

Date: 28.05.2026

ESL-IOO/HSE/MoEF/26-27/02

To,
The Deputy Director General of Forests (C),
Ministry of Environment, Forest, and Climate Change,
Regional Office (Eastern Zone),
A/3, Chandrasekhar, Bhubaneswar – 751023

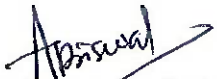
Sub: Submission of Six-monthly EC compliance report for the **Nadidihi Iron and Manganese Ore Mines of M/s ESL Steel Limited for the period 1st October 2025 to 31st March 2026**

Ref: - 1. Vesting Order, no 8472 /SM, Bhubaneswar, Dated 22.10. 2021. Bhubaneswar. issued by Govt of Odisha, Steel and Mines Department.

Sir,

We hereby submitting the half yearly Environmental clearance compliance report of reference letter from MoEF &CC, New Delhi- J-11015/249/2016-IA.II (M), Dated: 11.09.2019. for Nadidihi Iron and Manganese Ore Mines of M/S ESL Steel Ltd.

Thanking you
Yours Faithfully
For ESL Steel Ltd



Mr. Ashutosh Biswal
Mines Manager
Nadidihi Iron and Manganese Ore Mine

Copy to:

1. Zonal Office Kolkata, Central Pollution Control Board, South end Conclave, Block 502, 5th and 6th Floors, 1582 Razidanga Main Road, Kolkata, West Bengal 700107.
2. The Member Secretary, State Pollution Control Board, A/118, Nilakantha Nagar, Bhubaneswar, Odisha-751012.
3. The Regional Officer, State Pollution Control Board, Near Panposh Hockey Chawk, Rourkela, Sundargarh, Odisha-769004.

ENVIRONMENT CLEARANCE COMPLIANCE STATUS –Nadidihi Iron and Manganese Ore Mines.

Six Monthly Compliance report of Environmental Clearance for Nadidihi Iron and Manganese Ore Mines, ESL Steel Ltd. for the period from- 1st October 2025 to 31st March 2026

Reference letter from\ MoEF &CC, New Delhi- J-11015/249/2016-IA.II (M),Dated: 11.09.2019.

Capacity- 7.451 MTPA of iron Ore Production.

Sr. No.	A. <u>Specific Conditions</u>	Status of Compliance	Remarks
i)	This EC will be valid upto 31.03.2071	Complied	Noted
ii)	The enhance production shall be on pro-rata basis for the effective period of valid environment clearance granted herein. The PP shall ensure its compliance by getting concurrence in mining plan approved by concerned authority in this regard.	Complied	The mining activity is carried out as per approved mining plan
iii)	PP mentioned that the application for the surrender of forest area over 5.433 ha is submitted to State Govt. and the same has been accepted by the State Govt. Therefore, the lease area will be reduced to 115.962 ha (121.405-5.443 ha = 115.962 ha) and the mining activities will be restricted to 115.962 ha only.	Complied	The mine is an auctioned mine according to the lease deed the mine lease area is 117.206 ha
iv)	This EC for expansion proposal (2.88 MTPA to 6.0 MTPA (pro-rata basis) and reduction in dry processing (crushing and screening) of low-grade iron ore from old stack/dumps from 4.751 MTPA to 1.451 MTPA (Total handling 7.451 MTPA)) shall be operational after submission of an undertaking through affidavit to MoEFF&CC within 15 days of receipt of this letter, for compliance of all the conditions prescribed herein.	Complied	The condition was applicable to the previous lessee. At present, the actual production is being maintained well within the permitted limit of 2.88 MTPA prior to the expansion proposal. The mine is not operating beyond this approved capacity, and therefore, the current production remains compliant with the existing limits
V)	PP should adhere with the Site-Specific Conservation Plan for Schedule I species as approved by the Competent Authority.	Complied	Complied by the previous lessee
vi)	PP shall spend R. 1.9 crore as a CER	Complied	Complied by previous lessee

	cost within the validity period of EC.		
B.	<u>Recommendation of CSIR-NEERI Report on “Carrying Capacity Study for Environmentally Sustainable Iron and Manganese Ore Mining Activity in Keonjhar, Sundargarh and Mayurbhanj districts of Odisha State:</u>		
1)	Project Proponent and Department of Steel and Mines, Govt. of Odisha shall ensure the implementation of recommendations of carrying capacity study report conducted by CSIR-NEERI w.r.t. mining proposal of Iron Ore and/or manganese in the State of Odisha.	Complied	PP provides full co-operation to Department of Steel and Mines for implementing of recommendation of NEERI
2)	Department of Steel and Mines, Govt. of Odisha should prepare 5 years regional plan for annual iron ore requirement from the state, which in turn shall be met from different mines/zones (e.g. Joda, Koira) in the state. Accordingly, sustainable annual production (SAP) for each zone/mine may be followed adopting necessary environmental protection measures.	Complied	5 years Regional Plan for annual Iron Ore Requirement is prepared by the Department of Steel & Mines, Govt, of Odisha.
3)	Project Proponent shall construct the cement concrete road from mine entrance and exit to the main road with proper drainage system and green belt development along the roads and construction of road with minimum 300 m inside the mine. This should be done within one year for existing mines and new mine should have since beginning. The Department of Steel and Mines, Govt. of Odisha should ensure compliance and should not issue the Mining permits, if mine lease holder has not constructed proper cement concrete road as suggested. This EC for the expansion project shall be operated only after the compliance of the above-mentioned specific condition.	Agreed to Comply	The construction of cement concrete road is under progress dust suppression measures are being taken through washing the roads by mobile tankers also there is green belt along the road outside lease.
4)	The Committee observed that as per the recommendations of NEERI report, the PP needs to do regular vacuum cleaning of all mineral carrying roads aiming at	Agreed to Comply	Water tankers are used to regularly spray water on the haulage roads. The junctions are washed to keep it dust free and ensure dust suppression. The

	“zero dust suppression” within 3 months. This EC for the expansion project shall be operated only after the compliance of the mentioned specific conditions.		procurement of vacuum cleaning is under progress and shall be operational by end of May
5)	PP shall monitor the environmental quality parameters as per EC and CTE/CTO conditions, and implementation of suggested measures for control of road dust and air pollution. OSPCB has to ensure the compliance of CTO/CTE. Regional office of MoEF&CC, Bhubaneswar shall monitor the compliance of the EC conditions. Regional office of IBM shall monitor the compliance of mining plan and progressive mine closure plan. Any violation by mine lease holder may invite actions per the provisions of applicable Acts.	Complied	Environmental quality parameters are monitored on monthly basis based on EC / CTO conditions, reports are attached in Annexure 1. Various dust suppression measures as specified by PCB are adopted on the mines
6)	PP shall ensure the compliance of Suggested Ore Transport Mode (SOTM) with association of the State Govt. of Odisha. All existing mines should ensure adoption of SOTM within 5 years. New mines or mines seeking expansion should incorporate provision of SOTM in the beginning itself, and should have system in place within next 5 years.	Partially Complied	The transportation is carried out basis the available infrastructure in the area. Most of the transportation happened through Road Transport. (Condition applied: Rail transport is available) and rest is road transport (However Rake availability remains a challenge)
7)	The State Govt. of Odisha shall ensure dust free roads in mining areas wherever the road transportation of mineral is involved. The road shoulders shall be paved with fence besides compliance with IRC guidelines. All the roads should have proper drainage system and apart from paving of entire carriage width the remaining right of way should have native plantation (dust capturing species). Further, regular maintenance should also be ensured by the Govt. Of Odisha. Progress on development of dust free roads, implementation of SOTM, increased use of existing rail network, development of additional railway network/conveyor belt/pipelines etc. shall be submitted	Complied	It is the responsibility of State Government, co-operation will be given from PP side

	periodically to Regional Office of the MoEF&CC.		
8)	PP shall develop the parking plazas for trucks with proper basic amenities/facilities inside the mine. This should be done within one year for existing mines and new mines should have since beginning. This EC for the Expansion project shall be operated only after the compliance of the above-mentioned specific condition.	Complied	Complied, a dedicated truck parking area has already been developed within the mine lease area with basic facilities
9)	Department of Steel and Mines shall ensure the construction of NH 215 as minimum 4 lane road with proper drainage system and plantation and subsequent regular maintenance of the road as per the IRC guidelines. Construction of other mineral carrying roads with proper width and drainage system along with road side plantation to be carried out. This shall be completed within 2 years.	Complied	Government of Odisha has constructed NH 215 as 4 lane road
10)	Regular vacuum cleaning of all mineral carrying roads aiming at “Zero Dust Re-suspension” shall be adopted by PWD/NHAI/Mine lease holders within a time of 3 months for existing roads. This EC for the Expansion project shall be operated only after the compliance of the above-mentioned specific condition.	Complied	State government and municipalities has deployed vacuum cleaning machine, from mine exit to National highway continuous dust suppression is done through mobile water tanker
11)	In case the total requirement of iron ore exceeds the suggested limit for that year, permission for annual production by an individual mine may be decided depending on approved EC capacity (for total actual dispatch) and actual production rate of individual mine during last year or any other criteria set by the State Govt i.e. Dept. of Steel and Mines. Department of Steel and Mines in consultation with Indian Bureau of Mines – RO should prepare in advance mine-wise annual production scenario so that demand for iron ore can be anticipated, and actual production/dispatch does not exceed the suggested annual production.	Complied	Mining is carried out as per approved mining plan.
12)	R&D studies towards utilization of low-	Complied	R and D studies towards utilization of

	grade iron ore should be conducted through research/academic institutes like IMMT Bhubaneswar, NML Jamshedpur and concerned metallurgical departments in IITs, NITs, etc. targeting full utilization of low-grade iron ore (Fe content up to 45% by 2020 and up to 40% by 2025). In fact, life cycle assessment of whole process including environmental considerations should be done for techno-economic and environmental validity. R&D studies on utilization of mine wastewater having high concentration of Fe content for different commercial applications in industrial such as cosmetics, pharmaceutical, paint industry should also be explored. Responsibility: IBM, Dept. of Steel and Mines, Individual Mine Lease Holders		low-grade iron ore was conducted through the IMMT, Bhubaneswar for iron ore having Fe content upto 45 %. Since Iron ore having Fe content between 40-45 % is considered as waste and it is auctioned mines so lessee don't have permission to handle / workings of old waste dump as per given EC so we will explore the same in future as per conditions & market feasibility. There is no mine waste water generated the mine pit water is used for dust suppression and plantation
13)	The mining activity in Joda Koira sector is expected to continue for another 100 years, therefore, it will be desirable to develop proper rail network in the region. Rail Transport shall not only be in pollution free mode but also will be a much economical option for iron ore transport. The rail network and/or conveyor belt system up to public railway siding needs to be created. The total length of the conveyor belt system/ rail network to be developed from mines to nearest railway sidings by 11 mines in Joda region is estimated to be around 95 km. Further, it is suggested to develop a rail network connecting Banspani (Joda region) and Roxy railway sidings in Koira region. Responsibility: Dept. of Steel and Mines, Govt. of Odisha and Concerned Mines along with Indian Railways. Time: Minimum 7 years (by 2025). The Dept. of Steel and Mines, Govt. of Odisha should follow up with the concerned departments and railways so that proposed proper rail network is in place by 2025.	Agreed to Comply	The responsibility of developing the required infrastructure is with various government agencies.
14)	State Govt. of Odisha shall make all	Complied	Full cooperation will be provided to

	efforts to ensure exhausting all the Iron and Manganese Ore resources in the existing working mines and from disturbed mining leases/zones in Joda and Koira region. The criteria suggested shall be applicable while suggesting appropriate lease area and sustainable mining rate. Responsibility: Dept. of Steel and Mines, Govt. of Odisha		Dept of steel and mines, Govt of Odisha.
15.	Mining operations/Process related: Project proponent shall implement the following mitigation measures:		
	Appropriate mining process and machinery (viz. right capacity, fuel efficient) should be selected to carry out various mining operations that generate minimal dust/air pollution, noise, wastewater and solid waste e.g. drills should either be operated with dust extractors or equipped with water injection system.	Complied	Mining is carried out as per IBM approved mining plan. Regular maintenance of mining machinery is carried out to obtain optimum fuel consumption. Drills are operated with wet drilling system
	After commencement of mining operation, a study should be conducted to assess and quantify emission load generation (in terms of air pollution, noise, wastewater and solid waste) from each of the mining activity (including transportation) on annual basis. Efforts should be made to further eliminate/minimize generation of air pollution/dust, noise, wastewater, solid waste generation in successive years through use of better technology. This shall be ensured by respective mine lease holders.	Complied	Emission monitoring is carried out through NABL laboratory and reports submitted to authorities. It is observed that the results are within the limit. Efforts are made to improve the environmental performance year on year.
	Various machineries/equipment selected (viz. dumpers, excavators, crushers, screen plants etc.) and transport means should have optimum fuel/power consumption, and their fuel/power consumption should be recorded on monthly basis. Inspection and maintenance of all the machineries / equipment / transport vehicles should be followed as per manufacturer's instructions /recommended time schedule and record should be	Complied	Various machineries / equipment selected (viz. dumpers, excavators, crushers, screen plants etc.) are inspected and maintained regularly as per manufactures instruction and recommended schedule

	maintained by the respective mine lease holders.		
	Digital processing of the entire lease area using remote sensing technique should be carried out regularly once in 3 years for monitoring land use pattern and mining activity taken place. The extent of pit area excavated should also be demarcated based on remote sensing analysis. This should be done by ORSAC (Odisha Space Applications Centre, Bhubaneswar) or an agency of national repute or if done by a private agency, the report shall be vetted/authenticated by ORSAC, Bhubaneswar. Expenses towards the same shall be borne by the respective mine lease holders.	Complied	Digital processing of the entire lease area using remote sensing technique DGPS Drone survey is carried out every year by ORSAC empanelled / accredited agency M/s Skylark Drone Services Pvt Limited. This Drone survey data with land use pattern (demarcating the pit excavated area) is submitted to Indian Bureau of Mines (IBM) , Bhubaneswar on annual basis as per Rule-34A of MCDR-2021.
16.	Air Environment Related: Project Proponent shall implement the following mitigation measures:		
	Fugitive dust emissions from all the sources should be controlled regularly on daily basis. Water spraying arrangement on haul roads, loading, and unloading and at other transfer points should be provided and properly maintained. Water fogging system to be used to minimize water consumption. Ensure that the ambient water quality parameters conform to the norms prescribed by the CPCB in this regard.	Complied	Fugitive dust emission mitigated by water sprinkling through static arrangements system as well as water tankers within mine lease area. Mineral handling units having dry fog system at all discharging points to control dust emission generated by crushing system. Regular air monitoring is carried out and it is ensured that the ambient air quality within limits of CPCB
	The core zone of mining activity should be monitored on daily basis. Minimum 4 ambient air quality monitoring stations should be established in the core zone for SPM, PM10, PM2.5, SO2, NOx, and CO monitoring. Location of air quality monitoring stations should be decided based on the meteorological data, topographical features and environmentally and ecologically	Complied	The core zone is installed with one CAAQMs and buffer zone is installed with one CAAQMs to monitor parameters PM, 10, PM 2.5, SOx, NOx and CO 24 x7, with additional to manual ambient air monitoring system in 6 core and buffer zone to monitor all the 12 parameters and the frequency of monitoring is done as per CTO given by

	sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board (based on Emission Load Assessment Study). The number of monitoring locations may be more for larger capacity mines and working in larger area. Out of 4 stations, one should be online monitoring station in the mines having more than 3 MTPA EC capacity.		SPCB
	Monitoring in buffer zone should be carried out by SPCB or through NABET accredited agency. Air quality parameters (SPM, PM10, PM2.5, SO2, NOx and CO) shall be regularly monitored at locations of nearest human habitation including schools and other public amenities located nearest to source of the dust generation as applicable.	Complied	Environmental monitoring, Air quality parameters (SPM, PM10, PM2.5, SO2, NOx and CO in buffer zone at 4 locations is being carried out by NABL accredited laboratory Reports attached Annexure 1
	Emissions from vehicles as well as heavy machinery should be kept under control and regularly monitored. Measures should be taken for regular maintenance of vehicles used in mining operations and in transportation of mineral.	Complied	Vehicles as well as heavy machineries are regularly maintained and monitored and their emission conforms prescribed limit. Only Pollution Under control certificate available vehicles can ply within mine lease area.
	The vehicles shall be covered with a tarpaulin and should not be overloaded. Possibility of closed container trucks should be explored for direct to destination movement of iron ore. Air quality monitoring at one location should also be carried out along the transport route within the mine (periodically near truck entry and exit gate)	Complied	Overloading of trucks is not allowed All the trucks carrying iron ore to outside the mining lease area are properly covered with tarpaulin. Monitoring is carried out near our exit gate
17.	Noise and Vibration related: Project Proponent shall implement the following mitigation measures:		
	Blasting operation should be carried out only during daytime. Controlled blasting such as Nonel, should be practiced. The mitigation measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.	Complied	Blasting operations conducted only in day time. Controlled blasting technique is adopted with Nonel to mitigate ground vibrations and arrest fly rocks., Blasting is conducted based on requirement only

	Appropriate 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.	Complied	Workers are provided with ear plugs in their PPE kit to control, noise that can affect human environment
	Noise levels should be monitored regularly (on weekly basis) near the major sources of noise generation within the core zone. Date, time and distance of measurement also be indicated with the noise levels in the report. The data should be used to map the noise generation from different activities and efforts should be made to maintain the noise levels with the acceptable levels of CPCB (CPCB, 2000)	Complied	Noise zone is monitored regular basis in Core and Buffer Zone also in work zone the report are attached in Annexure 1. The noise level is within the limit prescribed by CPCB in day and night time
	Vibration at various sensitive locations should be monitored at least once in a month and mapped for any significant changes due to successive mining operations. Responsibility: Individual mine lease holders	Complied	The vibration study are conducted during blasting time and reports are attached in Annexure 2
18.	Water/wastewater related: Project Proponent shall implement the following mitigation measures:		
	Mining operations should be restricted to above ground water table, and it should not intersect groundwater table. If enough resources are estimated below the ground water table, the same may be explored after conducting detailed geological studies by GSI and hydrogeological studies by CGWB or NIH or Institute of National repute and ensuring that no damage to the land stability/water aquifer system shall happen. The details/outcome of such study may be reflected/incorporated in the EIA/EMP report of the mine appropriately.	Complied	The mine operations will intersect ground water table a detailed hydrogeological study was conducted through CGWA recognized consultant and submitted to CGWA and MOEF, the hydrogeological report is attached in Annexure 3
	Natural watercourse and /or water resources should not be obstructed due to any mining operations. Regular monitoring of the flow rate of the springs and perennial nallas should be carried out and records should be	Complied	Natural water course exist outside the lease and water resources is not obstructed due to mining operations. Regular monitoring of upstream and downstream is done at Karo river stream, it is not passing through the mine lease

	maintained. Regular monitoring of water quality of nallas and river passing through the mine lease area (upstream and downstream locations) should be carried out on monthly basis.		
	Regular monitoring of ground water level and its quality should be carried out within the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out on monthly basis.	Complied	Regular monitoring of ground water level is being carried out by piezometers – digital level recorder (piezometer), monitoring is done 24 x7 also manual monitoring is in place monthly, ground water quality is monitored
	To optimize water requirement, suitable conservation measures to augment ground water resources in the area should be undertaken in consultation with Central Ground Water Board (CGWB)	Complied	A suitable ground water conservation is followed like harvesting rain water in pits and part of it getting recharged
	Suitable rainwater harvesting measures on long term basis should be planned and implemented in consultation with CGWB, to recharge the ground water source. CGWB can prepare a comprehensive plan for the whole region.	Complied	All rainwater diverted in to mine pits, harvesting measures are taken
	Appropriate mitigation measures (viz. ETP, STP, garland drains, retaining walls, collection of runoffs etc.) should be taken to prevent pollution of nearby river/other water bodies. Water quality monitoring study should be conducted by State Pollution Control Board to ensure quality of surface and ground water sources on regular basis. The study can be conducted through NABL/NABET approved water testing laboratory. The report should be vetted by SPCB.	Complied	Mitigation measures such as the installation of a Sewage Treatment Plant (STP) with a capacity of 60 KLD and the construction of a retaining wall along the garland drain for runoff collection were implemented. Water quality monitoring for both surface and groundwater was carried out by an NABL-accredited laboratory, and the results were submitted to the State Pollution Control Board (SPCB). Additionally, the monthly progressive report along with the STP laboratory analysis report is being submitted to SPCB on monthly basis
	Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated in ETP to conform to the discharge standards applicable.	Complied	There is no workshop inside the mine lease hence there is no industrial waste water generated
	Oil and grease trap should be installed before discharge of workshop effluents. STP should be installed for the employees/colony, wherever	Complied	Oil and grease trap is not applicable as there is no workshop effluents. Sewage Treatment plant of 60 KLD is set up for sewage generated from office and colony

	applicable.		
	Mine lease holder should ensure that no silt originating due to mining activity is transported in the surface water course or any other water body. Appropriate measures for prevention and control of soil erosion and management of silt should be undertaken. Quantity of silt/soil generated should be measured on regular basis for its better utilization.	Complied	The monsoon run off is channelized into mine pits and settling ponds. It is ensured that the no silt flows outside the mine. The settling ponds will be desilted regularly on inspection and the handled silt used in processing based on the quality of silt
	Erosion from dumps site should be protected by providing geo-textile matting or other suitable material, and thick plantation of native trees and shrubs should be carried out at the dump slopes. Dumps should be protected by retaining walls.	Complied	Inward slope is provided to each dump step to prevent erosion along with required protective measures (Garland Drain & Retaining Wall). Geo textile Plantation of native species will be carried out on dump after it s finalized
	Trenches/garland drains should be constructed at the foot of dumps to arrest silt from being carried to water bodies. Adequate number of check dams should be constructed across seasonal/perennial nallahs (if any) flowing through the mine lease areas and silt be arrested. De-silting at regular intervals should be carried out and quantity should be recorded for its better utilization, after proper soil quality analysis.	Complied	Trenches/garland drains constructed at the foot of dumps to arrest silt from being carried to water bodies. And it is renovated pre-monsoon
	The water so collected in the reservoir within the mine should be utilized for the sprinkling on haul roads, green belt development.	Complied	Mine accumulated water is used for water sprinkling purpose and plantation
	There should be zero wastewater discharge from the mine. Based on actual water withdrawal and consumption/utilization in different activities, water balance diagram should be prepared on monthly basis and efforts should be made to optimize consumption of water per ton of ore production in successive years.	Complied	There is zero waste water discharge as the water discharged from mine pits is passed through series of settling ponds and then clean water is discharged, monitoring of the discharged water is done on monthly basis. On the basis of requirement flocculent is added to fasten the settling process
21.	Land/soil/overburden related: Project Proponent shall implement the following mitigation measures:		

	The topsoil should be temporarily stored at earmarked site(s) only and it should not be kept unutilized for long (not more than 3 years or as per provisions mentioned in the mine plan/scheme). The topsoil should be used for land reclamation and plantation appropriately.	Complied	Top soil not available in mine as all the area are already mined by previous lease
	Fodder plots should be developed in the non-mineralized area in lieu of use of grazing land, if any.	Complied	There is no non-mineralized area in the mine lease
	Overburden/low grade ore should be stacked at earmarked dump site(s) only and should not be kept active for long period. The dump height should be decided on case-to-case basis, depending on the size of the mine and quantity of waste material generated. However, slope stability study should be conducted for larger heights, as per IBM approved mine plan and DGMS guidelines. The OB dump should be scientifically vegetated with suitable native species to prevent erosion and surface run-off. In critical areas, use of geo-textiles should be taken for stabilization of dump. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Proper records should be maintained regarding species, their growth, area coverage etc.	Complied	Dumping is carried out as per approved mining plan. Regular survey of dump is carried to keep a check on any movement of material. The dumps once finalized as it is active dumps will be covered with geotextiles and taken up for plantation.
	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from mine operation, soil, OB and mineral dumps. The water so collected can be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly de-silted, particularly after monsoon and should be maintained properly. Appropriate documents should be maintained. Garland drains of appropriate size, gradient and length should be constructed for mine pit, soil. OB and mineral dumps and sump capacity	Complied	Garland drains and settling ponds are constructed to arrest silt and sediment, Drains are constructed for mine pit, dumps etc. and before monsoon. The water collected is used for dust suppression, plantation etc

	should be designed with appropriate safety margin based on long term rainfall data. Sump capacity should be provided for adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and de-silted at regular intervals.		
	Backfilling should be done as per approved mining plan/scheme. There should be no OB dumps outside the mine lease area. The backfilled area should be afforested, aiming to restore the normal ground level. Monitoring and management of rehabilitated areas should continue till the vegetation is established and becomes self-generating.	Agreed to Comply	Backfilling will be done as per approved mining plan/scheme. There are no OB dumps outside the mine lease area. The backfilled area will be afforested, aiming to restore the normal ground level as there is no backfilling area during the reporting period
	Hazardous waste such as waste oil, lubricants, resin, and coal tar etc. should be disposed of as per provisions of Hazardous Waste Management Rules, 2016, as amended from time to time. Responsibility: Individual mine lease holders	Complied	Hazardous waste such as. Used oil generated is disposed of as per provisions of Hazardous Waste Management Rules, 2016
22.	Ecology / Biodiversity (Flora-Fauna) Related: Project Proponent shall implement the following mitigation measures:		
	All precautionary measures should be taken during mining operation for conservation and protection of endangered fauna namely elephant, sloth bear etc. spotted in the study area. Action plan for conservation of flora and fauna should be prepared and implemented in consultation with the State Forest and Wildlife Department within the mine lease area, whereas outside the mine lease area, the same should be maintained by State Forest Department.	Complied	Projects are taken as per Biodiversity Management plan. However, a site-specific conservation plan was submitted by previous lessee
	Afforestation is to be done by using local and mixed species saplings within and outside the mining lease area. The reclamation and afforestation are to be done in such a manner like exploring the	Complied	Plantation is done within the lease to promote biodiversity according to mining plan yearly plantation is carried out per-monsoon, local species like Sirus, bela and Karanj, Jamun are planted during pre-

	growth of fruit bearing trees which will attract the fauna and thus maintaining the biodiversity of the area. As afforestation done so far is very less, forest department needs to identify adequate land and do afforestation by involving local people in a time bound manner.		monsoon period
	3. Green Belt development carried out by mines should be monitored regularly in every season and parameters like area under vegetation/plantation, type of plantation, type of tree species/grass species/scrubs etc., distance between the plants and survival rate should be recorded.	Complied	Green belt is developed monitored regularly based on survival rate and recorded
	4. Green Belt is an important sink of air pollutants including noise, development of green cover in mining area will not only help reducing air and noise pollution but also will help improve the ecological conditions and prevent soil erosion to a greater extent. Further, selection of tree species for green belt should constitute dust removal/dust capturing plants since plants can act as efficient biological filters removing significant amounts of particulate pollution. Thus, the identified native trees in the mine area maybe encouraged for plantation. Tree species have small leaf area, dense hair on leaf surface (rough surface), deep channels on leaves should be included for plantation.	Being Complied	Green belt is done dumps and planned further when the dumps get finalized and plantation is done at safety zones of 7.5 m width that act as barrier for noise, light and reduce emission
	5. Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value.	Agreed to Comply	As dumps are not finalized, dumps are in working stage once finalized it will be complied
	6. Details of compensatory afforestation done should be recorded and documented by respective forest divisions, and State Forest Department should present mine-wise annual status, along with mine-wise annual status, along with expenditure details. Responsibility: Individual mine lease holders and State Forest & Wildlife	Complied	Full co-operation is given to Forest division

	Department.		
23.	Socio-economic related: Project Proponent shall implement the following mitigation measures:		
	Public interaction should be done on regular basis and social welfare activities should be done to meet the requirements of the local communities. Further, basic amenities and infrastructure facilities like education, medical, roads, safe drinking water, sanitation, employment, skill development, training institute, etc. should be developed to alleviate the quality of life of the people of the region.	Complied	Being complied. For holistic community development, various community development initiatives such as health care support, children wellbeing and education, Water and Sanitation, Skilling and Livelihood initiatives, community asset creation etc. has been carried out, from since operation of the mines. Need based assessment survey has been completed and action plan is under implementation for community upliftment.
	Land outeets and land losers/affected people, if any, should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation.	Complied	Not applicable as there is no affected people of land losers so compensation was not required as it is an auctioned mine
	The socio-economic development in the region should be focused and aligned with the guidelines/initiatives of Govt. Of India/NITI Aayog around prosperity, equality, justice, cleanliness, transparency, employment, respect to women, hope, etc. This can be achieved by providing adequate and quality facilities for education, medical and developing skills in the people of the region. District administration in association with mine lease holders should plan for “Samagra Vikas” of these blocks as well as other blocks of the district. While planning for different schemes in the region, the activities should be prioritized as per Pradhan Mantri Khanij Kshetra Kalyan Yojna (PMKKKY) notified by Ministry of Mines, Govt. Of India, vide letter no. 16/7/2017-M.VI (Part), dated September 16, 2015. Responsibility: District Administration and Individual Mine Lease Holders	Complied	Complied as per the statutory guidelines
24.	Road Transport Related: Project		

	Proponent shall implement the following mitigation measures:		
	All the mine lease holders should follow the suggested ore transport mode (SOTM), based on its EC capacity within next 5 years.	Agreed to Comply	As there is no rail network constructed for the full capacity once the rail network is in place it will be complied
	The mine lease holders should ensure construction of cement road of appropriate width from and to the entry and exit gate of the mine. Further, maintenance of all the roads should be carried out as per requirement to ensure dust free road transport.\	Agreed to Comply	The cement concrete road is under progress Dust suppression measures are being taken by water tankers and also there is green belt along the road outside lease.
	Transportation of ore should be done by covering the trucks with tarpaulin or other suitable mechanism so that no spillage of ore/dust takes place. Further, air quality in terms of dust, PM10 should be monitored near the roads towards entry and exit gate on regular basis and be maintained within acceptable limits. Responsibility: Individual Mine Lease Holders and Dept. of Steel and Mines	Complied	Transportation of ore is done by truck covered by tarpaulin and Ambient Air monitoring is done ta exit gate regularly and the values are within the limit prescribed by SPCB
25.	Occupational Health Related: Project Proponent shall implement the following mitigation measures:		
	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 periodically.	Complied	1. Personnel working in the mine are provided protective respiratory devices and are made educated on safety and health aspects periodically by in house training.
	Occupational health surveillance program for all the employees/workers (including casual workers) should be undertaken periodically (on annual basis) to observe any changes due to exposure to dust, and corrective measures should be taken immediately, if needed.	Complied	2. OHS programmed of the workers are undertaken periodically by team of professional doctors engaged.
	Occupational health and safety measures related awareness programs including identification of work-related health hazard, training on malaria eradication, HIV and health effects on exposure to mineral dust, etc. should be carried out for all the workers on regular basis. A full-time qualified doctor	Complied	3. Periodical health monitoring is done by doctor through conducting health camps every month. Dispensary was set up with qualified doctor and paramedical staff. The six-month report is attached in Annexure 5, training on, HIV and health effects on exposure to mineral dust, etc. is carried out for all the workers on regular

	should be engaged for the purpose. Periodic monitoring (on 6 monthly basis) for exposure to respirable minerals dust on the workers should be conducted and record should be maintained, including health record of all the workers. Review of impact of various health measures undertaken (at an interval of 3 years or less) should be conducted followed by follow-up of actions, wherever required. Occupational health center should be established near mine site itself. Responsibility: Individual mine lease holders and District Administration (District Medical Officer)		basis.
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Sr. No.	Standard Conditions	Status of Compliance	Remarks
I.	<u>Statutory Compliance</u>		
1)	This Environment Clearance (EC) is subject to orders/judgement of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.	Complied	Noted
2)	This EC is valid up to 31.03.2071 as the lease validity is valid up to 31 st March 2071 as per the Amended MMDR Act, 2015	Agreed to comply	Noted it will be complied
3)	The Project Proponent complies with all the statutory requirements and judgement of Hon'ble Supreme Court dated August 2 nd , 2017, in Writ Petition (Civil) no. 114 of 2014 in matter of Common Cause versus Union of India and Ors. before commencing the mining operations.	Complied	Complied and all the statutory documents are renewed on timely basis
4)	The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining and Geology in strict compliance of Judgement of Hon'ble Supreme Court dated 2 nd August 2017 in Writ Petition (Civil) no. 114 of 2014	Complied	The mining operation does not have any compensation and hence mining operation is started

	in matter of Common Cause versus Union of India and Ors.		
5)	This Environmental Clearance shall become operational only after receiving formal NBWL Clearance from MoEF & CC after the recommendations of the Standing Committee of National Board for Wildlife, if applicable to the Project.	Complied	NBWL is not applicable to the mine
6)	This Environmental Clearance shall become operational only after receiving formal Forest Clearance (FC) under the provision of Forest Conservation Act, 1980, if applicable to the project.	Complied	Complied by the previous lessee with reference no : F. No/8-68/2011-FC Dated 30th October 2013
7)	Project Proponent (PP) shall obtain Consent to Operate after Grant of EC and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish/Consent to Operate from the concerned State Pollution Control Board/ Committee.	Complied	Consent to operate is obtained with a validity period till 31.03.2027 with Reference No 4062/IND-I-CON-2265 Dated 25.03.2026
8)	The PP shall adhere to the provision of the Mines Act, 1952, Mines and Mineral (Development and Regulation), Act, 2015 and rules & regulations made there under. PP shall adhere to various circulars issued by Directorate General Mines Safety (DGMS) and Indian Bureau of Mines from time to time.	Complied	Mines Act and MMDR act is adhered and various circulars issued by Directorate General Mines Safety (DGMS) and Indian Bureau of Mines from time to time.
9)	The Project Proponent shall obtain consents from all the concerned landowners, before start of mining operations, as per the provisions of MMDR Act, 1957 and rules made there under in respect of lands which are not owned by it.	Complied	The mine was got from auction hence there is no concerned landowner vesting order is there
10)	The Project Proponent shall follow the mitigation measures provided in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29 th October, 2014, titled "Impact of Mining activities on Habitations- Issues related to the Mining Projects wherein Habitations and villages are the part of mine lease areas in Habitations and villages are surrounded by the mine	Complied	According to the memorandum best mining practices are adopted as per approved mining plan, no water bodies are not disturbed, illuminance and noise level are within the limit during night hours, during blasting vibration study is made as there is no permanent haul road it is not feasible for fixed water sprinklers instead mobile water tankers are used, transportation is carried on bypass roads

	lease area.”		
11)	The Project Proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and from CGWA for withdrawal of ground water for the project.	Complied	NOC from the CGWA is obtained with ref no CGWA/NOC/MIN/REN/1/2025/11439
12)	A copy of EC letter will be marked to concerned Panchayat/local NGO etc. if any, from whom suggestion/representation has been received while processing the proposal.	Complied	Complied by the previous lessee
13)	State Pollution Control Board/Committee shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector’s office /Tehsildar’s Office for 30 days	Complied	Complied by the state govt
14)	The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board/Committee and website of the Ministry of Environment, Forest and Climate Change (www.parivesh.nic.in). A copy of the advertisement may be forwarded to the concerned MoEFCC Regional Office for compliance and record.	Complied	Complied by previous lessee
15)	PP shall inform the MoEF&CC for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred than mining operation shall only be carried out after transfer of EC as per provisions of the para 11 of EIA notification, 2006 as amended from time to time.	Agreed to Comply	As we are operating with the vesting order transfer of EC is in progress and lease document is available
II.	<u>Air quality monitoring and preservation</u>		
16)	The Project Proponent shall install a	Complied	As per renewed CTO recommendation 2

	minimum of 3 online Ambient Air Quality Monitoring Stations with 1 in upwind and 2 in downwind direction based on long term climatological data about wind direction such that an angle of 120 degrees is made between the monitoring locations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM10, PM2.5, NO2, CO and SO2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/I dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building, canteen etc. as per the site condition to ascertain the exposure characteristics at specific places. The above data shall be digitally displayed within 03 months in front of the main gate of the mine site.		CAAQMS is mentioned for the mine. 2 CAAQMS is installed and the data are linked to Odisha State pollution Control Board server, out of CAAQMs one in core zone and another in buffer zone is installed
17)	Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metaled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM10 and PM2.5 are evident such as haul road, loading and unloading point and transfer points. The fugitive dust emissions from all sources shall be regularly controlled by installation of required equipment's/machineries and preventive maintenance. Use of suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system. It shall be ensured air pollution level conform to the standards prescribed by the MoEFF/Central Pollution Control Board.	Complied	For prevention of dust generation and subsequent suppression water sprinkling through water tankers and mist canon system is carried out in areas prone to air pollution where in high level of PM10 and PM 2.5 are evident and dry mist canon system in installed
III.	<u>Water quality monitoring and preservation</u>		
1)	In case, immediate mining scheme envisages intersection of ground water	Complied	The mine operations will intersect ground water table a detailed and comprehensive

	table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEFCC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydrogeological study of the area.		hydrogeological study was conducted through CGWA recognized/accredited consultant and submitted to CGWA and MOEF, hydrogeological report is attached in Annexure 3
2)	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintained. The natural waterbodies and or streams which are flowing in and around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the PP must provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table. The Report on changes in Ground Water level and quality shall be submitted on 6-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department/State Pollution Control Board.	Complied	The natural water bodies or streams are not disturbed that flow around the mine outside the lease . The ground water table is monitored by Digital water level recorder (piezometer) 24 x 7. Till now there is no water scarcity recorded in the area or reduction in water table
3)	The Project Proponent shall regularly monitor and maintain records wrt ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezometer installations during the mining operations in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on 6-monthly basis to the Regional Office of the Ministry, CGWA and State	Complied	Complied as per CGWA conditions. The ground water level is recorded by Digital water level recorder (piezometers) system inside the mine premises and the ground water quality is monitored. There is no significant reduction in the water table level, and the ground water quality is attached in Annexure 1

	Groundwater Department/ State Pollution Control Board.		
4)	The PP shall undertake regular monitoring of natural water course/water resources/springs and perennial nallahs existing/flowing in and around the mine lease and maintain its records. The project proponent shall undertake regular monitoring of water quality upstream and downstream of water bodies passing within and nearby/adjacent to the mine lease and maintain its records. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. PP shall carry out regular monitoring wrt pH and include their water quality vis-à-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/or alteration be made to water bodies during mining operations without justification and prior approval of MoEFCC. The monitoring of water courses/bodies existing in lease area shall be carried out four times in a year viz. pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on 6-monthly basis.	Complied	The Karo river water at upstream and downstream is monitored on monthly basis and reports are attached as per Annexure 1 as Karo river is adjacent to the mine and ground water is also monitored monthly once as per CPCB guidelines and the report is attached in Annexure 1
5)	Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the	Complied	Quality of mine discharge and treated water of STP Maintained and water quality monitored regularly, TSS, TDS, pH, COD, BOD and other parameters are monitored Monitoring data also shared SPCB and MOEFCC.

	company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular no. J-20012/1/2000-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.		
6)	Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment groundwater resources in the area in consultation with Central Ground Water Board/State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office MoEFCC annually.	Complied	A suitable ground water conservation is followed like harvesting rain water in settling ponds and part of it getting recharged. The report of quantity of rain water recharged is attached in Annexure 4
7)	Industrial wastewater (workshop and wastewater from the mine) should be properly collected and treated so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through CTO and issued by SPCB. The workshop effluent shall be treated after its initial passage through oil and grease trap.		As there is no workshop located inside the mine lease area, no industrial wastewater is generated that requires treatment in an Effluent Treatment Plant (ETP)
8)	The water balance/water auditing shall be carried out and measured for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEFF&CC and State Pollution Control Board/Committee.	Complied	Action plan and taken for reducing water consumption, monthly MIS is tracked for water consumption like reuse of mien pit water for sprinkling purpose and STP installation so water is reused
IV.	<u>Noise and vibration monitoring and prevention</u>		
9)	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines	Complied	PPV at a 500m distance or within the nearest habitation is maintained as per DGMS Guideline.
10)	The illumination and sound at night at project sites disturb the villages in respect to both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to	Complied	Complied as per DGMS standard and noise monitoring is done monthly once the value is under the limit prescribed by SPCB/ All the lights which are installed in the mine are focused towards working mine pit hence it does not reach to the village side also safety

	mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/masks away from the villagers and keeping the noise levels well within the prescribed limits for day/night hours.		zone of 7.5 m is there around mine leas that acts as a barrier
11)	The PP shall take measures for control of noise levels below 85 dB in the work environment. The workers engaged in operations of HEMM, etc. should be provided with ear plugs/muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/personnels/labourers are working without personal protective equipment.	Complied	Necessary precautions are in place to prevent the noise pollution, workers are provided with ear plugs , dust mask in PPE kit and saplings are planted in safety zone area as a barrier
V.	<u>Mining Plan</u>		
12)	PP shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal wherein year-wise plan was mentioned for total excavation i.e. quantum of mineral, waste, overburden, interburden and topsoil, etc. No change in basic mining proposal like mining technology, total excavation, mineral and waste production, lease area and scope of working, viz. method of mining, overburden and dump management, OB and dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval of Ministry of Environment, Forest and Climate Change, which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by State Govt. in the form to Short Term Permit (STP), Query license or any other	Complied	Complied as per Approved Mining Plan issued by the IBM, Bhubaneswar. No change has been made in basic mining proposal like mining technology, excavation, waste production

	name.		
13)	The PP shall get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines/ Department of Mining and Geology as required under the provision of the MMDR Act, 1957 and Rules/Guidelines made there under. A copy of approved mine closure plan shall be submitted within 2 months of the approval of the same from the competent authority to the Regional Office of the Ministry of Environment, Forest and Climate Change for record and verification.	Agreed to comply	Will be complied as per Approved Mining Plan issued by the IBM, Bhubaneswar.
14)	The land use of the mine lease area at various stages of mining scheme as well as the end of life shall be governed as per the approved Mining Plan. The excavation vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to the MoEFCC and its concerned Regional Office.	Complied	The land use of the mine lease area at various stages of mining scheme as well as the end of life is governed as per the approved Mining Plan. The land use of mine lease is submitted in the previous reporting cycle
VI.	<u>Land Reclamation</u>		
15)	The O.B. generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS wrt safety in mining operations shall be strictly adhered to maintain the stability of topsoil/OB dumps. The topsoil shall be used for land reclamation and plantation.	Complied	The O.B. generated during the mining operations is stacked at OB dump. The physical parameters of the OB dumps like height, width and angle of slope is governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS wrt safety in mining operations is adhered to maintain the stability of OB dumps.
16)	The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only.	Complied	The waste / reject generated is stacked at waste dump and physical parameter like height, width and angle of slope is

	The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.		maintained as per DGMS
17)	The reclamation of waste dump sites shall be done in scientific manner as per the Approved Mining Plan cum Progressive Mine Closure Plan	Agreed to Comply	As the dumps are not finalized they are active dumps hence it will be complied once the dump gets finalized
18)	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozers/compactors thereby ensuring proper filling/levelling of dump mass. In critical areas, use of geo textiles/geo membranes/ clay liners/ bentonite etc. shall be undertaken for stabilization of the dump.	Agreed to Comply	As the dumps are not finalized they are active dumps once it is not finalized it will be vegetated in scientific manner of local species, once the dumps are not finalized laying of geo-textile will be done
19)	The PP shall carry out slope stability study in case the dump height is more than 30 m. The slope stability report shall be submitted to concerned regional office of MoEF&CC.	Complied	Slope stability test/study is done by CSIR-CIMFR and slope stability test/study for pit and dump is done by CSIR-CIMFR and reports submitted in the last reporting cycle
20)	Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mine yards and topsoil/OB/waste dumps to prevent runoff of water and flow of sediments directly into the water bodies (nallah/river/pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained	Complied	Settling ponds and check dams are constructed along with retaining wall at toe of dump and garland drain at benches to prevent run off water and diverted to the pits, the part of collected water is reused

	properly.		
21)	Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time thereby allowing proper settling of sediments/silt material. The sedimentation pits/sumps shall be constructed at the corners of the garland drains.	Complied	Check dams are in place and every pre-monsoon the check dam, settling ponds are desilted and maintained regularly based on the inspection of check dams and settling ponds
22)	The topsoil, if any, shall temporarily be stored at earmarked site(s) within the mine lease only and should not be kept unutilized for long. The physical parameters of the topsoil dumps like height, width and angle of slope shall be governed as per the approved Mining Plan and as per the guidelines framed by DGMS wrt safety in mining operations shall be strictly adhered to maintain the stability of dumps. The topsoil shall be used for land reclamation and plantation purpose.	Complied	There is no top soil because it is a brownfield mine as the top soil is handled by previous lease
VII.	<u>Transportation</u>		
23)	No transportation of the minerals shall be allowed in case of roads passing through villages/habitations. In such cases, PP shall construct a 'bypass' road for transportation of the minerals leaving an adequate gap (say at least 200 m) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with Nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/rural roads shall be allowed in consultation with nodal	Complied	Transportation of mineral is done on bypass roads there is no roads passing through village / habitations. Vehicular emissions are kept under control and regularly monitored of Pollution Under Control (PUC) certificate and water sprinkling is done in mine and exit gate for dust suppression.

