

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL**  
**EASTERN ZONE BENCH, KOLKATA**  
**(THROUGH PHYSICAL HEARING WITH HYBRID MODE)**

**Appeal No. 09/2025/EZ**

IN THE MATTER OF: -

Ajaya Muduli & Ors.-----Appellant(s)

Versus

State Level Environment Impact  
Assessment Authority, Odisha & Anr.-----Respondent(s)

**AFFIDAVIT ON BEHALF OF THE OPPOSITE  
PARTY/RESPONDENT NO.01 STATE ENVIRONMENT IMPACT  
ASSESSMENT AUTHORITY (SEIAA), ODISHA**

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Place: Bhubaneswar  
Date: 17/03/2026

**Shri Apurba Ghosh**  
Advocate for Respondent No.01  
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**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL**  
**EASTERN ZONE BENCH, KOLKATA**  
**(THROUGH PHYSICAL HEARING WITH HYBRID MODE)**

**Appeal No. 09/2025/EZ**

17 MAR 2026

IN THE MATTER OF: -

Ajaya Muduli & Ors.-----Appellant(s)

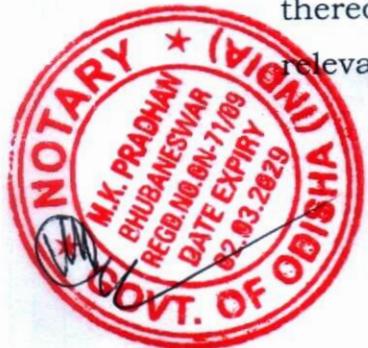
Versus

State Level Environment Impact  
Assessment Authority, Odisha & Anr.-----Respondent(s)

**AFFIDAVIT ON BEHALF OF THE OPPOSITE**  
**PARTY/RESPONDENT NO.01 STATE ENVIRONMENT IMPACT**  
**ASSESSMENT AUTHORITY (SEIAA), ODISHA**

1. Shri K. S. Pradeep, IFS, son of late K. Sivaraman aged about 45 years, at present working as Member Secretary, State Environment Impact Assessment Authority, Odisha, do hereby solemnly affirm and state as follows.
2. That I am the deponent in this affidavit and I have been duly authorized to swear this affidavit on behalf of the Opposite Party No.01 before this Hon'ble National Green Tribunal.
3. That, I have gone through the appeal petition and Hon'ble Court order dated. 21.11.2025 and understood the contents thereof. I am well acquainted with the facts of the case and the relevant official records. Any contention, allegation or averment

*Amul*  
MEMBER SECRETARY  
State E.I.A Authority  
Orissa, Bhubaneswar



not dealt with in the present affidavit shall be construed as denied.

4. That in reply to the averments made in the Para-01 to Para-02 of the appeal petition, the deponent humbly submits the following facts in chronological order for the kind consideration and better appreciation of the Hon'ble NGT, EZ, Kolkata:

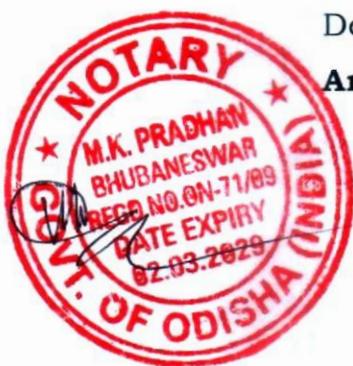
- (i) **01.03.2023:** Letter of intent (LOI) vide letter no. 2143 dated 01.03.2023 was issued by the Steel & Mines Department, Government of Odisha for grant of mining lease for mining of Bauxite from Ballada Bauxite Mines in Ballada village of Nandapur Tahasil of Koraput District over 144.945 hectare area in favour of M/s. Mundra Aluminium Limited for a period of 50 (fifty) years through e-auction.

The copy of Letter of Intent issued by the Steel & Mines Department, Government of Odisha vide letter no. 2143 dated 01.03.2023 is attached in **Annexure-I.**

- (ii) **09.06.2023:** The Change in name of entity from "M/s. Mundra Aluminium Limited" to Kalinga Alumina Limited was made vide letter no. 5995 dated 09.06.2023 of Steel & Mines Department, Government of Odisha

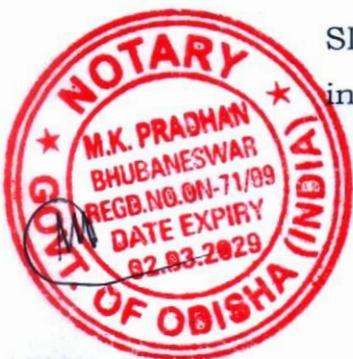
The copy of Change in name of entity from "M/s. Mundra Aluminium Limited" to Kalinga Alumina Limited issued vide letter no. 5995 dated 09.06.2023 of Steel & Mines Department, Government of Odisha is attached in **Annexure-II.**

  
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- (v) **01.09.2023:** The Project Proponent (PP) M/s. Kalinga Alumina Limited vide online application no. SIA/OR/MIN/439954/2023 dated 01.09.2023 has submitted Terms of Reference (ToR) application to the State level Expert Appraisal Committee (SEAC), Odisha for Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village-Ballada, Taluka-Nandapur, District-Koraput, Odisha.
- (vi) **22.09.2023:** The proposal was placed in SEAC meeting held on 22.09.2023 and after detailed discussion, the SEAC recommended the proposal for issues of ToR with stipulated standard and specific conditions for EIA (Environmental Impact Assessment), EMP (Environmental Management Plan) and Public Hearing.
- (vii) **06.11.2023:** Then, the ToR proposal was placed in 141<sup>st</sup> SEIAA, Odisha meeting held on 02.11.2023 and as per the SEAC recommendation, the Authority approved the ToR with standard and specific stipulation for Environmental Impact Assessment (EIA) studies along with Public Hearing. Accordingly, the ToR letter was issued vide file no. SIA/OR/MIN/439954/2023 dated 06.11.2023.

The copy of ToR letter issued vide file no. SIA/OR/MIN/439954/2023 dated 06.11.2023 is attached in **Annexure-IV**.



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- (iii) **08.08.2023:** Mining Plan along with Progressive Mine Closer Plan in respect of Ballada Block Mining Lease for Bauxite Ore over an area of 144.945 Ha in Ballada Village, Tahasil-Nandapur, District-Koraput of Odisha State in favour of M/s. Kalinga Alumina Ltd. was approved vide letter no. MCDR-MiFLOBXT/5/2023-BBS-IBM\_RO\_BBS dated 08.08.2025.

The copy of Approved Mining Plan issued vide letter no. MCDR-MiFLOBXT/5/2023-BBS-IBM\_RO\_BBS dated 08.08.2025 is attached in **Annexure-III**.

- (iv) **01.09.2023:** Forest Clearance (FC) application was submitted vide proposal no. FP/OR/MIN/QRY/442417/2023 dated 01.09.2023 to Ministry of Forest Environment & Climate Change, Govt. of India by the project proponent for Ballada Block for virgin bauxite block mines located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari Reserve Forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application was submitted for 157.212 ha lease area.

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(viii) **30.08.2023:** The Regional Officer of MoEF & CC, Bhubaneswar has issued in-principle approval letter vide letter no. FP/OR/SRY/429025/2023 dated 30.08.2023 for diversion of forest land over 6.05 ha within total mining lease of 144.945 ha of Bauxite Ore in Ballada bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District under Forest Division of M/s. Kalinga Alumina Limited, Odisha.

The copy of in-principle approval for diversion of forest land over an area of 6.05 ha out of the total mining lease area 144.945 ha from Ballada Bauxite Ore Mines issued vide letter no. FP/OR/SRY/429025/2023 dated 30.08.2023 is attached in **Annexure-V**.

(ix) **14.05.2024:** The Regional Officer of MoEF & CC, Bhubaneswar was issued final approval letter vide letter no. FP/OR/SRY/429025/2023 dated 14.05.2024 for diversion of forest land over an area of 6.05 ha within total mining lease of 144.945 ha of Bauxite Ore in Ballada bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District under Koraput Forest Division of Kalinga Alumina Limited, Odisha.

The copy of final approval for diversion of forest land over 6.05 ha of total mining lease of 144.945 ha of Bauxite Ore in Ballada bauxite Mines issued vide letter no.

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FP/OR/SRY/429025/2023 dated 14.05.2024 is attached in **Annexure-VI**.

- (x) **23.12.2024:** The project proponent has obtained Stage-I Forest Clearance (FC) from Ministry of Environment, Forest and Climate Change (MoEF & CC), Government of India vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024 in favour of M/s. Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada bauxite Mines within Mining Lease area of 144.945 ha of Odisha.

The copy of Stage-I Forest Clearance for diversion of forest land for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada bauxite Mines within Mining Lease area of 144.945 ha of Odisha is attached in **Annexure-VII**.

- (xi) **06.03.2025:** As per the ToR, the Public Hearing was conducted on 06.03.2025 by the Regional Officer of State Pollution Control Board along with Additional District Magistrate, Koraput, Odisha at Bheja village of Nandapur Tahasil in Koraput District, Odisha.



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Bhubaneswar

- (xii) **13.05.2025:** The project proponent/respondent no. 02 has submitted online application vide proposal no. SIA/OR/MIN/536061/2025 dated 13/05/2025 to State Level Expert Appraisal Committee (SEAC) for grant of prior Environmental Clearance (EC) to the project for mining of Bauxite from Ballada Bauxite Mine (ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m<sup>3</sup>) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil Nandapur, District-Koraput in favour of M/s. Kalinga Alumina Ltd.
- (xiii) **23.07.2025:** The project proposal was placed in SEAC meeting held on 23.07.2025 and after appraisal, the SEAC has recommended the proposal for grant of Environmental Clearance valid for a period of 10 years, stipulating various conditions (standard & specific).
- (xiv) **01.09.2025:** Then, the matter was again examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 230<sup>th</sup> meeting held on 19.08.2025 for grant of EC based on the recommendation of SEAC and in accordance with the EIA Notification, 2006 and further amendments thereto. After detailed deliberation, the authority approved the recommendation of SEAC and accorded EC valid for a period of 10 years from the date of issue of this letter for a production capacity of 4.0

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MTPA Bauxite (ROM) and Crushing/Screening facilities of 800 TPH capacity along with standard and specific conditions as recommended by SEAC. Accordingly, EC letter was issued vide EC Identification No. EC25B0000OR5647645N dated 01.09.2025.

The copy of environmental clearance (EC) letter issued vide EC Identification no. EC25B0000OR5647645N dated 01.09.2025 is attached in **Annexure-VIII**.

5. That, in reply to the averments made in the Para-03 of the appeal petition, deponent humbly submits that ToR has been issued by SEIAA, Odisha to project proponent vide letter no. SIA/OR/MIN/439954/2023 dated 06.11.2023 based on SEAC recommendation and documents submitted by the applicant i.e. letter of intent (LoI) issued by the Steel & Mines Department, Government of Odisha vide letter no. 2143 dated 01.03.2023 through e-auction, the documents/information submitted by the Quality Council of India (QCI) and National Accreditation Board for Education and Training (NABET) approved consultant M/s. Vardan Environment on behalf of present proponent. Based on the ToR, the EIA studies of the project area were conducted by NABET consultant along with public hearing held on 06.03.2025 and the same was appraised by SEAC, Odisha. Further, the proposal was approved by SEIAA, Odisha in 230<sup>th</sup> Meeting held on 19.08.2025 in due procedure as per the EIA Notification,2006 and amended therein.

*[Signature]*  
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Bhubaneswar



6. That, in reply to the averments made in the Para-04 to Para-11 of the appeal petition, deponent humbly submits that, the details about the mining lease area, and its peripheral area, a cave located in the mining lease area and mining impact on caves, local habitation, agricultural land, socio-economic impact due to mining activities, flora and fauna and its impact due to mining and its mitigation measure are elaborated in the final EIA (Environmental Impact Assessment) report and EMP (Environmental Management) report, the Wildlife Conservation Plan Prepared by the Divisional Forest Officer, Koraput Forest Division, Stage-I Forest Clearance and also in Public Hearing Proceeding. Accordingly, both specific and standard conditions were given in EC Identification No. EC25B0000OR5647645N dated 01.09.2025. In the final EIA and EMP report including Public Hearing proceeding, it is mentioned that the Forest Right Act (FRA), Rehabilitation and Resettlement Plan is not required for this mining project as no habitation exist in the mining lease area and it is a government land (Forest Land) was mentioned by the proponent/respondent no. 02 for this case.

7. That, in reply to the averments made in the Para-12 of the appeal, deponent humbly submits that the averments are matters on record and this deponent has no comments to offer.

8. That, in reply to the averments made in the Para-13 to Para-17 of the original petition, deponent humbly submits that different Authorities have issued clearance/approval/permission in different period of time i.e. (i). Mining Lease was granted by Steel & Mines Dept., Govt. of Odisha vide letter no.2143 dated

*Prashant*  
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Orissa, Bhubaneswar



01.03.2025, (ii). Mining Plan was approved vide letter no. MCDR-MiFLOBXT/5/2023-BBS-IBM\_RO\_BBS dated 08.08.2025, (iii). Stage-1 FC was granted by MoEF & CC, Govt. of India vide file no. FP/OR/MIN/QRY/456733/2023 on 23.12.2024, (iv). EIA and EMP was prepared by NABET consultant and Public Hearing was conducted on 06.03.2025 by the Regional Officer, Koraput State Pollution Control Board, Odisha in collaboration with Additional District Magistrate, Koraput, Odisha. (v). The SEAC recommended the proposal for grant of EC in its meeting held on 23.07.2025. Then, the Authority SEIAA, Odisha has granted prior environmental clearance (EC) for the said project after examining the above approval/permission/clearance of different authorities following in due procedure. The details on Culture and Aesthetic Attribute and Socio-economic Survey and details issues raised in Public Hearing on protection of cave, which is a place of worship in that locality and same is falling within the lease area was discussed in SEAC appraisal. In reply of the SEAC clarification the project proponent had submitted their reply stating that no mining activity will be carried out within 100m distance from the Cave. Hence, the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. District Administration is also intent for the beautification of Cave and accordingly, specific conditions given in EC letter for implementation the same.

  
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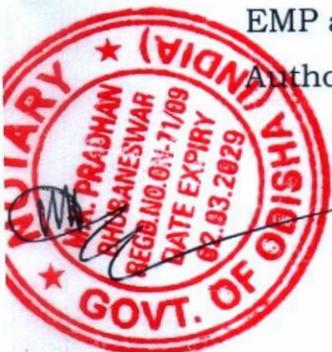
9. That, in reply to the averments made in the Para-18 and Para-19 of the appeal petition, deponent humbly submits that the averments are matters on record and this deponent has no



comments to offer.

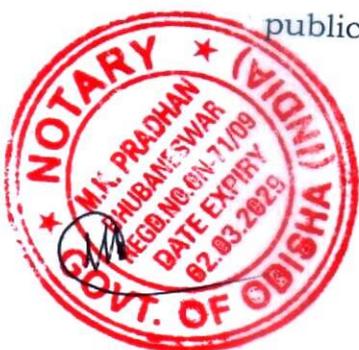
10. That, in reply to the averments made in the Para-20 of the appeal petition, deponent humbly submits that the Environmental Clearance (EC) for the said mining project was issued in due procedure and on the basis of SEAC recommendation and documents submitted by the project proponent.
11. That, in reply to the averments made in the Para-21 to Para-22 of the appeal petition, deponent humbly submits that as per EIA Notification and amended therein for B1-category projects in respect of any mining projects, the Terms of Reference (ToR) and EIA studies along Public Hearing are mandatory before grant of any prior EC. In this case project proponent along with NABET consultant has submitted ToR application to SEAC in Parivesh Portal 2.0 vide application No. SIA/OR/MIN/439954/2023 dated 01.09.2023 for Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 Mtpa over a Mining lease area of 144.945 Ha at Village-Ballada, Taluka-Nandapur, District- Koraput, Odisha with attaching approved Mining Plan, Letter of Intent for Ballada Bauxite Block, Pre-Feasibility Report (PFR), etc. The scrutiny and appraisal of the project proposal was done by SEAC based on the documents and presentation made by the consultant before Stale Level Expert Appraisal Committee (SEAC) and accordingly, the SEAC recommended the standard and specific ToR for EIA studies, EMP and Public Hearing and then the ToR was approved by the Authority, SEIAA, Odisha. The information submitted by the

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State E.I.A Authority  
Orissa, Bhubaneswar



project proponent and consultant to SEAC in Form-1 online application form based on preliminary studies and later the details information has been submitted by the project proponent which is highlighted in EC application form, Stage-1 Forest Clearance approval letter, Wildlife Conservation Plan prepared by Division Forest Officer, Koraput Forest Division, Koraput, Final EIA and EMP report, Public Hearing proceeding, presentation made project proponent before SEAC and reply of project proponent on SEAC clarification etc.

12. That, in reply to the averments made in the Para-23 to Para-36 of the appeal petition, deponent humbly submits that based on the recommendation of SEAC for the mining project, the ToR was issued by SEIAA, Odisha on 06.11.2023 for study of EIA and EMP along with Public Hearing before issue of prior EC. The EIA Notification, 2006 and amended therein speak that based on the ToR, the NABET consultant has to carry out the details EIA studies of the proposed project based on the standard and specific condition stipulated in the ToR letter. After EIA studies, the consultant has to prepared draft EIA and EMP report and the same to be submitted to concerned State Pollution Control Board with request to conduct public hearing in due procedure and forward the proceedings to the regulatory authority concerned within 45 (forty-five) of a request to the effect from the applicant. In this case the Public Hearing was conducted on 06.03.2025 headed by Regional Officer, SPCB, Koraput and Additional District Magistrate, Koraput and the details complaint made in appeal petition is addressed in the public hearing Proceeding.



MEMBER SECRETARY  
State E.I.A Authority  
Chirbhaneswar

13. That, in reply to the averments made in Para-37 to Para-96 of the appeal petition, the deponent humbly submits that as per the ToR conditions, the EIA study was carried out by NABET consultant M/s. Vardan Environet. Accordingly, the EMP, including Public Hearing proceedings was prepared. The Final EIA, EMP, and Public Hearing proceedings were submitted during the EC application to the SEAC by the project proponent and a detailed presentation was made by the project proponent along with consultant before SEAC. After verifying the EIA and EMP and receiving clarification on raised points, the SEAC appraised the proposal and recommended to grant of environmental clearance (EC). Based on the recommendations of SEAC, the Authority, SEIAA, Odisha accorded the EC (Identification No. EC25B0000OR5647645N) on 01.09.2025 for the project of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village-Ballada, Taluka-Nandapur, District-Koraput, Odisha with stipulated standard and specific conditions.

14. That the deponent reserves the right to file further affidavit as and when necessary.

15. That the facts stated above in this counter affidavit are true to the best of my knowledge and belief which are based on official records that I believe to be true.

Identified by  
  
Advocate  
*M.K. Pradhan*

SWORN BEFORE ME

*[Signature]*  
MEMBER SECRETARY  
State E.I.A Authority  
Orissa, Bhubaneswar  
Deponent

  
13

MANJULA KUMAR PRADHAN  
NOTARY PUBLIC  
BHUBANESWAR  
REGD. NO. ON-71/2009  
PH - 9437627119 (M)  
*[Signature]*

**VERIFICATION**

Verified at Bhubaneswar on this day of 17 MAR 2026  
that the contents of the above affidavits are true and correct on  
the basis of the records maintained by the respondent in the daily  
course of its business, no part of it is false and nothing has been  
concealed therefore.

Place: Bhubaneswar

Date: 17 MAR 2026

**SWORN BEFORE ME**



**MANJULA KUMAR PRADHAN  
NOTARY PUBLIC  
BHUBANESWAR  
REGD. NO. ON-71/2009  
PH - 9437627112 (M)**

*[Signature]*  
17/03/26  
**Deponent**  
MEMBER SECRETARY  
State E.I.A Authority  
Orissa, Bhubaneswar

*[Signature]*  
17/03/26

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GOVERNMENT OF ODISHA  
STEEL & MINES DEPARTMENT

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No. 2143 /S&M, Bhubaneswar, dated the 01.03.2023  
SM-MC2-MC-0007-2023

From

Sri S.K.Swain,  
Special Secretary to Government.

To

Mundra Aluminium Limited,  
10<sup>th</sup> Floor (East Wing), Adani Corporate House,  
Shantigram, Near Vaishno Devi Circle,  
S. G. Highway, Khodiyar,  
Ahmedabad-382421  
Email – [k.anilkumar@adani.com](mailto:k.anilkumar@adani.com)

**Sub:** Letter of intent with reference to e-auction dated 15.02.2023 for grant of mining lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area.

**1. Background:**

**1.1** Government of Odisha, pursuant to the Mines and Minerals (Development and Regulation) Act, 1957 (the "Act") and the Mineral (Auction) Rules, 2015 as amended from time to time (the "Auction Rules"), issued the Notice Inviting Tender (NIT) dated 23.11.2022 to commence the auction process for grant of mining lease for Ballada Bauxite Block located in Koraput District of Odisha. The e-auction process was conducted in accordance with the tender document for the said mineral block and Mundra Aluminium Limited was declared as the 'Preferred Bidder' under Rule 9(9)(iii) or Rule 10 (1A) of Auction Rules, having quoted a Final Price Offer of 72.25 %.

**1.2** As required under Rule 10(1) or Rule 10 (1A) of the Auction Rules and the tender document for the said mineral block, Mundra Aluminium Limited has made payment of the first instalment of Rs.6,68,41,122/- (Rupees Six Crore Sixty Eight Lakh Forty One Thousand One Hundred Twenty Two) being 20% (twenty percent) of the upfront payment through e-challan Reference Id-359A9C0976 dtd.27.02.2023 at Koraput, Odisha.



SM-MC2-MC-0007-2023/1/2023

## 2. Grant of Letter of Intent

Accordingly, pursuant to Rule 10(2) of the Auction Rules and the terms of the Tender Document, the Government of Odisha is pleased to issue this letter of intent for grant of Mining Lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area to Mundra Aluminium Limited for a period of 50 (fifty) years.

## 3. Conditions

3.1 This letter of intent and the subsequent grant of aforementioned mining lease shall be subject to the provisions of the Act and the Rules made thereunder, as amended from time to time, and Mundra Aluminium Limited shall be designated as the 'successful bidder' and subsequently granted the mining lease only upon satisfactory completion of all the requirements under the Acts and Rules made thereunder.

The State Government may impose such other conditions in the Mine Development and Production Agreement (MDPA) and/or Mining Lease as may be considered by the State Government to be in the interest of mineral development and in public interest.

Mundra Aluminium Limited shall be bound by (i) the enactment, bringing into effect, adoption, promulgation, amendment, modification or repeal of any Applicable Laws (including the Act and Rules) occurring at any time, including prior to or after the Bid Due Date; (ii) any amendments made by the State Government to this effect in the Tender Document, the letter of intent, the MDPA and/or the mining lease deed at any time, including prior to or after the Bid Due Date.

Mundra Aluminium Limited shall ensure that the Bid Security is valid until the Performance Security is furnished to the Government of Odisha.

3.2 For reference, the requirements under the Auction Rules for designation of Mundra Aluminium Limited as the "successful bidder" and subsequent grant of the mining lease are reiterated below. It is clarified that the requirements mentioned below are only for reference and in the event of any change in the Act or the Rules made thereunder, the requirements under the modified Act or the Rules made thereunder, as the case may be, shall be applicable.

a. Designation as the "Successful Bidder":

Mundra Aluminium Limited shall be considered to be the "successful bidder" upon:

- i. continuing to be in compliance with all the terms and conditions of eligibility;



- ii. payment of the second instalment being 20% (twenty per cent.) of the upfront payment;
- iii. furnishing an irrevocable and unconditional performance security to the State Government from an Acceptable Bank and payable at Bhubaneswar, Odisha, pursuant to the Auction Rules; and
- iv. satisfying the conditions specified in clause (b) of sub-section (2) of Section 5 of the Act with respect to a mining plan.

b. Signing of the Mine Development and Production Agreement

Mundra Aluminium Limited shall sign the Mine Development and Production Agreement with the Government of Odisha upon obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

c. Grant of mining lease

Subsequent to signing of the Mine Development and Production Agreement, Mundra Aluminium Limited shall make payment of the third instalment being 60% (sixty per cent) of the upfront payment and thereafter the Government of Odisha shall grant the aforementioned mining lease.

#### 4. Validity

4.1 This letter of intent is valid for a period of 3 (Three) years from the date of its issuance, within which time all the above conditions must be fulfilled and the Mining Lease deed must be executed between the Mundra Aluminium Limited and the Government of Odisha. In case there is a delay in execution of Mining Lease Deed due to reasons beyond the control of the Preferred Bidder, then it may submit an application to Government of Odisha, requesting for further extension.

4.2 If the Government of Odisha is satisfied that there is a delay in execution of Mining Lease Deed due to reasons beyond the control of the Preferred Bidder and a longer period is required to enable the Preferred Bidder to satisfy all or any of the above conditions, it may extend the validity of this letter of intent for such period or periods as the Government of Odisha may specify. Provided that: (a) this letter of intent shall be extended for a maximum period of 2 (two) years; and (b) the total period for which this letter of intent would remain valid must not exceed 5 (five) years from the date of issuance.

4.3 The holder of the Letter of Intent shall comply with the terms and conditions of this Letter of Intent, including executing the Mining Lease within the period referred to in Sub-rule 6 of Rule 10 of the Auction Rules, failing which:

- (a) this Letter of Intent shall be revoked; and
- (b) the Bid Security or the Performance Security, as the case may be, and

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any instalment of Upfront Payment paid, shall be forfeited and appropriated in full by the State Government.

Mundra Aluminium Limited shall furnish acceptance of the terms and conditions of Letter of Intent within 15 (Fifteen) days from the date of issue of this letter.

Yours faithfully,

  
01.03.2023

Special Secretary to Government

Memo No. 2144 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar/ the Deputy Director of Mines, Koraput for information and necessary action.

  
01.03.2023

Special Secretary to Government

Memo No. 2145 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Collector, Koraput for information and necessary action.

  
01.03.2023

Special Secretary to Government

**GOVERNMENT OF ODISHA  
STEEL & MINES DEPARTMENT**

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**PROCEEDING**

No. 5995 /SM, Bhubaneswar, Date 09.06.2023  
**SM-MC2-MC-0012-2023**

Sub: Change in name of entity from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" - **reg.**

**ORDER**

**Whereas**, "Mundra Aluminium Limited", a wholly owned subsidiary of Adani Enterprises Limited, took part in the e-auction process and declared as preferred bidder in respect two Bauxite Blocks Kutrumali and Ballada Bauxite Block. Accordingly, Letters of Intent (LoI) were issued in favour of "Mundra Aluminium Limited" on 27.02.2023 and 01.03.2023 for Kutrumali and Ballada bauxite mines respectively.

**And whereas**, Adani Enterprises Limited, being the holder of mineral concession, vide representation dated 04.04.2023 intimated the State Government regarding change of name from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" w.e.f. 30.03.2023. This name change has also been approved by Registrar of Companies, Ministry of Corporate Affairs, Government of India and issued Certificate of Incorporation on 30.03.2023 as per Rule-29 of the Companies (Incorporation) Rules, 2019.

**And whereas**, the company has also submitted that this change is a mere change in name and there is no change in the corporate structure, Memorandum and Articles of Association and the shareholding pattern. The renamed entity will continue to be a wholly owned subsidiary of Adani Enterprises Limited, in compliance with clause 5 (b) of the tender documents published under Notice Inviting Tender Dated 23.11.2022.

Therefore, , the State Government, after careful consideration have been pleased to allow the change of name from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" as per rule 61 of MC Rules, 2016 w.e.f.

As

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30.03.2023 at all places wherever the company is required to display its name without change in the corporate structure, Memorandum and Articles of Association and the share holding partners in terms of section 12 of the companies Act, 1956

By order of the Governor

A. K. Saha  
9/6/23  
Additional Secretary to Government

Memo No. 5996 /SM,

Dated: 09.06.2023

Copy forwarded to the CEO-Aluminium Business, 10th Floor (East Wing), Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad-382421 for information and necessary action.

A. K. Saha  
9/6/23  
Additional Secretary to Government

Memo No. 5997 /SM,

Dated: 09.06.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar for information and necessary action.

A. K. Saha  
9/6/23  
Additional Secretary to Government

Memo No. 5998 /SM,

Dated: 09.06.2023

Copy forwarded to the Collector, Kalahandi/Collector, Rayagada for information and necessary action.

A. K. Saha  
9/6/23  
Additional Secretary to Government  
Dated: 09.06.2023

Memo No. 5999 /SM,

Copy forwarded to the Deputy Director of Mines, Koraput/ DFO, Koraput for information and necessary action.

A. K. Saha  
9/6/23  
Additional Secretary to Government



# **MINING PLAN ALONG WITH PROGRESSIVE MINE CLOSURE PLAN**

**(Submitted for Approval Under Rule 16 of MCR, 2016)**

**For**

## **"BALLADA BAUXITE BLOCK"**

**(BLOCK AREA -144.945 ha.)**

**Village- Ballada, Tehsil- Nandapur,**

**District- Koraput, State- Odisha**

**(Open Cast- category A- Fully Mechanized Mine)**

**Type of Land- Nagasari Reserve Forest, 144.945 Ha.**

**Of**

## **M/s KALINGA ALUMINA LIMITED**

**(Formerly known as Mundra Aluminium Limited).**

**Prepared by**

### **Deepak Rathod**

**M. Tech (Mineral Exploration)**

**M. Sc. (Applied Geology)**

**Qualified Person**



**MINING TECH CONSULTANCY SERVICES PVT LTD**

**Adani Corporate House, Shantigram, SG Highway**

**Ahmedabad-382421, Gujarat, India**

**[info@mtcspl.com](mailto:info@mtcspl.com) | [www.mtcspl.com](http://www.mtcspl.com)**

By e-mail

**GOVERNMENT OF INDIA  
MINISTRY OF MINES  
INDIAN BUREAU OF MINES  
OFFICE OF THE REGIONAL CONTROLLER OF MINES, BHUBANESHWAR**

No. MCDR-MiFL0BXT/5/2023-BBS-IBM\_RO\_BBS

Dt : 08/08/2023

Shri/M/s. KALINGA ALUMINA LIMITED ,

Adani Corporate House, Shantigram Near Vaishnodevi Circle, SG Highway, Khodiyar Khodiyar

Ballada Bauxite Block (PB93)

**Sub** Approval of the Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of BALLADA BLOCK Mining Lease for  
: Bauxite Ore over an area of 144.945 ha of M/s Kalinga Alumina Ltd, situated in Ballada Village, Padua Taluka, Koraput District of Odisha State

Sir,

In exercise of the powers conferred by clause (b) of sub-section (2) of section 5 of the Mines & Minerals (Development & Regulation) Act, 1957 and clause (3) of Rule 16 of the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 read with Government of India Order No. S.O. 1857(E) dated 18th May, 2016; I hereby **Approve** the Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of BALLADA BLOCK Mining Lease Area for Bauxite Ore over an area of 144.945 ha of M/s.Kalinga Alumina Ltd, situated in Ballada Village, Padua Taluka, Koraput District of Odisha State. This approval is subject to the following conditions:-

**A--General Conditions:**

- (1). The Mining Plan is approved without prejudice to any other law applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.
- (2). That this approval of aforesaid Mining Plan does not in any way imply the approval of the Government in terms of any other provision of Mines & Minerals (Development & Regulation) Act, 1957, or the Mineral Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 or the rules made there under and other relevant statutes, order and guidelines as may be applicable to the lease area from time to time
- (3). The provisions of the Mines Act, 1952 and Rules and Regulations made thereunder including submission of notices of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.
- (4).The execution of Mining Plan shall be subjected to vacations of prohibitory orders / notices, if any.
- (5). If anything is found to be concealed as required by the Mines Act in the contents of the mining plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- (6). This approval for proposed mining operations and associated activities is restricted to the mining lease area only from this date. The mining lease area is as shown on the statutory plans by the Lessee/QP/Applicant and Indian Bureau of Mines has not undertaken any survey verification of mining lease boundary on the ground.
- (7). Your attention is invited to the Supreme Court interim order in W.P. (C) No. 202 dated 12.12.1996 for compliance. The approval of above said Mining Plan is therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.
- (8).This department does not undertake any responsibility regarding correctness of the boundaries of the lease area shown on the ground.
- (9). At any stage, if it is observed that the information furnished in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.
- (10). If this approval conflicts with any other law or court order/ Direction under any statute, it shall be revoked immediately.
- (11). It shall be mandatory for the project proponent, abstracting ground water, to obtain "No Objection Certificate" from Central Ground Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be.

(12). Lessee shall ensure grassing/re-grassing of worked out mining lease area in accordance with Hon'ble Supreme Court Order dated 8/1/2020.

(13). Validity of excavation proposal of this document shall expire within 5 (five) financial year from execution of the mining lease.

(14).The next Review of Mining Plan for the subsequent period of five years shall become due 180 days before expiry of this document proposal period.

(15) Copy of the Lease deed, MDPA signed and performance security deposited to the State Government to be submitted before commencement of mining operation.

(16) The feasibility report considered for reserve/resource estimation as per UNFC is submitted by the preferred bidder / lessee which is prepared based on the current data as reported and it may not establishes the future economic viability of mining project, which may be affected by the market dynamics and other related factors.

(17) Disposal of OB/Waste as minor mineral shall be carried out only after obtaining permission under Rule 12(1)(k) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Yours Faithfully

Ballada Bauxite Block (PB93)

(B.L.GURJAR)

Regional Controller of Mines,

Indian Bureau of Mines, Bhubaneswar

Copy for information to:-

(1).The Controller of Mines (EZ), Indian Bureau of Mines, CP-13, Sector V, Salt Lake City, Kolkata- 700 091 by mail. [zo.kol@ibm.gov.in](mailto:zo.kol@ibm.gov.in)

(2). The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, Bhubaneswar- 751001, Email- [directorateofmines@orissaminerals.gov.in](mailto:directorateofmines@orissaminerals.gov.in).

(3). The Director of Mines Safety, Bhubaneswar, Email-dgmsbbsr@gmail.com

(4).Qualified Person by mail- [deepak.rathod@mtcspl.com](mailto:deepak.rathod@mtcspl.com)

(5). Concerned MCDR file.

**Chapter 1 : General Information****1.1 : Lease Details**

IBM Registration Number :	IBM/45445/2023
Lease Code :	PB93
Mine Code :	Nil
Name of Lessee :	KALINGA ALUMINA LIMITED
Address of Lessee :	Adani Corporate House, Shantigram Near Vaishnodevi Circle, SG Highway, Khodiyar Khodiyar
Type of Lessee :	Private
Name of Mining Lease :	Ballada Bauxite Block
State :	ODISHA
District :	KORAPUT
Tehsil/ Taluk/ Mandal :	Padua
Village :	Balda
Lease Area (Ha) :	144.945
Forest Area (Ha) :	144.9450
Name of Minerals :	BAUXITE

Ballada Bauxite Block (PB93)

Name of associated minerals :	
Type :	Fresh Grant
Period of the proposal (FY) from :	Nil
Period of the proposal (FY) to :	Nil
Type of working :	Opencast
Nature of Use :	Non Captive
Category of Mine :	Category A

**1.1.1 : Initial/subsequent Lease grant details**

Grant	From	To	Lease deed execution date	Lease registration date
Nil	Nil	Nil	Nil	Nil

**1.1.2 : Mining Plan Submission Criteria Details**

Type of Document :	Mining Plan Under Rule 16(1) Of MCR 2016
LOI Number :	SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar
Date :	01/03/2023

**1.2 : Land Ownership Details**

View Land Ownership Details Excel	<a href="#">Land_Ownership_Details.xlsx</a>
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**1.3 : Existing Lease**

Date of Execution :	Nil
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**1.3.1 : Approval of earlier Mining Plan & Its Subsequent Review in Chronological Order**

S.N.	Letter Number	Date	Period		Type Of Approved Document	Remark
			From	To		
1	NA	Nil	Nil	Nil	Nil	Fresh Grant

**1.3.2 : Partial Surrenderd Area During Stages of Operations in Chronological Order**

Not Applicable

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

Not Applicable

**1.3.4 : Statutory Compliances****1.3.4.1 : Environment Clearance**

Applicable :	No
Letter No :	Nil
Date :	Nil
Validity :	Nil

ROM Mineral :	Nil
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**1.3.4.2 : SPCB Approvals**

Letter No :	Nil
Approval of :	Nil
Date :	Nil
Validity :	Nil
ROM Mineral :	Nil

**1.3.4.3 : Forest Clearance**

Applicable :	No
Letter No :	Nil
Date :	Nil
Validity :	Nil
Area (Ha) :	Nil

**1.3.4.4 : Land Acquisition Details**

Total Area Acquired in hectare:	0.0000
Total Amount Paid (INR) :	0.0000

**1.3.5 : Mine Location Details**

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Toposheet Number :

E44K11 (65 J/11)

**1.3.5.1 : Location of Boundary Pillars**

View Location of Boundary Pillars Excel

[location\\_boundary\\_pillar.xlsx](#)**1.3.6 : Owner/Nominated Owner Details**

Name	PAN of owner / Nominated Owner	Address of owner/ Nominated Owner	Mobile Number	Email	Please attach Minutes of Board Resolution in case of Nominated Owner
Ajit Kumar Samal	AGXPS6861N	902 Glen Dale Hiranadani Garden Powai Maharashtra	9820316442	ajit.samal@adani.com	<a href="#">A5_CTC_Owner_of_Mine.pdf</a>

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

S.N.	Prefix	Name	PAN of QP	Address	Mobile no.	Qualification	Exp in years as prescribed under the rule	Email
1	Mr	Deepak Rathod	ACXPR5593G	Mining Tech Consultancy Services Private Limited, Adani Corporate House, Shantigram, Near Vaishno Devi Circle, SG Highway Khodiyar Ahmedabad -382421 Gujarat	6358935667	MSc Applied Geology MTech Mineral Exploration	28	deepak.rathod@mtc spl.com

## Chapter 2A : Geology & Exploration

### 2A.1 : Geology

#### 2A.1.1 : Topography

Terrain :	Plateaux
Highest Level (m) from MSL :	1266.8900
Lowest Level (m) from MSL :	1037.5700
Average Level (m) from MSL :	1152.2300
Drainage Pattern :	Dendritic
Order of Stream :	Order 1
Min Dist of Stream from Lease Area(m) :	24.0000

#### 2A.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	Man Made pond	Jolaput Reservoir-3 Km	As part of rain water harvesting, a shallow depression is understood to have been dug under CAMPA Scheme in the year 2020-21 by the Forest Department. The dimension of the same is 76m x 54m x 1m.
Public roads (Tar road, cart road)	Tar Road	Balda SH-1.5 Km	Nil
Railway track	NIL	Bheja-5 Km	Nil
Human settlements	NIL	Balda, Lulluburu, Godiput, Maliput, Katiput.	Nil

Ballada Bauxite Block (PB93)

		Mulda, Kakada, Petal, Baraba, Karanjagura, Bodaligura, Chiliput, Handiput, H.Khilaput, Bheja, Hanjrapentha, Sukripit, Badel, Kakua, Somali, Kitaba, Banuru, Atanda, Patal, Padwa, Arlabput, Dorasabalpur, Malisubu	
Archaeological monuments/ places of worships/public utilities etc	NIL	NIL	Nil
Wild life sanctuaries/ national parks	NIL	NIL	Nil
Coastal Regulation Zone (CRZ)	NIL	NIL	Nil
Powertransmission lines/telephone lines	NIL	Present within 5 Km	Nil
Firing range	NIL	Padwa-5 Km	Nil
Ordinance factory	NIL	NIL	Nil
grazing land/ burial ground or cremation ground	NIL	Grazing Land present within 5 km.	Nil
Any other specify	Balda Cave	NIL	A small cave exists on the escarpment at the southern periphery of the block. The cave is likely to have been formed by weathering of rock which is a common geological phenomenon, particularly observed in Bauxite deposits.

Particulars	Distance from lease boundary in kms
Near by village	Balda-1.5 Km
Nearest Railway station	Bheja-5 Km
Nearest Port	Visakhapatnam-140 Km
Distance of SH/NH from lease area	SH-2 km, NH-(Proposed)-50Km (Raipur to Visakhapatnam)

## 2A.1.3 : Regional Geology

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**Regional Geology**

The Ballada hill range is located on the west of Pottangi plateau, Mali parbat and famous Panchpatmali plateau and forms a part of the Eastern Ghat Mobile Belt of Archean age represented by Khondalite suite of rocks, pyroxene granulite, Charnockite suite of rocks, variants of granite gneisses infused with pegmatoids and vein quartz of Archean age formed under granulite facies of metamorphism. The ortho and para metamorphites have undergone significant weathering and alteration at higher altitudes forming laterites of Tertiary age. The above lithounits form more or less banded assemblage in NNE-SSW trend in conformity to the general trend of the Eastern Ghats. The rocks exposed in the area belong to the Eastern Ghat Super Group of rocks represented by quartzite, migmatized khondalite, pyroxene granulite, charnockites, leptynites and porphyroblastic granite gneisses together with high level laterite/bauxite. The most common rock in this group is quartz-garnet-feldspar sillimanite gneisses i.e. khondalites with or without graphite and/or manganese which has been migmatized to variable extent. The Khondalite suites form high and linear hills with sharp crests, while the Charnockites occupy the low-lying plains as well as dome shaped hill rocks. Structurally the area is fairly complex. The bedding plane (S0) is never observed. The most pronounced planar structure is foliation plane (S1) of Khondalite. The trend of foliation swings from NNW - NNE to NE -SW with rather steep dip ranging from 60° to 80° due SE or SW. In the Niyam Dongar hill, where a broad upright asymmetric syncline is observed, the trend of foliation varies from NNW to NNE in the southern limb and swings to NE-SW in the northern limb.

**2A.1.4 : Local Geology & Structure****2A.1.4.1 : Local Geological Set-up**

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

**2A.1.4.2 : Structure**

The trend of regional foliation is NE-SW with the dips varying from 30 to 80 degree towards southeast. The swinging of local foliation towards ENE-WSW and NNE-SSW is very common. The axes of mesoscopic folds plunge towards south-east at low angle (15 to 20 degree). Mineral and groove lineations plunge towards east, south and south-east. Extensive slickensides are noticed at many places which result local displacements. These slickensides were probably generated due to a major fault system. Several synformal structures may be resulted due to the convergence of dips evident by the presence of synformal hills; the intervening low-lying areas mark the antiformal valleys.

**2A.1.4.3 : Lithology, Petrographic & Mineralogical Description for Major, Associated & Indicator Minerals**

Petrography: The bauxites are massive & moderately hard. The common types include reddish brown, pink, cream and yellowish brown-coloured bauxites with crystalline, cryptocrystalline and dense gibbsite occurring in varying proportions. Gibbsite occurs as fine dissemination, coarse saccharoidal grains, elongated and tabular crystals. Bauxites derived from the khondalite show relict foliations of crystalline and cryptocrystalline sillimanite within gibbsite. Minerography: Thin section studies revealed that gibbsite is the predominant aluminous mineral. This is confirmed by X-ray studies. Bohemite is present only in traces. Other minerals include Haematite & goethite as ferruginous minerals; Kaolinite as clay mineral and anatase as titanium mineral. At places fine disseminations of

gibbsite occur as lining of the micro and mega cavities. Otherwise, gibbsite is coarse grained saccharoidal and/or tabular displaying twinning effect. Gibbsitisation along cleavages in the sillimanite is best seen in some of the thin sections. The word bauxite used in this report defines the material with +30% Al<sub>2</sub>O<sub>3</sub> and -7% SiO<sub>2</sub> as per the IBMs end use specification and threshold limits prescribed, unless otherwise specified (Annexure-10). The ore zone have been defined by this threshold limit as given below: a. Metallurgical bauxite (MGB) - Ore containing +40% Al<sub>2</sub>O<sub>3</sub> and -4% total SiO<sub>2</sub> b. Low grade bauxite (LGB) - Ore containing +35% Al<sub>2</sub>O<sub>3</sub> and <7 % total SiO<sub>2</sub> c. Beneficiable grade bauxite (BGB) - Ore containing +30% to <35% Al<sub>2</sub>O<sub>3</sub> and 7 % total SiO<sub>2</sub> has been considered in this category. Although, the threshold limit by IBM prescribes this as -5% reactive silica for this category, -7% total silica has been considered as reactive silica has not been determined. d. High Silica bauxite (HSB) Although IBM has not defined any such categorisation, some bauxite samples exhibit ore containing +30% Al<sub>2</sub>O<sub>3</sub> and +7 % total SiO<sub>2</sub> & can be utilised as ore suitably by blending with high grade ores.

