स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED
रॉ मेटेरियल्स डिवीजन
RAW MATERIALS DIVISION
वरसुआ लौह खदान
BARSUA IRON MINES
P.O. TENSA - 770042
Phone- 06625-236026 Fax - 236031

Ref. No.: CGM/BIM-TIM/123

Date: 18.08.2021

To,
The Member Secretary
IA-Division (Non Coal Mining)
Ministry of Environment, Forest & Climate Change
Vayu-305, Indira Paryavaran Bhawan, Jorbagh Road
New Delhi-110003

Sub.: Amendment in Environmental Clearance for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases without change in production capacity of Barsua-Taldih-Kalta Iron Ore Mines, M/s Steel Authority of India Limited (SAIL) located in Villages Tantra & Bahamba and Toda RF, Tehsil Koira, District Sundargarh, Odisha under para 7(ii) of EIA Notification 2006 - Regarding Additional Information Sought

Ref.: (i) EC Grant Order No. J-11015/351/2006-IA II (M) dated 29.10.2010 and amendments dated 30.03.2016/03.07.2020 with corrigendum dated 13.07.2020 and further amendment dated 17.03.2021.

(ii) Proposal No. IA/OR/MIN/216764/2021 dated 26.06.2021

Sir,

Inviting kind reference to the subject cited above, we would like to inform that the proposal for obtaining amendment in Environmental Clearance of Barsua-Taldih-Kalta Iron Ore Mining Project of SAIL for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases (ML – 130 & ML – 162) without change in production capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006 has been submitted on 26.06.2021. The proposal has been considered and deliberated in 33rd EAC (Non-coal Mining) meeting held during 13-16, July 2021 (Agenda No. 4.1). Though minutes of the meeting available in PARIVESH portal, the Committee sought the additional information regarding the project proposal for further processing of the proposal.

The point wise replies to the ADS along with the Addendum to the EIA/EMP Report covering complete details of the proposal are attached herewith for your kind perusal. We earnestly request MoEFCC to consider the proposal and grant Environment Clearance to the above referred project at the earliest.

Regards,

Yours faithfully,

18/8/21

(P.K. Rath)
Chief General Manager (Mines)
Barsua-Taldih-Kalta Mines, SAIL

Encl. : As stated above.

Replies to Points Raised by EAC – Non-Coal Mining Projects Regarding Amendment of Environmental Clearance of Barsua-Taldih-Kalta Iron Ore Mines of SAIL for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases without change in production capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006

Sl. No.	Point Raised	Reply
1	The Project Proponent should submit the current environmental status, current practices followed during mining which includes extraction of mineral, dumping of mineral, tailing ponds, processing plants and its ultimate disposal covering both ML – 130 (2486.383 ha) and ML – 162 (77.94 ha) with EIA/EMP report.	**The current environmental status has been studied** on the basis of baseline environmental data generated during March – May, 2021 and given in Clauses 3.6 & 3.7 in Chapter 3 of the Addendum to the EIA/EMP Report which is attached as **Appendix** . **Extraction of Mineral:** Barsua-Taldih-Kalta Mine is divided into three blocks namely Barsua (operational since 1960), Kalta (operational since 1966) and Taldih (operational since Nov., 2016). Mining is carried out by conventional open cast mining involving drilling, blasting and excavation of ore & waste by shovel dumper combination. The present total mine capacity of 8.05 MTPA (Barsua - 3.5 MTPA, Kalta – 3.2 MTPA, Taldih – 1.35 MTPA). The details are given in Clause 2.5.2 of Chapter 2 of the Addendum to the EIA/EMP Report. The ore from Barsua Mine is beneficiated and moved by covered conveyors to the railway wagon loading facilities in Barsua Valley. At Taldih Mine, ROM ore is crushed, screened and despatched by trucks through public roads to the railway the railway wagon loading facilities in Barsua Valley. At Kalta Mine, ROM is crushed & screened before being despatched by trucks through NH-520 to Roxy Railway Siding. **Dumping of Mineral**: At all three mining blocks, overburden and sub-grade ore are dumped externally in dedicated areas within the lease & potion of OB at Barsua Mine is used for backfilling. Tailings from the mineral beneficiation process are dumped in an engineered tailings pond. EC has been accorded vide MoEFCC's EC Amendment letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July, 2020 for excavation and sale of 0.5 MTPA accumulated sub-grade ore each from Taldih and Kalta Blocks and for excavation and sale of 1 MTPA of tailings. The details of waste dumping are given in Clause 2.5.2 of Chapter 2 of the Addendum to the EIA/EMP Report. **Tailing pond:** Barsua Tailings pond is spread over 35.88 ha of which 3.95 ha is located within the mine lease (ML-162) and the balance 31.93 ha is located outside the lease area in acquired land by SAIL adjoining to amalgamated lease at Barsua Valley.

Sl. No.	Point Raised	Reply
		About 2.1 Mm^3 (or around 4.1 million tonnes) of tailing is stored in the pond. Subsequent to grant of EC amendment for excavation & dispatch of tailings from the Barsua tailings Pond, so far about 4.5 lakh tonnes of tailings has been evacuated from the tailings pond and sold in the open market since December 2020. A regular evacuation of tailings from the tailings Pond shall continue @ 0.5 to 1 MTPA, which will create space for storage of freshly generated tailings. **Processing Plant:** The ore from Barsua Block is processed at Beneficiation Plant which is operating @ 3.5 MTPA. The ore is beneficiated through both dry circuit as well as wet circuit. Barsua ore beneficiation plant is divided into three separate sections viz crushing plant, washing plant and dry screening plant having capacity of 3.5 MTPA. The crushing plant consists of two lines with rated capacity of 700 tph each. One line is normally used for Direct Ore (DO) and the second line for Beneficiable Ore (BO). The details are given in Clause 2.5.3 of Chapter 2 of the Addendum to the EIA/EMP Report. At Taldih mine, ROM ore is processed through two nos. of 300 tonnes per hour (TPH) mobile Screening Plants and two nos. of 300 TPH mobile Crushing & Screening Plants. The processed ore is despatched by trucks through public roads to the railway the railway wagon loading facilities in Barsua Valley. At Kalta Mine, ROM ore is processed through two nos. of 300 tonnes per hour (TPH) mobile Screening and two nos. of 300 TPH mobile Crushing & Screening Plants. Part of the ore at Kalta Mine is also produced through manual sizing and sorting. The processed ore is despatched by trucks through NH-520 to Roxy Railway Siding. The locations of various facilities, their area and their clearance status are given in Tables 4.2, 4.3 and 4.4 in Chapter 4 of Addendum to the EIA/EMP Report and also reproduced here as **Annexure 1.1**.
2	The Project Proponent needs to submit the status of beneficiation plant within the lease area and details of EC for beneficiation plant if any.	**Status of Beneficiation Plant Within the Lease Area:** The Barsua Ore Beneficiation Plant processes ore from Barsua Block of Barsua-Taldih-Kalta Mines. Presently the Beneficiation Plant is operating @ 3.5 MTPA. The existing beneficiation plant of Barsua is spread over ML – 130, ML – 162 and Acquired Land. Crushing & Washing Plants are located in ML – 130. Jigging plant, downhill conveyors, Thickeners, etc, are located in ML – 162. The dry screening plant, ore stock piles, Railway Siding etc. are located in the

Sl. No.	Point Raised	Reply
		acquired land. **Details of EC for Beneficiation Plant:** SAIL's Barsua-Taldih-Kalta Iron Mines had received Environmental Clearance (EC) from Ministry of Environment and Forests (MoEF) (as MoEFCC was earlier called) vide their letter no. J-11015/351/2006-IA.II (M) dated 29th October, 2010 for increase of total production to 8.05 MTPA (2.5 MTPA from Barsua + 4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. On page 2 under Para 2 of EC grant order,it is stated that the "*There is an existing beneficiation plant having a capacity of 2.5 million TPA within the mine lease having an area of 7 ha and 50 ha outside the mine lease (total area of 57 ha). In addition, the new beneficiation plant with a capacity of 4.25 million TPA will be setup in an area of 83 ha, out of which 50 ha will be within the mine lease and 33 ha, outside mine lease. The pelletisation plant also be outside the mine lease. The tailing pond is located outside the mine lease in Barsua Valley in an area of 35.88ha*" The EC was amended vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 30th March, 2016 for: 1. Permission to operate of the Beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA 2. To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease. The EC was amended vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July, 2020 for changing the production from Barsua Block to 3.5 MTPA. As per the latest EC Amendment accorded vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 17th March, 2021 this has remained unchanged i.e. Barsua Beneficiation Plant is operating @ 3.5 MTPA.
3	The Project Proponent must include current baseline data and the recent Public concerns.	The Addendum to the EIA/EMP Report, which is attached **Appendix**, has been prepared on the basis of baseline environmental data generated during March – May, 2021 (refer Clauses 3.6 & 3.7 in Chapter 3 of the Report). Concerns of the local public have been given in Clause 3.8 in Chapter 3 of the Report.
4	The Project Proponent submitted that out of 2564.323 ha, 2425.613 ha Forest Land (Toda R.F.) and 138.710 ha Non-Forest Land. PP obtained Stage-II FC for	5.742 ha Forest Land, which was part of ML – 130, is under occupation of the local Schedule Tribe & Other Traditional Forest Dwellers in village Tantra. Their individual rights have been recognized by granting pattas under Forest Right Act.,2006 {refer copy of Certificate Regarding Compliance of

Sl. No.	Point Raised	Reply
	2341.931 Ha vide letter dated 06.03.2013 and for 77.94 ha for development of mining infrastructure vide letter dated 23.10.2017. PP needs to submit the status of remaining forest land of 5.742 ha and submit the copy of Forest Clearances obtained.	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006} which is enclosed as **Annexure 4.1**}. Stage-II forest clearance for diversion of forest land over 2341.931 ha in ML – 130 was granted by MoEFCC vide F. No. 8-90/2011-FC (pt), dated 06.03.2013 (copy enclosed as **Annexure 4.2**). MoEFCC vide order No. F.No.8-18/2014-FC dated 23.10.2017 granted Stage-II FC for diversion of entire 77.94 ha of forest land under ML – 162 for development of mining infrastructure (copy enclosed as **Annexure 4.3**). Hence, Stage – II forest clearance over 2419.871 has been obtained covering under the amalgamated lease.

ANNEXURE 1.1: LOCATIONS OF VARIOUS FACILITIES OF BARSUA-TALDIH-KALTA MINES OF SAIL

Table 1: Various Facilities in Lease Area Barsua-Taldih-Kalta Iron Ore Mines & their Env. Clearances

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
ML-130 (Total Area: 2486.383 ha)	976.429	Open cast mining and mineral beneficiation in Barsua Block	• Generation of fugitive dust from open cast mining, handling of mineral & waste & vehicular movement over unpaved roads • Generation of fugitive dust from crushing & screening of ore • Surface run-offs from mineral stacks, waste dumps & unpaved roads containing suspended solids • Surface run-offs from quarries, dumps & unpaved roads containing high levels of suspended solids • Noise generation from drilling, blasting, crushing, screening & vehicular movement • Ground vibrations from blasting • Vegetation loss due to expansion of open cast quarries & external dumping of solid wastes.	• Water sprinkling by trucks and / or fixed road side sprinklers. • Dry fog dust suppression at Barsua Plant •Deployment of misting cannons near mobile crushing & screening plants and iron ore fines handling areas •Wherever possible crushers & screens housed •Development of green belt and plantation. •Provision of covered long-distance belt conveyors for ore transport. •Engineered storm water drainage systems routed through settling pits around quarries, dumps & mineral stacking areas. •Controlled blasting to reduce ground vibrations. •Biological reclamation of exhausted quarries and stabilised waste dumps using native species of plants •Concurrent backfilling of exhausted quarries.	EC received on 29-10-2010, for increase of total production to 8.05 MTPA (2.5 MTPA from Barsua + 4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. EC was amended for re-distribution of production from three mining blocks under ML – 130 by MoEFCC's vide dated 30th March, 2016 to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 MTPA. EC amended vide letter no. 11015/351/ 2006-IA.II(M) dt. 03-07-2020 with corrigendum dated 13th July 2020 for excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum up to 1 MTPA tailings from the tailings pond at Barsua for selling, excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA from Fines Stocks from each block for selling.
	1173.484	Open cast mining and mineral crushing & Screening in Taldih Block			
	336.47	Open cast mining and mineral crushing & Screening in Kalta Block			

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
ML-162 (Total Area: 77.94 ha)	73.99	Beneficiation of iron ore through wet process	• Generation of tailings • Generation of effluents	• Tailings discharged to engineered tailings pond from where part of tailings excavated and sold • Effluents treated in Thickeners and recycled in process to max. possible extent	Latest EC Amendment (Vide letter no. 11015/351/2006-IA.II(M) dt. 17-03-2021) has allowed redistribution of total production of 8.05 MTPA amongst the 3 blocks (3.5 MTPA from Barsua + 1.35 MTPA from Taldih + 3.2 MTPA from Kalta).
		Transport of beneficiated ore	Generation of fugitive dust	Ore transport only by covered conveyors	
	3.95	Disposal of Tailings	Generation of fugitive dust	• Tailings discharged to engineered tailings pond from where part of tailings excavated and sold • Water sprinkling to suppress fugitive dust	EC amendment dt. 03-07-2020 with corrigendum dated 13th July 2020 allowed excavation & sale of 1 MTPA of tailings.
		Excavation of tailings for sale	• Generation of fugitive dust • Surface run-offs from mineral stacking area containing suspended solids	• Water sprinkling • Deployment of misting cannons • Engineered storm water drainage systems routed through settling pits around mineral stacking areas.	Original EC amended vide letter no. J-11015 / 351 / 2006-IA.II (M) dated 03-07-2020 with corrigendum dated 13-07-2020 for excavation & sale of tailings @ 1 MTPA

Table 2: Various Mining Infrastructure Facilities Acquired Areas of Barsua-Taldih-Kalta Iron Ore Mines & their Env. Clearances

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
Acquired area in Barsua Valley (*Total Acquired Area: 164.626 ha*)	31.93	Disposal of Tailings	• Generation of fugitive dust • Release of overflow water containing suspended solids	• Water sprinkling • Collection, treatment & recycling of tailings pond overflow water	EC received vide letter dt. 29-10-2010 specifies location of tailings pond "outside ML Area". EC Amendment letter no. J-11015/351/2006-IA.II(M) dt. 30-03-2016 clarifies "Outside MLArea" as "within ML-162 & acquired area"
	132.696	Dry screening plant, iron ore stock piles, Railway Siding etc.	• Generation of fugitive dust • Surface run-offs from mineral stacking area containing suspended solids	• Water sprinkling • Engineered storm water drainage systems routed through settling pits around	EC received vide letter dt. 29-10-2010 for increase of total production to 8.05 MTPA, enhancement of beneficiation capacity to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
				mineral stacking areas.	additional material handling facilities. The EC letter also mentioned that the existing beneficiation plant covers in both ML – 130 and outside the mine lease area. The EC was amended vide dt. 30-03-2016 which stated "*To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease.*" EC was further amended vide letter dt. 03-07-2020 & Corrigendum dt.13-07-2020 permitting transport of the entire production from Taldih Mines (2.05 MTPA) by road to the railway loading facilities in Barsua Valley for onward despatch by rail. EC was further amended vide letter dt. 17-03-2021 allowing reduction in production from Taldih Mine to 1.35 MTPA; Other conditions of the previous EC Amendments would remain unchanged.

Table 3: Townships in Acquired Areas of Barsua-Taldih-Kalta Iron Ore Mines & their Env. Clearances

Location	Area (ha)	Approvals / Clearances
Acquired area in Barsua Valley	53.29	EC received vide letter dt. 29-10-2010 states in Para 2 "*Three townships namely Kalta Township, Tensa Township and Barsua Township are located outside the mine lease area. The Kalta Township is adjacent to the Mine lease, whereas the other two townships namely the Tensa Township and the Barsua Township are located at a distance of 0.5 km and 1.5 km respectively from the mine lease*". EC Amendment letter no. J-11015/351/2006-IA.II(M) dt. 30-03-2016 clarifies "*Outside ML Area*" as "*within ML-162 & acquired area*"
Acquired area in Tensa	140.377	
Acquired area in Kalta	31.10	

ANNEXURE 4.1: FRA CERTIFICATE

CERTIFICATE

REGARDING COMPLIANCE OF SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS(RECOGNITION OF FOREST RIGHTS) ACT, 2006 IN RESPECT OF DIVERSION OF FOREST LAND MEASURING HC 2253.994 IN BARSUAN-TALDIHI-KALTA MINES OF M/S STEEL AUTHORITY OF INDIA LTD(SAIL).

1. It is certified that the complete process for diversion and settlement of rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognisation of Forest Rights) Act, 2006 has been carried out for the entire Forest area of 2253.994 Hectors proposed for diversion for Barsuan-Taldihi-Kalta Mines of M/S Steel Authority of India Ltd. under Koira Tahsil. The concerned records of all consultations and Meetings held are annexed in shape of Palli Sabha Resolutions dated 07.08.2010 of village Bahamba and dated 10.9.2010 of village Tantra and enquiry report of Tahsildar, Koira.

2. It is certified that the proposal for such diversion have been placed before the Palli Sabha of Forest Dwellers under the Chairmanship of Ward Members, Smt Nirasa Naik for village Bahamba and Sri Baneswar Naik for village Tantra and in presence of more than 50% of members of palli sabha and members of village Forest Committee where the details of the Projects and its implication have been explained to them in vernacular language. It is further ascertained that out of 2253.994Hc. of forest land proposed for diversion ,the local Schedule Tribe other traditional forest dwellers are using 5.742 Hc. of land individually in village Tantra till 10.9.2010 .Their individual rights have been recognized by granting pattas under Forest Right Act.,2006.They have given their consent in favour the said diversion proposal. Besides this, no eligible forest dweller was found under Forest Rights Act, 2006.

3. It is certified that discussions and decisions on such proposals had taken place only when there was quorum of minimum 50% of the members of the Palli Sabha present.

4. It is certified that on the basis of the verification report and Palli Sabha Resolutions dated 07.08.2010 for village Bahamba and dated 10.9.2010 for Tantra that no other primitive Tribal Groups and pre-agricultural communities except as mentioned in para 2 above were available on forest land proposed for diversion and whose Forest Rights are required to be specifically safe guarded as per Section 3(1)(e) of the Forest Rights Act, 2006.

5. It is certified that on the basis of the verification report and Palli sabha Resolution dated 07.08.2010, for village Bahamba and dated 10.9.2010 for Tantra that no such facilities managed by Government requiring diversion of Forest Land U/S 3(2) of the Forest Rights Act, 2006 exist over the forest land proposed for diversion.

10/9/10

COLLECTOR, SUNDARGARH
AND
CHAIRMANN, DISTRICT LEVEL
COMMITTEE

ANNEXURE 4.2: STAGE II FC OF ML - 130

F. No. 8-90/1996-FC (pt.)
Government of India
Ministry of Environment and Forests
(F.C. Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.
Dated: 6th March, 2013

To

The Principal Secretary (Forests),
Government of Odisha,
Bhubaneshwar.

Sub: Diversion of 2341.931 ha. (2248.252 ha. for mining and allied activities and 93.679 ha. for safety zone) forest land under ML-130 of Barsua-Taldih – Kalta in favour of M/s Steel Authority of India Ltd. (SAIL) in Bonai Forest Division in Sundargarh district of Odisha during 2nd Renewal of Mining Lease.

Sir,

I am directed to refer to Government of Odisha's letter No. 10 F(Cons) 50/2010-23669/F&E dated 04.11.2010 wherein prior approval of the Central Government for the diversion of 2341.931 ha. (2248.252 ha. for mining and allied activities and 93.679 ha. for safety zone) forest land under ML-130 of Barsua-Taldih – Kalta in favour of M/s Steel Authority of India Ltd. (SAIL) in Bonai Forest Division in Sundargarh district of Odisha during 2nd Renewal of Mining Lease, was sought, in accordance with section 2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted by the Central Government under section 3 of the said Act, in-principle approval for diversion of the said forest land was accorded by this Ministry's vide letter of even number dated 08.03.2011 read with corrigendum of even number dated 08.12.2011, subject to fulfilment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government of Odisha vide their letter No. 10F (Cons)-9/ 2013-4603/ F & E dated 02.03.2013 approval of the Central Government is hereby granted under section-2 of the Forest (Conservation) Act, 1980 for diversion of a part of the said of 2341.931 ha. (2248.252 ha. for mining and allied activities and 93.679 ha. for safety zone) forest land under ML-130 of Barsua-Taldih – Kalta in favour of M/s Steel Authority of India Ltd. (SAIL) in Bonai Forest Division in Sundargarh district of Odisha during 2nd Renewal of Mining Lease, subject to fulfilment of the following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation over the degraded forest land double in extent to the 1858.35 ha. virgin/un-broken forest land (excluding the un-broken/virgin forest land included in the safety zone) being diverted in favour of the User Agency (2 x 1858.35 x 2 = 3,716.71 ha.) shall be raised and maintained by the State Forest Department from funds realised from the user agency;

(iii) Additional compensatory afforestation over the degraded forest land equal in extent to the forest land being diverted (i.e. 2341.931 ha.) in favour of the User Agency shall be

raised and maintained by the State Forest Department from funds realised from user agency;

(iv) Following activities shall be undertaken by the user agency at the project cost:

(a) A plan containing appropriate mitigative measures to minimize soil erosion and choking of streams shall be implemented;

(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 to arrest sliding down of the excavated material along the contour;

(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 28°; and

(e) Strict adherence to the prescribed top soil management.

(v) The State Government shall realize from the user agency the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(vi) The State Government and the user agency shall implement the detailed plan containing appropriate ameliorative/mitigative measures to eliminate/minimize the adverse impacts of the mining in the forest land proposed for diversion on the habitat, including migratory corridor of wildlife in general, and long ranging animals such as elephants in particular from funds to be provided by the user agency;

(vii) The State Government and the user agency shall implement the plan containing appropriate ameliorative/mitigative measures to prevent/minimize soil erosion from the forest land proposed for mining prepared by the Central Soil and Water Conservation Research Institute, Sunabeda;

(viii) The State Government and user agency shall implement, from funds provided by the user agency, the plan containing appropriate ameliorative/mitigative measures, including restriction on use of water by the user agency, to eliminate/minimise adverse impact on water regime in and around the forest land proposed for diversion, and to ensure adequate availability of water to the habitations presently depending on the streams originating from the area located in and around the forest land proposed for diversion prepared by the Indian Institute of Technology (IIT), Kharagpur g;

(ix) The user agency shall implement from its own cost the plan for rejuvenation/ restocking of the non-mineralised portion of the mining lease duly approved by the Regional Chief Conservator of Forests, Rourkela;

(x) The user agency shall conclude disciplinary proceedings against the concerned official(s) responsible for installation of one crusher unit and two crushing-cum-screening plants within the forest land proposed for diversion by the user agency without obtaining prior permission of the Central Government under the Forest Conservation Act by imposing exemplary punishment to the officials responsible for the said violation, with intimation to this Ministry;

(xi) The user agency shall implement from its own funds the concurrent reclamation plan duly approved by the Regional Chief Conservator of Forests, Rourkela Circle for reclamation of the broken up area in a time bound manner and hand over the fully reclaimed forest land back to the State Forest Department for future management;

(xii) State Government shall explore the feasibility to utilise the already broken area available in the mining lease for storing overburden. For storage of overburden, minimum area of

virgin forest land shall be used only after receipt of a certificate from the State Government of Odisha that there is no alternate other than the use of such minimum virgin forest land, as indicated in such certificate, for storage of the overburden;

(xiii) The State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (7.5 meter strip all along the outer boundary of the area identified to undertake mining) from funds realised from the user agency;

(xiv) The State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone from funds realised from the user agency;

(xv) 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, or Rules framed there under, subject to a maximum period of 20 years;

(xvi) User Agency shall undertake gap planting and soil & moisture conservation activities as per the scheme duly approved by the Regional Chief Conservator of Forests, Rourkela to restock and rejuvenate the degraded open forests (having crown density less than 0.4), if any, located in the area within 100 m. from outer perimeter of the mining lease from its own funds;

(xvii) The User Agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary, as per the scheme duly approved by the Regional Chief Conservator of Forests, Rourkela, so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;

(xviii) The user agency shall submit the quarterly progress report of the implementation of activities it has committed (undertaking given) for execution within its lease area to Regional Chief Conservator of Forests, Rourkela circle and six monthly report to Regional Office of this Ministry through the State Government;

(xix) 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 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, Government of Odisha and the Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office (Eastern Zone), Bhubaneswar. 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), the Eastern Regional Office, Bhubaneswar may recommend to the Ministry of Environment & Forests, suitable penal action to be taken against the user agency;

(xx) No labour camp shall be established on the forest land;

(xxi) The User Agency shall provide firewood preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on the adjacent forest areas;

(xxii) The boundary of the mining lease and safety zone shall be continued to be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars,

06/07/2017

each inscribed with its serial number, DGPS coordinates, forward and back bearing, and distance from pillar to pillar;

(xxiii) The forest land shall not be used for any purpose other than that specified in the proposal;

(xxiv) The user agency shall establish and operate a Vocational Training Institute having capacity to impart training in at-least five disciplines, to be decided by the State Government concerned in consultation with the user agency, for the benefits of the eligible unemployed youth in the project affected villages. The user agency should also endeavour to employ such trained manpower in their own industry or any other appropriate industry, preferably located in vicinity of the forest land being diverted; and

(xxv) The user agency shall maintain an independent Social Welfare Department/ Division and follow the subsequent condition of the project-affected and the project-displaced persons in such a way as to understand their socio-economic conditions before and after the project and take such corrective measures as are necessary to restore them to their original or better-than-original condition;

(xxvi) The user agency will continue to provide vehicular mobility to the Addl. Director General of Forest (Forest Conservation)in the Ministry of Environment and Forests;

(xxvii) Any other condition that the Eastern Regional Office of this Ministry, Bhubaneswar and State Government of Odisha may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxviii) User agency shall submit annual self-monitoring report, indicating status of compliance to the conditions stipulated in the approval, to the State Government and the concerned Regional Office of this Ministry; and

(xxix) 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.

Yours faithfully,

08/07/2015

(H. C. Chaudhary)
Assistant Inspector General of Forests

Copy to:

1. The Secretray, Ministry of Steel, Government of India.
2. The PCCF, Government of Odisha, Bhubaneshwar.
3. The Nodal Officer, O/o PCCF, Government of Odisha, Bhubaneshwar.
4. The Addl. Principal Chief Conservator of Forests (Central), Regional Office, Bhubaneshwar.
5. The User Agency.
6. The Monitoring Cell, FC Division, MoEF, New Delhi.
7. Guard File.

08/07/2015

(H. C. Chaudhary)
Assistant Inspector General of Forests

ANNEXURE 4.3: STAGE II FC OF ML-162

F. No. 8-18/2014-FC
Government of India
Ministry of Environment, Forests and Climate Change
(FC Division)

Indira Paryavaran Bhawan,
Aliganj, Jor Bag Road,
New Delhi - 110003.

Dated: 23rd October, 2017

To,

The Principal Secretary (Forests),
Government of Odisha,
Bhubaneswar.

Sub: Diversion of 77.94 ha of forest land including 2.562 ha of safety zone area for development of mining infrastructure in Toda RF in ML-162 Lease of M/s Steel Authority of India Limited (SAIL) under Bonai Forest division in Sundergarh District, Odisha during 2nd RML period.

Sir,

I am directed to refer to the Government of Odisha's letter No 10F (Cons) 63/ 2014-3792/ F&E Bhubaneswar dated 24.02.2014 on the above-mentioned subject, wherein prior approval of the Central Government for the diversion of 77.94 ha of forest land including 2.562 ha of safety zone area for development of mining infrastructure in Toda RF in ML-162 Lease of M/s Steel Authority of India Limited (SAIL) under Bonai Forest division in Sundergarh District, Odisha during 2nd RML period was sought. After careful consideration of the proposal by the Forest Advisory Committee constituted by the Central Government under Section-3 of the said Act, in-principle approval for the said diversion was granted vide this Ministry's letter of even number dated 10.02.2015 , subject to fulfilment of certain conditions.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Govt. of Odisha vide their letters No. 10 F (Cons) 66/2015/19211/ F&E dated 08.06.2016 , No.10F (Cons) 66/2015/19211 dated 21.10.2016 and No.10 F (Cons) 237/201613400/F&E dated 24.06.2017. **Stage-II/Final approval** of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 77.94 ha of forest land including 2.562 ha of safety zone area for development of mining infrastructure in Toda RF in ML-162 Lease of M/s Steel Authority of India Limited (SAIL) under Bonai Forest division in Sundergarh District, Odisha during 2nd RML period subject to following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation (CA) over the degraded forest land, twice in extent to the area of forest land proposed to be diverted, equivalent to shall be raised on the identified forest land within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved Plan by the State Forest Department from the funds provided by the user agency;

(iii) **The penal compensatory afforestation** over degraded forest land, five times in extent to the area of forest land used for non-forest purpose without obtaining requisite approval under the FC Act shall be raised on the identified forest land within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved Plan by the State Forest Department from the funds provided by the user agency;

(iv) Following activities, as per approved plan/schemes, shall be ensured by the user agency under the supervision of the State Forest Department:

(a) Mitigative measures to minimize soil erosion and choking of stream shall be initiated to be implemented within a period of three years with effect from the date of issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department;

23.10.17

(b) Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme;

(c) Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme;

(d) Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 28° ; and

(e) No damage shall be caused to the top-soil and the user agency will follow the top soil management plan.

(v) The user agency shall pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(vi) The User agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986;

(vii) The State Govt. ensure that the user agency shall implement the land surrender schedule in accordance with the approved mine plan and progressiye mine closure plan;

(viii) Fencing, protection and regeneration of the safety zone area [7.5 meters strip shall be kept within the mining lease boundary and area of the safety zone shall be part of the total area of mining lease as per the Ministry's guidelines dated 27.05.2015] shall be done within three years at the project cost as per approved scheme. Besides this afforestation on degraded forest land to be selected elsewhere measuring one & a half times the area under safety zone shall also be done at the project cost;

(ix) 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 0.4), if any, located in the area within 100 meters from outer perimeter of the mining lease;

(x) 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 and Regulation) Act, 1957, as amended and the Rules framed there-under;

(xi) User agency either itself or through the State Forest Department shall ensure afforestation on degraded forest land, one and half times in extent to the area used for safety zone as per the approved plan/scheme at the cost of the user agency;

(xii) The State Govt. and the User agency shall ensure 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 preferably within five years ;

(xiii) User agency shall provide firewood preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on the adjacent forest areas;

(xiv) The State Govt. ensure that 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. The said R&R Plan will be monitored by the State Government/Regional Office of MoEF &CC along with indicators for monitoring and expected observable milestones.

(xv) The State Govt. and the User agency shall ensure mining in a phased manner and take due care for reclamation of the mined over area. The concurrent reclamation plan shall be executed by the User Agency as per the approved mining plan/scheme and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, Government of Odisha and the Addl. Principal Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office, Bhubaneswar. 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 Addl. Principal Chief Conservator of

23.10.17

Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed;

(xvi) No labour camp shall be established on the forest land;

(xvii) Boundary of the mining lease and safety zone 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, distance from pillar to pillar and GPS Co-ordinates;

(xviii) Forest land shall not be used for any purpose other than that specified in the proposal;

(xix) The user agency shall submit the annual self -compliance report in respect of the above conditions to the State Government, concerned Regional Office and this Ministry by the end of March every year regularly.

(xx) Any other condition that the Regional Office, Bhubaneswar of this Ministry, may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxi) **As the status of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is sub-judice, the State Government shall ensure complete compliance on provisions of FRA- 2006 as per the final direction of Hon'ble High Court in Writ Petition no. 3105/2015;** and

(xxii) The State Government and User Agency shall ensure compliance to all conditions stipulated in the Stage-I approval for which undertakings have been obtained from the user agency and also the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) & NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.

Yours faithfully,

(Sandeep Sharma) 23.10.17

Assistant Inspector General of Forests (FC)

Copy to:

1. The Principal Chief Conservator of Forests, Government of Odisha, Bhubaneswar.
2. The Nodal Officer, O/o the PCCF, Government of Government of Odisha, Bhubaneswar.
3. The Addl. PCCF (Central) (FCA), Regional Office, Bhubaneswar
4. Monitoring Cell, FC Division, MoEF&CC .
5. Guard file.

(Sandeep Sharma) 23.10.17

Assistant Inspector General of Forests (FC)

APPENDIX

ADDENDUM TO EIA / EMP REPORT

Amendment in Environmental Clearance Due to Amalgamation of Two Adjacent Leases of Barsua-Taldih-Kalta Iron Ore Mining Project of SAIL

{EC letter no . J-11015/351/2006-IA.II(M) dt. 29th October, 2010}
(Amended Vide letter no. J-11015/351/2006-IA.II(M) (pt.) dt. 30th March, 2016)
(2nd Amendment Vide letter no. J-11015/351/2006-IA.II(M) dt. 3rd July, 2020)
(3rd Amendment Vide letter no. J-11015/351/2006-IA.II(M) dt. 17th March, 2021)

Barsua-Taldih-Kalta Iron Ore Mining Lease

At Villages Tantra, Bahamba & Toda Reserve Forest, Koida Tehsil Sundargarh District, Odisha

MEC/11/S2/A239/EA/2616/R.0. **August, 2021**

स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED
Rourkela Steel Plant
Barsua Iron Mine
PO – Tensa, Dist. Sundargarh
Odisha – 770042
Project Proponent

MECON LIMITED
(A Govt. of India Enterprise)
Vivekananda Path
PO. Doranda
Dist – Ranchi, Jharkhand - 834002
Certificate no: NABET/EIA/2023/RA 0195
Environmental Consultant

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ABBREVIATIONS

AAQ	*Ambient Air Quality*
AMSL	*Above Mean Sea Level*
ANFO	*Ammonium Nitrate Fuel Oil*
BDL	*Below Detection Limit*
BF	*Blast Furnace*
BHJ	*Banded Hematite Jasper*
BHQ	*Banded Hematite Quartz*
BO	*Beneficiable Ore*
BOD	*Biochemical Oxygen Demand*
CPCB	*Central Pollution Control Board*
d	*day*
dB(A)	*decibels (A weighted scale)*
DG	*Diesel Generator*
DGMS	*Directorate General of Mines Safety*
EC	*Electrical conductivity*
EET	*Emission Estimation Technique Manual for Mining Version 2.3 (DEH 2001) (Australia)*
EIA	*Environmental Impact Assessment*
EMP	*Environmental Management Plan*
FDM	*Fugitive Dust Model*
g	*gram*
GLC	*Ground Level Concentration*
ha	*hectare*
HEMM	*Heavy Earth Moving Machinery*
hr	*hour*
HSD	*High Speed Diesel*
Hz	*Hertz*
IBM	*Indian Bureau of Mines*
IMD	*India Meteorological Department*
ISC3	*Industrial Source Complex Model, Release 3*
l	*litre*
Leq	*Log equivalent*
m RL	*metre Reduced Level*
ML	*Mining Lease*
MoEFCC	*Ministry of Environment, Forest and Climate Change Govt. of India*
MPN	*Most Probable Number*
Mt	*Million tonnes*
MTPA	*Million tonnes per annum*
NAAQS	*National Ambient Air Quality Standard*

Nm^3	*Normal cubic metre*
NOx	*Oxides of Nitrogen*
NPI	*National Pollutant Inventory (of Australia)*
NTU	*Nephelometric Turbidity Units*
PM_{10}	*Particulate Matter <10 micron size*
$PM_{2.5}$	*Particulate Matter <2.5 micron size*
PPE	*Personal Protective Equipment*
RDS	*Respirable Dust Sampler*
RF	*Reserved Forest*
Rly	*Railway*
RMD	*Raw Materials Division*
ROM	*Run of Mine*
RPM	*Respirable Particulate Matter*
RSP	*Rourkela Steel Plant*
s	*Second*
SAIL	*Steel Authority of India Limited*
Sdg.	*Siding*
SO_2	*Sulphur-di-Oxide*
t	*tonnes*
ToR	*Terms of Reference*
TPH	*Tonnes Per Hour*
UNFC	*United Nations Framework Classification*
USEPA	*United States Environment Protection Agency*

Replies to Points Raised by EAC – Non-Coal Mining Projects Regarding Amendment of Environmental Clearance of Barsua-Taldih-Kalta Iron Ore Mines of SAIL for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases without change in production capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006

Sl. No.	Point Raised	Reply
1	The Project Proponent should submit the current environmental status, current practices followed during mining which includes extraction of mineral, dumping of mineral, tailing ponds, processing plants and its ultimate disposal covering both ML – 130 (2486.383 ha) and ML – 162 (77.94 ha) with EIA/EMP report.	**The current environmental status has been studied** on the basis of baseline environmental data generated during March – May, 2021 and given in Clauses 3.6 & 3.7 in Chapter 3 of the Addendum to the EIA/EMP Report. **Extraction of Mineral:** Barsua-Taldih-Kalta Mine is divided into three blocks namely Barsua (operational since 1960), Kalta (operational since 1966) and Taldih (operational since Nov., 2016). Mining is carried out by conventional open cast mining involving drilling, blasting and excavation of ore & waste by shovel dumper combination. The present total mine capacity of 8.05 MTPA (Barsua - 3.5 MTPA, Kalta – 3.2 MTPA, Taldih – 1.35 MTPA). The details are given in Clause 2.5.2 of Chapter 2. The ore from Barsua Mine is beneficiated and moved by covered conveyors to the railway wagon loading facilities in Barsua Valley. At Taldih Mine, ROM ore is crushed, screened and despatched by trucks through public roads to the railway the railway wagon loading facilities in Barsua Valley. At Kalta Mine, ROM is crushed & screened before being despatched by trucks through NH-520 to Roxy Railway Siding. **Dumping of Mineral**: At all three mining blocks, overburden and sub-grade ore are dumped externally in dedicated areas within the lease & potion of OB at Barsua Mine is used for backfilling. Tailings from the mineral beneficiation process are dumped in an engineered tailings pond. EC has been accorded vide MoEFCC's EC Amendment letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July, 2020 for excavation and sale of 0.5 MTPA accumulated sub-grade ore each from Taldih and Kalta Blocks and for excavation and sale of 1 MTPA of tailings. The details of waste dumping are given in Clause 2.5.2 of Chapter 2 **Tailing pond:** Barsua Tailings pond is spread over 35.88 ha of which 3.95 ha is located within the mine lease (ML-162) and the balance 31.93 ha is located outside the lease area in acquired land by SAIL adjoining to amalgamated lease at Barsua Valley.

Sl. No.	Point Raised	Reply
		About 2.1 Mm^3 (or around 4.1 million tonnes) of tailing is stored in the pond. Subsequent to grant of EC amendment for excavation & dispatch of tailings from the Barsua tailings Pond, so far about 4.5 lakh tonnes of tailings has been evacuated from the tailings pond and sold in the open market since December 2020. A regular evacuation of tailings from the tailings Pond shall continue @ 0.5 to 1 MTPA, which will create space for storage of freshly generated tailings. **Processing Plant:** The ore from Barsua Block is processed at Beneficiation Plant which is operating @ 3.5 MTPA. The ore is beneficiated through both dry circuit as well as wet circuit. Barsua ore beneficiation plant is divided into three separate sections viz crushing plant, washing plant and dry screening plant having capacity of 3.5 MTPA. The crushing plant consists of two lines with rated capacity of 700 tph each. One line is normally used for Direct Ore (DO) and the second line for Beneficiable Ore (BO). The details are given in Clause 2.5.3 of Chapter 2 of the Addendum to the EIA/EMP Report. The existing beneficiation plant of Barsua is spread over ML – 130, ML – 162 and Acquired Land. Crushing & Washing Plant are located in ML – 130. Jigging plant, downhill conveyors, Thickeners, etc, are located in ML – 162. The dry screening plant, ore stock piles, Railway Siding etc. are located in the acquired land. At Taldih mine, ROM ore is processed through two nos. of 300 tonnes per hour (TPH) mobile Screening Plants and two nos. of 300 TPH mobile Crushing & Screening Plants. The processed ore is despatched by trucks through public roads to the railway the railway wagon loading facilities in Barsua Valley. At Kalta Mine, ROM ore two nos. of 300 tonnes per hour (TPH) mobile Screening and two nos. of 300 TPH mobile Crushing & Screening Plants. Part of the ore at Kalta Mine is also produced through manual sizing and sorting. The processed ore is despatched by trucks through NH-520 to Roxy Railway Siding. The locations of various facilities, their area and their clearance status are given in Tables 4.2, 4.3 and 4.4 in Chapter 4.
2	The Project Proponent needs to submit the status of beneficiation plant within the lease area and details of EC for beneficiation plant if any.	**Status of Beneficiation Plant Within the Lease Area:** The Barsua Ore Beneficiation Plant processes ore from Barsua Block of Barsua-Taldih-Kalta Mines. Presently the Beneficiation Plant is operating @ 3.5 MTPA. The existing beneficiation plant was spread over a total area of 57 ha of which 7 ha is within ML130 and

Sl. No.	Point Raised	Reply
		50 ha is within ML 162. **Details of EC for Beneficiation Plant:** SAIL's Barsua-Taldih-Kalta Iron Mines had received Environmental Clearance (EC) from Ministry of Environment and Forests (MoEF) (as MoEFCC was earlier called) vide their letter no. J-11015/351/2006-IA.II (M) dated 29th October, 2010 for increase of total production to 8.05 MTPA (2.5 MTPA from Barsua + 4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. On page 2 under Para 2 of EC grant order,it is stated that the "*There is an existing beneficiation plant having a capacity of 2.5 million TPA within the mine lease having an area of 7 ha and 50 ha outside the mine lease (total area of 57 ha). In addition, the new beneficiation plant with a capacity of 4.25 million TPA will be setup in an area of 83 ha, out of which 50 ha will be within the mine lease and 33 ha, outside mine lease. The pelletisation plant also be outside the mine lease. The tailing pond is located outside the mine lease in Barsua Valley in an area of 35.88ha*" The EC was amended vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 30th March, 2016 for: 1. Permission to operate of the Beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA 2. To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease. The EC was amended vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July, 2020 for changing the production from Barsua Block to 3.5 MTPA. As per the latest EC Amendment accorded vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 17th March, 2021 this has remained unchanged i.e. Barsua Beneficiation Plant is operating @ 3.5 MTPA.
3	The Project Proponent must include current baseline data and the recent Public concerns.	The Addendum to the EIA/EMP Report, which is attached **Appendix**, has been prepared on the basis of baseline environmental data generated during March – May, 2021 (refer Clauses 3.6 & 3.7 in Chapter 3 of the Report). Concerns of the local public have been given in Clause 3.8 in Chapter 3 of the Report.
4	The Project Proponent submitted that out of 2564.323 ha, 2425.613 ha Forest Land (Toda R.F.) and 138.710 ha Non-Forest Land. PP obtained Stage-II FC for	5.742 ha Forest Land, which was part of ML – 130, is under occupation of the local Schedule Tribe & Other Traditional Forest Dwellers in village Tantra. Their individual rights have been recognized by granting pattas under Forest Right Act.,2006 {refer copy of Certificate Regarding Compliance of

Sl. No.	Point Raised	Reply
	2341.931 Ha vide letter dated 06.03.2013 and for 77.94 ha for development of mining infrastructure vide letter dated 23.10.2017. PP needs to submit the status of remaining forest land of 5.742 ha and submit the copy of Forest Clearances obtained.	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006} which is enclosed as **Annexure 1.10**}. Stage-II forest clearance for diversion of forest land over 2341.931 ha in ML – 130 was granted by MoEFCC vide F. No. 8-90/2011-FC (pt), dated 06.03.2013 (copy enclosed as **Annexure 1.8**). MoEFCC vide order No. F.No.8-18/2014-FC dated 23.10.2017 granted Stage-II FC for diversion of entire 77.94 ha of forest land under ML – 162 for development of mining infrastructure (copy enclosed as **Annexure 1.9**). Hence, Stage – II forest clearance over 2419.871 has been obtained covering under the amalgamated lease.

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Steel Authority of India Limited (SAIL), a Maharatna public sector undertaking under Ministry of Steel, Government of India, is having Integrated Steel Plants at Bokaro, Durgapur, Rourkela, Bhilai & Burnpur. SAIL sources its entire requirement of iron ore and part of its requirement of limestone, dolomite and coking coal from its captive mines located in the states of Jharkhand, Odisha, Chhattisgarh and Madhya Pradesh.

One of SAIL's captive iron ore mines is Barsua-Taldih-Kalta Iron Ore Mine, which is located in Villages Tantra & Bahamba and Toda Reserve Forest (R.F.), PS / Tehsil: Koida, Bonai Sub-division, Sundergarh District of Odisha. The Mining Lease area is 18 km long and comprises of 3 mining blocks namely Barsua (Southern part), Taldih (Middle part) and Kalta (Northern part).The lease falls in Survey of India Toposheet bearing No.73G/1 (F45N1) and is bounded by latitudes from $21^0$49"25.43800" to $21^0$59"50.88516"N and longitudes from $85^0$07"43.73832" to $85^0$13"53.48136"E. In addition to ML-130, SAIL has another lease ML-162 spread over 77.94 ha adjacent to ML-130 on its south-western side, which is non-mineralized. Parts of Barsua Beneficiation Plant, part of the tailings pond and some mineral handling facilities are located in this area. On account of non-mineralization of ML-162 lease and the same is being utilized as an infrastructure lease for ML-130 lease, Indian Bureau of Mines, Bhubaneswar suggested for amalgamation of both the leases. Consequently, SAIL vide letter dated 01.08.2020, a request was made to Govt. of Odisha to amalgamate ML-130 with ML-162 mining leases. Based on SAIL's application, Deptt. of Steel and Mines, Govt. of Odisha vide proceeding No. IV (B) SM-03/2020/10418/SM, Bhubaneswar, Dtd. 02.12.2020 amalgamated the contiguous Mining Leases viz ML– 130 (2486.383 ha) and ML–162 (77.94 ha) covering total area of 2564.323 ha having validity up to 05.01.2030. Lease deed of the amalgamated lease was executed on 30.03.2021.

SAIL has also acquired 164.626 ha land adjacent to ML-162 for locating mineral handling and despatch facilities. In addition SAIL has acquired 224.767 ha of land for setting up three townships. Thus Barsua-Taldih-Kalta Mine Complex comprises of:

a) Mines, part of beneficiation facilities and part of tailings pond in Amalgamated Lease (ML-130 + ML-162) spread over 2564.323 ha
b) Mineral Handling Infrastructure in Acquired Area outside ML Areas in Barsua Valley spread over 164.626 ha (*In original EC granted by MoEF vide letter no. J-11015/351/2006–IA.II(M) dt. 29-10-2010 it has been mentioned that part of beneficiation plants, tailings pond and infrastructure are located "outside lease area". In EC amendment dt. 30-03-2016 it has been specified that "Outside Area" means "ML-162 Lease and Acquired Area"*)
c) Three townships in Acquired Area outside ML Areas spread over 224.767 ha (*In original EC dt. 29-10-2010 it has been mentioned that townships are located "outside lease area". In EC amendment dt. 30-03-2016 it has been specified that "Outside Area" means "ML-162 Lease and Acquired Area"*).

Environmental Clearance for Integrated Barsua – Taldoh – Kalta Iron Ore Mining (ML – 130) was granted by MoEF vide letter no. J-11015/351/2006–IA.II(M) dated 29th October, 2010 for increase of production to 8.05 MTPA (2.5 MTPA from Barsua +

4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. Subsequently the EC was amended temporarily for a period of five years for re-distribution of production from three mining blocks under ML – 130 by MoEFCC's letter no. J-11015/351/2006-IA.II(M) dated 30th March, 2016 (i) to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 MTPA, (ii) permission to operate existing beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA & (iii) permission for road transportation of part of iron ore from Taldih to Barsua Valley (~11 km) and to Barsua beneficiation plant for a period five years till crushing plant, LDBC are erected and commissioned for the Taldih block. The EC was further amended for change in excavation & dispatch pattern with provisions for dispatch of tailings / dump fines from three mining blocks under ML – 130 by MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July 2020 for Excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum up to 1 MTPA tailings from the tailings pond at Barsua for selling, excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA from Fines Stocks from each block for selling. The EC was again amended MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 17-03-2021 for redistribution of production amongst the three blocks; Barsua production would remain unchanged at 3.5 MTPA, Taldih's production would be reduced to 1.35 MTPA & Kalta's production would be increased to 3.2 MTPA. All other mining parameters (lease area, technology, beneficiation process, mode of mineral transport would remain unchanged.

Out of 2564.323 ha lease area, 2425.613 ha is Forest Land (Toda R.F.) and 138.710 ha Non-Forest Land. Stage-II forest clearance for diversion of forest land over 2341.931 ha in ML – 130 was granted by MoEFCC vide F. No. 8-90/2011-FC (pt), dated 06.03.2013. MoEFCC vide order No. F.No.8-18/2014-FC dated 23.10.2017 granted Stage-II FC for diversion of entire 77.94 ha of forest land under ML – 162 for development of mining infrastructure. The remaining 5.742 ha forestland, which was part of ML – 130, is under occupation of the local Schedule Tribe & Other Traditional Forest Dwellers in village Tantra. Their individual rights have been recognized by granting pattas under Forest Right Act.,2006 .

Modification of Mining Plan for Amalgamated Mining Lease (2564.323 ha) of Barsua-Taldih-Kalta Iron Mine has been approved by IBM, Bhubaneswar vide letter No MP/A/39-ORI/BHU/2020-21, dated 01.04.2021.

2.0 PRESENT PROPOSAL

The present proposal is for Environmental Clearance for Change in Project Configuration of Barsua-Taldih-Kalta Iron ore Mining Project of SAIL for increase in Mine Lease Area from 2486.383 ha to 2564.323 ha due to amalgamation of the two separate leases (ML-130 and ML-162) without changing the total approved capacity of the entire mine (8.05 MTPA).

3.0 PRESENT ENVIRONMENTAL STATUS

Environmental Engineering Laboratory of MECON Ltd. has carried out baseline environmental data generation in and around Barsua-Taldih-Kalta Iron ore mines during March-May, 2021 (Summer season) covering Micro-meteorology, Ambient Quality, Ambient Noise levels Surface & Ground Water Quality and Soil Quality. The mine authorities are also regularly monitoring Work Zone Air quality.

3.1 Micro-meteorology

Meteorology plays a very important role in the environmental impacts of mining project. Meteorological conditions govern the dispersion (and hence dilution) of air pollutants. Hence Meteorological studies form an integral part of environmental impact assessment studies. A micro-meteorological station was set up near Barusa mines at Tensa Guest house. The meteorological data was generated hourly during the monitoring period from March to May 2021. Wind speed & direction, air temperature and relative humidity were recorded at hourly intervals continuously throughout the monitoring period. Rainfall was recorded on a daily basis.

During the monitoring period, at Tensa Guest House, wind was mostly blowing from South-West (prevailing for ~24.8% of the time) and South-East ((prevailing for ~11.9% of the time); calm conditions (wind speed <0.44 m/s) prevailed for ~23.2% of the time. During day time predominant wind directions were also South-West (~19.7%) and South-East (~11.2%); calm conditions prevailed for ~22.6% of the time. During night time the predominant wind directions were directions were also South-West (~30.9%) and South-East (prevailing for ~12.7% of the time); calm conditions prevailed for ~23.8% of the time. During the monitoring period the predominant wind speeds were mostly in the range of 0.44 m/s– 2.0 m/s.

Air temperatures ranged between 15.5^{o}C & 37.5^{o}C. Unusually heavy rainfall activity was recorded during May (total monthly rainfall – 741 mm) mainly due to the effects of Cyclone "Yaas"; 305 mm rainfall was recorded over 24 hours on 26-05-2021 due to this cyclone.

3.2 Ambient Air Quality

Ambient Air Quality was monitored at the following eight locations during the monitoring season:

1. Kalta Township (~0.45 km SW of Kalta Mine)
2. Jhirpani Village (~0.65 km W of Kalta Mine)
3. Bandhala Village (~2.2 km ESE of Taldih Mine)
4. Tantara Village (in Mine Lease Area – Core Zone)
5. Taldih Village (~5.3 km NW of Taldih Mine)
6. Barsa Mine office (~0.2 km E of Barsua Mine)
7. Tensa Township (near Barsua Mine - ~0.6 km SE of Barsua Mine)
8. Shashikela Village (~2 km W of Barsua Mine in Barsua Valley).

The ambient air quality was evaluated in terms of Particulate Matters (PM_{10}, $PM_{2.5}$), Sulphur-di-oxide (SO_2), Oxides of Nitrogen (NO_2), Carbon Monoxide (CO), Ammonia, (NH_3), Ozone (O_3), Benzene (C_6H_6), Benzo(a)Pyrene (BaP), Lead (Pb), Nickel (Ni), Arsenic (As) and free silica in PM_{10}.

The samples were collected twice a week for twelve weeks during summer season,2021. Samples of 24 hourly durations were collected for PM_{10}, $PM_{2.5}$, SO_2, NO_2 and NH_3. Hourly samples were taken for CO and O_3; four-hourly samples were collected for benzene. Benzo(a)Pyrene (BaP), Lead (Pb), Nickel (Ni), Arsenic (As) and free silica were analysed in selected samples at all the locations determined from PM_{10}.
The results were compared with National Ambient Air Quality Standards (NAAQS), 2009. The results indicated that the ambient air quality is within the norms for "Industrial, Residential, Rural & Other Areas"

Free silica has been analysed in Respirable Dust (PM_{10}) in three samples at each AAQ locations. The free silica values at all the AAQ locations are in traces and well below the detection limit. The maximum concentrations were with range of 0.001 to 0.099 µg/m^3 which are well below the limits. In terms of respirable dust, silica concentration in permissible limit as recommended by DGMS, GOVT. of India is 3 mg/$m^3$for eight hours' time weighted average provided the concentration of silica in the respirable dust remains less that 5% (DGMS (Tech.) (S&T) Circular No.01, Dhanbad, dt.21.01.2010).