	State Govt. Department only after required strengthening such that the carrying capacity of roads increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.		
24)	The main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards, etc. should invariably be provided with dust suppression arrangements. The air pollution control equipment's like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at crushers, belt conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.	Complied	As there is no permanent haul road in the mine it is not feasible for fixed haul sprinklers, instead water is sprinkled via mobile tankers capacity, installed mist canon system and areas like crushing plants are provided with sprinkling system
VIII.	<u>Green Belt</u>		
25)	The Project Proponent shall develop Green Belt in 7.5m wide safety zone all along. The mine lease boundary as per the guidelines of CPCB to arrest pollution emanating from mining operations within the lease. The whole green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of green belt shall be governed as per the EC granted by the Ministry irrespective of the stimulation made in approved mine plan.	Complied	The Project Proponent has already developed Green Belt in 7.5m wide safety zone all along the lease.

26)	The PP shall carryout plantation/afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/Agriculture Department/ Rural Development department/ Tribal welfare department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this regard shall also be adhered. The density of the trees should be around 2500 saplings per Ha. Adequate budgetary provision shall be made for protection and care of trees.	Complied	Plantation and afforestation proposal conducted as per Approved Mining Plan and CTO conditions in mining lease area, along the roadside of community and density is also maintained
27)	The PP shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Govt. In this regard, the PP should essentially implement the directions of the Hon'ble Supreme Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/protected against felling and plantation of such trees should be promoted.	Complied	There was no gazing land that was in the mine lease if any is instructed from State Government co-operation will be provided
28)	The PP shall undertake all precautionary measures for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation. A wildlife conservation plan shall be prepared for the same clearly delineating action to be taken for conservation of flora and fauna. The Plan shall be approved by Chief Wild Life warden of the State Govt.	Complied	Will always take necessary precautions to preserve the endangered flora and fauna and schedule-I species during mining operations. a wildlife management plan is prepared by previous lessee and it is approved by Chief wild life warden
29)	And implemented in consultation with the State Forest and Wildlife Department. A copy of wildlife	Complied	Submitted by the previous lessee.

	conservation plan and its implementation status (annual) shall be submitted to the Regional Office of the Ministry.		
IX.	<u>Public Hearing and Human Health Issues</u>		
30)	The PP shall appoint an Occupational Health Specialist for Regular as well as Periodical medical examination of the workers engaged in the mining activities, as per the DGMS guidelines. The records shall be maintained properly. PP shall also carry out Occupational Health check-ups in respect of workers who have ailments like BP, diabetes, habitual smoking, etc. The check-ups shall be undertaken once in six months and necessary remedial/preventive measures be taken. A status report on the same day be sent to MoEFCC Regional Office and DGMS on half-yearly basis.	Complied	Appointed a doctor for Regular as well as Periodical medical examination of the workers engaged in the mining activities, as per the DGMS guidelines. The records is maintained properly. Occupational Health check-ups in respect of workers is carried out by Health camps The status report are attached in Annexure 5
31)	The PP must demonstrate commitment to work towards 'Zero Harm' from their mining activities and carry out HIRA for identification of workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and well-being of workers and nearby community. The Proponent shall maintain accurate and systematic records of the HRA. The HRA for neighborhood has to focus on Public health problems like Malaria, Tuberculosis, HIV, Anaemia, Diarrhoea in children under 5 years, respiratory infections due to bio mass cooking. The Proponent shall also create awareness and educate the nearby community and workers for Sanitation, Personal Hygiene, Hand washing, not to defecate in open, Women health and hygiene (providing sanitary napkins), hazard of tobacco and alcohol use. The Proponent shall carryout baseline HRA for all the category of workers and thereafter	Complied	PP works towards zero harm by identification of various hazards of each and every activity by HIRA and their severity is analyzed and action plan was made. HIRA for Occupational health which focuses on infections and activity that affect health. Awareness is created to nearby community on sanitation, Personal hygiene.

	every 5 years.		
32)	The Proponent shall carry out Occupational Health surveillance which be a part of HRA and include Biological monitoring where practical and feasible, and then the tests and investigations relevant to the exposure (e.g. for dust a X-Ray chest; for nose audiometric; for lead exposure blood lead; for welders full Ophthalmologic Assessment; for Manganese Miners a complete Neurological Assessment by a Certified Neurologist, and Manganese (Mn) Estimation in Blood; For Inorganic Chromium- Fortnightly skin infection of hands and forearms by a responsible person. Except routine tests, all tests would be carried out in a lab accredited by NABH. Records of Health Surveillance must be kept for 30 years, including results of physical examination and tests. The record of exposure due to materials like Asbestos, Hard Rock Mining, Silica, Gold, Kaolin, Aluminum, Iron, Manganese, Chromium, Lead, Uranium needs to be handed over to the Mining department of the State in case the life of the mine is less than 30 years. It would be obligatory for the State Mines Departments to decide for the safe and secure storage of the records including X-Ray. Only conventional X-Ray will be accepted for record purposes and not the digital one.) X-Ray must meet ILO criteria (17x14 inches and of good quality).	Complied	Occupational health surveillance is done by health camps . 1.Regular health monitoring, including tests specific exposures (e.g., chest X-rays for dust exposure, audiometry for noise is covered in Medical examination records of IME and PME 2. Reports are as per NABH-accredited labs, and X-rays meeting ILO standards for size (17x14 inches) and quality. 3. Health Records (health camps, IME and PME records are available in OHC)
33)	The Proponent shall maintain a record of performance indicators for workers which includes (a) there should not be significant decline in their Mass Body Index and it should stay between 18.5-24.9, (b) the final chest X-Ray compared with the Baseline X-Ray should not show any capacities, (c) at the end of their leaving job, there should be no Diminution in their Lung Functions Forced Expiratory Volume	Complied	Complied through monthly health camps and Medical examination of works as per DGMS guidelines. and records are maintained

	in one second (FEV1), Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age, (d) their hearing should not be affected. As a proof, an audiogram (first and last need to be presented), (e) they should not have developed any Persistent Back Pain, Neck Pain and the movement of their Hip, Knee and other joints should have normal range of movement, (f) they should not have suffered loss of any body part. The record of the same should be submitted to the Regional office, MoEF&CC annually along with details of the relief and compensation paid to workers having above indicators.		
34)	The PP shall ensure that 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.	Complied	Compiled by providing suitable PPE like dust mask, ear plugs and training are provided to provide awareness on safety and health aspects
35)	PP shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche for kids, etc. The housing may be provided in the form of temporary structures which can be removed after the completion of the project related infrastructure. The domestic wastewater should be treated with STP to avoid contamination of underground water.	Complied	Workers colony is provided along with canteen facilities, with all basic infrastructure are provided with safe drinking water, also a STP of 60 KLD capacity is in place to treat the domestic waste water
36)	The activities proposed in action plan prepared for addressing the issues raised during the Public Hearing shall be completed as per the budgetary provisions mentioned in the Action Plan and within the stipulated time frame. The Status Report on implementation of Action Plan shall be submitted to the concerned Regional	Complied	Action plan is compiled by previous lessee

	Office of the Ministry along with District Administration.		
X.	<u>Corporate Environment Responsibility (CER)</u>		
37)	The activities and budget earmarked for CER as per Ministry's O.M No. 22-65/2017-IA. II (M) dated 01.05.2018 or as proposed by EAC should be kept in a separate bank account. The activities proposed for CER shall be implemented in a time bound manner and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude and longitude of infrastructure developed and road constructed needs to be submitted to Regional Office MoEF&CC annually along with audited statement.	Complied	Complied by previous lessee
38)	PP shall keep the funds earmarked for environmental protection measures in a separate account and refrain from diverting the same for other purposes. The year wise expenditure of such funds should be reported to the MoEF&CC and its concerned Regional Office.	Complied	Annual Budget kept for environmental protection measures and also tracking system in place to track the amount spent. The expenditure report for FY 25-26 is attached in Annexure 6
XI.	<u>Miscellaneous</u>		
39)	The Project Proponent shall prepare digital map (land use and land cover) of the entire lease area once in 5 years purpose of monitoring land use pattern and submit a report to concerned regional office of the MOEF&CC.	Complied	LULC map is prepared by ORSAC on profile of Dec-2021 and same is submitted in the last reporting cycle. The PP will ensue to prepare digital map every 5 year
40)	The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	Agreed to Comply	Noted
41)	The PP shall submit 6 monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MoEF&CC and its concerned regional office, CPCB and SPCB.	Complied	Noted
42)	A separate 'Environmental Management Cell' with suitable	Complied	The environmental cell is established including senior executives reporting

	qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall report directly to Head of the Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEFCC.		directly to Unit Head. The list of committee members is attached in Annexure 7
43)	The concerned Regional office of the MoEFCC shall randomly monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the MoEFCC officer(s) by furnishing the requisite data/information/monitoring reports.	Complied	Noted
44)	The Ministry or any other competent authority may alter / modify the above conditions or stipulate any further condition in the interest of environment protection	Complied	Noted
45)	Concealing factual data or submission of false/fabricated data and failure to comply with any of the condition mentioned above may result in withdrawal of this clearance and attract action under the provision of Environmental (Protection) Act 1986	Complied	Noted
46)	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, Environment (Protection) Act 1986 and the Public Liability insurance act 1991, along with their amendments and rules made there under and also any other order passed by the Honorable Supreme Court of India / high Court of Odisha and any other Court of law relating to the subject matter	Complied	Noted
47)	Any appeal against the environmental clearance shall lie with the National Green tribunal if preferred within a period of 30 days as prescribed under the section 16 of the National Green Tribunal Act 2010	Complied	Noted there was no appeal

**ENVIRONMENT MONITORING REPORT
FOR THE MONTH OF
OCTOBER- 2025**



NARAYANI

**Client- M/s. Nadidih Iron Ore & Mn Mines
(FEEGRADE),**

M/s ESL Steel Limited,

Address- Koira, Sundargarh, Odisha.



Monitored By - Green Force Associates Pvt. Ltd.

Address- Plot No-1363-3892 ,

Bhaibhab Realcon, Fulnakhara, Cuttack,

Odisha- 754001

NABL Certificate No:- TC-12258

PHOTOGRAPHS OF ENVIRONMENT MONITORING



Report No- GFAPL/25-26/ESLFG/116

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.10.2025	40.8	19.3	<4.0	<9.0
06.10.2025	38.2	18.8	<4.0	<9.0
09.10.2025	44.9	22.2	4.8	9.8
13.10.2025	48.6	24.2	5.2	10.4
16.10.2025	52.4	26.2	5.8	11.2
20.10.2025	55.9	28.1	6.2	11.8
23.10.2025	59.2	29.6	6.4	12.4
27.10.2025	61.5	30.8	6.8	13.2
30.10.2025	50.8	25.2	5.8	11.4
Max	61.50	30.80	6.80	13.20
Min	38.20	18.80	<4.0	<9.0
Average	50.26	24.93	5.86	11.46
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

Authorized Signatory

CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Chief Analyst
BHUBANESWAR, ODISHA
Miss. Ardi Sahoo

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/117

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ2- Near Mine In-gate; Lat: 21°57'28.39"N & Long: 85°15'19.40"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.10.2025	45.6	22.3	5	10
06.10.2025	42.8	20.2	4.8	9.8
09.10.2025	50.9	25.2	5.6	10.8
13.10.2025	54.9	27.4	6.2	11.8
16.10.2025	58.8	29.4	6.8	12.8
20.10.2025	64.6	32.4	7.4	13.8
23.10.2025	69.8	35.2	7.8	14.8
27.10.2025	72.5	36.8	8.2	15.4
30.10.2025	62.8	31.5	7.4	13.6
Max	72.50	36.80	8.20	15.40
Min	42.80	20.20	4.80	9.80
Average	58.08	28.93	6.58	12.53
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA
Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/118

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.10.2025	23.2	11.2	<4.0	<9.0
06.10.2025	22.8	10.8	<4.0	<9.0
09.10.2025	29.9	14.5	<4.0	<9.0
13.10.2025	34.5	17.2	<4.0	<9.0
16.10.2025	38.9	19.4	<4.0	<9.0
20.10.2025	44.1	23.2	4.6	9.8
23.10.2025	48.6	24.3	4.8	9.8
27.10.2025	51.2	25.5	5	10
30.10.2025	46.4	23.1	4.6	9.6
Max	51.20	25.50	5.00	10.00
Min	22.80	10.80	<4.0	<9.0
Average	37.73	18.80	4.75	9.80
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

Chief Analyst
BHUBANESHWAR, ODISHA
Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Technical Manager
BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/119

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.10.2025	22.2	10.6	<4.0	<9.0
06.10.2025	20.7	10.2	<4.0	<9.0
09.10.2025	28.1	13.6	<4.0	<9.0
13.10.2025	33.8	16.6	<4.0	<9.0
16.10.2025	36.4	18.1	<4.0	<9.0
20.10.2025	40.5	20.2	<4.0	<9.0
23.10.2025	45.2	22.6	4.6	9.6
27.10.2025	48.4	24.1	4.8	9.8
30.10.2025	44.3	22.1	<4.0	<9.0
Max	48.40	24.10	4.80	9.80
Min	20.70	10.20	<4.0	<9.0
Average	35.51	17.57	4.70	9.70
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

Authorized Signatory

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GREENFORCE ASSOCIATES PRIVATE LIMITED
Chief Analyst
BHUBANESWAR, ODISHA
Miss. Arti Sahoo

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

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END OF REPORT

GREEN FORCE

ASSOCIATES PRIVATE LIMITED

An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory

Report No- GFAPL/25-26/ESLFG/120

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat:21°58'18.92"N & Long: 85°15'23.08"E AAQ2- Near Mine In-gate; Lat:21°57'35.245"N & Long: 85°15'12.007"E AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)			
	AAQ1	AAQ2	AAQ3	AAQ4
02.10.2025	0.23	0.26	0.12	0.1
06.10.2025	0.21	0.24	0.11	0.1
09.10.2025	0.24	0.28	0.14	0.12
13.10.2025	0.28	0.31	0.16	0.14
16.10.2025	0.3	0.33	0.19	0.16
20.10.2025	0.32	0.34	0.22	0.19
23.10.2025	0.33	0.35	0.23	0.21
27.10.2025	0.34	0.37	0.24	0.22
30.10.2025	0.32	0.34	0.22	0.19
Max	0.34	0.37	0.24	0.22
Min	0.21	0.24	0.11	0.10
Average	0.29	0.31	0.18	0.16
NAAQ* Standard	4 mg/m3 (for 1hr)			
Methods of Analysis	IS: 5182 (Part- 10)			

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED.

BHUBANESHWAR, ODISHA

Mr. S.K. Parhi

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/121

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat: 21°59'52.38"N, & Long: :85°13'9.76"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
01.10.2025	22.1	10.9	<4.0	<9.0
04.10.2025	21.5	10.6	<4.0	<9.0
08.10.2025	28.2	13.8	<4.0	<9.0
11.10.2025	34.2	17.1	<4.0	<9.0
15.10.2025	38.4	19.1	<4.0	<9.0
18.10.2025	43.6	21.6	4.6	9.8
22.10.2025	46.9	23.4	4.8	9.8
25.10.2025	50.2	25.1	5	10.2
29.10.2025	45.8	22.7	4.6	9.6
Max	50.20	25.10	5.00	10.20
Min	21.50	10.60	<4.0	<9.0
Average	36.77	18.26	4.75	9.85
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. S.K. Parhi

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/122

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirā, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
01.10.2025	21.8	10.5	<4.0	<9.0
04.10.2025	20.4	10.1	<4.0	<9.0
08.10.2025	26.9	13.1	<4.0	<9.0
11.10.2025	29.6	14.7	<4.0	<9.0
15.10.2025	35.2	27.6	<4.0	<9.0
18.10.2025	39.6	19.6	<4.0	<9.0
22.10.2025	44.2	22.1	4.6	9.6
25.10.2025	46.8	23.5	4.8	9.8
29.10.2025	42.5	21.1	<4.0	<9.0
Max	46.80	27.60	4.80	9.80
Min	20.40	10.10	<4.0	<9.0
Average	34.11	18.03	4.70	9.70
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

Authorized Signatory

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GREEN FORCE

ASSOCIATES PRIVATE LIMITED

An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory

Report No- GFAPL/25-26/ESLFG/123

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat:21°59'52.38"N, & Long: :85°13'9.76"E AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)	
	AAQ5	AAQ6
01.10.2025	0.11	0.1
04.10.2025	0.1	0.1
08.10.2025	0.13	0.12
11.10.2025	0.16	0.14
15.10.2025	0.19	0.16
18.10.2025	0.22	0.18
22.10.2025	0.23	0.2
25.10.2025	0.24	0.21
29.10.2025	0.22	0.19
Max	0.24	0.16
Min	0.10	0.10
Average	0.18	0.16
NAAQ* Standard	4 mg/m3 (for 1hr)	
Methods of Analysis	IS: 5182 (Part- 10)	

Reviewed By

Authorized Signatory

CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Chief Analyst
BHUBANESWAR, ODISHA
Miss. Arti Sahoo

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/124

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Fugitive Dust Emission (F)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	F1: Mine Face Area; Lat:21° 57' 38.43"N & Long: 85° 15' 16.19"E; F2: Haul Road; Lat:21° 57' 38.16"N & Long: 85° 15' 14.66"E; F3: Near Crushing Plant; Lat: 21° 57' 46.19"N & Long: 85° 15' 10.74"E; F4: Near Screening Plant-1; Lat:21° 57' 47.89"N & Long:85° 15' 21.11"E; F5: Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E; F6: Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;		
Instrument Used	Respirable Dust Sampler (RDS)		

Sl. No.	Date of Sampling	Result (µg/m ³)					
		F1	F2	F3	F4	F5	F6
1	03.10.2025	228.5	212.5	284.5	306.8	178.2	205.2
2	07.10.2025	198.3	184.1	264.3	278.3	156.7	169.3
3	10.10.2025	428.5	342.5	542.5	605.2	356.2	294.5
4	14.10.2025	505.2	424.5	681.2	705.3	402.5	453.6
5	17.10.2025	624.5	516.2	709.6	784.2	459.3	502.4
6	21.10.2025	682.7	584.5	789.6	824.6	524.8	559.3
7	24.10.2025	724.6	624.2	846.5	887.2	556.4	594.2
8	28.10.2025	584.2	435.2	702.4	784.2	434.5	485.2
9	31.10.2025	567.5	342.6	542.6	584.2	342.8	394.2
Max		724.60	624.20	846.50	887.20	556.40	594.20
Min		198.30	184.10	264.30	278.30	156.70	169.30
Average		504.89	431.73	595.91	640.00	379.04	406.43
Fugitive Standard		1200 µg/m ³					
Methods of Analysis		IS:5182 (Part-4)					

Reviewed By
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GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA

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TECHNICAL MANAGER
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BHUBANESWAR, ODISHA

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Report No- GFAPL/25-26/ESLFG/125

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	14.10.2025	Date of Completion	15.10.2025
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Near Mine Office; Lat:21°58'18.92"N & Long: :85°15'23.08"E	56.8	40.7
2	Near Mine In gate; Lat:21°57'35.245"N & Long: :85°15'12.007"E	68.5	60.2
3	Near Screening Plant-1; Lat: 21°57'42.30"N & Long: 85°15'9.04"E	68.6	61.5
4	Near Crusher; Lat: 21°57'48.19"N, Long: 85°15'20.00"E	68.8	60.4
5	Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E;	62.8	56.4
6	Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;	66.9	62.6
<i>Noise permissible limits as per CPCB Norms in dB(A) Leq</i>			
Category of Area		Day Time	Night Time
Industrial Area		75	70
Commercial Area		65	55
Residential Area		55	45
Sensitive Area/ Silence Zone		50	40

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Report No- GFAPL/25-26/ESLFG/126

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Residential Area
Date of Sampling	17.10.2025	Date of Completion	18.10.2025
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Village Rengalberha; Lat:21°57'19.11"N, & Long: :85°15'43.28"E	47.5	37.2
2	Village Kalta; Lat:21°58'2.93"N, & Long: : 85°13'20.36"E	47.4	37.4
3	Village Jhirapani; Lat:21°59'52.38"N & Long:85°13'9.76"E	47.8	37.8
4	Village Kashira; Lat:21°55'9.95"N & Long:85°15'18.13"E	47.4	37.3

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

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Report No- GFAPL/25-26/ESLFG/127

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS-11255
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	14.10.2025	Date of Receiving	16.10.2025
Date of Analysis	16.10.2025	Date of Complete	19.10.2025
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: -85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Temperature	IS-11255 (PART-3) 1985	K	---	443
02	Velocity	IS-11255 (PART-3) 1985	m/sec	---	17.6
03	Particulate Matter as PM	IS-11255(PART-1) 1985 Gravimetric Method	mg/Nm3	100	76.2
04	Sulphur dioxide as SO2	IS-11255(PART-2) 1985	mg/Nm3	600	62.4
05	Carbon Monoxide as CO	IS-13270:1992	%	1%	<0.2
06	Carbon Dioxide as CO2	IS-13270:1992	%	---	1.3
07	Oxygen as O2	IS-13270:1992	%	---	16.6

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Chief Analyst
Miss. Aru Sahoo

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TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Technical Manager
Mr. S.K. Parhi

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Date of Sampling	14.10.2025	Date of Receiving	16.10.2025
Date of Analysis	16.10.2025	Date of Complete	19.10.2025
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & & Long: :-85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Nitrogen Oxide as NOx	IS-11255(PART-7) 1985	mg/Nm3	300	66.8

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Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	14.10.2025	Date of Receiving	16.10.2025
Date of Analysis	16.10.2025	Date of Complete	19.10.2025
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	pH	APHA 24th ED 4500- H+B:2023	--	6.5-9.0	7.88	7.18
2.	Total Suspended Solids	APHA 24th ED 2540-D: 2023	mg/l	100	242	18
3.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	4.8	<2.0
4.	Biological Oxygen Demand as BOD	IS 3025 (PART 44):1993	mg/l	30	36	<2.0
5.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 B:2023	mg/l	--	80	10

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

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Miss. Arti Sahoo

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TECHNICAL MANAGER

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Report No- GFAPL/25-26/ESLFG/128

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	14.10.2025	Date of Receiving	16.10.2025
Date of Analysis	16.10.2025	Date of Complete	19.10.2025
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	Fecal Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	<1000	<1.8	<1.8

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

Bhubaneswar, Odisha
Miss. Arti Sahoo

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TECHNICAL MANAGER

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Report No- GFAPL/25-26/ESLFG/129

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.10.2025	Date of Receiving	18.10.2025
Date of Analysis	18.10.2025	Date of Complete	22.10.2025
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	60	100
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	56	78
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.17	7.21
4.	Conductivity	APHA 24th ED 2510-B: 2023	μS/cm	--	155.2	169.6
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	97	106
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	11	13
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.27	0.32
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	2.9	3.1
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	3.7	3.6
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	6	8
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05	<0.05

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Bhubaneswar, ODISHA

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Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.10.2025	Date of Receiving	18.10.2025
Date of Analysis	18.10.2025	Date of Complete	22.10.2025
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.14	1.32
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001	<0.001
7.	Selenium as Se	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	900	900

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/130

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.10.2025	Date of Receiving	18.10.2025
Date of Analysis	18.10.2025	Date of Complete	22.10.2025
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	100
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	88
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.22
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	188.8
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	118
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	16
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.34
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	4.9
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.5
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	12
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05

Reviewed By
CHIEF ANALYST
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESHWAR, ODISHA
 Miss. Arti Sahoo

Authorized Signatory
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESHWAR, ODISHA
 Mr. S.R. Parhi

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ASSOCIATES PRIVATE LIMITED

An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory

Report No- GFAPL/25-26/ESLFG/130

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.10.2025	Date of Receiving	18.10.2025
Date of Analysis	18.10.2025	Date of Complete	22.10.2025
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.36
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	900

Reviewed By

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GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/131

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	14.10.2025	Date of Receiving	16.10.2025
Date of Analysis	16.10.2025	Date of Complete	19.10.2025
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	70
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	84
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	5.5-9.0	7.34
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	230.4
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	144
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	19
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.39
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	8.6
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.06
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	6.5
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	16
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.08

Reviewed By
CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Chief Analyst
BHUBANESHWAR, ODISHA
Miss. Arti Sahoo

Authorized Signatory
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/131

Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	14.10.2025	Date of Receiving	16.10.2025
Date of Analysis	16.10.2025	Date of Complete	19.10.2025
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	--	2.88
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	--	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	--	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	--	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	--	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	--	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	--	900

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

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Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	O ₃ ($\mu\text{g}/\text{m}^3$)	NH ₃ ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	21.10.2025	<8.0	<20.0
AAQ-2	Near Mine In Gate;	21.10.2025	<8.0	<20.0
AAQ-3	Near Rengalberha;	21.10.2025	<8.0	<20.0
AAQ-4	Near Kalta;	21.10.2025	<8.0	<20.0
AAQ-5	Village Jhirapani;	20.10.2025	<8.0	<20.0
AAQ-6	Village Kashira;	20.10.2025	<8.0	<20.0
NAAQ* Standard			100	400
Methods of Analysis			IS:5182 (Part-9)	IS:5182 (Part-25)

Reviewed By

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BHUBANESHWAR, ODISHA

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Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
AAQ-1	Near Vedanta Office	21.10.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-2	Near Mine InGate;	21.10.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-3	Near Rengalberha;	21.10.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-4	Near Kalta;	21.10.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-5	Village Jhirapani;	20.10.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-6	Village Kashira;	20.10.2025	<0.06	<0.6	<0.44	<5	<1
NAAQ* Standard			1	20	6	5	1
Methods of Analysis			IS:5182 (Part-22)	IS:5182 (Part-26)	As per CPCB method followed by AAS	IS:5182 (Part-11)	IS:5182 (Part-12)

Reviewed By

CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
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Issued Date-07.11.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Free Silica ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	21.10.2025	<2.0
AAQ-2	Near Mine InGate;	21.10.2025	<2.0
AAQ-3	Near Rengalberha;	21.10.2025	<2.0
AAQ-4	Near Kalta;	21.10.2025	<2.0
AAQ-5	Village Jhirapani;	20.10.2025	<2.0
AAQ-6	Village Kashira;	20.10.2025	<2.0
Methods of Analysis			NIOSH Method 7500 by X-Ray Diffraction

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

Chief Analyst
Miss. Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Technical Manager
Mr. S.K. Parhi

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**ENVIRONMENT MONITORING REPORT
FOR THE MONTH OF
NOVEMBER- 2025**



NARAYANI

**Client- M/s. Nadidih Iron Ore & Mn Mines
(FEEGRADE),**

M/s ESL Steel Limited,

Address- Koira, Sundargarh, Odisha.



Monitored By - Green Force Associates Pvt. Ltd.

Address- Plot No-1363-3892 ,

Bhaibhab Nagar, Lane-2, Fulnakhara,

Bhubaneswar, Khurda, Odisha- 754001

NABL Certificate No:- TC-12258

PHOTOGRAPHS OF ENVIRONMENT MONITORING





GREEN FORCE

ASSOCIATES PRIVATE LIMITED



TC-12258

Report No- GFAPL/25-26/ESLFG/133

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.11.2025	53.4	26.7	6	11.6
06.11.2025	55.1	27.8	6.4	12
10.11.2025	56.9	28.8	6.4	12.2
13.11.2025	58.2	29.5	6.8	12.8
17.11.2025	57.5	28.6	7	13.2
20.11.2025	59.4	29.8	7.2	13.4
24.11.2025	61.8	32.1	7.4	13.8
27.11.2025	58.6	29.5	7.4	14
Max	61.80	32.10	7.40	14.00
Min	53.40	26.70	6.00	11.60
Average	57.61	29.10	6.83	12.88
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

Authorized Signatory

TECHNICAL MANAGER

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

BHUBANESWAR, ODISHA

Mr. S.K. Parhi

Mr. M.K. Swain

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TC-12258

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Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ2- Near Mine In-gate; Lat: 21°57'28.39"N & Long: 85°15'19.40"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.11.2025	65.1	32.8	7.4	13.8
06.11.2025	68.6	34.5	7.8	14.4
10.11.2025	69.3	34.9	8.2	15.6
13.11.2025	72.5	36.8	8.4	16
17.11.2025	74.8	38.1	8.6	16.4
20.11.2025	73.1	37.7	8.6	16.8
24.11.2025	75.9	38.8	8.8	17.2
27.11.2025	74.2	37.6	8.8	17.4
Max	75.90	38.80	8.80	17.40
Min	65.10	32.80	7.40	13.80
Average	71.69	36.40	8.33	15.95
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

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TC-12258

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Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.11.2025	48.1	23.8	4.8	9.8
06.11.2025	50.6	25.1	4.8	10
10.11.2025	52.8	26.2	5	10.2
13.11.2025	54.1	26.8	5.2	10.4
17.11.2025	56.7	28.4	5.4	10.6
20.11.2025	55.5	27.6	5.4	10.8
24.11.2025	57.2	28.5	5.6	10.8
27.11.2025	54.3	27.2	5.4	10.6
Max	57.20	28.50	5.60	10.80
Min	48.10	23.80	4.80	9.80
Average	53.66	26.70	5.20	10.40
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/136

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.11.2025	47.1	23.5	<4.0	<9.0
06.11.2025	49.4	24.5	<4.0	<9.0
10.11.2025	50.1	24.8	<4.0	<9.0
13.11.2025	51.2	25.4	4.6	9.6
17.11.2025	54.2	26.8	4.6	9.8
20.11.2025	53.6	26.5	4.8	9.8
24.11.2025	55.7	27.2	5.2	10.2
27.11.2025	53.3	26.7	5.2	10.2
Max	55.70	27.20	5.20	10.20
Min	47.10	23.50	<4.0	<9.0
Average	51.83	25.68	4.88	9.92
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/137

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat:21°58'18.92"N & Long: 85°15'23.08"E AAQ2- Near Mine In-gate; Lat:21°57'35.245"N & Long: 85°15'12.007"E AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)			
	AAQ1	AAQ2	AAQ3	AAQ4
03.11.2025	0.33	0.35	0.22	0.18
06.11.2025	0.34	0.37	0.22	0.19
10.11.2025	0.34	0.38	0.23	0.19
13.11.2025	0.35	0.39	0.23	0.2
17.11.2025	0.36	0.39	0.24	0.21
20.11.2025	0.36	0.4	0.25	0.21
24.11.2025	0.37	0.41	0.25	0.22
27.11.2025	0.37	0.41	0.24	0.22
Max	0.37	0.41	0.25	0.22
Min	0.33	0.35	0.22	0.18
Average	0.35	0.39	0.24	0.20
NAAQ* Standard	4 mg/m3 (for 1hr)			
Methods of Analysis	IS: 5182 (Part- 10)			

Reviewed By

TECHNICAL MANAGER

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BHUBANESWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

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BHUBANESWAR, ODISHA

Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/138

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat: 21°59'52.38"N, & Long: :85°13'9.76"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
04.11.2025	46.9	23.4	4.6	9.6
07.11.2025	48.2	24.1	4.6	9.6
11.11.2025	51.4	25.5	4.8	9.8
14.11.2025	50.6	25.2	4.8	10
18.11.2025	52.9	26.4	5	10.2
21.11.2025	54.1	26.8	5.2	10.4
25.11.2025	56.2	27.5	5.4	10.8
28.11.2025	53.5	26.8	5.2	10.6
Max	56.20	27.50	5.40	10.80
Min	46.90	23.40	4.60	9.60
Average	51.73	25.71	4.95	10.13
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
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BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

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BHUBANESWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
04.11.2025	44.2	21.8	<4.0	<9.0
07.11.2025	47.6	23.4	<4.0	<9.0
11.11.2025	49.1	24.3	<4.0	<9.0
14.11.2025	48.7	24.1	<4.0	<9.0
18.11.2025	51.2	25.5	4.6	9.6
21.11.2025	53.4	26.5	4.8	9.8
25.11.2025	52.8	26.3	4.8	10
28.11.2025	53.6	26.7	5	10.2
Max	53.60	26.70	5.00	10.20
Min	44.20	21.80	<4.0	<9.0
Average	50.08	24.83	4.80	9.90
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

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BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/140

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat:21°59'52.38"N, & Long: :85°13'9.76"E AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)	
	AAQ5	AAQ6
04.11.2025	0.21	0.18
07.11.2025	0.21	0.19
11.11.2025	0.22	0.19
14.11.2025	0.23	0.2
18.11.2025	0.23	0.21
21.11.2025	0.24	0.21
25.11.2025	0.25	0.22
28.11.2025	0.24	0.22
Max	0.25	0.22
Min	0.21	0.18
Average	0.23	0.20
NAAQ* Standard	4 mg/m3 (for 1hr)	
Methods of Analysis	IS: 5182 (Part- 10)	

Reviewed By
TECHNICAL MANAGER
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Technical Manager
Mr. S.K. Parhi

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Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/141

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Fugitive Dust Emission (F)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	F1: Mine Face Area; Lat:21° 57' 38.43"N & Long: 85° 15' 16.19"E; F2: Haul Road; Lat:21° 57' 38.16"N & Long: 85° 15' 14.66"E; F3: Near Crushing Plant; Lat: 21° 57' 46.19"N & Long: 85° 15' 10.74"E; F4: Near Screening Plant-1; Lat:21° 57' 47.89"N & Long:85° 15' 21.11"E; F5: Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E; F6: Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;		
Instrument Used	Respirable Dust Sampler (RDS)		

Sl. No.	Date of Sampling	Result ($\mu\text{g}/\text{m}^3$)					
		F1	F2	F3	F4	F5	F6
1	04.11.2025	582.5	384.2	612.5	659.8	368.2	408.2
2	07.11.2025	619.5	408.6	684.6	724.6	409.6	464.9
3	11.11.2025	638.6	442.7	728.3	773.9	467.2	528.6
4	14.11.2025	668.2	473.9	794.5	846.8	492.5	594.5
5	18.11.2025	694.1	512.4	842.8	892.7	522.3	614.2
6	21.11.2025	738.5	548.3	889.3	908.6	557.6	637.5
7	25.11.2025	764.2	567.6	942.7	949.2	594.2	607.2
8	28.11.2025	773.4	598.2	972.8	983.7	627.3	634.8
Max		773.40	598.20	972.80	983.70	627.30	637.50
Min		582.50	408.60	612.50	659.80	368.20	408.20
Average		684.88	507.39	808.44	842.41	504.86	561.24
Fugitive Standard		1200 $\mu\text{g}/\text{m}^3$					
Methods of Analysis		IS:5182 (Part-4)					

Reviewed By
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BHUBANESWAR, ODISHA
Mr. M.R. Swain

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END OF REPORT



Report No- GFAPL/25-26/ESLFG/142

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	14.11.2025	Date of Completion	15.11.2025
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Near Mine Office; Lat:21°58'18.92"N & Long: :85°15'23.08"E	56.4	40.2
2	Near Mine In gate; Lat:21°57'35.245"N & Long: :85°15'12.007"E	68.8	60.5
3	Near Screening Plant-1; Lat: 21°57'42.30"N & Long: 85°15'9.04"E	67.9	60.8
4	Near Crusher; Lat: 21°57'48.19"N,Long: 85°15'20.00"E	69.2	62.4
5	Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E;	63.2	54.5
6	Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;	67.5	61.8

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

Reviewed By
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Mr. S.K. Parhi

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Bhubaneswar, Odisha
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/143

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Residential Area
Date of Sampling	18.11.2025	Date of Completion	19.11.2025
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Village Rengalberha; Lat:21°57'19.11"N, & Long: :85°15'43.28"E	48.6	37.5
2	Village Kalta; Lat:21°58'2.93"N, & Long: : 85°13'20.36"E	47.5	36.8
3	Village Jhirapani; Lat:21°59'52.38"N & Long:85°13'9.76"E	48.1	38.1
4	Village Kashira; Lat:21°55'9.95"N & Long:85°15'18.13"E	47.8	37.9
Noise permissible limits as per CPCB Norms in dB(A) Leq			
Category of Area		Day Time	Night Time
Industrial Area		75	70
Commercial Area		65	55
Residential Area		55	45
Sensitive Area/ Silence Zone		50	40

Reviewed By
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Mr. S.K. Parhi

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GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
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-1-



Report No- GFAPL/25-26/ESLFG/144

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS-11255
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	14.11.2025	Date of Receiving	15.11.2025
Date of Analysis	15.11.2025	Date of Complete	19.11.2025
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & & Long: :-85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Temperature	IS-11255 (PART-3) 1985	K	---	448
02	Velocity	IS-11255 (PART-3) 1985	m/sec	---	18.17
03	Particulate Matter as PM	IS-11255(PART-1) 1985 Gravimetric Method	mg/Nm ³	100	74.5
04	Sulphur dioxide as SO ₂	IS-11255(PART-2) 1985	mg/Nm ³	600	64.8
05	Carbon Monoxide as CO	IS-13270:1992	%	1%	<0.2
06	Carbon Dioxide as CO ₂	IS-13270:1992	%	---	1.4
07	Oxygen as O ₂	IS-13270:1992	%	---	16.4

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

By: Quality Manager

Mr. M.K. Swain

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END OF REPORT



GREEN FORCE

ASSOCIATES PRIVATE LIMITED

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/144

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Date of Sampling	14.11.2025	Date of Receiving	15.11.2025
Date of Analysis	15.11.2025	Date of Complete	19.11.2025
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: :-85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Nitrogen Oxide as NOx	IS-11255(PART-7) 1985	mg/Nm ³	300	68.2

Reviewed By
TECHNICAL MANAGER
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BHUBANESWAR, ODISHA
Mr. S.K. Parhi

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GREENFORCE ASSOCIATES PRIVATE LIMITED
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Report No- GFAPL/25-26/ESLFG/145

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	14.11.2025	Date of Receiving	15.11.2025
Date of Analysis	15.11.2025	Date of Complete	19.11.2025
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	pH	APHA 24th ED 4500- H+B:2023	--	6.5-9.0	7.98	7.24
2.	Total Suspended Solids	APHA 24th ED 2540-D: 2023	mg/l	100	172	16
3.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	6.4	<2.0
4.	Biological Oxygen Demand as BOD	IS 3025 (PART 44):1993	mg/l	30	40	<2.0
5.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 B:2023	mg/l	--	120	12

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

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Report No- GFAPL/25-26/ESLFG/145

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	14.11.2025	Date of Receiving	15.11.2025
Date of Analysis	15.11.2025	Date of Complete	19.11.2025
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	Fecal Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	<1000	<1.8	<1.8

Remarks: The Standard as per CTO is only applicable to the Discharge i.e., Outlet

