# RANTHA IRON ORE MINES

# REVIEW OF MINING PLAN

~~Mining Plan/~~**Review of Mining Plan**/~~Modified in Approved Mining Plan~~ of **Rantha Iron Ore Mine**/Deposit over an area of **268.84 Ha** as per ROR and **268.84 Ha** as per DGPS submitted under Rule ~~16(1)*/~~**17(2)***/~~17(3)*~~ of Minerals (Other than Atomic and Hydro-Carbons Energy Minerals) Concession Rules, 2016.

# TEXT

| | |
|---|---|
| *Mine/Deposit Name* | *Rantha Iron Ore Mine* |
| *Mining Lease no-* | *698* |
| *Mine Code-* | *30ORI13058* |
| *In Villages-* | *Rantha (Khandadhar P.R.F) & Khandadhar R.F* |
| *Tehsil-* | *Lahunipara* |
| *District-* | *Sundargarh* |
| *State* | *Odisha* |
| *Total-Lease area* | ***268.84 Ha** as per DGPS* |
| *Forest Area* | *268.84 Ha.* |
| *Non-Forest area* | *0.00 Ha.* |
| *Lease Execution Date* | *31.12.1968* |
| *Lease period-* | *70 years from 31.12.1968 to 30.12.2038* |
| *Mineral-* | *Iron Ore* |
| *Proposed category of Mine-* | *A-Mechanized* |
| *Mining plan period-* | *2023-24 to 2027-28* |
| *Working proposal period-* | *2023-24 to 2027-28* |
| *Applicant/lessee* | *Odisha Mining Corporation Ltd* |
| *IBM Registration no-* | *IBM/4269/2011* |
| *Address-* | *OMC House, Bhubaneswar - 751001,<br>District: Khurda, State: Odisha* |
| *Phone-* | *Tel: 0674-2377400 & 2377401,<br>Fax No: (0674) 2580145/020* |
| *Email-* | *info@odishamining.in* |
| *Prepared by-* | |
| *Qualified Person Name-* | *1.Sri Pradip Kumar Sahoo, B. Tech in Mining Engineering<br>2. Sri Rabindra Mohanty, M. Sc in Geology* |
| *Address-* | *OMC House, Bhubaneswar - 751001,<br>District: Khurda, State: Odisha* |
| *Phone-* | *9439277649,7978567771* |
| *Email-* | *pksahoo2@odishamining.in, rmohanty@odishamining.in* |

## CONSENT LETTER / UNDERTAKING / CERTIFICATE FROM THE LESSEE

1. The Review of Mining Plan in respect of **Rantha IronOre Mine** of **Odisha Mining Corporation Limited** over an area of 268.84 Ha in Village Rantha (Khandadhar P.R.F) and Khandadhar R.F in TahasilLahunipara, Bonai sub-division of Sundargarh district of Odisha state submitted under Rule 17(2) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rule, 2016 has been prepared by following Qualified Persons namely **Sri Pradip Kumar Sahoo,** Manager (Mining) **& Sri RabindraMohanty,** Sr. Manager (Geology) of OMC Ltd Jointly.

   This is to request the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar, to make any further correspondence regarding any correction of the Review of Mining Plan with the said qualified person at their addresses below.

| | |
|---|---|
| Sri Pradip Kumar Sahoo, Manager (Mining),<br>OMC House, Post Box No 34,<br>Bhubaneswar, Odisha - 751001<br>Phone: (0674), 2399950<br>Fax: (0674) 2391629, 2396889,<br>Email: pksahoo2@odishamining.in | Sri RabindraMohanty, Sr. Manager (Geology),<br>OMC House, Post Box No 34,<br>Bhubaneswar, Odisha - 751001<br>Phone: (0674), 2399950<br>Fax: (0674) 2391629, 2396889,<br>Email: rmohanty@odishamining.in |

   We hereby undertake that all modifications / updating as made in the said Review of Mining Plan by the said qualified persons be deemed to have been made with our knowledge and consent and shall be acceptable on us and binding in all respects.

2. It is certified that the **CCOM's Circular no. 2/2010** related to DGPS survey of the lease area has already been implemented by ORSAC an authorized agency approved by the State Government.

3. It is certified that the Progressive Mine Closure Plan prepared under Rule 23 of MCDR, 2017 ofRanthaIron Ore Mine of Odisha Mining Corporation Ltd over an area of 268.84 Ha complies with all statutory rules, regulations, orders made by the Central or State Government, statutory organization, court etc. which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.
   The information furnished in the **Progressive Mine Closure Plan** is true and correct to the best of our knowledge and records.

4. The provisions of **Mines Act, Rules and Regulations** made there under have been observed in the Review of Mining Plan of RanthaIron Ore Mine over an area of 268.84 Ha in Sundargarh district of Odisha state belonging to Odisha Mining Corporation Limited and where specific permissions are required, the applicant will approach the **DGMS**. Further, standards prescribed by **DGMS** in respect of **miner's health** will be strictly implemented.

Place: Bhubaneswar

Date:

**Managing Director & Nominated Owner**
**Odisha Mining Corporation Limited**
**OMC House, Bhubaneswar**

## CERTIFICATE FROM THE QUALIFIED PERSONS

The provisions of the Mineral Conservation and Development Rules, 2017 have been observed in the preparation of Review of Mining Plan for Rantha Iron Ore Mines over an area of 268.84 Ha(as per DGPS) in Village Rantha (Khandadhar P.R.F) and Khandadhar R.F in LahuniparaTahasilBonaisub-division of Sundargarh district of Odishastate and whenever specific permissions are required, the applicant will approach the concerned authorities of Indian Bureau of Mines.

The information furnished in the Mining Plan is true and correct to the best of our knowledge.

Qualified Person Qualified Person

Place: Bhubaneswar

Date:

**INRODUCTORY NOTE**:

Rantha Iron Ore Mines is owned by M/s Odisha Mining Corporation Limited, a Govt. of Odisha Undertaking. Rantha Iron Ore Lease of M/s Odisha Mining Corporation is located in village Rantha & Khandadhar Reserved Forest Lahunipara Tahsil and Bonai sub-division of Sundargarh district of Odisha state between latitude $21^0$45'12.45558"N– $21^0$46'54.64380"N & longitude $85^0$08'11.37095"E – $85^0$08'52.12745''E and is covered by survey of India topo-sheet no. F45N1 (73G/1).

**STATUS OF LEASE:**

Lease deed for Rantha lease was executed on 31.12.1968 for a lease area of 408.8731 Ha (As per RoR) & 408.832 Ha (as per DGPS) for a period of 50 years. Copy of lease deed for Rantha lease is enclosed at annexure 7. Subsequently, State Government order that in terms of rule 3(1) of Mineral (Mining by Government Company) Rules 2015 dated 03.12.2015, the period of the original lease is deemed to be granted for 50 years i.e. from 31.12.1968 to 30.12.2018. Further in terms of rule 3(2) and 3(3) of said rules, the validity period of the lease is extended for a further period of 20 years from 31.12.2018 to 30.12.2038 vide letter no: III(B) SM-25/2012/203/SM. Bhubaneswar Dated. 09.02.2016 over retained area of 268.84 Ha. Copy of lease extension letter from state Govt. is enclosed as annexure 8. The ML area granted at different points of time in chronological order is given in the table below:-

| Sl. No | Event with justification, if any | Remarks |
|---|---|---|
| 1 | Lease deed for Rantha was executed on 31.12.1968 for a lease area of 408.8731 Ha for a period of 50 years. | Lease Period : 31.12.1968 to 30.12.2018 |
| 2 | The validity of the lease is extended for a further period of 20 years vide letter no: III(B)SM-25/2012/203/SM. Bhubaneswar Dated. 09.02.2016 over retained area of 268.84 Ha. | Extended period : 31.12.2018 to 30.12.2038 |

**STATUS OF ENVIRONMENT CLEARANCE:**

Environment clearance for the lease has been granted by MoEF vide letter no. J-11015/1085/2007-IA. II (M) dated 11.06.2008 for a rated iron ore production capacity of 1.0 million tonnes per annum. A copy of the same is enclosed as Annexure- 17.

**STATUS OF FOREST CLEARANCE:**

The Stage- I & II forest clearance over the forest area of 268.84 Ha. have not been obtained from MoEF & CC. Application for Stage-I forest clearance have been applied to MoEF & CC vide letter No. 2917/OMC/F&E/2020 dated 20.02.2020. A copy of the same is enclosed as Annexure-15.

**STATUS OF CONSENTS FROM SPCB:**

Consent to establish for 1 MTPA has been granted by State Pollution Control Board vide Consent Order No: 9547/IND-II-NOC-4584 on dated 26.04.2007. Consent to Establish is enclosed as Annexure-18.Consent to operate to be obtained after getting all statutory clearances.

**STATUS OF SURFACE RIGHT:**

Permission for surface operation over 408.7730 Ha. out of 408.8731 hectares original M.L area was obtained by Lessee from the office of the Collector, Sundargarh vide letter No.XII-92/73-1193 dated 21.07.1973. M.L area applied for retaining over 268.84 Ha is a part of 408.7730 Ha in the originally executed M.L area over 408.8731 Ha. Hence, surface right of the retained area of 268.84 Ha. has been obtained.

Copy of letter of grant of surface right permission is given in Annexure — 16. Copy of land schedule is given at annexure 10.

| REVIEW OF MINING PLAN AT A GLANCE | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Name of the Applicant /lessee | Odisha Mining Corporation Limited | | | | |
| 2 | IBM Registration no | IBM/4269/2011 | | | | |
| 3 | Address of Applicant | OMC House, Bhubaneswar - 751001,<br>District: Khurda, State: Odisha. | | | | |
| 4 | Name of Mine | Rantha Iron Ore Mine | | | | |
| 5 | Mine Code | 30ORI13058 | | | | |
| 6 | Lease area in hects. | 268.84 Ha. (As per DGPS). | | | | |
| 7 | Forest area | 268.84 Ha. | | | | |
| 8 | Name of Mineral | IRON. | | | | |
| 9 | Lease period from to | Initial Grant: 31.12.1968 to 30.12.2018.<br>1st RML: 31.12.2018 to 30.12.2038. | | | | |
| 10 | Plan proposal period | 2023-24 to 2027-28. | | | | |
| 11 | Mineral Reserve (111, 121 & 122) in tonnes | 111-Nil.<br>121- 29778279.<br>122-41138733<br>Total: 7,09,17,012 tonnes | | | | |
| 12 | Mineral Resources (211, 221,222, 331, 332, 333 & 334) in tonnes | 221- 1765450, 222-6878088 ,<br>Total: 86,43,538 tonnes | | | | |
| 13 | Total (Reserve/ Resource) in tonnes | 7,09,17,012 tonnes | | | | |
| 14 | Reserve Estimated as on | 30.06.2022. | | | | |
| 15 | Explored Area in Ha. | G1-39.632 Ha., G2- 165.724 Ha., G3- Nil,G4- 63.484 Ha.<br>Explored & found Non-Mineralized- 20 Ha.(G2) | | | | |
| 16 | Exploration Proposal of bore holes for Five Year. | 192 nos. | | | | |
| | | In Situ (Year wise) | | From Dump (Year wise) | | Total (Year wise) |
| 17 | Production proposal Iron Ore in tonnes year wise i.e. FY 2023-24 to 2027-28 | 10,00,000 | | 0 | | 10,00,000 |
| 18 | OB/Waste handling proposal in CUM year wise i.e. FY 2023-24 to 2027-28 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 |
| | | 1,50,000 | 1,70,000 | 3,10,000 | 7,00,000 | 2,00,000 |
| 19 | Present EC permission in tonnes (Mineral or ROM). | 10,00,000 tonnes | | | | |
| 20 | Plantation proposal in Five years in numbers | 8040 Nos. | | | | |
| 21 | Plantation area proposal in Five year (ha). | 6.7 Ha. | | | | |
| 22 | Back filling proposal in Five year (ha). | No Proposal During the RMP Period i.e. 2023-24 to 2027-28. | | | | |
| 23 | Check Dams numbers in Five year | 02 Nos. | | | | |
| 24 | Garland drain in meters in Five year | 1710 mtr. | | | | |
| 25 | Retaining wall in meters in Five year | 1710 mtr | | | | |
| 26 | Settling ponds (Numbers) in Five year | 0 Nos. | | | | |
| 27 | Area put to use at end of five year in ha | 70.078 Ha. | | | | |
| 28 | Bank Guarantee Amount Rs | Rs. 3,50,39,000/- | | | | |
| 29 | Validity of BG upto | 31.03.2028. | | | | |
| 30 | Any other important information | Not Applicable. | | | | |
| 31 | Percentage of revenue sharing bid in case of auction grant of block | Not Applicable. | | | | |
| 32 | Amount of performance security and details if any | Not Applicable. | | | | |

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# PART-B

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# Chapter 1:

# GENERAL INFORMATION

## 1.1 : Lease Details:

**1.1.1:**

| | | | |
|---|---|---|---|
| IBM Registration Number: | IBM/4269/2011 | | |
| Lease Code: | 698 | | |
| Mine Code: | 30ORI13058 | | |
| Name of Lessee: | ODISHA MINING CORPORATION LIMITED | | |
| Address of Lessee: | OMC House, Post Box No.34, Bhubaneswar-751001, Odisha. | | |
| Type of Lessee : | PSU | | |
| Name of Mining Lease: | RANTHA IRON ORE MINE | | |
| State: | ODISHA | | |
| District: | SUNDARGARH | | |
| Tehsil/ Taluk/ Mandal: | LAHUNIPARA | | |
| Village: | RANTHA,KHANDADHAR P.R.F & KHANDADHAR R.F | | |
| Lease Area (Ha): | 268.84 | | |
| Forest Area (Ha): | 268.84 | | |
| Name of Minerals: | IRON. | | |
| Name of associated minerals: | NA | | |
| Type: | EXISTING LEASE | | |
| Five Year Block (Financial Year) | 2023-24 | TO | 2027-28 |
| Type of working: | OPENCAST | | |
| Nature of Use: | NON-CAPTIVE | | |
| Category of Mine: | A-MECHANIZED | | |

**Initial/subsequent Lease grants details:**

| Grant | From | To | Lease deed execution date | Lease Registration Date |
|---|---|---|---|---|
| Initial grant | 31.12.1968 | 30.12.2018 | 31.12.1968 | 22.11.1968 |
| 1st RML | 31.12.2018 | 30.12.2038 | 31.12.1968 | 22.11.1968 |

Lease Deed attached as Annexure-7 & Extension of Validity of lease attached as Annexure- 8. Supplementary lease deed with the State Government is yet to be executed.

### 1.1.2: Mining Plan Submission Criteria Details:

| Type of document | Review of Mining Plan for the period from 2023-24 to 2027-28. |
|---|---|
| Reason/s for modification | NA |
| Period for which modification is proposed | NA |
| LOI Number: | NA |
| Date: | NA |

### 1.2: Land Ownership Details:

| S.N. | Village | Taluka | Area (Ha) | Plot no/ Khasra No | Type of Land | Nature of Land |
|---|---|---|---|---|---|---|
| 1 | Khandadhar R.F | Lahunipada | 199.814 | ----- | Forest Land | Government Waste Land |
| 2 | Rantha | Lahunipada | 0.862684 | 110,40 | Forest Land | Government Waste Land |
| 3 | Rantha | Lahunipada | 4.78544 | 111,40 | Forest Land | Government Waste Land |
| 4 | Rantha | Lahunipada | 2.49948 | 117,40 | Forest Land | Government Waste Land |
| 5 | Rantha | Lahunipada | 4.38695 | 118,40 | Forest Land | Government Waste Land |
| 6 | Rantha | Lahunipada | 4.49366 | 121,40 | Forest Land | Government Waste Land |
| 7 | Rantha | Lahunipada | 2.40576 | 122,40 | Forest Land | Government Waste Land |
| 8 | Rantha | Lahunipada | 8.37509 | 186,40 | Forest Land | Government Waste Land |
| 9 | Rantha | Lahunipada | 7.3943 | 188,40 | Forest Land | Government Waste Land |
| 10 | Rantha | Lahunipada | 1.59105 | 18940 | Forest Land | Government Waste Land |
| 11 | Rantha | Lahunipada | 1.82661 | 192,40 | Forest Land | Government Waste Land |
| 12 | Rantha | Lahunipada | 16.0595 | 193,40 | Forest Land | Government Waste Land |
| 13 | Rantha | Lahunipada | 7.42079 | 194,40 | Forest Land | Government Waste Land |
| 14 | Rantha | Lahunipada | 6.0563 | 195,40 | Forest Land | Government Waste Land |
| 15 | Rantha | Lahunipada | 0.867978 | 197,40 | Forest Land | Government Waste Land |

### 1.3: Existing Lease:

| | |
|---|---|
| Date of Execution | 31.12.1968 |

### 1.3.1: Approval of earlier Mining Plan & Its Subsequent Review in Chronological Order:

| Sl. No | Letter no. | Date | Period | | Type of Approved Document |
|---|---|---|---|---|---|
| | | | From | To | |
| 1 | 314(3)98/MCCM©MP-2 | 13.10.1998 | ---- | ---- | Mining Plan |
| 2 | 314(3)2006-MCCM(CZ)/S-1 | 23.10.2006 | 2003-2004 | 2007-2008 | Scheme of Mining Plan |
| 3 | 314(3)2008-MCCM(CZ)/MS-26 | 05.03.2009 | 2008-2009 | 2012-2013 | Scheme of Mining Plan |
| 4 | FMCP/FM/43-ORI/BHU | 25.10.2018 | ---- | ----- | Final Mine Closure Plan |
| 5 | MPM/FMM/06-ORI/BHU/2019-20 | 01.10.2019 | 2018-19 | 2022-23 | Modification of Mining Plan |

### 1.3.2: Partial Surrendered Area during Stages of Operations in Chronological Order:

| Sl. No. | Date | Supplementary Surrender order Letter Number | Supplementary Lease Deed Date | Final Retained Area over which current Mining Plan is Prepared ( ha) |
|---|---|---|---|---|
| 01. | 22.07.2019 | 5252/S&M, Bhubaneswar III (B) SM-25/2012. | Supplementary lease deed with the State Government is yet to be executed. | 268.84 Ha. |

### 1.3.3: Transfer of Lease Area Subsequent to Grant:

| | | | | Nature of block transferred | |
|---|---|---|---|---|---|
| Sl. No. | Transfer of lease deed Number | Date of execution of Transfer lease deed | Name of Transferor | Granted through auction | other than through auction for captive use |
| Not Applicable. | | | | | |

### 1.3.4: Statutory Compliances:

### 1.3.4.1: Environment Clearance:

| | |
|---|---|
| Applicable | Yes |
| Letter No | J-11015/1085/2007-IA.II(M) |
| Date | 11.06.2008 |
| Validity | 30.12.2038 |
| ROM Mineral in tonnes | 1000000 |

### 1.3.4.2: SPCB Approvals:

| | |
|---|---|
| Letter No | 9547/IND-II-NOC-4584 |
| Approval of | Consent to Establish |
| Date | 26.04.2007 |
| Validity | 30.12.2038 |
| ROM Mineral in tonnes | 1000000 |

Consent to operate to be obtained after getting all statutory clearances.

### 1.3.4.3: Forest Clearance:

The Stage- I & II forest clearance over the forest area of 268.84 Ha. have not been obtained from MoEF & CC application for Stage-I forest clearance have been applied to MoEF & CC vide letter No. 2917/OMC/F&E/2020 dated 20.02.2020. A copy of the same is enclosed as Annexure-15.

| | |
|---|---|
| Applicable | Yes |
| Letter No | Not Available. |
| Date | Not Available |
| Validity | Not Available |
| Area (Ha) | 268.84 Ha. |

### 1.3.4.4: Land Acquisition Details:

| | |
|---|---|
| Total Area acquired/purchased so far | Nil |
| Total Amount Paid (INR) | Nil |

### 1.3.5: Mine Location Details:

| | |
|---|---|
| Toposheet Number: | F45N1 (73G/1),<br>Attached Key Plan as Plate no-1 |

### 1.3.5.1: Location of Boundary Pillars–(add additional Row for subsequent pillars):

| SI. No. | Pillar No. | Pillar Latitude (dd:mm:ss.ss) | Pillar Longitude (dd:mm:ss.ss) | Easting | Northing |
|---|---|---|---|---|---|
| 1 | M L-A | 21°46'54.64380" | 85°08'52.12745" | 308500.348121 | 2409829.48622 |
| 2 | ML-A1 | 21°46'50.89922" | 85°08'52.23212" | 308501.973067 | 2409714.2781 |
| 3 | ML-A2 | 21°46'43.02926" | 85°08'52.45199" | 308505.385 | 2409472.146 |
| 4 | ML-A3 | 21°46'35.47052" | 85°08'52.66297" | 308508.657 | 2409239.589 |
| 5 | ML-A4 | 21°46'27.55031" | 85°08'52.88401" | 308512.085 | 2408995.911 |
| 6 | ML-A5 | 21°46'19.78416" | 85°08'53.10071" | 308515.445597 | 2408756.97295 |
| 7 | ML-B | 21°46'12.07986" | 85°08'53.31592" | 308518.786696 | 2408519.93778 |
| 8 | ML-B1 | 21°46'11.90736" | 85°08'48.19212" | 308371.519197 | 2408516.39827 |
| 9 | ML-B2 | 21°46'11.76661" | 85°08'43.99557" | 308250.90274 | 2408513.51663 |
| 10 | ML-B3 | 21°46'11.42757" | 85°08'33.88464" | 307960.295762 | 2408506.57945 |
| 11 | M L-B4/M | 21°46'11.10132" | 85°08'24.14307" | 307680.304163 | 2408499.9131 |
| 12 | M j_-D3 | 21°45'12.52483" | 85°08'17.18929" | 307458.811498 | 2406700.67926 |
| 13 | ML-D4 | 21°45'12.64531" | 85°08'27.29882" | 307749.331131 | 2406700.88809 |
| 14 | ML-D5 | 21°45'12.76646" | 85°08'37.51892" | 308043.027818 | 2406701.08448 |
| 15 | ML-D6 | 21°45'12.88968" | 85°08'47.80550" | 308338.634774 | 2406701.32679 |
| 16 | M L-E | 21°45'13.26966" | 85°08'55.47307" | 308559.084627 | 2406710.37327 |
| 17 | ML-E1 | 21°45'23.12839" | 85°08'55.34083" | 308558.917614 | 2407013.64281 |
| 18 | ML-F | 21°45'31.12078" | 85°08'55.23496" | 308558.82126 | 2407259.50057 |
| 19 | M L-G | 21°45'31.19763" | 85°09'01.95777" | 308752.006914 | 2407259.55096 |
| 20 | ML-G1 | 21°45'34.66136" | 85°09'01.88196" | 308751.104007 | 2407366.11076 |
| 21 | ML-G2 | 21°45'44.25862" | 85°09'01.66485" | 308748.399957 | 2407661.36753 |
| 22 | ML-G3 | 21°45'54.26981" | 85°09'01.43829" | 308745.577537 | 2407969.359 |
| 23 | ML-G4 | 21°46'03.81409" | 85°09'01.22287" | 308742.903695 | 2408262.98586 |
| 24 | ML-G5 | 21°46'13.36836" | 85°09'01.00819" | 308740.255624 | 2408556.91976 |
| 25 | ML-G6 | 21°46'23.21792" | 85°09'00.78701" | 308737.530282 | 2408859.93822 |
| 26 | ML-G7 | 21°46'32.92000" | 85°09'00.56876" | 308734.835454 | 2409158.4198 |
| 27 | ML-G8 | 21°46'42.61844" | 85009'00.35035" | 308732.135332 | 2409456.78978 |
| 28 | ML-H | 21°46'51.75200" | 85°09'00.14520" | 308729.608467 | 2409737.78093 |
| 29 | ML-M1 | 21°46'05.19006" | 85°08'24.20928" | 307680.016709 | 2408318.07739 |
| 30 | ML-N | 21°46'00.53083" | 85°08'24.26422" | 307679.869313 | 2408174.75418 |
| 31 | ML-N1 | 21°46'00.39278" | 85°08'16.98060" | 307470.558777 | 2408173.02919 |
| 32 | ML-0 | 21°46'00.26986" | 85°08'10.43142" | 307282.353775 | 2408171.51793 |
| 33 | ML-01 | 21°45'51.10107" | 85°08'10.61172" | 307284.131315 | 2407889.45001 |
| 34 | M L-02 | 21°45'35.75736" | 85°08'10.91281" | 307287.088635 | 2407417.4177 |

| Sl. No. | Pillar No. | Pillar Latitude (dd:mm:ss.ss) | Pillar Longitude (dd:mm:ss.ss) | Easting | Northing |
|---|---|---|---|---|---|
| 35 | ML-03 | 21°45'27.91478" | 85°08'11.06680" | 307288.603548 | 24071769.14968 |
| 36 | ML-04 | 21°45'20.31110" | 85°08'11.21574" | 307290.062412 | 2406942.23095 |
| 37 | ML-P | 21°45'12.45558" | 85°08'11.37095" | 307291.608513 | 2406700.56428 |

### 1.3.6: Owner/Nominated Owner Details:

| Name | PAN of Nominated Owner | Address of Nominated Owner | Mobile Number | E-mail | Please attach Minutes of Board Resolution in case of Nominated Owner |
|---|---|---|---|---|---|
| BALWANT SINGH, IAS | BFMPS6439D | Managing Director OMC HOUSE,POST BOX NO-34,BHUBANESWAR ODISHA-751001 | 9777355594 | info@odishamining.in, md@orissamining.com | Attached in Annexure-2 |

### 1.3.7: Qualified Person Details as per M (OAHCEM) CR, 2016:

| Sr. No | Prefix | Name | PAN of QP | Address | Mobile no. | Qualification | Experience in years as prescribed under the rule | Email |
|---|---|---|---|---|---|---|---|---|
| 01. | Mr. | PRADIP KUMAR SAHOO | BPMPS0920K | OMC HOUSE,POST BOX NO-34,BHUBANESWAR ODISHA-751001 | 9439277649 | B.TECH IN MINING ENGINEERING | 14 | pksahoo2@odishamining.in<br>pmc@odishamining.in |
| 02. | Mr. | RABINDRA MOHANTY | BFOPM2802N | OMC HOUSE,POST BOX NO-34,BHUBANESWAR ODISHA-751001 | 7978567771 | M.SC IN GEOLOGY | 16 | rmohanty@odishamining.in<br>pmc@odishamining.in |

# Chapter 2

# GEOLOGY & EXPLORATION

## 2.1: GEOLOGY:

### 2.1.1: Topography:

| | |
|---|---|
| Terrain | Undulating |

Relief:

| Highest Level (m) from MSL | Lowest Level (m) from MSL | Average Level (m) from MSL |
|---|---|---|
| 1015 | 715 | 300 |

| Drainage Pattern | Order of Stream | Minimum Distance of Stream from Lease Area (m) |
|---|---|---|
| Dendritic | Order 1 | 2500metre (Khandadhar) |

### 2.1.2: Details of Physiographic features and Infrastructures available in and around the lease/ block area:

| Description | Location if existing Within the lease/block area. | Distance from boundary periphery in kms, if existing outside the lease/block area. (within 5.00Kms) | Remark if any |
|---|---|---|---|
| River/Nallah/Reservoir | Khandadhar Nala | The drainage system of the area is mostly influenced by a perennial nala known as Khandadhar nala which flows due north and lies 2.5 km west of the lease area which is the tributary of Kurarhi nadi. | |
| Public roads (Tar road, cart road) | There is no public road within the lease area. | The lease area is accessible from Barbil through NH-215 covering a distance of 38 km up to Koira and 18 km after Koira. | |
| Railway track | There is no railway line within the lease area. | | |
| Human settlements | Rantha | Tilkuda,Usukuda,Sareikal | |

| Description | Location if existing Within the lease/block area. | Distance from boundary periphery in kms, if existing outside the lease/block area. (within 5.00Kms) | Remark if any |
|---|---|---|---|
| Archaeological monuments/ places of worships/public utilities etc. | Nil | Nil | |
| Wild life sanctuaries/ national parks | Nil | Nil | |
| Coastal Regulation Zone (CRZ) | Nil | Nil | |
| Power transmission lines/telephone lines | Nil | Nil | |
| Firing range | Nil | Nil | |
| Ordinance factory | Nil | Nil | |
| grazing land/ burial ground or cremation ground | Nil | Nil | |
| Any other specify | Nil | Nil | |

| Particulars | Distance from lease boundary in kms |
|---|---|
| Nearby village | Tilkuda,Usukuda,Sareikal, Rantha |
| Nearest Railway station | Barsuan (Rourkela-Barsuan route) at a distance of about 18 km from lease area. |
| Nearest Port | Pradeep (300 kms distance from lease area) |
| Distance of SH/NH from lease area | NH-215 (about 18kms distance from lease area) |

**2.1.3: Regional Geology:**

Geology of the M.L area is a part and parcel of the Singhbhum – Sudargarh – Bonai iron ore belt, also known as the Jamda – Koira valley and is represented by a narrow NNE plunging folded synclinorium of 60 Km long and 25 Km in width. The Precambrian horse-shoe shaped belt is well known for its large reserves of iron and manganese ore. The general strike is northeast to northerly and dips are moderate to the west. The western limb of the synclinorium is slightly overturned.

The Precambrian rocks of this region comprising of basic lava, tuffs, banded iron formation (BIF), shales, conglomerates and sandstones etc. were mapped for the first time by Jones (1934). The stratigraphic succession established by Jones has largely been modified later by Dunn (1940). Based on detailed mapping in the northern parts of the belt, Dunn recognized a new group lying unconformable over the Iron Ore

Group, which he named as the "Kolhan Group". The rock types of the area belonging to the Kolhan Group lies to the north of Nuamundi in Bihar.

The most acceptable litho – stratigraphic succession for the belt was proposed by Murthy and Acharya (1975). They identified different depositional facies and proposed a more detailed stratigraphic succession. They also proposed a new name the "Koira Group" to the rocks of Bonai-Sundargarh belt. The stratigraphy suggested by Murthy and Acharya (1975) has been given in the table below:

| | |
|---|---|
| Kolhan Group | Sandstone, Conglomerate – Breccia |
| ---------- Unconformity ---------- | |
| Mixed Facies Formation | Basic Lava, tuffs and tuffites of Volcanic facies iron, manganese, lenses of iron formation, chert, small lenses of sandy and silty shale of clastic facies |
| Banded Shale Formation | Banded shale member<br>Black shale member<br>Black shale-chert member |
| Koira Group | |
| Banded Iron Formation | Finely banded Jaspilite member<br>Coarsely banded Jaspilite member<br>Tuffaceous shale<br>Basic lava |
| Volcanic Formation | Basal sandstone, Gritty sandstone, Quartzite Conglomeratic at places with inter-bedded lava at top |
| ---------- Unconformity ---------- | |
| Singhbhum Granite with enclaves of older meta-basic and meta-sedimentary rocks. | |

**2.1.4: Local Geology &Structure:**

**2.1.4.1: Local Geological Set-Up:**

M.L area applied for retaining displays an undulated topography with hillocks and valleys. Lithounits such as Laterite, BHJ / BHQ / Chert and Shale are found to occur in the area.

Nalas flowing in the area are structurally controlled. Both E-W and N-S folding are prominent with plunging direction uniformly towards N100E or S100W. In general, reversal of plunge is occasionally noted. The axial plane cleavages of the mega folds have acted uniformly as a prominent passage for stream flow. Folds of micro and mega scale are very common. Major fault is not seen in the area. Joints are numerous and developed due to competency of the rock.

