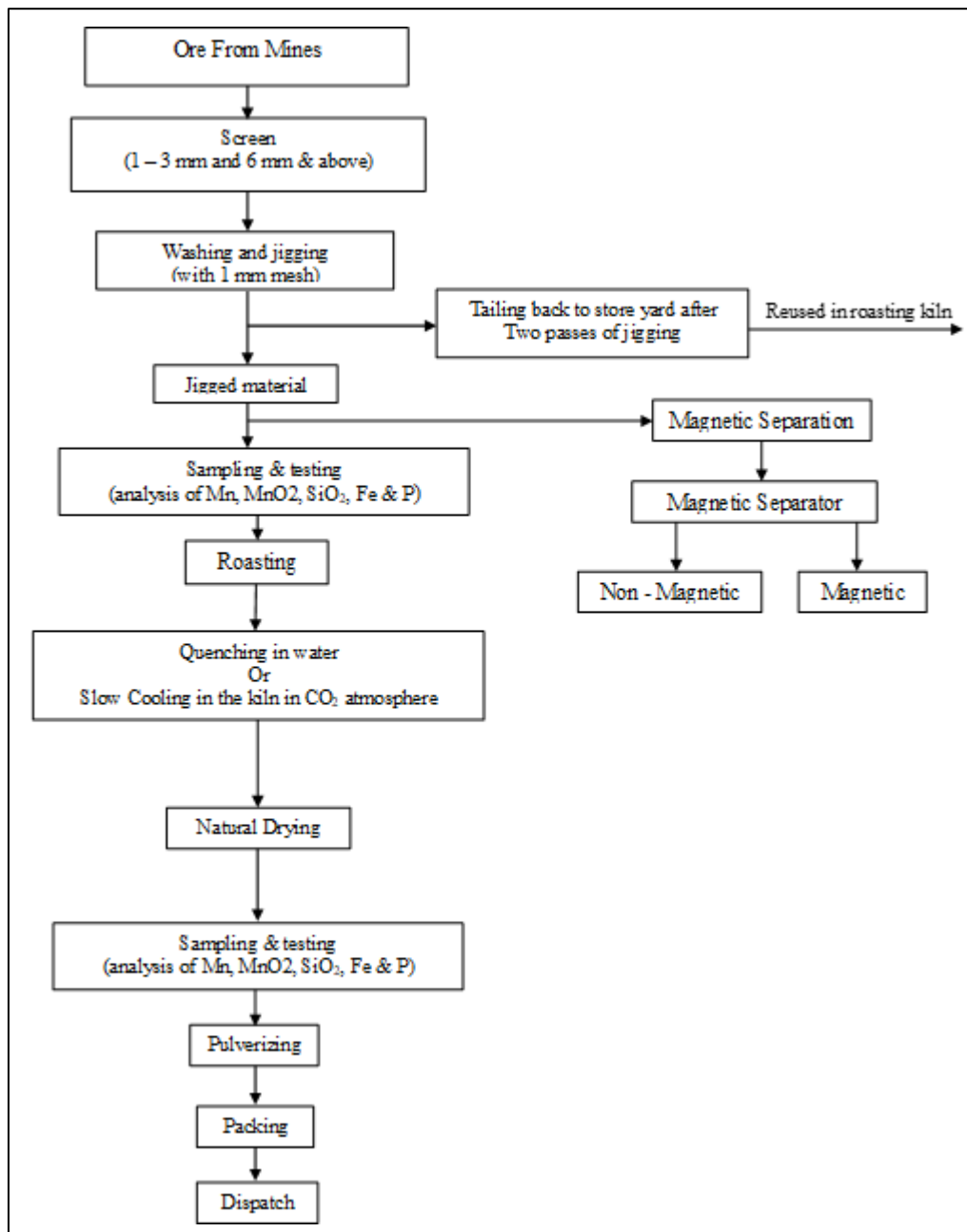


|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

wood/coal application rate comes to approximately 20% of the Mn-ore charged in the kiln. The reaction will start slowly in 20-30 min. & the entire batch of manganese ore gets roasted after 3 hours.



After roasting is done, the cover of kiln is taken off and the entire roasted mass is quenched on-site with water. After bringing the temperature down to normal handling temperature the material from the kiln is removed and spread on drying platform. After drying, material is sent for pulverizing and is further packed with proper air-tight sealing in double line woven-sacks and kept- ready for loading in the truck covered with tarpaulin.



**Figure 4: Process of Reduction of  $MnO_2$  to  $MnO$  in Roasting Kiln**

### 3. Description of Environment

Field monitoring was done for primary data collection of various environment components such as air quality, water quality, soil quality, noise. Also, secondary data such as micrometeorology, flora and fauna, socio-economic, hydro-geological study, traffic study etc. from authenticated sources was used as a guideline and reference material. The entire data has been collected through actual physical surveys and observations, literature surveys,

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

interaction with locals, government agencies, and departments. The baseline study begins with site visits and reconnaissance survey in the study area.