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TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUDANESWAR, ODISHA
Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/146

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.11.2025	Date of Receiving	18.11.2025
Date of Analysis	18.11.2025	Date of Complete	22.11.2025
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	20	30
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	—	18	24
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.2	7.22
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	---	166.4	179.2
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	104	112
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	12	14
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.29	0.32
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	3.1	3.4
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	3.7	3.6
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	7.2	9
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05	<0.05

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.11.2025	Date of Receiving	18.11.2025
Date of Analysis	18.11.2025	Date of Complete	22.11.2025
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.22	1.4
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	900	900

Reviewed By

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BHUBANESWAR, ODISHA
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Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.11.2025	Date of Receiving	18.11.2025
Date of Analysis	18.11.2025	Date of Complete	22.11.2025
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	40
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	68
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.24
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	198.4
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	124
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	17
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.35
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	5.1
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.5
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	14
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.11.2025	Date of Receiving	18.11.2025
Date of Analysis	18.11.2025	Date of Complete	22.11.2025
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Nitrate (as NO ₃)	APHA 24 th ED 4500-NO ₃ -E: 2023	mg/l	50	1.48
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24 th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025 (Part 42)	mg/l	0.05	<0.03
4.	Lead (as Pb)	APHA 24 th ED 3500 Pb: 2023	mg/l	0.01	<0.01
5.	Zinc (as Zn)	APHA 24 th ED 3500 Zn: 2023	mg/l	5	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24 th ED 3500 B: 2023	mg/l	0.005	<0.001
8.	Cadmium (as Cd)	IS: 3025 (Part 41)	mg/l	0.003	<0.001
9.	Total Coliform	APHA 24 th ED 9222-H: 2023	MPN/100ml	---	900

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Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.11.2025	Date of Receiving	18.11.2025
Date of Analysis	18.11.2025	Date of Complete	22.11.2025
Sampling Location & Coordinates	Mine Discharge Water Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	20
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	20
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	5.5-9.0	7.36
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	240
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	150
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	22
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.4
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	10.2
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.06
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	6.5
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	20
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.1

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	17.11.2025	Date of Receiving	18.11.2025
Date of Analysis	18.11.2025	Date of Complete	22.11.2025
Sampling Location & Coordinates	Mine Discharge Water Lat: 21°57'35.69"N, Long: 85 15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	--	3.02
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24 th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	--	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	--	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	--	<0.03
6.	Arsenic as As	IS: 3025(Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	--	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	--	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	--	900

Reviewed By

TECHNICAL MANAGER

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BHUBANESWAR, ODISHA

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END OF REPORT



GREEN FORCE

ASSOCIATES PRIVATE LIMITED



TC-12258

Report No- GFAPL/25-26/ESLFG/149

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	GW1: Feegrade office ; Lat: 21.917898 & Long: 85.257635 GW2: Village Rengalberha; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
1	Colour	IS 3025: (Part 4)- 2021	Hazen	5	15	<5.0	<5.0	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B - 2023	NTU	1	5	<1	<1	<1	<1
3	pH Value @25°C	APHA 24th ED 4500-H+B:2023	—	6.5-8.5	NR	7.12	7.01	7.12	7.09
4	Total Dissolved Solids (TDS)	APHA 24th ED: 2540-C: 2023	mg/l	500	2000	155	132	143	146
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	12	14	13	12
6	Total Hardness	APHA 24th ED 2340-C: 2023	mg/l	200	600	97	88	89	92
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	24.2	21.8	22.2	22.8
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	9.1	7.9	8.0	8.5
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	93	82	83	85
10	Residual Free Chlorine	APHA 24 th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
13	Total Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
14	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.19	0.21	0.23	0.25

--1 of 4--



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TC-12258

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
15	Sulfate	APHA 24th ED 4500-SO4 E: 2023	mg/l	200	400	4.1	2.4	2.4	2.5
16	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05	<0.05	<0.05
18	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01	<0.01	<0.01
18	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05	<0.05	<0.05
19	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	--	--	6.3	6.2	6.7	6.3
20	Potassium as K	APHA 24th ED 3500- K-B	mg/l	--	--	0.5	0.5	0.6	0.5

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESWAR, ODISHA
 Technical Manager
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESWAR, ODISHA
 Deputy Quality Manager
 Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLBI/149

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	GW1: Feegrade office area; Lat: 21.917898 & Long: 85.257635 GW2: Village Rengalberha; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
1	Odour	APHA 24th ED: 2150-B - 2023	---	Agreeable	Agreeable	U/O	U/O	U/O	U/O
2	Taste	APHA 24th ED: 2160-B - 2023	---	Agreeable	Agreeable	al	al	al	al
3	Nitrate	APHA 24th ED 4500-NO ₃ -E : 2023	mg/l	45	NR	2.38	1.39	1.49	1.36
4	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001	<0.001	<0.001
5	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	1.5	<0.03	<0.03	<0.03	<0.03
6	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	15	<0.03	<0.03	<0.03	<0.03
7	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01	<0.01	<0.01
8	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
9	Mercury (as Hg)	APHA 24th ED 3500Hg: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
10	Arsenic (as As)	IS: 3025 (Part 37)	mg/l	0.01	0.05	<0.001	<0.001	<0.001	<0.001
11	Aluminum (as Al)	APHA 24th ED 3500Al : 2023	mg/l	0.03	0.2	<0.01	<0.01	<0.01	<0.01
12	Mineral Oil	APHA 24th ED 5220 B: 2023	mg/l	0.5	NR	ND	ND	ND	ND
13	Anionic Detergents (as MBAS)	APHA 24th ED 5540 C : 2023	mg/l	0.2	1.0	ND	ND	ND	ND



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Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	AL				
14	Phenolic Compound (as C ₆ H ₅ OH)	APHA 24th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001
15	Total Coliforms	APHA 24th ED 9222-H: 2023	MPN/100ml	-	-	<1.8	<1.8	<1.8	<1.8

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. M.K. Swain

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END OF REPORT



Report No- GFAPL/25-26/ESLFG/150

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from themethod (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	S1: Lease Area; Lat: 21°57'42.30"N; & Long: 85°15'9.04"E S2: Village Rengalberha'; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		

Sl. No.	Parameters	Standard	Unit	S1	S2
1	pH	IS: 2720(Part-26)-1987	%	6.28	6.3
2	Organic Carbon Content	IS: 2720(Part-22)-1972	%	1.12	1.41
3	Water Content (Moisture)	IS: 2720(Part-2)-1973	%	7.8	7.9
4	Specific gravity	IS: 2720(Part-3/Sec1)-1980	Gs	2.69	2.66
5	Sulfate	IS: 2720(Part-27)-1977	mg/Kg	80	124

Reviewed By
TECHNICAL MANAGER
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BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory
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Report No- GFAPL/25-26/ESLFG/150

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from themethod (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	S1: Lease Area; Lat: 21°57'42.30"N; & Long: 85°15'9.04"E S2: Village Rengalberha'; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		

Sl. No.	Parameters	Standard	Unit	S1	S2
1.	Colour	GFAPL/SOP/Soil & Rock/01-23	--	Brown	Brown
2.	Electrical conductivity (as EC)	IS:14767: 2000	micro s/cm	204.2	190.3
3.	Soil Texture	GFAPL/SOP/Soil & Rock/02-23	---	Sandy loamy	Sandy Clay loamy
4.	Bulk Density	GFAPL/SOP/Soil & Rock/03-23	gm/cc	1.35	1.26
5.	Calcium (as Ca)	IS: 2720(Part-23)	mg/kg	442	360
6.	Magnesium (as Mg)	GFAPL/SOP/Soil & Rock/04-23	mg/kg	218	172
7.	Nitrogen (as N)	IS:14684: 1999	kg/hect	48	90
8.	Phosphorus (as p)	GFAPL/SOP/Soil & Rock/05-23	kg/hect	24	36
9.	Potassium (as K)	GFAPL/SOP/Soil & Rock/06-23	mg/kg	160	128
10.	Chloride(as Cl)	GFAPL/SOP/Soil & Rock/07-23	mg/kg	140	126
11.	Manganese (as Mn)	GFAPL/SOP/Soil & Rock/08-23	mg/kg	8.8	2.4
12.	Iron (as Fe)	GFAPL/SOP/Soil & Rock/09-23	%	2.78	1.84

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END OF REPORT



Report No- GFAPL/25-26/ESLFG/151

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	S3: Village Kendudihi; Lat: 21°59'40.58"N& Long: 85°16'9.91"E S4: Village Village Kalta; Lat: 21°57'59.29"N& Long: 85°12'59.68"E		

Sl. No.	Parameters	Standard	Unit	S3	S4
1	pH	IS: 2720(Part-26)-1987	%	6.44	6.34
2	Organic Carbon Content	IS: 2720(Part-22)-1972	%	1.48	1.46
3	Water Content (Moisture)	IS: 2720(Part-2)-1973	%	7.6	7.7
4	Specific gravity	IS: 2720(Part-3/Sec1)-1980	Gs	2.66	2.66
5	Sulfate	IS: 2720(Part-27)-1977	mg/Kg	134	128

Reviewed By
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Report No- GFAPL/25-26/ESLFG/151

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	S3: Village Kendudihi; Lat: 21°59'40.58"N& Long: 85°16'9.91"E S4: Village Village Kalta; Lat: 21°57'59.29"N& Long: 85°12'59.68"E		

Sl. No.	Parameters	Standard	Unit	S3	S4
1.	Colour	GFAPL/SOP/Soil & Rock/01-23	--	Brown	Brown
2.	Electrical conductivity (as EC)	IS:14767: 2000	micro s/cm	191.4	188.6
3.	Soil Texture	GFAPL/SOP/Soil & Rock/02-23	---	Sandy Clay loamy	Sandy Clay loamy
4.	Bulk Density	GFAPL/SOP/Soil & Rock/03-23	gm/cc	1.26	1.26
5.	Calcium (as Ca)	IS: 2720(Part-23)	mg/kg	376	362
6.	Magnesium (as Mg)	GFAPL/SOP/Soil & Rock/04-23	mg/kg	182	172
7.	Nitrogen (as N)	IS:14684: 1999	kg/hect	108	102
8.	Phosphorus (as p)	GFAPL/SOP/Soil & Rock/05-23	kg/hect	32	30
9.	Potassium (as K)	GFAPL/SOP/Soil & Rock/06-23	mg/kg	134	136
10.	Chloride(as Cl)	GFAPL/SOP/Soil & Rock/07-23	mg/kg	120	124
11.	Manganese (as Mn)	GFAPL/SOP/Soil & Rock/08-23	mg/kg	2.6	2.48
12.	Iron (as Fe)	GFAPL/SOP/Soil & Rock/09-23	%	1.78	1.76

Reviewed By
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GREENFORCE ASSOCIATES PRIVATE LIMITED
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END OF REPORT



Report No- GFAPL/25-26/ESLFG/152

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	O ₃ ($\mu\text{g}/\text{m}^3$)	NH ₃ ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	20.11.2025	<8.0	<20.0
AAQ-2	Near Mine In Gate;	20.11.2025	<8.0	<20.0
AAQ-3	Near Rengalberha;	20.11.2025	<8.0	<20.0
AAQ-4	Near Kalta;	20.11.2025	<8.0	<20.0
AAQ-5	Village Jhirapani;	21.11.2025	<8.0	<20.0
AAQ-6	Village Kashira;	21.11.2025	<8.0	<20.0
NAAQ* Standard			100	400
Methods of Analysis			IS:5182 (Part-9)	IS:5182 (Part-25)

Reviewed By
TECHNICAL MANAGER
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Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/152

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
AAQ-1	Near Vedanta Office	20.11.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-2	Near Mine InGate;	20.11.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-3	Near Rengalberha;	20.11.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-4	Near Kalta;	20.11.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-5	Village Jhirapani;	21.11.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-6	Village Kashira;	21.11.2025	<0.06	<0.6	<0.44	<5	<1
NAAQ* Standard			1	20	6	5	1
Methods of Analysis			IS:5182 (Part-22)	IS:5182 (Part-26)	As per CPCB method followed by AAS	IS:5182 (Part-11)	IS:5182 (Part-12)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

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GREEN FORCE

ASSOCIATES PRIVATE LIMITED

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/152

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Free Silica ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	20.11.2025	<2.0
AAQ-2	Near Mine InGate;	20.11.2025	<2.0
AAQ-3	Near Rengalberha;	20.11.2025	<2.0
AAQ-4	Near Kalta;	20.11.2025	<2.0
AAQ-5	Village Jhirapani;	21.11.2025	<2.0
AAQ-6	Village Kashira;	21.11.2025	<2.0
Methods of Analysis			NIOSH Method 7500 by X-Ray Diffraction

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. M.K. Swain

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END OF REPORT



Report No- GFAPL/25-26/ESLFG/149

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron and Manganese Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	GW1: Feegrade office ; Lat: 21.917898 & Long: 85.257635 GW2: Village Rengalberha; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
1	Colour	IS 3025: (Part 4)- 2021	Hazen	5	15	<5.0	<5.0	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B - 2023	NTU	1	5	<1	<1	<1	<1
3	pH Value @25°C	APHA 24th ED 4500-H+B:2023	—	6.5-8.5	NR	7.12	7.01	7.12	7.09
4	Total Dissolved Solids (TDS)	APHA 24th ED: 2540-C: 2023	mg/l	500	2000	155	132	143	146
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	12	14	13	12
6	Total Hardness	APHA 24th ED 2340-C: 2023	mg/l	200	600	97	88	89	92
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	24.2	21.8	22.2	22.8
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	9.1	7.9	8.0	8.5
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	93	82	83	85
10	Residual Free Chlorine	APHA 24 th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
13	Total Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
14	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.19	0.21	0.23	0.25



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TC-12258

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
15	Sulfate	APHA 24th ED 4500-SO4 E: 2023	mg/l	200	400	4.1	2.4	2.4	2.5
16	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05	<0.05	<0.05
18	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01	<0.01	<0.01
18	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05	<0.05	<0.05
19	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	--	--	6.3	6.2	6.7	6.3
20	Potassium as K	APHA 24th ED 3500- K-B	mg/l	--	--	0.5	0.5	0.6	0.5

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

Reviewed By
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Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLBI/149

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron and Manganese Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.11.2025	Date of Receiving	22.11.2025
Date of Analysis	22.11.2025	Date of Complete	26.11.2025
Sampling Location & Coordinates	GW1: Feegrade office area; Lat: 21.917898 & Long: 85.257635 GW2: Village Rengalberha; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
1	Odour	APHA 24th ED: 2150-B - 2023	---	Agreeable	Agreeable	U/O	U/O	U/O	U/O
2	Taste	APHA 24th ED: 2160-B - 2023	---	Agreeable	Agreeable	al	al	al	al
3	Nitrate	APHA 24th ED 4500-NO3-E : 2023	mg/l	45	NR	2.38	1.39	1.49	1.36
4	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001	<0.001	<0.001
5	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	1.5	<0.03	<0.03	<0.03	<0.03
6	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	15	<0.03	<0.03	<0.03	<0.03
7	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01	<0.01	<0.01
8	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
9	Mercury (as Hg)	APHA 24th ED 3500Hg: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
10	Arsenic (as As)	IS: 3025 (Part 37)	mg/l	0.01	0.05	<0.001	<0.001	<0.001	<0.001
11	Aluminum (as Al)	APHA 24th ED 3500Al : 2023	mg/l	0.03	0.2	<0.01	<0.01	<0.01	<0.01
12	Mineral Oil	APHA 24th ED 5220 B: 2023	mg/l	0.5	NR	ND	ND	ND	ND
13	Anionic Detergents (as MBAS)	APHA 24th ED 5540 C : 2023	mg/l	0.2	1.0	ND	ND	ND	ND



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Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	AL				
14	Phenolic Compound (as C ₆ H ₅ OH)	APHA 24th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001
15	Total Coliforms	APHA 24th ED 9222-H: 2023	MPN/100ml	-	-	<1.8	<1.8	<1.8	<1.8

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

Reviewed By
TECHNICAL MANAGER
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BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/146

Issued Date-09.12.2025

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ground Water Level Monitoring		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per CPCB Guidelines
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.11.2025		

Sl. No.	Parameters	Result
1	GW1: Near Mine Lease; Lat: 21°58'19.58"N & Long: 85°15'24.19"E	13.92 m
2	GW2: Village Rengalberha; Lat: 21°57'10.45"N & Long: 85°14'55.35"E	13.47 m
3	GW3: Village Kendudihi; Lat: 21°59'40.63"N & Long: 85°16'07.74"E	13.35 m
4	GW4: Village Kalta; Lat: 21°57'54.83"N & Long: 85°12'49.46"E	12.89 m

Reviewed By
TECHNICAL MANAGER
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BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Mr. M.K. Swain

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END OF REPORT

**ENVIRONMENT MONITORING REPORT
FOR THE MONTH OF
DECEMBER- 2025**



NARAYANI

**Client- M/s. Nadidih Iron Ore & Mn Mines
(FEEGRADE),**

M/s ESL Steel Limited,

Address- Koira, Sundargarh, Odisha.



Monitored By - Green Force Associates Pvt. Ltd.

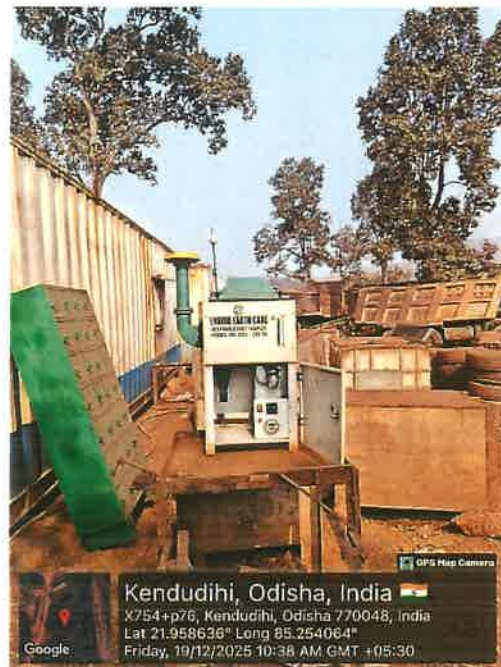
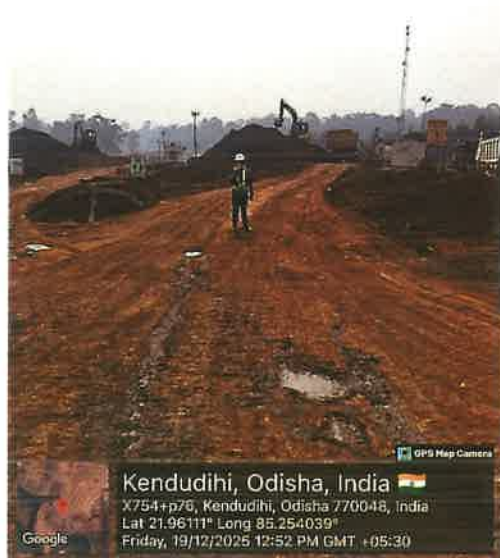
Address- Plot No-1363-3892 ,

Bhaibhab Nagar, Lane-2, Fulnakhara,

Bhubaneswar, Khurda, Odisha- 754001

NABL Certificate No:- TC-12258

PHOTOGRAPHS OF ENVIRONMENT MONITORING



Report No- GFAPL/25-26/ESLFG/153

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.12.2025	60.5	30.8	7.6	14.4
05.12.2025	63.4	32.1	7.8	15
09.12.2025	64.2	32.5	8.2	15.6
12.12.2025	61.4	31.1	8	15.4
16.12.2025	63.7	32.4	8.2	15.8
19.12.2025	65.6	33.1	8.4	16
23.12.2025	68.2	34.6	8.6	16.4
26.12.2025	64.7	33.1	8	16
30.12.2025	66.9	33.8	8.4	16.4
Max	68.20	34.60	8.60	16.40
Min	60.50	30.80	7.60	14.40
Average	64.29	32.61	8.13	15.67
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/154

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ2- Near Mine In-gate; Lat: 21°57'28.39"N & Long: 85°15'19.40"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.12.2025	72.8	36.8	8.6	17.4
05.12.2025	74.6	37.9	8.9	18
09.12.2025	70.9	35.7	8.6	17.8
12.12.2025	75.4	38.2	9.2	18.6
16.12.2025	73.5	37.2	9.5	19
19.12.2025	76.1	38.6	10	20.4
23.12.2025	74.9	37.7	9.8	20.2
26.12.2025	72.8	36.8	9.4	19.8
30.12.2025	78.6	39.8	10	20.4
Max	78.60	39.80	10.00	20.40
Min	70.90	35.70	8.60	17.40
Average	74.40	37.63	9.33	19.07
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

Authorized Signatory

TECHNICAL MANAGER
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Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/155

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.12.2025	56.7	28.5	5.6	10.8
05.12.2025	58.2	29.3	5.9	11.2
09.12.2025	55.4	27.8	5.6	11
12.12.2025	57.6	28.9	5.8	11.6
16.12.2025	59.2	29.6	6	12
19.12.2025	58.2	29.2	6.2	12.4
23.12.2025	60.7	30.6	6.4	12.6
26.12.2025	57.4	28.9	6	12.2
30.12.2025	59.4	29.8	6.2	12.4
Max	60.70	30.60	6.40	12.60
Min	55.40	27.80	5.60	10.80
Average	58.09	29.18	5.97	11.80
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
TECHNICAL MANAGER
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Mr. S.K. Parhi

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GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
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END OF REPORT

--1--

Report No- GFAPL/25-26/ESLFG/156

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.12.2025	54.8	27.6	5.4	10.6
05.12.2025	52.7	26.5	5.2	10.4
09.12.2025	56.4	28.3	5.4	10.6
12.12.2025	58.2	29.4	5.6	10.8
16.12.2025	56.7	28.6	5.6	11
19.12.2025	54.5	27.8	5.4	10.8
23.12.2025	56.9	28.8	5.6	11
26.12.2025	55.4	27.7	5.6	11.2
30.12.2025	57.6	28.8	5.8	11.6
Max	58.20	29.40	5.80	11.60
Min	52.70	26.50	5.20	10.40
Average	55.91	28.17	5.51	10.89
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

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TECHNICAL MANAGER

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END OF REPORT

-1-

Report No- GFAPL/25-26/ESLFG/157

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat:21°58'18.92"N & Long: 85°15'23.08"E AAQ2- Near Mine In-gate; Lat:21°57'35.245"N & Long: 85°15'12.007"E AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)			
	AAQ1	AAQ2	AAQ3	AAQ4
02.12.2025	0.37	0.42	0.25	0.23
05.12.2025	0.38	0.43	0.27	0.23
09.12.2025	0.39	0.42	0.26	0.24
12.12.2025	0.37	0.44	0.27	0.25
16.12.2025	0.39	0.47	0.29	0.26
19.12.2025	0.39	0.49	0.29	0.25
23.12.2025	0.4	0.48	0.3	0.26
26.12.2025	0.38	0.48	0.28	0.27
30.12.2025	0.4	0.5	0.29	0.27
Max	0.40	0.50	0.30	0.27
Min	0.37	0.42	0.25	0.23
Average	0.39	0.46	0.28	0.25
NAAQ* Standard	4 mg/m3 (for 1hr)			
Methods of Analysis	IS: 5182 (Part- 10)			

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Technical Manager

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Dy. Quality Manager

Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/158

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat: 21°59'52.38"N, & Long: :85°13'9.76"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.12.2025	57.5	28.8	5.6	10.8
06.12.2025	55.2	27.8	5.4	10.6
10.12.2025	52.8	26.5	5.4	10.4
13.12.2025	54.5	27.4	5.6	10.8
17.12.2025	56.8	28.5	5.6	11
20.12.2025	58.4	29.3	5.8	11.2
24.12.2025	61.2	30.8	6.2	11.8
27.12.2025	56.4	28.6	5.8	11.4
31.12.2025	57.7	28.9	6	11.8
Max	61.20	30.80	6.20	11.80
Min	52.80	26.50	5.40	10.40
Average	56.72	28.51	5.71	11.09
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By: Quality Manager
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/159

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.12.2025	54.6	27.3	5.4	10.6
06.12.2025	53.8	26.8	5.2	10.4
10.12.2025	55.2	27.4	5.4	10.6
13.12.2025	52.7	26.5	5	10.2
17.12.2025	54.9	27.4	5.4	10.4
20.12.2025	56.4	28.2	5.6	10.8
24.12.2025	53.8	27	5.4	10.6
27.12.2025	55.1	27.6	5.6	10.8
31.12.2025	54.6	27.5	5.6	11
Max	56.40	28.20	5.60	11.00
Min	52.70	26.50	5.00	10.20
Average	54.57	27.30	5.40	10.60
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 Technical Manager
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 By: Quality Manager
 Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/160

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat:21°59'52.38"N, & Long: :85°13'9.76"E AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)	
	AAQ5	AAQ6
03.12.2025	0.25	0.23
06.12.2025	0.24	0.22
10.12.2025	0.24	0.23
13.12.2025	0.25	0.21
17.12.2025	0.26	0.22
20.12.2025	0.26	0.24
24.12.2025	0.28	0.23
27.12.2025	0.27	0.25
31.12.2025	0.28	0.26
Max	0.28	0.26
Min	0.24	0.21
Average	0.26	0.23
NAAQ* Standard	4 mg/m3 (for 1hr)	
Methods of Analysis	IS: 5182 (Part- 10)	

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHURANESWAR, ODISHA
 Technical Manager
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHURANESWAR, ODISHA
 Dy. Quality Manager
 Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/161

Issued Date-09.01.2026

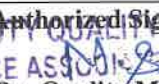
TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Fugitive Dust Emission (F)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	F1: Mine Face Area; Lat:21° 57' 38.43"N & Long: 85° 15' 16.19"E; F2: Haul Road; Lat:21° 57' 38.16"N & Long: 85° 15' 14.66"E; F3: Near Crushing Plant; Lat: 21° 57' 46.19"N & Long: 85° 15' 10.74"E; F4: Near Screening Plant-1; Lat:21° 57' 47.89"N & Long:85° 15' 21.11"E; F5: Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E; F6: Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;		
Instrument Used	Respirable Dust Sampler (RDS)		

Sl. No.	Date of Sampling	Result (µg/m³)					
		F1	F2	F3	F4	F5	F6
1	02.12.2025	789.2	618.9	1025.6	1054.8	658.3	789.2
2	05.12.2025	809.6	594.2	1084.5	1084.5	701.2	809.6
3	09.12.2025	854.2	624.5	1034.7	1124.6	742.5	854.2
4	12.12.2025	827.6	638.2	984.6	1172.4	685.3	827.6
5	16.12.2025	795.6	673.4	1045.3	1046.2	697.4	795.6
6	19.12.2025	842.7	592.5	976.8	1072.5	734.2	842.7
7	23.12.2025	886.5	638.4	1104.2	1024.5	708.5	886.5
8	26.12.2025	752.4	573.5	938.5	986.8	673.5	752.4
9	30.12.2025	798.6	625.3	1046.7	1014.2	714.2	798.6
Max		886.50	673.40	1104.20	1172.40	742.50	886.50
Min		752.40	573.50	938.50	986.80	673.50	752.40
Average		820.90	623.69	1026.91	1065.71	707.10	820.90
Fugitive Standard		1200 µg/m³					
Methods of Analysis		IS:5182 (Part-4)					

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Dy. Quality Manager
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/162

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	14.12.2025	Date of Completion	15.12.2025
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Near Mine Office; Lat:21°58'18.92"N & Long: :85°15'23.08"E	56.9	40.4
2	Near Mine In gate; Lat:21°57'35.245"N & Long: :85°15'12.007"E	69.4	61.1
3	Near Screening Plant-1; Lat: 21°57'42.30"N & Long: 85°15'9.04"E	68.3	61.4
4	Near Crusher; Lat: 21°57'48.19"N,Long: 85°15'20.00"E	69.4	62.1
5	Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E;	63.6	55.2
6	Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;	67.8	61.1

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/163

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Residential Area
Date of Sampling	19.12.2025	Date of Completion	20.12.2025
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Village Rengalberha; Lat:21°57'19.11"N, & Long: :85°15'43.28"E	48.5	38.1
2	Village Kalta; Lat:21°58'2.93"N, & Long: : 85°13'20.36"E	48.1	37.4
3	Village Jhirapani; Lat:21°59'52.38"N & Long:85°13'9.76"E	48.8	38.2
4	Village Kashira; Lat:21°55'9.95"N & Long:85°15'18.13"E	47.9	37.4

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By, Quality Manager
Mr. M.K. Swain

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Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS-11255
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: -85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Temperature	IS-11255 (PART-3) 1985	K	---	447
02	Velocity	IS-11255 (PART-3) 1985	m/sec	---	17.98
03	Particulate Matter as PM	IS-11255(PART-1) 1985 Gravimetric Method	mg/Nm ³	100	76.4
04	Sulphur dioxide as SO ₂	IS-11255(PART-2) 1985	mg/Nm ³	600	62.8
05	Carbon Monoxide as CO	IS-13270:1992	%	1%	<0.2
06	Carbon Dioxide as CO ₂	IS-13270:1992	%	---	1.5
07	Oxygen as O ₂	IS-13270:1992	%	---	16.3

Reviewed By

TECHNICAL MANAGER

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Technical Manager

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DEPUTY QUALITY MANAGER

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BHUBANESHWAR, ODISHA

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & & Long: :-85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Nitrogen Oxide as NOx	IS-11255(PART-7) 1985	mg/Nm ³	300	60.4

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUPANESWAR, ODISHA
 Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUPANESWAR, ODISHA
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Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	pH	APHA 24th ED 4500- H+B:2023	--	6.5-9.0	8.34	7.46
2.	Total Suspended Solids	APHA 24th ED 2540-D: 2023	mg/l	100	162	12
3.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	5.4	<2.0
4.	Biological Oxygen Demand as BOD	IS 3025 (PART 44):1993	mg/l	30	40	4.8
5.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 B:2023	mg/l	--	100	12

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/165

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	Fecal Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	<1000	<1.8	<1.8

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

Reviewed By
TECHNICAL MANAGER
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 BHUBANESWAR, ODISHA
 Technical Manager
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESWAR, ODISHA
 Deputy Quality Manager
 Mr. M.K. Swain

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Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	<5.0	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	12	24
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.24	7.28
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	185.6	203.2
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	116	127
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	14	16
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.34	0.36
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	3.8	4.1
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.3	6.1
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	10	12
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05	<0.05

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 BHUBANESHWAR, ODISHA
 Mr. S.K. Parhi

Authorized Signatory
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--1 of 2--

Report No- GFAPL/25-26/ESLFG/166

Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.46	1.54
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	370	410

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 Bhubaneswar, Odisha
 Mr. M.K. Swain

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Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	60
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.31
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	204.8
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	128
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	20
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.39
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	5.8
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	0.06
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.1
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	18
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.08

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Mr. S.K. Parhi

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GREENFORCE ASSOCIATES PRIVATE LIMITED
M. Swain
Deputy Quality Manager
Mr. M.K. Swain

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.82
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	510

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BHUBANESWAR, ODISHA
 By: Quality Manager
 Mr. M.K. Swain

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Issued Date-09.01.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	40
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	5.5-9.0	7.4
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	268.8
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	168
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	27
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.42
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	11.6
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.08
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	6
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	24
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.14

TECHNICAL MANAGER
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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	19.12.2025	Date of Receiving	20.12.2025
Date of Analysis	20.12.2025	Date of Complete	25.12.2025
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	--	3.84
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	--	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	--	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	--	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	--	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	--	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	--	470

Reviewed By
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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	O ₃ ($\mu\text{g}/\text{m}^3$)	NH ₃ ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	23.12.2025	<8.0	<20.0
AAQ-2	Near Mine In Gate;	23.12.2025	<8.0	<20.0
AAQ-3	Near Rengalberha;	23.12.2025	<8.0	<20.0
AAQ-4	Near Kalta;	23.12.2025	<8.0	<20.0
AAQ-5	Village Jhirapani;	24.12.2025	<8.0	<20.0
AAQ-6	Village Kashira;	24.12.2025	<8.0	<20.0
NAAQ* Standard			100	400
Methods of Analysis			IS:5182 (Part-9)	IS:5182 (Part-25)

Reviewed By

TECHNICAL MANAGER

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Bhubaneswar, Odisha

Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Bhubaneswar, Odisha

By: Quality Manager
Mr. M.K. Swain

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Pb (µg/m³)	Ni (ng/m³)	As (ng/m³)	C6H6 (µg/m³)	BaP (ng/m³)
AAQ-1	Near Vedanta Office	23.12.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-2	Near Mine InGate;	23.12.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-3	Near Rengalberha;	23.12.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-4	Near Kalta;	23.12.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-5	Village Jhirapani;	24.12.2025	<0.06	<0.6	<0.44	<5	<1
AAQ-6	Village Kashira;	24.12.2025	<0.06	<0.6	<0.44	<5	<1
NAAQ* Standard			1	20	6	5	1
Methods of Analysis			IS:5182 (Part-22)	IS:5182 (Part-26)	As per CPCB method followed by AAS	IS:5182 (Part-11)	IS:5182 (Part-12)

Reviewed By
TECHNICAL MANAGER
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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Free Silica ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	23.12.2025	<2.0
AAQ-2	Near Mine InGate;	23.12.2025	<2.0
AAQ-3	Near Rengalberha;	23.12.2025	<2.0
AAQ-4	Near Kalta;	23.12.2025	<2.0
AAQ-5	Village Jhirapani;	24.12.2025	<2.0
AAQ-6	Village Kashira;	24.12.2025	<2.0
Methods of Analysis			NIOSH Method 7500 by X-Ray Diffraction

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 Technical Manager
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 By, Quality Manager
 BHUBANESWAR, ODISHA
 Mr. M.K. Swain

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END OF REPORT

**ENVIRONMENT MONITORING REPORT
FOR THE MONTH OF
JANUARY- 2026**



NARAYANI

**Client- M/s. Nadidih Iron Ore & Mn Mines
(FEEGRADE),**

M/s ESL Steel Limited,

Address- Koira, Sundargarh, Odisha.



Monitored By - Green Force Associates Pvt. Ltd.

Address- Plot No-1363-3892 ,

Bhaibhab Nagar, Lane-2, Fulnakhara,

Bhubaneswar, Khurda, Odisha- 754001

NABL Certificate No:- TC-12258

PHOTOGRAPHS OF ENVIRONMENT MONITORING



Report No- GFAPL/25-26/ESLFG/178

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.01.2026	61.5	30.8	7.8	15.8
07.01.2026	64.2	32.5	8.2	16.2
10.01.2026	66.8	33.8	8.6	16.8
14.01.2026	64.9	32.6	8.4	16.4
17.01.2026	67.2	33.9	8.8	17
21.01.2026	69.4	35.1	9.4	18
24.01.2026	65.8	33.4	9	17.8
28.01.2026	68.5	34.6	9.4	18.4
31.01.2026	64.2	32.7	9	18
Max	69.40	35.10	9.40	18.40
Min	61.50	30.80	7.80	15.80
Average	65.83	33.27	8.73	17.16
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/179

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ2- Near Mine In-gate; Lat: 21°57'28.39"N & Long: 85°15'19.40"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.01.2026	73.8	37.1	9.4	19.4
07.01.2026	76.9	38.8	10	20.2
10.01.2026	79.2	40.2	10.4	20.6
14.01.2026	84.1	42.9	11	21.8
17.01.2026	82.6	42.1	10.8	21.4
21.01.2026	86.7	44.1	11.6	22.8
24.01.2026	85.1	43.4	12	23.6
28.01.2026	82.4	42.1	11.4	22.8
31.01.2026	83.9	42.5	11.8	23.4
Max	86.70	44.10	12.00	23.60
Min	73.80	37.10	9.40	19.40
Average	81.63	41.47	10.93	21.78
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESHWAR, ODISHA

Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/180

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.01.2026	57.2	28.8	5.8	11.8
07.01.2026	58.8	29.5	6	12.2
10.01.2026	61.6	31.1	6.4	12.8
14.01.2026	63.4	32.1	6.6	13.2
17.01.2026	61.9	31.4	6.4	12.8
21.01.2026	64.2	32.6	6.8	13.8
24.01.2026	66.4	33.5	7.2	14.4
28.01.2026	63.7	32.2	6.8	14
31.01.2026	64.6	32.7	7	14.4
Max	66.40	33.50	7.20	14.40
Min	57.20	28.80	5.80	11.80
Average	62.42	31.54	6.56	13.27
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Bhubaneswar, Odisha

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Bhubaneswar, Odisha

Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/181

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
03.01.2026	56.2	28.3	5.6	11.4
07.01.2026	57.2	28.7	5.8	11.8
10.01.2026	55.8	28.1	5.6	11.8
14.01.2026	58.3	29.4	6	12
17.01.2026	59.2	29.7	6	12.2
21.01.2026	60.4	30.4	6.2	12.4
24.01.2026	58.6	29.5	6	12.2
28.01.2026	59.7	30.1	6.2	12.4
31.01.2026	56.8	28.9	5.8	11.8
Max	60.40	30.40	6.20	12.40
Min	55.80	28.10	5.60	11.40
Average	58.02	29.23	5.91	12.00
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By: Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By: Quality Manager
Mr. M.K. Swain

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END OF REPORT

--1--

GREEN FORCE

ASSOCIATES PRIVATE LIMITED

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/182

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat:21°58'18.92"N & Long: 85°15'23.08"E AAQ2- Near Mine In-gate; Lat:21°57'35.245"N & Long: 85°15'12.007"E AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)			
	AAQ1	AAQ2	AAQ3	AAQ4
03.01.2026	0.38	0.49	0.27	0.25
07.01.2026	0.39	0.5	0.29	0.27
10.01.2026	0.42	0.52	0.3	0.28
14.01.2026	0.42	0.54	0.31	0.29
17.01.2026	0.45	0.53	0.3	0.29
21.01.2026	0.47	0.56	0.32	0.3
24.01.2026	0.46	0.58	0.34	0.28
28.01.2026	0.48	0.57	0.33	0.28
31.01.2026	0.47	0.59	0.34	0.27
Max	0.48	0.59	0.34	0.30
Min	0.38	0.49	0.27	0.25
Average	0.44	0.54	0.31	0.28
NAAQ* Standard	4 mg/m3 (for 1hr)			
Methods of Analysis	IS: 5182 (Part- 10)			

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Technical Manager

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Deputy Quality Manager

Mr. M.K. Swain

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END OF REPORT

-1-

Report No- GFAPL/25-26/ESLFG/183

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat: 21°59'52.38"N, & Long: :85°13'9.76"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.01.2026	59.4	29.9	6	12
06.01.2026	62.8	31.8	6.2	12.4
09.01.2026	60.9	30.8	6.2	12.6
13.01.2026	63.7	32.2	6.4	12.8
16.01.2026	66.2	33.8	6.8	13.4
20.01.2026	65.4	33.1	6.8	13.6
23.01.2026	67.2	34.1	7	14.2
27.01.2026	65.1	33.1	6.8	14
30.01.2026	63.9	32.6	6.6	13.8
Max	67.20	34.10	7.00	14.20
Min	59.40	29.90	6.00	12.00
Average	63.84	32.38	6.53	13.20
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/184

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
02.01.2026	55.8	28.2	5.6	11.4
06.01.2026	57.1	28.8	5.8	11.8
09.01.2026	56.9	28.5	5.8	12
13.01.2026	58.4	29.4	6	12.2
16.01.2026	61.2	30.8	6.4	12.6
20.01.2026	60.7	30.5	6.2	12.4
23.01.2026	63.4	31.8	6.6	12.8
27.01.2026	62.8	31.6	6.4	12.8
30.01.2026	60.9	30.8	6.4	12.6
Max	63.40	31.80	6.60	12.80
Min	55.80	28.20	5.60	11.40
Average	59.69	30.04	6.13	12.29
NAAQ* Standard	100	60	80	80
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. M.K. Swain

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END OF REPORT

GREEN FORCE

ASSOCIATES PRIVATE LIMITED

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/185

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat:21°59'52.38"N, & Long: :85°13'9.76"E AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	CO Analyser		

Date of Sampling	CO (mg/m3)	
	AAQ5	AAQ6
02.01.2026	0.29	0.28
06.01.2026	0.3	0.29
09.01.2026	0.31	0.29
13.01.2026	0.33	0.3
16.01.2026	0.34	0.31
20.01.2026	0.34	0.31
23.01.2026	0.35	0.32
27.01.2026	0.35	0.32
30.01.2026	0.34	0.31
Max	0.35	0.32
Min	0.29	0.28
Average	0.33	0.30
NAAQ* Standard	4 mg/m3 (for 1hr)	
Methods of Analysis	IS: 5182 (Part- 10)	

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUPANESWAR, ODISHA

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUPANESWAR, ODISHA

By: Quality Manager

Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/186

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Fugitive Dust Emission (F)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	F1: Mine Face Area; Lat:21° 57' 38.43"N & Long: 85° 15' 16.19"E; F2: Haul Road; Lat:21° 57' 38.16"N & Long: 85° 15' 14.66"E; F3: Near Crushing Plant; Lat: 21° 57' 46.19"N & Long: 85° 15' 10.74"E; F4: Near Screening Plant-1; Lat:21° 57' 47.89"N & Long:85° 15' 21.11"E; F5: Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E; F6: Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;		
Instrument Used	Respirable Dust Sampler (RDS)		

Sl. No.	Date of Sampling	Result (µg/m ³)					
		F1	F2	F3	F4	F5	F6
1	02.01.2026	694.2	689.3	934.5	994.2	684.2	572.6
2	06.01.2026	724.8	604.2	964.8	1008.6	724.5	594.2
3	09.01.2026	767.2	642.7	997.2	1024.3	753.8	619.3
4	13.01.2026	798.6	637.2	1054.6	1072.8	694.1	658.2
5	16.01.2026	819.5	628.5	1024.8	1124.3	734.8	694.6
6	20.01.2026	843.7	676.4	1068.3	1094.6	756.7	712.4
7	23.01.2026	864.2	704.2	1009.4	1056.4	789.5	642.8
8	27.01.2026	850.7	754.6	978.6	1014.2	724.8	688.3
9	30.01.2026	871.2	738.3	1001.8	1048.8	740.9	673.8
Max		871.20	754.60	1068.30	1124.30	789.50	712.40
Min		724.80	628.50	964.80	1008.60	694.10	594.20
Average		817.49	683.13	1012.44	1055.50	739.89	660.45
Fugitive Standard		1200 µg/m ³					
Methods of Analysis		IS:5182 (Part-4)					