The lithological succession as observed within the lease area is as follows:

| | |
|---|---|
| | Soil & alluvium |
| Recent | Laterite |
| Iron Ore Group | Iron Ore |
| | BHJ / BHQ / Chert Shale. |

**2.1.4.2: Structure:**

The structural study of the area is very well achieved while taking traverse along the nala. All along, the BHJ is exposed. The nala is fully structurally controlled. Both E-W and N-S folding is very prominent with plunge direction uniformly towards N10°E to N10°W. Reversal of plunge is occasional marked. The axial plane cleavage of the mega folds has acted uniformly as a prominent Passage for stream flow. Once it follows the axial plane, it passes through the bedding plane making an obtuse kink in the flow direction. Because of very tight folding the overall appearance of the nala is very straight. Similar parallel streams have been formed as a result of the structure only. The general strike of the litho units, particularly BHJ, varies from N20°W to N15°E with dip varying from 20° to 60° towards east and west respectively.

Folds of both micro and mega scale are very common and book examples of various types of folds are very common. Faults of major scale are rarely seen. Joints are numerous and developed due to competency of the rock.

The structure has helped to decipher the stratigraphic sequence of the area. But at places the gradational contact caused difficulty in delineating the top and bottom criteria. However the Shale exposed in the area bears a gradational contact with the Iron ore bodies. Sometimes BHJ occur as undigested patches within the Iron ore bodies.

**2.1.4.3: Lithology, Petrographic & Mineralogical Description for Major, Associated & Indicator Minerals:**
The different litho units of Rantha Iron Ore Mine has been given below:

BHJ: The most fascinating structural imprints are very well reflected in the BHJ units exposed all along the Nala sections where the top formations have been eroded out. Because of the folded structure BHJ has been observed at the crest of the mounds at place. Iron ore bodies overlie the BHJ in the east and to the west ferruginous shale overlies the BHJ.

Shale: The shale occurring to the west of the leasehold area is ferruginous in nature and bears a gradational contract with Iron ore bodies at places. The Northern part is latertised. The colour varies from brown, black, yellow, lomonitic and at places pinkish white due to presence of talc. At depth grayish white and hard sometimes confused with hard chert are also observed. Tufaceous shale of light green colour is also seen in the lease hold.

Iron Ore Bodies: Mostly soft laminated Iron ore occur above the BHJ and at it times it also bears a gradational relationship with the BHJ, along the nala sections due to crestal part of the fold have been

easily ended out giving a deep cutting. Soft laminated ore mostly occupies the crestal part of the mounds. Hard massive ore have not been encountered so far. The friable nature of ore and undigested BHJ chunks in them devalue the deposit for its exploitation. On the surface either it is covered by soil or at places lateritised with lot of lemonite in it.

**Type of ores**

Based on the field visa-a-vise macroscopic characters the iron ore in this area are classified as:

i. Laminated or biscuity ore
ii. Powdery ore or blue dust iii.
iii. Conga ore
iv. Recemented ore and
v. Lateritic ore

The origin of different varieties of iron ore such as lamininated, biscuity, shaly ore and conga area the products of secondary enrichment in BHQ and BHJ group of rocks .The process is brought out by three ways.

1. Leaching of silica in solution and its removal causing enrichment of iron oxide in the process. 2. Segregation of iron ore oxide at favorable areas by sub-surface water to fill in the voids created by removal of silica.

3. Partial replacement of silica by Jasper and iron oxide from the mineralized solution.

Different types of ore were produced due to varying degree of leaching, enrichment and replacement that took place in BHQ and BHJ formation with the aid of underground meteoric water.

**2.1.4.4: Mode of Occurrence& Controls of Mineralization:**

Numerous large deposits of rich Iron Ores in the Bonai-Keonjhor belt occur predominantly in association with iron formation and with adjoining ferruginous shale/chert. The iron ore deposits are generally exposed at the surface occupying hilltop and valley slope region. The ore bodies occur in the form of regular and continuous beds. These beds are conformably disposed in relation to other members of the sequence and show remarkable structural concordance. The ore bodies nevertheless occur as detached masses separated by barren saddles with irregular boundaries.

The deposits largely composed of hematite while the other distinct type of deposit occurs nearly towards the base of the banded iron formation around Rantha area comprising of hematite, magnetite and martite. The ore bodies proceed downwards into lower grade ores and finally into the original bedrock (BHJ).

The iron ore resources in this belt are associated either directly or indirectly with the bedded rocks, chemically precipitated banded iron formation (BIF) and fine clastic (tuffaceous shale). This region is well endowed with resource base of iron ore both in terms of quantity and quality.

The iron ore bodies mostly occur as detached masses with irregular boundaries towards the top of the banded iron formation and shale. The occurrence of detached masses may be due to cross fold or cross-faulted natures of the formations in the region.

The deposits are confined to hilltops often extending some considerable distance along the flanks as well. The other types less widely distributed are the laminated and biscuity ore at the outskirt of the banded iron formation or ferruginous shale horizon. These ore bodies in fact are mostly confined to the crest and trough zones of the folds. It is often observed that conglomeratic conga ore is uniformly distributed as blankets over this laminated variety in some areas. The powdery ore known as blue dust is traced as pockets within the other ore bodies. The recemented ore another important zone, however, runs for more than lkm in length has been observed.

**2.1.4.5: Extent of Weathering/ Alteration:**

It is difficult to inherent that banded iron-formation (BIF) to produce representative information. The qualitative effects of weathering in BIF, and the progressive stages that lead to iron enrichment are not hard to follow, but to establish even semi-quantitative data is difficult. In general, the range of minerals found in BIF is not large. Even with the variation imposed by metamorphism, it is possible to limit discussion to a handful of mineral groups—silica, iron oxides and silicates.

**2.1.4.6: Nature/Form of Mineral:**

The nature/ form of mineral of the Rantha Iron ore lease areas are Lump, Fines and Friable.

**2.1.4.7: Extent of Mineralization:**

The different litho units of Rantha Iron Ore lease is given below:

Iron ore is associated with the following litho units and covers about 65-70% area. The rocks bearing iron ore are of various types are as follows,

a. Lateritic Iron Ore:
   Lateritic iron ore in the ML is the lateritised product of hard/ soft laminated iron ore. Thus, the same structures as found in the parent rocks could also be seen in this rock types.
b. Soft Laminated Ore (SLO):
   It is found in most of the quarries. It is overlain by ferruginous shale, laterite/soil and iron ore float. Considerable thickness of SLO has been encountered in the boreholes drilled in the area.

c. Hard Massive Ore (HMO)/Hard Laminated Ore (HLO):
   HMO in the ML area is highly jointed and has moderate dip towards north-west direction. Two smaller in-situ HLO patches are found within the Laterised HLO exposures in the NW quadrant of the ML. the HLO blocks have moderate dip towards the directions of north.
d. Blue Dust:
   It occurs at some selective patches in the area. The only silica available has been leached out leaving behind hematite grains to give rise to blue dust.

**2.1.4.8: Deposit Type (as per MEMC Rule):**

As per Mineral (Evidence and Content) Rule'2015, the Rantha Iron Ore Mine is Bedded Stratiform and tabular deposit of regular habit.

Strike / Trend of the Ore Body : N20$^0$ W to N 15$^0$E
Amount of dip of Orebody : 20$^0$ to 60$^0$ E and West
Dip Direction of the Ore Body : Westerly and Easterly
Plunge of Mineral Body (degree) (if any) : Nil
Direction of plunge : NA

**2.2: Exploration:**

**2.2.1: Summary of the Previous Exploration (for fresh grant) / During Last Plan Period (For existing leases):**

Due to want of forest clearance permission the exploration proposal has not been initiated.

**2.2.1.1: Geological Mapping:**

| Sl. No | Year | Scale | Area Covered |
|---|---|---|---|
| 1 | 2018-19 | Nil | Nil |
| 2 | 2019-20 | Nil | Nil |
| 3 | 2020-21 | Nil | Nil |
| 4 | 2021-22 | Nil | Nil |
| 5 | 2022-23( As on 30.06.2022) | Nil | Nil |

**2.2.1.2: Airborne Geophysical Survey: Nil.**

| Sl. No. | Type of Survey | Spacing (m) | Total line (km) | Area Covered (Ha/km$^2$) | Latitude | | Longitude | |
|---|---|---|---|---|---|---|---|---|
| | | | | | To | From | To | From |
| Nil. | | | | | | | | |

**2.2.1.3: Ground Geophysical Survey: Nil**

| Sl. No. | Type of Survey | Spacing (m) | Total line (km) | Area Covered (Ha/km2) | Latitude | | Longitude | |
|---|---|---|---|---|---|---|---|---|
| | | | | | To | From | To | From |
| NIL. | | | | | | | | |

**2.2.1.4: Geochemical Survey: Nil.**

| Sl. No. | Type of Sample | No of Samples | Analysisreport | Area Covered (Ha/km$^2$) |
|---|---|---|---|---|
| Nil. | | | | |

**2.2.1.5: Pitting: Nil.**

| | |
|---|---|
| Number of pits * | Nil. |

### 2.2.1.6: Trenching: Nil.

| Sl. No. | Year | Pit ID | Length of Pit (m) | Width of Pit (m) | Depth of Pit (m) | Depth (from) | Depth(to) | Running meters | Litho units exposed | Name of the radical | Av. Grade (in %) | Latitude | Longitue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nil. | | | | | | | | | | | | | |
| No. of trenches | | Nil. | | | | | | | | | | | |

### 2.2.1.6.1: Spacing: NA

| Min (m) | Max (m) | Avg (m) |
|---|---|---|
| Nil. | | |

| Sl. No. | Year | Trench ID | Length of Trench (m) | Width of Trench (m) | Depth of Trench (m) | Depth(from) | Depth(to) | Running meters | Litho units exposed | Name of the radical | Av.grade | Latitude(from) | Longitude (from) | Latitude( to) | Longitude (to) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nil. | | | | | | | | | | | | | | | |

### 2.2.1.7 Exploratory Drilling (Core/non-Core): Nil

| | | | Core holes | | Non-core (RC/DTH) | | Grand total | | Attach log sheet of each borehole in csv/excel format. |
|---|---|---|---|---|---|---|---|---|---|
| Sl. No | Year | Exploration agency | Number of boreholes drilled | Total meter | Number of boreholes drilled | Total mteres | Total boreholes | Total meters | |
| Nil. | | | | | | | | | |

### 2.2.1.8: Exploratory Mining: Nil.

| Sl. No. | Pit/Adit ID | Length in Mtr | Width in Mtr | Depth in mtrs | Volume ($m^3$) |
|---|---|---|---|---|---|
| NIl. | | | | | |

### 2.2.1.9: Sampling:

| Sl. No. | Type of Sample | Number of Samples Collected | Number of samples analyzed | Location | | Remarks if any |
|---|---|---|---|---|---|---|
| | | | | Latitude | Longitude | |
| Nil. | | | | | | |

### 2.2.1.10: Chemical Analysis:

| Sl. No. | Sample ID | Minerals | Radical with grade in % | Name of Agency | Type of agency | Attachment |
|---|---|---|---|---|---|---|
| Nil. | | | | | | |

**2.2.1.11: Petrology & Mineralogical Studies: Nil.**

| Sl. No. | Type of Sample | Number of Sample Drawn | Number of Sample Analyzed | Petrographic Study Report |
|---|---|---|---|---|
| Nil. | | | | |

**2.2.1.12: Beneficiation Studies: Not Applicable.**

| Sl. No. | Type of Beneficiation | Number of Samples | Attach |
|---|---|---|---|
| Nil. | | | |

**2.2.1.13: Bulk Density Study as per M (EMC) Rules, 2016 and SOP of CGPB:**

Method adopted for calculating bulk density of ore and waste:

The bulk Density has been determined by M/s SUPCO India (Pvt). Ltd., a NABL accredited laboratory.

**1. Scope:**

The international standard specifies two methods of determining the bulk density of Iron ore.
Method 1 is applicable to natural Iron ore and processed Iron ore having a nominal size of -100micron. to 150 micron.
Method 2 is applicable to a natural Ironore and processed ores, regardless of size.

**2. Principle:**

A test is introduced into a container of known volume until surface is level. The bulk density calculated as the ratio of the sample to the internal volume of the container.
Note 1 Constant mass is achieved when the difference in mass between two subsequent measurements become less than 0.05% of the initial mass the test sample.
In the case of method 2, the test sample shall have a minimum mass of 35 tonnes, the recommended mass being 50 tonnes.
Note 2 A test sample of mass 35 tonnes has a volume of approximately 14 $m^3$ to 23.6 $m^3$, according to the material.

**3. Apparatus:**

General: The test apparatus shall comprise
a) Ordinary laboratory equipment, such as hand tools and safety equipment.
b) Small container,
c) Large container, and
d) A weighing device.

**Method 1:**

Small container, made of metal, cylindrical in form, and having an internal diameter of 400 mm ±2mm and an internal height of 400 mm ± 2mm (inner volume: approximately 0.05 m3). The container wall and bottom shall have sufficient thickness to ensure their rigidity during the test. The container shall be reinforced by a steel band around the outside periphery at the top, and shall have two handles, 1800 apart, attached to the outer surface by welding. A carriage or other suitable device may be provided to facilitate its transportation within the laboratory. The volume of the container shall be determined with a precision of 0, 1 using potable water of known density.
Weighing device, capable of weighing the test sample and test portions and having a sensitivity of 1/1000 or better.

**Method: 2:**

Large container, such as truck or railway wagon, of regular geometrical shape, with smooth inner surface of the walls and bottom, and in good general condition, the container shall have sufficient capacity to hold. When filled, a minimum of 10 t of test shall be 10 times the maximum particle size of the test portion.

Weighing device, preferably of platform type, capable of weighing the mass to be determined to a sensitivity of 1/200

Density determination

**Method 1 – Small container:**

Weigh the dried container and record the mass (mO) to the nearest 0.2 kg.

Fill the container with the sample of as-received, air dried material, using a proper shovel. Empty the shovel from a height not exceeding 50 mm above the surface of the material in the container. Fill the container carefully, in order to prevent evident segregation.

After filling the container to over flowing, draw a straight-edge across the top of the container to make the heaped surface level.

Transfer the filled container to the weighing device without loss of sample from the container, weigh the filled container and record the mass (m1) to the nearest 0.2 kg.

**Method 2 – Large containers:**

Measure the length, width and height of the container with a precision of ±0.5 % and then calculate and record its volume (V). Weigh the empty container and record the mass (mO).

With the container on a level surface, discharge the sample into it manually or by mechanical means, taking care to avoid breakages or segregation of particles. Level off the upper surface across the top of the container, verifying by visual inspection and removing or pushing down any particles which would appear to obstruct the passage of a straight-edge if it were pulled across the top of the container.

Weigh the filled container and record the mass (m1).

Expression of Result

Calculation of the bulk density (Pap)

The bulk density, (Pap), expressed in kg/$m^3$, is calculated from the following formula:

$$(Pap) = \frac{m1 - mO}{V}$$

Where

mO is the mass, in kilograms, of the empty container;

m1 is the mass, in kilograms, of the container plus sample;

V is the volume, in cubic meters, of the container.

The bulk density of the individual ore types as given below were taken as the in-situ densities of the respective ore type. It has been derived from the exploration report of Rantha Iron Ore Mines.

Average Bulk Density of Different Ore Types

| Sl. No. | Nature of Ore/OB | Mineral | Number of samples | Bulk Density Established (t/m³) |
|---|---|---|---|---|
| 01 | Iron Ore (Hematite) | Ore ( Fe > 55% ) | 1 | 3.00 |
| 02 | | Mineral Reject/Subgrade (Fe between 45 – 55 %) | 1 | 2.7 |

Copy of report of bulk density test carried out by Mitra S.K, a NABL accredited lab is enclosed as Annexure 26.

**2.2.1.14: Area Covered under Exploration:**

| Level of exploration | Area in Ha | | Total area in Ha. |
|---|---|---|---|
| | Forest | Non-forest | |
| G-1 | 39.632 | 0 | 39.362 |
| G-2 | 165.724 | 0 | 165.724 |
| G-3 | 0 | 0 | 0 |
| G-4 | 63.484 | 0 | 63.484 |
| Area proved as Non-mineralized | 20 | 0 | 20.00 |
| Area to be explored | 0 | 0 | 0 |
| Total | 268.84 | 0 | 268.84 |

**2.2.2: Summary of the Previous Exploration (Before Last Plan Period):**

(A) M/s Mining Associates Pvt. Limited (MAPL),
Atwal Nagar, S.B. Gorai Road,
Asansol - 713-301 West Bengal.

(iii)E mail addresses and phone no.

M/s Mining Associates Pvt. Limited (MAPL) –
Phone – (0341) 2220757, 2220758, 2205765

**2.2.2.1: Geological Mapping:**

| Sl. No. | Year | Scale | Area Covered (ha) |
|---|---|---|---|
| 01. | Prior to 2018-19 | 1: 4000 | 268.84 |

**2.2.2.2: Airborne Geophysical Survey: Not Applicable.**

| Sl. No. | Type of Survey | Spacing (m) | Total line (km) | Area Covered (ha) | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | |

**2.2.2.3: Ground Geophysical Survey: Not Applicable.**

| Sl. No. | Type of Survey | Spacing (m) | Total line (km) | Area Covered (ha) | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | |

**2.2.2.4: Geochemical Survey: Not Applicable.**

| Sl. No. | Type of Sample | No of Samples |
|---|---|---|
| Not Applicable. | | |

**2.2.2.5: Pitting:**

| Sl. No. | Pit ID | Length of Pit (m) | Width of Pit (m) | Depth of Pit (m) | Litho Unit Exposed | Litho Unit From (m) | Litho Unit To (m) | Average Grade | Running Meters (m) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | | | | | |

**2.2.2.6: Trenching:**

| Number of Trenches | Spacing | | |
|---|---|---|---|
| | Min (m) | Max (m) | Avg (m) |
| Not Applicable. | | | |

**Area Covered Under Trenching:**

**Co-ordinates:**

| **Latitude** | **Longitude** |
|---|---|
| Not Applicable. | |

| Sl. No. | Trench ID | Length of Trench (m) | Width of Trench (m) | Depth of Trench (m) | Litho Unit Exposed | Average Grade (%) | Running Meters (m) | From Longitude | From Latitude | To Latitude | To Longitude |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | | | | | |

**2.2.2.7: Exploratory Drilling:**

**2.2.2.7.1:Core/Non-core Drilling:**

| | | | Core holes | | Non-core (RC/DTH) | | Grand total | |
|---|---|---|---|---|---|---|---|---|
| Sl. No | Year | Exploration agency | Number of Core boreholes drilled | Total meter | Number of DTH boreholes drilled | Total mtrs | Total boreholes | Attach log sheet of each borehole in csv/excel format. |
| 1 | 2007-08 | (i)M/s Mining Associates Pvt. Limited (MAPL), Atwal Nagar, S.B. Gorai Road, | 26 | 1003.55 | Nil | Nil | 26 | Bore Hole Log sheet of collar, survey, assay and |
| 2 | 2009- | | 29 | 852.85 | Nil | Nil | 29 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 | Asansol - 713301 West Bengal. | | | | | | geology files are Attached in Annexure-23. |
| 3 | 2010-11 | | 22 | 630.55 | Nil | Nil | 22 | |
| Grand Total | | | 77 | 2486.95 | Nil | Nil | 77 | |

The details of all the bore holes explored at Rantha Iron Ore Mines as on 30.06.2022 have been attached in Annexure-23.

### 2.2.2.8: Exploratory Mining: Not Applicable.

| Sl. No. | Pit ID | Volume ($m^3$) |
|---|---|---|
| Not Applicable. | | |

### 2.2.2.9: Sampling:

| Sl. No. | Type of Sample | Number of Samples | Area Covered (ha) | Latitude | Longitude | Remarks |
|---|---|---|---|---|---|---|
| 1 | Drill core | 31 | 1 | 2407888.014 | 308366.794 | |
| 2 | Drill core | 44 | 1 | 2407988.049 | 308366.806 | |
| 3 | Drill core | 36 | 1 | 2408088.049 | 308266.806 | |
| 4 | Drill core | 31 | 1 | 2408088.014 | 308166.793 | |
| 5 | Drill core | 38 | 1 | 2407885.137 | 308266.806 | |
| 6 | Drill core | 18 | 1 | 2407988.049 | 308266.806 | |
| 7 | Drill core | 41 | 1 | 2407788.014 | 308364.708 | |
| 8 | Drill core | 42 | 1 | 2407988.049 | 308166.806 | |
| 9 | Drill core | 21 | 1 | 2407888.014 | 308166.794 | |
| 10 | Drill core | 15 | 1 | 2407788.014 | 308266.794 | |
| 11 | Drill core | 31 | 1 | 2407685.809 | 308362.699 | |
| 12 | Drill core | 30 | 1 | 2407688.014 | 308466.794 | |
| 13 | Drill core | 25 | 1 | 2407788.014 | 308466.794 | |
| 14 | Drill core | 42 | 1 | 2407688.05 | 308569.911 | |
| 15 | Drill core | 25 | 1 | 2407588.049 | 308466.806 | |
| 16 | Drill core | 21 | 1 | 2407588.049 | 308366.794 | |
| 17 | Drill core | 56 | 1 | 2407588.014 | 308566.876 | |
| 18 | Drill core | 35 | 1 | 2407488.014 | 308466.794 | |
| 19 | Drill core | 32 | 1 | 2407508.176 | 308366.794 | |
| 20 | Drill core | 49 | 1 | 2407588.015 | 308666.794 | |
| 21 | Drill core | 49 | 1 | 2407488.014 | 308562.107 | |
| 22 | Drill core | 47 | 1 | 2407488.015 | 308664.823 | |
| 23 | Drill core | 39 | 1 | 2407688.015 | 308666.794 | |
| 24 | Drill core | 64 | 1 | 2407888.049 | 308466.806 | |
| 25 | Drill core | 44 | 1 | 2407988.049 | 308468.451 | |
| 26 | Drill core | 22 | 1 | 2407788.05 | 308555.806 | |
| 27 | Drill core | 29 | 1 | 2407866.373 | 307768.947 | |
| 28 | Drill core | 40 | 1 | 2407670.049 | 307772.794 | |
| 29 | Drill core | 38 | 1 | 2407677.013 | 307579.794 | |
| 30 | Drill core | 47 | 1 | 2407466.571 | 307537.528 | |

| Sl. No. | Type of Sample | Number of Samples | Area Covered (ha) | Latitude | Longitude | Remarks |
|---|---|---|---|---|---|---|
| 31 | Drill core | 40 | 1 | 2407868.746 | 307560.646 | |
| 32 | Drill core | 37 | 1 | 2407388.049 | 307928.807 | |
| 33 | Drill core | --- | 1 | 2407278.618 | 307528.274 | |
| 34 | Drill core | 22 | 1 | 2407233.049 | 307724.807 | |
| 35 | Drill core | 19 | 1 | 2407426.049 | 307737.807 | |
| 36 | Drill core | 13 | 1 | 2407286.704 | 307967.804 | |
| 37 | Drill core | 24 | 1 | 2407088.013 | 307366.815 | |
| 38 | Drill core | 13 | 1 | 2407905.727 | 307409.648 | |
| 39 | Drill core | 17 | 4 | 2407262.199 | 307348.815 | |
| 40 | Drill core | 20 | 4 | 2407288.049 | 308166.807 | |
| 41 | Drill core | 36 | 4 | 2407700.049 | 308168.806 | |
| 42 | Drill core | 19 | 4 | 2407088.013 | 307566.795 | |
| 43 | Drill core | 11 | 4 | 2407088.013 | 307767.199 | |
| 44 | Drill core | 26 | 4 | 2407088.014 | 307966.795 | |
| 45 | Drill core | 54 | 4 | 2407343.165 | 308128.802 | |
| 46 | Drill core | 14 | 4 | 2407088.014 | 308166.795 | |
| 47 | Drill core | 20 | 4 | 2407288.174 | 308367.664 | |
| 48 | Drill core | 14 | 4 | 2407502.013 | 307335.794 | |
| 49 | Drill core | 15 | 4 | 2407869.122 | 308072.485 | |
| 50 | Drill core | 16 | 4 | 2407088.014 | 308366.795 | |
| 51 | Drill core | 24 | 4 | 2407088.014 | 308550.705 | |
| 52 | Drill core | 29 | 4 | 2407288.014 | 308566.849 | |
| 53 | Drill core | 8 | 4 | 2407670.266 | 307377.881 | |
| 54 | Drill core | 12 | 4 | 2407765.014 | 308088.794 | |
| 55 | Drill core | 36 | 4 | 2407291.343 | 308717.016 | |
| 56 | Drill core | 23 | 4 | 2406888.049 | 308366.807 | |
| 57 | Drill core | 8 | 4 | 2407976.049 | 308065.806 | |
| 58 | Drill core | 40 | 4 | 2406888.014 | 308550.686 | |
| 59 | Drill core | 40 | 4 | 2407883.049 | 307968.806 | |
| 60 | Drill core | 51 | 4 | 2407891.05 | 308565.806 | |
| 61 | Drill core | 43 | 4 | 2407783.487 | 308658.096 | |
| 62 | Drill core | 14 | 4 | 2406888.014 | 308166.795 | |
| 63 | Drill core | 43 | 4 | 2407888.05 | 308666.806 | |
| 64 | Drill core | 6 | 4 | 2408251.014 | 307998.793 | |
| 65 | Drill core | 44 | 4 | 2406709.937 | 308369.171 | |
| 66 | Drill core | 22 | 4 | 2406888.049 | 307966.807 | |
| 67 | Drill core | 6 | 4 | 2408306.014 | 308399.793 | |
| 68 | Drill core | 42 | 4 | 2408401.143 | 308183.914 | |
| 69 | Drill core | 10 | 4 | 2408230.049 | 307798.806 | |
| 70 | Drill core | 3 | 4 | 2408089.05 | 308576.806 | |
| 71 | Drill core | 12 | 4 | 2408485.049 | 307964.805 | |
| 72 | Drill core | 5 | 4 | 2408495.049 | 308355.805 | |
| 73 | Drill core | 11 | 4 | 2408090.049 | 308471.806 | |

| Sl. No. | Type of Sample | Number of Samples | Area Covered (ha) | Latitude | Longitude | Remarks |
|---|---|---|---|---|---|---|
| 74 | Drill core | 12 | 4 | 2406708.362 | 308164.088 | |
| 75 | Drill core | 17 | 4 | 2408498.049 | 308141.805 | |
| 76 | Drill core | 28 | 4 | 2408106.143 | 308384.718 | |
| 77 | Drill core | 16 | 4 | 2407988.014 | 308574.766 | |

### 2.2.2.10: Chemical Analysis:

| Sl. No. | Sample ID | Minerals | Radical Analysis ("Fe" range in %) |
|---|---|---|---|
| 1 | RNT01/1 to 31 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 50.68 to 63.62 $SIO_2$: 0.37 to 7.73 Al2O3: 3.07 to 16 P: 0.031 to 0.059 S: 0.029 to 0.05 |
| 2 | RNT02/1 to 44 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 21.78 to 64.58 $SIO_2$: 0.2 to 60.21 Al2O3: 1 to 14.9 P: 0.025 to 0.059 S: 0.025 to 0.059 |
| 3 | RNT03/1 to 36 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 30.37 to 63.56 $SIO_2$: 1.88 to 44.88 Al2O3: 2 to 27.01 P: 0.029 to 0.089 S: 0.027 to 0.065 |
| 4 | RNT04/1 to 31 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 30.4 to 60.73 $SIO_2$: 1.29 to 50.6 Al2O3: 3.5 to 21.5 P: 0.031 to 0.53 S: 0.029 to 0.048 |
| 5 | RNT05/1 to 38 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 46.95 to 64.53 $SIO_2$: 0.4 to 19.97 Al2O3: 1.6 to 44.4 P: 0.022 to 0.048 S: 0.029 to 0.047 |
| 6 | RNT06/1 to 18 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 34.29 to 64.68 $SIO_2$: 1.08 to 47.26 Al2O3: 2.4 to 11.2 P: 0.036 to 0.048 S: 0.029 to 0.048 |
| 7 | RNT07/1 to 41 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 36.98 to 63.36 $SIO_2$: 1.05 to 33.71 Al2O3: 1.55 to 15 P: 0.029 to 0.138 S: 0.022 to 0.042 |
| 8 | RNT08/1 to 42 | Fe ,$SiO_2$, $Al_2O_3$,P,S | Fe: 36.29 to 62.56 $SIO_2$: 2.24 to 35.88 Al2O3: 2.6 to 21.9 P: 0.031 to 0.045 S: 0.027 to 0.048 |
| 9 | RNT09/1 to 21 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 35.89 to 61.8 $SIO_2$: 3.87 to 22.6 Al2O3: 3.6 to 25.7 P: 0.029 to 0.048 S: 0.023 to 0.048 |
| 10 | RNT10/1 to 15 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 32 to 56.99$SIO_2$: 1.28 to 48.64 Al2O3:4 to 17 P: 0.03 to 0.047 |

| Sl. No. | Sample ID | Minerals | Radical Analysis ("Fe" range in %) |
|---|---|---|---|
| | | | S: 0.027 to 0.05 |
| 11 | RNT11/1 to 31 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 33.48 to 61.59 $SIO_2$: 1.52 to 38.79 Al2O3: 4 to 19.1 P: 0.029 to 0.045 S: 0.024 to 0.048 |
| 12 | RNT12/1 to 30 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 26.08 to 62.43 $SIO_2$: 0.57 to 53.84 Al2O3: 1.8 to 27 P: 0.028 to 0.046 S: 0.027 to 0.042 |
| 13 | RNT13/1 to 25 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 37.28 to 62.34 $SIO_2$: 3.76 to 19.58 Al2O3: 2.33 to 22.3 P: 0.046 to 0.05 S: 0.015 to 0.025 |
| 14 | RNT14/1 to 42 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 36.66 to 65.42 $SIO_2$: 1.08 to 13.06 Al2O3: 2.64 to 24.84 P: 0.045 to 0.05 S: 0.018 to 0.028 |
| 15 | RNT15/1 to 25 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 28.08 to 61.71 $SIO_2$: 6.2 to 55.74 Al2O3: 1.23 to 19.81 P: 0.046 to 0.05 S: 0.016 to 0.025 |
| 16 | RNT16/1 to 21 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 42.72 to 61.32 $SIO_2$: 3.32 to 13.78 Al2O3: 3.14 to 17.65 P: 0.046 to 0.049 S: 0.016 to 0.021 |
| 17 | RNT17/1 to 56 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 16.81 to 66.23 $SIO_2$: 1.28 to 27.66 Al2O3: 0.17 to 34.63 P: 0.046 to 0.058 S: 0.016 to 0.029 |
| 18 | RNT18/1 to 35 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 31.03 to 67.25 $SIO_2$: 0.5 to 42.77 Al2O3: 2.1 to 14.4 P: 0.031 to 0.048 S: 0.031 to 0.049 |
| 19 | RNT19/1 to 32 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 36.16 to 58.05 $SIO_2$: 8 to 20 Al2O3: 4 to 10 P: 0.035 to 0.045 S: 0.01 to 0.014 |
| 20 | RNT20/1 to 49 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 48.22 to 64.31 $SIO_2$: 3. to 18 Al2O3: 2.5 to 7.5 P: 0.033 to 0.043 S: 0.004 to 0.014 |
| 21 | RNT21/1 to 49 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 20.26 to 67.55 $SIO_2$: 0.55 to 67.3 Al2O3: 0.69 to 19.34 P: 0.027 to 0.054 S: 0.006 to 0.034 |
| 22 | RNT22/1 to 47 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe:31.52 to 29.44 $SIO_2$: 0.3 to 24 Al2O3: 0.041 to 20.75 P: 0.041 to 20.75 S: 0.007 to 0.0.034 |
| 23 | RNT23/1 to 39 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 17.58 to 65.06 $SIO_2$: 1 to 40.5 Al2O3: 2.33 to 26.45 P: 0.037 to 0.54 S: 0.007 to 0.34 |