The guiding factors for the present baseline study are the requirements prescribed by the guidelines given in the EIA Manual of the MoEFCC and methodologies mentioned in Technical EIA Guidelines Manual for Mineral Beneficiation projects by Administrative Staff College of India, Bellavista, Khairatabad, Hyderabad.

The studies were conducted during winter season for the period of 1<sup>st</sup> December 2021 to 28<sup>th</sup> February 2022.

Frequency of environment monitoring and its result is given in **Table 3**.

**Table 3: Frequency of primary data collection and its results**

| Environmental Attributes           | Frequency of monitoring   | Parameters  | Observed Results   |
|------------------------------------|---|---|--|
| Meteorology                        | Microprocessor based Weather Monitoring Station Continuous hourly recording           | Wind speed,   | 4.53 m/s   |
|                                    |   | Wind direction  | E & NE   |
|                                    |   | Max. Temp.  | 45.6 °C  |
|                                    |   | Mini. Temp.   | 8.8 °C   |
|                                    |   | Relative Humidity                                       | 19-85 %  |
|                                    |   | Precipitation   | -  |
| Ambient Air Quality                | 8 Locations<br>24 hourly samples<br>Twice a week for 3 months (in µg/m <sup>3</sup> ) | PM10  | 50.5 to 67.5   |
|                                    |   | PM2.5   | 20.1 to 30.9   |
|                                    |   | SO <sub>2</sub>   | 11.4 to 23.2   |
|                                    |   | NO <sub>x</sub>   | 20.3 to 33.4   |
| Water Quality (Ground and Surface) | Once in season at 10 locations (Physical, chemical and biological parameters)         | Colour  | All parameters are within limit except TDS, in some cases, Hardness.   |
|                                    |   | pH  |  |
|                                    |   | TDS   |  |
|                                    |   | COD   |  |
| Soil Quality                       | Once in season at 8 locations   | Soil type and texture, Physico-chemical properties, NPK | Reddish yellow to black soil has low to Medium low fertility, good water holding capacity, heavy metal contamination signs not seen. |
| Noise Quality                      | Once in season at 8 Locations (Noise levels in dB(A))                                 | Average Day   | 50.8   |
|                                    |   | Average Night   | 32.08  |
| Land use Pattern                   | One time visit of the study area for ground truthing                                  | Identification and classification of land use           | Most of the land is Agricultural land followed by Barren land  |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

|                          |   |   |   |
|--------------------------|---|---|---|
| Geology and hydrogeology | Primary observation during visit and sec. data  | Geology and hydrogeology of the study area          | Metamorphic and igneous rocks, alluvium occurs in small areas.  |
| Ecology                  | General in 10 km radial study area and data collected around the project site through field visits.             | Flora   | Azadirachta indica, Casuarina equisetifolia, Muntingia calabura, Mangifera indica, Musa paradisiaca, etc.   |
|                          |   | Fauna   | Canis lupus familiaris and Funambulus palmarum, Calotes versicolor, etc.  |
| Socioeconomic Data       | Primary and sec data in 10 km radial study area and data collected around the project site through field visits | Socio-economic characteristics of the affected area | Sanitation facilities are satisfactory, Power supply facility is available in almost villages and town, drinking water sources is mostly from tanker water supply, Medical facilities in terms of primary health center and primary health sub centers in the rural areas are good. |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

#### 4. Anticipated Environmental Impacts

Significant Impacts from the project activities and its mitigation measures are summarized in

Table 4 below –

**Table 4: Summary of Impacts and Mitigation Measures**

| Sr. No | Environmental Component | Project Activity        | Impacts Identified  | Impact Assessment after Mitigation                            |
|--------|-------------------------|-------------------------|---|---|
| 1.     | Air Quality             | Construction activities | Local increase in SPM   | Insignificant   |
|        |                         | Transportation          | Vehicular and fugitive emissions  | Insignificant   |
| 2.     | Noise                   | Construction activities | Temporary local increase in noise   | Insignificant   |
|        |                         | Operation activities    | Continuous noise but confined to within the Plant Area                            | Insignificant   |
|        |                         | Transportation          | Increase in noise levels due to vehicular traffic                                 | Insignificant   |
| 3.     | Water Resources         | Construction activities | The water will be used during the construction activities.                        | Insignificant   |
|        |                         | Operation activities    | No impacts as no waste water will be discharged outside the plant                 | Insignificant   |
| 4.     | Water Pollution         | Construction activities | Small volume of wastewater from the construction and sanitation                   | Insignificant   |
|        |                         | Operation activities    | Waste water generated in the plant  | Insignificant as there will be zero discharge of waste water. |
| 5.     | Ecology                 | Construction activities | There will not be major disturbance   | Insignificant   |
|        |                         | Operation activities    | There will not be major disturbance to flora fauna                                | Insignificant   |
| 6.     | Soil Characteristics    | Construction activities | Since no excavation, the proposed expansion area is within the existing industry. | Insignificant   |
|        |                         | Operation activities    | No changes are envisaged in this phase  | Insignificant   |
| 7.     | Socio-economics         | Construction activities | Creation of additional jobs/businesses  | Significant   |
|        |                         | Operation activities    | No additional employment generation   | Insignificant   |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Environmental Component   | Project Activity        | Impacts Identified  | Impact Assessment after Mitigation |
|--------|---------------------------|-------------------------|---|------------------------------------|
| 8.     | Occupational Health       | Construction activities | Dusty conditions during summer with vehicular movement                              | Insignificant                      |
|        |                           | Operation activities    | Process specific activities, heat and emission protective control measures followed | Insignificant                      |
| 9.     | Vibrations                | Construction activities | Heavy equipment usage will be temporary   | Insignificant                      |
|        |                           | Operation activities    | Continuous usage of machinery   | Insignificant                      |
| 10.    | Solid/<br>Hazardous waste | Construction activities | General construction waste will be disposed of in designated sites                  | Insignificant                      |
|        |                           | Operation activities    | Ash from burning of coal/wood in boilers  | Insignificant                      |