#### 2A.1.4.4 : Mode of Occurance & Controls of Mineralization

The bauxite occurs as a blanket or capping over the partially lateritised khondalite or weathered khondalite. The full profile can be observed in some of the scarp faces. The contact between laterite and bauxite at top is generally gradational whereas at bottom the contact between bauxite and khondalite is sharp. Laterite/bauxite occurs within khondalite exposure on surface. The extensive exposure of bauxite/laterite in the capping indicates its physical continuity on the surface. The long axis is aligned in NE-SW direction for an axial length of 2200 m. The plateau has an average width of about 390m.

#### 2A.1.4.5 : Extent of Weathering/ Alteration

Bauxite is derived by the in-situ chemical weathering of the underlying khondalites (garnet-sillimanite-quartz-feldspar gneisses). There is convincing field evidence corroborated by equally striking mineralogical and chemical data which clearly indicate the in-situ origin of the East coast bauxite deposits.

#### 2A.1.4.6 : Nature/Form of Mineral

Specify If any other

Lump

The host rock ferruginous kaolinised sillimanite gneiss has probably led to the formation of bauxite in the area. The kaolinite in these rocks might have developed after feldspar alteration. Gibbsite is the main bauxite mineral which has developed mo

#### 2A.1.4.7 : Extent of Mineralization

The Ballada bauxite block comprising over an area of 144.945 Ha, constitutes the plateau area of 91.67 Ha with a mineralised zone of 83.778 Ha and non-mineralised zone of 61.167 Ha including the central khondalite and southern clay pocket. The deposit spreads all over the plateau area and is irregular in shape. The non-mineralised zone within the plateau area is 7.892 Ha and outside the plateau is 53.275 Ha. Considering the threshold limit of bauxite and aluminous laterite, the plateau exposes bauxites of different categories with a thin layer of soil having 0.2 to 1m thickness.

**2A.1.4.8 : Deposit Type (as per MEMC Rule)**

I. Stratiform, Strata-bound and Tabular Deposits of Regular Habit: Principal kinds of minerals - thick bauxite cappings

**Strike / Trend of the Ore Body**

NE	Nil	NE	to	SW	Nil	SW
----	-----	----	----	----	-----	----

Amount of Dip of the Ore Body (degree)	Amount of Dip of the Ore Body (degree)
30	80
(from)	(to)

Dip Direction of the Ore Body	Plunge of Mineral Body (degree) (if any)	Direction of Plunge
SE	15	SE
Nil		Nil
SE		SE

**2A.2: Exploration****2A.2.1: Summary of The Previous Exploration (for fresh grant) / During Last Plan Period (for existing leases)**

Name of The Agency
Geological Survey of India (GSI)

**2A.2.1.1: Geological Mapping**

Sl.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	01/04/1975	31/03/1977	1:1000	91.7600

**2A.2.1.2: Airborne Geophysical Survey**

Sl.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)	Longitude (dd:mm:ss.ss)
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Ballada Bauxite Block (PB93)

					Form	To	Form	To
1	NIL	0	0.00	0.0000	Nil	Nil	Nil	Nil

**2A.2.1.3: Ground Geophysical Survey**

Sl.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					Form	To	Form	To
1	Nil	0	0	0.0000	Nil	Nil	Nil	Nil

**2A.2.1.4: Geochemical Survey**

Sl.No.	Type of Sample	No of Samples	Aanlysis report	Area Covered (Ha)
1	Nil	0	Nil	Nil

**2A.2.1.5: Pitting**

Number of Pits															
0															

Sl.No.	Year		Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av Grade(in %)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	NIL	0.00	0.00	0.00	0.00	0.00	0.00	NIL	NIL	0.00	Nil	Nil	Nil	Nil

**2A.2.1.6: Trenching**

Number of Trenches															
0															

## 2A.2.1.6.1: Spacing

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

Sl.No.	Year		Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av. Grade	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	NIL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	NIL	NIL	0.0000	Nil	Nil	Nil	Nil

## 2A.2.1.7 Exploratory Drilling(Core/non Core)

Sl.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	
1	01/04/1975	31/03/1977	Geological Survey of India (GSI)	15	291.65	0	0.00	15	291.65	<a href="#">A12_BH_Litho_log.xlsx</a>

## 2A.2.1.8: Exploratory Mining

Sl.No.	Pit/Adit ID	Length in Mtr	Width in Mtr	Depth in mtrs	Volume (m <sup>3</sup> )
1	NIL	0.00	0.00	0.00	0.00

## 2A.2.1.9: Sampling

Sl.No.	Type of sample	No of samples collected	Number of samples analyzed	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remark if any
				From	To	From	To	
1	Drill Core	12	12	18:27:02.76	18:27:02.76	82:40:10.70	82:40:10.70	BB-01
2	Drill Core	4	4	18:26:52.87	18:26:52.87	82:40:02.77	82:40:02.77	BB-02

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3	Drill Core	18	18	18:26:47.93	18:26:47.93	82:40:09.57	82:40:09.57	BB-03
4	Drill Core	21	21	18:26:43.15	18:26:43.15	82:39:54.66	82:39:54.66	BB-04
5	Drill Core	15	15	18:26:33.20	18:26:33.20	82:39:46.62	82:39:46.62	BB-05
6	Drill Core	11	11	18:26:38.27	18:26:38.27	82:39:39.65	82:39:39.65	BB-06
7	Drill Core	12	12	18:26:26.76	18:26:26.76	82:39:55.52	82:39:55.52	BB-07
8	Drill Core	15	15	18:26:23.27	18:26:23.27	82:39:38.92	82:39:38.92	BB-08
9	Drill Core	6	6	18:26:14.72	18:26:14.72	82:39:50.50	82:39:50.50	BB-09
10	Drill Core	0	0	18:26:27.98	18:26:27.98	82:39:49.65	82:39:49.65	BB-10
11	Drill Core	13	13	18:26:19.95	18:26:19.95	82:39:54.45	82:39:54.45	BB-11
12	Drill Core	9	9	18:26:38.89	18:26:38.89	82:40:00.61	82:40:00.61	BB-12
13	Drill Core	20	20	18:26:12.92	18:26:12.92	82:39:34.94	82:39:34.94	BB-13
14	Drill Core	18	18	18:26:53.40	18:26:53.40	82:40:12.61	82:40:12.61	BB-14
15	Drill Core	9	9	18:27:08.02	18:27:08.02	82:40:16.65	82:40:16.65	BB-15

**2A.2.1.10: Chemical Analysis**

SI.No.	Sample ID	Minerals	Radical with garde in %	Name of Agency	Type of agency	Attachment
1	Borehole BB-1 to BB-15 (183 no. of samples)	Bauxite	Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub> , Fe <sub>2</sub> O <sub>3</sub> , TiO <sub>2</sub> and LOI	GSI	Govt. Lab	<a href="#">Collar Survey Litho Assay.xls</a>

\* Chemical analysis of core /non vore samples may be uploaded in CSV file which shall normally include Five files namely collar file, survey file and Geology log file, Assay file & RQD File.

**2A.2.1.11: Petrology & Mineralogical Studies**

SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	None	0	0	Nil

**2A.2.1.12: Beneficiation Studies**

Sl.No.	Type of Beneficiation	Number of Samples	Attach
1	Nil	0	Nil

**2A.2.1.13: Bulk Density Study as per M(EMC) Rules, 2015 and SOP of CGPB**

Method adopted for calculating bulk density of ore and waste

Method adopted for calculating bulk density of ore and waste. About 20 to 40 specimens were collected from each block representing the various lithological types. Their specific gravities were determined with the help of a Walker's steel yard. The average specific gravity was calculated for each block. It ranges between 2.1 and 2.3. An effective specific gravity of 2 was considered for resource calculations.

Sl.No.	Nature of Ore/OB	Mineral	Number of samples	Bulk Density Established (t/m <sup>3</sup> )
1	Bauxite	Bauxite	20 to 40	2.00

**2A.2.1.14: Area Covered under Exploration**

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	0.000000	0.000000	0.000000
G-2	83.778000	0.000000	83.778000
G-3	0.000000	0.000000	0.000000
G-4	0.000000	0.000000	0.000000
Area proved as Non-mineralized	61.167000	0.000000	61.167000
Area to be explored	0.000000	0.000000	0.000000
Total	144.945000	0.000000	144.945000

**2A.2.2: Summary of The Previous Exploration (Before Last Plan Period)**

Name of The Agency
Not Applicable





Ballada Bauxite Block (PB93)

1	NIL	0.0000	0.0000	0.0000	NIL						
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**2A.2.2.7: Exploratory Drilling****2A.2.2.7.1: Core/Non-core Drilling**

Sl.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Total boreholes	Total mtrs	
1	Nil	Nil	NA	0	0.00	0	0.00	0	0.00	Nil

**2A.2.2.8: Exploratory Mining**

Sl.No.	Pit / Adit ID	Volume (m <sup>3</sup> )
1	NIL	0.00

**2A.2.2.9: Sampling**

Sl.No.	Type of sample	Number of Samples	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
				From	To	From	To
1	Nil	0	0.00	Nil	Nil	Nil	Nil

**2A.2.2.10: Chemical Analysis**

Sl.No.	Sample ID	Minerals	Radical Analysis	Attachment
1	NIL	NIL	NIL	Nil

**2A.2.2.11: Petrology & Mineralogical Studies**



Ballada Bauxite Block (PB93)

Potentially Mineralised area (Ha)

Nil

**2A.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)	Chemical parameters				
						Average Depth (m)	Name of the radical	Min Grade (%)	Max Grade (%)	Avg Grade (%)
1	Bauxite	NE-SW	SW	2200.00	390.00	19.44	Al <sub>2</sub> O <sub>3</sub>	33.01	46.28	43.65
2	Bauxite	NE-SW	SW	2200.00	390.00	19.44	SiO <sub>2</sub>	1.93	7.29	3.90

**2A.2.4: Reserve / Resource Estimation Method****2A.2.4.1: Methodology**

Resource / Reserve Estimation Method
Sectional Area Method
Methodology
Six parallel cross section lines at about 200m-400m strike interval have been drawn in NW-SE direction. These lines are numbered NE to SW as G1 to G5 & G0 generated based on borehole data of BH No. BB-15. Geological cross sections are generated from borehole logs. Cross sectional area on each section has been measured with the help of AutoCAD and recorded. Half-way influence between two section lines has been taken. Each of these areas has been multiplied by strike influence of the section line to arrive at volume. To get tonnage (gross resources), volume has been multiplied with Bulk Density. The resources were calculated by following given formula: $R = Sv * T * BD$ where R = Resources/ Tonnage, Sv = Sectional area of Bauxite, T = Halfway influence (200m) between successive section lines, BD = Bulk Density. The parameters of estimation of resource quantity are based on the Geological Report prepared by GSI provided along with Tender Document (Annexure-15).

**2A.2.4.2: Resource Calculation**

Sl.No.	Cross Section/Block	Section Area/ Block Area(sq mt)	Influence(m)	Depth in mtr	Volume (m <sup>3</sup> )	Bulk Density (t/m <sup>3</sup> )	Resource Quantity (t)	Level of Exploration	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	G0	1598.47	240.00	11.00	383632.80	2.00	767265.6000 0	332	Forest	Al <sub>2</sub> O <sub>3</sub> & SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> : 39.16 SiO <sub>2</sub> : 4.36	CS Method, HSB-(17469 3.6 t, Al <sub>2</sub> O <sub>3</sub> -

Ballada Bauxite Block (PB93)

												37.91 and SiO2- 7.75) , MGB-(2853 52.8t, Al2O3-41.35 and SiO2-2.70), LGB-(30721 9.2t, Al2O3-37.85 and SiO2-3.97)
2	G1	3515.37	383.00	16.00	1346386.71	2.00	2692773.42000	332	Forest	Al2O3 & SiO2	Al2O3:40.77 SiO2: 3.423.33	CS Method, HSB-(34193 8.57t, Al2O3- 39.54 and SiO2-7.10), (MGB- 1225446.8t, Al2O3- 43.79 and SiO2-1.89, L GB-1125388 .05t, Al2O3- 37.85 and SiO2-3.97)
3	G2	5259.595	382.00	20.00	2009165.29	2.00	4018330.58000	332	Forest	Al2O3 & SiO2	Al2O3: 43.49 SiO2: 2.84	CS Method, HSB-(35749 8.527t, Al2O3- 44.62 and SiO2-7.44), (MGB- 2097756.82t, Al2O3- 46.84 and SiO2-1.849, LGB-156307 5.24t,

Ballada Bauxite Block (PB93)

												Al2O3-38.74 and SiO2-1.70)
4	G3	5852.255	386.00	16.00	2468861.79	2.00	4937723.58000	332	Forest	Al2O3 & SiO2	Al2O3: 42.13 SiO2: 2.90	CS Method, HSB-(54231 4.56t, Al2O3-45.86 and SiO2- 7.72), (MGB- 2210 7158.56t, Al2O3-46.53 and SiO2-1.94), LGB-(18684 67.74t, Al2O3-38.23 and SiO2-2.50), BGB-(41978 2.72t,Al2O3-32.63 and SiO2-3.18 )
5	G4	6499.175	380.00	15.00	2895924.90	2.00	5791849.80000	332	Forest	Al2O3 & SiO2	Al2O3: 41.74 SiO2: 2.90	CS Method, HSB-(56143 8.6t, Al2O3-47.26 and SiO2- 7.92), (MGB- 2324201.6t, Al2O3-47.34 and SiO2-1.69), LGB-(20537 32.8t, Al2O3-37.46 and SiO2-2.89), BGB-(85247 6.8t,Al2O3-

Approved

Ballada Bauxite Block (PB93)

												33.11 and SiO2-2.96 )
6	G5	5384.94	329.00	16.00	1961780.94	2.00	3923561.880 00	332	Forest	Al2O3 & SiO2	Al2O3: 42.93 SiO2: 3.18	CS Method, HSB-(86134 1.74t, Al2O3-44.13 and SiO2-7.18), (MGB-1529928.96t, Al2O3-48.69 and SiO2-1.56), LGB-(11520 19.82t, Al2O3-37.43 and SiO2- 2.51), BGB-(38027 1.36t,Al2O3-33.67 and SiO2-2.70 )
Total					11065752.43		22131504.86 000					

**2A.2.4.3: Mineral Resource Estimate for Conversion to Mineral Reserve**

Resources have been estimated based on level of exploration. All the exploratory holes drilled have been considered for computation. Based on the above data, the existing geological plan and sections are prepared. Bulk density of 2.0 tonnes/m3 for all grades of Bauxite has been considered (as per Geological Report Annexure-15). Section-wise Bauxite resources have been estimated for the entire lease based on the exploration undertaken and the configuration of the mineral body is more or less well established. The ultimate pit depth is upto 1166 mRL based on the disposition of the Bauxite. The Bauxite resources / reserves are considered based on +30% Al2O3 and -7% SiO2 as per threshold value specified given in Notification No. C-284/3/CMG/2017. By adopting the above enumerated criteria, section-wise mineral resource has been estimated at 22.13 Mt. Following losses are considered for estimation of mineable reserves from geological resources: a. Resources blocked under various mining constraints such as in the 7.50 m statutory barrier, bench slopes etc; these resources have been categorized under pre-feasibility resource (222). b. Mining loss at 5.0% due to operation.

**2A.2.4.4: Threshold value & Cut off Parameters**

The word "bauxite" used in this report connotes material with +30% Al<sub>2</sub>O<sub>3</sub> and - 7% SiO<sub>2</sub> as per the IBM's end use specification and threshold limits prescribed vide Circular No. C-284/3/CMG/2017, unless otherwise specified. These parameters constitute the chemical or specified threshold limits at which the ore characteristics have been assessed. The weighted average total silica within all types of bauxite (MGB, LGB, BGB, HSB) is 2.06, and Al<sub>2</sub>O<sub>3</sub> is 42.09, which are well above the prescribed threshold value of Bauxite.

#### 2A.2.4.5: Mining Factors or Assumptions

The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator / dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking the prior permission from DGMS. Further, it is proposed to mine with the Ripping and Dozing method and deployment of Surface Miner at a later date.

#### 2A.2.4.6: Metallurgical Factors or Assumptions

The bauxite deposit of Ballada will be used for commercial sale to alumina refineries and/or captive purpose for production of alumina hydrate and/or alumina. As per the process requirement, the bauxite feed to the alumina plant should preferably contain  $\geq 40\%$  Al<sub>2</sub>O<sub>3</sub> and  $\leq 4\%$  SiO<sub>2</sub>. The bauxite of Ballada is of high grade, averaging approximately 42.09% Al<sub>2</sub>O<sub>3</sub> and 2.96% SiO<sub>2</sub>, and meets the specifications of refinery feed requirement, up-gradation of bauxite is not required before it is being sold or used for captive purpose. However, size reduction of the mined bauxite is mandatory to make the material transportable. Hence, required equipment and systems are envisaged.

#### 2A.2.4.7: Cost & Revenue Factors

The capital cost of the project is Rs 230 Crores. The operating cost of bauxite/tonne is estimated to about Rs. 3185 / t ex-mines. Bauxite produced from the mine shall be sold to alumina refineries and/or used for captive purpose in proposed alumina refinery project.

#### 2A.2.4.8: Market Assessment

Bauxite produced from the mine will be consumed as raw material in the proposed captive alumina refinery plant. Alumina is produced by Bayer process by refining bauxite ore. The refined Alumina (Aluminium Oxide) is used further as feed material in a smelter to produce Aluminium metal. As per CRU analysis of July 2015, global alumina capacity which is presently at about 138 MTPY is forecasted to grow consistently over the next ten years, reaching to about 180 MT by 2024. The demand & supply status changes according to market requirements.

#### 2A.2.4.9: Other Modifying Factors

LOI has been granted, this is fresh block, Environment and Forest clearance will be obtained after approval of Mining Plan. NOC's from pollution department (CTE & CTO) will also be obtained after obtaining the EC. The topography of the area is such, that, no disaster like land slide, flood or inundation or fire are anticipated. The height and width of benches will be 6m & 10m respectively and the pit slope at 70 degree in Bauxite. The hanging wall & footwall of the mineralized zone are hard & competent to stand safely for long time. There will be no risk of fire as no wood will be

used in the mine. Fuel oil and lubricants will be stored only in the tanks of machinery and filled there in by Diesel pumps. The mining project is economical and viable.

#### 2A.2.4.10: Classification

Economic Axis The deposit is of metallurgical grade having reserves of about 20.48 million tonnes which will sustain for a period of 9 years considering the peak mine capacity of 4.0 MTPA. Further, the area is devoid of any private lands and no acquisition of land is involved for smooth mining operations. The reserves have been placed under Probable (122) category while some reserves fall under Prefeasibility Resource (222) category as per UNFC code while entire area is covered under General Exploration (G-2 level) as per prevailing MEMC Rules. Feasibility Axis The equipment will be selected to match the proposed mode of operation of conventional mining by drilling and blasting with shovel-dumper combination or Ripper Dozer and Surface miner options. Environmental studies will be undertaken. Monitoring of various environmental parameters shall be regularly carried out. The pre-feasibility study report is given as Annexure-14. Geological Axis The mining lease area covering 144.945 ha was explored by DMG. About 291.65m of exploratory drilling was carried out in 15 bore holes at 400x400m interval to establish Probable Reserve (122). As detailed exploration is proposed in the period of Mining plan and R & R of area may be increase which will be assess after detailed exploration. Bauxite reserves have been classified as per UNFC norms: based on drilling grid (400m x 400m) and exploration depth. The mineral reserves of Ballada Block have been categorized as Probable Reserve (122) as per UNFC code.

#### 2A.2.4.11: Calculation of blocked resources

Sl.No.	Reserves blocked due to	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m <sup>3</sup> )	Bulk Density (t/m <sup>3</sup> )	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	Ultimate Pit Limit	G0	40.48	240.00	11.00	9715.20	2.00	19428.48000	222	Forest	Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> : 39.47 SiO <sub>2</sub> : 3.69	CS Method, HSB-(744t, Al <sub>2</sub> O <sub>3</sub> - 37.92 and SiO <sub>2</sub> -7.76), MGB- (4114.68t, Al <sub>2</sub> O <sub>3</sub> - 41.35 and SiO <sub>2</sub> -2.70), LGB-(2533. 8t, Al <sub>2</sub> O <sub>3</sub> - 37.85 and SiO <sub>2</sub> - 3.97)
2	Ultimate Pit Limit	G1	437.85	383.00	16.00	167696.55	2.00	335390.23000	222	Forest	Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> : 36.35 SiO <sub>2</sub> : 3.50	CS Method, HSB-(4345. 14t, Al <sub>2</sub> O <sub>3</sub> -

Ballada Bauxite Block (PB93)

													39.54 and SiO2-7.10), MGB-(43467.05t, Al2O3-43.79 and SiO2-1.89), LGB-(25246t, Al2O3-37.85 and SiO2- 3.97)
3	Ultimate Pit Limit	G2	589.09	382.00	20.00	225032.38	2.00	450061.90000	222	Forest	Al2O3 SiO2	Al2O3: 41.54 SiO2: 1.97	CS Method, HSB-(17874.9t, Al2O3-44.63 and SiO2-7.45), MGB-(102902.4t, Al2O3-46.84 and SiO2-1.84), LGB-(67026.29t, Al2O3-38.74 and SiO2- 1.70)
4	Ultimate Pit Limit	G3	678.37	386.00	16.00	261850.82	2.00	523704.34000	222	Forest	Al2O3 SiO2	Al2O3: 41.98 SiO2: 3.16	CS Method, HSB-(24475.49t, Al2O3-44.86 and SiO2-7.72), MGB-(100279.91t, Al2O3-46.53 and SiO2-1.94), LGB-(88318.15t,

Ballada Bauxite Block (PB93)

													Al2O3-38.23 and SiO2-2.50), BGB-(19243.26t, Al2O3-32.63 and SiO2- 3.18)
5	Ultimate Pit Limit	G4	829.48	380.00	15.00	315202.40	2.00	630408.98000	222	Forest	Al2O3 SiO2	Al2O3: 42.70 SiO2: 3.15	CS Method, HSB-(2449 0.43t, Al2O3-47.26 and SiO2-7.93), MGB-(107999.99t, Al2O3-47.34 and SiO2-1.69), LGB-(9825 9.26t, Al2O3-37.46 and SiO2-2.89), BGB-(40905.10t, Al2O3-33.11 and SiO2- 2.96)
6	Ultimate Pit Limit	G5	317.80	329.00	16.00	104556.47	2.00	209113.72000	222	Forest	Al2O3 SiO2	Al2O3: 44.23 SiO2: 2.65	CS Method, HSB-(1200 4.72t, Al2O3-44.14 and SiO2-7.19), MGB(-59320.35.6t , Al2O3-48.69 and SiO2-1.56),

Approved

Ballada Bauxite Block (PB93)

													LGB-(4583 5.79t, Al2O3- 37.43 and SiO2- 2.51), BGB- (19013.57t, Al2O3- 33.67 and SiO2- 2.70)
Total						1084053.82	2168107.65						

## 2A.2.4.12: Calculation of Reserves - I

SI.No.	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m <sup>3</sup> )	Bulk Density (t/m <sup>3</sup> )	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	G0	1557.99	240.00	11.00	373918.56	2.00	747837.12	122	Forest	Al2O3 SiO2	Al2O3: 39.16 SiO2: 4.38	CS Method, HSB-(17312 1.6t, Al2O3-37.92 and SiO2-7.76), MGB-(276378.12t, Al2O3-41.35 and SiO2-2.70), LGB-(29833 7.4t, Al2O3-37.85 and SiO2- 3.97)
2	G1	3077.52	383.00	16.00	1178691.60	2.00	2357383.19	122	Forest	Al2O3 SiO2	Al2O3: 40.97 SiO2: 3.41	CS Method, HSB-(33627 2.085t, Al2O3-39.54 and SiO2-7.10),

Ballada Bauxite Block (PB93)

												MGB- (1142 166.897t, Al2O3- 43.79 and SiO2-1.89), LGB-(87894 4.2105t, Al2O3- 37.85 and SiO2- 3.97)
3	G2	4670.51	382.00	20.00	1784134.34	2.00	3568268.69	122	Forest	Al2O3 SiO2	Al2O3: 43.74 SiO2: 2.32	CS Method, HSB-(33962 3.594t, Al2O3- 44.63 and SiO2-7.45), MGB- (1955 145.524t, Al2O3- 46.84 and SiO2-1.84), LGB-(12734 99.567t, Al2O3- 38.74 and SiO2- 1.70)
4	G3	5717.64	386.00	16.00	2207009.62	2.00	4414019.24	122	Forest	Al2O3 SiO2	Al2O3: 42.15 SiO2: 2.87	CS Method, HSB-(46503 4.272t, Al2O3- 44.86 and SiO2-7.72), MGB-( 1905 318.195t, Al2O3- 46.53 and SiO2-1.94), LGB-(16780 44.869t, Al2O3-

Ballada Bauxite Block (PB93)

												38.23 and SiO <sub>2</sub> -2.50), BGB-(36562 1.902t, Al <sub>2</sub> O <sub>3</sub> -32.63 and SiO <sub>2</sub> - 3.18)
5	G4	6791.37	380.00	15.00	2580720.41	2.00	5161440.82	122	Forest	Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> : 41.62 SiO <sub>2</sub> : 2.88	CS Method, HSB-(46531 8.17t, Al <sub>2</sub> O <sub>3</sub> -47.26 and SiO <sub>2</sub> -7.93), MGB-(2051999.81t, Al <sub>2</sub> O <sub>3</sub> -47.34 and SiO <sub>2</sub> -1.69), LGB-(18669 25.94t, Al <sub>2</sub> O <sub>3</sub> -37.46 and SiO <sub>2</sub> -2.89), BGB-(77719 6.9t, Al <sub>2</sub> O <sub>3</sub> -33.11 and SiO <sub>2</sub> - 2.96)
6	G5	5645.06	329.00	16.00	1857224.08	2.00	3714448.16	122	Forest	Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> : 42.86 SiO <sub>2</sub> : 3.22	CS Method, HSB-(83232 7.7t, Al <sub>2</sub> O <sub>3</sub> -44.14 and SiO <sub>2</sub> -7.19), MGB(-1414678.6t, Al <sub>2</sub> O <sub>3</sub> -48.69 and SiO <sub>2</sub> -1.56), LGB-(11061 84.0t, Al <sub>2</sub> O <sub>3</sub> -

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2. Prefeasibility Mineral Resource (B)	221	0.00	0.00	0.00	0	0	Nil
3. Prefeasibility Mineral Resource (B)	222	2168107.64	0.00	2168107.64	Al <sub>2</sub> O <sub>3</sub> : 41.89, SiO <sub>2</sub> : 2.91	0	HSB-227528.14T, MGB-824158.38T LGB-967966.83T, BGB-148454.29T
4. Measured Mineral Resource (B)	331	0.00	0.00	0.00	0	0	Nil
5. Indicated Mineral Resource (B)	332	0.00	0.00	0.00	0	0	Nil
6. Inferred Mineral Resource (B)	333	0.00	0.00	0.00	0	0	Nil
7. Reconnaissance Mineral Resource (B)	334	0.00	0.00	0.00	0	0	Nil
Total Mineral Resources (A+B) :					22131504.86		

**2A.2.4.13: Calculation of Reserves -III**

No associate minerals are available!

**2A.2.5: Future Exploration Proposal****2A.2.5.1: Geological Mapping**

SI.N.	Year	Scale	Area Covered (Ha)
1	Year1	1:1000	144.95

**2A.2.5.2: Ground Geophysical Survey**

SI.No.	Year	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To

1	Nil	NIL	0	0	0.0000	Nil	Nil	Nil	Nil
---	-----	-----	---	---	--------	-----	-----	-----	-----

**2A.2.5.3: Pitting**

Number of Pits										
Nil										
Sl.No.	Year	Land Type	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Nil	NIL	0.00	0.00	0.00	Nil	Nil	Nil	Nil

**2A.2.5.4: Trenching**

Number of Trenches										
0										

**2A.2.5.4.1: SPACING**

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

**2A.2.5.4.2: Area Covered Under Trenching****Co-ordinates**

Sl.No.	Year	Land Type	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Nil	NIL	0.0000	0.0000	0.0000	Nil	Nil	Nil	Nil

**2A.2.5.5: Exploratory Drilling****2A.2.5.5.1: Core Drilling & Non-Core Drilling**

Sl.No.	Year	In Forest Area				In Non Forest Area				Total Borehole	Total Meter
		No. of Borehole	Total Mtr	Type Borehole	Grid Interval	No. of Borehole	Total Mtr	Type Borehole	Grid Interval		
1	Year1	75	2625.00	Core	100.00	0	0.00	Nil	0.00	75	2625.00

**2A.2.5.6: Exploratory Mining**

Sl.No.	Year	Pit ID	Length in meter	Width in meter	Depth in meter	Volume (m <sup>3</sup> )
1	Nil	NIL	0.00	0.00	0.00	0.00

**2A.2.5.7: Sampling**

Sl.No.	Year	Type of Sample	Number of Samples Proposed	Area Covered(Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	Year1	Drill Core	2625	91.67	Nil	Nil	Nil	Nil

**2A.2.5.8 Petrographic & Mineralgraphic Studies**

Sl.No.	Year	Type of Sample	Number of Samples Proposed
1	Year1	Mineral	15
2	Year1	Waste	5

**Chapter 2B : Geology & Exploration UG : NA**

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### Chapter 3: Mineral Beneficiation / Processing

Name of The Ore/Mineral	Bauxite
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#### 3.1: Mineralogy of the ROM ore/ Mineral

SI.No	Valuable Mineral Name	Approx. Mineral %	Gangue Mineral/s name	Approx. Mineral Gangue %
1	NIL	0.0000	NIL	0.0000

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

SI.No	Radical	Wt%
1	Al <sub>2</sub> O <sub>3</sub>	42.0900
2	SiO <sub>2</sub>	2.9600
3	Fe <sub>2</sub> O <sub>3</sub>	28.9700
4	TiO <sub>2</sub>	2.1900
5	LOI	23.6300

#### 3.3: Crushing Section

##### 3.3.1: Primary Crushing

SI.No	Type of Crusher	Make	Capacity of Crusher(tph)	Feed Size(mm)	Product Size(mm)
1	Jaw Crusher	Bedeschi	800	600.0000	-150.0000

##### 3.3.2: Secondary Crushing

Not Applicable

**3.3.3: Tertiary Crushing**

Not Applicable

**3.4: Grinding Section**

**3.4.1: Dry Grinding**

Not Applicable

**3.4.2: Wet Grinding**

Not Applicable

**3.5: Dry Processing**

**3.5.1: Screening and Classification**

Not Applicable

**3.5.2: Other Operations**

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	spiral, etc.)										
1	NA	NA	Nil								

**3.6.4: Magnetic Separation**

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	Product non-Mag (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	NA	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**3.6.5: Flotation**

Sl.No	Type of flotation equipment (froth/ column)	Stages (rougher/ cleaner, etc), if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Float (tph)	Product non-Float (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	NA	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**3.6.6: Other Operations**

Sl.No	Type of equipment / operation	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Conc (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**3.6.7: Product Quality (wet processing)**

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
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Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

**3.7: Overall Product Quality (Dry cum Wet Processing)**

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

**3.8: Disposal Method for tailing/ rejects**

a) Explain the disposal method for tailing or reject from processing plant with detail chemical / mineral analysis of tailing	Nil
b) Size and capacity of tailing pond, toxic effect of such tailings, process adopted to neutralise its effect (if any)	Nil
c) Any other data (if available)	Nil

**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	<a href="#">Water Requirement and Source.pdf</a>
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**3.10: Flow sheets and charts**

Material balance chart of mineral processing plant(s) (each stage of process)	<a href="#">Mineral Processing Plant.pdf</a>
Attach flow sheet of beneficiation of plant(s)	Nil

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Any other data (if applicable)

Nil

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### Chapter 4A: Mining Operations

4A.1.1: Existing Method of Mining	Nil
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4A.1.2: Proposed Method of Mining	Mechanized
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Choose one or more	HEMM with deephole drilling	None	None	None
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Reasons for Proposed Changes	The maximum proposed production of Bauxite is 4 million tonnes per annum The thickness of overburden which is usually soil in Ballada plateau is 20 cm to 1m The Ore to waste ratio was computed during the initial 5 year period as 1 to zero point 018 T to T Mining operations are proposed to be carried out by fully mechanized opencast mining method It is proposed to mine with excavator dumper combination Deep hole drilling Short hole drilling and blasting is proposed after taking the prior permission
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#### 4A.2: Operational Parameters

##### 4A.2.1: Inventory of Existing Pits & Dumps

###### 4A.2.1.1: Pits

Sl.No.	Pit ID	Pit Status	Area Covered by Pit(Ha)	Pit Dimensions(L*W*D)
1	NIL	Nil	0.00	NIL

###### 4A.2.1.2: Dumps and Stacks

**4A.2.1.2.1: Dump Details**

Sl.No.	Dump ID	Dump Status	Type of Dump	Total of Dump Quantity(t)	Area Covered by Dump(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	NIL	Nil	Nil	0.00	0.00	0.00	Nil	Nil	Nil	Nil

**4A.2.1.2.2: Stack Details**

Sl.No.	Stack ID	Type of Stack	Total Stack of Quantity(t)	Area Covered by Stack(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To
1	NIL	Nil	0	0	0	Nil	Nil	Nil	Nil

**4A.2.1.3: Details of stabilised dumps**

Sl.No.	Dump ID	Number of Terraces	Average Height of Terraces(m)	Lenght of Toe Wall(m)	Lenght of Garland Drain(m)	Area Stabilized(Ha)	Method of Stabilization
1	NIL	Nil	0.00	0.00	0.00	0.00	0

**4A.2.2: Opencast Mining****4A.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 (mRL)	Max Slope Angle of Haul Roads (1xx in)
PIT-1	Year1	0.00	0.00	0.00	6.00	10.00	70.00	30.00	0	0	3	15.00	Nil	16
PIT-1	Year2	6.00	10.00	70.00	6.00	10.00	70.00	30.00	0	0	5	21.00	Nil	16

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PIT-1	Year3	6.00	10.00	70.00	6.00	10.00	70.00	30.00	0	0	6	21.50	Nil	16
PIT-1	Year4	6.00	10.00	70.00	6.00	10.00	70.00	30.00	0	0	4	16.00	Nil	16
PIT-1	Year5	0.00	0.00	70.00	6.00	10.00	70.00	30.00	0	0	5	25.00	Nil	16

## 4A.2.2.2: Yearwise Opencast Development - I Continue

SI.No.	Year	Pit ID	Bench	Direction	Bulk Density of Overburden (BD1) (ton/m <sup>3</sup> )	Bulk Density of Mineral (BD2) (tonn/m <sup>3</sup> )	Top Soil Volume (Length x Width x Height) (m <sup>3</sup> )	Over Burden Volume (Length x Width x Height) (m <sup>3</sup> )	Over Burden Quantity (t)	ROM Volume (Length x Width x Height) (m <sup>3</sup> )	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB Ratio to Ore (m <sup>3</sup> /ton)
1	Year1	Pit-1	RL-1206, 1200,1194	NW-SE to N-S to NE-SW	2.00	2.00	24072.00	0.00	0.00	500060.00	1000120.00	1.00	0.00	1000120.00	0.00	Nil
2	Year2	Pit-1	RL-1206, 1200,1194, 1188	NW-SE to N-S to NE-SW	2.00	2.00	1710.00	24783.00	49566.00	1012010.00	2024020.00	1.00	0.00	2024020.00	0.00	0.0122
3	Year3	Pit-1	RL-1206, 1200,1194, 1188,182,1176	N-S and NW-SE	2.00	2.00	0.00	44671.00	89342.00	1000741.00	2001482.00	1.00	0.00	2001482.00	0.00	0.0223
4	Year4	Pit-1	RL-1212, 1206,1200	NNW-SSE	2.00	2.00	0.00	3800.00	7600.00	1001207.00	2002414.00	1.00	0.00	2002414.00	0.00	0.0019
5	Year5	Pit-1	RL-1224, 1218,1212,1206,1200	NNW-SSE	2.00	2.00	0.00	0.00	0.00	2000934.00	4001868.00	1.00	0.00	4001868.00	0.00	0.0000
Total									146508.00		1102990.400		0.00	1102990.400	0.00	

**4A.2.2.2 Yearwise Opencast Development - I End**

SI.No.	Year	Pit ID	Total Topsoil Volume (m <sup>3</sup> )	Total Over Burden Volume (m <sup>3</sup> )	Total Over Burden Quantity (t)	Total ROM Volume (m <sup>3</sup> )	Total ROM Quantity (t)
1	Year1	Pit-1	24072.00	0.00	0.00	500060.00	1000120.00
2	Year2	Pit-1	1710.00	24783.00	49566.00	1012010.00	2024020.00
3	Year3	Pit-1	0.00	44671.00	89342.00	1000741.00	2001482.00
4	Year4	Pit-1	0.00	3800.00	7600.00	1001207.00	2002414.00
5	Year5	Pit-1	0.00	0.00	0.00	2000934.00	4001868.00
Total			25782.00	73254.00	146508.00	5514952.00	11029904.00

**4A.2.2.3: Transportation & Hauling Equipment**

SI.No.	Type	Make	Capacity (m <sup>3</sup> )	No. of Equipments
1	Dumper	Bharat Benz 3528/Ashok Leyland 3532/TATA LX 3130	16.00	11

**4A.3: Material Handling Summary****4A.3.1: Studies Undertaken**

Title	Study Undertaken	Attachment (only pdf allowed)
Blast Vibration Study Report	No	Nil
Slope Stability Study Report	No	Nil
Recovery Study Report	No	Nil
Hydrological Study Report	No	Nil
Mineral Beneficiation Study Report	No	Nil
Subsidence Study Report	No	Nil
Geotechnical Study Report	No	Nil



5	Year5	NIL													
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#### 4A.3.4: Calculation Summary

Year	Year1	Year2	Year3	Year4	Year5	Total
(A) Total ROM quantity (t)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00
(B) Saleable ore from ROM (t)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00
(C) Proposed Dump Handling Quantity (t)	0.00	0.00	0.00	0.00	0.00	0.00
(D) Saleable Ore recovered from dump workings (t)	0.00	0.00	0.00	0.00	0.00	0.00
(E) Total Saleable Ore t(=B+D)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00
(F) Total Quantity Handled t(=A+C)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00

#### 4A.4: Machine Calculation

##### 4A.4.1: Machine Requirement Summary

Number of Average Working Days in One Year (A)	305
Number of Shifts per Day (B)	3
Material Handling Required per Day (t) ((D)=Largest of (Q1,Q5)/(A))	13121
Material to be Handled per Shift (t) ((E)=(D)/(B))	4373.67
Handling Required per Hour (t) ((F)=(E)/8 hours)	728.83

Effective Shift Time

6 hrs 00 mins

**4A.4.2: Shovel / Excavator Requirement**

Effective Shift Time					6 hrs					00 mins				
Sl.No.	Type	Bucket Capacity (m <sup>3</sup> )(A)	Bucket Fill Factor (B)	Swell Factor (C)	Tonnage Factor (t/m <sup>3</sup> ) (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)	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)
1	Diesel Hydraulic Shovel	3.10	0.90	0.8	2.00	0.65	0.70	30	243.73	5490	1338077.70	4001868.00	2.99	1

**4A.4.3: Dumper Requirement**

Effective Shift Time					6 hrs					00 mins				
Sl.No.	Total Hours=Number of working days (W)x Number of shifts/day x Effective shift hours (Machine Requirement)	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 = (60 / vi)	Total transportation per hour =(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)

	Summary) (A)													
1	5490	24.00	17.00	4.50	15.88	4.25	2.50	22.63	2	63	345870.00	4001868.00	12	2

**4A.4.4: Drill Machine Requirement**

Effective Shift Time	6 hrs	00 mins
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Sl.No.	Type of Drill	Depth of Hole(including Sub-grade Drilling (m)	Spacing (m)	Burden (m)	Bulk Density of Waste (t/m <sup>3</sup> )	Bulk Density of Mineral (t/m <sup>3</sup> )	Yield per Hole (t)	Yield per Meter (t/m) = Yield per Hole (t)/Depth of Hole(including Sub-grade Drilling (m))	Annual Target Known (t)	Drilling Requirement per Day (m) = (Annual Target Known (t) / Yield per Meter (t/m) )/Number of Average Working Days in One Year (A)	Drilling Requirement per Shift (m)	Rate of Drilling per Hours (m/hr) = Drilling Requirement per Shift (m)/Effective Shift Time	Required No. of drills (m/c) = Required rate of drilling in meters per hr./ Actual rate of drilling in meters per hr of the machine deployed	Stand by Drill
1	In-the-hole longhole drill rigs	6.50	3.25	2.50	2.00	2.00	97.50	15.00	4001868.00	874.72	291.57	48.59	2.00	1

**4A.4.5: Machine Deployment Details****4A.4.5.1: Excavator & Loading Equipment**

Sl.No.	Type	Make	Capacity (m <sup>3</sup> )	No. of Equipments
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1	Diesel Hydraulic Excavator	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.10	4
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**4A.4.5.2: Dozers Details**

SI.No.	Type	Make	Capacity (hp)	No. of Equipments
1	Crawler Dozer	BEML D155	324.00	1

**4A.4.5.3: Drilling Details**

SI.No.	Type	Make	Capacity (t)	Diameter of Hole(mm)
1	DTH Drill	Epiroc-T40	16.30	115.00

**4A.5 Blasting Requirement****4A.5.1: Blasting & Explosive Requirement in Waste/Development**

SI.No.	Drill Pattern / Spacing of Holes (m)	Burden of Holes (m)	Number of Rows / Rings	Yield per Holes in Waste (m <sup>3</sup> )	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 (t/kg)	Depth Of Hole
1	0	0	0	0	0	0	0	0	0	0	0

**4A.5.2: Blasting & Explosive Requirement in Mineral / Ore**

Type of Explosive	Type of Explosives used / to be Used
Non Permitted Explosives	Non Permitted Slurry Explosives (Large Diameter)

SI.No.	Total ROM proposed	Total ROM proposed	Spacing of Holes	Burden of Holes	Number of Rows	Yield per Holes	Frequency of Blasting	Maximum Number	No of Holes Required	Charge per Hole	Charge per Round	Explosive Requirement	Powder Factor in Ore	Pop Shooting (no of)	Plaster Shooting (no of)	Use of Rockbreaker	Capacity	Secondary Blasting	Depth Of Hole
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Ballada Bauxite Block (PB93)

	to be handled in CUM/annum	to be handled in CUM/day	(m)	(m)		in ROM Zone (m <sup>3</sup> )	in a Week	Number of Holes Blasted in a Round	to be Blasted per Round	(kg)	(kg)	Quantity Per Month for ROM Zone Blasting (kg)	(t/kg)	Boulders	Boulders			Requirements	
1	2002434	6565.35	3.25	2.5	3	48.75	6	135	135	35	4725	113400	2.78	1	1	2	0	Yes	6.0