3.2 Work Zone Air Quality

Monitoring of fugitive emissions in work zone are being carried out at twelve locations; five in Barsua Iron Mine (BIM), three in Taldih Iron Mine (TIM) and four in Kalta Iron Mine (KIM). The locations covered drilling areas, excavation areas, haul roads, dumps, crushing & screening areas as well as stock-pile & wagon loading areas i.e. all operations of the iron ore mining & beneficiation complex. At the existing iron ore complex all the recorded PM levels were below the maximum permissible limit of 1200µg/m^3 at a distance of 25±2 m.

3.3 Water Quality

Water quality monitoring was carried out at sixteen (16) locations during summer, 2021 covering eight (08) surface water samples and eight (08) ground water samples. Effluents are generated at the mine from the wet beneficiation process. Effluents generated from the beneficiation plants are treated in thickeners followed by tailing ponds. 60% clear water is recycled and the underflow from the thickener is discharged into tailing Dam. As there is direct overflow from the Tailings Pond during the study period, the dam seepage water has been analysed and compared with water criteria for surface water.

Surface water samples were analysed for different parameters as required by CPCB's Water Quality Criteria for Surface Water and also with different parameters as per IS: 10500 (2012) Amendment No. 1, 2015. In absence of any norms for ground water, the analysis results of ground water samples were compared with Drinking Water Specification IS:10500.

Water from four of the surface water sampling locations is suitable "For drinking after conventional treatment and disinfection". Water from the remaining four locations can be used for "Outdoor Bathing (Organised)".

The results indicate that all the ground water quality parameters analysed to assess the ground water quality in study area meets the prescribed norms except some values of Manganese in GW4 (Sarkunda Village) & GW6 (Barsua township).

3.4 Noise Levels

To have an idea of the present background noise level in the study area, hourly noise levels were recorded continuously for 24 hours at ten locations during baseline monitoring season. Among the ten locations, the location "Barsua Mine office" falls under "Industrial area" and the remaining locations are "Residential areas". The results have been compared with ambient air quality norms in respect of noise (as per schedule III, Rule 3 of EP (Rules). The ambient noise levels at all the nine residential locations and one industrial area are well within the norms.

The noise levels are monitored at twelve locations in work zone, five locations in Barsua Iron Mine (BIM), three locations in Taldih Iron Mine (TIM) and four locations in Kalta Iron Mine (KIM). The work zone noise results have been compared with Occupational Safety and Health Administration standards (OSHA) and as per MoEF standard for 8 hr exposure is 90 dB (A).The noise levels at all the locations were well within the norms.

3.5 Traffic Density

Traffic Density has been studied on the haul routes at four locations:

1. On the public road near Barsua Public Siding (TDS1).
2. On the public road going from Koida to Barsua Valley near Tensa Guest House (TDS2).
3. On the public road going from Koida to Barsua Valley just beyond Taldih Mine towards Barsua Valley (TDS3).
4. On NH-520 at Toda Village at Toda (between Kalta Mines gate & Roxy siding) (TDS4).

Traffic of two-wheelers, light motor vehicles and heavy vehicles going both-ways was recorded every hour continuously for seven days during the monitoring period.

The Tensa-Barsua Road (TDS 2 & TDS 3) is a Two-lane road in Rolling Terrain with surfaced shoulders of at least 1.5 m on either side (i.e. capacity – 12,650 PCUs/day PCUs/day as per IRC:64). The road near Barsua Siding (TDS1) is also a two-lane road but on "Plain Terrain" (i.e. capacity – 13800 PCUs/day as per IRC:64). The Kalta– Roxy Siding Road (NH-520) is a "four-lane divided carriage-ways in plain terrain" (i.e. capacity – 35000 PCUs/day as IRC:64).

A present the traffic volumes at TDS1, TDS2, TDS3 and TDS4 are within the respective Recommended Design Service Volumes.

3.5 People's Perception

An opinion poll was carried out during June, 2021 to get an idea about local people's perception regarding Barsua-Taldih-Kalta Mines of SAIL.

It is observed that 74.5% of them have identified creation of employment opportunity as the main advantage. People are hopeful of getting employment in the vicinity of the Barsuan-Taldih-Kalta Mines. About 78.2 % of the respondents are expecting improvement in business. About 72.7% of respondents are expecting that the educational facility will improve around the study area. Around 81.8% of the respondents feel improvement in peripheral development activities. The major disadvantage is that about 25.5 % of the respondents are showing concern to health due to environmental pollution.

During the survey local people pointed out that in view of the prevailing Covid-19 pandemic students are forced to attend classes online. Due to poor internet connectivity in the region children are unable to attend such on-line classes properly. Local people expect that SAIL should arrange to improve internet connectivity in the region.

Local people agree that SAIL has contributed much to the health care delivery system in the region. But there is scope for improvement.

3.6 Ecology

The study area lies in the Eastern Highlands sub-zone of the Eastern Plateau and Hills agro-climatic zone. Most of the area is hilly. Almost the entire area is rural. Most of the lease area lies within Torha Reserved Forests. In addition there are a number of other Reserved Forests (R.Fs.) within the study area.

These forests are classified as Moist Peninsular Valley Sal Forests, sub-group of Northern Tropical Moist Deciduous Forests. In some areas, Dry Deciduous Scrub Forests have developed due to biotic influences. Besides forests, the core zone comprises of grasslands, rural settlements, mines & mining infrastructure and plantations (created as the mine's green belt & plantations).

The common trees in this region are *Shorea robusta* (the most common species)*, Pterocarpus marsupium, Terminalia tomentosa, Terminalia belirica, Terminalia chebula, Ficus sps., Schleichera oleosa, Mangifera indica, Diospyros melanoxylon, Buchnania lanzan, Gmelina arborea, Anogeissus latifolia, Careya arborea etc.*

Due to round the clock mining operations diversity of animals is low especially in Barsua Block as the animals have been displaced by clearance of vegetation, and scared off by noise & vibrations from mining & allied operations and illumination of the mining areas . Taldih Block commenced operations only a few years ago. Barking deers, wild pigs, rabbits, jackals and other common small mammal are regularly seen in Taldih Block. In Kalta Block too these animals are often seen especially as there are dense forests on relatively less steep grounds. Elephants are seasonal visitors to the forests around the tailings pond in Barsua Valley; they also bathe and drink from the tailings pond.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS

4.1 Impacts on Land Use

The amalgamation of the two leases shall have no impacts on land use as both leases are under SAIL's possession and the scale of operations shall remain unchanged.

4.2 Impacts on Traffic

The amalgamation of the two leases of SAIL shall not lead to any increase in traffic as production from SAIL's Barsua-Taldih-Kalta Mines shall remain at the levels for which permission has been granted vide EC Amendment Letter No. 11015/351/2006-IA.II(M) dt. 17-03-2021.

4.3 Impacts on Air Quality

Iron ore handling and transportation activities generate fugitive dust. During transportation of

ore outside the lease area, the emission shall be limited to close to road sides. Oxides of Nitrogen (NOx) and Carbon Monoxide may also be present in emissions of diesel powered vehicles and mining machinery.

Under the present proposal no change in Air Quality is anticipated as the level of mining & allied activities shall remain unchanged.

4.4 Impacts on Noise Levels

Under the present proposal no change in Noise Levels are anticipated as the level of mining & allied activities shall remain unchanged.

4.5 Impacts on Water Quality

No additional water shall be required for the proposed changes in Barsua-Taldih-Kalta Lease Area as present operations shall remain unchanged.

5.0 MITIGATION MEASURES

Barsua –Taldih – Kalta iron ore mines are located in forest and hilly region. Adequate measures for safeguarding the environment around the mines have already been adopted over the years. A step beyond compliance, Environmental Management System (EMS) has been implemented at all the three mines i.e. Barsua, Taldih and Kalta Mines and certified to ISO -14001 : 2015.

Over the years, significant improvement in prevention & control of pollution at these iron ore mines has been achieved through introduction of the cleaner technologies and best environmental management practices such as wet drilling, slurry explosives with NONEL Detonation, high capacity excavators &dumpers, Long Distance Belt Conveyers for ore transport, dry fog dust suppression at ore handing areas, ETP for ore washing effluents& garages.

5.1 Prevention & Control of Air Pollution

To control the air pollution due to mining activities, prevention and control measures for fugitive dust emissions have been adopted at various mining activities at the Barsua-Taldih-Kalta Iron Mines. In addition to this, stabilization of waste dumps and increased green cover in the leasehold area as well as in township has also significantly reduced the dust levels in the Township. Efforts are also being made to further strengthen the existing air pollution control measures for continual improvement with a priority to avoid generation of dust at the source itself. The major dust control measures provided at present at Barsua-Taldih-Kalta Iron Mines are as follows:

- Wet drilling to control fugitive dust from drilling
- Use of 28 KL High Pressure Water Sprinklers for Haul Road Dust Suppression
- Fixed Water Sprinklers on permanent haul roads& railway sidings over 6.0 km length at Barsua & Kalta.
- Use of slurry explosives with NONEL Detonation for controlling blasting hazards
- High Capacity Excavators & Dumpers for handling of ore & waste
- Dry fog dust suppression at Barsua Ore Processing Plant
- Long Distance Belt Conveyers for transportation ore

- Stabilization waste dumps through use of geo-textiles and vetiver plantation.
- Installed 3 numbers of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) around the mines to check the efficacy of the pollution prevention measures.
- Installation Wheel washing facilities at Taldih and Kalta at the entry of Public Black Topped Roads to clean the wheels of the tippers before entering the public roads
- Misting Cannons at Mobile Crushing & Screening Plants

5.2 Prevention & Control of Water Pollution

Surface run-off management Structure at Barsua Iron Mine:

The Barsua Mine is located on the hill slope and there is no organised perennial water nalla inside the mine area. Only during rainy season the run-off water of the mine are being channelized through garland drains to settling pit and finally discharged to Kuradih Nalla originated from eastern flank of the mine.

The run-off generated from the dumps and other parts of the mine is managed by the surface run-off management structures within the mine itself. The run-off water is channelized through garland drains of the mine and passed through de-silting pits/dry boulder walls followed by check dams having weep holes constructed at the bottom of external dumps to allow the silt to be settled before final discharges to surrounding environment. In Barsua Iron Mine, total mining area including dumps is divided into 3 Nos. of catchment area such as 1, 2 and 3 based on the surface contour, lithology, land use etc for surface run-off management.

Catchment area 1: This part lies at the north-eastern side of the mine which covers area 3E &W, Dump-5, Dump-1, Dump-9, Dump-8 (part). Total drainage area is approximately 68.60 ha. There is an abandoned pit at 3E, where about 90% of mine drainage of catchment area-1is stored during the monsoon & total holding capacity of the above pit is 577500 m3 as the dimension of the pit is 350m x 110m x 15m which is adequate for handling the total surface run-off from the above area i.e. 32928 m^3 (max.) per two hour.

Catchment area 2:This part lies at the middle portion of the mine which covers Dump-8 (part), Dump-2, Dump-7, Dump-3&4 and mining installations. Total drainage area is approximately 33.01Ha. There are two settling pit (30m x 15m x 2.5m and 50m x 30m x 1.0m) having holding capacity is approx. 2625 m3. Total run-off off the above area is 15845 m^3.

Since, holding capacity is not adequate in this area, the following check dams (53m x 4.0m x 19.0/3.0m, 35m x 4.0m x 6.0/3.0m, 35m x 3.0m x 4.0/2.5m. and 60m x 2.0m x 1.25m respectively) at the bottom of Dump-2, Dump-7 and Dump-9 (external portion) have been constructed to control surface run-off. Some of the photographs are shown below.

Catchment area 3: This part lies at the south-eastern side of the mine which covers Area-2&4, Area-5, sub-grade stack and Dump-10 of area 2 & 4 etc. Total drainage area is approximately 41.107 Ha. Total run-off off the above area is 19731 m^3. There is a settling pit (50m x 50m x 2.0m) having holding capacity is approx. 5000 m^3 which is not adequate for holding the total surface run-off from the above area i.e. 19731 m^3 (maxm.) per two hour. Hence, two nos. of check dams have been constructed at the bottom of Dump 2, Dump-7 (48m x 1.5m x 1.5/1.4m) and at the toe of lump stack of area 2&4 (53m x 4.0m x 19.0/3.0m) to control surface run-off of the area.

Surface run-off management Structure at Taldih Iron Mine:

Taldih Iron Mine is the central block of amalgamated lease. Mining operation in Taldih started in June, 2016. So far four benches have been opened the RL of bottom most bench being 800 m. The mining operations in the Taldih Iron Mine are on the hill top and presently the mining operations including temporary stacking area for sub-grade ores covers about 23 ha. only.

In order to control surface runoff water from the mine pit, earthen bunds and dry boulder walls have been provided at strategic locations. The details of check dams / earthen bunds provided at Taldih Mine are as follows:

Surface run-off management Structure at Kalta Iron Mine:

Most of surface runoff during rainy season from the mining areas is being diverted to the mine quarry / pit, from where the water is being percolated down and augmenting the ground water resources. Retaining walls with garland drains at the bottom of the dumps are being provided to control silt carry and surface runoff from the dumps. The details of the retaining wall already provided are given below:

- 690 m length retaining wall has been constructed at Dump No. 1 near Goarkpur area.
- 80 m length retaining wall has been constructed at Dump No. 4 & 5 near C Block.
- 520 m length retaining wall has been constructed at Dump No. 6.
- 205 metres length retaining wall has been constructed at the Dump No. 9 & 10 near Challan Gate.

For further control of surface runoff from the dump areas, a masonry check dyke of about 450 m length has been constructed in the North-East part of the Dumps No. 1, 2, 3 & 6 to control silt carry over to Najkura Nalla. An area of 14700 sq. mtr in the western portion of the check dam has been earmarked as Settling Pond and being de-silted every year before onset of monsoon.

Further on downstream of Najkura Nalla, another 27 m length Check Dam has been constructed to control silt carry over from the dump areas.

5.3 Plantations

Plantation of native species is being done inside the lease area of Barsua-Taldih-Kalta Iron Mines and nearby areas for creating greenbelt over the years. Safety Zone plantation of 32000 saplings over an area of 93.679 ha has been done through State Forest Department. Apart from this, so far 225865 saplings have been planted covering an area of 110.48 ha since 2010.

In the year 2020-21, total 13000 saplings have been planted over an area of 5.50 ha at Barsua and Kalta blocks.

The plantation efforts will continue at these mines as per the progressive mine closure plan. Besides, Barsua-Taldih-Kalta Iron Mines distributes good quality sapling to local villagers on free of cost to encourage plantation in the nearby areas.

5.4 Pollution Prevention & Control Measures Under Implementation

The following additional measures are recently implemented / under implementation at Barsua-Taldih-Kalta Iron Mines:

- Construction of concrete approach roads at Kalta & Taldih Mines as per the NEERI
- Installation of one additional CAAQMS for real time monitoring of PM_{10}, $PM_{2.5}$, SO_2, NOx and CO at Barsua Railway Siding.
- Regular maintenance of ore transport roads within the leasehold and proper drainage along the roads
- Covering of ore transport vehicles with a tarpaulin sheets to avoid fugitive dust emissions.
- Speed limit and strict prohibition on over taking and overloading.
- Only trained drivers are being employed and all traffic rules are being strictly followed.
- Regular preventive maintenance of the transportation vehicles is carried out to control exhaust emissions.
- Use of high pressure water sprinklers for dust suppression on internal transport roads Covering of ore transport vehicles with a tarpaulin sheets to avoid fugitive dust emissions during use of public roads.
- Tailings excavation will be temporarily suspended during heavy rains.
- The tailings stacking area will have an engineered storm water drainage system routed through settling tanks. Coagulants will be added to the contents of the settling tanks to promote settling of solids. During monsoons, the settling tanks will be regularly cleaned.
- Deployment of truck-mounted mist cannon for dust suppression operations.

All these existing environmental management practices as well as ongoing measures at Barsua, Taldih and Kalta Mines under ML – 130 will further improve environmental quality and land use in the area even after proposed modifications under the proposal and also maintain the socio-economic aspects for a sustainable period.

6.0 CONCLUSION

Amalgamation of ML-162 with ML-130 will have no environmental impacts as:

- The two adjacent leases are adjacent to each other with a common lease boundary and both are under SAIL.
- ML-162 is non-mineralised and only some beneficiation facilities, tailings pond and infrastructure are located within the lease. Some of the accumulated tailings are being excavated and are being sold off after taking necessary permissions including Environmental Clearance (EC).
- Activities going on in the two leases have already been considered in the existing Environmental Clearances
- Part of the tailings pond and some of the mineral despatch facilities extend into areas adjacent to ML-162 which have been acquired by SAIL. These facilities have also been considered in the existing ECs
- The amalgamation shall not involve any new construction except those which already been permitted under the valid ECs.
- The scale of operations shall not deviate from those already specified in the valid ECs.

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1.0 INTRODUCTION

Steel Authority of India Limited (SAIL) is having integrated steel plants at Bokaro, Durgapur, Rourkela, Bhilai & Burnpur and special steels plants at Bhadrawati, Durgapur & Salem and a Ferro-alloys plant at Chandrapur. In order to supply raw materials to its steel plants, SAIL also operates Iron Ore, Limestone, Dolomite, Coking Coal and Manganese Ore mines in the states of Jharkhand, Odisha, Chhattisgarh and Madhya Pradesh.

SAIL has several captive iron ore mining leases in Jharkhand, Odisha and Chhattisgarh. One of SAIL's captive iron ore mining leases is Barsua-Taldih-Kalta Iron Ore Mining Lease (also called ML-130) over 2486.383 ha which is located in Villages Tantra & Bahamba and Toda Reserve Forest (R.F.), PS / Tehsil: Koida, Bonai Sub-division, Sundargarh District of Odisha. The Mining Lease area is 18 km long and comprises of 3 mining blocks namely Barsua (Southern part), Taldih (Middle part) and Kalta (Northern part). Contiguous to the ML – 130, there is another Mining Lease viz ML – 162 (77.94 ha), which is non-mineralized. The ML–162 is being used for evacuation of ore & associated infrastructure facilities.

SAIL's Barsua-Taldih-Kalta Iron Mines has received Environmental Clearance (EC) from Ministry of Environment and Forests (MoEF) (as MoEFCC was earlier called) vide their letter no. J-11015/351/2006-IA.II (M) dated 29th October, 2010 (enclosed as **Annexure 1.1**) for expanding the facilities of ML-130 (2486.383 ha) without any increase in lease area which involves:

i) Increasing ROM iron ore production capacity from 2.54 Million Tonnes Per Annum (MTPA) to 8.05 (2.5 MTPA from Barsua Block, 1.3 MTPA from Kalta Block and 4.25 MTPA from the virgin Taldih block)
ii) Expansion of the existing iron ore beneficiation plant located at Barsua from 2.5 MTPA to 6.75MTPA.
iii) Setting up a new 2.0 MTPA Pellet Plant
iv) Modernisation of existing material handling facilities commensurate with increased production.

The EC was subsequently amended for re-distribution of production from three mining blocks under ML – 130 by MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 30th March, 2016 (enclosed as **Annexure 1.2**) for the following:

i) Temporary permission to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 MTPA as specified in the earlier environmental clearance.
ii) Permission to operate existing beneficiation plant at the rate 4.5 MTPA instead of 2.5 MTPA.
iii) Permission for road transportation of part of iron ore (ROM) from Taldih block to the Barsua Valley (about 11 km) and to the Barsua beneficiation plant for a period five years till facilities viz. crushing plant, LDBC are erected and commissioned for the Taldih block.

iv) To replace "outside mine lease area" with "ML- 162 lease and acquired area" in environmental clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease.

v) To modify the total lease area of ML-130 lease from 2486.391 to 2486.383 ha as per the joint survey committee report (DGPS survey report) of Govt. of Odisha and the lease deed executed by and between the Govt. of Odisha and SAIL on 13th November, 2014.

Note: The amendment for point no (i) to (iii) would be only for 5 years i.e. up to 30.03.2021.

The EC was further amended for change in excavation & dispatch pattern with provisions for dispatch of tailings / dump fines from three mining blocks under ML – 130 by MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July 2020 (enclosed as **Annexure 1.3**) for the following:

1) Excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum up to 1 MTPA tailings from the tailings pond at Barsua for selling. The excavated tailings will be transported through internal road over 2.1 km to the stacking yard and then to Barsua Public Siding by public road over 0.6 km or any other nearby railway sidings,
2) Excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA from Fines Stocks from each block for selling. The excavated sub-grade iron ore fines will be dispatched by road / road & rail,
3) The entire 2.05 MTPA iron ore excavated at Taldih will be trucked directly to Barsua Private / Public Sidings till construction of road from Taldih to Barsua Beneficiation Plant.
4) Continuation of the already amended provisions of EC amendment dated 30.03.2016 (valid up to 30.03.2021) for further two years i.e. up to 31.03.2023, which are:
   a. Permission to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) excavation restricted to 8. 05 MTPA as specified in the earlier environmental clearance,
   b. Permission to operate existing beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA, subject to the certain conditions, in addition to the conditions prescribed in the EC and subsequent amendments."

The EC was again amended vide MoEFCC's letter no. J-11015/351/2006-IA.II (M) dated 17th March, 2021 (enclosed as **Annexure 1.4**) for redistribution of the production amongst the three mining blocks:

- Production from Barsua Block would remain unchanged at 3.50 MTPA.
- Production from Taldih Block would be reduced by 0.7 MTPA to 1.35 MTPA.
- Production from Kalta Block would be increased by 0.7 MTPA to 3.2 MTPA.

All other attributes (ML Area, Mining Method, Mineral Despatch) would remain unchanged.

The mining lease (ML-130) was first granted on 06.01.1960 for a period of 30 years. Application for 1st Renewal of Mining Lease (RML) was submitted on 29.12.1988 for the

period of 20 years from 06.01.1990 to 05.01.2010. 2nd RML was granted for 20 years from 06.01.2010 to 05.01.2030 and the Lease Deed was executed on 13.11.2014. ML – 130 consists of 2347.673 ha forestland and the remaining 138.710 ha is non-forest land. Stage-2 forest clearance for diversion of forest land over 2341.931 ha was granted by MoEFCC vide F. No. 8-90/2011-FC (pt), dated 06.03.2013. The remaining 5.742 ha forest land under ML – 130 is under the occupation of ST & OTFD, for which diversion has not been granted as per ST & OTFD (RFR) Act, 2006. However, the same will not be required till the life of the mines by SAIL.

The associated infrastructure facilities of Barsua Iron Mine are located in the adjoining mining lease viz ML – 162 (77.94 ha), which was granted on 29.04.1960 and subsequently it has been renewed as well as extended up to 28.04.2030 and supplementary lease deed was executed on 24.09.2016. MoEFCC vide order dated 23.10.2017 granted Stage-II FC for diversion of entire 77.94 ha of forest land under ML – 162 for development of mining infrastructure.

Mining Plan for 2nd renewal period for production of 8.05 MTPA was approved by IBM vide letter no. 314(3)/2007-MCCM (CZ)/MP-40 dated 28.07.2008. Subsequently, Scheme of mining for period from 2015-16 to 2019-20 was also approved by IBM vide letter No. No. MS/FM/36-ORI/BHU/2014-15/1843 dated 04.09.2015. Further, Review of Mining Plan for the period from 2020-21 to 2024-25 was approved by IBM vide letter no. RMP/A/16-ORI/BHU/2019-20 dated 08.11.2019. The same was again modified and approved by IBM vide letter no. MRMP/A/48-ORI/BHU/2020-21 dated 03.02.2021.

Based on SAIL's application, Deptt. of Steel and Mines, Govt. of Odisha vide proceeding No. IV(B)SM-03/2020/10418/SM, Bhubaneswar, Dtd. 02.12.2020 amalgamated the contiguous Mining Leases viz ML – 130 (2486.383 ha) and ML – 162 (77.94 ha) covering total area of 2564.323 ha having validity up to 05.01.2030. Lease deed of the amalgamated lease has been executed on 30.03.2021. Modification of Mining Plan for Amalgamated Mining Lease (2564.323 ha) of Barsua-Taldih-Kalta Iron Mines has been approved by IBM, Bhubaneswar vide letter No MP/A/39-ORI/BHU/2020-21, dated 01.04.2021.

1.1 IDENTIFICATION OF THE PROJECT AND PROJECT PROPONENT

1.1.1 The Project Proponent

Steel Authority of India Limited (SAIL), a Maharatna public sector undertaking under Ministry of Steel, Government of India, is the leading steel maker in the country and is having Integrated Steel Plants at Bokaro, Durgapur, Rourkela, Bhilai, Burnpur and Special Steels Plants at Bhadrawati, Durgapur & Salem and a ferro-alloys plant at Chandrapur. SAIL's mines are spread over the states of Jharkhand, Odisha, Chhattisgarh and Madhya Pradesh as captive sources of raw materials for its various plants. The captive mines located in the State of Odisha are under Rourkela Steel Plant, Rourkela whereas the mines located in the State of Jharkhand are under Bokaro Steel Plant, Bokaro. The captive mines located in Chhattisgarh and Madhya Pradesh are under Bhilai Steel Plant, Bhilai. SAIL's Registered Office is at Ispat Bhavan, Lodi Road, New Delhi-110003.

1.1.2 The Project

Barsua-Taldih-Kalta Iron Ore Mining Lease (ML – 130) is spread over 2486.383 ha. The mining lease comprises of three mining blocks with their own quarries, mineral plants, material despatch facilities and other infrastructure. The project (the three mines combined together) has received permission for mining 8.05 MTPA ROM along with expansion and modernisation of the existing beneficiation plants, material handling and despatch facilities. Of the three mining blocks, Barsua and Kalta have been operating since 1960 and 1965 respectively, whereas Taldih was a virgin block whose development commenced from November 2016.

The associated infrastructure facilities of Barsua Iron Mine are located in the another adjoining mining lease viz ML – 162 (77.94 ha), which was granted on 29.04.1960 and subsequently it has also been renewed as well as extended the lease period up to 28.04.2030 and supplementary lease deed was executed on 24.09.2016. ML-162 shares a common boundary with Barsua Block of ML-130.

On account of non-mineralization of ML-162 lease and the same is being utilized as an infrastructure lease for ML-130 lease, Indian Bureau of Mines, Bhubaneswar suggested for amalgamation of both the leases. Consequently, SAIL vide letter dated 01.08.2020, a request was made to Govt. of Odisha to amalgamate ML-130 with ML-162 mining leases. Based on SAIL's application, Deptt. of Steel and Mines, Govt. of Odisha vide proceeding No. IV (B) SM-03/2020/10418/SM, Bhubaneswar, Dtd. 02.12.2020 (enclosed as **Annexure 1.5**) amalgamated the contiguous Mining Leases viz ML– 130 (2486.383 ha) and ML–162 (77.94 ha) covering total area of 2564.323 ha having validity up to 05.01.2030. Lease deed of the amalgamated lease was executed on 30.03.2021 (enclosed as **Annexure 1.6**). Modification of Mining Plan for Amalgamated Mining Lease (2564.323 ha) of Barsua-Taldih-Kalta Iron Mines has been approved by IBM, Bhubaneswar vide letter No MP/A/39-ORI/BHU/2020-21, dated 01.04.2021(enclosed as **Annexure 1.7**).

Out of 2564.323 ha lease area, 2425.613 ha is Forest Land (Toda R.F.) and 138.710 ha Non-Forest Land. Stage-II forest clearance for diversion of forest land over 2341.931 ha in ML – 130 was granted by MoEFCC vide F. No. 8-90/2011-FC (pt), dated 06.03.2013 (copy enclosed as **Annexure 1.8**). MoEFCC vide order no. F.No.8-18/2014-FC dated 23.10.2017 granted Stage-II FC for diversion of entire 77.94 ha of forest land under ML – 162 for development of mining infrastructure (copy enclosed as **Annexure 1.9**). Hence, Stage – II forest clearance over 2419.871 has been obtained covering under the amalgamated lease. The remaining 5.742 ha forestland, which was part of ML – 130, is under occupation of the local Schedule Tribe & Other Traditional Forest Dwellers in village Tantra. Their individual rights have been recognized by granting pattas under Forest Right Act.,2006 {refer copy of Certificate Regarding Compliance of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006} which is enclosed as **Annexure 1.10**}.

Barsua-Taldih-Kalta Mine Complex comprises of:

a) Mines, part of beneficiation facilities and part of tailings pond in Amalgamated Lease (ML-130 + ML-162) spread over 2564.323 ha

b) Mineral Handling Infrastructure in Acquired Area outside ML Areas in Barsua Valley spread over 164.626 ha (*In original EC dt. 29-10-2010 it has been mentioned that part of beneficiation plants, tailings pond and infrastructure are located "outside lease area". In EC amendment dt. 30-03-2016 it has been specified that "Outside Area" means "ML-162 Lease and Acquired Area"*)
c) Three townships in Acquired Area outside ML Areas spread over 224.767 ha (*In original EC dt. 29-10-2010 it has been mentioned that townships are located "outside lease area". In EC amendment dt. 30-03-2016 it has been specified that "Outside Area" means "ML-162 Lease and Acquired Area"*).

1.1.3 Present Proposal

Barsua-Taldih-Kalta Mines (ML-130) comprises of three blocks, Barsua Taldih & Kalta. Barsua Block which is operating the since 1960 is a mechanised mine; the mined ore is moved by conveyors to Barsua Railway Siding for onward despatch to SAIL's steel plants. Taldih and Kalta Mines are semi-mechanized mines and are in operation since 1966 and 2016.respectively. The total EC sanctioned capacity of the mines is 8.05 MTPA. 3.2 MTPA of ore from Kalta Block is transported by road (NH-520) to Roxy Railway Siding for onward despatch by railway wagons. Ore from Barsua Block is moved by conveyors to SAIL's Barsua Rly. Siding. 1.35 MTPA ore is transported by road from Taldih Block to Barsua Rly. Siding. Also maximum of 1 MTPA of tailings are excavated from the tailings pond and these are auctioned off; the sold of tailings are despatched by road or rail at the buyers' discretion.

The present proposal is for Environmental Clearance for Change in Project Configuration of Barsua-Taldih-Kalta Iron ore Mining Project of SAIL for increase in Mine Lease Area from 2486.383 ha to 2564.323 ha due to amalgamation of the two separate leases (ML-130 and ML-162) without changing the total approved capacity of the entire mine (8.05 MTPA).

1.2 LOCATION OF THE PROJECT

The amalgamated mining lease is spread over an area of 2564.323 ha located in villages Tantra & Bahamba and Toda R.F, Tehsil Koida under Bonai subdivision of Sundargarh district, Odisha is a part of Survey of India Toposheet bearing No.73G/1 (F45N1) and is bounded by the latitudes from $21^0$49'25.43880" N to 21^0 59' 50.88516" N and longitude from 85^0 07' 43.73832" E to 85^0 13' 53.48136" E as per DGPS survey authenticated by ORSAC. The leasehold area extends for 18 km, aligned North – South, as a narrow plateau on a hill range.

Location of Barsua-Taldih-Kalta mine lease is shown on Google Earth imagery in **Fig. 1.1**. The same marked on SOI Toposheet is shown in **Fig. 1.2.**

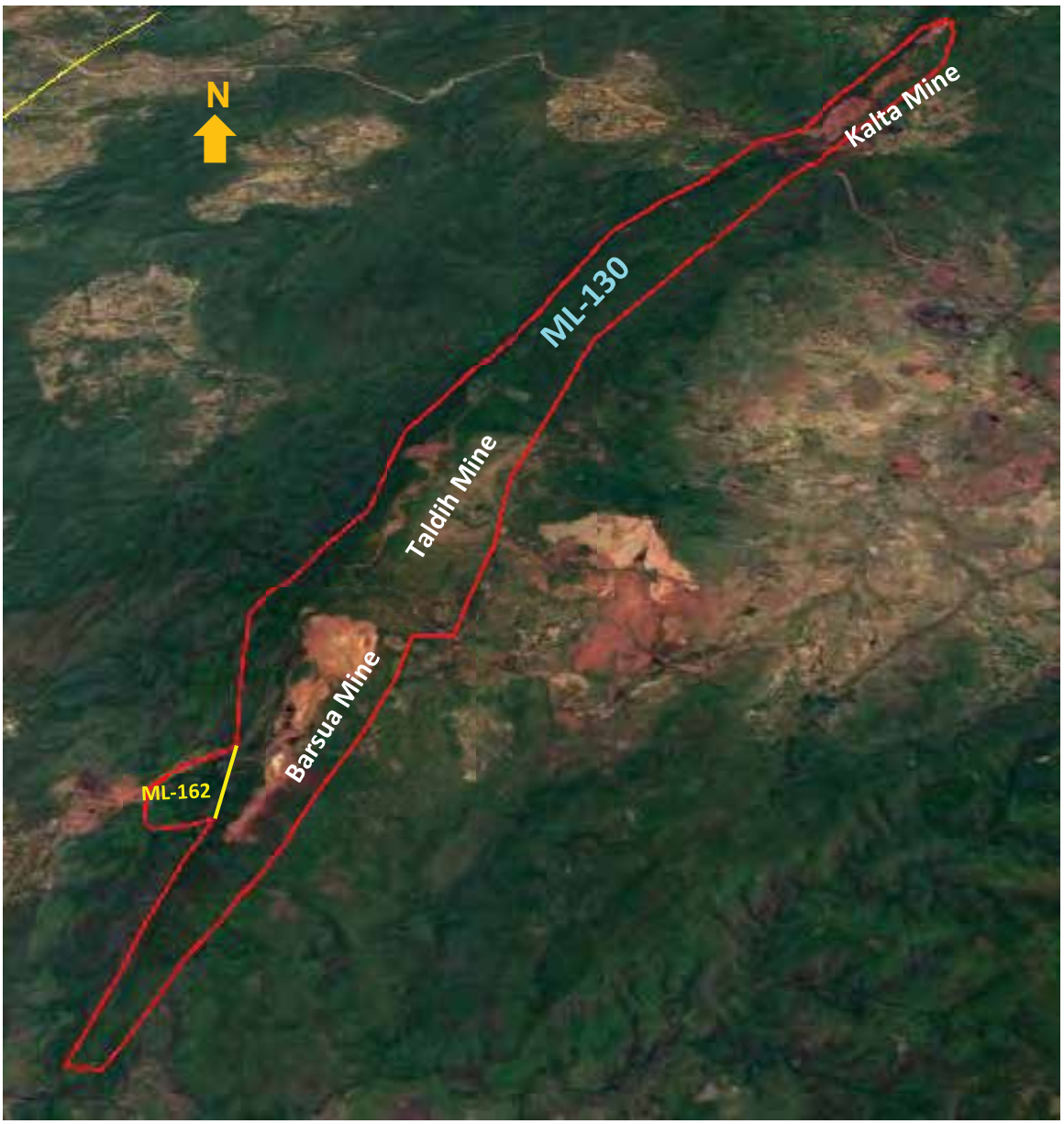


Figure 1.1: Google Earth imagery of Amalgamated Barsua-Taldih-Kalta mine lease

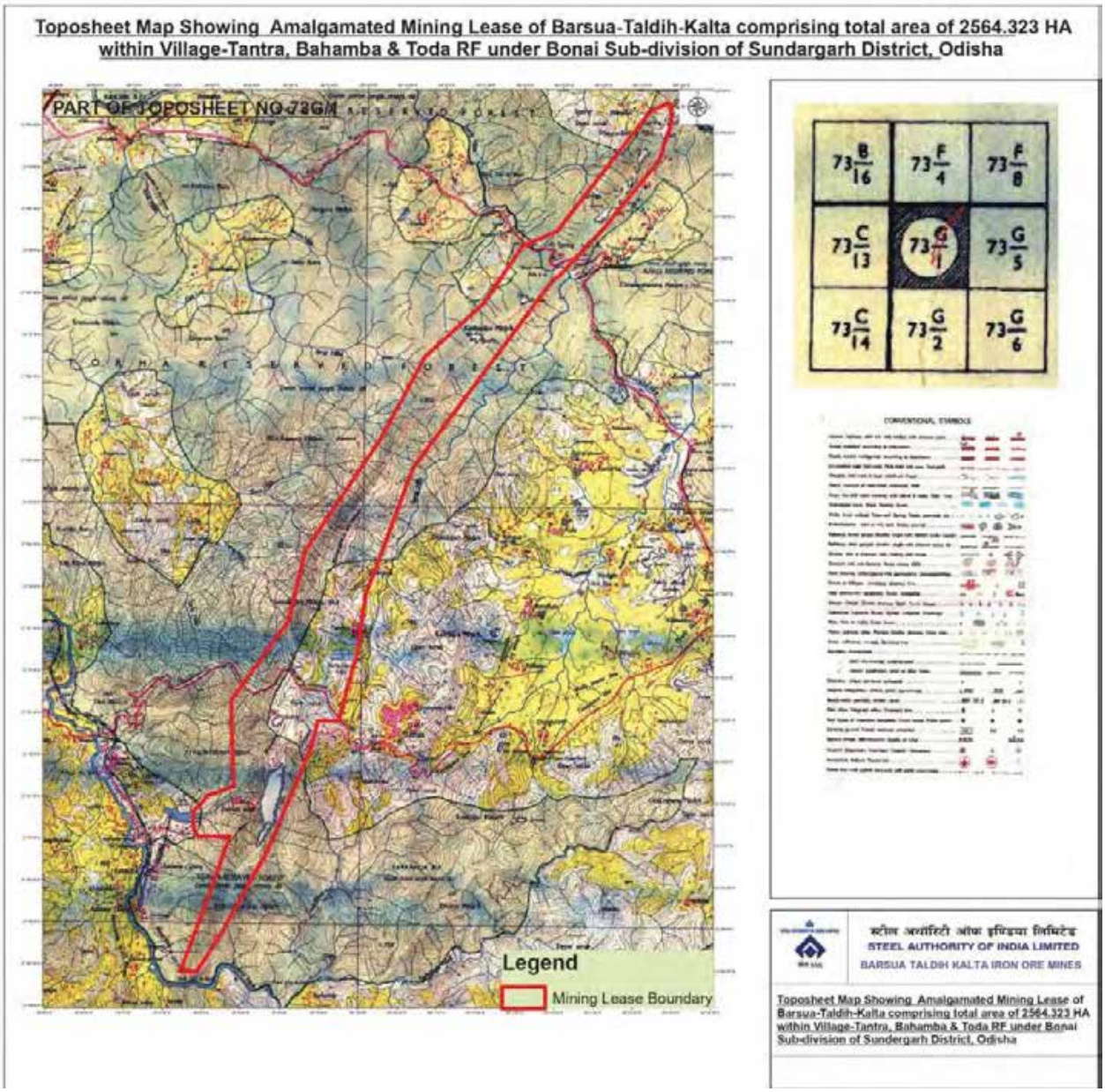


Fig. 1.2: Amalgamated Barsua-Taldih-Kalta mine lease marked on SOI Toposheet

1.4 BASELINE DATA GENERATION, FIELD STUDIES AND SECONDARY INFORMATION COLLECTION

The present Environmental Appraisal Report includes baseline environmental data covering micro-meteorology, air quality, water quality, noise levels and traffic density generated by Environmental Engg. Laboratory of MECON during the period March to May, 2021.

1.5 COVERAGE OF THE REPORT

This report contains information on the existing environment and evaluates the predicted environmental impacts of the reconfigured iron ore mine. A detailed coverage of background

environmental quality, pollution sources, anticipated environmental impacts and mitigation measures have been provided in this report.

The report including this introduction chapter includes:

- Project Description
- Description of the Environment
- Anticipated Environmental Impacts (due to changed project configuration) and Mitigation Measures
- Summary and Conclusion

1.6 ACKNOWLEDGEMENT

MECON wishes to place on record its deep appreciation for the trust reposed in MECON by Steel Authority of India Ltd. (SAIL) and for the active interest and help extended by concerned officials of SAIL.

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

SAIL's Barsua-Taldih-Kalta Iron Ore Mines have been created by amalgamating two adjacent mining leases viz ML – 130 (2486.383 ha) and ML – 162 (77.94 ha) both under SAIL's Barsua-Taldih-Kalta Iron Ore Mines. The ~18 km long ML-130 is the main iron ore mining lease and comprises of 3 mining blocks namely Barsua Iron Mine (Southern part), Taldih Iron Mine (Middle part) and Kalta Iron Mine (Northern part). ML-162, which is adjacent to Barsua Block is non-mineralised but is vital for the operation of the mine as it is being used for evacuation of ore & associated infrastructure facilities of Barsua Iron Mine.

On account of non-mineralization of ML-162 lease and the same is being utilized as an infrastructure lease for ML-130 lease, Indian Bureau of Mines, Bhubaneswar suggested for amalgamation of both the leases. Consequently, SAIL vide letter dated 01.08.2020, a request was made to Govt. of Odisha to amalgamate ML-130 with ML-162 mining leases. Based on SAIL's application, Deptt. of Steel and Mines, Govt. of Odisha vide proceeding No. IV (B) SM-03/2020/10418/SM, Bhubaneswar, Dtd. 02.12.2020 amalgamated the contiguous Mining Leases viz ML–130 (2486.383 ha) and ML – 162 (77.94 ha) covering total area of 2564.323 ha having validity up to 05.01.2030. Lease deed of the amalgamated lease was executed on 30.03.2021.

The instant proposal is for obtaining amendment in Environmental Clearance of Barsua-Taldih-Kalta Iron Ore Mining Project of SAIL for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases (ML – 130 & ML – 162) without change in production capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006.

2.2 TYPE OF PROJECT

The Barsua-Taldih-Kalta Iron Ore Mining Project spread over 2564.323 ha comprises of three mines with their own quarries, mineral processing plants, mineral despatch facilities and other infrastructure. The project falls under category 'A' (Sl.no. 1(a) of Schedule: Mining of Minerals of the "List of project or activities requiring prior environmental clearance" of EIA Notification 2006 dated 14th September, 2006.

2.3 LOCATION AND ACCESSIBILITY

Barsua-Taldih-Kalta Iron Ore Mines are located in Villages Tantra & Bahamba and Toda Reserve Forest (R.F.) in Koira Tehsil, Bonai Subdivision, Sundargarh District of Odisha. The Lease area is ~18 km long and comprises of 3 mining blocks namely Barsua Iron Mine (Southern part), Taldih Iron Mine (Middle part) and Kalta Iron Mine (Northern part).

The amalgamated lease falls in Survey of India Toposheet bearing No.73G/1 (F45N1) and is bounded by latitudes $21^0$49′ 25.43880″ N to 21^0 59′ 50.88516″ N and longitudes from 85^0 07′ 43.73832″ E to 85^0 13′ 53.48136″ E. Location of Barsua-Taldih-Kalta Amalgamated Mining Lease on Toposheets has been shown in **Fig. 1.2** (in Chapter 1).

The lease area can be approached by two separate highways leading to the northern end (Kalta Iron Mine) and the southern end (Barsua Iron Mine) from Rajamunda on NH 23, connecting Barakot on NH-6 with Rourkela and Ranchi. On western side 35 km long road connects Barsua iron ore mine to Rajamunda. Towards east a 12 km long road connects Koida on NH-520 (old NH – 215) from Rajamunda to Barbil via Koida. Nearest railhead is at Barsua Valley on Bondamunda – Barsua branch line at a distance of ~14 km by road from Barsua Iron Mine. A 79 km broad gauge line connects the Barsua Valley installations with Bondamunda Railway Station on Howrah-Nagpur-Mumbai trunk line. The line was set up for transporting iron ore from Barsua Valley to Rourkela Steel Plant of SAIL.

2.4 SIZE OR MAGNITUDE OF OPERATION

The Barsua-Taldih-Kalta Iron Ore Mining Project under amalgamated mining lease spread over 2564.323 ha comprises of three mines with their own quarries, mineral processing plants, mineral dispatch facilities and other associated infrastructure. Presently, three mines viz Barsua Iron Mine, Taldih Iron Mine and Kalta Iron Mine under the amalgamated lease are operating with total combined capacity 8.05 MTPA.

1) Barsua Block: 3.50 MTPA iron ore including a provision of excavation of tailings maximum up to 1 MTPA from the tailings pond at Barsua for selling and transportation of excavated tailings through road & rail.

2) Taldih Block: 1.35 MTPA iron ore including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA for selling. The excavated sub-grade iron ore fines are dispatched by road / road & rail.

3) Kalta Block: 3.20 MTPA iron ore including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA from Fines Stocks for selling. The excavated sub-grade iron ore fines will be dispatched by road / road & rail.

The method of mining at all the three mines is conventional open cast mining with deep hole drilling & blasting, excavation and haulage through shovel dumper combination.

2.5 TECHNOLOGY AND PROCESS DESCRIPTION

Barsua, Taldih and Kalta Mines are opencast mines with deep hole drilling and blasting along with deployment of shovel - dumper /truck combination. Beneficiation at Barsua Mine is being done by both dry / wet process involving crushing, screening, washing, jigging etc. The processing of ore at Kalta and Taldih Mines is done by mobile Crushing & Screening Plants and Screening Plants. Part of the ore at Kalta Mine is also produced through manual sizing and sorting.

2.5.1 Reserves

The estimated iron ore reserves & resources as on 31.10.2020 in the three mines under amalgamated mining lease are 747.319 million tonnes. The details of reserves are given in **Table 2.1.**

Table 2.1: In-situ Iron Ore Reserve and Resource as per UNFC

Reserve/ resources	Type	UNFC Code	Iron ore Quantity (Mt)				
			Barsua	Taldih	Kalta	Total	Grade
Reserves	Proved	111	104.529	250.178	77.663	**432.370**	>57% Fe
	Probable	121	26.188	78.084	18.344	**122.616**	+45-57% Fe
		122	---	---	---	**---**	---
Sub-Total (a)		**---**	**130.717**	**328.262**	**96.007**	**554.986**	---
Remaining resources	Feasibility	211	77.024	39.542	21.082	**137.648**	>57% Fe
	Pre-feasibility	221	30.508	19.520	4.657	**54.685**	+45-57% Fe
		222	---	---	---	**---**	---
	Measured	331	---	---	---	**---**	---
	Indicated	332	---	---	---	**---**	---
	Inferred	333	---	---	---	**---**	---
	Reconnaissance	334	---	---	---	**---**	---
Sub-Total (b)		**---**	**107.532**	**59.062**	**25.739**	**192.333**	**---**
Total (a + b)		**---**	**238.249**	**387.324**	**121.746**	**747.319**	**---**

2.5.2 Mining

Barsua deposit which forms the southern-most part of the leasehold commenced operation in 1960. With total strike length of 5.3 km, the Barsua deposit has been sub-divided into 5 parts viz. Area 1, Area 2, Area 3, Area 4 & Area 5. Iron ore at Areas 1, 2 & 4 located in central part of the mine has already been exhausted and presently mining activities are confined to Area 3 & Area 5 located at both the flanks of the mine.

Kalta deposit which forms the northern part of the lease area commenced operation in 1966. Kalta deposit has been sub-divided into three Blocks, A, B and C from South to North. Presently, mining is being carried out in A and C blocks.

Taldih deposit with a strike length of 9.9 km constitutes the central part of the leasehold and has been sub-divided into A, C, B and D blocks from Barsua end. Presently, Block-A & Block-C are under active operation.

Barsua Iron Mine (BIM)

The Barsua Mine commenced operation as a fully mechanized mine in 1961. Existing approved capacity of the mine is 3.5 MTPA. The mine was divided into five blocks as described above. Till recently mining operations have been concentrated in Area 3E. Initially top slicing method of open cast mining was adopted. Later, in Area 3E, benches of 10 m height and minimum 20 m width were formed and the mechanized pit was developed and worked. Thickness of the ore body varies from 20 m to 83 m (average: 50 m). Maximum thickness of overburden i.e. laterite capping is 40 m, though at some places there is no overburden. Average overburden thickness is 4.5 m. Details of Barsua Mine including mining parameters are as follows :

Area covered	1054.369 ha
Method of mining	Fully Mechanized Open pit mining
Current Operating pits	Area – 3 & Area – 5
Bench height& Width	10 m and 20 m
Mineable Iron Ore reserves	130.717 Million Tonnes

Opencast mining operations are being carried out by shovel-dumper combination with 150 mm dia drills, 2.5 m^3/ 4.5 m^3 bucket excavators and 25 t/ 50 t/ 60 t/ 100 t dumpers. Average height of the benches is kept at 10 m with minimum width of 20 m. At present there is one (1) no. of external waste dump covering 15.5 ha and containing ~5.787 million tonnes of materials which will also be used for future dumping. There are also Seven (7) nos. of external mineral rejects dumps spread over 18.32 ha and containing ~12.807 Mt of materials (~46.3 - ~49% Fe). In addition 0.2 Mt of iron ore fines are also stacked externally.

Taldih Iron Mine (TIM)

From South to North Taldih deposit consists of four blocks A, C, B and D. Taldih mine is developed to work by mechanized opencast methods for a production capacity of 1.35 MTPA. Initially one quarry (Block A) has been developed with 6 m high and 10 m wide benches. Blasted ore is loaded into dumpers with the help of hydraulic excavators for transportation to mobile crushing and screening plant located in the eastern side of the deposit. Block A quarry will be extended laterally to Block C. Except for a few patches of iron ore, the entire mineralized area of Taldih hill is covered with laterite, shale and non-mineable transitional ore. Details of Taldih Mine including mining parameters are as follows:

Area covered	1173.484 ha
Method of mining	Mechanized
Operating pits	Block A & Block C
Bench height & width	6 m & 12 m
Mineable Iron Ore reserves	328.262 Million Tonnes
Permitted Production Capacity	1.35 MTPA

At present there is one (1) no. of external waste dump covering 3.5 ha and containing ~0.365 million tonnes of materials. There is also one external mineral rejects dump spread over 4.000 ha and containing ~0.155 Mt of materials (~46.3 - ~49% Fe).

Kalta Iron Mine (KIM)

Kalta iron mine commenced operations in the northern end of mining lease in the year 1996 in order to supply high grade iron ore lumps with 64% Fe content, to blend the same with comparatively low grade lumps of Barsua iron mine so that the desired grade is supplied to Rourkela Steel Plant. The ore body from Kalta mine is not uniform both in thickness and grade. Below the hard mantle softer ore is associated with ochre and clay bands besides laterite and transitional soft friable ore and blue dust in depth. Due to tectonic movement the ore body is folded bearing series of isoclinal folds with irregular patches of transitional ore.

Kalta Block has been sub-divided in to 3 parts namely Block-A, Block-B & Block-C. Presently, Block-A & Block-C are being worked. Existing approved capacity of the mine is 3.2 MTPA of ROM iron ore. Opencast manual as well as mechanized method of mining has been adopted in Kalta Iron Mine. Fully mechanized mining is being carried out on 3 shift basis to produce a major amount of iron ore and manual method of mining will also be continued to produce remaining iron ore on one shift basis for employment of local people. Two existing quarries namely Block-A Quarries and Block-C Quarry are being developed simultaneously laterally as

well as depth-wise to produce iron ore @3.2 Mt / annum. Details of Kalta Mine including mining parameters are as follows:

Area covered	336.47 ha
Method of mining	Semi mechanized & Manual Mining
Operating pits	Block A & Block C
Bench height& width	6 m & 12 m
Mineable Iron Ore reserves	96.007 Million Tonnes
Permitted Production Capacity	3.2 MTPA

At present there is one (1) no. of external waste dumps covering 1.92 ha and containing ~0.650 million tonnes of materials. There are also Seven (7) nos. of external mineral rejects dumps which cover 27.776 ha and contain ~1.867 Mt of materials (~47.8 – 54.5% Fe). In addition ~0.606 Mt of iron ore fines are also stacked externally.

2.5.3 Mineral Processing

Barsua Iron Mine (BIM) :

The Barsua ore beneficiation plant is divided into three separate sections viz crushing plant, washing plant and dry screening plant having capacity of 3.5 MTPA. The crushing plant consists of two lines with rated capacity of 700 tph each. One line is normally used for Direct Ore (DO) and the second line for Beneficiable Ore (BO). Each line consists of a crusher receiving hopper with a pan feeder, which feeds a grizzly ahead of a jaw crusher. The primary jaw crusher produces minus 200 mm top size. The primary crusher product is conveyed to a scalping screen. The oversize is fed to a secondary gyratory crusher. The crushed product goes to a surge bin and is taken via the downhill conveyor to the dry screening station, if the material is DO or it is conveyed to a storage bins ahead of the washing plant, if the material is BO.

The washing plant has two lines of screening. The crushed ore is withdrawn from each storage bin by an apron feeder, which discharges the material into a wet scrubber. The scrubber discharge flows by gravity to a double deck vibrating screen. The screen oversize, or +10 mm, is washed lump and is conveyed to the downhill conveyor as product. The – 10 mm flows downhill to the jig plant. First the –10 mm material is screened on a double deck screen to produce – 8 x 2 mm jig feed. The –10 mm x 8mm oversize by-passes the jig plant and will be combined with the jig product. The –2 mm material flows to a screw classifier. The classifier sands are dewatered and are fines product. The overflow of classifiers mostly of gangues are channelled to hydro cyclones. The underflows of hydro cyclones (slimes) along with the other effluents are discharged to tailing pond. Overflow of hydro cyclones goes to thickener. The jig feed is stored in hoppers equipped with vibrating feeders.