## 5. Analysis of Alternatives

No alternatives have been considered as the project is an expansion of the existing industry located at Kh. No. 307, Mouza Hardoli, Tahsil Tumsar, District Bhandara. Since it is an expansion project, all required infrastructure such as industrial land, roads, electricity, etc. are already developed. The industry has proposed to produce 300 MT/M of MnO in addition to the existing production of 300 MT/M of MnO<sub>2</sub>. The site selected also has the following merits –

- Project site is already developed and the existing area is sufficient for the proposed expansion.
- Land use of the site is already earmarked as industrial use.
- Required infrastructure like road, transport, water, electricity, etc. are already available in the area.
- No resettlement & rehabilitation is involved.
- Site is easily accessible to local markets.
- For finished good product market area is available within 75-100 km radius

**Table 5: Matrix of Alternative Site Analysis**

| Sr. No. | Site Selection Criteria  | Existing Site |
|---------|--|---------------|
| 1.      | Non-Agricultural Land  | ✓             |
| 2.      | No R & R Issue   | ✓             |
| 3.      | Topography (Flat)  | ✓             |
| 4.      | Site Connectivity (Approach Road)  | ✓             |
| 5.      | No Notified Wildlife Sanctuary, National Park, Ecologically Sensitive Area, Biosphere Reserve, etc. within 5 km radius | ✓             |
| 6.      | No Notified Critically Polluted Area as per CPCB within 5 km radius  | ✓             |
| 7.      | No Archaeological Monuments within 5 km radius   | ✓             |
| 8.      | Availability of Electricity (MSEDCL)   | ✓             |
| 9.      | Availability of Raw Material   | ✓             |
| 10.     | Availability of labour force (Construction purpose)  | ✓             |
| 11.     | Availability of Local Market for finished products   | ✓             |

## 6. Environmental Monitoring

The regular monitoring of different environmental parameters is of immense importance in order to assess the present environmental conditions as well as the impacts of the proposed project on the environment. A proper monitoring program will be required in order to ensure the effectiveness of the implementation of suggested mitigation measures. Environmental monitoring will help in assessing the changes in environmental conditions by monitoring the effective implementation of mitigation measures and measuring deteriorations in environmental quality for further preventive actions. The proposed expansion will be carried out in the existing plot area. All the infrastructure such as Roads, Electricity, Water, etc. has been already available.

The monitoring program during and after the proposed project will be designed in such a way that it will comply with the guidelines of the Central Pollution Control Board/ Maharashtra Pollution Control Board.

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

**Table 6: Environmental Monitoring During Construction Stage**

| Sr. No. | Potential Impact        | Action to be Followed  | Parameters for Monitoring  | Frequency of Monitoring   |
|---------|-------------------------|--|--|---|
| 1.      | Air                     | All equipment's to be operated within prescribed standards   | Random checks of equipment's logs/manuals  | Weekly  |
|         |                         | Ambient air quality within the premises of the proposed unit 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> | 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 readings.  | Weekly during construction activities                                 |
|         |                         | Night working is to be minimized.  | Working hour records.  | Daily records   |
|         |                         | Generation of vehicular noise  | Maintenance of record 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 monthly basis whichever is earlier |
| 3.      | Wastewater Discharge    | No untreated domestic waste water discharge is to be made to groundwater or soil.  | No discharge hoses shall be in the vicinity of the watercourse.  | Monthly during construction activities.                               |
| 4.      | Soil Erosion            | Protect topsoil stockpile where possible at the edge of the site.  | Effective cover in place.  | The period during construction activities                             |
| 5.      | Drainage and Management | Ensure drainage system and specific design measures are working effectively. The design to incorporate existing drainage patterns and avoid disturbing the same. | Visual inspection of drainage and record thereof.  | Weekly during construction activities                                 |