| Sl. No. | Sample ID | Minerals | Radical Analysis ("Fe" range in %) |
|---|---|---|---|
| 24 | RNT24/1 to 64 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 64.39 to 66.29<br>$SIO_2$: 0.51 yo 27.6 Al2O 1.83 to 14.2<br>P: 0.029 to 0.054 S:0.004 to 0.034 |
| 25 | RNT25/1 to 44 | Fe ,$SiO_2$,$Al_2O_3$,P | Fe: 25.88 to 66.93<br>$SIO_2$:1 to 15.06 Al2O31.09 to 23.2<br>P: 0.045 to 0.05 |
| 26 | RNT26/1 to 44 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 34.25 to 66.93<br>$SIO_2$: 1 to 10.2 Al2O3: 1.09 to 25.3<br>P: 0.045 to 0.05 S: 0.013 to 0.052 |
| 27 | RNT27/1 to 29 | Fe ,$SiO_2$,$Al_2O_3$,P,S | Fe: 29.72 to 64.22<br>$SIO_2$: 2.81 to 46.99 Al2O3:2.3 to 12.63 |
| 28 | RNT28/1 to 40 | Fe ,$SiO_2$,$Al_2O_3$ | Fe:4.96 to 60.08<br>$SIO_2$:2.58 to 55.56<br>Al2O3: 1.95 to 38.99 |
| 29 | RNT29/1 to 38 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 15.2 to 58.02<br>$SIO_2$: 3.92 to 20.21<br>Al2O3: 0.34 to 59.7 |
| 30 | RNT32/1 to 47 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 25.52 to 67.97<br>$SIO_2$: 1.3 to 46.48<br>Al2O3: 0.26 to 26.79 |
| 31 | RNT33/1 to 40 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 4.79 to 67.52<br>$SIO_2$: 0.63 to 47.52<br>Al2O3: 0.66 to 30.95 |
| 32 | RNT35/1 to 37 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 13.47 to 51.46<br>$SIO_2$: 9.18 to 59.45<br>Al2O3: 0.3 to 29.65 |
| 33 | RNT37/1 to 2 | Fe ,$SiO_2$,$Al_2O_3$ | NA |
| 34 | RNT41/1 to 22 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 26.1 to 65.25<br>$SIO_2$: 2.08 to 55.84<br>Al2O3:1.86 to 17.7 |
| 35 | RNT42/1 to 19 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 28.37 to 54.24<br>$SIO_2$: 2.76 to 48.88<br>Al2O3: 2.16 to 17.21 |
| 36 | RNT44/1 to 13 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 27.34 to 57.41<br>$SIO_2$: 5.08 to 0.56<br>Al2O3: 1.19 to 24.94 |
| 37 | RNT45/1 to 25 | Fe ,$SiO_2$ | Fe: 31.3 to 49.72<br>$SIO_2$: 8.97 to 44.51 |
| 38 | RNT46/1 to 12 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 42.57 to 47.29<br>$SIO_2$: 7.94 to 14.61<br>Al2O3: 10.03 to 14.76 |
| 39 | RNT47/1 to 17 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 29.17 to 56.59<br>$SIO_2$: 11.38 to 54.64<br>Al2O3: 1.31 to 11.81 |
| 40 | RNT49/1 to 21 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 32.5 to 65.95<br>$SIO_2$: 1.32 to 46.9<br>Al2O3: 1.82 to 18.85 |
| 41 | RNT51/1 to 38 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 45.25 to 57.72<br>$SIO_2$:4.23 17.75 |

| Sl. No. | Sample ID | Minerals | Radical Analysis ("Fe" range in %) |
|---|---|---|---|
| | | | Al2O3: 9.96 to 15.33 |
| 42 | RNT52/1 to 20 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 37 to 62.84<br>$SIO_2$: 3.48 to 13.69<br>Al2O3: 4.18 to 24.14 |
| 43 | RNT54/1 to 11 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 35.66 to 51.99<br>$SIO_2$: 9.86 to 47.7<br>Al2O3: 0.36 to 11.1 |
| 44 | RNT56/1 to 17 | Fe ,$SiO_2$,$Al_2O_3$ | Fe:47 to 28 to 59.66<br>$SIO_2$: 6.39 to 22.82<br>Al2O3: 3.04 to 11.21 |
| 45 | RNT57/1 to 30 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 46.51 to 65.19<br>$SIO_2$: 0.52 to 19.15<br>Al2O3: 2.26 to 12.92 |
| 46 | RNT58/1 to 15 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 51.14 to 66.88<br>$SIO_2$: 2.28 to 15.83<br>Al2O3: 0.49 to 12.73 |
| 47 | RNT59/1 to 20 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 46.36 to 66.07<br>$SIO_2$: 0.79 to 10.85<br>Al2O3: 2.07 to 18.32 |
| 48 | RNT60/1 to 15 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 7.26 to 37.48<br>$SIO_2$:16.67 to 39.8<br>Al2O3: 15.9 to 30.84 |
| 49 | RNT61/1 to 15 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 28.66 to 54.06<br>$SIO_2$: 9.32 to 54.86<br>Al2O3:0.86 to 12.91 |
| 50 | RNT63/1 to 17 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 46.51 to 64.78<br>$SIO_2$: 1.35 to 12<br>Al2O3: 2.15 to 12.32 |
| 51 | RNT64/1 to 18 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 39.86 to 52.26<br>$SIO_2$:7.74 to 28.04<br>Al2O3: 2.67 to 14.27 |
| 52 | RNT65/1 to 30 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 49 to 67.04<br>$SIO_2$: 0.89 to 10.75<br>Al2O3:1.06 to 14.14 |
| 53 | RNT66/1 to 10 | Fe ,$SiO_2$,$Al_2O_3$ | Fe:24.58 to 33.88<br>$SIO_2$: 5.87 to 17.56<br>Al2O3: 18.69 to 39.45 |
| 54 | RNT68/1 to 12 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 35.34 to 51.57<br>$SIO_2$: 10.06 to 45.83<br>Al2O3: 1.83 to 16.28 |
| 55 | RNT69/1 to 19 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 46.77 to 64.56<br>$SIO_2$: 1.6 to 7.15<br>Al2O3: 2.32 to 14.41 |
| 56 | RNT70/1 to 25 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 34.11 to 59.88<br>$SIO_2$: 6.07 to 35.7<br>Al2O3: 0.61 to 25.51 |
| 57 | RNT71/1 to 8 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 32.01 to 62.85<br>$SIO_2$: 3.48 to 49.69<br>Al2O3: 0.69 to 9.36 |

| Sl. No. | Sample ID | Minerals | Radical Analysis ("Fe" range in %) |
|---|---|---|---|
| 58 | RNT72/1 to 41 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 44.12 to 56.91<br>$SIO_2$: 3.24 to 12.75<br>Al2O3: 5.02 to 13.54 |
| 59 | RNT74/1 to 24 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 41.98 to 62.9<br>$SIO_2$: 2.38 to 17<br>Al2O3: 2.2 to 17.25 |
| 60 | RNT75/1 to 36 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 19.94 to 65.08<br>$SIO_2$: 2 to 28.6<br>Al2O3: 1.35 to 22.11 |
| 61 | RNT76/1 to 43 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 33.02 to 64.55<br>$SIO_2$: 1.77 to 45.35<br>Al2O3: 0.35 to 14.23 |
| 62 | RNT77/1 to 14 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 32.58 to 52.98<br>$SIO_2$: 5.91 to 47.76<br>Al2O3: 2.8 to 12.83 |
| 63 | RNT78/1 to 44 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 38.19 to 63.14<br>$SIO_2$: 0.8 to 15.8<br>Al2O3: 1.22 to 17.32 |
| 64 | RNT79/1 to 6 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 25.8 to 38.52<br>$SIO_2$: 23.94 to 53.7<br>Al2O3: 1.92 to 14.88 |
| 65 | RNT80/1 to 45 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 46.32 to 67.64<br>$SIO_2$: 0.67 to 9.65<br>Al2O3: 0.5 to 14.26 |
| 66 | RNT81/1 to 22 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 29.82 to 61.61<br>$SIO_2$: 1.43 to 52.49<br>Al2O3: 2.97 to 13.51 |
| 67 | RNT82/1 to 11 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 38.54 to 42.27<br>$SIO_2$: 11.53 to 21.77<br>Al2O3: 11.68 to 19.95 |
| 68 | RNT83/1 to 42 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 24.63 to 66.23<br>$SIO_2$: 0.96 to 55.92<br>Al2O3: 0.92 to 42.17 |
| 69 | RNT84/1 to 16 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 27.88 to 41.35<br>$SIO_2$: 13.8 to 21.7<br>Al2O3: 11.67 to 24.64 |
| 70 | RNT85/1 to 3 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 34.28 to 52.96<br>$SIO_2$: 4.92 to 41.9<br>Al2O3: 2.2 to 13.49 |
| 71 | RNT86/1 to 15 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 13.72 to 48.47<br>$SIO_2$: 0.32 to 26.06<br>Al2O3: 19.41 to 41.7 |
| 72 | RNT88/1 to 5 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 25.74 to 40.77<br>$SIO_2$: 18.01 to 53.4<br>Al2O3: 1.94 to 16.63 |
| 73 | RNT89/1 to 11 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 25.27 to 50.88<br>$SIO_2$: 8.64 to 53.72<br>Al2O3: 4.03 to 25.19 |
| 74 | RNT91/1 to 12 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 30.01 to 55.3 |

| Sl. No. | Sample ID | Minerals | Radical Analysis ("Fe" range in %) |
|---|---|---|---|
| | | | $SIO_2$: 3.74 to 47.75<br>Al2O3: 0.77 to 23.28 |
| 75 | RNT92/1 to 17 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 16.02 to 47.24<br>$SIO_2$: 1.01 to 50.81<br>Al2O3: 2.76 to 38.11 |
| 76 | RNT93/1 to 28 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 33.09 to 63<br>$SIO_2$: 4.13 to 47.65<br>Al2O3: 1 to 17.77 |
| 77 | RNT96/1 to 9 | Fe ,$SiO_2$,$Al_2O_3$ | Fe: 47.18 to 52.39<br>$SIO_2$: 3.15 to 9<br>Al2O3: 6.94 to 14.35 |

Chemical analysis report from NABL accredited Lab of bore holes are attached in Annexure-24.

### 2.2.2.11: Petrology & Mineralogical Studies: NIL

| Sl. No. | Type of Sample | Number of Sample Drawn | Number of Sample Analyzed | Petrographic Study Report |
|---|---|---|---|---|
| NIL | | | | |

### 2.2.2.12: Beneficiation Test: Not Applicable.

| Sl. No. | Type of Beneficiation | Number of Samples |
|---|---|---|
| Not Applicable. | | |

### 2.2.2.13: Bulk Density:

Method adopted for calculating bulk density of ore and waste:

The bulk Density has been determined by M/s Mitra SK (Pvt). Ltd., a NABL accredited laboratory.

**1. Scope:**

The international standard specifies two methods of determining the bulk density of Iron ore.
Method 1 is applicable to natural Iron ore and processed Iron ore having a nominal size of -100micron. to 150 micron.
Method 2 is applicable to a natural Iron ore and processed ores, regardless of size.

**2. Principle:**

A test is introduced into a container of known volume until surface is level. The bulk density calculated as the ratio of the sample to the internal volume of the container.
Note 1 Constant mass is achieved when the difference in mass between two subsequent measurements become less than 0.05% of the initial mass the test sample.
In the case of method 2, the test sample shall have a minimum mass of 35 tonnes, the recommended mass being 50 tonnes.
Note 2 A test sample of mass 35 tonnes has a volume of approximately 14 $m^3$ to 23.6 $m^3$, according to the material.

**3. Apparatus:**

General: The test apparatus shall comprise
a) Ordinary laboratory equipment, such as hand tools and safety equipment.

b) Small container,
c) Large container, and
d) A weighing device.

**Method 1:**

Small container, made of metal, cylindrical in form, and having an internal diameter of 400 mm ±2mm and an internal height of 400 mm ± 2mm (inner volume: approximately 0.05 m3). The container wall and bottom shall have sufficient thickness to ensure their rigidity during the test. The container shall be reinforced by a steel band around the outside periphery at the top, and shall have two handles, 1800 apart, attached to the outer surface by welding. A carriage or other suitable device may be provided to facilitate its transportation within the laboratory. The volume of the container shall be determined with a precision of 0, 1 using potable water of known density.

Weighing device, capable of weighing the test sample and test portions and having a sensitivity of 1/1000 or better.

**Method: 2:**

Large container, such as truck or railway wagon, of regular geometrical shape, with smooth inner surface of the walls and bottom, and in good general condition, the container shall have sufficient capacity to hold. When filled, a minimum of 10 t of test shall be 10 times the maximum particle size of the test portion.

Weighing device, preferably of platform type, capable of weighing the mass to be determined to a sensitivity of 1/200
Density determination

**Method 1 – Small container:**

Weigh the dried container and record the mass (mO) to the nearest 0.2 kg.

Fill the container with the sample of as-received, air dried material, using a proper shovel. Empty the shovel from a height not exceeding 50 mm above the surface of the material in the container. Fill the container carefully, in order to prevent evident segregation.

After filling the container to over flowing, draw a straight-edge across the top of the container to make the heaped surface level.

Transfer the filled container to the weighing device without loss of sample from the container, weigh the filled container and record the mass (m1) to the nearest 0.2 kg.

**Method 2 – Large containers:**

Measure the length, width and height of the container with a precision of ±0.5 % and then calculate and record its volume (V). Weigh the empty container and record the mass (mO).

With the container on a level surface, discharge the sample into it manually or by mechanical means, taking care to avoid breakages or segregation of particles. Level off the upper surface across the top of the container, verifying by visual inspection and removing or pushing down any particles which would appear to obstruct the passage of a straight-edge if it were pulled across the top of the container.

Weigh the filled container and record the mass (m1).

Expression of Result

Calculation of the bulk density (Pap)

The bulk density, (Pap), expressed in kg/$m^3$, is calculated from the following formula:

$$(Pap) = \frac{m1 - mO}{V}$$

Where

mO is the mass, in kilograms, of the empty container;
m1 is the mass, in kilograms, of the container plus sample;
V is the volume, in cubic meters, of the container.

The bulk density of the individual ore types as given below were taken as the in-situ densities of the respective ore type. It has been derived from the exploration report of Rantha Iron Ore Mines.

**Average Bulk Density of Different Ore Types**

| Sl. No. | Nature of Ore/OB | Mineral | Number of samples | Bulk Density Established (t/m³) |
|---|---|---|---|---|
| 01 | Iron Ore (Hematite) | Ore ( Fe > 55% ) | 1 | 3.00 |
| 02 | | Mineral Reject/Subgrade (Fe between 45 – 55 %) | 3 | 2.70 |

Copy of report of bulk density test carried out by Mitra S.K, a NABL accredited lab is enclosed as Annexure 26.

### 2.2.2.14: Area Covered under Exploration:

As per the approved Mod. Of Mining Plan vide letter no. MPM/FM/06-ORI/BHU/2019-20, dtd.01.10.2019 the details are given below;

| | |
|---|---|
| G1 (Ha) | 39.632 |
| G 2 (Ha) | 165.724 |
| G3 (Ha) | 0.00 |
| G4 (Ha) | 63.484 |
| G1+G2+G3+G4 (Ha) | 268.84 |

Since the mine has not been working from the approval of the earlier mining plan ,so, no exploration work has been carried out during approved period, so the explored area as per approved Mining Plan.

| Year | Area converted to G1 from G2, G3 & G4 | % increase in G-1 Area | Remaining Area % in G2 | Remaining Area % in G3 | Remaining Area % in G4 | Remaining Area in G2 | Remaining Area in G3 | Remaining Area in G4 |
|---|---|---|---|---|---|---|---|---|
| 2017 | 39.632 | Nil | 61.64 | Nil | 23.61 | 165.724 | Nil | 63.484 |

### 2.2.3: Ore Body Geometry & Grade:

| Sl.No. | Name of the ore band | General Strike / Trend | Dip Of Mineral Body | Average Strike Length (m) | Average Width (m) | Name of the radical | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Average Depth (m) | Name of the radical | Min Grade (Fe %) | Max Grade (Fe %) | Avg. Grade (Fe %) |
| 01. | Iron Ore | N200 W to N 150E | 200 to 600 E and West | 1600 | 60 | 30 | Fe | 47.51 | 64.76 | 55.8 |

### 2.2.4: Reserve / Resource Estimation Method:

### 2.2.4.1: Methodology:

| | |
|---|---|
| Resource / Reserve Estimation Method | Sectional Method<br>Software Used (SURPAC&AUTOCAD) |

**Geological Resource as on 02.06.2019**

| Reserve/ resources | Type | UNFC Code | Iron Ore Quantity (Mt) | Grade |
|---|---|---|---|---|
| Reserves | Proved | 111 | --- | --- |
| | Probable | 121 | 19.176 (+55% Fe) | 59.5% Fe |
| | | | 13.586 (+45-55% Fe) | 50.3% Fe |
| | | 122 | 28.635 (+55% Fe) | 59.5% Fe |
| | | | 26.790 (+45-55% Fe) | 50.3% Fe |
| **Sub-Total (a)** | --- | --- | **88.187** | --- |
| Remaining resources | Feasibility | 211 | --- | --- |
| | Pre-feasibility | 221 | --- | --- |
| | | | --- | --- |
| | | 222 | 0.964 (+55% Fe) | 59.5% Fe |
| | | | 0.990 (+45-55% Fe) | 50.3% Fe |
| | Measured | 331 | --- | --- |
| | Indicated | 332 | --- | --- |
| | Inferred | 333 | --- | --- |
| | Reconnaissance | 334 | --- | --- |
| **Sub-Total (b)** | --- | --- | **1.954** | --- |
| **Total (a + b)** | --- | --- | **90.141** | --- |

Re-estimation has been carried out considering Mineral (Evidence & Content) Rule'2015. The details are given below.

**Methodology:**

Keeping in view the re-draw of geological plan & sections based on the outcomes of 77 boreholes, mineral resources has been re-estimated in the Review of Mining plan considering Mineral (Evidence & Content)Rule' 2015. As per Minerals (Evidence of Mineral Contents) Rule 2015, lateral extension of the mineral continuity shall be limited to a distance of 50% of the borehole spacing & depth continuity of G1 & detailed G2 category mineral resource shall be limited up to the depth of evidence of established mineral evidence. Accordingly, geological cross-sections have been modified & re-assessment of the balance geological & balance mineable reserve has been carried out considering above factors. A fresh estimate has been made on the basis of all the boreholes drilled till date using state of the art

mining software i.e. 'SURPAC' at 45% Fe cut off and the resources/ reserves figures have been established as per the guidelines of UNFC.

**Parameters considered for estimation of Mineral Resources**

(a) The threshold value has been considered as per the IBM guidelines is 45% Fe.
(b) The Cutoff grade considered for estimation of resource/reserve is 55 % Fe.
(c) Updated pit position as on 30.06.2022.
(d) Borehole collar, survey, assay & litho data from exploration.
(e) Pit exposures data & Ultimate Pit.
(f) The influence of the ore body has been taken @50 mtrs on either side of the grid along the strike of the bore hole drilled. No extrapolation of the ore section has been done beyond 50mtrs.
(g) The depth continuity of mineralization has been considered limited to the depth up to which direct evidence of mineralization is established.
(h) The lateral extension has been considered for resource assessment depending on geological continuity by mapping and has not been more than 50 mtrs of the probe point.
(i) Entire data has been transferred to create a geological database in an ore body modeling software namely 'SURPAC'.
(j) Bulk density of individual ore types & OB has been used as a tonnage conversion factor (TCF) in this document. The bulk density considered in this report has been taken from the exploration report of OMC & carried out by NABL accredited Laboratory. The copy of Bulk Density report by NABL Accredited laboratory is attached in Annexure-26.
(k) The Recovery Factor of100 % for Saleable Ore (+55 % Fe) & Mineral Rejects (+45 % Fe to -55 % Fe) for assessment of Ore resource/reserve has been taken in to consideration. The copy of the recovery test report by NABL accredited laboratory has been attached at Annexure-28.
(l) In total, 12 nos. of cross sections from 00E to 1200E have been prepared for estimations of resource.
(m) Grid spacing 100m x 100m (max) bore holes on G1 category and 200m x 200m (max) bore holes on G2 category has been taken to calculate reserve as per MEMC Rule'2015.

**Preparation of Database**

Four basic files namely collar, survey, assay and litho files are required in Comma Separated Value (CSV) format for further processing by SURPAC Software. Ore type-wise litho codes used for database preparation is given below.

**Ore Type-wise Litho Codes Used for Database Preparation**

| Litho Type | Litho code |
|---|---|
| Lateritic Iron Ore (LIO) | 7A |
| Soft Laminated Ore (SLO) / Friable Ore | 7C |
| Hard Laminated Ore (HLO)/Hard Massive Ore (HMO) | 7B |
| Blue Dust (BD)/ Powdery Ore | 7D |
| BHJ/ BHQ/ BMQ | 9 |
| Lateritic/ Ferg. Shale Ore (Mineral Rejects) (45 % to 55% Fe) | 4 |
| Waste (Shale, Soil Cover etc.) | 5 |

**Delineation of Ore Geometry and Construction of Ore Body**

Preparation of Transverse Sections

Boreholes were displayed in SURPAC graphics window along with litho, Fe%, $SiO_2$% & $Al_2O_3$%. 12 nos. of transverse sections at 100 m & 200 m interval were extracted from 00E to 1200E .The envelopes of ore (Fe% >= 55%), Mineral Rejects (45%<=Fe%<55%) & Waste (Fe%<45%) were delineated at each section considering the continuity of mineralization, lithology and other geological features. Lateral extent of mineralization has been limited up to 50% of borehole spacing & vertical extent of mineralization has been limited up to the depth of evidence of established mineral evidence in the boreholes.

Preparation of Digital Terrain Model (DTM) of Surface Topography

The digitized contour of updated surface plan with Z values have been transformed into digital terrain model (DTM) utilizing the principle of triangulation and wire framing of points with X, Y and Z co-ordinates. Digital terrain model is the most effective way of representing a surface in three-dimensional computerized form. It is an important tool to calculate volume between two or more surfaces.

3-D Solid Modeling of Ore Body

The respective envelopes of ore lithology, Mineral Rejects & waste of the respective transverse cross sections have been connected/ joined to form respective solid ore body models. 3-D solid model of Rantha Iron Ore Mine

**Block Modeling**

The entire deposit is divided into no. of judiciously chosen sub-blocks for proper estimation of grade and quantity, keeping in view of the structural discontinuity of the deposit, extent etc. The estimated blocks in the block model has been used for optimum pit generation, mine planning and production scheduling.

- Selection of Block Size
  Considering the accuracy desired, borehole spacing and mining constraints, a unit block of 10 m x 10 m x 2.5 m has been selected for block wise grade estimation.

- Development of Block Model
  In order to cover the entire extent of Rantha Iron Ore Mine. Ore Mines in three dimensions, a dummy block model with unit block sizes as indicated above have been generated.

- Addition of Attributes
  Attributes are the properties of individual block such as Fe, $SiO_2$, $Al_2O_3$, specific gravity, litho code etc. These attributes were added in the dummy block model using suitable technique.

- Application of Constraints

Constraints are the logical combination of spatial operators and objects such as DTM of surface contour, solid model of ore zone, block etc. with which the block model can be enveloped/ intersected with respect to inside/ outside and above/ below their spatial position. The block model developed for Rantha Iron Ore Mine. Ore Mines has been constrained with the surface DTM with updated pit positions, mining lease boundary, statutory safety barriers, individual quarry boundaries as well as ore type-wise 3-D solid models as developed and discussed in the preceding paragraphs. In this way, the blocks have been enveloped within ore zone boundary and surface topography for the purpose of grade interpolation and reserves estimation. Constrained block model is given below.

- Block model estimation

Block model estimation parameters such as anisotropic ratio, search distances etc. were derived from the results of variogram analysis discussed in previous para. Rantha Iron Ore Mine. ore deposit is uniform in mineralization. It is not erratic in behavior. The coefficient of variation of grades in all the ores are low in the range of 0.03 – 0.1 indicating uniform grade distribution and the deposit has also been explored at almost uniform grid of 50 m x 50m both along dip and strike direction, the globally accepted technique of Inverse Square Distance (ISD) method has been used for ore reserve estimation for different ore types. The parameters for reserve estimation have been derived from the statistical and geo-statistical analysis done previously. A search ellipsoid as indicated below has been used to select samples for assigning grade to the blocks. The axial parameters and its search orientation were derived from the results of geo-statistical analysis.

The bulk density of the individual ore types as given below were taken as the in-situ densities of the respective ore type. Same has been derived from the exploration report of Rantha Iron Ore Mine.

**Average Bulk Density of Different Ore Types**

| Sl. No. | Ore Type | Bulk Density, t/cu.m |
|---|---|---|
| 1 | Iron Ore >55% Fe | 3.00 |
| 2 | Mineral Reject (45 % Fe to 55% Fe) | 2.7 |

Copy of report of bulk density test carried out by NABL accredited lab is enclosed as Annexure 26.

For estimation resources the following parameters have been considered:

**Measured resources: -**

➢ The entire exploratory drill holes with grid spacing of 100m X 100m has been considered as G1 category and has been categorized under 331 as per UNFC code.

**Indicated resources: -**

➢ The entire exploratory drill hole with grid spacing at more than 100m X 100m and less than 200m x 200m grid interval and where the borehole density is quite low has been considered as G2 category and has been categorized under 332 as per UNFC code.

### 2.2.4.2: Resource Calculation:

**Section-wise Reserve/Resource**:

The details of the resources established based on level of exploration as on 30.06.2022 under different sections at a cut off of 45% Fe are tabulated below.

| Sl. No. | Cross section/Block | Sectional Area/Block area (sq mtr) | Influence (m) | Depth in mtr | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | Level of Exploration | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X1_Y1/MINERAL REJECT | 1355 | 200 | 540 to 560 | 270905 | 2.7 | 731444 | G2 | Forest | Fe | 47.51 | Inverse Square Distance Method |
| 2 | X2_Y2/SLO | 7321 | 200 | 540 to 560 | 1464272 | 3 | 4392816 | G2 | Forest | Fe | 58.34 | Inverse Square Distance Method |
| 3 | X2_Y2/MINERAL REJECT | 3761 | 200 | 540 to 560 | 752140 | 3 | 2030778 | G2 | Forest | Fe | 51.34 | Inverse Square Distance Method |
| 4 | X2_Y2/BLUE DUST | 8011 | 200 | 540 to 560 | 1602124 | 3 | 4806372 | G2 | Forest | Fe | 64.76 | Inverse Square Distance Method |
| 5 | X3_Y3/MINERAL REJECT | 12129 | 200 | 540 to 560 | 2425737 | 2.7 | 6549490 | G2 | Forest | Fe | 48.04 | Inverse Square Distance Method |
| 6 | X3_Y3/SLO | 8653 | 200 | 540 to 560 | 1730654 | 3 | 5191963 | G2 | Forest | Fe | 57.59 | Inverse Square Distance Method |

| Sl. No. | Cross section/Block | Sectional Area/Block area (sq mtr) | Influence (m) | Depth in mtr | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | Level of Exploration | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | X3_Y3/HLO/HMO | 200 | 200 | 540 to 560 | 40085 | 3 | 120254 | G2 | Forest | Fe | 56.74 | Inverse Square Distance Method |
| 8 | X3_Y3/LIO | 463 | 200 | 540 to 560 | 92581 | 3 | 277742 | G2 | Forest | Fe | 56.55 | Inverse Square Distance Method |
| 9 | X4_Y4/MINERAL REJECT | 3956 | 150 | 540 to 560 | 593333 | 2.7 | 1601998 | G2 | Forest | Fe | 50.07 | Inverse Square Distance Method |
| 10 | X4_Y4/SLO | 3572 | 150 | 540 to 560 | 535842 | 3 | 1607526 | G2 | Forest | Fe | 58.33 | Inverse Square Distance Method |
| 11 | X4_Y4/LIO | 150 | 150 | 540 to 560 | 22472 | 3 | 67417 | G2 | Forest | Fe | 56.06 | Inverse Square Distance Method |
| 12 | X5_Y5/MINERAL REJECT | 3683 | 100 | 540 to 560 | 368343 | 2.7 | 994526 | G1 | Forest | Fe | 50.85 | Inverse Square Distance Method |
| 13 | X5_Y5/SLO | 5271 | 100 | 540 to 560 | 527110 | 3 | 1581330 | G1 | Forest | Fe | 58.47 | Inverse Square Distance Method |

| Sl. No. | Cross section/Block | Sectional Area/Block area (sq mtr) | Influence (m) | Depth in mtr | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | Level of Exploration | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | X5_Y5/LIO | 133 | 100 | 540 to 560 | 13307 | 3 | 39920 | G1 | Forest | Fe | 56.06 | Inverse Square Distance Method |
| 15 | X6_Y6/SLO | 15973 | 100 | 540 to 560 | 1597300 | 3 | 4791901 | G1 | Forest | Fe | 58.44 | Inverse Square Distance Method |
| 16 | X6_Y6/MINERAL REJECT | 15609 | 100 | 540 to 560 | 1560930 | 2.7 | 4214511 | G1 | Forest | Fe | 50.08 | Inverse Square Distance Method |
| 17 | X6_Y6/HLO/HMO | 833 | 100 | 540 to 560 | 83342 | 3 | 250026 | G1 | Forest | Fe | 57.63 | Inverse Square Distance Method |
| 18 | X7_Y7/SLO | 12827 | 100 | 540 to 560 | 1282742 | 3 | 3848226 | G1 | Forest | Fe | 59.57 | Inverse Square Distance Method |
| 19 | X7_Y7/MINERAL REJECT | 5332 | 100 | 540 to 560 | 533237 | 2.7 | 1439739 | G1 | Forest | Fe | 50.38 | Inverse Square Distance Method |
| 20 | X7_Y7/LIO | 206 | 100 | 540 to 560 | 20615 | 3 | 61845 | G1 | Forest | Fe | 57.93 | Inverse Square Distance Method |

| Sl. No. | Cross section/Block | Sectional Area/Block area (sq mtr) | Influence (m) | Depth in mtr | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | Level of Exploration | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | X8_Y8/SLO | 22578 | 100 | 540 to 560 | 2257816 | 3 | 6773448 | G1 | Forest | Fe | 59.36 | Inverse Square Distance Method |
| 22 | X8_Y8/MINERAL REJECT | 10952 | 100 | 540 to 560 | 1095201 | 2.7 | 2957043 | G1 | Forest | Fe | 49.58 | Inverse Square Distance Method |
| 23 | X8_Y8/LIO | 623 | 100 | 540 to 560 | 62286 | 3 | 186858 | G1 | Forest | Fe | 57.86 | Inverse Square Distance Method |
| 24 | X9_Y9/SLO | 17670 | 100 | 540 to 560 | 1767012 | 3 | 5301037 | G1 | Forest | Fe | 59.6 | Inverse Square Distance Method |
| 25 | X9_Y9/MINERAL REJECT | 10038 | 100 | 540 to 560 | 1003826 | 2.7 | 2710329 | G1 | Forest | Fe | 48.79 | Inverse Square Distance Method |
| 26 | X9_Y9/LIO | 2289 | 100 | 540 to 560 | 228913 | 3 | 686738 | G1 | Forest | Fe | 56.8 | Inverse Square Distance Method |
| 27 | X9_Y9/HLO/HMO | 2923 | 100 | 540 to 560 | 292280 | 3 | 876840 | G1 | Forest | Fe | 61.98 | Inverse Square Distance Method |

| Sl. No. | Cross section/Block | Sectional Area/Block area (sq mtr) | Influence (m) | Depth in mtr | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | Level of Exploration | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | X10_Y10/SLO | 20391 | 100 | 540 to 560 | 2039077 | 3 | 6117231 | G1 | Forest | Fe | 58.71 | Inverse Square Distance Method |
| 29 | X10_Y10/MINERAL REJECT | 8387 | 100 | 540 to 560 | 838694 | 2.7 | 2264473 | G1 | Forest | Fe | 48.85 | Inverse Square Distance Method |
| 30 | X10_Y10/LIO | 1085 | 100 | 540 to 560 | 108513 | 3 | 325540 | G1 | Forest | Fe | 56.61 | Inverse Square Distance Method |
| 31 | X10_Y10/HLO/HMO | 413 | 100 | 540 to 560 | 41250 | 3 | 123750 | G1 | Forest | Fe | 61.24 | Inverse Square Distance Method |
| 32 | X11_Y11/MINERAL REJECT | 5131 | 100 | 540 to 560 | 513144 | 2.7 | 1385488 | G1 | Forest | Fe | 50.08 | Inverse Square Distance Method |
| 33 | X11_Y11/SLO | 15310 | 100 | 540 to 560 | 1530964 | 3 | 4592892 | G1 | Forest | Fe | 57.67 | Inverse Square Distance Method |
| 34 | X11_Y11/HLO/HMO | 1130 | 100 | 540 to 560 | 112974 | 3 | 338923 | G1 | Forest | Fe | 63.63 | Inverse Square Distance Method |

| Sl. No. | Cross section/Block | Sectional Area/Block area (sq mtr) | Influence (m) | Depth in mtr | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | Level of Exploration | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | X11_Y11/LIO | 616 | 100 | 540 to 560 | 61607 | 3 | 184822 | G1 | Forest | Fe | 55.68 | Inverse Square Distance Method |
| 36 | X12_Y12/MINERAL REJECT | 302 | 100 | 540 to 560 | 30188 | 2.7 | 81501 | G1 | Forest | Fe | 51.95 | Inverse Square Distance Method |
| 37 | X12_Y12/SLO | 179 | 100 | 540 to 560 | 17938 | 3 | 53813 | G1 | Forest | Fe | 62.9 | Inverse Square Distance Method |
| Total | | | | | | | 79560550 | | | | 55.8 | |

**2.2.4.3: Mineral Resource Estimate for Conversion to Mineral Reserve:**

Mineral reserve has been calculated deducting the reserve that would be blocked under the pit slope and within the safety zone inclusive of the safety zone of the existing nala.