**4A.6: Man Power Deployment****4A.6.1: Managerial**

SI.No.	Particular	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	Geologist	0	0	0	1	1
4	Mechanical Engineer	0	0	0	2	2
5	Electrical Engineer	0	0	0	2	2
6	other	0	0	0	3	3

**4A.6.2: Supervisory**

SI.No.	Particular	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	Foreman	1	1	1	0	3
2	Mine-mate	1	1	1	0	3
3	Blaster	2	0	0	0	2
4	other	2	0	0	2	4

**4A.6.3: Skilled Workers / Operators**

SI.No.	Particular	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	Drill Operator	2	2	2	0	6
2	Dumper Operator	9	9	9	0	27
3	Dozer/Grader Operator	1	1	1	0	3
4	Pump Operator	0	0	0	1	1
5	Technician	1	1	1	3	6
6	Operator	3	3	3	0	9

**4A.6.4: Semi-skilled Workers**

SI.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
1	3	3	2	5	13

**4A.6.5: Unskilled Workers**

SI.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
1	6	4	4	8	22

**4A.6.6: Others Specify**

SI.No.	Particular	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	other	4	2	2	4	12

**4A.6.7: No of Persons Engaged Per Day**

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
1	36	28	27	35	126
No of Shifts per Day ((A) = Machine Requirement Summary (B))				3	
Average Daily Employment per Shift ((B) = (Total Number of Person per Day) / (A))				42	
Material to be Handled per Shift ((C) = Machine Requirement Summary (E))				4373	

**4A.6.8: Supervision**

Sl.No.	Particular	Qualification	Requirement / Proposed	In Position / Existing Strength	(Requirement / Proposed) - (In Position / Existing Strength) = (-) Shortage / (+) Excess	Remarks
1	General Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
2	Mines Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
3	Deputy General Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
4	Assistant Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
5	Mining Engineer	B.Tech (Mining)	3	0	3	Mine Operation Yet To Start
6	Geologist	M.Tech/M.Sc Geology	2	0	2	Mine Operation Yet To Start
7	Mine Foreman	Diploma (Mining)	4	0	4	Mine Operation Yet To Start
8	Mining Mate	Diploma/12th/10th	8	0	8	Mine Operation Yet To Start

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9	Blaster	12th/10th	2	0	2	Mine Operation Yet To Start
10	Others Specify	B.tech (Mech)	2	0	2	Mine Operation Yet To Start
11	Others Specify	B.tech (Elec)	2	0	2	Mine Operation Yet To Start
12	Others Specify	Diploma (Mine Survey)	2	0	2	Mine Operation Yet To Start
13	Others Specify	Graduate	3	0	3	Mine Operation Yet To Start

**4A.7: Waste Management****4A.7.1: Existing Dump**

Sl.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m <sup>3</sup> )	Existing Dump Location
						From	To	From	To		
1	Nil	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**4A.7.2: New Dump**

Sl.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m <sup>3</sup> )	New Dump Location
						From	To	From	To		
1	Year1	NIL	Waste	0.00	0.00	Nil	Nil	Nil	Nil	0.00	NIL
2	Year2	Dump-1	Waste	0.53	5.00	18:26:44.29	18:26:48.26	82:39:58.20	82:39:58.24	24783.00	E: 675984.2504 - 675933.6977 N: 2040297.2354 - 2040429.558
3	Year3	Dump-1	Waste	0.75	7.00	18:26:48.41	18:26:49.67	82:39:57.79	18:26:49.67	36023.00	E:

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											675942.3968 - 676060.1538 N: 2040413.287 - 2040500.7938
4	Year3	Dump-1	Waste	0.53	2.00	18:26:48.41	18:26:49.67	82:39:57.79	18:26:49.67	8648.00	E: 675984.2504 - 675933.6977 N: 2040297.2354 - 2040429.558
5	Year4	Dump-1	Waste	0.26	2.00	18:26:46.69	18:26:49.67	82:40:00.27	82:40:01.90	3800.00	E: 676014.9741 - 676072.9116 N: 2040375.6681 - 2040473.3461
6	Year5	NIL	Waste	0.00	0.00	Nil	Nil	Nil	Nil	0.00	NIL

**4A.7.3: Existing Stack**

Sl.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m <sup>3</sup> )	Existing Stack Location
						From	To	From	To		
1	Nil	NIL	Nil	0.00	0.00	Nil	Nil	Nil	Nil	0.00	NIL

**4A.7.4: New Stack**

Sl.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m <sup>3</sup> )	New Stack Location
						From	To	From	To		
1	Year1	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N:

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											2039433.586 - 2039767.987
2	Year2	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987
3	Year3	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987
4	Year4	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987
5	Year5	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987

**4A.8: Mineral Waste Handling To Utilize As Minor Mineral**

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 <sup>3</sup> )
1	Year1	NIL	Nil	0.00	0.00	0.00	NIL	0.00
2	Year2	NIL	Nil	0.00	0.00	0.00	NIL	0.00
3	Year3	NIL	Nil	0.00	0.00	0.00	NIL	0.00
4	Year4	NIL	Nil	0.00	0.00	0.00	NIL	0.00

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5	Year5	NIL	Nil	0.00	0.00	0.00	NIL	0.00
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**4A.9: Use of Minerals**

Sl.No.	Proposed Use Of Mineral	Name Of Mineral	Relevant Use Of Mineral	Physical Specifications	Chemical Specifications
1	Captive use in Own Industry	BAUXITE	Proposed alumina refinery project	Lumps (-150mm)	Al <sub>2</sub> O <sub>3</sub> 42.09%, SiO <sub>2</sub> 2.96%, Fe <sub>2</sub> O <sub>3</sub> 28.97%, TiO <sub>2</sub> 2.19%, LOI 23.63%
2	Direct Selling	BAUXITE	As per buyers requirement	Lumps (-150mm)	Al <sub>2</sub> O <sub>3</sub> 42.09%, SiO <sub>2</sub> 2.96%, Fe <sub>2</sub> O <sub>3</sub> 28.97%, TiO <sub>2</sub> 2.19%, LOI 23.63%

\* Choose among these:

1. Captive use in own industry

2. Direct Selling

3. Selling Post-Beneficiation /Up-gradation

\*Select more than one, if applicable

Approved

**Chapter 4 B : Mining Operations UG : NA**

Approved

## Chapter 5: Sustainable Mining

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

This is a fresh grant of auction block, Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR'2017 will be complied after execution of lease area. A Sustainable development framework committee shall be established with various representatives for stakeholder engagement. The Committee shall be responsible for assessing impacts and their mitigation measures for sustainable development of mining operation starting from exploration to production and subsequent implementation of Progressive mine closure plan. Details documents shall be submitted to IBM after the formulation of SDF Committee.

(Total 200 characters)

Compliance of Vishakha Committee Guidelines for prevention of women harassment at workplace	Not Applicable
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### 5.2: CSR INITIATIVES

#### 5.2.1: Year1

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.1.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.1.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.1.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses

0	0
<b>5.2.1.4: Efforts Made towards Providing Transport to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
0	0
<b>5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
500	500
<b>5.2.1.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
1000	1000
<b>5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
50	50
<b>5.2.1.8: Efforts Made to Promote Education &amp; Knowledge Based Initiatives</b>	
Number of Beneficiaries	Number of Beneficiaries
500	500
<b>5.2.1.9: Communication Facilities Provided to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
0	0
<b>5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
50	50
<b>5.2.1.11: Adoption of ODF</b>	

Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	10	200

**5.2.1.12: Awareness Program among Mine Workers for Swatchata**

Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

**5.2.1.13: Efforts for green energy**

Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

**5.2.1.14: Water & recycled use**

Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

**5.2.2: Year2**

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.2.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00

**5.2.2.2: Area for Water Storage & Recharge Facility**

Area (Ha)	Area (Ha)
0.00	0.00

**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	
0		0	
<b>5.2.2.5: Efforts Made towards Providing Healthcare to Local Communities</b>			
Number of Beneficiaries		Number of Beneficiaries	
1000		1500	
<b>5.2.2.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>			
Number of Beneficiaries		Number of Beneficiaries	
2000		3000	
<b>5.2.2.7: Efforts Made towards Skill Development Programs to Local Communities</b>			
Number of Beneficiaries		Number of Beneficiaries	
100		150	
<b>5.2.2.8: Efforts Made to Promote Education &amp; Knowledge Based Initiatives</b>			
Number of Beneficiaries		Number of Beneficiaries	
1000		1500	
<b>5.2.2.9: Communication Facilities Provided to Local Communities</b>			
Number of Beneficiaries		Number of Beneficiaries	
0		0	
<b>5.2.2.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities</b>			
Number of Beneficiaries		Number of Beneficiaries	
100		150	
<b>5.2.2.11: Adoption of ODF</b>			
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries	
0	10	200	

**5.2.2.12: Awareness Program among Mine Workers for Swatchata**

Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

**5.2.2.13: Efforts for green energy**

Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

**5.2.2.14: Water & recycled use**

Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

**5.2.3: Year3**

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)
0.00	0.00

**5.2.3.2: Area for Water Storage & Recharge Facility**

Area (Ha)	Area (Ha)
0.00	0.00

**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
0	0

**5.2.3.5: Efforts Made towards Providing Healthcare to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
1000	2500

**5.2.3.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
2000	5000

**5.2.3.7: Efforts Made towards Skill Development Programs to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
100	250

**5.2.3.8: Efforts Made to Promote Education & Knowledge Based Initiatives**

Number of Beneficiaries	Number of Beneficiaries
1000	2500

**5.2.3.9: Communication Facilities Provided to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
0	0

**5.2.3.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities**

Number of Beneficiaries	Number of Beneficiaries
100	250

**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	5	100

**5.2.3.12: Awareness Program among Mine Workers for Swatchata**

Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

5.2.3.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

5.2.3.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

## 5.2.4: Year4

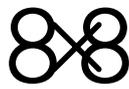
Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.4.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.4.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.00

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
0	0

5.2.4.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1000	3500



<b>5.2.4.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>		
Number of Beneficiaries		Number of Beneficiaries
2000		7000
<b>5.2.4.7: Efforts Made towards Skill Development Programs to Local Communities</b>		
Number of Beneficiaries		Number of Beneficiaries
100		350
<b>5.2.4.8: Efforts Made to Promote Education &amp; Knowledge Based Initiatives</b>		
Number of Beneficiaries		Number of Beneficiaries
1000		3500
<b>5.2.4.9: Communication Facilities Provided to Local Communities</b>		
Number of Beneficiaries		Number of Beneficiaries
0		0
<b>5.2.4.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities</b>		
Number of Beneficiaries		Number of Beneficiaries
100		350
<b>5.2.4.11: Adoption of ODF</b>		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
5	30	100
<b>5.2.4.12: Awareness Program among Mine Workers for Swatchata</b>		
Number of Swatchata Programmes Proposed		Number of Swatchata Programmes Held
2		0
<b>5.2.4.13: Efforts for green energy</b>		
Total energy consumption (KWh)		Green energy consumption (% of total)
3000000.00		10.00

5.2.4.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

## 5.2.5: Year5

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.5.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.5.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.5.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses
0	0
<b>5.2.5.4: Efforts Made towards Providing Transport to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
0	0
<b>5.2.5.5: Efforts Made towards Providing Healthcare to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
1000	4500
<b>5.2.5.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
2000	9000

<b>5.2.5.7: Efforts Made towards Skill Development Programs to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
100	450	
<b>5.2.5.8: Efforts Made to Promote Education &amp; Knowledge Based Initiatives</b>		
Number of Beneficiaries	Number of Beneficiaries	
1000	4500	
<b>5.2.5.9: Communication Facilities Provided to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
0	0	
<b>5.2.5.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
100	450	
<b>5.2.5.11: Adoption of ODF</b>		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	5	100
<b>5.2.5.12: Awareness Program among Mine Workers for Swatchata</b>		
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held	
2	0	
<b>5.2.5.13: Efforts for green energy</b>		
Total energy consumption (KWh)	Green energy consumption (% of total)	
3000000.00	10.00	
<b>5.2.5.14: Water &amp; recycled use</b>		
Total water consumption (KLD)	Water recycled (% of total)	
690.00	5.00	

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

Particular	Year1	Year2	Year3	Year4	Year5
Proposed Number of Project Affected Persons(PAP)	0	0	0	0	0
Proposed Number of Person for Alternate Arrangement for Sustainable Livelihood	0	0	0	0	0
Proposed Number of Person for Skill Training	0	0	0	0	0
Proposed Number of Person Likely to get Direct Employment	0	0	0	0	0
Proposed Number of Person Likely to get Indirect Employment	0	0	0	0	0
Proposed Project Affected Families Skilled and Absorbed	0	0	0	0	0
Proposed Number of Project Affected Families	0	0	0	0	0

## 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 outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabilized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)
Area under mining operation	Mined Out area in the lease								
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 6.2: Progressive Reclamation and Rehabilitation Plan

#### 6.2.1: Backfilling

Quantity of Waste / Fill Material Available at Site (m <sup>3</sup> )	0.00
Availability of Top Soil for Spreading (m <sup>3</sup> )	0.00
Proposed Spread Area (m <sup>2</sup> )	0.00

#### 6.2.1.1: Year Wise Proposal

Sl.No	Year	Pit ID	Area (m <sup>2</sup> )	Top RL	Bottom RL	Estimated Expenditure (₹ INR)
1	Year1	NIL	0.00	0	0	0.00
2	Year2	NIL	0.00	0	0	0.00
3	Year3	NIL	0.00	0	0	0.00

4	Year4	NIL	0.00	0	0	0.00
5	Year5	NIL	0.00	0	0	0.00

**6.2.2: Water Reservoir**

Average Rainfall of The Area (mm)	1200.00
Proposed Area under Water Storage	NIL

**6.2.2.1: Preparations For Ground Water Recharging**

6.2.2.1.1: Drilling Holes	
Year	Proposed no of Holes to be Drilled
Year1	0.00
Year2	0.00
Year3	0.00
Year4	0.00
Year5	0.00

6.2.2.1.2:Preparation of Course Gravel Bed	
Year	Proposed Area of Bed (LxW)
Year1	0
Year2	0
Year3	0
Year4	0
Year5	0

Please specify, if others

This is fresh grant of area under auction.

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

6.2.2.2.1: Fencing					
Year	Proposed Fencing Length (m)	Latitude(dd:mm:ss.ss)		Longitude(dd:mm:ss.ss)	
		From	To	From	To
Year1	0	Nil	Nil	Nil	Nil
Year2	0	Nil	Nil	Nil	Nil
Year3	0	Nil	Nil	Nil	Nil
Year4	0	Nil	Nil	Nil	Nil
Year5	0	Nil	Nil	Nil	Nil

6.2.2.2.2: Retaining Wall					
Year	Proposed Wall Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
Year1	0	Nil	Nil	Nil	Nil
Year2	128	Nil	Nil	Nil	Nil
Year3	192	Nil	Nil	Nil	Nil
Year4	152	Nil	Nil	Nil	Nil
Year5	0	Nil	Nil	Nil	Nil

6.2.2.2.3: Garland Drains					
Year	Proposed Bund Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
Year1	0	Nil	Nil	Nil	Nil
Year2	195	Nil	Nil	Nil	Nil
Year3	192	Nil	Nil	Nil	Nil
Year4	152	Nil	Nil	Nil	Nil

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Year5	0	Nil	Nil	Nil	Nil
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**6.2.3: Green Belt Development****6.2.3.1: Cumulative work done (upto end of previous block of five years)**

SI.No	Total Expenditure Incurred up to Last Year (INR)	Area Covered (Ha)	Number of Plants	Survival Rate (%)
1	0.00	0.00	Nil	0.00

**6.2.3.2: Year Wise Proposal**

SI.No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (₹ INR)
1	Year1	Statutory Barrier Dump haul roads	0.72	1440	75	201600
2	Year2	Statutory Barrier Dump haul roads	0.86	1720	75	240800
3	Year3	Statutory Barrier Dump haul roads	1.16	2320	75	324800
4	Year4	Statutory Barrier Dump haul roads	0.68	1360	75	190400
5	Year5	Statutory Barrier Dump haul roads	0.80	1600	75	224000

**6.2.4: Use of Shallow Pits****6.2.4.1: Cumulative Work Done (upto end of previous block of five years)**

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Ballada Bauxite Block (PB93)

SI.No	Pit ID	Work Done	Area covered (m <sup>2</sup> )	Total Expenditure Incurred (up to last five year block) (₹ INR)
1	NIL	0	0.00	0.00

**6.2.4.2: Year Wise Proposal**

SI.No	Year	Pit ID	Total Area(Ha)	Area Proposed for Crops (Ha)	Suitable Crops	Area Proposed for Grass (Ha)	Total Proposed Expenditure (₹ INR)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remarks
								From	To	From	To	
1	Year1	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
2	Year2	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
3	Year3	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
4	Year4	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
5	Year5	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL

**6.2.5: Pisciculture**

<b>6.2.5.1: Total Expenditure incurred as on Date (INR)</b>	0
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**6.2.5.2: Cumulative work done as on Date**

SI.No	Pit ID	Area (m <sup>2</sup> )	Expenditure (₹ INR)
1	NIL	0.00	0.00

**6.2.5.3: Year Wise Proposal**

SI.No	Year	Pit ID	Area (m <sup>2</sup> )	Estimated Expenditure (₹ INR)
1	Year1	NIL	0.00	0.00
2	Year2	NIL	0.00	0.00

Ballada Bauxite Block (PB93)

3	Year3	NIL	0.00	0.00
4	Year4	NIL	0.00	0.00
5	Year5	NIL	0.00	0.00

<b>6.2.5.4: Source of Water for Pisciculture</b>	Not applicable
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<b>6.2.5.5: Whether the quality of water has been assessed &amp; found to be suitable for Pisciculture</b>	Yes
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**6.2.6: Recreational Facility**

<b>6.2.6.1: Total Expenditure Incurred (up to last five year block) (INR)</b>	0.00
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**6.2.6.2: Cumulative work done as on Date**

Sl.No	Pit ID	Area (m <sup>2</sup> )	Expenditure (₹ INR)
1	NIL	0.00	0.00

**6.2.6.3: Year Wise Proposal**

Sl.No	Year	Type of Recreational Facility	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Estimated Expenditure (INR)
				From	To	From	To	
1	Year1	NIL	0.00	Nil	Nil	Nil	Nil	0.00
2	Year2	NIL	0.00	Nil	Nil	Nil	Nil	0.00
3	Year3	NIL	0.00	Nil	Nil	Nil	Nil	0.00
4	Year4	NIL	0.00	Nil	Nil	Nil	Nil	0.00
5	Year5	NIL	0.00	Nil	Nil	Nil	Nil	0.00

**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
1	Year1	NIL	0	0.00	0.00	0.00	0.00	NIL	0.00	Nil
2	Year2	Dump-1	1	5.00	128.00	195.00	0.00	NIL	692650.00	Nil
3	Year3	Dump-1	1	7.00	192.00	192.00	0.00	NIL	1011840.00	Nil
4	Year3	Dump-1	1	2.00	0.00	0.00	0.00	NIL	0.00	Nil
5	Year4	Dump-1	1	2.00	152.00	152.00	0.00	NIL	801040.00	Nil
6	Year5	NIL	0	0.00	0.00	0.00	0.00	NIL	0.00	Nil

#### 6.2.8: Other Form of Reclaiming the Area

##### 6.2.8.1: Cumulative work done as on Date

Sl.No	Total Expenditure incurred as on Date (INR)	Work Done
1	0.00	0

##### 6.2.8.2: Year Wise Proposal

Sl.No	Year	Work Proposals	Estimated Expenditure (INR)
1	Year1	No Proposal	0.00
2	Year2	No Proposal	0.00
3	Year3	No Proposal	0.00
4	Year4	No Proposal	0.00
5	Year5	No Proposal	0.00

#### 6.2.9: TopSoil Management

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

Sl.No	Top Soil Generated (m <sup>3</sup> )	Top Soil Utilized (m <sup>3</sup> )	Topsoil Stored (m <sup>3</sup> )	Total expenditure incurred as on date (₹)
1	0.00	0.00	0.00	0.00

**6.2.9.2: Year Wise Proposal**

Sl.No	Year	Topsoil Generated (m <sup>3</sup> ) (A)	Topsoil Utilized (m <sup>3</sup> ) (B)	Topsoil Stored (m <sup>3</sup> ) (A-B)	Estimated Expenditure (INR)
1	Year1	15660.00	4700.00	Nil	3132000.00
2	Year2	1680.00	5400.00	Nil	336000.00
3	Year3	7375.00	7375.00	Nil	1475000.00
4	Year4	3960.00	4000.00	Nil	792000.00
5	Year5	0.00	7200.00	Nil	0.00

**6.2.10: Tailings Dam Management**

Sl.No	Year	Yearly generation of Tailing (m <sup>3</sup> ) (A)	Total capacity of Tailing Pond (m <sup>3</sup> )	Measures Proposed for Periodic Desilting	Yearly Utilization of Tailing (m <sup>3</sup> ) (B)	Disposal of Tailing to Tailing Pond (m <sup>3</sup> ) (A-B)	Tailing Dam Design	Structural Stability Studies
1	Year1	0.00	0.00	0	0.00	0.00	Nil	Nil
2	Year2	0.00	0.00	0	0.00	0.00	Nil	Nil
3	Year3	0.00	0.00	0	0.00	0.00	Nil	Nil
4	Year4	0.00	0.00	0	0.00	0.00	Nil	Nil
5	Year5	0.00	0.00	0	0.00	0.00	Nil	Nil

**6.2.11: Land Use of Lease Area at the Expiry of Lease Period**

Total Area Degraded	Non Degraded	Total mined out area Reclaimed and	Other Areas Reclaimed and Rehabilitated
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Ballada Bauxite Block (PB93)

Mined Out area in the lease	Area under Dumps(in hect)	Area under the Tailing Dam	Area under utility services(in hect)	area	Rehabilitated			Stabilized 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)
				Area undisturbed/virgin	Mined out Area Reclaimed but not rehabilitated(in hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)				
81.82	1.95	0.00	0.00	61.18	80.74	0.00	1.08	1.95	4.23	0.00	0.00

Approved

**Chapter 7: Financial Assurance/ Performance Surety (AREA PUT TO USE)****Year1**

## Consolidated View of Financial Assurance

SI.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	0.00	5.89	5.89
2	Topsoil stacking	0.00	0.28	0.28
3	Overburden/Waste Dumping	0.00	0.00	0.00
4	Mineral Storage	0.00	1.93	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18	0.18
6	Roads	0.00	0.38	0.38
7	Railway	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	0.13	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.72	0.72
	Total	0.00	9.51	9.51

**Year2**

## Consolidated View of Financial Assurance

SI.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	5.89	4.40	10.29
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	0.00	0.53	0.53
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18
6	Roads	0.38	0.00	0.38
7	Railway	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	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.72	0.86	1.58
	Total	9.51	5.79	15.30

**Year3**

## Consolidated View of Financial Assurance

SI.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	10.29	7.10	17.39
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	0.53	1.15	1.68
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18

Ballada Bauxite Block (PB93)

6	Roads	0.38	0.00	0.38
7	Railway	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	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	1.58	1.16	2.74
	Total	15.30	9.41	24.71

## Year4

## 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	17.39	8.36	25.75
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	1.68	0.26	1.94
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18
6	Roads	0.38	0.00	0.38
7	Railway	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	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	2.74	0.38	3.12
	Total	24.71	9.00	33.71

## Year5

## Consolidated View of Financial Assurance

SI.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	25.75	17.03	42.78
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	1.94	0.00	1.94
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18
6	Roads	0.38	0.00	0.38
7	Railway	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	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	3.12	0.80	3.92
	Total	33.71	17.83	51.54
	Grand Total			Nil
Performance Surety				

## (b) Performance Surety

Lease Category (A/B)	Total Resources in Tonnes For Calculations of Performance Surety	Existing Performance Surety in Rs	Valid Till (dd/mm/yyyy)	Upload Copy Of Existing Performance Surety as Attachment
A	22132136	334205610.00	Nil	Nil

105

1670

Ballada Bauxite Block (PB93)

Approved

**Chapter 8 : Review of previous proposals during the last plan period (NA)**

Approved

**Chapter 9: Impact Assessment(for fresh grant)****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)	No

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

It is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIA EMP report shall be submitted to IBM

(Total 500 characters)

**9.2: Environment Parameters****9.2.1: Environment Monitoring****Monitoring Activity****9.2.1.1: Ambient Air Quality**

Core Zone (Quarterly Monitoring Planned)	Yes
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Buffer Zone (Quarterly Monitoring Planned)	Yes
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**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	91.1000
Land under Agriculture / Crops	0.0000
Land covered with Plants	53.7500
Land under Grass Cover	0.0000
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	0.0000

Land under Habitation	0.0000
Land under Monuments & places of Historical Importance	0.0000
Degraded by Pits & Excavation	0.0000
Degraded by Dumps & Material Staking	0.0000
Covered under Mine Infrastructure (plants, shades, buildings etc.)	0.0000
Land under Forest	144.9450
Historically, Culturally & Ecologically Important Places	0.1000
Any Other, please specify below	0.0000
Date of Observation	25/04/2023

**9.3.2.2: ANTICIPATED IMPACT**

Post Mining Use	AREA (Ha)
Degradation by Excavation	81.8200
Degradation by Dumps & Material Staking	1.9500
Covered under Plants, Shades & Buildings	0.0000
Covered by Roads & Approaches	0.0000
Any Other, please specify below	61.1800

**9.3.2.3: MITIGATION MEASURES****9.3.2.3.1: Backfilling**

The Ore to OB ratio during the first five years is 1:0.018. The OB thus generated is very less in quantity and shall be dumped separately. The dump area is being progressively stabilized. No backfilling during the plan period is proposed. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/ EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

#### 9.3.2.3.2: Area proposed to be covered by Plantation in Backfilled Area

No backfilling during the plan period is proposed. Hence, no area is proposed to be covered by Plantation in Backfilled Area during the period of Mining Plan.

(Total 1000 characters)

#### 9.3.2.3.3: Proposed Area under Agriculture

No area is proposed for agriculture during the period of the Mining Plan.

(Total 1000 characters)

#### 9.3.2.3.4: Proposed Area to be converted to Grazing Land

No Grazing land exists in the block area since it is hilly terrain. Therefore no proposals of converting Grazing Land is given However, the same shall be reviewed during the conceptual period of mining. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/ EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

#### 9.3.2.3.5: Ground Water Recharging

A water storage ha been proposed during the conceptual period. The total area of the proposed water storage shall be 1.08 ha. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/ EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

#### 9.3.2.3.6: Green Belt Development

Area under greenbelt has proposed covering statutory boundary, haul road and around the dumps During the Plan period, 3.2 ha. area has been considered for greenbelt development. Year Wise Proposal for plantation is mentioned under Para 6.2.3.2: Major steps for post plantation care are given below: Mulching to minimize transpiration losses and to ensure good establishment. Regular dose of compost manure/ fertilizers as per the schedules. Spraying of organic insecticides and fungicides whenever required. Hoeing, weeding, and watering at regular intervals. Guarding of saplings by fencing wherever needed. Monitoring of the growth of plantation by the independent and self-sustained horticulture department.

(Total 1000 characters)

#### 9.3.2.3.7: Agriculture

No proposals of agriculture are given in this Mining plan period. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/

EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

### 9.3.3: Air Environment

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

Temperature (°C)	
Maximum	36.00
Minimum	10.00
Relative Humidity (%)	
60.00	
Average Rainfall (mm)	
99.99	

#### 9.3.3.2: Air Quality Details for Base line Information / Present Status

S.N.	Station Name	Season	PM10 (µg/m <sup>3</sup> )	PM10 Excess (µg/m <sup>3</sup> ) <sup>2</sup>	PM2.5 (µg/m <sup>3</sup> )	PM2.5 Excess (µg/m <sup>3</sup> ) <sup>2</sup>	SO <sub>2</sub> Value (µg/m <sup>3</sup> )	SO <sub>2</sub> Excess (µg/m <sup>3</sup> )	NO <sub>x</sub> Value (µg/m <sup>3</sup> )	NO <sub>x</sub> Excess (µg/m <sup>3</sup> )	Date of Observation	Action
1	NIL	Nil	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Nil	NA

#### 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 conveyer

The mining activity does have impacts on air quality. The major contribution to the air pollution by open cast mining is the rise in Suspended Particulate Matter (SPM) due to generation of dust by drilling, blasting, handling of waste/mineral, movement of fleet of dumpers, trucks, jeep etc. Apart from these, the fumes emitted by mining machinery also pollute the atmosphere. The proposed mining activities include various mining operations involving development of benches, approach roads, haul roads, excavation and transportation of Bauxite and waste materials, operation of crushing unit for sizing of Bauxite. These operations generally result in generation of dust. Dust is a particulate contaminant suspended in the atmosphere. The upper size limit of dust particles is governed by gravitational effects. While the distinction between the respirable and irrespirable dust is scientifically valid, it is clear that both sizes can impair lung functions when inhaled over a long period of time. Deployment of diesel-powered equipment for mining may produce emissions that are known to be hazardous.

(Total 1000 characters)

#### 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

Regular ambient air quality monitoring will be carried out at different locations in core/buffer zone and nearby villages of the lease area to assess the existing air quality and also to assess the conformity to standards of ambient air quality during mining operations. Measure taken to control dust pollution: During drilling operations: - Sharp drill bits will be used for drilling and regrinding of these is to be done periodically to reduce generation of dust. Drilling machines will be equipped with wet drilling and dust collector systems to prevent dust to get air borne. The drill machines will be kept leakage free. The drill operator and helper will be provided with personal protective equipment. During blasting operation: - Sufficient stemming column will be maintained to prevent air blast. Controlled blasting with proper blast design and charging. Controlled blasting also provides a number of hazard mitigation measures including the: By applying appropriate quality control and understanding of the implications of proper blast design, blasting operations can not only improve the safety on the mine, but will most likely improve productivity and the long-term sustainability of the mine as well. During loading operation: - Water sprinkling through water tanker fitted with rain guns will be done on working faces to reduce generation of dust. The operators will be provided with closed cabins and dust mask. During Transport operation: - Haul roads will be properly maintained with use of compactor and motor grader and watered regularly to prevent generation of dust. Water spraying arrangements will be made at all material transfer points to suppress dust. Prevention of spillage of material during transportation. Ambient air quality monitoring Ambient air monitoring will be carried out regularly in core and buffer zones to know the quality of air

(Total 1000 characters)

### 9.3.4: Water Environment

#### 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)

First order dendritic drainage pattern is observed adjacent to the block area. As part of rain water harvesting a shallow depression is understood to have been dug under CAMPA Scheme in the year 2020/21 by the Forest Department. The dimension of the same is 76m x 54m x 1m. The current mine plan proposal does not envisage mining of the aforementioned area during the first 5 years of mining. A water storage has been proposed during the conceptual period of mining.

(Total 1000 characters)

#### 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)

Mining operation will not generate toxic effluent from solid waste Therefore impacts of mining activities on soil and water environment in and around the mining area will be negligible The chances of the water quality getting affected due to mining activity are very remote as no chemical having toxic element shall be used in carrying out mining activity Mining will be carried out above the water table during the Plan period and shall not intersect the ground water table during the plan and conceptual period The Machhkund is the major source for water and the deposit is a plateau with forest covered area Hence mining activity will not affect agriculture or vegetation As it is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIAEMP report shall be submitted to IBM

(Total 1000 characters)

#### 9.3.4.1.3: Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

The water levels in the area exist far below the proposed working depth and the ultimate working depth at the end of life of mine The mining operations will not interfere with natural drainage patterns In order to avoid soil erosion carryover of the material with rainwater retaining wall garland drain is proposed along the waste dump and topsoil stack yard to arrest the wash off Moreover peripheral drains all around the dumps shall be made to trap rainwater washings out of the dumps which in turn will reduce the load of suspended solids in the discharged water Sump pits will be provided along the length of the drains for effective trapping of rainwater washings Garland drains around the dumps will trap the fine particles from the dumps washed away by rain The drains will be 1m wide at the top and 1m deep and shall be provided with sump pits at suitable interval along its lengths Further a green belt is proposed to be provided around the dumps As it is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIAEMP report shall be submitted to IBM

(Total 1000 characters)

### 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)

As part of rain water harvesting a shallow depression is understood to have been dug under CAMPA Scheme in the year 2020/21 by the Forest Department The dimension of the same is 76m x 54m x 1m . The current mine plan proposal does not envisage mining of the aforesaid area during the first 5 years of mining.

(Total 1000 characters)

**9.3.4.2.2: Anticipated Impact**

(Ingress of Sea Water, Particularly for Mining Projects in Coastal Areas)

Mining operation will not generate toxic effluent from solid waste. Therefore, impacts of mining activities on soil and water environment in and around the mining area will be negligible. The chances of the water quality getting affected due to mining activity are very remote, as no chemical having toxic element shall be used in carrying out mining activity. Mining will be carried out above the water table during the Plan period and shall not intersect the ground water table during the plan and conceptual period.

(Total 1000 characters)

**9.3.4.2.3: Mitigation Measure**

(Steps to Minimize Impact on Water Table if Mining Intercepts Groundwater Regime)

The water levels in the area exist far below the proposed working depth and the ultimate working depth and at the end of life of mine. The mining operations will not interfere with natural drainage patterns. Safe distance will be left from canal, Nallah & River on either side if any. The water will pass only in the rainy season through broken land, waste dumps, and its quality is likely to deteriorate, as in absence of toxic minerals, the quality of water will not have any adverse impact. In order to avoid soil erosion & carry-over of the material with rainwater, retaining wall & garland drain are proposed. Various steps, statutory and otherwise, are being taken to protect surface water.

(Total 1000 characters)

**9.3.4.3: Water Balance****9.3.4.3.1: Base / Present Status**

(Water Balance (Withdrawal of Surface Water &amp; Release of Mine Drainage Water) Water Requirement &amp; Waste Water Generation from various Activities of Mine, Including Beneficiation)

Water requirement during construction phase domestic and construction activity is estimated as average 15 KLD with a peak consumption of 30 KLD The water requirement of the project during operation phase is 690 KLD Source of water supply Water will be sourced from nearby Jalaput lake located at distance of 3 km Adequate control measures shall be adopted to check the wash off The measures proposed to be adopted are Garland drains are proposed at the toe of the dumps to channelize the runoff water from dumps No waste water shall be generated from the mining activities Septic tanks and soak pit shall be provided for the disposal of effluent generated from mine office The breakup of water requirement is given below Haul road dust suppression including maintenance of topsoil 600 KLD Washing and cleaning of earthmoving equipment service water system 45 KLD Drinking system 10KLD Afforestation 15 KLD Miscellaneous 20 KLD TOTAL 690 KLD

(Total 1000 characters)

**9.3.4.3.2: Anticipated Impact**

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

The mining activity will not entail any significant adverse environmental impact on the surface water and ground water resources and their quality in the core zones of mining lease area. Further, no tailing dam exists in the lease area. There are no well-defined aquifers within the area. Thus, due to mining, ground water resources of the area will not be affected adversely. However, the baseline data collection will be carried out during the EIA/EMP report preparation and shall be furnished to IBM. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF/CC. During the preparation of EIA/EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

#### 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.)

Adequate control measures shall be adopted to check the wash off. The measures proposed to be adopted are: Garlands are proposed at the toe of the dumps to channelize the runoff water from dumps. No wastewater shall be generated from the mining activities. Septic tanks and soak pits shall be provided for the disposal of effluent generated from mine office. Water monitoring stations are marked on Environment Key Plan.

(Total 1000 characters)

### 9.3.5: Noise

#### 9.3.5.1: Critical Locations Identified within Lease Area

Noise is created during drilling, blasting and by movement of dumpers, trucks, loading of muck by shovels etc. and movement of HEMM. Noise levels will be measured within core zone and buffer zone of area. The sample locations are marked on the environment plan. The noise level is under permissible level. The noise level will be recorded quarterly, and the monitoring reports will be submitted to MOEF and CPCB.

(Total 1000 characters)

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

Generally, high noise levels will be confined to work zone areas only and the noise levels get diffused rapidly with distance. In summary, it can be stated that the impact on the present noise levels due to mining operations will be restricted to the work zone areas only. The summary of the permissible exposures in cases of continuous noise as per above rules is given below:- Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings but when it is abnormally high, it incurs some maleficent effects on human beings. Sufficiently loud noise may cause the following adverse effects:- (i) Damage hearing and health (ii) Interfere with work task (iii) Interfere with speech communication (iv) Cause irritation (v) Affect inter-room privacy (vi) Interfere with sleep (vii) Cause annoyance. The impact on the ambient noise levels will not be felt at the settlement areas due to masking effect with the existing noise levels. Hence, the noise levels impact due to the proposed mining operations on community is insignificant.

(Total 1000 characters)

#### 9.3.5.3: Measures to Minimize the Impact on Receiving Environment

Noise level will be managed by: 1. Maintenance of machinery and running the same at optimum level. 2. Trained operators will be employed for the operation of machinery. 3. Plantation of trees around haul roads. 4. Drilling should be done by use of sharp bits. 5. Controlled blasting with adequate burden, spacing delay blasting and adequate charge and stemming, secondary blasting shall be avoided. 6. Blasting will be carried out in day times only. 7. The operator's cabin shall be guarded with proper enclosures to reduce the noise level. 8. Provisions of Earmuffs/Plugs for operator. 9. Quarterly monitoring of Sound Level will be done, and reports will be sent to MOEF and RSPCB

(Total 1000 characters)

#### 9.3.5.4: Noise Details for Base / Present Status

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

#### Note :

1. Day time reckoned in between 6.00 am to 9.00p.m
2. Night time reckoned in between 9.00p.m.to 6:00am
3. Silence zone is defined as areas up to 100 meter around such premises as Hospitals, Educational institutes and Courts. The Silence zones are to be declared by the competent Authority
4. Mixed categories of areas should be declared as "one of the four above mentioned categories" by the Competent Authority and the corresponding standards shall be applied.

S.N.	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
1	NIL	Nil	Nil	0	0	0	0	Nil

#### 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

Noise at lower levels sound pressure is quite acceptable and does not have any bad effect on human beings but when it is abnormally high it incurs some maleficent effects on human beings Sufficiently loud noise may cause the following adverse effects Damage hearing and health Interfere with work task Interfere with speech communication Cause irritation Interfere with sleep Cause annoyance

(Total 1000 characters)

**9.3.5.5.2: Mitigation Measure**

Give details on measures for noise abatement including point source & line source

Due to the mining activities the noise sources shall not generate sound levels above 75 dBA and 70 dBA during day and night respectively as per CPCB Norms for Industrial area The following control measures shall be adopted to keep the ambient noise levels well below the limits Drilling shall be carried out with the help of sharp drill bits which will help in reducing noise Controlled blasting shall be done with proper spacing burden stemming and optimum charge delay Secondary blasting shall not be carried out and Hydraulic rock breaker shall be used for breaking boulders The blasting shall be carried out during favorable atmospheric conditions and less human activity timings Proper maintenance of oiling and greasing of mining machinery at regular intervals shall be done to reduce generation of noise Adequate silencers shall be provided in all diesel engines Acoustic cabin in HEMM protects the operator from high noise level Green Belt Plantation shall be developed around the mining activity area along haul roads temporary dumps and other open areas The plantation minimizes propagation of noise Personal Protective Equipment like dust mask ear plugs etc shall be provided to all employees Periodical monitoring of noise shall be done

(Total 1000 characters)

**9.3.6: VIBRATION****9.3.6.1: Vibration Details for Base / Present Status**

S.N.	Station Name	Season	Distance from the Blasting Site (m)	Peak Particle Velocity (mm/s)	Air Over Pressure (DB)	Frequency (Hz)	Date of Observation
1	NIL	Nil	0.00	0.00	0.00	0.00	Nil

**9.3.6.2: Impact Assessment & Mitigation Measures****9.3.6.2.1: Anticipated Impact**

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

The ground vibrations are generated due to mechanization blasting Since there are no habitats are nearby the mining zone it will not have any impact on the buildings and structures etc Blasting also generates air over pressure which may cause damage to window pans Main key factors affecting the ground vibrations are geology and rock type burden maximum charge weight delay initiation pattern and distance and conditions of structure Besides structural damage another factor of concern is human response towards vibration Controlled Blasting under the supervision of a Mining Engineer Mines Manager is proposed so the effect of vibration will not be there also the effect of vibration will be reduced by using sequential blasting with delay detonators and Shock tubes Also the guidelines of DGMS and other competent agencies are being strictly followed apart from the provisions of safety precautions as laid down in the Metalliferous Mines Regulation 1961

(Total 1000 characters)

#### 9.3.6.2.2: Mitigation Measure

Give details on measures for noise abatement including point source & line source

The blasting operations in the mine shall be carried out by using delay detonators which reduces the ground vibrations Further the ground vibrations shall also be controlled by using modern shock tubes with delay nonelectric detonators The measures that are generally followed and currently proposed for abatement of ground vibration air blast and fly rocks are detailed below Blasting shall be carried out strictly as per the guidelines specified under MMR1961 Proper design of blast with correct spacing burden optimum charge delay Supervision of drilling and blasting operations to ensure blast design geometry Subdrilling shall be kept just adequate to tear off the bench bottom Blasting operations shall be carried out only during daytime as per DGMS guidelines Proper warning signals shall be given Drilling parameters like depth diameter and spacing shall be properly designed to give an optimum blast Effective stemming of the explosives shall be done in the drill holes NonElectric detonators NONEL shall also be used to control ground vibrations Blast vibration study shall be conducted regularly

(Total 1000 characters)

### 9.3.7: Socio-Economic Environment

#### 9.3.7.1: Demographic Profile

S.N.	Type of Area	Name of Village	Total Population	Male to Female Ratio	Literacy Rate (%)	Employment Rate (%)
1	Residential	Atanda Banuru	360.00	1.00	37.00	41.70
2	Residential	Badel	1108.00	0.88	20.80	57.90
3	Residential	Balda LulluburuSoput	1385.00	2.11	62.30	21.00
4	Residential	Bheja BarabaBodaliguraH KhilaputHanjrapenthaSuk ripur	401.00	0.97	46.40	54.10
5	Residential	Chiliput	208.00	0.82	26.00	28.40
6	Residential	Kulabiri Dorasabalpur	1435.00	0.85	59.40	35.30

7	Residential	Handiput	Nil	Nil	Nil	Nil
8	Residential	Kakada	146.00	0.94	22.60	24.70
9	Residential	Kakua	428.00	1.04	13.80	51.20
10	Residential	Karanjagura Khurji	210.00	1.03	9.10	26.70
11	Residential	Katiput	132.00	0.97	34.90	21.20
12	Residential	Kitaba	223.00	1.04	17.50	21.50
13	Residential	Maliput Hikimput	151.00	1.15	30.50	29.80
14	Residential	Malisubular	337.00	1.00	25.20	0.30
15	Residential	Mulda	385.00	0.91	35.90	59.20
16	Residential	Padwa	1487.00	1.12	42.50	34.80
17	Residential	Petal	377.00	1.02	22.80	27.30
18	Residential	Somali	954.00	1.09	11.30	27.10

**9.3.7.1.1: Anticipated Impact**

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

The above demography table has been sourced from Census data from internet. The major source of employment in the buffer zone is agriculture which depends upon the rain. There will be no impact on cropping due to mining activities. The Machhkund is the major source for water and the deposit is a plateau with forest covered area. Hence mining will not affect agriculture. Corporate development invariably contributes towards acceleration of the process of socio-economic upliftment of the rural society. CSR activities in the area are proposed.