|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

|     |  |  |  |  |
|-----|--|--|--|--|
| 6.  | Waste Management                           | Implement a waste management plan that identifies and characterizes every waste arising associated with proposed activities and which identifies the procedure for collection, handling, and disposal of each waste arising. | A comprehensive Waste Management plan should be in place and available for inspection on site. Compliance with MSW Rules,1998 and Hazardous Wastes (Management and Handling Rule)2003. | Fortnightly 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.   | Monthly during construction activities.          |
| 8.  | Health                                     | Employees and migrant labour health check-up.  | All relevant parameters including HIV.   | Six monthly check-ups.                           |
| 9.  | Environmental Management Cell/Unit         | The Environmental Management Cell/Unit is to ensure implementation and monitoring of environmental safeguards.   | Responsibilities and roles will be decided before the commencement of work.  | During construction phase.                       |
| 10. | Loss of flora and fauna                    | Re-vegetation as per Forest guidelines   | No. of plants, species.  | During site clearance Phase.                     |

The following routine monitoring program as detailed in Table 7 shall be implemented at the site. Besides this monitoring, the compliances to all environmental clearance conditions and regular permits from SPCB/MoEFCC shall be monitored and reported periodically.

**Table 7: Environmental Monitoring Schedule during Operation Phase**

| Sr. No. | Particulate         | Parameters  | Number of locations   | Frequency |
|---------|---------------------|---|---|-----------|
| 1.      | Ambient air quality | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO, and HC | Ambient air quality at minimum 2 locations. 1 location within the plant | Monthly   |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No. | Particulate                         | Parameters  | Number of locations   | Frequency                       |
|---------|-------------------------------------|---|---|---------------------------------|
|         |                                     |   | premises, 1 location in downwind direction.   |                                 |
| 2.      | Stack gas                           | PM, SO <sub>2</sub> , and NO <sub>x</sub>   | 1 No. of stack  | Monthly                         |
| 3.      | Workplace                           | PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO  | No process emissions are anticipated from the proposed expansion process.   | -                               |
| 4.      | Surface water and ground water      | pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) and <i>E.Coli</i>          | 1 Ground water location at plant site   | Half yearly                     |
| 5.      | Solid waste                         | Wet Waste, Dry Waste  | Process dust generated sludge.  | Monthly                         |
| 6.      | Noise                               | Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity | 2 locations<br>At plant site and nearest habitat  | Monthly                         |
| 7.      | Green belt                          | Number of plantation (units), number of survived plants/ trees, number of poor plants/ trees.   | In and around the plant site.   | Monthly                         |
| 8.      | Soil                                | Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.           | 1-2 near Solid/ hazardous waste storage.<br>At least 2 locations from Greenbelt and area where manure of biological waste is applied. | Quarterly                       |
| 9.      | Occupational health                 | Health and fitness check-up of employees getting exposed to various hazards and all other staff   | All worker  | Yearly/ twice a year            |
| 10.     | Drainage and Waste Water Management | Design to incorporate Existing drainage pattern and avoid disturbing the same.  | Ensure drainage system and specific design measures are working effectively.  | Periodic during operation phase |

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|---|--|-------------------|
| M/s. Shri Sainath Manganese Processing & Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil Tumsar, District Bhandara, Maharashtra - 441912. | Executive Summary |
|---|--|-------------------|

| Sr. No. | Particulate                                   | Parameters  | Number of locations  | Frequency                      |
|---------|---|---|--|--------------------------------|
| 11.     | Emergency preparedness, such as fire fighting | Mock drill records, on site emergency plan, evacuation plan | Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention. | Monthly during operation phase |

## 7. Additional Studies

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks to proposed project M/s. Shri Sainath Manganese Processing & Trading in terms of upgradation of a Mineral Beneficiation project to produce two main Products i.e. MnO<sub>2</sub> and MnO. This is purely independent project and not interlinked with any project in any manner. Mineral Ore will be sourced from MOIL. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. In this project, the operations will be planned and designed in such way to eliminate or reduce any hazards that may arise during the operations of the plant. The efforts will be made to achieve the desired standard of safety by implementing rules and regulation. Improvement will be done in working condition. The material and monetary resources shall be provided for the smooth and efficient execution of the safety plans. Continual efforts will be made to improve the living conditions and health of all the employees. The working floors will be furnished with required equipment/materials that ensures free from recognized occupational hazards likely to cause injury or illness.

Additional studies have been included in chapter VII are as below,

- Risk Assessment in which risks arising from
  - ✓ Charging of roasting kilns.

Following additional studies have been carried out to mitigate the risk -

- Disaster Management Plan
- Occupational Health and Safety Management System.
- On-site and Off-Site Emergency Plan

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

## 8. Project Benefits

As the proposed expansion will be done within the existing plot area; all industrial infrastructure such as water supply and electricity are already present. In addition to that, industry has planned to develop 759 sq.m. of area as Green Belt. Apart from this, as per the ministry's O.M No 22-65/2017-IA.II (M) dated 1st May, 2018, 1.5% of the total project investment i.e. Rs. 2.55 Lakhs will be earmarked for Corporate Environmental Responsibility (CER) Activities. Details of budget is presented in **Table 8**.