**The Parameters of Reserves calculation by Cross Sectional Method are:**

Detailed calculation has been carried out in the lease area through coring boreholes, reserves have been estimated based upon the extension of the ore body, specific gravity and the percentage of ore recovery. Surface data, structural interpretation and observation made in the nearby quarries have also been taken into consideration. As per the direction of dip and strike, an attempt was made to construct cross-section across the strike for calculation of reserves. 12 nos. of such sections have been drawn.

With a view to estimate the reserves of iron ore available in the deposit, the following parameters have been considered.

1. Cut-off Grade
2. Length of influence
3. Bulk density
4. Recovery factor -100%

1. Cut-off Grade:

Based on marketability, the cut-off grade of iron ore has been considered at +55% fe. The Sub-grade ore considered 45 to 55% fe.

2. Length of Influence:

The ore zones are generally flat and tabular in nature. The same have been penetrated by vertical drill holes at a closed spaced grid spacing 200m and 100m interval. Depending on the drill holes spacing at specific grid interval, the length of influence has been considered on either side of the sections and taken in to consideration for computation of ore reserves.

3. Bulk Density:

The bulk density of iron ore has been considered as per actual determined by the authenticated NABL accredited laboratory. The copy of the same is attached as annexure-26.

Recovery Factor:

Recovery factor plays a vital role for estimation of reserve. The factor is considered as per actual determination carried out by an NABL acrredited laboratory. In the lease area recovery factors has been considered as 100%.

Method of Reserve Estimation:

Systematic geological cross sections are constructed with the surveyed ground profile on which the drill hole inputs and average grade-wise analytical result of different ore zones is plotted and accordingly, the correlation of ore zones are interpreted with respect to grade.

The entire system is calculated through “SURPAC “software. The computed geological reserve is summarized in the table 2.2.4.2

**2.2.4.4: Threshold value & Cut off Parameters:**

a. The threshold value has been considered as per the IBM guidelines is 45% Fe.
b. The Cutoff grade considered for estimation of resource/reserve is >55 % Fe.
c. The Fe % raised between >45% to <55% is considered as Mineral Reject.

**2.2.4.5: Mining Factors or Assumptions:**

The mine is not operated since a long back due to want of forest clearance. The various mining operations such as drilling & blasting, excavation & loading and transportation were practiced in this Rantha Opencast Iron Ore Mine after execution of mining lease over 408.8731 hectares on 31.12.1968. Mining was carried out by manual means on single shift basis with the use of pick axe, crow bars, spades, chisels, hammers and baskets etc. for loosening, excavation and loading and 10t capacity tippers for transportation of ore. ROM iron ore produced from the mine was broken, sized, sorted and blended manually. Finally, saleable materials was loaded manually by head load and transported to the consuming industries.

**2.2.4.6: Metallurgical Factors or Assumptions:**

The average grade of Iron ore produced from Rantha Iron Ore Mines is above 55.8% Fe. The mine is supposed to produce calibrated lump ore (+10 to -40mm) size fraction and fines ore (-10mm) size fraction. The entire ore production including lumps and fines produced from Rantha iron Ore Mines will be consumed in neighbouring steel plant/sponge iron plant of Odisha.

**2.2.4.7: Cost & Revenue Factors:**

**ECONOMIC EVALUATION**

The entire ore production including lumps and fines produced from Rantha Iron Ore Mine will be sold to iron ore consumers of Odisha and nearby states. To meet market demand with about 60 % Fe the ore produced can be sold after processing i.e. sizing and sorting. To meet market demand with 60% Fe, both ore and mineral reject produces are proposed to be blended

**2.2.4.8: Market Assessment:**

The entire ore production including lumps and fines produced from Rantha Iron Ore Mine will be consumed in neighboring steel plants/sponge iron plants of Odisha and nearby states. To meet market demand with about 60 % Fe the ore produced can be sold after processing i.e. sizing and sorting.

The Cash Flow analysis, NPV and IRR for the project has been shown in the pre-feasibility report. As NPV is positive and IRR is 33% so the project is an economic viable proposition.

**2.2.4.9: Other Modifying Factors:**

**Public acceptance:**

The mining project has been well accepted by the general public of the surrounding villages as evident from no litigation, agitation or complain by general public have so far been recorded by the lessee.

**Socio-economic impact studies:**

The mining activity in the area has already created direct employment opportunity for the local people both directly and indirectly. Workmen to mines, supervisory staff, mining engineers, geologists, surveyors, engineers etc. are employed in the mine. In addition,

it will facilitate in developing indirect employment opportunities in transport sector and work shop facilities in the surrounding areas. The lessee will extends its help and supports to welfare measures like free health check up camps, provision of bore wells, road repairing, provision of drinking water etc. The continuation of mining work has also augmented the educational status, communication facilities, health & sanitation and overall economic condition of the people of nearby villages. The lessee contributes regularly for peripheral development of the area.

**Government factors**

All the valid rights, approvals, clearances, licensees has been available in favour of Odisha Mining Corporation Limited.

**National Park**

There is no National Park within 10 km radius of the ML area.

### 2.2.4.10: Classification:

**PROBABLE MINERAL RESERVE (121)**

Detailed exploration has been carried out by core boreholes, surface exposures have been found, number of pits were opened which later on were converted into one big quarry. The proved reserve has been estimated based on the area covered by drill holes and the existing quarry. Laterally, the proved zone has been extended 50m beyond the quarry limit as per UNFC. Thus geological axis for such estimated reserves can be brought under G1 category. As regards feasibility, it stated that the mining plan was prepared and approved and thus recoveries and efficiencies have been estimated. Manpower and requirement of machineries have been estimated based on actual need. Infrastructure resources are already available. The forest clearance is available, however tree falling permission from Divisional Forest Office is yet to be materialized. Thus, the resources can be brought under F2 category. On economic front, the materials have already been dispatched to the various consuming industries in past and accordingly the grade of the ore is acceptable to the marked demand, Land use pattern, working plan is already known and designed. Thus the reserves can be brought under El category. In view of the above considerations, the reserves can be classified under 121 category.

**PROBABLE MINERAL RESERVE (122)**

Based on the information gathered from the DTH boreholes, the ore zone has been extended laterally beyond proved zone as per UNFC. This lateral extension of the ore body is kept under probable category due to non-confirmation of grade. Thus, the geological axis can be brought under G2 category. On feasibility axis, mining plan was prepared and approved and thus recoveries and efficiencies estimated. Manpower & machine requirement have been estimated based on actual need. Infrastructure resources are already available. However, the forest clearance is yet to be obtained. Thus, the resources can be brought under F2 category. On economic front, the materials have already been dispatched to the various consuming industries in past. Accordingly the grade of the ore is suitable for meeting the market demands. Land use pattern, working plan is already known or designed. Therefore, the reserves can be brought under El category. In view of the above considerations, reserves can be classified under 122 category.

**PREFEASIBLE MINERAL RESOURCES (221 & 222)**

The ore which will be blocked and cannot be extracted due to pit slope or safety zone has been put under this category. Probable reserve which cannot be extracted has been categorized as 221 and 222.

### 2.2.4.11: Calculation of blocked resources: >45% Fe to <55% Fe (221)

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ultimate Pit Limit | X7-Y7 /MR | 177.27 | 100 | 880 to 890 mRL | 17727 | 2.7 | 47862 | 221 | Forest | Fe | 47.93 | Inverse Square Distance Method |
| 2 | Ultimate Pit Limit | X8-Y8 /MR | 56.65 | 100 | 880 to 890 mRL | 5665 | 2.7 | 15296 | 221 | Forest | Fe | 49.69 | Inverse Square Distance Method |
| 3 | Ultimate Pit Limit | X10-Y10/MR | 347.91 | 100 | 880 to 890 mRL | 34791 | 2.7 | 93935 | 221 | Forest | Fe | 48.97 | Inverse Square Distance Method |
| 4 | Ultimate Pit Limit | X11-Y11/MR | 510.07 | 100 | 880 to 890 mRL | 51007 | 2.7 | 137718 | 221 | Forest | Fe | 50.6 | Inverse Square Distance Method |
| Total | | | | | | | | 294811 | 221 | Forest | Fe | 49.6 | |

**Calculation of blocked resources: > 55% Fe (221)**

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ultimate Pit Limit | X6_Y6/SLO | 5.62 | 100 | 880 to 890 mRL | 562 | 3 | 1685 | 221 | Forest | Fe | 56.31 | Inverse Square Distance Method |
| 2 | Ultimate Pit Limit | X8_Y8/SLO | 147.88 | 100 | 881 to 890 mRL | 14788 | 3 | 44364 | 221 | Forest | Fe | 58.42 | Inverse Square Distance Method |
| 3 | Ultimate Pit Limit | X9_Y9/SLO | 76.47 | 100 | 882 to 890 mRL | 7647 | 3 | 22942 | 221 | Forest | Fe | 61.29 | Inverse Square Distance Method |
| 4 | Ultimate Pit Limit | X10_Y10/SLO | 26.79 | 100 | 883 to 890 mRL | 2679 | 3 | 8036 | 221 | Forest | Fe | 57.41 | Inverse Square Distance Method |
| 5 | Ultimate Pit Limit | X11_Y11/SLO | 4044.15 | 100 | 884 to 890 mRL | 404415 | 3 | 1213246 | 221 | Forest | Fe | 57.58 | Inverse Square Distance Method |
| 6 | Ultimate Pit Limit | X11_Y11/HLO/HMO | 443.28 | 100 | 885 to 890 mRL | 44328 | 3 | 132985 | 221 | Forest | Fe | 65.62 | Inverse Square Distance Method |
| 7 | Ultimate Pit Limit | X11_Y11/LIO | 157.94 | 100 | 886 to 890 mRL | 15794 | 3 | 47381 | 221 | Forest | Fe | 55.63 | Inverse Square Distance Method |
| 1 | Ultimate | X6_Y6/SLO | 5.62 | 100 | 880 to | 562 | 3 | 1685 | 221 | Forest | Fe | 56.31 | Inverse |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pit Limit | | | | 890 mRL | | | | | | | | Square Distance Method |
| Total | | | | | | | | 1470639 | 221 | Forest | Fe | 58.32 | |

**Calculation of blocked resources: >45% Fe to <55 % Fe (222)**

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ultimate Pit limit | X2_Y2/MR | 72.8 | 200 | 880 to 890 mRL | 14560 | 2.7 | 39313 | 222 | Forest | Fe | 51.97 | Inverse Square Distance Method |
| 2 | Ultimate Pit limit | X1_Y1/MR | 377.455 | 200 | 880 to 890 mRL | 75491 | 2.7 | 203827 | 222 | Forest | Fe | 47.74 | Inverse Square Distance Method |
| 3 | Ultimate Pit limit | X3_Y3/MR | 220.63 | 200 | 880 to 890 mRL | 44126 | 2.7 | 119140 | 222 | Forest | Fe | 48.3 | Inverse Square Distance Method |
| 4 | Ultimate Pit limit | X4_Y4/MR | 140.9 | 150 | 880 to 890 mRL | 21135 | 2.7 | 57064 | 222 | Forest | Fe | 50.34 | Inverse Square Distance Method |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | Ultimate Pit limit | X5_Y5/MR | 171.4 | 100 | 880 to 890 mRL | 17140 | 2.7 | 46278 | 222 | Forest | Fe | 50.92 | Inverse Square Distance Method |
| 6 | Ultimate Pit limit | X6_Y6/MR | 226.85 | 100 | 880 to 890 mRL | 22685 | 2.7 | 61250 | 222 | Forest | Fe | 49.73 | Inverse Square Distance Method |
| 7 | Ultimate Pit limit | X7_Y7/MR | 101.52 | 100 | 880 to 890 mRL | 10152 | 2.7 | 27410 | 222 | Forest | Fe | 50.16 | Inverse Square Distance Method |
| 8 | Ultimate Pit limit | X8_Y8/MR | 321.48 | 100 | 880 to 890 mRL | 32148 | 2.7 | 86801 | 222 | Forest | Fe | 49.03 | Inverse Square Distance Method |
| 9 | Ultimate Pit limit | X9_Y9/MR | 1362.08 | 100 | 880 to 890 mRL | 136208 | 2.7 | 367761 | 222 | Forest | Fe | 50.22 | Inverse Square Distance Method |
| 10 | Ultimate Pit limit | X10_Y10/MR | 2053.29 | 100 | 880 to 890 mRL | 205329 | 2.7 | 554388 | 222 | Forest | Fe | 49.34 | Inverse Square Distance Method |
| 11 | Ultimate Pit limit | X11_Y11/MR | 683.94 | 100 | 880 to 890 mRL | 68394 | 2.7 | 184663 | 222 | Forest | Fe | 51.59 | Inverse Square Distance Method |
| 12 | Ultimate Pit limit | X12_Y12/MR | 211.72 | 100 | 880 to 890 mRL | 21172 | 2.7 | 57164 | 222 | Forest | Fe | 51.96 | Inverse Square Distance Method |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | Safety Zone | X1_Y1/MR | 32.9 | 200 | 881 to 890 mRL | 6580 | 2.7 | 17765 | 222 | Forest | Fe | 47.85 | Inverse Square Distance Method |
| 14 | Safety Zone | X3_Y3/MR | 368.8 | 200 | 882 to 890 mRL | 73760 | 2.7 | 199151 | 222 | Forest | Fe | 49.06 | Inverse Square Distance Method |
| 15 | Safety Zone | X4_Y4/MR | 52.17333 | 150 | 883 to 890 mRL | 7826 | 2.7 | 21131 | 222 | Forest | Fe | 48.63 | Inverse Square Distance Method |
| 16 | Safety Zone | X6_Y6/MR | 26.04 | 100 | 884 to 890 mRL | 2604 | 2.7 | 7031 | 222 | Forest | Fe | 47.2 | Inverse Square Distance Method |
| 17 | Safety Zone | X7_Y7/MR | 8.89 | 101 | 885 to 890 mRL | 898 | 2.7 | 2423 | 223 | Forest | Fe | 49.02 | Inverse Square Distance Method |
| 18 | Safety Zone | X8_Y8/MR | 61.88 | 100 | 885 to 890 mRL | 6188 | 2.7 | 16706 | 222 | Forest | Fe | 48.77 | Inverse Square Distance Method |
| 19 | Safety Zone | X9_Y9/MR | 31.76 | 100 | 886 to 890 mRL | 3176 | 2.7 | 8575 | 222 | Forest | Fe | 48.68 | Inverse Square Distance Method |
| 20 | Safety Zone | X10_Y10/MR | 552.66 | 100 | 887 to 890 mRL | 55266 | 2.7 | 149219 | 222 | Forest | Fe | 48.69 | Inverse Square Distance Method |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | Safety Zone | X11_Y11/ MR | 69.6 | 100 | 888 to 890 mRL | 6960 | 2.7 | 18793 | 222 | Forest | Fe | 51.44 | Inverse Square Distance Method |
| 22 | Safety Zone | X12_Y12/ MR | 90.16 | 100 | 889 to 890 mRL | 9016 | 2.7 | 24342 | 222 | Forest | Fe | 51.94 | Inverse Square Distance Method |
| Total | | | | | | | | 2270195 | 222 | Forest | Fe | 49.59 | |

**Calculation of blocked resources: >55% Fe (222)**

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ultimate Pit Limit | X2_Y2/SLO | 149.37 | 200 | 884 to 890 mRL | 29874 | 3 | 89621 | 222 | Forest | Fe | 59.47 | Inverse Square Distance Method |
| 2 | Ultimate Pit Limit | X2_Y2/BLUE DUST | 67.71 | 200 | 885 to 890 mRL | 13542 | 3 | 40625 | 222 | Forest | Fe | 65.05 | Inverse Square Distance Method |
| 3 | Ultimate Pit Limit | X3_Y3/SLO | 250.67 | 200 | 886 to 890 mRL | 50134 | 3 | 150403 | 222 | Forest | Fe | 59.65 | Inverse Square Distance Method |
| 4 | Ultimate Pit Limit | X3_Y3/HLO/HMO | 34.985 | 200 | 887 to 890 mRL | 6997 | 3 | 20991 | 222 | Forest | Fe | 56.74 | Inverse Square Distance Method |
| 5 | Safety Zone | X3_Y3/SLO | 552.105 | 200 | 888 to 890 mRL | 110421 | 3 | 331262 | 222 | Forest | Fe | 58.44 | Inverse Square Distance Method |
| 6 | Ultimate Pit Limit | X4_Y4/SLO | 68.56 | 150 | 889 to 890 mRL | 10284 | 3 | 30852 | 222 | Forest | Fe | 58.26 | Inverse Square Distance Method |
| 7 | Safety Zone | X4_Y4/SLO | 67.44667 | 150 | 890 to 890 mRL | 10117 | 3 | 30352 | 222 | Forest | Fe | 58.5 | Inverse Square Distance Method |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Ultimate Pit Limit | X5_Y5/SLO | 171.85 | 100 | 891 to 890 mRL | 17185 | 3 | 51556 | 222 | Forest | Fe | 59.32 | Inverse Square Distance Method |
| 9 | Safety Zone | X5_Y5/SLO | 1.11 | 100 | 892 to 890 mRL | 111 | 3 | 334 | 222 | Forest | Fe | 57.39 | Inverse Square Distance Method |
| 10 | Ultimate Pit Limit | X6_Y6/SLO | 457.95 | 100 | 893 to 890 mRL | 45795 | 3 | 137385 | 222 | Forest | Fe | 59.67 | Inverse Square Distance Method |
| 11 | Safety Zone | X6_Y6/SLO | 7.42 | 100 | 894 to 890 mRL | 742 | 3 | 2227 | 222 | Forest | Fe | 57.48 | Inverse Square Distance Method |
| 12 | Ultimate Pit Limit | X7_Y7/SLO | 814.38 | 100 | 895 to 890 mRL | 81438 | 3 | 244313 | 222 | Forest | Fe | 62.85 | Inverse Square Distance Method |
| 13 | Safety Zone | X7_Y7/SLO | 136.48 | 100 | 896 to 890 mRL | 13648 | 3 | 40945 | 222 | Forest | Fe | 63.75 | Inverse Square Distance Method |
| 14 | Safety Zone | X8_Y8/SLO | 288.59 | 100 | 897 to 890 mRL | 28859 | 3 | 86578 | 222 | Forest | Fe | 63.49 | Inverse Square Distance Method |
| 15 | Ultimate Pit Limit | X8_Y8/SLO | 2965.01 | 100 | 898 to 890 mRL | 296501 | 3 | 889503 | 222 | Forest | Fe | 62.26 | Inverse Square Distance Method |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Safety Zone | X9_Y9/SLO | 147.08 | 100 | 899 to 890 mRL | 14708 | 3 | 44124 | 222 | Forest | Fe | 63.47 | Inverse Square Distance Method |
| 17 | Ultimate Pit Limit | X9_Y9/SLO | 3379.63 | 100 | 900 to 890 mRL | 337963 | 3 | 1013889 | 222 | Forest | Fe | 60.82 | Inverse Square Distance Method |
| 18 | Ultimate Pit Limit | X10_Y10/SLO | 2687.34 | 100 | 901 to 890 mRL | 268734 | 3 | 806203 | 222 | Forest | Fe | 58.08 | Inverse Square Distance Method |
| 19 | Ultimate Pit Limit | X10_Y10/LIO | 36.23 | 100 | 902 to 890 mRL | 3623 | 3 | 10869 | 222 | Forest | Fe | 55.03 | Inverse Square Distance Method |
| 20 | Safety Zone | X10_Y10/SLO | 499.46 | 100 | 903 to 890 mRL | 49946 | 3 | 149837 | 222 | Forest | Fe | 57.04 | Inverse Square Distance Method |
| 21 | Safety Zone | X10_Y10/LIO | 48.69 | 100 | 904 to 890 mRL | 4869 | 3 | 14607 | 222 | Forest | Fe | 55.03 | Inverse Square Distance Method |
| 22 | Safety Zone | X11_Y11/SLO | 46 | 100 | 905 to 890 mRL | 4600 | 3 | 13799 | 222 | Forest | Fe | 61.87 | Inverse Square Distance Method |
| 23 | Ultimate Pit Limit | X11_Y11/SLO | 1084.5 | 100 | 906 to 890 mRL | 108450 | 3 | 325350 | 222 | Forest | Fe | 61.33 | Inverse Square Distance Method |

| Sl. No. | Reserves blocked due to | Cross section/Block | Sectional area/ block area (in Sq mrt) | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Resource Quantity (t) | UNFC code | Type of Land | Name of the radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | Ultimate Pit Limit | X11_Y11/ LIO | 34.85 | 100 | 907 to 890 mRL | 3485 | 3 | 10456 | 222 | Forest | Fe | 55.63 | Inverse Square Distance Method |
| 25 | Ultimate Pit Limit | X11_Y11/ HLO/HMO | 60 | 100 | 908 to 890 mRL | 6000 | 3 | 17999 | 222 | Forest | Fe | 63.01 | Inverse Square Distance Method |
| 26 | Safety Zone | X12_Y12/ SLO | 50.16 | 100 | 909 to 890 mRL | 5016 | 3 | 15047 | 222 | Forest | Fe | 62.88 | Inverse Square Distance Method |
| 27 | Ultimate Pit Limit | X12_Y12/ SLO | 129.22 | 100 | 910 to 890 mRL | 12922 | 3 | 38766 | 222 | Forest | Fe | 62.91 | Inverse Square Distance Method |
| | Total | | | | | | | 4607893 | 222 | Forest | Fe | 60.43 | |

### 2.2.4.12: Calculation of Reserves: > 45% Fe to <55 %Fe (121)

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X4_Y4/MR | 522 | 150 | 910 to 890 mRL | 78241 | 2.7 | 211251 | 121 | Forest | Fe | 48.57 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | X5_Y5/MR | 603 | 100 | 910 to 890 mRL | 60315 | 2.7 | 162850 | 121 | Forest | Fe | 49.92 | Inverse Square Distance Method |
| 3 | X6_Y6/MR | 8860 | 100 | 910 to 890 mRL | 885997 | 2.7 | 2392193 | 121 | Forest | Fe | 49.67 | Inverse Square Distance Method |
| 4 | X7_Y7/MR | 2059 | 100 | 910 to 890 mRL | 205868 | 2.7 | 555842 | 121 | Forest | Fe | 49.55 | Inverse Square Distance Method |
| 5 | X8_Y8/MR | 6807 | 100 | 910 to 890 mRL | 680715 | 2.7 | 1837929 | 121 | Forest | Fe | 49.86 | Inverse Square Distance Method |
| 6 | X9_Y9/MR | 4853 | 100 | 910 to 890 mRL | 485280 | 2.7 | 1310257 | 121 | Forest | Fe | 49.01 | Inverse Square Distance Method |
| 7 | X10_Y10/MR | 4224 | 100 | 910 to 890 mRL | 422367 | 2.7 | 1140390 | 121 | Forest | Fe | 48.7 | Inverse Square Distance Method |
| 8 | X11_Y11/MR | 3783 | 100 | 910 to 890 mRL | 378275 | 2.7 | 1021343 | 121 | Forest | Fe | 49.68 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | | | 8632055 | 121 | Forest | Fe | 49.45 | |

**Calculation of Reserves: > 55% Fe (121)**

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X4_Y4/SLO | 878.4867 | 150 | 910 to 890 mrl | 131773 | 3 | 395318 | 121 | Forest | Fe | 58.55 | Inverse Square Distance Method |
| 2 | X5_Y5/SLO | 404.22 | 100 | 911 to 890 mrl | 40422 | 3 | 121267 | 121 | Forest | Fe | 57.07 | Inverse Square Distance Method |
| 3 | X7_Y7/SLO | 6269.14 | 100 | 911 to 890 mrl | 626914 | 3 | 1880743 | 121 | Forest | Fe | 58.7 | Inverse Square Distance Method |
| 4 | X7_Y7/LIO | 192.87 | 100 | 911 to 890 mrl | 19287 | 3 | 57860 | 121 | Forest | Fe | 57.93 | Inverse Square Distance Method |
| 5 | X7_Y7/SLO | 93.75 | 100 | 911 to 890 mrl | 9375 | 3 | 28124 | 121 | Forest | Fe | 58.53 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | X6_Y6/SLO | 5879.42 | 100 | 912 to 890 mrl | 587942 | 3 | 1763827 | 121 | Forest | Fe | 57.42 | Inverse Square Distance Method |
| 7 | X8_Y8/SLO | 13237.5 | 100 | 913 to 890 mrl | 1323750 | 3 | 3971250 | 121 | Forest | Fe | 58.4 | Inverse Square Distance Method |
| 8 | X8_Y8/LIO | 622.86 | 100 | 914 to 890 mrl | 62286 | 3 | 186858 | 121 | Forest | Fe | 57.86 | Inverse Square Distance Method |
| 9 | X9_Y9/SLO | 9856.7 | 100 | 915 to 890 mrl | 985670 | 3 | 2957009 | 121 | Forest | Fe | 59.92 | Inverse Square Distance Method |
| 10 | X9_Y9/HLO/HMO | 2922.8 | 100 | 916 to 890 mrl | 292280 | 3 | 876840 | 121 | Forest | Fe | 61.98 | Inverse Square Distance Method |
| 11 | X9_Y9/LIO | 1983.42 | 100 | 917 to 890 mrl | 198342 | 3 | 595027 | 121 | Forest | Fe | 57.08 | Inverse Square Distance Method |
| 12 | X10_Y10/SLO | 15474.05 | 100 | 918 to 890 mrl | 1547405 | 3 | 4642215 | 121 | Forest | Fe | 58.66 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | X10_Y10/HLO/ HMO | 412.5 | 100 | 919 to 890 mrl | 41250 | 3 | 123750 | 121 | Forest | Fe | 61.24 | Inverse Square Distance Method |
| 14 | X10_Y10/LIO | 809.21 | 100 | 920 to 890 mrl | 80921 | 3 | 242764 | 121 | Forest | Fe | 57.15 | Inverse Square Distance Method |
| 15 | X11_Y11/SLO | 9970.79 | 100 | 921 to 890 mrl | 997079 | 3 | 2991238 | 121 | Forest | Fe | 57.26 | Inverse Square Distance Method |
| 16 | X11_Y11/HLO/ HMO | 620.48 | 100 | 922 to 890 mrl | 62048 | 3 | 186143 | 121 | Forest | Fe | 62.32 | Inverse Square Distance Method |
| 17 | X11_Y11/LIO | 419.97 | 100 | 923 to 890 mrl | 41997 | 3 | 125991 | 121 | Forest | Fe | 55.7 | Inverse Square Distance Method |
| | Total | | | | | | 21146224 | | | | 58.57 | |

**Calculation of Reserves: > 45% Fe to <55 %Fe (122)**

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X2_Y2/MR | 3687.9 | 200 | 910 to 890 mRL | 737580 | 2.7 | 1991465 | 122 | Forest | Fe | 51.33 | Inverse Square Distance Method |
| 2 | X1_Y1/MR | 944.17 | 200 | 910 to 890 mRL | 188834 | 2.7 | 509852 | 122 | Forest | Fe | 47.41 | Inverse Square Distance Method |
| 3 | X3_Y3/MR | 11539.26 | 200 | 910 to 890 mRL | 2307851 | 2.7 | 6231198 | 122 | Forest | Fe | 48 | Inverse Square Distance Method |
| 4 | X4_Y4/MR | 3240.867 | 150 | 910 to 890 mRL | 486130 | 2.7 | 1312552 | 122 | Forest | Fe | 50.32 | Inverse Square Distance Method |
| 5 | X5_Y5/MR | 2908.88 | 100 | 910 to 890 mRL | 290888 | 2.7 | 785397 | 122 | Forest | Fe | 51.04 | Inverse Square Distance Method |
| 6 | X6_Y6/MR | 6496.43 | 100 | 910 to 890 mRL | 649643 | 2.7 | 1754037 | 122 | Forest | Fe | 50.67 | Inverse Square Distance Method |
| 7 | X7_Y7/MR | 2985.93 | 100 | 910 to 890 mRL | 298593 | 2.7 | 806202 | 122 | Forest | Fe | 51.11 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | X8_Y8/MR | 3704.86 | 100 | 910 to 890 mRL | 370486 | 2.7 | 1000311 | 122 | Forest | Fe | 49.13 | Inverse Square Distance Method |
| 9 | X9_Y9/MR | 3791.62 | 100 | 910 to 890 mRL | 379162 | 2.7 | 1023737 | 122 | Forest | Fe | 48 | Inverse Square Distance Method |
| 10 | X10_Y10/MR | 1209.41 | 100 | 910 to 890 mRL | 120941 | 2.7 | 326542 | 122 | Forest | Fe | 48.54 | Inverse Square Distance Method |
| 11 | X11_Y11/MR | 85.08 | 100 | 910 to 890 mRL | 8508 | 2.7 | 22971 | 122 | Forest | Fe | 51.11 | Inverse Square Distance Method |
| | | Total | | | | | 15764264 | 122 | Forest | Fe | 49.29 | |