(Total 1000 characters)

**9.3.7.1.2: Mitigation Measure**

(Give details about compensation for loss of land & crops)

Entire Ballada Bauxite block comprises of forest land and no private land is involved. The land within the block area will be degraded during the course of mine operation. However, various mitigation measures have been proposed to control and minimize the impact. Retaining walls / Toe walls and garland drains have been proposed in the periphery of the dump and pit area to control and prevent the flow of discharge water from the mining area. It is proposed to develop greenbelt plantation within the 7.5m safety zone and stabilizing dead dumps by carrying out plantation on it. During the plan period, the worked out area will be reclaimed by suitable plantation.

(Total 1000 characters)

**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 major source of employment in buffer zone is agriculture.

(Total 1000 characters)

**9.3.7.2.2: Anticipated Impact**

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

The major source of employment in buffer zone is agriculture. Due to mining activities no evacuation of human settlement is involved. The mining operations will not cause any adverse impact on socio economic environment of the area. The Social & Demographic Profile of the area improves by having economic activity near the villages by direct and in direct jobs.

(Total 1000 characters)

**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)

The mining activities in the area will help in the improvement of the socio-economic status of the people around the mine area by generating direct or indirect employment opportunities. The project also attracts ancillary and related small-scale industries in the adjoining areas. Continued mining activities will benefit the local people due to provision of more infrastructural facilities provided by local industry as mining industry boost up the local market. The Bauxite mined from this mine will be used for Alumina manufacturing, which is an essential commodity for infrastructure development, thus this help in improving economic standard of the country. Further, the company will contribute towards taxes, DMF etc, which will indirectly benefit the local community. Hence, The Social & Demographic Profile of the area will definitely improve by having an economic activity near the villages by direct and in direct jobs.

(Total 1000 characters)

**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)

The major source of employment in buffer zone is agriculture The economic Profile of the populations in core and buffer zone is satisfactory The socioeconomic conditions of the surrounding villages near the mine site will be improved as the mine will provide both direct and indirect employment to the people However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

#### 9.3.7.3.2: Anticipated Impact

(Give details about impact on community resources such as grazing land)

No adverse impact is envisaged due to mining activities on community resources such as grazing land However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

#### 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)

The company will assist in improvement of livelihood to promote productive employment and microenterprise short term intensive courses in various trades may commence that aim to achieve sustainable livelihood by strengthening youths technical and functional skills However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

#### 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)

Within the mining lease area no human settlements However there are 18 villages within the buffer zone The details are provided in Demographic Profile chapter Various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

##### 9.3.7.4.2: Anticipated Impact

(Give details about any displacement of human settlements during the life of the mine)

No displacement of human settlements is proposed during the life of the mine The mining activities will be undertaken after obtaining forest clearance No private land acquisition is involved However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to

IBM

(Total 1000 characters)

#### 9.3.7.4.3: Mitigation Measure

(Give details about rehabilitation & resettlement of land owners & displaced people)

As no displacement of human settlements is proposed during the life of the mine so this para is not applicable However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

#### 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)

The health profile of the populations in the buffer zone are satisfactory Some health and safety hazards are anticipated to affect the persons to be employed in the project The workers will be exposed to the dust particles and excavation if adequate measures have not been taken it may cause occupational health hazard However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

##### 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)

No adverse impact on the general health condition of the population in buffer zone is envisaged due to mining operations Plantation is proposed in the area The applicant will strictly implement all the prescribed safety measures although the magnitude of mining is very less High safety is ensured in the working conditions of the miners Protective equipment will be provided to the employees such as safety shoes helmets and dust masks By using these PPEs the chances of occupational health diseases will be minimized The health of the workers will be regularly monitored and suitable medical facilities shall be created by the applicant By periodical medical checkup treatment and job rotation of employees the impact would be minimized Pre placement medical checkup shall be done and regular health check up in 6 monthly intervals is planned for all the mine workers Following measures will be implemented Dust Extraction System Regular Water Sprinkling for dust suppressions Initial medical examination of workers is proposed Rest shelter and toilets facilities will be provided All the safety equipment such as helmets shoes goggles dust mask and ear plugs will be provided Medical facilities will be provided to the workers A well equipped first aid facility will be maintained at the area However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

**9.3.7.5.3: Mitigation Measure**

(Give details about avenues like dispensaries, hospitals, maternity homes if any to be created)

Public health Centre PHCS are there in all the villages in buffer zone but for other major facilities are available Villagers have to go to more than 10 km from their place to avail medical facility However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

**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)

The core and buffer zone are free from historically culturally and ecologically important places up to 10km radius

(Total 1000 characters)

**9.3.7.6.2: Anticipated Impact**

(Give details about risk profiling)

As there is no historical monument place of worship within 10 km of the mining lease area hence no anticipations are envisaged

(Total 1000 characters)

**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.)

The project is a fresh grant of area under auction All the clearances will be taken before execution of are The mining plan approval environmental clearance process is also being run Owing to that a detailed EIAEMP report shall be prepared incorporating all the issues related to the environment concerning both core and buffer zones After that preparation the detailing as required can be done As far as the matter related to public health is a concern and the company is very keen in the particular matter shall do accordingly as the regulations

(Total 1000 characters)

## Chapter 10: Annexures

## 1. Upload Document

## 1.1 Upload Document

Sl.No.	Title	Is Upload	Document (only pdf allowed)
1	Letter of Intent /Letter of lease grant	Nil	<a href="#">A1 Letter of Intent Name Change.pdf</a>
2	Copy of lease deed executed	Nil	Nil
3	Copy of Declaration of Owner/Nominated Owner in case of Company/partnership firm	Nil	<a href="#">A5 CTC Onwner of Mine.pdf</a>
4	ID & Address Proof of Owner/ Nominated Owner	Nil	<a href="#">A6 KYC - Ajit Kumar Sama.pdf</a>
5	Copy of Environment and Forest Clearence, Consent to Establish, Consent to Operate	Nil	Nil
6	Copy of Registration of Company (RoC)/Partnership firm (Registration) & Deed	Nil	<a href="#">A3 Registration of Company MAL KAL.pdf</a>
7	Consent letter for Qualified Person	Nil	<a href="#">A7 Mine Owners Authorization 22May2023.pdf</a>
8	Experience & Qualification Details of Qualified Person	Nil	<a href="#">A8 OP Certificates.pdf</a>
9	Certificate from QP	Nil	<a href="#">A9 Certificate from Qualified Person-f.pdf</a>
10	Copy of Bank Guarantee	Nil	<a href="#">Bid Security BG Ballada.pdf</a>
11	Copy of Performance Surety	Nil	<a href="#">Upfront payment.pdf</a>
12	Copy of MDPA (as applicable)	Nil	Nil
13	Exploration details	Nil	<a href="#">Proposed BH Details.pdf</a>
14	Copy of feasibility Report	Nil	<a href="#">Prefeasibility Report.pdf</a>

Ballada Bauxite Block (PB93)

15	Copy of Study reports conducted as per Para 4.3.1	Nil	<a href="#">Ballada_combined_GR.pdf</a>
16	Chemical and Mineralogical analysis report	Nil	<a href="#">A14_Chemical_Analysis_Report.pdf</a>
17	Any other Report or Certification as required in the submitted Document.	Nil	Nil
18	Copy of Scale relaxation approval granted(if applicable)	No	Nil
19	Mineral processing flowsheet with stage wise recovery	Nil	<a href="#">Mineral_Processing_Plant.pdf</a>
20	Any Other	Yes	<a href="#">Combined_Annexures_Uploaded.pdf</a>

Approved

## Chapter 11: Plates (OC)

## 1. Upload Document

## 1.1 Upload Document

S.N.	Title	Is Upload	Document
1	Lease sketch plan;	Nil	<a href="#">Plate 1 Ballada Key Plan Toposheet.pdf</a>
2	Surface Plan (.KMZ format)(Georeferenced); A statutory plan as per MCDR, 2017. The Plan should be submitted showing different color codes for:(1) Active Pits & Excavation area(2) Excavated area reclaimed & rehabilitated (3)Active dumps (4) Stabilized & rehabilitated dump area , (5) Green belt (6) Mineral Stacks (7) Utilities such as plant, buildings etc (8) Lease boundary along with other details.)	Nil	<a href="#">SURFACE_PLAN.kmz</a>
3	Surface Geological Plan of the lease (.KMZ format)(Georeferenced); The Plan should be submitted showing different color codes for : (1) Lithological/Geological Occurance (2) Area under G1,G2,G3 & G4 (3) Active pits & Excavation area (4) Dump Area (5) Mineral Stacks (6) Lease boundary along with other details.)	Nil	<a href="#">GEOLOGICAL_PLAN.kmz</a>
4	Surface Geological sections (in Pdf format); Geological sections with different color coding depicting all the features shown in Surface Geological Plan. )	Nil	<a href="#">Geological_Cross_Section.pdf</a>
5	Five year Production and Development plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for: (1) Active Pit and Excavation area ,	Nil	<a href="#">5_YEARS_P&amp;D.kmz</a>

	(2) Year wise excavation proposal for year I to V (3) Active dump and yearwise dump proposal for year I to V (4) Year wise Dump working proposal for year I to V (6) Lease boundary (with reference to chapter 4) along with other details.)		
6	Five year Production and Development sections (in pdf format); Year wise excavation and dumping proposals with different color coding depicting all the features as shown in the Five year Production and development plan.)	Nil	<a href="#">P&amp;D_Sections.pdf</a>
7	Progressive Mine Closure Plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for : (1) Yearwise excavated area Reclaimed & rehabilitated for year I to V (2) Year wise dump area to be stabilized and dump area to be rehabilitatd for year I to V (3) Year wise Green area proposed from year I to V.(4) Any other reclamation and rehabilitation measures proposed.(5) Lease boundary ( with reference to chapter 6) along with other details.)	Nil	<a href="#">PMCP_1.kmz</a>
8	Progressive mine Closure sections (in pdf format); Year wise Progressive mine clouser sections showing all the yearwise reclamation, rehabilitaion proposals as depicted in the Progressive mine clouser plan.)	Nil	<a href="#">Progressive_Mine_Closure_Section.pdf</a>
9	Conceptual Plan (.KMZ format)(Georeferenced); The Plan should depict the staus of lease area as envisaged at the end of life of Mine showing all the details. Status of land use shall be depicted by different color coding.)	Nil	<a href="#">CONCEPTUAL_PLAN.kmz</a>
10	Conceptual Sections (pdf) format;	Nil	<a href="#">Conceptual_Section.pdf</a>
11	Geo referenced Cadastral Plan; Duly certified by the State Government)	Nil	<a href="#">Georeferenced_Cadastral_Plan.pdf</a>
12	Financial Assurance Plan (KMZ);	Nil	<a href="#">FINANCIAL_ASSURANCE_PLAN.kmz</a>

Ballada Bauxite Block (PB93)

13	Environmental Plan (.KMZ format)(Georeferenced); As per MCDR, 2017 indicating all the details.)	Nil	<a href="#">Plate_11_Enviornment_Plan.kmz</a>
14	Any other plan/section as deemed necessary by approving authority;	Yes	<a href="#">Ballada Plan_Combined.pdf</a>
15	Five Year Production and Development sections (in pdf format);	No	Nil
16	LEVEL WISE SLICE PLAN; LEVEL WISE SLICE PLAN (PDF FORMAT IN VISIBLE SCALE))	No	Nil

Approved

**Chapter 11 : Plates(UG) : NA**

Approved



**STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA**  
 SRF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, Email: seiaaodisha@gmail.com  
 (A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment  
 (Protection) Act, 1986)

**File No. SIA/OR/MIN/439954/2023**

Dated 06<sup>th</sup> November, 2023.  
 Bhubaneswar

To

Sri Kassireddy Anil Kumar,  
 Associate Vice-President of  
 M/s. Kalinga Alumina Limited  
 (Formerly known as Kalinga Alumina Ltd.)  
 Address-Shantigram, Ahmedabad  
 Guhurat-382421

**Subject: Proposal of M/s. Kalinga Alumina Limited for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka-Nandapur, District-Koraput and applicant is Sri Kassireddy Anil Kumar, Associate Vice-President of M/s. Kalinga Alumina Ltd.- Reg.**

The Project Proponent Sri Kassireddy Anil Kumar on behalf of M/s. Kalinga Alumina Limited has submitted an application for ToR to SEIAA, Odisha through the Parivesh portal of MoEF&CC, GOI vide online application no. SIA/OR/MIN/439954/2023 dated 01.09.2023 for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka-Nandapur, District- Koraput.

2. Proposal in brief:

Proposal No.	SIA/OR/MIN/439954/2023
Date of Application	01.09.2023
File No.	439954/109-MINB1/09-2023
Project Type	Proposal for ToR
Category	B1
Project/Activity including Schedule No.	1(a) Mining of minerals
Name of the Project	Proposal for ToR of M/s. Kalinga Alumina Limited for Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 Mtpa over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka-Nandapur, District- Koraput of Sri Kassireddy Anil Kumar



**STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA**  
 5RF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, Email: seiaaodisha@gmail.com  
 (A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment  
 (Protection) Act, 1986)

Name of the company/Organization	Sri Kassireddy Anil Kumar (Associate Vice President) Kalinga Alumina Limited
Location of Project	Village-Ballada, Taluka-Nandapur, District-Koraput
ToR Date	N/A
Name of Consultant	M/s Vardan Environet, Gurugram

3. Project details: The highlights of the project, as ascertained from the application and as revealed from the proceedings/ discussions held during the meetings of SEAC/SEIAA, are given as under:

- (i) This is a proposal submitted for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka-Nandapur, District- Koraput of Sri Kassireddy Anil Kumar, the applicant.
- (ii) The company was declared preferred bidder for this block on 17-02-2023. The letter of Intent has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1<sup>st</sup> March 2023 by Steel and Mines Department, Government of Odisha.
- (iii) The project involves open cast mining of Bauxite (ROM) with 4.0 MTPA capacity & setting up of 800 TPH Crusher/screening plant at pit head.
- (iv) Mining Plan along with Progressive Mine Closure Plan has been approved by IBM vide letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM\_RO-BBS dated 8<sup>th</sup> August 2023.
- (v) Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/442417/2023 dated 1<sup>st</sup> September 2023. Ballada Block is virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha.
- (vi) Location and connectivity: Ballada Bauxite Block by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM), located at village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Ballada Bauxite Block covers an area of about 144.945 ha bounded by latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitudes 82°39'32.39136" to 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the



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Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South and SW. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East.

- (vii) Method of Mining: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility.

Table: Proposed list of equipment

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m <sup>3</sup>	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 p )	1

- (viii) Transport: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of road and rail route. There is an existing motorable approach road to the east of the mine which connects MDR-52 (Visakhapatnam-Jeypore Road). Bauxite shall be transported through 30 tonner dump trucks via the aforesated road to the nearest "Bheja Railway Station" from where it will be loaded on railway wagons using front end loaders and subsequently despatched to destination. Empty trucks shall return to mine for repeat loading. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.
- (ix) Waste generation and management: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm<sup>3</sup> or 0.15 MT of along with generation of 0.026 Mm<sup>3</sup> of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5<sup>th</sup> year



onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

Table: Proposed production plan during first five-year period

Year	Top Soil Volume (m <sup>3</sup> )	Over Burden/Waste Volume (m <sup>3</sup> )	ROM Quantity (t)
Year 1	24072	0	1000120
Year 2	1710	24783	2024020
Year 3	0	44671	2001482
Year 4	0	3800	2002414
Year 5	0	0	4001868

- (x) Water requirement and wastewater management: The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Wastewater generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.
- (xi) Power requirement: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.
- (xii) Greenbelt: The greenbelt is proposed as per the following table.

Sr. No	Year	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	0.72	1440	75	2,01,600
2	Year 2	0.86	1720	75	2,40,800
3	Year 3	1.16	2320	75	3,24,800
4	Year 4	0.68	1360	75	1,90,400
5	Year 5	0.80	1600	75	2,24,000
Total		4.22	8440		11,81,600

- (xiii) Manpower requirement: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.



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- (xiv) Project cost: Total cost of the project is about Rs. 230 Crores which includes cost of Infrastructures, Land Acquisition and other development costs.
- (xv) Environment Consultant: The Environment consultant M/s Vardan Environet, Gurugram along with the proponent made a presentation on the proposal before the Committee.
4. This proposal conforms to the item no. 1(a) in the schedule of EIA Notification, 2006 as amended time to time, and the proposed project falls under category "B1" of Item of Schedule to the EIA Notification, 2006 or activity 1 (a): Mining of Mineral.
5. Whether SEAC recommended the proposal – Yes, the proposal was placed in SEAC meeting held on 22.09.2023 and after detailed discussion, the SEAC recommended the proposal for issues of both standard and below mentioned specific ToR.
6. The matter was examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 141<sup>st</sup> meeting held on 01.11.2023 & 02.11.2023 in accordance with the EIA Notification, 2006 and further amendments thereto.
7. **The Terms of Reference (ToR) is granted under the provisions of EIA Notification No. S.O. 1533 (E) dated the 14<sup>th</sup> September, 2006 of the Government of India in the erstwhile Ministry of Environment and Forests, as amended from time to time for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka-Nandapur, District- Koraput and applicant is Sri Kassireddy Anil Kumar, Associate Vice-President of M/s. Kalinga Alumina Ltd. for EIA studies with the specific conditions mentioned below along with Public Hearing and standard conditions (attached in annexure-I).**

**Specific Conditions**

- i) The following information to be submitted.
- Compliance of mining plan, including waste and OB dump management, mine closure plan etc.
  - Compliance to Common cause judgment
  - Status of R&R
  - Compliance of plantation
  - Compliance of public hearing issues
  - Status of complaints/ court cases/legal action
  - Any other relevant environmental issue / parameter.
  - The following studies be undertaken by domain experts, viz:
    - Blast vibration study
    - Socio economic study of the neighbouring habitation
    - Biodiversity study with audit mechanism.
    - Slope stability study for both mines and OB /waste dumps.



- Surface runoff management along with rainwater harvesting and ground water recharge include the design of drainage structures.
  - Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.
  - Hydrology study: The study findings and the mitigation measures thereof to be submitted.
  - Process scheme details of the crusher / screening plant such as dry / wet crushing etc. If dry crushing, then management plan for dust control. If wet crushing, then plan for treating used water and its recycle etc.
- ii) Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.
- iii) The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.
- iv) The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.
- v) The project proponent should submit the real-time photographs during EIA data collection, aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.
- vi) The project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain



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- water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.
- vii) The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.
- viii) The project proponent should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.
- ix) The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.
- x) The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.
- xi) The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.
- xii) The project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.
- xiii) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.
- xiv) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline data, preparation of EIA/EMP report and during the appraisal process. The project



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- proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA, Odisha are factually correct and the project proponent and consultant are fully accountable for the same.
- xv) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.
  - xvi) "Zero discharge" management & "Zero Dust Re-suppression" management with SOP be submitted.
  - xvii) Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.
  - xviii) Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.
  - xix) Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.
  - xx) Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.
  - xxi) Forest Clearance details with copy of all Forest Clearance.
  - xxii) Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.
  - xxiii) Copy of lease document.
  - xxiv) Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage.
  - xxv) Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.
  - xxvi) Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period.
  - xxvii) STP plan with design with location in the layout map for domestic waste water treatment.
  - xxviii) Provision of solar power (percentage wise) with detail plan.
  - xxix) To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.
  - xxx) To submit parking plaza at entry and exit of the mines with basic amenities.
  - xxxi) Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Resuspension system to completely mitigate and arrest fugitive dust emission.



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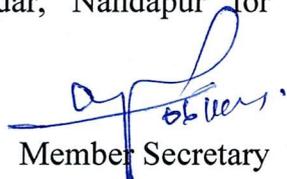
- xxxii) Total water management including domestic use w.r.t sourcing from borewell, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted.
- xxxiii) Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation.
- xxxiv) Year wise waste/OB management with reference to generation and utilization in consideration with dynamic movement of inventory indicating dump area and dimension of storage be submitted.
- xxxv) Find out the possibility of other alternatives for approach road so that felling of 1000 trees proposed can be avoided.
- xxxvi) Submit Wildlife Conservation plan duly certified from the concerned DFO.
- xxxvii) Submit copy of application of forest diversion proposal and current status of it.
- xxxviii) Explore possibility for construction of reservoir or adopt appropriate rainwater harvesting methods for collection of rain water and its usage.
- xxxix) Submit Mine closure Plan with supporting documentation.
- xl) Submit Standard Operating Procedure for magazine management.
- xli) This Bauxite mines is meant for captive use. The proponent has not yet established any refinery in the state. They have to give details of use of Bauxite in absence of refinery and also an undertaking that Bauxite Ore cannot export outside the state.
- xlii) Possibility of restoration/ creation of the pond present within lease area so that villagers can use it in future after mining lease period expires.

Yours Faithfully,

  
Member Secretary

Copy to

1. Additional Chief Secretary, Forest, Environment & Climate Change Dept., Government of Odisha for information.
2. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
3. Member Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for information.
4. Deputy D.G.Forest., Integrated Regional Office (IRO), Ministry of Environment & Forests, A-31, Chandrasekharpur, Bhubaneswar for information.
5. Collector & DM, Koraput /Sub Collector, Koraput, Tahasildar, Nandapur for Information and necessary action.
6. Director Steel & Mines Dept., Govt. of Odisha
7. Guard file for record/Website/Parivesh Portal.

  
Member Secretary

**TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR M/S. KALINGA ALUMINA LIMITED OF BALLADA BAUXITE MINE FOR A PEAK RATED CAPACITY OF 4.0 MTPA OVER A MINING LEASE AREA OF 144.945 HA AT VILLAGE - BALLADA, TALUKA - NANDAPUR, DISTRICT-KORAPUT OF SRI KASSIREDDY ANIL KUMAR - TOR.**

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**A. STANDARD TOR FOR MINING PROJECT**

1. The Environmental Clearance will not be operational till such time the Project Proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
2. Department of Mining & Geology, State Government shall ensure that mining operation shall not commence till the entire compensation levied, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
3. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
4. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
5. All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
6. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
7. Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
8. Details about the land proposed for mining activities should be given with

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information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.

9. It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.
10. The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
11. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
12. Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
13. A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
14. Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
15. Implementation status of recognition of forest rights under the Scheduled Tribes and



other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

16. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
17. A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
18. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
19. A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
20. Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
21. Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
22. R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs/STs and other weaker sections of the society in the study area, a need based sample survey, family-



wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine (ease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

23. One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season) ; December - February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM<sub>10</sub>, particularly for free silica, should be given.
24. Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
25. The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
26. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided,
28. Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
29. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater, Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter- alia,



shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

30. Details of any stream, seasonal or otherwise, passing through the tease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.
31. Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.
32. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
33. Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
34. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
35. Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial



measures should be detailed along with budgetary allocations.

38. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
  39. Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
  40. Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
  41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
  42. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
  43. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
  44. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
  45. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India O.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.
  46. The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.
  47. Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgement of Hon'ble Supreme Court, dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.
- B.** Besides the above, the below mentioned general points are also to be followed: -
- a) All documents to be properly referenced with index and continuous page numbering.



- b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
  - c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
  - d) Where the documents provided are in a language other than English, an English translation should be provided.
  - e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
  - f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006- IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
  - g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
  - h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
  - i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.
- C. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.**



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Government of India

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Regional Office, Odisha

Online Proposal No.: **FP/OR/SRY/429025/2023**

Dated: **30/08/2023**



To,  
The Addl. Chief Secretary,  
Forest & Environment Deptt.,  
Govt. of Odisha,  
Bhubaneswar.,

**Subject:** Proposal for prospecting of Minerals in forest land over 6.05 ha within total mining lease of 144.945 ha of Bauxite Ore in Ballada Bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District under Koraput Forest Division of Kalinga Alumina Limited, Odisha

**Sir/Madam,**

I am to refer to State Govt. letter No.FE-DIV-FLD-0070-2023-16377/FE&CC dated 04.08.2023 on the above mentioned subject seeking prior approval of the Ministry of Environment, Forest & Climate Change under section 2 of Forest (Conservation) Act, 1980.

2. After due consideration of the proposal of the State Government and on the basis of approval of Regional Empowered Committee meeting held on 17.08.2023, the Ministry of Environment, Forest & Climate Change hereby conveys In-principle/Stage-I approval to carry out prospecting of minerals in forest land over 6.05 ha within total mining lease of 144.945 ha of Bauxite Ore in Ballada Bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District for undertaking exploratory drilling (38 boreholes of 4" dia each over 3.80 ha and 2.25 ha for temporary approach road) in Koraput Forest Division of Kalinga Alumina Limited, Odisha, subject to the fulfillment of the following conditions.

### 1. General Conditions

S. No	Conditions
1.1	1. The user agency shall submit complete plan of operation for prospecting/ exploration/seismic survey in the entire forest area prior to start of work to the Nodal Officer of the State.

S. No	
	<ol style="list-style-type: none"><li>2. The exploration work should be stopped during the movement of Elephants and other wildlife in the forest block wherever prospecting is proposed to be carried out. Adequate precautionary measures shall be taken by the user agency to ensure that prospecting activities do not harm the wildlife in the area. Any damage done in this context, shall be dealt as per rule thereof by the concerned DFO/State Govt.</li><li>3. No explosive should be used for exploration activities.</li><li>4. The user agency shall take mitigative measure to minimize soil erosion during the construction of new access road/path to borehole point.</li><li>5. The user agency shall seek permission of concerned Divisional Forest Officer before entering into the forest area and borehole shall be dug with prior permission of the concerned Divisional Forest Officer and also furnish detailed report thereof on completion of the project.</li><li>6. Proper plugging of boreholes shall be made after exploration activities are complete to the satisfaction of the concerned Divisional Forest Officer.</li><li>7. No tree felling shall be undertaken for exploration activities as proposed by the State Govt. Project activities shall be restricted to clearing of bushes and lopping of tree branches if any for the purpose of site preparation.</li><li>8. The user agency shall re-locate the bore hole/s to avoid tree felling and minimum impact of forest floor.</li><li>9. The user agency shall be responsible for any loss to the flora and fauna in the surrounding. Any damage done in this regard shall be compensated by the user agency from the project cost as per assessment of the concerned Divisional Forest Officer.</li><li>10. No other new road shall be constructed by the user agency for transporting prospecting tools and machines beyond what permitted. The user agency may use the existing/proposed forest road/path with prior information to the concerned Divisional Forest Officer. The use of existing/proposed road/path during the prospecting work shall be restored to its original status of forest after completion of prospecting work.</li><li>11. No other construction activities shall be done by the user agency on forest land.</li><li>12. Any change in the diameter of borehole and number of boreholes will be reported to the concerned Regional Office in advance for consideration and recommendations to the Central Govt.</li><li>13. No labour camp shall be established on the forest land and no work shall be allowed after sunset.</li><li>14. In case, right over forest land proposed to be used for prospecting purpose, has already been settled in favour of eligible claimants as per provisions of the Forest Right Act, 2006, the claimants shall either be compensated appropriately or location of borehole by suitably re-located.</li><li>15. Initially the permission for prospecting will be granted for two years from the date of issue of this approval which can be extended for one more year with convincing justification from the State Govt. for extension.</li><li>16. In case of violations of conditions by the user agency, the permission for prospecting of minerals shall be suspended by the concerned Divisional Forest Officer. Further, it shall be enquired by the Nodal Officer (FCA) of the State Govt. and report to be submitted to the concerned Regional Office for appropriate action.</li></ol>

S. No	Conditions
	<p>17. The samples collected during the prospecting shall be used purely for investigation purposes and shall in no case be used for trade or commerce purpose.</p> <p>18. To minimize disturbance to the wildlife, user agency shall take all possible measures to minimize noise during prospecting operations and halt the prospecting activities during night and during such periods in the day as may be advised by the concerned Chief Wildlife Warden, concerned State Forest Department.</p> <p>19. The user agency and the State Govt. shall ensure compliance to provisions of the MoEF&amp;CC Guidelines F. No.11-96/2009-FC dated 4<sup>th</sup> July, 2014 issued by the Ministry regarding drilling in the forest land.</p> <p>20. Violation of any of these conditions will be dealt as per Para 1.21 (iii) of Chapter-1 of Handbook of Guidelines issued under F.C. Act, 1980 vide Ministry's letter No.5-2/2017-FC dated 28.03.2019.</p> <p>21. The State Govt. and the user agency shall comply with any other condition that the concerned Regional Office or the Ministry may stipulate in the interest of conservation, protection and development of forests &amp; wildlife.</p> <p>22. The State Govt. and user agency shall comply the provisions of the all Acts, Rules, Regulations, Guidelines, NGT Order (s) &amp; Hon'ble Court Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.</p>

## 2. Standard conditions

## 3. Specific Conditions

S. No	Conditions
3.1	<p>1. The user agency shall be allowed exploratory drilling of maximum of 38 boreholes of 4" dia each over 3.80 ha of forest land and 2.25 ha of forest land for temporary approach road.</p> <p>2. As per Ministry's letter No.5-3/2007-FC dated 17.11.2020, NPV, in respect of prospecting/exploration shall be charged on borehole basis. It is noted that for each borehole an area of approximately 0.1 ha is impacted with various activities that are undertaken during prospecting/exploration. Any variation from 0.1 ha area per borehole shall be informed by the user agency to State Govt.</p> <p>3. Any amount of NPV deposited in the stipulated Government account is non-refundable. However, the NPV deposited for prospecting in the area, will be adjusted against the estimated NPV to be levied, in case the approval is obtained for diversion of the same forest land for mineral extraction, under Section 2 of Forest (Conservation) Act, 1980.</p> <p>4. Permission for carrying out prospecting/exploration/seismic survey or any payment of NPV deposited for such operation will not confer any right with user agency to get forest clearance of that particular land under Section 2 (ii) of Forest (Conservation) Act, 1980. All decisions will be taken as per procedure prescribed in Forest (Conservation) Rules, 2022 and on merit.</p>

S. No	Conditions
	<p>5. The user agency shall prepare a plan to plant 110 tall trees per borehole/2 tall plant per shot hole as the case may be. The cost of preparation of plan and plantation shall be borne by the user agency. The State Govt. shall ensure that the plants are raised on abandoned borehole area or degraded forest land, as per prescription of working plan.</p> <p>6. Charges towards NPV &amp; payments towards planting of trees shall be realized by the State Govt. from the user agency &amp; deposited in CAMPA fund through e-portal.</p>

After receipt of the report on compliance to the conditions stipulated above, from the State Government of Odisha, final/Stage-II approval for diversion of the said forest land under Section 2 of Forest (Conservation) Act, 1980 will be issued by this Ministry. Transfer of forest land to user agency should not be effected by the State Government of Odisha till final/Stage-II approval for its diversion is issued by the Ministry of Environment, Forest & Climate Change.

**Copy To**

1. The Inspector General of Forests (ROHQ), Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, Aliganj, New Delhi – 110 003.
2. The PCCF & Nodal Officer (FCA), Forest Department, Govt. of Odisha, Aranya Bhawan, Chandrasekharpur, Bhubaneswar-751023.
3. The Associate Vice-President, Kalinga Alumina Ltd., Adani Corporate House, Nr. Vaishnodevi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421.

**Your's faithfully**

(Padma Mahanti)  
Dy. Inspector General of Forests (C)

**Validity unknown**

Digitally Signed by : PADMA MAHANTI  
Deputy Inspector General of Forest, IRO

Date: 30/08/2023



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Government of India

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Regional Office, Odisha

Online Proposal No.: **FP/OR/SRY/429025/2023**

Dated: **14/05/2024**



To,

The Addl. Chief Secretary,  
Forest, Environment & CC Deptt.,  
Govt. of Odisha,  
Bhubaneswar.

**Subject:**

Proposal for prospecting of Minerals in forest land over 6.05 ha within total mining lease of 144.945 ha of Bauxite Ore in Ballada Bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District under Koraput Forest Division of Kalinga Alumina Limited, Odisha

**Sir/Madam,**

I am directed to refer to State Govt. letter No.FE-DIV-FLD-0070-2023-16377/FE&CC dated 04.08.2023, wherein prior approval of the Ministry of Environment, Forest & Climate Change for prospecting of Minerals in forest land over 6.05 ha within total mining lease of 144.945 ha of Bauxite Ore in Ballada Bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District under Koraput Forest Division of Kalinga Alumina Limited, Odisha, was sought in accordance with Section-2 of the Van (Sanrakshan Evam Samvardhan) Adhinyam, 1980. After due consideration of the proposal of the State Government and on the basis of approval of Regional Empowered Committee meeting held on 17.08.2023, the in-principle approval for diversion of the said forest land was accorded by Ministry vide Online Proposal No.FP/OR/SRY/429025/2023 dated 30.08.2023, subject to fulfillment of certain conditions. The Nodal Officer (FCA) of the State Government has furnished the compliance report in respect of the conditions stipulated in the in-principle approval and has requested to grant final approval of the proposal.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the PCCF & Nodal Officer (FCA), Odisha vide their letter No.9457/9F (SRY) -362/2023 dated 06.05.2024 and submitting of the Stage-I compliance report in *Parivesh* web portal on 07.05.2024, **Stage-II/final** approval of the Ministry of Environment, Forest & Climate Change is hereby granted under Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhinyam, 1980 for prospecting of minerals in forest land over 6.05 ha (38 boreholes of 4" dia each over 3.80 ha and 2.25 ha for temporary approach road) within total mining lease of 144.945 ha of Bauxite Ore in Ballada Bauxite Mines located entirely within Nagasari Reserve Forest under Nandapur Tahasil of Koraput District under Koraput Forest Division of Kalinga Alumina Limited, Odisha, subject to the fulfillment of the following conditions.

**1. General Conditions**

S. No	Conditions
1.1	The user agency shall be allowed exploratory drilling of maximum of 38 boreholes of 4” dia each over 3.80 ha of forest land and 2.25 ha of forest land for temporary approach road.
1.2	The State Govt. shall carry out plantation of 4,180 nos. of tall plants towards compensatory afforestation within two years from the issue of approval as per approved plan/scheme and maintained thereafter, at the cost of user agency. The species to be planted in the plantation scheme shall be of native species of the area. At least 18 month old seedlings should be planted. Intensive monitoring of the plantation needs to be done and documented using Geo tagging so that the increase of canopy density and survival and growth of plantation can be evaluated at regular intervals.
1.3	Any amount of NPV deposited in the stipulated Government account is non-refundable. However, the NPV deposited for prospecting in the area, will be adjusted against the estimated NPV to be levied, in case the approval is obtained for diversion of the same forest land for mineral extraction, under Section 2 of Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980.
1.4	The State Govt. shall ensure that permission for carrying out prospecting/exploration/ seismic survey or any payment of NPV deposited for such operation will not confer any right with user agency to get forest clearance of that particular land under Section 2 (ii) of Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980. All decisions will be taken as per procedure prescribed in Van (Sanrakshan Evam Samvardhan) Rules, 2023 and on merit.
1.5	The user agency shall submit complete plan of operation for prospecting/ exploration/seismic survey in the entire forest area prior to start of work to the Nodal Officer of the State.
1.6	The State Govt. and user agency shall ensure that the exploration work should be stopped during the movement of Elephants and other wildlife in the forest block wherever prospecting is proposed to be carried out. Adequate precautionary measures shall be taken by the user agency to ensure that prospecting activities do not harm the wildlife in the area. Any damage done in this context, shall be dealt as per rule thereof by the concerned DFO/State Govt.
1.7	The State Govt. and user agency shall ensure that no explosive should be used for exploration activities.
1.8	The user agency shall take mitigative measure to minimize soil erosion during the construction of new access road/path to borehole point.
1.9	The State Govt. shall ensure that the user agency shall seek permission of concerned Divisional Forest Officer before entering into the forest area and borehole shall be dug with prior permission of the concerned Divisional Forest Officer and also furnish detailed report thereof on completion of the project.
1.10	The State Govt. and user agency shall ensure that proper plugging of boreholes shall be made after exploration activities are complete to the satisfaction of the concerned Divisional Forest Officer.
1.11	The State Govt. and user agency shall ensure that no tree felling shall be undertaken for exploration activities as proposed by the State Govt. Project activities shall be restricted to clearing of bushes

S. No	
	and lopping of tree branches if any for the purpose of site preparation.
1.12	The State Govt. shall ensure that the user agency shall re-locate the bore hole/s to avoid tree felling and minimum impact of forest floor.
1.13	The State Govt. shall ensure that the user agency shall be responsible for any loss to the flora and fauna in the surrounding. Any damage done in this regard shall be compensated by the user agency from the project cost as per assessment of the concerned Divisional Forest Officer.
1.14	The State Govt. and user agency shall ensure that no other new road shall be constructed by the user agency for transporting prospecting tools and machines beyond what permitted. The user agency may use the existing/proposed forest road/path with prior information to the concerned Divisional Forest Officer. The use of existing/proposed road/path during the prospecting work shall be restored to its original status of forest after completion of prospecting work.
1.15	The State Govt. and user agency shall ensure that no other construction activities shall be done by the user agency on forest land.
1.16	The State Govt. and user agency shall ensure that any change in the diameter of borehole and number of boreholes will be reported to the concerned Regional Office in advance for consideration and recommendations to the Central Govt.
1.17	The State Govt. and user agency shall ensure that no labour camp shall be established on the forest land and no work shall be allowed after sunset.
1.18	The State Govt. shall ensure that in case, right over forest land proposed to be used for prospecting purpose, has already been settled in favour of eligible claimants as per provisions of the Forest Right Act, 2006, the claimants shall either be compensated appropriately or location of borehole by suitably re-located.
1.19	Initially the permission for prospecting will be granted for two years from the date of issue of this approval which can be extended for one more year with convincing justification from the State Govt. for extension.
1.20	The State Govt. shall ensure that in case of violations of conditions by the user agency, the permission for prospecting of minerals shall be suspended by the concerned Divisional Forest Officer. Further, it shall be enquired by the Nodal Officer (FCA) of the State Govt. and report to be submitted to the concerned Regional Office for appropriate action.
1.21	The State Govt. and user agency shall ensure that the samples collected during the prospecting shall be used purely for investigation purposes and shall in no case be used for trade or commerce purpose.
1.22	The State Govt. and user agency shall ensure that to minimize disturbance to the wildlife, user agency shall take all possible measures to minimize noise during prospecting operations and halt the prospecting activities during night and during such periods in the day as may be advised by the concerned Chief Wildlife Warden, concerned State Forest Department.
1.23	The user agency and the State Govt. shall ensure compliance to provisions of the MoEF&CC Guidelines F. No.11-96/2009-FC dated 4 <sup>th</sup> July, 2014 issued by the Ministry regarding drilling in

S. No	Conditions
	the forest land.
1.24	The State Govt. and the user agency shall comply with any other condition that the concerned Regional Office or the Ministry may stipulate in the interest of conservation, protection and development of forests & wildlife.
1.25	The user agency shall submit six monthly monitoring report on compliance of stipulated conditions to the Nodal Officer (FCA) of the State and concerned Integrated Regional Office of this Ministry.
1.26	The State Govt. and user agency shall comply the provisions of the all Acts, Rules, Regulations, Guidelines, NGT Order (s) & Hon'ble Court Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.
1.27	Violation of any of these conditions will amount to violation of Van (Sanrakshan Evam Samvardhan) Adhinyam, 1980 and action would be taken as prescribed in Para 1.16 of Chapter 1 of the Consolidated Guidelines and Clarification issued under Van (Sanrakshna Evan Samvardhan) Adhinyam, 1980 and Van (Sanrakshan Evam Samvardhan) Rules, 2023 by this Ministry's letter dated 29.12.2023.

## 2. Standard conditions

## 3. Specific Conditions

### Copy To

1. The Inspector General of Forests (ROHQ), Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, Aliganj, New Delhi – 110 003.
2. The PCCF & Nodal Officer (FCA), Forest Department, Govt. of Odisha, Aranya Bhawan, Chandrasekharpur, Bhubaneswar.
3. The Associate Vice-President, Kalinga Alumina Ltd., Adani Corporate House, Nr. Vaishnodevi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421.

**Your's faithfully**

(Dr. Padma Mahanti)  
Dy. Inspector General of Forests (C)

**Signature Not Verified**

Digitally Signed by : PADMA MAHANTI  
Deputy Inspector General of Forest, IRO

Date: 14/05/2024



Government of India

Ministry of Environment, Forest and Climate Change

(Forest Conservation Division)



Online Proposal No.:  
FP/OR/MIN/QR/456733/2023



Dated: 23/12/2024

To,

Additional Chief Secretary (Forests)  
Government of Odisha  
Bhubaneswar

**Subject:**

Proposal for seeking prior approval of the Central Government under Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of M/s Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada Bauxite Mines within Mining Lease area of 144.945 ha.

**Sir/Madam,**

I am directed to refer to the Government of Odisha's letter No letter No. FE-DIV-FLD-0052-2024-13003/FE&CC dated 19.07.2024 on the above subject seeking prior approval of the Central Government under Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 and additional information submitted through online on PARIVESH 2.0 portal as sought by the Ministry and to say that the proposal has been examined by the Advisory Committee constituted by the Central Government under Section - 3 of the aforesaid Act.