**Table 8: Details of CER Activity**

| CER activity                       | 2022-23 (Lacs) |
|------------------------------------|----------------|
| Lighting by LED bulb/ Solar panels | 0.5            |
| Free health camp                   | 1              |
| Tree plantation                    | 0.5            |
| Provision of RO filters            | 0.5            |
| <b>Total</b>                       | <b>2.5</b>     |

The above-mentioned CER activities will be carried out in Hingna, Takla, Hardoli, Mitewani, Ambagad and Dawezari villages. RO filters will be provided to ZP School, Ambagad, ZP School, Hardoli, etc.

M/s. Shri Sainath Manganese Processing & Trading. Is aware of the obligations towards the society and to fulfil the social obligations. During Construction phase, semi-skilled and unskilled labourers from the nearby villagers will be employed as far as possible. The development of the industry will also try to generate maximum indirect employment in the vicinity of the project by appointing local transport services during the operation phase. After the successful operation of the proposed project, the unit will also make provision of the fund every year towards CSR activities in nearby villages. The various CSR activities identified and planned at present are described below:

- Education and Skill development
- Health Camps
- Infrastructure development in nearby government and Zilla Parishad school
- Blood and Organ Donation Camps
- Other social welfare activities as per Felt Need Study.

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

## 9. Environmental Management Plan

The EMP is,

- Prepared in accordance with rules and requirements of the MoEFCC and the State Pollution Control Board.
- Prepared to ensure that the component of facility is operated in accordance with the design.
- A process that confirms proper orientation through supervision and monitoring.
- A system that addresses public complaints during construction and operation phase.
- A plan that ensures remedial measures are implemented immediately.

The key benefits of the EMP are that, it provides the organization with means of managing its environmental performance thereby allowing it to contribute to improved environment quality. The other benefits include cost control and improved relation to stakeholders.

EMP includes four major element –

- **Commitment and Policy:** of proposed project will strive to provide and implement the Environmental Management Plan that incorporates all issues related to air, land and water.
- **Planning:** This includes identification of environmental impacts, legal requirements and setting environmental objectives.
- **Implementation:** This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken
- **Measurement and Evaluation:** This includes monitoring, corrective actions, and record keeping.

### 9.1 Environment Management Plan during Construction Phase

The construction activities of the proposed unit will increase dust concentrations and fugitive emission. The following control measures are recommended to mitigate the probable adverse impacts.

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

### 9.1.1 Site Preparation

The development of site for erections of plant structure and other allied activities shall require careful management planning proponent. It is necessary to control the dust nuisance that would be created by levelling and transportation activities so that impacts on the various components of environment would be minimized. Regular sprinkling of water around vulnerable areas of the construction sites to control the dust spread or emission into the atmosphere. However, identified impacts would be of temporary type and within the plant boundary. Green belt area shall be developed to reduce air and noise pollution impacts. Top soil removed during setting up of new unit will be used in greenbelt development. First aid facilities shall be made available during construction.

### 9.1.2 Noise

Though level of construction activities shall not be very high, still some specific sources of noise like welding, transportation, movement of earth movers, tractors, concrete or asphalt mixing etc. should be carried out in a controlled manner. Neither the plant nor the construction workers should be exposed to excessive noise levels. No idling of machine shall be allowed during construction activities. Night-time construction activities and vehicular movement shall not be allowed. Personal protective equipment like earmuffs or ear plugs, masks etc. will be provided to workers who will be exposed to high noise.

### 9.1.3 Construction Equipment and Waste

Transport vehicles as well as transport routes should be properly maintained during whole construction phase to minimize smoke / dust emission from vehicle exhausts and unpaved roads. Composite solid wastes including metal scrape, other wastes, getting generated in construction process should be disposed of in safe manner. Certain hazardous waste materials, though the requirement of such materials shall be small, should be stored safely and be disposed of properly.

## 9.2 Environment Management Plan for Operation Phase

Factory proposes comprehensive environment management plan to combat pollution arising from the project activities. Detailed EMP is described below for various environmental parameters.