The screened fines are fed to the jig. Jig contains a product and a tailings dewatering screen. The dewatered tailings go to a reject pile. The dewatered jig heavy fraction goes to the fines product. The dewatering screen underflow goes to a classifier, which recovers some material. This material joins the fines product.
The Thickener collects all the rejects with the exception of the jig tailings. The overflow clear water from the Thickener is recycled back to the system and underflow is discharged to the

Tailing Pond located partly in ML-162 and partly in acquired land. The area of tailing pond measures 35.88 ha and the pond is located at the foothill of hill range. Dam top is at 420.5 m AMSL. Maximum settled slime level is at 416.5 m AMSL and the spill way is at 418.0 m AMSL. At present about 2.1 Mm^3 (or around 4.1 million tonnes) of tailing is stored in the pond. Subsequent to grant of EC amendment for excavation & dispatch of tailings from the Barsua tailings Pond, so far about 4.5 lakh tonnes of tailings has been evacuated from the tailings pond and sold in the open market since December 2020. A regular evacuation of tailings from the tailings Pond shall continue @ 0.5 to 1 MTPA, which will create space for storage of freshly generated tailings.

Process flow sheet of Barsua Beneficiation Plant is presented as **Fig. 2.1**.

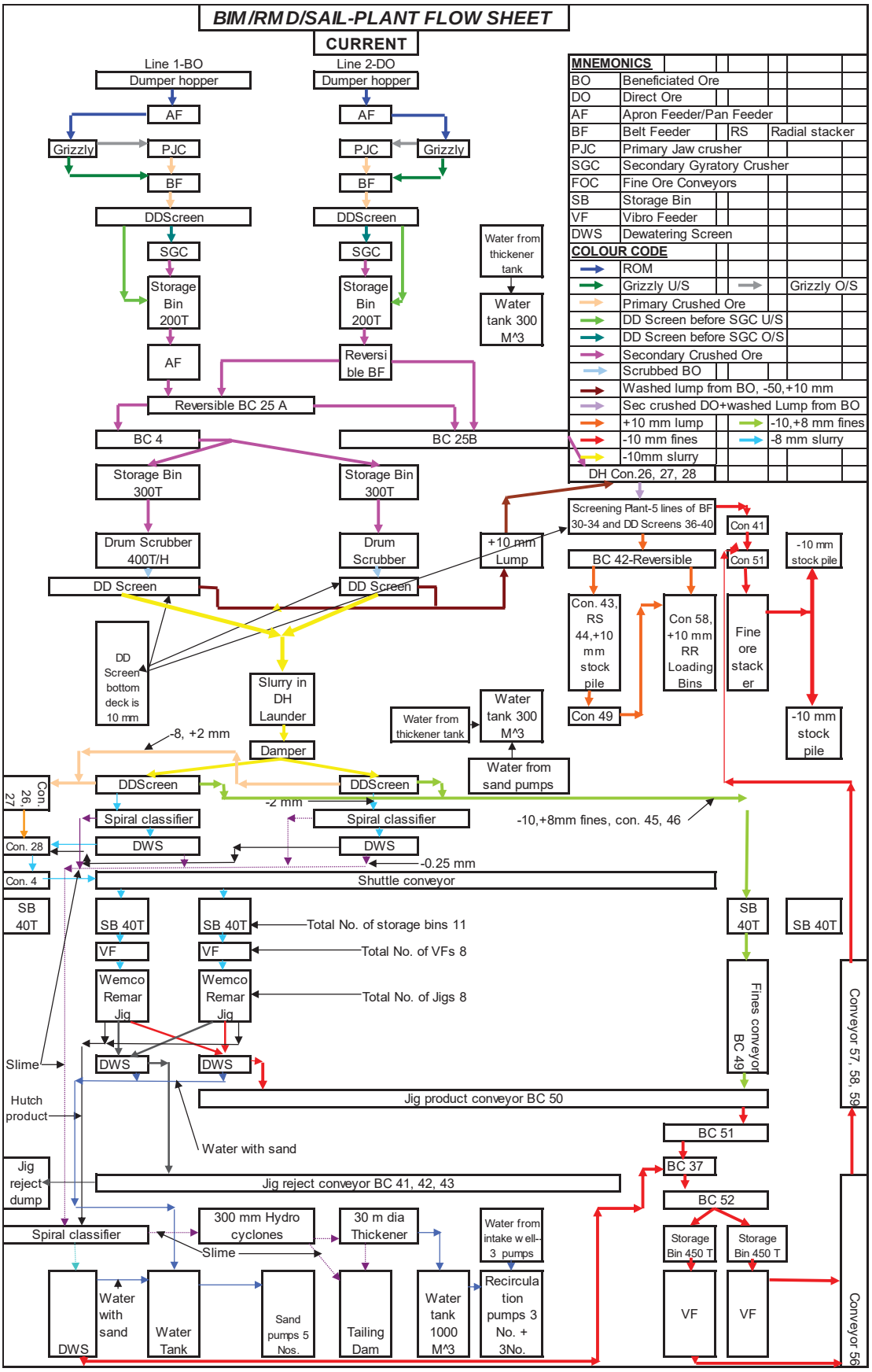


Fig. 2.1: Process Flow Sheet of SAIL's Barsua Iron Ore Beneficiation Plant

Taldih Iron Mine (TIM)

The iron ore produced from TIM is being processed through dry processing method as Direct Ore and sent to Barsua railway siding. The -150 mm size ROM ore excavated & loaded by the shovel in dumpers is fed in to in-pit mobile screening plant for screening and +40mm& -40mm size ore is segregated. The screened ores are separately stacked near mobile in-pit crushing and screening plant. The +150 mm size (oversize boulders) ROM is broken by the rock breakers / in-pit crusher and broken ore of +40 mm will be transported and stacked near in-pit crushing and screening plant. The screened lump ore from the stack is then fed by FEL to the Mobile in-pit crushing and screening plant for crushing and screening. As a result, (+) 10 mm (-) 40 mm size lump ore fraction and (-) 10 mm size fines fraction get separated.

These are separately stacked for final despatch to Barsua Valley Railway siding. In a similar manner, screened (-)40 mm fines is also processed in the mobile crushing and screening plant to separate (-) 10 mm size fines and (+)10 mm (-) 40 mm size lump ore. These lumps and fines are stacked separately near mobile in-pit crushing and screening plant and despatched after stack sampling by FEL-truck combination to Barsua Valley Railway Siding by road for final despatch.

There are two nos. of 300 tonnes per hour (TPH) mobile Screening Plants and two nos. of 300 TPH mobile Crushing & Screening Plants are provided for processing of ore from the mine.

Kalta Iron Mine (KIM)

Iron ore produced from KIM is being processed through dry processing method as Direct Ore and sent to Roxy railway siding. After blasting, a part of iron ore ROM ore is handled manually. Lump ore produced manually after breaking & sizing of blasted ore and fines generated. Manually produced lump stacks near mine faces are also screened, lumps and fines are separated.

In the mechanized mining area, -150 mm size ROM Ore is fed in to in-pit mobile screening plant for screening and +40 mm & -40 mm size ore is segregated. The screened are separately stacked near mobile in-pit crushing and screening plant. The +150 mm size (oversize boulders) ROM is broken by the rock breakers and broken ore of +40 mm will be transported and stacked near in-pit crushing and screening plant. The screened lump ore from the stack is then fed to the mobile in-pit crushing and screening plant for crushing and screening. As a result, (+) 10 mm (-) 40 mm size lump ore fraction and (-) 10 mm size fines are separated. These lumps & fines are stacked in the mine before being despatched to Roxy railway siding.

There are two nos. of 300 tonnes per hour (TPH) mobile Screening Plants (see **Fig. 2.2**) and two nos. of 300 TPH mobile Crushing & Screening Plants are provided for processing of ore from the mine.

Fig. 2.2: 300 TPH Mobile Screening Plant in Operation at Kalta Mine

2.5.4 Mineral Transportation

Barsua Iron Mine:

Entire ore produced at Barsua Iron Mine is transported by dumpers from the mine faces to the receiving hopper of Barsua Beneficiation Plant. Barsua Beneficiation Plant is located on the slope of a hill. The ore is beneficiated as it moves downhill through a series of covered conveyors. The beneficiated ore is mechanically loaded onto railway wagons at Barsua Private Siding of SAIL located at the bottom of the hill (acquired land) in Barsua Valley.

Kalta Iron Mine:

The entire production from Kalta Mine (presently 3.2 MTPA) is transported through NH 520 (old NH 215) by road to railway siding located at Roxy at a distance of 22 km {*17.5 km of public road (NH-520)* } from Kalta Mine. The haulage route from Kalta to Roxy Siding is shown in **Fig. 2.3**. Most of this road is a "four lane road with divided carriageway". Work on upgradation of the balance stretch is at an advanced stage.

Fig. 2.3: Haulage Route from Kalta Mine to Roxy Siding

Taldih Iron Mine:

Production at Taldih Mine commenced in November 2016. Present production is to the tune of ~1.35 MTPA. The entire production from Taldih Mine is transported through PWD road to railway siding located at Barsua Valley at a distance of 11 km. The entire iron ore produced at Taldih is trucked directly to SAIL's Barsua Siding. The haulage route from Taldih to Barsua Siding is shown in **Fig. 2.4**.

Fig. 2.4: Haulage Route (in white) from Taldih Mine to Barsua Siding

2.6 ELECTRICITY, WATER AND MANPOWER

2.6.1 Electricity

At present electrical power is received at the main receiving station at Barsua from Joda sub-station of GRIDCO (situated at a distance of 42 km). The Power is received at 33 KV and annual consumption for Barsua is 15 million units. Electric power is supplied to Kalta mine by an 11 KV transmission line from Barsua. Consumption at Kalta is 1.8 million units.

2.6.2 Water Supply

Present water demand for Barsua-Taldih-Kalta Mine complex is about 7600 m^3/day which includes 2900 m^3/day industrial and 4700 m^3/day for drinking & domestic usage. Water is drawn from Kuradhi River and Najkura Nala with due permission from the Govt. of Odisha.

2.6.3 Manpower

Presently 3857 persons (387 regular & 3470 contractual) are employed in Barsua-Taldih-Kalta Mine complex.

2.7 AUXILIARY SERVICES

The leasehold area hosts statutory facilities *viz.* crèche, canteen, first aid centre, vocational training centre etc. and also Administration block, servicing and repairing shops, fuel pump station and a medical unit. Residential accommodations for staffs and executives have been provided.

A residential colony at Tensa and another at Barsua valley exist at present. The colony in Tensa has schools, hospital, bank, post office etc. while the colony at Barsua valley has only residential accommodation and caters to employees working at washing plant, loading plant and water intake pump house. Tensa Township accommodates personnel deployed at Taldih Mine. There is also a railway staff colony near Barsua valley Railway station. Kalta has a small township established outside the mining lease.

2.8 EXISTING LAND USE PATTERN

Most of the amalgamated lease area of Barsua–Taldih–Kalta Mines falls within Toda Reserved Forest under Bonai Forest Division in Sundargarh District, Odisha. Out of the 2564.323 ha lease area, 2425.613 ha is forest land and 138.710 is non-forest land. Stage II Forest Clearances have been granted for 2419.333 ha Forest Land. Local Schedule Tribe other traditional forest dwellers are using 5.742 ha of Forest Land individually in village Tantra till 10.9.2010 and their individual rights have been recognized by granting pattas under Forest Right Act.,2006 {refer copy of Certificate Regarding Compliance of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.

The mining operations in the lease are continuing since 1960. The existing land use pattern of the amalgamated lease area is given in **Table 2.2**.

Table 2.2 : Existing Land Use of the Amalgamated Lease

Sl. No.	Type of land use	Existing Land Use (ha)			
		BIM	TIM	KIM	Total
1	Area under Mining	175.500	14.120	116.500	**306.120**
2	Storage for top soil	0.000	0.500	0.000	**0.500**
3	Waste dump site	2.202	1.500	0.000	**3.702**
4	Mineral storage	71.095	4.000	32.762	**107.857**
5	Infrastructure, workshop, administrative building etc.	16.640	1.000	4.966	**22.606**
6	Roads	15.060	15.250	17.192	**47.502**
7	Tailing Pond	3.950	0.000	0.000	**3.950**
8	Effluent Treatment	1.260	0.000	0.000	**1.260**
9	Mineral separation plant	2.540	0.500	1.264	**4.304**
10	Others (Retaining wall, Garland drain, Fencing & intermediate area)	36.784	1.000	7.000	**44.784**
Sub-Total		**325.031**	**37.870**	**179.684**	**542.585**
11	Undisturbed Lease Area / Remaining Area	729.338	1135.614	156.786	**2021.738**
Total		**1054.369**	**1173.484**	**336.470**	**2564.323**

Some facilities are located outside the mine lease area in area acquired by SAIL. The details of various facilities and their locations are given in **Table 2.3.**

Table 2.3: Locations of Various Facilities of Barsua-Taldih-Kalta Iron Ore Mines

Location	Area (ha)	Activities	Approvals / Clearances
ML-130 (Total Area: 2486.383 ha)	976.429	Open cast mining and mineral beneficiation in Barsua Block	EC received vide letter no. J-11015/351/2006-IA.II(M) dt. 29-10-2010, for increase of total production to 8.05 MTPA (2.5 MTPA from Barsua + 4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. EC was amended for re-distribution of production from three mining blocks under ML – 130 by MoEFCC's vide dated 30th March, 2016 to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 MTPA. EC amended vide letter no. 11015/351/ 2006-IA.II(M) dt. 03-07-2020 with corrigendum dated 13th July 2020 for excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum up to 1 MTPA tailings from the tailings pond at Barsua for selling, excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA from Fines Stocks from each block for selling. Latest EC Amendment (Vide letter no. 11015/351/2006-IA.II(M) dt. 17-03-2021) has allowed redistribution of total production of 8.05 MTPA amongst the 3 blocks (3.5 MTPA from Barsua + 1.35 MTPA from Taldih + 3.2 MTPA from Kalta).
	1173.484	Open cast mining and mineral crushing & Screening in Taldih Block	
	336.47	Open cast mining and mineral crushing & Screening in Kalta Block	
ML-162 (Total Area: 77.94 ha)	73.99	Downhill conveyor, Beneficiation of iron ore through fines jigging plant, Effluent treatment plant.	
	3.95	Disposal of Tailings	Original EC received vide letter no. J-11015/351/2006-IA.II(M) dt. 29-10-2010 specifies that "The tailing pond is located outside the mine lease area in Barsua Valley in an area of 35.85 ha." EC Amendment letter no. J-11015/351/2006-IA.II(M) dt. 30-03-2016 clarifies "Outside mine lease area" as "ML-162 & acquired area".
Acquired area in Barsua Valley for mining allied activities (Total Area : 164.626 ha)	31.93	Disposal of Tailings	
		Excavation of tailings for sale	Original EC amended vide letter no. J-11015 / 351 / 2006-IA.II (M) dated 03-07-2020 with corrigendum dated 13-07-2020 for excavation & sale of tailings @ 1 MTPA
	132.696	Dry screening plant, iron ore stock piles, Railway Siding etc.	EC received vide letter no. J-11015/351/2006-IA.II(M) dt. 29-10-2010, for increase of total production to 8.05 MTPA (2.5 MTPA from Barsua + 4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. On page 2 under Para 2 it is stated that the *"There is an existing beneficiation plant having a capacity of 2.5 million TPA within the mine lease having an area of 7 ha and 50 ha outside the mine lease (total area of 57 ha). In addition, the new beneficiation plant with a capacity of 4.25 million TPA will be setup in an area of 83 ha, out of which 50 ha will be within the mine lease and 33 ha, outside mine lease. The pelletisation plant also be outside the mine lease. The tailing pond is located outside the mine lease in Barsua Valley in an area of 35.88ha"*

Location	Area (ha)	Activities	Approvals / Clearances
			EC was amended vide letter no. J-11015/351/2006-IA.II(M) dt. 30-03-2016. Para 6 (iv) of this letter states: "*To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease.*" The Environmental Clearance dated 29.01.2010 with amendments thereon granted for the integrated Barsua Taldih Kalta Iron Ore Mining Project covers the main mining lease (ML – 130) and use of ML – 162 & acquired area for use of infrastructure facilities for the iron ore produced form ML – 130.
Acquired for township in Barsua Valley	53.29	Township	EC received vide letter no. J-11015/351/2006-IA.II(M) dt. 29-10-2010.
Acquired in Tensa	140.377	Township	
Acquired in Kalta	31.10	Township	

2.9 ACCREDITATION TO INTERNATIONAL STANDARDS

The Barsua, Taldih and Kalta Iron Mines have implemented the Integrated Management System (IMS) and accredited to Quality Management System (QMS linked ISO – 9001 - 2015), Environmental Management System (EMS linked to ISO – 14001: 2015) and Occupational Health and Safety Management System (linked to ISO – 45001 - 2018).

3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

Information on the existing baseline environmental status is essential for assessing the likely environmental impacts of the proposed project. For studying the existing baseline environmental status the following basic steps are required:

- Delineation of project site and study area.
- Delineation of the environmental components and methodology
- Identification of study period.
- Delineation of the location of proposed project and description of its surroundings based on secondarydata.

After delineation of the above for the present case, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise levels, etc. have been studied/monitored in order to establish baseline for different environmental components in summer season from March to May, 2021.

3.2 PROJECT SITE AND STUDY AREA

Amalmagated Mining Lease covering Barsua, Taldih and Kalta blocks, along with the existing infrastructure facilities is designated as the project site or the core zone. The buffer zone for the present study is taken as an area encompassing 10 km from the boundary of the mine lease. The location of the study area along with 10 km buffer area is marked in **Drawing No. MEC/G25C/11/S2/01**.

3.3 MONITORING LABORATORY

The field survey and analysis for the baseline study has been carried out by Environmental Enginerring Laboratory, MECON Ltd's in-house laboratory, which is MoEFCC recognized laboratory.

3.4 ENVIRONMENTAL ATTRIBUTES AND METHODOLOGY

The environmental attributes studied and the methodologies adopted for conducting the environmental monitoring and described subsequently

3.4.1 Methodology

The significant parameters identified for the various environmental attributes, their frequency of sampling/monitoring and the methodologies followed for the baseline study is given in **Table 3.1.**

Table 3.1: Environmental Components and the Methodologies

Sn	Area	Environmental Attributes	Parameters & Frequency	Methodology
1	Project Area, Study Area	Micro-Meteorology	- Micro-meteorology (Air temperature, wind speed & direction, relative humidity, precipitation, Solar Radiation) - Monitoring frequency: 1 *hour intervals continuously for 3 months*].	Field Monitoring & Analysis
		Air	- Ambient Air Quality • PM_{10}, $PM_{2.5}$, SO_2, NO_x and NH_3. Monitoring frequency: *24-hourly twice a week for 12 weeks*. • CO O_3 and Benzene • Pb, Ni, As, Benzo(a)Pyrene and Free silica in PM_{10} - Selected samples at all the locations	
		Noise	- Noise Levels Monitoring frequency: *1 hour intervals continuously for 24 hours oncein a season.*	
2	Study Area	Water	- Water Quality [*Grab samples, Once*] • Surface [parameters as per CPCB Water Quality Criteria & IS: 10500] • Ground [parameters as per IS: 10500] - Monitoring frequency: *Grab samples taken Once in the season*	Field Monitoring & Analysis
3	Study Area	Soil	- Soil Quality (physical characteristics including texture, bulk density, permeability, porosity, Chemical properties as pH, Electrical Conductivity, CEC, Exchangeable Ca/Mg/K/Na, SAR, Available NPK, Organic carbon & organic matter, Water soluble chlorides. - Monitoring frequency: *Once during season*	Field Monitoring & Analysis
4	Interface of Study Area & Project Site	Transport Infrastructure	Traffic Density [*1 hour intervals continuously for 24 hours once in the season*] for one week.	Field Monitoring

3.4.2 Monitoring Schedule

Baseline environmental data generation for air, water, noise and soil quality at the core and buffer zones of the defined site was carried out for one full season covering three months of Summer, 2021 (March, April, May).

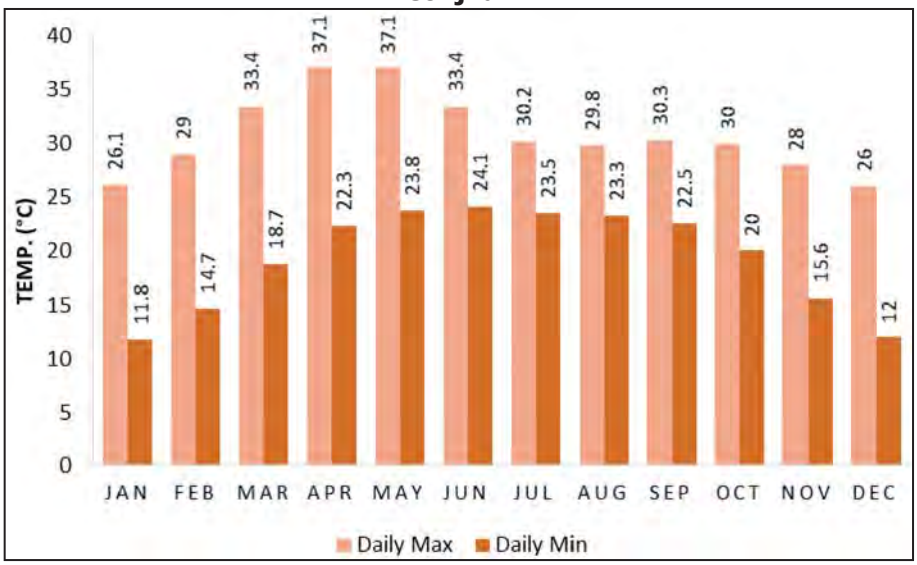
3.5 ENVIRONMENTAL SETTING

3.5.1 General Climate

The study area lies in tropical region where climate is characterised by very hot summers and cool winters. Summer is typically from March to June when monthly temperature ranges from a maximum of 42°C during daytime to a minimum of 14°C at night. Winter is from November to February when the maximum temperature during day goes up to 31°C and minimum temperature at night becomes as low as 8°C. Monthly variation in daily average maximum and minimum temperature as recorded at India Meteorological Department's (IMD) observatory at Keonjhar (about 50 km away) is illustrated as **Fig.3.1**.

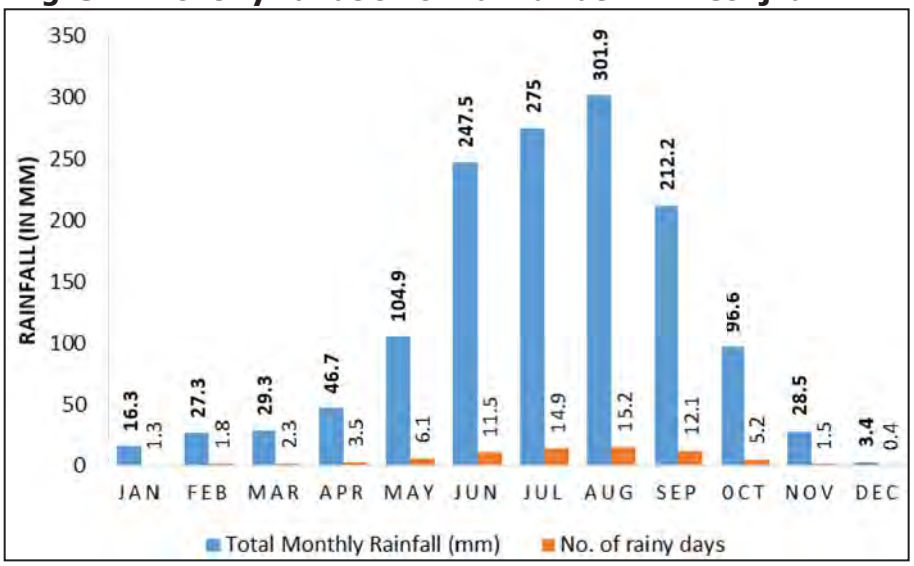
The average annual rainfall as recorded at IMD observatory (1981-2010) at Keonjhar is 1389.5 mm. The Southwest monsoon lasts from mid June to mid September and the area gets more than 80% of the annual rainfall during this period. Monthly Variation in rainfall as recorded at IMD's observatory at Keonjhar is illustrated in **Fig.3.2**.

Fig. 3.1: Monthly variation of daily average maximum and minimum temperature at IMD Keonjhar



Source: Climatological Tables and Observations in India, India Meteorological Department, Keonjhar (1981 to 2010)

Fig. 3.2: Monthly variation of Rainfall at IMD Keonjhar



Source: Climatological Tables and Observations in India, India Meteorological Department, Keonjhar (1981 to 2010)

Annual percentage frequency of wind blowing from for day and night based on nearest IMD Keonjhar is presented in the **Table 3.2**. IMD data are recorded only in the morning and evening and is represented in 8 quadrants. As indicated in the IMD publication, data recorded in the morning represents day time wind direction and the data recorded in the evening represents night time data. In general, annual predominant wind directions are about 10-17% from SW, 8-11% from SE direction and 9-7% from NE directions. During summer season, the winds are also predominantly from SW, SE & NE, showing similarity to Annual trend of predominant wind direction.

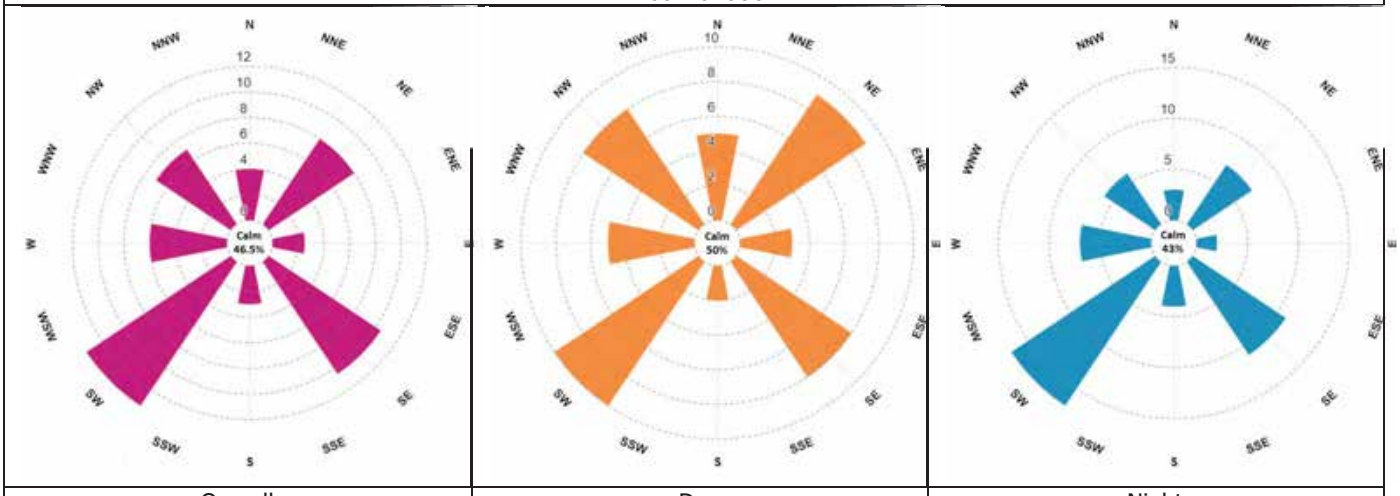
Table 3.2: Climatological data of IMD Keonjhar (from 1981 to 2010)

		N	NE	E	SE	S	SW	W	NW	Calm
IMD Annual Mean (% no. of days wind from)	Day	5	9	3	8	2	10	5	8	50
	Night	3	7	2	11	4	17	7	6	43
	Overall	2	8	5	10.5	3	13.5	6	7	46.5
Predominance Sequence (Annual)		**8th**	**3rd**	**6th**	**2nd**	**7th**	**1st**	**5th**	**4th**	
Summer Season (March,April& May)	Day (avg)	5.0	8.7	5.3	12.3	3.7	10.7	5.7	6.3	42.3
	Night (avg)	3.3	9.3	3.3	14.0	5.3	21.3	7.3	8.0	28.0
	Overall (avg)	4.2	9.0	4.3	13.2	4.5	16.0	6.5	7.2	35.2
Predominance Sequence (Summer)		**8th**	**3rd**	**7th**	**2nd**	**6th**	**1st**	**5th**	**4th**	

The Annual and Summer season Wind rose diagrams at IMD's Keonjhar observatory is shown in **Fig.3.3**.

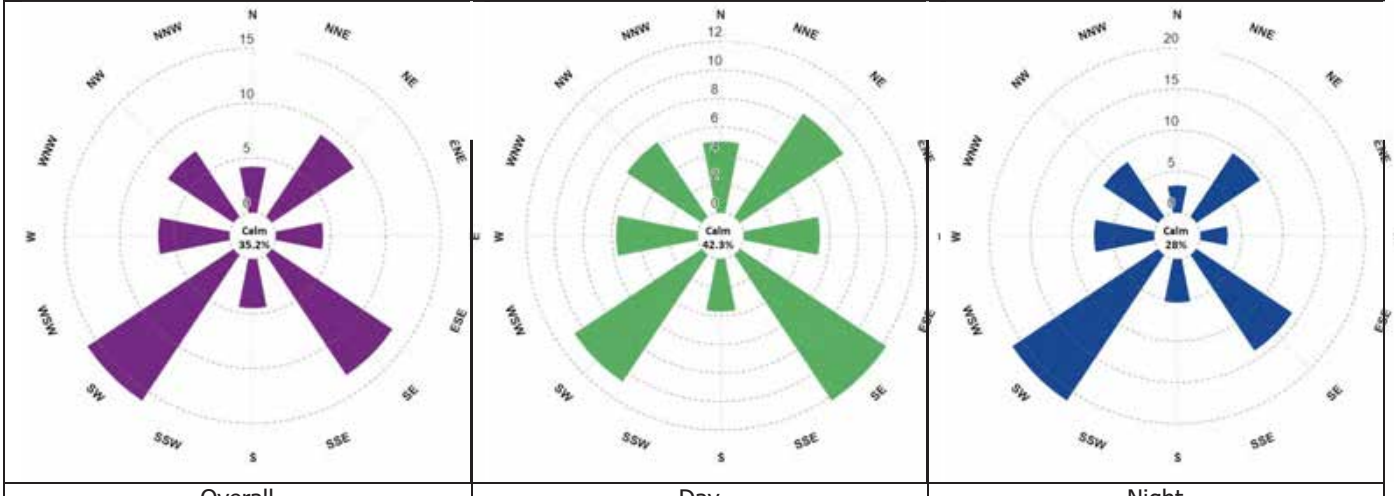
Fig. 3.3: Annual & Summer Season Wind Rose at IMD's Keonjhar Observatory

Annual variation



Overall | Day | Night

Summer variation (March-April-May)



Overall | Day | Night

Source: Climatological Tables and Observations in India, India Meteorological Department, Keonjhar (1981 to 2010)

3.5.2 Physiography

The leasehold area lies at the peak of the hill ranges combining DandraharPahar (at 838 mRL), BichakhanPahar (at 714 mRL), SamalabarPahar (at 846 mRL), KarasapaniPahar (at 802 mRL) and MajuranachanaPahar (at 820 mRL) from south to north. Most of the deposit

area is located in Toda Reserve Forest. Small villages are located in the valley region on either side of the central ridge that hosts the deposit. Average ground level on eastern side valley is 600 mRL whereas on western side plain tract the average ground level slopes from about 400 to 500 mRL

There is no national park, biosphere reserve, sanctuary, habitat for migratory birds, archeological site, defense installation, and airports within 10 km of the periphery of the lease area. The area is located in Seismic Zone II and is not a landslide prone zone.

3.5.3 Industrial profile of the study area

Other industries and mines located within 10 km radius area of Barsua – Taldih – Kalta mine lease are as follows (**Table 3.4**):

Table 3.4: Industries within 10 km around Barsua-Taldih-Kalta mine lease

NAME	AERIAL DISTANCE (km) & Direction	
	CORE ZONE	BUFFER ZONE
Industries		
Sponge Iron Plant of Rungta Mines Ltd. at Komarha	3 km East	In Buffer Zone
Mines (Leases)		
SAIL at Kiriburu-Meghahatuburu (*in Jharkhand*)	9.5 km north	In Buffer zone and extending slightly beyond
Jindal Steel and Power Ltd. at Tantra, Raikela	0.2 km east	In Buffer Zone
Geeta Rani Mohanty at Raikela	1.0 km east	In Buffer Zone
KabitaAgarwal at Tantra	0.6 km east	In Buffer Zone
S.N. Mohanty, Raikela	1 km east	In Buffer Zone
M/s National Enterprises, Raikela	1.2 km east	In Buffer Zone
Orissa Mines & Minerals (P) Ltd., Orahuri	6.5 km east	In Buffer Zone
EMI Ltd., Koira	8 km east	In Buffer Zone
M/s K.C. Pradhan, Nuagaon	8.3 km east	In Buffer Zone
M/S S.D. Sharma, Nuagaon	8.5 km east	In Buffer Zone
M/S S.D. Sharma, Raikela	1.1 km east	In Buffer Zone
M/S Penguin Trading Agencies, Raikela	1.3 km east	In Buffer Zone
M/S S. N. Mohanty, Jaldihi	10 km east	In Buffer Zone
M/S U.C. Mishra, Komarha	3.5 km east	In Buffer Zone
M/S Tarini Minerals, Nuagaon	8.5 km east	In Buffer Zone
M/S J.C. Budhiraj, Bhaludungri	6 km east	In Buffer Zone
M/S C.P. Sharma, Raikela	1.4 km east	In Buffer Zone
Orissa Mines & Minerals (P) Ltd., Tentuldih	8 km east	In Buffer Zone
Orissa Mining Corporation Ltd., Koira - Kashira	8.2 km east	In Buffer Zone
Orissa Mining Corporation Ltd., Koira- Bhanjpalli	8.4 km east	In Buffer Zone
M/S S. N. Mohanty, Nuagaon	8.7 km east	In Buffer Zone
M/S Rungta Mines (P) Ltd., Kanthar Koira	8 km east	In Buffer Zone
M/S Rungta Sons (P) Ltd., Oraghat	7.2 km east	In Buffer Zone
M/S J.N. Patnaik, Bhanjpalli	8.4 km east	In Buffer Zone
M/S S.A. Halim, Oraghat	7 km east	In Buffer Zone
** These Companies own 2 or more leases*		

3.6 BASELINE DATA GENERATION/ESTABLISHMENT OF BASELINE FOR ENVIRONMENTAL COMPONENTS

The establishment of baseline for different environmental components in the study area and at the project site has been done by conducting field monitoring for baseline data generation. The data generation was carried out for covering Meteorology, Ambient Air Quality, Noise Levels, Water Quality, Soil and Socio-economic features.

3.6.1 Micro-Meteorology

Meteorology plays a very important role in the environmental impacts of mining project. Meteorological conditions govern the dispersion (and hence dilution) of air pollutants. Hence Meteorological studies form an integral part of environmental impact assessment studies.

Monitoring Location& Schedule

A Micro-Meteorological station was set up at Tensa Guest house (lat. 21°52'13.32"N long. 85° 9'59.40"E) to generate meteorological data during summer season, 2021. The location of the meteorological data monitoring station is shown together with Ambient Air Quality (AAQ) monitoring stations, subsequently in **Figure 3.5**.

Methodology

The meteorological data was generated hourly during the monitoring period from March to May 2021. The following parameters have been recorded at hourly intervals continuously throughout the monitoring period:

- Wind speed
- Wind Direction
- Atmospheric Temperature
- Relative Humidity

Rainfall was recorded on a daily basis.

Results of Micro-MeteorologyMonitoringat Tensa Guest house (Summer, 2021)

The summary of meteorological data collected during summer season, 2021 is given in **Table 3.5**. **Tables 3.6.1, 3.6.2** and**3.6.3** give the monitored wind frequency distribution for overall, day and night hours respectively. Overall day, Day time (0600 hrs.–1800 hrs.) and night time (1800 hrs.–0600 hrs.) Wind-rose diagrams have been prepared and presented as **Figures 3.4.1, 3.4.2** and **3.4.3** respectively.

Table 3.5: Summarized Monitored Meteorological Data,Summer season, 2021

Month	Wind Speed (m/s)			Temperature (°C)			Relative Humidity (%)			Rainfall (mm)	
	Max	Min	Avg.	Max	Min	Avg.	Max	Min.	Avg.	Total	24 hr highest
March	4.0	0.0	0.9	36.2	15.5	27.7	95.4	14.1	36.1	28	14.5 (24/03/21)
April	3.1	0.0	1.1	37.5	19.4	29.2	95.4	17.2	63.0	70.5	16.5 (09/04/21)
May	5.4	0.0	1.2	37.4	18.2	26.9	92.3	12.3	50.6	731	305 (26/05/21) *
*Very Heavy Rainfall during 23 – 28 May on account of Cyclone "Yaas"											

Table 3.6.1: Wind Frequency Distribution (%) During Day & Night (Overall), Summer season, 2021

Wind Direction	Wind Speed Ranges (m/s)					Total (%)
	0.44-2.00	2.00-3.00	3.00-5.00	5.00-6.00	>=6.0	
N	2.85	0.68	0.32	0.00	0.00	3.85
NNE	0.59	0.27	0.00	0.00	0.00	0.86
NE	2.90	0.54	0.05	0.05	0.00	3.53
ENE	2.40	0.45	0.23	0.05	0.00	3.13
E	1.40	0.23	0.05	0.00	0.00	1.68
ESE	1.86	0.41	0.18	0.00	0.00	2.45
SE	10.73	0.95	0.23	0.00	0.00	11.91
SSE	2.63	0.23	0.00	0.05	0.00	2.90
S	2.13	0.18	0.00	0.00	0.00	2.31
SSW	3.53	0.50	0.05	0.00	0.00	4.08
SW	21.74	2.40	0.59	0.05	0.00	24.77
WSW	2.58	0.32	0.09	0.00	0.00	2.99
W	1.95	0.23	0.00	0.00	0.00	2.17
WNW	2.94	0.14	0.23	0.00	0.00	3.31
NW	3.44	0.59	0.09	0.00	0.00	4.12
NNW	2.26	0.36	0.18	0.00	0.00	2.81
Total	**65.94**	**8.47**	**2.26**	**0.18**	**0.00**	**76.85**
Calm (Wind Speed <0.44 m/s) = 23.15 %						

Table 3.6.2: Wind Frequency Distribution (%) During Day Time, Summer season, 2021

Wind Direction	Wind Speed Ranges (m/s)					Total (%)
	0.44-2.00	2.00-3.00	3.00-5.00	5.00-6.00	>=6.0	
N	2.59	0.67	0.08	0.00	0.00	3.34
NNE	0.59	0.50	0.00	0.00	0.00	1.09
NE	3.76	0.84	0.08	0.08	0.00	4.77
ENE	3.76	0.59	0.33	0.00	0.00	4.68
E	2.26	0.42	0.08	0.00	0.00	2.76
ESE	3.18	0.59	0.17	0.00	0.00	3.93
SE	9.95	0.92	0.33	0.00	0.00	11.20
SSE	3.01	0.25	0.00	0.08	0.00	3.34
S	2.59	0.33	0.00	0.00	0.00	2.93
SSW	4.35	0.42	0.08	0.00	0.00	4.85
SW	17.22	1.76	0.59	0.08	0.00	19.65
WSW	2.93	0.50	0.08	0.00	0.00	3.51
W	2.42	0.42	0.00	0.00	0.00	2.84
WNW	2.68	0.17	0.33	0.00	0.00	3.18
NW	2.34	0.59	0.00	0.00	0.00	2.93
NNW	1.92	0.33	0.17	0.00	0.00	2.42
Total	**65.55**	**9.28**	**2.34**	**0.25**	**0.00**	**77.42**
Calm (Wind Speed <0.44 m/s) = 22.58 %						

Table 3.6.3: Wind Frequency Distribution (%) During Night Time,Summer season, 2021

Wind Direction	Wind Speed Ranges (m/s)					Total (%)
	0.44-2.00	2.00-3.00	3.00-5.00	5.00-6.00	>=6.0	
N	3.16	0.69	0.59	0.00	0.00	4.45
NNE	0.59	0.00	0.00	0.00	0.00	0.59
NE	1.88	0.20	0.00	0.00	0.00	2.08
ENE	0.79	0.30	0.10	0.10	0.00	1.28
E	0.40	0.00	0.00	0.00	0.00	0.40
ESE	0.30	0.20	0.20	0.00	0.00	0.69
SE	11.60	0.99	0.10	0.00	0.00	12.69
SSE	2.17	0.21	0.00	0.00	0.00	2.38
S	1.58	0.00	0.00	0.00	0.00	1.58
SSW	2.57	0.59	0.00	0.00	0.00	3.16
SW	27.11	3.17	0.59	0.00	0.00	30.87
WSW	2.17	0.10	0.10	0.00	0.00	2.37
W	1.38	0.00	0.00	0.00	0.00	1.38
WNW	3.26	0.10	0.10	0.00	0.00	3.46
NW	4.74	0.59	0.20	0.00	0.00	5.53
NNW	2.67	0.40	0.20	0.00	0.00	3.26
Total	**66.38**	**7.53**	**2.17**	**0.10**	**0.00**	**76.18**
Calm (Wind Speed <0.44 m/s) = 23.82 %						

Fig.3.4.1: Wind Rose at TensaGuestHouse, 24 hours (overall), Summer, 2021

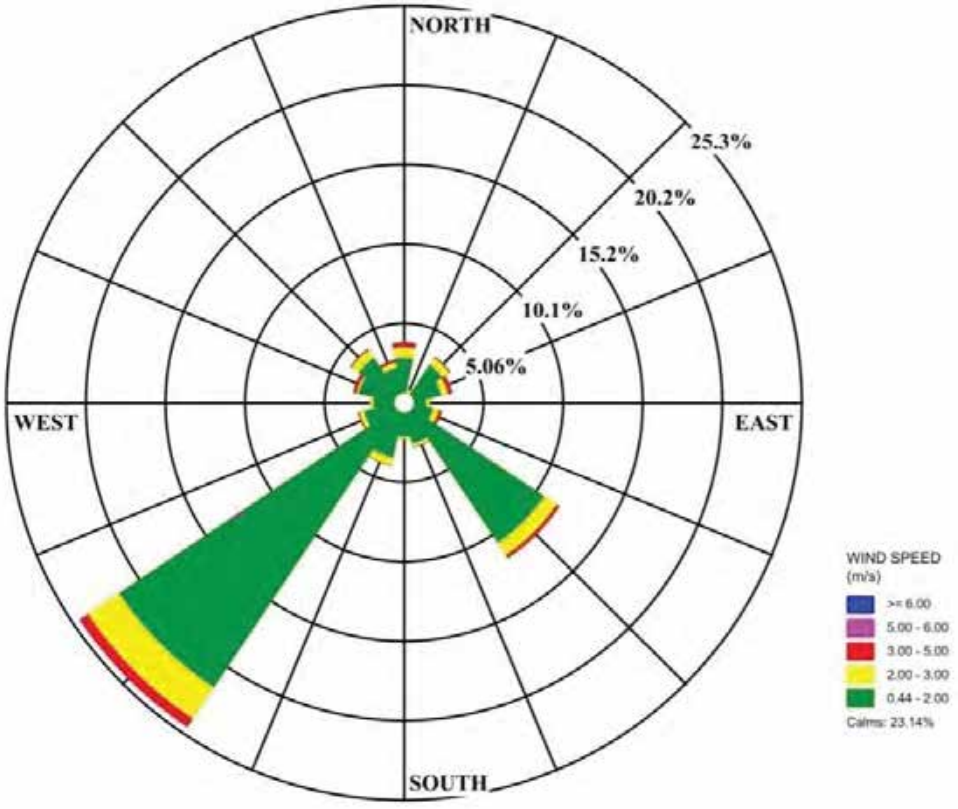


Fig.3.4.2: Wind Rose at TensaGuestHouse, Day, Summer, 2021

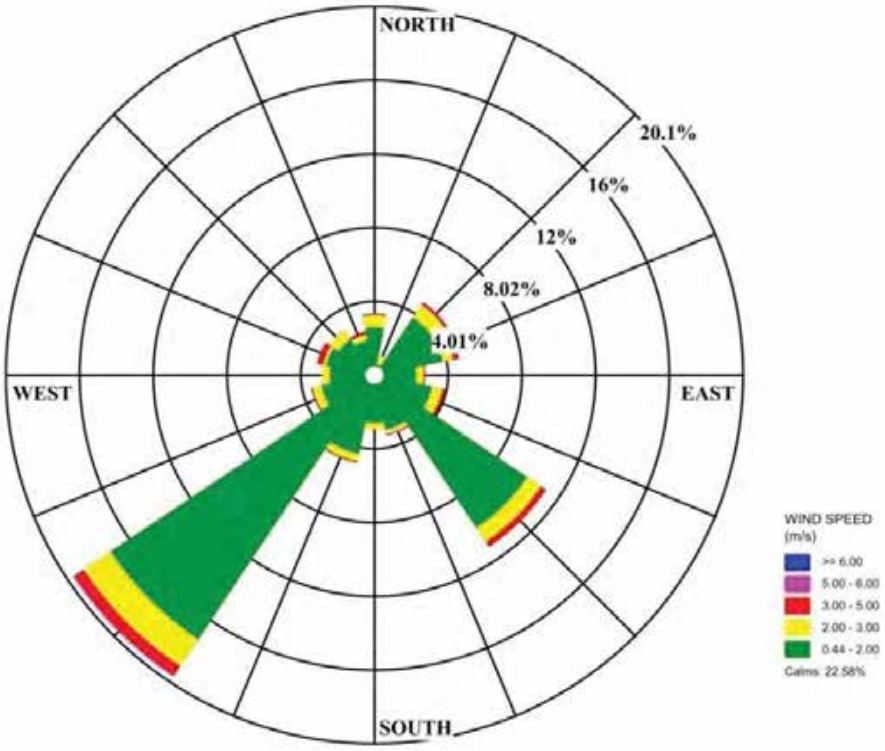
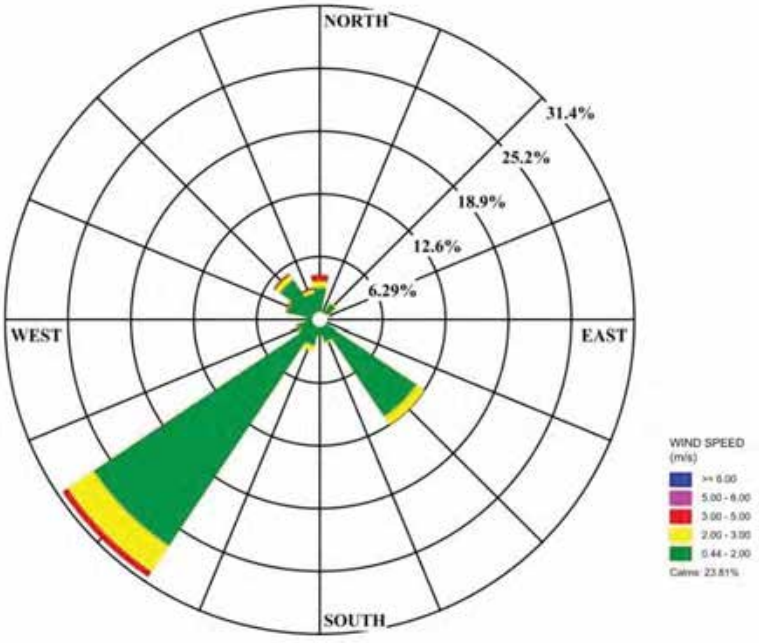


Fig.3.4.3: Wind Rose at TensaGuestHouse, Night, Summer, 2021



From **Tables 3.6.1, 3.6.2** and **3.6.3** above, it can be seen that during Summer season, 2021, in the Tensa guest housestudy area, wind was mostly blowing fromSouth-West (prevailing for ~24.8% of the time) and South-East ((prevailing for ~11.9% of the time); calm conditions (wind speed <0.44 m/s) prevailed for ~23.2% of the time.During day time predominant wind directions werealso South-West (~19.7%) and South-East (~11.2%);

calm conditions prevailed for ~22.6% of the time. During night time the predominant wind directions were directions were also South-West (~30.9%) and South-East (prevailing for ~12.7% of the time); calm conditions prevailed for ~23.8% of the time.During the monitoring period the predominant wind speeds were mostly in the range of 0.44 – 2.0 m/s.

3.6.2 Ambient Air Quality

To quantify the effects of existing and proposed activities it is necessary to initially evaluate the existing air quality in and around the existing mining area. Present ambient air quality has been determined quantitatively through a planned field monitoring.

3.6.2.1 Selection of AAQ Monitoring Locations & Schedule

The main objective of AAQ data generation / establishment of baseline for AAQ are to assess the future scenario of the surrounding environment by superimposing the predicted pollution levels on the existing pollution levels. Thus it will be possible to identify the location where maximum concentrations of pollutants are likely to occur due to emissions from the mining operations.

Information published by India Meteorological Department (IMD) was utilized to select the locations of the ambient air quality monitoring stations. The IMD observatory nearest to plant site is at Keonjhar(21°37'N latitude and 85°35'E longitude).The following considerations were made for selection of the stations:

In order to fix the locations of the monitoring stations, a model suggested by Houghland and Stephens (*Ref: The Design of Air Quality Monitoring Network; R.E. Munn, 1981)* has been used. This model suggests setting up of monitoring stations at those locations where ground level concentration (GLC) is high. The probability factor was found by determining the "coverage factor" for potential monitoring locations around the project, which are likely to be affected due to air pollutants from the project. The coverage factor for all potential locations were calculated by the following formula:

$$A_{jk} = \frac{\text{Freq. (k)}}{(1 + D_j)}$$

Where

A_{jk} = Coverage factor of the monitoring site in the k^{th}down wind sector
Freq. (k) = Frequency of wind direction in the k^{th} sector.
D_j = Distance (km) from the source (project) to the site.

- The wind rose data of IMD Keonjhar observatory was used to calculate the Ajk values of all potential AAQ monitoring stations. Stations were set up all around the project site.
- Possible stations covering all possible downwind directions and in varying distances up to a limited stretch from the project site were tested with this mathematical model. The station with the lowest coverage factor has been selected to serve as the control station.
- Stations were set up at all around the mine lease area keeping in view the pre-dominant downwind direction and location of sensitive receptors.
- CPCB Guidelines for Ambient Air quality monitoring, 2003 were considered for selection of AAQ statiions.

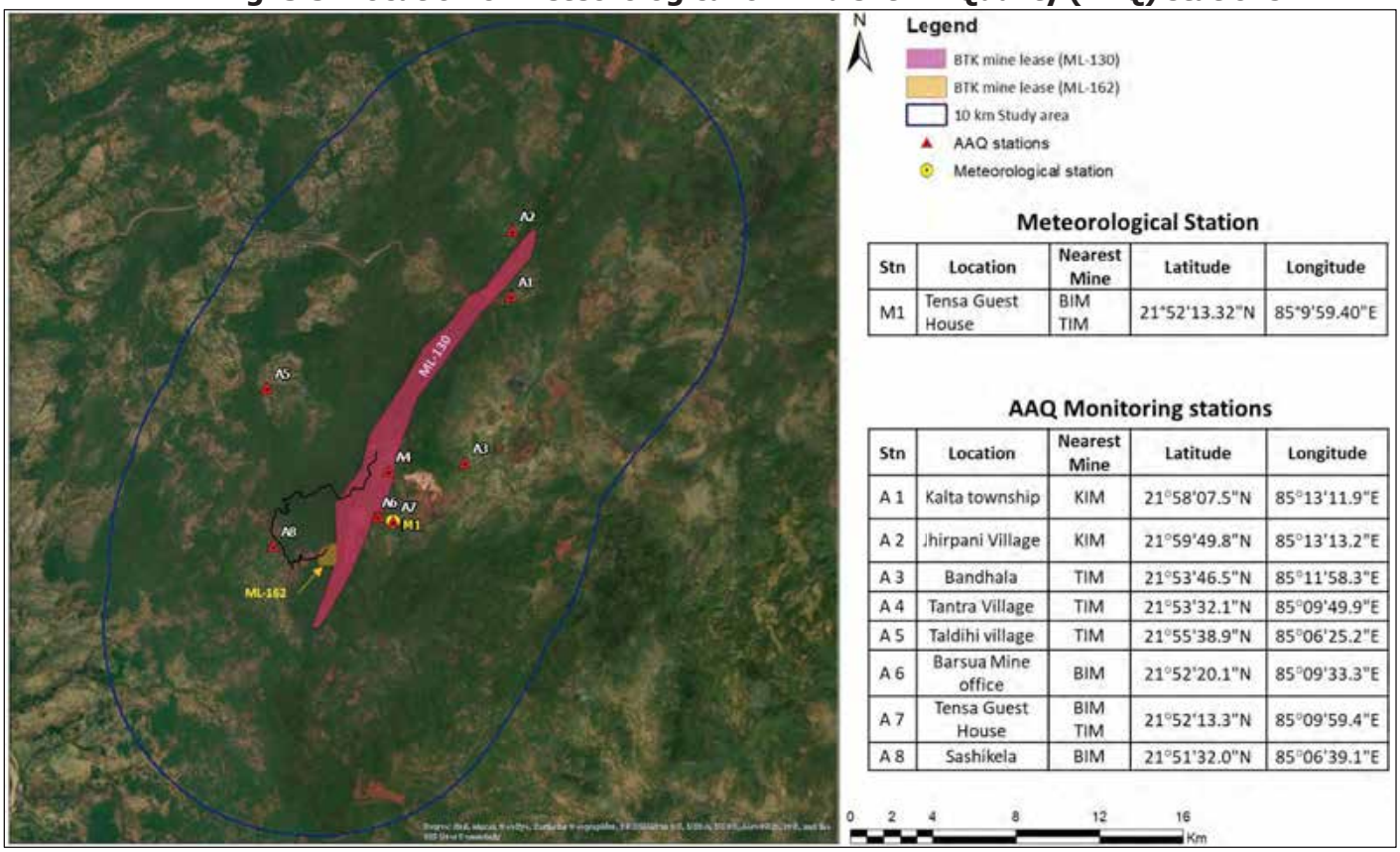
- 8 AAQ monitoring stations were selected to cover upwind and downwind direction of annual and summer winds with respect to the mining lease areas within 10 km radius around the mine lease.
- Of these stations, one AAQ station was placed within ~500 m of the mine lease of Barsua, Taldih and Kalta Mines.
- The rest AAQ stations were outside the mining lease mostly within 4 km of the core zone.