TECHNICAL MANAGER
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Bhubaneswar, Odisha
Technical Manager
Mr. S.K. Parhi

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GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
By, Quality Manager
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/187

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	17.01.2026	Date of Completion	18.01.2026
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Near Mine Office; Lat:21°58'18.92"N & Long: :85°15'23.08"E	57.2	40.5
2	Near Mine In gate; Lat:21°57'35.245"N & Long: :85°15'12.007"E	68.8	59.8
3	Near Screening Plant-1; Lat: 21°57'42.30"N & Long: 85°15'9.04"E	68.8	60.2
4	Near Crusher; Lat: 21°57'48.19"N,Long: 85°15'20.00"E	68.9	61.4
5	Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E;	64.2	54.8
6	Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;	68.2	60.2

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

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Report No- GFAPL/25-26/ESLFG/188

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Residential Area
Date of Sampling	20.01.2026	Date of Completion	21.01.2026
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Village Rengalberha; Lat:21°57'19.11"N, & Long: :85°15'43.28"E	48.8	37.8
2	Village Kalta; Lat:21°58'2.93"N, & Long: : 85°13'20.36"E	48.5	37.5
3	Village Jhirapani; Lat:21°59'52.38"N & Long:85°13'9.76"E	49.3	38.9
4	Village Kashira; Lat:21°55'9.95"N & Long:85°15'18.13"E	48.4	38.7
Noise permissible limits as per CPCB Norms in dB(A) Leq			
Category of Area		Day Time	Night Time
Industrial Area		75	70
Commercial Area		65	55
Residential Area		55	45
Sensitive Area/ Silence Zone		50	40

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Authorized Signatory

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Report No- GFAPL/25-26/ESLFG/189

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS-11255
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: -85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Temperature	IS-11255 (PART-3) 1985	K	---	451
02	Velocity	IS-11255 (PART-3) 1985	m/sec	---	17.69
03	Particulate Matter as PM	IS-11255(PART-1) 1985 Gravimetric Method	mg/Nm3	100	74.2
04	Sulphur dioxide as SO2	IS-11255(PART-2) 1985	mg/Nm3	600	64.2
05	Carbon Monoxide as CO	IS-13270:1992	%	1%	<0.2
06	Carbon Dioxide as CO2	IS-13270:1992	%	---	1.4
07	Oxygen as O2	IS-13270:1992	%	---	16.5

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Report No- GFAPL/25-26/ESLFG/189

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: :-85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Nitrogen Oxide as NOx	IS-11255(PART-7) 1985	mg/Nm3	300	58.2

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Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	pH	APHA 24th ED 4500- H+B:2023	--	6.5-9.0	8.34	7.46
2.	Total Suspended Solids	APHA 24th ED 2540-D: 2023	mg/l	100	162	12
3.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	5.4	<2.0
4.	Biological Oxygen Demand as BOD	IS 3025 (PART 44):1993	mg/l	30	40	4.8
5.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 B:2023	mg/l	--	100	12

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	Fecal Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	<1000	<1.8	<1.8

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

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 Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/191

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	<5.0	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	14	20
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.22	7.25
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	176	190.4
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	110	119
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	13	15
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.31	0.33
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	3.4	3.6
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.5	6.3
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	9	12
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05	<0.05

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Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.34	1.48
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	—	<0.001	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	—	<0.001	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	470	510

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	300	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	--	54
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	8.5	7.28
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	208
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	130
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	18
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.36
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	5.5
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	0.06
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.3
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	16
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.06

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/192

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW3
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.6
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.005	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	570

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESWAR
 Technical Manager
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESWAR, ODISHA
 By: Quality Manager
 Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/193

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	28
3.	pH @25°C	APHA 24th ED 4500- H+B:2023	---	5.5-9.0	7.37
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	249.6
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	156
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	23
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.41
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	10.3
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.08
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	6.2
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	--	22
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.11

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BHUBANESHWAR, ODISHA
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Mr. S.K. Parhi

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GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Deputy Quality Manager
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END OF REPORT

Report No- GFAPL/25-26/ESLFG/193

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	20.01.2026	Date of Receiving	21.01.2026
Date of Analysis	21.01.2026	Date of Complete	27.01.2026
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	--	3.42
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	--	<0.03
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	--	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	--	<0.03
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	--	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	--	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	--	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	--	570

Reviewed By

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GREENFORCE ASSOCIATES PRIVATE LIMITED
 Bhubaneswar, ODISHA
 Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
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Report No- GFAPL/25-26/ESLFG/194

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	O ₃ ($\mu\text{g}/\text{m}^3$)	NH ₃ ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	21.01.2026	<8.0	<20.0
AAQ-2	Near Mine In Gate;	21.01.2026	<8.0	<20.0
AAQ-3	Near Rengalberha;	21.01.2026	<8.0	<20.0
AAQ-4	Near Kalta;	21.01.2026	<8.0	<20.0
AAQ-5	Village Jhirapani;	23.01.2026	<8.0	<20.0
AAQ-6	Village Kashira;	23.01.2026	<8.0	<20.0
NAAQ* Standard			100	400
Methods of Analysis			IS:5182 (Part-9)	IS:5182 (Part-25)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Dy. Quality Manager
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ASSOCIATES PRIVATE LIMITED

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Report No- GFAPL/25-26/ESLFG/194

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
AAQ-1	Near Vedanta Office	21.01.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-2	Near Mine InGate;	21.01.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-3	Near Rengalberha;	21.01.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-4	Near Kalta;	21.01.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-5	Village Jhirapani;	23.01.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-6	Village Kashira;	23.01.2026	<0.06	<0.6	<0.44	<5	<1
NAAQ* Standard			1	20	6	5	1
Methods of Analysis			IS:5182 (Part-22)	IS:5182 (Part-26)	As per CPCB method followed by AAS	IS:5182 (Part-11)	IS:5182 (Part-12)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

Technical Manager

Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER

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Report No- GFAPL/25-26/ESLFG/194

Issued Date-04.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Free Silica ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	21.01.2026	<2.0
AAQ-2	Near Mine InGate;	21.01.2026	<2.0
AAQ-3	Near Rengalberha;	21.01.2026	<2.0
AAQ-4	Near Kalta;	21.01.2026	<2.0
AAQ-5	Village Jhirapani;	23.01.2026	<2.0
AAQ-6	Village Kashira;	23.01.2026	<2.0
Methods of Analysis			NIOSH Method 7500 by X-Ray Diffraction

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/209

Issued Date-05.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron and Manganese Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.01.2026	Date of Receiving	23.01.2026
Date of Analysis	23.01.2026	Date of Complete	28.01.2026
Sampling Location & Coordinates	GW1: Bhanjapali Munda Sahi; Lat: 21.917898 & Long: 85.257635 GW2: M/ne lease; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
1	Colour	IS 3025: (Part 4)- 2021	Hazen	5	15	<5.0	<5.0	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B - 2023	NTU	1	5	<1	<1	<1	<1
3	pH Value @25°C	APHA 24th ED 4500-H+B:2023	--	6.5-8.5	NR	7.12	7.05	7.1	7.14
4	Total Dissolved Solids (TDS)	APHA 24th ED: 2540-C: 2023	mg/l	500	2000	155	211	197	221
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	12	33	30	31
6	Total Hardness	APHA 24th ED 2340-C: 2023	mg/l	200	600	97	119	114	131
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	24.2	28.5	27.3	32.1
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	9.1	11.7	11.2	12.4
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	93	109	102	117
10	Residual Free Chlorine	APHA 24 th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
13	Total Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
14	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.19	0.17	0.21	0.18

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
15	Sulfate	APHA 24th ED 4500-SO4 E: 2023	mg/l	200	400	4.2	4.7	4.8	4.2
16	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05	<0.05	<0.05
18	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01	<0.01	<0.01
18	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05	<0.05	<0.05
19	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	--	--	19.4	18	18.2	19.4
20	Potassium as K	APHA 24th ED 3500- K-B	mg/l	--	--	2	1.8	1.8	2
21	Taste	APHA 24th ED: 2160-B: 2023	---	AG	AG	AL	AL	AL	AL
22	Nitrate	APHA 24th ED 4500-NO3-E: 2023	mg/l	45	NR	1.81	1.72	1.96	1.81
23	Copper (as Cu)	IS: 3025 (Part 42)	mg/l	0.05	1.5	<0.02	<0.02	<0.02	<0.02
24	Mercury (as Hg)	APHA 24th ED 3500Hg: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
25	Aluminum (as Al)	APHA 24th ED 3500Al: 2023	mg/l	0.03	0.2	<0.01	<0.01	<0.01	<0.01
26	Phenolic Compound (as C6H5OH)	APHA 24th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001
27	Total Coliforms	APHA 24th ED 9222 -H: 2023	MPN/100 ml	--	--	<1.8	<1.8	<1.8	<1.8

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

Reviewed By
TECHNICAL MANAGER
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BHUBANESWAR, ODISHA
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Report No- GFAPL/25-26/ESLBI/209

Issued Date-05.02.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron and Manganese Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.01.2026	Date of Receiving	23.01.2026
Date of Analysis	23.01.2026	Date of Complete	28.01.2026
Sampling Location & Coordinates	GW1: Bhanjapali Munda Sahi; Lat: 21.917898 & Long: 85.257635 GW2: Within Mine lease Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
27	Odour	APHA 24thED:2150-B: 2023	---	AG	AG	U/O	U/O	U/O	U/O
28	Cadmium (Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001	<0.001	<0.001
29	Zinc (as Zn)	APHA 24thED3500 Zn: 2023	mg/l	5	15	<0.02	<0.02	<0.02	<0.02
30	Lead (as Pb)	APHA 24thED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01	<0.01	<0.01
31	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
32	Arsenic (as As)	APHA24th ED 3500As: 2023	mg/l	0.01	0.05	<0.001	<0.001	<0.001	<0.001
33	Mineral Oil	APHA 24th ED5220 B: 2023	mg/l	1.0	NR	ND	ND	ND	ND
34	Anionic Detergents (as MBAS)	APHA24th ED 5540 C: 2023	mg/l	0.2	1.0	ND	ND	ND	ND

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

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END OF REPORT

—2 of 3—

**ENVIRONMENT MONITORING REPORT
FOR THE MONTH OF
FEBRUARY- 2026**



NARAYANI

**Client- M/s. Nadidih Iron Ore & Mn Mines
(FEEGRADE),**

M/s ESL Steel Limited,

Address- Koira, Sundargarh, Odisha.



Monitored By - Green Force Associates Pvt. Ltd.

Address- Plot No-1363-3892 ,

Bhaibhab Nagar, Lane-2, Fulnakhara,

Bhubaneswar, Khurda, Odisha- 754001

NABL Certificate No:- TC-12258

PHOTOGRAPHS OF ENVIRONMENT MONITORING



Report No- GFAPL/25-26/ESLFG/195

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
04.02.2026	63.8	32.4	9	18.4	0.47
07.02.2026	67.2	33.8	9.4	18.8	0.48
11.02.2026	69.7	35.4	9.8	19.4	0.5
14.02.2026	71.5	36.6	10.2	20	0.51
18.02.2026	68.2	34.8	10	19.8	0.5
21.02.2026	65.7	33.5	9.8	19.6	0.5
25.02.2026	66.9	33.9	9.8	19.8	0.51
28.02.2026	64.5	32.7	9.6	19.4	0.5
Max	71.50	36.60	10.20	20.00	0.51
Min	63.80	32.40	9.00	18.40	0.47
Average	67.19	34.14	9.70	19.40	0.50
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Technical Manager

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Dy. Quality Manager

Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/196

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ2- Near Mine In-gate; Lat: 21°57'28.39"N & Long: 85°15'19.40"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
04.02.2026	84.8	42.9	12	23.8	0.61
07.02.2026	86.2	43.8	12.4	24.4	0.63
11.02.2026	82.7	42.2	11.8	23.4	0.61
14.02.2026	85.4	43.8	12.4	24.6	0.62
18.02.2026	88.1	45.1	12.8	25	0.64
21.02.2026	84.2	43.1	12	24.4	0.63
25.02.2026	81.7	42.5	11.4	23.4	0.6
28.02.2026	83.9	43.1	11.8	24	0.62
Max	88.10	45.10	12.80	25.00	0.64
Min	81.70	42.20	11.40	23.40	0.60
Average	84.63	43.31	12.08	24.13	0.62
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By

Authorized Signatory

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. S.K. Parhi

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/197

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
04.02.2026	62.1	32.6	6.6	13.6	0.32
07.02.2026	65.8	33.2	6.8	14	0.34
11.02.2026	61.8	31.8	6.4	13.4	0.33
14.02.2026	60.7	30.8	6.4	13.6	0.33
18.02.2026	63.1	32.1	6.6	13.8	0.34
21.02.2026	64.2	32.6	6.8	14.2	0.35
25.02.2026	61.9	31.5	6	13.4	0.33
28.02.2026	63.7	32.3	6.4	13.8	0.34
Max	65.30	33.20	7.00	14.20	0.35
Min	60.70	30.80	6.00	13.40	0.32
Average	62.85	32.11	6.53	13.73	0.34
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/198

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
04.02.2026	58.1	29.5	6	12	0.3
07.02.2026	59.7	30.2	6	12.2	0.3
11.02.2026	61.2	30.8	6.2	12.6	0.31
14.02.2026	58.3	29.7	6	12.4	0.31
18.02.2026	60.7	30.6	6.4	12.8	0.32
21.02.2026	62.8	31.5	6.4	13	0.32
25.02.2026	58.6	29.8	6	12.4	0.3
28.02.2026	59.8	30.4	6.2	12.6	0.31
Max	62.80	31.50	6.40	13.00	0.32
Min	58.10	29.50	6.00	12.00	0.30
Average	59.90	30.31	6.15	12.50	0.31
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
By: Quality Manager
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/199

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat: 21°59'52.38"N, & Long: :85°13'9.76"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
03.02.2026	60.8	30.8	6.4	13.4	0.33
06.02.2026	61.5	31.2	6.4	13.6	0.34
10.02.2026	63.7	32.4	6.6	13.8	0.34
13.02.2026	64.9	32.9	6.8	14	0.35
17.02.2026	66.1	33.6	7	14.4	0.36
20.02.2026	67.2	34.2	7.2	14.6	0.37
24.02.2026	63.8	32.6	6.4	13.6	0.35
27.02.2026	65.2	33.5	6.8	14	0.36
Max	67.20	34.20	7.20	14.60	0.37
Min	60.80	30.80	6.40	13.40	0.33
Average	64.15	32.65	6.70	13.93	0.35
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/200

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
03.02.2026	61.5	31.1	6.6	13	0.32
06.02.2026	59.2	30.4	6.2	12.8	0.31
10.02.2026	58.4	29.8	6.2	12.4	0.3
13.02.2026	62.5	31.6	6.4	12.8	0.31
17.02.2026	60.3	30.7	6.2	12.6	0.32
20.02.2026	59.8	30.5	6	12.4	0.31
24.02.2026	61.6	31.1	6.4	12.8	0.32
27.02.2026	60.7	30.7	6.4	13	0.33
Max	62.50	31.60	6.60	13.00	0.33
Min	58.40	29.80	6.00	12.40	0.30
Average	60.50	30.74	6.30	12.73	0.32
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Dy. Quality Manager
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/201

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Fugitive Dust Emission (F)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	F1: Mine Face Area; Lat:21° 57' 38.43"N & Long: 85° 15' 16.19"E; F2: Haul Road; Lat:21° 57' 38.16"N & Long: 85° 15' 14.66"E; F3: Near Crushing Plant; Lat: 21° 57' 46.19"N & Long: 85° 15' 10.74"E; F4: Near Screening Plant-1; Lat:21° 57' 47.89"N & Long:85° 15' 21.11"E; F5: Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E; F6: Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;		
Instrument Used	Respirable Dust Sampler (RDS)		

Sl. No.	Date of Sampling	Result ($\mu\text{g}/\text{m}^3$)					
		F1	F2	F3	F4	F5	F6
1	03.02.2026	894.2	718.6	1008.3	1042.8	768.2	694.2
2	06.02.2026	914.6	709.5	1054.2	1142.5	795.4	708.5
3	10.02.2026	964.2	754.2	1049.3	1098.3	808.6	682.8
4	13.02.2026	997.8	726.4	1078.6	1138.6	824.3	714.2
5	17.02.2026	1006.8	738.2	1038.5	1088.5	864.1	735.6
6	20.02.2026	979.3	769.4	997.5	1105.2	842.9	742.8
7	24.02.2026	997.5	771.4	1006.8	1075.3	894.6	697.5
8	27.02.2026	984.2	749.8	1039.5	1043.8	867.2	684.2
Max		1006.80	771.40	1078.60	1142.50	894.60	742.80
Min		894.20	709.50	997.50	1042.80	768.20	682.80
Average		967.33	742.19	1034.09	1091.88	833.16	707.48
Fugitive Standard		1200 $\mu\text{g}/\text{m}^3$					
Methods of Analysis		IS:5182 (Part-4)					

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By: Quality Manager

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/202

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	17.01.2026	Date of Completion	18.01.2026
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Near Mine Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E	57.8	41.2
2	Near Mine In gate; Lat: 21°57'35.245"N & Long: 85°15'12.007"E	69.4	60.4
3	Near Screening Plant-1; Lat: 21°57'42.30"N & Long: 85°15'9.04"E	69.3	31.8
4	Near Crusher; Lat: 21°57'48.19"N, Long: 85°15'20.00"E	69.5	62.1
5	Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E;	64.6	55.1
6	Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;	68.6	60.6

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Technical Manager

Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

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Report No- GFAPL/25-26/ESLFG/203

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Residential Area
Date of Sampling	20.02.2026	Date of Completion	21.02.2026
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
Results in dB(A)			
1	Village Rengalberha; Lat:21°57'19.11"N, & Long: 85°15'43.28"E	49.2	38.8
2	Village Kalta; Lat:21°58'2.93"N, & Long: : 85°13'20.36"E	48.8	38.9
3	Village Jhirapani; Lat:21°59'52.38"N & Long:85°13'9.76"E	48.8	38.2
4	Village Kashira; Lat:21°55'9.95"N & Long:85°15'18.13"E	47.9	37.4
Noise permissible limits as per CPCB Norms in dB(A) Leq			
Category of Area	Day Time	Night Time	
Industrial Area	75	70	
Commercial Area	65	55	
Residential Area	55	45	
Sensitive Area/ Silence Zone	50	40	

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory

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GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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END OF REPORT

-1-

Report No- GFAPL/25-26/ESLFG/204

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS-11255
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	19.02.2026	Date of Receiving	20.02.2026
Date of Analysis	20.02.2026	Date of Complete	25.02.2026
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: -85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Temperature	IS-11255 (PART-3) 1985	K	---	448
02	Velocity	IS-11255 (PART-3) 1985	m/sec	---	17.75
03	Particulate Matter as PM	IS-11255(PART-1) 1985 Gravimetric Method	mg/Nm3	100	76.2
04	Sulphur dioxide as SO2	IS-11255(PART-2) 1985	mg/Nm3	600	60.4
05	Carbon Monoxide as CO	IS-13270:1992	%	1%	<0.2
06	Carbon Dioxide as CO2	IS-13270:1992	%	---	1.5
07	Oxygen as O2	IS-13270:1992	%	---	16.2
08	Nitrogen Oxide as NOx	IS-11255(PART-7) 1985	mg/Nm3	300	62.8

Reviewed By
TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/205

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	19.02.2026	Date of Receiving	20.02.2026
Date of Analysis	20.02.2026	Date of Complete	25.02.2026
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	pH	APHA 24th ED 4500- H+B:2023	--	6.5-9.0	8.46	7.41
2.	Total Suspended Solids	APHA 24th ED 2540-D: 2023	mg/l	100	148	10
3.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	6.2	<2.0
4.	Biological Oxygen Demand as BOD	IS 3025 (PART 44):1993	mg/l	30	36	5.6
5.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 B:2023	mg/l	--	94	14

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

Reviewed By
TECHNICAL MANAGER
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Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/205

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	19.02.2026	Date of Receiving	20.02.2026
Date of Analysis	20.02.2026	Date of Complete	25.02.2026
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	Faecal Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	<1000	<1.8	<1.8

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

Reviewed By

Authorized Signatory

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, ODISHA
Mr. S.K. Parhi

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, ODISHA
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/206

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4): 2021	Hazen	300	<5.0	<5.0
2.	Turbidity	APHA 24th ED: 2180-B: 2023	NTU	16	16	20
3.	pH	APHA 24th ED 4500- H+B:2023	---	6.0-9.0	7.27	7.3
4.	Conductivity	APHA 24th ED 2510-B: 2023	μS/cm	---	193.6	214.4
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	121	134
6.	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	600	15	17
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.5	0.34	0.37
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	400	4.1	4.5
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	<0.05	<0.05
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	---	<2.0	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4	6.2	6
14.	BOD (3)days at 27°C	IS 3025 (PART 44):1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	---	10	13

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	<0.05	<0.05
17.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.58	1.64
18.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001	<0.001
19.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.05	<0.05
20.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	18	20

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESHWAR, ODISHA
 Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESHWAR, ODISHA
 Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/206

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.1	<0.01	<0.01
2.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	15	<0.02	<0.02
3.	Arsenic (as As)	APHA 24th ED 3500As: 2023	mg/l	0.2	<0.001	<0.001
4.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.05	<0.001	<0.001
5.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.01	<0.001	<0.001

Reviewed By

Authorized Signatory

GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

DEPUTY QUALITY MANAGER
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BHUBANESWAR, ODISHA
Dy. Quality Manager
Mr. M.R. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/207

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	54
3.	pH @25°C	APHA 24th ED 4500- H+B:2023		5.5-9.0	7.34
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	216
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	135
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	22
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.41
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	6.2
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.06
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	5.9
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand	APHA 24th ED 5220 C:2023	mg/l	--	20
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.12
17.	Nitrate (as NO3)	APHA 24th ED 4500-NO3-E: 2023	mg/l	50	1.98
18.	Phenolic Compounds as C6H5OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
19.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
20.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	24

Reviewed By
TECHNICAL MANAGER
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Mr. S.K. Parhi

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END OF REPORT

--1 of 2--

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Report No- GFAPL/25-26/ESLFG/207

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Lead (as Pb)	APHA 24 th ED 3500 Pb: 2023	mg/l	0.1	<0.01
2.	Zinc (as Zn)	APHA 24 th ED 3500 Zn: 2023	mg/l	15	<0.02
3.	Arsenic (as As)	APHA 24 th ED 3500 As: 2023	mg/l	0.2	<0.001
4.	Selenium (as Se)	APHA 24 th ED 3500 B: 2023	mg/l	0.05	<0.001
5.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.01	<0.001

Reviewed By
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BHUBANESWAR, ODISHA
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END OF REPORT

Report No- GFAPL/25-26/ESLFG/208

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	38
3.	pH @25°C	APHA 24th ED 4500- H+B:2023		5.5-9.0	7.38
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	273
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	168
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	28
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.40
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	11.9
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.07
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	5.7
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand	APHA 24th ED 5220 C:2023	mg/l	--	26
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.15
17.	Nitrate (as NO3)	APHA 24th ED 4500-NO3-E: 2023	mg/l	50	3.92
18.	Phenolic Compounds as C6H5OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
19.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
20.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	20

TECHNICAL MANAGER
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END OF REPORT

Report No- GFAPL/25-26/ESLFG/208

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat:-21°57'35.69"N, Long:-85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.1	<0.01
2.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	15	<0.02
3.	Arsenic (as As)	APHA 24th ED 3500 As: 2023	mg/l	0.2	<0.001
4.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.05	<0.001
5.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.01	<0.001

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
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END OF REPORT

Report No- GFAPL/25-26/ESLFG/209

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	GW1: Bhanjapali Munda Sahi; Lat: 21.917898 & Long: 85.257635 GW2: Village Rengalberha; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
1	Colour	IS 3025: (Part 4)- 2021	Hazen	5	15	<5.0	<5.0	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B - 2023	NTU	1	5	<1	<1	<1	<1
3	pH Value @25°C	APHA 24th ED 4500-H+B:2023	--	6.5-8.5	NR	7.12	7.05	7.1	7.14
4	Total Dissolved Solids (TDS)	APHA 24th ED: 2540-C: 2023	mg/l	500	2000	155	211	197	221
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	12	33	30	31
6	Total Hardness	APHA 24th Ed 2340-C: 2023	mg/l	200	600	97	119	114	131
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	24.2	28.5	27.3	32.1
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	9.1	11.7	11.2	12.4
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	93	109	102	117
10	Residual Free Chlorine	APHA 24 th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
13	Total Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	<0.05	<0.05	<0.05	<0.05
14	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.19	0.17	0.21	0.18

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
15	Sulfate	APHA 24th ED 4500-SO ₄ E: 2023	mg/l	200	400	4.2	4.7	4.8	4.2
16	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05	<0.05	<0.05
18	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01	<0.01	<0.01
18	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05	<0.05	<0.05
19	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	--	--	19.4	18	18.2	19.4
20	Potassium as K	APHA 24th ED 3500- K-B	mg/l	--	--	2	1.8	1.8	2
21	Taste	APHA 24th ED: 2160-B: 2023	---	AG	AG	AL	AL	AL	AL
22	Nitrate	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	45	NR	1.81	1.72	1.96	1.81
23	Copper (as Cu)	IS: 3028 (Part 42)	mg/l	0.05	1.5	<0.02	<0.02	<0.02	<0.02
24	Mercury (as Hg)	APHA 24th ED 3500 Hg: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
25	Aluminum (as Al)	APHA 24th ED 3500 Al: 2023	mg/l	0.03	0.2	<0.01	<0.01	<0.01	<0.01
26	Phenolic Compound (as C ₆ H ₅ OH)	APHA 24th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001
27	Total Coliforms	APHA 24th ED 9222 -H: 2023	MPN/100 ml	--	--	<1.8	<1.8	<1.8	<1.8

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

Reviewed By
TECHNICAL MANAGER
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BHUBANESHWAR, ODISHA
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLBI/209

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	GW1: Bhanjapali Munda Sahi; Lat: 21.917898 & Long: 85.257635 GW2: Village Rengalberha; Lat: 21.953047 & Long: 85.24916 GW3: Rengalbeda High School; Lat: 21.953827 & Long: 85.255226 GW4: Rengalbeda Rahadi Hating; Lat: 21.960128 & Long: 85.252218		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3	GW4
				AL	PL				
27	Odour	APHA 24thED:2150-B: 2023	---	AG	AG	U/O	U/O	U/O	U/O
28	Cadmium (Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001	<0.001	<0.001
29	Zinc (as Zn)	APHA 24thED3500 Zn: 2023	mg/l	5	15	<0.02	<0.02	<0.02	<0.02
30	Lead (as Pb)	APHA 24thED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01	<0.01	<0.01
31	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001	<0.001
32	Arsenic (as As)	APHA24th ED 3500As: 2023	mg/l	0.01	0.05	<0.001	<0.001	<0.001	<0.001
33	Mineral Oil	APHA 24th ED5220 B: 2023	mg/l	1.0	NR	ND	ND	ND	ND
34	Anionic Detergents (as MBAS)	APHA24th ED 5540 C: 2023	mg/l	0.2	1.0	ND	ND	ND	ND

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; al- agreeable;

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GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Deputy Manager
Mr. M.K. Swain

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END OF REPORT

--2 of 3--

Report No- GFAPL/25-26/ESLFG/210

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from themethod (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	S1: Lease Area; Lat: 21°57'42.30"N; & Long: 85°15'9.04"E S2: Village Rengalberha'; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		

Sl. No.	Parameters	Standard	Unit	S1	S2
1	pH	IS: 2720(Part-26)-1987		6.25	6.38
2	Organic Carbon Content	IS: 2720(Part-22)-1972	%	1.18	1.42
3	Water Content (Moisture)	IS: 2720(Part-2)-1973	%	6.2	6.2
4	Specific gravity	IS: 2720(Part-3/Sec1)-1980	Gs	2.69	2.66
5	Sulfate	IS: 2720(Part-27)-1977	mg/Kg	80	128
6	Electrical conductivity (as EC)	IS:14767: 2000	micro s/cm	197.6	184.2
7	Bulk Density	GFAPL/SOP/Soil & Rock/03-23	gm/cc	1.35	1.26
8	Nitrogen (as N)	IS:14684: 1999	kg/hect	56	88

Reviewed By
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Report No- GFAPL/25-26/ESLFG/210

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	S1: Lease Area; Lat: 21°57'42.30"N; & Long: 85°15'9.04"E S2: Village Rengalberha'; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		

Sl. No.	Parameters	Standard	Unit	S1	S2
9.	Colour	GFAPL/SOP/Soil & Rock/01-23	--	Brown	Brown
10.	Soil Texture	GFAPL/SOP/Soil & Rock/02-23		Sandy loamy	Sandy Clay loamy
11.	Calcium (as Ca)	IS: 2720(Part-23)	mg/kg	424	356
12.	Magnesium (as Mg)	GFAPL/SOP/Soil & Rock/04-23	mg/kg	214	170
13.	Phosphorus (as p)	GFAPL/SOP/Soil & Rock/05-23	kg/hect	32	30
14.	Potassium (as K)	GFAPL/SOP/Soil & Rock/06-23	mg/kg	158	118
15.	Chloride(as Cl)	GFAPL/SOP/Soil & Rock/07-23	mg/kg	130	116
16.	Manganese (as Mn)	GFAPL/SOP/Soil & Rock/08-23	mg/kg	8.6	2.2
17.	Iron (as Fe)	GFAPL/SOP/Soil & Rock/09-23	%	2.76	1.92

Reviewed By

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Authorized Signatory

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TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	S3: Village Kendudihi; Lat: 21°59'40.58"N& Long: 85°16'9.91"E S4: Village Village Kalta; Lat: 21°57'59.29"N& Long: 85°12'59.68"E		

Sl. No.	Parameters	Standard	Unit	S3	S4
1	pH	IS: 2720(Part-26)-1987		6.42	6.37
2	Organic Carbon Content	IS: 2720(Part-22)-1972	%	1.45	1.44
3	Water Content (Moisture)	IS: 2720(Part-2)-1973	%	6.4	6.3
4	Specific gravity	IS: 2720(Part-3/Seq1)-1980	Gs	2.66	2.66
5	Sulfate	IS: 2720(Part-27)-1977	mg/Kg	130	136
6	Electrical conductivity (as EC)	IS:14767: 2000	micro s/cm	185.6	186.7
7	Bulk Density	GFAPL/SOP/Soil & Rock/03-23	gm/cc	1.26	1.26
8	Nitrogen (as N)	IS:14684: 1999	kg/hect	112	116

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Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Soil		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per TNAU Agritech Portal
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Soil and Rock
Date of Sampling	21.02.2026	Date of Receiving	23.02.2026
Date of Analysis	23.02.2026	Date of Complete	28.02.2026
Sampling Location & Coordinates	S3: Village Kendudihi; Lat: 21°59'40.58"N& Long: 85°16'9.91"E S4: Village Village Kalta; Lat: 21°57'59.29"N& Long: 85°12'59.68"E		

Sl. No.	Parameters	Standard	Unit	S3	S4
9.	Colour	GFAPL/SOP/Soil & Rock/01-23	--	Brown	Brown
10.	Soil Texture	GFAPL/SOP/Soil & Rock/02-23	---	Sandy Clay loamy	Sandy Clay loamy
11.	Calcium (as Ca)	IS: 2720(Part-23)	mg/kg	364	368
12.	Magnesium (as Mg)	GFAPL/SOP/Soil & Rock/04-23	mg/kg	172	168
13.	Phosphorus (as p)	GFAPL/SOP/Soil & Rock/05-23	kg/hect	28	32
14.	Potassium (as K)	GFAPL/SOP/Soil & Rock/06-23	mg/kg	124	126
15.	Chloride(as Cl)	GFAPL/SOP/Soil & Rock/07-23	mg/kg	108	112
16.	Manganese (as Mn)	GFAPL/SOP/Soil & Rock/08-23	mg/kg	2.8	2.6
17.	Iron (as Fe)	GFAPL/SOP/Soil & Rock/09-23	%	1.84	1.72

Reviewed By

Authorized Signatory

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Mr. S.K. Parhi

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
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Report No- GFAPL/25-26/ESLFG/212

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	O ₃ ($\mu\text{g}/\text{m}^3$)	NH ₃ ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	21.02.2026	<8.0	<20.0
AAQ-2	Near Mine In Gate;	21.02.2026	<8.0	<20.0
AAQ-3	Near Rengalberha;	21.02.2026	<8.0	<20.0
AAQ-4	Near Kaltar;	21.02.2026	<8.0	<20.0
AAQ-5	Village Jhirapani;	20.02.2026	<8.0	<20.0
AAQ-6	Village Kashira;	20.02.2026	<8.0	<20.0
NAAQ* Standard			100	400
Methods of Analysis			IS:5182 (Part-9)	IS:5182 (Part-25)

Reviewed By

TECHNICAL MANAGER
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Bhubaneswar, Odisha
Mr. S.K. Parhi

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Report No- GFAPL/25-26/ESLFG/212

Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
AAQ-1	Near Vedanta Office	21.02.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-2	Near Mine InGate	21.02.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-3	Near Rengalberha	21.02.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-4	Near Kalta;	21.02.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-5	Village Jhirapani;	20.02.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-6	Village Kashira;	20.02.2026	<0.06	<0.6	<0.44	<5	<1
NAAQ* Standard			1	20	6	5	1
Methods of Analysis			IS:5182 (Part-22)	IS:5182 (Part-26)	As per CPCB method followed by AAS	IS:5182 (Part-11)	IS:5182 (Part-12)

Reviewed By
TECHNICAL MANAGER
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 BHUBANESWAR, ODISHA
 Technical Manager
 Mr. S.K. Parhi

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DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 BHUBANESWAR, ODISHA
 By: Quality Manager
 Mr. M.K. Swain

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Issued Date-05.03.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirā, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Free Silica ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	21.02.2026	<2.0
AAQ-2	Near Mine InGate;	21.02.2026	<2.0
AAQ-3	Near Rengalberha;	21.02.2026	<2.0
AAQ-4	Near Kalta;	21.02.2026	<2.0
AAQ-5	Village Jhirapani;	20.02.2026	<2.0
AAQ-6	Village Kashira;	20.02.2026	<2.0
Methods of Analysis			NIOSH Method 7500 by X-Ray Diffraction

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA

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END OF REPORT

**ENVIRONMENT MONITORING REPORT
FOR THE MONTH OF
MARCH- 2026**



NARAYANI

**Client- M/s. Nadidih Iron Ore & Mn Mines
(FEEGRADE),**

M/s ESL Steel Limited,

Address- Koira, Sundargarh, Odisha.



Monitored By - Green Force Associates Pvt. Ltd.

Address- Plot No-1363-3892 ,

Bhaibhab Nagar, Lane-2, Fulnakhara,

Bhubaneswar, Khurda, Odisha- 754001

NABL Certificate No:- TC-12258

PHOTOGRAPHS OF ENVIRONMENT MONITORING



Report No- GFAPL/25-26/ESLFG/213

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ1- Near Vedanta Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
03.03.2026	63.7	32.8	9	18.4	0.48
06.03.2026	65.9	34.2	9.8	19.4	0.49
10.03.2026	68.2	34.9	10.2	19.8	0.5
13.03.2026	71.6	36.7	10.4	20.4	0.52
17.03.2026	70.4	35.8	10.4	20.8	0.53
20.03.2026	73.8	37.5	10.8	21.4	0.55
24.03.2026	67.9	34.4	9	18	0.51
27.03.2026	69.4	35.5	9.4	18.6	0.52
Max	73.80	37.50	10.80	21.40	0.55
Min	63.70	32.80	9.00	18.00	0.48
Average	68.86	35.23	9.88	19.60	0.51
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/214

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ2- Near Mine In-gate; Lat: 21°57'28.39"N & Long: 85°15'19.40"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
03.03.2026	79.8	40.7	10.8	22.8	0.57
06.03.2026	82.4	41.9	11.4	23.8	0.6
10.03.2026	86.5	44.1	12	24.4	0.62
13.03.2026	84.8	43.2	11.8	24	0.61
17.03.2026	85.9	43.7	12.4	24.8	0.64
20.03.2026	88.4	45.1	13	25.4	0.65
24.03.2026	81.2	41.5	11.8	23.4	0.59
27.03.2026	84.6	43.1	12.4	24	0.62
Max	88.40	45.10	13.00	25.40	0.65
Min	79.80	40.70	10.80	22.80	0.57
Average	84.20	42.91	11.95	24.08	0.61
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/215

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ3- Near Rengalberha; Lat: 21°57'9.84"N& Long: 85°14'55.34"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
03.03.2026	60.9	30.7	6	13	0.33
06.03.2026	65.2	33.1	6.8	13.8	0.35
10.03.2026	63.7	32.8	6.4	13.4	0.34
13.03.2026	66.4	33.8	6.8	14	0.35
17.03.2026	64.1	32.6	7	14.4	0.36
20.03.2026	66.9	34.1	7.4	14.8	0.37
24.03.2026	60.7	30.9	6.4	13	0.33
27.03.2026	62.4	31.7	6.8	13.4	0.34
Max	66.90	34.10	7.40	14.80	0.37
Min	60.70	30.70	6.00	13.00	0.33
Average	63.79	32.46	6.70	13.73	0.35
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/216

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ4- Near Kalta; Lat: 21°57'59.29"N & Long: 85°12'59.68"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
03.03.2026	58.5	29.8	5.8	12.8	0.32
06.03.2026	59.4	30.1	6.2	13.2	0.33
10.03.2026	58.2	29.8	6	13.4	0.33
13.03.2026	61.7	31.3	6.2	13.6	0.34
17.03.2026	60.6	30.8	6.2	13.4	0.33
20.03.2026	63.8	32.5	6.4	13.8	0.34
24.03.2026	56.9	28.8	5.8	11.8	0.3
27.03.2026	58.2	29.5	6	12.4	0.31
Max	63.80	32.50	6.40	13.80	0.34
Min	56.90	28.80	5.80	11.80	0.30
Average	59.66	30.33	6.05	13.05	0.33
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
By: Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/217

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ5- Village Jhirapani; Lat: 21°59'52.38"N, & Long: :85°13'9.76"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
04.03.2026	63.8	32.4	6.4	13.8	0.35
07.03.2026	66.4	33.7	6.8	14.4	0.36
11.03.2026	68.2	34.7	7.4	14.8	0.37
14.03.2026	65.1	33.1	7.4	14.6	0.37
18.03.2026	66.9	34.1	7.8	15	0.38
21.03.2026	67.8	34.6	8	15.4	0.39
25.03.2026	60.8	30.7	6.4	12.8	0.33
28.03.2026	62.4	31.6	6.8	13.4	0.35
Max	68.20	34.70	8.00	15.40	0.39
Min	60.80	30.70	6.40	12.80	0.33
Average	65.18	33.11	7.13	14.28	0.36
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/218

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	AAQ6- Village Kashira; Lat:21°55'9.95"N, & Long: :85°15'18.13"E		
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Date of Sampling	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)
04.03.2026	58.1	29.6	5.8	12.6	0.31
07.03.2026	60.2	30.7	6.1	13	0.33
11.03.2026	62.4	31.8	6.2	13.4	0.34
14.03.2026	64.6	32.6	6.4	13.6	0.35
18.03.2026	63.1	31.9	6.4	13.8	0.36
21.03.2026	64.8	32.7	6.8	14.2	0.36
25.03.2026	59.1	29.8	6	12.4	0.3
28.03.2026	60.4	30.6	6.2	12.8	0.32
Max	64.80	32.70	6.80	14.20	0.36
Min	58.10	29.60	5.80	12.40	0.30
Average	61.59	31.21	6.23	13.23	0.33
NAAQ* Standard	100	60	80	80	4
Methods of Analysis	IS:5182 (Part-23)	IS:5182 (Part-24)	IS:5182 (Part-2)	IS:5182 (Part-6)	IS: 5182 (Part- 10)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/219

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Fugitive Dust Emission (F)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Sampling Location & Coordinates	F1: Mine Face Area; Lat:21° 57' 38.43"N & Long: 85° 15' 16.19"E; F2: Haul Road; Lat:21° 57' 38.16"N & Long: 85° 15' 14.66"E; F3: Near Crushing Plant; Lat: 21° 57' 46.19"N & Long: 85° 15' 10.74"E; F4: Near Screening Plant-1; Lat:21° 57' 47.89"N & Long:85° 15' 21.11"E; F5: Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E; F6: Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;		
Instrument Used	Respirable Dust Sampler.(RDS)		

Sl. No.	Date of Sampling	Result ($\mu\text{g}/\text{m}^3$)					
		F1	F2	F3	F4	F5	F6
1	04.03.2026	924.5	701.5	994.2	1009.3	789.5	618.2
2	07.03.2026	964.1	728.3	1024.6	1042.5	805.2	659.3
3	11.03.2026	958.2	769.4	1084.2	1078.6	824.3	708.4
4	14.03.2026	986.4	801.4	1056.4	1104.5	864.1	724.8
5	18.03.2026	1003.8	794.5	1008.3	1048.3	819.6	764.9
6	21.03.2026	1014.9	824.6	1072.6	1108.3	843.5	783.7
7	25.03.2026	988.2	742.5	978.2	1007.2	784.2	724.3
8	28.03.2026	965.7	801.5	1024.6	1054.6	824.9	764.9
Max		1014.90	843.60	1084.20	1108.30	883.60	804.50
Min		924.50	701.50	978.20	1007.20	784.20	618.20
Average		973.32	778.59	1033.31	1059.73	826.54	728.11
Fugitive Standard		1200 $\mu\text{g}/\text{m}^3$					
Methods of Analysis		IS:5182 (Part-4)					