**Calculation of Reserves: > 55% Fe (122)**

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X2_Y2/SLO | 7171.99 | 200 | | 1434398 | 3 | 4303195 | 122 | Forest | Fe | 58.32 | Inverse Square Distance Method |
| 2 | X2_Y2/BLUE DUST | 7942.91 | 200 | | 1588582 | 3 | 4765746 | 123 | Forest | Fe | 64.75 | Inverse Square Distance Method |
| 3 | X3_Y3/SLO | 7850.495 | 200 | | 1570099 | 3 | 4710297 | 124 | Forest | Fe | 57.46 | Inverse Square Distance Method |
| 4 | X3_Y3/HLO/HMO | 165.44 | 200 | | 33088 | 3 | 99263 | 125 | Forest | Fe | 56.74 | Inverse Square Distance Method |
| 5 | X3_Y3/LIO | 462.905 | 200 | | 92581 | 3 | 277742 | 126 | Forest | Fe | 56.55 | Inverse Square Distance Method |
| 6 | X4_Y4/SLO | 2557.787 | 150 | | 383668 | 3 | 1151003 | 127 | Forest | Fe | 58.25 | Inverse Square Distance Method |
| 7 | X4_Y4/LIO | 149.8133 | 150 | | 22472 | 3 | 67417 | 128 | Forest | Fe | 56.06 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | X5_Y5/SLO | 4693.91 | 100 | | 469391 | 3 | 1408173 | 129 | Forest | Fe | 58.56 | Inverse Square Distance Method |
| 9 | X5_Y5/LIO | 133.07 | 100 | | 13307 | 3 | 39920 | 130 | Forest | Fe | 56.06 | Inverse Square Distance Method |
| 10 | X6_Y6/SLO | 9622.59 | 100 | | 962259 | 3 | 2886777 | 131 | Forest | Fe | 59 | Inverse Square Distance Method |
| 11 | X6_Y6/HLO/HMO | 833.42 | 100 | | 83342 | 3 | 250026 | 132 | Forest | Fe | 57.63 | Inverse Square Distance Method |
| 12 | X7_Y7/SLO | 5513.67 | 100 | | 551367 | 3 | 1654101 | 133 | Forest | Fe | 59.98 | Inverse Square Distance Method |
| 13 | X7_Y7/LIO | 13.28 | 100 | | 1328 | 3 | 3984 | 134 | Forest | Fe | 57.87 | Inverse Square Distance Method |
| 14 | X8_Y8/SLO | 5939.17 | 100 | | 593917 | 3 | 1781752 | 135 | Forest | Fe | 59.88 | Inverse Square Distance Method |

| Sl. No. | Cross Sectinon/Block | Sectional area/block area in Sq mtr | Influence (m) | Depth (m) | Volume ($m^3$) | Bulk Density ($t/m^3$) | Reserves Quantity (t) | UNFC code | Type of Land | Name of the of radical | Grade (%) | Method used for resource estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | X9_Y9/SLO | 4210.24 | 100 | | 421024 | 3 | 1263072 | 136 | Forest | Fe | 57.72 | |
| 16 | X9_Y9/LIO | 305.7 | 100 | | 30570 | 3 | 91711 | 137 | Forest | Fe | 55.03 | |
| 17 | X10_Y10/SLO | 1703.14 | 100 | | 170314 | 3 | 510941 | 138 | Forest | Fe | 60.72 | |
| 18 | X10_Y10/LIO | 191 | 100 | | 19100 | 3 | 57299 | 139 | Forest | Fe | 55.03 | |
| 19 | X11_Y11/SLO | 164.2 | 100 | | 16420 | 3 | 49259 | 140 | Forest | Fe | 60.1 | |
| 20 | X11_Y11/LIO | 3.32 | 100 | | 332 | 3 | 995 | 141 | Forest | Fe | 55.62 | |
| 21 | X11_Y11/HLO/ HMO | 5.99 | 100 | | 599 | 3 | 1796 | 142 | Forest | Fe | 57.76 | |
| | Total | | | | | | 25374469 | | | | 59.63 | |

2.2.4.13:

| | |
|---|---|
| Mineral | Hematite (Iron Ore) |
| Reserves/ Resources estimated as on | 30/06/2022 |
| UNIT of estimation | Metric Ton |

| Classification | Code | Quantity | | | | | | | Grade | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Forest | | Non-Forest | | Total | | Grand Total | Forest | | Non-Forest | | Total | | G. Total |
| | | a | b | c | d | e=(a+c) | f=(b+d) | g=(e+f) | a % | b % | c % | d % | e % | f % | g % |
| A. Mineral Reserve | | Fe>45% to <55% | Fe>55% | Fe>45% to <55% | Fe>55% | Fe>45% to <55% | Fe>55% | Fe>45% | Fe>45% to <55% | Fe >55% | Fe>45% to <55% | Fe >55% | Fe>45% to <55% | Fe >55% | Fe >45% |
| 1. Proved Mineral Reserve (A) | 111 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 2. Probable Mineral Reserve (A) | 121 | 8632055 | 21146224 | Nil | Nil | 8632055 | 21146224 | 29778279 | 49.45 | 58.57 | Nil | Nil | 49.45 | 58.56 | 55.73 |
| 3. Probable Mineral Reserve (A) | 122 | 15764264 | 25374469 | Nil | Nil | 15764264 | 25374469 | 41138733 | 49.29 | 59.63 | Nil | Nil | 49.29 | 59.63 | 55.66 |
| Total(A) | | 24396319 | 46520693 | Nil | Nil | 24396319 | 46520693 | 70917012 | 49.34 | 59.16 | Nil | Nil | 49.34 | 59.16 | 55.68 |
| B. Remaining Resources | | Fe>45% to <55% | Fe>55% | Fe>45% to <55% | Fe>55% | Fe>45% to <55% | Fe>55% | Fe>45% | Fe>45% to <55% | Fe >55% | Fe>45% to <55% | Fe >55% | Fe>45% to <55% | Fe >55% | Fe >45% |

| Classification | Code | Quantity | | | | | | | Grade | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Forest | | Non-Forest | | Total | | Grand Total | Forest | | Non-Forest | | Total | | G. Total |
| | | a | b | c | d | e=(a+c) | f=(b+d) | g=(e+f) | a % | b % | c % | d % | e % | f % | g % |
| 1. Feasibility Mineral Resource (B) | 211 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 2. Prefeasibility Mineral Resource (B) | 221 | 294811 | 1470639 | Nil | Nil | 294811 | 1470639 | 1765450 | 49.6 | 58.32 | Nil | Nil | 49.6 | 58.32 | 56.86 |
| 3. Prefeasibility Mineral Resource (B) | 222 | 2270195 | 4607893 | Nil | Nil | 2270195 | 4607893 | 6878088 | 49.59 | 60.43 | Nil | Nil | 49.59 | 60.43 | 56.85 |
| 4. Measured Mineral Resource (B) | 331 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 5. Indicated Mineral Resource (B) | 332 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 6. Inferred Mineral Resource (B) | 333 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 7. Reconnaissance Mineral Resource (B) | 334 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| Total (B) | | 2565006 | 6078532 | Nil | Nil | 2565006 | 6078532 | 8643538 | 49.59 | 59.92 | Nil | Nil | 49.59 | 59.92 | 56.85 |

| Classification | Code | Quantity | | | | | | | Grade | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Forest | | Non-Forest | | Total | | Grand Total | Forest | | Non-Forest | | Total | | G. Total |
| | | a | b | c | d | e=(a+c) | f=(b+d) | g=(e+f) | a % | b % | c % | d % | e % | f % | g % |
| Grand Total (A + B) | | 26961325 | 52599225 | Nil | Nil | 26961325 | 52599225 | 79560550 | 49.36 | 59.24 | Nil | Nil | 49.36 | 59.24 | 55.8 |

**2.5: Future Exploration Proposal:**

**2.2.5.1: Geological Mapping:**

| Sl. No. | Year | Scale | Area Covered (ha) |
|---|---|---|---|
| Nil | | | |

**2.2.5.2: Ground Geophysical Survey: Not Applicable.**

| Sl. No. | Type of Survey | Spacing (m) | Total line (km) | Area Covered (ha) | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | |

**2.2.5.3: Pitting: Not Applicable.**

| Number of pits |
|---|
| Not Applicable. |

| Sl. No. | Year | Land type | Pit ID | Length of Pit (m) | Width of Pit (m) | Depth of Pit (m) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | | |

**2.2.5.4: Trenching: Not Applicable.**

**Number of Trenches: Not Applicable.**

**2.2.5.4.1: Spacing: Not Applicable.**

| Spacing | | |
|---|---|---|
| Min (m) | Max (m) | Avg (m) |
| Not Applicable. | | |

**2.2.5.4.2 Area Covered Under Trenching: Not Applicable.**

**Co-ordinates:**

| Latitude | Longitude |
|---|---|
| Not Applicable. | |

| Sl. No. | Trench ID | Length of Trench (m) | Width of Trench (m) | Depth of Trench (m) | Litho Unit Exposed | Average Grade (%) | Running Meters (m) | From Longitude | To Latitude | To Longitude |
|---|---|---|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | | | | |

**2.2.5.5: Exploratory Drilling:** The future exploration proposal are required only in G2 & G3 area.

**2.2.5.5.1:Core/Non-core Drilling: Core Drilling**

| Sl. No | Year | In forest area | | | | In Non-forest | | | | Total borehole | Total Mtr | Attach-ment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. of boreholes | Total mtr | Type of borehole | Grid interval | No. of bore holes | Total mtr | Type of borehole | Grid interval | | | |
| 1 | 2023-24 | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | Core | 100 mtr x 100 mtr | Nil | NIL | Nil | NIL | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | |
| 2 | 2024-25 | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | Core | 100 mtr x 100 mtr | Nil | NIL | Nil | NIL | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | |
| 3 | 2025-26 | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | Core | 100 mtr x 100 mtr | Nil | NIL | Nil | NIL | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier | |
| 4 | 2026-27 | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | Core | 100 mtr x 100 mtr | Nil | NIL | Nil | NIL | 48 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | |
| Total | 4 years | 192 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | Core | 100 mtr x 100 mtr | Nil | NIL | Nil | NIL | 192 | Each borehole @ 100mtrs or till the end of mineralisation /discontinuation of ore body, whichever is earlier. | |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| 1st Year 2023-24 | PBH 01 | 2408500 | 308667 | 826.8 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 02 | 2408500 | 308567 | 815 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 03 | 2408500 | 308467 | 811 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 04 | 2408500 | 308267 | 827 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 05 | 2408400 | 308267 | 846 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 06 | 2408400 | 308367 | 840.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 07 | 2408400 | 308467 | 825 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 08 | 2408400 | 308567 | 829 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 09 | 2408400 | 308667 | 842 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 10 | 2408300 | 308667 | 871 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 11 | 2408300 | 308567 | 850 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 12 | 2408300 | 308467 | 845,5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 13 | 2408200 | 308467 | 852 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 14 | 2408200 | 308567 | 856.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 15 | 2408200 | 308667 | 894 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 16 | 2408100 | 308667 | 889 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 17 | 2408000 | 308667 | 876 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 18 | 2408500 | 308067 | 852 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 19 | 2408492 | 307867 | 855 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 20 | 2408490 | 307767 | 846.2 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 21 | 2408400 | 307767 | 850 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 22 | 2408400 | 307867 | 861 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 23 | 2408400 | 307967 | 861.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 24 | 2408400 | 308067 | 864.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 25 | 2408300 | 308267 | 870 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 26 | 2408300 | 308167 | 867.7 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 27 | 2408300 | 308067 | 862 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 28 | 2408300 | 307967 | 858.2 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 29 | 2408300 | 307867 | 853.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 30 | 2408300 | 307767 | 848.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 31 | 2408200 | 307689 | 818 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 32 | 2408200 | 307867 | 847 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 33 | 2408200 | 307967 | 855.3 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 34 | 2408200 | 308067 | 856 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 35 | 2408200 | 308167 | 867.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 36 | 2408200 | 308267 | 880 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 37 | 2408200 | 308367 | 880.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 38 | 2408100 | 308067 | 860 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 39 | 2408100 | 307967 | 856.5 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 40 | 2408100 | 307867 | 845 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 41 | 2408100 | 307767 | 829.2 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 42 | 2408100 | 307567 | 800 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 43 | 2408100 | 307467 | 792 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 44 | 2408100 | 307367 | 792.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 45 | 2408000 | 307367 | 801.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 46 | 2408000 | 307467 | 815 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 47 | 2408000 | 307567 | 824.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 48 | 2408000 | 307653 | 828 | Core | 100 | Vertical | Forest | Non-Surface Right |
| 2nd Year 2024-25 | PBH 49 | 2408000 | 307867 | 841.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 50 | 2408000 | 307967 | 864.3 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 51 | 2407900 | 307667 | 845 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 52 | 2407900 | 307467 | 823.5 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 53 | 2407800 | 307367 | 809 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 54 | 2407800 | 307467 | 834 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 55 | 2407800 | 307567 | 850.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 56 | 2407800 | 307667 | 861.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 57 | 2407800 | 307767 | 854.3 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 58 | 2407800 | 307845 | 843 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 59 | 2407800 | 307967 | 863 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 60 | 2407800 | 308167 | 927 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 61 | 2407700 | 308267 | 939 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 62 | 2407700 | 308067 | 867.8 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 63 | 2407700 | 307867 | 859 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 64 | 2407700 | 307667 | 874 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 65 | 2407700 | 307467 | 842 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 66 | 2407600 | 307367 | 844.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 67 | 2407600 | 307467 | 850 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 68 | 2407600 | 307567 | 864.4 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 69 | 2407600 | 307667 | 881 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 70 | 2407600 | 307767 | 893.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 71 | 2407600 | 307867 | 890 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 72 | 2407600 | 307967 | 881.4 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 73 | 2407600 | 308067 | 872.8 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 74 | 2407600 | 308167 | 887 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 75 | 2407600 | 308267 | 920 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 76 | 2407500 | 308267 | 887 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 77 | 2407500 | 308167 | 885.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 78 | 2407500 | 308067 | 905 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 79 | 2407500 | 307967 | 916.4 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 80 | 2407500 | 307867 | 913.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 81 | 2407500 | 307767 | 94.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 82 | 2407500 | 307667 | 870 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 83 | 2407500 | 307467 | 850 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 84 | 2407400 | 307367 | 839 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 85 | 2407400 | 307467 | 845 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 86 | 2407400 | 307567 | 846.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 87 | 2407400 | 307667 | 850 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 88 | 2407400 | 307867 | 909 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 89 | 2407400 | 308067 | 927.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 90 | 2407400 | 308167 | 907.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 91 | 2407400 | 308267 | 896 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 92 | 2407400 | 308367 | 900.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 93 | 2407400 | 308467 | 900 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 94 | 2407400 | 308567 | 914 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 95 | 2407400 | 308667 | 939 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 96 | 2407300 | 308467 | 930 | Core | 100 | Vertical | Forest | Non-Surface Right |
| 3rd Year 2025-26 | PBH 97 | 2407300 | 308267 | 926 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 98 | 2407300 | 308067 | 932 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 99 | 2407300 | 307867 | 894.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 100 | 2407300 | 307767 | 855 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 101 | 2407300 | 307667 | 838 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 102 | 2407300 | 307467 | 831 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 103 | 2407200 | 307367 | 807.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 104 | 2407200 | 307467 | 826 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 105 | 2407200 | 307567 | 831.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 106 | 2407200 | 307667 | 844 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 107 | 2407200 | 307767 | 868.4 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 108 | 2407200 | 307867 | 901 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 109 | 2407200 | 307967 | 926.4 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 110 | 2407200 | 308067 | 951 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 111 | 2407200 | 308167 | 954.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 112 | 2407200 | 308267 | 960 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 113 | 2407200 | 308367 | 969 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 114 | 2407200 | 308467 | 974 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 115 | 2407200 | 308549 | 968 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 116 | 2407100 | 308467 | 1002.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 117 | 2407100 | 308267 | 982 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 118 | 2407100 | 308067 | 965.4 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 119 | 2407100 | 307867 | 922 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 120 | 2407100 | 307667 | 855 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 121 | 2407100 | 307467 | 835 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 122 | 2407000 | 307367 | 809.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 123 | 2407000 | 307467 | 829 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 124 | 2407000 | 307567 | 847.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 125 | 2407000 | 307667 | 867 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 126 | 2407000 | 307767 | 885 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 127 | 2407000 | 307867 | 857.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 128 | 2407000 | 307967 | 935.9 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 129 | 2407000 | 308067 | 952.8 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 130 | 2407000 | 308167 | 971 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 131 | 2407000 | 308267 | 990 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 132 | 2407000 | 308367 | 1004.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 133 | 2407000 | 308467 | 1017 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 134 | 2407000 | 308549 | 1012.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 135 | 2406900 | 308467 | 1010 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 136 | 2406900 | 308267 | 967 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 137 | 2406900 | 308064 | 922 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 138 | 2406900 | 307867 | 881 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 139 | 2406900 | 307767 | 861.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 140 | 2406900 | 307667 | 852 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 141 | 2406900 | 307567 | 832.3 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 142 | 2406900 | 307467 | 819 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 143 | 2406900 | 307367 | 820.5 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 144 | 2406800 | 307367 | 840 | Core | 100 | Vertical | Forest | Non-Surface Right |
| 4th Year 2026-27 | PBH 145 | 2406800 | 307467 | 833.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 146 | 2406800 | 307567 | 838.3 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 147 | 2406800 | 307667 | 846 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 148 | 2406800 | 307767 | 848.6 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 149 | 2406800 | 307867 | 857 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 150 | 2406800 | 307967 | 869,7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 151 | 2406800 | 308067 | 889 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 152 | 2406800 | 308167 | 907.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 153 | 2406800 | 308267 | 926 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 154 | 2406800 | 308367 | 962 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 155 | 2406800 | 308467 | 996 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 156 | 2406800 | 308550 | 1013 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 157 | 2406722 | 308547 | 1012 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 158 | 2406717 | 308467 | 990 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 159 | 2406713 | 308267 | 948 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 160 | 2406713 | 308067 | 908.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 161 | 2406713 | 307967 | 898.8 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 162 | 2406712 | 307867 | 879 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 163 | 2406712 | 307767 | 877 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 164 | 2406711 | 307667 | 880 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 165 | 2406711 | 307567 | 867.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 166 | 2406711 | 307467 | 850 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 167 | 2406710 | 307367 | 838 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 168 | 2408600 | 308667 | 824 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 169 | 2408600 | 308567 | 806.6 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 170 | 2408700 | 308567 | 795.7 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 171 | 2408700 | 308667 | 823 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 172 | 2408800 | 308667 | 820.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 173 | 2408800 | 308567 | 794 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 174 | 2408900 | 308567 | 767 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 175 | 2408900 | 308667 | 802 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 176 | 2409000 | 308667 | 793 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 177 | 2409000 | 308567 | 789 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 178 | 2409100 | 308567 | 786 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 179 | 2409100 | 308667 | 812 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 180 | 2409200 | 308667 | 795.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 181 | 2409200 | 308567 | 777 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 182 | 2409300 | 308567 | 773 | Core | 100 | Vertical | Forest | Non-Surface Right |

| Year of drilling | Proposed BH No | Northing | Easting | Collar RL | Core/RC /DTH | Proposed Depth (In Mtr) | Inclination | Forest/Non Forest-diverted/Non Diverted | Surface Right/Non surface right area |
|---|---|---|---|---|---|---|---|---|---|
| | PBH 183 | 2409300 | 308667 | 765 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 184 | 2409400 | 308667 | 750 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 185 | 2409400 | 308567 | 765 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 186 | 2409500 | 308567 | 742.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 187 | 2409500 | 308667 | 749 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 188 | 2409600 | 308667 | 739 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 189 | 2409600 | 308567 | 730 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 190 | 2409700 | 308567 | 743 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 191 | 2409700 | 308667 | 720.5 | Core | 100 | Vertical | Forest | Non-Surface Right |
| | PBH 192 | 2409792 | 308567 | 758 | Core | 100 | Vertical | Forest | Non-Surface Right |

a. The locations are spaced suitably (in a grid pattern to the extent possible and may be modified depending on structural complexity) for establishing existence of the ore body and its lateral and vertical continuity.
b. *100 - each borehole drilled @ 100mtrs or till the end of mineralization /discontinuation of ore body, whichever is earlier.

**2.2.5.6: Exploratory Mining: Not Applicable.**

| Sl. No. | year | Pit ID | Length in mtrs | Width in mtrs | Depth in mtrs | Volume ($m^3$) |
|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | |

**2.2.5.7: Sampling:**

| Sl. No. | Type of Sample | Number of Samples proposed | Area Covered (ha) | Latitude | Longitude |
|---|---|---|---|---|---|
| 01 | Core | One Sample/Mtr | G2 and G3 | As per location of the borehole. | As per location of the borehole. |

- The Mineralized portions will sample every one meter or less as per requirement. If the outcome of the boreholes will found non-potential in nature or the borehole drilled in non-mineralized area, then the no of samples will be reduced.

**2.2.5.8: Petrology & Mineralogical Studies: Not Applicable.**

| Sl. No. | Type of Sample | Number of Sample proposed |
|---|---|---|
| Not Applicable. | | |

# Chapter 3: MINERAL BENEFICIATION / PROCESSING

| Name of The Ore/Mineral | Iron Ore / Hematite |
|---|---|

### 3.1: Mineralogy of the ROM ore/ Mineral:

| S. No. | Valuable Mineral Name | Approx. Mineral % | Gangue Mineral/s Name | Approx. Gangue Mineral % |
|---|---|---|---|---|
| Not Available. | | | | |

### 3.2: Complete Chemical Analysis of the ROM Ore/Mineral:

| Sl. No. | Radicals | Wt % | Wt % | Wt % | Wt % |
|---|---|---|---|---|---|
| 01. | Not Available. | | | | |

The mine has been non-operational since long time so Complete chemical analysis of the ROM Ore / Mineral will be carried out after resume of mining operation.

### 3.3: Crushing Section:

| Sl. No. | Type of Crusher | Make | Capacity of Crusher (tph) | No. Of Units. | Feed Size (mm) | Product Size (mm) |
|---|---|---|---|---|---|---|
| 01. | Fixed Integrated Crushing & Screening Plant | Puzzlona/Sandvic/Extec/ Thysenkrup | 350 | 01 | 0-600 mm | 0-10 mm,10-40 mm , 5-18 mm & 0-5 mm |
| 02. | Mobile integrated Crushing & Screen Plant | Puzzlona/Sandvic/Extec/ Power Screen/Fintec | 250 | 02 | 0-300 mm | 0-10 mm, 10-40 mm,5-18 mm & 0-5 mm |

### 3.3.1: Primary Crushing:

| Sl. No. | Type of Crusher | Make | Capacity of Crusher (tph) | No.of Units. | Feed Size (mm) | Product Size (mm) |
|---|---|---|---|---|---|---|
| 01. | Fixed Integrated Crushing (Jaw Crusher) | Puzzlona/Sandvic/Extec/ Thysenkrup | 350 | 01 | 0-600 mm | 0-100 mm |
| 02. | Mobile Integrated Crusher Plant (Jaw Crusher) | Puzzlona/Sandvic/Extec | 250 | 02 | 0-300 mm | 0-100 mm |

### 3.3.2: Secondary Crushing:

| Sl. No. | Type of Crusher | Make | Capacity of Crusher (tph) | No.of Units. | Feed Size (mm) | Product Size (mm) |
|---|---|---|---|---|---|---|
| 01. | Fixed Integrated Crushing (Cone Crusher) | Puzzlona/Sandvic/Extec/ Thysenkrup | 300 | 01 | 0-100 mm | -100 mm |
| 02. | Mobile Integrated Crusher Plant (Cone Crusher) | Puzzlona/Sandvic/Extec | 200 | 2 | 0-100 mm | -100 mm |

### 3.3.3: Tertiary Crushing:

| Sl. No. | Type of Crusher | | Make | Capacity of Crusher (tph) | Feed Size (mm) | Product Size (mm) |
|---|---|---|---|---|---|---|
| 01. | | Not Applicable | | | | |

**3.4: Grinding Section: Not Applicable.**

**3.4.1: Dry Grinding:**

| Sl. No | Type of Mill | Stages | Make of the mill | Feed Flow Rate (tph) | Feed Size(mm) | Product Size Mill Discharge(mm) | Type of screen |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

*Table continued…..*

| Sl. No | Make | Aperture Size of Screen/Classifier(mm),if applicable | Classifier/Screen undersize(tph) | Classifier/Screen oversize(tph) |
|---|---|---|---|---|
| Not Applicable. | | | | |

**3.4.2: Wet Grinding: Not Applicable.**

| Sl. No | Type of Mill | Stages | Make of the mill | Feed Flow Rate (tph) | Feed Size(mm) | Product Size(mm) | Type of screen/ Classifier |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

*Table continued……*

| Sl. No. | Aperture Size of Screen/Classifier (mm), if applicable | Classifier/Screen undersize(tph) | Classifier/Screen oversize(tph) | WaterRequirement(l/h) | FreshWaterRequirement(l/h) | RecirculatedWater(l/h) |
|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | |

**3.5: Dry Processing:**

**3.5.1: Screening and Classification: Screening**

| Sl. No | Type of screen/ classifiers | Stages | Make | Capacity(tph) | Aperture Size of Screen/Classifier (mm),if | Feed Size(mm) | Product Size(mm) | Product quality (if applicable) |
|---|---|---|---|---|---|---|---|---|
| 01. | Fixed Integrated Screening Plant | 01 | Puzzlona/Sandvic/Extec/ Thysenkrup | 350 | 0-10 mm,10-40 mm, 5-18mm & +40mm | -100 mm | 0-10 mm,10-40 mm,5-18 mm,0-5 mm & 40-100 mm | Fe % > 45% |
| 02. | Mobile Integrated Crushing & Screen Plant | 03 | Puzzlona/Sandvic/Extec/ Power Screen/Fintec | 250 | 0-10 mm,10-40 mm | -100 mm | 0-10 mm,10-40 mm & 40-100 mm | Fe % > 45% |

**3.5.2: Other Operations: Not Applicable.**

| S.N | Type of equipment /operation | Stages, if applicable | Make | Capacity(tph) | Feed Size(mm) | Product Size(mm) | Product-Mid (tph),if available | Product-Tail (tph) |
|---|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | | |

**3.5.3: Product Quality:**

| Products | Wt% | In tonnes | Size(range)mm | Complete Chemical Analysis |
|---|---|---|---|---|
| Concentrate | Not Applicable. | | | |
| Sub-grade | Fe% 45 ~ 55 | 23,70,000 | 0-10 mm & 10-40 mm | The mine has been non-operational since long time. The complete chemical analysis will be carried out after the resume of mine operation. |
| Rejects | Not Applicable. | | | |

**3.6: Wet Processing: Not Applicable.**

**3.6.1: Scrubbing / Washing: Not Applicable.**

| Sl. No | Type of Scrubbers /washers | Stages, if applicable | Make | Capacity (tph) | Feed Size(mm) | Product Size(mm) | Product quality (if applicable) |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

*Table continued…*

| Sl. No | Water Requirement(l/h) | Fresh Water Requirement (l/h) | Re-circulated water(l/h) |
|---|---|---|---|
| Not Applicable. | | | |

**3.6.2: Screening and Classification: Not Applicable.**

| Sl. No | Type of screen/ classifiers | Stages, if applicable | Make | Capacity (tph) | Aperture Size of Screen/Classifier (mm),if applicable | Feed Size(mm) | Product Size(mm) |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

*Table continued……*

| Sl. No | Product quality(if applicable) | Water Requirement (l/h) | Fresh Water Requirement (l/h) | Re-circulated water(l/h) |
|---|---|---|---|---|
| Not Applicable. | | | | |

**3.6.3: Gravity Separation: Not Applicable.**

| Sl. No | Type of separators (jig, table, spiral, | Stages, if applicable | Make | Capacity(tph) | Feed Size(mm) | Product (Conc) (tph) | Product-Mid(tph),if available |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

*Table continued…*

| S.N | Product-Tail (tph) | Water Requirement (l/h) | Fresh Water Requirement (l/h) | Re-circulated water(l/h) |
|---|---|---|---|---|
| Not Applicable. | | | | |

**3.6.4: Magnetic Separation: Not Applicable.**

| Sl. No | Type of magnetic separators (magnetic intensity) | Stages, if applicable | Make | Capacity(tph) | Feed Size(mm) | Product-Mag (tph) | Product-Mid(tph),if available |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

*Table continued….*

| Sl. No. | Product non-Mag (tph) | Water Requirement (l/h) | Fresh Water Requirement (l/h) | Re-circulated water(l/h) |
|---|---|---|---|---|
| Not Applicable. | | | | |

**3.6.5: Flotation: Not Applicable.**

| Sl.No | Type of flotation equipment(froth/column) | Stages(roughe r/cleaner ,etc), if applicable | Make | Capacity (tph) | Feed Size(mm) | Product-Float (tph) | Product non-Float (tph) |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

*Table continued….*

| Sl. No | Water Requirement(l/h) | Fresh Water Requirement (l/h) | Re-circulated water(l/h) |
|---|---|---|---|
| Not Applicable. | | | |

**3.6.6: Other Operations: Not Applicable.**

| Sl. No | Type of equipment /operation | Stages, if applicable | Make | Capacity (tph) | Feed Size(mm) | Product-Conc (tph) | Product-Mid (tph),if available |
|---|---|---|---|---|---|---|---|
| Not Applicable. | | | | | | | |

Table continued….

| Sl. No | Product-Tail (tph) | Water Requirement (l/h) | Fresh Water Requirement (l/h) | Re-circulated water(l/h) |
|---|---|---|---|---|
| Not Applicable. | | | | |

**3.6.7: Product Quality (wet processing): Not Applicable.**

| Products | Wt% | In tonnes | Size(range)mm | Complete chemical |
|---|---|---|---|---|
| Concentrate | Not Applicable. | | | |
| Sub-grade | | | | |
| Rejects | | | | |

**3.7: Overall Product Quality (Dry cum Wet Processing): Not Applicable.**

| Products | Wt % | In tonnes | Size (range) mm | Complete chemical analysis |
|---|---|---|---|---|
| Concentrate | Not Applicable. | | | |
| Sub-grade | | | | |
| Rejects | | | | |

**3.8: Disposal Method for tailing/ rejects: Not Applicable.**

| | |
|---|---|
| a) Explain the disposal method for tailing or reject from processing plant with detail chemical / mineral analysis of tailing | Not Applicable. |
| b) Size and capacity of tailing pond, toxic effect of such tailings, process adopted to neutralize its effect (if any) | Not Applicable. |
| c) Any other data (if available) | Not Applicable. |