Table 3.7 gives the locations of the ambient air quality monitoring stations and their & the GPS co-ordinates which are marked in aforementioned **Fig. 3.5**.

Table 3.7: Ambient Air Quality (AAQ) monitoring stations (Summer season, 2021)

Sl. No.	Stn. Code	Location	Nearest SAIL Mine	Direction & Distance from nearest lease boundary (km)	Latitude	Longitude	Station Description
1.	A 1	Kalta township	KIM	0.45, SE of KIM	21°58'07.5"N	85°13'11.9"E	The station is in Kalta township which is near to Kalta mine lease area within a distance of 500 m & SE direction of KIM and ~130 m lower altitude. NH520 highway is close to the township.
2.	A 2	Jhirpani Village	KIM	0.65, W of KIM	21°59'49.8"N	85°13'13.2"E	The station is a residential area in NW direction of KIM, situated near to Odisha and Jharkhand state boundaries. The village is located away from active mining and transportation activities. Also, the station is in close proximity to forested areas.
3.	A 3	Bandhala	TIM	3.2, ESE of TIM	21°53'46.5"N	85°11'58.3"E	The station is in E direction of SAIL mines. Opencast mine 1.7 km SW. Sponge iron plant 4.2 km NE. Village approached by a single lane busy road connecting NH520 with Koida-Barsuan Road.
4.	A 4	Tantra Village	TIM	Within Core Zone	21°53'32.1"N	85°09'49.9"E	The station is within the Taldih mine lease area. Open cast mines 0.8 km ESE & 1.2 km NE.
5.	A 5	Taldihi village	TIM	5.3, NW of TIM	21°55'38.9"N	85°06'25.2"E	The station is in W direction& beyond 5.0 km of TIM. The village is located away from any industrial/ mining and transportation activities. Also, the station is in close proximity to forested areas.
6.	A 6	Barsua Mine office	BIM	0.2, E of BIM	21°52'20.1"N	85°09'33.3"E	The station is just outside ML Area of Barsua mine which is in the administrative building.
7.	A 7	Tensa Guest House	BIM TIM	0.58, SE of BIM	21°52'13.3"N	85°09'59.4"E	The station is near to busy road connecting Koida with Barsuan. Surrounded by mature sal trees.
8.	A 8	Sashikela	BIM	2.0, W of BIM	21°51'32.0"N	85°06'39.1"E	The station is in W direction of BIM (ML-162) and ~300m away from Koida road. The station is close to forested areas.

Fig. 3.5: Location of Meteorological & Ambient Air Quality (AAQ) stations



Meteorological Station

Stn	Location	Nearest Mine	Latitude	Longitude
M1	Tensa Guest House	BIM TIM	21°52'13.32"N	85°9'59.40"E

AAQ Monitoring stations

Stn	Location	Nearest Mine	Latitude	Longitude
A 1	Kalta township	KIM	21°58'07.5"N	85°13'11.9"E
A 2	Jhirpani Village	KIM	21°59'49.8"N	85°13'13.2"E
A 3	Bandhala	TIM	21°53'46.5"N	85°11'58.3"E
A 4	Tantra Village	TIM	21°53'32.1"N	85°09'49.9"E
A 5	Taldihi village	TIM	21°55'38.9"N	85°06'25.2"E
A 6	Barsua Mine office	BIM	21°52'20.1"N	85°09'33.3"E
A 7	Tensa Guest House	BIM TIM	21°52'13.3"N	85°09'59.4"E
A 8	Sashikela	BIM	21°51'32.0"N	85°06'39.1"E

3.6.2.2 Methodology

The ambient air quality was evaluated in terms of Particulate Matters (PM_{10}, $PM_{2.5}$), Sulphur-di-oxide (SO_2), Oxides of Nitrogen (NO_2), Carbon Monoxide (CO), Ammonia, (NH_3), Ozone (O_3), Benzene (C_6H_6), Benzo(a)Pyrene (BaP), Lead (Pb), Nickel (Ni), Arsenic (As) and free silica in PM_{10}.

The samples were collected twice a week for twelve weeks during summer season,2021. Samples of 24 hourly durations were collected for PM_{10}, $PM_{2.5}$, SO_2, NO_2 and NH_3. Hourly samples were taken for CO and O_3; four-hourly samples were collected for benzene. Benzo(a)Pyrene (BaP), Lead (Pb), Nickel (Ni), Arsenic (As) and free silica were analysed in selected samples at all the locations determined from PM_{10}.

The methods of sample collection, equipment used and analysis procedure as followed are given in **Table 3.8.**

Table 3.8: Details of methodology of AAQ sampling for summer season, 2021

Sl. No.	Parameters	Instrument/ Apparatus used	Method followed	Reference
1	Sulphur dioxide (SO_2)	RDS with Impinger tubes, spectrophotometer	Improved West &Gaecke Method	IS 5182 Part 2 2001, (Reaffirmed 2017)
2	Nitrogen dioxide(NO_2)	RDS with Impinger tubes, spectrophotometer	Jacobs &Hochheiser Modified (Sodium Arsenite) Method	IS 5182 Part 6 2001, (Reaffirmed 2017)
3	Particulate matter (PM_{10})	Respirable Dust Sampler (RDS),balance	Gravimetry	IS 5182 Part 23 2006, (Reaffirmed 2017)
4	Particulate Matter ($PM_{2.5}$)	PM2.5 Sampler (Fine dust sampler), balance	Gravimetry	NAAQS Monitoring & Analysis Guidelines
5	Ammonia (NH_3)	RDS with Impinger tubes, spectrophotometer	Indophenol Method	APHA Edition 21st
6	Carbon Monoxide (CO)	CO Analyzer	NDIR Method	NAAQS Monitoring & Analysis Guidelines
7	Ozone (O_3)	RDS with Impinger tubes, UV-Vis Spectrophotometer	Chemical method	Guidelines for Manual Sampling and Analysis for NAAQ, Vol. 1, CPCB; Method - 411, Air Sampling & Analysis, 3rd ed.); IS 5182 part 9, 1974 (Reaffirmed 2014)
8	Nickel (Ni)	RDS, MP-AES/AAS	AAS Method after sampling on EPM 2000 F.P.	IS 5182 part 10, 1999
9	Arsenic (As)	RDS, MP-AES/AAS	AAS Method after sampling on EPM 2000 F.P.	IS 5182 part 10, 1999
10	Lead (Pb)	RDS, MP-AES/AAS	AAS Method after sampling on EPM 2000 F.P.	IS 5182 part 10, 1999
11	Benzene (C_6H_6)	Benzene Sampler, GC	Adsorption & Desorption followed by GC	IS 5182 part 11, 2006 (Reaffirmed 2017)
12	Benzo(a)Pyrene (BaP)	RDS, HPLC	Solvent extraction followed by HPLC	IS 5182 part 12, 2004 (Reaffirmed 2014)
13	Free Silica	RDS, Particulate Phase	Visible Spectrophotometer	NIOSH Manual of Analytical Methods, 4thEd., Method 7601, Issue 3, 15th March 2003.

3.6.2.3 Results of Ambient Air Quality Monitoring

The summarized results of ambient air quality monitoring are given in **Table 3.9**.The results have been compared with the National Ambient Air Quality standards 2009 of Central Pollution Control Board mentioned in **Table 3.10**.

Table 3.9: Summarized AAQ monitoring results forSummerseason, 2021

Pollutants		A1 Kalta township	A2 Jhirpani Village	A3 Bandhala	A4 Tantra Village	A5 Taldihi village	A6 Barsua Mine office	A7 Tensa Guest House	A8 Sashikela	NAAQS Norms
PM_{10}# (Detection limit= 5 µg/m^3)	Max	93	89	95	94	91	95	93	92	100µg/m^3
	Min	76	65	75	65	70	77	72	66	
	Mean	87	78	85	82	82	88	85	80	
	C98	91	87	94	93	90	94	92	91	
$PM_{2.5}$# (Detection limit= 5 µg/m^3)	Max	54	47	56	53	49	55	53	52	60µg/m^3
	Min	36	32	36	38	38	39	38	34	
	Mean	46	40	45	45	44	47	45	43	
	C98	50	46	54	53	48	52	51	49	
SO_2# (Detection limit=4 µg/m^3)	Max	16.7	14.7	19.7	17.0	13.6	19.2	18.7	18.2	80µg/m^3
	Min	6.3	4.2	4.3	6.1	<4	5.7	4.8	4.7	
	Mean	10.8	7.5	14.1	10.3	8.5	11.7	12.5	9.3	
	C98	15.6	11.3	19.3	15.6	11.8	16.7	18.6	14.9	
NO_2# (Detection limit=10 µg/m^3)	Max	23.7	19.4	28.6	19.6	18.5	22.5	28.0	21.5	80µg/m^3
	Min	10.2	<10	<10	6.7	<10	<10	11.0	10.0	
	Mean	17.0	13.1	18.8	13.1	14.5	13.3	20.3	15.0	
	C98	22.9	16.4	26.0	18.2	18.3	17.4	27.8	21.0	
NH_3# (Detection limit=4.2 µg/m^3)	Max	40.2	35.8	67.2	42.8	40.4	69.1	73.4	39.1	400µg/m^3
	Min	18.3	9.5	17.8	12.6	16.1	11.4	28.5	9.0	
	Mean	28.3	22.6	39.3	24.1	23.8	41.2	47.7	24.1	
	C98	38.5	35.2	65.3	34.0	33.3	68.2	70.9	38.7	
CO** (Detection limit=57 µg/m^3)	Max	1626	1863	1795	1638	1699	1908	1899	1793	2000µg/ m^3
	Min	207	125	314	202	156	208	176	147	
	Mean	1274	1057	1018	1012	991	1252	1136	908	
O_3** (Detection limit=20 µg/m^3)	Max	41	42	40	37	40	42	39	43	180µg/m^3
	Min	29	29	24	23	27	23	26	27	
	Mean	35	35	33	32	33	34	34	33	
Pb (Detection limit=0.001 µg/m^3)	Max	0.017	0.071	0.090	0.058	0.052	0.045	0.075	0.058	1µg/m^3
	Min	0.012	0.017	0.029	0.032	0.027	0.015	0.040	0.002	
	Mean	0.014	0.051	0.055	0.045	0.038	0.026	0.063	0.024	
Ni (ng/m^3) (Detection limit=0.6 ng/m^3)	Max	10.5	4.8	14.2	8.7	7.2	8.1	19.7	7.3	20 ng/m^3
	Min	1.1	1.6	1.7	4.9	2.9	3.7	12.1	6.3	
	Mean	5.3	3.2	7.1	6.4	5.3	6.1	15.7	6.9	
As (Detection limit=0.6 ng/m^3)	Max	0.6	1.0	<0.6	1.9	3.6	2.1	3.6	3.7	6 ng/m^3
	Min	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	2.5	<0.6	
	Mean	-	0.9	-	1.8	4.3	1.7	2.9	3.6	
Benzene (Detection limit=1.04 µg /m^3)	Max	4.46	1.32	4.68	2.48	2.02	3.86	4.74	2.24	5µg/m^3
	Min	2.86	1.05	2.23	1.82	1.85	1.32	3.75	1.80	
	Mean	3.57	1.21	3.95	2.19	1.96	2.79	4.39	2.06	
Benzo-a- Pyrene (Detection limit=0.24 ng/m^3)	Max	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	1 ng/m^3
	Min	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	
	Mean	-	-	-	-	-	-	-	-	

Table 3.10: National Ambient Air Quality Standards, 2009

Sl. No.	Parameter	Time Weighted Average	Concentration in Ambient Air	
			Industrial, Residentia, Rural & Other Areas	Ecologically Sensitive Area (Notified by Central Govt.)
1	Sulphur Dioxide (SO_2) ; ($\mu g/m^3$)	Annual*	50	20
		24 Hours**	80	80
2	Nitrogen Dioxide (NO_2) ; ($\mu g/m^3$)	Annual*	40	30
		24 Hours**	80	80
3	Particulate Matter, PM_{10}; ($\mu g/m^3$)	Annual*	60	60
		24 Hours**	100	100
4	Particulate Matter, $PM_{2.5}$; ($\mu g/m^3$)	Annual*	40	40
		24 Hours**	60	60
5	Carbon Monoxide (CO); (mg/m^3)	8 Hours **	02	02
		1 Hour **	04	04
6	Ozone (O_3) ; ($\mu g/m^3$)	8 Hours **	100	100
		1 Hour **	180	180
7	Ammonia (NH_3) ; ($\mu g/m^3$)	Annual*	100	100
		24 Hours**	400	400
8	Lead (Pb); ($\mu g/m^3$)	Annual*	0.50	0.50
		24 Hours**	1.0	1.0
9	Arsenic (As); (ng/m^3)	Annual*	06	0.6
10	Nickel (Ni); (ng/m^3)	Annual*	20	20
11	Benzene (C_6H_6) ; ($\mu g/m^3$)	Annual*	05	05
12	Benzo(a)Pyrene (BaP); (ng/m^3)	Annual*	01	01

**Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals*
***24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days.*

The above results indicate that air quality is within the norms at all the eight monitoring locations in the study area for all parameters (PM_{10}, $PM_{2.5}SO_2$, NO_2, CO, NH_3, O_3, Pb, As and Ni) as prescribed by NAAQS 2009. All values of Benzo(a)Pyrene (BaP) in PM_{10}in ambient air were found below the detection limits of measurement.

The maximum SO_2 concentrations in the eight (8) AAQ stations in thestudy area ranged from 13.6 to 19.7 $\mu g/m^3$ andthe maximum NO_2 concentrations varies from 18.5 to 28.6 $\mu g/m^3$. The low values of SO_2 and NO_2 concentration are found in A5 (Taldihi village) and A2 (Jhirpanivillage) while comparatively high concentrations are found at A6, A7, A8& A1 for SO_2 concentration and A7, A1, A6& A8for NO_2 concentration.

The concentration of CO varied from 125 to 1908 $\mu g/m^3$ and the ground level ozone concentrations ranged from 23 to 43 $\mu g/m^3$ at all the eight locations. The concentrations of Pb, Ni and As in PM_{10} in all the AAQ locations were found below the limits.Pb concentrations ranged from 0.002 to 0.09 $\mu g/m^3$ and Ni concentrations were 1.1 to 19.7 $\mu g/m^3$. High concentrations of Ni in PM_{10} were found in A7 (Tensa Guest House), A3(Bandhala) and A1 (Kalta township) locations which are in close proximity to roads.As concentration is found in the range of <0.6 to 3.7 ng/m^3.Benzene concentrations in AAQ locations are in the range of 1.05 to 4.74 $\mu g/m^3$. The low concentrations of benzene were

found in A2 (Jhirpani Village) AAQ location and high concentrations of benzene were found in A7, A3 & A1 which are in close proximity to roads.

The maximum PM_{10} values ranged from 89 to 95 µg/$m^3$and $PM_{2.5}$ values ranged from 47 to 56 µg/m^3 at the monitored eight locations which were well within the limits.

Particulate matter values in the 8 AAQ locations are briefed below

- A6 AAQ station is in the administrative office near the Barsuamineand the PM_{10} and $PM_{2.5}$ valuesranged from 77 to 95 and 39 to 55 µg/m^3.
- The AAQ locations A1, A4 and A7 are the nearest villages to Kalta, Taldih and Barsua mines.

Mine Area	Closest AAQ village within ~500 m to mine	Range of PM_{10} (mean) in µg/m^3	Range of $PM_{2.5}$ (mean) in µg/m^3	Location details
KIM	A1 (Kalta township)	76- 93 (87)	36- 54 (46)	• The station is close to Kalta mine area. • Highway is close to the township.
TIM	A4 (Tantra Village)	65 - 94 (82)	38 - 53 (45)	• The station is within the ML-area close to Taldih mine. • The station is close to road and other mine lease areas.
BIM	A7 (Tensa Guest House)	72 - 93 (85)	38 - 53 (45)	• The station is close to Koida-Barsuan road and other mine lease areas.

- A3 (Bandhala) AAQ location is the village which is in between various other mining lease areas, industry and transport routeand the PM_{10} and $PM_{2.5}$ valuesranged from 75 to 95 and 36 to 56 µg/m^3.
- A12 (Sashikela), the station is in W direction of BIM (ML-162) and ~300m away from Koida roadbut with tree covered hill in between. The PM_{10} and $PM_{2.5}$ values ranged from 66 to 92 and 34 to 52 µg/m^3.
- A4,Jhirpani Village(W of Kalta Mines) and A9 (West to Taldih mines) are background AAQ locations which are representative of the activities by the local population & other activities. These locations have less impact or absence of nearby industrial/mining and associated transport emissions. The pollutant concentrations were lesser than other AAQ locations.
- The high concentrations of PM were observed in the month of March & April 2021. The effect of rains on PM and other pollutants decreases the concentration as precipitation is most important mechanisms in self-purification of the atmosphere[1]. Tensa at an altitude of ~800m is a hill station, also called zero point, experiences significant precipitation.

A graphical representation of varaiationpattern of PM_{10} and $PM_{2.5}$ at 8 monitored locations has been presented in **Fig. 3.6.1**and **Fig.3.6.2** respectively.

1Y. Qin and C. S. Zhao, Fundamentals of Atmospheric Chemistry, China Meteorological Press, Beijing, China, 2003.

Fig. 3.6.1: Variationpattern ofPM_{10}in summer season at AAQ locations

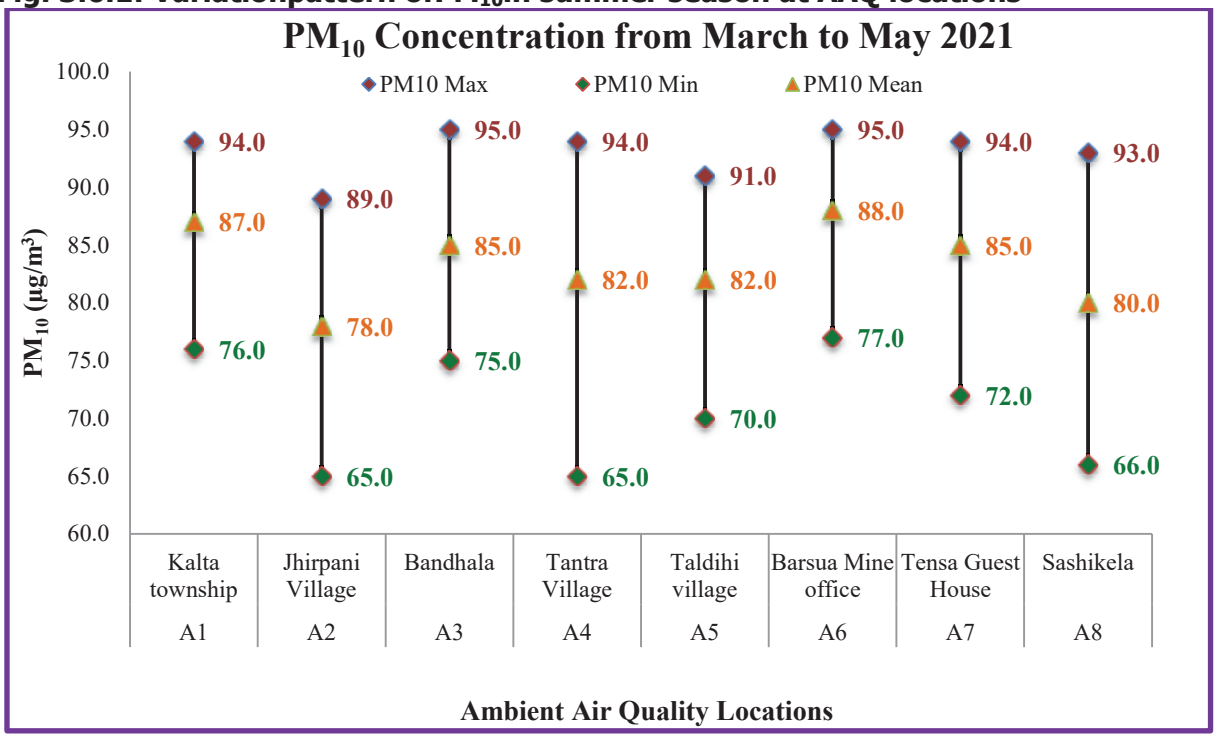
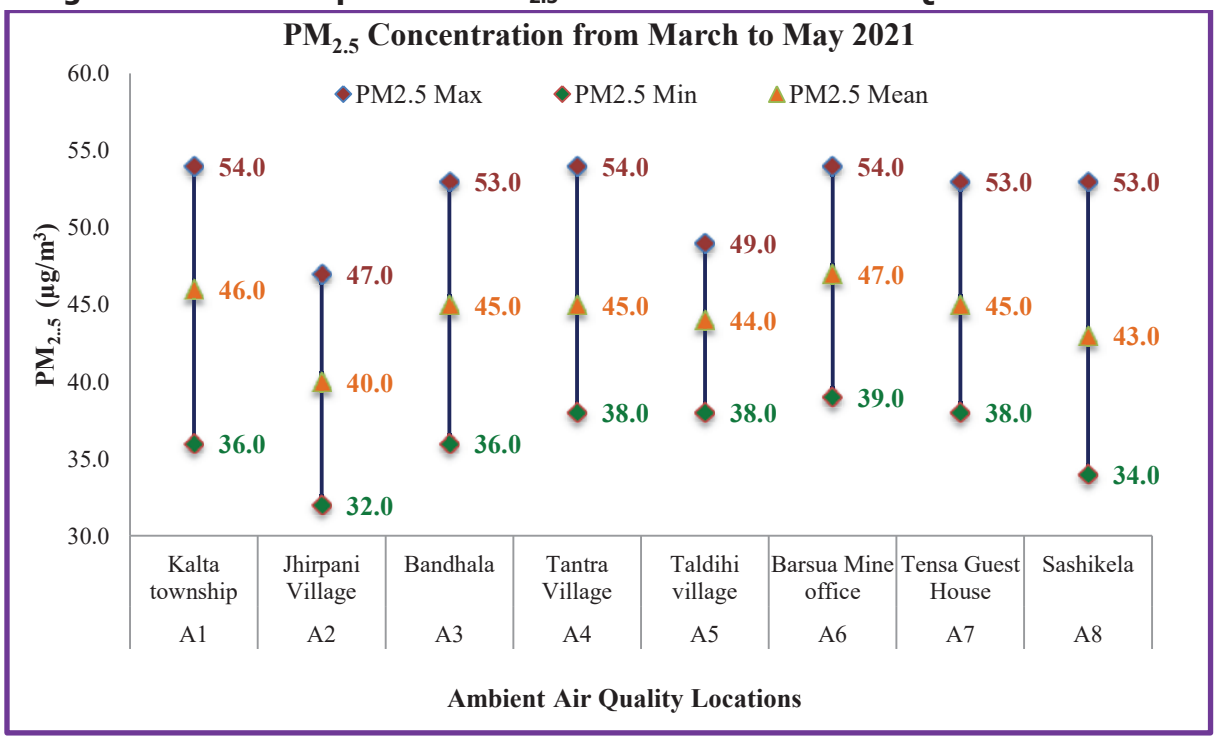


Fig. 3.6.2: Variation pattern of$PM_{2.5}$ in summer seasonat AAQ locations



The sources contributing to particulate matter in the study area are:

- Operation of several iron ore mines in the area and road transportation of ore.
- Use of coal and wood as domestic fuel by local villagers.
- During summer Sal trees (*Shorearobusta*), which are the predominat species in the area, flower and produce large amounts of pollen.
- Village traffic

- The fugitive dust emissions fromkutcha village roads, fallow lands and ploughed agricultural fields.
- Forest fires (natural or otherwise).
  - During the monitoring period from March to May 2021, ~58 incidents of forest fires have occurred in Forests of Toda BlockofKalta, Bonai Division, Koira Range.
  - Also, ~217 incidents of forest fires were recorded in Forests of Barsuan Block ofBarsua, Rourkela circle, Bonai Division, BarsuanRangeinSundargarh district.
  - The forests in the study area forms a part of the aforementioned Toda Block of Koira Range and Barsuan Block of Barsuan Range.
  - The GPS coordinates and the details of the forest fires in Toda Block (Kalta) and Barsuan Block (Barsua)have been tracked during the monitoring period March to May 2021 from Forest Survey of India, MOEF&CC (http://117.239.115.41/smsalerts/index.php).
  - During dry weather conditions, forest fires are witnessed in the study area. From the Rourkela forest circle fire zone map, the study area comes under no fire to medium risk zone as reported in Combating Forest Fire in Odisha, 2017 from Principla Chief Conservator of Forests, Bhubaneswar, Odisha..

3.6.2.4 Free Silica in Ambient Air Quality

Free silica has been analysed in Respirable Dust (PM_{10}) in three samples at each AAQ locations and results are presented in **Table 3.11**. The free silica values at all the AAQ locations are in traces and well below the detection limit. The maximum concentrations were with range of 0.001 to 0.099 µg/m^3 which are well below the limits. In terms of respirable dust, silica concentration in permissible limit as recommended by DGMS, GOVT. of India is 3 mg/$m^3$for eight hours time weighted average provided the concentration of silica in the respirable dust remains less that 5% (DGMS (Tech.) (S&T) Circular No.01, Dhanbad, dt.21.01.2010).

Table 3.11: Results of Free Silica in Respirable Dust PM_{10} (µg/m^3)

Sl.No.	Sampling Location	Station Code	Results in µg/m^3		
			Max	Min	Mean
1	Kalta township	A1	0.099	<0.001	0.055
2	Jhirpani Village	A2	0.044	0.001	0.023
3	Bandhala	A3	0.009	<0.001	0.008
4	Tantra Village	A4	0.003	0.001	0.002
5	Taldihi village	A5	0.004	<0.001	0.002
6	Barsua Mine office	A6	0.001	<0.001	0.001
7	Tensa Guest House	A7	0.004	<0.001	0.002
8	Sashikela	A8	0.003	<0.001	0.002

3.6.3 Work Zone Air Quality

Monitoring of fugitive emissions in work zone are being carried out at twelve locations; five in Barsua Iron Mine (BIM), three in Taldih Iron Mine (TIM) and four in Kalta Iron Mine (KIM). The locations are given in **Table 3.12**.

Table 3.12: Fugitive Emission Monitoring Stations

Stn. Code	Location
F1	Drilling Site (BIM)
F2	Excavation & loading (BIM)
F3	Haul Road (BIM)
F4	Dump Area (BIM)
F5	Stock pile& Loading (B/V, BIM)
F6	Haul Road (TIM)
F7	Screening Area (TIM)
F8	Excavation Area (TIM)
F9	Drilling Area (KIM)
F10	Excavation & Loading Area (KIM)
F11	Haul Road Area (KIM)
F12	Crushing & Screening Area (KIM)

The results of monitoring of fugitive emission for the periodJune2020 to January 2021 are presented in **Table 3.13.**

Table 3.13: Summarised Results of Fugitive Emissions from June 2020 to January 2021 at Barsua-Taldih-Kalta Iron Ore Mine (µg/m^3)

Location	June 2020		July 2020		August 2020		September 2020		October 2020		November 2020		December 2020		January 2021	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
F 1	342	542	519	656	541	563	556	596	602	641	602	624	621	638	541	589
F 2	411	506	447	530	458	512	466	498	574	614	612	634	618	634	490	518
F 3	529	557	532	596	537	591	544	588	592	661	602	614	608	636	539	598
F 4	332	392	341	496	349	400	386	399	664	694	618	633	622	644	510	597
F 5	394	424	384	437	339	415	369	416	581	652	610	628	616	658	479	499
F 6	521	572	736	772	742	766	731	756	741	784	712	744	726	748	740	766
F 7	541	588	743	788	744	766	741	768	741	778	718	741	729	744	748	766
F 8	548	596	768	796	772	799	772	794	778	798	716	742	732	752	778	795
F 9	448	524	442	528	448	516	451	526	-	-	468	482	452	478	432	496
F 10	638	748	630	744	638	730	641	674	-	-	466	485	472	492	531	569
F 11	712	748	706	760	712	742	712	758	-	-	448	462	456	489	556	595
F 12	711	860	711	856	711	860	749	796	-	-	454	478	456	488	749	767
Norm	**1200 µg/m^3**															

Note: *Fugitive emission standards as per MoEF Notification No. GSR 809(E) dtd.04.10.2010 on iron ore mining and processing, PM – 1200 µg/m^3 at a distance of 25±2 m.*

SPM values in all the twelve locations are well within the prescribed limitsas per MoEF Notification No. GSR 809(E) dt.04.10.2010 for iron ore mining and processing. The SPM values are high at F12 Crushing & Screening Area (KIM), F8 Excavation Area (TIM) and F4Dump Area (BIM)among the individual fugitive emissions from each mine.

From the above Table it can be notedFugitive emissions in the work zone areas are highest (but not exceeding the limit) in Kalta Iron Ore Mine followed by Taldih Iron Ore Mine and Barsua Iron Ore Mine.The results' trend shows higher SPM levels in crushing, ore loading and unloading, drilling areas which are the potential sources for fugitive emissions during mining & allied operations.

Various measures have been implemented at the mines to control fugitive dust which are described in Chapter 4 of this report.

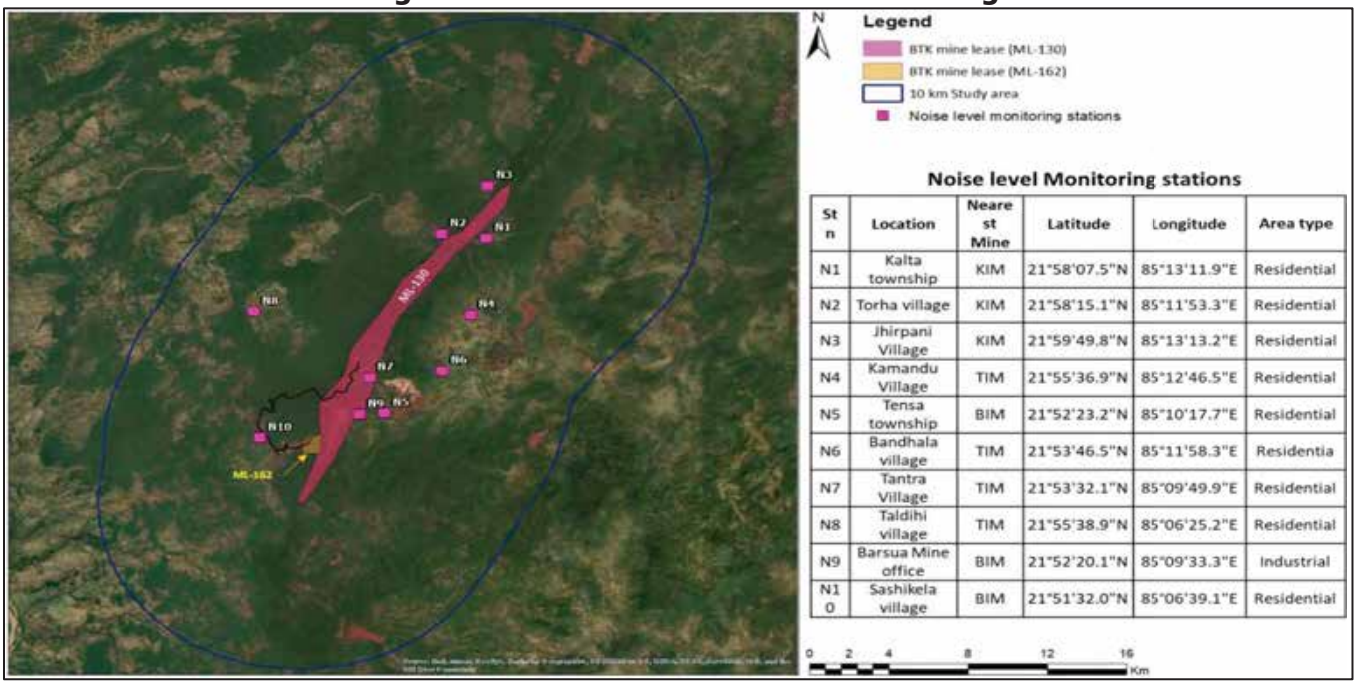
3.6.4 Ambient Noise Levels

To have an idea of the present background noise level in the study area, hourly noise levels wererecorded continuously for 24 hours at ten locations during baseline monitoring seasonusing integrated sound level meter by CASELA CEL-62X series sound level meter, USA with frequency of 31.5 Hz to 16000 Hz. The details of location are given in **Table 3.14**and the locations are marked in **Fig. 3.7**.

Table 3.14: Ambient Noise LevelMonitoringlocations(Summer, 2021)

Stn. Code	Description	Distance & Direction from nearest SAIL mine	Location		Type of area
			Latitude	Longitude	
N1	Kalta township	0.5, SE of KIM	21°58'07.5"N	85°13'11.9"E	Residential
N2	Torha village	0.27, W of KIM	21°58'15.1"N	85°11'53.3"E	Residential
N3	Jhirpani Village	0.65, NW of KIM	21°59'49.8"N	85°13'13.2"E	Residential
N4	Kamandu Village	2.8, E of TIM	21°55'36.9"N	85°12'46.5"E	Residential
N5	Tensa township	0.9, E of BIM	21°52'23.2"N	85°10'17.7"E	Residential
N6	Bandhala village	3.2, ESE of TIM	21°53'46.5"N	85°11'58.3"E	Residentia
N7	Tantra Village	0, (Within TIM)	21°53'32.1"N	85°09'49.9"E	Residential
N8	Taldihi village	5.3, NW of TIM	21°55'38.9"N	85°06'25.2"E	Residential
N9	Barsua Mine office	0.2, E of BIM	21°52'20.1"N	85°09'33.3"E	Industrial
N10	Sashikela village	2.0, W of BIM	21°51'32.0"N	85°06'39.1"E	Residential

Fig. 3.7: Location of Noise level monitoring stations



Noise level Monitoring stations

Stn	Location	Nearest Mine	Latitude	Longitude	Area type
N1	Kalta township	KIM	21°58'07.5"N	85°13'11.9"E	Residential
N2	Torha village	KIM	21°58'15.1"N	85°11'53.3"E	Residential
N3	Jhirpani Village	KIM	21°59'49.8"N	85°13'13.2"E	Residential
N4	Kamandu Village	TIM	21°55'36.9"N	85°12'46.5"E	Residential
N5	Tensa township	BIM	21°52'23.2"N	85°10'17.7"E	Residential
N6	Bandhala village	TIM	21°53'46.5"N	85°11'58.3"E	Residentia
N7	Tantra Village	TIM	21°53'32.1"N	85°09'49.9"E	Residential
N8	Taldihi village	TIM	21°55'38.9"N	85°06'25.2"E	Residential
N9	Barsua Mine office	BIM	21°52'20.1"N	85°09'33.3"E	Industrial
N10	Sashikela village	BIM	21°51'32.0"N	85°06'39.1"E	Residential

The results of noise monitoring are given in **Table 3.15**.

Table 3.15: Ambient Noise Levels (Summer, 2021)

Stn. Code	Description	Type of area	Noise Level dB(A)							
			Day (0600 – 2200 hrs.)				Night (2200 – 0600 hrs.)			
			Max	Min	Mean	Norm	Max	Min	Mean	Norm
N1	Kalta township	Residential	52.5	42.5	49.4	55	41.3	39.1	40.3	45
N2	Torha village	Residential	54.5	47.1	51.8	55	43.9	40.1	42.1	45
N3	Jhirpani Village	Residential	54.0	41.7	50.3	55	42.5	38.8	40.5	45
N4	Kamandu Village	Residential	54.2	43.3	51.4	55	45.0	39.8	42.0	45
N5	Tensa township	Residential	54.0	40.3	48.8	55	41.1	38.7	40.0	45
N6	Bandhala village	Residentia	55.0	41.3	49.5	55	42.5	40.1	41.5	45
N7	Tantra Village	Residential	54.9	43.2	51.3	55	42.6	40.5	41.5	45
N8	Taldihi village	Residential	54.5	41.1	49.9	55	41.9	39.1	40.6	45
N9	Barsua Mine office	Industrial	68.9	53.6	63.4	75	55.6	51.1	53.8	70
N10	Sashikela village	Residential	53.9	40.6	50.4	55	44.6	41.1	43.1	45

The maximum, minimum and average ambient noise levels during day time and night time at the ten locations have been presented in **Fig 3.8.1** and**Fig.3.8.2** respectively.

Fig. 3.8.1: Ambient Noise Levels during Day time (summer season, 2021)

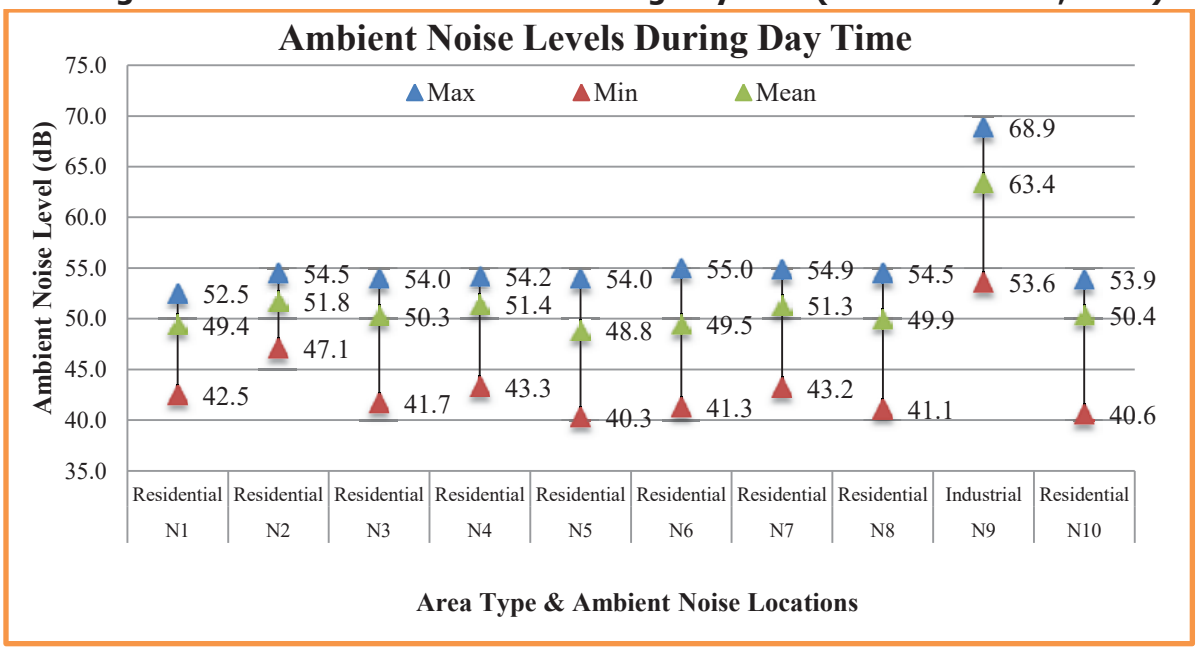
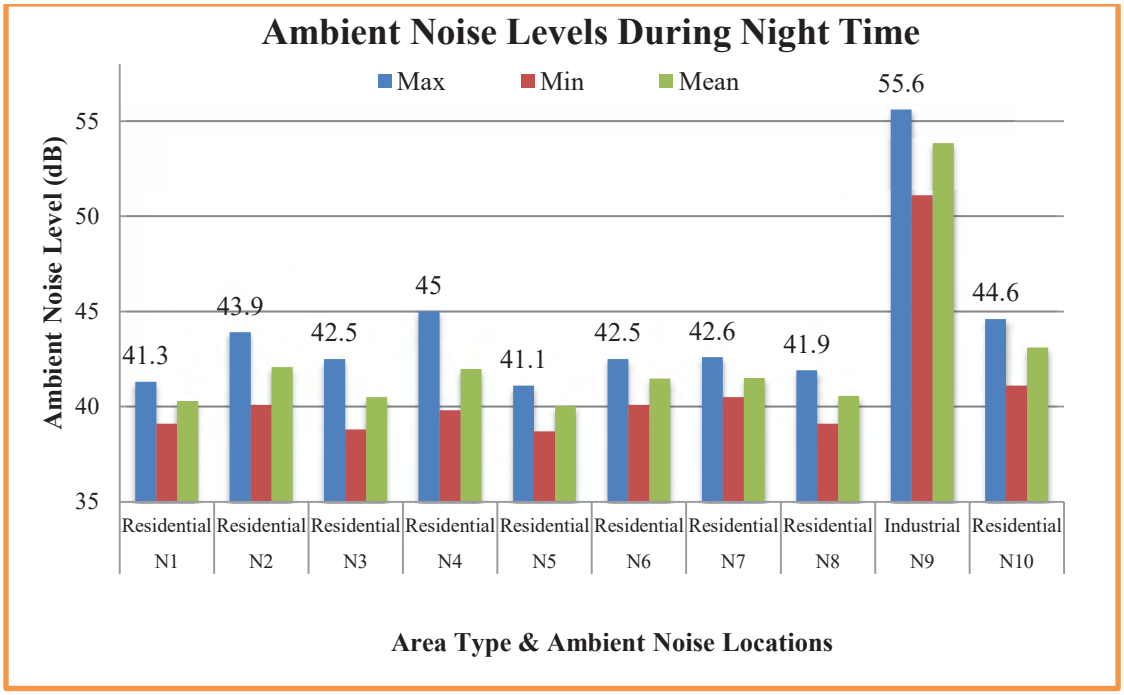


Fig. 3.8.2: Ambient Noise Levels during Night time (summer season, 2021)



The results have been compared with ambient air quality norms in respect of noise (as per schedule III, Rule 3 of EP (Rules) are given in **Table 3.16**.

Table 3.16: Ambient Air Quality norms in respect of noise (As per schedule III, Rule 3 of EP (Rules), 2000

Type of area	Day (0600 – 2200 hrs).	Night (2200 – 0600 hrs).
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40
Note: All values are in dB(A).		

Among the ten locations, the location N9 (Barsua Mine office) falls under "Industrial area" and the remaining locations are"Residential areas". The max day ambient noise levels at all the residential locations were in the range of 52.5 to 55.0 dB, while the night max. ambient noise levels ranged from 41.1 to 45.0dB(A).The max day noise levels at N9 is 68.9dB(A) and max night noise levels is 55.6 dB(A).

Comparatively noise values at N2 (Torha village),N7 (Tantra Village outside boundary wall), N4 (Kamandu Village) and N5 (Tensa township) were high in comaprsion to the other residential locations as they are near busy roads. The ambient noise levels at all the nine residential locations and one industrial area are well within the norms. All the locations are surrounded with good green cover.

3.6.5 Work Zone Noise Levels

Work Zone noise levels are monitored at twelve locations,five locations in Barsua Iron Mine (BIM), three locations in Taldih Iron Mine (TIM) and four locations in Kalta Iron Mine (KIM). The locations and range of work zone noise levelsLeq. dB (A) results monitored during day and night time for the periods June to August 2020 and November 2020 to January 2021 are given in **Table 3.17.**

Table 3.17: Range of Work Zone Noise Levels

ID	LOCATION	Distance from source (m)	NoiseLevelindB(A) Leq	
			Day	Night
WN1	Near Drilling (BIM)	10	66.8 - 73.2	30.7 - 61.9
WN2	Near Excavation (BIM)	12	64.2 - 74.1	54.2 - 68.4
WN3	Secondary Crusher (BIM)	15	65.3 - 75.9	56.0 - 66.5
WN4	Haul Road (BIM)	12	68.0 - 74.4	58.8 - 64.1
WN5	Wagon Loading (BIM)	18	65.6 - 73.6	59.1 - 64.2
WN6	Haul Road (TIM)	10	68.2 -73.8	58.8 – 68.8
WN7	Screening Area (TIM)	11	70.2 – 76.6	60.8 – 69.2
WN8	Excavation Area (TIM)	8	70.6 – 74.8	60.8 – 65.8
WN9	Near Drilling (KIM)	10	70.2 – 73.8	60.6 – 69.2
WN10	Excavation & Loading (KIM)	12	70.1 – 73.6	58.8 – 66.6
WN11	Haul Road(KIM)	15	69.2 – 73.2	58.8 - 66.8
WN12	Crushing & Screening (KIM)	12	70.0 – 73.1	57.6 – 68.2

The work zone noise results have been compared with Occupational Safety and Health Administration standards (OSHA) and as per MoEF[2]standard for 8 hr exposure is 90 dB (A).The noise levels at all the locations were well within the norms.

The operators engaged in blasting/ drilling operations and operator of HEMM are provided with personnel protective equipment (PPEs) such as ear plug/ ear muffs with helmet. Use of these protective measures is ensured by educating the workers on ill effect of the prolonged excessive exposure to high Noise levels and daily checks by shift mining engineers regarding usage of ear plug/ear muffs.

3.6.6 Water Environment

Water quality monitoring was carried out with the following objectives:

- To collect baseline data on existing ground and surface water quality.
- To assess the impact, if any, of the existing facilities on water quality of receiving water bodies.

3.6.6.1 Selection of Water Quality Sampling Locations, Schedule and Methodology

Reconnaissance survey was undertaken and sampling locations were selected on basis of:

- Up gradient and down gradient of mine areas Barusa, Taldih and Kalta

2http://moef.gov.in/wp-content/uploads/2017/06/moef_gov_in_citizen_specinfo_noise_html.pdf

- Drainage pattern
- Location of industrial, mine areas, residential and villages representing different activities/likely impact areas in and around project
- Likely areas, which can represent baseline conditions.
- Locations near the solid waste
- Effluent discharge from themines and beneficiation plant

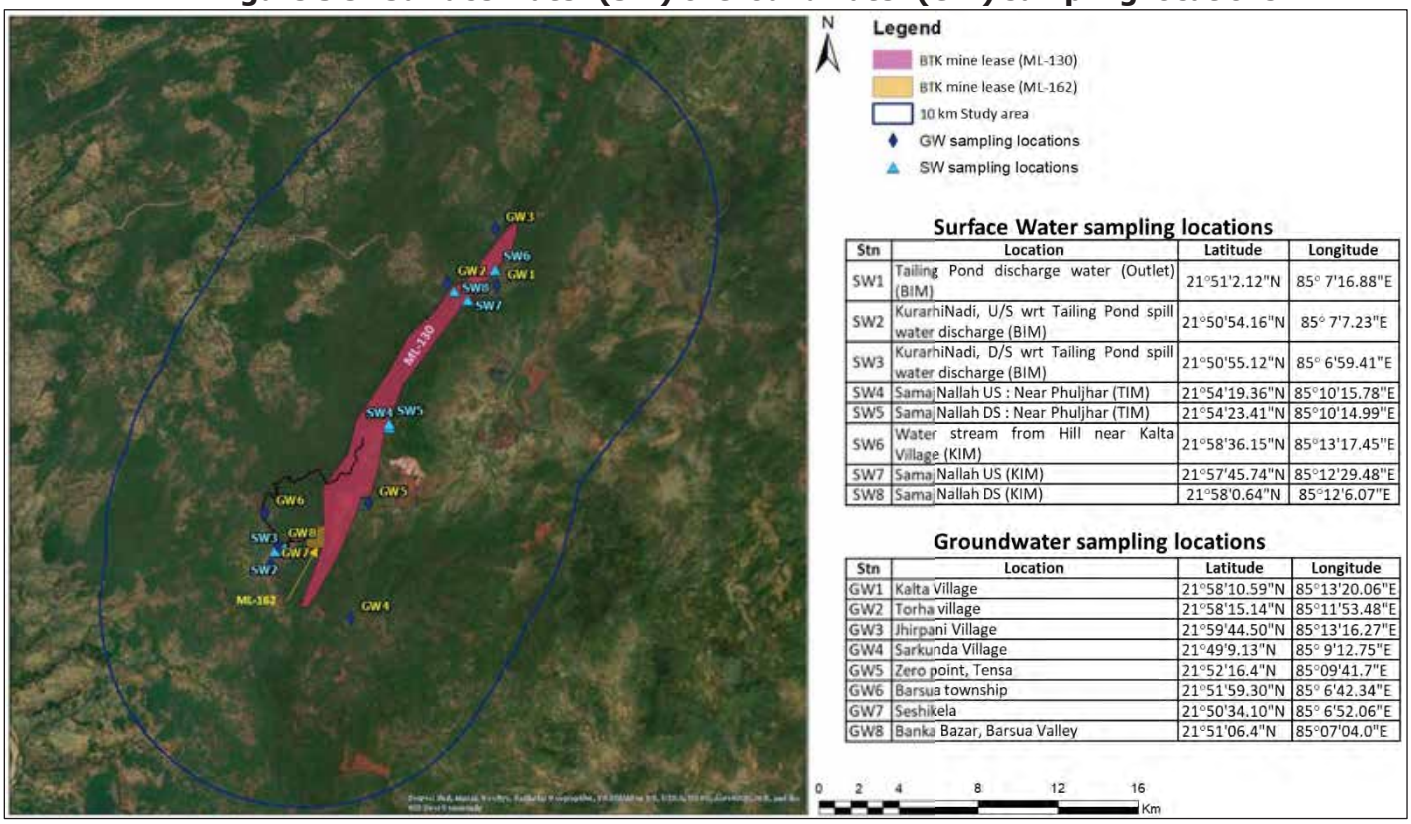
Water quality monitoring was carried out at sixteen (16) locations during summer, 2021 covering eight (08) surface water samples and eight (08)ground water samples. The details of location are given in **Table 3.18** and the locations are shownin**Fig. 3.9**.

Table 3.18: Locations of water sampling during summer season, 2021

Sn	Stn. Code	Location	Nearest SAIL Mine	Direction & Distance from nearest lease boundary (km)	Latitude	Longitude	Date of Sampling
Surface Water							
1.	SW1	Tailing Pond discharge water (Outlet) (BIM)	BIM	1.0, SW of BIM	21°51'2.12"N	85° 7'16.88"E	08.03.2021
2.	SW2	KurarhiNadi, U/S wrt Tailing Pond spill water discharge (BIM)	BIM	1.4, SW of BIM	21°50'54.16"N	85° 7'7.23"E	08.03.2021
3.	SW3	KurarhiNadi, D/S wrt Tailing Pond spill water discharge (BIM)	BIM	1.6, SW of BIM	21°50'55.12"N	85° 6'59.41"E	08.03.2021
4.	SW4	SamajNallah US : Near Phuljhar (TIM)	TIM	0.12, E of TIM	21°54'19.36"N	85°10'15.78"E	08.03.2021
5.	SW5	SamajNallah DS : Near Phuljhar (TIM)	TIM	0.05, E of TIM	21°54'23.41"N	85°10'14.99"E	08.03.2021
6.	SW6	Water stream from Hill near Kalta Village (KIM)	KIM	0.05, SE of KIM	21°58'36.15"N	85°13'17.45"E	08.03.2021
7.	SW7	SamajNallah US (KIM)	KIM	0.04, SE of KIM/TIM	21°57'45.74"N	85°12'29.48"E	08.03.2021
8.	SW8	SamajNallah DS (KIM)	KIM	0, (Within KIM)	21°58'0.64"N	85°12'6.07"E	08.03.2021
Ground Water							
9	GW1	Kalta Village	KIM	0.6, SE of KIM	21°58'10.59"N	85°13'20.06"E	08.03.2021
10	GW2	Torha village	KIM	0.27, W of KIM	21°58'15.14"N	85°11'53.48"E	08.03.2021
11	GW3	Jhirpani Village	KIM	0.45, NW of KIM	21°59'44.50"N	85°13'16.27"E	08.03.2021
12	GW4	Sarkunda Village	BIM	2.1, SE of BIM	21°49'9.13"N	85° 9'12.75"E	08.03.2021
13	GW5	Zero point, Tensa	BIM TIM	0.5, SE of BIM/TIM	21°52'16.4"N	85°09'41.7"E	08.03.2021
14	GW6	Barsua township	BIM	2.4, NW of BIM	21°51'59.30"N	85° 6'42.34"E	08.03.2021
15	GW7	Seshikela	BIM	2.0, W of BIM	21°50'34.10"N	85° 6'52.06"E	08.03.2021
16	GW8	Banka Bazar, Barsua Valley	BIM	1.4, SW of BIM	21°51'06.4"N	85°07'04.0"E	08.03.2021

Effluents are generated at the mine from the wet beneficiation process. However during the monitoring season wet beneficiation had been suspended on the orders of the State Govt. Hence no effluents were being generated.

Figure 3.9: Surface water (SW) & Groundwater (GW) sampling locations



Surface Water sampling locations

Stn	Location	Latitude	Longitude
SW1	Tailing Pond discharge water (Outlet) (BIM)	21°51'2.12"N	85° 7'16.88"E
SW2	KurarhiNadi, U/S wrt Tailing Pond spill water discharge (BIM)	21°50'54.16"N	85° 7'7.23"E
SW3	KurarhiNadi, D/S wrt Tailing Pond spill water discharge (BIM)	21°50'55.12"N	85° 6'59.41"E
SW4	SamajNallah US : Near Phuljhar (TIM)	21°54'19.36"N	85°10'15.78"E
SW5	SamajNallah DS : Near Phuljhar (TIM)	21°54'23.41"N	85°10'14.99"E
SW6	Water stream from Hill near Kalta Village (KIM)	21°58'36.15"N	85°13'17.45"E
SW7	SamajNallah US (KIM)	21°57'45.74"N	85°12'29.48"E
SW8	SamajNallah DS (KIM)	21°58'0.64"N	85°12'6.07"E

Groundwater sampling locations

Stn	Location	Latitude	Longitude
GW1	Kalta Village	21°58'10.59"N	85°13'20.06"E
GW2	Torha village	21°58'15.14"N	85°11'53.48"E
GW3	Jhirpani Village	21°59'44.50"N	85°13'16.27"E
GW4	Sarkunda Village	21°49'9.13"N	85° 9'12.75"E
GW5	Zero point, Tensa	21°52'16.4"N	85°09'41.7"E
GW6	Barsua township	21°51'59.30"N	85° 6'42.34"E
GW7	Seshikela	21°50'34.10"N	85° 6'52.06"E
GW8	Banka Bazar, Barsua Valley	21°51'06.4"N	85°07'04.0"E

The water samples ere analysed for different physico-chemical and bacteriological parameters as per 23rd edition of "Standard Methods for the Examination of Water and Waste Water" published by American Public Health Association (APHA), 2017. Parameters which require immediate analysis like pH, EC, DO, conductivity and turbidity, are measured at the site using multi-parameter analyser and other parameters are analysed in the laboratory at Ranchi.