Reviewed By
TECHNICAL MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 Technical Manager
 Mr. S.K. Parni
 BHUBANESWAR, ODISHA

Authorized Signatory
DEPUTY QUALITY MANAGER
 GREENFORCE ASSOCIATES PRIVATE LIMITED
 Dy. Quality Manager
 Mr. M.K. Swain
 BHUBANESWAR, ODISHA

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/220

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	18.03.2026	Date of Completion	19.03.2026
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
		Results in dB(A)	
1	Near Mine Office; Lat: 21°58'18.92"N & Long: 85°15'23.08"E	58.1	41.5
2	Near Mine In gate; Lat: 21°57'35.245"N & Long: 85°15'12.007"E	69.9	60.8
3	Near Screening Plant-1; Lat: 21°57'42.30"N & Long: 85°15'9.04"E	69.6	62.8
4	Near Crusher; Lat: 21°57'48.19"N, Long: 85°15'20.00"E	69.4	62.6
5	Near Weigh Bridge; Lat: 21°57'38.16"N & Long: 85°15'12.96"E;	65.6	56.8
6	Near Screening Plant-2; Lat: 21°57'45.08"N & Long: 85°15'12.44"E;	68.8	61.2

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, ODISHA
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, ODISHA
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/221

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Residential Area
Date of Sampling	20.03.2026	Date of Completion	21.03.2026
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Day Time	Night Time
Results in dB(A)			
1	Village Rengalberha; Lat:21°57'19.11"N & Long: 85°15'43.28"E	49.5	40.1
2	Village Kalta; Lat:21°58'2.93"N, & Long: : 85°13'20.36"E	49.4	40.2
3	Village Jhirapani; Lat:21°59'52.38"N & Long:85°13'9.76"E	50.1	40.6
4	Village Kashira; Lat:21°55'9.95"N & Long:85°15'18.13"E	49.2	39.8
Noise permissible limits as per CPCB Norms in dB(A) Leq			
Category of Area		Day Time	Night Time
Industrial Area		75	70
Commercial Area		65	55
Residential Area		55	45
Sensitive Area/ Silence Zone		50	40

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Technical Manager
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Deputy Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/222

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Stack Monitoring (ST)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS-11255
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	17.03.2026	Date of Receiving	18.03.2026
Date of Analysis	18.03.2026	Date of Complete	23.03.2026
Sampling Location & Coordinates	ST- DG SET; Lat: 21°57'37.63"N & Long: -85°15'15.59"E;		
Instrument Used	Stack monitoring Kit; Vacuum Pump; Pyrometer		

Sl. No	Items	Testing Method	Unit	As per CPCB Standard	Result
01	Temperature	IS-11255 (PART-3) 1985	K	---	446.0
02	Velocity	IS-11255 (PART-3) 1985	m/sec	---	17.74
03	Particulate Matter as PM	IS-11255(PART-1) 1985 Gravimetric Method	mg/Nm3	100	78.2
04	Sulphur dioxide as SO2	IS-11255(PART-2) 1985	mg/Nm3	600	64.4
05	Carbon Monoxide as CO	IS-13270:1992	%	1%	<0.2
06	Carbon Dioxide as CO2	IS-13270:1992	%	---	1.6
07	Oxygen as O2	IS-13270:1992	%	---	15.8
08	Nitrogen Oxide as NOx	IS-11255(PART-7) 1985	mg/Nm3	300	58.6

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BHUBANESWAR, ODISHA
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END OF REPORT

Report No- GFAPL/25-26/ESLFG/223

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	17.03.2026	Date of Receiving	18.03.2026
Date of Analysis	18.03.2026	Date of Complete	23.03.2026
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	pH	APHA 24th ED 4500- H+B:2023	--	6.5-9.0	8.64	7.28
2.	Total Suspended Solids	APHA 24th ED 2540-D: 2023	mg/l	100	128	18
3.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	7.4	<2.0
4.	Biological Oxygen Demand as BOD	IS 3025 (PART 44):1993	mg/l	30	40	6
5.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 B:2023	mg/l	--	100	18

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

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Report No- GFAPL/25-26/ESLFG/223

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirā, Sundargarh, Odisha.		
Nature of Sampling	STP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	17.03.2026	Date of Receiving	18.03.2026
Date of Analysis	18.03.2026	Date of Complete	23.03.2026
Sampling Location & Coordinates	STP1- Inside the ML Area (STP-Inlet); Lat: 21°58'18.36"N, Long: 85°15'18.05"E; STP2- Inside the ML Area (STP-Outlet); Lat: 21°58'18.30"N, Long: 85°15'18.01"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	STP1	STP2
1.	Faecal Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	<1000	<1.8	<1.8

Remarks: The Standard as per CTO is only applicable to the Discharge ie., Outlet

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Report No- GFAPL/25-26/ESLFG/224

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.03.2026	Date of Receiving	23.03.2026
Date of Analysis	23.03.2026	Date of Complete	28.03.2026
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4): 2021	Hazen	300	<5.0	<5.0
2.	Turbidity	APHA 24 th ED: 2130-B: 2023	NTU		16	20
3.	pH	APHA 24 th ED 4500- H+B: 2023	---	6.0-9.0	7.31	7.35
4.	Conductivity	APHA 24 th ED 2510-B: 2023	µS/cm	--	204.8	222.4
5.	Total Dissolved Solid	APHA 24 th ED 2540-C: 2023	mg/l	1500	128	139
6.	Chloride (as Cl)	APHA 24 th Ed 4500- Cl-B: 2023	mg/l	600	17	19
7.	Cyanide (as CN)	APHA 24 th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24 th ED 3500-Fe-B: 2023	mg/l	0.5	0.36	0.4
10.	Sulfate (as SO4)	APHA 24 th ED 4500-SO4 D: 2023	mg/l	400	4.5	4.8
11.	Fluoride (as F)	APHA 24 th ED 4500-F-C: 2023	mg/l	1.5	0.06	0.07
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	--	<2.0	<2.0
13.	Dissolved oxygen	APHA 24 th ED 4500 O-C: 2023	mg/l	4	5.9	5.8
14.	BOD (3)days at 27°C	IS 3025 (PART 44):1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24 th ED 5220 C: 2023	mg/l	--	12	16

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.06	0.08
17.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.68	1.88
18.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001	<0.001
19.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.05	<0.05
20.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	14	16

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 Dy. Quality Manager
 Mr. M.K. Swain

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Report No- GFAPL/25-26/ESLFG/224

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.03.2026	Date of Receiving	23.03.2026
Date of Analysis	23.03.2026	Date of Complete	28.03.2026
Sampling Location & Coordinates	SW1: Karo River Upstream(US); Lat: 21°57'51.50"N & Long: 85°15'1.33"E SW2: Karo River Downstream(DS); Lat: 21°58'37.78"N & Long: 85°16'6.64"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.1	<0.01	<0.01
2.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	15	<0.02	<0.02
3.	Arsenic (as As)	APHA 24th ED 3500As: 2023	mg/l	0.2	<0.001	<0.001
4.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.05	<0.001	<0.001
5.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.01	<0.001	<0.001

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Report No- GFAPL/25-26/ESLFG/225

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.03.2026	Date of Receiving	23.03.2026
Date of Analysis	23.03.2026	Date of Complete	28.03.2026
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	54
3.	pH @25°C	APHA 24th ED 4500- H+B:2023		5.5-9.0	7.38
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	230.4
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	144
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	24
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.42
10.	Sulfate (as SO4)	APHA 24th ED 4500-SO4 D: 2023	mg/l	--	6.8
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.08
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	5.8
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand	APHA 24th ED 5220 C:2023	mg/l	--	22
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.16
17.	Nitrate (as NO3)	APHA 24th ED 4500-NO3-E: 2023	mg/l	50	2.24
18.	Phenolic Compounds as C6H5OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
19.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
20.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	20

Reviewed By

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END OF REPORT

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Report No- GFAPL/25-26/ESLFG/225

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirā, Sundargarh, Odisha.		
Nature of Sampling	Surface Water (SW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.03.2026	Date of Receiving	23.03.2026
Date of Analysis	23.03.2026	Date of Complete	28.03.2026
Sampling Location & Coordinates	SW3: Topadih; Lat: 21°59'21.57"N, Long: 85°18'15.30"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Lead (as Pb)	APHA 24 th ED 3500 Pb: 2023	mg/l	0.1	<0.01
2.	Zinc (as Zn)	APHA 24 th ED 3500 Zn: 2023	mg/l	15	<0.02
3.	Arsenic (as As)	APHA 24 th ED 3500 As: 2023	mg/l	0.2	<0.001
4.	Selenium (as Se)	APHA 24 th ED 3500 B: 2023	mg/l	0.05	<0.001
5.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.01	<0.001

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/226

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.03.2026	Date of Receiving	23.03.2026
Date of Analysis	23.03.2026	Date of Complete	28.03.2026
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat: 21°57'35.69"N, Long: 85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Colour	IS 3025: (Part 4)- 2021	Hazen	--	<5.0
2.	Total Suspended Solid	APHA 24th ED 2540-D: 2023	mg/l	100	37
3.	pH @25°C	APHA 24th ED 4500- H+B:2023		5.5-9.0	7.41
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	--	281.1
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	--	172
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	--	30
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	--	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	--	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	--	0.41
10.	Sulfate (as SO ₄)	APHA 24th ED 4500-SO ₄ D: 2023	mg/l	--	12.1
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	--	0.09
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	10	<2.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	--	5.9
14.	BOD (3)days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	--	<2.0
15.	Chemical Oxygen Demand	APHA 24th ED 5220 C:2023	mg/l	--	28
16.	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	--	0.17
17.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	3.99
18.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	--	<0.001
19.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.03
20.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	18

Reviewed By

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 Dy. Quality Manager
 Mr. N.K. Swain
 BHUBANESWAR, ODISHA

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END OF REPORT

GREEN FORCE

ASSOCIATES PRIVATE LIMITED

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/226

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Mines Discharge Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	21.03.2026	Date of Receiving	23.03.2026
Date of Analysis	23.03.2026	Date of Complete	28.03.2026
Sampling Location & Coordinates	Mine Discharge Water (Near Sub Station); Lat:-21°57'35.69"N, Long:-85°15'14.09"E		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per CTO	Result
1.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.1	<0.01
2.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	15	<0.02
3.	Arsenic (as As)	APHA 24th ED 3500As: 2023	mg/l	0.2	<0.001
4.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.05	<0.001
5.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.01	<0.001

Reviewed By

Authorized Signatory

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Technical Manager
Mr. S.K. Parhi

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Report No- GFAPL/25-26/ESLFG/227

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koira, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	O ₃ ($\mu\text{g}/\text{m}^3$)	NH ₃ ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	20.03.2026	<8.0	<20.0
AAQ-2	Near Mine In-Gate;	20.03.2026	<8.0	<20.0
AAQ-3	Near Rengalberha;	20.03.2026	<8.0	<20.0
AAQ-4	Near Kalta;	20.03.2026	<8.0	<20.0
AAQ-5	Village Jhirapani;	21.03.2026	<8.0	<20.0
AAQ-6	Village Kashira;	21.03.2026	<8.0	<20.0
NAAQ* Standard			100	400
Methods of Analysis			IS:5182 (Part-9)	IS:5182 (Part-25)

Reviewed By

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. S.K. Parhi

Authorized Signatory

DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Mr. M.K. Swain

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GREEN FORCE

ASSOCIATES PRIVATE LIMITED

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/25-26/ESLFG/227

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koiria, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
AAQ-1	Near Vedanta Office	20.03.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-2	Near Mine InGate;	20.03.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-3	Near Rengalberha;	20.03.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-4	Near Kalta;	20.03.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-5	Village Jhirapani;	21.03.2026	<0.06	<0.6	<0.44	<5	<1
AAQ-6	Village Kashira;	21.03.2026	<0.06	<0.6	<0.44	<5	<1
NAAQ* Standard			1	20	6	5	1
Methods of Analysis			IS:5182 (Part-22)	IS:5182 (Part-26)	As per CPCB method followed by AAS	IS:5182 (Part-11)	IS:5182 (Part-12)

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESHWAR, ODISHA
Deputy Quality Manager
Mr. M.K. Swain

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ASSOCIATES PRIVATE LIMITED

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Report No- GFAPL/25-26/ESLFG/227

Issued Date-04.04.2026

TEST REPORT

Client Name & Address	M/s. Nadidih Iron Ore & Mn Mines (FEEGRADE), M/s ESL Steel Limited, At/PO:- Koirra, Sundargarh, Odisha.		
Nature of Sampling	Ambient Air Quality Monitoring (AAQ)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per IS: 5182
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Instrument Used	Respirable Dust Sampler, Fine Particulate Dust Sampler		

Location Code	Sampling Location	Date of Sampling	Free Silica ($\mu\text{g}/\text{m}^3$)
AAQ-1	Near Vedanta Office;	20.03.2026	<2.0
AAQ-2	Near Mine InGate;	20.03.2026	<2.0
AAQ-3	Near Rengalberha;	20.03.2026	<2.0
AAQ-4	Near Kalta;	20.03.2026	<2.0
AAQ-5	Village Jhirapani;	21.03.2026	<2.0
AAQ-6	Village Kashira;	21.03.2026	<2.0
Methods of Analysis			NIOSH Method 7500 by X-Ray Diffraction

Reviewed By
TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Technical Manager
Mr. S.K. Parhi

Authorized Signatory
DEPUTY QUALITY MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha
Dy. Quality Manager
Mr. M.K. Swain

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END OF REPORT

Date/Time MicL at 14:13:48 December 08, 2025
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB(L)
Range Geo: 254.0 mm/s
Record Time 5.0 sec at 1024 sps
Operator/Setup: Operator/FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration November 29, 2024 by UES New Delhi
File Name UM20028_20251208161348.IDFW
Scaled Distance 28.3 (200.0 m, 50.0 kg)

Notes

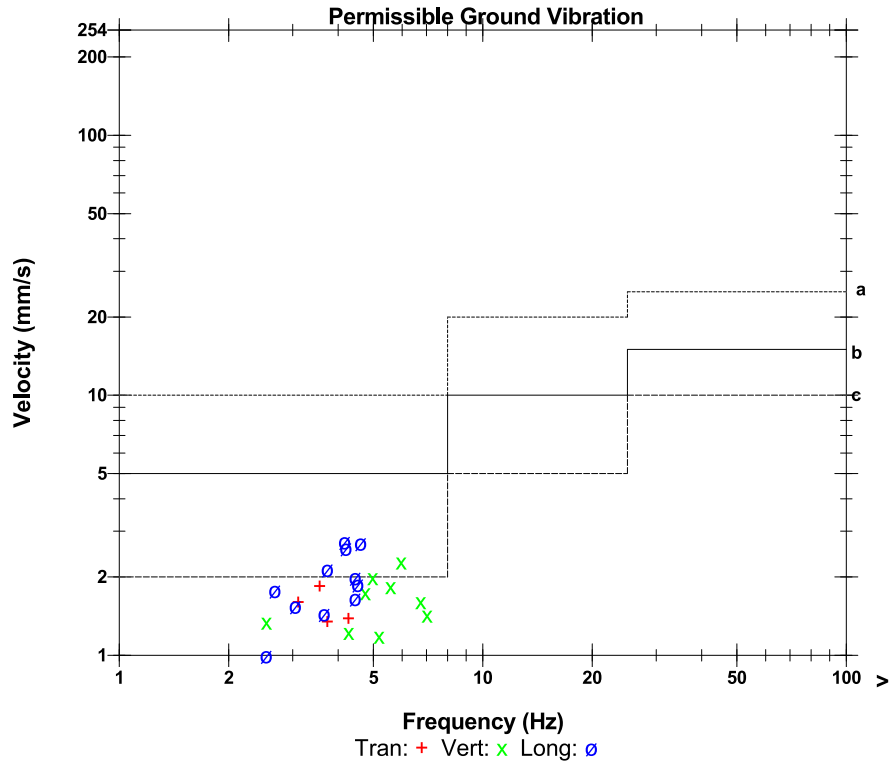
Location: FEEGRADE IRON & MN ORE MINES
Client: NARAY ANI SONS INDIA PVT. LTD
User Name: TRIMURTI EXPLOSIVES
General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 128.5 dB(L) at 0.186 sec
ZC Freq 32 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1260 mv)

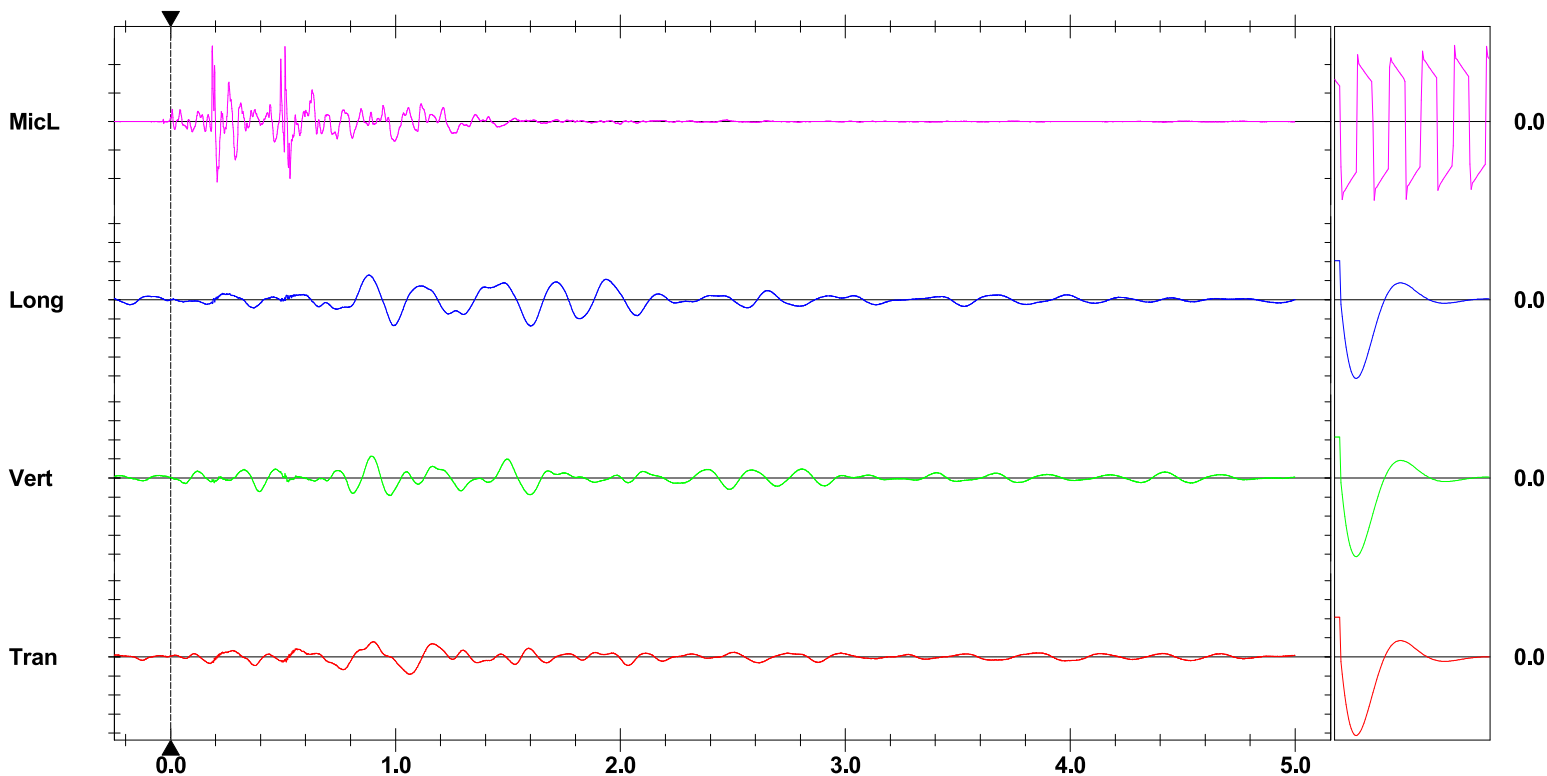
	Tran	Vert	Long	
PPV	1.844	2.294	2.743	mm/s
ZC Freq	3.6	6.0	4.2	Hz
Time (Rel. to Trig)	1.063	0.892	1.602	sec
Peak Acceleration	0.028	0.027	0.023	g
Peak Displacement	0.074	0.060	0.111	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.3	Hz
Overswing Ratio	4.8	4.5	4.6	

Peak Vector Sum 3.695 mm/s at 0.890 sec

DGMS India (A)



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 20.00 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 14:32:39 December 23, 2025
Trigger Source Geo: 0.700 mm/s, Mic: 2.000 pa.(L)
Range Geo: 254.0 mm/s
Record Time 5.0 sec at 1024 sps
Operator/Setup: Operator/FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20251223165239.IDFW

Notes

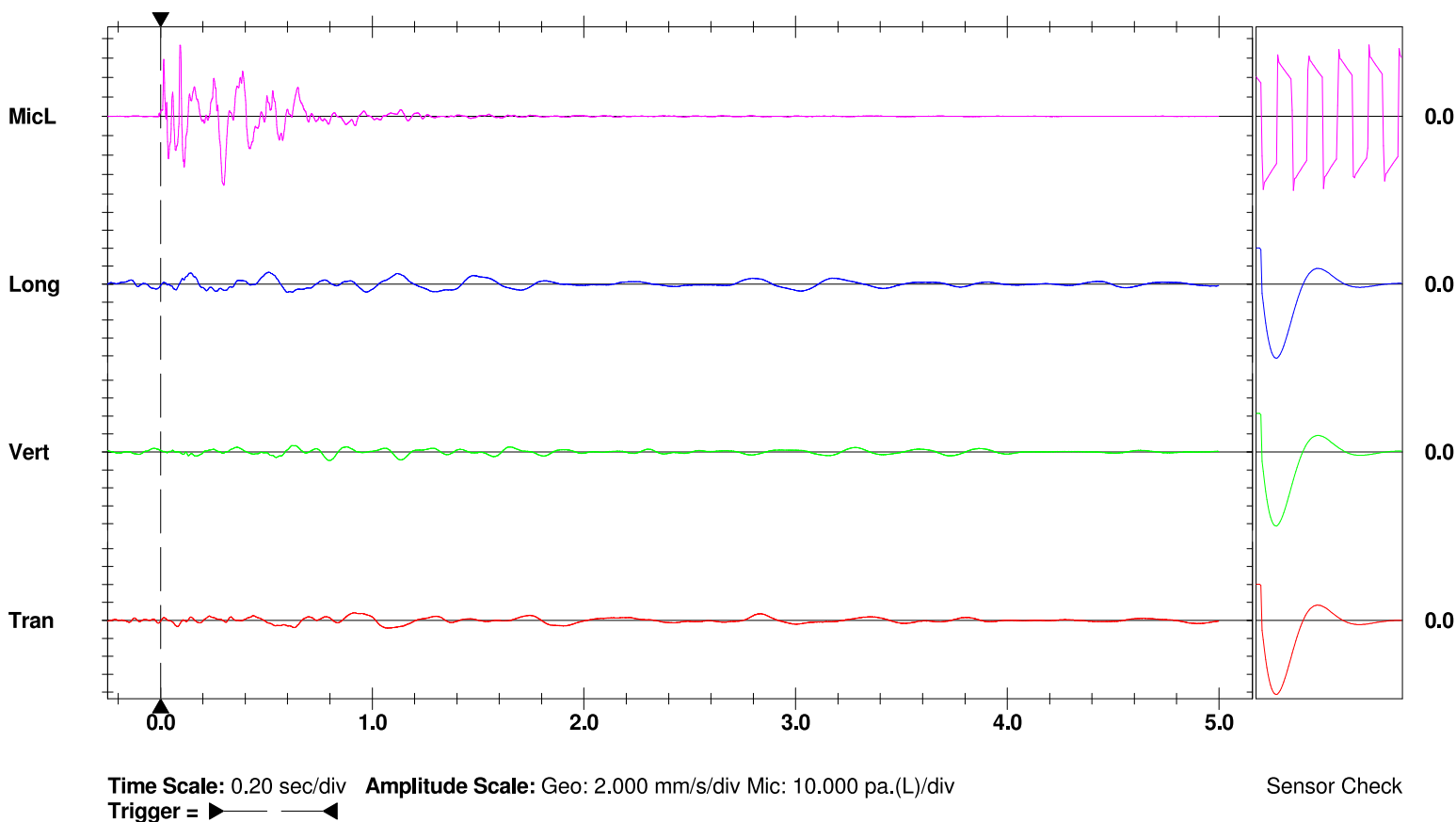
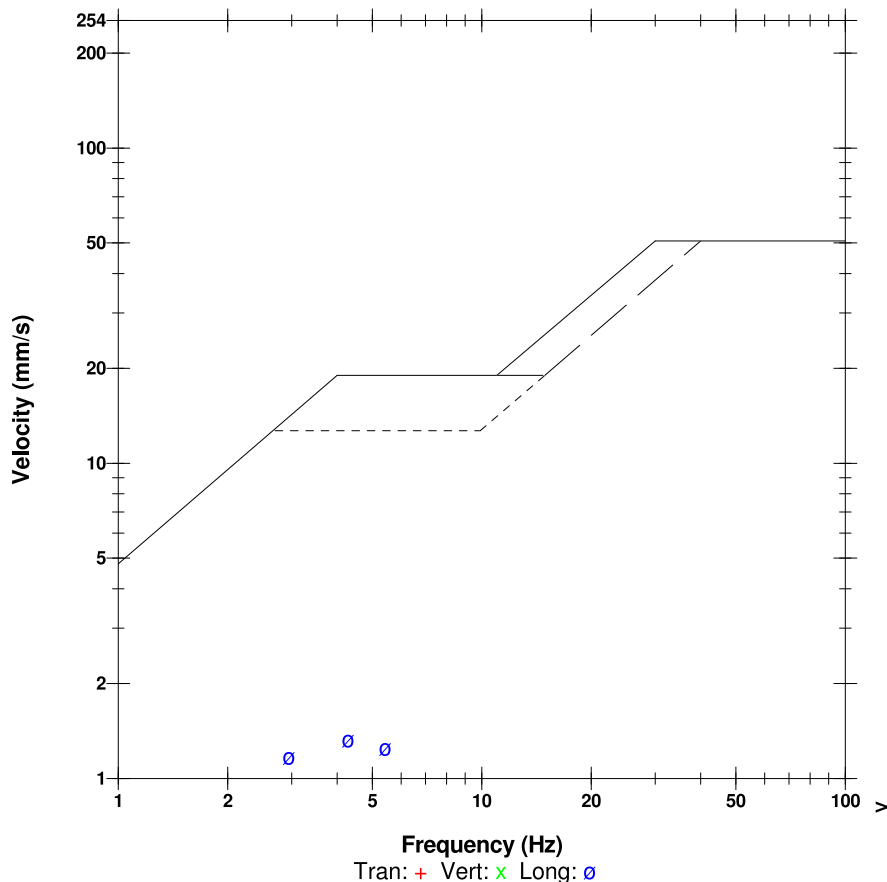
Location: FEEGRADE IRON & MN ORE MINES
Client: NARAYANI SONS INDIA PVT. LTD.
User Name: TRIMURTI EXPLOSIVES
General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 36.68 pa.(L) at 0.092 sec
ZC Freq 39 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1273 mv)

	Tran	Vert	Long	
PPV	0.867	0.954	1.332	mm/s
ZC Freq	2.7	6.2	4.3	Hz
Time (Rel. to Trig)	1.068	0.795	0.511	sec
Peak Acceleration	0.009	0.007	0.012	g
Peak Displacement	0.054	0.025	0.063	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.9	4.5	4.7	

Peak Vector Sum 1.580 mm/s at 1.123 sec

DGMS India (A) Permissible Ground Vibration



Date/Time Tran at 14:02:31 January 13, 2026
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB(L)
Range Geo: 254.0 mm/s
Record Time 4.004 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/NSIPL_FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20260113140231.IDFW

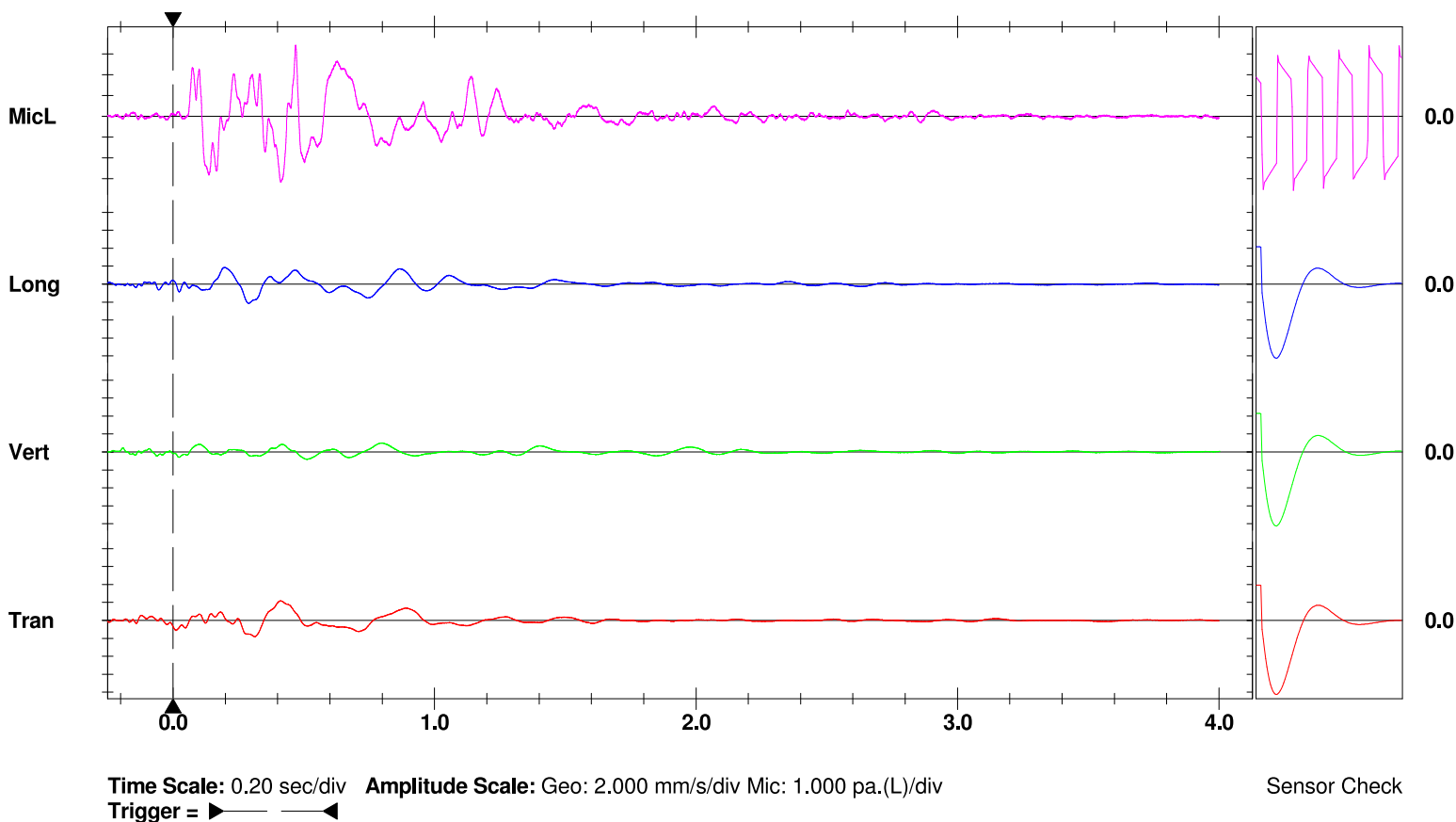
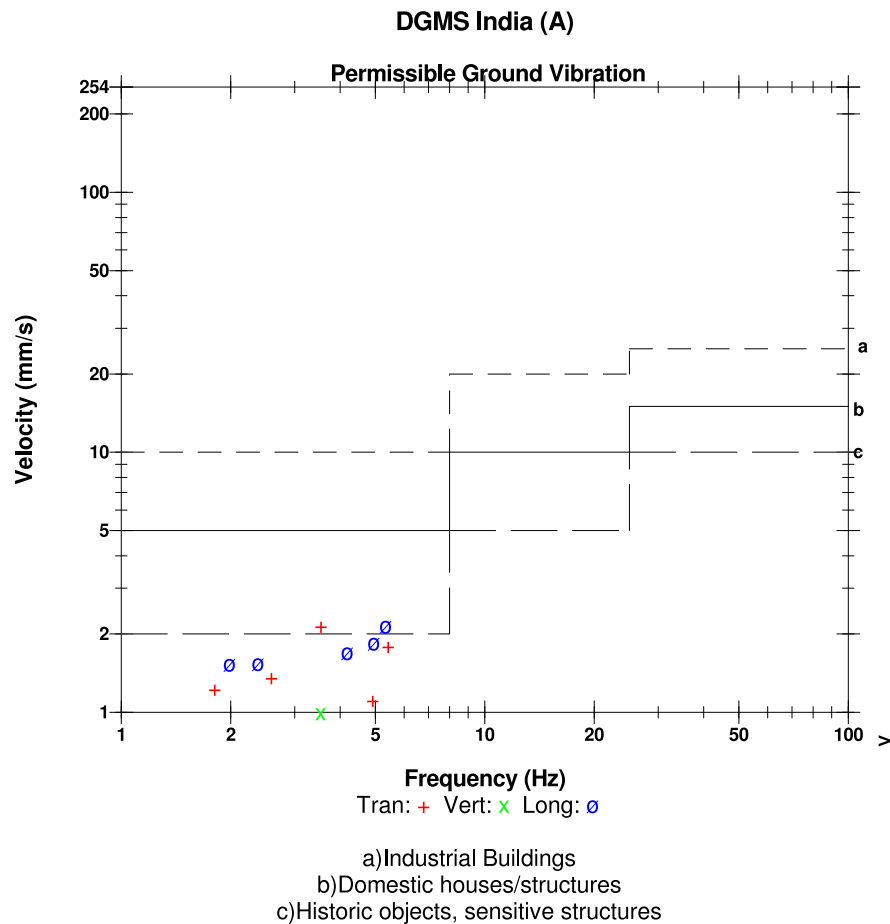
Notes

Location: FEEGRADE IRON & MN ORE MINES
 Client: NARAYANI SONS INDIA PVT. LTD.
 User Name: TRIMURTI EXPLOSIVE
 General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 104.7 dB(L) at 0.469 sec
ZC Freq 10.9 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1275 mv)

	Tran	Vert	Long	
PPV	2.175	1.001	2.160	mm/s
ZC Freq	3.5	3.5	5.4	Hz
Time (Rel. to Trig)	0.410	0.798	0.288	sec
Peak Acceleration	0.015	0.012	0.016	g
Peak Displacement	0.093	0.039	0.093	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.9	4.5	4.6	

Peak Vector Sum 2.675 mm/s at 0.291 sec



Date/Time Vert at 14:44:57 January 21, 2026
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB(L)
Range Geo: 254.0 mm/s
Record Time 4.611 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/NSIPL_FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20260121134457.IDFW

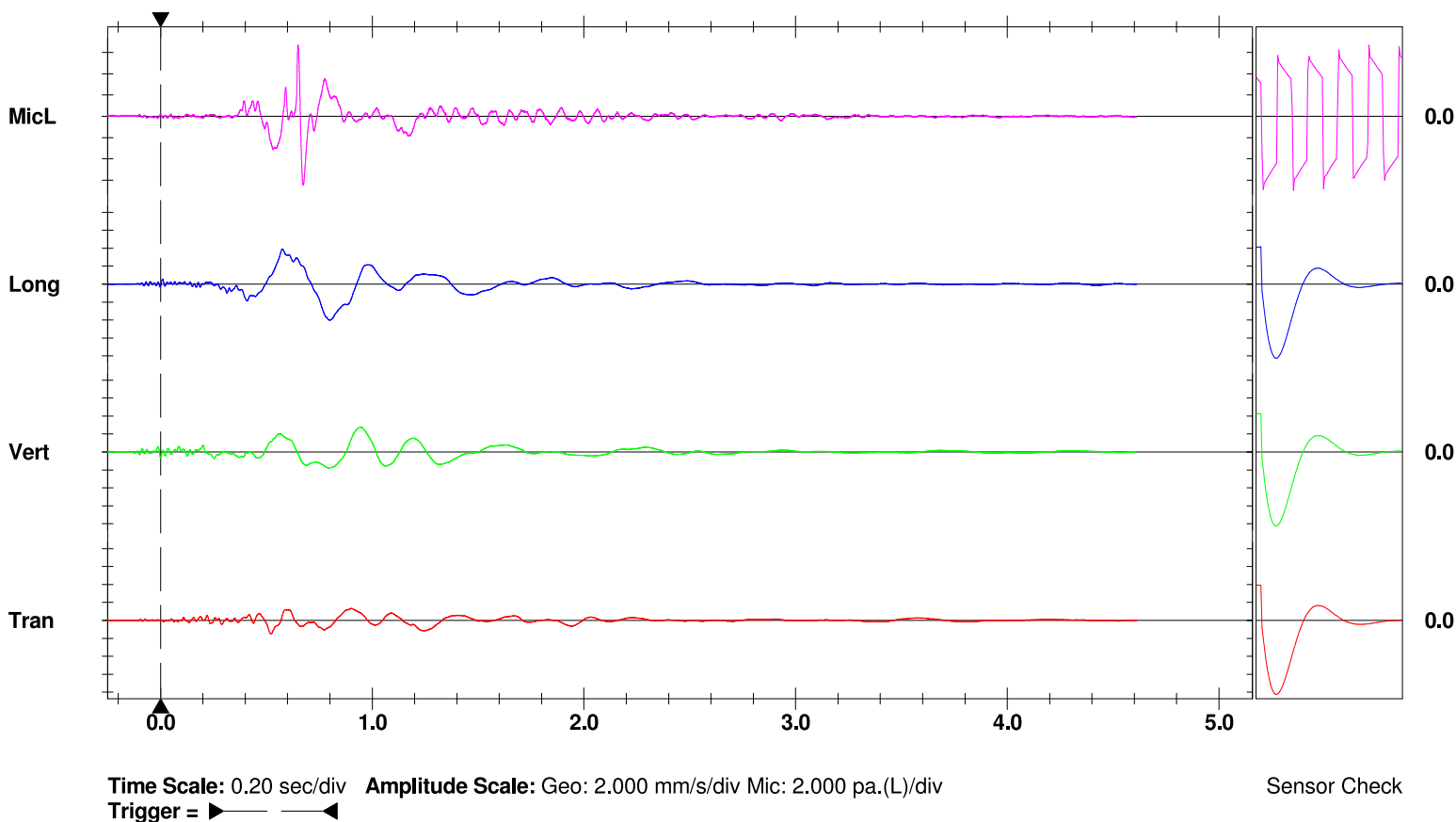
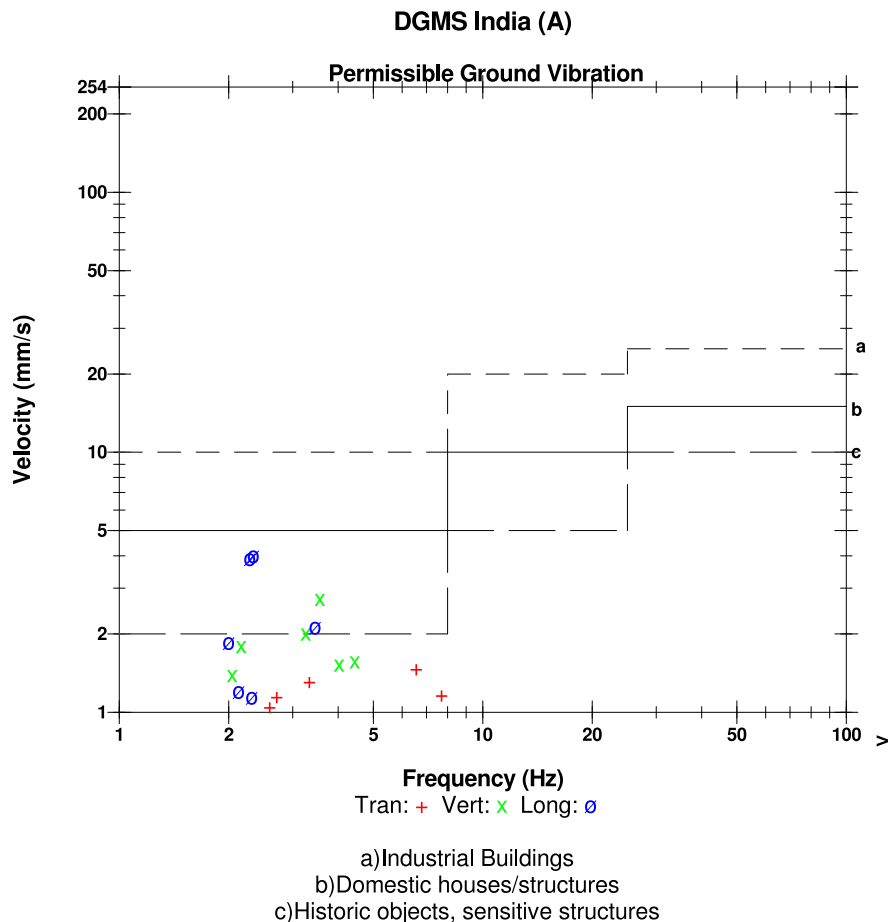
Notes

Location: NADIDIHI IRON & MN ORE MINES
 Client: NARAYANI SONS PRIVATE LIMITED
 User Name: TRIMURTI EXPLOSIVE
 General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 110.5 dB(L) at 0.650 sec
ZC Freq 16.0 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1262 mv)