**3.9: Overall water requirement of mining and mineral processing:**

| | |
|---|---|
| Indicate quantity, source of supply, disposal of water and extent of recycling and chemical analysis of water | 232 $m^3$/day. Attach at Annexure No: 29. |

**3.10: Flow sheets and charts:**

| | |
|---|---|
| Material balance chart of mineral processing plant(s) (each stage of process). | Attached at Annexure No: 30. |
| Attach flow sheet of beneficiation of plant(s) | Attached at Annexure No:30 |
| Any other data (if applicable) | Not Applicable |

# Chapter 4: MINING OPERATIONS

**4.1: MINING METHOD (Opencast): Opencast.**

**4.1.1: Existing Method of Mining**– Mechanized.

*Specify in the space below*:

| |
|---|
| HEMM with deep hole drilling with Combination of loaders and tippers. |

**4.1.2: Proposed Method of Mining:** Mechanized.

*Specify in the space below*:

| |
|---|
| HEMM with deep hole drilling with Combination of loaders and tippers. |

**Reasons for proposed changes: Not Applicable.**

**4.2: Operational Parameters:**

**4.2.1: Inventory of Existing Pits & Dumps:**

**4.2.1.1: Pits as on 30.06.2022.**

| Sl. No. | Pit ID | Pit Status | Area Covered by Pit (Ha) | Pit Dimension (m x m x m ) |
|---|---|---|---|---|
| 01. | Quarry-I | Active | 2.442 | 274.44 x 89.0 x 6 |

**4.2.1.2: Dumps & Stack:**

**4.2.1.2.1: Dump Details as on 30.06.2022:**

| Sl. No. | Dump ID | Dump Status | Type of Dump | Total Dump Quantity (t) | Area covered by Dump (Ha) | Height (m) | Location |
|---|---|---|---|---|---|---|---|
| The mine has been non-operational since long period, so there is no existing dump present with in the ML area. | | | | | | | |

**4.2.1.2.2: Stack Details as on 30.06.2022:**

| Sl. No. | Stack ID | Type of Stack | Total Stack Quantity (t) | Area covered by Stack (Ha) | Height (m) |
|---|---|---|---|---|---|
| The mine has been non-operational since long period, so there is no existing stacks present with in the ML area. | | | | | |

**4.2.1.3: Details of Stabilized Dumps:**

| Sl. No. | Dump ID | Number of Terraces | Average Height of Terraces (m) | Length of Toe Wall (m) | Length of Garland Drain (m) | Area Stabilized (ha) | Method of Stabilization |
|---|---|---|---|---|---|---|---|
| There is no stabilized dump present within the ML area as on date 30.06.2022. | | | | | | | |

### 4.2.2: Opencast Mining:

#### 4.2.2.1: Bench Parameters:

| Pit Id | Year | Max Height of the Benches in Over Burden (m) | Min Width of the Benches in Over Burden (m) | Slope of the Bench in Over Burden (degree) | Max Height of the Benches in Mineral (m) | Minimum Width of the Benches in Mineral (m) | Slope of the Bench in Mineral (degree) | Overall Slope of Pit (degree) | Number of Benches in Top Soil | Number of Benches in Over Burden | Number of Benches in Mineral | Max Depth of Workings (m) | Depth of Water Table (m) | Max Slope Angle of Haul Roads (1 in) | Year-Wise Development & Production Plan | Year-Wise Development & Production Section |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quarry-1 | 2023-24 | 6 | 12 | 70-80 | 6-10 | 10-15 | 70-80 | 20 | 0 | 03 | 02 | 30 | 813 mRL | 16 | Plate No-6A | Plate No-7A |
| Quarry-1 | 2024-25 | 6 | 12 | 70-80 | 6-10 | 10-15 | 70-80 | 20 | 0 | 02 | 0604 | 54 | | 16 | Plate No-6B | Plate No-7B |
| Quarry-1 | 2025-26 | 6 | 12 | 70-80 | 6-10 | 10-15 | 70-80 | 20 | 0 | 01 | 04 | 36 | | 16 | Plate No-6C | Plate No-7C |
| Quarry-1 | 2026-27 | 6 | 12 | 70-80 | 6-10 | 10-15 | 70-80 | 20 | 0 | 02 | 03 | 54 | | 16 | Plate No-6D | Plate No-7D |
| Quarry-1 | 2027-28 | 6 | 12 | 70-80 | 6-10 | 10-15 | 70-80 | 20 | 0 | 01 | 05 | 36 | | 16 | Plate No-6E | Plate No-7E |

### 4.2.2.2: Year wise Opencast Development:

| Sr. No | Year | Pit ID | Bench | Direction | Bulk Density of Overburden (BD1) (ton/m3) | Bulk Density of Mineral (BD2) (tonn/m3) | Top Soil Volume (Length x Width x Height) (m3) | Over Burden Volume (Length x Width x Height) (m3) | Over Burden Quantity (t) | ROM Volume (Length x Width x Height) (m3) | ROM Quantity (t) | Recovery | Mineral Reject (t) | Production Main (t) | Production Associated (t) | Location of Advancement | OB to Ore Ratio (ton/m3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01. | 2023 -24 | Quarry-1 | 940 mRL 910 mRL | South-East | 2.0 | Avg. Bulk Density of Ore: 3.00 & Sub-Grade Ore/ MR :2.7 | 0 | 1,50,000 | 3,00,000 | 3,52,593 | 10,00,000 | Production Main- 48% & MR-52% | 5,20,000 | 4,80,000 | 0 | 2407688N-2407988N 308050E-308438E | 1:0.15 |
| 02. | 2024 -25 | Quarry-1 | 910 mRL 886 mRL | North-West | | | 0 | 1,70,000 | 3,40,000 | 3,44,815 | 10,00,000 | Production Main- 69% & MR-31% | 3,10,000 | 6,90,000 | 0 | 2407786N-2408055N 308033E-308338E | 1:0.17 |
| 03. | 2025 -26 | Quarry-1 | 940 mRL 904 mRL | South-East | | | 0 | 3,10,000 | 6,20,000 | 3,55,186 | 10,00,000 | Production Main- 41% & MR-59% | 5,90,000 | 4,10,000 | 0 | 2407539N-2408055N 308032E-308438E | 1:0.31 |
| 04. | 2026 -27 | Quarry-1 | 904 mRL 880 mRL | North-West | | | 0 | 7,00,000 | 14,00,000 | 3,52,963 | 10,00,000 | Production Main- 47% & MR-53% | 5,30,000 | 4,70,000 | 0 | 2407539N-2408055N 307993E-308438E | 1:0.70 |
| 05. | 2027 -28 | Quarry-1 | 898 mRL 862 mRL | North-East | | | 0 | 2,00,000 | 4,00,000 | 3,48,889 | 10,00,000 | Production Main- 58% & MR-42% | 4,20,000 | 5,80,000 | 0 | 2407900N-2408278N 308209E-308575E | 1:0.20 |

Recovery Factor of production main with respect to ROM has been considered for calculation of production.

Details of section wise calculation of ROM, Salable Ore, Mineral Reject & waste for the Review of mining Plan period i.e. FY 2023-24 to 2027-28 is enclosed at Annexure-31.

Average Bulk Density of Different Ore Types

| Sl. No. | Ore Type | Bulk Density, t/cu.m |
|---|---|---|
| 01. | Ore (Fe > 55%) | 3.00 |
| 02. | Sub Grade Ore (45 % to 55% Fe) | 2.70 |
| 03. | Waste | 2.0 |

Note: The mine has been non-operational since long period, so average bulk density of waste material not available. Average bulk density of material to be derived after resume of mining operation. So for the time being average bulk density of waste material has been taken from nearby mines i.e. Kurmitar Iron & Mn. Ore Mines.

| Sl. No. | Pit ID | Total Topsoil Volume ($m^3$) | Total Over Burden Volume ($m^3$) | Total Over Burden Quantity (t) | Total ROM Volume ($m^3$) | Total ROM Quantity (t) |
|---|---|---|---|---|---|---|
| 01. | Quarry-1 | 0 | 15,30,000 | 30,60,000 | 17,54,446 | 50,00,000 |
| G. Total | | 0 | 15,30,000 | 30,60,000 | 17,54,446 | 50,00,000 |

**4.2.2.3: Transportation & Hauling Equipment:**

| Sl. No. | Type | Make | Capacity ($m^3$) | No. of Equipments |
|---|---|---|---|---|
| 01. | Hauling Equipment | Volvo/Bharat Benz/Eicher/ Tata Prima | 19 | 12 |
| 02. | Hauling Equipment | Volvo/Bharat Benz/Eicher/ Tata Prima | 14 | 15 |

**4.3: Material Handling Summary:**

**4.3.1: Studies Undertaken:**

| | | |
|---|---|---|
| Slope Stability Study Report | No | Slope Stability Study will be conduct after Resume of Mining Operation. |
| Recovery Study Report | Yes | Attached in Annexure No:28 |
| Hydrological Study Report | No | Hydrological Study will be conduct after Resume of Mining Operation. |
| Mineral Beneficiation Study Report | ---- | NA |
| Underground Rock Displacement Study Report | ---- | NA |
| Subsidence Study Report | ----- | NA |
| Geotechnical Study Report | ---- | NA |
| Blast Induced ground Vibration Study | No | Blast Induced ground Vibration Study will be conduct after Resume of Mining Operation. |
| Bulk Density Study Report | Yes | Attached in Annexure No:26 |

### 4.3.2: Insitu Mining:

| Sl. No. | Year | Pit ID | Total Handling (t) | Waste Quantity (t) | ROM Quantity (t) | ROM Quantity Saleable Mineral (t) | ROM Quantity Mineral Reject (t) | OB to Ore Ratio (Waste Quantity / ROM Quantity) | Grade Range (%) |
|---|---|---|---|---|---|---|---|---|---|
| 01. | 2023-24 | Quarry-1 | 13,00,000 | 3,00,000 | 10,00,000 | 4,80,000 | 5,20,000 | 1:0.3 | Fe >55 % |
| 02. | 2024-25 | Quarry-1 | 13,40,000 | 3,40,000 | 10,00,000 | 6,90,000 | 3,10,000 | 1:0.34 | Fe >55 % |
| 03. | 2025-26 | Quarry-1 | 16,20,000 | 6,20,000 | 10,00,000 | 4,10,000 | 5,90,000 | 1:0.62 | Fe >55 % |
| 04. | 2026-27 | Quarry-1 | 24,00,000 | 14,00,000 | 10,00,000 | 4,70,000 | 5,30,000 | 1:1.4 | Fe >55 % |
| 05. | 2027-28 | Quarry-1 | 14,00,000 | 4,00,000 | 10,00,000 | 5,80,000 | 4,20,000 | 1:0.4 | Fe >55 % |
| G-Total | | | 80,60,000 | 30,60,000 | 50,00,000 | 26,30,000 | 23,70,000 | 1:0.61 | Fe >55 % |

Details of section wise calculation of ROM, Salable Ore, Mineral Reject & waste for the period i.e. for the FY 2023-24 to 2027-28 of the Review of Mining Plan period is enclosed at Annexure-31.

### 4.3.3: Dump workings:

| S.N. | Year | Dump Id | Location Latitude | Location Longitude | Area ($m^2$) | Avg Height of Dump (m) | Volume ($m^3$) | Total Dump Quantity (t) | Proposed Dump Handling Quantity (t) (A) | Proposed Recovery of Saleable Mineral (t)(B) | Proposed Waste Quantity (t) (A-B) | Grade Range (%) | Justification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| There is no proposal for dump working during the RMP period i.e. FY 2023-24 to 2027-28. | | | | | | | | | | | | | |

### 4.3.4: Calculation Summary:

| Year | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | Total |
|---|---|---|---|---|---|---|
| (A) Total ROM quantity (t) | 10,00,000 | 10,00,000 | 10,00,000 | 10,00,000 | 10,00,000 | 50,00,000 |
| (B) Saleable ore from ROM (t) | 4,80,000 | 6,90,000 | 4,10,000 | 4,70,000 | 5,80,000 | 26,30,000 |
| (C ) Proposed Dump Handling Quantity (t) | 0 | 0 | 0 | 0 | 0 | 0 |
| (D) Saleable Ore recovered from dump workings (t) | 0 | 0 | 0 | 0 | 0 | 0 |
| (E ) Total Saleable Ore (t) (=B+D) | 4,80,000 | 6,90,000 | 4,10,000 | 4,70,000 | 5,80,000 | 26,30,000 |
| (F) Total Quantity Handled (t) (=A+C) | 10,00,000 | 10,00,000 | 10,00,000 | 10,00,000 | 10,00,000 | 50,00,000 |

### 4.4: Machine Calculation:

### 4.4.1: Machine Requirement Summary:

| | |
|---|---|
| Number of Average Working Days in One Year (A) | 300 |
| Number of Shifts per Day (B) | 3 |
| Material Handling Required per Day (t) ((D)=Largest of (Q1,Q5)/(A)) | 8,000 |
| Material to be Handled per Shift (t) ((E)=(D)/(B)) | 2667 |
| Handling Required per Hour (t) ((F)=(E)/6 hours) | 445 |
| Effective Shift Time | 6 hr |

**4.4.2: Shovel / Excavator Requirement:**

| Effective Shift Time: | 6 Hrs | 00 min |
|---|---|---|

| Sl. No. | Type | Bucket Capacity ($m^3$)(A) | Bucket Fill Factor (B) | Swell Factor (C) | Tonnage Factor ($m^3$/t) (D) | Machine Utilization Factor (%) (U) | Efficiency (%) (E) | Cycle time (sec) (F) | (G) TPH =TPH (G) =((3600 x A x B x C x D x E x U ) / F)/10000 | Total Hours (H) =Number of working days x Number of shifts/day x Effective shift hours | Yearly handling by one Excavator (t) (I)=(G x H) | Maximum handling of the material by this machine during the block period (t) (J) | Number of excavator machines required (K) = (J / I) | Standby excavator (L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01. | Excavator | 3.5 | 0.8 | 0.8 | 2.5 | 80% | 80% | 50 | 258 | 5400 | 13,93,200 | 24,00,000 | 2 | 1 |
| 02. | Excavator | 2.5 | 0.8 | 0.8 | 2.5 | 80% | 80% | 50 | 184 | 5400 | 9,93,600 | 24,00,000 | 3 | 1 |

### 4.4.3: Dumper Requirement:

| Effective Shift Time: | | | 6.00 Hrs | | | | 00 mins | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl. No | Total Hours=Number of working days (W)x Number of shifts/day x Effective shift hours (Machine Requirement Summary) (A) | Capacity of Dumpers (t) (B) | Speed of the dumper (KMPH) (i) | Lead Distance (KM) (ii) | Time taken to cover distance in minutes(iii) =(ii/i) x 60 | Queuing, Loading Time at Shovel (min) (iv) | Queuing, Unloading Time during unloading (min) (v) | Total Time to complete one trip(vi) = (iii + iv + v ) | No. of Trips / hr (vii) = (60 / vi) | Total transportation per hour (viii) =( B X vii) | Yearly handling by one dumper (ix) = A x TPH | Maximum handling of the material by this machine during the block period (t) (x) | Number of dumpers will be (xi) =( x / ix) | Plus Standby dumper (xii) |
| 01. | 5400 | 35 | 20 | 6 | 18 | 3 | 3 | 24 | 2.5 | 87.5 | 4,72,500 | 24,00,000 | 5 | 2 |
| 02. | 5400 | 25 | 20 | 6 | 18 | 3 | 3 | 24 | 2.5 | 62.5 | 3,37,500 | 24,00,000 | 7 | 3 |
| 03. | 5400 | 35 | 20 | 6 | 18 | 3 | 3 | 24 | 2.5 | 87.5 | 4,72,500 | 10,00,000 | 3 | 2 |
| 04. | 5400 | 25 | 20 | 6 | 18 | 3 | 3 | 24 | 2.5 | 62.5 | 3,37,500 | 10,00,000 | 3 | 2 |

**4.4.4: Drill Machine Requirement:**

| **Effective Shift Time:** | | | 6.00 hrs | | | | 0 mins | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl. No. | Type of Drill | Depth of Hole(including Sub-grade Drilling (m) | Spacing (m) | Burden (m) | Bulk Density of Waste (t/m³) | Bulk Density of Mineral (t/m³) | Yield per Hole (t) | Yield per Meter (t/m) | Annual Target Known (t) | Drilling Requirement per Day (m) | Drilling Requirement per Shift (m) | Rate of Drilling per Hours (m/hr) | Required Number of Drills (m/c) | Stand by Drill |
| 01. | Mechanical | 6.6 | 3.5 | 3 | 2.0 | 3 | 189 | 31.5 | 16,80,000 | 198 | 66 | 20 | 4 | 1 |

70% with respect to the total excavation have been required blasting.

**4.4.5: Machine Deployment Details:**

4.4.5.1: Excavator & Loading Equipment:

| Sl. No. | Type | Make | Capacity ($m^3$) | No. of Equipments |
|---|---|---|---|---|
| 01. | Excavator | Tata Hitachi/ Volvo/ Kobelco/ Sany | 3.5 | 3 |
| 02. | Excavator | Tata Hitachi/ Volvo/ Kobelco/ Sany | 2.5 | 4 |

4.4.5.2: Dozers Details:

| Sl. No. | Type | Make | Capacity (HP) | No. of Equipments |
|---|---|---|---|---|
| 01. | Dozer | BEML/Komatsu/CASE/L&T | 324 HP | 02 |

4.4.5.3: Drilling Details:

| Sl. No. | Type | Make | Capacity (t) | Diameter of Hole (mm) |
|---|---|---|---|---|
| 01. | Drill Machine | INDUS/Atlas Copco/Sandvik | 450 | 115-150 mm |

4.4.5.4: Auxiliary Mining Equipment:

| Sl. No. | Type | Make | Capacity | No. of Equipments |
|---|---|---|---|---|
| 01. | Exacvator | Tata Hitachi/ Volvo/ Kobelco/ Sany | 0.9-2.7 CuM | 04 |
| 02. | Loader | SDLG/LIUGONG/Volvo/Tata | 4.5-3.5 CuM | 3/4 |
| 03. | Loader | HM2021/Volvo | 1.5/2CuM | 2/2 |
| 04. | Diesel Tanker | TATA/Eicher | 12KL | 1 |
| 05. | Water Sprinkler | TATA/Eicher | 10KL | 3 |
| 06. | Motor Grader | Hidromek/ LIUGONG | 140HP | 1 |
| 07. | Explosive Van | TATA/Ashok Leyland | 2 ton | 1 |
| 08. | Pick up Van | Mahindra | ---- | 3 |
| 09. | Rock Breaker | Atlascopco/Volvo | 120 ton | 1 |
| 10. | Portable Tower lights | Kirloskar/Catterpillar /Atlas Copco/Koel | ----- | 10 |
| 11. | Mobile Service Van | TATA/Eicher | ---- | 1 |
| 12. | Crane | Volvo/L&T/Hitachi | 100 ton | 1 |
| 13. | Tyre Handler | -- | -- | 1 |

The proposed equipment shall be sufficient for smooth operation of the Mine for the proposed capacity of 1.0 MTPA of ROM ore during the Review of Mining Plan period. However, exact specification, capacity & numbers of HEMMs proposed may vary as per exact requirement.

**4.5 Blasting Requirement:**

4.5.1 Blasting & Explosive Requirement in Waste/Development:

| S.N. | Drill Pattern / Spacing of Holes (m) | Burden of Holes (m) | Number of Rows / Rings | Yield per Holes in Waste ($m^3$) | Frequency of Blasting in a Week | Maximum Number of Holes Blasted in a Round | Charge per Hole (kg) | Charge per Round (kg) | Explosive Requirement Per Month in Development (kg) | Powder Factor in Development / Waste (kg/t) | Depth Of Hole |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01. | Staggered/ 3.5 | 3 | 3 | 63 | 3 | 55 | 30 | 1,680 | 19,000 | 5 | 6 |

Blasting has been carried out by third party agency.

4.5.2 Blasting & Explosive Requirement in Mineral / Ore:

| Type of Explosive | Type of Explosives used / to be Used |
|---|---|
| Emulsion, Slurry, SME.<br>Initiation by NONEL/Detonating Fuse/Electric Detonator. | Emulsion, Slurry, SME.<br>Initiation by NONEL/Detonating Fuse/ Electric Detonator. |

| Sl. No. | Total ROM proposed to be handled in CUM/annum | Total ROM proposed to be handled in CUM/ day | Spacing of Holes (m) | Burden of Holes (m) | Number of Rows | Yield per Holes in ROM Zone ($m^3$) | Frequency of Blasting in a Week | Maximum Number of Holes Blasted in a Round | No of Holes Required to be Blasted per Round | Charge per Hole (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2,48,630 | 829 | 3.5 | 3 | 3 | 63 | 3 | 30 | 36 | 36 |

*Table continued….*

| Sl. No. | Charge per Round (kg) | Explosive Requirement Per Month for ROM Zone Blasting (kg) | Powder Factor in Ore (t/kg) | Pop Shooting (no of Boulders) | Plaster Shooting (no of Boulders) | Use of Rock breaker | Capacity | Secondary Blasting Requirements | Depth Of Hole |
|---|---|---|---|---|---|---|---|---|---|
| 01. | 1,080 | 12,960 | 6.5 | NA | NA | yes | 120 ton | Not Required | 6 |

**4.6: Man Power Deployment:**

4.6.1: Managerial:

| Sr. No | Particulars | Number of Persons in Shift 1 | Number of Persons in Shift 2 | Number of Persons in Shift 3 | Number of Persons in General Shift | Total No. of Persons per day |
|---|---|---|---|---|---|---|
| 1 | 1st Class | 0 | 0 | 0 | 2 | 2 |
| 2 | 2nd class Manager | 1 | 1 | 1 | 2 | 5 |
| 3 | Mining Engineer | 0 | 0 | 0 | 1 | 1 |
| 4 | Geologist | 1 | 0 | 0 | 1 | 2 |
| 5 | Mechanical Engineer | 0 | 0 | 0 | 1 | 1 |
| 6 | Electrical Engineer | 0 | 0 | 0 | 1 | 1 |
| 7 | Others | 0 | 0 | 0 | 10 | 10 |
| Total | | 2 | 1 | 1 | 18 | 22 |

4.6.2: Supervisory:

| Sl. No. | Particulars | Number of Person in Shift 1 | Number of Person in Shift 2 | Number of Person in Shift 3 | Number of Person in General Shift | Total Number of Person per Day |
|---|---|---|---|---|---|---|
| 1. | Mines Foreman | 2 | 2 | 2 | 2 | 8 |
| 2. | Mechanical Foreman & JEE | 1 | 1 | 0 | 1 | 3 |
| 3. | Electrical Foreman & JEE | 1 | 0 | 0 | 1 | 2 |
| 4. | JEE Civil | 0 | 0 | 0 | 1 | 1 |
| 5. | Mine mate | 3 | 3 | 3 | 3 | 12 |
| 6. | Blaster | 0 | 0 | 0 | 1 | 1 |
| 7. | Surveyor | 0 | 0 | 0 | 2 | 2 |
| 8. | Others | 0 | 0 | 0 | 35 | 35 |
| Total | | 7 | 6 | 5 | 46 | 64 |

4.6.3: Skilled Workers / Operators:

| Sr. No | Particulars | Number of Persons in Shift 1 | Number of Persons in Shift 2 | Number of Persons in Shift 3 | Number of Persons in General Shift | Total No. of Persons per day |
|---|---|---|---|---|---|---|
| 01. | Excavator Operator | 7 | 7 | 7 | 3 | 24 |
| 02. | Dumper Operator | 15 | 15 | 15 | 7 | 52 |
| 03. | Loader Operator | 4 | 4 | 4 | 2 | 14 |
| 04. | Diesel tanker Operator | 1 | 1 | 1 | 1 | 4 |
| 05. | Water Tanker Operator | 3 | 3 | 3 | 0 | 9 |
| 06. | Dozer Operator | 2 | 2 | 2 | 0 | 6 |
| 07. | Grader Operator | 1 | 1 | 0 | 0 | 2 |
| 09. | Service Van Operator | 1 | 1 | 1 | 0 | 3 |
| 10. | Crane Operator | 1 | 1 | 0 | 0 | 2 |
| 11. | Explosive Van Driver | 1 | 1 | 0 | 0 | 2 |
| 12. | Drill Operator | 2 | 2 | 2 | 0 | 6 |
| 13. | Work Shop Mechanic | 6 | 6 | 6 | 0 | 18 |
| Total | | 44 | 44 | 41 | 13 | 142 |

4.6.4: Semi-skilled Workers:

| Sl. No | Number of Persons in Shift 1 | Number of Persons in Shift 2 | Number of Persons in Shift 3 | Number of Persons in General Shift | Total No. of Persons per day |
|---|---|---|---|---|---|
| 01. | 40 | 40 | 40 | 37 | 157 |

4.6.5: Unskilled Workers:

| Sl. No | Number of Persons in Shift 1 | Number of Persons in Shift 2 | Number of Persons in Shift 3 | Number of Persons in General Shift | Total No. of Persons per day |
|---|---|---|---|---|---|
| 01. | 12 | 12 | 12 | 18 | 54 |

4.6.6: No of Persons Engaged Per Day:

| Number of Persons in Shift 1 | Number of Persons in Shift 2 | Number of Persons in Shift 3 | Number of Persons in General Shift | Total No. of Persons per day |
|---|---|---|---|---|
| 105 | 103 | 99 | 132 | 439 |

| | |
|---|---|
| No of Shifts per Day ((A) = Machine Requirement Summary (B)) | 3 shifts |
| Average Daily Employment per Shift ((B) = (Total Number of Person per Day) / (A)) | 146 |
| Material to be Handled per Shift ((C) = Machine Requirement Summary (E)) | 2,667 |

4.6.7: Supervision:

| Sl. No. | Particulars | Qualification | Requirement / Proposed | In Position / Existing Strength | (-) Shortage / (+) Excess | Remarks |
|---|---|---|---|---|---|---|
| 01. | Excavation Point | $10^{th}$ pass | 8 | 0 | Shortage | After Resume of Mine operation all the supervision staff appointed and they will work under Mining Mate / Mines Foreman as per statutory Guidelines. |
| 02. | Loading Point | $10^{th}$ pass | 6 | 0 | Shortage | |
| 03. | Dumping Point | $10^{th}$ pass | 6 | 0 | Shortage | |

**4.7: Waste Management:**

4.7.1: Existing Dump as on 30.06.2022:

| Sl. No. | Year | Dump Id | Type of Dump | Proposed Area (ha) | Height (m) | Total Dump Quantity ($m^3$) | Existing Dump Location |
|---|---|---|---|---|---|---|---|
| The mine has been non-operational since long period, so there is no existing dump present with in the ML area. | | | | | | | |

4.7.2: New Dump:

| Sl. No. | Year | Dump Id | Type of Dump | Proposed Area (ha) | Height (m) | Total Dump Quantity ($m^3$) | New Dump Location |
|---|---|---|---|---|---|---|---|
| 01. | 2023-24 | WD-1 | Waste Dump | 16.464 | 60 | 16,000,00 | 2408194N to 2408703N 308267E to 308734E |
| The waste generated during the Review of Mining Plan Period i.e. FY 2023-24 to 2027-28 is proposed to be dumped over waste dump WD-1. The waste dump WD-1 will be operated during the RMP period i.e. FY 2023-24 to 2027-28. | | | | | | | |

4.7.3: Existing Stack as on 30.06.2022.:

| Sl. No. | Year | Stack ID | Type of Stack | Proposed Area (ha) | Height (m) | Total Stack Quantity ($m^3$) | Existing Stack Location |
|---|---|---|---|---|---|---|---|
| The mine has been non-operational since long period, so there is no existing stack present with in the ML area. | | | | | | | |

4.7.4: New Stack

| Sl. No. | Year | Stack ID | Type of Stack | Proposed Area (ha) | Height (m) | Total Stack Quantity ($m^3$) | New Stack Location |
|---|---|---|---|---|---|---|---|
| 01. | 2023-24 | ST-1 | Processed Ore | 1.174 | 10 | 80,000 | 247965N-2408152N to 307953E-308094E |
| 02. | | ST-2 | Processed Ore | 1.622 | 20 | 1,50,000 | 2408202N-2408436N to 307914E-308106E |
| 03. | | ST-3 | Sub-Grade Ore | 6.598 | 40 | 6,00,000 | 2408060N-2408380N to 307685E-308066E |
| All the above Stack yard have been developed during the FY 202324 of RMP period and all these Stack yard will be operated during the RMP period i.e. FY 2023-24 to 2027-28. | | | | | | | |

**4.8: Mineral Waste Handling To Utilize As Minor Mineral: Not Applicable.**

| Sl. No. | Year | Dump Id | Type of Dump | Proposed Area (ha) | Quantity Handled (t) | Quantity Recovered (t) | Name Of Minor Mineral | Alternative Waste Utilization ($m^3$) |
|---|---|---|---|---|---|---|---|---|
| There is no mineral waste generate for utilizing as minor mineral during the RMP period i.e. from FY 2023-24 to 2027-28. | | | | | | | | |

**4.9: Use of Minerals:**

| Sl. No. | Proposed Use Of Mineral | Name Of Mineral | Relevant Use Of Mineral | Physical Specifications | Chemical Specifications |
|---|---|---|---|---|---|
| 1 | Direct Selling to prospective buyers | Iron Ore | Steel Plant & Spong Iron Plants | 0-10 mm,5-18 mm & 10-40 mm | Fe > 55% $SiO_2$- 2% (Max.) |
| 2 | Direct Selling to prospective buyers in case of demand for Subgrade Ore/MR | Iron Ore | Steel Plant & Spong Iron Plants | 0-10 mm,5-18 mm & 10-40 mm | Fe 45% ~ 55% $SiO_2$- 2% (Max.) |

# Chapter 5: SUSTAINABLE MINING

## 5.1: Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR'2017-

Odisha Mining Corporation (OMC), incorporated in 1956 as a joint venture between Government of India and the Government of Odisha to harness untapped mineral wealth of the state, is now a Gold category State PSU and a wholly state-owned corporation, with head office at Bhubaneswar.

OMC aspires to become a market leader in the metals & mining industry in India with state-of-the-art infrastructure and world-class operational facilities. At present, OMC focuses its operations on Iron, Chrome, Bauxite and Manganese, but there are plans on expanding the business into coal mining domain as well. OMC believe that high governance standards are imperative to deliver corporate success, and to strategically align business policies with it's long-term goals and targets. OMC operates on principles of equality, fairness, transparency and accountability, that helps strengthen it's relationships with employees, their unions and all stakeholders. These principles also ensures integrated development of not just the organization, but also it's employees and surrounding local communities.

OMC has a vision to become a world class organization with mining as its core activities by providing the best of services in terms of quality, productivity, profitability, customer satisfaction and environmental sustainability

OMC envisions to attain the global leader position in metals and mining industry through sustainable growth and knowledge excellence. It's focus is to contribute to the national and local economy by ensuring good quality mineral production while simultaneously reducing the impacts on the ecosystem, generating employment opportunities for the local communities and fulfilling societal needs.

Odisha Mining Corporation Limited, create values for all stakeholders in a manner that is responsible, transparent and respects the rights of all. This is carried out consciously and responsibly across the life cycle of the projects that drives long-term growth and profitability through the inclusion of environmental, social and corporate governance aspects co-creating harmony between development and ecosystem. Sustainable Development is integral to the company's ethos and OMC is committed to excel on Triple Bottom Line performance.