In absence of any norms for ground water, the analysis results of ground water samples were compared with Drinking Water Specification IS:10500.

The analytical methods used for water quality parameters and corresponding Below Detection Limit (BDL) values of Environmental Engineering Laboratory, MECON Limited are given in **Table 3.19**.

Table 3.19: Parameters, BDL values and Analytical Methods for Water Quality Analysis

Sl. No.	Parameter	BDL	Method
1	Colour, Hazen Units (*max)*	5	Method 2120-B, APHA, 23rd edition, 2017
2	pH value	1	Method 4500-H-B, APHA, 23rd edition, 2017
3	Turbidity, NTU, Max.	0.02	Method 2130-B, APHA, 23rd edition, 2017
4	Total Dissolved Solids, mg/l, max.	5	Method 2540-C, APHA, 23rd edition, 2017
5	Total Hardness(as $CaCO_3$), mg/l, max	8	Method 2340-C, APHA, 23rd edition, 2017
6	Aluminium (as Al), mg/l, Max	0.01	Method 3030 E, 3111 B, 3120, APHA, 23rd edition, 2017
7	Boron (as B), mg/l, max.	0.05	Method 3030 E, 3111 B, 3120, APHA, 23rd edition, 2017
8	Calcium (as Ca), mg/l, max.	10	Method 3500-Ca B, APHA, 23rd edition, 2017

Sl. No.	Parameter	BDL	Method
9	Chloride (as Cl),mg/l, max.	8	Method 4500-Cl-B, APHA, 23rd edition, 2017
10	Copper (as Cu), mg/l, max.	0.01	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
11	Fluoride (as F), mg/l, max.	0.1	Method 4500-F-B,C & D, APHA, 23rd edition, 2017
12	Iron (as Fe), mg/l, max.	0.05	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
13	Manganese (as Mn), mg/l, max.	0.01	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
14	Nitrate (as NO_3), mg/l, max.	1	Method 4500-NO_3 – B, APHA, 23rd edition, 2017
15	Phenolic compounds, mg/l, max.	0.001	Method 5530 C, APHA, 23rd edition, 2017
16	Sulphate (as SO_4), mg/l, max.	4	Method 4500-SO_4 – D, APHA, 23rd edition, 2017
17	Total Alkalinity(as $CaCO_3$), mg/l	20	Method 2320-B, APHA, 23rd edition, 2017
18	Zinc (as Zn), mg/l, max.	0.05	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
19	Cyanide (as CN), mg/l, max.	0.01	Method 4500 B, C & F APHA, 23rd edition, 2017
20	Lead (as Pb), mg/l, max.	0.01	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
21	Mercury (as Hg), mg/l, max.	0.0005	Method 3112 B, 23rd edition, 2017
22	Nickel (as Ni), mg/l, max.	0.01	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
23	Total Arsenic (as As), mg/l, max.	0.01	Method 3114 C, 3120 APHA, 23rd edition, 2017
24	Total Chromium (as Cr), mg/l, Max.	0.01	Method 3030 E, 3111 B, 3120 APHA, 23rd edition, 2017
25	Dissolved Oxygen (as O_2), mg/l	1	Method 4500-O-C, APHA, 23rd edition, 2017
26	BOD, 3 days at 27°C, mg/l	1	Respirometric Method 5210 D, APHA, 23rd edition, 2017 using BOD analyser
27	Sodium (as Na), mg/l	1	Method 3500-Na B, APHA,23rd edition, 2017
28	Potassium(as K), mg/l	1	Method 3500-K B, APHA,23rd edition, 2017
29	Total Coliform organisms, MPN/100ml	1.1	Method 9221 C, APHA, 23rd edition, 2017
30	Free Ammonia (as N) mg/l	0.01	BIS:2488 (Part –IV)
31	Electrical Conductivity, µmhos/cm	1	Method 2510-B, APHA, 23rd edition, 2017

3.6.6.2 Results & Discussions of Surface Water Analysis

The surface water samples have collected from the up stream and down stream of rivers and nallahs flowing near the mine areas of Barusa, Taldih and Kalta to understand the impact of mine discharges if any into the water bodies.

Surface water samples were analysed for different parameters as required by CPCB'sWater Quality Criteria for Surface Water(**Table 3.20**) and also with different parameters as per IS: 10500 (2012)Amendment No. 1, 2015.

Table 3.20: Central Pollution Control Board (CPCB) Surface Water Quality Criteria

SN	Parameters	Class A	Class B	Class C	Class D	Class E
1.	pH	6.5–8.5	6.5–8.5	6.0-9.0	6.5–8.5	6.5–8.5
2.	Dissolved oxygen (as O_2), mg/l, min	6	5	4	4	-
3.	BOD, 5 days at 20°C, max	2	3	3	-	-
	Total coliform organism, MPN/100 ml, max	50	500	5000	-	-
5.	Free ammonia (as N), mg/l, max	-	-	-	1.2	-
6.	Electrical conductivity, μmhos/cm, max	-	-	-	-	2250
7.	Sodium absorption ratio, max.	-	-	-	-	26
8.	Boron (as B), mg/l, max.	-	-	-	-	2

Class A : Drinking water source without conventional treatment but after dis-infection
Class B : Outdoor bathing (organised)
Class C : Drinking water source after conventional treatment and after dis-infection
Class D : Propagation of Wild life and Fisheries
Class E : Irrigation, Industrial Cooling, and Controlled Waste Disposal
Below E: Not meeting A, B, C, D & E Criteria

The result of analysis of Surface Water is given in **Table 3.21**.

pH of water samples are in the range of 7.02 to7.39which are wel within 6.5-8.5.The dissolved oxygen varied from 4.4 to 6.9 mg/l.Total coliform results of SW1, SW3, SW7 & SW8 samples are above 500 MPN/ 100 ml which makes these surface water quality fall under Class C i.e. surface water which can be used as drinking water source after conventional treatment and disinfection. The rest of the surface water samples SW2, SW4, SW5 & SW6 is suitable can be used for outdoor bathing (organised) (i.e. Class B) as the Total coliform concentrations are less than 500 MPN/ 100 ml.

It can be seen from the **Table 3.21** above that the turbidity of SW1, SW3 and SW5 are higher than other surface water samples. The concentration of all other parameters are well below the drinking water norms of IS: 10500 (2012), Amendment No. 1, 2015. The Fe concentration with 0.598 mg/l is high in SW1 (Tailing Pond discharge water (Outlet) (BIM) when compared with other surface water samples. The Fe concentrations are found to be low in upstream when compared with down stream samples.

The concentrations of total alkalinity (as $CaCO_3$), in eight surface water samples ranges from 20 to 56 mg/l and the Total hardness (as $CaCO_3$) concentrations varied from 20 to 48 mg/l. Hence the water samples can be categorised as soft water due to low degrees of hardness which is evident from the Mn concentrations in soil samples as reported in soil section.

Table 3.21: Results of Surface Water QualitySummer Season, 2021

Sl. No.	Parameter	SW1 Tailing Pond discharge water (Outlet) (BIM)	SW2 KurarhiNadi, U/S wrt Tailing Pond spill water discharge (BIM)	SW3 KurarhiNadi, D/S wrt Tailing Pond spill water discharge (BIM)	SW4 SamajNallah US : Near Phuljhar (TIM)	SW5 SamajNallah DS : Near Phuljhar (TIM)	SW6 Water stream from Hill near Kalta Village (KIM)	SW7 SamajNallah US (KIM)	SW8 SamajNallah DS (KIM)
Compulsory parameters									
1.	pH Value	7.21	7.39	7.26	7.17	7.16	7.19	7.04	7.02
2.	Total Coliform bacteria, MPN/100ml	840	430	630	400	430	70	580	790
3.	Dissolved Oxygen (as O_2), mg/l	4.4	6.1	5.4	5.8	5.7	6.9	5.3	4.8
4.	BOD, 3 days at 27°C, mg/l	5	2	3	2	2	<1	3	4
5.	Sodium Absorption Ratio (SAR)	0.31	0.19	0.17	0.33	0.29	0.17	0.33	0.25
6.	Free ammonia (as N), mg/l, max	0.02	0.018	0.025	0.010	0.010	<0.01	<0.01	<0.01
7.	Electrical conductivity, at 25°C, mmhos/cm, max	94.7	44.4	52.3	61.7	62.8	42.1	70.4	86.6
8.	Boron (as B), mg/l, max.	<0.05	<0.05	<0.05	<0.05	0.078	<0.05	<0.05	<0.05
CLASS AS PER CPCB's SURFACE WATER QUALITY CRITERIA		**C**	**B**	**C**	**B**	**B**	**B**	**C**	**C**
Additional parameters									
9.	Turbidity, NTU ,Max	9.8	2.6	6.7	3.9	5.8	<0.02	1.9	1.3
10.	Total dissolved solids, mg/l	75	35	48	46	50	38	52	63
11.	Aluminium (as Al), mg/l	0.309	0.031	0.185	0.080	0.280	0.071	0.067	0.100
12.	Calcium (as Ca), mg/l, max.	13	<10	<10	<10	<10	<10	<10	10
13.	Chloride (as Cl), mg/l, max.	10	8	12	12	10	10	8	12
14.	Copper (as Cu), mg/l, max.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
15.	Fluoride (as F), mg/l, max.	0.1	<0.1	<0.1	0.172	<0.1	<0.1	<0.1	0.122
16.	Iron (as Fe), mg/l, max.	0.598	<0.05	0.431	0.197	0.541	<0.05	0.062	0.135

Sl. No.	Parameter	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
		Tailing Pond discharge water (Outlet) (BIM)	KurarhiNadi, U/S wrt Tailing Pond spill water discharge (BIM)	KurarhiNadi, D/S wrt Tailing Pond spill water discharge (BIM)	SamajNallah US : Near Phuljhar (TIM)	SamajNallah DS : Near Phuljhar (TIM)	Water stream from Hill near Kalta Village (KIM)	SamajNallah US (KIM)	SamajNallah DS (KIM)
17.	Magnesium (as Mg), mg/l, max.	4	2	3	3	6	3	2	6
18.	Sodium (as Na), mg/l	5	2	2	4	4	2	4	4
19.	Potassium(as K), mg/l	2	<1	1	1	1	<1	1	1
20.	Manganese (as Mn), mg/l, max.	0.029	0.013	0.020	0.010	0.020	<0.01	<0.01	0.01
21.	Nitrate (as NO_3), mg/l, max.	1.39	1.59	0.65	1.94	1.92	1.06	0.61	0.59
22.	Sulphate (as SO4), mg/l, max.	<4	<4	<4	4	<4	<4	<4	<4
23.	Zinc (as Zn), mg/l, max.	<0.05	<0.05	<0.05	<0.05	0.011	<0.05	<0.05	<0.05
24.	Total alkalinity (as $CaCO_3$), mg/l	56	20	28	32	32	24	36	44
25.	Total hardness (as $CaCO_3$), mg/l, max	48	20	24	28	36	24	28	48
26.	Cyanide (as CN), mg/l, max.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27.	Mercury (as Hg), mg/l, max.	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
28.	Nickel (as Ni), mg/l, max.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
29.	Lead (as Pb), mg/l, max.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30.	Total Chromium (as Cr), mg/l, Max.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

3.6.6.3 Ground Water Quality Analysis

The results of ground water quality are given in **Table 3.22**. In absence of any specific norms for Ground Water Quality, the results have been compared with drinking water norms of IS: 10500 (2012), Amendment No. 1, 2015.

The results indicate that all the ground water quality parameters analysed to assess the ground water quality in study area meets the prescribed norms except some values of Manganese in GW4 (Sarkunda Village) & GW6 (Barsua township).

Nitrate concentrations are found to be below detection limitsin all the ground water monitoring samples except in GW1 and GW8. The concentration of Total hardness (as $CaCO_3$) varied from 84 to 160 mg/l in eight ground water samples which is well within the "Acceptable Limits". Slightly high turbidity was found in locations as per the following order: GW2 > GW7 > GW6; however, within the "Permissible Limits".

Manganese (Mn) is also found to be under the "Permissible Limits" in all the locations except at GW4 and GW6 with 0.702 and 0.650 mg/l where it exceeded the norms. This may be due to the high manganese in study area's soil & rocks.

Table 3.22: Results of Ground Water Quality (Summer, 2021)

Sl. No.	Parameters	Norms*		Locations							
		#Requirement (Acceptable limits)	##Permissible limits in the absence of alternate source	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
A	**ORGANOLEPTIC AND PHYSICAL PARAMETERS**										
1	Colour, Hazen Units (*max)*	5	15	<1	<1	<1	<1	<1	<1	<1	<1
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	6.5 to 8.5	No Relaxation	7.33	7.28	7.62	6.91	7.21	7.34	7.41	7.16
4	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Turbidity, NTU, Max.	1	5	0.61	4.99	0.4	1.03	0.84	4.77	4.92	1.28
6	Total Dissolved Solids, mg/l, max.	500	2000	133	265	200	230	170	210	132	159
7	Total Hardness(as $CaCO_3$), mg/l, max	200	600	88	160	140	132	96	108	84	96
B	**GENERAL PARAMETERS CONCERNING SUBSTANCES UNDESIRABLE IN EXCESSIIVE AMOUNTS**										
8	Aluminium (as Al), mg/l, Max	0.03	0.2	0.048	<0.01	<0.01	0.068	<0.01	0.035	<0.01	<0.01
9	Boron (as B), mg/l, max.	0.5	1	<0.05	<0.05	<0.05	0.104	<0.05	<0.05	<0.05	<0.05
10	Calcium (as Ca), mg/l, max.	75	200	14	27	16	35	22	16	18	22
11	Chloride (as Cl),mg/l, max.	250	1000	14	8	12	10	12	33	18	35
12	Copper (as Cu), mg/l, max.	0.05	1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
13	Fluoride (as F), mg/l, max.	1	1.5	0.248	0.215	0.235	0.119	<0.1	0.186	<0.1	0.23
14	Iron (as Fe), mg/l, max.	1	No Relaxation	<0.05	0.148	0.097	<0.05	0.178	0.399	0.130	0.162
15	Magnesium (as Mg), mg/l, max.	30	100	12	21	23	10	9	16	9	9
16	Manganese (as Mn), mg/l, max.	0.1	0.3	0.05	0.171	0.144	0.702	0.016	0.650	0.098	0.018
17	Nitrate (as NO_3), mg/l, max.	45	No Relaxation	1.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	14
18	Phenolic compounds, mg/l, max.	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Sulphate (as SO_4), mg/l, max.	200	400	<4	<4	<4	<4	<4	<4	<4	5
20	Total Alkalinity(as $CaCO_3$), mg/l	200	600	80	208	140	160	132	124	88	60

Sl. No.	Parameters	Norms*		Locations							
		#Requirement (Acceptable limits)	##Permissible limits in the absence of alternate source	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
21	Zinc (as Zn), mg/l, max.	5	15	0.262	0.104	0.051	<0.05	0.057	1.013	0.05	0.213
C	**PARAMETERS CONCERNING TOXIC SUBSTANCES**										
22	Cyanide (as CN), mg/l, max.	0.05	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
23	Lead (as Pb), mg/l, max.	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
24	Mercury,(as Hg), mg/l, max.	0.001	No relaxation	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
25	Nickel (as Ni), mg/l, max.	0.02	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Total Arsenic (as As), mg/l, max.	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr), mg/l, Max.	0.05	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

*** compared with Drinking Water Specification IS: 10500 (2012), Amendment no. 1, June'2015**

 # Requirement (Acceptable limits)
Permissible limits in the absence of alternate source

3.6.7 Soil Characteristics

The soil sampling locations were selected with the following objective:

- To assess the background / baseline soil quality of the region.
- To assess the impact (if any) due to mining activities and vehicular emissions, effluent discharge and solid waste on soil of the study area.

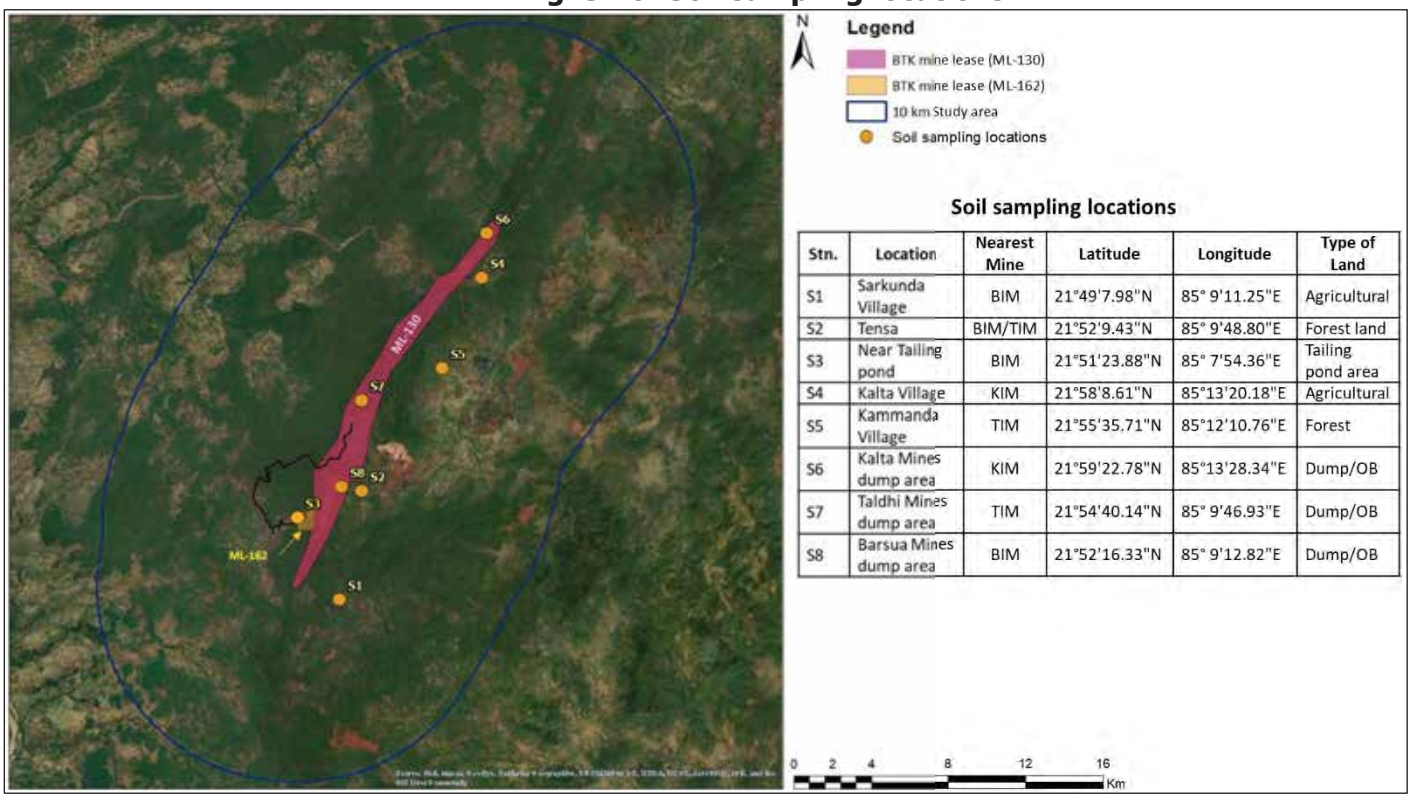
Sampling locations were selected to assess the existing soil conditions in and around the mining area representing various land use conditions. The samples were collected into the soil up to a depth of 25-30 cm for Physico-chemical analysis.

Soil quality was determined at eight (08) locations during summer,2021whosedetails are given in **Table 3.23** and the locations are shown in **Figure 3.10**.

Table 3.23: Soil Sampling Locations (summer season, 2021)

Sl. No.	Stn. Code	Location	Nearest SAIL Mine	Direction & Distance fromnearest lease boundary (km)	Latitude	Longitude	Type of Land
1.	S1	Sarkunda Village	BIM	2.0, SE of BIM	21°49'7.98"N	85° 9'11.25"E	Agricultural
2.	S2	Tensa	BIM TIM	0.7, E of BIM/TIM	21°52'9.43"N	85° 9'48.80"E	Forest land
3.	S3	Near Tailing pond	BIM	0.05, W of BIM (adjacent to ML-162)	21°51'23.88"N	85° 7'54.36"E	Tailing pond area
4.	S4	Kalta Village	KIM	0.6, SE of KIM	21°58'8.61"N	85°13'20.18"E	Agricultural
5.	S5	Kammanda Village	TIM	2.0, SE of TIM	21°55'35.71"N	85°12'10.76"E	Forest
6.	S6	Kalta Mines dump area	KIM	0, (Within KIM)	21°59'22.78"N	85°13'28.34"E	Dump/ Over Burden
7.	S7	Taldhi Mines dump area	TIM	0, (Within TIM)	21°54'40.14"N	85° 9'46.93"E	Dump/ Over Burden
8.	S8	Barsua Mines dump area	BIM	0, (Within BIM)	21°52'16.33"N	85° 9'12.82"E	Dump/ Over Burden

Fig. 3.10: Soil sampling locations



Soil sampling locations

Stn.	Location	Nearest Mine	Latitude	Longitude	Type of Land
S1	Sarkunda Village	BIM	21°49'7.98"N	85° 9'11.25"E	Agricultural
S2	Tensa	BIM/TIM	21°52'9.43"N	85° 9'48.80"E	Forest land
S3	Near Tailing pond	BIM	21°51'23.88"N	85° 7'54.36"E	Tailing pond area
S4	Kalta Village	KIM	21°58'8.61"N	85°13'20.18"E	Agricultural
S5	Kammanda Village	TIM	21°55'35.71"N	85°12'10.76"E	Forest
S6	Kalta Mines dump area	KIM	21°59'22.78"N	85°13'28.34"E	Dump/OB
S7	Taldhi Mines dump area	TIM	21°54'40.14"N	85° 9'46.93"E	Dump/OB
S8	Barsua Mines dump area	BIM	21°52'16.33"N	85° 9'12.82"E	Dump/OB

The collected soil samples were air-dried, powdered & passed through 2 mm sieve and further analysed for different physico-chemical characteristics following methodology given in "Soil Test Methodology" -1992 edited by B.S.Mathur, a Technical Bulletin 3/92 of Department of Soil Sciences and Agriculture Chemistry (SSAC), Birsa Agriculture University (BAU), Ranchi.

The results of analysis of Colour, Texture, Bulk Density, Water Holding Capacity, pH and conductivity of the tested soils samples for summer season, 2021is presented in **Table 3.24**.

Table 3.24: Physical & Chemical properties of Soil (Summer Season, 2021)

Sample No.	Location	Color	Texture	Water Holding Capacity (%)	Bulk Density (gm/cc)	pH (1: 5)	Electrical Conductivity (µs/cm)
S1	Sarkunda Village	Yellowish red	Silty clay	56.3	1.04	4.62	87.8
S2	Tensa	Dark brown	Silty clay	88.8	0.90	5.58	51.9
S3	Near Tailing pond	Reddish brown	Sandy loam	41.5	1.03	4.71	62.1
S4	Kalta Village	Reddish brown	Silt loam	62.9	1.18	5.31	101.5
S5	Kammanda Village	Reddish yellow	Sandy loam	55.4	1.29	5.15	89.4
S6	Kalta Mines dump area	Dark reddish gray	Silt clay loam	61.6	1.38	5.81	141.6
S7	Taldhi Mines dump area	Yellowish red	Silt loam	37.5	1.77	5.56	50.3
S8	Barsua Mines dump area	Yellowish brown	Silt loam	19.7	1.54	5.42	19.4

Soil pH plays a very important role in the availability of nutrients. The composition of the soil microbial community is also dependent on the soil pH. In the study area, the soil pH varied

from 4.62–5.94, indicating acidic nature of the soil. The test results of pH from different locations are matching with the pH status in soils of Sundargarh district which are stong to very strong acidic as reported in Mapping of Nutrient Status of Odisha Soils pg 307, ICRISAT, 2020 indicate that there is no impact on soil due to the industrial activity. The soil under different reaction classes of Indian Soils is given in **Table 3.25**.

Table 3.25: Soil Under Different Reaction Classes[3]

pH Range	Soil Reaction
< 4.5	Extremely acidic
4.6 to 5.2	Strongly acidic
5.3 to 6.0	Moderately acidic
6.1 to 6.5	Slightly acidic
6.6 to 7.0	Neutral
7.1 to 7.5	Slightly alkaline
7.6 to 8.3	Moderately Alkaline
8.4 to 9.0	Strongly alkaline

Ref: Assessment and Mapping of Some Important Soil Parameters Including Soil Acidity for The State Of Jharkhand (1:50,000 Scale) Towards Rational Land Use Plan Icar, Keonjhar District, National Bureau of Soil Survey and Land Use Planning (ICAR) Regional Centre, Kolkata In collaboration with : Deptt. Of Soil Science & Agricultural Chemistry, BAU, Ranchi, Jharkhand. (https://www.sameti.org/Soil_Inventory/Keonjhar_Soil_Analysis.pdf)

The availabilities of major nutrients during summer season 2021 are presented in **Table 3.26.**

Table 3.26: Available Major Nutrients in Soil (summer season, 2021)

Nutrients and Ratings	S1	S2	S3	S4	S5	S6	S7	S8
Available Nitrogen (kg/ha) & Rating	527 (M)	803 (H)	640 (H)	590 (H)	564 (H)	941 (H)	376 (M)	314 (M)
Available Phosphorus (Kg/ha) and Rating	0.64 (L)	1.16 (L)	1.83 (L)	0.82 (L)	0.63 (L)	0.57 (L)	0.45 (L)	0.47 (L)
Available Potassium (Kg/ha) and Rating	386 (H)	178 (M)	386 (H)	178 (M)	166 (M)	564 (H)	214 (M)	59 (L)
Organic carbon (%) and Ratings	1.13 (H)	1.02 (H)	0.90 (H)	0.99 (H)	1.11 (H)	0.96 (H)	0.63 (M)	0.24 (L)
Organic matter %	2.38	2.19	1.97	2.13	2.35	2.08	1.48	0.78
	Low		Medium			High		
Available Nitrogen	<280		280 - 560			>560		
Available Phosphorus	<10		10 - 25			>25		
Available Potassium	<120		120 - 280			>280		
Organic carbon	<0.50		0.5 - 0.75			>0.75		

Organic carbon, Nitrogen and Phosphorus are limiting nutrients. In the tested soil samples most of the nutrients are available in low to high concentration ranges. Available Phosphorus levels are found to be in "Low" in all samples. Organic carbon was found to be "High" in S1 to S5soil samples and the soil samplesS6, S7 & S8 collected near the dump/ over burden of mines areas showed high, medium and low concentration. Available Nitrogen levels are found to be "Medium" to "High". Availability of Potassium is found to be "high" (S1, S3 & S6), "medium" (S2, S4, S5 & S7) and low in S8. As the major nutrients are not showing any major

[3] *I.A.R.I. (1970). Soil survey manual, All India Soil and Land Use Organization, Indian Agricultural Research Institute, New Delhi.*

deviation among the tested soil samples, it is indicating that there is no impact on nutrient contents of soil in the nearby villages.

The concentrations of exchangeable cations are presented in **Table 3.27**. The results show that the calciumconstitutes the bulk of exchangeable cations followed by magnesium and potassium in the tested soil samples whereas levels of exchangeable sodium are relatively low. The presence of secondary nutrients such as calium and magnesium in soil play a very important role in plant growth. Calcium aids in translocation of photosynthesis from leaves to fruting organs and magnesium is the key element of chlorophyll production and activator of many plant enzymes. The concentration of Na & K indicates that the collected soil samples are not showing any signs of increase in alkalinity (Sodium / Potassium) due to industrial activity.

Table 3.27: Exchangeable Cations(summer season, 2021)

Parameters	S1	S2	S3	S4	S5	S6	S7	S8
Calcium (meq/100gm)	1.4	5.8	4.8	6.4	6.4	13.4	3.8	0.6
% contribution to the Base Saturation	46.8	80.8	50.8	71.0	82.3	78.9	73.8	48.3
Magnesium (meq/100gm)	0.4	0.8	3.6	2.0	0.8	2.2	0.6	0.4
% contribution to the Base Saturation	13.4	11.1	38.1	22.2	10.3	12.9	11.6	32.2
Sodium (meq/100gm)	0.11	0.11	0.11	0.14	0.11	0.11	0.14	0.11
% contribution to the Base Saturation	3.6	1.5	1.1	1.6	1.4	0.6	2.7	8.5
Potassium (meq/100gm)	1.08	0.47	0.95	0.47	0.47	1.29	0.61	0.14
% contribution to the Base Saturation	36.2	6.6	10.0	5.3	6.1	7.6	11.8	10.9

Soil micro–nutrients also play an important role in plant growth and can act as limiting nutrients. Soil micro–nutrient analysis can be employed as a diagnostic tool for predicting the possibility of deficiency of a nutrient and the profitability of its application. For this, it is necessary to fix the critical limits. The critical limit of a micro–nutrient is that content of extractable nutrient at or below which plantation practised on it will produce a positive response to its application. The results of available micronutrient of soil samples collected during summer season, 2021 from various locations of the study area are given in **Table 3.28**.

Table 3.28: Available Micronutrients summer season, 2021

Micro Nutrients	Critical Limits (mg/kg)*	Results (mg/kg)							
		S1	S2	S3	S4	S5	S6	S7	S8
Copper	4.5 – 6.0	0.25	3.25	1.99	1.09	1.11	0.26	0.14	0.25
Zinc	0.20 – 0.66	0.30	9.90	0.60	0.76	0.67	0.35	0.33	0.43
Iron	0.50 - 0.65	0.95	26.39	15.12	14.42	23.25	4.07	0.41	4.72
Manganese	10-25	2.92	14.87	10.17	18.01	47.93	6.36	0.74	6.19
(* Source: "Soil Test Methodology" (1992), Edited B.S. Mathur. SSAC (BAU) Tech. Bull. 3/92. Pp. 312. Department of Soil Sciences and Agriculture Chemistry, Birsa Agriculture University, Ranchi).									

From the above table it can be seen that, availableFe is in higher concentration in respect to critical ranges in the entire tested soil sample except in S7 and the highest in the following order S2 > S5 > S3 > S4 > S8 > S6 > S1 samples.The concentrations of available Mn are found to in the range of critical limits in S2, S3 & S4 and adequate in S5 and below in S1, S6, S7 & S8 soil samples. The concentration of available Copper is found to be in range of 0.14 to 3.25 mg/kg in the study area below the critical limits. The available Zinc concentration in the study area is in the soil samples are in agreement with critical limits and highest in S2 location with 9.9 mg/kg.

The soil samples collected near the dump/ over burden area have also shown good concentrations except in S7 (Taldih dump mine area).

In the study area, the level of some micro–nutrients is above the critical limits. Hence, it implies that no external application of micro-nutrients is required (fertilisers) for good plant growth.

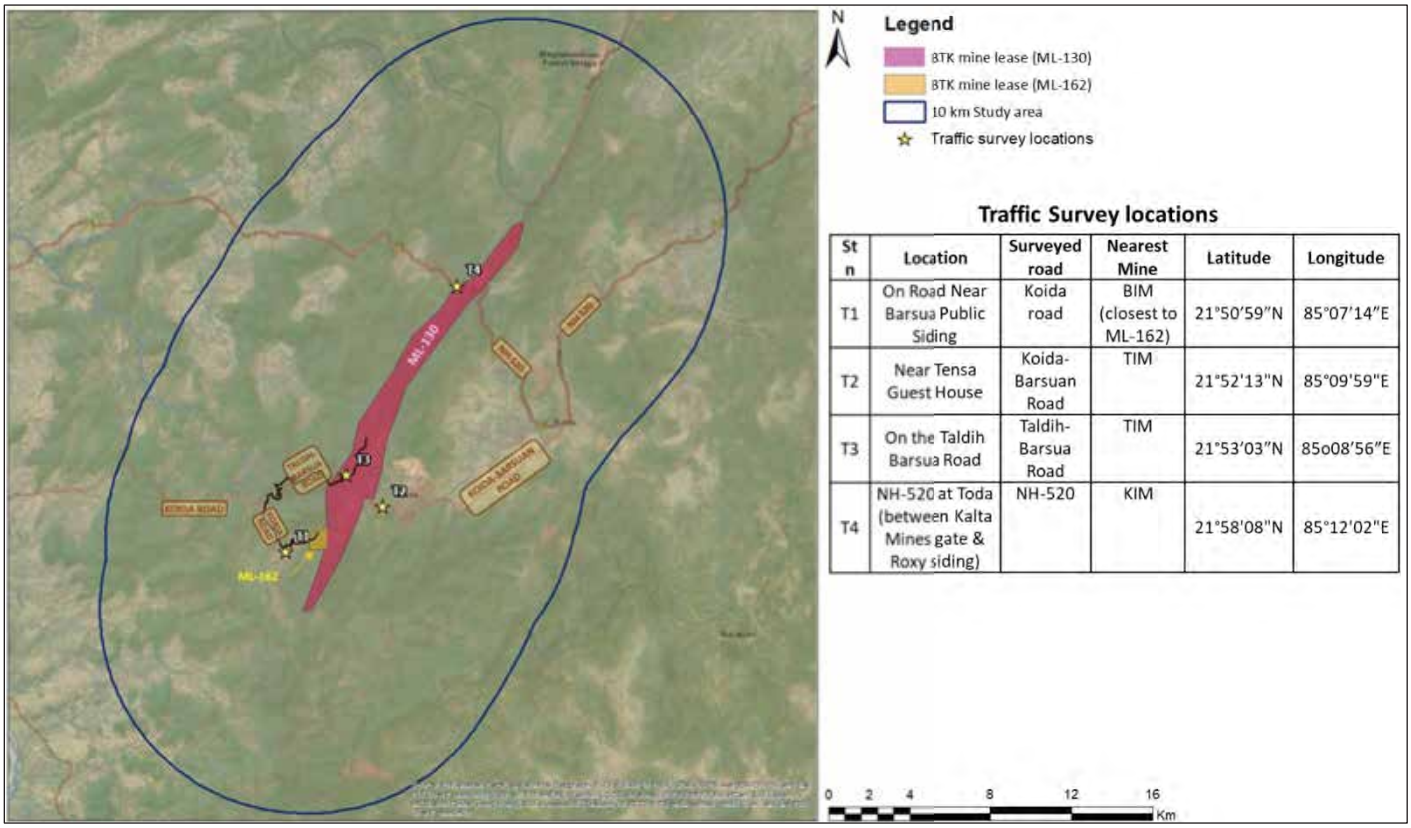
3.7 TRAFFIC DENSITY

Traffic volume survey was recorded hourlycontinuously for 7 days at 4 (four) locations from 16th March to 22nd March 2021. The details of traffic location are given below in **Table 3.29** and illustrated in **Fig. 3.11.**

Table 3.29: Locations of Traffic Volume

Sl. No.	Stn. Code	Location	Latitude	Longitude
1.	TDS1	On Road Near Barsua Public Siding	21°50'59"N	85°07'14"E
2.	TDS2	On the public road going from Koida to Barsua Valley near Tensa Guest House	21°52'13"N	85°09'59"E
3.	TDS3	On the public road going from Koida to Barsua Valley just beyond Taldih Mine towards Barsua Valley.	21°53'03"N	85°08'56"E
4.	TDS4	NH-520 at Toda (between Kalta Mines gate & Roxy siding)	21°58'08"N	85°12'02"E

Fig. 3.11: Trafficsurvey locations



Traffic Survey locations

Stn	Location	Surveyed road	Nearest Mine	Latitude	Longitude
T1	On Road Near Barsua Public Siding	Koida road	BIM (closest to ML-162)	21°50'59"N	85°07'14"E
T2	Near Tensa Guest House	Koida-Barsuan Road	TIM	21°52'13"N	85°09'59"E
T3	On the Taldih Barsua Road	Taldih-Barsua Road	TIM	21°53'03"N	85o08'56"E
T4	NH-520 at Toda (between Kalta Mines gate & Roxy siding)	NH-520	KIM	21°58'08"N	85°12'02"E

The summarized results of traffic survey of the four locations are given in **Table 3.30.1, Table 3.30.2, Table 3.308.3** and **Table 3.30.4**.

Table 3.30.1: Traffic near Barsua Public Siding (TDS1) (21°50'59"N, 85°07'14"E)

Date (Total Traffic on each day)	Going Towards Barsua Siding			Going Towards Barsua Town			Traffic In Terms Of PCUs
	Two Wheelers	LMV	HMV	Two Wheelers	LMV	HMV	
16th to 17th March 2021	595	485	1594	558	449	1523	10862
17th to 18th March 2021	525	501	1388	542	470	1508	10193
18th to 19th March 2021	493	471	1386	520	503	1463	10028
19th to 20th March 2021	467	606	1383	563	361	939	8448
20th to 21th March 2021	449	446	912	491	274	837	6437
21th to 22nd March 2021	455	445	1048	346	303	846	6831
22nd to 23rd March 2021	460	479	1382	560	467	1261	9385
Average of 7 days	**492**	**490**	**1299**	**511**	**404**	**1197**	**8883**

Table 3.30.2: Traffic near Tensa Guest House (TDS2)
(21°52'13"N, 85°09'59"E)

Date (Total Traffic on each day)	Going Towards Barsua			Going Towards Koida			Traffic In Terms Of PCUs
	Two Wheelers	LMV	HMV	Two Wheelers	LMV	HMV	
16th to 17th March 2021	527	381	1336	479	417	1153	8768
17th to 18th March 2021	492	444	1121	448	423	1069	7907
18th to 19th March 2021	508	432	993	516	411	1025	7409
19th to 20th March 2021	324	330	1113	315	323	1267	8113
20th to 21th March 2021	469	265	1167	523	323	1175	8110
21th to 22nd March 2021	412	395	888	364	357	760	6084
22nd to 23rd March 2021	478	489	1190	505	522	1269	8880
Average of 7 days	**459**	**391**	**1115**	**450**	**397**	**1103**	**7896**

Table 3.30.3: Traffic on Barsua-TaldihRoad (TDS3)
(21°53'03"N, 85°08'56"E)

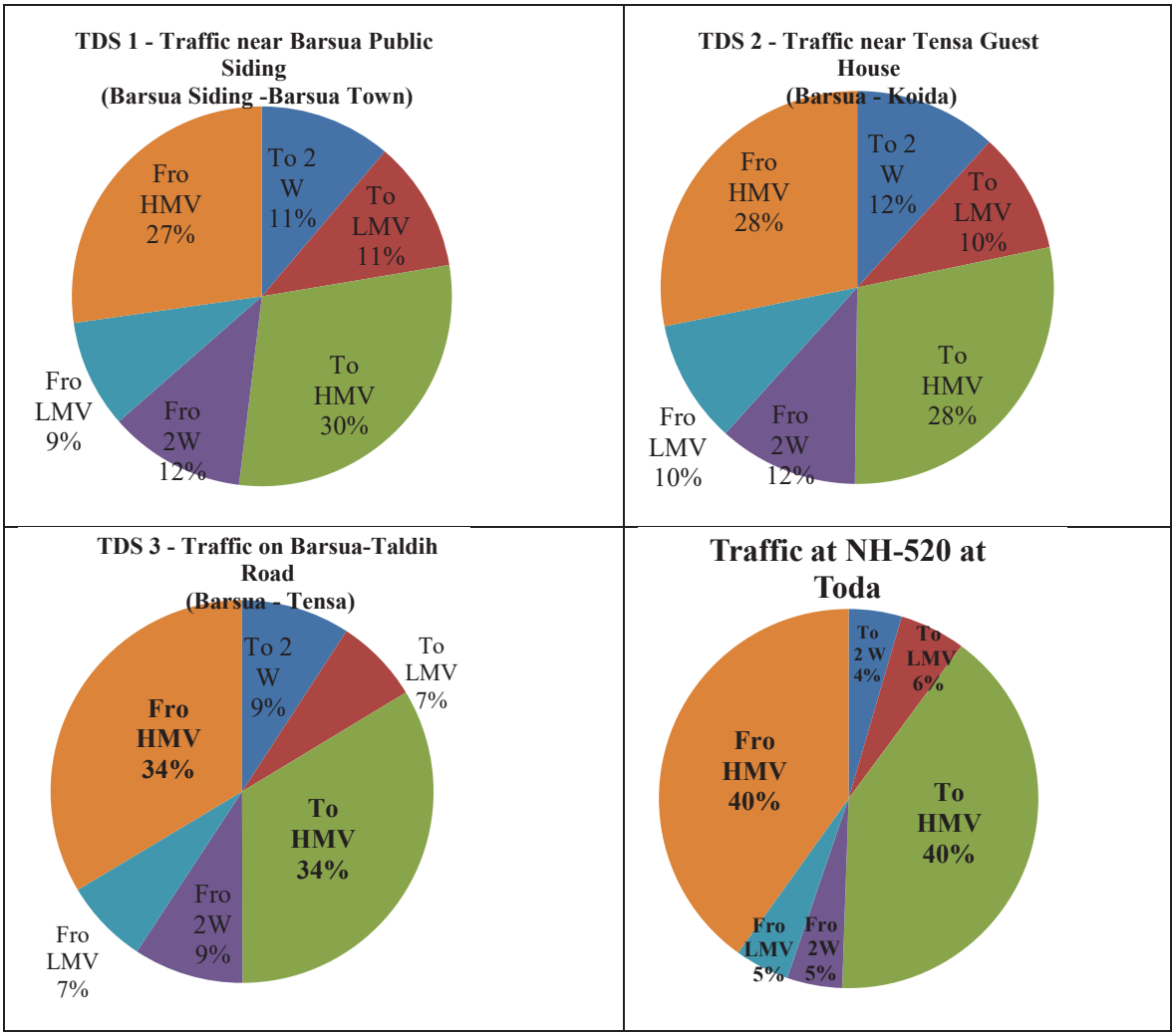
Date (Total Traffic on each day)	Going Towards Barsua			Going Towards Tensa			Traffic In Terms Of PCUs
	Two Wheelers	LMV	HMV	Two Wheelers	LMV	HMV	
16th to 17th March 2021	406	304	1783	329	255	1637	11187
17th to 18th March 2021	409	320	1589	431	300	1562	10493
18th to 19th March 2021	428	245	1428	455	263	1514	9776
19th to 20th March 2021	334	288	1552	347	304	1631	10482
20th to 21th March 2021	481	277	1510	539	330	1542	10273
21th to 22nd March 2021	415	393	1315	373	348	1190	8650
22nd to 23rd March 2021	486	483	1673	519	508	1759	11791
Average of 7 days	**423**	**330**	**1550**	**428**	**330**	**1548**	**10379**

Table 3.30.4: Traffic at NH-520 at Toda,
between Kalta Mines gate & Roxy siding (TDS4)
(21°58'08"N, 85°12'02"E)

Date (Total Traffic on each day)	Going Towards Roxy Siding			Going Towards Koida			Traffic In Terms Of PCUs
	Two Wheelers	LMV	HMV	Two Wheelers	LMV	HMV	
16th to 17th March 2021	322	231	3436	404	240	3131	20535
17th to 18th March 2021	390	284	3730	359	276	3393	22304
18th to 19th March 2021	334	882	3491	359	396	3422	22364
19th to 20th March 2021	400	253	3250	419	298	3768	22015
20th to 21th March 2021	422	580	2709	436	546	2998	18676
21th to 22nd March 2021	346	463	3007	337	494	3082	19566
22nd to 23rd March 2021	386	525	3586	386	419	3239	21805
Average of 7 days	**371**	**460**	**3316**	**386**	**381**	**3290**	**21038**

The average 7 day traffic has been illustrated in **Fig. 3.12**.

Fig. 3.12: Average 7 day traffic to and fro vehicles of two wheeler (2W), LMV and HMV



From **Fig.3.12**, it can be seen that HMVs constitute 57% of the traffic at TDS 1, followed by Two-wheelers (23%) and LMVs (20%).

At TDS2 HMVs constitute 56% of the traffic followed by Two-wheelers (24%) and LMVs (20%). The heavy HMV traffic is on account of iron transport from private iron ore mines beyond Tensa towards Koida to Barsua Valley.

At TDS3 HMVs constitute 68% of the traffic followed by Two-wheelers (18%) and LMVs (14%). The increase in proportion of HMVs at TDS3 as compared to TDS2 can be attributed to movement of iron ore from JSPL's Tensa Mine & SAIL's Taldih Mine towards Barsua Valley.

At TDS4 HMVs constitute 80% of the traffic. It is to be noted that this road carries traffic not only from SAIL's Kalta Mines but also traffic from several other iron ore mines in the Koida area.

As per IRC:64 "Guidelines for Capacity of Roads in Rural Areas", the recommended design service volume for roads on various terrains with low curvature is given in **Table 3.31**:

Table 3.31: Carrying capacity for different road widths

Sl. No	Type of road (Carriageway width)	Recommended Design Service Volume in PCU/Day	
		Plain with <51°/km curvature	Rolling with <101°/km curvature
1	Single lane road (3.75m)	2000	1800
2	Intermediate lane(5.5m)	6000	5700
3	Two Lane road (7.0m)	15000	11000

Clause 11.1 of IRC:64 also states "*Tentaively, a value of 35000 PCUs can be adopted for four-lane divided carriage-ways in plain terrain*".

The Tensa-Barsua Road (TDS 2 & TDS 3) is a Two-lane road in Rolling Terrain. It is classified as"Other District Roads (ODR) category with black topped carriage way with well-dressed shoulders of 2 m width on either side". As per IRC:64 "Guidelines for Capacity of Roads in Rural Areas", the recommended design service volume for ODR on Rolling Terrain is 11,000 Passenger Car Units (PCUs) per day and the increased factor for the surfaced shoulders of at least 1.5 m on either side is 15 %. Accordingly, the recommended design service volume comes to 12,650 PCUs/day.

The road near Barsua Siding (TDS1) is also a two-lane road but on "Plain Terrain". As per IRC:64 "Guidelines for Capacity of Roads in Rural Areas", the recommended design service volume for the two lane roads on plain terrain with low curvature (<51°/km) is 15000 Passenger Car Units (PCUs) per day and the reduction factor for 3.5 m wide lane and shoulder width of 1.2 m is 0.92. Accordingly, the recommended design service volume comes down to 13800 PCUs/day.

The Kalta– Roxy Siding Road (NH-520) is a "four-lane divided carriage-ways in plain terrain" (i.e. capacity – 35000 PCUs/day).

A present the traffic volumes at TDS1, TDS2, TDS3 and TDS4 are within the respective Recommended Design Service Volumes.

3.8 PEOPLE'S PERCEPTION

An opinion poll was carried out during June, 2021 to get an idea about local people's perception regarding Barsua-Taldih-Kalta Mines of SAIL. The results of the analysisofopinion poll are given in **Table 3.32**.

Table3.32.Peoples' Perception on the Project

Perception	No. of Respondents	Distribution (%)
Advantages		
Employment opportunity	41	74.50
Improvement in educational facilities	40	72.70
Development of the area	45	81.80
Business development	43	78.20
Improvement in Health Care facilities	42	76.30
Disadvantages		
Pollution	35	63.60
Damage to health	14	25.50
Total Respondents	**55**	

It is observed that 74.5% of them have identified creation of employment opportunity as the main advantage. People are hopeful of getting employment in the vicinity of the Barsuan-Taldih-Kalta Mines. About 78.2 % of the respondents are expecting improvement in business. About 72.7% of respondents are expecting that the educational facility will improve around the study area. Around 81.8% of the respondents feel improvement in peripheral development activities. The major disadvantage is that about 25.5 % of the respondents are showing concern to health due to environmental pollution.
During the survey local people pointed out that invies of the prevailing Covid-19 pandemic students are forced to attend classes online. Due to poor internet connectivity in the region children are unable to attend such on-line classes properly. Local people expect that SAIL should arrange to improve internet connectivity in the region.

Local people agree that SAIL has contributed much to the health care delivery system in the region. But there is scope for improvement.

3.9 ECOLOGY

The area comprises of hills & plateaus and plain areas. The hills are mostly forested being part of the Saranda Forest which is one of the largest tracts of sal forests and extends from Jharkhand, Odisha and into Chhttisgarh. The plain areas comprise of forests, grasslands and rural settlements. The grasslands have probably developed due to anthropogenic activities. There are several open-cast iron ore mines in the area especially on the hills.

The study area lies in the Eastern Highlands sub-zone of the Eastern Plateau and Hills agro-climatic zone. Most of the area is hilly. Almost the entire area is rural. Most of the lease area lies within Torha Reserved Forests. In addition there are a number of other Reserved Forests (R.Fs.) within the study area, which are as follows:

1. Amarurhi R. F.: 7.3 km west of the lease's southern part
2. Sarkanda R. F. : 2 km east of the lease's southern part
3. Khandadhar R.F. : 6 km south of the lease's southern tip
4. Khajurdih R.F. : 9.5 km east of the lease's southern part
5. Mendhamaruni R.F.: 7 km east of the lease's central part
6. Kathmala R.F. : 5.5 km east of the lease's central part
7. Karo R.F.: Just east of the lease's northern part
8. Uliburu R.F.: 10 km north-east of the lease's northern tip
9. Karampada R.F. : 2 km north of the lease's northern tip
10. Rakshi R.F.: 9.5 km west of the lease's northern part

These forests are classified as Moist Peninsular Valley Sal Forests, sub-group of Northern Tropical Moist Deciduous Forests. In some areas, Dry Deciduous Scrub Forests have developed due to biotic influences.

Besides forests, the core zone comprises of grasslands, rural settlements, mines & mining infrastructure and plantations (created as the mine's green belt & plantations).

Barsua mining block is in operation since the 1960s. Most of the vegetation on the hill top has been cleared for the mine and allied facilities. The vegetation in the mining area comprises of small isolated patches of scrub, plantaions& green belt and a few scattered trees from the original natural vegetation. However dense forests are still present on the steep hill slopes in the non-mineralised zone as can be seen in **Fig. 3.13**. The common trees in this region are *Shorea robusta* (the most common species)*, Pterocarpus marsupium, Terminalia tomentosa, Terminalia belirica, Terminalia chebula, Ficus sps., Schleichera oleosa, Mangifera indica, Diospyros melanoxylon, Buchnania lanzan, Gmelina arborea, Anogeissus latifolia, Careya arborea etc.*

Fig. 3.13: Forest in Western side of Barsua Block as seen from ML-162

Since Taldih Block commenced operations in late 2016, large tracts of the original vegetation are still remaining. The vegetation is dominated by *Shorea robusta.* The other species are *Pterocarpus marsupium, Terminalia tomentosa, Terminalia belirica, Terminalia chebula, Ficus sps., Schleichera oleosa, Mangifera indica, Diospyros melanoxylon, Buchnania lanzan, Gmelina arborea, Anogeissus latifolia, Bombax ceiba etc.* Lichens are present on tree trunks.Since the forests are relatively undisturbed bio-diversity is high.

Grasslands have developed in the corezone near Tantra Village. The vegetation comprises of grasses, herbs, shrubs and widely scattered trees (*Shorea robusta, Mangifera indica, Schleichera oleosa, Artocarpus spp., Ficus bengalensis, Ficus religiosa, Madhuca indica, Terminalia belirica, Diospyros melanoxylon*). *Butea monosperma* which is common on outskirts of forests in Odisha and Jharkhand is absent.

Villagers have planted trees of economic importance and ornamental trees in and around their homesteads such as *Artocarpus heterophyllus* (Jack-fruit), *Mangifera indica* (Mango), *Psidium guajava* (Guava), *Pongamia pinnata* (Karanj), *Azadirachta indica* (Neem), *Tectona grandis* (Teak), *Delonix regia* (Gulmohar) etc.. Some of the original vegetation has also been retained. These include *Madhuca indica* (Mahua)*, Mangifera ndica, Artocarpus heterophyllus, Syzygium spp.* (Jamun) etc.*.*

On the outskirts of villages shrubs such as *Ricinus communis* (Castor)*, ,* *Calotropis procera, Lantana camara* and herbs such as *Jatropha gossypifolia* (Bellyache bush), *Parthenium hysterophorus, Solanum xanthocarpum, Tephrosia spp.* are observed

Kalta Block commenced operations in 1966. Although the quarries are fully developed, large tracts of the original vegetation are still remaining in the non-mineralised areas of the Block. The vegetation is dominated by *Shorearobusta.* The other species are *Pterocarpus marsupium, Terminalia tomentosa, Terminalia belirica, Terminalia chebula, Ficus sps., Schleicheraoleosa, Mangiferai ndica, Diospyros melanoxylon, Buchnania lanzan, Gmelina arborea, Anogeissus latifolia, Bauhinia spp. Careya arborea etc.* Lichens are present on tree trunks. The forests in the non-mineralised zone are relatively undisturbed and consequently the biodiversity is on the higher side. In the mineralized area the vegetation compises of isolated patches of scrub and mine's green belt & plantations.