	Tran	Vert	Long	
PPV	1.490	2.751	4.028	mm/s
ZC Freq	6.6	3.6	2.3	Hz
Time (Rel. to Trig)	0.522	0.946	0.799	sec
Peak Acceleration	0.015	0.021	0.015	g
Peak Displacement	0.062	0.141	0.247	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	5.0	4.5	4.7	

Peak Vector Sum 4.468 mm/s at 0.799 sec



Date/Time Long at 14:33:58 February 03, 2026
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB
Range (L) Geo: 254.0 mm/s
Record Time 5.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/NSIPL_FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20260203143358.IDFW

Notes

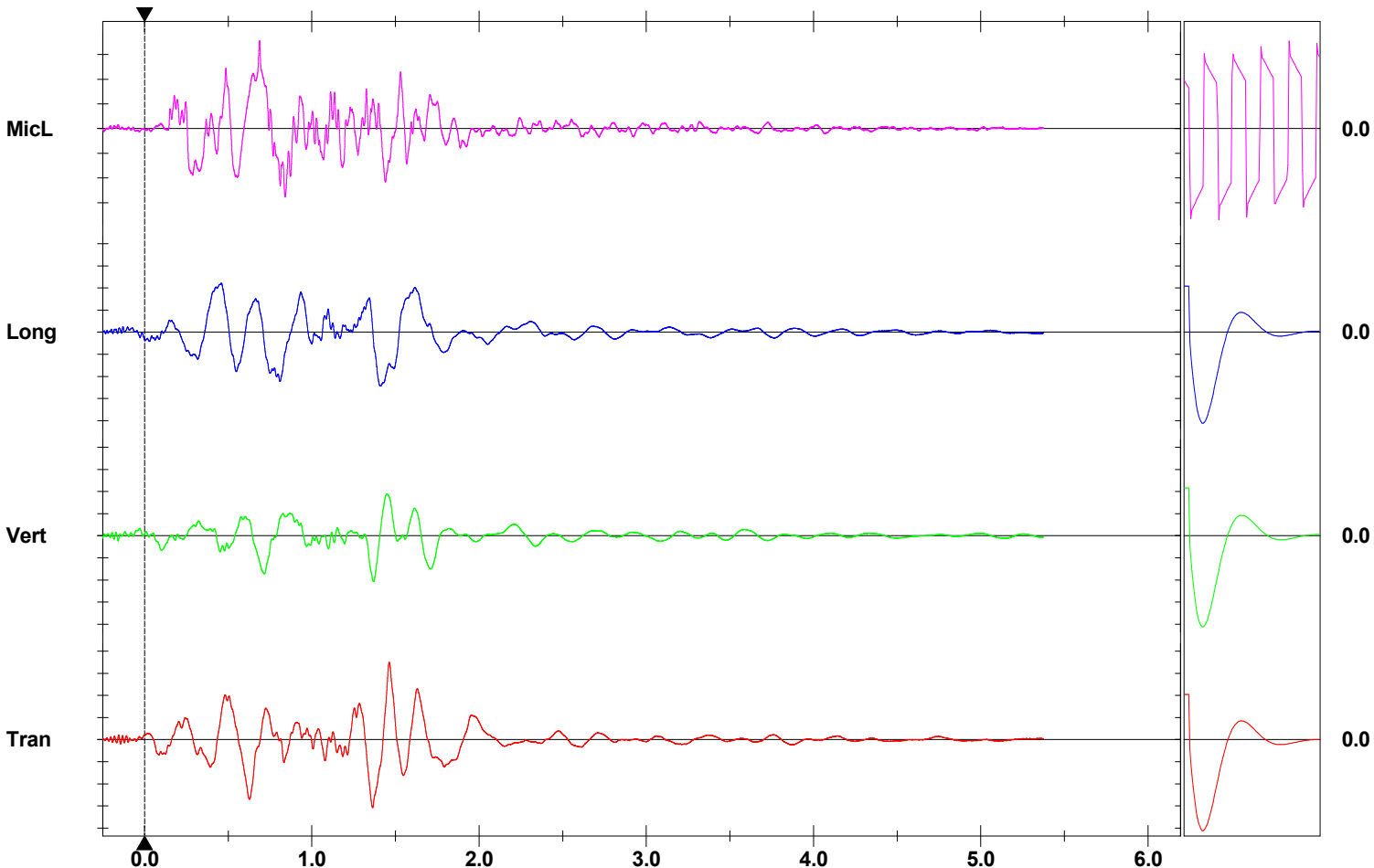
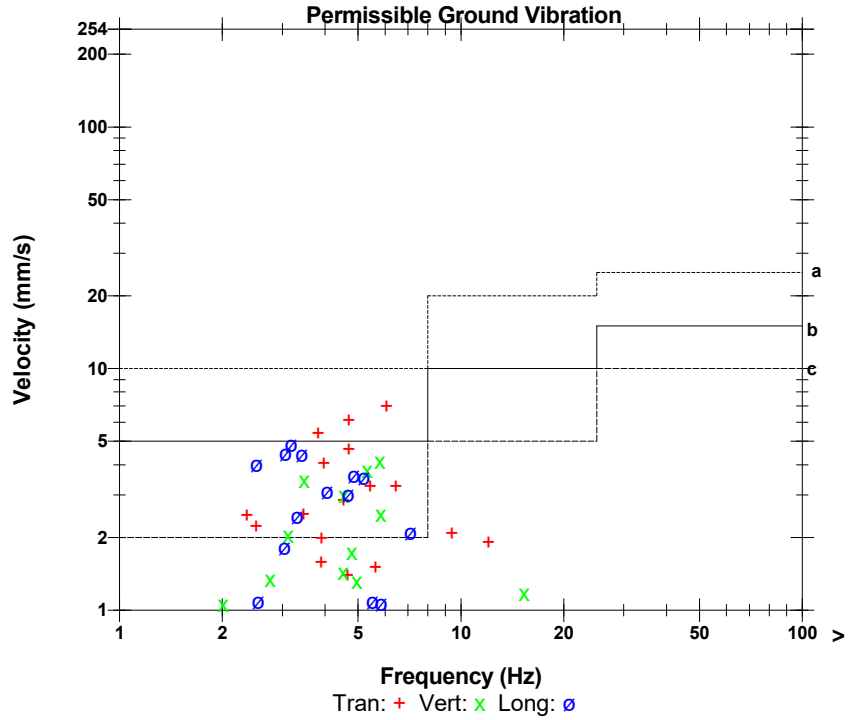
Location: NADIDIHI IRON & MN ORE MINES
Client: NARAYANI SONS PRIVATE LIMITED
User Name: TRIMURTI EXPLOSIVE
General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 111.0 dB(L) at 0.687 sec
ZC Freq 3.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1256 mv)

	Tran	Vert	Long	
PPV	7.007	4.154	4.871	mm/s
ZC Freq	6.1	5.8	3.2	Hz
Time (Rel. to Trig)	1.463	1.367	1.411	sec
Peak Acceleration	0.033	0.030	0.041	g
Peak Displacement	0.187	0.117	0.251	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.9	4.5	4.6	

Peak Vector Sum 8.339 mm/s at 1.462 sec

DGMS India (A)



Date/Time Long at 14:33:58 March 16, 2026
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB
Range (L) Geo: 254.0 mm/s
Record Time 5.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20260316143358.IDFW

Notes

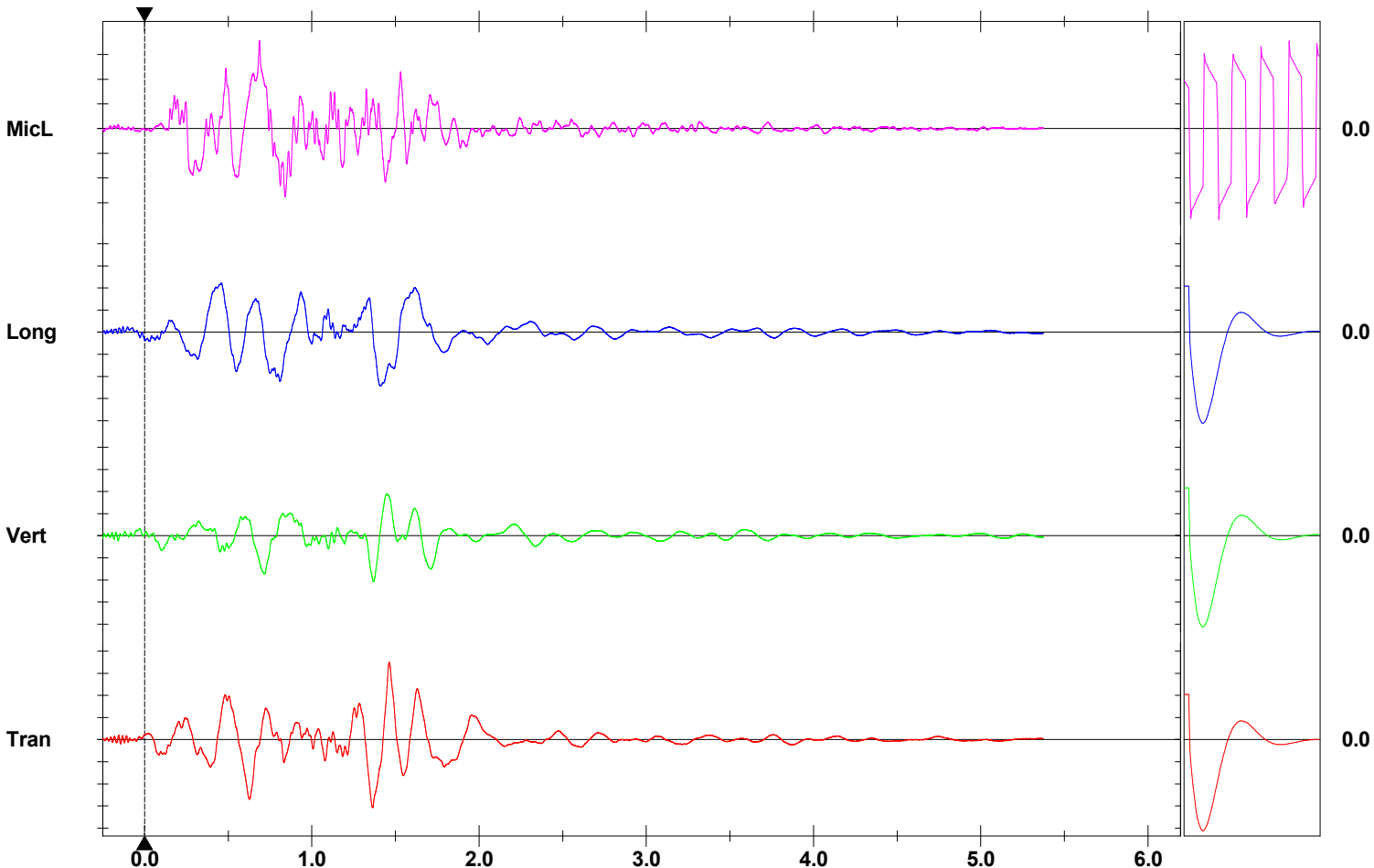
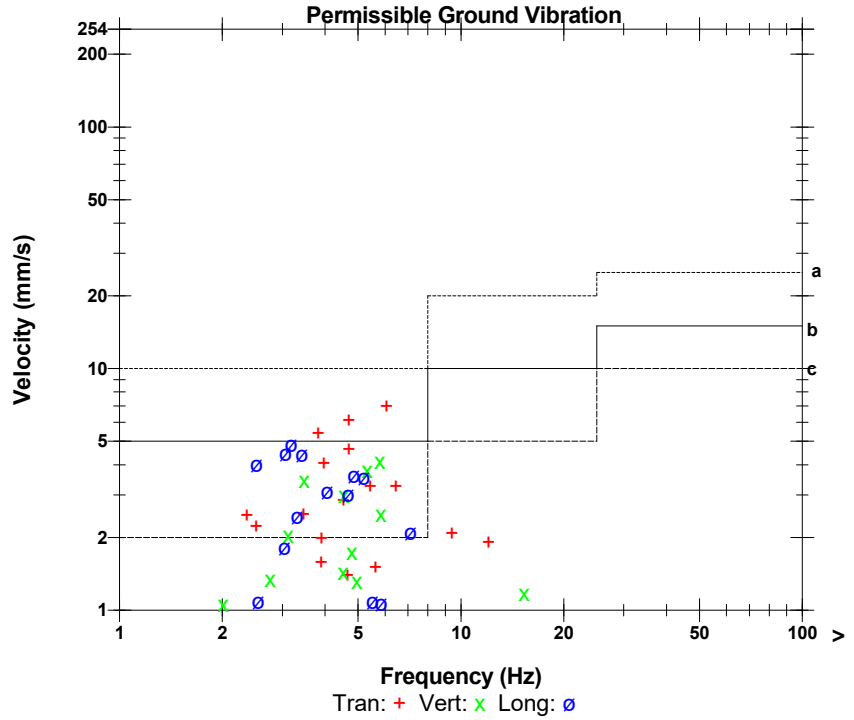
Location: NADIDIHI IRON & MN ORE MINE
 Client: ORISSA MOTORS PVT.LTD,
 User Name: TRIMURTI EXPLOSIVE
 General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 111.0 dB(L) at 0.687 sec
ZC Freq 3.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1256 mv)

	Tran	Vert	Long	
PPV	7.007	4.154	4.871	mm/s
ZC Freq	6.1	5.8	3.2	Hz
Time (Rel. to Trig)	1.463	1.367	1.411	sec
Peak Acceleration	0.033	0.030	0.041	g
Peak Displacement	0.187	0.117	0.251	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.9	4.5	4.6	

Peak Vector Sum 8.339 mm/s at 1.462 sec

DGMS India (A)



Date/Time Long at 14:41:13 March 21, 2026
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB(L)
Range Geo: 254.0 mm/s
Record Time 3.0 sec at 1024 sps
Operator/Setup: Operator/FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20260321144113.IDFW
Scaled Distance 28.3 (200.0 m, 50.0 kg)

Notes

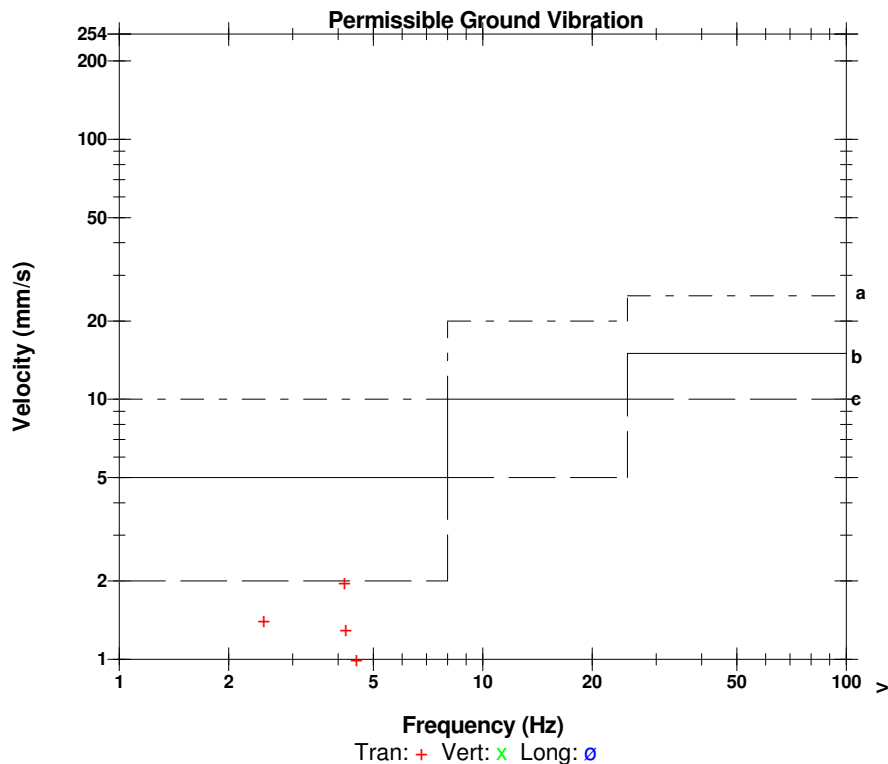
Location: NADIDIHI IRON & MN ORE MINES
Client: ORISSA MOTORS PVT. LTD.
User Name: TRIMURTI EXPLOSIVES
General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 108.3 dB(L) at 0.246 sec
ZC Freq 4.9 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1482 mv)

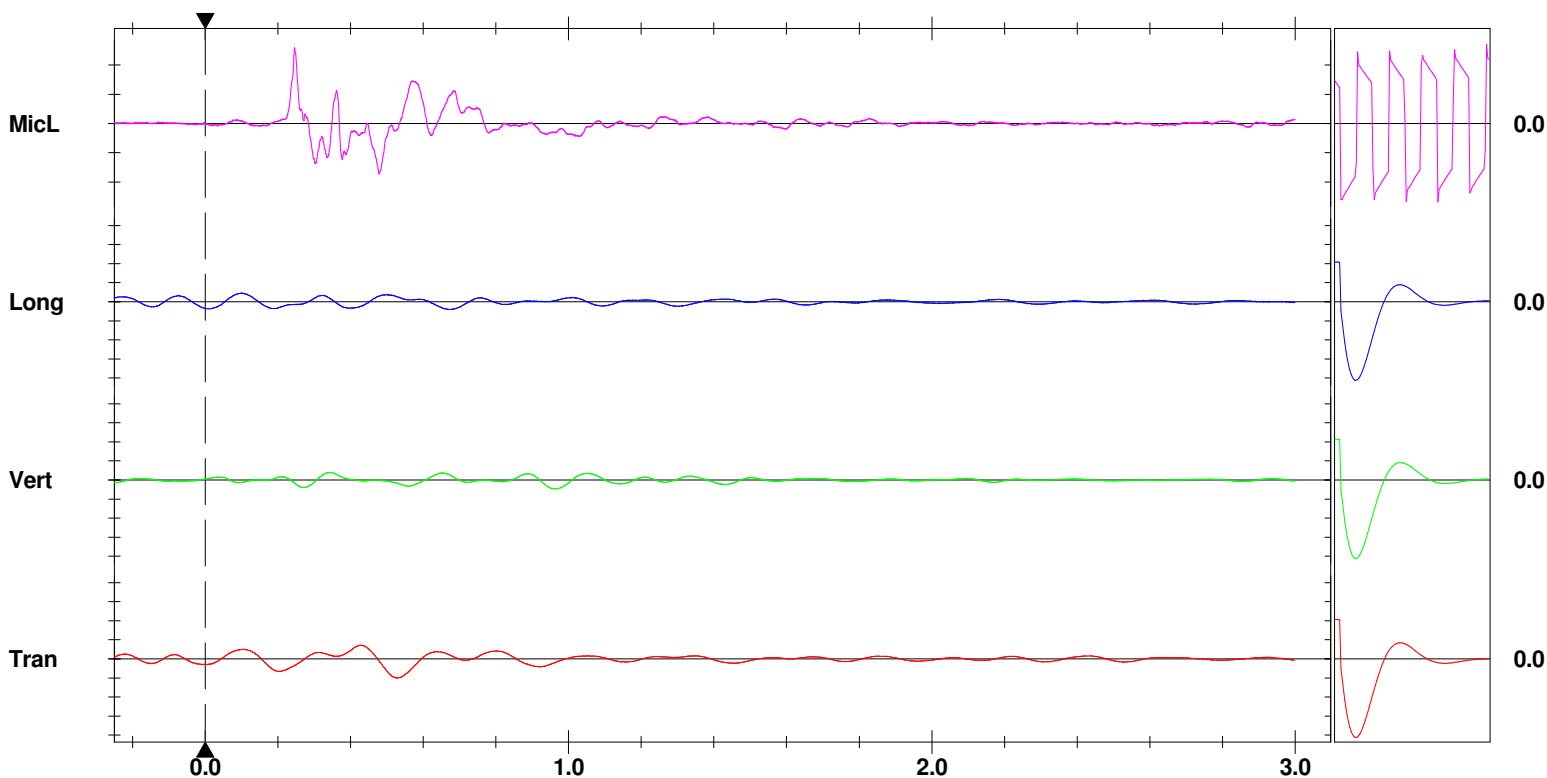
	Tran	Vert	Long	
PPV	2.002	0.938	0.914	mm/s
ZC Freq	4.2	5.7	5.4	Hz
Time (Rel. to Trig)	0.525	0.960	0.101	sec
Peak Acceleration	0.012	0.007	0.007	g
Peak Displacement	0.072	0.027	0.032	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.9	4.5	4.6	

Peak Vector Sum 2.099 mm/s at 0.529 sec

DGMS India (A)



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures



Sensor Check

Date/Time Vert at 14:44:57 March 26, 2026
Trigger Source Geo: 0.700 mm/s, Mic: 100.00 dB
Range (L) Geo: 254.0 mm/s
Record Time 4.611 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/FEEGRADE.MMB

Serial Number UM20028 V 10-90FB Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration December 11, 2025 by UES New Delhi
File Name UM20028_20260326144457.IDFW

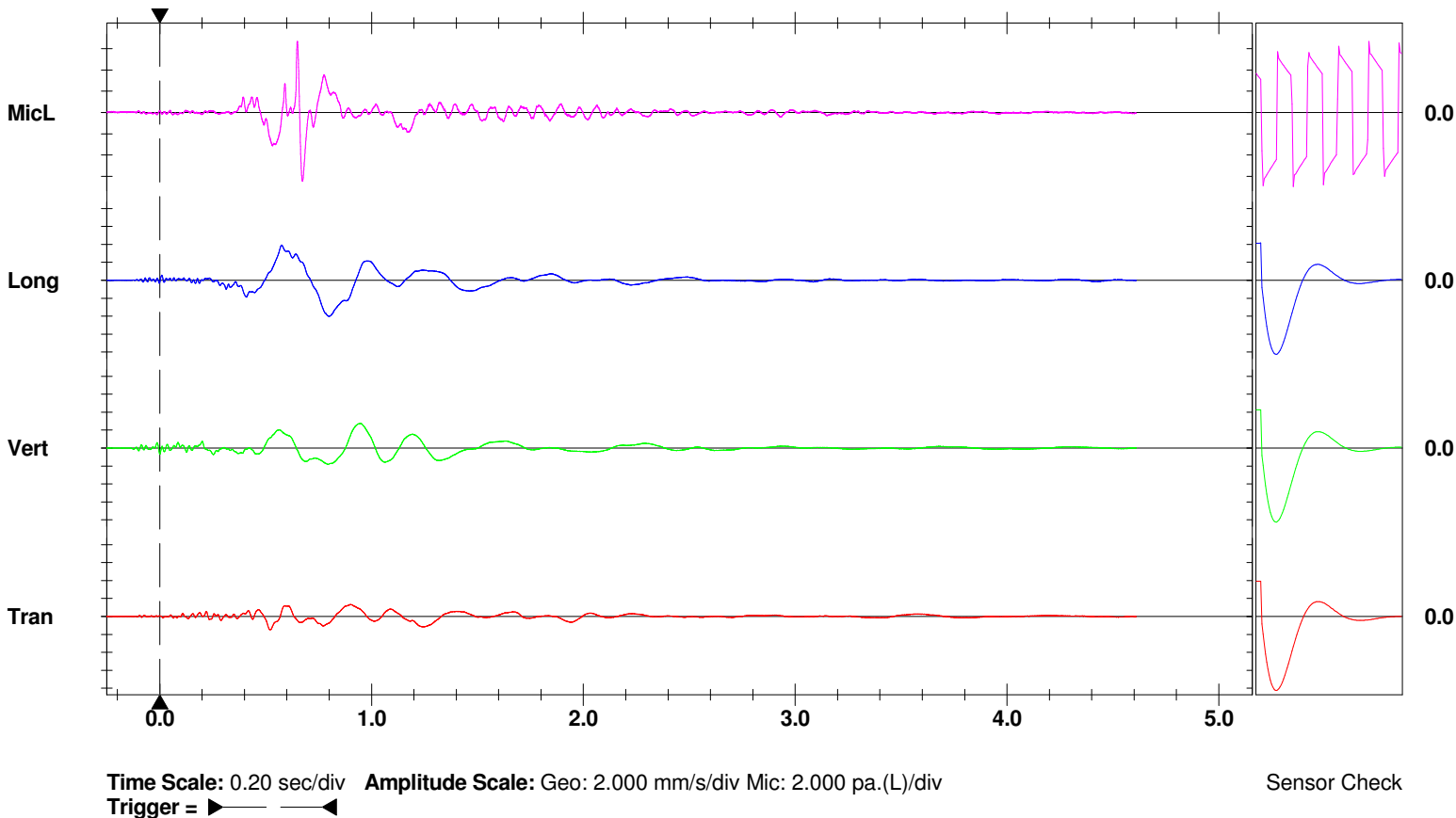
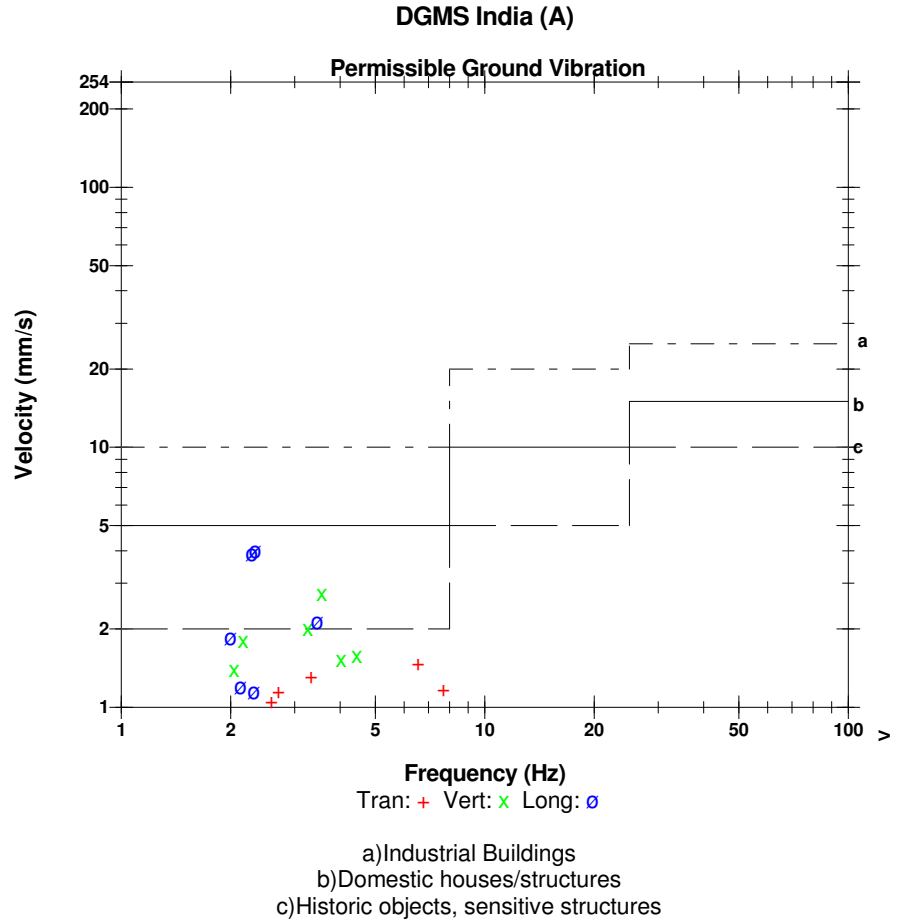
Notes

Location: NADIDIHI IRON & MN ORE MINES
Client: ORISSA MOTORS PRIVATE LIMITED
User Name: TRIMURTI EXPLOSIVE
General: BLAST VIBRATION STUDY

Microphone Linear Weighting
PSPL 110.5 dB(L) at 0.650 sec
ZC Freq 16.0 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1262 mv)

	Tran	Vert	Long	
PPV	1.490	2.751	4.028	mm/s
ZC Freq	6.6	3.6	2.3	Hz
Time (Rel. to Trig)	0.522	0.946	0.799	sec
Peak Acceleration	0.015	0.021	0.015	g
Peak Displacement	0.062	0.141	0.247	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	5.0	4.5	4.7	

Peak Vector Sum 4.468 mm/s at 0.799 sec



COMPREHENSIVE HYDROGEOLOGICAL REPORT

(IN & AROUND 10 KM RADIUS BUFFER ZONE)

OF

NADIDIHI IRON & MANGANESE ORE MINE **(117.206 Ha)**

Of

M/s ESL Steel Limited

Village – Rengalbeda & Nadikasira, Tahsil - Koira

District - Sundargarh, Odisha

Prepared by

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Accreditation Number: - CGWA/RGI/038

January 2026

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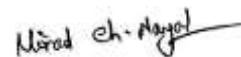
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List of Abbreviations

Abbreviation	Descriptions
amsl	Above mean sea Level
BHJ	Banded Hematite Jasper
BHQ	Banded Hematite Quartzite
BW	Bore Well
CTE	Consent to Establish
CTO	Consent to Operate
DEM	Digital Elevation Model
DRI	Direct Reduced Iron
DTWL	Depth to water level
EC	Electrical Conductivity
GW	Ground water
Ha	Hectare
HP	Horse Power
IMD	India Meteorological Department
KLD	Kilo liter per day
lps	Liter per Second
LULC	Land Use and Land Cover
m bgl	Meter below ground level
m bmp	Meter below measuring point
MP	Measuring point
MT	Million Tons
MTPA	Million Tons Per Annum
NHS	National Hydrograph monitoring station
NOC	No Objection Certificate
OW	Observation Well
PW	Pumping Well
STP	Sewage Treatment Plant
SWL	Static Water Level
TPH	Tons per hour
TW	Tube Well
WTP	Water Treatment Plant

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Sl. No.	CHECK LIST	Yes/ No
1	Whether Month and Year of submission of report is mentioned on Front Page	Yes
2	Whether Version of report (if revised) mentioned on Front Page	Yes
3	Whether groundwater quantum in report matches with NOC application	Yes
4	Whether all salient features have been entered in the Table (Chapter-1).	Yes
5	Whether Accreditation Certificate has been attached.	Yes
6	Whether Work Order or relevant document having proof of date of Work Order has been attached.	Yes
7	Whether all sections as per report Sop have been covered (even if certain section is not deemed relevant, same should also be inserted in the text with comment like not required/ not applicable etc. with reason)	Yes
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9	Whether all figures in the report have been referred to/ discussed in text with Figure No.	Yes
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12	Whether source of data (in tables/ values etc.) taken from elsewhere (i.e Secondary Data) has been quoted in the text/ below the table.	Yes
13	Whether details of references cited in text/ source of data have been given at the end of report as Bibliography.	Yes
14	Whether all certificates/ documents bearing signatures (such as Work Order, Certificate by Consultant etc.) have the name of signatory below signature.	Yes

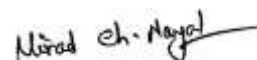


Nirad Chandra Nayak

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1. Salient Feature of the proposal

Sl. No.	Particulars	Information
1	Application No.	21-4/2151/OR/MIN/2018
2	Fresh or Renewal	Renewal
3	Existing or New/ Proposed	Existing
4	If Renewal, date of validity of existing/ last NOC	15.02.2026
5	CTE Issue Date	29.11.2024
6	Name of Project with Address	Nadidihi Iron and Manganese Ore Mine , Rengalbeda & Nadikasira
7	State	Odisha
8	District	Sundergarh
9	Block/ Taluk	Koida
10	Category of Block/ Taluka (as per prevailing GWRE)	Koira, Safe
11	Quantum of GW applied (KLD)	100 KLD for abstraction & 4707 KLD for dewatering
12	Quantum of GW applied (m ³ /Year)	17,54,555
13	Alluvium/ Non-alluvium	Non-alluvium
14	GW Modelling Required (Yes/ No)	yes
15	Name of Authorized Signatory of Project & Designation	Biswanath Sahoo Chief Operating Officer
16	Consultant Details with Name of Authorized Signatory (If Institution)	Dr. Nirad Chandra Nayak
17	In case report is prepared jointly by accredited institute and individual consultant, name details of chapters prepared by the individual consultant	N A
18	Accreditation Certificate No. and Date/ Validity (In case jointly as per Point No. 14, No. and validity of both institution and individual are to be given)	CGWA/RGI/038, 14.02.2026



Nirad Chandra Nayak

2. About the Project

The Nadidihi Iron and Manganese Ore Mine of M/s ESL Steel Limited is located near Rengalbeda & Nadikasira village falling in Koira Tehsil of Sundargarh district (figure - 1). The Mine is located at a distance of 8 km from Koira and 24 km from Barbil. The nearest railway station is Barbil which is 24 Km away from the mine. The mining lease is bounded by Latitude $21^{\circ} 57' 23.04''$ to $21^{\circ} 58' 19.92''$ N and Longitude $85^{\circ} 14' 58.2''$ and $85^{\circ} 15' 37.44''$ E and is falling on the Survey of India Topo sheet No. 73 G/5 (Figure - 1).

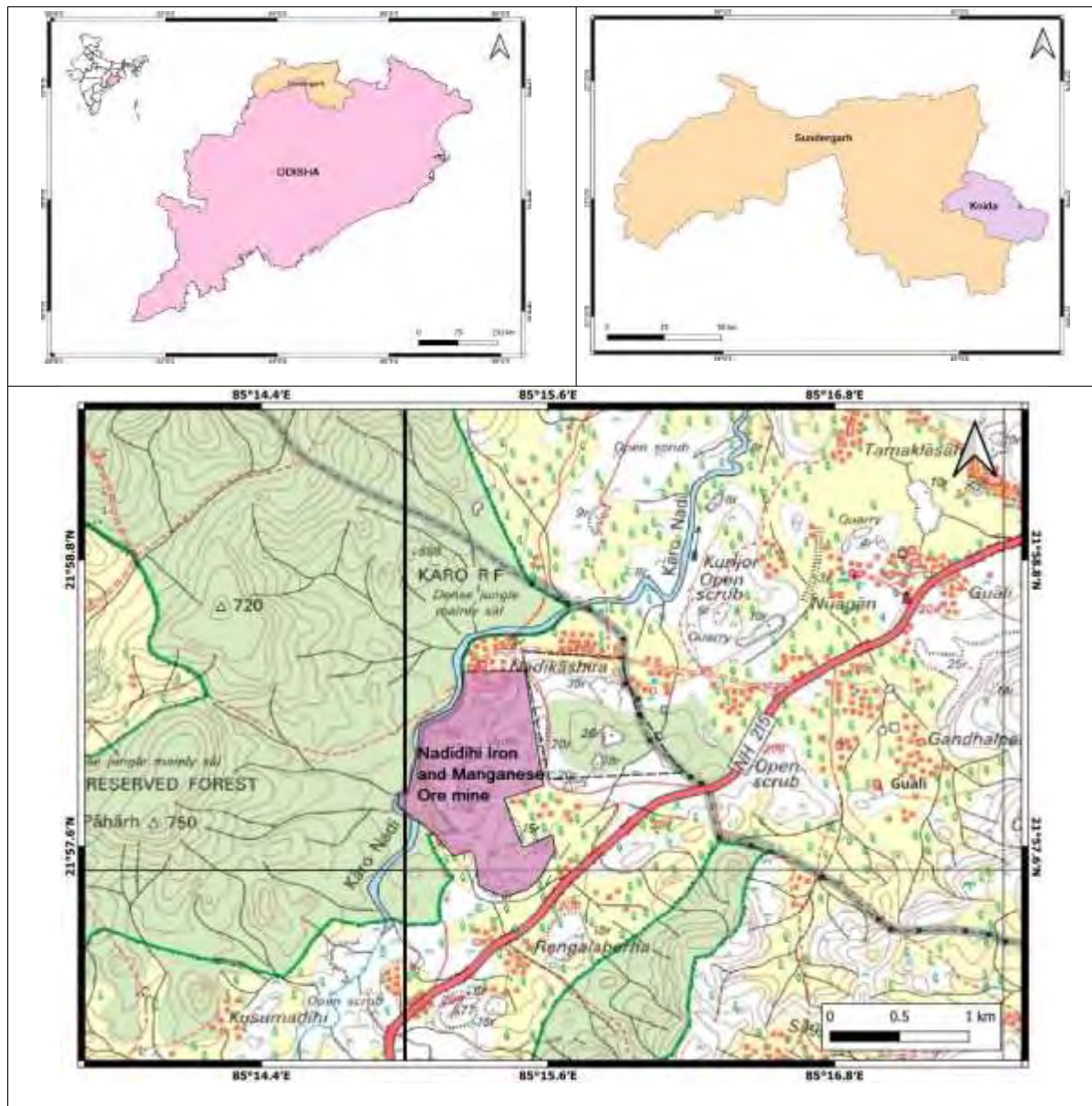


Figure - 1: Location map of the Nadidihi Iron & Manganese Ore Mine

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Conventional opencast mining method is adopted using deep hole drilling and blasting with 110 mm diameter wagon drilling. Iron ore both lump & fines are being produced from the mine by mechanized method by the deployment of excavator, tipper, deep-hole drilling, blasting, rock breakers, etc. The mine have maximum production capacity of 7.451 million Tons per annum (TPA).

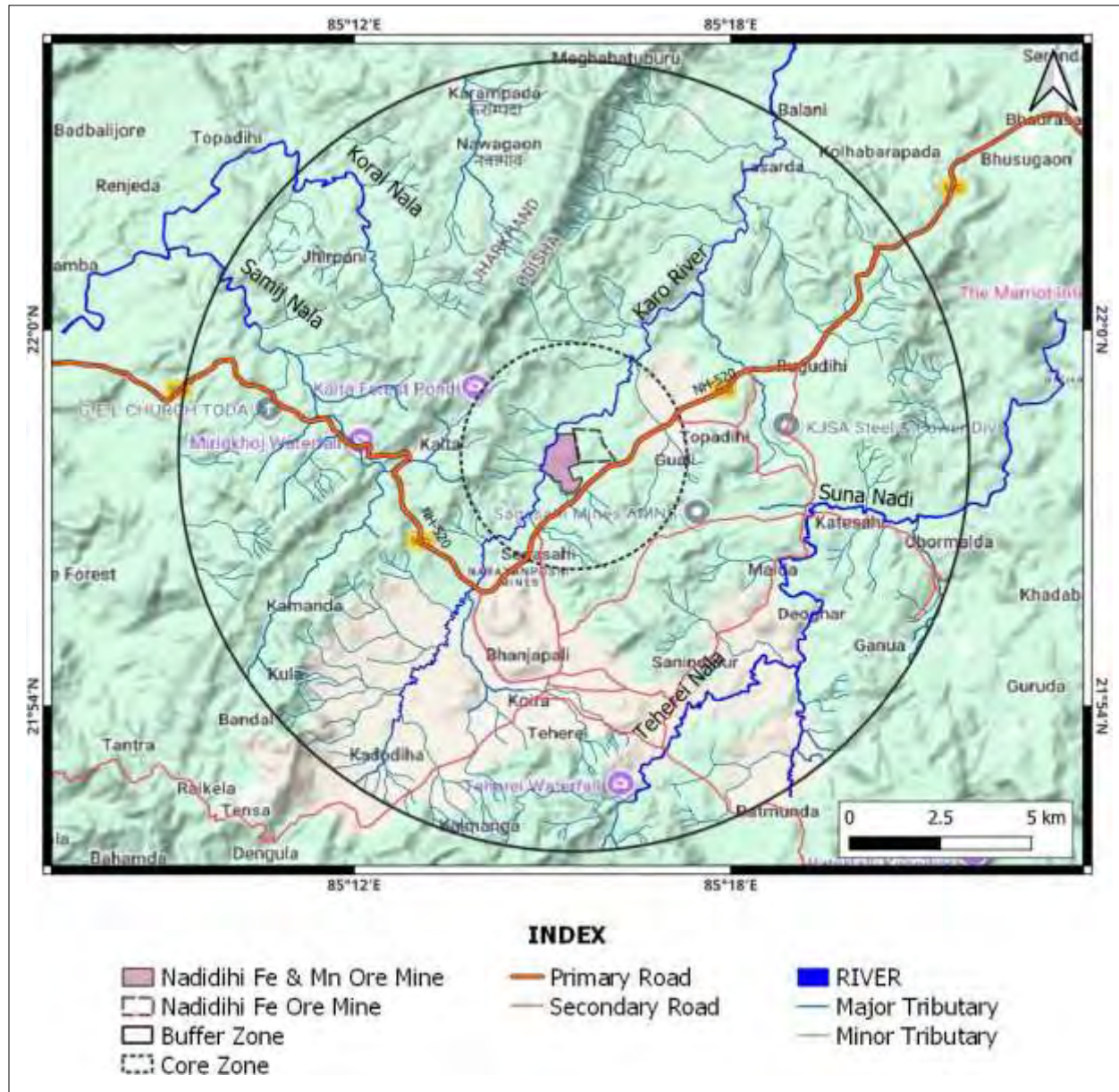


Figure - 2: Buffer map of Nadidihi Iron & Manganese Ore Mines

2.1 LanduseLandCover:

The land use and land cover of the buffer zone is taken from NRSC (ISRO), and is shown in figure 3. Major part of the study area is under forest cover, while the rest is being utilized mainly for

cultivation, mining and allied activities. Waste land is scattered over the study area and occupy a small portion. Agriculture is confined to inter-montane valleys adjacent to Nala/River especially the Karo river. Quite a good portion of the land is being utilized for mining and allied activities.