The Company as per guidelines of Government of India has set its own target to achieve of 5 Star Rating under Sustainable Development Framework as per the provisions of Mineral Conservation and Development Rules, 2017(MCDR).

As per Rule 35 of MCDR 2021, OMC has considered relevant aspects of environmental, economic and social taken into account for sustainable development in the mining lease area. Also OMC have a dedicated cell which looks comparative performance on sustainable development with initiative & implementation for achieving environmental and social goals.

OMC is committed for improvement of its SDF status on a continuous basis. Some of the major initiatives taken on SDF are as follows:

- Initiative by Apex Management to provide exposure to senior officer to visit 5 Star Mines.
- Induction of modern equipment.
- Erection of Crated Boulder Wall and construction of concrete garland drains with settling ponds to arrest wash offs from waste dumps / subgrade stacks
- Plantation of tall seedings through Odisha Forest Development Corporation (OFDC) ensuring at least 90% survival and faster growth.
- Efforts undertaken for Rain water harvesting
- Certification of International Standards and its periodical renewal
- Developing New Park and renovating park at different leases of OMC.
- Green energy initiatives
- Converting waste to wealth by drum/vermi/continuous composting
- Quality Circle for innovations

**Compliance of Vishakha Committee Guidelines for prevention of women harassment at workplace:**

Not Implemented.

**5.2: CSR Initiatives:**

| **5.2.1: 2023-24** | |
|---|---|
| **Details of Work Proposed during the Year / Measures Planned for the Affected Segment** | **Cumulative Work done / Measures Taken** |
| **5.2.1.1: Area to be Developed for Recreation** | |
| Area (Ha) | Area (Ha) |
| 0.2 | 0.2 |
| **5.2.1.2: Area for Water Storage & Recharge Facility** | |
| Area (Ha) | Area (Ha) |
| 0 | 0 |
| **5.2.1.3: Efforts Made towards Housing for Local Communities** | |
| Number of Houses | Number of Houses |
| 0 | 0 |
| **5.2.1.4: Efforts Made towards Providing Transport to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 100 |
| **5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 100 |
| **5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 100 |
| **5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 10 |
| **5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives** | |
| Number of Beneficiaries | Number of Beneficiaries |

| | |
|---|---|
| 10 | 10 |
| **5.2.1.9: Communication Facilities Provided to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 100 |
| **5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 10 |

| | | |
|---|---|---|
| **5.2.1.11: Adoption of ODF** | | |
| Number of Toilets Built inside the Lease Area: | Number of Toilets Built outside the Lease Area: | Number of Beneficiaries |
| 0 | 0 | 0 |

| | |
|---|---|
| **5.2.1.12: Awareness Program among Mine Workers for Swatchata** | |
| Number of Swatchata Programmes proposed: | Number of Swatchata Programmes Held: |
| 01 | 0 |

| | |
|---|---|
| **5.2.1.13: Efforts for green energy** | |
| Total energy consumption (KWh) | Green energy consumption (% of total) |
| 0 | 0 |
| **5.2.1.14: Water & recycled use** | |
| Total water consumption (KLD) | Water recycled (% of total) |
| 0 | 0 |

| **5.2.2: 2024-25** | |
|---|---|
| **Details of Work Proposed during the Year / Measures Planned for the Affected Segment** | **Cumulative Work done / Measures Taken** |
| **5.2.2.1: Area to be Developed for Recreation** | |
| Area (Ha) | Area (Ha) |
| 0.2 | 0.4 |
| **5.2.2.2: Area for Water Storage & Recharge Facility** | |
| Area (Ha) | Area (Ha) |
| 0 | 0 |
| **5.2.2.3: Efforts Made towards Housing for Local Communities** | |
| Number of Houses | Number of Houses |
| 0 | 0 |
| **5.2.2.4: Efforts Made towards Providing Transport to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 200 |
| **5.2.2.5: Efforts Made towards Providing Healthcare to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 200 |
| **5.2.2.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities** | |

| | |
|---|---|
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 200 |
| **5.2.2.7: Efforts Made towards Skill Development Programs to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 20 |
| **5.2.2.8: Efforts Made to Promote Education & Knowledge Based Initiatives** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 20 |
| **5.2.2.9: Communication Facilities Provided to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 200 |
| **5.2.2.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 20 |

| | | |
|---|---|---|
| **5.2.2.11: Adoption of ODF** | | |
| Number of Toilets Built inside the Lease Area: | Number of Toilets Built outside the Lease Area: | Number of Beneficiaries |
| 0 | 0 | 0 |
| **5.2.2.12: Awareness Program among Mine Workers for Swatchata** | | |
| Number of Swatchata Programmes proposed: | | Number of Swatchata Programmes Held: |
| 01 | | 0 |

| | |
|---|---|
| **5.2.2.13: Efforts for green energy** | |
| Total energy consumption (KWh) | Green energy consumption (% of total) |
| 0 | 0 |
| **5.2.2.14: Water & recycled use** | |
| Total water consumption (KLD) | Water recycled (% of total) |
| 0 | 0 |

| **5.2.3: 2025-26** | |
|---|---|
| **Details of Work Proposed during the Year / Measures Planned for the Affected Segment** | **Cumulative Work done / Measures Taken** |
| **5.2.3.1: Area to be Developed for Recreation** | |
| Area (Ha) | Area (Ha) |
| 0.2 | 0.6 |
| **5.2.3.2: Area for Water Storage & Recharge Facility** | |
| Area (Ha) | Area (Ha) |
| 0 | 0 |
| **5.2.3.3: Efforts Made towards Housing for Local Communities** | |
| Number of Houses | Number of Houses |
| 0 | 0 |

| **5.2.3.4: Efforts Made towards Providing Transport to Local Communities** | |
|---|---|
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 300 |
| **5.2.3.5: Efforts Made towards Providing Healthcare to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 300 |
| **5.2.3.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 300 |
| **5.2.3.7: Efforts Made towards Skill Development Programs to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 30 |
| **5.2.3.8: Efforts Made to Promote Education & Knowledge Based Initiatives** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 30 |
| **5.2.3.9: Communication Facilities Provided to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 300 |
| **5.2.3.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 30 |

| **5.2.3.11: Adoption of ODF** | | |
|---|---|---|
| Number of Toilets Built inside the Lease Area: | Number of Toilets Built outside the Lease Area: | Number of Beneficiaries |
| 0 | 0 | 0 |

| **5.2.3.12: Awareness Program among Mine Workers for Swatchata** | |
|---|---|
| Number of Swatchata Programmes proposed: | Number of Swatchata Programmes Held: |
| 01 | 0 |

| **5.2.3.13: Efforts for green energy** | |
|---|---|
| Total energy consumption (KWh) | Green energy consumption (% of total) |
| 0 | 0 |

| **5.2.3.14: Water & recycled use** | |
|---|---|
| Total water consumption (KLD) | Water recycled (% of total) |
| 0 | 0 |

| 5.2.4: 2026-27 | |
|---|---|
| **Details of Work Proposed during the Year / Measures Planned for the Affected Segment** | **Cumulative Work done / Measures Taken** |
| **5.2.4.1: Area to be Developed for Recreation** | |
| Area (Ha) | Area (Ha) |
| 0.2 | 0.8 |
| **5.2.4.2: Area for Water Storage & Recharge Facility** | |
| Area (Ha) | Area (Ha) |
| 0 | 0 |
| **5.2.4.3: Efforts Made towards Housing for Local Communities** | |
| Number of Houses | Number of Houses |
| 0 | 0 |
| **5.2.4.4: Efforts Made towards Providing Transport to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 400 |
| **5.2.4.5: Efforts Made towards Providing Healthcare to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 400 |
| **5.2.4.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 400 |
| **5.2.4.7: Efforts Made towards Skill Development Programs to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 40 |
| **5.2.4.8: Efforts Made to Promote Education & Knowledge Based Initiatives** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 40 |
| **5.2.4.9: Communication Facilities Provided to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 400 |
| **5.2.4.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 40 |
| **5.2.4.11: Adoption of ODF** | |
| Number of Toilets Built inside the Lease Area: / Number of Toilets Built outside the Lease Area: | Number of Beneficiaries |
| 0 / 0 | 0 |
| **5.2.4.12: Awareness Program among Mine Workers for Swatchata** | |
| Number of Swatchata Programmes proposed: | Number of Swatchata Programmes Held: |
| 01 | 0 |
| | |

| 5.2.4.13: Efforts for green energy | |
|---|---|
| Total energy consumption (KWh) | Green energy consumption (% of total) |
| 0 | 0 |
| **5.2.4.14: Water & recycled use** | |
| Total water consumption (KLD) | Water recycled (% of total) |
| 0 | 0 |

## 5.2.5: 2027-28

| Details of Work Proposed during the Year / Measures Planned for the Affected Segment | Cumulative Work done / Measures Taken |
|---|---|
| **5.2.5.1: Area to be Developed for Recreation** | |
| Area (Ha) | Area (Ha) |
| 0.2 | 1.0 |
| **5.2.5.2: Area for Water Storage & Recharge Facility** | |
| Area (Ha) | Area (Ha) |
| 0 | 0 |
| **5.2.5.3: Efforts Made towards Housing for Local Communities** | |
| Number of Houses | Number of Houses |
| 0 | 0 |
| **5.2.5.4: Efforts Made towards Providing Transport to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 500 |
| **5.2.5.5: Efforts Made towards Providing Healthcare to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 500 |
| **5.2.5.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 500 |
| **5.2.5.7: Efforts Made towards Skill Development Programs to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 50 |
| **5.2.5.8: Efforts Made to Promote Education & Knowledge Based Initiatives** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 50 |
| **5.2.5.9: Communication Facilities Provided to Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 100 | 500 |
| **5.2.5.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities** | |
| Number of Beneficiaries | Number of Beneficiaries |
| 10 | 50 |
| **5.2.5.11: Adoption of ODF** | |
| Number of Toilets Built inside the Lease Area: | Number of Toilets Built outside the Lease Area: | Number of Beneficiaries |

| | | |
|---|---|---|
| 0 | 0 | 0 |
| **5.2.5.12: Awareness Program among Mine Workers for Swatchata** | | |
| Number of Swatchata Programmes proposed: | | Number of Swatchata Programmes Held: |
| 01 | | 0 |
| **5.2.5.13: Efforts for green energy** | | |
| Total energy consumption (KWh) | Green energy consumption (% of total) | |
| 0 | 0 | |
| **5.2.5.14: Water & recycled use** | | |
| Total water consumption (KLD) | Water recycled (% of total) | |
| 0 | 0 | |

**5.3: Rehabilitation & Resettlement of Affected Persons:**

| Particular | 2022-23 |
|---|---|
| Proposed Number of Project Affected Persons(PAP) | Nil |
| Proposed Number of Person for Alternate Arrangement for Sustainable Livelihood | Nil |
| Proposed Number of Person for Skill Training | Nil |
| Proposed Number of Person Likely to get Direct Employment | Nil |
| Proposed Number of Person Likely to get Indirect Employment | Nil |
| Proposed Project Affected Families Skilled and Absorbed | Nil |
| Proposed Number of Project Affected Families | Nil |

# Chapter 6: PROGRESSIVE MINE CLOSURE PLAN

## 6.1: Status of Land:

| Total Area Degraded | | | | | Total mined out area Reclaimed and Rehabilitated | | | Other Areas Reclaimed and Rehabilitated | |
|---|---|---|---|---|---|---|---|---|---|
| Total area under excavation in the lease | | Area under Dumps(in hect) | Area under utility services(in hect) | Area under Stack yards(in hect) | Mined out Area Reclaimed but not rehabilitated (in hect) | Mined out Area fully Rehabilitated from Reclaimed area (in hect) | Area under Water Reservoir considered Rehabilitated (in hect) | Stabililized Waste dump Rehabilitated (in hect) | Virgin area under Green Belt (in hect) |
| Area under mining operation | Mined Out area in the lease | | | | | | | | |
| 2.442 | 0.00 | 0.00 | 6.443 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.126 |

## 6.2: Progressive Reclamation and Rehabilitation Plan:

### 6.2.1: Backfilling:

| | |
|---|---|
| Quantity of Waste / Fill Material Available at Site ($m^3$) | 0 |
| Availability of Top Soil for Spreading ($m^3$) | 0 |
| Spread Area ($m^2$) | 0 |

| Year Wise Proposal | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sl. No | Year | Pit ID | Co-ordinates | Area ($m^2$) | Top RL | Bottom RL | Estimated Expenditure (INR) |
| There is no proposal for back filling during the RMP period i.e. FY 2023-24 to 2027-28. | | | | | | | |

### 6.2.2: Water Reservoir:

| | |
|---|---|
| Average Rainfall of The Area (mm) | 1269.1 |
| Proposed Area under Water Storage | 0 |

### 6.2.2.1: Preparations for Ground Water Recharging:

| **6.2.2.1.1: Drilling Holes** | |
|---|---|
| Year | Proposed no of Holes to be Drilled |
| 2023-24 | Nil |
| 2024-25 | Nil |
| 2025-26 | Nil |
| 2026-27 | Nil |
| 2027-28 | Nil |

| 6.2.2.1.2:Preparation of Course Gravel Bed: | |
|---|---|
| Year | Proposed Area of Bed (LxW) |
| 2023-24 | Nil |
| 2024-25 | Nil |
| 2025-26 | Nil |
| 2026-27 | Nil |
| 2027-28 | Nil |

**Please specify, if others: Not Applicable.**

**6.2.2.2: Protective measures (Please specify running meter)**

| 6.2.2.2.1: Fencing: | | | |
|---|---|---|---|
| Year | Proposed Fencing Length (m) | Co-ordinates from | Co-ordinates to |
| 2023-24 | 850 (MLP E1 to G1) | 2406717N,308551E | 2407366N,308743E |
| 2024-25 | 900 (MLP G1 to G4) | 2407366N,308743E | 2408263N,308735E |
| 2025-26 | 900(MLP G4 to G7) | 2408263N,308735E | 2409158N,308727E |
| 2026-27 | 900(MLP G7 to A1) | 2409158N,308727E | 2409714N,308509E |
| 2027-28 | 1200(MLP A1 to B) | 2409714N,308509E | 2408520N,308526E |

| 6.2.2.2.2: Retaining Wall: | | | |
|---|---|---|---|
| Year | Proposed Wall Length (m) | Co-ordinates from | Co-ordinates to |
| 2023-24 | 440 | 2408506N to 308520E Along the OB Dump | 2408698N to 308725E Along the OB Dump |
| 2024-25 | 350 | 2408698N to 308725E Along the OB Dump | 2408348N to 308725E Along the OB Dump |
| 2025-26 | 400 | 2408505N to 308447E Along the OB Dump | 2408299N to 308327E Along the OB Dump |
| 2026-27 | 520 | 2408299N to 308327E Along the OB Dump | 2408348N to 308725E Along the OB Dump |
| 2027-28 | Maintenance | | |

| 6.2.2.2.3: Garland Drains: | | | |
|---|---|---|---|
| Year | Proposed Bund Length (m) | Co-ordinates from | Co-ordinates to |
| 2023-24 | 440 | 2408511N to 308520E Along the OB Dump | 2408703N to 308725E Along the OB Dump |
| 2024-25 | 350 | 2408703N to 308725E Along the OB Dump | 2408348N to 308730E Along the OB Dump |
| 2025-26 | 400 | 2408509N to 308447E Along the OB Dump | 2408296N to 308323E Along the OB Dump |
| 2026-27 | 520 | 2408296N to 308323E Along the OB Dump | 2408348N to 308730E Along the OB Dump |
| 2027-28 | Maintenance | | |

### 6.2.3: Green Belt Development: As on 30.06.2022

| 6.2.3.1: Cumulative work done (Up to end of previous block of five years) | | | | |
|---|---|---|---|---|
| Sr. No | Total Expenditure Incurred up to Last Year (INR) | Area Covered (Ha) | Number of Plants | Survival Rate (%) |
| The mine has been non-operational since long period due to want of forest clearance, so there is no plantation have been carried out up to end of previous block period. | | | | |

| 6.2.3.2: Year Wise Proposal: | | | | | | |
|---|---|---|---|---|---|---|
| Sl. No | Year | Green Belt Location (s) | Area Proposed to be Covered (Ha) | Number of Plants Proposed | Expected Survival Rate (%) | Estimated Expenditure (INR) |
| 01. | 2023-24 | Between ML Pillar MLP -E to MLP – G4 (Boundary Safety zone) | 1.3 | 1560 | 70 | 4,19,640 |
| 02. | 2024-25 | Between ML Pillar MLP-G4 to MLP-A1. (Boundary Safety zone) | 1.3 | 1560 | 70 | 4,19,640 |
| 03. | 2025-26 | Between ML Pillar MLP-A1 to MLP-B4/M. (Boundary Safety zone) | 1.5 | 1800 | 70 | 4,84,200 |
| 04. | 2026-27 | Between ML Pillar MLP- B4/M to MLP-O3. (Boundary Safety zone) | 1.3 | 1560 | 70 | 4,19,640 |
| 05. | 2027-28 | Between ML Pillar MLP-O3 to MLP-E. (Boundary Safety zone) | 1.3 | 1560 | 70 | 4,19,640 |

### 6.2.4: Use of shallow pits: Not Applicable

| 6.2.4.1: Cumulative work done (up to end of previous block of five years) | | | | |
|---|---|---|---|---|
| Sl. No | Pit ID | Work Done | Area covered ($m^2$) | Total Expenditure Incurred (up to last five year block) (INR) |
| Not Applicable | | | | |

| 6.2.4.2: Year Wise Proposal: | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sl. No | Year | Pit ID | Total Area (Ha) | Area Proposed for Crops (Ha) | Suitable Crops | Area Proposed for Grass (Ha) | Total Proposed Expenditure (INR) | Location (s) | Remarks |
| Not Applicable | | | | | | | | | |

### 6.2.5: Pisciculture: Not Applicable

| 6.2.5.1: Total Expenditure incurred as on Date (INR) | Not Applicable |
|---|---|

**6.2.5.2: Cumulative work done as on Date: Not Applicable**

| Sl. No | Pit ID | Area ($m^2$) | Expenditure (INR) |
|---|---|---|---|
| Not Applicable. | | | |

**6.2.5.3: Year Wise Proposal: Not Applicable**

| Sl. No | Year | Pit ID | Area ($m^2$) | Estimated Expenditure (INR) |
|---|---|---|---|---|
| Not Applicable. | | | | |

| 6.2.5.4: Source of Water for Pisciculture | Not Applicable. |
|---|---|
| 6.2.5.5: Whether the quality of water has been assessed & found to be suitable for Pisciculture | Not Applicable. |

### 6.2.6: Recreational Facility:

| 6.2.6.1: Total Expenditure Incurred (up to last five year block) (INR) | Nil |
|---|---|

**6.2.6.2: Cumulative work done as on Date 30.06.2022.**

| Sl. No | Pit ID | Area ($m^2$) | Expenditure (INR) |
|---|---|---|---|
| The mine has been non-operational since long period due to want of forest clearance, so there is no recreational facility have been developed up to end of previous block period. | | | |

**6.2.6.3: Year Wise Proposal:**

| Sl. No | Year | Type of Recreational Facility | Area Covered (Ha) | Location | Estimated Expenditure (INR) |
|---|---|---|---|---|---|
| 01. | 2023-24 | Park | 0.2 | 2408000N 307843E | 10,00,000 |
| 02. | 2024-25 | Park | 0.2 | 2408012N 307819E | 10,00,000 |
| 03. | 2025-26 | Park | 0.2 | 2408047N 307840E | 10,00,000 |
| 04. | 2026-27 | Park | 0.2 | 2408035N 307778E | 10,00,000 |
| 05. | 2027-28 | Park | 0.2 | 2408074N 307800E | 10,00,000 |

**6.2.7: Dump Area Stabilization & Development:**

| Sl. No | Year | Dump ID | No of Terraces | Average Height of Terraces (m) | Length of Toe Wall (m) | Length of Garland Drain (m) | Area Stabilized (Ha) | Method of Stabilization | Estimated Expenditure (INR) | No of Check Dams |
|---|---|---|---|---|---|---|---|---|---|---|
| 01. | 2023-24 | Waste Dump WD-1 | 2 | 20 | 440 | 440 | Nil | NA | 62,47,200 | 01 |
| 02. | 2024-25 | | 2 | 20 | 350 | 350 | Nil | NA | 55,83,000 | 01 |
| 03. | 2025-26 | | 2 | 20 | 400 | 400 | Nil | NA | 29,52,000 | 0 |
| 04. | 2026-27 | | 1 | 20 | 520 | 520 | Nil | NA | 38,37,600 | 0 |
| 05 | 2027-28 | | 1 | 20 | --- | --- | Nil | NA | 0 | 0 |

### 6.2.8: Other Form of Reclaiming the Area

**6.2.8.1: Cumulative work done as on Date 30.06.2022.**

| Sl. No | Total Expenditure incurred as on Date (INR) | Work Done |
|---|---|---|
| 01. | Nil | Nil |

**6.2.8.2: Year Wise Proposal:**

| Sl. No | Year | Work Proposals | Estimated Expenditure (INR) |
|---|---|---|---|
| 01. | 2023-24 | Nil | Nil |
| 02. | 2024-25 | Nil | Nil |
| 03. | 2025-26 | Nil | Nil |
| 04. | 2026-27 | Nil | Nil |
| 05. | 2027-28 | Nil | Nil |

### 6.2.9: Topsoil Management:

**6.2.9.1: Cumulative Work Done as on Date 30.06.2022**

| Sl. No. | Top Soil Generated ($m^3$) | Top Soil Utilized ($m^3$) | Topsoil Stored ($m^3$) | Total expenditure incurred as on date (₹) |
|---|---|---|---|---|
| Nil. | | | | |

**6.2.9.2: Year Wise Proposal:**

| Year | Topsoil Generated ($m^3$) (A) | Topsoil Utilized ($m^3$) (B) | Topsoil Stored ($m^3$) (A-B) | Estimated Expenditure (INR) |
|---|---|---|---|---|
| 2023-24 | 0 | 0 | 0 | 0 |
| 2024-25 | 0 | 0 | 0 | 0 |
| 2025-26 | 0 | 0 | 0 | 0 |
| 2026-27 | 0 | 0 | 0 | 0 |
| 2027-28 | 0 | 0 | 0 | 0 |

### 6.2.10: Tailings Dam Management: Not Applicable

| Year | Yearly generation of Tailing ($m^3$) (A) | Total capacity of Tailing Pond ($m^3$) | Measures Proposed for Periodic Desilting | Yearly Utilization of Tailing ($m^3$) (B) | Disposal of Tailing to Tailing Pond ($m^3$) (A-B) | Tailing Dam Design | Structural Stability Studies |
|---|---|---|---|---|---|---|---|
| Not Applicable | | | | | | | |

### 6.2.11 Land Use Of Lease Area at the Expiry of Lease Period (Conceptual Stage):

| Total Area Degraded | | | | Non Degraded area | Total mined out area Reclaimed and Rehabilitated | | | Other Areas Reclaimed and Rehabilitated | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mined Out area in the lease | Area under Dumps(in hect) | Area under the Tailing Dam | Area under utility services(in hect) | Area undisturbed/virgin | Mined out Area Reclaimed but not rehabilitated(in hect) | Mined out Area fully Rehabilitated from Reclaimed area(in hect) | Area under Water Reservoir considered Rehabilitated (in hect) | Stabillilized Waste dump Rehabilitated (in hect) | Virgin area under Green Belt (in hect) | Rehabilitated Area under utility services(in hect) | Rehabilitated Area under Tailing dam (in hect) |
| 166.555 Ha. | 53.343 Ha. | 0.00 | 35.579Ha. | 13.363 Ha. | 0.00 Ha. | 0.00 Ha. | 0.00 Ha | 0.00 Ha. | 13.126 Ha. | 0.00 | 0.00 |

# Chapter 7: FINANCIAL ASSURANCE/ PERFORMANCE SURETY

**(AREA PUT TO USE)**

## 7.1 YEAR (2023-24 to 2027-28) (Separate form for each year as below)

Financial assurance calculation as per Rule 27(1) of MCDR 2021 is given in the table below:

| Sl. No. | Particular | Area put to use at Start of Year (ha) (A)* | Additional Requirement (ha) (B)* | Total (ha) (C = A + B) |
|---|---|---|---|---|
| 1 | Area under Mining | 2.442 | 21.312 | 23.754 |
| 2 | Topsoil stacking | 0.00 | 0.00 | 0.00 |
| 3 | Overburden/Waste Dumping | 0.00 | 16.464 | 16.464 |
| 4 | Mineral Storage | 0.00 | 9.394 | 9.394 |
| 5 | Infrastructure (Workshop, Administrative Building etc.) | 2.904 | 5.208 | 8.112 |
| 6 | Roads | 1.572 | 3.576 | 5.148 |
| 7 | Railways | 0.00 | 0.00 | 0.00 |
| 8 | Tailing Pond | 0.00 | 0.00 | 0.00 |
| 9 | Effluent Treatment Plant | 0.00 | 0.00 | 0.00 |
| 10 | Mineral Separation Plant | 0.00 | 5.239 | 5.239 |
| 11 | Township Area | 0.00 | 0.00 | 0.00 |
| 12 | Others to Specify (Conveyor Corridor) | 1.967 | 0.00 | 1.967 |
| **TOTAL** | | 8.885 | 61.193 | 70.078 |
| **GRAND TOTAL** | | | | |

| **2023-24** | | | | |
|---|---|---|---|---|
| Consolidated View of Financial Assurance | | | | |
| Sl. No. | Particular | Area put to use at Start of Year (ha) (A)* | Additional Requirement (ha) (B)* | Total (ha) (C = A + B) |
| 1 | Area under Mining | 2.442 | 6.690 | 9.132 |
| 2 | Topsoil stacking | 0.00 | 0.00 | 0.00 |
| 3 | Overburden/Waste Dumping | 0.00 | 16.464 | 16.464 |
| 4 | Mineral Storage | 0.00 | 9.394 | 9.394 |
| 5 | Infrastructure (Workshop, Administrative Building etc.) | 2.904 | 5.208 | 8.112 |
| 6 | Roads | 1.572 | 3.576 | 5.148 |
| 7 | Railways | 0.00 | 0.00 | 0.00 |
| 8 | Tailing Pond | 0.00 | 0.00 | 0.00 |
| 9 | Effluent Treatment Plant | 0.00 | 0.00 | 0.00 |
| 10 | Mineral Separation Plant | 0.00 | 5.239 | 5.239 |
| 11 | Township Area | 0.00 | 0.00 | 0.00 |
| 12 | Others to Specify(Conveyor Corridor) | 1.967 | 0.00 | 1.967 |
| | Total | 8.885 | 46.571 | 55.456 |

**2024-25**

Consolidated View of Financial Assurance

| Sl. No. | Particular | Area put to use at Start of Year (ha) (A)* | Additional Requirement (ha) (B)* | Total (ha) (C = A + B) |
|---|---|---|---|---|
| 1 | Area under Mining | 9.132 | 1.00 | 10.132 |
| 2 | Topsoil stacking | 0.00 | 0.00 | 0.00 |
| 3 | Overburden/Waste Dumping | 16.464 | 0.00 | 16.464 |
| 4 | Mineral Storage | 9.394 | 0.00 | 9.394 |
| 5 | Infrastructure (Workshop, Administrative Building etc.) | 8.112 | 0.00 | 8.112 |
| 6 | Roads | 5.148 | 0.00 | 5.148 |
| 7 | Railways | 0.00 | 0.00 | 0.00 |
| 8 | Tailing Pond | 0.00 | 0.00 | 0.00 |
| 9 | Effluent Treatment Plant | 0.00 | 0.00 | 0.00 |
| 10 | Mineral Separation Plant | 5.239 | 0.00 | 5.239 |
| 11 | Township Area | 0.00 | 0.00 | 0.00 |
| 12 | Others to Specify | 1.967 | 0.00 | 1.967 |
| Total | | 55.456 | 1.00 | 56.456 |

**2025-26**

Consolidated View of Financial Assurance

| Sl. No. | Particular | Area put to use at Start of Year (ha) (A)* | Additional Requirement (ha) (B)* | Total (ha) (C = A + B) |
|---|---|---|---|---|
| 1 | Area under Mining | 10.132 | 5.255 | 15.387 |
| 2 | Topsoil stacking | 0.00 | 0.00 | 0.00 |
| 3 | Overburden/Waste Dumping | 16.464 | 0.00 | 16.464 |
| 4 | Mineral Storage | 9.394 | 0.00 | 9.394 |
| 5 | Infrastructure (Workshop, Administrative Building etc.) | 8.112 | 0.00 | 8.112 |
| 6 | Roads | 5.148 | 0.00 | 5.148 |
| 7 | Railways | 0.00 | 0.00 | 0.00 |
| 8 | Tailing Pond | 0.00 | 0.00 | 0.00 |
| 9 | Effluent Treatment Plant | 0.00 | 0.00 | 0.00 |
| 10 | Mineral Separation Plant | 5.239 | 0.00 | 5.239 |
| 11 | Township Area | 0.00 | 0.00 | 0.00 |
| 12 | Others to Specify | 1.967 | 0.00 | 1.967 |
| Total | | 56.456 | 5.255 | 61.711 |

| **2026-27** | | | | |
|---|---|---|---|---|
| Consolidated View of Financial Assurance | | | | |
| Sl. No. | Particular | Area put to use at Start of Year (ha) (A)* | Additional Requirement (ha) (B)* | Total (ha) (C = A + B) |
| 1 | Area under Mining | 15.387 | 1.978 | 17.365 |
| 2 | Topsoil stacking | 0.00 | 0.00 | 0.00 |
| 3 | Overburden/Waste Dumping | 16.464 | 0.00 | 16.464 |
| 4 | Mineral Storage | 9.394 | 0.00 | 9.394 |
| 5 | Infrastructure (Workshop, Administrative Building etc.) | 8.112 | 0.00 | 8.112 |
| 6 | Roads | 5.148 | 0.00 | 5.148 |
| 7 | Railways | 0.00 | 0.00 | 0.00 |
| 8 | Tailing Pond | 0.00 | 0.00 | 0.00 |
| 9 | Effluent Treatment Plant | 0.00 | 0.00 | 0.00 |
| 10 | Mineral Separation Plant | 5.239 | 0.00 | 5.239 |
| 11 | Township Area | 0.00 | 0.00 | 0.00 |
| 12 | Others to Specify | 1.967 | 0.00 | 1.967 |
| Total | | 61.711 | 1.978 | 63.689 |

| **2027-28** | | | | |
|---|---|---|---|---|
| Consolidated View of Financial Assurance | | | | |
| Sl. No. | Particular | Area put to use at Start of Year (ha) (A)* | Additional Requirement (ha) (B)* | Total (ha) (C = A + B) |
| 1 | Area under Mining | 17.365 | 6.389 | 23.754 |
| 2 | Topsoil stacking | 0.00 | 0.00 | 0.00 |
| 3 | Overburden/Waste Dumping | 16.464 | 0.00 | 16.464 |
| 4 | Mineral Storage | 9.394 | 0.00 | 9.394 |
| 5 | Infrastructure (Workshop, Administrative Building etc.) | 8.112 | 0.00 | 8.112 |
| 6 | Roads | 5.148 | 0.00 | 5.148 |
| 7 | Railways | 0.00 | 0.00 | 0.00 |
| 8 | Tailing Pond | 0.00 | 0.00 | 0.00 |
| 9 | Effluent Treatment Plant | 0.00 | 0.00 | 0.00 |
| 10 | Mineral Separation Plant | 5.239 | 0.00 | 5.239 |
| 11 | Township Area | 0.00 | 0.00 | 0.00 |
| 12 | Others to Specify | 1.967 | 0.00 | 1.967 |
| Total | | 63.689 | 6.389 | 70.078 |