Due to round the clock mining operations diversity of animals is low especially in Barsua Block as the animals have been displaced by clearance of vegetation, and scared off by noise & vibrations from mining & allied operations and illumination of the mining areas . Taldih Block commenced operations only a few years ago. Barking deers, wild pigs, rabbits, jackals and other common small mammal are regularly seen in Taldih Block. In Kalta Block too these animals are often seen especially as there are dense forests on relatively less steep grounds. Elephants are seasonal visitors to the forests around the tailings pond in Barsua Valley; they also bathe and drink from the tailings pond.

The buffer zone comprises of forests, grasslands, settlements, agricultural land, plantations, mines & mining infrastructure and a steel plant.

Shorea robusta is the predominant species. Other common associates are *Terminalia tomentosa, Buchnania lanzan, Diospyros melanoxylon, Anogeissuslatifolia, Xylia xylocarpa, Terminalia belirica* etc. *Artocarpus heterophyllus, Butea spp.* and *Madhuca indica* were observed only in forest fringes and open forests.

Grasslands have developed in the study area probably due to tree felling, live-stock grazing and / or poor soil cover. The vegetation comprises of grasses, herbs, shrubs and widely scattered trees of which *Shorea robusta, Mangifera indica, Schleichera oleosa, Artocarpus spp., Ficus bengalensis, Ficus religiosa, Madhuca indica, Terminalia belirica, Diospyros melanoxylon, Azadirachta indica* are the most common species. *Butea monosperma* which is common on outskirts of forests in Odisha and Jharkhand is seen only rarely in the study area and that too ~6 km from the core zone.

Mine operators, the steel plant operator and the State Forest Department have created several plantations in the study area, mostly of *Tectona grandis* (Teak) and *Acacia auriculiformis* (Australian Acacia). These two species have also become feral in the area. Other species planted in the area are *Agave spp.* and*Alstonia scholaris.*

There are several rural settlements and mine townships in the study area. Barsua has developed into a small town. The vegetation in and around these settlements has been much altered and several species of non-native species have been planted in great numbers. The tree species in these settlements include *Tectona grandis*(Teak), *Delonix regia*(Gulmohar), *Eucalyptus spp, Peltophorum ferrugienum* (Radhachuda)*Artocarpus heterophyllus* (Jack-fruit), *Mangifera indica* (Mango), *Tamarindus indica* (Tamarind), *Psidium guajava* (Guava), *Pongamia pinnata* (Karanj), *Azadirachta indica* (Neem), *Syzygium spp., Ficus*

bengalensis(Banyan), *Ficus religiosa*(Peepal)*, Nerium indicum, Plumeria spp.* (Frangipani)*, Polyalthia longifolia* (Druping Ashok)*, Alstonia scholaris, Moringa oleifera* (Drumstick), *Swietenia mahogany* (Mahogany), *Annona squamosa*etc. On the outskirts of settlements and in vacant plots in settlements, shrubs such as *Ricinus communis* (Castor)*,Calotropis procera, Lantana camara* and herbs such as *Jatropha gossypifolia* (Bellyache bush), *Parthenium hysterophorus, Eupatorium odoratum, Colocasiaesculenta, Solanum xanthocarpum, Tephrosia spp.* are commonly observed.

There are extensive forests in the study area. However due to presence of several open cast mines in the area, disturbances have scared off many species of animals especially large ones. The habitat too has been fragmented. Large mammals including Elephants and Sloth Bears are found in the forests only.

Site Specific Wildlife Conservation and Management Plan (SSWCP) for ML-130 lease (2486.383 ha) was prepared and submitted to the concerned authorities. The Site Specific Wildlife Conservation and Management Plan has been Approved vide Memo No. 1655/1 WL(C) SSP-224/2012 dated 25th Feb., 2013 for a period of 10 years. Similarly, Site Specific Wildlife Conservation Plan of ML-162 lease (77.94 ha) was approved vide letter No. 1084/6F (Mg), dated 06.02.2016 which is valid upto 05.02.2026. These two plans were approved by Govt. of Odisha for both Project area as well as project impact area. At present, both the SSWCPs are under effective implementation at the BarsuaTaldihKalta Mines.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Barsua-Taldih-Kalta Mines had received Environmental Clearance (EC) vide letter dt.29-10-2010 for increasing iron ore production to 8.05 MTPA, additional beneficiation facilities to process 6.75 MTPA, a new 2.0 MTPA pelletisation plant and upgradation of the existing mineral handling facilities to handle the increased production. In the EC it had been mentioned that part of beneficiation plant, part of the tailings pond and the mineral despatch facilities were located "outside the lease area". The EC was amended vide letter dt. 30-03-2016 wherein it was specified that the facilities which are located "outside the lease area" are located in "ML-162 lease and acquired area".

The EC was amended in 2020 and again in 2021. As per the latest amendment (issued vide letter no. J-11015/351/2006-IA.II (M) dated 17th March, 2021, the production from Barsua, Taldih and Kalta Blocks shall be 3.5 MTPA, 1.35 MTPA & 3.20 MTPA respectively. Ore from Barsua would be beneficiated and moved by conveyors to the railway wagon loading facilities at Barsua Valley. Ore from Taldih would be transported by trucks to the railway loading facilties in Barsua Valley. Ore from Kalta would be despatched by trucks to Roxy Railway Siding. Permission was also accorded for excavation and sale of max. of 1 MTPA of tailings from the tailings pond.

Since receipt of the last EC Amendment, ML-130 (where the mines and part of the beneficiation facilities are located) spread over 2486.383 ha, has been amalgamated with the adjacent ML-162 (where part of the beneficiation facilities, part of the tailings pond and part of the mineral despatch facilities are located) which is spread over 77.94 ha. Thus the lease area has been revised to 2564.323 ha

4.1 IMPACTS ON LAND USE

The two adjacent leases (ML-130 & ML 162) which have been amalgamated are already in SAIL's possession. The western boundary of ML-162 is common with that of ML-130. Some of the facilities in ML-130 (beneficiation plants and ore conveyors) extend into ML-162. SAIL has also acquired 164.626 ha land adjoining ML-162. Barsua Tailings Pond and the ore despatch facilities extend from ML-162 into this acquired area. The amalgamation does not involve construction / development of any new facilities. So the amalgamation of ML-130 and ML-162 will have no effect whatsoever on land-use.

4.2 IMPACTS ON TRAFFIC

Amendment of Environment Clearance was accorded vide letter no. No. 11015/351/2006-IA.II(M) dt. 17-03-2021 for road transport of 1.35 MTPA iron ore from Taldih to Barsua Valley and 3.2 MTPA ore from Kalta to Roxy Siding. The amalgamation of the two leases of SAIL shall not lead to any increase in traffic as production from SAIL's Barsua-Taldih-Kalta Mines shall remain at the levels for which permission has been granted vide the above referred EC Amendment Letter.

4.3 IMPACTS ON AMBIENT AIR QUALITY

Iron ore handling and transportation activities generate fugitive dust. Emissions from diesel powered earth moving and material handling machinery also contribute air pollutants during

transportation. However, the fugitive dust during loading/unloading is not expected to spread beyond lease area. During transportation of ore outside the lease area, the emission shall be limited to close to road sides. Gaseous pollutants like SO_2, NOx and CO will also be added to the ambient air due to vehicular traffic movement.

During the Environmental Appraisal for redistribution of production amongst the three Blocks of Barsua-Taldih-Kalta Mines, impact prediction had been carried out for the following:

1. Emissions for Mining of 3.5 MTPA of ore from Barsua, 1.35 MTPA from Taldih and 3.2 MTPA from Kalta and transport via conveyor/rail/road.
2. Excavation of 1 MTPA of tailings from Barsua Tailings Pond
3. Transport of entire productions by road from Taldih and Kalta to respective railway sidings.

The US Environmental Protection Agency's (EPA's) AERMOD computer code was used to estimate atmospheric dispersion and concentrations of the released emissions in the immediate vicinity of the proposed sources. The impacts were predicted over a 20 km X 20 km area with the location of the fines dump is taken as the center. GLCs were calculated at every 500 m grid point. Ground Level Concentrations modelling was carried out considering complex terrain.

It was observed that the estimated values of maximum Ground level concentrations were concentrated in and around the ore transportation route. The maximum predicted GLCs due to proposed changed are limited to 34.9 µg/m^3, 7.5 µg/m^3, 1.9 µg/m^3 and 14.5 µg/m^3 for PM_{10}, $PM_{2.5}$, SO_2 and NOx respectively over roads. The same is decreasing away from the road. The predicted GLC values at individual stations due to operations of Barsua-Taldih-Kalta mines in future are given in **Table 4.1**.

Table 4.1: Predicted GLC values at individual AAQ monitoring locations

Station ID	Station Name	Background AAQ Conc (C_{98}) #	Predicted Additional GLCs	Cumulative values in future	Norm
PM_{10}					
A1	Kalta Township	92	0.01	92.01	100
A4	Tantara Village	93	0.04	93.04	
A7	Tensa Township (BIM)	92	0.01	92.01	
$PM_{2.5}$					
A1	Kalta Township	53	0	53	60
A4	Tantara Village	52	0	52	
A7	Tensa Township (BIM)	53	0	53	
SO_2					
A1	Kalta Township	15.6	0	15.6	80
A4	Tantara Village	15.6	0	15.6	
A7	Tensa Township (BIM)	18.6	0	18.6	
NOx					
A1	Kalta Township	22.9	0.01	22.91	80
A4	Tantara Village	18.2	0.01	18.21	
A7	Tensa Township (BIM)	27.8	0.01	27.81	
All values in µg/m^3					
#As monitored during March – May, 2021					

All values in µg/m^3

Under the present proposal no change in Air Quality is anticipated as mining & allied activities shall remain unchanged from what has already been considered.

4.4 IMPACTS ON AMBIENT NOISE LEVELS

Under the present proposal no change in Noise Levels are anticipated as the level of mining & allied activities shall remain unchanged.

4.5 IMPACTS ON WATER ENVIRONMENT

No additional water shall be required for the proposed changes in Barsua-Taldih-Kalta Lease Area as present operations shall remain unchanged.

4.6 ENVIRONMENTAL CONTROL MEASURES IN BARSUA-TALDIH-KALTA MINE COMPLEX

Barsua –Taldih – Kalta iron ore mines are located in forest and hilly region. Considering the sensitivity of the forest ecology and environment, adequate measures for safeguarding the environment around the mines have already been adopted over the years. A step beyond compliance, Environmental Management System (EMS) has been implemented at all the three mines i.e. Barsua, Taldih and Kalta Mines and certified to ISO -14001: 2015.

Over the years, significant improvement in prevention & control of pollution at these iron ore mines has been achieved through introduction of the cleaner technologies like wet drilling, controlled blasting, use of high capacity HEMM, high pressure sprinklers, dust suppression / extraction systems for ore handling areas, etc. In addition to this a series of check dams / siltation ponds have been constructed at strategic locations to arrest migration of silts from the mines to the adjoining surface water bodies. Major thrust has been given for adoption of cleaner technologies, increased recovery of fines through setting up of beneficiation facilities, ETP for treatment of ore washing effluents, zero discharge, etc., mainly aiming protection of forest and river ecology.

4.6.1 Prevention & Control of Air Pollution

At various stages of mining operations such as drilling, blasting, excavation, loading and transportation of materials, processing of ore etc., dust particulates of various sizes are generated in the form of fugitive dust. The dust pollution in the mines are mostly confined to mine face, haulage roads, blasting sites, crushing operations, screening processes, loading and unloading points etc., in the form of fugitive dust. Control of air borne dust has become a major challenge in mines. Air borne dusts are most economically controlled in short term by sprinkling water and in long term by re- vegetation.

To control the air pollution due to mining activities, prevention and control measures for fugitive dust emissions have been adopted at various mining activities at the Barsua-Taldih-Kalta Iron Mines. In addition to this, stabilization of waste dumps and increased green cover in the leasehold area as well as in township has also significantly reduced the dust levels in the Township. Efforts are also being made to further strengthen the existing air pollution control measures for continual improvement with a priority to avoid generation of dust at the source itself. The major dust control measures provided at present at Barsua-Taldih-Kalta Iron

Mines are as follows:

- Wet drilling to control fugitive dust from drilling
- Use of 28 KL High Pressure Water Sprinklers for Haul Road Dust Suppression
- Fixed Water Sprinklers on permanent haul roads & railway sidings over 6.0 km length at Barsua & Kalta (see **Fig. 4.1**)
- Use of slurry explosives with NONEL Detonation for controlling blasting hazards
- High Capacity Excavators & Dumpers for handling of ore & waste
- Dry fog dust suppression at Barsua Ore Processing Plant (see **Fig. 4.2**)
- Long Distance Belt Conveyers for transportation ore
- Stabilization waste dumps through use of geo-textiles and vetiver plantation.
- Installed 4 numbers of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) around the mines to check the efficacy of the pollution prevention measures.
- Installation Wheel washing facilities at Taldih and Kalta at the entry of Public Black Topped Roads to clean the wheels of the tippers before entering the public roads.
- Installation of Misting Cannons at Mobile Crushing & Screening Plants (see **Fig. 4.3**)

Fig.4.1: Fixed Sprinkler Alongside Road In Kalta Mine

Fig.4.2: Dry Fog Dust Suppression System at Receiving Hopper, Barsua Beneficiation Plant

Fig.4.3: Misting Cannon (far left) at Mobile Crushing & Screening Plant, Kalta Mine

4.6.2 Prevention & Control of Water Pollution

Surface run-off management Structure at Barsua Iron Mine:

Barsua Mine is located on the hill slope and there is no organised perennial water nalla inside the mine area. Only during rainy season the run-off water of the mine are being channelized through garland drains to settling pit and finally discharged to Kuradih Nalla originated from eastern flank of the mine.

The run-off generated from the dumps and other parts of the mine is managed by the surface run-off management structures within the mine itself. The run-off water is channelized through garland drains of the mine and passed through de-silting pits/dry boulder walls followed by check dams having weep holes constructed at the bottom of external dumps to allow the silt to be settled before final discharges to surrounding environment. In Barsua Iron

Mine, total mining area including dumps is divided into 3 Nos. of catchment area such as 1, 2 and 3 based on the surface contour, lithology, land use etc. for surface run-off management.

Catchment area 1: This part lies at the north-eastern side of the mine which covers area 3E &W, Dump-5, Dump-1, Dump-9, Dump-8 (part). Total drainage area is approximately 68.60 ha. There is an abandoned pit at 3E, where about 90% of mine drainage of catchment area-1is stored during the monsoon & total holding capacity of the above pit is 577500 m^3 as the dimension of the pit is 350 m x 110m x 15m which is adequate for handling the total surface run-off from the above area i.e. 32928 m^3 (max.) per two hour.

Catchment area 2: This part lies at the middle portion of the mine which covers Dump-8 (part), Dump-2, Dump-7, Dump-3&4 and mining installations. Total drainage area is approximately 33.01Ha. There are two settling pit (30m x 15m x 2.5m and 50m x 30m x 1.0m) having holding capacity is approx. 2625 m^3. Total run-off off the above area is 15845 m^3.

Since, holding capacity is not adequate in this area, the following check dams (53m x 4.0m x 19.0/3.0m, 35m x 4.0m x 6.0/3.0m, 35m x 3.0m x 4.0/2.5m. and 60m x 2.0m x 1.25m respectively) at the bottom of Dump-2, Dump-7 and Dump-9 (external portion) have been constructed to control surface run-off. Some of the photographs are shown in **Fig.4.4**.

Fig.4.4: Check Dams at Barsua Block

Catchment area 3: This part lies at the south-eastern side of the mine which covers Area-2&4, Area-5, sub-grade stack and Dump-10 of area 2 & 4 etc. Total drainage area is approximately 41.107 ha. Total run-off off the above area is 19731 m^3. There is a settling pit (50m x 50m x 2.0m) having holding capacity is approx. 5000 m^3 which is not adequate for holding the total surface run-off from the above area i.e. 19731 m^3 (maxm.) per two hour.

Hence, two nos. of check dams have been constructed at the bottom of Dump 2, Dump-7 (48m x 1.5m x 1.5/1.4m) and at the toe of lump stack of area 2&4 (53m x 4.0m x 19.0/3.0m) to control surface run-off of the area.

Surface run-off management Structure at Taldih Iron Mine:

Taldih Iron Mine is the central block of ML-130. Mining operation in Taldih started in June, 2016. So far four benches have been opened the RL of bottom most bench being 800 m.

The mining operations in the Taldih Iron Mine are on the hill top and presently the mining operations including temporary stacking area for sub-grade ores covers about 23 ha. only.

In order to control surface runoff water from the mine pit, earthen bunds and dry boulder walls have been provided at strategic locations. The details of check dams / earthen bunds provided at Taldih Mine are as follows:

Sl. No.	Location	Specification
1.	Near Phuljhar	27.5m x 1.0m x 1.0m
2.	Near Phuljhar	26.2m x 2.1m x 2.0m
3.	Near Phuljhar	70.0m x 2.0m x 2.8m
4.	Near Explosive Magazine	27.9m x 2.1m x 2.4m
5.	Near Sub-grade Dump	19.0m x 1.4m x 5.5m
6.	Near Tantara Village	33.0m x 1.5m x 1.5m
7.	Near OB Dump	420m x 1.5m x 1.6m

Surface run-off management Structure at Kalta Iron Mine:

Most of surface runoff during rainy season from the mining areas is being diverted to the mine quarry / pit, from where the water is being percolated down and augmenting the ground water resources. Retaining walls with garland drains at the bottom of the dumps are being provided to control silt carry and surface runoff from the dumps. The details of the retaining wall already provided are:

- 690 m length retaining wall has been constructed at Dump No. 1 near Goarkpur area.
- 80 m length retaining wall has been constructed at Dump No. 4 & 5 near C Block.
- 520 m length retaining wall has been constructed at Dump No. 6.
- 205 metres length retaining wall has been constructed at the Dump No. 9 & 10 near Challan Gate.

For further control of surface runoff from the dump areas, a masonry check dyke of about 450 m length has been constructed in the North-East part of the Dumps No. 1, 2, 3 & 6 to control silt carry over to Najkuara Nalla. An area of 14700 sq. mtr in the western portion of the check dam has been earmarked as Settling Pond and being de-silted every year before onset of monsoon.

Further on downstream of Najkura Nalla, another 27 m length Check Dam has been constructed to control silt carry over from the dump areas.

Fig.4.5: Check Dam across the Najkura Nalla (Kalta Block)

4.6.3 Noise Control

The noise levels in the mining areas are dependent upon the type & capacity of mining machinery, ore handling & processing methods, heavy-duty vehicles in the area etc. Noise is produced due to drilling and blasting, movement of machinery, processing of ore etc., but the pronounced effect of noise is felt only near the active working area. The main sources of noise in the mine are classified as follows:

- Stationary & Mobile Mining Equipment
- Drilling and blasting operations
- Crushing & Screening Plants
- Loading & Transportation of Ore

The following major noise control measures are being implemented at Barsua-Taldih-Kalta Iron Mines:

- Diesel powered machinery, which are major source of noise in open cast mines, are being maintained as per maintenance schedule to prevent undesirable noise. Attention is being paid towards rigorous maintenance of the silencers of the engines
- Provision of good silencers on transportation vehicles
- Proper maintenance of haul roads & transport roads
- Carrying blasting only during working hours i.e. during day time.
- Supply and enforcing use of earmuffs /ear plugs by workers in noise prone zones.

4.6.4 Plantation Efforts

Plantation of native species is being done inside the lease area of Barsua-Taldih-Kalta Iron Mines and nearby areas for creating greenbelt over the years. Safety Zone plantation of 32000 saplings over an area of 93.679 ha has been done through State Forest Department. Apart from this, so far 225865 saplings have been planted covering an area of 110.48 ha since 2010.

In the year 2020-21, total 13000 saplings have been planted over an area of 5.50 ha at Barsua and Kalta blocks.

The plantation efforts will continue at these mines as per the progressive mine closure plan. Besides, Barsua-Taldih-Kalta Iron Mines distributes good quality sapling to local villagers on free of cost to encourage plantation in the nearby areas.

4.6.5 Additional Measures Under Implementation

The following additional measures are recently implemented / under implementation at Barsua-Taldih-Kalta Iron Mines:

- Construction of concrete approach roads at Kalta & Taldih Mines as per the NEERI
- Installation of one additional CAAQMS for real time monitoring of PM_{10}, $PM_{2.5}$, SO_2, NOx and CO at Barsua Railway Siding.
- Regular maintenance of ore transport roads within the leasehold and proper drainage along the roads
- Covering of ore transport vehicles with a tarpaulin sheets to avoid fugitive dust emissions.
- Speed limit and strict prohibition on over taking and overloading.
- Only trained drivers are being employed and all traffic rules are being strictly followed.
- Regular preventive maintenance of the transportation vehicles is carried out to control exhaust emissions.
- Use of high pressure water sprinklers for dust suppression on internal transport roads Covering of ore transport vehicles with a tarpaulin sheets to avoid fugitive dust emissions during use of public roads.
- Tailings excavation will be temporarily suspended during heavy rains.
- The tailings stacking area will have an engineered storm water drainage system routed through settling tanks. Coagulants will be added to the contents of the settling tanks to promote settling of solids. During monsoons, the settling tanks will be regularly cleaned.
- Deployment of truck-mounted mist cannon for dust suppression operations.

All these existing environmental management practices as well as ongoing measures at Barsua, Taldih and Kalta Mines under ML – 130 will further improve environmental quality and land use in the area even after proposed modifications under the proposal and also maintain the socio-economic aspects for a sustainable period.

4.7 CONCLUSION

Amalgamation of ML-162 with ML-130 will have no environmental impacts as:

- The two adjacent leases are adjacent to each other with a common lease boundary and both are under SAIL.
- ML-162 is non-mineralised and only some beneficiation facilities, tailings pond and infrastructure are located within the lease. Some of the accumulated tailings are being excavated and are being sold off after taking necessary permissions including Environment Clearance (EC).
- Activities going on in the two leases have already been considered in the existing Environmental Clearances (Refer **Table 4.2** below).
- Part of the tailings pond and some of the mineral despatch facilities extend into areas adjacent to ML-162 which have been acquired by SAIL. These facilities have also been considered in the existing ECs (Refer **Table 4.3** below)

- The amalgamation shall not involve any new construction except those which already been permitted under the valid ECs.
- The scale of operations shall not deviate from those already specified in the valid ECs.

Table 4.2: Various Facilities in Lease Area Barsua-Taldih-Kalta Iron Ore Mines & their Env. Clearances

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
ML-130 (Total Area: 2486.383 ha)	976.429	Open cast mining and mineral beneficiation in Barsua Block	• Generation of fugitive dust from open cast mining, handling of mineral & waste & vehicular movement over unpaved roads • Generation of fugitive dust from crushing & screening of ore • Surface run-offs from mineral stacks, waste dumps & unpaved roads containing suspended solids • Surface run-offs from quarries, dumps & unpaved roads containing high levels of suspended solids • Noise generation from drilling, blasting, crushing, screening & vehicular movement • Ground vibrations from blasting • Vegetation loss due to expansion of open cast quarries & external dumping of solid wastes.	• Water sprinkling by trucks and / or fixed road side sprinklers. • Dry fog dust suppression at Barsua Plant •Deployment of misting cannons near mobile crushing & screening plants and iron ore fines handling areas •Wherever possible crushers & screens housed •Development of green belt and plantation. •Provision of covered long-distance belt conveyors for ore transport. •Engineered storm water drainage systems routed through settling pits around quarries, dumps & mineral stacking areas. •Controlled blasting to reduce ground vibrations. •Biological reclamation of exhausted quarries and stabilised waste dumps using native species of plants •Concurrent backfilling of exhausted quarries.	EC received on 29-10-2010, for increase of total production to 8.05 MTPA (2.5 MTPA from Barsua + 4.25 MTPA from Taldih + 1.3 MTPA from Kalta), enhancement of beneficiation capacity from 2.5 MTPA to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities to handle higher increased production. EC was amended for re-distribution of production from three mining blocks under ML – 130 by MoEFCC's vide dated 30th March, 2016 to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 MTPA. EC amended vide letter no. 11015/351/ 2006-IA.II(M) dt. 03-07-2020 with corrigendum dated 13th July 2020 for excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum up to 1 MTPA tailings from the tailings pond at Barsua for selling, excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum up to 0.5 MTPA from Fines Stocks from each block for selling.
	1173.484	Open cast mining and mineral crushing & Screening in Taldih Block			
	336.47	Open cast mining and mineral crushing & Screening in Kalta Block			
ML-162 (Total Area: 77.94 ha)	73.99	Beneficiation of iron ore through wet process	• Generation of tailings • Generation of effluents	• Tailings discharged to engineered tailings pond from where part of tailings excavated	Latest EC Amendment (Vide letter no. 11015/351/2006-IA.II(M) dt. 17-03-2021) has allowed redistribution of total production of

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
				and sold • Effluents treated in Thickeners and recycled in process to max. possible extent	8.05 MTPA amongst the 3 blocks (3.5 MTPA from Barsua + 1.35 MTPA from Taldih + 3.2 MTPA from Kalta).
		Transport of beneficiated ore	Generation of fugitive dust	Ore transport only by covered conveyors	
	3.95	Disposal of Tailings	Generation of fugitive dust	• Tailings discharged to engineered tailings pond from where part of tailings excavated and sold • Water sprinkling to suppress fugitive dust	EC amendment dt. 03-07-2020 with corrigendum dated 13th July 2020 allowed excavation & sale of 1 MTPA of tailings.
		Excavation of tailings for sale	• Generation of fugitive dust • Surface run-offs from mineral stacking area containing suspended solids	• Water sprinkling • Deployment of misting cannons • Engineered storm water drainage systems routed through settling pits around mineral stacking areas.	Original EC amended vide letter no. J-11015 / 351 / 2006-IA.II (M) dated 03-07-2020 with corrigendum dated 13-07-2020 for excavation & sale of tailings @ 1 MTPA

Table 4.3: Various Mining Infrastructure Facilities Acquired Areas of Barsua-Taldih-Kalta Iron Ore Mines & their Env. Clearances

Location	Area (ha)	Activities	Aspects	Mitigation Measures	Approvals / Clearances
Acquired area in Barsua Valley (*Total Acquired Area: 164.626 ha*)	31.93	Disposal of Tailings	• Generation of fugitive dust • Release of overflow water containing suspended solids	• Water sprinkling • Collection, treatment & recycling of tailings pond overflow water	EC received vide letter dt. 29-10-2010 specifies location of tailings pond "outside ML Area". EC Amendment letter no. J-11015/351/2006-IA.II(M) dt. 30-03-2016 clarifies "Outside MLArea" as "within ML-162 & acquired area"
	132.696	Dry screening plant, iron ore stock piles, Railway Siding etc.	• Generation of fugitive dust • Surface run-offs from mineral stacking area containing suspended solids	• Water sprinkling • Engineered storm water drainage systems routed through settling pits around mineral stacking areas.	EC received vide letter dt. 29-10-2010 for increase of total production to 8.05 MTPA, enhancement of beneficiation capacity to 6.75 MTPA, setting up new 2 MTPA Pellet Plant and additional material handling facilities. The EC letter also mentioned that the existing beneficiation plant covers in both ML – 130 and outside the mine lease area. The EC was amended vide dt. 30-03-2016 which stated "*To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease.*" EC was further amended vide letter dt. 03-07-2020 & Corrigendum dt.13-07-2020 permitting transport of the entire production from Taldih Mines (2.05 MTPA) by road to the railway loading facilities in Barsua Valley for onward despatch by rail. EC was further amended vide letter dt. 17-03-2021 allowing reduction in production from Taldih Mine to 1.35 MTPA; Other conditions of the previous EC Amendments would remain unchanged.

Table 4.4: Townships in Acquired Areas of Barsua-Taldih-Kalta Iron Ore Mines & their Env. Clearances

Location	Area (ha)	Approvals / Clearances
Acquired area in Barsua Valley	53.29	EC received vide letter dt. 29-10-2010 states in Para 2 "*Three townships namely Kalta Township, Tensa Township and Barsua Township are located outside the mine lease area. The Kalta Township is adjacent to the Mine lease, whereas the other two townships namely the Tensa Township and the Barsua Township are located at a distance of 0.5 km and 1.5 km respectively from the mine lease*". EC Amendment letter no. J-11015/351/2006-IA.II(M) dt. 30-03-2016 clarifies "*Outside ML Area*" as "*within ML-162 & acquired area*"
Acquired area in Tensa	140.377	
Acquired area in Kalta	31.10	

5.0 SUMMARY AND CONCLUSIONS

Barsua-Taldih-Kalta Iron Ore Mines is one of the major sources of iron ore for SAIL's integrated steel plants. There are three mines under the amalgamated lease viz Barsua Iron Mine, Taldih Iron Mine & Kalta Iron Mine. Barsua and Kalta Mines have been operating since 1960 and 1965 respectively, whereas Taldih commenced operating only from November 2016.

Earlier there were two mining leases under Barsua-Taldih-Kalta Iron Ore Mining Project viz ML-130 (2486.383 ha) and ML–162 (77.94 ha). The ~18 km long ML – 130 was the main mining lease and comprises of 3 mining blocks namely Barsua (Southern part), Taldih (Middle part) and Kalta (Northern part). Contiguous to the ML – 130, there was another Mining Lease viz ML – 162 (77.94 ha), which is non-mineralized and is being used for evacuation of ore & associated infrastructure facilities of Barsua Iron Mine.

Since ML-162 lease is non-mineralised and is being utilized only as an infrastructure lease for ML-130 lease, Indian Bureau of Mines (IBM), Bhubaneswar suggested that the two leases be amalgamated. Based on SAIL's application, Deptt. of Steel and Mines, Govt. of Odisha vide proceeding No. IV (B) SM-03/2020/10418/SM, Bhubaneswar, Dtd. 02.12.2020 amalgamated the contiguous Mining Leases viz ML – 130 (2486.383 ha) and ML – 162 (77.94 ha) covering total area of 2564.323 ha having validity up to 05.01.2030. Lease deed of the amalgamated lease was executed on 30.03.2021. Modification of Mining Plan for Amalgamated Mining Lease (2564.323 ha) of Barsua-Taldih-Kalta Iron Mine has been approved by IBM, Bhubaneswar vide letter No MP/A/39-ORI/BHU/2020-21, dated 01.04.2021. In addition to the amalgamated mining lease, an area over 164.626 ha at Barsua Valley adjoining to the mining lease was acquired for installation of various allied mining facilities such as part of ore processing plant, ore stock piles, loading bins, railway siding, tailing pond etc. and being used since inception of the mines.

Environmental Clearance for Integrated Barsua-Taldih-Kalta Iron Mining Project (ML-130) was obtained from Ministry of Environment & Forests, Govt. of India under EIA Notification 2006 vide letter No.J-11015/351/2006- IA.II (M) dated 29.10.2010 for production of 8.05 MTPA iron ore (i.e. 2.5 MTPA from Barsua, 4.25 MTPA from Taldih and 1.3 MTPA from Kalta). Subsequently, the EC was amended by MoEF&CC, New Delhi vide dated 30-03-2016 for redistribution of production of iron ore i.e. 3.5 MTPA from Barsua, 2.05 MTPA from Taldih and 2.5 MTPA from Kalta keeping total production within the EC Capacity of 8.05 MTPA for a limited period of 5 years i.e. up to 30.03.2021 and use of ML-162 lease and acquired area for infrastructure facilities for processing of iron ore produced from ML-130 lease.

The Environmental Clearance was further amended on 3rd July, 2020 with corrigendum on 13.07.2020 for change in excavation & despatch pattern with provisions for excavation & dispatch of max. up to 1 MTPA tailings from Tailing Pond of Barsua and sub-grade dump fines maximum up to 0.5 MTPA from Taldih & Kalta for selling in open market keeping the total production within 8.05 MTPA under para 7(ii) of EIA Notification, 2006. Further, validity of re-distribution of production as per the EC amendment dated 30.03.2016 was further extended by two more years. Again the EC was amended on 17.03.2021 for redistribution of production of iron ore i.e. 3.5 MTPA from Barsua, 1.35 MTPA from Taldih and 3.20 MTPA from Kalta keeping total production within the EC Capacity of 8.05 MTPA.

Further, after receiving in-principle approval of the SAIL Board for expansion of Barsua-Taldih-Kalta Iron Mines from 8.05 MTPA to 16 MTPA ROM, an inline EC application in the prescribed Form – 1 for grant of TOR for capacity expansion of Barsua – Taldih – Kalta Iron Ore Mines was submitted on PARIVEH Portal on 03.04.2021. The proposal was considered by EAC (Non-coal Mining) in its 31st meeting held during 9th-15th June, 2021 and directed SAIL to first obtain necessary amendment in EC for amalgamation of mining leases and then apply for Terms of Reference for capacity expansion of Barsua-Taldih-Kalta Iron Ore Mines.

Accordingly, proposal for obtaining amendment in Env. Clearance of Barsua-Taldih-Kalta Iron Ore Mining Project for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases (ML – 130 & ML – 162) without change in production capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006 has been submitted on 26.06.2021. The proposal has been considered and deliberated at the 33rd EAC (Non-coal Mining) meeting held during 13-16, July 2021 (Agenda No. 4.1). The Committee sought additional information such as current environmental status, current practices of mining, dumping, processing, current baseline data, details of beneficiation plant, recent Public concerns, status of forest lands involved in the amalgamated lease etc. Accordingly, the revised addendum EIA / EMP report covering the complete details of the Barsua – Taldih – Kalta In ron Ore Mining Project including additional details sought by the EAC.

Accordingly, the instant proposal is for obtaining amendment in Environmental Clearance of Barsua-Taldih-Kalta Iron Ore Mining Project of SAIL for change in mining lease area from 2486.383 ha to 2564.323 ha on account of amalgamation of two contiguous mining leases (ML – 130 & ML – 162) without change in production capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006.

Over the years, significant improvement in prevention & control of pollution at these iron ore mines has been achieved through introduction of the cleaner technologies like wet drilling, controlled blasting, use of high capacity HEMM, high pressure sprinklers, dust suppression / extraction systems for ore handling areas, etc. In addition to this a series of check dams / siltation ponds have been constructed at strategic locations to arrest migration of silts from the mines to the adjoining surface water bodies. Further, major thrust has been given for adoption of cleaner technologies, increased recovery of fines through setting up of beneficiation facilities, ETP for treatment of ore washing effluents, zero discharge, etc., mainly aiming protection of forest and river ecology.

The present proposal involves only change in mining lease on account of amalgamation of two existing mining leases and does not involve change in production of 8.05 MTPA from Barsua– Taldih–Kalta Mines or any change in mode of transport. As there is no change in production as well as mode of evacuation & dispatch from Barsua – Taldih – Kalta Mines under the present proposal, possibility of any change in pollution load does not arise. SAIL is already undertaking a number of measures for prevention & control of pollution from these since long and further implementing best environmental management practices. All these continuous environmental management practices at Barsua–Taldih–Kalta Mines will further improve environmental quality and land use in the area and also maintain the socio-economic aspects for a sustainable period.

ANNEXURES

ANNEXURE 1.1: COPY OF ENV. CLEARANCE FOR EXPANSION OF BARSUA-TALDIH-KALTA MINES

No. J-11015/351/2006-IA.II(M)

Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110 003.

Dated the 29th October, 2010

To

M/s Steel Authority of India Limited
5th Floor, Industry House, 10 Camac Street,
Kolkata-700 017
E-mail: rmdsail@gmail.com

Subject: Integrated Barsua-Taldih-Kalta Iron Ore Mining(ML-130 lease), Beneficiation and Pelletisation Plant Project of M/s Steel Authority of India Limited, located in Village Tantra and within Tohra RF, Tehsil Koira, District Sundargarh, Orissa- environmental clearance regarding.

Sir,

This has reference to your letter No.RMD/K/E&L/09/331 dated 21.11.2009 and subsequent letters dated 04.01.2010, 08.01.2010, 19.02.2010, 02.03.2010, 24.05.2010 and 16.09.2010 on the subject mentioned above. The project was earlier prescribed Terms of Reference (TORs) by the Ministry of Environment and Forests on 15.01.2007 for undertaking detailed EIA study for the purpose of obtaining environmental clearance. The proposal is for renewal of mine lease which fall due since 1990 and enhancement of production of iron ore from 2.54million tonnes per annum (million TPA) to 8.05million TPA along with expansion of beneficiation plant from 2.5million TPA to 6.75million TPA [2.5million TPA (existing) + 4.25million TPA (new)] and setting up of a pelletisation plant of 2.0million TPA capacity.

2. The mines [(Barsua-976.429ha, Taldih-1173.484ha(Taldih Block A & C-617.024ha and Taldih Block B &D-556.46ha) and Kalta-336.47ha) are in ML-130 lease, which comprises of a total mine lease area of 2486.391ha, out of which 19.059ha is an agricultural land, 2347.641ha is forestland, 113.841ha is wasteland and 5.85ha is others (settlements). Area proposed for mining is 1113.024ha, an area of 376.676ha is kept for OB dumps, 30.756ha for mineral storage, 98.505ha for infrastructure, 57.608ha for roads, 126.484ha for green belt and 683.338hs is others. There is an existing beneficiation plant having a capacity of 2.5million TPA within the mine lease having an area of 7ha and 50ha outside the mine lease (total area of 57ha). In addition, the new beneficiation plant with a capacity of 4.25million TPA will be setup in an area of 83ha, out of which 50ha will be within the mine lease and 33ha, outside mine lease. The pelletisation plant also be outside the mine lease. The tailing pond is located outside the mine lease in Barsua Valley in an area of 35.88ha. No additional land will be acquired for tailing pond for the expansion purpose. The existing tailing pond will be adequate till the life of the plant. The total

..2/-

capacity of the tailing pond is 7.045 million tonnes and the pond is presently having tailings of 2.575million tonnes. Three townships namely Kalta township, Tensa township and Barsua township are located outside the mine lease. The Kalta township is adjacent to the mine lease, whereas the other two townships namely the Tensa township and the Barsua township are located at a distance of 0.5km and 1.5km respectively from the mine lease. The Samij Nala is passing through the mine lease. In addition, the Kurarhi Nala and the Karo River are flowing in the buffer zone of the mine at a distance of 0.15km and 3km respectively from the mine lease boundary. A few initial stage drainage impressions are observed in the mine lease area. Eight first order seasonal streams draining into the Kurarhi nallah will be affected due to the mining operation in the Barsua Block (Id1-122m, Id2-252m and Id3-300m) and in the Taldih Block(Id4-203m, Id5-154m, Id6-160m, Id7-365m and Id8-70m).

3. No national park/wildlife sanctuary/biosphere reserve/tiger reserve/elephant reserve/ wildlife corridors etc. are reported within 10 km of the mine lease. A letter dated 30.11.2009 from the DFO cum Wildlife Warden, Bonai Division has been submitted along with map in this regard. A site specific wildlife conservation plan has been prepared for this project and as per the information provided in the plan the nearest elephant corridor is the Karo-Karampada Corridor, which is about 20km East-North East of the mine lease's northern tip.

4. The mine working will be opencast by mechanized method with conventional shovel-dumper combination and involving drilling and blasting. The targetted production capacity of the mine is 8.05million TPA of iron ore (2.5milion TPA from Barsua; 1.3million TPA from Kalta and 4.25million TPA from Taldih). The life of the mine in these three blocks varies from 23 years to 44years(Barsua 23yrs, Kalta 44yrs and Taldih 42 yrs). The iron ore will be transported through rail from the railway siding at Barsua Valley. Inside the lease, ore is conveyed mainly by long distance conveyor. The existing beneficiation plant at Barsua has a capacity to process 2.5million TPA of iron ore from Barsua block. Under expansion programme, beneficiation facility at Barsua Valley will be enhanced to process additional 4.25 million TPA of ROM ore to be produced at Taldih block. Pelletisation facility will also be added alongside the beneficiation plant to produce pellets (2 million TPA) from the beneficiated concentrate. No wet beneficiation has been envisaged for the ore mined at Kalta. Regarding proposed facilities for handling 4.25 million TPA of ROM from Taldih block, after Primary crushing at Taldih, crushed ore will be conveyed by long distance belt conveyor (LDBC) from Taldih to Barsua Valley (approx. 9km) within 2886.391ha mine lease are (ML 130) and beneficiation, loading etc. will be installed outside the mine lease area at Barsua Valley over 33ha land. Ore beneficiation plant of Barsua mine having processing capacity of 2.5million TPA of ore consists of two stages of crushing followed by screening. Blending of ore is carried out to obtain desired proportion. The processing facilities planned for Taldih mine comprises of primary crushing plant, crushed ore stockpiles, long distance belt conveyor, beneficiation plant,

P.3/-

product stockpiling and loading system, pelletisation plant etc. A pellet plant of 2million TPA capacity will be set up as a down stream facility in Barsua Valley based on the pellet grade fines produced mainly from Taldih mine.

5. The topography of the area is Hilly at an elevation above mean sea level ranging from 560m-860m.The present working depth of mine in the Barsua block is at 820m AMSL(Barsua Area-5) and 800m AMSL(Barsua Area-3) ; in the Kalta Block is at 696m AMSL(Kalta Block-A), 714m AMSL(Kalta Block-B), 782m AMSL(Kalta Block-C) and the Taldih Block is a virgin Block. The ultimate working depth of mine in the Barsua block will be 650m AMSL (Barsua Area-5) and 640m AMSL(Barsua Area-3) ; in the Kalta Block will be 648m AMSL(Kalta Block-A & Kalta Block-B) and 744m AMSL(Kalta Block-C) and in the Taldih Block, the ultimate working depth of mine will be 750m AMSL(Taldih Block-A), 660m AMSL(Taldih Block-C), 640m AMSL(Taldih Block-B) and 620m AMSL(Taldih Block-A). The groundwater table reported to varies between 404m–408m AMSL in the Barsua Block; 580m-586m AMSL in the Kalta Block and 587m–593m AMSL in the Taldih block. The mine working will not intersect the groundwater table. The peak water requirement of the project is estimated as 15100KLD, which will be obtained from the surface water. TheTantra Village with 170households comprising a population of 781people is in the core zone. Displacement of population and R&R has not been envisaged it being an expansion project without increase in lease area or land acquisition. It is estimated that 91.62million m^3 of OB will be generated during expansion of mine, out of which, 42.58million m^3 will be used for backfilling and the remaining will be disposed off in the form of external OB dumps. At the end of the mine life, there will be nine(9) external dumps, which include five(5) existing and stabilized dumps. Plantation will be raised in an area of 1658.803ha at the end of mine life and there will be no water body left during the post mining stage.

6. The public hearing of the project was held on 28.08.2009 for production enhancement of iron ore from 3.8MTPY to 8.05MTPY alongwith beneficiation plant capacity of 4.25 MTPY and pellet plant of 2 MTPY capacity over an area of 2486.391ha. The Indian Bureau of Mines had approved the mining plan of the project (ML-130 iron ore lease) on 28.07.2008 (covering Barsua, Kalta and Taldih iron ore mine) over an area of 2486.391ha. The capital cost of the project is Rs.1086Crores and the capital cost for the environmental protection measures is proposed as Rs.203Lakhs. The annual recurring cost towards the environmental protection measures is proposed as Rs.71Lakhs. The proponent has stated that there is no court case relating to the project or related activity.

7. The Ministry of Environment and Forests has examined the application in accordance with the EIA Notification, 2006 and hereby accords environmental clearance under the provisions thereof to the above mentioned Integrated Barsua-Taldih-Kalta Iron Ore Mining(ML-130 lease), Beneficiation and Pelletisation Plant Project of M/s Steel Authority of India Limited for an annual production capacity of 8.05million tonnes of iron ore by the opencast mechanized method along with setting up of a beneficiation plant of

4/-

4.25million TPA (in additional to existing plant of 2.5million TPA) and setting up of a pelletisation plant of 2.0million TPA capacity involving total mine lease area of 2486.391ha, subject to implementation of the following conditions and environmental safeguards.

A. Specific conditions

(i) The project proponent shall obtain Consent to Establish and Consent to Operate from the State Pollution Control Board, Orissa and effectively implement all the conditions stipulated therein.

(ii) The environmental clearance is subject to grant of approval of the State Land use Department, Government of Orissa for diversion of agricultural land for non agricultural use.

(iii) Necessary forestry clearance under the Forest (Conservation) Act, 1980 for an area of 2347.641ha is forestland involved in the project shall be obtained. Environmental clearance is subject to grant of forestry clearance.

(iv) Environmental clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No. 460 of 2004, as may be applicable to this project.

(v) Environmental clearance is subject to obtaining clearance under the Wildlife (Protection) Act, 1972 from the competent authority, as may be applicable to this project.

(vi) The project proponent shall ensure that no natural watercourse and/or drainage channels except first order channels Id1, Id2, Id3, Id4, Id5, Id6, Id7 and Id8 passing through the mine lease shall be diverted. The channels shall be so diverted that it finally meets its final natural course.

(vii) The top soil shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation.

(viii) The over burden generated during the mining operation shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time and its phase-wise stabilization shall be carried out. There shall be nine external over burden dumps. The project proponent shall carry out slope stability study through an expert organization like Central Institute of Mining and Fuel Research, Dhanbad for attaining the proposed height of dump of 60m in three lifts and submit report to the Ministry and its Regional Office, Bhubneswar within three months. Proper terracing of the OB dumps shall be carried out so that the overall slope of the dump shall be maintained to 27°. The over burden dump shall be

/5/-

scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.

(ix) Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and over burden dumps to prevent run off of water and flow of sediments directly into the agricultural fields, the first order channels, the Samij Nallah, the Kurarhi Nala, the Karo River and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after the monsoon and maintained properly.

Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the mine pit, mineral and over burden dumps to prevent run off of water and flow of sediments directly into the agricultural fields, the first order channels, the Samij Nallah, the Kurarhi Nala, the Karo River and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.

(x) Dimension of the retaining wall at the toe of the over burden dumps and the OB benches within the mine to check run-off and siltation shall be based on the rain fall data.

(xi) The water recovery and spill way system shall be so designed that the natural water resources are not affected and that no spill water goes into the nearby Karo River and other water bodies.

(xii) The project proponent shall carry out conditioning of the ore with water to mitigate fugitive dust emission, without affecting flow of ore in the ore processing and handling areas.

(xiii) The effluent from the ore beneficiation plant shall be treated to conform to the prescribed standards and the tailings slurry shall be transported through a closed pipeline to the tailing dam.

(xiv) The project proponent shall take necessary safeguard measures to ensure that there is no leaching from the tailing pond.

6/-

(xv) The decanted water from the tailing pond shall be re-circulated and there should be zero discharge from the tailing pond.

(xvi) Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as crusher zone, loading and unloading point and all transfer points during handling of the ore. Extensive water sprinkling shall be carried out on roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.

(xvii) Plantation shall be raised in an area of 1658.803ha including a 7.5m wide green belt in the safety zone around the mining lease, over burden dumps, around beneficiation plant, mine benches, around tailing ponds, pelletisation plant, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.

(xviii) The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.

(xix) Regular monitoring of ground water level and quality shall be carried out in and around the project area(mine lease, beneficiation plant, pelletisation plant and tailing ponds) by establishing a network of existing wells and installing new piezometers during the operation. The periodic monitoring [(at least four times in a year- pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in each season)] shall be carried out in consultation with the State Ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubneshwar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.

(xx) The groundwater and surface water in and around the mine including tailing ponds shall be regularly monitored at strategic locations for heavy metals. The monitoring stations shall be established in consultation with the Regional Director, Central Ground Water Board and the State Pollution Control Board.

(xxi) Appropriate mitigative measures shall be taken to prevent pollution of the Karo River in consultation with the State Pollution Control Board.

-7/-

(xxii) Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the project area shall be carried out and records maintained.

(xxiii) The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water) required for the project.

(xxiv) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.

(xxv) Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operation and in transportation of mineral. The vehicles carrying the mineral shall be covered with a tarpaulin and shall not be overloaded.

(xxvi) Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.

(xxvii) Occupational health surveillance program of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed. Health records of the workers shall be maintained.

(xxviii) Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.

(xxix) Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and the wastewater generated during mining operation.

(xxx) The R&R of the project affected people, if any shall be carried out as per the NPRR.

(xxxi) Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to MOEF and its Regional Office located at Bhubneshwar.

(xxxii) 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, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

8/-

(xxxiii) The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna namely elephant, sloth bear, peacock etc. spotted in the study area. Action plan for conservation of flora and fauna prepared shall be implemented in consultation with the State Forest and Wildlife Department. All the safeguard measures brought out in the Wildlife Conservation Plan so prepared specific to this project site shall be effectively implemented. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. A copy of action plan shall be submitted to the Ministry of Environment and Forests and its Regional Office, Bhubaneswar.

(xxxiv) The critical parameters such as RSPM (Particulate matter with size less than 10micron i.e., PM_{10}) SO_2 and NOx in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically . Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II(M) dated 27.05.2009 issued by Ministry of Environment and Forests, which is available on the website of the Ministry www.envfor.nic.in shall also be referred in this regard for its compliance.

(xxxv) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

B. General conditions

(i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral iron ore and waste should be made.

(iii) Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM (Particulate matter with size less than 10micron i.e., PM_{10}), SO_2 and NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.

9/-

(iv) Data on ambient air quality RSPM (Particulate matter with size less than 10micron i.e., PM_{10}), SO_2 and NOx should be regularly submitted to the Ministry of Environment and Forests including its Regional office located at Bhubneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.

(v) Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.

(vi) Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

(vii) Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

(viii) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.

(ix) A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

(x) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Bhubneswar.

(xi) The project authorities should inform to the Regional Office located at Bhubneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

(xii) The Regional Office of this Ministry located at Bhubneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

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(xiii) The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Office Bhubneswar, the respective Zonal Office of Central Pollution Control Board the State Pollution Control Board. The proponent shall upload the status of compliance of the environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environment and Forests, Bhubneswar, the respective Zonal Office of Central Pollution Control Board and the State Pollution Control Board.

(xiv) A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.

(xv) The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days.

(xvi) The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the Regional Office of the Ministry of Environment and Forests, Bhubneswar by e-mail.

(xvii) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubneswar.

8. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

9. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.

11/-

10. 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 thereunder and also any other orders passed by the Hon'ble Supreme Court of India/High Court of Orissa and any other Court of Law relating to the subject matter.

11. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Authority Act, 1997.

29/X/2010

(SATISH C. GARKOTI)
Scientist 'E'

Copy to:

(i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

(ii) The Secretary, Department of Environment, Government of Orissa, Secretariat, Bhubaneswar.

(iii) The Secretary, Department of Mines and Geology, Government of Orissa, Secretariat, Bhubaneswar.

(iv) The Secretary, Department of Forests, Government of Orissa, Secretariat, Bhubaneswar.

(v) The Chief Wildlife Warden, Government of Orissa, Bhubaneswar.

(vi) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

(vii) The Chief Conservator of Forests, Regional Office (EZ), Ministry of Environment and Forests, A-3 Chandrashekharpur, Bhubaneshwar-751023.

(viii) The Chairman, Orissa State Pollution Control Board, Parivesh Bhawan, A/118 Nilkantha Nagar, Unit-VIII, Bhubaneshwar-751012.

(ix) The Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.

(x) The Chief Controller of Mines, Indian Bureau of Mines, 2nd Floor, 'A' Block, Indira Bhavan, Civil Lines, Nagpur-440 102.

..12/-

(xi) The District Collector, Sundergarh District, Orissa.

(xii) EI Division, Ministry of Environment & Forests, EI Division, New Delhi.

(xiii) Monitoring File.

(xiv) Guard File.

(xv) Record File.

Speed Post

F. No. J-11015/351/2006-IA.II(M) (pt.)
Government of India
Ministry of Environment, Forest & Climate Change
Impact Assessment Division

3rd Floor, Vayu Wing,
Indira Paryavaran Bhawan,
Jorbagh Road, Aliganj,
New Delhi-110 003
E-mail: sridhar-mef@nic.in
Tele: 011-24695304

Dated: 30th March, 2016

To,

M/s Steel Authority of India Limited,
5th Floor, Industry House,
10 Comac Street,
Kolkata-700017
E-mail: rmdsail@gmail.com

Subject: Integrated Barsua-Taldih-Kalta iron Ore mining (ML-130 lease), Beneficiation and Pelletisation Plant Project of M/s Steel Authority of India Limited, located in Village Tantra and within Tohra RF, Tehsil Koira, District Sundergarh, Orissa- Amendment of Environmental Clearance regarding.

Reference: Online Application IA/OR/MIN/20364/2009

The proposal for amendment of Environmental Clearance was received in the Ministry on 5th November, 2015 along with pre-feasibility report, approved scheme of mining, report on environmental impact due to modified production capacity, beneficiation and transportation arrangement. The proposal was placed before Expert Appraisal Committee in its 2nd meeting, held during January 20-22, 2016.

2. The proposal for enhancement of iron ore production capacity from 2.54 million TPA to 8.05 million TPA (ROM) along with expansion of beneficiation plant from 2.54 million TPA to 6.75 million TPA [(2.5 million TPA + 4.25 million TPA (new)] and setting up of a pelletization plant of 2.0 million TPA was granted EC on 29.10.2010.

3. The PP has requested for following amendments:

(i) Temporary permission to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 million TPA to 3.5, 2.05 and 2.5 million TPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 million TPA as specified in the earlier environment clearance.

(ii) Permission to operate existing beneficiation plant at the rate 4.5 million TPA instead of 2.5 million TPA.
(iii) Permission for road transportation of part of iron ore (ROM) from Taldih block to the Barsua Valley (about 11 kms.) and to the Barsua beneficiation plant for a period five years till facilities viz. crushing plant, LDBC are erected and commissioned for the Taldih block.
(iv) To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease.
(v) To modify the total lease area of ML-130 lease from 2486.391 to 2486.383 ha. as per the joint survey committee report (DGPS survey report) of Govt. of Odisha and the lease deed executed by and between the Govt. of Odisha and SAIL on 13th November, 2014.