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

**Table 9: EMP during Operation Phase**

| Sr. No | Aspects      | Source & Impacts  | Mitigation Measures  | Monitoring/ Action   | Responsibility | Frequency of Audit/ Monitoring/ External Reporting  | Cost (Rs. In Lakh) |
|--------|--------------|---|--|--|----------------|---|--------------------|
| 1.     | Air Emission | <p>Source:<br/>Emission from Kilns<br/>Emergency operation of DG Sets<br/>Emission from vehicular movement<br/>Dust emission from dusty road</p> <p>Impact:<br/>Increase in NO<sub>x</sub>, Sox, PM concentration</p> | <p>30 m common stack attached with Kilns (2 nos) for better dilution and dispersion of pollutants. Wet scrubber will be attached preceding to the stack to arrest particulate matter.<br/>DG stacks of 10 m or as per MPCB directions/ norms<br/>Provision of air filters to DG sets.</p> <p>All vehicles and their exhausts will be well maintained and will be regularly monitored. for emission generated from the vehicle exhaust. Control of the airborne fugitive emissions from the ore handling area will be achieved through regular water sprinkling in this area.</p> | <p>Review of status of implementation of suggested mitigation measures</p> <p>Monitoring provision for flue gases emitting from process &amp; Utilities.</p> <p>Six monthly/as per Consent condition requirement for monitoring of stack emissions through MoEF recognized</p> | EHS            | <p>EHS Manager to review<br/>Emission results of monitoring<br/>Results of manual samples collected from process emissions stack by external laboratory<br/>Ensure compliance of conditions of Consent to Operate issued under Air Act; Annual renewals of CTO;</p> | 15                 |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects               | Source & Impacts   | Mitigation Measures  | Monitoring/ Action  | Responsibility                 | Frequency of Audit/ Monitoring/ External Reporting                                  | Cost (Rs. In Lakh) |
|--------|-----------------------|--|--|---|--------------------------------|---|--------------------|
|        |                       |  | Only PUC holder trucks will be allowed at site.<br>All internal road within plant area will be asphalted & whenever dusty situation will be found on road, water sprinkling will be done.<br>Green belt will be developed around the plant area.<br>Regular Air quality monitoring will be done. | external laboratory   |                                |   |                    |
| 2.     | Water Use             | Source:<br>Run off storm water<br>Runoff water from toilets<br>Impact:<br>Impact on ground water | Project has planned use of water Supply.<br>Provision of 2 no. of rainwater harvesting pit together with storage of water for re-use.<br>Sufficient recharge to be made annually to minimize impact on groundwater.  | Review of status of implementation of suggested mitigation measures | Facility Manager               | Six monthly reviews of reporting by Facility Manager                                | --                 |
| 3.     | Wastewater generation | Source:<br>Discharge of untreated sewage & effluent  | In the proposed no additional sewage generation existing Project 1 KLD sewage is being generated and it is being   | Review of status of implementation of suggested                     | EHS officer & Facility Manager | Facility Manager to Daily review of ETP log books<br>Review of results of essential | --                 |



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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects                 | Source & Impacts   | Mitigation Measures  | Monitoring/ Action   | Responsibility   | Frequency of Audit/ Monitoring/ External Reporting   | Cost (Rs. In Lakh) |
|--------|-------------------------|--|--|--|------------------|--|--------------------|
|        |                         | Impact:<br>Ground water pollution and increase in soil alkalinity                                      | treated in septic tank followed by soak pit.<br>The generated waste water of 2.5 KLD from jigging will be reused for quenching process.<br>Efforts should be taken towards treated wastewater quality to achieve land irrigation parameters prescribed in SCHEDULE –VI, The Environment (Protection) Rules, 1986<br>Maintaining good housekeeping in all the units so that wastewater generation is minimized; | mitigation measures  |                  | parameters and results of monthly collected treated water samples by external laboratory<br>Ensure compliance of conditions of Consent to Operate issued under Water Act<br>Annual renewals of CTO;<br>Six monthly monitoring of treated effluent. |                    |
| 4.     | Solid Waste generation. | Source:<br>Coal/ Wood Ash – 60 to 65 MT/M & Domestic waste will be generated from the project activity | Ash will be given to Bricks manufacturer for which agreement will be done<br>Garbage collection bins will be provided at requisite locations for collection of dry waste & wet waste.  | Review of status of implementation of suggested mitigation measures<br><br>Monthly review of | Facility Manager | Facility Manager to monthly review of waste logs<br><br>Also, EHS Manager to ensure compliance of conditions of authorization or   | 0.5                |

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects       | Source & Impacts  | Mitigation Measures   | Monitoring/ Action  | Responsibility | Frequency of Audit/ Monitoring/ External Reporting   | Cost (Rs. In Lakh) |
|--------|---------------|---|---|---|----------------|--|--------------------|
|        |               | Impact:<br>Ground water pollution<br>Soil contamination<br>Sanitation and Hygiene problem plant processes and | Domestic solid waste will be given to Authorized waste management Authority.                          | non-hazardous and hazardous waste generated from the project<br><br>Review conditions of storage location and records related to hazardous wastes as per the conditions of authorization<br>Maintain records on disposal of hazardous wastes. |                | annual filing of hazardous wastes returns.           |                    |
| 5.     | Ambient Noise | Source:<br>Increase in noise from DG set, Mechanical Separator,   | Provision of silencers at high noise generating utility equipment and erecting suitable enclosures to | Review of status of implementation of suggested   | EHS            | Six monthly review by EHS Manager<br><br>Six monthly | 0.5                |