## 7.2 Financial Assurance:

**Category-A Mining Lease:**

| Total Area Proposed to be put to use in Hact i.e. from FY 2023-24 to FY 2027-28. | Amount of Bank Guarantee(Lac INR) | Valid till (dd/mm/yyyy) | Upload copy of Bank Guarantee |
|---|---|---|---|
| 70.078 Ha. | Rs. 350.39 Lakhs | 31.03.2028 | Total Financial Assurance payable till the end of plan period as per rule 27(1) of MCDR 2021, i.e. up to 31.03.2028 is calculated to be Rs. 3, 50, 39,000/-(Rupees Three Corers Fifty Lakhs Thirty Nine Thousand Only) for Category-A fully mechanized mines calculated at Rs. 5, 00,000/- per hectare for an area of 70.078 Ha of ML area put to use. The amount of Rs. 3, 50, 39,000/- ( Rupees Three Corers Fifty Lakhs Thirty Nine Thousand Only) in shape of Bank Guarantee has been submitted during the final submission of the document. |

## 7.3 Performance Security:

| Lease Category (A/B) | Total Resources in tonnes for calculation of Performance Surety* | Existing Performance surety amount in Rs | Valid till (dd/mm/yyyy) | Upload copy of existing Performance Security |
|---|---|---|---|---|
| Not Applicable. | | | | |

# Chapter 8: Review of Previous Proposals

**(Not applicable for fresh grant)**

## 8.1: General:

### 8.1.1: Lease Area Utilization:

| Sl. No. | Type of land use (in ha) | Area at the beginning of the proposal period | Area proposed under activity | Actual Area utilized in the proposal period | Deviation | Reasons for deviation |
|---|---|---|---|---|---|---|
| 1 | Mining | 3.612 | 10.356 | 2.442 | No Deviation | Not Applicable. |
| 2 | Mineral storage | 0.00 | 7.811 | 0.00 | | |
| 3 | Mineral Beneficiation plant | 0.00 | 1.400 | 0.00 | | |
| 4 | Township | 0.00 | 0.00 | 0.00 | | |
| 5 | Tailing Pond | 0 | 0 | 0.00 | | |
| 6 | Railways | 0 | 0 | 0.00 | | |
| 7 | Roads | 1.257 | 3.087 | 1.572 | | |
| 8 | Infrastructure (Workshop, administrative building etc.) | 3.404 | 6.602 | 2.904 | | |
| 9 | OB/waste dump | 0.434 | 2.922 | 0.00 | | |
| 10 | Top soil preservation | 0.00 | 0.342 | 0.00 | | |
| 11 | Conveyor Corridor | 0.00 | 4.020 | 1.967 | | |
| 12 | Others (Safety Zone) | 13.126 | 13.126 | 13.126 | | |
| 13 | Total area put to use | 8.707 | 36.54 | 8.885 | | |
| 14 | Excavated area reclaimed | 0 | 0 | 0 | | |
| 15 | Waste dump area reclaimed | 0 | 0 | 0 | | |
| 16 | Undisturbed Area | 260.133 | 232.300 | 259.955 | | |
| | Total | 268.84 | 268.84 | 268.84 | | |

### 8.1.2: SDF and CSR Expenditures:

| Activity | Proposals | | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|---|
| Total expenditure incurred for implementation of SDF at mine level including<br>- Environment Protection<br>- CSR & other welfare activities in peripheral area<br>*(Explanation: Expenditure is not over and above the statutory levies imposed by the Government; However, THIS EXCLUDES CONTRIBUTION TO DMF & NMET and is over and above the statutory levies imposed by the Government.)* | 10% of Royalty<br>(a)<br>Nil | Total Expenditure for SDF & CSR implementation<br>(b)<br>Nil | Nil | No Deviation | Not Applicable. |
| CSR (Corporate Social Responsibility) spending at the mine level in Proposal Period (as per Companies Act, 2013 or otherwise) | | | | | |

### 8.2: Technical Details:

### 8.2.1: Exploration: As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| Number of Boreholes/ Pits/ Trenches | 192 | 0 | Deviation | Total 192 number of bore holes have been proposed in the FY 2018-19 to 2022-23. No bore holes have been drilled during the period from 2018-19 to 2022-23 (As on 30.06.2022) because of non-availability of forest clearance. |
| Boreholes Meterage (If Boreholes selected in first row) (m) | 19,200 | 0 | Deviation | |
| Grid | 100 X 100 | 0 | Deviation | |
| G Axis up gradation during Proposal Period as per guidelines of MEMC Rule 2015) | 100 | 0 | Deviation | |
| Area converted under G1 from G2/G3 | 57.651 | 0 | Deviation | |

Remark: The proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23(As on 30.06.2022).

### 8.2.2: Mine Development (Opencast/ Dump Mining): As on 30.06.2022.

| Particulars | Proposed | Actual | Deviation | Reasons for deviation |
|---|---|---|---|---|
| **8.2.2.1: Generation of Ore/Waste While Development: as on 30.06.2022.** | | | | |
| Ore (Tonnes) | 2,273,700 | 0 | Deviation. | The development proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23(As on 30.06.2022). The Production of Ore could not be achieved as per proposal due to non- |
| Waste (Cubic Meters) | 1,24,400 | 0 | | |
| Generated Waste while ROM recovery | 0 | 0 | | |
| Dumping Site (For Surface) | 2.922 | 0 | | |
| Removal of waste/ over burden in cubic meters | 1,24,400 | 0 | | |
| Generated Waste while ROM recovery | 0 | 0 | | |
| Dumping site of waste/ overburden | 2408295N to 2408504N | 0 | | |

| | | | | | |
|---|---|---|---|---|---|
| | | & 308248E to 308438E | | | availability of forest clearance & other statutory clearances. The mine has been non-operational since long period due to want of forest clearance & other statutory clearances. |
| **8.2.2.2: Excavation as on 30.06.2022.** | | | | | |
| Lateral extent | Quarry-1 | 2428372 N to 2428622N, 335061E to 335271E | 2407933 N to 2408147N, 308073E to 308358E | Deviation. | |
| Vertical extent | | 940 mRL to 856 mRL | 862 mRL to 878 mRL | | |

### 8.2.3: Mining operation: Dump Mining: As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| Handling of Material | No dump mining has been proposed during the Modification of Mining Plan period from 2018-19 to 2022-23. | | | |
| Waste Generated post recovery | | | | |
| Dumping site for waste | | | | |

### 8.2.4: Zero Waste Mining: As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| Alternative use / Disposal of Waste Generated (excluding top soil) | Not Applicable. | | | |

### 8.2.5: Backfilling: As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| Site (Co-ordinates) | 0 | 0 | No Deviation. | Not Applicable. |
| Area | 0 | 0 | | |
| Depth | 0 | 0 | | |
| Volume Backfilled (CuM) | 0 | 0 | | |
| Backfilled Area available for Reclamation and Rehabilitation | 0 | 0 | | |
| Backfilled Area Reclaimed and Rehabilitated | 0 | 0 | | |
| Balance Backfilled Area | 0 | 0 | | |

Remark: The proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23(As on 30.06.2022).

### 8.2.6: Production of Mineral(s): As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| **8.2.6.1: ROM (tonnes)** | | | | |
| Opencast | 3,829,710 | 0 | Deviation | The Production proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23(As on 30.06.2022). The Production of ROM could not be achieved as per proposal due to non-availability of forest clearance & other statutory clearances. The mine has been non-operational since long period due to want of forest clearance & other statutory clearances. |
| **8.2.6.2: Cleaned Ore (Tonnes)** | | | | |
| Opencast | 2,273,700 | 0 | Deviation | |
| Dump Mining | 0 | 0 | | |
| Recovery from Mineral Rejects or Tailings | 0 | 0 | | |
| Total | 40,10,000 | 0 | | |

Remark: The proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23 (As on 30.06.2022).

### 8.2.7: Handling of Mineral Rejects/ Sub-Grade: As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| **Generation of mineral rejects (Tonnes)** | | | | The Production proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23(As on 30.06.2022). The Production of mineral reject could not be achieved as per proposal due to non-availability of forest clearance & other statutory clearances. The mine has been non-operational since long period due to want of forest clearance & other statutory clearances. |
| Opencast | 1,556,010 | 0 | Deviation | |
| Dump mining | 0 | 0 | | |
| Other recovery | 0 | 0 | | |
| | | | | |
| Stacking of mineral rejects/ sub-grade mineral | 0 | 0 | Deviation | |
| Blending of mineral reject / Sub-grade. | 1,556,010 | 0 | | |

Remark: The proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23(As on 30.06.2022).

### 8.2.8: Environment Compliances: As on 30.06.2022.

| Particulars | Proposals | Achievement | Deviation | Reasons for deviation |
|---|---|---|---|---|
| **8.2.8.1: Top soil (Cum.)** | | | | |
| Generation | 10,261 | 0 | Deviation | The mine has been non-operational since long period due to want of forest clearance & other statutory clearances. |
| Utilization | 0 | 0 | | |
| Stacking (Dump Id) | 10,261 | 0 | | |
| | | | | |
| Reclamation | 0 | 0 | No Deviation | Not Applicable. |
| Rehabilitation | 0 | 0 | | |
| **8.2.8.2: Afforestation (Dumps/Benches/Backfilled Area etc.) As on 30.06.2022.** | | | | |
| 2018-19 | 0 | 0 | Deviation | The mine has been non-operational since long period due to want of forest clearance & other statutory clearances. |
| 2019-20 | 0 | 0 | | |
| 2020-21 | 500 | 0 | | |
| 2021-22 | 625 | 0 | | |
| 2022-23 | 750 | 0 | | |
| **8.2.8.3: Afforestation (Green Belt): As on 30.06.2022.** | | | | |
| 2018-19 | 0 | 0 | No Deviation | Not Applicable. |
| 2019-20 | 0 | 0 | | |
| 2020-21 | 0 | 0 | | |
| 2021-22 | 0 | 0 | | |
| 2022-23 | 0 | 0 | | |
| Construction of check dams | 1 | 0 | Deviation | The proposal for check dams, Garland Drain & Retaining wall have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23 (as on 30.06.2022). As per proposal there is no construction of check dams, Garland Drain & Retaining wall because of the mine has been non-operational since long period due to want of forest clearance & other statutory clearances. |
| Construction of garland drains | 460 | 0 | | |
| Construction of retaining walls | 580 | 0 | Deviation | |
| **8.2.8.4: Tailings: As on 30.06.2022** | | | | |
| Generation | Not Applicable. | | | |
| Utilization (Auto fill from production) | | | | |
| Disposal | | | | |

Remark: The proposal have been given for 5-year period for the F.Y 2018-19 to 2022-23 and review have been carried out for the F.Y 2018-19 to 2022-23 (As on 30.06.2022).

## 8.3: Socio-Economic Review as on 30.06.2022.

| **8.3.1: Rehabilitation & Resettlement for Project Affected People as on 30.06.2022.** | | | | |
|---|---|---|---|---|
| Particulars | Proposals | Actual | Deviation | Reasons for deviation |
| No. of Project Affected People (PAP) | Nil | Nil | No Deviation | Not Applicable. |
| %age of PAP for whom alternate arrangements made for sustained livelihood | Nil | Nil | | |
| % of project affected families given employment | Nil | Nil | | |
| % of project affected families who have been skilled by the lessee and absorbed (% of total employment given to affected families) | Nil | Nil | | |
| **8.3.2: Grievance Redressal as on 30.06.2022.** | 2018-19 to 2022-23 | | | |
| Grievances Received | 0 | | | |
| Grievances Redressed | 0 | | | |
| **8.3.3: Welfare and socio-economic development programs for local communities as on 30.06.2022.** | | | | |
| **8.3.3.1: Support for Drinking Water & Agriculture as on 30.06.2022.** | 2018-19 to 2022-23 | | | |
| No. of Water Storage Tanks constructed | 0 | | | |
| Drinking Water Facilities provided (Bore wells/ Pumps etc.) | 0 | | | |
| Irrigation Support provided (Canals/ Pumps etc.) | 0 | | | |
| No. of Water tanks De-silted | 0 | | | |
| Water Treatment facilities provided (A/NA) | NA | | | |
| Amount of Water treated (in kL) (if selected A in above) | NA | | | |
| **8.3.3.2: Support to Health & Medical Services as on 30.06.2022.** | 2018-19 to 2022-23 | | | |
| No. of persons identified from Occupational health diseases | 0 | | | |
| No. of Health Camps/ Medicine Camps Organized | 0 | | | |
| **8.3.3.3: Support to Skill development & Education as on 30.06.2022.** | | | | |
| Vocational Training Provided/ Support Provided as on 30.06.2022. | 2018-19 to 2022-23 | | | |
| No. of employees undergone Vocational training | 0 | | | |
| No. of other persons undergone Vocational training | 0 | | | |
| Number of Literacy & Education Camps held/ Supported | 0 | | | |

| | |
|---|---|
| **8.3.3.4: Support to Transportation Services & Infrastructure as on 30.06.2022.** | 2018-19 to 2022-23 |
| Expenditure on Transportation Services & Infrastructure in Lakhs | 0 |
| Road development (m) in the peripheral area (not lease area) | 0 |
| No. of Public transport support provided (Ambulance/Buses/ School Vans etc) | 0 |
| **8.3.3.5: Swatchata Programs: Creating/providing sanitation and healthy condition in and around the mine area as on 30.06.2022.** | |
| Adoption of ODF within mining lease area as on 30.06.2022. | 2018-19 to 2022-23 |
| No. of Toilets built in the Lease Area | 0 |
| Adoption of ODF in nearby villages as on 30.06.2022. | 2018-19 to 2022-23 |
| No. Of Toilets built in the villages | 0 |
| Provision for green age recreational facility (Within Lease Area/ Outside) as on 30.06.2022. | 2018-19 to 2022-23 |
| Recreational Area Type (Picnic Spot/ tracks/Park Etc) | 0 |
| Area covered (For within Lease Area only) | 0 |
| Awareness program among Mine workers for Swatchata as on 30.06.2022. | 2018-19 to 2022-23 |
| No. of Swatchchta Programmes held | 0 |

# Chapter 9: IMPACT ASSESSMENT (for fresh grant): Not Applicable:

**9.1: Baseline Information:**

| | |
|---|---|
| Whether Area falls under Forest | YES |
| Whether Area falls under Wildlife Sanctuary | NO |
| Whether Area falls under Coastal Regulation Zone (CRZ) | NO |
| Whether Area falls under Defence Land | NO |
| Any Other Clearance (specify) | NA |

Any Significant Objections from any Agency Involved in Stakeholder's Consultation -

**9.2: Environment Parameters:**

9.2.1: Environment Monitoring:

Monitoring Activity

9.2.1.1: Ambient Air Quality:

| | |
|---|---|
| Core Zone (Quarterly Monitoring Planned) | YES |
| Buffer Zone (Quarterly Monitoring Planned) | YES |

9.2.1.2: Water Quality:

| | |
|---|---|
| Core Zone (Quarterly Monitoring Planned) | YES |
| Buffer Zone (Quarterly Monitoring Planned) | YES |

9.2.1.3: Noise Level:

| | |
|---|---|
| Core Zone (Quarterly Monitoring Planned) | YES |
| Buffer Zone (Quarterly Monitoring Planned) | YES |

9.3: Impact Assessment:

9.3.2: Land Environment:

| 9.3.2.1: BASE / PRESENT STATUS | |
|---|---|
| Pre Mining Use | AREA (Ha) |
| Barren / Waste land with small bushes & shrubs | 0 |
| Land under Agriculture / Crops | 0 |
| Land covered with Plants | 0 |
| Land under Grass Cover | 0 |
| Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.) | 0 |
| Land under Habitation | 0 |
| Land under Monuments & places of Historical Importance | 0 |
| Degraded by Pits & Excavation | 2.442 |
| Degraded by Dumps & Material Staking | 0 |
| Covered under Mine Infrastructure (plants, shades, buildings etc.) | 6.443 |
| Land under Forest | 268.84 |
| Historically, Culturally & Ecologically Important Places | 0 |
| Any Other, please specify below | 0 |
| Date of Observation | 30.06.2022 |

| 9.3.2.2: ANTICIPATED IMPACT | |
|---|---|
| Post Mining Use | AREA (Ha) |
| Degradation by Excavation | 166.555 |
| Degradation by Dumps & Material Staking | 66.839 |
| Covered under Plants, Shades & Buildings | 11.622 |
| Covered by Roads & Approaches | 10.461 |
| Any Other, please specify below (Undisturbed Virgin SZ) | 13.363 |

**9.3.2.3: Mitigation Measures:**

9.3.2.3.1: Backfilling: The mined out area of 65.337Ha. have been envisaged for back filling. The back filled area will be re-grassed after end of the lease period.

9.3.2.3.2: Area proposed to be covered by Plantation in Backfilled Area: The mined out area of 65.337 Ha. have been envisaged for back filling.

9.3.2.3.3: Proposed Area under Agriculture: Nil

9.3.2.3.4: Proposed Area to be converted to Grazing Land: The area covered under mineral separation plant & mineral stacking area of 11.622 Ha. shall be converted to grazing land after end of the lease period.

9.3.2.3.5: Ground Water Recharging: Nil.

9.3.2.3.6: Green Belt Development *: The green belt will be developed over the area covered under dumps, and backfilled area of mined out area and virgin area under safety zone.

9.3.2.3.7: Agriculture *: No Proposal for agriculture.

**9.3.3: Air Environment:**

9.3.3.1: Climate & Meteorology (Please provide average of 10 years):

| Temperature (°C) | | Relative Humidity (%) | Average Rainfall (mm) |
|---|---|---|---|
| Maximum | Minimum | 76 | 1269.1 |
| 42 | 8 | | |

9.3.3.2: Air Quality Details for Base line Information / Present Status: The Air Quality base line data has been given in environmental monitoring report. Same has been attached as Annexure-32.

| Sr. No. | Station Name | Season | PM10 (µg/m3) | PM10 Excess (µg/m3) 2 | PM2.5 (µg/m3) | PM2.5 Excess (µg/m3) 2 | $SO_2$ Value (µg/m3) | $SO_2$ Excess (µg/m3) | $NO_X$ Value (µg/m3) | $NO_X$ Excess (µg/m3) | Date of Observation | Action |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

9.3.3.3: Impact Assessment & Mitigation Measures:

9.3.3.3.1: Anticipated Impact *(Give details on Prediction of fugitive dust emissions due to mining activities, crushing & cleaning plants, loading & unloading, transportation by rail, road or conveyor)*

There will be generation of dust during hauling of both ore and over burden to stackyard, during transportation of finished ore and during blasting.

9.3.3.3.2: Mitigation Measure Give details on measures to reduce the emissions of pollutants during mining, loading, unloading, transportation, drilling, blasting, crushing etc. to maintain the air quality:

Following measures are proposed for management of air quality: -

- ✓ Water sprinkling on haul roads at regular intervals.
- ✓ Installing of permanent water sprinklers at strategic places.
- ✓ Dense plantation along the safety zone/avenue plantation.
- ✓ No overloading of tippers/ Dumpers.
- ✓ Ore shall be covered with tarpaulin during transportation from stockyard to outwards.
- ✓ Provision of dust extractors with the drill machines/ wet drilling practices.
- ✓ Water spraying in the dump hopper of crusher.
- ✓ Provisions of dust masks to the persons exposed to dust.

9.3.4: Water Environment:

Depending upon the drainage pattern of the area where the dump area is located, retaining walls, garland drain with settling tanks will be provided. The garland drains will be dug around 1 m beneath the adjoining contour level at the lower peripheral areas of the dump. The width of the drains shall be around 1.5 m. A series of settling pits along with a main settling tank of 15 m length at the outlet of the garland drains will be provided to arrest the wash-off solid particles. The settling tank will be provided with three compartments each of around 5m width to arrest the suspended solids followed with the chamber to arrest any oil particles. The last chamber shall contain the clean water which will be ultimately discharged. The retaining walls will be of 1.5m height and 1.2 m width at the top and around 1.5m at the base.

9.3.4.1: Rain Water:

9.3.4.1.1: Base / Present Status (Details of Rivers, Springs, Lakes, Reservoirs & Drains up to First Order in Study Area)

The area falls within the watershed area of the Baitarani River. No water/waste water is discharged in to the river. During rains, the runoff passes through garland drain and series of settling pits before draining into water harvesting pond.

9.3.4.1.2: Anticipated Impact (Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological Study Give details about impact on vegetation)

The surface water is not contaminated from the mining waste, as the working quarries is situated far away from any nala and the rain water is usually absorbed in the sub soil before reaching the nala.

9.3.4.1.3: Mitigation Measure (Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Water harvesting and artificial recharge is done in the form of ponds developed and maintained within the Mining Lease.

9.3.4.2: Water Body:

9.3.4.2.1: Base / Present Status*(Water Bodies Existing & Water Bodies likely to be created due to Mining Activities & their Water Holding Capacity)

The baseline data of water quality has been given in environmental monitoring report. Same has been attached as Annexure-32.

9.3.4.2.2: Anticipated Impact (Ingress of Sea Water, Particularly for Mining Projects in Coastal Areas)

Not Applicable.

9.3.4.2.3: Mitigation Measure (Steps to Minimize Impact on Water Table if Mining Intercepts Groundwater Regime)

During the conceptual period mining intercepts Groundwater Regime, for minimize Impact on Water table the following steps to be proposed.

- Ground water recharge by bore holes.
- Frequent analysis of ground water.

9.3.4.3: Water Balance:

9.3.4.3.1: Base / Present Status (Water Balance (Withdrawal of Surface Water & Release of Mine Drainage Water) Water Requirement & Waste Water Generation from various Activities of Mine, Including Beneficiation)

Water Balance chart attached as Annexure-29.

9.3.4.3.2: Anticipated Impact(Impact of Water Drawl on Surface & Groundwater Resources Impact on Surface & Groundwater Quality due to Discharges from Mining, Tailings Pond, Workshop, Township, & Leach ate from Solid Waste Dumps etc)

There will not be any impact of water drawl on surface as well as ground water resources due to mining activities.
The surface water is not contaminated from the mining waste, as the working quarries is situated far away from any nala and the rain water is usually absorbed in the sub soil before reaching the perennial nala.

9.3.4.3.3: Mitigation Measure (Construction of Check Dams, Sedimentation Ponds, Settling Tanks, Retaining Walls etc. with Design & Site Features for Control of run-off Mine Water Treatment for Meeting the Prescribed Standard Waste Water Treatment for Township Sewage, Workshop(s), Tailing Pond Overflow etc)

The surface runoff shall be diverted through garland drains of around 1 m beneath the adjoining contour level at the lower peripheral areas of the dump. The width of the drains shall be around 1.5 m. A series of settling pits along with a main settling tank of 15 m length at the outlet of the garland drains will be provided to arrest the wash-off solid particles. The settling tank will be provided with three compartments each of around 5m width to arrest the suspended solids followed with the chamber to arrest any oil particles. The last chamber shall contain the clean water which will be ultimately discharged. The retaining walls will be of 1.5m height and 1.2 m width at the top and around 1.5m at the base.

9.3.5: NOISE
9.3.5.1: Critical Locations Identified within Lease Area *

Details of noise monitoring has been given in environmental monitoring report. Same has been attached as Annexure-32.

9.3.5.2: Give Detail about Prediction of Noise Level by using Mathematical Modeling at Different Locations Identified *

Due to operation of the HEMM & plant, ambient noise level is likely to increase but the same will be managed through proper maintenance of the plant & machineries & use of personal protective equipment.

9.3.5.3: Measures to Minimize the Impact on Receiving Environment *

- Regular maintenance of vehicles, machinery and other equipment is being done.
- Silencers and mufflers are provided in the exhaust.
- Limiting time exposure of workers to excessive noise.
- PPEs such as ear muffs, ear plugs have been provided to workers.

- Control blasting limits noise generation.

9.3.5.4: Noise Details for Base / Present Status

The copy of noise level baseline data has been given in environmental monitoring report. Same has been attached as Annexure-32.

| Noise Standards | | | |
|---|---|---|---|
| Area Code | Category of Area | Limits in dB(A)Leq | |
| | | Day Time | Night Time |
| A | Industrial Area | 75 | 70 |
| B | Commercial Area | 65 | 55 |
| C | Residential Area | 55 | 45 |
| D | Silence Area | 50 | 40 |

| Sl. No. | Station Name | Season | Type of Area | Noise At Day Time: | Excess Noise At Day | Noise At Night Time: | Excess Noise at Night | Date of Observation |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

9.3.5.5: Impact Assessment & Mitigation Measures:
9.3.5.5.1: Anticipated Impact (Give details on impact on ambient noise level due to rock excavation, transportation, processing equipment's & ancillaries):

The impact of noise on the workers due to rock excavation, transportation, processing equipment is very low.

9.3.5.5.2: Mitigation Measure (Give details on measures for noise abatement including point source & line source)
9.3.6: Vibration:
9.3.6.1: Vibration Details for Base / Present Status

The blast induced ground Vibration Study shall be carried out after resume of mining operation.

| Sl. No | Station | Season | Distance from Blasting Site(m) | Peak Particle Velocity(mm/sec) | Air over Pressure(DB) | Frequency (Hz) | Date of Observation |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

9.3.6.2.1: Anticipated Impact (Give details on impact of vibrations including damage to materials/structures due to blasting)

The residential houses/structures were located far away from the present workings. Thus no impact of blasting. Further control blasting as per the ground vibration study limits the vibration level.

9.3.6.2.2: Mitigation Measure (Give details on measures for noise abatement including point source & line source)

The blast induced ground vibrations will be controlled through limiting the charge per delay and use of in-hole delay by NONEL means of initiation. The blast induced ground Vibration Study shall be carried out after resume of mining operation.

9.3.7: Socio-Economic Environment:
9.3.7.1: Demographic Profile: The demographic data attached as Annexure-35.

| Sl. No. | Type of Area | Name of Village | Total Population | Male to Female Ratio | Literacy Rate (%) | Employment Rate (%) |
|---|---|---|---|---|---|---|
| The demographic data attached as Annexure-35. | | | | | | |

9.3.7.1.1: Anticipated Impact (Give details about impact on the cropping pattern & crop productivity in the core zone)

There shall be no impact on the cropping pattern & crop productivity in the core zone as the ore-bearing zone contains mainly shrub forest.

9.3.7.1.2: Mitigation Measure (Give details about compensation for loss of land & crops)

The compensatory afforestation plan will be implemented by the Forest Department.

9.3.7.2: Traditional Skills & Source of Livelihood-

9.3.7.2.1: Base / Present Status (Give details about present status on traditional skills & source of livelihood)

The mining employment has greatly increased the income levels of the natives. In addition, creation of comparatively well-paid jobs in the area has generated not only sizeable trade in household supplies (including vegetables, milk, food, textile, etc) but also some household employment. It has also generated demand for tertiary services like transport and repair shops. The impact of mining operations in the area on socio-economic has been a positive one. The infrastructure of the area roads, public transport and electricity supply, has also improved after the advent of mining operation in the area.

9.3.7.2.2: Anticipated Impact (Give details about positive & negative impacts on present status of livelihood in the area)

There will be no impact on the lively hood in the area.

9.3.7.2.3: Mitigation Measure (Give details about training to locals for employment in the project training for making them self-employable or elsewhere)

Employment generation in mining, transporting activities will be sustainable for the lively hood of nearby area.

9.3.7.3: Economic Profile of the Population in Core & Buffer Zone

9.3.7.3.1: Base / Present Status (Give details about economic profile of the population in core & buffer zone)

Occupational structure of the people of the study area reveals that about 14% have cultivation as primary source of income. Majority of them are engaged in service (28%). Substantial portion of the respondents have private business (14%). Wage labours constitute 44%.

9.3.7.3.2: Anticipated Impact (Give details about impact on community resources such as grazing land)

There is no impact on community resources such as grazing land due to mining activity.

9.3.7.3.3: Mitigation Measure (Give details about employment opportunities & access to other amenities such as education, health care facilities to be extended to locals, addressing local unemployment, tourism or recreation opportunities, efforts for sustainable development of the local community)

During the phase of mine expansion, substantial amount of employment and income are going to be created. A large portion of these is likely to trickle down to the local people. Besides this it is expected that for yearly operation of the project local people will get employment in various mining activities in accordance with their qualification, skill and experience. Besides direct employment, the project is expected to generate substantial indirect employment in semi-skilled labour, casual labour as also skilled labour in other sectors e.g. in the small scale industrial units and service centers etc. which are existing at present and also expected to come in the vicinity of the Projects. The indirect employment and income effects are likely to be much larger than the direct effects of the project. Overall assessment of the employment and income effects indicates that the project has strong positive direct as well as indirect impact on employment and income generation.

9.3.7.4: Human Settlement in Core & Buffer Zone

9.3.7.4.1: Base / Present Status*(Give details about human settlement in core & buffer zone)
Only Rantha, KhandadharR.F villages have been found in the 500 m buffer zone of the area.

9.3.7.4.2: Anticipated Impact *(Give details about any displacement of human settlements during the life of the mine)

There shall be no displacement of any human settlement during the life of the mine.

9.3.7.4.3: Mitigation Measure *(Give details about rehabilitation & resettlement of land ousters & displaced people)

There shall be no displacement of any human settlement during the life of the mine.

9.3.7.5: Health Profile of Population in Core & Buffer Zone

9.3.7.5.1: Base / Present Status*(Give details about health profile of population in core & buffer zone)

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factors of occupational health for the project are mainly dust, siltation etc. Safety of employees during operation and maintenance etc. shall be as per mines rules and regulations. To avoid any adverse effects on the health of workers due to various pollutants, sufficient measures have already been addressed in this chapter. The following measures relating to safety and health shall also be practiced:

- Provision of rest shelters for mine workers with amenities like drinking water etc.
- All safety measures like use of safety appliances, safety awards, posters, slogans related to safety etc.
- Training of employees for use of safety appliances and first aid.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a medical specialist so that any adverse effect may be detected in its early stage.
- First Aid organization in mines including training and retraining of First Aiders.
- Close surveillance of the factors in working environment and work practices, which may affect environment and worker's health. Monitoring of the values of various factors which may lead to occupational health hazards.
- Working of mine as per approved mining and environmental plans.

9.3.7.5.2: Anticipated Impact *(Give details about any adverse impact on the general health condition of the population in core & buffer zone)

The population in core and buffer will not have any adverse impact on the general health condition as the mining site is far away.

9.3.7.5.3: Mitigation Measure *(Give details about avenues like dispensaries, hospitals, maternity homes if any to be created)

Not Applicable.

9.3.7.6: Historically, Culturally & Ecologically Important Places in Core & Buffer Zone-

9.3.7.6.1: Base / Present Status*(Give details about historically, culturally & ecologically important places in core & buffer zone)

There is no historically, culturally & ecologically important places in core & buffer zone of the lease.
9.3.7.6.2: Anticipated Impact *(Give details about risk profiling)

Not Applicable.
9.3.7.6.3: Mitigation Measure *(Give details about public health benefits (e.g. clean water to an aboriginal community), measure for safeguard against damage etc.)

Not Applicable.