4. The project proponent (SAIL) has requested for above (i)-(iii) amendments only for three years and has provided the justification/reasons in the pre-feasibility report for making amendments in the environment clearance no. J-11015/351/2006-IA.II (M) granted on 29th October, 2010. The Stage-II Forest Clearance for ML-130 lease was obtained on 06.03.2013 and Stage-I forest clearance exists for the diversion of 77.94 ha. in ML-162 lease which was granted on 10th February, 2015. Permission for tree felling in 24.06 ha in Taldih block of ML-130 lease was granted on 28.10.2014 by the State Govt. and due to delay in tree felling, there has been considerable delay in establishing infrastructure for commencing the mining operation in the Taldih block. This is resulting in shortage of iron ore supply to the expanded and modernized SAIL steel plants. In order to meet the enhanced demand of iron ore of the already expanded / modernized steel plants, it is planned to redistribute iron ore production from the three blocks under ML -130 lease (i.e. Barsua to 3.5 Mt/yr, Kalta to 2.5 Mt/yr and Taldih Block to 2.05 Mt/yr) respectively against production of 2.5 Mt/yr from Barsua, 1.3 Mt/yr from Kalta& 4.25 Mt/yr from Taldih keeping the total annual production capacity within the approved limit of 8.05 Mt/yr till originally envisaged and approved facilities are established and commissioned in Taldih Block, which is likely to take about 5 years. The proposed redistribution of production from the mining blocks under ML - 130 would also involve change in beneficiation plant capacity of existing Ore Beneficiation Plant at Barsua from 2.5 Mt/yr to 4.5 Mt/yr and mode of temporary ore transport by road instead of earlier approved Long Distance Belt Conveyor. Thereafter, the project will operate as per the originally approved scope of work i.e. 2.5, 4.25 and 1.3 million TPA from Barsua, Taldih and Kalta blocks respectively. The scheme of mining has been approved by IBM vide No. MS/FM/36-ORI/BHU/2014-15/1843 dated 04.09.2015 for the proposed changes in production of iron ore (ROM) from the three mining blocks under ML-130 i.e. 3.5, 2.05 and 2.5 million TPA from Barsua, Taldih and Kalta blocks respectively (Total 8.05 million TPA of iron ore production-ROM).

5. As the above proposed change of scope of work is likely to impact the local road infrastructure as also the air quality of the area, specific environmental studies viz., Traffic Density Study and Air Quality Impact Predication Study have been carried out and presented in the report. The project proponent submitted the information on in the Pre-feasibility Report. It has been observed that adequate road capacity is available to undertake additional traffic load due to ore transportation by road from ML - 130 as proposed. Further, the air quality impact predication also shows the quality of air within the permissible limit.

6. The proposal of **amendment of EC** was appraised in the EAC meeting held during **January 20-22, 2016** wherein the Committee deliberated at length the information submitted, presentation made and discussion held, the Committee **recommended** the proposal for amendment in the environmental clearance granted vide letter no. J-11015/351/2006-IA.II (M) on 29th October, 2010 for the following:

(i) Temporary permission to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 million TPA to 3.5, 2.05 and 2.5 million TPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 million TPA as specified in the earlier environment clearance.

(ii) Permission to operate existing beneficiation plant at the rate 4.5 million TPA instead of 2.5 million TPA.

(iii) Permission for road transportation of part of iron ore (ROM) from Taldih block to the Barsua Valley (about 11 kms.) and to the Barsua beneficiation plant for a period five years till facilities viz. crushing plant, LDBC are erected and commissioned for the Taldih block.

(iv) To replace 'outside mine lease area' with 'ML- 162 lease and acquired area' in environment clearance, in order to utilize the infrastructure facilities for processing of iron ore produced from ML-130 lease.

(v) To modify the total lease area of ML-130 lease from 2486.391 to 2486.383 ha. as per the joint survey committee report (DGPS survey report) of Govt. of Odisha and the lease deed executed by and between the Govt. of Odisha and SAIL on 13th November, 2014.

The amendment for point no.(i) to (iii) will be only for 5 years.

7. The matter has been examined in the ministry and it has been decided that recommendation of the EAC are accepted, and the amendment in the above Point of amendment in the environmental clearance granted vide letter no. J-11015/351/2006-IA.II (M) on 29th October, 2010 is agreed. The amendment for point no.6 (i) to 6 (iii) will be only for 5 years from the date of issue of this letter.

8. This issues with the approval of the Competent Authority.

Yours faithfully,

(Dr. U. Sridharan)
Scientist 'F'

Copy to:

(i) **The Secretary,** Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

(ii) **The Commissioner and Secretary**, Department of Mines & Geology, Government of Himachal Pradesh, Himachal Pradesh Secretariat, Shimla-171 002.

(iii) **The Commissioner and Secretary,** Department of Environment, Government of Himachal Pradesh, Himachal Pradesh Secretariat, Shimla-171 002.

(iv) **The Additional Principal Chief Conservator of Forests (C),** Ministry of Environment, Forest and Climate Change, Regional Office (NCZ), Pearson Road, P.O. New Forest, Forest Research Institute (FRI) campus, Dehradun - 248006.

(v) **The Chief Wildlife Warden**, Government of Himachal Pradesh, Mist Chamber, 1st Floor, Khalini, Shimla - 171 002.
(vi) **The Chairman,** Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
(vii) **The Member Secretary,** Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-ll0001.
(viii) **The Chairman,** Himachal Pradesh State Pollution Control Board, Paryavaran Bhavan, Phase-III, New Shimla - 171 009.
(ix) **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
(x) **The District Collector**, Solan District, Himachal Pradesh.
(xi) Guard File & MoEF&CC website.

(Dr. U. Sridharan)
Scientist 'F'

ANNEXURE 1.3: SECOND AMENDMENT OF EC OF BARSUA-TALDIH-KALTA MINES

F. No. J-11015/351/2006-IA II (M)
Government of India
Ministry of Environment, Forests and Climate Change

3rd Floor, Vayu Block,
Indira Paryavaran Bhawan,
Jor Bagh Road,
Aliganj, New Delhi-110003

Dated: 3rd July, 2020

To,

Sh. Ajit Kumar Sinha,
Chief General Manager, M/s Steel Authority of India Ltd.
Barsua Iron Mines, At/Po Tensa,,Koida,
Sundargarh, Orissa-770042
Email- envbim@gmail.com

Subject: Integrated Barsua- Taldih-Kalta Iron Ore Mining (ML-130), Beneficiation and Pelletisation Plant Project of M/s Steel Authority of India Limited, located in Village Tantra and within Toda RF, Tehsil Koira, District Sundargarh, Odisha - Amendment in Environmental clearance for change in product mix and operation by including excavation and dispatch of non-ore fines / slimes keeping total production within permitted EC capacity of 8.05 MTPA under para 7(ii) of EIA Notification - Regarding

Ref: Proposal No **IA/OR/MIN/146098/2020**

Sir,

The proposal of M/s. Steel Authority of India Limited is for amendment under para 7 (ii) of EIA Notification, 2006 in the Environmental Clearance granted vide letter no. J-11015/351/2006–IA. II(M) dated 29th October, 2010 for the production of 8.05 Mt/yr of iron ore from ML–130 lease [MLA: 2486.383 ha] of Barsua-Taldih-Kalta Iron Ore Mines of M/s Steel Authority of India Limited, located in village Tantra and within Tohra RF, Tehsil Koira, District Sundergarh, Odisha. The Mining Lease area is ~18 km long and comprises of 3 mining blocks namely Barsua (Southern part), Taldih (Middle part) and Kalta (Northern part). The mines lease falls in Survey of India Topo-sheet bearing No.73G/1 (F45N1) and is bounded by latitudes from 21°49"25.43800" to 21°59"50.88516" N and longitudes from 85°07"43.73832" to 85°13"53.48136" E.

2. As per EIA Notification dated 14th September, 2006 as amended from time to time, the project falls under Category A or Activity 1(a) as the mining lease area is greater than 100 ha.

3. PP has submitted that Environmental Clearance for the production of 8.05 Mt/yr of iron ore from ML–130 was granted by MoEF vide letter no. J-11015/351/2006–

IA.II(M) dated 29th October, 2010. However, the envisaged Long Distance Belt Conveyors (LDBC) for evacuation of ore from Taldih and setting up of Beneficiation Plant of 4.25 MTPA capacity for processing of from Taldih have been held up for want of Stage – II FC for the adjoining non-mineralized lease i.e. ML – 162 (77.94 ha) {part of the infrastructure for mineral despatch are located in this lease} and finalization of the project. Hence, the Taldih Block could not be developed as per the envisaged plan. Delay in development of Taldih Block had resulted acute shortage of iron ore supply to SAIL's Plants. Therefore, subsequently the EC was amended temporarily for a period of 5 years for re-distribution of production from three mining blocks under ML – 130 by MoEFCC's letter no. J-11015/351/2006-IA. II(M) dated 30th March, 2016 viz. i) to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) production restricted to 8.05 MTPA, ii) permission to operate existing beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA and iii) permission for road transportation of part of iron ore from Taldih to Barsua Valley (~11 km) and to Barsua beneficiation plant for a period five years till crushing plant, LDBC are erected and commissioned for the Taldih block.

4. PP has submitted that the **mine lease** (ML-130) was first granted on 06.01.1960 for an area of 2486.383 ha for a period of 30 years which expired on 05.01.1990. The Mining Lease has been renewed vide LOI Memo No. 4004/SM dated 29.05.2014 for 1st Renewal as well as 2nd Renewal period from 06.01.2010 to 05.01.2010. The lease deed for the 2nd renewal period from 06.01.2010 to **05.01.2030** has been executed on 13.11.2014 vide Registration I.D. No. 1721400594.

5. PP submitted that the mine is spread over 2486.383 ha area which includes **2347.673 ha Forest Land**, 24.014 ha private land and 114.696 ha Govt. Non-Forest land. The Forest Land has been diverted for setting up the mine and allied infrastructure. Stage-2 forest clearance for diversion of entire forest land over 2341.931 ha was granted by MoEFCC vide F. No. 8-90/2011-FC(pt), dated 06.03.2013. Stage – II FC for the adjoining non-mineralized lease i.e. ML – 162 was granted on 23.10.2017

6. PP submitted that **Scheme of Mining** for period from 2015-16 to 2019-20 was approved by IBM vide letter No. No. MS/FM/36-ORI/BHU/2014-15/1843 dated 04.09.2015. Further, Review of Mining Plan and progressive mine closure plan for the period from 2020-21 to 2024-25 has also been approved by IBM vide letter no. RMP/A/16-ORI/BHU/2019-20 dated 08.11.2019.

7. The PP submitted that Iron ore shall be produced by conventional **open cast mining** using shovel dumper combination which involves drilling & blasting. Accumulated iron ore fines/tailings will be excavated by shovel dumper combination without drilling & blasting. Overburden generated from mining is / will be dumped in designated areas within mine lease area.

8. PP submitted that depth of **ground water level** near mining lease area in pre & post monsoon are found to be 10.36 to 2.43 mbgl& 1.2 to 8.6 mbgl respectively. PP submitted that the source of water required will be pumped through pipeline from surface water (KuradihiNalla) for which approval has been granted from Sundargarh Irrigation Division, Government of Odisha vide agreement dated 13.08.2015. Mining activity **will not intersect ground water** table hence permission under Ministry's O.M No. 21-103/2015-IA-III is not required. PP submitted that water demand under the present proposal is about **500 m3/day** which includes 450 m3 /day industrial purpose (275 m3 /day for Dust suppression, 75 m3 /day for Wheel washing & 100 m3 /day for equipment washing) and 50 m3 /day for drinking and domestic usage.

9. PP submitted that reclamation through **afforestation** will be carried out in 2486.383 ha area (existing + proposed plan) with a density of 2500 saplings per ha. This will include plant in Virgin Area (683.33 ha), External OB Dump (376.676 ha), Internal Dump (389.558 ha), Quarry (723.466 ha), Safety Zone (126.484 ha), Others (such as Excavation area along ML boundary, along Infrastructure, Embankment Area and in Township Located outside the Lease etc.) (129.261 ha) and roads (57.608 ha). This will be 93.62% of total project area. The funds allocated towards afforestation will be Rs. 6.9 crores.

10. PP has submitted that there is no **Schedule-1 species** in the core zone but there is a presence of Schedule-1 species in the buffer zone viz. Palm Civet, Indian Elephant, Sloth Bear, Wolf, Mouse deer. PP has submitted a Site Specific Conservation Plan with a budget of Rs 2900.96 Lakh for 10 years. The same has been approved from the Office of Principal Chief Conservator of Forest (Wildlife) and Chief Wildlife Warden, Odisha, vide Memo No. 1655/1 WL(C) SSP-224/2012 dated 25.02.2013 with a financial forecast of Rs. 2900.96 lakh which includes the financial forecast of Rs. 1118.96 lakh for the activities to be implemented by M/s. SAIL in project area and financial amount of Rs. 1782.00 lakhs for activities to be implemented by the DFO, Bonai Division in project impact area.

11. PP submitted the **baseline** environmental data covering air quality, water quality, noise levels generated by SAIL during the period April, 2018 to March, 2019 and traffic density studies conducted during October, 2019 at selected locations. PP has submitted that the proposed change in scope of work does not have any significant adverse impacts on environment as revealed by the studies undertaken. PP submitted that Barsua –Taldih – Kalta iron ore mines are located in forest and hilly region. Considering the sensitivity of the forest ecology and environment, adequate measures for safeguarding the environment around the mines have already been adopted over the years. PP has submitted that the Barsua, Taldih and Kalta Iron Mines under ML – 130 have implemented the Integrated Management System (IMS) and accredited to Quality Management System (QMS linked ISO – 9001 - 2015), Environmental Management

System (EMS linked to ISO – 14001 : 2015) and Occupational Health and Safety Management System (linked to ISO – 45001 - 2018).

12. PP submitted that there is no **R&R** in the project area. PP submitted that budget earmarked under Corporate Environmental Responsibility (**CER**) is Rs 0.0839 Crores. Project Proponent submitted that the budget earmarked for Environmental Management Plan (**EMP**) shall be ₹ 4.55 Crores (Capital) &₹ 0.8 Crores (recurring/annum).

13. PP has submitted the **EC Compliance Report** certified by RO, MoEF vide 101-257/07/EPE dated 17.12.2019. PP also submitted the action plan on the non-compliance and observations made by RO, MoEFCC on EC Compliance Report on 08.04.2020. PP has submitted that being a Major Mineral there is no requirement of District Survey Report.

14. PP also submitted an **undertaking** dated 29.02.2020 that data and information given in the application, enclosure and other documents are true to best of his knowledge and belief and PP is aware that if any part of data or information submitted is found to be false or misleading at any stage the project will be rejected and clearance given if any will be revoked at his risk and cost.

15. PP reported that subsequent to the judgment of Apex Court dated 02.08.2017, the Governments of Odisha has issued demand notices to Barsua-Kalta Mines for payment of compensation towards excess production on or before 31st December, 2017 against EC / CTO capacity. Dy. Director of Mines (DDM), Koira vide letter dated 02.09.2017 issued a demand notice for payment of Rs. 66,89,42,779.5 /- in respect of Barsua / Kalta Iron Mines to recover price of mineral produced without/beyond EC alone under Section 21 (5) of MMDR Act, 1957. The said amount was deposited on 29.12.2017 under protest. Further, letter No.5962/Mines dtd 24.10.2017 of DDM, Koira has directed to pay compensation of Rs.90,19,71,684.40 /- for mining in excess of the permissible limit under the Consent to Operate. Against the above stated demands, SAIL had filed a Writ Petition bearing WP (C) No- 24282/2017 in High Court of Odisha, Cuttack. The matter was heard and Hon'ble High Court had passed the stay order on 04.04.2018 & matter is sub-judice. However, PP submitted an undertaking by the way of an affidavit bearing NO 51AA 243376 dated 20.04.2020 for compliance of all statutory requirement and Common Cause Judgment dated 2.08.2017.

16. PP submitted that the tailings pond of Barsua beneficiation plant is filling up and presently ~4.1 million tonnes of tailings are stored in the pond. Further raising of the height of the tailings dam is not possible. In addition, sub-grade fines are also stacked at mine pit heads of Barsua / Taldih / Kalta. Since, Barsua Mine has no beneficiation & pelletisation facilities for processing of these low grade fines at present, in-house utilisation of tailings / sub-grade ores is not possible.

17. PP submitted that Ministry of Mines, Gov. of India have noted in their Order F.No. 16/30/2019-M.VI dated 16th September, 2019 that vast stocks of slimes and sub-grade ore are lying at pit heads of captive mines of SAIL are potential environmental hazards. Accordingly, Ministry of Mines, Govt. of India have accorded permission for selling of these low grade mineral (tailings and sub-grade ore) in the open market such that mineral can be exhausted and environmental hazards can be mitigated. The disposal of such stockpiles would enhance the availability of iron ore for the purpose of beneficiation and pelletisation and subsequent use for iron & steel making. Based on the application submitted by SAIL, Govt. of Odisha vide letter No.IV(AB)SM-28/2017/9506/SM dated 02.12.2019 granted permission to sell slimes / dump fines from SAIL's captive mines in the State of Odisha including Barsua – Taldih – Kalta Mines.

18. PP submitted that Ministry of Mines, Govt. of India vide Order no. F.NO/16/30/2019-M.VI dated 16.09.2019 also directed concerned State Governments to allow SAIL to sell fresh iron ore also up to 25% of total previous year production for a period of 2 years to mitigate the risk of possible shortage of iron ore on account of expiry of mining leases pertaining to merchant mining by 31.03.2020. In this regard, though SAIL has been allowed to develop Taldih Mine to produce 2.05 MTPA involving dispatch of 1.05 MTPA by road to Barsua Railway Siding and remaining 1.0 MTPA by road to Barsua Beneficiation Plant, the mine could not be operated to its permitted capacity as construction of road from the Taldih Mine to Barsua Beneficiation Plant could not be made due to delay in grant of forest permissions. The activities related installation of originally envisaged and approved Long Distance Belt Conveyor (LDBC) for evacuation of ore from Taldih to Barsua is under progress and expected to take about 3 years. Hence, in order to increase the production from Taldih to its approved EC limit of 2.05 MTPA, it is required that the entire 2.05 MTPA iron ore produced at Taldih will be transported by trucks directly to SAIL's Barsua Siding till commissioning of the LDBC from Taldih to Barsua Siding, which would take about 3 years.

19. PP submitted that though Taldih Mine is operational since November, 2016, the originally envisaged and approved facilities which inter-alia keeps the provision of Long Distance Belt Conveyor (LDBC) and beneficiation facilities for Taldih Block could not be commissioned though the process has started and is expected to take three more years. Hence validity of amended provisions of EC dated 30.03.2016 is essential to maintain continuity of production from Taldih Block beyond 30.03.2021 for a period of two more years i.e. upto 31.03.3023.

20. Project Proponent submitted that the total project cost shall be ₹8.39 Crore and shall give direct employment to 116 persons.

21. The committee has deliberated in detail and opined that the proposal is amendment in EC for redistribution of the production within the sanctioned EC capacity and extension of validity of the amendment granted for further period of two years. The

Committee recommended for amendment in environmental clearance under clause 7(ii)(a) of EIA Notification, 2006 read with subsequent amendments in its meeting held during May 5-6, 2020 after uploading of the minutes PP has requested for some factual change in the MoM and the proposal was again reconsidered in EAC meeting held during 28 & 29th May,2020 & 1st June, 2020 while re-conforming the minutes of meeting of the 16th EAC, the committee recommended i) Excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum upto 1 MTPA tailings from the tailings pond at Barsua for selling. The excavated tailings will be transported through internal road over 2.1 km to the stacking yard and then to Barsua Public Siding by public road over 0.6 km or any other nearby railway sidings, ii) Excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum upto 0.5 MTPA from Fines Stocks from each block for selling. The excavated sub-grade iron ore fines will be dispatched by road / road & rail and iii) Continuation of the already amended provisions of EC amendment dated 30.03.2016 (valid up to 30.03.2021) for further two years i.e. up to 31.03.2023, which are [i) Permission to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) excavation restricted to 8.05 MTPA as specified in the earlier environmental clearance, ii) Permission to operate existing beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA], subject to the following conditions (Sl. No 22 A), in addition to the conditions prescribed in the EC and subsequent amendments.

22. The Ministry of Environment, Forest & Climate Change has examined the proposal in accordance with the para 7(ii) of Environmental Impact Assessment Notification, 2006 (as amended) hereby **accords the Environmental Clearance** under the provisions thereof for the amendments as recommended by EAC to the above mentioned proposal i.e. Barsua- Taldih-Kalta Iron Ore Mining (ML-130), Beneficiation and Pelletisation Plant Project of M/s Steel Authority of India Ltd. located in Village Tantra and within Toda RF, Tehsil Koira, District Sundargarh, Odisha subject to compliance of following Specific Conditions. The other conditions prescribed in EC letter dated 29th October, 2010 & EC amendment letter dated 30th March, 2016 shall remain same.

A. Specific Conditions:

1) Air pollution control measures, inter alia, include Covering of fines transport vehicles with tarpaulin sheets to avoid fugitive dust emissions; Deployment of additional Mobile Water Sprinklers; Deployment of vehicle mounted Misting Cannons at fines handling areas; Wheel Washing facility for trucks before entering to public road; Regular maintenance of roads to reduce fugitive emissions from roads & vehicular emissions; Regular maintenance of diesel powered vehicles as per manufacturer's guidelines; Construction of concrete approach roads at Kalta & Taldih Mines; etc.

2) Additional water sprinkling arrangements shall be made at the excavation / handling / transportation of subgrade ore and tailings.

3) An additional amount Rs 0.0839 Crores, as committed by project proponent shall be earmarked for activities under Corporate Environmental Responsibility (CER) and implemented in next two years.

4) In pursuant to Ministry's O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Hon'ble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, the mining lease holder shall after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.

B. Standard Conditions

The Standard EC Conditions as per Ministry O.M. No. 22-34/2018-IA.III dated 8.01.2019 is applicable for this project.

23. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

24. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

25. 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.

26. 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.

Yours faithfully,

3/7/2020

(Sharath Kumar Pallerla)
Director/Scientist 'F'
Email: sharath.kr@gov.in
Phone/Fax: 011-26495325

Copy to:

1). **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2). **The Secretary,** Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
3). **The Secretary,** Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
4). **The Secretary,** Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
5). **The Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
6). **The Additional Principal Chief Conservator of Forests (C),** Ministry of Environment, Forest and Climate Change, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar – 751023.
7). **The Chief Wildlife Warden**, Prakruti Bhawan, 5th floor, BDA Apartment Nilakanthanagar, Nayapalli, Bhubaneswar-751012, Odisha
8). **The Member Secretary,** Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
9). **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
10). **The Member Secretary,** Central Ground Water Board Ministry of Agriculture and Irrigation, 12/1 Jam Nagar House, Shahjahan Road, New Delhi 110011.
11). **The District Collector,** District- **Sundargarh,** State of Odisha.
12). **Guard File.**
13). **Parivesh Website.**

3/7/2019

(Sharath Kumar Pallerla)
Director/Scientist 'F'

F.No. J-11015/351/2006-IA.II (M)
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)
***

3rd Floor, Vayu Block
Indira Paryavaran Bhavan,
Jor Bagh Road, Aliganj
New Delhi-110 003

Dated: 13th July, 2020

To,

Shri. Ajit Kumar Sinha
Chief General Manager, M/s. Steel Authority of India Limited
Barsua Iron Mines, At/PO: Tensa, Koida,
Sundargarh, Orissa-770042
Email – envbim@gmail.com

Subject : Integrated Barsua-Taldih-Kalta Iron Ore Mining (ML-130), Beneficiation and Pelletisation Plant Project of M/s Steel Authority of India Limited, located in Village Tantra and within Toda RF, Tehsil Koira, District Sundargarh, Odisha - Amendment in Environmental clearance for change in product mix and operation by including excavation and dispatch of iron-ore fines / slimes keeping total production within permitted EC capacity of 8.05 MTPA under para 7(ii) of EIA Notification – Corrigendum.

Sir,

The is with reference to Environment Clearance granted vide Letter No. J-11015/351/2006-IA. II (M) dated 3rd July, 2020 for the aforementioned project of M/s. Steel Authority of India Limited and letter No. BIM/E&L/2020-21/62 dated 07.07.2020 of M/s. Steel Authority of India Limited wherein it was informed that Point No. 3 is missing in para 21 of the letter issued by MoEF&CC vide No. J-11015/351/2006-IA II (M) dated 3rd July, 2020.

2. The matter was examined in the Ministry and para 21 of the Environment Clearance granted vide Letter No. J-11015/351/2006-IA. II (M) dated 3rd July, 2020 should be read as follows:

"The committee has deliberated in detail and opined that the proposal is amendment in EC for redistribution of the production within the sanctioned EC capacity and extension of validity of the amendment granted for further period of two years. The Committee recommended for amendment in environmental clearance under clause 7(ii)(a) of EIA Notification, 2006 read with subsequent amendments in its meeting

held during May 5-6, 2020 after uploading of the minutes. PP has requested for some factual change in the MoM and the proposal was again reconsidered in EAC meeting held during 28th & 29th May,2020 & 1st June, 2020 while re-conforming the minutes of meeting of the 16th EAC, the committee recommended ***1)*** *Excavation of iron ore from Barsua Block at 3.50 MTPA including a provision of excavation of maximum upto 1 MTPA tailings from the tailings pond at Barsua for selling. The excavated tailings will be transported through internal road over 2.1 km to the stacking yard and then to Barsua Public Siding by public road over 0.6 km or any other nearby railway sidings,* ***2)*** *Excavation of iron ore from Taldih & Kalta Blocks at 2.05 MTPA and 2.50 MTPA respectively including provision of excavation and dispatch of sub-grade iron ore fines maximum upto 0.5 MTPA from Fines Stocks from each block for selling. The excavated sub-grade iron ore fines will be dispatched by road / road & rail,* ***3)*** *The entire 2.05 MTPA iron ore excavated at Taldih will be trucked directly to Barsua Private / Public Sidings till construction of road from Taldih to Barsua Beneficiation Plant and* ***4)*** *Continuation of the already amended provisions of EC amendment dated 30.03.2016 (valid up to 30.03.2021) for further two years i.e. up to 31.03.2023, which are [i) Permission to change iron ore production (ROM) from three blocks viz. Barsua, Taldih and Kalta in ML-130 lease from 2.5, 4.25 and 1.3 MTPA to 3.5, 2.05 and 2.5 MTPA respectively, keeping the total iron ore (ROM) excavation restricted to 8.05 MTPA as specified in the earlier environmental clearance, ii) Permission to operate existing beneficiation plant at the rate of 4.5 MTPA instead of 2.5 MTPA], subject to the following conditions (Sl. No 22 A), in addition to the conditions prescribed in the EC and subsequent amendments."*

4. The other conditions prescribed in EC letter dated 3rd July, 2020 shall remain same.

5. This issues with the approval of the Competent Authority.

Yours faithfully,

13/7/2020

(Sharath Kumar Pallerla)
Scientist 'F'/Director

Copy to:-

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhavan, New Delhi.
2. The Secretary, Department of Mines & Geology, Government of Odisha, Bhubaneswar.
3. The Secretary, Department of Environment, Government of Odisha, Bhubaneswar.

4. The Secretary, Department of Forest, Government of Odisha, Bhubaneswar.
5. The Chief Wildlife Warden, Govt. of Odisha, 5th Floor, BDA Apartments, Prakruti Bhawan, Nilakantha Nagar, Nayapalli, Bhubaneshwar-751012.
6. The APCCF, Regional Office (EZ), A/3, Chandrasekharpur, Bhubaneswar – 751023.
7. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
8. The Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
9. The Chairman, OSPCB, Paribesh Bhawan, A/118, Nilakantha Nagar,Unit – VIII, Bhubaneswar – 751012, Odisha.
10. The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
11. The District Collector, District Sundargarh,Orissa.
12. Guard File /
13. MoEF&CC Website.

13/7/2020

(Sharath Kumar Pallerla)
Scientist 'F'/Director

J-11015/351/2006-IA.II(M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
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Indira Paryavaran Bhavan,
Agni Wing, 1st Floor, Aliganj,
Jor Bagh Road, New Delhi-110 003.

Dated: 17th March, 2021

To,

M/s Steel Authority of India Limited
The Chief General Manager,
Barsua-Taldih Iron Mines SAIL- Raw Materials Division,
PO- Tensa, Sundargarh, Orissa-770042.

Subject: Proposal for Amendment in Environmental Clearance for re-distribution of iron ore production from Kalta and Taldih Blocks keeping total production from Barsua, Taldih & Kalta Blocks within permitted EC capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006 for Integrated Barsua-Taldih-Kalta Iron Ore Mining project (ML-130, Lease area 2486.383 Ha) of M/s Steel Authority of India Limited, located in Village Tantra and within Toda RF, Tehsil Koira, District Sundergarh, Odisha - Amendment in EC.

Sir,

The proposal of M/s Steel Authority of India Limited is for Amendment in Environmental Clearance for re-distribution of iron ore production from Kalta and Taldih Blocks keeping total production from Barsua, Taldih & Kalta Blocks within permitted EC capacity of 8.05 MTPA under para 7(ii) of EIA Notification 2006 for Integrated Barsua-Taldih-Kalta Iron Ore Mining project (ML-130, Lease area 2486.383 Ha), located in Village Tantra and within Toda RF, Tehsil Koira, District Sundergarh, Odisha. The Mining Lease area is 18 km long and comprises of 3 mining blocks namely Barsua (Southern part), Taldih (Middle part) and Kalta (Northern part). The mine lease area falls under the Survey of India Toposheet No. 73G/1 and bounded by latitude 21°49"25.43800" to 21°59"50.88516"N and longitudes from 85°07"43.73832" to 85° 13"53.48136"E.

2. As per EIA Notification dated 14th September, 2006 as amended from time to time, the project falls under Category A or Activity 1(a) as the mining lease area is greater than 100 ha.

3. The Project Proponent submitted that the Environmental Clearance was granted for a production capacity of 8.05 Million Tonnes of iron ore along with setting up of a beneficiation plant of 4.25 million TPA (in additional to existing plant of 2.5 million TPA) and setting up of a pelletisation pant of 2.0 million TPA capacity involving total mine lease area of 2486.391 Ha by MoEF&CC vide letter no. J-11015/351/2006-IA.II(M) dated 29.10.2010. PP has earlier obtained Amendment in EC vide MoEF&CC letter no. J-11015/351/2006-

IA.II(M) dated 30.03.2016. The EC was further amended for change in excavation & dispatch pattern with provisions for dispatch of tailings / dump fines from three mining blocks under ML–130 by MoEF&CC letter no. J-11015/351/2006-IA.II (M) dated 3rd July, 2020 with corrigendum dated 13th July 2020.

4. The Project Proponent informed that the Ministry of Mines, Govt. of India vide Order no. F.NO/16/30/2019-M.VI dated 16.09.2019 directed concerned State Governments to allow SAIL to sell iron ore up to 25% of total previous year production to mitigate shortage of iron ore on account of expired mining leases pertaining to merchant mining on 31.03.2020. Govt. of Odisha vide order dated 02.12.2019 allowed SAIL to sell up to 25% of previous year production from SAIL mines in Odisha. Accordingly, SAIL has planned to maximize iron ore production from its mines up to EC permitted capacities and supply the additional iron ore in the open market in addition to meeting its own requirements. Taldih Mine commenced operation only in Nov., 2016. Due to limited availability of diverted area, production bottle-necks have developed and the mine's capacity is limited to 1.35 MTPA (i.e. 0.7 MTPA less than the permitted capacity of 2.05 MTPA). On the other hand Kalta Mine is operating since 1966 and the quarries are fully developed. In order to make up for the shortfall in iron ore production from Taldih, it is proposed to increase iron ore production from Kalta to 3.2 MTPA from 2.5 MTPA. The production from Barsua block would remain unchanged (3.5 MTPA). Thus the permitted capacity of 8.05 MTPA would not be exceeded. This can be achieved with existing resources without any increase in lease area (2486.383 ha). In view of the above, the Project Proponent applied for Amendment in Environmental Clearance vide online Proposal No:IA/OR/MIN/197576/2021 dated 13.02.2021 for Change in Project Configuration of Barsua-Taldih-Kalta Iron ore Mining Project (ML-130) of SAIL for redistribution of production amongst of two of the three blocks of the mine (Kalta & Taldih) without changing the total approved capacity of the entire mine (8.05 MTPA) and mine lease area (2486.383 ha) under Para 7(ii) of EIA Notification 2006. The proposal for amendment in Environmental Clearance (EC) was considered before the Expert Appraisal Committee (Non-Coal Mining) in its 28th EAC meeting held during 24th-26th February, 2021.

5. The Project Proponent submitted that the baseline environmental data covering air quality, water quality, noise levels generated by SAIL during the period April, 2019 to March, 2020 and traffic density studies conducted during January, 2021 at a selected location. PP submitted that the fugitive emissions in the work zone are carried at five locations in Barsua Iron Mine (BIM), three locations in Taldih Iron Mine (TIM) and four locations in Kalta Iron Mine (KIM). The SPM values in all the twelve locations are well within the prescribed limits as per MoEF Notification No. GSR 809(E) dt 04.10.2010 for iron ore mining and processing. In addition, Continuous AAQ Monitoring stations (CAAQMS) have also been installed at three locations for measurement of PM10, PM2.5, Sulphur-dioxide (SO2) and Oxides of Nitrogen (NOx). The results indicated that the ambient air quality is within the norms of National Ambient Air Quality Standards (NAAQS), 2009. The noise levels had been monitored at three AAQ locations and four locations in the work zone during the 1st and 2nd quarters of 2019 - 20. During the 3rd & 4th Quarters of 2019 – 2020, noise was monitored at eleven locations in work zone and is found to be within the prescribed limits of CPCB. The ground

water analysis was carried out 3 locations every month and observed to well within the prescribed limits of IS: 10500 (2012). The surface water analysis was carried out 6 locations every month and it is observed that the water is slightly reddish though is suitable for drinking in absence of any alternate source. Quality of Tailing Dam supernatant water before discharge and Tailing Dam Overflow water i.e. Discharge Water monitored every month. The results for pH, TSS, oil & Grease, BOD and COD were well with the prescribed limits. PP submitted that the Barsua, Taldih and Kalta Iron Mines under ML – 130 have implemented the Integrated Management System (IMS) and accredited to Quality Management System (QMS linked ISO – 9001 - 2015), Environmental Management System (EMS linked to ISO – 14001: 2015) and Occupational Health and Safety Management System (linked to ISO – 45001 - 2018).

6. The Project Proponent submitted the past production details for the period 1993-94 to 2018-19 duly authenticated by Deputy Director of Mines, Koira vide Lr. No. 6522/Mines dated 13.12.2019. PP reported that subsequent to the judgment of Apex Court dated 02.08.2017 the Government of Odisha has issued demand notice to Barsua Kalta Mines for payment of compensation towards excess production on or before 31st December, 2017 against EC/CTO capacity. Dy. Director of Mines (DDM), Koira vide letter dated 02.09.2017 issued a demand notice for payment of Rs. 66,89,42,779.5 /- in respect of Barsua / Kalta Iron Mines to recover price of mineral produced without/beyond EC alone under Section 21 (5) of MMDR Act, 1957. The said amount was deposited on 29.12.2017 under protest. Further, letter No.5962/Mines dtd 24.10.2017 of DDM, Koira has directed to pay compensation of Rs.90,19,71,684.40 /- for mining in excess of the permissible limit under the Consent to Operate. Against the above stated demands, SAIL had filed a Writ Petition bearing WP (C) No- 24282/2017 in High Court of Odisha, Cuttack. The matter was heard and Hon'ble High Court had passed the stay order on 04.04.2018 & matter is sub-judice. PP also submitted the affidavit dated 20.04.2020 that Barsua-Taldih-Kalta Iron Ore Mine (ML-130, Mining Lease: 2486.383 Ha) of SAIL shall comply with all the statutory requirement & judgment of Hon'ble Supreme Court dated 2nd August 2017 in writ Petition (civil) No. 114 of 2014 in the matter of common cause versus Union of India & Ors subject to the result of the pending writ petitions before Hon'ble High Court of Odisha and further appeals thereto if need arises.

7. The proposal for amendment in Environmental Clearance (EC) was considered before the Expert Appraisal Committee (Non-Coal Mining) in its 28th EAC meeting held during 24th-26th February, 2021. The Committee has deliberated in detail and opined that the proposal is for amendment in EC for redistribution of the production within the sanctioned EC capacity. In view of the above, the Committee **recommended** the proposal for Amendment in Environmental Clearance under para 7(ii) of EIA Notification 2006 for re-distribution as (i) increase in iron ore production from Kalta Block by 0.7 MTPA from 2.5 MTPA and the final capacity is 3.2 MTPA which also includes maximum of 0.5 MTPA of sub-grade iron ore fines excavated from accumulated stocks and (ii) reduction in iron ore production from Taldih Block by 0.7 MTPA from 2.05 MTPA and the final capacity is 1.35 MTPA which also includes maximum of 0.5 MTPA of sub-grade iron ore fines excavated from accumulated stocks within permitted EC capacity of 8.05 MTPA for Integrated Barsua-Taldih-Kalta Iron Ore Mining project (ML-130, Lease area 2486.383 Ha) of M/s Steel Authority of India

Limited, located in Village Tantra and within Toda RF, Tehsil Koira, District Sundergarh, Odisha keeping all the other terms and conditions of earlier EC dated 30.03.2016, 30.07.2020 and 13.07.2020 remain unchanged.

8. The Ministry of Environment, Forest & Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto; and after accepting the recommendation of EAC meeting held during 24th - 26th February, 2021 hereby decided to accord the amendment of Environmental Clearance under the provisions there to the above mentioned proposal for grant of Amendment in Environmental Clearance under para 7(ii) of EIA Notification 2006 for re-distribution as (i) increase in iron ore production from Kalta Block by 0.7 MTPA from 2.5 MTPA and the final capacity is 3.2 MTPA which also includes maximum of 0.5 MTPA of sub-grade iron ore fines excavated from accumulated stocks and (ii) reduction in iron ore production from Taldih Block by 0.7 MTPA from 2.05 MTPA and the final capacity is 1.35 MTPA which also includes maximum of 0.5 MTPA of sub-grade iron ore fines excavated from accumulated stocks within permitted EC capacity of 8.05 MTPA for Integrated Barsua-Taldih-Kalta Iron Ore Mining project (ML-130, Lease area 2486.383 Ha) of M/s Steel Authority of India Limited, located in Village Tantra and within Toda RF, Tehsil Koira, District Sundergarh, Odisha. All other terms & conditions of the Environmental Clearance granted vide EC dated 30.03.2016, 30.07.2020 and 13.07.2020 shall remain same along with the following specific conditions:

I. The Project Proponent shall submit the additional EMP cost to take care for extraction of 0.7MTPA ROM and its transportation to Roxy railway siding.
II. The Project Proponent also informed that the internal haul road of 4.5km leading to National Highway will be used for next 4 years. The Committee permitted to utilize the internal haul road for next 4 years only by which time the conveyor shall be installed.
III. Production from Barsua Block (3.5 MTPA) shall remain unchanged.
IV. Total production from Mines (8.05 MTPA) shall remain unchanged.
V. No change in M.L. Area (2486.383 ha) or method of mining or mineral transport.

9. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

10. Concealing factual data or submission of false/fabricated date and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection)Act, 1986.

11. 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.

Pankaj Verma

12. 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.

13. PP shall also obtain the NOC from the statutory bodies as required to be obtained.

14. These issues with the approval of the Competent Authority.

Yours faithfully,

(Pankaj Verma)
Scientist 'E'
Email- pankaj.verma@nic.in
Tel./Fax- 011-24695264

Copy to:

1. The Secretary, Ministry of Mines, Government of India Shastri Bhawan, NewDelhi.
2. The Chief Secretary, Government of Odisha, Secretariat, Bhubaneswar.
3. The Secretary, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
4. The Secretary, Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
5. The Secretary, Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
6. The Secretary, Department of Steel and Mines, Government of Odisha, Secretariat, Bhubaneswar.
7. The Member Secretary, Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
8. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (EZ), A/3, Chandrasekharpur Bhubaneswar -751023.
9. The Chief Wildlife Warden, Prakurti Bhawan, 5th floor, BDA Apartment, Nilakanthanagar, Nayapalli, Bhubaneswar-751012, Odisha.
10. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi–110032.
11. The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440001
12. The Member Secretary, Central Ground Water Board, Ministry of Agriculture and Irrigation,12/1 Jam Nagar House, Shahjahan road, New Delhi 110011.
13. The District Collector, Sundergarh District, Govt. of Odisha.
14. Guard File.
15. PARIVESH PORTAL.

(Pankaj Verma)
Scientist 'E'

ANNEXURE 1.5: LEASE AMALGAMATION LETTER

Government of Odisha
Department of Steel & Mines
******

PROCEEDING

No. 10418 /SM. Bhubaneswar, Dtd. 02/12/2020
IV (B) SM-03/2020

Sub:- Regarding amalgamation of two contiguous Mining Leases of SAIL viz (i) ML-130 (Barsuan, Taldih-Kalta over 2486.383 ha) (ii) ML-162 (Infrastructure lease over 77.94 ha) covering total area of 2564.323 ha located in Sundargarh District, Odisha as per provisions under Rules 56 of MC Rules, 2016.

Order:-

Whereas, M/s SAIL has applied vide its letter dtd. 09.01.2020 for amalgamation of two contiguous Mining Leases viz (i) ML-130 (Barsuan, Taldih-Kalta over 2486.383 ha) and (ii) ML-162 (Infrastructure lease over 77.94 ha) together with (iii) surface right area over 164.626 hac., covering total area of 2728.949 hac. located in Sundargarh District, Odisha under the provisions under Rules, 56 of M.C Rules, 2016.

Whereas, subsequently vide its application dated 01.08.2020, SAIL requested to exclude the surface right area of 164.626 hac. from the proposed amalgamation.

Whereas, amalgamation has been proposed primarily to make use of allied mining infrastructure available in adjoining ML-162 for facilitating mining in ML-130 based on the observations of IBM on Review of Mining Plan.

Whereas, the IBM vide its letter dated 01.10.2020 has found the amalgamation proposal to be satisfactory for mineral conservation and development of ML-130 and accordingly recommended that on request of SAIL, the State Government may consider for amalgamation of both the leases.

Whereas, Director of Mines vide his letter dated 28.08.2020 and dated 15.10.2020 has recommended the instant proposal of amalgamation, inter-alia on the ground that it will facilitate effective use of allied mining infrastructure for smooth operation of the captive ore mines.

Whereas, the mining lease i.e ML-130 Barsuan, Taldih-Kalta over 2486.383 hac in Sundargarh District has validity period up to 05.01.2030 and ML-162 in village Toda-RF lease over 77.94 hac in Sundargarh District has validity period up to 28.04.2030 being used for infrastructure purpose only.

Whereas, the relevant provisions on amalgamation of leases as provided under Mineral Concession Rules, 2016 (MCR, 2016) are as follows:-

Rule-56 *The State Government may, in the interest of mineral development and with reasons to be recorded in writing permit amalgamation of two or more adjoining leases held by a lessee:*

Provided that the period of amalgamated leases shall be co-terminus with the lease whose period will expire first.

Whereas, with amalgamation of two mining leases, there will be one lease over a compact and contiguous block which is in the interest of mineral conservation, development and smooth operation of captive mines.

Now therefore after careful consideration State Government pursuant to the powers conferred u/r- 56 of the Mineral (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 have been pleased to allow amalgamation of two mining leases of M/s SAIL i.e. ML-130 Barsuan, Taldih-Kalta over 2486.383 ha. and ML-162 Infrastructure lease over 77.94 ha.

The above amalgamation is subject to following conditions:-

- Validity period of the amalgamated mining lease to be co-terminus with the lease whose period will expire first i.e. 05.01.2030.
- All the terms and conditions of the principal mining lease deed dated 13.11.2014 of Barsuan- Taldihi-Kalta Iron ore mines [ML-130] over 2486.383 hac and the principal mining lease deed dated 24.09.2016/ 29.09.2016 of village Toda RF [ML-162] over 77.94 hac shall continue to be binding in full force and effect.
- The lessee shall furnish an undertaking that it will make the payment for the demand raised or to be raised under section 21(5) of the MMDR Act in accordance with the judgment of Hon'ble Supreme Court passed in WP(C) No.114/2014.
- This amalgamation shall be without prejudice to ongoing proceedings, if any, for lapsing or determination of any or both amalgamated leases in accordance to the provisions of MMDR Act 1957 or Rules framed thereunder.
- This amalgamation shall be subject to the final result / outcome of Writ Petition (Civil) No.114/2014 (Common Cause-vrs-Union of India and others) pending in Hon'ble Supreme Court of India.
- The lessee shall not undertake mining operations in the amalgamated mining lease except under and in accordance to the approved mining plan/scheme of mining of the amalgamated mining lease
- The lessee shall complete the prospecting operations in accordance with the provisions contained in letter dated 23.12.2010 of Ministry of Mines, Government of India within the time period specified therein and subsequent instructions, rules and regulations if any issued or that may be issued prescribing the timeline.
- The lessee shall carryout "*regressing in mining area after closure of mines*", pursuant to the order dated 14.01.2020 passed by the Ministry of Mines, Government of India, consequent upon the order dated 08.01.2020 of the Hon'ble Apex Court passed in W.P.(C). No.114/2014.

- The lessee shall execute the amalgamated supplementary mining lease deed within three months from the date of issue of this order and the above conditions and undertaking shall form part of such deed.

By Order of the Governor

2.12.20

OSD-Cum-Addl. Secy. to Government

Memo No. 10419 /SM Date 02.12.2020

Copy forwarded to M/s SAIL, ISPAT Bhawan,271-Bidyut Marg,Unit-4 Bhubancswar for information and necessary action.

2.12.20

OSD-Cum-Addl. Secy. to Government

Memo No. 10420 /SM Date 02.12.2020

Copy forwarded to the Director, Mines, Odisha, Bhubaneswar/ Collector, Sundargarh / DDM, Koira for information and necessary action.

2.12.20

OSD-Cum-Addl. Secy. to Government

Memo No. 10421 /SM Date 02.12.2020

Copy forwarded to the Special Secretary, Forest & Environment Department / Member Secretary, SPCB , Bhubaneswar for information and necessary action.

2.12.20

OSD-Cum-Addl. Secy. to Government

Memo No. 10422 /SM Date 02.12.2020

Copy forwarded to the Regional Controller of Mines, IBM, Bhubaneswar with reference to letter dated 01.10.2020 for information and necessary action.

2.12.20

OSD-Cum-Addl. Secy. to Government

 ORIGINAL

भारतीय गैर न्यायिक

एक सौ रुपये Rs. 100

रु. 100 ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

ଓଡ଼ିଶା ओड़िशा ODISHA M 439511

Registration I.D. No 17221-00-224
Document No 17221-00282
Book No 1 Vol 5 2021
Dated 6th Day of April 2021
Registering Officer

The stamp duty & regn fee already paid thereon.

FORM-K

AMALGAMATED SUPPLEMENTARY LEASE DEED

[See rule 31)

THIS INDENTURE made this 30th the day of March 2021; between the Governor of Odisha; (hereinafter referred to as the State Government which expression shall where the context so admits be deemed to include the successors and assigns) of the one part;

When the Lessee is a registered company

BARSUA-TALDIHI-KALTA IRON MINES OF M/S. STEEL AUTHORITY OF INDIA LIMITED, (Name of company) a company registered under Indian Companies Act 1956 (Act under which incorporated) and having its registered office at Lodi Road, New Delhi. (Hereinafter referred to as "the lessee" which expression shall where the context so admits be deemed to include its successors and ~~permitted~~ assigns), of the other part., being represented through their Chief General Manager, "Sri Prasanna Kumar Rath".

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खदान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

WHEREAS, the lessee/lessees has/have executed a mining lease deed on dtd.13.11.2014 in accordance with the Mineral Concession Rules, 1960 (hereinafter referred to as the said Rules) in respect of the land and described in part-1 of the schedule of the said lease for **Iron Ore** over an area of **2486.383** hects. in village **Tantara, Bahamba and Toda RF** under Bonai Sub-Division of Sundargarh district which has been registered vide No.**1721400594(O)** & **1721400595 (D)** of **2014 in the office of the Sub-Registrar, Bonai on dtd 13.11.2014.** The said lease is valid up to 05.01.2030.

AND WHEREAS the lessee/lessees has/have also executed a mining lease deed on dtd. 18.01.1984 in accordance with the Mineral Concession Rules, 1960 (hereinafter referred to as the said Rules), in respect of the land and described in Part-1 of that in consideration of the rents and royalties, of the schedule of the said lease of **Iron Ore over an area 77.94 hects. in village Toda R.F/ under Bonai Sub-Division of Sundargarh district which has been registered vide No.472 (O) & 473 (D) of 1984 in the office of the District Sub-Registrar, Sundargarh on dated. 20.03.1984 (hereinafter referred to as the said lease).** Said lease was valid up to 28.04.2020 subsequently, as per order No. 5583/SM, dtd.05.07.2016 of Department of Steel & Mines the validity period of said lease has been extended up to 28.04.2030 and a supplementary lease deed has been executed on **24.09.2016** and registered on **29.09.2016** vide registered ID No.1721600543 of 2016 in the office of the Sub-Registrar, Bonai, subject to all the conditions of said lease deed and additional conditions in supplementary lease deed.

AND WHEREAS the State Government in pursuant to the powers conferred under Rule, 56 of the Minerals (Other than Atomic & Hydra Carbons Energy Minerals) Concession Rules, 2016 have been please to allow amalgamation of said two mining leases of M/s SAIL i.e. ML No.130 over an area of 2486.383 ha. in village Barsuan, Taldihi- Kalta under Bonai Sub-Division of Sundargarh District & ML No.162 over an area of 77.94 ha.

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

in village Toda R.F. under Bonai Sub-Division of Sundargarh District vide proceeding No.10418/SM, dt.02.12.2020 of Govt. of Odisha in Department of Steel & Mines. The amalgamation is subject to all the conditions in both the original lease deed and subject to the additional conditions described in supplementary lease deed of ML No. 162 and the amalgamation is subject to the following conditions: -

1. Validity period of the amalgamated mining lease to be co-terminus with the lease whose period will expire first i.e. **05.01.2030**
2. All the terms and conditions of the principal mining lease deed dated 13.11.2014 of Barsuan-Taldihi-Kalta Iron Ore Mines (ML-130) over 2486.383 hac and the principal mining lease deed dated 24.09.2016/29.09.2016 of village Toda RF (ML-162) over 77.94 hac shall continue to be binding in full force and effect.
3. The lessee shall furnish an undertaking that it will make the payment for the demand raised or to be raised under section 21(5) of the MMDR Act in accordance with the judgment of Hon'ble Supreme Court passed in WP© No.114/2014
4. This amalgamation shall be without prejudice to ongoing proceedings, if any, for lapsing or determination of any or both amalgamated leases in accordance to the provisions of MMDR Act 1957 or Rules framed thereunder.
5. This amalgamation shall be subject to the final result/ outcome of Writ Petition (Civil) No.114/2014 (Common Cause-vrs-Union of India and others) pending in Hon'ble Supreme Court of India
6. The lessee shall not undertake mining operations in the amalgamated mining lease except under and in accordance to the approved mining plan/scheme of mining of the amalgamated mining lease
7. The lessee shall complete the prospecting operations in accordance with the provisions contained in letter dated. 23.12.2010 of Ministry of Mines, Government of India within the time period specified therein and subsequent instructions, rules and regulations if any issued or that may be issued proscribing the timeline.
8. The lessee shall carryout "regressing in mining area after closure of Ministry of Mines, Government of India, consequent upon the order dated.08.01.2020 of the Hon'ble Apex Court passed in W.P.(C) No.114/2014

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालदा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

Additional Condition

9. As per Letter No.9179/DM Dt.21.10.2014 of Director of Mines, Bhubaneswar.

   The Lessee shall abide by the outcome of final orders of Hon'ble High Court of Odisha in the writ petitions relating to Indian relating to Indian stamp (Odisha) Amendment Act'2013 and Indian stamp (Odisha) amendment Rules, 2013 pending before Hon'ble High Court of Odisha and accordingly shall pay the differential stamp duty, if any.

10. "the mining lease holder(s) shall, after ceasing mining operations, undertake re-grassing the mining area 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".

11. As per Notification F NO.10/75/2008, New Delhi, dt. 23.12.2013 of Ministry of Mines, Govt. of India and Memo No.1715/SM, dtd.02.03.2012 of Govt. of Odisha Department of Steel & Mines.

The lessee shall

(a) Ensure that prospection work is carried out in his lease area at his own cost in such mining lease where:
   - i) Prospecting has not been done and a Prospecting Report has not been filed with the Indian Bureau of Mines.
   - ii) The Prospecting Report for the mining lease has been prepared in terms of standards that are materially different or incompatible with UNFC standards.
   - iii) Fresh prospecting work has become necessary for such minerals for which the threshold values have been revised by the Indian Bureau of Mines and
   - iv) Fresh prospecting is required to prove the depth persistency of the ore or mineral deposit.

(b) Ensure that prospecting work, if required under clause (a) above, shall be completed as per the time-schedule given below

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

Sl	Item	Time Limit
1.	XXX	XXX
2.	XXX	XXX
3.	All mining leases with an area of more than 50 hectares.	The mining lease are to be equally demarcated for prospecting work is completed in a period of five years from the date of imposition of the condition in the Mining lease.