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects          | Source & Impacts   | Mitigation Measures   | Monitoring/ Action   | Responsibility   | Frequency of Audit/ Monitoring/ External Reporting | Cost (Rs. In Lakh) |
|--------|------------------|--|---|--|------------------|--|--------------------|
|        |                  | Jigging Process etc.<br>Movement of vehicles inside the project site<br>Impact:<br>It will affect occupational Health & Safety | minimise the impact of high noise generating sources.<br>DG sets will be provided with Acoustic Enclosures to minimise noise.<br>Ear plugs to be provided to the personnel working in high noise area.<br>Unwanted honking of horns to be restricted through signage. | mitigation measures<br><br>Ambient noise monitoring along the plant periphery to be done through external laboratory on six monthly basis. |                  | monitoring of ambient noise                        |                    |
| 6.     | Socio – Economic | Source:<br>Employment<br>Impact:<br>There will be positive impact  | Preference to be given to the local candidate as per educational qualification during recruitment   | Review status of implementation of planned CSR activities  | HR Head          | Quarterly as per requirement                       | --                 |
| 7.     | House Keeping    | Source:<br>Operational activity<br>Impact:<br>Aesthetics blockage of storm water drain & Rain                                  | System to upkeep housekeeping and general cleanliness by providing adequate manpower.<br>Maintain clean curb cuts to avoid soil and vegetation build up, Green belt and landscape maintenance.  | Review of status of implementation of suggested mitigation measures  | Facility Manager | Fortnightly review of by Facility Manager          | 1                  |

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects                                      | Source & Impacts  | Mitigation Measures   | Monitoring/ Action  | Responsibility   | Frequency of Audit/ Monitoring/ External Reporting | Cost (Rs. In Lakh) |
|--------|--|---|---|---|------------------|--|--------------------|
|        |  | Water harvesting pit  | Inspections of drains and area surrounding cooling tower to check any water logging situation.  |   |                  |  |                    |
| 8.     | Energy                                       | Utilization of non-renewal resources<br><br>Heat gain in the building                     | Provision of renewable energy to be used for street lighting.<br>LED have been used for internal lighting which helps save energy.  | Review of status of implementation of suggested mitigation measures | Facility Manager | Six monthly review by Facility Manager             | --                 |
| 9.     | EHS including associated risks of flammables | Source:<br>Fire, Explosion, accident<br><br>Impact:<br>Health hazards, Damage to property | The industry will adopt high standards, controls, mitigation measures to control risks associated with fire.<br>Following risk mitigation measures are adopted:<br>Proper system for collection and disposal of domestic and non-hazardous waste;<br>All the required safety measures (working guideline, use of personal protective equipment like gloves, helmets, earmuffs, etc.) for any repair and | Review of status of implementation of suggested mitigation measures | EHS Manager      | Six monthly review by EHS Manager                  | --                 |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects | Source & Impacts | Mitigation Measures  | Monitoring/<br>Action | Responsibility | Frequency of<br>Audit/ Monitoring/<br>External Reporting | Cost (Rs. In Lakh) |
|--------|---------|------------------|--|-----------------------|----------------|--|--------------------|
|        |         |                  | <p>maintenance work within the proposed facility have been provided;</p> <p>For safety of people occupying the building, regulations concerning fire safety are followed. Some of the requirements are:</p> <p>Installation of fire extinguishers all over the building,</p> <p>Emergency Response Plan will be periodically updated. The Site Operations Manager shall carry out exercises of part of the Emergency Response Plan at a regular interval as deemed necessary.</p> <p>The lesson learnt from these exercises shall be documented and used during the updating of the Emergency Response Plan.</p> |                       |                |  |                    |

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects             | Source & Impacts                               | Mitigation Measures   | Monitoring/ Action                              | Responsibility                    | Frequency of Audit/ Monitoring/ External Reporting        | Cost (Rs. In Lakh) |
|--------|---------------------|--|---|---|-----------------------------------|---|--------------------|
|        |                     |  | Provision of water hydrants in operative conditions.<br>Emergency exit.<br>Proper labelling of exit and place of the protective system installation.<br>Conducting mock drills.<br>Trained personnel to use the fire control systems.<br>Display of emergency evacuation maps at the working place.<br>Regular training and awareness programs to be conducted for people as per training modules formulated by the management for efficient control and management of environmental, safety and health related issues. |   |                                   |   |                    |
| 10.    | Disaster Management | Source:<br>Risk of damage due to fire, natural | During operation phase, potential risks include accidental fire, electrical shock, fall hazards by  | Review of status of implementation of suggested | EHS Manager<br>Security In charge | Six monthly reviews by EHS Manager and Security In charge | 2                  |

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects | Source & Impacts  | Mitigation Measures   | Monitoring/ Action  | Responsibility | Frequency of Audit/ Monitoring/ External Reporting | Cost (Rs. In Lakh) |
|--------|---------|---|---|---------------------|----------------|--|--------------------|
|        |         | <p>disaster and other emergency situations</p> <p>Impact:<br/>Loss of life, damage to property, financial loss to company</p> | <p>working at height, physical injury, mechanical failure, vehicular hazards etc. These risks will be minimised by periodical operation and maintenance of equipment and periodical supervision by operation team.</p> <p>Ensure adequate Fire Fighting system established onsite prior to commissioning of the Project as per the Fire Fighting Plan covering following aspects:<br/>Fire Prevention Measure and Systems Signage<br/>Fire Detection &amp; alarm System<br/>Fire Fighting System and devices<br/>Annually, update Emergency Response Plan and ensure organization available for its implementation.</p> | mitigation measures |                |  |                    |