2. After careful examination of the proposal of the Government of Odisha and on the basis of the recommendations of the Advisory Committee, and approval of the same by the competent authority of the MoEF&CC, New Delhi, the Central Government hereby accords '*in-principle*' approval under Section - 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of M/s Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada Bauxite Mines within Mining Lease area of 144.945 ha. of Odisha subject to the fulfilment of the following conditions:

#### 1. General Conditions

S. No	Conditions
1.1	Legal status of the diverted forest land shall remain unchanged
1.2	The non-forest land identified for raising compensatory afforestation shall be transferred and mutated in favour of the State Forest Department before issue of the Stage-II clearance
1.3	The User Agency shall transfer the cost of raising and maintaining the compensatory afforestation, at the current wage rate, to the State Forest Department. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years
1.4	At the time of payment of the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India
1.5	All the funds received from the user agency under the project, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred to Ad-hoc CAMPA in the Savings Bank Account pertaining to the State concerned
1.6	The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required
1.7	The boundary of the diverted forest land, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar
1.8	The User agency, if required, will undertake comprehensive soil conservation measures in the area being diverted at the project cost in consultation with the State Forest Department. A scheme of the same may be submitted along with the compliance report
1.9	No labour camp shall be established on the forest land
1.10	The User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas
1.11	The forest land shall not be used for any purpose other than that specified in the proposal
1.12	The layout plan of the proposal shall not be changed without the prior approval of the Central Government
1.13	The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government
1.14	No damage to the flora and fauna of the adjoining area shall be caused
1.15	Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department
1.16	The user agency in consultation with the State Government shall create and maintain alternate habitat/home for the avifauna, whose nesting trees are to be cleared in this project. Bird's nests artificially made out of eco-friendly material shall be used in the area, including forest area and

S. No	Conditions
	human settlements, adjoining the forest area being diverted for the project
1.17	The User Agency shall submit six monthly self-compliance reports as on 1st January and 1st July of every year to this office as well as to the Nodal Officer of the State
1.18	The State Government shall monitor compliance of conditions of Forest Clearance and shall submit in this regard yearly report as on 31st December of every year
1.19	Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife
1.20	The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project
1.21	The State Government shall charge the Net Present Value (NPV) of the forest land being diverted under this proposal from the User Agency as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC (Pt.) dated 06.01.2022 read with the letter dated 22.03.2022 in this regard.
1.22	The non-forest land transferred and mutated in favour of the State Forest Department or the revenue forest land, as the case may be, shall be notified by the State Government as Protected Forests under section 29 of the Indian Forest Act, 1927 or under the relevant section(s) of the local Forest Act, before issue of the 'Final' approval under the Adhiniyam. The Nodal Officer shall report compliance in this regard along with a copy of the original notification declaring the non-forest land as PF, along with compliance of 'in-principle' approval;
1.23	<p><b>Safety Zone Management:</b> Following activities, at project cost, shall be undertaken by the user agency for the management of safety zone as per relevant guidelines issued by the Ministry's guidelines:</p> <ol style="list-style-type: none"> <li>User agency shall ensure demarcation of safety zone (7.5-meter strip all along the inner boundary of the mining lease area), and its fencing, protection and regeneration by erecting adequate number of 6 feet high RCC boundary pillars inscribed with DGPS coordinates with barbed wire fencing and deploying adequate number of watchers under the supervision of the State Forest Department;</li> <li>Boundary of the safety zone of the mining lease, adjacent to habitation/roads, should be properly fenced by the user agency;</li> <li>Safety zone shall be maintained as green belt around mining lease and to ensure dense canopy in the area, regeneration shall be taken up in this area by the user agency at project cost under the supervision of the State Forest Department;</li> <li>The State Government and the user agency shall ensure that safety zone is maintained as per the prescribed norms;</li> </ol>

## 2. Standard conditions

S. No	Conditions
2.1	The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, as amended or Rules framed there under, subject to a maximum period of 30 or 50 years.
2.2	The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed.
2.3	The user agency shall prepare a schedule for surrender of the mined out and reclaimed forest land in accordance with existing mining plan and submit the same along with an undertaking to surrender the mined out and reclaimed forest land as per such schedule to the MoEF&CC before grant of Stage-II approval under the FC Act for diversion of the said forest land;
2.4	In case of under-ground mines, areas on surface shall be fenced and afforested from the funds to be provided by the user agency.
2.5	The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MoEF along with indicators for monitoring and expected observable milestones.
2.6	Adequate care shall be taken to check any rolling of overburden/dumps beyond diverted area and also to check soil erosion caused due to mining activities;
2.7	The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
2.8	Following activities shall be undertaken by the User Agency at the project cost: (a) Preparation and implementation of a plan containing appropriate mitigative measures to minimize soil erosion and choking of streams; (b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion; (c) Construction of check dams, retention /toe walls along the contour to arrest sliding down of the excavated material; (d) Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than 28o;
2.9	The User agency will undertake comprehensive soil conservation measures at the project cost in consultation with the State Forest Department. A scheme of the same shall be submitted to the Regional Office along with the Stage-I compliance report

S. No	Conditions
2.10	No damage shall be caused to the top-soil and the user agency will follow the top soil management plan;
2.11	A site-specific Wildlife Management Plan shall be prepared by the State Government in consultation with the PCCF (Wildlife) for the protection and conservation of wildlife of the area. A copy of approved Plan shall be submitted to the Ministry along with the compliance of Stage-I approval. Entire cost of implementation of the provisions of the Wildlife Management Plan shall be deposited into the account of CAMPA of the State;
2.12	The user agency shall explore the possibility of translocation of maximum number of trees identified to be felled and shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department
2.13	The User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the concern Addl. Principle Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed;
2.14	The User Agency shall comply with the Hon'ble Supreme Court order on re- grassing, and re-grass the mining area and any other areas which may have been disturbed due to mining to restore them to a condition which is fit for growth of fodder, flora, fauna, etc. in a timely manner;
2.15	The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) including the complete compliance of the FRA, 2006 as per the Rules 11 (7) of the VSES Rules 2023 pertaining to this project, if any, for the time being in force, as applicable to the project.
2.16	Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 29.12.2023.
2.17	User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;

### 3. Specific Conditions

S. No	Conditions
3.1	The State Govt. shall ensure that the area earmarked as green belt i.e. 48.56 ha shall be kept as

S. No	Conditions
	green or used as admissible as per the extant rules and guidelines and no change in the land use shall be affected without the prior approval of the Central Govt.
3.2	The shallow water body within the mine lease area is a manmade formation created by forest department. The said water body (admeasuring 76 m X 54 m X 1 m) was created under CAMPA by the Department of Forest during the year 2020-21. In order to compensate the construction made and to provide the alternative, the State shall create other such suitable waterbody in the nearby surrounding area at the cost of the user agency. The funds in this regard shall be deposited by the User Agency in NA CAMPA.
3.3	The State Govt. shall ensure that the User Agency will not carry out any mining activity near the caves as recommended by the State and Regional Officer and take suitable measure to provide safe passage for accessibility to the local people for their religious belief, rituals and worships, if any.

After receipt of the compliance report on the fulfillment of the conditions mentioned above, the proposal shall be considered for final approval under section Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980. Transfer of forest land shall not be affected till final approval is granted by the Government in this regard.

**Copy To**

1. PCCF (HoFF), State Forest Department, Government of Odisha, Bhubaneswar
2. PCCF & Nodal Officer (FCA), O/o PCCF, State Forest Department, Government of Odisha, Bhubaneswar.
3. CEO, National Authority CAMPA, MoEF&CC, New Delhi.
4. DDGF (Central), Regional Office of MoEF&CC at Bhubaneswar.
5. User Agency.
6. Monitoring Cell, FC Division, MoEF&CC, New Delhi
7. Guard File.

**Your's faithfully**

(Suneet Bhardwaj)  
Assistant Inspector General of Forests

Signed by  
Suneet Bhardwaj  
Date: 23-12-2024 18:21:40  
Reason: Verified and  
signed



सत्यमेव जयते

1640  
File No.: 536061/34-MINB1/05-2025

Government of India

Ministry of Environment, Forest and Climate Change

(Issued by the State Environment Impact Assessment Authority (SEIAA),  
ODISHA)

\*\*\*

1725



Dated 01/09/2025



To,

Sri. Kassireddy Anil Kumar, Associate Vice President  
M/s Kalinga Alumina Ltd.  
Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421  
Kalinga.Alumina@adani.com

**Subject:** Grant of prior Environmental Clearance (EC) to the proposed Mining Project under the provisions of EIA Notification 2006-regarding

**Sir/Madam,**

This is in reference to your application submitted to SEIAA, Odisha vide proposal number SIA/OR/MIN/536061/2025 dated 13/05/2025 for grant of prior Environmental Clearance (EC) to the project for mining of Bauxite from Ballada Bauxite Mine (ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m<sup>3</sup>) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil-Nandapur, District-Koraput by M/s Kalinga Alumina Ltd. under the provision of the EIA Notification 2006-and as amended thereof.

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC25B0000OR5647645N
(ii) File No.	536061/34-MINB1/05-2025
(iii) Clearance Type	Fresh EC
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Environmental Clearance of Ballada Bauxite Mine (ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM)
(viii) Location of Project (District, State)	Village-Ballada, Tahasil-Nandapur, District-Koraput
(ix) Issuing Authority	SEIAA, Odisha
(x) Applicability of General Conditions	No

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1 (Part A, B and C)/ EIA & EMP Report, Application for EC were submitted to the SEIAA, Odisha for an appraisal by the State Level Expert Appraisal Committee(SEAC) under the provision of EIA notification 2006 and its subsequent amendments thereto.
4. The above-mentioned proposal has been considered for EC by SEAC in its meeting held on 23.07.2025. The minutes of the meeting and all the project documents as submitted by project proponent are available on Parivesh portal which can be accessed from the Parivesh portal by scanning the QR Code above.
5. The details of the project along with the salient features of the project as submitted by the project proponent in Form-1(Part A, B and C)/ EIA & EMP Report and as presented before SEAC are annexed to this EC as Annexure-2.
6. The SEAC, after detailed deliberations made by the Project Proponent and the EIA Consultant, in its meeting held on 23.07.2025 under the provisions of EIA Notification 2006 and its subsequent amendments, recommended for grant of Environmental Clearance valid for a period of 10 years, stipulating various conditions(standard & specific).
7. The matter was again examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 230th meeting held on 19.08.2025 for grant of EC based on the recommendation of SEAC and in accordance with the EIA Notification, 2006 and further amendments thereto. After detailed deliberation, the authority approved the EC valid for a period of 10 years from the date of issue of this letter for a production capacity of 4.0 MTPA Bauxite (ROM) and Crushing/ Screening facilities of 800 TPH capacity along with standard and specific conditions as recommended by SEAC.
8. Environmental Clearance (EC) is granted to the project valid for a period of 10 years from the date of issue of this letter under the provisions of EIA Notification No. S.O. 1533 (E) dated the 14th September, 2006 of the Government of India in the erstwhile Ministry of Environment and Forests, as amended from time to time for proposed mining of Bauxite from Ballada Bauxite Mine(ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil-Nandapur, District-Koraput by M/s Kalinga Alumina Ltd.” with the following stipulations, environmental conditions and safeguards as given in Annexure- 1.
9. The Validity of EC shall be for a period of 10 years from the date of issue of this letter.
10. The SEIAA, Odisha reserves the right to alter /modify the above conditions or stipulate any further condition in the interest of environment protection.
11. The Environmental Clearance to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
12. The PP is under obligation to implement commitments made in the Environment Management Plan, which forms part of this EC.
13. This issue with an approval of the Competent Authority.

**Copy To**

1. Joint Secretary (IA Division), Ministry of Environment, Forests and Climate Change Govt. of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi-110003 for information.
2. Additional Chief Secretary, Forests & Environment Dept., Government of Odisha for information.
3. Additional Secretary to Govt, Steel & Mines Department, Government of Odisha for Information and necessary action.
4. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for Information and necessary action.
5. Deputy Director General of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office, A/3, Chandrasekharpur, Bhubaneswar – 751023 for Information and necessary action.

6. Regional Director, CGWA, South Eastern Region, Bhubaneswar, Khandagiri, Bhubaneswar, Pin-751030 for Information and necessary action.
7. The Director of Mines, Odisha, Bhubaneswar for information and necessary action.
8. Director General, Directorate General of Mines Safety, Hiraipur, Dhanbad, Jharkhand, 826001
9. Collector & DM, Koraput, District-Koraput/DDM, Koraput for Information and necessary action.
10. Guard file for record/Website/Parivesh Portal.

## Annexure 1

## Specific EC Conditions for (Mining Of Minerals)

## 1. Specific Condition

S. No	EC Conditions
1.1	The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report. No mining activity will be carried out within 100m distance from the Cave.
1.2	The proponent shall obtain permission from the Archaeological Department before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department.
1.3	The proponent shall use conveyor for mineral transportation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral transportation by road. Tarpaulins covered trucks should be used to prevent spillage and emission of dust. Mechanically covered trucks should also be explored. Operators, Supervisors, contractor personal should be properly trained on environmental aspects of Ore/waste spillage and resultant air and water pollution. Record of above training of the personal, supervisor/officials should be submitted to Regional office of MoEF&CC.
1.4	As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine so that drilling and blasting is minimized. PP should submit the study report for the feasibility of using ripper dozer, surface miner in this project to Regional Office in its six-monthly compliance report.
1.5	The project proponent shall develop greenbelt in the lease area as proposed in the EMP. The greenbelt developed shall be under the campaign "Ek Ped Maa Ke Naam" and the plantation shall be carried out in the earmarked greenbelt area as a part of tree plantation campaign and the details of the same shall be uploaded in the MeriLiFE Portal ( <a href="https://merilife.nic.in">https://merilife.nic.in</a> ).
1.6	The Project Proponent shall make the actual count on the saplings planted and its survival rate and in case of failure of achievement of 95% survival rate, action plan for achieving the target survival rate shall be submitted to the Regional Office of Ministry as part of Six-Monthly Compliance report.
1.7	The Project Proponent needs to complete the entire peripheral plantation under green belt, safety barrier plantation and gap plantation within three years from the start of mining operations. The PP should plant quality sampling of appropriate height of native and fruit bearing species. Plantation shall be undertaken in consultation with the State Forest Dept. PP needs to undertake the adequate

S. No	
	bench plantation and on the terrace of the waste dumps to prevent the soil erosion.
1.8	To address the concerns raised by the public in the public hearing, PP should complete its public hearing commitments. PP shall comply with all action plans made for public hearing concerns and make regular maintenance and record the progressive activity outcomes. The Project proponent shall ensure that the activities proposed under the public hearing is different from the CSR activities.
1.9	The EMP shall be implemented in a time bound manner. The adoption of mitigation measures and monitoring of the same as proposed in the EMP shall be done under the supervision of the qualified environmental personnel. The implementation status of the same shall be submitted to the Regional Office of Ministry as a part of six-monthly compliance report.
1.10	Bench and dump slopes are to be designed based on scientific studies by subject experts from Institute of repute and maintained so that their failure is avoided.
1.11	The PP shall ensure proper surface runoff management and adopt adequate water conservation measures to augment the water resources of the area. Also, PP needs to construct sedimentation ponds, check dam, gabion structures, retaining wall, catch drains, etc., bond the dumps (OB, Ore, top soil) to prevent any silt flow outside.
1.12	Proper Air Pollution Control measures shall be provided to control dust emission and local dust generation. Dust suppression and extraction system shall be provided in the crushing and screening units to control fugitive emission. The Project Proponent shall monitor the air quality, noise level, water quality, water level and ground vibration during drilling and blasting at the edge of the mine, near the village, at crusher and at other sensitive receptors and such collected data shall be submitted quarterly to the Ministry's Regional Office
1.13	OB dump sites shall be managed properly as proposed.
1.14	The natural water bodies and or streams which are flowing in and around the mine lease area should not be disturbed. PP shall consult state Water Resource department and SPCB regarding Nallah/Stream and follow their instructions for the safeguards. Implementation status of this condition should be communicated to Regional Office, Bhubaneswar. Check dams, gabion structures should be constructed in consultation with State Forest Department to prevent any silt flow in the natural stream/nallahs around the mine lease area.
1.15	The Project Proponent should install Continuous Ambient Air Quality Monitoring Stations (CAAQMS) as per the scientific study and in consultation with CPCB/SPCB. The real time data so generated should be displayed digitally at entry and exit gate of mine lease area for public display and shall be linked to server of CPCB/SPCB.
1.16	PP shall ensure that all type of plastic waste generated from the mines shall be stored separately in isolated area and disposed of strictly adhering to the Plastic Waste Management Rules 2016. In pursuant to Ministry's OM dated 18/07/2022, PP shall also create awareness among the people working in the project area as well as in its surrounding area on the ban on Single Use Plastic (SUP) in order to ensure compliance of Ministry's Notification published by the Ministry on 12/08/2021. A report along with photograph on the measures taken shall also be included in the six monthly compliance report.

**1. Statutory Compliance**

S. No	EC Conditions
1.1	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
1.2	The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.
1.3	A copy of EC letter will be marked to concerned Panchayat / local NGO etc. if any, from whom suggestion / representation has been received while processing the proposal.
1.4	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.
1.5	This Environmental Clearance (EC) is subject to orders/ judgment of Honble Supreme Court of India, Honble High Court, Honble NGT and any other Court of Law, Common Cause Conditions as may be applicable.
1.6	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).
1.7	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
1.8	The Project Proponent shall inform the MoEF&CC for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred. PP needs to apply for transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.
1.9	The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board/Committee and web site of the Ministry of Environment, Forest and Climate Change ( <a href="http://www.parivesh.nic.in">www.parivesh.nic.in</a> ). A copy of the advertisement may be forwarded to the concerned MoEFCC Regional Office for compliance and record.
1.10	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.
1.11	State Pollution Control Board/Committee shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tehsildar's Office for 30 days.

S. No	EC Conditions
1.12	The Project Proponent shall follow the mitigation measures provided in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area."

2.

S. No	EC Conditions
2.1	The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.
2.2	The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Government. In this regard, Project Proponent should essentially implement the directions of the Hon'ble Supreme Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/ protected against felling and plantation of such trees should be promoted.
2.3	The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc

### 3. Air Quality Monitoring And Preservation

S. No	EC Conditions
3.1	The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g., PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to S02 and NOx emissions) within and outside the ML area at least at four locations (one within and three outside the ML area at an angle of 120 each).covering upwind and downwind directions.
3.2	The project proponent shall monitor fugitive emissions in the ML area premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986. 9) The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g., PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to S02 and NOx emissions) within and outside the ML area at least at four locations (one within and three outside the ML area at an angle of 120 each). covering upwind and downwind directions.
3.3	The Project Proponent shall install a minimum of 3 (three) online Ambient Air Quality Monitoring Stations with 1 (one) in upwind and 2 (two) in downwind direction based on long term

S. No	EC Conditions
	climatological data about wind direction such that an angle of 120° is made between the monitoring locations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM10, PM2.5, NO2, CO and SO2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/I, dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building, canteen etc. as per the site condition to ascertain the exposure characteristics at specific places. The above data shall be digitally displayed within 03 months in front of the main Gate of the mine site.
3.4	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.
3.5	Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metalled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM10 and PM2.5 are evident such as haul road, loading and unloading point and transfer points. The Fugitive dust emissions from all sources shall be regularly controlled by installation of required equipments/ machineries and preventive maintenance. Use of suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system. It shall be ensured that air pollution level conform to the standards prescribed by the MoEFCC/ Central Pollution Control Board.
3.6	The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories. Monitor fugitive emissions in the ML area premises.
3.7	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.
3.8	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.
3.9	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality /fugitive emissions to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
3.10	The project proponent use leak proof trucks/dumpers carrying ore and other raw materials and cover them with tarpaulin.

#### 4. Water Quality Monitoring And Preservation

S. No	EC Conditions
4.1	Adhere to Zero Liquid Discharge
4.2	Industrial waste water (workshop and waste water from the mine) should be properly collected and

S. No	
	treated so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through Consent to Operate (CTO) issued by concerned State Pollution Control Board (SPCB). The workshop effluent shall be treated after its initial passage through Oil and grease trap.
4.3	Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.
4.4	Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with Central Ground Water Board/ State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office MoEFCC annually.
4.5	Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J- 20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.
4.6	The Project Proponent shall undertake regular monitoring of natural water course/ water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease including upstream and downstream. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. The parameters to be monitored shall include their water quality vis-à-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/ or alteration be made to water bodies during mining operations without justification and prior approval of MoEFCC. The monitoring of water courses/ bodies existing in lease area shall be carried out four times in a year viz. pre- monsoon (April May), monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on six-monthly basis.
4.7	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
4.8	The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF&CC and State Pollution Control Board/Committee.
4.9	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.

S. No	EC Conditions
4.10	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.
4.11	The project proponent shall provide the slime disposal facility with impervious lining and collection wells for seepage. The water collected from the slime pond shall be treated and recycled.
4.12	The project proponent shall practice rainwater harvesting to maximum possible extent.
4.13	In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEFCC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro-geological study of the area.
4.14	The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the lease area and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.

#### 5. Noise And Vibration Monitoring And Prevention

S. No	EC Conditions
5.1	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.
5.2	The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The workers engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/ laborers are working without personal protective equipment.
5.3	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.

#### 6. Noise Monitoring And Prevention

S. No	EC Conditions
6.1	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.
6.2	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be

S. No	
	submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.

### 7. Mining Plan

S. No	EC Conditions
7.1	The land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The excavation vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to the MoEFCC and its concerned Regional Office.
7.2	The Project Proponent shall adhere to approved mining plan, inter alia, including, total excavation (quantum of mineral, waste, over burden, inter burden and top soil etc.); mining technology; lease area; scope of working ( method of mining, overburden & dump management, O.B& dump mining, mineral transportation mode, ultimate depth of mining, concurrent reclamation and reclamation at mine closure; land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life; etc.).

### 8. Energy Conservation Measures

S. No	EC Conditions
8.1	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly;
8.2	Provide LED lights in their offices and residential areas.

### 9. Land Reclamation

S. No	EC Conditions
9.1	Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and Top Soil/OB/Waste dumps to prevent run off of water and flow of sediments directly into the water bodies (Nallah/ River/ Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/ sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.
9.2	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.

S. No	EC Conditions
9.3	Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps shall be constructed at the corners of the garland drains.
9.4	The Overburden (O.B.), waste and topsoil generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB / waste dumps / topsoil dump like height, width and angle of slope shall be governed as per the approved Mining Plan and the guidelines/circulars issued by D.G.M.S. The topsoil shall be used for land reclamation and plantation.

### 10. Waste Management

S. No	EC Conditions
10.1	The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.

### 11. Transportation

S. No	EC Conditions
11.1	No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a 'bypass' road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers. [If applicable in case of road transport].
11.2	The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.

### 12. Public Hearing And Human Health Issues

S. No	EC Conditions
12.1	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
12.2	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
12.3	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
12.4	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.
12.5	Project Proponent shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche for kids etc. The housing may be provided in the form of temporary structures which can be removed after the completion of the project related infrastructure. The domestic waste water should be treated with STP in order to avoid contamination of underground water.

### 13. Green Belt

S. No	EC Conditions
13.1	The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.

### 14. Corporate Environment Responsibility

S. No	EC Conditions
14.1	The Project Proponent shall submit the time- bound action plan to the concerned regional office of the Ministry within 6 months from the date of issuance of environmental clearance for undertaking the activities committed during public consultation by the project proponent and as discussed by the SEAC, in terms of the provisions of the MoEF&CC Office Memorandum No.22-65/2017-IA.III dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.
14.2	Self-environmental audit shall be conducted annually. The Project Proponent shall conduct third party audit of compliance of EC condition at an interval one year and its report shall be submitted to RO, MoEF&CC.
14.3	A separate 'Environmental Management Cell' with suitable qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall directly report to Head of the

S. No	EC Conditions
	Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF&CC.
14.4	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest /wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest I wildlife norms / conditions and / or shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the Regional Office of MoEF&CC as a part of six-monthly report.
14.5	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Regional Office of Ministry, SPCB,Odisha along with the Six Monthly Compliance Report.
14.6	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Mineral Beneficiation plants shall be implemented.

#### 15. Miscellaneous

S. No	EC Conditions
15.1	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
15.2	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
15.3	The project proponent shall monitor the criteria pollutants level namely; PM10, SO2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.
15.4	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
15.5	The project proponent shall inform the Regional Office of MoEF & CC,GOI, SPCB, Odisha , the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
15.6	The concerned Regional Office of the MoEF&CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MoEF&CC officer(s) by furnishing the requisite data / information / monitoring reports.

S. No	
15.7	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the State Expert Appraisal Committee.
15.8	No further expansion or modifications in the project shall be carried out without prior approval of the SEIAA, Odisha.
15.9	It shall be mandatory for the project management to submit half yearly compliance reports on the status of implementation of the above stipulated environmental safeguards to the SEIAA, Odisha / Integrated Regional Office of the MoEF & CC, Bhubaneswar in soft copies on 1st day of June and December of each calendar year. No hard copy of six monthly compliance report shall be accepted to SEIAA. The proponent shall also upload the compliance report including results of monitored data, in the website of the Ministry(www.parivesh.nic.in) for monitoring of EC Conditions, failing which EC is liable to be revoked.
15.10	The SEIAA may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
15.11	A separate 'Environmental Management Cell' with suitable qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall directly report to Head of the Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF&CC.
15.12	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.
15.13	Concealing factual data failure to comply with any or submission of false/ fabricated data and of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
15.14	The Project Proponent shall prepare digital map (land use & land cover) of the entire lease area once in five years purpose of monitoring land use pattern and submit a report to concerned Regional Office of the MoEF&CC.
15.15	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

1. Proposal in Brief:

The highlights of the proposal as ascertained from the application and as revealed from proceedings/discussion held during the meeting of SEAC/SEIAA, are given as under:-

- (i) This is a proposal of M/s Kalinga Alumina Ltd. for obtaining Environmental Clearance of proposed mining of Bauxite from Ballada Bauxite Mine (ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m<sup>3</sup>) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil-Nandapur, District-Koraput filed by Sri. Kassireddy Anil Kumar, Associate Vice President.
- (ii) Category: This is a Category – B project which falls under schedule 1(a): Mining of Minerals as per the EIA Notification 2006 and amendments thereafter.
- (iii) Project details: The present proposal is a greenfield project for mining of major mineral (Bauxite) with peak production capacity of 4.0 MTPA in Mine Lease area of 144.945 Ha. ToR has been granted vide File No. SIA/OR/MIN/439954/2023 on 06.11.2023 by SEIAA, Odisha and Public Hearing held on 06.03.2025. Subsequently, the application has now been submitted for grant of Environmental Clearance (EC).
- (iv) List of statutory clearances:

Sl. No.	Clearance	Date
i)	The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar	01.03.2023
ii)	Mining plan along with Progressive Mine Closure Plan has been approved by IBM vide Letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS	08.08.2023
iii)	The Site-Specific Wildlife Conservation plan received approval from PCCF (WL) & CWLW, Odisha. An amount of Rs 457.546 lakhs has been allocated towards conservation of wildlife in the study area.	04.06.2024
iv)	Permission for use of surface water from Jalaput Reservoir obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR	08.11.2024
v)	Forest Clearance Stage-I “In-principal” approval has been granted by MoEF & CC (Forest Conservation Division).	23.12.2024

- (v) Forest Application details: Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/456733/2023; dated 30.12.2023. Ballada Block is a virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of

bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha. Forest Clearance Stage-I “In-principal” approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024.

- (vi) ToR details: Terms of Reference (TOR) was granted by SEIAA, Odisha vide letter dtd. 06.11.2023.
- (vii) Public hearing details: The Public Hearing for the proposed bauxite mine was held at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha, dated: 06.03.2025, Time: 11:00 AM. Issues raised during public hearing are resettlement and rehabilitation plan, Education Renovation of Primary school/Higher Secondary School, Free education in schools, Healthcare facilities like provision of Ambulance, Distribution of free medicine, conducting health Camps, Construction of road, Water coolers and purifier, for Drinking water, maintenance of village roads, rainwater harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision of Water Cooler for Potable Drinking water, skill development and employment, about the Ballada Cave, that might be destroyed due to mining activity, agriculture of villages will be affected, The Forest Right Act is to be adopted for diversion of forest and R&R plan, Applicability & Implementation of the PESA Act, Stream Water Affect, measures to control air pollution, overburden protection and subsequent plantation, cutting down trees, increase of DMF fund for development.
- (viii) Location and connectivity: Ballada Bauxite Block is located at Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Block covers an area of about 144.945 ha. bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha. of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km south. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East. The Nearest Wild life Sanctuary is “Karlapat Wildlife Sanctuary” at a distance of 139.8 km in NNE direction. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South.
- (ix) Product details:

Units	Products and by Products	Existing	Additional	After Expansion
Million Tonnes Per Annum (MTPA)	Product: Bauxite	0.00	4.00	Not Applicable

## Equipment details:

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m <sup>3</sup>	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 (hp)	1

- (x) Mining method and production: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility. Mineable reserve is 19.96 Mt.

Year	Top Soil (m3)	Over Burden/ Waste (m3)	Over Burden/ Waste Quantity (t)	ROM Volume (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB to Ore Ratio (m <sup>3</sup> /ton)
Year 1	24072	0	0	500060	1000120	100%	-	1000120	0	0.0
Year 2	1710	24783	49566	1012010	2024020		-	2024020	0	0.012
Year 3	0	44671	89342	1000741	2001482		-	2001482	0	0.022
Year 4	0	3800	7600	1001207	2002414		-	2002414	0	0.002
Year 5	0	0	0	2000934	4001868		-	4001868	0	0.0
Total	25782	73254	146508	5514952	11029904				11029904	

- (xi) Transportation details: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of conveyor and rail route. The crushed bauxite will be transported by a closed conveyor system to the nearest "Bheja Railway Siding" from where it will be loaded on railway wagons using front end loaders and subsequently

dispatched to destination. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

- (xii) Ground water depth: Pre-monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl, in the study area.
- (xiii) Details of Drilling & Blasting: The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting NONEL with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of mine will be 4 Mt per annum (2 Mm<sup>3</sup> per annum).
- (xiv) Soil dump details: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm<sup>3</sup> or 0.15 MT of along with generation of 0.026 Mm<sup>3</sup> of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.
- (xv) Crusher and screen details: For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

Type of Crusher	Capacity, TPH	Feed Size, mm	Product size, mm
Crushing & Screening Plant	800	600-800	Minus 150

- (xvi) Land use details:

Head	At Present (Ha.)	At the end of SOM period (Ha.)	At the end of conceptual period (Ha.)

a)	Area under Mining	0.00	42.78	81.82
b)	Topsoil stacking	0.00	0.28	-
c)	Overburden / Waste Dumping	0.00	1.94	1.95
d)	Mineral Storage	0.00	1.93	-
e)	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18	-
f)	Roads	0.00	0.38	-
g)	Mineral Separation Plant	0.00	0.13	-
h)	Others	0.00	3.92	-
i)	Undisturbed	0.00	-	61.18
	Total	0.00	51.54	144.945

(xvii) Details of waste generated:

Year	Top Soil Volume (m <sup>3</sup> )	Overburden/ Waste Volume (m <sup>3</sup> )
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

(xviii) Mitigation of waste produced: It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

(xix) Baseline study details: Baseline Study has been conducted during March 2023 to May 2023.

Parameters	Baseline status
Ambient Air Quality	PM <sub>10</sub> – 50.4 – 76.9 (µg/m <sup>3</sup> )
	PM <sub>2.5</sub> – 28.7 – 50.9 (µg/m <sup>3</sup> )
	NO <sub>x</sub> – 16.1 – 34.8 (µg/m <sup>3</sup> )
	SO <sub>2</sub> – 9.4 – 21.8 (µg/m <sup>3</sup> )
	CO – 0.5 – 1.0 (mg/m <sup>3</sup> )
Noise Level	Noise Level during Day Time -- 41.59 – 52.2 Leq.(dB)A
	Noise Level during Night Time -- 34.2 – 43.38 Leq.(dB)A

Water Quality	Ground Water : All the Parameters like TDS (320.0–380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20-300.42 mg/L) etc. are found within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)
Socio Economic Study	The proposed project will provide positive impact to the nearby area. The project will provide direct and indirect employment to nearby villagers. Project will generate employment for about 126 persons.
Ecology and Biodiversity	There is no wildlife sanctuary/biosphere reserve/national parks present within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (WL) & CWLW for conservation of schedule-I species of the study area.

(xx) Water requirement and wastewater management: Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD. The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024 Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Waste water generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

S. No.	Consuming Area	Water requirement, (KLD)
i)	Haul road dust suppression including maintenance of topsoil	600
ii)	Washing and cleaning of earthmoving equipment	45
iii)	Drinking system	10
iv)	Afforestation	15
v)	Miscellaneous	20
	Total	690

(xxi) Power Requirement and solar power details: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest

substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

- (xxii) Rainwater Harvesting Details: As per the CGWA Manual for Recharge (GEC Norms-2015), the recharge structures like Check Dam/ Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. The estimated ground water recharge through mine pit will be 253341 m<sup>3</sup>/month.
- (xxiii) Green belt Development: The details of proposed greenbelt are given below:

Sr. No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
i)	Year 1	Statutory Barrier, Dump & haul roads	0.72	1440	75	2,01,600
ii)	Year 2	Statutory Barrier, Dump & haul roads	0.86	1720	75	2,40,800
iii)	Year 3	Statutory Barrier, Dump & haul roads	1.16	2320	75	3,24,800
iv)	Year 4	Statutory Barrier, Dump & haul roads	0.68	1360	75	1,90,400
	Year 5	Statutory Barrier, Dump & haul roads	0.80	1600	75	2,24,000
Total			4.22	8440		11,81,600

- (xxiv) Total employment: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.
- (xxv) Project Cost: Estimated cost of the project is Rs. 23000 Lakhs, EMP cost includes Capital Cost of Rs. 220 Lakhs and Recurring Cost of Rs. 60 Lakhs/year; CSR cost is Rs. 532.5 Lakhs.

Sl. No.	Environmental Protection Measures	Capital Cost	Recurring Cost
		(Rs. In lakhs)	(Rs. In lakhs/year)
i)	Air Pollution Control Measures	100.00	25.00
ii)	Water Pollution Control Measures	25.00	5.00
iii)	Noise Pollution Control Measures	15.00	1.00
iv)	Greenbelt Development	20.00	5.00
v)	Rainwater Harvesting	10.00	2.00

vi)	Health & Safety measures	20.00	2.00
vii)	Environment Monitoring	30.00	20.00
Total		220.00	60.00

(xxvi) Environment Consultant: The Environment consultant M/s Vardan Environet LLP, Gurugram along with the proponent made a presentation on the proposal before the Committee on 30.05.2025. The SEAC decided to take the decision on the proposal after receipt of certain information / documents from the proponent:

(xxvii) The SEAC in its meeting held on dated 30.05.2025 decided to take decision after receipt of the following information and documents from the proponent. The proponent has furnished the compliance and the SEAC verified the same as follows:

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
i)	Status of stage-I Forest Clearance and copy of stage-I Clearance, if obtained.	FC Stage-1 has been granted vide file no. FP/OR/MIN/QRY/456733/2023 on 23.12.2024. Copy of FC stage-1 approval is attached as Annexure 1.	Complied
ii)	Copy of Letter of Intent in name of Kalinga Alumina.	The Letter of Intent (LOI) has been issued in the name of Mundra Alumina Ltd. vide letter no.2143/SM-MC2-MC007-2023, S&M, Bhubaneswar on 01.03.2023 from the Steel & Mines Department, Govt. of Odisha. However, change in name of entity from "Mundra Alumina Ltd." to "Kalinga Alumina Ltd.)" has been approved by the Department of Steel & Mines, Govt. of Odisha vide letter no. 5995 SM-MC2-MC-0012-2023/SM, Bhubaneswar on 09.06.2023. The Copy of Letter of Intent is attached as Annexure 2.	-----
iii)	Explore the possibility of implementing the sprinkling system all along the conveyor line.	Provision of sprinkling system for dust suppression will be provided at the loading end, discharge end and at all the transfer points of the long-distance conveyor.	Complied
iv)	Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.	Provision for continuous water sprinkling facility will be adopted all along the Haul Road during transportation of minerals. An adequate number of water sprinkler and fog cannon shall be installed at appropriate locations to prevent air pollution during internal transportation of mineral from pit to crusher.	
v)	Note on Management of reactive silica.	Reactive Silica refers to a mineralogical form of silica, primarily present as Kaolinite, with the chemical formula $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ . It is termed "Reactive" due to its chemical reactivity with caustic solutions used in the Bayer Process, the standard method employed by	Complied

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
		<p>alumina refineries to extract alumina from bauxite.</p> <p>During the Bayer Process, Reactive Silica reacts with the caustic soda and precipitates as a solid by-product known as Desilication Product (DSP). This DSP becomes part of the red mud, a residue that requires careful management by alumina refinery operators.</p> <p>As such, Reactive Silica does not pose any environmental or processing concerns during the mining and crushing stages. Further, its presence in bauxite does not impact on the operations of Kalinga Alumina Limited, whose responsibilities are limited to the extraction, crushing, and sale of bauxite ore to various alumina refineries.</p>	
vi)	Parking Plaza details.	Designated parking plot for HEMM will be inside the mining lease area for Intra mine transportation. Since Bauxite will be transported through the long-distance conveyor system, therefore, no transportation of bauxite by road is envisaged.	Complied
vii)	Details on the exploration of minerals with respect to critical minerals.	<p>As per the tender documents, exploratory drilling was carried out during the year 1976-77 by Geological Survey of India. A total of 15 boreholes (BB-1 to BB-15) have been drilled with a total meterage of 291.65 meters.</p> <p>Based on the grades, Bauxite has been categorized into 5 types such as Metallurgical grade bauxite, Low grade Bauxite, Beneficiable grade Bauxite High Silica Bauxite and Aluminous Laterite and the resources have been estimated accordingly.</p> <p>The geological setting of the area, being part of the Eastern Ghats hill ranges and predominantly composed of Khondalite and Charnockite group of rocks, significantly reduces the likelihood of encountering critical mineral deposits.</p> <p>As per the Geological Report, the absence of known mineralization zones or geochemical anomalies in the region further supports that the possibility of occurrence of critical minerals in this bauxite deposit is very remote.</p> <p>Geological report is attached as Annexure-3.</p>	-----
viii)	During public hearing, local people made complaint about protection of cave, which is a place	Regarding the protection of the Cave, we have proposed no mining activity will be carried out within 100m distance from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be	Complied

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
	of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.	developed and beautified so as to attract tourism. District administration is also intent for the Beautification of Cave. The layout plan mentioning Safety zone is attached as Annexure 4. The protection plan of Cave is attached as Annexure 5.	

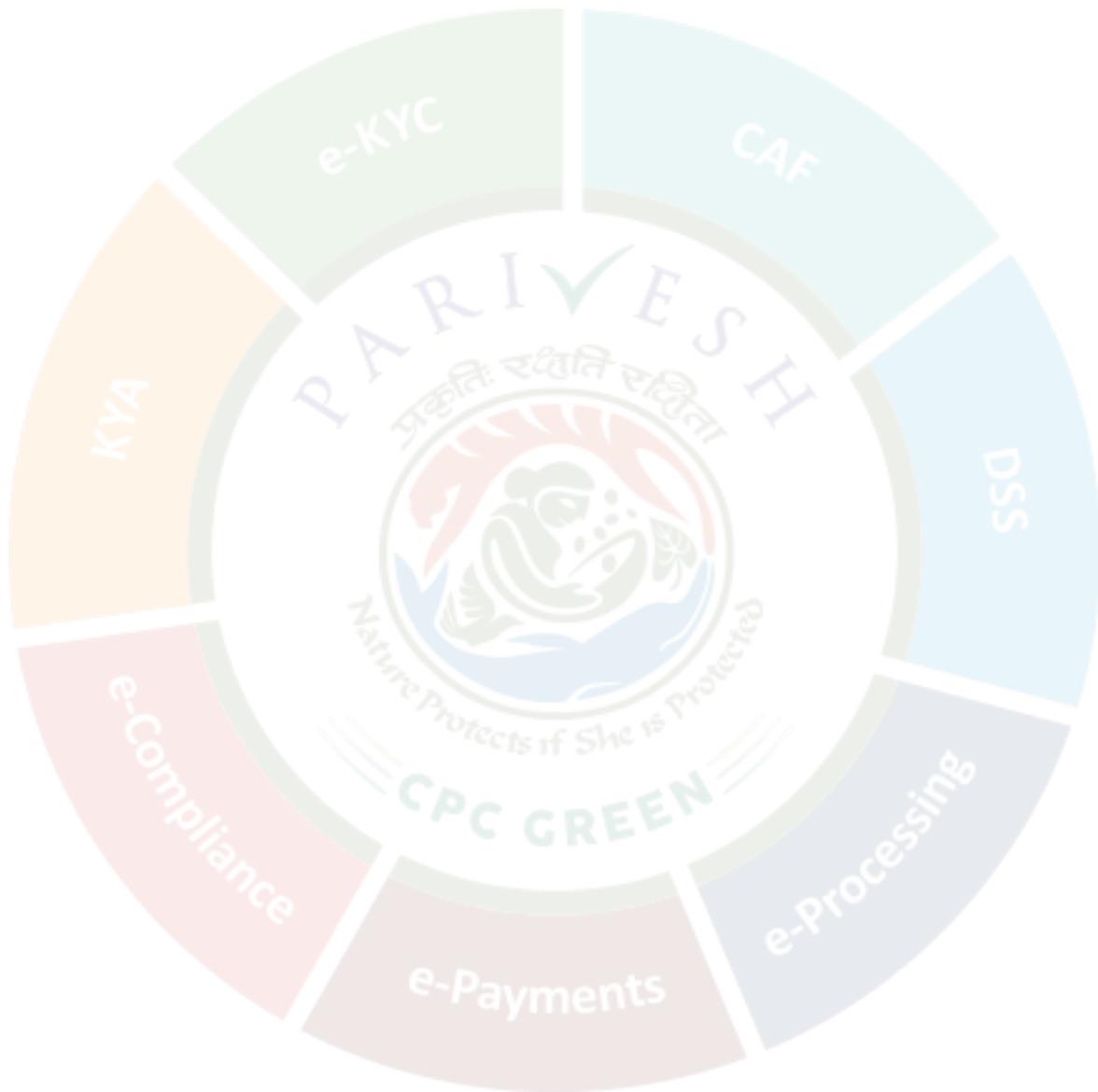
(xxviii) Following issues have been raised by the public during Public Hearing for Ballada Bauxite Mines for M/s Kalinga Alumina Limited, Koraput held on 06.03.2025 at 11.00 am at Mouza Bheja (Khata no. 27. Plot no. 225 area -2,48 ac, kissam-d-111) under Nandapur Tehsil, District – Koraput.

- i) Resettlement and Rehabilitation (R&R) Plan/Compensation details for the Project Affected People (PAP) should be furnished.
  - ii) Education Renovation of Primary school/Higher Secondary School, Free education in schools.
  - iii) Healthcare facilities like provision of Ambulance, Distribution of free medicine and conducting health Camps
  - iv) Infrastructure Development; Construction of road, Water coolers and purifier, for Drinking water
  - v) Physical Work: Strengthening/maintenance of village roads, Rainwater Harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision.
  - vi) Water Cooler for Potable Drinking water
  - vii) Skill Development and Employment; Wick making, Stitching, Mushroom Production and Computer Training.
  - viii) Ballada Cave will be destroyed due to mining activity.
  - ix) Agriculture of villages will be affected.
  - x) The Forest Right Act is to be adopted for diversion of forest and R&R plan
  - xi) Applicability & Implementation of the Panchayats Extension to Scheduled Areas (PESA) Act, 1996
  - xii) Stream Water Affect
  - xiii) Measures need to be taken to prevent Air Pollution in this project.
  - xiv) Overburden protection & subsequent plantation
  - xv) Felling of trees
  - xvi) Increase of DMF fund for development
- About 2420 Nos. of written representations have been received by the Board in connection with the public hearing and most of them are related to the above issues along with issues related to destruction of Nageswari Hill, Destruction of natural habitats of 23

different types of Animals and Birds, Affect the crops and millets grown at the foothill of the Balda Hill, affect the 23 perennial streams and 15 ponds and lakes around the Balda Hills and destruction of medicinal trees etc.

- Further, a representation from Sri Rama Chandra Kadam, Hon'ble MLA, Pottangi has been submitted to Hon'ble Chief Minister, Odisha raising following issues
  - i) The villagers of Balda Gram Panchayat, along with five other panchayats and about 30 villages, are associated with the Nageswari Hills. The forests, jungles and springs of nature are the beliefs and emotions of their tribal people. This hill is associated with the memories of our ancestors and our livelihood.
  - ii) On the other hand, the State Tourism Department has also arranged an eco-retreat very close to this hill to attract tourists, which is the oldest cave in this area, known as Nageswari Cave. If the hill is excavated by the Adani Company, the tourism of the State, the natural beauty of the Nageswari Cave and the hill will be completely affected.
  - iii) All the perennial streams and springs in this area will be dried up.
  - iv) The medicinal trees that were thousands of years ago will also disappear, which is an irreparable loss.
- (xxix) The Committee observed that most of the points raised by the public during public hearing as well as raised by Hon'ble MLA have been addressed by the proponent in the EIA report. The proponent has also submitted a detailed proposal for protection of the Nageswari Cave such as maintaining no mining zone from the cave, beautification of the cave area to attract tourists and other pollution control measures as per concerns of public.
- (xxx) Any deficiencies/omission have been noticed in the above documents- Nil
- 2. Deliberation in SEAC Meeting: – The proposal was placed in the SEAC meeting held on 23.07.2025 and the Considering the information furnished and the presentation made by the consultant, M/s Vardan Environet LLP, Gurugram along with the project proponent, the SEAC recommended for grant of Environmental Clearance to the project valid for 10 years with stipulated conditions in addition to the following specific conditions.
  - i) The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report.
  - ii) The issues raised during the public hearing shall be addressed by the proponent as proposed in EIA/EMP report.
  - iii) The proponent shall obtain permission from the Archaeological Department if applicable before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department if required.
  - iv) The proponent shall use conveyor for mineral evacuation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral evacuation by road.
  - v) As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine.
- 3. Decision of Authority: Approved :-The proposal was placed in the 230<sup>th</sup> meeting of SEIAA held on 19.08.2025 for consideration of EC. After detailed deliberation, the authority approved the EC valid for a period of 10 years from the date of issue of this letter for a

production capacity of 4.0 MTPA Bauxite (ROM) and Crushing/ Screening facilities of 800 TPH capacity along with standard and specific conditions as recommended by SEAC.