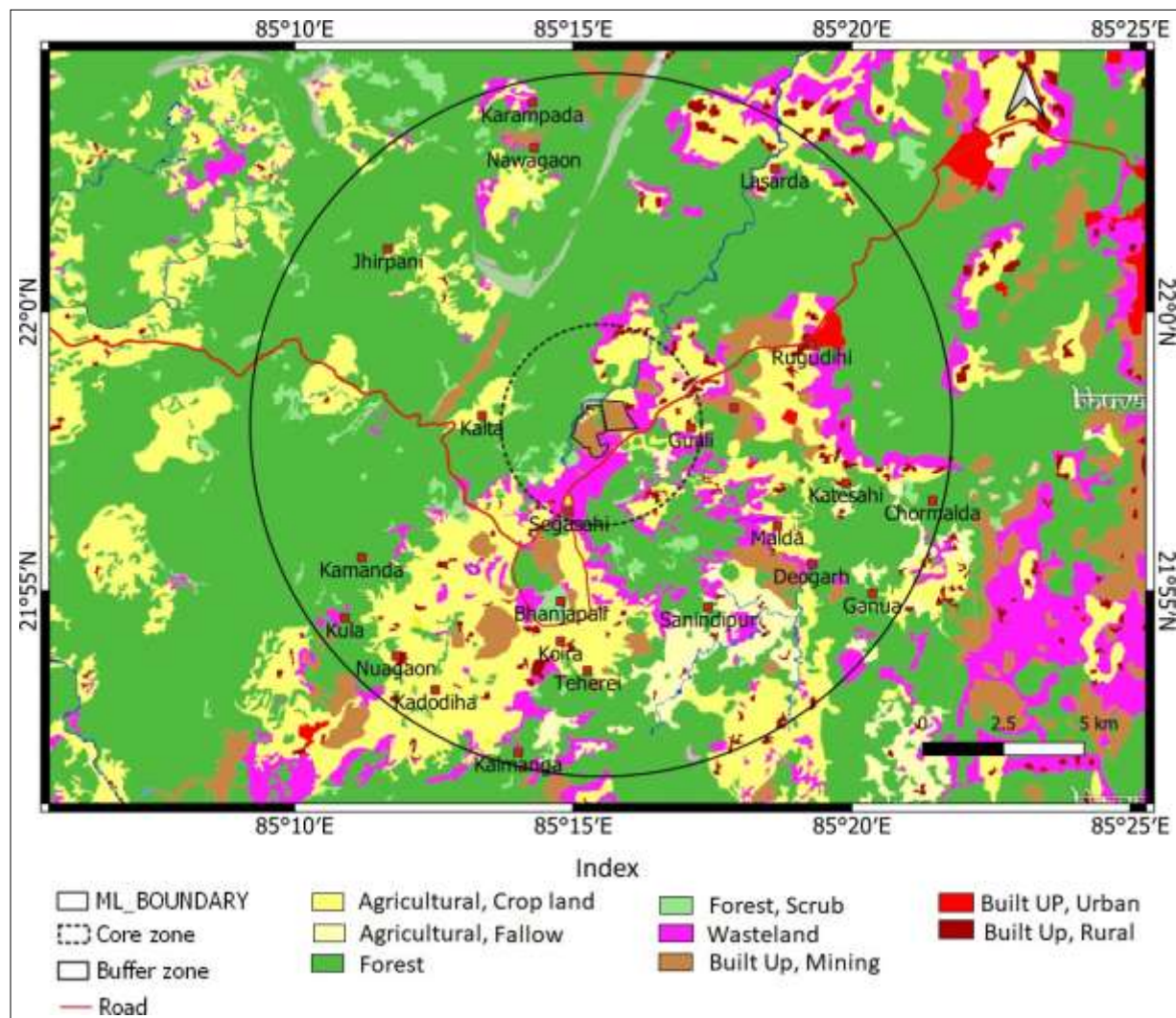


Figure - 3: Land Use Land Cover map of the study area

The study area (Buffer zone) comes partly under Koira & Joda block of Sundergarh & Keonjhar district respectively. The land use pattern of both the blocks is given in Table - 2. Due to the hilly terrain, net sown area is limited to 20-30 % of the total geographical area. Most of the net sown area is rainfed and thus utilized to raise only one crop. However due to the availability of MIP, Lift Irrigation Projects and groundwater resources, 28 to 36% of net sown area is used for second crop.

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Table - 1: Land Use Pattern in Koira & Joda Block, Odisha (Area in Ha)

Name of Block	Total Geographical Area	Area under Agriculture				Area under forest	Area under wasteland	Area under other uses
		Gross Cropped Area (1)	Net Sown Area (2)	Area sown more than Once (1-2)	Cropping intensity (%)			
Koira	84940	18317	14269	4048	128	40771	4865	0
Joda	51900	19524	14351	5173	136.05	14872	1718	20959
Source: District irrigation plan of Sundergarh and Keonjhar, Odisha								

2.2 DEM/ Topography:

The topography around the 10 km buffer zone of the Nadidihi Fe & Mn Ore mine is characterized by highly undulating terrain with elongated hills and valleys, forming part of the Singhbhum - Keonjhar - Bonai Iron - Ore Belt. An elongated structural hill with elevation between 650 to 883 m with NE - SW orientation is seen in the western part of the study area. Topographic lows with land contours between 500 to 600 m amsl are characterized by gently sloping valleys with numerous streams and rivers. The Karo River which is flowing centrally in a NE - SW direction provides a perennial water source for the local inhabitants. The Koira township is situated in a valley with an elevation between 550 to 600 m (figure - 4). The elevation of the mine lease area varies from 485 to 651 m amsl with average level of 568 m amsl.

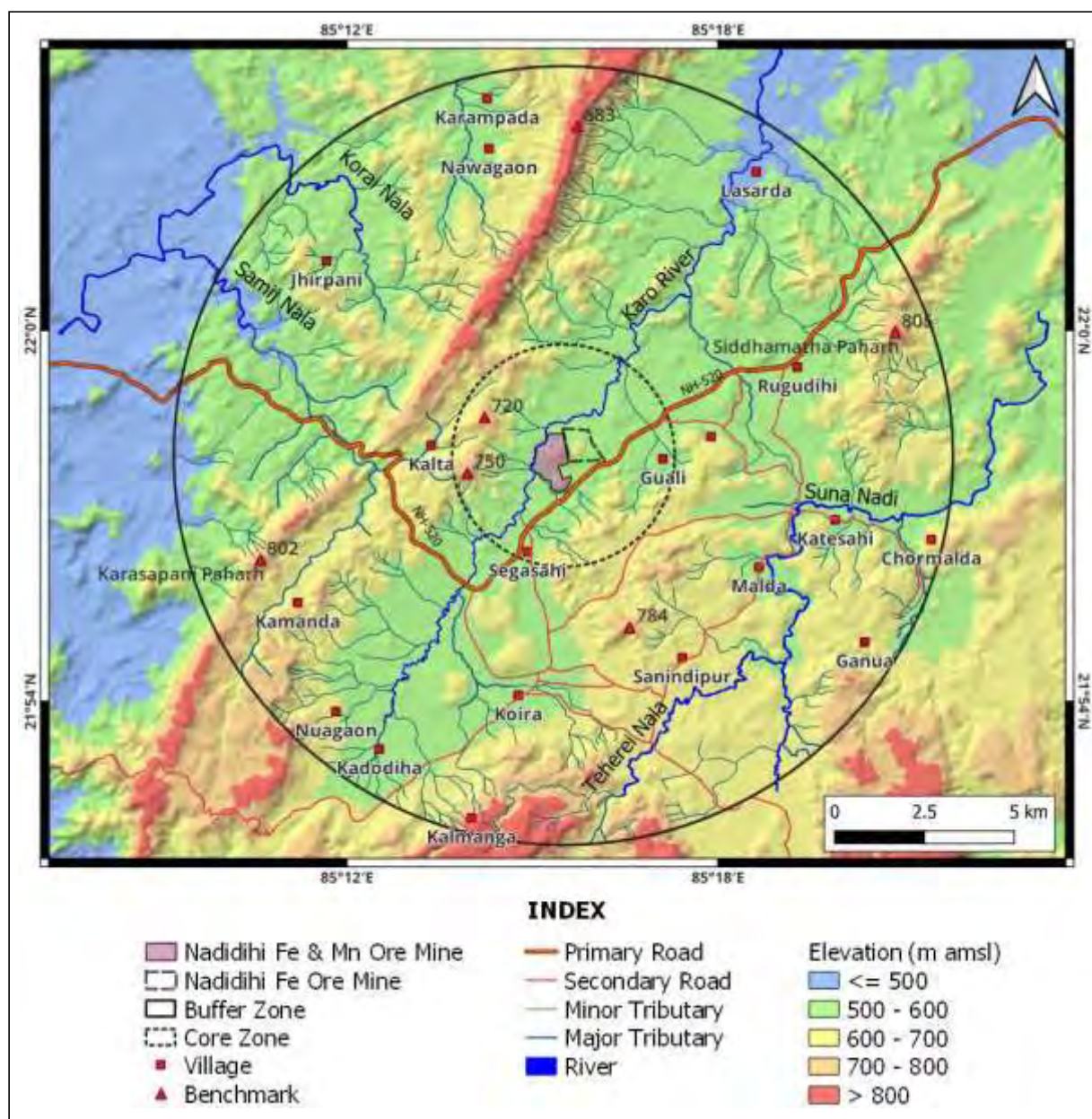


Figure - 4: Topography and drainage of the study area

2.3 Geomorphology and Drainage:

Hydro geomorphological units pertaining to the buffer zone prepared after Geological Survey of India are mentioned below:

Structural Hills and intermontane valleys: This hydro geomorphic unit comprises of Iron Ore Group of rocks, mainly Quartzite's in the form of Banded Haematite Quartzite (BHQ) and Banded Haematite Jasper (BHJ) and meta-sediments. These form a major geomorphic unit in the eastern,

and western part of the study area. These are structurally controlled hills with complex folding, faulting and mostly acts as run-off zones. However stretches traversed by joints / fractures facilitate infiltration to augment the groundwater bearing formations. The occurrences of springs are common in this hydromorphic unit.

The valleys are mostly structurally controlled and consist of soft rocks like phyllites and shales which offer good scope for groundwater recharge to the underlying formation. The infiltration taking place in the surrounding mountain zone enriches lower valley portion. Ground water potential is moderately good.

Pediment:

This unit is developed as a result of continuous weathering and erosion followed by depositional processes of sedimentation. This unit is restricted to relatively gently sloping areas in between mountain ranges and contain coarse sediments of moderate thickness. The Groundwater prospect of this unit is moderate.

Pedi plains:

These units are found as isolated patches dispersed throughout in the pediment areas with flat topography. Generally, the sediment thickness is more and thus serves as potential zones for ground water extraction.

Denudational Hills and valley:

Low dissected denudational hills and valleys occur as isolated patches in the pediment-pediplain complex. The topography is highly rugged, drainage density is low to medium and run off is high. Infiltration takes place along few structural weaknesses like joints & fractures. Thus, infiltrated water moves through fractures, jointed plains and comes out in the form of springs along topographic cuts at fracture zones. This unit generally acts as runoff zone and ground water prospect is poor. The hills are characterised by more resistant formations standing out prominently due to differential erosion and weathering. In spite of their isolated occurrence, their continuity in a linear or curvilinear fashion gives indication that they are structurally controlled.

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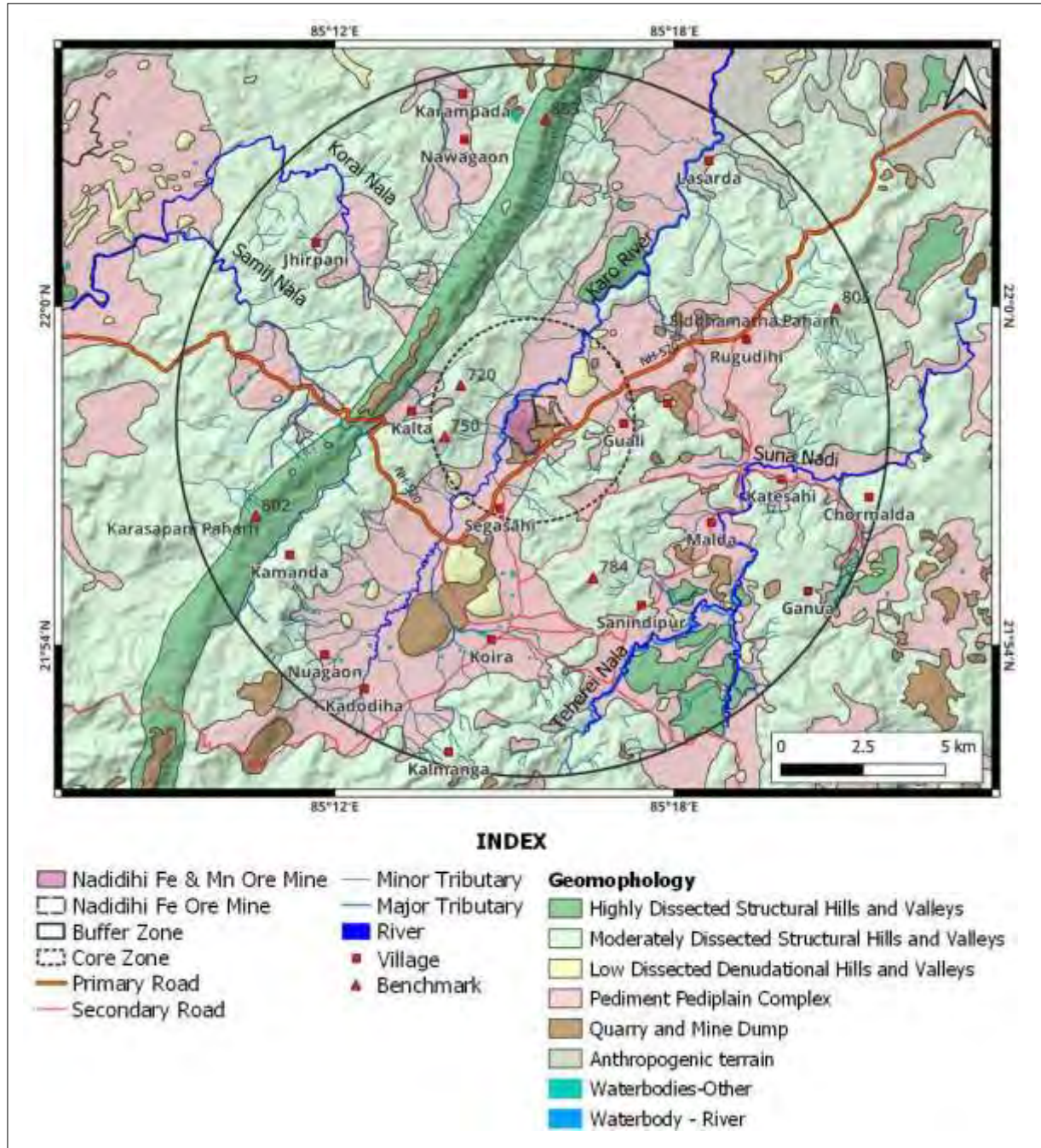


Figure - 5: Geomorphological map of the area

Drainage

The area is well drained by Suna & Karo Nadi and their tributaries as shown in figure - 6. The drainage shows rectangular to angular pattern and hence structurally controlled. Streams and rivers follow lithological contacts, fold axial traces, fractures and lineaments and are generally perennial in nature. The drainage density is moderate.

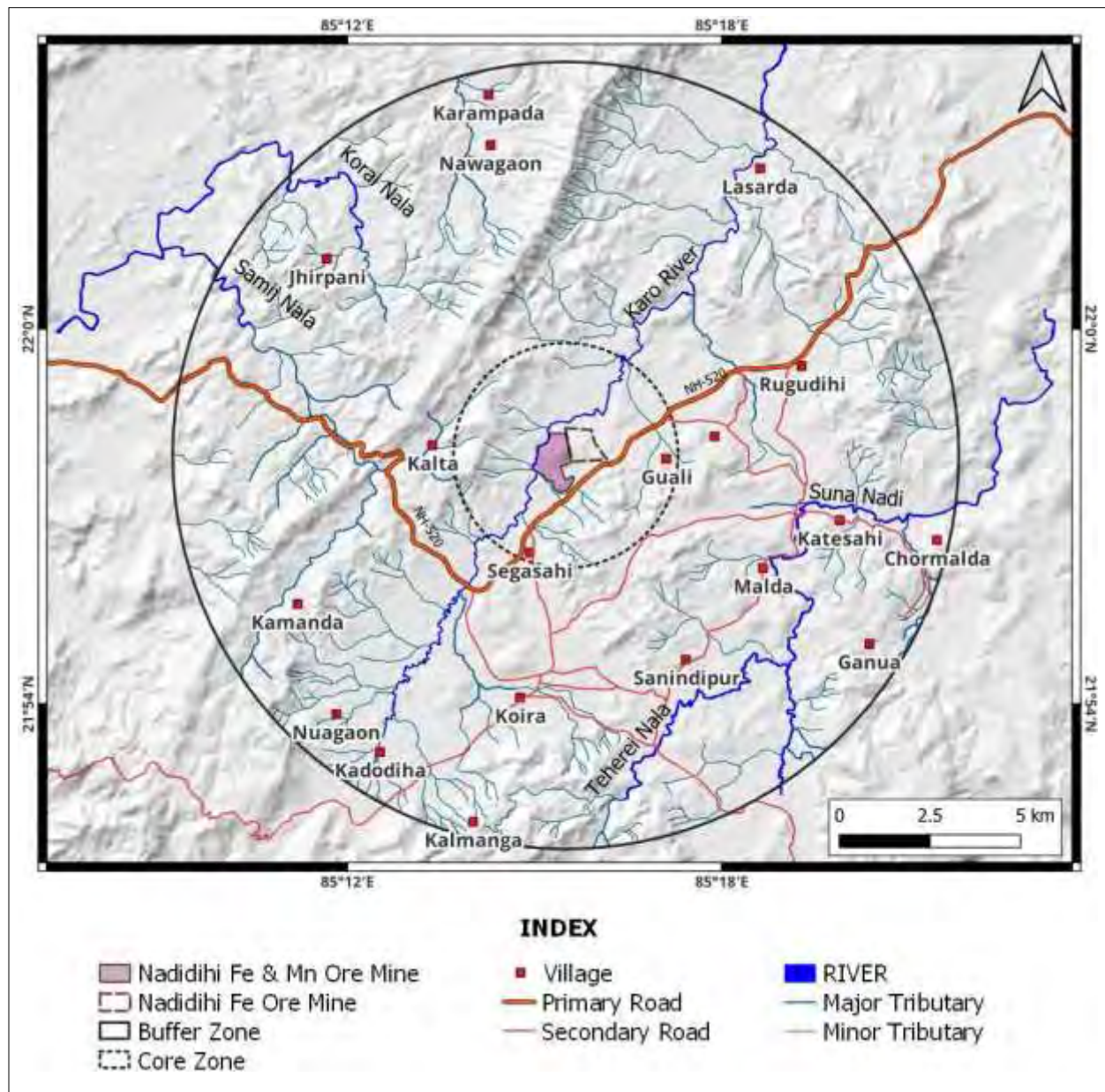


Figure - 6: Drainage map showing the major rivers / nalas and their tributaries.

2.4 Details of Wetlands:

As per the land use & land cover map, there are no wetlands / Ramsar sites / NLCP lakes or any other important wetlands in terms of the dependencies of the local communities.

2.5 Climatological Condition:

The area experiences sub-tropical climate with abundant rainfall during monsoon months. Three distinct seasons are well observed in the area viz. summer, rainy and winter season during April - May, June - October and December - February respectively. The summers are not very hot due to thick forest cover. April-May are the hottest months and December-January the coolest months. The area experiences moderate to high annual precipitation.

Details of monthly rainfall of Koira block for the period of 2011 - 2024 are given in Appendix - A (Special Relief Commissioner, Government of Odisha). The average annual rainfall is around 1384.7 mm with majority of annual rainfall (80%) is received by the southwest monsoon between June to October. Lots of variation in annual as well as monthly rainfall is observed over the years. The maximum and minimum annual rainfall recorded during the period is 1726.1 & 1087.09 mm in the year 2021 & 2024 respectively. Generally, July and August months record maximum rainfall while the rainfall in other months is limited to cyclones and other disturbances. The maximum monthly rainfall recorded is 608.9 mm during the month of August 2020.

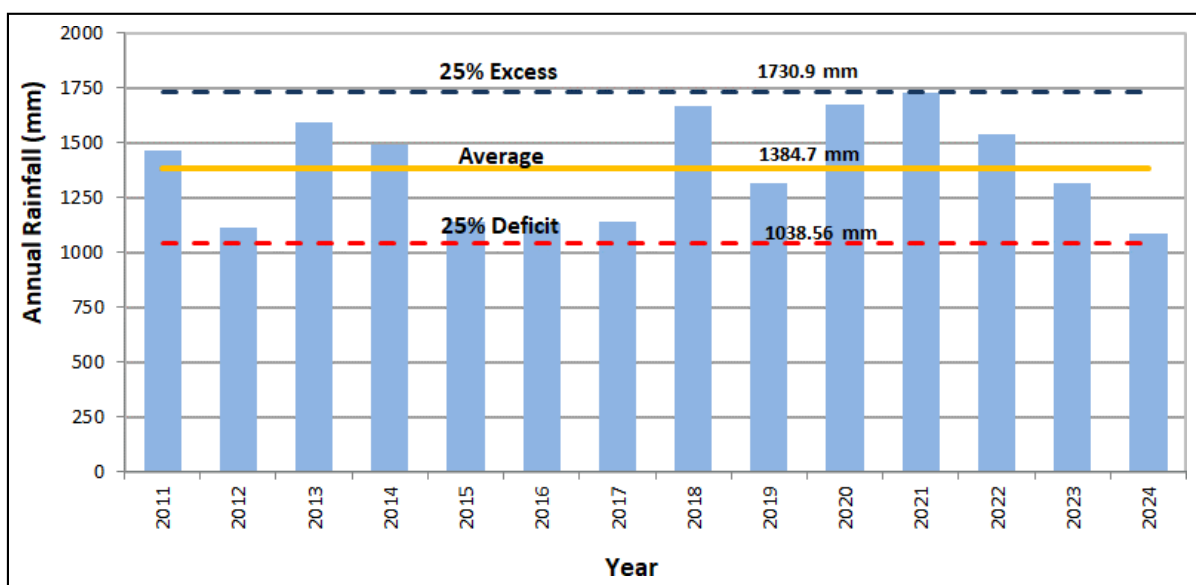


Figure - 7: Annual rainfall distribution pattern of Koira block

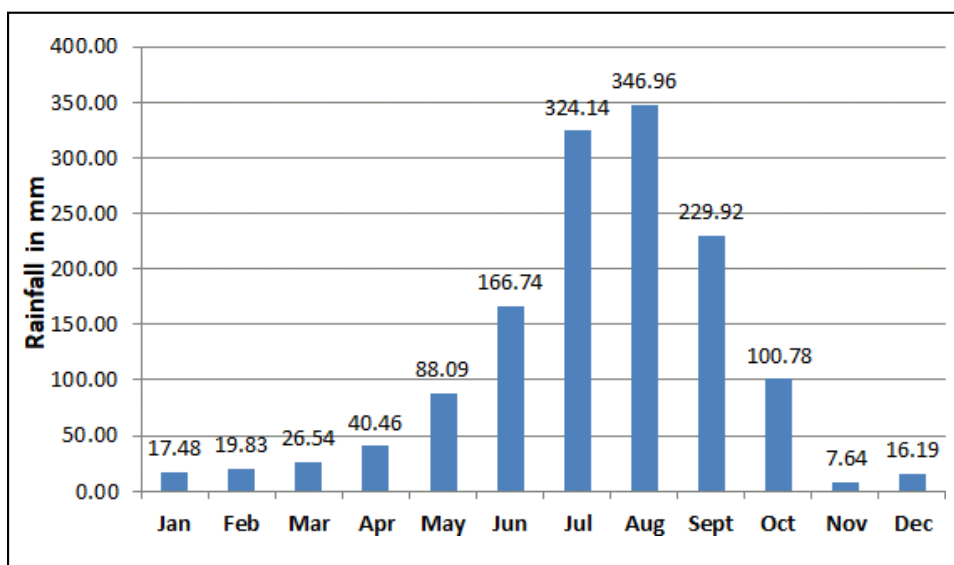


Figure - 8: Average monthly rainfall of Koira block, Odisha

3. Hydrogeology

3.1 Geological

Setup Regional

geology

The lease area is a part of the Bonai-Kendujhar belt of Sundargarh and Kendujhar districts. The rocks are disposed in a “Horse-Shoe” Shaped Synclinorium (Jones, 1934) which is plunging northerly. The metamorphosed Precambrian Volcano-Sedimentary rocks known as “Iron Ore Group” (Sarkar & Saha, 1963) or “Koira Group” (Murty and Acharya, 1975) exposed in this belt between the Singhbhum Granite in the east and Bonai Granite in the west. The stratigraphic succession of this area is shown below.

Table - 2: Stratigraphy of the area modified after Murty and Acharya:

The litho-stratigraphy of the area:	
Kolhan Group	
KOIRA GROUP/ IRON ORE GROUP	Upper shale formation
	Banded Iron Formation
	Volcanic Formation
	Basal Sandstone – Quartzite
Singhbhum and Bonai Granites and metamorphosed Sediments	

The basement of the area consists of Singhbhum and Bonai Granites which is overlain by Iron Ore Group or Koira Group. The differential weathering of the rocks of iron ore group gives rise to

rugged topography in the area. The iron ore group comprises of basal sandstone, mafic volcanics, banded iron formation and shale formation. The “Banded Iron Formation” is mostly BHJ/ BHQ, with intermediate black or green shale and banded ferruginous chert. This formation is overlain by the “Upper Shale Formation” which comprises of thick sequence of shale and interbedded with BHJ/ BHQ bands which spread over the entire core of the synclinorium. The “Upper Shale Formation” is divided into two horizons (Patel, et.al, 2005) namely, lower manganiferous shale zone which is conformably overlain by upper ferruginous shale zone. The mafic volcanic formations are mafic composition in lower flows and tuffaceous in upper flows. The lava is amygdaloidal at the top and pillowed at the bottom part indicating its sub-aqueous, sub-aerial condition. Dunn (1942) believes that certain phyllites and shales in eastern and southern Singhbhum were originally volcanic tuffs, which have either been silicified or being replaced by iron. At places these phyllites are manganiferous. The manganese ores are small dimensions and mainly occurs at some places of Keonjhar and Bonai.

The iron ore or Koira group is unconformably overlain by younger sequence of arenaceous rock known as Kolhan group. It consists jasper pebbles, iron ore pebbles and fragments of BHJ which differentiate it from the basal sandstones and conglomerate.

The banded hematite jasper consists of alternating bands of jasper and hematite containing varying proportion of iron oxide and silica. The maximum thickness of hematite – jasper formation as stated by Jones (1934) is about 3000 feet in Bonai and 1000 feet in main ore range on border of Keonjhar and Singhbhum.

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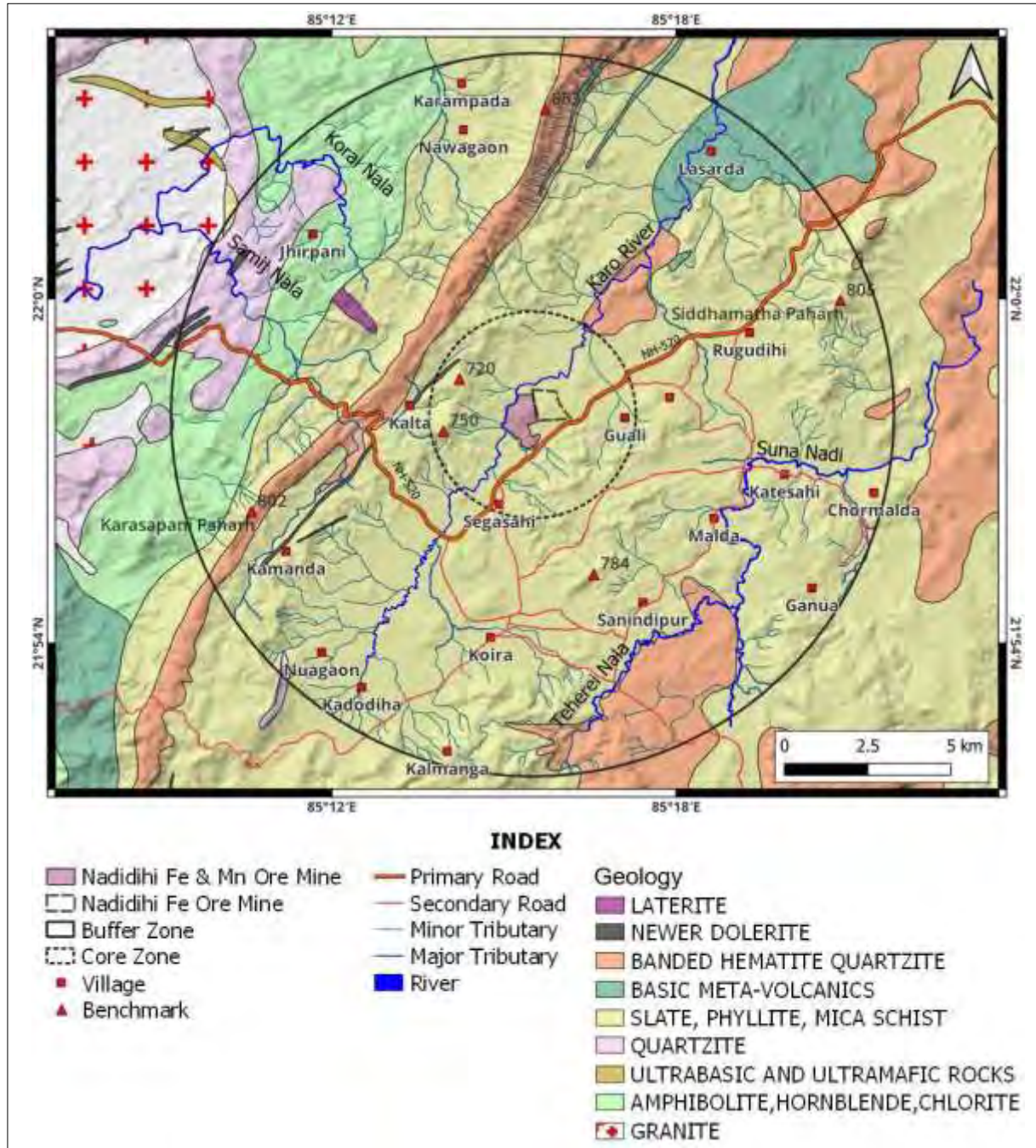


Figure - 9: Geology map of the study area

Description of rock types

Basal Sandstone: The sandstones are gritty in nature and ranges from ortho-quartzite to pebbly sandstone. Sandstones are made up of exclusively quartz sand and generally devoid of fine-grained matrix.

Volcanic Formation: The volcanic formation comprises predominantly of Lower Volcanic flows of mafic composition and the lava is pillowed indicating its sub-aqueous and subsequent sub-aerial character. The upper part is tuffaceous and amygdaloidal in nature.

Banded Iron Formation: It comprise of BHQ, BHJ, ferruginous quartzite and serve as important marker horizon. Megascopically BHJ consist of thin laminations of hematite and red jasper (less than 5 mm thick). Magnetite is rare and usually associated with hematite in minor proportion. BHQ occur in the upper part of BHJ profile and sheared at various places with presence of hematite veins.

Upper Shale formation

Manganiferous Shale: This shale unit consists of clay minerals, sericite and needle sized amphibole. This unit is called manganiferous shale because of Manganese enrichment at places.

Ferruginous Shale: The Ferruginous Shale is represented by a finely laminated rock having varied shades of colour such as white, gray, purple and green which depends on the mineral composition (Murthy & Acharya, 1975). It is composed of micaceous minerals, cherts, carbonaceous shale, and mudstones etc.

Iron ore: The hematite ore bodies exposed in the valley area are thinly laminated and lateritised. However, massive and brecciated ores have been observed in detail exploration.

Laterites: laterites occur as capping on different geological formations in most part of the study area. Bauxitic laterite are formed from alumina rich shales while manganiferrus and ferruginous laterites have developed on shales rich in Fe & Mn.

Alluvial soil: The river banks and low-lying areas are generally filled up with alluvial soils

Geology of the Mine lease Area

The Nadidihi Fe and Mn ore deposits form a part of iron ore group. The general strike of the formation is NNE- SSW and dips towards southwest.

The lithology of the lease area is

- Ferruginous shale
- Laterite
- Iron ore
- Manganiferous shale
- Banded hematite Jasper/Quartzite

The iron ore occurs in various forms due to natural processes like lateritization and enrichment:

- Hard laminated ore
- Hard massive ore
- Soft laminated ore
- Lateritic ore
- Blue dust

Structure

In the Nadidih deposit, the strike is variable due to intense folding, with observed strike varies from N 45° W & S 45° E, dipping towards southwest.

3.2 Geophysical Studies:

Geophysical Investigation

Geophysical investigation has not been undertaken in the study area due to unavailability of good stretches for Vertical electrical soundings (VES). However similar studies in Sanindpur & Puribahal areas (6 to 7 Km away) shows shallow to moderate thickness of weathered zone over low resistant formations representing friable and laminated formations. This is underlain by highly resistant massive formations representing BHQ/BHJ. Moreover, as the formations with seepage zones being exposed in the mine section, unavailability of geophysical data of the local area is not a deterrent for undertaking the hydrogeological studies.

3.3 Hydrogeological Setup:

The hydrogeology is mainly controlled by geological setup, rainfall distribution and the degree of primary & secondary porosity of the geological formation for storage and movement of ground water. The study area has undergone several phases of intense tectonic deformations which has been responsible for development of deep-seated intersecting fracture system. The whole buffer zone is occupied by crystalline rocks belonging to Iron Ore Group of Precambrian age.

3.3.1 Aquifer description: The whole buffer zone is occupied by crystalline rocks belonging to Precambrian age i.e., Iron Ore Group mainly comprises of shale, phyllite and mica schists and BHQ. Presence of thick weathered zone underlain by fracture formation especially in valley & flat plateau areas support good ground water flow to wells and thus dug wells are the most common ground water abstraction structures. Yield of dug wells varies from 15 to 30 m³/day depending on their location (nearness to valley) and weathered thickness. The pre-monsoon water level in dug well varies between 2.75 to 14.66 mbgl. However, the water level improves during post-monsoon season varying between 1.62 to 10.04 mbgl. The presence of shallow fractures also makes borewells successful with yield varying between 2.0 to 5.0 lps. However, their success is limited to proper site selection. Incidence of well collapsing is observed in borewells where blue-dust and loose formations have been encountered at depth. In such locations, tube wells tapping the water bearing zones have been tried with success. Unlike the phreatic aquifer, the water level of bore/tube wells remains quite deeper ranging between 7.87 to 18.09 mbgl.

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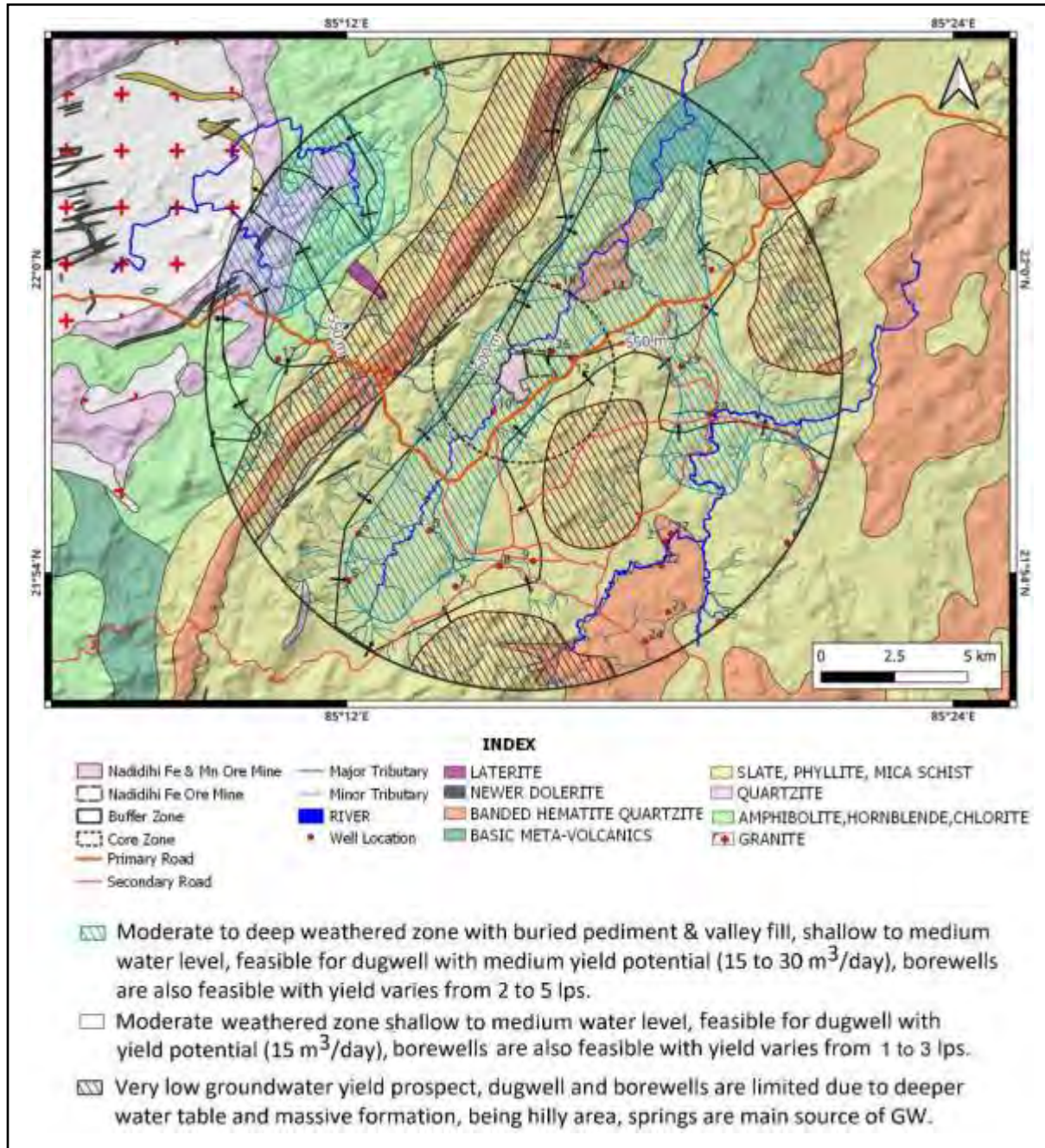


Figure - 10: Hydrogeology map of the study area

Aquifer Properties determination

Aquifer Performance Test (APT)

Constant discharge pumping test was conducted on 11th Dec 2025 at Main gate, near Nadidihi Iron Mine (21.9734 N, 85.2625 E). The pumping well fitted with 3 HP Submersible Pump was run for 260 minutes. The static water level was 8.5 m bmp with measuring point (MP) of 0.4 m agl. The drawdown and recovery data collected in the observation well 17 meters away is interpreted using Jacob Straight Line & Theis Recovery Method. The average Transmissivity & storativity value obtained is around 37.2 m²/day & 0.000893 respectively.

The time vs drawdown data for both the pumping tests are tabulated in (Appendix - B). The highlights of pumping tests have been listed in the table below;

Sl. No.	Pumping Well/Obse rvation well	SWL (m bgl)	Average Discharge (m ³ /hour)	Pumping Duration (Minute)	Maximum Drawdown (m)	T (m ² /day) Drawdown Data Analysis	T (m ² /day) Recovery Data Analysis	Average T (m ² /day)
1	OW	8.1	6	260	1.56	41.33*	33.07#	37.2

*Jacob's Straight Line Method

Theis Recovery Method

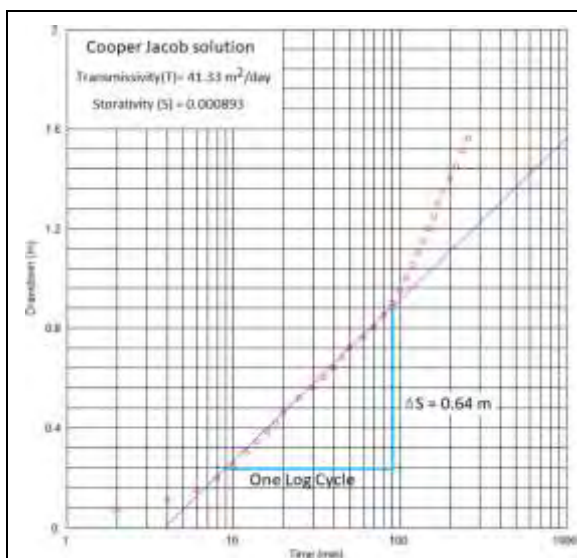


Figure - 11a: Drawdown versus time plot of Observation well data

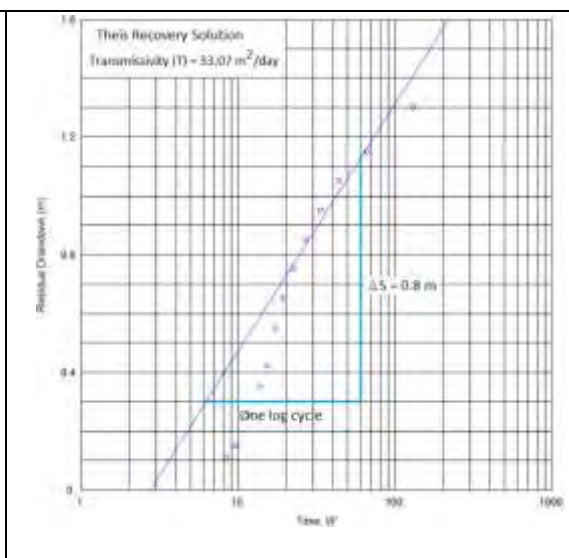


Figure - 11b: Residual Drawdown versus t/t' plot of observation well data

3.3.2 Ground water flow and aquifer interaction

The water table contour and ground water flow direction are shown in the hydrogeological map. The regional ground water flow is towards northeast and most of the streams are getting contribution from ground water and are thus perennial in nature.