(c) Submit:

(i) Yearly report on the progress in the prospection work along with the expenditure details and a copy of the interim Prospecting Report, where the prospecting report is for a part area as at serial number (2) and (3) of the sub-clause (b) above; and

(ii) Complete Prospecting Report with a feasibility report of end of the Prospecting Report.

to the Chief Controller of Mines, Indian Bureau of Mines, and concerned State Government.

11. In case of production level is enhanced through modification of mining plan in future, the stamp duty will be re-assessed for the differential production level and the lessee shall deposit the differential stamp duty before such enhancement.

THE AREA OF THE LEASE AFTER AMALGAMATION

Location and area of the lease: -

All that tract of lands situated at village Tantara, Bahamba & Toda R.F. (Description of area or areas) under Bonai Sub-Division of District Sundargarh, Sub-Registrar Office Bonai, PS- Koira having Cadastral Survey No.73G/1(Part) containing an area of 6336.62 Acres or 2564.323 Hacts. Or thereabouts delineated on the plan hereto annexed and thereon coloured white and bounded as follows: -

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

BOUNDARY DESCRIPTION SHOWING THE AMALGAMATED MINING LEASE AREA OVER 2564.323 HA OR 6336.62 ACRES FOR IRON ORE IN VILLAGE-TANTRA, BAHAMBA & TODA RESERVE FOREST OF M/S STEEL AUTHORITY OF INDIA LTD. UNDER BONAI SUB-DIVISION OF SUNDARGARH DISTRICT, ODISHA.

PL. NO.	LONGITUDE	LATITUDE	UTM COORDINATE	
	DD-MM-SS	DD-MM-SS	EASTING	NORTHING
1	85°08'20.68512"	21°52'26.24160"	307720.310	2420039.402
2	85°08'20.50800"	21°52'40.34532"	307720.484	2420473.249
3	85°09'03.49740"	21°53'37.09572"	308975.620	2422203.846
4	85°09'15.73272"	21°54'27.62676"	309345.507	2423753.820
5	85°10'12.40140"	21°55'48.02484"	311001.488	2426207.167
6	85°10'45.73452"	21°56'47.39640"	311979.735	2428021.888
7	85°11'30.25860"	21°57'25.95852"	313271.294	2429192.812
8	85°11'59.45676"	21°58'07.10868"	314123.902	2430448.608
9	85°12'25.88652"	21°58'18.23556"	314886.159	2430781.941
10	85°13'36.56100"	21°59'44.88144"	316944.562	2433423.268
11	85°13'49.81512"	21°59'50.88516"	317326.871	2433603.522
12	85°13'53.48136"	21°59'48.39684"	317431.143	2433525.772
13	85°13'51.93300"	21°59'46.19796"	317385.947	2433458.655
14	85°13'52.16556"	21°59'44.84580"	317392.137	2433416.985
15	85°13'52.55616"	21°59'41.79876"	317402.256	2433323.141
16	85°13'52.61916"	21°59'38.11740"	317402.763	2433209.894
17	85°13'51.53448"	21°59'33.56916"	317370.024	2433070.364
18	85°13'50.16612"	21°59'28.74516"	317329.057	2432922.441
19	85°13'48.32472"	21°59'25.74492"	317275.176	2432830.781
20	85°13'48.05544"	21°59'23.41752"	317266.620	2432759.291
21	85°13'47.13564"	21°59'21.81480"	317239.667	2432710.292
22	85°13'46.40988"	21°59'17.53080"	317217.322	2432578.772
23	85°13'44.79996"	21°59'12.80508"	317169.466	2432433.959
24	85°13'45.32412"	21°59'14.30412"	317185.030	2432479.893
25	85°13'43.85928"	21°59'10.10472"	317141.516	2432351.219
26	85°13'01.19748"	21°58'19.95744"	315899.781	2430823.070
27	85°12'59.81400"	21°58'19.01460"	315859.753	2430794.531
28	85°12'55.73016"	21°58'14.19996"	315740.875	2430647.812
29	85°12'55.05480"	21°58'13.78488"	315721.348	2430635.275
30	85°12'54.35820"	21°58'13.10880"	315701.126	2430614.711
31	85°12'52.56432"	21°58'11.49960"	315649.084	2430565.816
32	85°12'50.96160"	21°58'10.62732"	315602.784	2430539.525
33	85°12'49.48020"	21°58'08.23584"	315559.426	2430466.466
34	85°12'28.11816"	21°57'46.35504"	314938.698	2429800.645
35	85°12'24.39828"	21°57'44.55468"	314831.325	2429746.518
36	85°12'23.74668"	21°57'43.00848"	314812.076	2429699.176
37	85°12'20.98296"	21°57'40.51152"	314731.886	2429623.313

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38	85°10'40.25208"	21°55'31.12068"	311794.550	2425677.738
39	85°10'38.93232"	21°55'29.44092"	311756.061	2425626.513
40	85°10'37.24680"	21°55'27.30504"	311706.907	2425561.404
41	85°10'19.16112"	21°54'39.44232"	311170.342	2424095.458
42	85°10'02.58312"	21°53'57.09552"	310678.986	2422798.661
43	85°09'59.13792"	21°53'33.93420"	310571.596	2422087.465
44	85°09'57.62556"	21°53'20.13144"	310523.119	2421663.445
45	85°09'56.75688"	21°53'14.53236"	310496.128	2421491.531
46	85°09'54.71532"	21°53'08.72484"	310435.381	2421313.607
47	85°09'43.69644"	21°52'29.62740"	310104.698	2420114.860
48	85°09'43.50528"	21°52'26.03100"	310097.888	2420004.314
49	85°09'26.95392"	21°52'26.16492"	309622.776	2420014.125
50	85°09'22.12776"	21°52'07.04208"	309477.162	2419427.620
51	85°08'49.05276"	21°50'51.60408"	308499.641	2417118.764
52	85°08'13.59996"	21°49'51.39984"	307459.251	2415279.337
53	85°07'55.94880"	21°49'25.43880"	306942.675	2414486.979
54	85°07'43.73832"	21°49'25.89060"	306592.170	2414505.132
55	85°08'03.87996"	21°50'17.25000"	307189.750	2416077.794
55E	85°08'20.33580"	21°51'02.82530"	307679.240	2417473.848
56	85°08'09.75264"	21°51'02.51388"	307375.244	2417467.954
57	85°07'59.30760"	21°51'02.50092"	307075.327	2417471.187
58	85°07'56.58960"	21°51'02.52072"	306997.296	2417472.742
59	85°07'53.07456"	21°51'06.33420"	306897.791	2417591.261
60	85°07'52.36176"	21°51'12.51540"	306879.626	2417781.629
61	85°07'52.10940"	21°51'20.12220"	306875.228	2418015.682
62	85°07'57.32472"	21°51'24.76224"	307026.702	2418156.575
63	85°08'00.00456"	21°51'27.82836"	307104.794	2418249.950
64	85°08'01.47840"	21°51'29.93976"	307147.899	2418314.382
65	85°08'02.61384"	21°51'31.64976"	307181.130	2418366.576
66	85°08'04.53696"	21°51'32.24196"	307236.577	2418384.121
67	85°08'07.75428"	21°51'33.14772"	307329.288	2418410.861
68	85°08'11.49468"	21°51'34.12476"	307437.042	2418439.616
69	85°08'16.62684"	21°51'36.62640"	307585.331	2418514.767
70	85°08'21.42132"	21°51'37.94796"	307723.479	2418553.759
71	85°08'23.04456"	21°51'38.33100"	307770.219	2418564.975

Sd/- 19.03.2021
Junior Mining Officer,
O/o the DDM, Koira
Dist. Sundargarh

Sd/-10.03.2021
Rev. Supervisor,
Koira

Sd/-10.03.2021
Tahasildr, Koira

Sd/-
P.K. Rath
Chief General Manager
SAIL, RMD, BIM &KIM

Sd/- 19.03.2021
Deputy Director of Mines, Koira

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LAND SCHEDULE OF AMALGAMATED MINING LEASE AREA OVER 2564.323 HA OR 6336.62 ACRES FOR IRON ORE IN VILLAGE-TANTRA, BAHAMBA & TODA RESERVE FOREST OF M/S STEEL AUTHORITY OF INDIA LTD. UNDER BONAI SUB-DIVISION OF SUNDARGARH DISTRICT, ODISHA.

VILLAGE TANTARA					
KHATA No.	**NAME OF THE TENANT**	**PLOT NO.**	**KISSAM**	**AREA IN ACRES**	**REMARKS**
1	Ananda Naik,Budhu Naik S/O- Kushan Naik	125	Goda I	1.1	Encroached by Madan Naik S/O-Milu Naik since 1965(ST)
1	Ananda Naik, Budhu Naik S/O-Kushan Naik	129	Gharabari	0.09	Encroached by Madan Naik S/O-Milu Naik since 1965(ST)
2	Sek. Imam Box S/O-Sayad Box	195/256(P)	Gharabari	0.02	
3	Kandara Naik S/O-Suna Naik	60	Goda II	0.90	ST
3	Kandara Naik S/O-Suna Naik	90	Goda II	0.78	ST
4	Kasturi Dehury S/O-Desa Dehury & others	173	Goda II	1.00	ST
4	Kasturi Dehury S/O-Desa Dehury & others	174	Malasadharana	0.61	ST
4	Kasturi Dehury S/O-Desa Dehury & others	81/276(P)	Goda II	0.76	ST
4	Kasturi Dehury S/O-Desa Dehury & others	80/277(P)	Malasadharana	0.48	ST
4	Kasturi Dehury S/O-Desa Dehury & others	226	Goda II	0.54	ST
4	Kasturi Dehury S/O-Desa Dehury & others	130	Gharabari	0.07	ST
4	Kasturi Dehury S/O-Desa Dehury & others	131	Gharabari	1.32	ST
5	Baneswar Naik S/O-Krushna Naik.Budhu Naik S/O-Gamaha Naik	62	Goda II	1.37	ST

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5	Baneswar Naik S/O-Krushna Naik,Budhu Naik S/O-Gamha Naik	132	Gharabari	0.69	ST
5	Baneswar Naik S/O-Krushna Naik,Budhu Naik S/O-Gamha Naik	133	Gharabari	0.08	ST
5	Baneswar Naik S/O-Krushna Naik,Budhu Naik S/O-Gamha Naik	134	Gharabari	0.09	ST
5	Baneswar Naik S/O-Krushna Naik.Budhu Naik S/O-Gamaha Naik	172/266	Goda II	0.13	ST
5	DO	172	Goda II	0.34	ST
6	Chihudu Naik, Maghu Naik S/o-Damu Naik	152/267	Goda II	0.21	ST
7	Chandi Naik,Ghasiani Naik. D/O- Ramachandra Naik,Fagu Naik S/O-Shukra Naik	149	Gharabari	0.19	ST
7	do	150	Gharabari	0.18	ST
8	Chema Naik, Banshi Naik S/O-Dasharu Naik.Encroached by Krushna Naik,Budhu Naik S/O-Gamaha Naik since 1950	62/268	Goda II	1.58	ST
9	Turi Naik,Sunari Naik,Jadhani Naik D/O-Bania Naik.Banshi Naik W/O-Bania Naik.Raghu Naik s/o-Indra Naik. Jagannath Naik,Dhanu Naik s/o-Jaya Naik.Kali Naik w/o-Jaya Naik.Sara NaikW/O-Jagu Naik	87	Goda II	3.86	ST
10	Dasharu Naik S/O-Fulashar Naik	96	Goda II	0.68	ST
10	Dasharu Naik S/O-Fulashar Naik	96/338	Gharabari	0.05	ST

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11	Damu Munda S/O-T epa Munda	105	Gharabari	0.09	ST
11	DO	106	Gharabari	0.45	ST
12	Uchhaba Naik, S/O-Panchu Naik	92	Goda II	0.35	ST
12	DO	91	Goda II	0.58	ST
12	DO	145	Gharabari	0.09	ST
12	DO	142	Gharabari	0.15	ST
12	DO	143	Gharabari	0.11	ST
12	DO	156	Gharabari	0.50	ST
13	Nandara Naik S/O-Saheb Naik	43	Goda II	0.37	ST
13	DO	42	Gharabari	0.05	ST
13	DO	41	Goda II	3.44	ST
13	DO	39	Malasadharan a	0.85	ST
13	DO	37	Berna Sadharana	0.47	ST
14	Panu Naik S/O-Mangulu Naik.Sanu Naik & Others S/O-Sujan Naik. Jagabandhu Naik S/O- Rudan Naik.Baidhar Naik, Dasaru Naik S/O-Bami Naik.Mani Naik S/O- Jayadhar Naik.	63/274	Goda II	0.1	ST
14	DO	227	Goda II	0.78	ST
14	DO	119	Goda I	1.05	ST
14	DO	117	Goda I	0.24	ST
14	DO	120	Goda I	1.58	ST
14	DO	121	Gharabari	0.23	ST
14	DO	122	Gharabari	0.08	ST
14	DO	123	Gharabari	0.67	ST
14	DO	124	Goda I	0.71	ST
14	DO	126	Gharabari	0.10	ST
14	DO	110	Goda I	0.26	ST
14	Panu Naik S/O-Mangulu Naik.Sanu Naik & Others S/O-Sujan Naik. Jagabandhu Naik S/O- Rudan Naik.Baidhar Naik, Dasaru Naik S/O-	112/P	Goda I	1.21	ST

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	Bami Naik.Mani Naik S/O- Jayadhar Naik.				
14	DO	233/P	Goda II	0.04	ST
14	DO	127	Gharabari	0.12	ST
15	Panu Naik, Shukra Naik S/O- Gada Naik .Kandara Naik,Laxman Naik S/O-Suna Naik,Ratna Naik S/O- Mangulu Naik.	161	Goda I	0.13	Occupied By Laxman Naik.(ST)
15	DO	175	Malasadharana	0.39	Occupied By Laxman Naik.(ST)
15	DO	165	Malasadharana	0.15	Occupied By Kandara Naik.(ST)
15	DO	164	Malasadharana	0.25	Occupied By Panu Naik.(ST)
15	Panu Naik, Shukra Naik S/O- Gada Naik .Kandara Naik,Laxman Naik S/O-Suna Naik,Ratna Naik S/O- Mangulu Naik.	94	Goda II	0.92	Occupied by Sukra Naik & Ratna Naik.(ST)
15	DO	89/270	Goda II	0.17	Occupied By Panu Naik.(ST)
15	DO	137	Gharabari	0.02	Occupied By Panu Naik.(ST)
15	DO	138	Gharabari	0.02	Occupied By Shukra Naik & others Mu Plot no-94(ST)
15	DO	139	Gharabari	0.04	Occupied By Kandara Naik.(ST)
15	DO	140	Gharabari	0.06	Occupied By Laxman Naik.(ST)
15	DO	141	Gharabari	0.13	Occupied By Laxman Naik.(ST)
15	DO	144	Gharabari	0.13	Occupied By Kandara Naik.(ST)
15	DO	153	Gharabari	0.30	Occupied by Laxman Naik.(ST)
15	DO	155	Gharabari	0.22	Occupied By Panu Naik.(ST)

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15	DO	158	Goda II	0.65	Occupied By Kandara Naik.(ST)
15	DO	159	Gharabari	0.29	Occupied By Panu Naik.(ST)
16	Panu Naik S/O-Gada Naik	89	Goda II	0.50	ST
16	DO	57	Goda II	1.87	ST
16	DO	60/265	Goda II	1.00	ST
17	Panu Naik S/O-Mangalu Naik	114	Goda II	0.37	ST
18	Bania Naik,Raghu Naik,Jaya Naik S/O-Indra Naik. Para Naik W/O-Jagu Naik	95/271	Goda II	2.00	ST
18	DO	87/272	Goda II	0.34	ST
18	DO	98	Goda II	1.33	ST
18	DO	99	Gharabari	0.21	ST
19	Banamali Munda S/O-P alau Munda	103	Gharabari	0.02	ST
19	DO	104	Gharabari	0.28	ST
20	Barju Naik,Dharmu Naik,Dukhu Naik S/O-Kuladhar Naik,Madhu Naik,Padu NaikS/O-Dula Naik	171	Goda II	0.39	ST
20	DO	97	Goda II	0.60	ST
20	DO	100	Gharabari	0.05	ST
20	DO	101	Gharabari	0.03	ST
20	DO	102	Gharabari	1.50	ST
22	Sana baisakhu Naik S/O-Gunthu Naik.Encroached by Arjun Dehury S/O-Pareshawar Dehury since 1945	146	Gharabari	0.06	ST
22	DO	151	Gharabari	0.29	ST
23	Mani Naik S/O-Jayadhar Naik	225	Goda II	0.23	ST
24	Rania Naik S/O-Bithhal Naik	147	Gharabari	0.07	ST
24	DO	148	Gharabari	0.17	ST
24	DO	154	Goda I	0.33	ST
25	Ratna Naik S/O-Mangulu Naik	160	Goda II	0.21	ST
26	Laxman Naik S/O-Suna Naik	88	Goda II	0.71	ST

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26	DO	228	Goda II	0.71	ST
26	DO	59	Goda II	1.75	ST
27	Laxmiram AgrawalaS/O-Parshuram Agrawala	195/258	Gharabari	0.08	
28	Sanu Naik, Raya Naik, Kusha Naik S/O-Sujan Naik	63	Goda II	2.72	ST
29	Sridhar Naik,Rama Naik S/O-Panika Naik. Encroached by Chihilu Naik,Maghu NaikS/O-Dimu Naik Since 1963	152	Gharabari	0.38	ST
30	Sunia Munda ,Sama MundaS/o-Tanti Munda,Sonu MundaS/O-Indra Munda,Jagat Munda S/O-Turka Munda	108/283	Goda II	0.42	ST
31	Hari Naik S/O-Bami Naik	64	Goda II	2.10	ST
31	DO	128	Gharabari	0.11	ST
32	Rakhit	30	Gramya jungle	12.72	
32	Rakhit	193/305	Sadak	4.48	Encroached by Hindustan Steel Since 1958,Lahunipara to Dengula
32	Rakhit	178	Gochar	12.50	
32	Rakhit	238	Gochar	8.55	
32	Rakhit	93	Basti jogya	16.88	
32	Rakhit	95/284	Unnat yojana jogya	2.00	
32	Rakhit	111/P	Pani Nala	0.34	
32	Rakhit	195/261	Gharabari	0.19	Quarter of Forester & Forest Guard
32	Rakhit	115	Gharabari	0.41	Tantra L.P. School Buildings Managed by Koira Gram panchayat since 1960
32	Rakhit	116	Bagicha	0.06	-do-
32	Rakhit	118	Pani Nala	1.32	
32	Rakhit	136	Gharabari	0.06	

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32	Rakhit	107	Sarba Sadharana	0.77	Reserve for Burning Ghat
32	Rakhit	240/P	Unnat Jojana Yogya	0.60	Reserve for school Building & Play Ground.
32	Rakhit	234/P	Pani Nala	0.22	
33	Sarbasadharana	217	Gharabari	0.08	Girja Ghara
33	Sarba sadharana	109	Rasta	1.04	
33	Sarba sadharana	229/P	Rasta	0.90	
33	Sarba sadharana	135	Rasta	0.19	
33	Sarba sadharana	176	Bijesthali	0.70	Bijesthali of Grama Devati
33	Sarba sadharana	23/P	Rasta	0.34	
33	Sarbasadharana	213	Rasta	0.45	
33	Sarbasadharana	221	Kabara sthan	0.33	Grave yard
33	Sarbasadharana	222/282	Play ground	0.28	
33	Sarba sadharana	113	Rasta	0.32	
34	Abad jogya Anabadi	56	Jungle	3.16	
34	Abad jogya Anabadi	196	Gharabari	1.11	Encroached by Masidas Munda,Gamia Munda S/O-Suleman Munda
34	Abad jogya Anabadi	197	Gharabari	0.72	Encroached by Masidas Munda & others mu. Plot no. 196
34	Abad jogya Anabadi	198	Goda II	0.94	Encroached by Suleman Munda, Paulush Munda S/O-Johan Munda since 1958.
34	Abad jogya Anabadi	199	Goda II	0.70	Encroached by Masidas Munda & others mu. Plot no. 196
34	Abad jogya Anabadi	24/P	Berna Sadharana	0.14	Encroached by Simon Munda
34	Abad jogya Anabadi	29	Berna Sadharana	0.25	Encroached by Santosh Munda & others .Mu. Pl. No-19
34	Abad jogya Anabadi	27	Goda II	0.18	Encroached by Anand masi Munda.
34	Abad jogya Anabadi	28	Goda II	0.28	Encroached by Santosh Munda & others .Mu. Pl. No-19

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34	Abad jogya Anabadi	25/P	Goda II	0.24	Encroached by Simon Munda & other
34	Abad jogya Anabadi	20	Gharabari	0.47	Encroached by Santosh Munda & other
34	Abad jogya Anabadi	19	Gharabari	0.06	Encroached by Santosh Munda ,Patras Munda S/O-Alias Munda
34	Abad jogya Anabadi	65	Patit	29.15	
34	Abad jogya Anabadi	157	Patit	6.25	
34	Abad jogya Anabadi	179	Patit	40.00	Reserve for jawans of Odisha
34	Abad jogya Anabadi	170	Patit	41.25	
34	Abad jogya Anabadi	210	Gharabari	0.11	Encroached by Kusal Munda mu. Plot no - 201
34	Abad jogya Anabadi	211	Gharabari	0.15	Encroached by Masidas Munda & others mu. Plot no. 196
34	Abad jogya Anabadi	212	Gharabari	0.15	Encroached by Masidas Munda & others mu. Plot no. 196
34	Abad jogya Anabadi	177	Patit	40.45	
34	Abad jogya Anabadi	95	Patit	7.95	
34	Abad jogya Anabadi	205	Patit	1.44	
34	Abad jogya Anabadi	222	Patit	28.52	
34	Abad jogya Anabadi	55	patit	0.40	
34	Abad jogya Anabadi	54	Patit	3.32	
34	Abad jogya Anabadi	53	Patit	0.83	
34	Abad jogya Anabadi	52	Patit	1.10	Reserve for jawans of Odisha.
34	Abad jogya Anabadi	50	Patit	0.32	
34	Abad jogya Anabadi	195/281	Gharabari	0.4	Encroached by Kandha Swami mu. Plot no 195/263

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

34	Abad jogya Anabadi	202	Gharabari	0.58	Encroached by Kusal Munda mu. Plot no - 201
34	Abad jogya Anabadi	49	Gharabari	0.42	Encroached by Budhu Naik Mu. Plot no-44
34	Abad jogya Anabadi	48	Patit	0.23	
34	Abad jogya Anabadi	47	Patit	0.07	
34	Abad jogya Anabadi	46	Gharabari	0.10	Encroached by Budhu Naik Mu. Plot no-44
34	Abad jogya Anabadi	45	Gharabari	0.05	Encroached by Budhu Naik Mu. Plot no-44
34	Abad jogya Anabadi	44	Gharabari	0.35	Encroached by Budhu NaikS/O-Kulu Naik Since 1960 .
34	Abad jogya Anabadi	40	Patit	0.72	
34	Abad jogya Anabadi	34/P	patit	1.89	
34	Abad jogya Anabadi	38	Patit	1.30	
34	Abad jogya Anabadi	81/P	Patit	7.46	
34	Abad jogya Anabadi	80/P	Patit	5.35	
34	Abad jogya Anabadi	36	Goda II	4.12	Encroached by Simon Munda & others Mu. Plot no-13
34	Abad jogya Anabadi	15/P	Gharabari	0.18	Encroached by Simon Munda
34	Abad jogya Anabadi	14/P	Gharabari	0.32	Encroached by Simon Munda
34	Abad jogya Anabadi	13/P	Goda II	0.2	Encroached by Simon Munda ,Paulus MundaS/O-Nirmal Munda
34	Abad jogya Anabadi	37/269	Patit	0.22	
34	Abad jogya Anabadi	62/307	Goda II	0.13	Encroached by Krushna Naik, Budhu NaikS/O-Gamha Naik Since 1960 .

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SUNDARGARH

34	Abad jogya Anabadi	201	Goda II	0.31	Encroached by Kusal Munda S/O-Lukash Munda since 1958
34	Abad jogya Anabadi	108	GodaII	0.80	Encroached by Panu Naik. Mu. Plot no-114
34	Abad jogya Anabadi	199/278	Goda II	0.16	Encroached by Suleman Munda
34	Abad jogya Anabadi	61	Patit	8.35	Reserve for jawans of Odisha.
34	Abad jogya Anabadi	195/263	Gharabari	0.13	Encroached by Kandha Swami S/O-Rama swami since 1962
31/42	Barada Prased Mohanty, S/o Gopendranath Mohanty	195/264	Gharabari	0.13	
34	Abad jogya Anabadi	195/260	Patit	0.08	
35	Abad Ajogya Anabadi	35	Patharbani	0.23	
35	Abad Ajogya Anabadi	33	Patharbani	0.10	
35	Abad Ajogya Anabadi	51	Pahad	46.38	Samalai
35	Abad Ajogya Anabadi	58/P	Pahad	8.77	Samalai
35	Abad Ajogya Anabadi	66	Pahad	14.50	Samalai
35	Abad Ajogya Anabadi	67	Pahad	14.20	Samalai
35	Abad Ajogya Anabadi	68/P	Pahad	0.80	Bichakandi
35	Abad Ajogya Anabadi	86/P	Pahad	10.30	Marakham
35	Abad Ajogya Anabadi	162	Pahad	7.90	Gothapara
35	Abad Ajogya Anabadi	163	Pahad	33.75	Gothapara
35	Abad Ajogya Anabadi	167	Pahad	38.00	Samalai
35	Abad Ajogya Anabadi	166	Pahad	39.78	Samalai
35	Abad Ajogya Anabadi	168	Pahad	39.55	Samalai
35	Abad Ajogya Anabadi	169	Pahad	38.52	Samalai
35	Abad Ajogya Anabadi	180	Pahad	25.00	Bichakandi

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SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

35	Abad Ajogya Anabadi	181	Pahad	40.00	Bichakandi
35	Abad Ajogya Anabadi	182	Pahad	40.22	Bichakandi
35	Abad Ajogya Anabadi	183	Pahad	35.50	Bichakandi
35	Abad Ajogya Anabadi	184	Pahad	39.00	Bichakandi
35	Abad Ajogya Anabadi	185	Pahad	39.55	Bichakandi
35	Abad Ajogya Anabadi	186	Pahad	41.12	Bichakandi
35	Abad Ajogya Anabadi	187	Pahad	30.32	Bichakandi
35	Abad Ajogya Anabadi	188	Pahad	26.24	Bichakandi
35	Abad Ajogya Anabadi	189	Pahad	43.56	Bichakandi
35	Abad Ajogya Anabadi	190	Pahad	26.32	Bichakandi
35	Abad Ajogya Anabadi	191	Pahad	51.30	Bichakandi
35	Abad Ajogya Anabadi	192	Pahad	29.32	Bichakandi
35	Abad Ajogya Anabadi	193	Pahad	37.84	Bichakandi
35	Abad Ajogya Anabadi	194/P	Pahad	29.39	Bichakandi
35	Abad Ajogya Anabadi	195/P	Pahad	12.40	Bichakandi
35	Abad Ajogya Anabadi	223	Pahad	40.00	Bichakandi
35	Abad Ajogya Anabadi	224/P	Pahad	55.718	Bichakandi
35	Abad Ajogya Anabadi	255/P	Pahad	32.49	Bichakandi
35	Abad Ajogya Anabadi	239	Pahad	15.00	Bichakandi
31/1	Rajabir Bahadur, Purna Bahadur S/O- Bhaleswar Bahadur	195/262	Gharabari	0.35	
31/41	Bibek Prasad Jaiswal S/O-Nanda Kishor Jaiswal.	195/257	Gharabari	0.09	
31/3	Patras Munda S/O-Simon Munda	214	Gharabari	0.43	ST
31/4	Patras Munda, Kushal Munda, Samuel Munda, S/O-Paulus Munda	207	Gharabari	1.72	ST

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31/4	Patras Munda, Kushal Munda, Samuel Munda, S/O-Paulus Munda	204	Goda II	0.59	ST
31/4	Patras Munda, Kushal Munda, Samuel Munda, S/O-Paulus Munda	208	Gharabari	0.15	ST
31/5	Anand masi Munda S/O- Christ Munda	26	Berna Sadharana	0.35	ST
31/5	Anand masi Munda S/O- Christ Munda	18	Gharabari	0.49	ST
31/5	Anand masi Munda S/O- Christ Munda	17	Goda II	0.72	ST
31/5	Anand masi Munda S/O- Christ Munda	16	Gharabari	0.13	ST
31/5	Anand masi Munda S/O- Christ Munda	12/P	Goda II	0.21	ST
31/6	Paulus Munda S/O-Gobarel Munda	200	Goda II	0.33	ST
31/6	Paulus Munda S/O-Gobarel Munda	215	Gharabari	0.45	ST
31/6	DO	216	Gharabari	0.07	ST
31/7	Lukas Munda S/O-Santosh Munda	206	Goda II	0.79	ST
31/7	Lukas Munda S/O-Santosh Munda	203	Goda II	0.84	ST
31/7	DO	209	Gharabari	0.21	ST
31/8	Mohan Munda S/o-Sama Munda	32	Goda II	1.71	ST
31/8	Mohan Munda S/o-Sama Munda	31	Berna Sadharana	1.00	ST
31/8	DO	22	Gharabari	0.09	ST
31/8	Mohan Munda S/o-Sama Munda	21	Gharabari	0.47	ST
31/8	Mohan Munda S/o-Sama Munda	34/275	Goda II	1.32	ST
31/9	Daud Munda S/O-Matias Munda	218	Gharabari	0.09	ST
31/9	DO	219	Gharabari	0.41	ST
31/9	DO	220	Goda II	1.40	ST
31/10	Kamaudin Khan S/O-Khudbox	195/259	Gharabari	0.08	

TOTAL:- **1363.468 ACRES OR 551.777 HA**

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

N.B

i. On measurement Plot No. 194 of Khata No. 35 is found . 31.56 AC., In ROR-17.60 AC.

ii. On measurement Plot No. 167 of Khata No. 35 is found 38.00 AC.,in ROR-29.50 AC.

iii. On measurement Plot No. 86 of Khata No. 35 is found 11.90 AC., in ROR-9.88 AC.

iv. On measurement Plot No. 216 of Khata No. 31/6 is found 0.07 AC., in ROR-0.21 AC.

VILLAGE BAHAMBA

KHATA No.	NAME OF THE TENANT	PLOT NO.	KISSAM	AREA IN ACRES	REMARKS
25	Abad Ajogya Anabadi	1	Pahad	38.75	Kuradhi Munda
25	Abad Ajogya Anabadi	2/P	Pahad	29.19	do
25	Abad Ajogya Anabadi	3/P	Pahad	22.43	do
25	Abad Ajogya Anabadi	4/P	Pahad	20.38	do
25	Abad Ajogya Anabadi	67/P	Pahad	4.24	do
		TOTAL		**114.99 ACRES OR 46.535 HA**	

RESERVE FOREST AREA

IN TODA R.F		4858.162

GRAND TOTAL 6336.62 ACRES OR 2564.323 HA

ABSTRACT

1	IN VILLAGE TANTRA	1363.468
2	IN VILLAGE BAHAMBA	114.99
3	IN TODA R.F.	4858.162
	TOTAL	**6336.62 ACRES OR 2564.323 HA**

Sd/- 19.03.2021
Junior Mining Officer,
O/o the DDM, Koira
Dist. Sundargarh

Sd/-10.03.2021
Rev. Supervisor,
Koira

Sd/-10.03.2021
Tahasildr, Koira

Sd/-
P.K. Rath
Chief General Manager
SAIL, RMD, BIM &KIM

Sd/- 19.03.2021
Deputy Director of Mines, Koira

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
सेल, आर.एम.डी. बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

COLLECTOR
SUNDARGARH

IN WITNESS WHEREOF these presents have been executed in the manner hereunder appearing the day and year first above written.

COLLECTOR
SUNDARGARH

In presence of-

Collector, Sundargarh
For and on behalf of the
Governor of Odisha.

1. Deputy Collector, Mining
Collectorate Sundargarh

2. Kedar Nag, SRA
Collectorate, Sng.

पी. के. रथ / P. K. RATH
मुख्य महाप्रबंधक (खादान)
Chief General Manager (Mines)
बरसुआ एवं कालटा
SAIL, RMD, BIM & KIM

In presence of-

Chief General Manager
For and on behalf of Barsua-Taldih-Kalta
Mines of M/s SAIL

1. Pradyumna Kumar Das
Pradyumna Kumar Das
Senior Manager (P & A)
Barsua Iron Mine, RMD, SAIL

2. Anupam Naik
ANUPAM NAIK
Sr. Manager (Env.)
Barsua Iron Mine, RMD, SAIL

			Signature of the Registering officer	
MS STEEL AUTHORITY OF INDIA LIMITED THROUGH CGM SRI PRASANNA KUMAR RATH		 242623815		06-Apr-2021

Identified by **PRADYUMNA KUMAR DAS** Son/Wife of **LATE P C DAS** of **BARSUA IRON MINES TENSA SUNDARGARH** by profession **Cultivation**

Name	Photo	Thumb Impression	Signature	Date of Admission of Execution
PRADYUMNA KUMAR DAS		 41839925		06-Apr-2021

Date: 06/04/2021

Signature of Registering officer

Sub-Registrar
Bonai

Endorsement of certificate of registration under section 60

Registered and true copy filed in : Office of the Sub-Registrar, BANEI

Book Number : 7 || Volume Number : 5

Document Number : 71722100222

For the year : 2021

Seal :

THE SEAL OF THE SUB-REGISTRAR BONAI

Date: 06/04/2021

Print

Signature of Registering officer

Sub-Registrar
Bonai

ANNEXURE 1.7: MINING PLAN APPROVAL LETTER

भारत सरकार GOVERNMENT OF INDIA
खान मंत्रालय MINISTRY OF MINES
भारतीय खान ब्यूरो INDIAN BUREAU OF MINES
क्षेत्रीय खान नियंत्रक के कार्यालय
OFFICE OF THE REGIONAL CONTROLLER OF MINES

150 YEARS OF CELEBRATING THE MAHATMA

By. Regd. Parcel / E-mail
Phone: 0674-2352463;
Tele Fax: 0674-2352490;
eMail:
ro.bhubaneshwar@ibm.gov.in
Plot No.149, Pokhariput
BHUBANESWAR-751020

No. MP/A/39-ORI/BHU/2020-21 **Date: 01.04.2021**

To

Shri Harinand Rai, Director &
Nominated Owner, M/s Steel
Authority of India Limited,
Ispat Bhawan, Lodi Road,
New Delhi-110003.

Sub: Approval of Modification of Mining Plan of Barsua-Taldih-Kalta Iron Mine (Amalgamated Lease of ML-130 & ML-162) along with Progressive Mine Closure Plan (PMCP) over an area of 2564.323 ha in Sundargarh district of Odisha of M/s Steel Authority of India Limited submitted under Rule-17 (3) of MCR, 2016.

Ref: -

i. Your letter no. SAIL/DTPRM/2021/085 dated 24.02.2021 received on 02.03.2021.
ii. This office letter of even no. dated 02.03.2021.
iii. This office letter of even no. dated 02.03.2021 addressed to the Director of Mines, Govt. of Odisha, copy endorsed to you.
iv. This office letter of even no. dated 19.03.2021.
v. Your letter no. SAIL/DTPRM/2021/111 dated 26.03.2021 received on 31.03.2021.

Sir,

In exercise of the power delegated to me vide Gazette Notification No. S.O. 1857 (E) dated 18.05.2016, I hereby **Approve** the Modification of Mining Plan including Progressive Mine Closure Plan of Barsua-Taldih-Kalta Iron Mine (Amalgamated Lease of ML-130 & ML-162) over an area of 2564.323 ha of M/s Steel Authority of India Limited in Sundargarh district of Odisha State submitted under Rule 17 (3) of Mineral Concession Rules, 2016. This approval is subject to the following conditions:

I. The Modification of 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.
II. The proposals shown on the plates and/or given in the document is based on the lease map /sketch submitted by the applicant/ lessee and is applicable from the date of approval.
III. It is clarified that the approval of aforesaid Modification of 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, Occupational Safety, Health and Working Conditions Code, 2020 and Rule & Regulations made there under.
IV. Indian Bureau of Mines has not undertaken verification of the mining lease boundary on the ground and does not undertake any responsibility regarding correctness of the boundaries of the leasehold shown on the ground with reference to lease map & other plans furnished by the applicant / lessee.

Contd. Page-2

V. At any stage, if it is observed that the information furnished, data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.

VI. If this approval conflicts with any other law or court order/direction under any statute, it shall be revoked immediately.

VII. Validity of this document shall expire on 31.03.2025.

भवदीय / ~~yours~~ faithfully,

Encl: - One copy of approved
Modification of Mining Plan

(HARKESH MEENA)
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

Copy for kind information to:-

1. The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, New Capital, Bhubaneswar– 751001, Odisha along with one copy of Modification of Mining Plan by ***REGISTERED PARCEL***.

2. Shri D. D. Kumar, Qualified Person, Raw Material Section, M/s SAIL, RDCIS Lab. Building 04th Floor, Post-Doranda, Ranchi-834002, Jharkhand.

3. Shri Rajendra Prasad Mondal, Sr. Manager (Geology), M/s Steel Authority of India Limited, Basrsua Iron Mines, At/Post-Tensa, Ps-Lahunipara, Dist-Sundargarh, Odisha-770042.

(HARKESH MEENA)
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

ANNEXURE 1.8: FOREST CLEARANCE LETTER FOR ML-130

F. No. 8-90/1996-FC (pt.)
Government of India
Ministry of Environment and Forests
(F.C. Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.
Dated: 6th March, 2013

To

The Principal Secretary (Forests),
Government of Odisha,
Bhubaneshwar.

Sub: Diversion of 2341.931 ha. (2248.252 ha. for mining and allied activities and 93.679 ha. for safety zone) forest land under ML-130 of Barsua-Taldih – Kalta in favour of M/s Steel Authority of India Ltd. (SAIL) in Bonai Forest Division in Sundargarh district of Odisha during 2nd Renewal of Mining Lease.

Sir,

I am directed to refer to Government of Odisha's letter No. 10 F(Cons) 50/2010-23669/F&E dated 04.11.2010 wherein prior approval of the Central Government for the diversion of 2341.931 ha. (2248.252 ha. for mining and allied activities and 93.679 ha. for safety zone) forest land under ML-130 of Barsua-Taldih – Kalta in favour of M/s Steel Authority of India Ltd. (SAIL) in Bonai Forest Division in Sundargarh district of Odisha during 2nd Renewal of Mining Lease, was sought, in accordance with section 2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted by the Central Government under section 3 of the said Act, in-principle approval for diversion of the said forest land was accorded by this Ministry's vide letter of even number dated 08.03.2011 read with corrigendum of even number dated 08.12.2011, subject to fulfilment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government of Odisha vide their letter No. 10F (Cons)-9/ 2013-4603/ F & E dated 02.03.2013 approval of the Central Government is hereby granted under section-2 of the Forest (Conservation) Act, 1980 for diversion of a part of the said of 2341.931 ha. (2248.252 ha. for mining and allied activities and 93.679 ha. for safety zone) forest land under ML-130 of Barsua-Taldih – Kalta in favour of M/s Steel Authority of India Ltd. (SAIL) in Bonai Forest Division in Sundargarh district of Odisha during 2nd Renewal of Mining Lease, subject to fulfilment of the following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation over the degraded forest land double in extent to the 1858.35 ha. virgin/un-broken forest land (excluding the un-broken/virgin forest land included in the safety zone) being diverted in favour of the User Agency (2 x 1858.35 x 2 = 3,716.71 ha.) shall be raised and maintained by the State Forest Department from funds realised from the user agency;

(iii) Additional compensatory afforestation over the degraded forest land equal in extent to the forest land being diverted (i.e. 2341.931 ha.) in favour of the User Agency shall be

raised and maintained by the State Forest Department from funds realised from user agency;

(iv) Following activities shall be undertaken by the user agency at the project cost:

(a) A plan containing appropriate mitigative measures to minimize soil erosion and choking of streams shall be implemented;

(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 to arrest sliding down of the excavated material along the contour;

(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 28°; and

(e) Strict adherence to the prescribed top soil management.

(v) The State Government shall realize from the user agency the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(vi) The State Government and the user agency shall implement the detailed plan containing appropriate ameliorative/mitigative measures to eliminate/minimize the adverse impacts of the mining in the forest land proposed for diversion on the habitat, including migratory corridor of wildlife in general, and long ranging animals such as elephants in particular from funds to be provided by the user agency;

(vii) The State Government and the user agency shall implement the plan containing appropriate ameliorative/mitigative measures to prevent/minimize soil erosion from the forest land proposed for mining prepared by the Central Soil and Water Conservation Research Institute, Sunabeda;

(viii) The State Government and user agency shall implement, from funds provided by the user agency, the plan containing appropriate ameliorative/mitigative measures, including restriction on use of water by the user agency, to eliminate/minimise adverse impact on water regime in and around the forest land proposed for diversion, and to ensure adequate availability of water to the habitations presently depending on the streams originating from the area located in and around the forest land proposed for diversion prepared by the Indian Institute of Technology (IIT), Kharagpur g;

(ix) The user agency shall implement from its own cost the plan for rejuvenation/ restocking of the non-mineralised portion of the mining lease duly approved by the Regional Chief Conservator of Forests, Rourkela;

(x) The user agency shall conclude disciplinary proceedings against the concerned official(s) responsible for installation of one crusher unit and two crushing-cum-screening plants within the forest land proposed for diversion by the user agency without obtaining prior permission of the Central Government under the Forest Conservation Act by imposing exemplary punishment to the officials responsible for the said violation, with intimation to this Ministry;

(xi) The user agency shall implement from its own funds the concurrent reclamation plan duly approved by the Regional Chief Conservator of Forests, Rourkela Circle for reclamation of the broken up area in a time bound manner and hand over the fully reclaimed forest land back to the State Forest Department for future management;

(xii) State Government shall explore the feasibility to utilise the already broken area available in the mining lease for storing overburden. For storage of overburden, minimum area of

virgin forest land shall be used only after receipt of a certificate from the State Government of Odisha that there is no alternate other than the use of such minimum virgin forest land, as indicated in such certificate, for storage of the overburden;

(xiii) The State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (7.5 meter strip all along the outer boundary of the area identified to undertake mining) from funds realised from the user agency;

(xiv) The State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone from funds realised from the user agency;

(xv) 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, or Rules framed there under, subject to a maximum period of 20 years;

(xvi) User Agency shall undertake gap planting and soil & moisture conservation activities as per the scheme duly approved by the Regional Chief Conservator of Forests, Rourkela to restock and rejuvenate the degraded open forests (having crown density less than 0.4), if any, located in the area within 100 m. from outer perimeter of the mining lease from its own funds;

(xvii) The User Agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary, as per the scheme duly approved by the Regional Chief Conservator of Forests, Rourkela, so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;

(xviii) The user agency shall submit the quarterly progress report of the implementation of activities it has committed (undertaking given) for execution within its lease area to Regional Chief Conservator of Forests, Rourkela circle and six monthly report to Regional Office of this Ministry through the State Government;

(xix) 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 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, Government of Odisha and the Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office (Eastern Zone), Bhubaneswar. 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), the Eastern Regional Office, Bhubaneswar may recommend to the Ministry of Environment & Forests, suitable penal action to be taken against the user agency;

(xx) No labour camp shall be established on the forest land;

(xxi) The User Agency shall provide firewood preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on the adjacent forest areas;

(xxii) The boundary of the mining lease and safety zone shall be continued to be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars,

06/07/2017

each inscribed with its serial number, DGPS coordinates, forward and back bearing, and distance from pillar to pillar;

(xxiii) The forest land shall not be used for any purpose other than that specified in the proposal;

(xxiv) The user agency shall establish and operate a Vocational Training Institute having capacity to impart training in at-least five disciplines, to be decided by the State Government concerned in consultation with the user agency, for the benefits of the eligible unemployed youth in the project affected villages. The user agency should also endeavour to employ such trained manpower in their own industry or any other appropriate industry, preferably located in vicinity of the forest land being diverted; and

(xxv) The user agency shall maintain an independent Social Welfare Department/ Division and follow the subsequent condition of the project-affected and the project-displaced persons in such a way as to understand their socio-economic conditions before and after the project and take such corrective measures as are necessary to restore them to their original or better-than-original condition;

(xxvi) The user agency will continue to provide vehicular mobility to the Addl. Director General of Forest (Forest Conservation)in the Ministry of Environment and Forests;

(xxvii) Any other condition that the Eastern Regional Office of this Ministry, Bhubaneswar and State Government of Odisha may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxviii) User agency shall submit annual self-monitoring report, indicating status of compliance to the conditions stipulated in the approval, to the State Government and the concerned Regional Office of this Ministry; and

(xxix) 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.

Yours faithfully,

08/07/2015

(H. C. Chaudhary)
Assistant Inspector General of Forests

Copy to:

1. The Secretray, Ministry of Steel, Government of India.
2. The PCCF, Government of Odisha, Bhubaneshwar.
3. The Nodal Officer, O/o PCCF, Government of Odisha, Bhubaneshwar.
4. The Addl. Principal Chief Conservator of Forests (Central), Regional Office, Bhubaneshwar.
5. The User Agency.
6. The Monitoring Cell, FC Division, MoEF, New Delhi.
7. Guard File.

08/07/2015

(H. C. Chaudhary)
Assistant Inspector General of Forests

ANNEXURE 1.9: FOREST CLEARANCE LETTER FOR ML-162

F. No. 8-18/2014-FC
Government of India
Ministry of Environment, Forests and Climate Change
(FC Division)

Indira Paryavaran Bhawan,
Aliganj, Jor Bag Road,
New Delhi - 110003.

Dated: 23rd October, 2017

To,

The Principal Secretary (Forests),
Government of Odisha,
Bhubaneswar.

Sub: Diversion of 77.94 ha of forest land including 2.562 ha of safety zone area for development of mining infrastructure in Toda RF in ML-162 Lease of M/s Steel Authority of India Limited (SAIL) under Bonai Forest division in Sundergarh District, Odisha during 2nd RML period.

Sir,

I am directed to refer to the Government of Odisha's letter No 10F (Cons) 63/ 2014-3792/ F&E Bhubaneswar dated 24.02.2014 on the above-mentioned subject, wherein prior approval of the Central Government for the diversion of 77.94 ha of forest land including 2.562 ha of safety zone area for development of mining infrastructure in Toda RF in ML-162 Lease of M/s Steel Authority of India Limited (SAIL) under Bonai Forest division in Sundergarh District, Odisha during 2nd RML period was sought. After careful consideration of the proposal by the Forest Advisory Committee constituted by the Central Government under Section-3 of the said Act, in-principle approval for the said diversion was granted vide this Ministry's letter of even number dated 10.02.2015 , subject to fulfilment of certain conditions.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Govt. of Odisha vide their letters No. 10 F (Cons) 66/2015/19211/ F&E dated 08.06.2016 , No.10F (Cons) 66/2015/19211 dated 21.10.2016 and No.10 F (Cons) 237/201613400/F&E dated 24.06.2017. **Stage-II/Final approval** of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 77.94 ha of forest land including 2.562 ha of safety zone area for development of mining infrastructure in Toda RF in ML-162 Lease of M/s Steel Authority of India Limited (SAIL) under Bonai Forest division in Sundergarh District, Odisha during 2nd RML period subject to following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation (CA) over the degraded forest land, twice in extent to the area of forest land proposed to be diverted. equivalent to shall be raised on the identified forest land within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved Plan by the State Forest Department from the funds provided by the user agency;

(iii) **The penal compensatory afforestation** over degraded forest land, five times in extent to the area of forest land used for non-forest purpose without obtaining requisite approval under the FC Act shall be raised on the identified forest land within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved Plan by the State Forest Department from the funds provided by the user agency;

(iv) Following activities, as per approved plan/schemes, shall be ensured by the user agency under the supervision of the State Forest Department:

(a) Mitigative measures to minimize soil erosion and choking of stream shall be initiated to be implemented within a period of three years with effect from the date of issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department;

23.10.17

(b) Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme;

(c) Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme;

(d) Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 28° ; and

(e) No damage shall be caused to the top-soil and the user agency will follow the top soil management plan.

(v) The user agency shall pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(vi) The User agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986;

(vii) The State Govt. ensure that the user agency shall implement the land surrender schedule in accordance with the approved mine plan and progressiye mine closure plan;

(viii) Fencing, protection and regeneration of the safety zone area [7.5 meters strip shall be kept within the mining lease boundary and area of the safety zone shall be part of the total area of mining lease as per the Ministry's guidelines dated 27.05.2015] shall be done within three years at the project cost as per approved scheme. Besides this afforestation on degraded forest land to be selected elsewhere measuring one & a half times the area under safety zone shall also be done at the project cost;

(ix) 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 0.4), if any, located in the area within 100 meters from outer perimeter of the mining lease;

(x) 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 and Regulation) Act, 1957, as amended and the Rules framed there-under;

(xi) User agency either itself or through the State Forest Department shall ensure afforestation on degraded forest land, one and half times in extent to the area used for safety zone as per the approved plan/scheme at the cost of the user agency;

(xii) The State Govt. and the User agency shall ensure 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 preferably within five years ;

(xiii) User agency shall provide firewood preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on the adjacent forest areas;

(xiv) The State Govt. ensure that 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. The said R&R Plan will be monitored by the State Government/Regional Office of MoEF &CC along with indicators for monitoring and expected observable milestones.

(xv) The State Govt. and the User agency shall ensure mining in a phased manner and take due care for reclamation of the mined over area. The concurrent reclamation plan shall be executed by the User Agency as per the approved mining plan/scheme and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, Government of Odisha and the Addl. Principal Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office, Bhubaneswar. 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 Addl. Principal Chief Conservator of

23.10.17

Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed;

(xvi) No labour camp shall be established on the forest land;

(xvii) Boundary of the mining lease and safety zone 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, distance from pillar to pillar and GPS Co-ordinates;

(xviii) Forest land shall not be used for any purpose other than that specified in the proposal;

(xix) The user agency shall submit the annual self -compliance report in respect of the above conditions to the State Government, concerned Regional Office and this Ministry by the end of March every year regularly.

(xx) Any other condition that the Regional Office, Bhubaneswar of this Ministry, may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxi) **As the status of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is sub-judice, the State Government shall ensure complete compliance on provisions of FRA- 2006 as per the final direction of Hon'ble High Court in Writ Petition no. 3105/2015;** and

(xxii) The State Government and User Agency shall ensure compliance to all conditions stipulated in the Stage-I approval for which undertakings have been obtained from the user agency and also the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) & NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.

Yours faithfully,

(Sandeep Sharma) 23.10.17

Assistant Inspector General of Forests (FC)

Copy to:

1. The Principal Chief Conservator of Forests, Government of Odisha, Bhubaneswar.
2. The Nodal Officer, O/o the PCCF, Government of Government of Odisha, Bhubaneswar.
3. The Addl. PCCF (Central) (FCA), Regional Office, Bhubaneswar
4. Monitoring Cell, FC Division, MoEF&CC .
5. Guard file.

(Sandeep Sharma) 23.10.17

Assistant Inspector General of Forests (FC)

ANNEXURE 1.10: FRA CERTIFICATE

CERTIFICATE

REGARDING COMPLIANCE OF SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS(RECOGNITION OF FOREST RIGHTS) ACT, 2006 IN RESPECT OF DIVERSION OF FOREST LAND MEASURING HC 2253.994 IN BARSUAN-TALDIHI-KALTA MINES OF M/S STEEL AUTHORITY OF INDIA LTD(SAIL).

1. It is certified that the complete process for diversion and settlement of rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognisation of Forest Rights) Act, 2006 has been carried out for the entire Forest area of 2253.994 Hectors proposed for diversion for Barsuan-Taldihi-Kalta Mines of M/S Steel Authority of India Ltd. under Koira Tahsil. The concerned records of all consultations and Meetings held are annexed in shape of Palli Sabha Resolutions dated 07.08.2010 of village Bahamba and dated 10.9.2010 of village Tantra and enquiry report of Tahsildar, Koira.

2. It is certified that the proposal for such diversion have been placed before the Palli Sabha of Forest Dwellers under the Chairmanship of Ward Members, Smt Nirasa Naik for village Bahamba and Sri Baneswar Naik for village Tantra and in presence of more than 50% of members of palli sabha and members of village Forest Committee where the details of the Projects and its implication have been explained to them in vernacular language. It is further ascertained that out of 2253.994Hc. of forest land proposed for diversion ,the local Schedule Tribe other traditional forest dwellers are using 5.742 Hc. of land individually in village Tantra till 10.9.2010 .Their individual rights have been recognized by granting pattas under Forest Right Act.,2006.They have given their consent in favour the said diversion proposal. Besides this, no eligible forest dweller was found under Forest Rights Act, 2006.

3. It is certified that discussions and decisions on such proposals had taken place only when there was quorum of minimum 50% of the members of the Palli Sabha present.

4. It is certified that on the basis of the verification report and Palli Sabha Resolutions dated 07.08.2010 for village Bahamba and dated 10.9.2010 for Tantra that no other primitive Tribal Groups and pre-agricultural communities except as mentioned in para 2 above were available on forest land proposed for diversion and whose Forest Rights are required to be specifically safe guarded as per Section 3(1)(e) of the Forest Rights Act, 2006.

5. It is certified that on the basis of the verification report and Palli sabha Resolution dated 07.08.2010, for village Bahamba and dated 10.9.2010 for Tantra that no such facilities managed by Government requiring diversion of Forest Land U/S 3(2) of the Forest Rights Act, 2006 exist over the forest land proposed for diversion.

10/09/10

COLLECTOR, SUNDARGARH
AND
CHAIRMANN, DISTRICT LEVEL
COMMITTEE