Date: 20.06.2025

**To**  
**The Member Secretary,**  
**State Level Environment Impact Assessment Authority (SEIAA),**  
**5RF-2/1, Acharya Vihar, Unit – IX,**  
**OPTCL Colony, Anand Bazar, Bhoi Nagar,**  
**Bhubaneswar, Odisha 751022,**

**Sub:** Submission of Additional Document Sought (ADS). vide file no. F. No. 536061/34-MINB1/05-2025 for Proposal of Ballada Bauxite Block (ML Area 144.945 Ha, rated capacity of 4.0 MTPA) by M/s Kalinga Alumina Limited, located at Village-Ballada, Tehsil-Nandapur, District-Koraput, Odisha – Grant of Environment Clearance regarding.

**Ref:**  
 (i) ToR Granted: 439954/109-MINB 1/09-2023 dated 06.09.2023  
 (ii) Online Proposal No. **SIA/OR/MIN/536061/2025** and File no.: **536061/34-MINB1/05-2025**  
 (iii) ADS raised **12.06.2025**

Respected Sir,

This is in reference to the above-mentioned subject; an ADS has been raised by SEAC at Parivesh Portal on 12<sup>th</sup> June 2025. Point-wise reply to the ADS are furnished below:

Sl. No.	Observations	Reply
a)	Status of Stage-I Forest Clearance and copy of Stage-I Clearance, if obtained.	FC Stage-1 has been granted vide file no. FP/OR/MIN/QRY/456733/2023 on 23.12.2024.  Copy of FC stage-1 approval is attached as <b>Annexure 1</b> .
b)	Copy of Letter of Intent in name of Kalinga Alumina.	The Letter of Intent (LOI) has been issued in the name of Mundra Alumina Ltd. vide letter no.2143/SM-MC2-MC-007-2023, S&M, Bhubaneswar on 01.03.2023 from the Steel & Mines Department, Govt. of Odisha. However, <b><u>change in name of entity from “Mundra Alumina Ltd.” to “Kalinga Alumina Ltd.” has been approved by the Department of Steel &amp; Mines, Govt. of Odisha</u></b> vide letter no. 5995 SM-MC2-MC-0012-2023/SM, Bhubaneswar on 09.06.2023.  The Copy of Letter of Intent is attached as <b>Annexure 2</b> .
c)	Explore the possibility of implementing the sprinkling system all along the conveyor line.	Provision of sprinkling system for dust suppression will be provided at the loading end, discharge end and at all the transfer points of the long-distance conveyor.

Kalinga Alumina Limited  
 (Formerly Known as Mundra Aluminium Limited)  
 Adani Corporate House, Shantigram,  
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Sl. No.	Observations	Reply
d)	Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.	Provision for continuous water sprinkling facility will be adopted all along the Haul Road during transportation of minerals. An adequate number of water sprinkler and fog cannon shall be installed at appropriate locations to prevent air pollution during internal transportation of mineral from pit to crusher.
e)	Note on Management of reactive silica.	Reactive Silica refers to a mineralogical form of silica, primarily present as Kaolinite, with the chemical formula $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ .  It is termed "Reactive" due to its chemical reactivity with caustic solutions used in the Bayer Process, the standard method employed by alumina refineries to extract alumina from bauxite.  During the Bayer Process, Reactive Silica reacts with the caustic soda and precipitates as a solid by-product known as Desilication Product (DSP). This DSP becomes part of the red mud, a residue that requires careful management by alumina refinery operators.  As such, Reactive Silica does not pose any environmental or processing concerns during the mining and crushing stages. Further, its presence in bauxite does not impact on the operations of Kalinga Alumina Limited, whose responsibilities are limited to the extraction, crushing, and sale of bauxite ore to various alumina refineries.
f)	Parking Plaza details.	Designated parking plot for HEMM will be inside the mining lease area for Intra mine transportation. Since Bauxite will be transported through the long-distance conveyor system, therefore, no transportation of bauxite by road is envisaged.
g)	Details on the exploration of minerals with respect to critical minerals.	As per the tender documents, exploratory drilling was carried out during the year 1976-77 by Geological Survey of India. A total of 15 boreholes (BB-1 to BB-15) have been drilled with a total meterage of 291.65 meters.  Based on the grades, Bauxite has been categorized into 5 types such as Metallurgical grade bauxite, Low grade Bauxite, Beneficiable grade Bauxite High Silica Bauxite and Aluminous Laterite and the resources have been estimated accordingly.

Sl. No.	Observations	Reply
		<p>The geological setting of the area, being part of the Eastern Ghats hill ranges and predominantly composed of Khondalite and Charnockite group of rocks, significantly reduces the likelihood of encountering critical mineral deposits.</p> <p>As per the Geological Report, the absence of known mineralization zones or geochemical anomalies in the region further supports that the possibility of occurrence of critical minerals in this bauxite deposit is very remote.</p> <p>Geological report is attached as <b>Annexure-3</b>.</p>
h)	<p>During public hearing, local people complained about protection of cave, which is a place of worship in that locality and same is falling within the lease area.</p> <p>A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.</p>	<p>Regarding the protection of the Cave, we have proposed no mining activity will be carried out within 100m distance from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. District administration is also intent for the Beautification of Cave.</p> <p>The layout plan mentioning Safety zone is attached as <b>Annexure 4</b>.</p> <p>The protection plan of Cave is attached as <b>Annexure 5</b>.</p>

We trust that the above information furnished are in order as per the requirement. It is therefore requested your good office to kindly consider the above-mentioned project for the Grant for Environment Clearance.

Thanking You.

**For M/s Kalinga Alumina Limited**



**K Anil Kumar,**  
**Vice President – Projects,**  
**Kalinga Alumina Limited,**  
**Shantigram, Ahmedabad,**  
**Gujarat-382421**

**Encl:** Annexures – 1 to 5 nos. as above

Kalinga Alumina Limited  
 (Formerly Known as Mundra Aluminium Limited)  
 Adani Corporate House, Shantigram,  
 Nr. Vaishno Devi Circle, S. G. Highway,  
 Khodiyar, Ahmedabad - 382421  
 Gujarat, India

CIN: U09900GJ2021PLC128064

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad – 382 421

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# **ANNEXURE-1**



Government of India

Ministry of Environment, Forest and Climate Change

(Forest Conservation Division)

Online Proposal No.:  
FP/OR/MIN/QR/456733/2023

Dated: 23/12/2024

To,

Additional Chief Secretary (Forests)  
Government of Odisha  
Bhubaneswar**Subject:**

Proposal for seeking prior approval of the Central Government under Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of M/s Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada Bauxite Mines within Mining Lease area of 144.945 ha.

**Sir/Madam,**

I am directed to refer to the Government of Odisha's letter No letter No. FE-DIV-FLD-0052-2024-13003/FE&CC dated 19.07.2024 on the above subject seeking prior approval of the Central Government under Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 and additional information submitted through online on PARIVESH 2.0 portal as sought by the Ministry and to say that the proposal has been examined by the Advisory Committee constituted by the Central Government under Section - 3 of the aforesaid Act.

2. After careful examination of the proposal of the Government of Odisha and on the basis of the recommendations of the Advisory Committee, and approval of the same by the competent authority of the MoEF&CC, New Delhi, the Central Government hereby accords *'in-principle'* approval under Section - 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of M/s Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada Bauxite Mines within Mining Lease area of 144.945 ha. of Odisha subject to the fulfilment of the following conditions:

**1. General Conditions**

S. No	Conditions
1.1	Legal status of the diverted forest land shall remain unchanged
1.2	The non-forest land identified for raising compensatory afforestation shall be transferred and mutated in favour of the State Forest Department before issue of the Stage-II clearance
1.3	The User Agency shall transfer the cost of raising and maintaining the compensatory afforestation, at the current wage rate, to the State Forest Department. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years
1.4	At the time of payment of the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India
1.5	All the funds received from the user agency under the project, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred to Ad-hoc CAMPA in the Savings Bank Account pertaining to the State concerned
1.6	The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required
1.7	The boundary of the diverted forest land, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar
1.8	The User agency, if required, will undertake comprehensive soil conservation measures in the area being diverted at the project cost in consultation with the State Forest Department. A scheme of the same may be submitted along with the compliance report
1.9	No labour camp shall be established on the forest land
1.10	The User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas
1.11	The forest land shall not be used for any purpose other than that specified in the proposal
1.12	The layout plan of the proposal shall not be changed without the prior approval of the Central Government
1.13	The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government
1.14	No damage to the flora and fauna of the adjoining area shall be caused
1.15	Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department
1.16	The user agency in consultation with the State Government shall create and maintain alternate habitat/home for the avifauna, whose nesting trees are to be cleared in this project. Bird's nests artificially made out of eco-friendly material shall be used in the area, including forest area and

S. No	Conditions
	human settlements, adjoining the forest area being diverted for the project
1.17	The User Agency shall submit six monthly self-compliance reports as on 1st January and 1st July of every year to this office as well as to the Nodal Officer of the State
1.18	The State Government shall monitor compliance of conditions of Forest Clearance and shall submit in this regard yearly report as on 31st December of every year
1.19	Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife
1.20	The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project
1.21	The State Government shall charge the Net Present Value (NPV) of the forest land being diverted under this proposal from the User Agency as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC (Pt.) dated 06.01.2022 read with the letter dated 22.03.2022 in this regard.
1.22	The non-forest land transferred and mutated in favour of the State Forest Department or the revenue forest land, as the case may be, shall be notified by the State Government as Protected Forests under section 29 of the Indian Forest Act, 1927 or under the relevant section(s) of the local Forest Act, before issue of the 'Final' approval under the Adhiniyam. The Nodal Officer shall report compliance in this regard along with a copy of the original notification declaring the non-forest land as PF, along with compliance of 'in-principle' approval;
1.23	<p><b>Safety Zone Management:</b> Following activities, at project cost, shall be undertaken by the user agency for the management of safety zone as per relevant guidelines issued by the Ministry's guidelines:</p> <ol style="list-style-type: none"> <li>User agency shall ensure demarcation of safety zone (7.5-meter strip all along the inner boundary of the mining lease area), and its fencing, protection and regeneration by erecting adequate number of 6 feet high RCC boundary pillars inscribed with DGPS coordinates with barbed wire fencing and deploying adequate number of watchers under the supervision of the State Forest Department;</li> <li>Boundary of the safety zone of the mining lease, adjacent to habitation/roads, should be properly fenced by the user agency;</li> <li>Safety zone shall be maintained as green belt around mining lease and to ensure dense canopy in the area, regeneration shall be taken up in this area by the user agency at project cost under the supervision of the State Forest Department;</li> <li>The State Government and the user agency shall ensure that safety zone is maintained as per the prescribed norms;</li> </ol>

## 2. Standard conditions

S. No	Conditions
2.1	The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, as amended or Rules framed there under, subject to a maximum period of 30 or 50 years.
2.2	The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed.
2.3	The user agency shall prepare a schedule for surrender of the mined out and reclaimed forest land in accordance with existing mining plan and submit the same along with an undertaking to surrender the mined out and reclaimed forest land as per such schedule to the MoEF&CC before grant of Stage-II approval under the FC Act for diversion of the said forest land;
2.4	In case of under-ground mines, areas on surface shall be fenced and afforested from the funds to be provided by the user agency.
2.5	The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MoEF along with indicators for monitoring and expected observable milestones.
2.6	Adequate care shall be taken to check any rolling of overburden/dumps beyond diverted area and also to check soil erosion caused due to mining activities;
2.7	The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
2.8	Following activities shall be undertaken by the User Agency at the project cost: (a) Preparation and implementation of a plan containing appropriate mitigative measures to minimize soil erosion and choking of streams; (b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion; (c) Construction of check dams, retention /toe walls along the contour to arrest sliding down of the excavated material; (d) Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than 28o;
2.9	The User agency will undertake comprehensive soil conservation measures at the project cost in consultation with the State Forest Department. A scheme of the same shall be submitted to the Regional Office along with the Stage-I compliance report

S. No	Conditions
2.10	No damage shall be caused to the top-soil and the user agency will follow the top soil management plan;
2.11	A site-specific Wildlife Management Plan shall be prepared by the State Government in consultation with the PCCF (Wildlife) for the protection and conservation of wildlife of the area. A copy of approved Plan shall be submitted to the Ministry along with the compliance of Stage-I approval. Entire cost of implementation of the provisions of the Wildlife Management Plan shall be deposited into the account of CAMPA of the State;
2.12	The user agency shall explore the possibility of translocation of maximum number of trees identified to be felled and shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department
2.13	The User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the concern Addl. Principle Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed;
2.14	The User Agency shall comply with the Hon'ble Supreme Court order on re- grassing, and re-grass the mining area and any other areas which may have been disturbed due to mining to restore them to a condition which is fit for growth of fodder, flora, fauna, etc. in a timely manner;
2.15	The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) including the complete compliance of the FRA, 2006 as per the Rules 11 (7) of the VSES Rules 2023 pertaining to this project, if any, for the time being in force, as applicable to the project.
2.16	Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 29.12.2023.
2.17	User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;

### 3. Specific Conditions

S. No	Conditions
3.1	The State Govt. shall ensure that the area earmarked as green belt i.e. 48.56 ha shall be kept as

S. No	Conditions
	green or used as admissible as per the extant rules and guidelines and no change in the land use shall be affected without the prior approval of the Central Govt.
3.2	The shallow water body within the mine lease area is a manmade formation created by forest department. The said water body (admeasuring 76 m X 54 m X 1 m) was created under CAMPA by the Department of Forest during the year 2020-21. In order to compensate the construction made and to provide the alternative, the State shall create other such suitable waterbody in the nearby surrounding area at the cost of the user agency. The funds in this regard shall be deposited by the User Agency in NA CAMPA.
3.3	The State Govt. shall ensure that the User Agency will not carry out any mining activity near the caves as recommended by the State and Regional Officer and take suitable measure to provide safe passage for accessibility to the local people for their religious belief, rituals and worships, if any.

After receipt of the compliance report on the fulfillment of the conditions mentioned above, the proposal shall be considered for final approval under section Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980. Transfer of forest land shall not be affected till final approval is granted by the Government in this regard.

**Copy To**

1. PCCF (HoFF), State Forest Department, Government of Odisha, Bhubaneswar
2. PCCF & Nodal Officer (FCA), O/o PCCF, State Forest Department, Government of Odisha, Bhubaneswar.
3. CEO, National Authority CAMPA, MoEF&CC, New Delhi.
4. DDGF (Central), Regional Office of MoEF&CC at Bhubaneswar.
5. User Agency.
6. Monitoring Cell, FC Division, MoEF&CC, New Delhi
7. Guard File.

**Your's faithfully**

(Suneet Bhardwaj)  
Assistant Inspector General of Forests

Signed by  
Suneet Bhardwaj  
Date: 23-12-2024 18:21:40  
Reason: Verified and  
signed

# **Annexure-2**

**GOVERNMENT OF ODISHA  
STEEL & MINES DEPARTMENT**

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**PROCEEDING**

No. 5995 /SM, Bhubaneswar, Date 09.06.2023  
**SM-MC2-MC-0012-2023**

Sub: Change in name of entity from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" – **reg.**

**ORDER**

**Whereas**, "Mundra Aluminium Limited", a wholly owned subsidiary of Adani Enterprises Limited, took part in the e-auction process and declared as preferred bidder in respect two Bauxite Blocks Kutrumali and Ballada Bauxite Block. Accordingly, Letters of Intent (LoI) were issued in favour of "Mundra Aluminium Limited" on 27.02.2023 and 01.03.2023 for Kutrumali and Ballada bauxite mines respectively.

**And whereas**, Adani Enterprises Limited, being the holder of mineral concession, vide representation dated 04.04.2023 intimated the State Government regarding change of name from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" w.e.f. 30.03.2023. This name change has also been approved by Registrar of Companies, Ministry of Corporate Affairs, Government of India and issued Certificate of Incorporation on 30.03.2023 as per Rule-29 of the Companies (Incorporation) Rules, 2019.

**And whereas**, the company has also submitted that this change is a mere change in name and there is no change in the corporate structure, Memorandum and Articles of Association and the shareholding pattern. The renamed entity will continue to be a wholly owned subsidiary of Adani Enterprises Limited, in compliance with clause 5 (b) of the tender documents published under Notice Inviting Tender Dated 23.11.2022.

Therefore, , the State Government, after careful consideration have been pleased to allow the change of name from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" as per rule 61 of MC Rules, 2016 w.e.f.

Aw



30.03.2023 at all places wherever the company is required to display its name without change in the corporate structure, Memorandum and Articles of Association and the share holding partners in terms of section 12 of the companies Act, 1956

By order of the Governor

A. U. K.  
9/6/23

Additional Secretary to Government

Memo No. 5996 /SM,

Dated: 09.06.2023

Copy forwarded to the CEO-Aluminium Business, 10th Floor (East Wing), Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad-382421 for information and necessary action.

A. U. K.  
9/6/23

Additional Secretary to Government

Memo No. 5997 /SM,

Dated: 09.06.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar for information and necessary action.

A. U. K.  
9/6/23

Additional Secretary to Government

Memo No. 5998 /SM,

Dated: 09.06.2023

Copy forwarded to the Collector, Kalahandi/Collector, Rayagada for information and necessary action.

A. U. K.  
9/6/23

Additional Secretary to Government

Memo No. 5999 /SM,

Dated: 09.06.2023

Copy forwarded to the Deputy Director of Mines, Koraput/ DFO, Koraput for information and necessary action.

A. U. K.  
9/6/23

Additional Secretary to Government



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Regd. Post with A/D

GOVERNMENT OF ODISHA  
STEEL & MINES DEPARTMENT

\*\*\*\*

No. 2143 /S&M, Bhubaneswar, dated the 01.03.2023  
SM-MC2-MC-0007-2023

From

Sri S.K.Swain,  
Special Secretary to Government.

To

Mundra Aluminium Limited,  
10<sup>th</sup> Floor (East Wing), Adani Corporate House,  
Shantigram, Near Vaishno Devi Circle,  
S. G. Highway, Khodiyar,  
Ahmedabad-382421  
Email – [k.anilkumar@adani.com](mailto:k.anilkumar@adani.com)

**Sub:** Letter of intent with reference to e-auction dated 15.02.2023 for grant of mining lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area.

**1. Background:**

1.1 Government of Odisha, pursuant to the Mines and Minerals (Development and Regulation) Act, 1957 (the "Act") and the Mineral (Auction) Rules, 2015 as amended from time to time (the "Auction Rules"), issued the Notice Inviting Tender (NIT) dated 23.11.2022 to commence the auction process for grant of mining lease for Ballada Bauxite Block located in Koraput District of Odisha. The e-auction process was conducted in accordance with the tender document for the said mineral block and Mundra Aluminium Limited was declared as the 'Preferred Bidder' under Rule 9(9)(iii) or Rule 10 (1A) of Auction Rules, having quoted a Final Price Offer of 72.25 %.

1.2 As required under Rule 10(1) or Rule 10 (1A) of the Auction Rules and the tender document for the said mineral block, Mundra Aluminium Limited has made payment of the first instalment of Rs.6,68,41,122/- (Rupees Six Crore Sixty Eight Lakh Forty One Thousand One Hundred Twenty Two) being 20% (twenty percent) of the upfront payment through e-challan Reference Id-359A9C0976 dtd.27.02.2023 at Koraput, Odisha.



SM-MC2-MC-0007-2023/1/2023



## 2. Grant of Letter of Intent

Accordingly, pursuant to Rule 10(2) of the Auction Rules and the terms of the Tender Document, the Government of Odisha is pleased to issue this letter of intent for grant of Mining Lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area to Mundra Aluminium Limited for a period of 50 (fifty) years.

## 3. Conditions

3.1 This letter of intent and the subsequent grant of aforementioned mining lease shall be subject to the provisions of the Act and the Rules made thereunder, as amended from time to time, and Mundra Aluminium Limited shall be designated as the 'successful bidder' and subsequently granted the mining lease only upon satisfactory completion of all the requirements under the Acts and Rules made thereunder.

The State Government may impose such other conditions in the Mine Development and Production Agreement (MDPA) and/or Mining Lease as may be considered by the State Government to be in the interest of mineral development and in public interest.

Mundra Aluminium Limited shall be bound by (i) the enactment, bringing into effect, adoption, promulgation, amendment, modification or repeal of any Applicable Laws (including the Act and Rules) occurring at any time, including prior to or after the Bid Due Date; (ii) any amendments made by the State Government to this effect in the Tender Document, the letter of intent, the MDPA and/or the mining lease deed at any time, including prior to or after the Bid Due Date.

Mundra Aluminium Limited shall ensure that the Bid Security is valid until the Performance Security is furnished to the Government of Odisha.

3.2 For reference, the requirements under the Auction Rules for designation of Mundra Aluminium Limited as the "successful bidder" and subsequent grant of the mining lease are reiterated below. It is clarified that the requirements mentioned below are only for reference and in the event of any change in the Act or the Rules made thereunder, the requirements under the modified Act or the Rules made thereunder, as the case may be, shall be applicable.

### a. Designation as the "Successful Bidder":

Mundra Aluminium Limited shall be considered to be the "successful bidder" upon:

- i. continuing to be in compliance with all the terms and conditions of eligibility;





any instalment of Upfront Payment paid, shall be forfeited and appropriated in full by the State Government.

Mundra Aluminium Limited shall furnish acceptance of the terms and conditions of Letter of Intent within 15 (Fifteen) days from the date of issue of this letter.

Yours faithfully,

  
01.03.2023

Special Secretary to Government

Memo No. 2144 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar/ the Deputy Director of Mines, Koraput for information and necessary action.

  
01.03.2023

Special Secretary to Government

Memo No. 2145 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Collector, Koraput for information and necessary action.

  
01.03.2023

Special Secretary to Government



# **Annexure-3**



**GOVERNMENT OF ODISHA  
DEPARTMENT OF STEEL & MINES  
DIRECTORATE OF GEOLOGY**

**GEOLOGICAL REPORT ON INVESTIGATION OF BAUXITE  
IN BALLADA BLOCK, KORAPUT DISTRICT  
ODISHA**

**TOPOSHEET NO. E44K11 (65 J/11)**

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**ABSTRACT**

The present Geological Report embodies the revised estimates of resource and grade of category wise bauxite resources of Ballada bauxite block taking into account the exploration inputs available in the Geological Report prepared by Geological Survey of India and provided by M/s Odisha Mining Corporation Ltd. in line with the end use grade specification and threshold values of minerals prescribed by IBM vide Circular No. C-284/3/CMG/2017.

GSI carried out preliminary exploration of the Ballada bauxite block during East Coast Bauxite Project in shape of geological mapping (1:5000), drilling at 200m to 400m grid spacing, core sampling and analysis of the drill cores. The Ballada bauxite block comprising over an area of 144.945 Ha, constitute the plateau area of 91.67 Ha with a mineralised zone of 83.778 Ha and non-mineralised zone of 61.167 Ha including the central khondalite and southern clay pocket. The Ballada bauxite deposit spreads over an area of 91.67 Ha and is irregular in shape. The longer axis is aligned in NE-SW direction for an axial length of 2200 m. The plateau has an average width of about 390 m. The Ballada plateau periphery is marked by sheer scarps.

The Ballada plateau trends in NE-SW direction and rises to a maximum height of 1265 m from MSL. The plateau is characterised by laterite/bauxite capping on all sides. The deposit characteristics are re-assessed at the specified threshold of (+) 30%  $\text{Al}_2\text{O}_3$  and (-) 7%  $\text{SiO}_2$ . Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is scoriaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture. Highly ferruginous zones are more massive. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is more soft and aluminous in the lower parts and grade into bauxite. The soil is mostly lateritic. Relict foliation is noticeable in many places in the exposures of laterites, bauxite and PLK. The attitude is in conformity with that of foliation in khondalite. The periphery is marked by the development of escarpments along the slopes. In the southern and eastern and western part, escarpments are more prominent.

In all 15 vertical boreholes (BB-1 to BB-15) were drilled with a total meterage of 291.65 m. Only one borehole, BB-10 did not intersect any bauxite which is located on a clay pocket. Dry drilling was employed and in order to facilitate maximum core recovery short drill runs were adopted. Depth of BHs varies from 11.6 m to 28 m. Thickness of overburden which is

usually soil in Ballada plateau is 0.2 m. (BB 13) to 1 m (BB 5). The Ore Overburden ratio computed to be 1:0.003. Meter wise core samples from boreholes (183 nos.) were analysed for five radicals viz  $Al_2O_3$ ,  $SiO_2$ ,  $Fe_2O_3$ ,  $TiO_2$  and LOI in the ERL of GSI. The average specific gravity is 2 g/cc.

The resources are computed by cross section method (principal) and checked by polygonal method (check). The resource estimated by cross sectional area method is accepted in which a total inferred resources of 22.13 million tonnes bauxite of all grades (9.46 mt metallurgical grade, 8.47 mt low grade, 1.84 mt beneficiable grade and 2.37 mt high silica bauxite with average  $Al_2O_3$  content of 43.646%  $Al_2O_3$ , 3.904%  $SiO_2$ . The overall thickness of bauxite is about 13.47 m has been estimated.

Thus, a total of 22.13 million tonnes of inferred resource of bauxite of all grade have been estimated by cross sectional area method which is at G3 level of MEMC Rule, 2015. As a whole the resource of Ballada block is of **Inferred Mineral Resource category with code 333** can be considered akin to **Indicated Mineral Resource** as per section-5(iii) of MEMC Amendment Rules, 2021 for putting the block for auction for Mining Lease (ML).

The Ballada bauxite deposit has a large potential of metallurgical grade bauxite.

## CHAPTER-I INTRODUCTION

### 1.0.0 Introduction:

Bauxite is the source of alumina from which aluminium metal is extracted. Odisha, hosts the northern extremities of the Eastern Ghat meta-sedimentaries of psammopelitic gneisses and schists, Because of prevailing tropical to sub-tropical climatic conditions, these litho-assemblages have undergone residual chemical weathering at high altitudes (+900m amsl) giving rise to alteration of the aluminous gneisses leaving behind peneplained surfaces forming high altitude plateaux of khondalitic residuum, the duri-crust thus formed hosts a rim of lateritic bauxite blanket over the duricrust, which now serve as the source of alumina. With the growing demand for aluminium metal and advent of extraction technology, intensive exploration programme during seventies over the high grade granulitic terrain of the Eastern Ghat meta-sedimentaries in the state of Odisha and Andhra Pradesh by Geological Survey of India (GSI) State DMG and Mineral Exploration Corporation Ltd. under the "East Coast Bauxite Project" located and assessed the potentiality of high level lateritic bauxite. During the East Coast Bauxite Project, huge resources of metallurgical bauxite were identified in the plateaux and Ballada plateau in Koraput district is one of them.

The East Coast Bauxite is attractive in many respects not only for internal metallurgical purposes but also as exportable commodity in the World market as this is a low silica, low Titania, Gibbsite Bauxite without contaminants like Bohemite, Diaspore, Corundum etc, and need low pressure, low temperature digestion avoiding complications in the process technology. The grindability is also high. The resources established by G.S.I. is vitally important for taking major decisions regarding mineability of ore, selection of optimum grade, export of the ore/metal and future planning for setting up of aluminium smelter in the country for internal consumption. The results obtained indeed have put India in the World map of Aluminium and the country has emerged as a potential exporter of Aluminium.

Now, with the Amendments of the MM (D&R) Act, the partially explored plateaux are being revisited to make the resource exploitable through the auction route as per existing guidelines. In order to meet the objective and keeping in view the revised of threshold limits of bauxite and end use grade specified by IBM, the resource and grade estimated by GSI need to be re-assessed for classification of different categories of bauxite at revised cut-offs. The present Geological Report embodies the revised estimates of resource and grade of category wise bauxite resources of Ballada bauxite block taking into account the original exploration

inputs available in the Geological Report prepared by GSI in line with the end use grade specification and threshold values of minerals prescribed by IBM vide Circular No.C-284/3/CMG/2017.

### 1.1.0 Block Description

### 1.2.0 Location and Accessibility

The Ballada Bauxite deposit located to the west of Ballada village features in the central part of the East Coast Bauxite belt. The block lies in Nandapur Tahasil of Koraput district. It is featured in parts of Toposheet No. E44K11 (65 J/11). The explored block has been demarcated by DGPS using Leica 1200 with serial No: (i) 350443 (ii) 350445 (iii) 350447 (iv) 350448 (v) 350449 (vi) 350453 & (vii) 350336 by Odisha Space Application Centre (ORSAC) and the area is bounded by the following geo coordinates. (Plate-VI)

The block coordinates are tabulated below:

Sl. No.	Pillar Id	Latitude	Longitude
1	1	18°26'16.23156"	82°40'00.46092"
2	2	18°26'18.91140"	82°40'00.67800"
3	3	18°26'23.21664"	82°39'58.77720"
4	4	18°26'36.61440"	82°40'05.93040"
5	5	18°26'48.06600"	82°40'15.01104"
6	6	18°27'09.92016"	82°40'25.36716"
7	7	18°27'13.34448"	82°40'21.25920"
8	8	18°27'03.40524"	82°40'01.11144"
9	9	18°26'45.46356"	82°39'46.92528"
10	10	18°26'37.11876"	82°39'33.80148"
11	11	18°26'25.86912"	82°39'33.42420"
12	12	18°26'12.46524"	82°39'32.39136"
13	13	18°26'07.02348"	82°39'36.53856"
14	14	18°26'05.61588"	82°39'50.41692"

The plateau is situated about one kilometre west of Ballada and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km north-north-west of the Ballada deposit and is approachable by major district road No.52.

Koraput, the district headquarters is at 60 km north of the deposit, and is connected by a metalled road via Similiguda on NH 26.

The Kirandul-Kottavalasa broad gauge section of the South-Eastern Railway passes close to Ballada deposit in the east and the nearest rail head is Bheja, which is about 3 km to the north-east of the capping. Visakhapatnam is about 150 km south-east of Ballada and is connected by a tarmac road which passes through Araku in Andhra Pradesh.

### **1.3.0 Physiography and Drainage**

The area around Ballada plateau is marked by innumerable hillocks rising to heights varying from 100 to 200m from the surrounding plains generally 880m about MSL. This hill is elongated in a NE-SW direction and is moderately flat in the southern part, whereas it has somewhat gentle slope towards east, in the northern part where the highest peak marked by G.T.S. 1265m is situated in the northern part of the plateau. The peripheries are at places marked by escarpments with development of caves. The length of the hill is 2.2 km with the average width of about 390 m and the area of the capping is 91.67 Ha. A saucer shaped depression occupied by clay occurs in the south central part of the capping. There is gentle rolling country to the west and south of the Ballada plateau, at an average elevation of 1200 m, forming a part of reservoir area of the Machhkund Hydro-Electric Project.

Numerous first order ephemeral nalas originate from the plateau margin that drains to the back water nalas of Machhkund reservoir. The Machhkund River flows west of Ballada plateau and meanders in a north-westerly direction. The Patal River, a tributary of the Machhkund, also has a meandering course and joins the Machhkund, south-west of Ballada plateau.

The drainage pattern is litho-structurally controlled and more or less sub-dendritic.

### **1.4.0 `Climate, Flora and Fauna**

The area enjoys tropical to sub tropical climate. The area situated at an altitude of about 1000m above MSL experience cold weather between November and January when the temperature drops to less than 10<sup>0</sup>C. The temperature rises steadily from January onwards reaching 32<sup>0</sup>-36<sup>0</sup>C in summer in the month of May. Summer months are, in general, pleasant when compared to the coastal plains, and marked by occasional gusty winds with intermittent hailstorms. The average annual precipitation in the area is 120 cm distributed between June and September, under the influence of the south west monsoon. The mean humidity is 40 minimum (January) and 90 maximum (August-September) cloud bursts are uncommon in the area;

although such occurrences are rarely reported. The wind velocity varies between 40 Kmph and 80 Kmph, even higher values have been reported from time to time. Lightening incidences are rarely reported in the area. In view of the pleasant climate enjoyed in summer, Pottangi and Koraput in Odisha sector and Araku in Andhra sector are considered as summer resorts. Movement of low altitude clouds gives a panoramic view. The Machhkund is the major source for water and the deposit is a plateau with forest covered area. Hence exploration cannot affect agriculture.

Some parts of the area are reported to have an abundance of wild life. Amongst the wild animals, tiger, leopard, bison and bear are common. The hill tracts support thick vegetation. Bamboo (*Bambusa*), Teak (*Tectona grandis*), Coffee (*Coffe arabica*), Eucalyptus (*Eucalyptus rostrate*), and Mulbery (*Morus alba*) are grown at selected places. Other forest products include Tamarind (*Tamarindus indica*), Amla (*Phylanthus emblica*), Jackfruit (*Antocarpus integrifolia*) and Soapnut (*Sapindus laurifolins*).

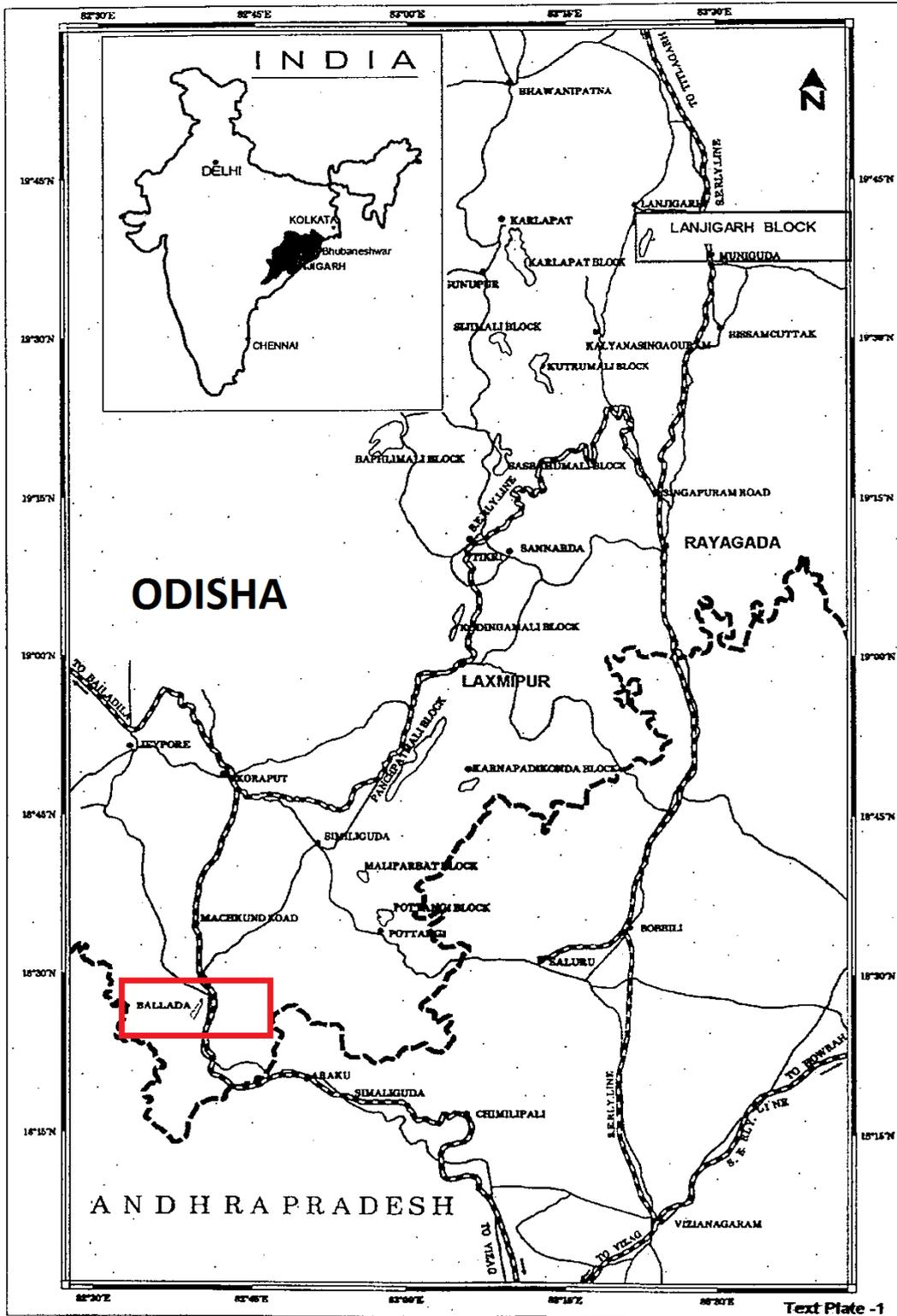
#### **1.5.0 Previous Works**

The bauxite plateau was taken up for preliminary resource evaluation by Geological Survey of India (GSI) under East Coast Bauxite project during field seasons 1975-1977.

#### **1.6.0 Scope and objective of the investigation:**

The objective is to recast the GR considering the exploration inputs generated by GSI and the findings thereof to reassess the resource and grade of bauxite in line with the threshold value and end use grade specified by IBM within the potential block.

LOCATION MAP OF BALLADA BAUXITE PLATEAU



## CHAPTER-II GEOLOGY

### 2.0 Regional Geology:

The Ballada hill ranges lying west of Pottangi plateau, Mali parbat and famous Panchpatmali plateau forms a part of the Eastern Ghat Mobile Belt of Archean age represented by khondalite suite of rocks, pyroxene granulite, charnockite suite of rocks, variants of granite gneisses which are permeated by pegmatoids and vein quartz of Archean age formed under granulite facies of metamorphism. The ortho and para metamorphites have undergone significant weathering and alteration at higher altitudes forming laterites of Tertiary age. The above lithounits form more or less banded assemblage in NNE-SSW trend in conformity to the general trend of the Eastern Ghats. The rocks exposed in the area belong to the Eastern Ghat Super Group of rocks represented by quartzite, migmatized khondalite, pyroxene granulite, charnockites, leptynites and porphyroblastic granite gneisses together with high level laterite/bauxite. The most common rock in this group is quartz-garnet-feldspar sillimanite gneisses i.e. khondalite with or without graphite and/or manganese which has been migmatized to variable extent. The khondalite suites form high and linear hills with sharp crests, while the charnockites occupy the low-lying plains as well as dome shaped hill rocks.

Structurally the area is fairly complex. The bedding plane ( $S_0$ ) is never observed. The most pronounced planar structure is foliation plane ( $S_1$ ) of khondalite. The trend of foliation swings from NNW - NNE to NE -SW with rather steep dip ranging from  $60^\circ$  to  $80^\circ$  due SE or SW. In the Niyam Dongar hill, where abroad upright asymmetric syncline is observed, the trend of foliation varies from NNW to NNE in the southern limb and swings to NE-SW in the northern limb.

The regional stratigraphic succession of the area is as follows.

Recent		Residual soil and alluvium
Quaternary/Tertiary		Ferruginous/aluminous laterite and bauxite
	Intrusive	Porphyroblastic granite gneisses
Precambrian	Eastern Ghat Super Group	Garnetiferous quartzo-feldspathic schist (Leptynite), pyroxene granulite (charnockite), Garnet - quartz feldspar - sillimanite - graphite and/or manganese (khondalite), quartzite

## 2.1 Local Geology of Ballada Plateau:

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks.

The geological succession tentatively worked out for the area is presented below:

Recent-----	Soil and Alluvium
Tertiary/ Quaternary-----	Bauxite/laterite
	Pegmatites and quartz veins
Archean-----	Migmatites
	Charnockite Group
	Khondalite Group

The Khondalite Group consists of garnet-sillimanite-quartz-feldspar gneiss and its variants which include garnetiferous quartzite, sillimanite-quartzite and quartzite. Likewise, the Charnockite Group is represented by both the basic and intermediate varieties. Diopside-hypersthene-granulite and the gneiss are the prevalent rock types. Occurrence of lenticular patches of pyroxene granulite within the intermediate charnockitic gneiss is common. Both the khondalites and charnockites are marked by lit-par-lit injections of quartzo-feldspathic material which has resulted in the migmatites and augen gneisses. The contact between the charnockite and khondalite is, in general, marked by a garnetiferous quartzo-feldspathic granulite (leptynite).

Outcrops of khondalite are seen south of the GTS in the northern part of the capping occupying the elevated parts. The combined areal extent of the khondalite exposure is about 0.04 sq km. The khondalite outcrops show foliation trending in NE-SW direction with steep easterly dips. The depression occupied by clay in the south central part of the capping has been drilled and the results confirm that the area is barren of bauxite but contains clay. This clay pocket occupies about 0.03 sq km. In the rest of the area, the surface of the capping is occupied by bauxite with a thin veneer of soil at places.

Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is

sporeous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture and highly ferruginous zones are more massive.

The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is more soft and aluminous in the lower parts and grade into bauxite. The soil is mostly lateritic. Relict foliation is noticeable in many places in the exposures of laterites, bauxite and PLK. The attitude is in conformity with that of foliation in khondalite. The periphery is marked by the development of escarpments along the slopes. In the southern and eastern and western part, escarpments are more prominent.

#### **Profile:**

Unlike the central Indian and west coast areas, the entire thickness of the residuum in the East Coast Profile is aluminous with varying concentration of alumina. A typical East Coast Bauxite profile is as follows:

<u>Lithounit</u>	<u>Thickness (in metres)</u>
Bauxite with intercalations of laterite (sensu stricto)	2-52
Partially lateritised khondalite/ Charnockite or lithomarge	3-25
Kaolinised Khondalite/ Charnockite	5-8
Unaltered Khondalite/ Charnockite	Base

The khondalite outcrops and the clay depression have been separately indicated on the map. The contact between laterite and bauxite is gradational and their demarcation on ground was difficult because of their similarity in mineralogy, colour and other physical characteristics.

#### **Structure:**

The regional foliation trend is NE-SW with the dips varying from  $30^{\circ}$  to  $80^{\circ}$  towards southeast. Local foliation swerves in trend to ENE-WSW and NNE-SSW are very common. Alternating concordant bands represent tight isoclinal folds with a NE-SW axis. The axes of mesoscopic folds plunge due southeast at  $15^{\circ}$  to  $20^{\circ}$ . Mineral and groove lineations plunge due east, south and southeast. The strike and dip joints are the most prevalent. These form some of the lineaments in the area. Extensive slickensides are noticed at many places which is a sequel to local displacements. In all probability, these are sympathetic to a major fault system. Several synformal structures could be made out by the convergence of dips and consequently some of the hills are synformal hills and the intervening low lying areas mark the antiformal valleys.

**CHAPTER-III**  
**EXPLORATION**

### **3.0 Exploration:**

During East Coast Bauxite Project, GSI carried out reconnaissance survey and located many large and medium sized plateaux of varied dimension in the granulitic terrain. As a part of the programme Prospecting for bauxite in Ballada bauxite plateau during 1975-77 through systematic survey, Geological mapping in 1:5,000 scale with 4 m contouring over an area of 91.67 Ha, drilling and core sampling.

### **3.1 Techniques of Exploration**

The following techniques have been used during the present phase of exploration in Ballada Bauxite Deposit.