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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

| Sr. No | Aspects                 | Source & Impacts                           | Mitigation Measures  | Monitoring/ Action  | Responsibility   | Frequency of Audit/ Monitoring/ External Reporting | Cost (Rs. In Lakh) |
|--------|-------------------------|--|--|---|------------------|--|--------------------|
| 11.    | Project Related Traffic | Potential Congestion on the approach roads | The company has provided a total area of 87 sqm. for parking space.<br>The vehicles bringing utility raw materials are regulated and managed by the project in such a way that the impact during peak hours of traffic remains minimum.<br>Internal roads are provided with adequate signage to maintain smooth flow of different type of Project related traffic. | Review of status of implementation of suggested mitigation measures | Facility Manager | Monthly review by the staff related to function.   | --                 |



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|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

### 9.3 Implementation of EMP

Environmental Health and Safety (EHS) Department of M/s. Shri Sainath Manganese Processing & Trading will take the overall responsibility for co-ordination of the actions required for environmental management and mitigation and for monitoring the progress of the proposed management plans and actions to be implemented for the project. An Environment Management System (EMS) would be set-up which identifies legal requirement, analyses aspect-impact, sets objective, targets and programs, prepares action plans, roles & responsibilities, monitors the progress of these plans and incorporates corrective action required if any.

The implementation mainly comprises of resources available to the project proponent, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken. It is proposed to create Environment Management Cell under EHS Manager for effective implementation of EMP. The Cell will have following functions:

- To implement the environmental management plan,
- To assure regulatory compliance with all relevant rules and regulations,
- To ensure regular operation and maintenance of pollution control devices,
- To minimize environmental impacts of operations as by strict adherence to the EMP,
- To initiate environmental monitoring as per approved schedule.
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit.
- Maintain environmental related records; and
- Coordination with regulatory agencies, external consultants, monitoring laboratories.

The schematic organizational set up of Environment Management Cell for operation phase is given in **Figure 5**.



**Figure 5: Environment Monitoring Cell**

#### 9.4 EMP Review and Amendments

The EMP acts as an environmental management tool that needs to be reviewed periodically to address changes in the organization, process, or regulatory requirements. Following a review, EHS Manager will be responsible for making the amendments in the EMP and seeking approval from the senior management. The amended EMP will be communicated to all related staff. EHS Manager will ensure that the training needs are identified and conducted. Training needs will be identified based on the specific requirements of EMP and the capacity of site and project personnel to undertake the required EMP management actions and monitoring activities. Also, general environmental awareness will be created among the project's team to encourage the implementation of environmentally sound practices and compliance requirements of the project activities. This will help in minimizing adverse environmental impacts, compliance with the applicable regulations and standards, and achieving performance beyond compliance.

|   |   |                      |
|---|---|----------------------|
| M/s. Shri Sainath<br>Manganese Processing &<br>Trading. | Proposed Expansion of Mineral Ore Benefaction at Kh. No. 307, Mouza Hardoli, Tahsil<br>Tumsar, District Bhandara, Maharashtra - 441912. | Executive<br>Summary |
|---|---|----------------------|

## 10. Environment Management Cost

The total cost of the project is estimated about Rs. 1.7 Cr. The project cost estimates include land and land development, civil, building structure, plant and machinery, other expenses, contingencies @2% on building, plant and machinery, margin money of working capital. Environment management cost will be around Rs. 21 Lakhs and recurring cost will be Rs. 5.5 Lakhs per annum. The details of EMP cost are given in **Table 10**.

**Table 10: Environmental Management Cost**

| Sr.No.       | Component                               | Description  | Capital cost<br>Rs. In lacs | Operational &<br>Maintenance cost<br>(Rs. In Lacs/yr) |
|--------------|---|--|-----------------------------|---|
| 1            | Air Pollution control                   | Stack for boiler, scrubber system, DG stack, VOC control system via primary secondary condenser                  | 15                          | 1   |
| 2            | Noise pollution control                 | Noise Level Monitoring   | 0.5                         | 0.5   |
| 3            | Environmental Monitoring and Management | Ambient air monitoring, stack emission monitoring, workplace monitoring from MoEF approved lab on monthly basis. | 1                           | 1   |
| 4            | Occupational Health and Others          | Medical check of staff from certified surgeon and providing health cover   | 2                           | 1   |
| 5            | Green Belt                              | Green belt maintenance   | 1.5                         | 1   |
| 6            | Solid & Hazardous Waste Management      | Solid waste disposal   | NA                          | 0.5   |
| 7            | PPE'S                                   | Personal Protective Equipment's  | 1                           | 0.5   |
| <b>Total</b> |   |  | <b>21</b>                   | <b>5.5</b>  |