#### **3.1.1 Topographical Surveying**

A 2200 m long baseline was laid along the main axis of the capping and cross lines were also laid at 400m intervals. The periphery of the hill was marked and components plotted. Borehole sites were accurately located and their reduced levels were determined with reference to the GTS station. An area of 91.67 Ha on 1:5,000 scale with 4m contour interval was surveyed.

#### **3.1.2 Detailed Geological Mapping**

Surface geological mapping was carried out and data were plotted on topographic base plan prepared by surveying on 1:5000 scale. Traverses were taken on all the cross section lines as well as between them to demarcate lithological boundaries, outcrops of laterite/ bauxite, and khondalite etc. and depicted in the topographical and geological map (1:1000 scale, Plate No.- II). The contact between the bed rock which is khondalite and the laterite/bauxite was delineated in the first instance. Where the contact is not clear or where the slopes are covered with thick scree the last in-situ outcrop of bauxite or the bottom of the bauxite scarp was taken as the inferred contact as far as possible. The demarcation of the geological contact as also contouring was accomplished by plane table method using mostly the Russian alidades. The Survey of India triangulation station point on each hill was taken as the reference station for purposes of contouring. The nature of bauxite is such that it is not amenable for further differentiation into different litho-units based on megascopic characters unlike the Central Indian and West Coast types. Attitude of foliation in the khondalite, relict foliation in laterite/bauxite, joints etc. were also recorded. The mapping was done with the help of tape and brunton compass.

### 3.2 Drilling

Drilling which is the primary tool for prospecting and exploration was carried out by dry-method. Exploratory drilling was carried out at grid spacing of about 200 to 400 m at the grid intersections. The boreholes were all vertical. Dry drilling was employed and the recovery of the core was very satisfactory. In order to facilitate maximum core recovery short drill runs were adopted. Depth of BHs varies from 11.6 m to 28 m.

In all 15 boreholes (BB-1 to BB-15) were drilled with a total meterage of 291.65 m. Only one borehole, BB-10 did not intersect any bauxite which is located on a clay pocket. This borehole was located in the clay-bearing saucer depression to ascertain the presence or absence of bauxite beneath the clay. Otherwise the plateau exposes lateritic bauxite of different grades on the surface with a thin veneer of soil at places. .

### 3.3 Core Logging

Careful geological logging was carried out to identify (i) contact between overburden and bauxite, (ii) lenses / patches of non-bauxite within ore and (iii) bauxite-khondalite (altered) or bauxite-lithomarge (at places) contact at the bottom. While doing visual logging, colour, physical nature, lithology, structural details and mineralogy wherever possible, were recorded. While logging, the percentage of  $\text{Al}_2\text{O}_3$  content on visual estimates was labelled for each drill-run on the basis of concentration of the glittering needle and particles of gibbsite seen through a pocket lens as the East Coast Bauxite is predominantly gibbsitic.

### 3.4 Core sampling

The length of each sample was, in general, kept around one meter for the purposes of this investigation. In a few cases, however, the length of the sample was hardly 0.20m especially in the top sections where it is contaminated with the superficial soil and other extraneous material. Within the profile where the lithology is conspicuously different and deleterious at places, they were separately sampled. The whole method of sampling is oriented to achieve the objective of thorough understanding of the bauxitic profiles by having a megascopic control over the quality. It may be pertinent to quote McKinstry at this juncture "If Geology benefits from sampling, it also contributes to it, for sampling can never be reduced to blind rules of thumb, it must be carried out in conformity with geological principles".

### 3.5 Specific Gravity and Bulk density:

About 20 to 40 specimens were collected from each block representing the various lithological types. Their specific gravities were determined with the help of a Walker's steel

yard. The average specific gravity was calculated for each block. It ranges between 2.1 and 2.3. An effective specific gravity of 2 was considered for resource calculations.

### 3.6 Analysis of Samples:

All the primary and check samples from boreholes (183 nos.) were analysed on dry basis for five radicals viz  $Al_2O_3$ ,  $SiO_2$ ,  $Fe_2O_3$ ,  $TiO_2$  and LOI in the ERL of GSI. The results of five radicals are presented in Annexure - II.

### 3.7 Petrographic Studies:

**Petrography:** The bauxites are massive and moderately hard. The common types include the reddish brown, pink, cream and yellowish brown coloured bauxites with crystalline, cryptocrystalline and dense gibbsite occurring in varying proportions. Gibbsite occurs as fine dissemination, coarse saccharoidal grains, elongated and tabular crystals. Bauxites derived from the khondalite show pronounced relict foliations. Crystalline and cryptocrystalline gibbsite is common in the khondalitic bauxite.

**Mineragraphy:** Thin section studies revealed that gibbsite is the predominant aluminous mineral. This is confirmed by X-ray studies. Bohemite is present only in traces. Haematite and goethite are the ferruginous minerals; Kaolinite is the clay mineral and anatase, the titanium mineral. Gibbsite is pseudomorphous after sillimanite, garnet and feldspar which are integral constituents of the khondalite. It is crystalline in general and dense occasionally. Relict grains of unaltered sillimanite and garnet are present in minute proportions even in good bauxites. Fine disseminations of gibbsite occur lining the micro and mega cavities, at places. Otherwise gibbsite is coarse grained saccharoidal and/or tabular. Twinning is common. Gibbsitisation along cleavages in the sillimanite is best seen in some of the thin sections. Likewise the original outlines of garnet are completely preserved despite leaching and transformation.

**3.8 Data Density and verification:** A total of 15 boreholes were drilled at an interval of 200-400m within the area of 91.67 Ha. The total meterage of drilling is 291.65m. A total of 183 core samples have been collected and analysed from the boreholes.

## CHAPTER-IV

## CHARACTERISTICS OF BAUXITE

**4.0 General:**

The different characteristics of the bauxite deposit and its overburden, as deduced from the surface and sub-surface data gathered during the detailed exploration are described.

The word “bauxite” used in this report connotes material with +30%  $\text{Al}_2\text{O}_3$  and - 7%  $\text{SiO}_2$  as per the IBM’s end use specification and threshold limits prescribed, unless otherwise specified. These parameters constitute the chemical or specified threshold limits at which the ore characteristics have been assessed. The boundaries of zone have been defined by this threshold limit as enumerated below:

- a. **Metallurgical bauxite or Bauxite (MGB)** - Ore containing + 40%  $\text{Al}_2\text{O}_3$  and -4% total  $\text{SiO}_2$  (Max,) has been considered in this category.
- b. **Low grade bauxite (LGB)** - Ore containing + 35%  $\text{Al}_2\text{O}_3$  and <7 % total  $\text{SiO}_2$  has been considered in this category.
- c. **Beneficial grade bauxite (BGB)** - Ore containing + 30% to <35%  $\text{Al}_2\text{O}_3$  and – 7 % total  $\text{SiO}_2$  has been considered in this category. Although, the threshold limit by IBM prescribes this as -5% reactive silica for this category, -7% total silica has been considered for this category as reactive silica has not been determined for the samples and the recent revision of the threshold limit of silica.
- d. **High Silica bauxite (HSB)** – Although IBM has not defined any such categorisation, but some bauxite samples exhibits Ore containing + 30%  $\text{Al}_2\text{O}_3$  and + 7 % total  $\text{SiO}_2$  which can be utilised as ore by suitable blending with high grade ores, so a special category is included i.e HSB and has been considered in this category. However, this nomenclature has been confined to zones occurring in between two ore zones or above bauxite zone.

**4.1 Bauxite profile:**

The term ‘Bauxite’ is applied to ores with 30%  $\text{Al}_2\text{O}_3$  and above and  $\text{SiO}_2$  less than 7%. Bauxite occurs as cappings of varying thickness ranging from 3.7m (BH-2) to 22.5 m (BH4) over the khondalite duricrust. Majority of the cappings amidst the Eastern Ghats overlie khondalites. Bauxite occurs as lenses or tabular bodies in the upper middle portions of the laterite profiles, in general. An unaltered khondalitic duricrust was delineated on the plateau top that signifies its khondalitic parentage. Besides, a saucer depression of 0.03 sq km containing clay (kaolinite) is also delineated, both of which are considered as non-mineralised for all purposes. More or less, the bauxite occurs as a blanket, capping the partially lateritised

khondalite or weathered khondalite. The full profile can be observed in some of the scarp faces. The floor of bauxite zone is generally sharp, but the top of ore zone is gradational. The contact between laterite and bauxite is generally gradational at top, whereas the contact between bauxite and khondalite at bottom is sharp. Laterite/bauxite occurs within khondalite exposure on surface. Almost, invariably the top part of profile is highly ferruginous and siliceous, it is whereas more gibbsitic towards the lower part. Non-ore lenses do occur within the bauxite zone at few places as revealed by boreholes.

The extensive exposure of bauxite/laterite in the capping indicates its physical continuity on the surface. Drilling indicated a generalised laterite/bauxite profile in the Ballada deposit which is as follows:

The profile has a top zone of lateritic bauxite (with + 30%  $\text{Al}_2\text{O}_3$ ). This at places is overlain by a thin rim 0.2m (BH 13) to 1.00 m (BH 5) of soil. This lateritic bauxite zone has a hard cap, which is aluminous / ferruginous. Thickness of lateritic bauxite is more in the central and southern part of the capping where the slopes are flat to gentle. This is underlain by bauxite with more than 40% alumina and less than 4 % silica. In general, though chemical zoning is not quite marked, there is an improvement in the grade of ore towards depth. The bauxite zone has a thickness of 3.7 m to 22.5 m. Bauxite grades into an impersistent transition zone containing an admixture of bauxite and lithomarge. The basement for the bauxite profile is partly weathered khondalite.

For the metallurgical bauxite, increase in thickness towards east from 0.95 metres (BB-7 & 9) to 17.05 metres (BB-14) was seen in the northern part, east of the khondalite outcrop. South of the khondalite outcrop, the maximum thickness of 28 m bauxite was intersected in BB-4 close to the khondalite outcrop. In the rest of the southern part, the thickness was variable from 6.85 m (BB-9) to 19.4 m (BB-13). However, the more potential zone of an average thickness of about 13.8 m occurs in the area bounded by BB-8, 13, 9 & 11 and limited to the south of the clay pocket.

Bauxite with +45%  $\text{Al}_2\text{O}_3$  has been intercepted in BHs 4,5, 7, 8, 9, 11, 13 and 14 in which enriched aluminous zone usually lie in the central part or above the khondalitic radium of the vertical profile. Here the metallurgical bauxite zone has a range from 1m (BB-5) near the clay outcrop, to 10.05 m in (BB-11). South of the khondalite outcrop, the thickness remains more or less uniform except in BB-4 where the maximum thickness of 11.60 m was intersected in BB-6 on the western periphery, and BB-12 (10.45m) near the eastern periphery, however, no bauxite of +45%  $\text{Al}_2\text{O}_3$  was intersected.

#### **4.2 Shape and Size**

The Ballada bauxite block comprising over an area of 144.945 Ha, constitute the plateau area of 91.67 Ha with a mineralised zone of 83.778 Ha and non-mineralised zone of 61.167 Ha including the central khondalite and southern clay pocket. The Ballada bauxite deposit spreads over an area of 91.67 Ha and is irregular in shape. The non-mineralised zone within the plateau area is 7.892 Ha and outside the plateau is 53.275 Ha. The long axis is aligned in NE-SW direction for an axial length of 2200 m. The plateau has an average width of about 390 m. The Ballada plateau periphery is marked by sheer scarps (Plate No. II). Areas adjacent to the plateau periphery are considered non mineralised for obvious geological reasons that the bauxite is blanket type with a khondalitic substratum underneath.

#### **4.3 Overburden:**

After a systematic study of chemical character of bauxite on a large number of samples, the material analysing + 30%  $\text{Al}_2\text{O}_3$  and -7%  $\text{SiO}_2$  have been considered as bauxite while the rest are accounted as overburden in the profile. Considering the threshold limit of bauxite and aluminous laterite, the plateau exposes bauxites of different categories with a thin rim of soil. Thickness of overburden which is usually soil in Ballada plateau is 0.2 m. (BB 13) to 1 m (BB 5).

#### **4.4 Process of Bauxitisation**

Bauxite is derived by the in-situ chemical weathering of the underlying khondalites (garnet-sillimanite-quartz-feldspar-gneisses). There are convincing field evidence corroborated by equally striking mineralogical and chemical data which clearly indicate the in-situ origin of the East coast bauxite deposits.

Gibbsite is pseudomorphous after feldspar, sillimanite and garnet which are the main constituent minerals of khondalite. A study of the chemical logs shows a progressive chemical gradation between the parent rock and the overlying residue. Gibbsite formation is a sequel to direct transformation without an intervening clay phase under good drainage conditions. Moderate to gentle slopes coupled with the litho-textural and structural fabric or the source rock result in good drainage which in turn facilitates direct gibbsitisation. The postulation of good drainage conditions is further borne out by the nature of the transition zone which is more often a partially lateritised khondalite.

#### 4.5 Inference

The host rock ferruginous kaolinised sillimanite gneiss has probably led to the formation of bauxite in the area. The kaolinite in these rocks might have developed after feldspar alteration. Gibbsite is the main bauxite mineral which has developed mostly from sillimanite and partially from kaolinite/clays and corundum. The development of gibbsite by sillimanite is evidenced by the presence of relics of grains and crystal outlines of sillimanite within gibbsite. The fine prismatic gibbsite in cryptocrystalline kaolinite/clayey material suggests that the gibbsite is developing from this material which has come from the alteration of feldspathic minerals.

**CHAPTER-V**  
**ESTIMATION OF RESOURCE AND GRADE**

**5.0 BAUXITE RESOURCES:**

The resources and grade of bauxite as well as overburden have been recomputed in line with the end use grade specified by IBM, on the basis of results of exploration discussed above, particularly considering the analytical data of the bore holes confined within the block. The block has been explored by 15 BHs where bauxite has been encountered in 14 BHs and one BH (BB-10) went barren.

The tonnage and grade are calculated at the "Specified" threshold of + 30%  $\text{Al}_2\text{O}_3$  and – 7 %  $\text{SiO}_2$  for the estimation of ore resources. Different grades of bauxite taken in to consideration in this re-estimation are as discussed in chapter-IV.

Resource of different categories of bauxite in the Ballada Plateau was estimated by both (i) Borehole Influence area method (Annexure IV) and (ii) Cross-Sectional area method (Annexure V)

**5.1. Borehole Influence area method:**

In the first method, the khondalite outcrop occurring in the northern part of the deposit was excluded from the area of influence of the boreholes. In view of the irregular boundary of the outcrop, the entire khondalite was blocked out with straight boundaries to facilitate measurement of area of influence and also to avoid chances of over estimating the resource. Similarly, the clay outcrop in the central part of the deposit was also excluded from the resource estimation.

An average effective specific gravity of 2.0 for bauxite was taken into consideration for estimating the resources.

Close to the khondalite/clay outcrops, the boreholes indicate the existence of considerably thick bauxite zones and therefore, it may not be realistic to assume that a large halo of low-bauxite thickness would exist around the khondalite/clay outcrops.

In the area of influence method the thickness of bauxite as observed in the borehole close to the khondalite/clay outcrops has been taken into account for its influence factor.

Grade of Bauxite	Resource of bauxite (in tonnes)	Resource of bauxite (in million tonnes)
Metallurgical grade Bauxite	11012177	11.012

Low grade Bauxite	3419033	3.419
Beneficiable grade Bauxite	1984447	1.984
High Silica Bauxite	6353850	6.354
<b>Total Bauxite</b>	<b>22769507</b>	<b>22.77</b>

Other category	Resource of bauxite (in tonnes)	Resource of bauxite (in million tonnes)
Aluminous Laterite	148695	0.149

Thus the total bauxite resource of all grades estimated for the Block by the BH Influence area method is 22.77 Million tonnes.

### 5.2. Cross-Section (principal) Method:

The cross-section method has been taken as the “Principal Method” for estimation of resources of bauxite. Five sets of vertical cross sections namely G Series (G1-G1’ to G5-G5’) on 1:1,000 scale have been prepared across the foliation. Out of 14 BHs, 10 BHs data have been taken into account for estimation of resource considering the spacing of BHs and lithology encountered. The plan distance of influence of each of the cross-section is taken to extend half-way to the adjoining sections on either side. The sectional areas are measured by computer using Auto Cad Software.

The volume of the ore in each segment is calculated as per the formula:

$$V = SA \times D, \text{ where 'V' is the volume,}$$

'SA' is the sectional area and 'D' is the plan distance of influence of the section on its either side. The tonnage of the ore in' each segment is calculated by multiplying the volume with specific gravity (i.e. 2.0).

Grade of Bauxite	Resource of bauxite (in tonnes)	Resource of bauxite (in million tonnes)
Metallurgical grade Bauxite	9458496	9.458
Low grade Bauxite	8465182	8.465
Beneficiable grade Bauxite	1842192	1.842
High Silica Bauxite	2366266	2.366
<b>Total Bauxite</b>	<b>22132136</b>	<b>22.131</b>

Other category	Resource of bauxite (in tonnes) (by BH influence method)	Resource of bauxite (in million tonnes)
Aluminous Laterite	148695	0.149

Thus the total bauxite resource of all grades estimated for the Block by the Cross-sectional area method is **22.13 million tonnes**. The details of the resources and grade of bauxite are incorporated in Annexure IV, V & VI.

### 5.3.0 Resource & Grade

Computation of grade of the ore zone at a given exploration point is done by weighing the thickness of the individual samples in the column with their grade. In the present estimate the grade of the bauxite has been calculated by considering the grade of bauxite encountered in the borehole. The block average grade of bauxite is determined by considering the average grade of each borehole.

Category of bauxite	Grade of Bauxite (By BH influence method)
Metallurgical grade bauxite	Al <sub>2</sub> O <sub>3</sub> – 46.276 % SiO <sub>2</sub> -1.929 %
Low grade Bauxite	Al <sub>2</sub> O <sub>3</sub> – 38.099 % SiO <sub>2</sub> – 3.099%
Beneficiable grade Bauxite	Al <sub>2</sub> O <sub>3</sub> –33.011% SiO <sub>2</sub> -2.766%
High Silica Bauxite	Al <sub>2</sub> O <sub>3</sub> –44.480% SiO <sub>2</sub> -7.289%
Aluminous Laterite	Al <sub>2</sub> O <sub>3</sub> –26.916% SiO <sub>2</sub> -1.711%

The resource has been calculated in 5 cross sections at suitable interval so as to accommodate the mineralised zone. The estimation of resource by cross sectional area method and borehole influence method are given below:

Category of bauxite	Resource by cross sectional area method	Resource by borehole influence method in mt
Metallurgical grade Bauxite	9.458 mt	11.012 mt
Low grade Bauxite	8.465 mt	3.419 mt
Beneficiable grade Bauxite	1.842 mt	1.984 mt
High Silica Bauxite	2.366 mt	6.354 mt
<b>Total Resource</b>	<b>22.13 mt</b>	<b>22.77 mt</b>

Comparison of the estimated resources by the above two methods indicates a 3 percentage of deviation which may be attributed to the following reasons. In cross sections, thickness of bauxite zone is not uniform throughout the cross section due to wavy nature of bauxite floor. It tapers towards the end point of sections from boreholes. In polygon, it is presumed that thickness of bauxite zone is uniform throughout the area of influence of each borehole. The variation in resources of Low grade bauxite and High silica bauxite may be attributed to the wider spacing of boreholes.

For better appraisal and higher confidence level, the resource estimated by cross sectional area method is accepted in which total resources of 22.13 million tonnes bauxite of all grades with average Al<sub>2</sub>O<sub>3</sub> content of 43.646 % and SiO<sub>2</sub> content of 3.904% has been estimated. It may be added here that it is a virgin block and there is no depletion (mining loss) of bauxite from the re-estimated resource. The details are presented in Annexure-VI.

The total of 22.13 million tonnes of inferred resource of bauxite of all grade have been estimated by cross sectional area method which is at G3 level of MEMC Rule, 2015. As a whole the resource of Ballada block is of **Inferred Mineral Resource category with code 333** can be considered akin to **Indicated Mineral Resource** as per section-5(iii) of MEMC Amendment Rules, 2021 for putting the block for auction for Mining Lease (ML).

The bauxite zone is characterized by moderate alumina, low percentages of silica and titania and relatively more iron oxide. The silica content ranges from 0.65 to 25.40%. Titania content is uniformly low throughout with a range of 1.20 to 3.60%. The Al<sub>2</sub>O<sub>3</sub> content on the other hand, has a wider range from as low as 23.46% to 57.10%. Loss on ignition is more or less commensurate with the proportion of alumina content, and the alumina, in general, is about 1.8 times than of LOI. The average grade of the deposit is estimated as follows:

Category	Thickness in m	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %
<b>Metallurgical grade Bauxite</b>	88	1.929	46.276	23.892	2.195	25.554
<b>Low grade Bauxite</b>	29.5	3.099	38.099	34.381	2.099	22.135
<b>Beneficiable grade Bauxite</b>	11.25	2.766	33.011	42.330	1.975	19.769
<b>High Silica Bauxite</b>	62.1	7.289	44.480	21.757	2.092	24.169
<b>Aluminous Laterite</b>	2.05	1.711	26.916	52.212	1.307	17.629

#### **5.4.0 Overburden**

In general Ballada bauxite plateau exposes lateritic bauxite with a thin veneer of soil ranging in thickness from 0.2 m to 1m as encountered in the Borehole. So the Overburden is almost negligible. However, from the cross sections the volume of soil has been calculated to be 61422 Cubic Meter.

#### **Ore: Overburden ratio**

The Ore Overburden ratio computed to be 1:0.003

#### **5.5.0 Categorisation of Resources:**

##### **5.5.1 UNFC Classification**

#### **Economic axis (E)**

Detailed geological study and Preliminary Exploration has been made. Rough estimates of tonnage and grades are known. General idea about forest /non-forest and land use status is known. Economic Viability categories, however, cannot in general be defined from the Geological Study because of the lack of detail necessary for an Economic Viability evaluation. The resource quantities estimated may indicate that the deposit is of intrinsic economic interest, i.e. in the range of economic to potentially economic (E-3).

#### **Feasibility Axis (F)**

The area under investigation is well within the existing mining belt. The geographical conditions are favorable. Infrastructures like public utilities, roads & railways and manpower exists in the area. Geological study under G-3 stage has been carried out and can be sufficient for deciding whether a Pre-feasibility Study and General Exploration are warranted. Hence the Feasibility axis can be F-3.

#### **Geological axis (G)**

The present work is under Preliminary Exploration which involves outcrop identification, initial delineation of the ore deposit. Large scale mapping and contour surveying are carried out at 4 m interval. Core sampling at 1 m interval have been done, Boreholes are widely spaced (200m to 400m), tonnage, grade and mineral content estimated with reasonable level of confidence. Hence the present exploration in the geological axis may be put under G-3 category.

The total of 22.13 million tonnes of inferred resource of bauxite of all grade have been estimated by cross sectional area method which is at G3 level of MEMC Rule, 2015. As a whole the resource of Ballada block is of **Inferred Mineral Resource category with code G3** can be considered akin to **Indicated Mineral Resource** as per section-5(iii) of MEMC Amendment Rules, 2021 for putting the block for auction for Mining Lease.

## CHAPTER-VI

## CONCLUSION &amp; RECOMMENDATIONS

**6.0.0 Conclusion**

Ballada bauxite block with an area of 144.945 Ha featured in T.S.No. E44K11 (65J/11). The plateau spreading over an area of 91.67 Ha was explored at G-3 stage by GSI during East Coast Bauxite Project by Geological Mapping(1:5,000), Drilling(200m to 400m), Sampling(1 m interval).

The resource & grade of the plateau has been estimated with the revised threshold limits considering the original available assay log of the boreholes.

Ballada bauxite plateau contains an inferred resource of about 22.13 million tonnes (all grades) of ore in an area of 91.67 Ha estimated by cross sectional area method which is at G3 level of MEMC Rule, 2015. As a whole the resource of Ballada block is of **Inferred Mineral Resource category with code 333** can be considered akin to **Indicated Mineral Resource** as per section-5(iii) of MEMC Amendment Rules, 2021 for putting the block for auction for Mining Lease (ML).

Overburden with thickness ranging from 0.2m to 1 m underlain by 3.7 m to 22.5 m of bauxite is present in the deposit. The overall thickness of bauxite is about 13.47 m while its average grade is 43.646%  $\text{Al}_2\text{O}_3$ , 3.904%  $\text{SiO}_2$ . Bauxite in the northern part of the deposit is thicker while in the southern part it is slightly thinner.

The thickness is easily accessible by road and rail. The Machhkund Hydel Project is close by and the reservoir area has abundant water supply. From an infrastructural point of view, the Ballada deposit has many advantages over the neighbouring bauxite occurrences.

Other bauxite cappings in the neighbourhood, though smaller than Ballada, may collectively contain considerable ore resource to augment that of Ballada in case these deposits along with Ballada as a group are to be considered for exploration. Under such circumstances detailed proving operation for bauxite on the deposit may be taken up.

**6.1.0. Recommendation**

Ballada bauxite plateau needs upscaling of resource & grade by higher level of exploration for a better understanding of resource & grade distribution.

Adequate mineralogical tests could not be carried out in the samples collected during the resources evaluation. Such studies should now be taken as the result would have an impact on the economic exploitation of bauxites.

Wealth of data regarding shape, size and attitude of the deposits, distribution of ore grades and availability of infrastructure facilities like road, railways, power, water etc., collected by G.S.I. and the M.E.C.L during their exploratory operations should enable the concerned exploiting agencies to carry out the feasibility study for mining the deposits and setting up the proposed alumina plants.

**References:**

September, 1977: Report on Resource Evaluation of East Coast Bauxite Deposits (ANDHRA PRADESH & ORISSA), Volume I (Text), II (Annexures) and III (Plates), G.S.I.

January, 1976: Unpublished Report of GSI on Information Memorandum of Ballada Bauxite Deposit, Koraput District, Orissa.

ANNEXURE-I  
LOCALITY INDEX

Sl. No.	Name of Places	Latitude	Longitude	Toposheet No
1	Ballada Deposit	18 <sup>0</sup> 26' 30"	82 <sup>0</sup> 40' 00"	65J/11

## ANNEXURE-II

## Borehole litho log and chemical assay log of Ballada Bauxite Block, Koraput District

Bore hole no. BB-1									
Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-1/1	0.00	1.25	1.25	7.50	35.19	33.54	2.00	21.52	HSB
BB-1/2	1.25	2.20	0.95	8.46	38.76	29.94	2.30	20.57	HSB
BB-1/3	2.20	3.20	1.00	4.95	36.21	34.73	2.60	21.22	LGB
BB-1/4	3.20	4.15	0.95	3.37	40.29	29.94	2.20	23.57	MB
BB-1/5	4.15	5.25	1.10	3.71	42.23	28.35	2.00	23.44	MB
BB-1/6	5.25	6.40	1.15	4.47	38.25	31.54	2.40	22.88	LGB
BB-1/7	6.40	7.40	1.00	2.02	38.25	34.73	2.70	22.27	LGB
BB-1/8	7.40	8.30	0.90	1.44	40.80	31.14	2.10	24.30	MB
BB-1/9	8.30	9.30	1.00	2.19	38.76	33.14	2.20	23.29	LGB
BB-1/10	9.30	10.45	1.15	2.17	41.82	29.94	2.00	23.99	MB
BB-1/11	10.45	11.55	1.10	7.44	40.28	25.40	2.60	24.03	HSB
BB-1/12	11.55	12.70	1.15	5.84	37.74	31.20	2.90	21.94	LGB
Analyst: ERL									

Bore hole no. BB-2									
Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-2/1	0.00	1.00	1.00	2.22	45.13	25.20	1.90	25.12	MGB
BB-2/2	1.00	2.05	1.05	4.05	42.07	27.30	2.65	23.51	HSB
BB-2/3	2.05	2.95	0.90	5.76	40.54	27.80	2.50	23.09	HSB
BB-2/4	2.95	3.70	0.75	6.27	40.54	27.00	2.65	23.31	HSB
Analyst: ERL									

Bore hole no. BB-3									
Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-3/1	0.00	1.00	1.00	8.00	38.50	29.20	2.30	21.84	HSB
BB-3/2	1.00	2.00	1.00	6.13	39.52	30.40	1.70	22.21	LGB
BB-3/3	2.00	3.10	1.10	2.69	44.88	25.60	2.50	24.27	MGB
BB-3/4	3.10	4.30	1.20	2.04	36.72	37.60	2.10	21.36	LGB
BB-3/5	4.30	5.45	1.15	1.56	38.05	34.80	2.40	22.71	LGB
BB-3/6	5.45	6.45	1.00	0.65	44.88	26.80	2.80	24.58	MGB
BB-3/7	6.45	7.30	0.85	0.99	42.32	29.00	2.80	24.69	MGB
BB-3/8	7.30	8.30	1.00	2.13	44.36	26.40	1.80	24.95	MGB
BB-3/9	8.30	9.55	1.25	1.66	45.89	25.60	2.30	23.99	MGB

BB-3/10	9.55	10.3 5	0.80	2.42	45.88	24.20	2.30	24.90	MGB
BB-3/11	10.35	11.4 5	1.10	2.42	44.17	27.20	1.90	23.87	MGB
BB-3/12	11.45	12.6 5	1.20	1.92	46.21	24.70	2.00	24.81	MGB
BB-3/13	12.65	13.8 0	1.15	2.28	44.87	25.30	2.40	24.74	MGB
BB-3/14	13.80	14.8 5	1.05	0.80	42.95	46.00	1.40	18.73	MGB
BB-3/15	14.85	16.0 0	1.15	0.78	43.86	26.75	2.00	26.14	MGB
BB-3/16	16.00	17.0 0	1.00	0.83	45.90	26.35	2.00	24.91	MGB
BB-3/17	17.00	18.2 0	1.20	0.95	42.82	29.95	1.90	23.94	MGB
BB-3/18	18.20	19.3 5	1.15	5.81	49.98	15.17	2.10	26.53	HSB
<b>Analyst:</b> ERL									

**Bore hole no. BB-4**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-4/1	0.00	1.05	1.05	9.13	38.76	27.55	2.00	22.63	HSB
BB-4/2	1.05	2.00	0.95	3.94	41.82	29.54	2.00	22.71	MGB
BB-4/3	2.00	3.10	1.10	1.51	41.31	31.14	2.20	23.56	MGB
BB-4/4	3.10	4.25	1.15	1.18	37.74	36.73	2.00	21.89	LGB
BB-4/5	4.25	5.35	1.10	2.25	39.78	32.74	2.60	22.66	LGB
BB-4/6	5.35	6.65	1.30	2.61	42.33	27.55	2.20	25.14	MGB
BB-4/7	6.65	7.85	1.20	2.53	41.31	30.34	2.40	23.43	MGB
BB-4/8	7.85	9.05	1.20	1.14	43.86	28.75	2.30	23.85	MGB
BB-4/9	9.05	10.0 0	0.95	0.77	45.39	27.15	2.20	24.38	MGB
BB-4/10	10.00	11.0 5	1.05	0.70	49.47	20.76	1.70	27.35	MGB
BB-4/11	11.05	12.3 0	1.25	1.19	48.96	19.96	2.30	27.27	MGB
BB-4/12	12.30	13.3 0	1.00	2.76	51.00	15.17	2.00	28.58	MGB
BB-4/13	13.30	14.5 0	1.20	4.75	57.12	7.18	2.20	28.43	HSB
BB-4/14	14.50	15.6 5	1.15	5.65	45.90	20.36	1.50	26.14	HSB
BB-4/15	15.65	16.6 5	1.00	6.87	52.53	11.58	2.10	26.48	HSB
BB-4/16	16.65	17.7 5	1.10	2.13	53.04	14.77	2.20	27.62	MGB
BB-4/17	17.75	18.6 0	0.85	1.84	55.08	11.18	1.90	29.62	MGB
BB-4/18	18.60	19.6 0	1.00	1.96	53.04	13.97	2.00	28.60	MGB

BB-4/19	19.60	20.55	0.95	1.07	60.18	6.39	1.70	30.20	MGB
BB-4/20	20.55	21.45	0.90	1.21	60.69	4.79	1.80	31.12	MGB
BB-4/21	21.45	22.50	1.05	4.92	57.12	6.79	3.00	27.71	HSB
Analyst: ERL									

**Bore hole no. BB-5**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-5/1	1.00	1.05	0.05	3.77	32.13	42.72	1.60	19.53	BGB
BB-5/2	1.05	2.05	1.00	5.76	34.17	37.53	1.60	20.47	BGB
BB-5/3	2.05	3.20	1.15	5.08	36.21	35.53	1.60	21.11	LGB
BB-5/4	3.20	4.25	1.05	7.25	35.19	34.73	1.70	20.85	HSB
BB-5/5	4.25	5.30	1.05	4.65	41.31	28.75	2.10	22.86	HSB
BB-5/6	5.30	6.25	0.95	2.60	40.30	32.80	2.40	21.80	MGB
BB-5/7	6.25	7.15	0.90	0.98	40.62	32.00	2.80	23.50	MGB
BB-5/8	7.15	8.40	1.25	0.94	45.00	24.00	3.60	26.52	MGB
BB-5/9	8.40	9.50	1.10	1.73	47.60	20.10	3.50	26.95	MGB
BB-5/10	9.50	10.45	0.95	1.56	46.12	24.20	2.10	26.10	MGB
BB-5/11	10.45	11.45	1.00	1.17	41.20	30.80	2.20	24.66	MGB
BB-5/12	11.45	12.25	0.80	1.48	51.10	16.00	2.20	29.18	MGB
BB-5/13	12.25	13.05	0.80	1.07	42.50	30.40	2.80	23.16	MGB
BB-5/14	13.05	14.10	1.05	0.98	31.70	45.60	2.80	18.78	BGB
BB-5/15	14.10	15.10	1.00	1.53	31.96	44.80	2.40	19.30	BGB
Analyst: ERL									

**Bore hole no. BB-6**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-6/1	0.00	1.25	1.25	3.82	38.20	34.00	1.90	22.10	LGB
BB-6/2	1.25	2.25	1.00	6.10	31.10	42.00	2.00	18.78	BGB
BB-6/3	2.25	3.30	1.05	5.22	36.30	36.00	2.20	20.24	LGB
BB-6/4	3.30	4.25	0.95	1.90	46.60	24.00	2.40	24.95	MGB
BB-6/5	4.25	5.20	0.95	1.02	38.75	35.20	2.80	22.23	LGB
BB-6/6	5.20	6.25	1.05	1.12	34.70	40.50	2.10	21.43	BGB
BB-6/7	6.25	7.25	1.00	2.10	38.50	35.60	2.00	21.75	LGB
BB-6/8	7.25	8.35	1.10	1.38	39.80	40.50	1.80	16.40	LGB
BB-6/9	8.35	9.25	0.90	2.82	37.10	30.40	1.80	27.80	LGB
BB-6/10	9.25	10.4	1.20	2.45	40.85	30.40	1.80	24.30	MGB

		5							
<b>BB-6/11</b>	10.45	11.6 0	1.15	3.37	44.50	26.00	1.80	24.25	MGB
<b>Analyst:</b> <b>ERL</b>									

**Bore hole no. BB-7**

<b>Sample no.</b>	<b>From (m)</b>	<b>To (m)</b>	<b>Thickness (in m)</b>	<b>SiO<sub>2</sub> %</b>	<b>Al<sub>2</sub>O<sub>3</sub> %</b>	<b>Fe<sub>2</sub>O<sub>3</sub> %</b>	<b>TiO<sub>2</sub> %</b>	<b>L.O.I %</b>	<b>Lithology</b>
<b>BB-7/1</b>	0.00	0.90	0.90	8.50	47.80	16.00	1.90	25.70	HSB
<b>BB-7/2</b>	0.90	1.80	0.90	6.45	51.90	12.40	2.40	26.67	HSB
<b>BB-7/3</b>	1.80	3.00	1.20	4.12	52.40	13.60	3.00	26.82	HSB
<b>BB-7/4</b>	3.00	4.15	1.15	6.22	47.70	18.00	3.20	24.86	HSB
<b>BB-7/5</b>	4.15	5.20	1.05	4.78	48.14	20.80	1.60	24.70	HSB
<b>BB-7/6</b>	5.20	6.35	1.15	6.36	51.40	13.68	1.90	26.88	HSB
<b>BB-7/7</b>	6.35	7.30	0.95	3.30	51.30	16.80	1.40	27.10	MGB
<b>BB-7/8</b>	7.30	8.05	0.75	4.26	49.80	19.20	1.20	25.32	HSB
<b>BB-7/9</b>	8.05	9.05	1.00	5.50	47.20	21.00	1.60	24.66	HSB
<b>BB-7/10</b>	9.05	10.0 5	1.00	4.98	49.10	19.20	1.50	25.10	HSB
<b>BB-7/11</b>	10.05	10.9 5	0.90	12.96	47.20	14.80	1.70	23.27	HSB
<b>BB-7/12</b>	10.95	11.8 0	0.85	25.40	37.80	16.40	1.30	19.13	HSB
<b>Analyst:</b> <b>ERL</b>									

**Bore hole no. BB-8**

<b>Sample no.</b>	<b>From (m)</b>	<b>To (m)</b>	<b>Thickness (in m)</b>	<b>SiO<sub>2</sub> %</b>	<b>Al<sub>2</sub>O<sub>3</sub> %</b>	<b>Fe<sub>2</sub>O<sub>3</sub> %</b>	<b>TiO<sub>2</sub> %</b>	<b>L.O.I %</b>	<b>Lithology</b>
<b>BB-8/1</b>	0.65	1.70	1.05	4.76	37.30	35.60	1.50	20.75	LGB
<b>BB-8/2</b>	1.70	2.65	0.95	3.85	37.10	37.60	1.50	19.86	LGB
<b>BB-8/3</b>	2.65	3.75	1.10	3.80	34.80	40.00	1.70	19.60	BGB
<b>BB-8/4</b>	3.75	4.80	1.05	2.22	31.50	46.00	1.60	18.63	BGB
<b>BB-8/5</b>	4.80	5.80	1.00	1.13	48.40	23.20	1.70	25.50	MGB
<b>BB-8/6</b>	5.80	6.90	1.10	0.93	37.11	37.60	2.50	21.76	LGB
<b>BB-8/7</b>	6.90	7.75	0.85	1.88	34.88	40.00	2.30	20.92	BGB
<b>BB-8/8</b>	7.75	8.65	0.90	1.07	37.22	37.70	2.27	21.66	LGB
<b>BB-8/9</b>	8.65	9.65	1.00	1.09	41.11	31.80	2.00	23.58	MGB
<b>BB-8/10</b>	9.65	10.7 5	1.10	2.05	48.08	19.80	2.63	27.10	MGB
<b>BB-8/11</b>	10.75	11.8 5	1.10	1.17	49.61	18.00	2.72	27.28	MGB
<b>BB-8/12</b>	11.85	12.9 0	1.05	0.94	51.82	16.20	2.45	28.49	MGB
<b>BB-8/13</b>	12.90	13.9 5	1.05	0.99	51.50	14.80	3.54	29.05	MGB
<b>BB-8/14</b>	13.95	14.9 5	1.00	0.96	52.77	13.90	2.63	29.42	MGB

<b>BB-8/15</b>	14.95	15.7 0	0.75	1.41	51.95	14.60	2.90	28.81	MGB
<b>Analyst: ERL</b>									

**Bore hole no. BB-9**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
<b>BB-9/1</b>	0.00	1.10	1.10	4.55	49.97	17.20	2.01	25.85	HSB
<b>BB-9/2</b>	1.10	2.40	1.30	6.05	47.36	19.20	2.33	24.70	HSB
<b>BB-9/3</b>	2.40	3.45	1.05	4.66	49.27	17.80	2.09	25.73	HSB
<b>BB-9/4</b>	3.45	4.40	0.95	3.90	51.89	15.00	1.63	27.23	MGB
<b>BB-9/5</b>	4.40	5.70	1.30	9.56	47.23	16.00	2.09	24.90	HSB
<b>BB-9/6</b>	5.70	6.85	1.15	16.36	45.07	14.80	2.09	21.54	HSB
<b>Analyst: ERL</b>									

**Bore hole no. BB-11**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
<b>BB-11/1</b>	0.00	1.00	1.00	3.25	45.12	24.60	1.45	25.30	MGB
<b>BB-11/2</b>	1.00	2.20	1.20	5.16	41.55	27.60	1.88	23.33	HSB
<b>BB-11/3</b>	2.20	3.40	1.20	1.25	50.99	18.00	1.68	27.88	MGB
<b>BB-11/4</b>	3.40	4.45	1.05	7.36	44.75	21.20	1.88	24.22	HSB
<b>BB-11/5</b>	4.45	5.35	0.90	14.62	38.90	23.60	2.09	20.77	HSB
<b>BB-11/6</b>	5.35	6.25	0.90	11.42	40.29	23.80	2.00	22.54	HSB
<b>BB-11/7</b>	6.25	7.25	1.00	2.72	48.44	19.40	1.90	26.15	MGB
<b>BB-11/8</b>	7.25	8.20	0.95	3.29	50.36	18.00	1.63	26.19	MGB
<b>BB-11/9</b>	8.20	9.10	0.90	1.55	42.47	28.20	3.01	24.40	MGB
<b>BB-11/10</b>	9.10	10.10	1.00	1.51	45.38	25.40	2.56	24.90	MGB
<b>BB-11/11</b>	10.10	11.40	1.30	1.79	44.87	26.10	2.72	24.38	MGB
<b>BB-11/12</b>	11.40	12.65	1.25	1.99	42.47	27.80	3.09	24.44	MGB
<b>BB-11/13</b>	12.65	13.70	1.05	2.13	41.30	30.60	2.90	22.64	MGB
<b>Analyst: ERL</b>									

**Bore hole no. BB-12**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
<b>BB-12/1</b>	0.00	1.25	1.25	13.60	39.01	24.40	2.01	20.90	HSB
<b>BB-12/2</b>	1.25	2.50	1.25	4.04	43.79	24.40	2.59	24.71	HSB
<b>BB-12/3</b>	2.50	3.70	1.20	9.65	37.88	29.60	2.63	20.10	HSB
<b>BB-12/4</b>	3.70	4.75	1.05	6.47	43.45	23.96	2.20	24.06	HSB
<b>BB-12/5</b>	4.75	5.80	1.05	3.98	42.84	26.35	2.60	23.78	MGB

BB-12/6	5.80	7.00	1.20	5.31	44.37	23.96	2.10	23.84	HSB
BB-12/7	7.00	8.20	1.20	19.73	38.76	19.56	2.00	19.68	HSB
BB-12/8	8.20	9.35	1.15	2.30	50.00	17.97	1.70	26.71	MGB
BB-12/9	9.35	10.45	1.10	4.27	41.31	27.15	2.90	23.93	HSB
Analyst: ERL									

**Bore hole no. BB-13**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-13/1	0.20	1.20	1.00	12.49	33.66	29.94	1.70	21.80	HSB
BB-13/2	1.20	2.35	1.15	4.35	47.43	18.76	1.70	27.50	HSB
BB-13/3	2.35	3.20	0.85	6.55	43.86	23.16	1.80	24.74	HSB
BB-13/4	3.20	4.25	1.05	9.43	42.84	23.16	2.00	22.61	HSB
BB-13/5	4.25	5.45	1.20	6.37	41.82	24.75	2.00	24.62	HSB
BB-13/6	5.45	6.50	1.05	5.69	42.33	25.55	2.30	24.14	HSB
BB-13/7	6.50	7.60	1.10	3.09	46.41	20.76	2.20	27.38	MGB
BB-13/8	7.60	8.50	0.90	3.15	48.45	18.76	2.40	26.82	MGB
BB-13/9	8.50	9.60	1.10	4.53	46.41	19.96	2.20	26.54	HSB
BB-13/10	9.60	10.75	1.15	4.79	46.92	19.16	2.20	26.84	HSB
BB-13/11	10.75	11.70	0.95	5.09	47.43	19.16	1.90	26.38	HSB
BB-13/12	11.70	12.65	0.95	1.26	23.46	57.09	1.20	16.62	AL
BB-13/13	12.65	13.50	0.85	3.52	39.27	31.94	1.90	23.27	LGB
BB-13/14	13.50	14.65	1.15	1.39	39.27	32.74	1.80	24.45	LGB
BB-13/15	14.65	15.75	1.10	1.23	36.21	36.73	2.20	23.50	LGB
BB-13/16	15.75	16.75	1.00	1.15	42.84	28.35	2.30	25.01	MGB
BB-13/17	16.75	17.65	0.90	0.67	45.90	24.35	2.20	26.50	MGB
BB-13/18	17.65	18.70	1.05	0.74	42.33	29.94	2.30	24.63	MGB
BB-13/19	18.70	19.65	0.95	1.68	39.78	31.14	2.80	24.30	LGB
BB-13/20	19.65	20.55	0.90	8.46	30.09	39.13	2.40	19.64	HSB
Analyst: ERL									

**Bore hole no. BB-14**

Sample no.	From (m)	To (m)	Thickness (in m)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I %	Lithology
BB-14/1	0.00	1.20	1.20	5.54	42.33	25.55	1.70	24.76	HSB
BB-14/2	1.20	2.45	1.25	2.14	47.43	20.76	2.30	26.91	MGB

<b>BB-14/3</b>	2.45	3.55	1.10	2.02	42.84	28.75	1.70	24.52	MGB
<b>BB-14/4</b>	3.55	4.60	1.05	1.53	34.17	41.12	2.20	20.78	BGB
<b>BB-14/5</b>	4.60	5.75	1.15	1.16	40.48	33.60	1.50	22.96	MGB
<b>BB-14/6</b>	5.75	6.80	1.05	1.76	32.20	44.90	1.50	19.43	BGB
<b>BB-14/7</b>	6.80	7.90	1.10	2.10	29.90	48.00	1.40	18.50	AL
<b>BB-14/8</b>	7.90	9.05	1.15	4.22	40.52	31.20	1.90	21.95	HSB
<b>BB-14/9</b>	9.05	10.15	1.10	4.40	42.80	25.60	2.40	24.70	HSB
<b>BB-14/10</b>	10.15	11.30	1.20	1.80	46.10	24.00	1.70	26.36	MGB
<b>BB-14/11</b>	11.30	12.40	1.05	1.95	49.40	20.00	2.10	26.33	MGB
<b>BB-14/12</b>	12.40	13.35	0.95	2.97	45.10	24.80	2.10	24.75	MGB
<b>BB-14/13</b>	13.35	14.50	1.15	2.60	45.20	24.80	2.00	25.30	MGB
<b>BB-14/14</b>	14.50	15.55	1.05	1.48	53.50	14.40	1.50	28.90	MGB
<b>BB-14/15</b>	15.55	16.55	1.00	0.96	57.10	9.60	2.60	29.48	MGB
<b>BB-14/16</b>	16.55	17.70	1.15	2.13	54.20	12.40	3.00	28.10	MGB
<b>BB-14/17</b>	17.70	18.90	1.20	5.20	56.90	6.40	1.70	29.56	HSB
<b>BB-14/18</b>	18.90	20.20	1.30	4.35	51.80	15.60	1.60	26.36	HSB
<b>Analyst:</b>									
<b>ERL</b>									

<b>Bore hole no. BB-15</b>									
<b>Sample no.</b>	<b>From (m)</b>	<b>To (m)</b>	<b>Thickness (in m)</b>	<b>SiO<sub>2</sub> %</b>	<b>Al<sub>2</sub>O<sub>3</sub> %</b>	<b>Fe<sub>2</sub>O<sub>3</sub> %</b>	<b>TiO<sub>2</sub> %</b>	<b>L.O.I %</b>	<b>Lithology</b>
<b>BB-15/1</b>	0.00	1.00	1.00	7.84	38.10	29.60	1.50	22.80	HSB
<b>BB-15/2</b>	1.00	2.20	1.20	3.37	42.10	29.60	2.00	22.70	MGB
<b>BB-15/3</b>	2.20	3.20	1.00	4.77	39.30	32.00	1.70	21.94	LGB
<b>BB-15/4</b>	3.20	4.20	1.00	5.10	39.60	31.20	1.50	22.48	LGB
<b>BB-15/5</b>	4.20	5.35	1.15	4.15	39.30	32.80	1.40	22.30	LGB
<b>BB-15/6</b>	5.35	6.35	1.00	2.42	45.10	25.60	1.40	25.40	MGB
<b>BB-15/7</b>	6.35	7.35	1.00	2.70	44.60	25.60	1.50	25.30	MGB
<b>BB-15/8</b>	7.35	8.45	1.10	2.24	45.10	25.60	2.10	24.90	MGB
<b>BB-15/9</b>	8.45	9.55	1.10	2.14	46.10	26.00	1.80	23.95	MGB

## ANNEXURE-III

<b>Details of Boreholes of Ballada Bauxite Deposit, Koraput District</b>				
<b>Sl. No.</b>	<b>B.H No.</b>	<b>R. L. in m</b>	<b>Depth in m</b>	<b>No. of Samples Collected</b>
1	BB-1	1248.18	17.55	12
2	BB-2	1263.78	18	4
3	BB-3	1227.62	22.5	18
4	BB-4	1236.41	28	21
5	BB-5	1219.51	18.35	15
6	BB-6	1201.03	15.5	11
7	BB-7	1218.56	20	12
8	BB-8	1201.7	22	15
9	BB-9	1215.96	11.6	6
10	BB-10	1213.94	20.55	0
11	BB-11	1218.4	17	13
12	BB-12	1238.72	17	9
13	BB-13	1187.42	23.2	20
14	BB-14	1240.22	26.4	18
15	BB-15	1216.64	14	9
<b>Total</b>			<b>291.65</b>	<b>183</b>

**Resource calculation by Borehole Influence Method of Ballada Bauxite Plateau, Koraput District**

BH No.	Block Area in sq m	Thickness in m					Volume in cu m					Tonnage in tonnes (Area X Thickness X Tonnage Factor)				
		HSB	MGB	LGB	BGB	AL	HSB	MGB	LGB	BGB	AL	HSB	MGB	LGB	BGB	AL
BB-1	44321	3.3	4.1	5.3			146259	181716	234901	0	0	292519	363432	469803	0	0
BB-2	76466	2.7	1				206458	76466	0	0	0	412916	152932	0	0	0
BB-3	56895	2.15	13.85	3.35			122324	787996	190598	0	0	244649	1575992	381197	0	0
BB-4	63237	5.45	14.8	2.25			344642	935908	142283	0	0	689283	1871815	284567	0	0
BB-5	107049	2.1	7.75	1.15	4.1		224803	829630	123106	438901	0	449606	1659260	246213	877802	0
BB-6	55400		3.3	6.25	2.05		0	182820	346250	113570	0	0	365640	692500	227140	0
BB-7	35327	10.85	0.95				383298	33561	0	0	0	766596	67121	0	0	0
BB-8	120652		8.05	4	3		0	971249	482608	361956	0	0	1942497	965216	723912	0
BB-9	63459	5.9	0.95				374408	60286	0	0	0	748816	120572	0	0	0
BB-11	67265	4.05	9.65				272423	649107	0	0	0	544847	1298215	0	0	0
BB-12	60523	8.25	2.2				499315	133151	0	0	0	998630	266301	0	0	0
BB-13	35365	10.4	4.95	4.05		0.95	367796	175057	143228	0	33597	735592	350114	286457	0	67194
BB-14	37046	5.95	11.05		2.1	1.1	220424	409358	0	77797	40751	440847	818717	0	155593	81501
BB-15	14775	1	5.4	3.15			14775	79785	46541	0	0	29550	159570	93083	0	0
<b>Total Resources in tonnes</b>											6353850	11012177	3419033	1984447	148695	
<b>Total Resources in million tonnes</b>											<b>6.354</b>	<b>11.012</b>	<b>3.419</b>	<b>1.984</b>	<b>0.149</b>	

**N. B.** As it is a virgin block and there is no depletion (mining loss) of bauxite from the re-estimated resource.

**Resource calculation by Cross-Sectional area Method of Ballada Bauxite Plateau, Koraput District**

Sections	Sectional area in Sq m				Length of Influence in m	Volume in Cu m				Specific gravity	Tonnage in tonnes			
	HSB	MGB	LGB	BGB		HSB	MGB	LGB	BGB		HSB	MGB	LGB	BGB
G1-G1'	458	666	849		452	207016	301032	383748	0	2	414032	602064	767496	0
G2-G2'	263	2959	2155		298	78374	881782	642190	0	2	156748	1763564	1284380	0
G3-G3'	721	2986	2219		391	281911	1167526	867629	0	2	563822	2335052	1735258	0
G4-G4'	787	2968	2948	1308	376	295912	1115968	1108448	491808	2	591824	2231936	2216896	983616
G5-G5'	860	3395	3308	1154	372	319920	1262940	1230576	429288	2	639840	2525880	2461152	858576
<b>Total Resources in tonnes</b>											<b>2366266</b>	<b>9458496</b>	<b>8465182</b>	<b>1842192</b>
<b>Total Resources in million tonnes</b>											<b>2.366</b>	<b>9.458</b>	<b>8.465</b>	<b>1.842</b>

**N. B.** As it is a virgin block and there is no depletion (mining loss) of bauxite from the re-estimated resource.

### Calculation of Average Grade of Ballada Bauxite Block

BH No	Categories of Bauxite	Thickness in m	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	L.O.I%
BB-1	MGB	4.1	2.701	41.352	29.777	2.068	23.813
	LGB	5.3	3.965	37.851	32.972	2.565	22.325
	HSB	3.3	7.756	37.914	29.790	2.286	22.083
BB-2	MGB	1	2.220	45.130	25.200	1.900	25.120
	HSB	2.7	5.237	41.135	27.383	2.600	23.314
BB-3	MGB	13.85	1.580	44.556	27.969	2.148	24.185
	HSB	1.15	5.810	49.980	15.170	2.100	26.530
BB-4	MGB	14.8	1.817	48.626	20.733	2.084	26.508
	LGB	2.25	1.703	38.737	34.779	2.293	22.266
	HSB	5.45	6.206	50.373	14.618	2.150	26.333
BB-5	MGB	7.75	1.435	44.303	26.191	2.754	25.288
	LGB	1.15	5.080	36.210	35.530	1.600	21.110
	BGB	4.1	2.995	32.476	42.699	2.102	19.511
	HSB	2.1	5.950	38.250	31.740	1.900	21.855
BB-6	MGB	3.3	2.612	43.777	27.024	1.973	24.470
	LGB	6.15	2.804	38.109	35.317	2.076	21.653
	BGB	2.05	3.549	32.944	41.232	2.051	20.137
BB-7	MGB	0.95	3.300	51.300	16.800	1.400	27.100
	HSB	10.85	7.817	48.422	16.775	1.995	24.950
BB-8	MGB	8.15	1.220	49.372	19.072	2.573	27.389
	LGB	4	2.660	37.182	37.098	1.948	21.021
	BGB	3	2.703	33.668	42.100	1.835	19.635
BB-9	MGB	0.95	3.900	51.890	15.000	1.630	27.230
	HSB	5.9	8.306	47.712	17.015	2.128	24.526
BB-11	MGB	9.65	2.130	45.697	24.279	2.345	25.146
	HSB	4.05	9.224	41.511	24.207	1.953	22.816
BB-12	MGB	2.2	3.102	46.583	21.970	2.130	25.312
	HSB	8.25	9.111	41.185	24.699	2.343	22.417
BB-13	MGB	4.95	1.771	45.102	24.530	2.278	26.056
	LGB	4.05	1.862	38.559	33.280	2.164	23.909
	HSB	10.4	6.685	42.524	23.986	2.021	24.604
	AL	0.95	1.260	23.460	57.090	1.200	16.620
BB-14	MGB	11.05	1.920	48.017	21.455	2.048	26.338
	BGB	2.1	1.645	33.185	43.010	1.850	20.105
	HSB	5.95	4.746	47.075	20.615	1.846	25.523
	AL	1.1	2.100	29.900	48.000	1.400	18.500
BB-15	MGB	5.4	2.589	44.544	26.570	1.776	24.384
	LGB	3.15	4.648	39.395	32.038	1.527	22.243
	HSB	1	7.840	38.100	29.600	1.500	22.800

## ANNEXURE-VII

## SUMMARISED LITHOLOG OF BORE HOLES

<b>BB-1</b>			
<b>Depth:17.55m</b>		<b>RL of collar :1248.18</b>	
<b>Run</b>		<b>Thickness</b>	<b>Description</b>
<b>From</b>	<b>To</b>	<b>(in m)</b>	
0.00	3.20	3.20	Highly ferruginous laterite with fairly high amount of kaolinite. Gibbsite is disseminated and is present in moderate quantity.
3.20	5.25	2.05	Bauxite rich in iron content. Gibbsite and Goethite in moderately equal proportion.
5.25	7.40	2.15	Laterite, semi massive with moderate Gibbsite content
7.40	10.45	3.05	Bauxite, spongy in texture, moderately Gibbsitic .Goethite content also is considerable. the core less powdery and at times moderately hard
10.45	12.7	2.45	partly lateritised Khondalite
12.7	17.55	4.85	Weathered Khondalite with slight admixture of clay
<b>BB-2</b>			
<b>Depth:18.00 m</b>		<b>RL of collar :1263.78</b>	
<b>Run</b>		<b>Thickness</b>	<b>Description</b>
<b>From</b>	<b>To</b>	<b>(in m)</b>	
0	2.05	2.05	Bauxite core is hard and fragmentary .The Bauxite has a spongy and cavernous texture.slightly clayey
2.05	3.7	1.65	Clayey Bauxite. Rich in Kaolinite content moderately Gibbsitic
3.7	18	14.3	weathered khondalite
<b>BB-3</b>			
<b>Depth:22.50 m</b>		<b>RL of collar : 1227.62</b>	
<b>Run</b>		<b>Thickness</b>	<b>Description</b>
<b>From</b>	<b>To</b>	<b>(in m)</b>	
0	5.45	5.45	Laterite rich in goethite and clay pockets, cavernous in most parts, spongy at places.
5.45	18.2	12.85	Bauxite gibbsitic, spongy and semi massive, clayey at places, but clay content is very low.
18.2	19.35	1.15	Clayey bauxite rich in kaolinite and gibbsite.
19.35	22.5	3.15	weathered khondalite.
<b>BB-4</b>			
<b>Depth:28.00 m</b>		<b>RL of collar : 1236.41</b>	
<b>Run</b>		<b>Thickness</b>	<b>Description</b>
<b>From</b>	<b>To</b>	<b>(in m)</b>	
0	5.35	5.35	Laterite rich in goethite with some clay, cavernous at the top with the voids filled by cryptocrystalline gibbsite.
5.35	22.5	17.15	Bauxite highly gibbsitic, cavernous and spongy, voids spaces lined by gibbsite crystals, goethite present at places.
22.5	28	5.5	weathered khondalite.
<b>BB-5</b>			

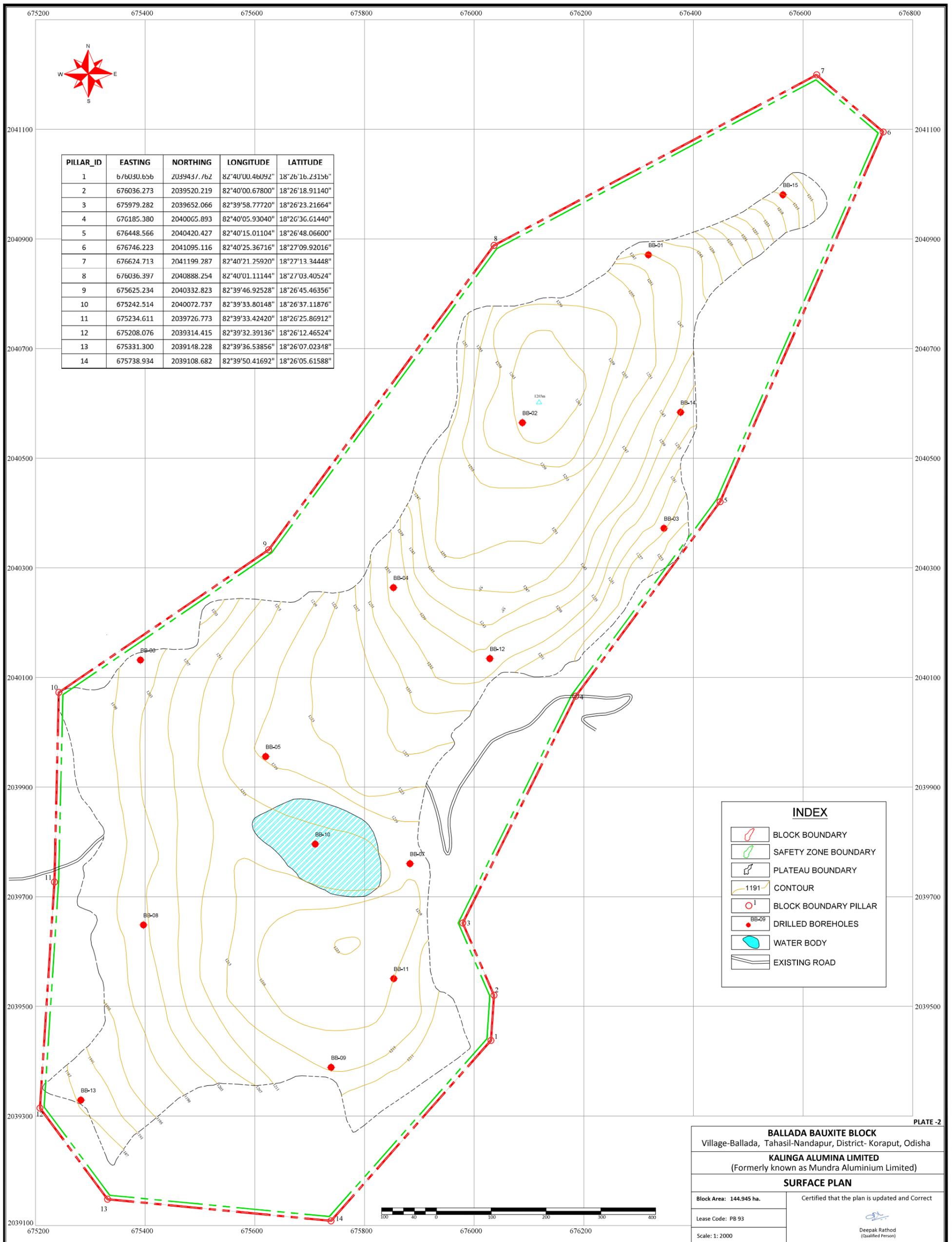
Depth: 18.35m		R.L. of collar: 1219.51m	
From	To	Thickness	Description
0	4.25	4.25	Spongy ferruginous laterite with abundant goethite and some kaolinite.
4.25	13.05	8.85	Bauxite-moderately gibbsitic, spongy texture, rarely cavernous. The core recovered is powdery and fragmentary, generally soft, Slightly goethitic at places.
13.05	15.1	2.05	Laterite-highly ferruginous, spongy texture.
15.1	18.35	3.25	weathered khondalite, admixed with kaolinite.
	<b>BB-6</b>		
Depth: 15.50m		R.L. of collar: 1201.03m	
From	To	Thickness	Description
0	9.25	9.25	Laterite- highly ferruginous and cavernous, a few concretions of iron oxides, slightly admixed with kaolinite at the top.
9.25	11.6	2.35	Bauxite-soft powdery ore, gibbsite within a matrix of limonite.
11.6	13.3	1.7	Lithomarge-moderately rich in kaolinite.
13.3	15.5	2.2	Weathered khondalite.
	<b>BB-7</b>		
Depth: 20m		R.L. of collar: 1218.56m	
From	To	Thickness	Description
0	1.8	1.8	Bauxite with high amount of clay.
1.8	10.05	8.25	Bauxite-highly gibbsitic, iron minerals are much less. Clay admixture is more predominant.
10.05	11.8	1.75	Siliceous bauxite-high amount of clay admixture, some intercalations of weathered khondalite.
11.8	20	8.2	Weathered khondalite.
	<b>BB-8</b>		
Depth: 22m		R.L. of collar: 1201.70m	
From	To	Thickness	Description
0	0.65	0.65	Soil.
0.65	8.65	8	Laterite-highly ferruginous, hematitic with minor amount of clay. Goethite content also is considerable, spongy and cavernous texture, gibbsite present in void spaces.
8.65	15.7	7.05	Soft powdery bauxite- highly gibbsitic, spongy texture, slightly limonitic.
15.7	22	6.3	Lithomarge-highly kaolinitic.
	<b>BB-9</b>		
Depth: 11.60m		R.L. of collar: 1215.96m	
From	To	Thickness	Description
0	4.4	4.4	Bauxite-rich in ferruginous content, spongy and gibbsitic slight admixture of clay, soft powdery ore.
4.4	6.85	2.45	Lithomarge admixed with bauxite- highly Kaolinitic.
6.85	11.6	4.85	Weathered khondalite.
	<b>BB-10</b>		

Depth: 20.55m		R.L. of collar: 1213.94m	
From	To	Thickness	Description
0	0.35	0.35	Soil.
0.35	10	9.65	Clay with rare pebbles of gibbsite, top portion admixed with soil.
10	16.85	6.85	Clay with weathered khondalite.
16.85	20.55	3.75	Weathered khondalite.
	<b>BB-11</b>		
Depth: 17.00m		R.L. of collar: 1218.40m	
From	To	Thickness	Description
0	3.4	3.4	Bauxite-hard cores are recovered, moderately ferruginous, spongy and gibbsitic. Banded nature observed, cavernous at the top.
3.4	6.25	2.85	Siliceous bauxite-admixture of spongy gibbsitic bauxite and sporadic clay pockets.
6.25	13.7	7.45	Spongy gibbsitic bauxite- rich in hematite at places.
13.7	17	3.3	Weathered khondalite with a few iron rich bands.
	<b>BB-12</b>		
Depth: 17.00m		R.L. of collar: 1238.72m	
From	To	Thickness	Description
0	7	7	Laterite and siliceous bauxite alternating ferruginous and clay rich bands.
7	8.2	1.2	Weathered khondalite with kaolinite.
8.2	10.45	2.25	Bauxite-spongy and gibbsitic, iron oxide content rather poor.
10.45	17	6.55	Weathered khondalite.
	<b>BB-13</b>		
Depth: 23.20m		R.L. of collar: 1187.42m	
From	To	Thickness	Description
0	0.2	0.2	Soil.
0.2	6.5	6.3	Hard laterite-cavernous at the top, rich in clay, slightly gibbsitic.
6.5	11.7	5.2	Bauxite-modeartely gibbsitic, cavernous with the cavities lined by gibbsite crystals, rarely limonitic, kaolinite is very low amount.
11.7	15.75	4.05	Laterite-moderately hard, rich in goethite, spongy to massive in texture. Gibbsite content is low.
15.75	18.7	2.95	Gibbsitic bauxite- modeartely ferruginous with iron rich concretions.
18.7	20.55	1.85	Laterite-rich in limonite, highly kaolinitic.
20.55	23.2	2.75	Weathered khondalite.
	<b>BB-14</b>		
Depth: 26.40m		R.L. of collar: 1240.22m	
From	To	Thickness	Description
0	1.2	1.2	Siliceous bauxite-rich in kaolinite.
1.2	5.75	4.55	Bauxite- highly porous, gibbsitic with hematite and goethite. Core is rather soft and powdery, cavities filled with goethite.

5.75	7.9	2.15	Laterite-highly limonitic, clay content rather negligible.
7.9	20.2	12.3	Highly gibbsitic bauxite- spongy texture, rarely cavernous with cavities filled with iron oxides and gibbsite.
20.2	26.4	6.2	Weathered khondalite-top portion rich in kaolinite.
	<b>BB-15</b>		
<b>Depth: 14.00m</b>		<b>R.L. of collar: 1216.64m</b>	
<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Description</b>
0	5.35	5.35	Laterite- hard core recovered, highly ferruginous with slight admixture of kaolinite, cavernous.
5.35	9.55	4.2	Bauxite-moderately gibbsitic, slightly clayey, hard concretions of gibbsite are seen at places.
9.55	14	4.45	Weathered khondalite with kaolinite rich zone at the top.

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# **Annexure-4**



PILLAR_ID	EASTING	NORTHING	LONGITUDE	LATITUDE
1	676030.656	2039437.762	82°40'00.46092"	18°26'16.23156"
2	676036.273	2039520.219	82°40'00.67800"	18°26'18.91140"
3	675979.282	2039652.066	82°39'58.77720"	18°26'23.21664"
4	676185.380	2040065.893	82°40'05.93040"	18°26'36.61440"
5	676448.566	2040420.427	82°40'15.01104"	18°26'48.06600"
6	676746.223	2041095.116	82°40'25.36716"	18°27'09.92016"
7	676624.713	2041199.287	82°40'21.25920"	18°27'13.34448"
8	676036.397	2040888.254	82°40'01.11144"	18°27'03.40524"
9	675625.234	2040332.823	82°39'46.92528"	18°26'45.46356"
10	675242.514	2040072.737	82°39'33.80148"	18°26'37.11876"
11	675234.611	2039726.773	82°39'33.42420"	18°26'25.86912"
12	675208.076	2039314.415	82°39'32.39136"	18°26'12.46524"
13	675331.300	2039148.228	82°39'36.53856"	18°26'07.02348"
14	675738.934	2039108.682	82°39'50.41692"	18°26'05.61588"

INDEX	
	BLOCK BOUNDARY
	SAFETY ZONE BOUNDARY
	PLATEAU BOUNDARY
	CONTOUR
	BLOCK BOUNDARY PILLAR
	DRILLED BOREHOLES
	WATER BODY
	EXISTING ROAD

**PLATE -2**

<b>BALLADA BAUXITE BLOCK</b>	
Village-Ballada, Tahasil-Nandapur, District- Koraput, Odisha	
<b>KALINGA ALUMINA LIMITED</b> (Formerly known as Mundra Aluminium Limited)	
<b>SURFACE PLAN</b>	
Block Area: 144.945 ha.	Certified that the plan is updated and Correct
Lease Code: PB 93	 Deepak Rathod (Qualified Person)
Scale: 1: 2000	

## **Annexure-5**

**BALLADA BLOCK – EXISTING POSITION**

252

1817

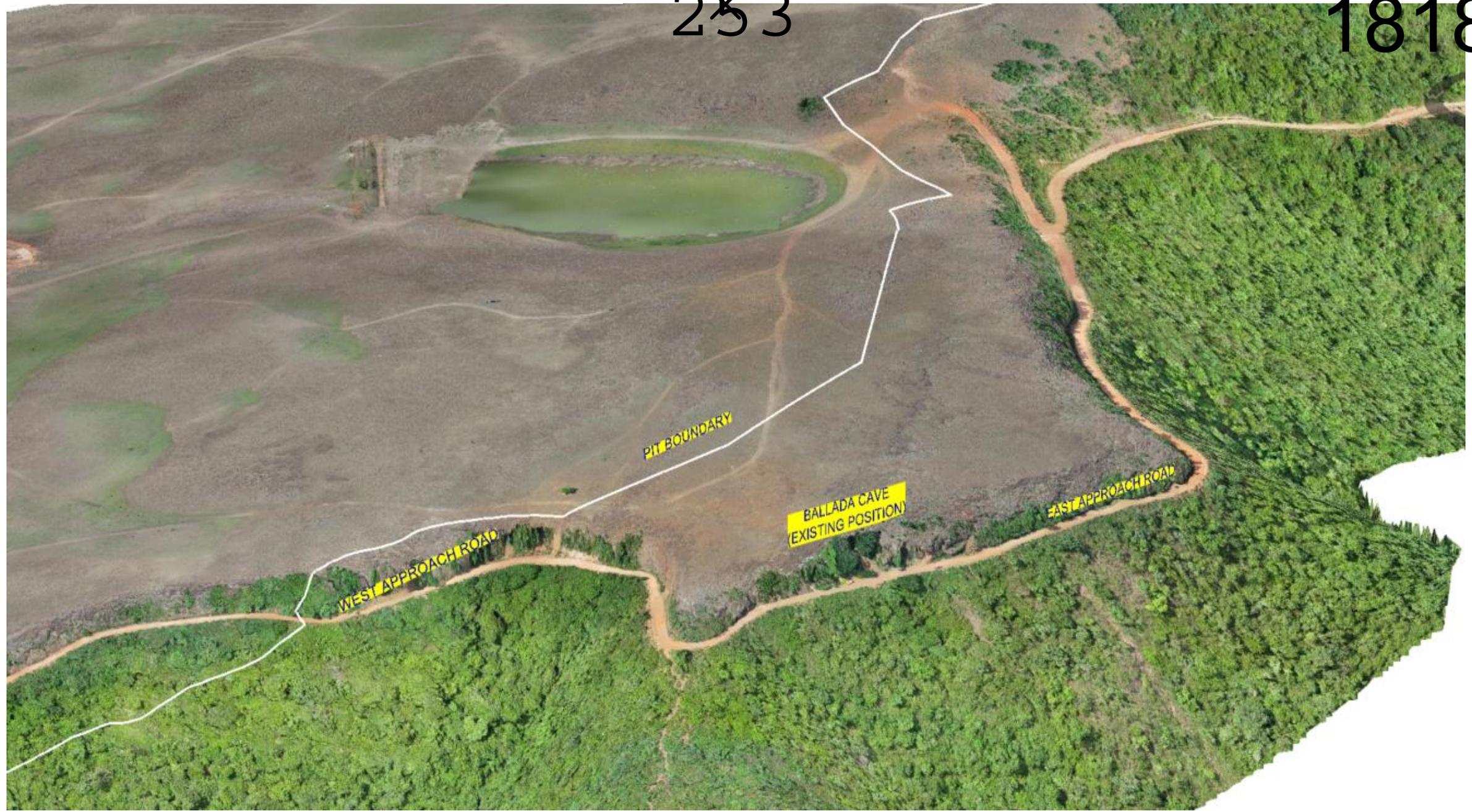


**BALLADA CAVE**

**BALLADA CAVE – EXISTING POSITION**

253

1818



WEST APPROACH ROAD

PIT BOUNDARY

BALLADA CAVE  
(EXISTING POSITION)

EAST APPROACH ROAD

# BALLADA CAVE – PROPOSED PROTECTION

254

1819



West road

Pit Boundary

Barrier

BOUNDARY WALL  
Ballada Cave

East road

# BALLADA CAVE – PROPOSED BEAUTIFICATION WORK

2025

1820

Current

Planned



The Ballada Cave and its vicinity shall be developed and beautified so as to attract tourism.

**BALLADA CAVE – PROPOSED BEAUTIFICATION WORK**

256

1821



**BALLADA CAVE – PROPOSED BEAUTIFICATION WORK**

287

1822





BALLADA CAVE – PROPOSED BEAUTIFICATION WORK

289

1824



260

1825



Government of Odisha  
Department of Water Resources

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No. 30630 /WR., Date: 8/11/2024  
*WR-MAJII-WRC-0127/2024(OSWAS File No.)*  
*Irr-II-WRC-110/2024(Physical File No.)*

From

Smt. Arati Rout, O.A.S. (SAG),  
Additional Secretary to Government.

To

M/s Kalinga Alumina Limited,  
Dist- Koraput.

Sub: Application for allocation of 0.282 cusec of surface water from Jalaput reservoir for operation purposes in favour of M/s Kalinga Alumina Limited, Koraput.

Ref:- Application No- 2024070441000681 dated 04.07.2024.

Sir,

In inviting reference to the subject and application cited above, I am directed to say that after careful consideration, Government in Department of Water Resources have been pleased to allocate 0.282 cusec of surface water from Jalaput Reservoir in favour of M/s Kalinga Alumina Limited, Koraput from 01.04.2025 for a period 5 years for operational purpose without assurance during the lean period/scarcity time with intake location having Latitude: 18° 26' 48.06" N & Longitude: 82° 36' 16.89" E, with the terms & conditions mentioned below.

Further, you are requested to construct a water storage facility to meet the water requirement during the lean period/scarcity time.

**TERMS AND CONDITIONS:-**

1. M/s Kalinga Alumina Limited, Koraput shall make suitable arrangements to take the water from the Irrigation works at which it will be supplied. M/s Kalinga Alumina Limited, Koraput shall not use the water supplied to him for any purpose other than that which is specified in the schedule.
2. If the special water rate for the aforesaid quantity of water or any part thereof, is not paid on or before the date specified in the agreement it shall become payable at once (unless the Government sanctions for special reason an extension of time) and M/s Kalinga Alumina Limited, Koraput and the sureties shall be liable jointly and severally to pay the same with compound interest at the rate of two percent per mensem from the date of default. All amount due to the Government under terms of these presents shall if not paid in time, be recoverable as a public demand under the Orissa Public Demands Recovery Act, 1962.

**"Every drop of water is precious. Use optimally by adopting recycle, reuse and zero discharge technology"**

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3. (i) M/s Kalinga Alumina Limited, Koraput shall be liable for criminal and civil action if by drawl of water, the rights of any third party are affected and shall indemnify the Government against all claims for damage preferred by the person or persons affected by the permission granted.
  - (ii) M/s Kalinga Alumina Limited, Koraput shall not without prior permission in writing from the Government lay the pipeline on Government or communal lands. If the pipelines have to pass through Government lands permission of the Government for this shall be taken separately which may be granted subject to the protection of rights of the Government or community, as the case may be.
  - (iii) M/s Kalinga Alumina Limited, Koraput shall not draw or lift water more than the quantity mentioned in the requisition or order and not exceeding the volume mentioned in the Schedule-II except with the prior approval of the Government. The Superintending Engineer of WR shall assess the fees to be charged as per Unit quantity of water drawn or allocated whichever is higher. If drawl is more than the allocation, a penal rate at six times the rate specified in Schedule II shall be charged on the quantity of excess drawl, in addition to the normal bill on the allocated quantity. The excess drawl is permissible for a maximum period of six months, within which the licensee shall have to apply for a higher allocation of water with reason where the licensee fails to so apply for such higher allocation or where the licensee is refused for such higher allocation, the agreement shall be liable to cancellation and the water supplied shall be stopped thereafter.
  - (iv) The permission granted shall not be deemed to exempt M/s Kalinga Alumina Limited, Koraput from liability to payment of water charges lawfully assessable at the rate as may be prescribed by Govt. from time to time.
  - (v) The government reserves the right to suspend or cancel the permission in case of violation of any of the covenants.
4. M/s Kalinga Alumina Limited, Koraput at his own cost shall install an IoT Flow Meter for measurement of water drawn or lifted by him from the Irrigation Works as per the procedure laid down in rule 23-A(b). The Superintending Engineer of WR shall visit the location of the drawl or lifting of water, verify the quantities of water drawn or lifted by M/s Kalinga Alumina Limited, Koraput, and ensure such control as may be necessary for administering the drawl or lifting of water. Assessment of the water rate shall be made as per the quantity of water drawn or allocated whichever is higher. In case of any defect or non-functioning of the Flow Meter, the licensee shall bring the fact to the notice of the Superintending Engineer of WR forthwith and take appropriate steps to remove the defects in the Meter or for replacement thereof within three months and in such cases the fees shall be charged on the quantity of water allocated for the said period of three months or till the defect in the Meter is removed or the Meter replaced, as the case may be whichever is earlier, and where the licensee fails to bring the defect or non-functioning of the Meter to the notice of the Superintending Engineer of WR or fails to remove the defects in the Meter or to replace the same, as the case may be, within

three months, the agreement shall be liable to cancellation and thereafter the water supply shall be stopped.

5. M/s Kalinga Alumina Limited, Koraput shall construct a full-proof effluent discharge plant before the commissioning of the project. For proper test of such effluent there shall be computerized testing system and M/s Kalinga Alumina Limited, Koraput shall give details of effluent discharged in the natural source (in River or Nala).
6. For the construction of head works and control mechanism i.e. intake well, pump house and other related facilities, M/s Kalinga Alumina Limited, Koraput will get the land leased in their favour through IDCO as is done in respect of any other government land required by the industry. IDCO will make available land on a long-term lease to M/S Kalinga Alumina Limited, Koraput. The continuance of the lease agreement will be subject to the condition that the industry shall pay water rates as per the prevailing water rate and all other dues of the Government and IDCO from time to time.
7. M/s Kalinga Alumina Limited, Koraput would be required to pay 3 (three) months advance water charges in favour of Superintending Engineer concerned in shape of Bank Draft or FDR duly discharged by the company as non - interest bearing security deposit and for 9 (nine) months a Bank Guarantee duly pledged in favour of concerned Superintending Engineer of WR. The onus of maintaining the Bank Guarantee lies with M/S Kalinga Alumina Limited, Koraput.
8. In case of water supply for M/s Kalinga Alumina Limited, Koraput is to be met from a common source through a sharing mechanism, such common infrastructure for drawl of water will be constructed, maintained, and operated either by IDCO or Special Purpose Vehicle (SPV) after taking due clearance from IDCO. Water will be supplied to Industry by IDCO/SPV and they would also be liable for payment of water rate to the Govt. and will in turn have arrangements as similar therein as clauses (6) and (7) detailed earlier.
9. M/s Kalinga Alumina Limited, Koraput drawing or allocated water from the reservoir for its uses, shall sign a supplementary agreement with the Odisha Hydra Power Corporation Ltd., to compensate for the loss of energy generation due to its over drawl and the Odisha Hydra Power Corporation Ltd., shall raise demands for compensation of loss of energy generation within the first week of every month against the excess quantity of water drawn than the allocated quantity.
10. M/s Kalinga Alumina Limited, Koraput will not disturb the normal flow of water so that riparian rights in downstream will be affected and the company shall have no claim on the account.
11. The drawl mechanism for raw water and disposal system of effluent to be established by the industry without disturbing the existing ecosystem and environmental setup.
12. The Rehabilitation and Resettlement Action Plan/ Welfare Action Plan, if so required will be prepared in conformity with the current Orissa Rehabilitation and Resettlement policy and executed by the company at its own cost under the supervision of the Water Resources Department and the Collector of the District.
13. M/s Kalinga Alumina Limited, Koraput should not claim as a matter of right to get the desired quantity of water during non-monsoon and lean periods to meet their full industrial use and the Company has to make adequate storage facility in their land for supply of water to their plant during such period.
14. The safety design of all the structures lies fully on M/s Kalinga Alumina Limited, Koraput.

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**"Every drop of water is precious. Use optimally by adopting recycle, reuse and zero discharge technology"**

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15. In case of any dispute/interpretation required, the decision of the Government in the Water Resources Department shall be final.
16. Any surplus power from the Captive Power Plant shall be sold by M/s Kalinga Alumina Limited, Koraput to GRIDCO or any other entity to be notified by the State Government under mutually acceptable terms & conditions.
17. The allocation of water will automatically lapse if the company does not use the water for the purpose applied for within three years of allotment.
18. This agreement shall be valid for three years from the date of execution subject to the renewal of agreement by the Superintending Engineer of WR. For renewal of the agreement, M/s Kalinga Alumina Limited, Koraput has to apply a minimum of three months before the expiry of the agreement.
19. If it is found that the industry is drawing water unauthorizedly before signing the agreement/installation of the flow meter, the Superintending Engineer of WR will charge a penal rate at six times the normal rate as provided in Schedule-II of the Rule.
20. The government shall be at liberty to review the water allocation unilaterally in case of exigencies.
21. The Superintending Engineer of WR or his authorized representative reserves the right to inspect all installations of drawl and disposal mechanism during and after construction including the intake structure, flow meter, and treatment plant.
22. M/s Kalinga Alumina Limited, Koraput will have to show clearly in the water management plan as to what storage facility the company will create for the lean season and to what extent and how the water is going to be recycled which shall be a part of the project report of the unit.
23. M/s Kalinga Alumina Limited, Koraput may engage at their cost, consultant(s) experienced in the field to take up field investigations, prepare design and drawing to set up the water supply scheme for drawing water from the Irrigation works for their proposed plant. The actual work will start after approval of the scheme by the competent authority of Water Resources Department who can inspect work during the construction.
24. The exact place for lifting will be decided in consultation with the competent authority of the Water Resources Department.
25. The Department of Water Resources (DoWR) will not be held responsible for the non-availability of water due to dry season, disruption, repair & maintenance of the Canal/Reservoir.
26. The agreement to be executed by Industry/ commercial establishment with the local Superintending Engineer of WR must be approved by the DoWR before drawl of water.
27. M/s Kalinga Alumina Limited, Koraput will have to adopt water harvesting, rooftop water harvesting, groundwater recharge, and recycling of wastewater measures in its plant premises as per the approved water management plan.
28. M/s Kalinga Alumina Limited, Koraput shall follow the zero effluent discharge principle, satisfy State Pollution Control Board (SPCB) norms, and obtain requisite permissions from the SPCB, Odisha before drawl of operational water.
29. In case, M/s Kalinga Alumina Limited, Koraput intends to supply bulk water to Municipalities, Notified Area Councils, other local authorities, and the cluster of villages, M/s Kalinga Alumina Limited, Koraput shall install separate flow meters or measuring device, as the case may be, at a suitable place along the pipeline to ensure quantum of water supplied to such Municipalities, Notified Area Councils, other local authorities and cluster of villages for drinking and washing etc. in addition to installation of the flow meter under clause 23-A (1)(b)

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which shall be treated as industrial or commercial use and license fee for such industrial or commercial use shall be at the rate double the existing rate as provided in item 3 (ii) of schedule-II.

30. M/s Kalinga Alumina Limited, Koraput shall abide by the conditions laid down by the competent authority of DoWR during the approval of the scheme of drawl.
31. M/s Kalinga Alumina Limited, Koraput shall undertake a water utilization audit every three years and make the report available for scrutiny by the competent authority of DoWR.
32. Special water rate shall be charged and collected at the rate as specified in Schedule -II per unit or quantity of water drawn or allocated whichever is higher and shall be enhanced at the rate of ten percent per annum with effect from the first day of April.
33. M/s Kalinga Alumina Limited, Koraput is acquiring/ has acquired irrigated land for industrial purposes under unavoidable circumstances, it has to comply with the conditions laid down vide DoWR Notification No. 4538, dt.24.02.2016.
34. M/s Kalinga Alumina Limited, Koraput shall register the project on the IWCRCM website within 7 days of entry, after due execution of the agreement with the concerned Superintending Engineer of DoWR.

Yours faithfully,

*[Signature]*  
08.11.2024

Additional Secretary to Government

Memo No. 30631 /WR. Dtd. 8/11/2024

Copy forwarded to the EIC, P & D, BBSR / Chief Engineer, Water Services, BBSR/ the Chief Construction Engineer, Potteru Irrigation Project, Balimela/ Superintending Engineer, Earth Dam Division, Chittrakonda for information and necessary action.

*[Signature]*  
08.11.2024

Under Secretary to Government

Memo No. 30632 /WR. Dtd. 8/11/2024

Copy forwarded to the Industries Department/ IPICOL for information and necessary action.

*[Signature]*  
08.11.2024

Under Secretary to Government

Memo No. 30633 /WR, Dtd. 8/11/2024

Copy forwarded to the Member Secretary, State Pollution Control Board (SPCB), BBSR for information and necessary action.

*[Signature]*  
08.11.2024

Under Secretary to Government

Memo No. 30634 /WR. Dtd. 8/11/2024

Copy forwarded to the Collector & District Magistrate, Koraput for information and necessary action.

*[Signature]*  
08.11.2024

Under Secretary to Government