3.3.3 Depth to water level

29 monitoring dug wells have been established during Pre & Post-monsoon to find out ground water regime of the phreatic aquifer. The Pre & Post-monsoon water level varies from 2.75 to 14.66 & 1.62 to 10.04 mbgl respectively. The water level fluctuation between pre & post ranges between 0.08 to 7.97 m. The details of the monitoring wells are given in Appendix - C.

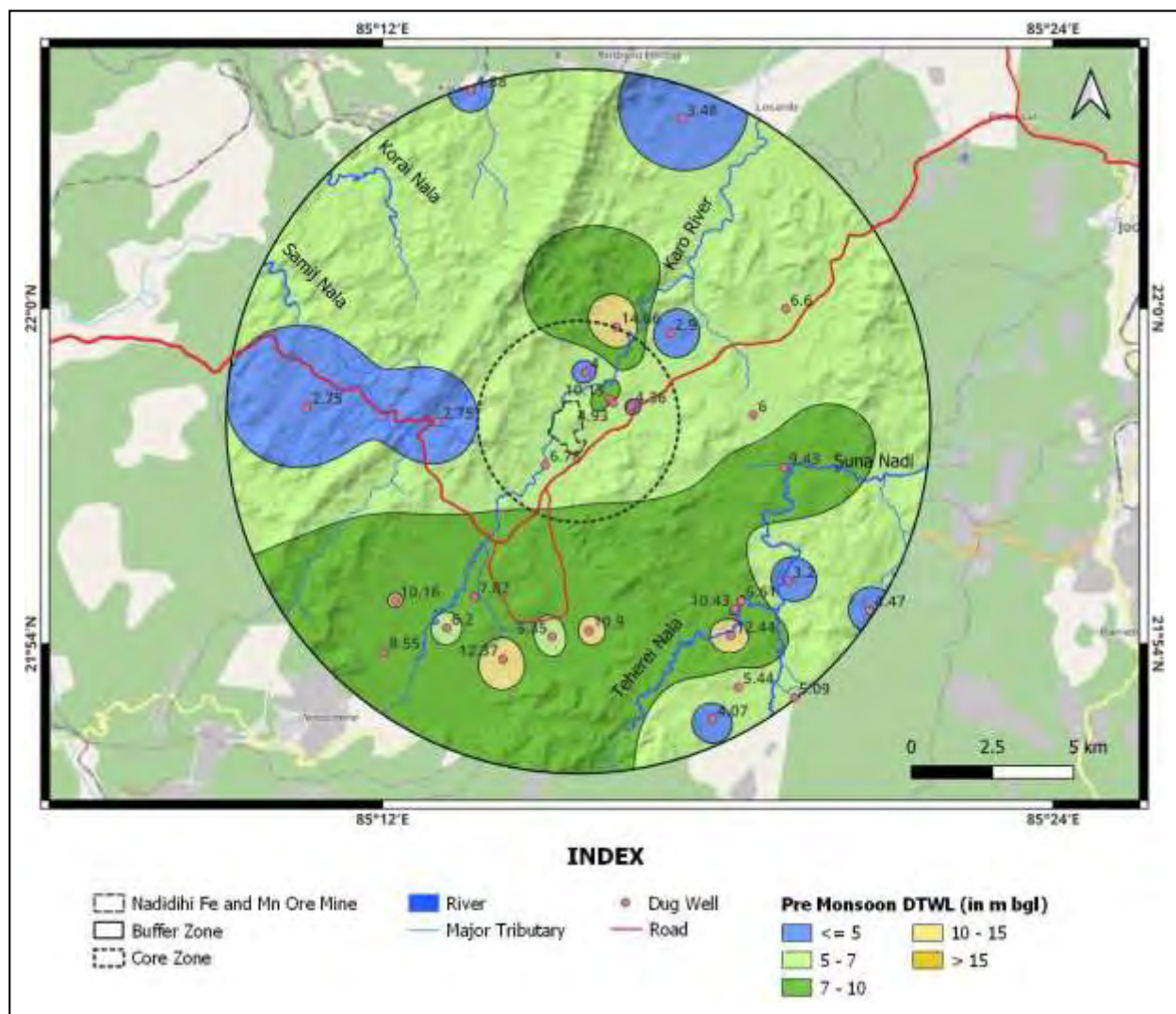


Figure - 12: Pre-monsoon Depth to Water level map of phreatic aquifer

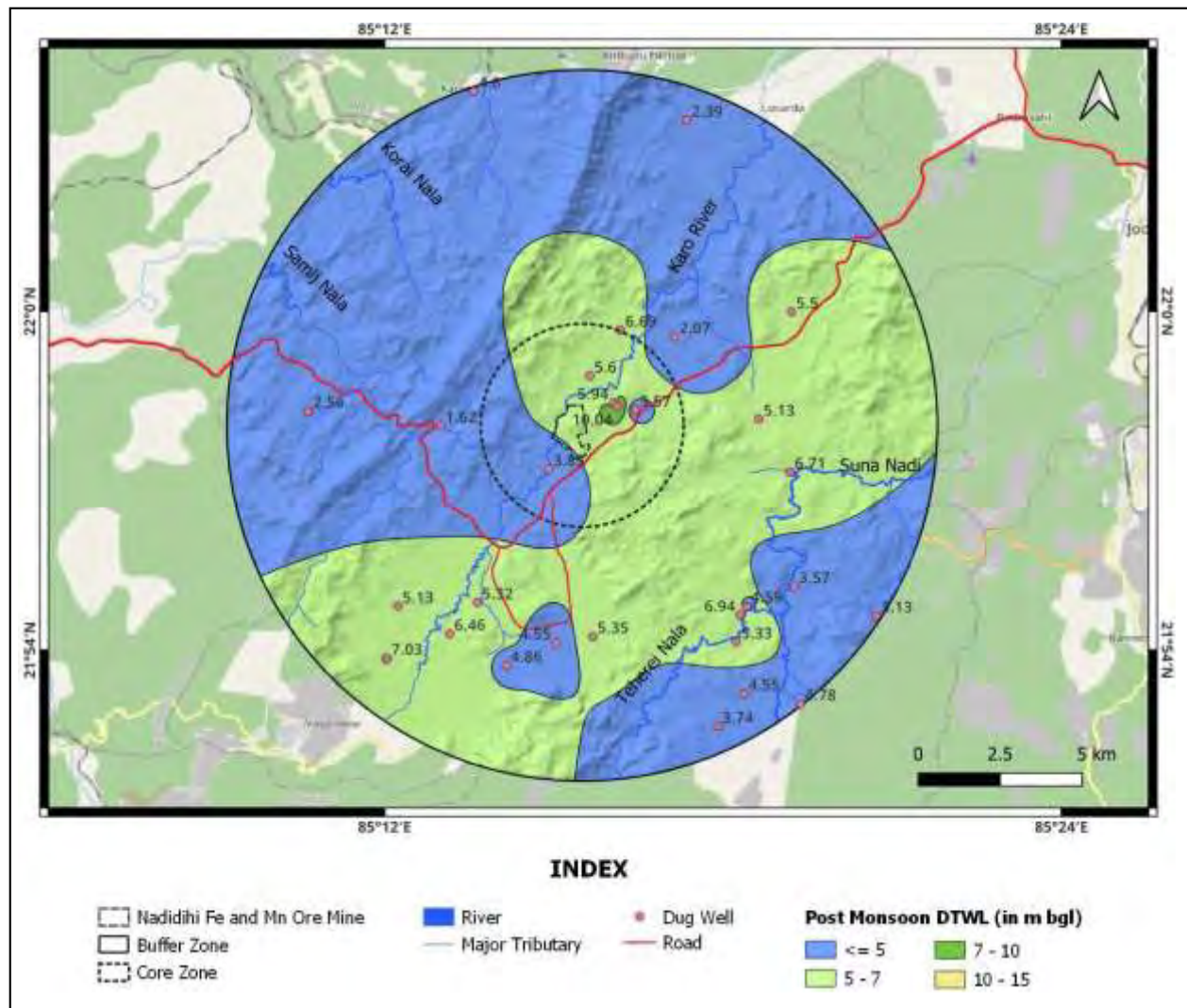


Figure - 13: Post-monsoon Depth to Water level map of phreatic aquifer

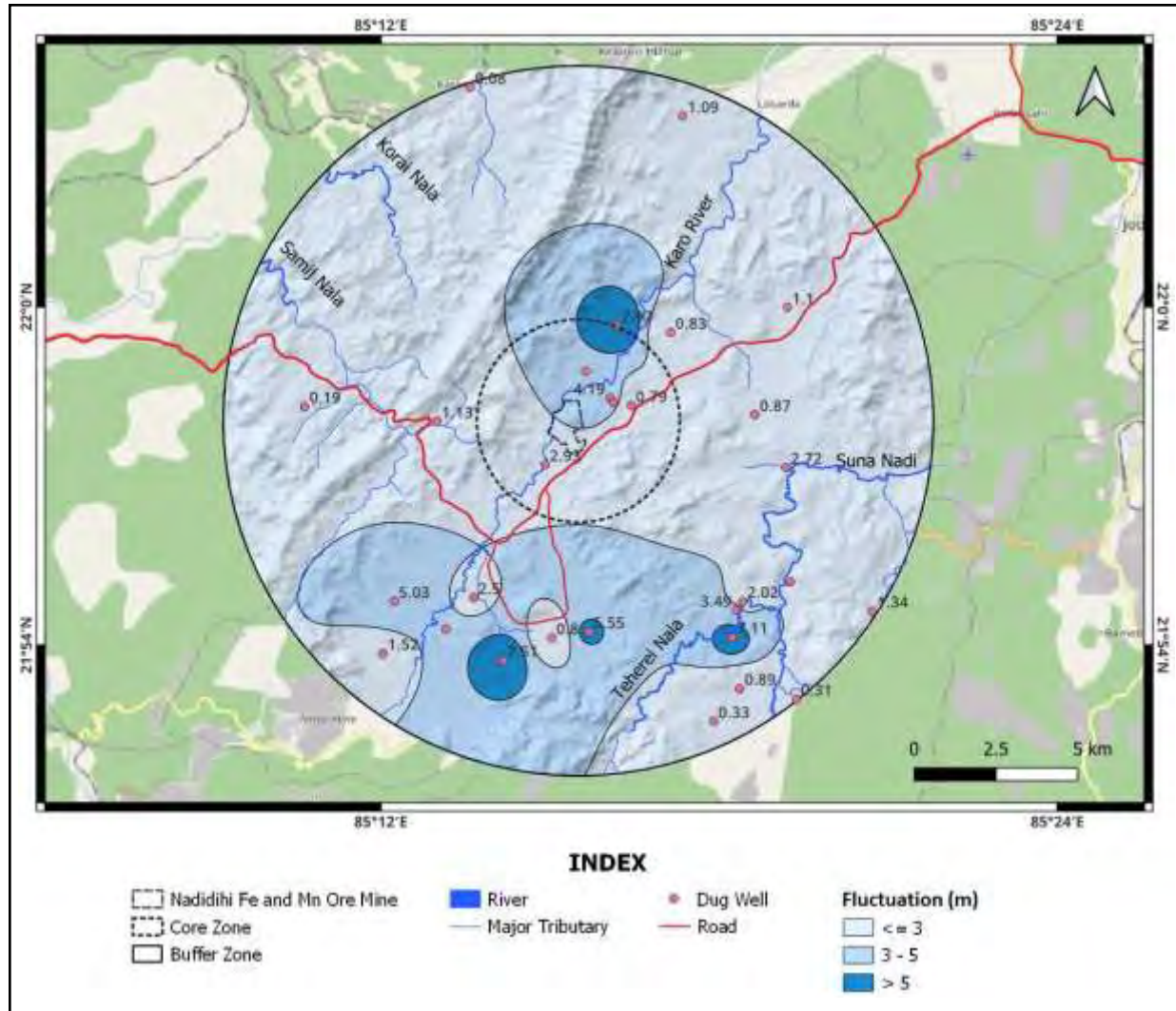


Figure - 14: Water level fluctuation map of the study area

20 Tube well have also been established during pre & Post monsoon season to monitor water level of the deeper aquifer. Depth to Water level (DTWL) of the deeper aquifer during Pre & Post - monsoon varies from 7.87 to 18.09 & 4.51 to 8.13 m bgl respectively. The average piezometric head fluctuation between pre & post monsoon ranges between 1.0 to 10.99 m. The details of the monitoring wells are given in Appendix - C.

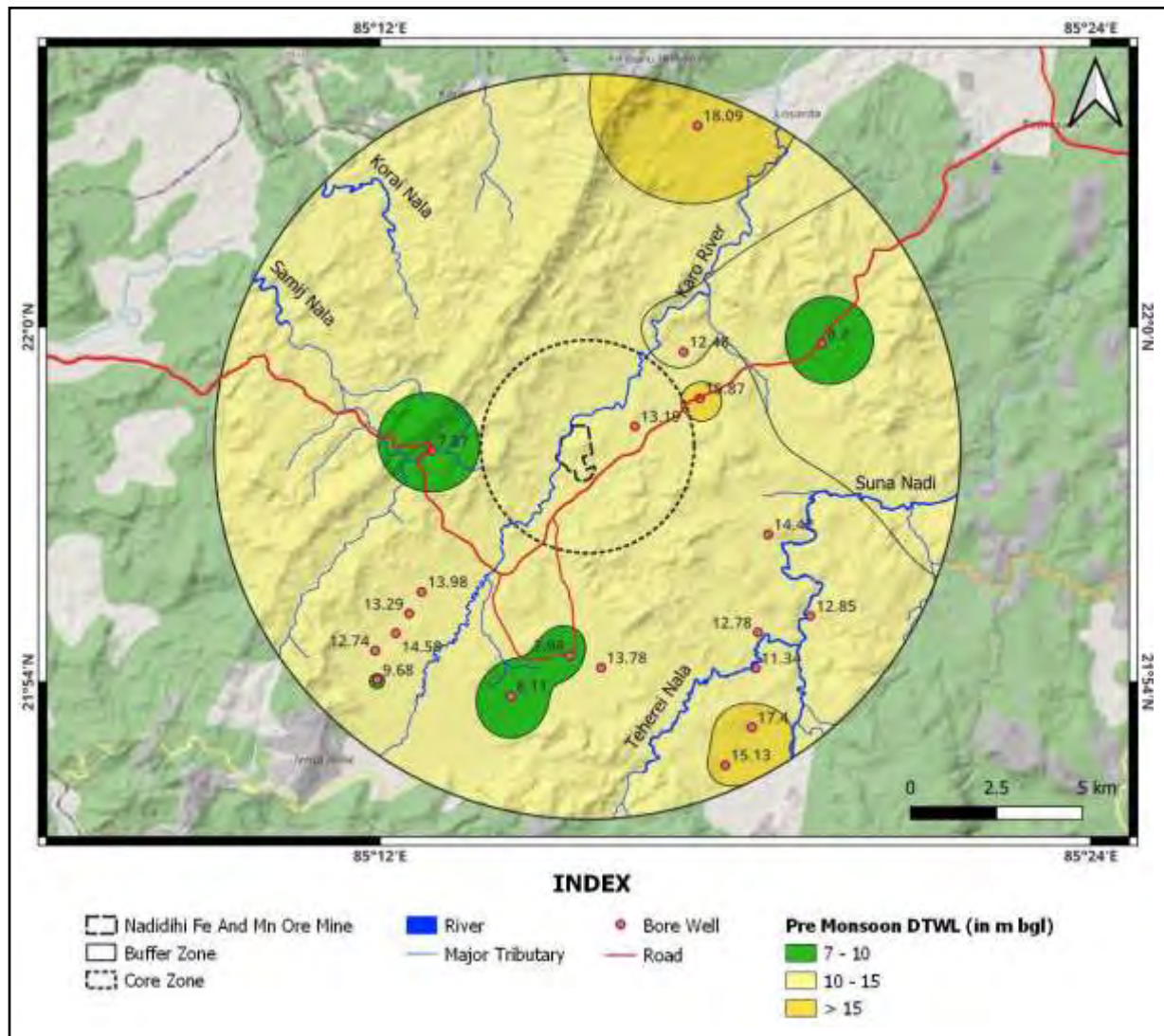


Figure - 15: Pre-monsoon Depth to Water level (DTWL) map of deeper aquifer (60 to 90 mbgl)

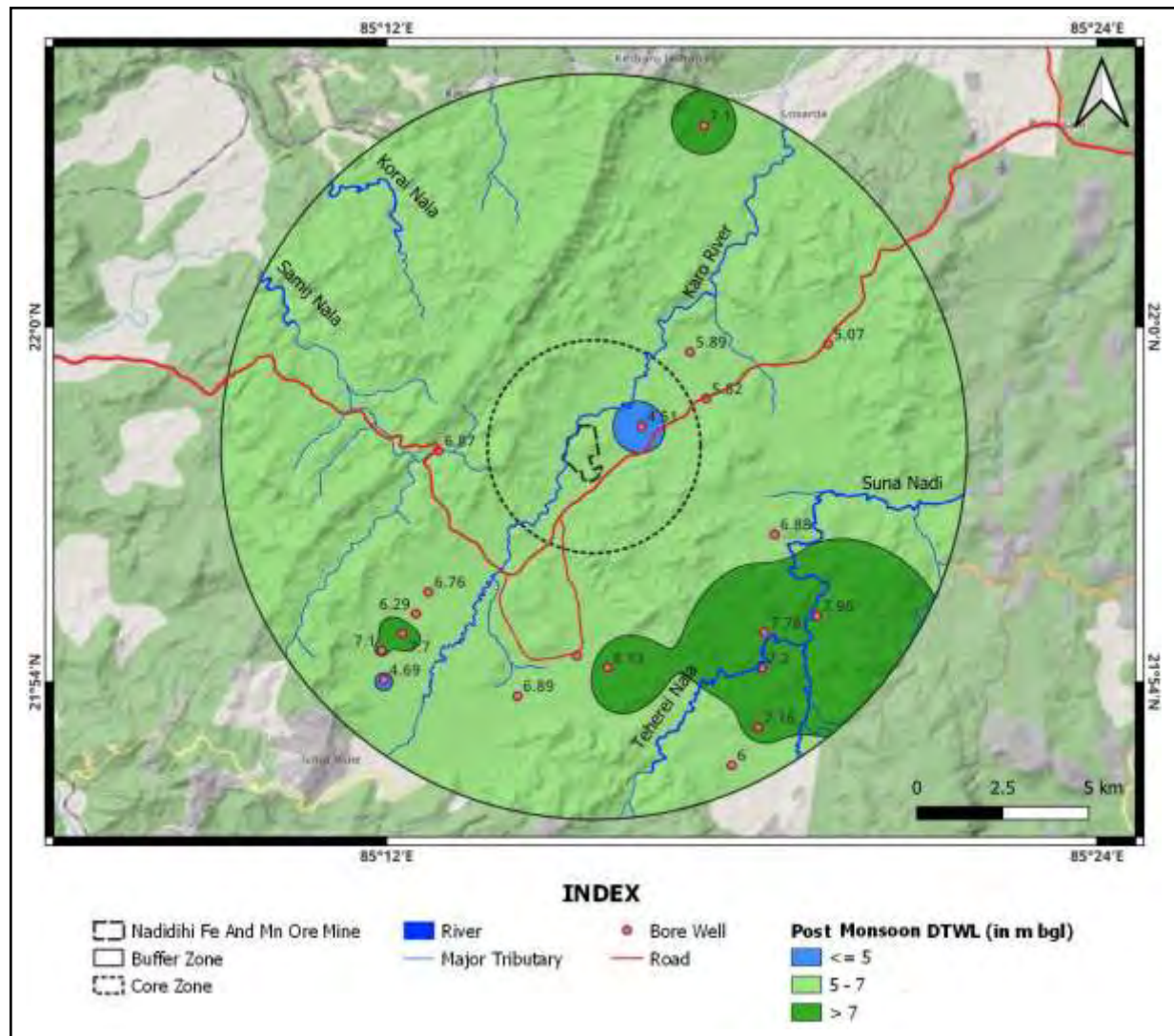


Figure - 16: Post-monsoon Depth to Water level (DTWL) map of deeper aquifer (60 to 90 mbgl)

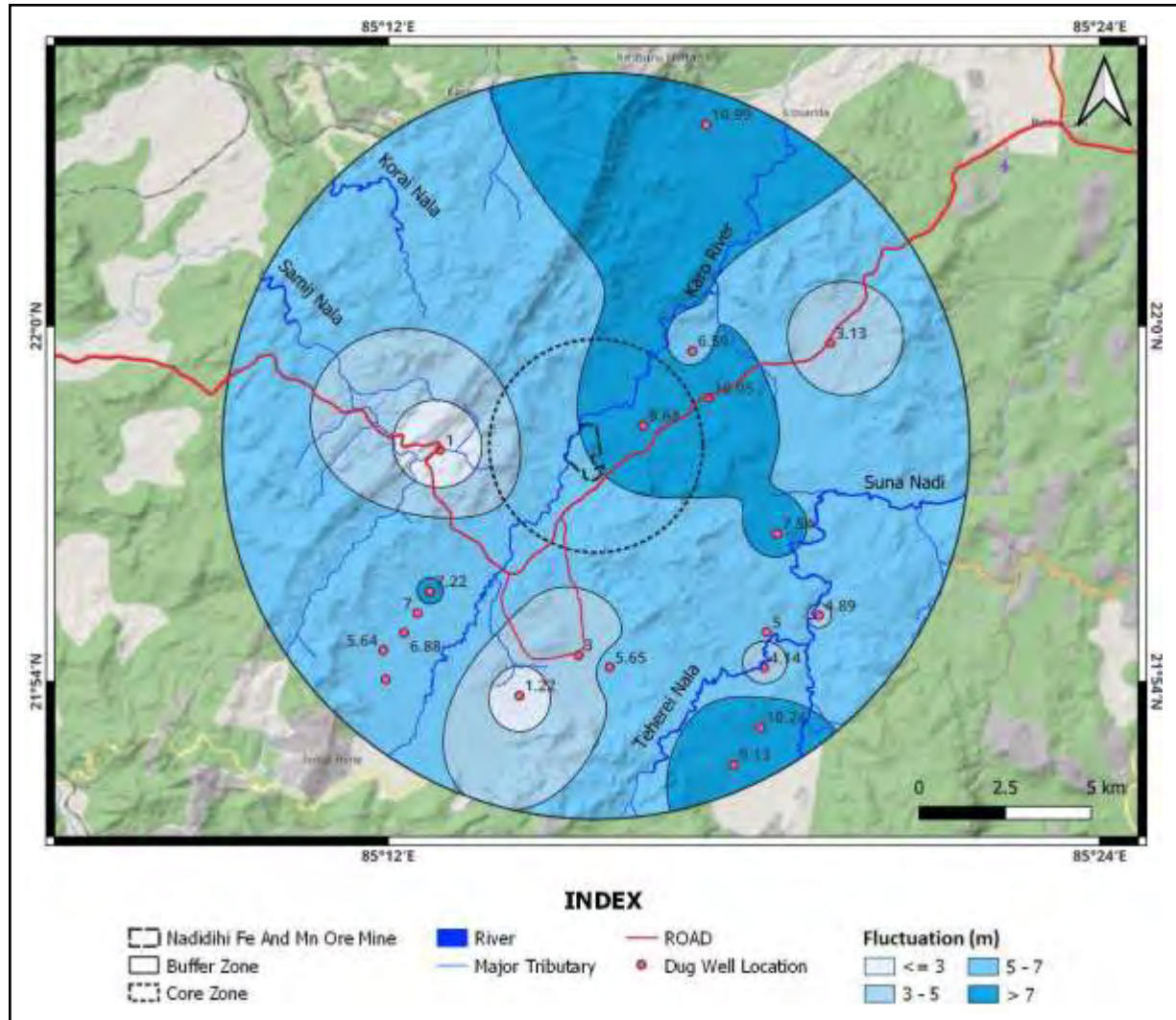


Figure - 17: Fluctuation map of deeper aquifer (60 to 90 mbgl)

3.3.4 Long term water level data

Historical water level record is available in India WRIS site for two CGWB National Hydrograph monitoring Station (NHS) located at Koira & Rugudi. The hydrograph of Koira and Rugudi are prepared and given in (Figure 18 & 19). The water level shows slight declining trend for both Pre & Post-monsoon season for Koira NHS whereas rising trend is observed in Rugudi NHS.

Table - 3: Water Level Trends of CGWB monitoring wells

Sl No	Village	Year	Pre-Monsoon		Post-Monsoon	
			Rise(m)	Fall(m)	Rise(m)	Fall(m)
1	Koira	2014-23		-0.09		-0.129
2	Rugudi	2001-21	0.47		0.04	

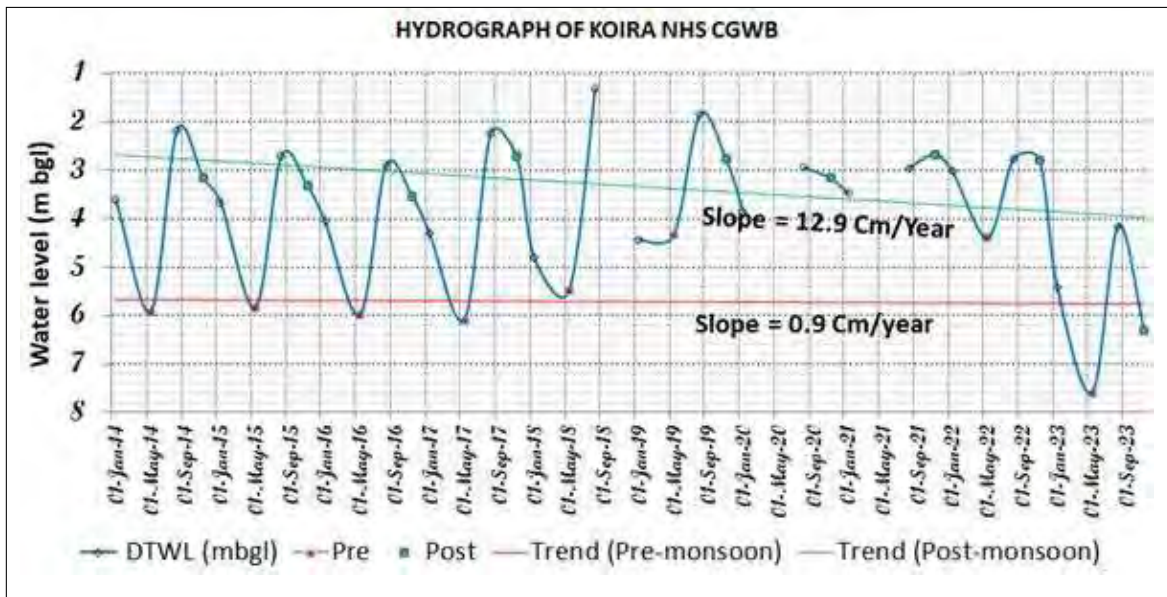


Figure - 18: Hydrograph of Koira NHS of CGWB

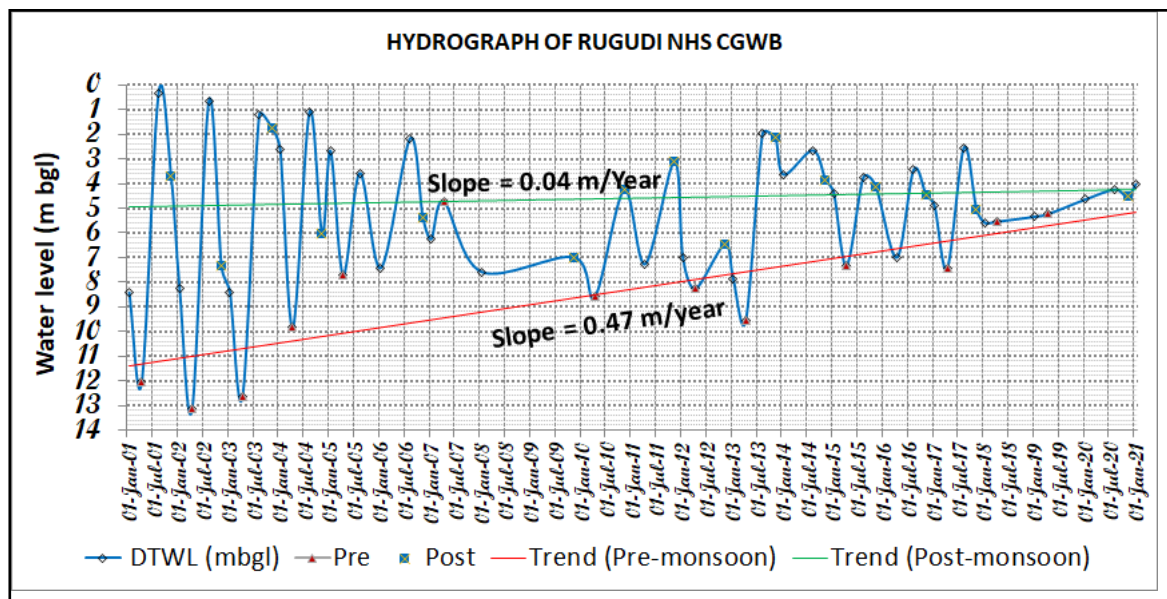


Figure - 19: Hydrograph of Rugudi NHS of CGWB

3.3.5 Ground water quality:

Ground water samples have been collected from 15 locations (10 Dug-wells, 4 Tube-wells and mine pit) of its buffer zone for chemical quality. The analysis result reveals that the shallow aquifer is excellent in quality with EC varying from 43 to 215 mg/l. The ground water is mainly of Ca HCO₃ type with at places mixed type (Ca HCO₃ + Na/K Cl). Fluoride which is detrimental to human health is found above desirable limit in 46% of the samples. Nitrate which indicates anthropogenic pollution is much under the permissible limit (45 mg/l).

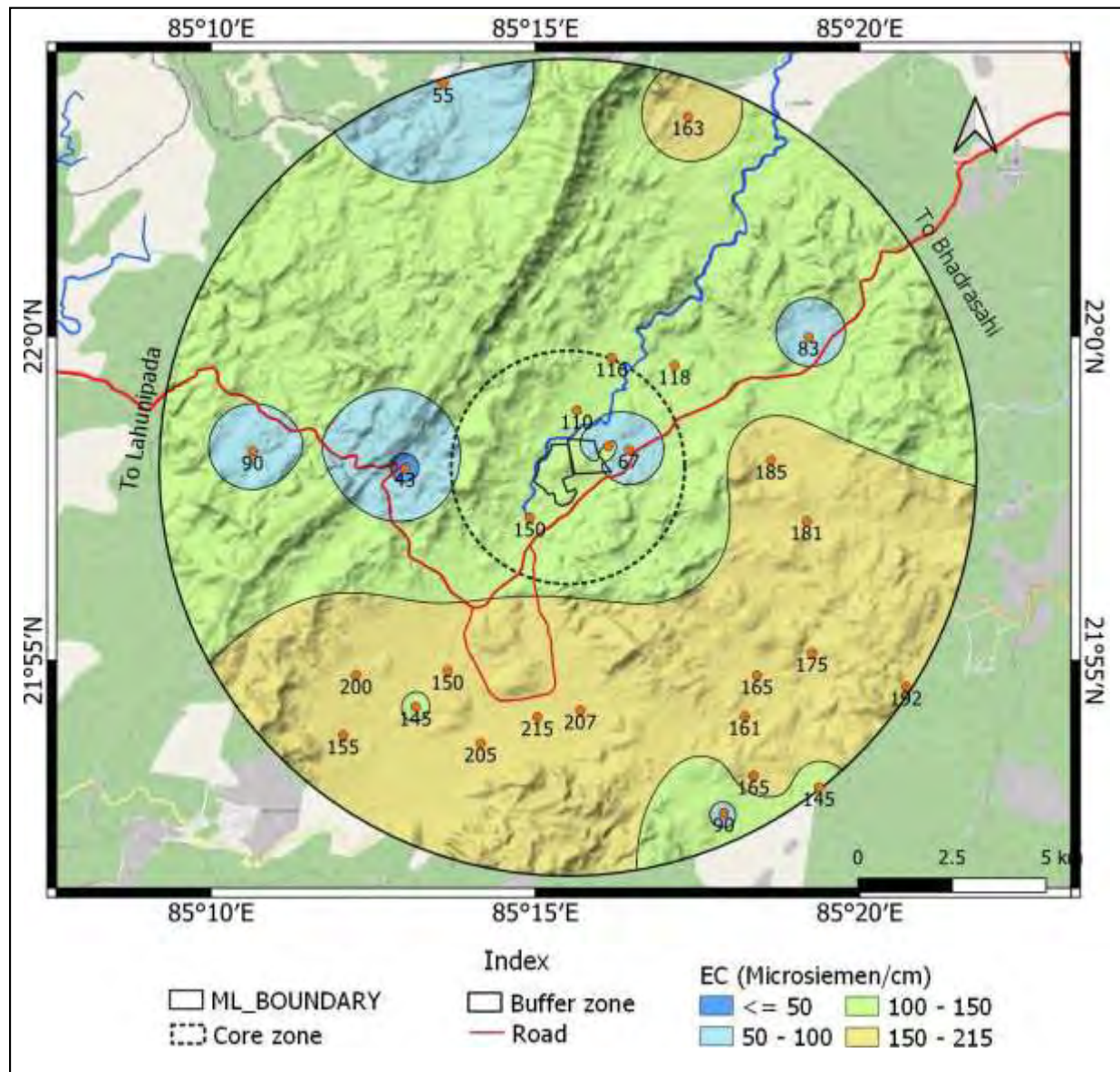


Figure - 20: EC Map of Phreatic aquifer

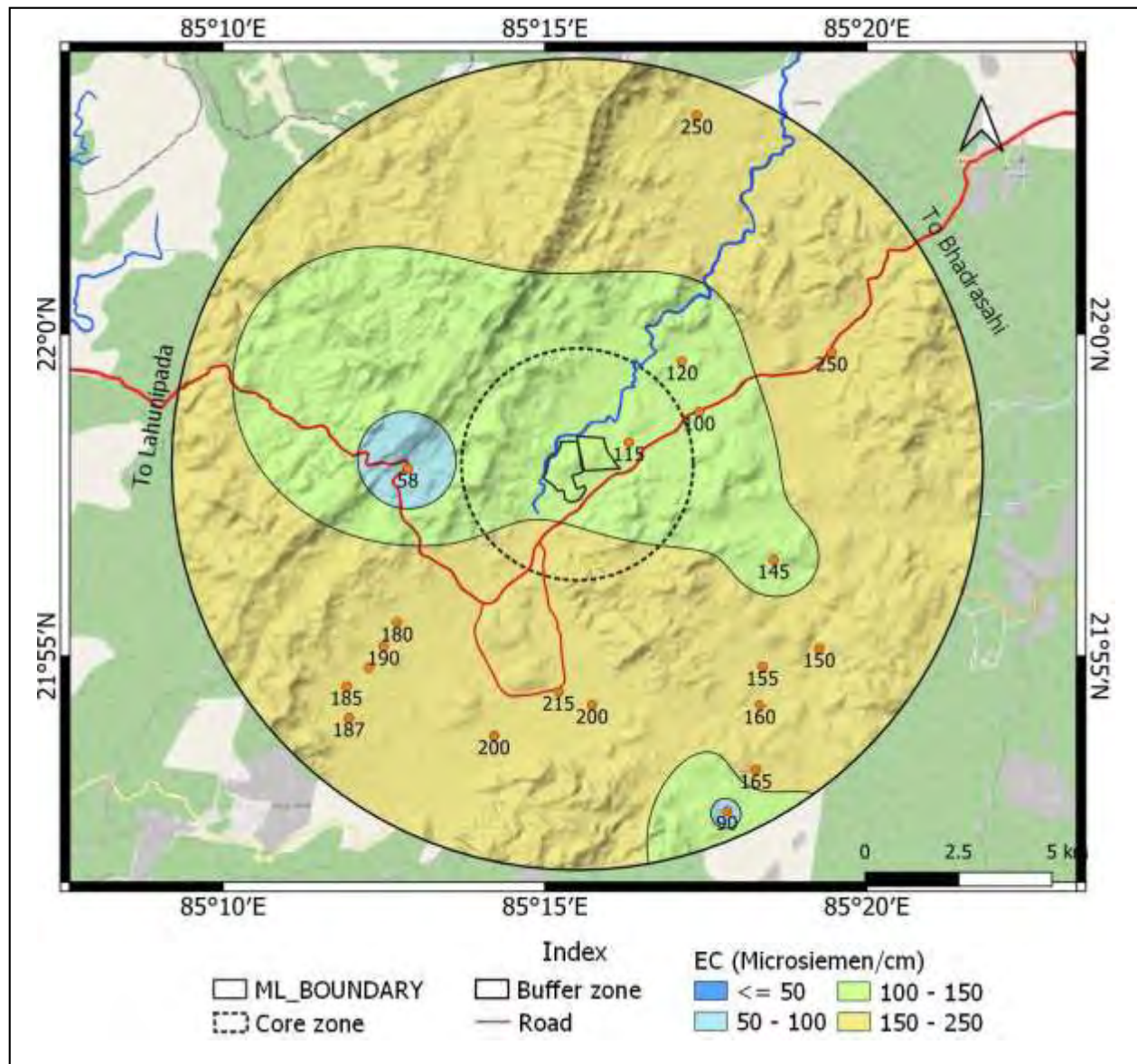


Figure - 21: EC Map of deeper aquifer

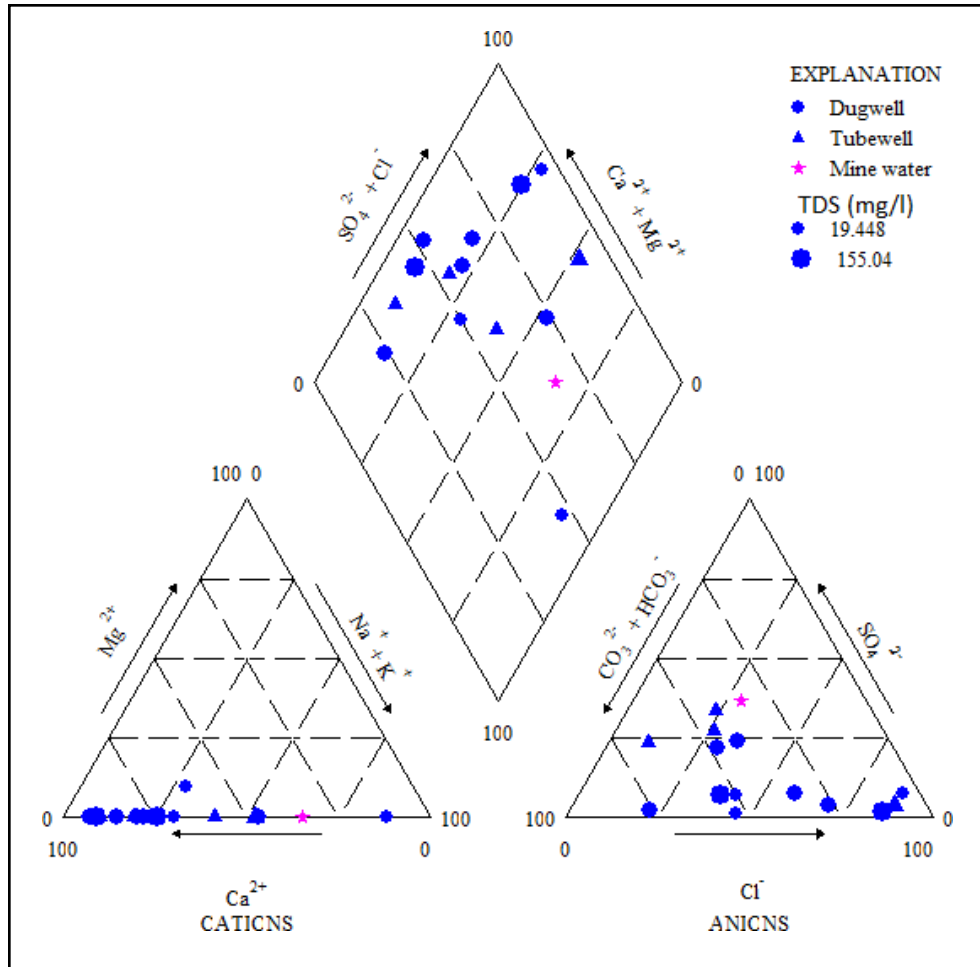


Figure - 22: Piper Trilinear Diagram showing water types

4. Approved Mine plan

The existing mining operation for Nadidihi Iron & Manganese ore mine is fully mechanised conventional opencast method having maximum production capacity of 7.451 million TPA. Iron ore both lumpy and fines are being produced. The conventional opencast mining was adopted with deep hole drilling and blasting followed by excavation using excavator of capacity 1.5 - 4.5 m³. Loaders of capacity 1.5m³/2.5m³ are used for loading purpose. Ore is being transported by dumper of capacity up to 35 tonnes. The height and width of quarry bench are maintained between 9 m and 9 m respectively.

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Year	South Pit	Top RL	Bottom RL	Surface Area (Ha)	Floor area (Ha)*	Sump area (Ha)	Depth (m)
Current	South Pit	557	480	27.03	3.65	0.17	77
2026-27	South Pit	557	475	27.42	3.93	0.17	82
2027-28	South Pit	557	463	27.68	1.73	0.17	94
2028-29	South Pit	557	445	27.68	0.23	0.17	112

Year	North Pit	Top RL	Bottom RL	Surface Area (Ha)	Floor area (Ha)*	Sump area (Ha)	Depth (m)
Current	North Pit	578	520	20.31	1.71	0.15	58
2026-27	North Pit	578	511	21.67	2.78	0.15	67
2027-28	North Pit	578	499	22.78	1.51	0.15	79
2028-29	North Pit	578	493	27.39	2.95	0.15	85

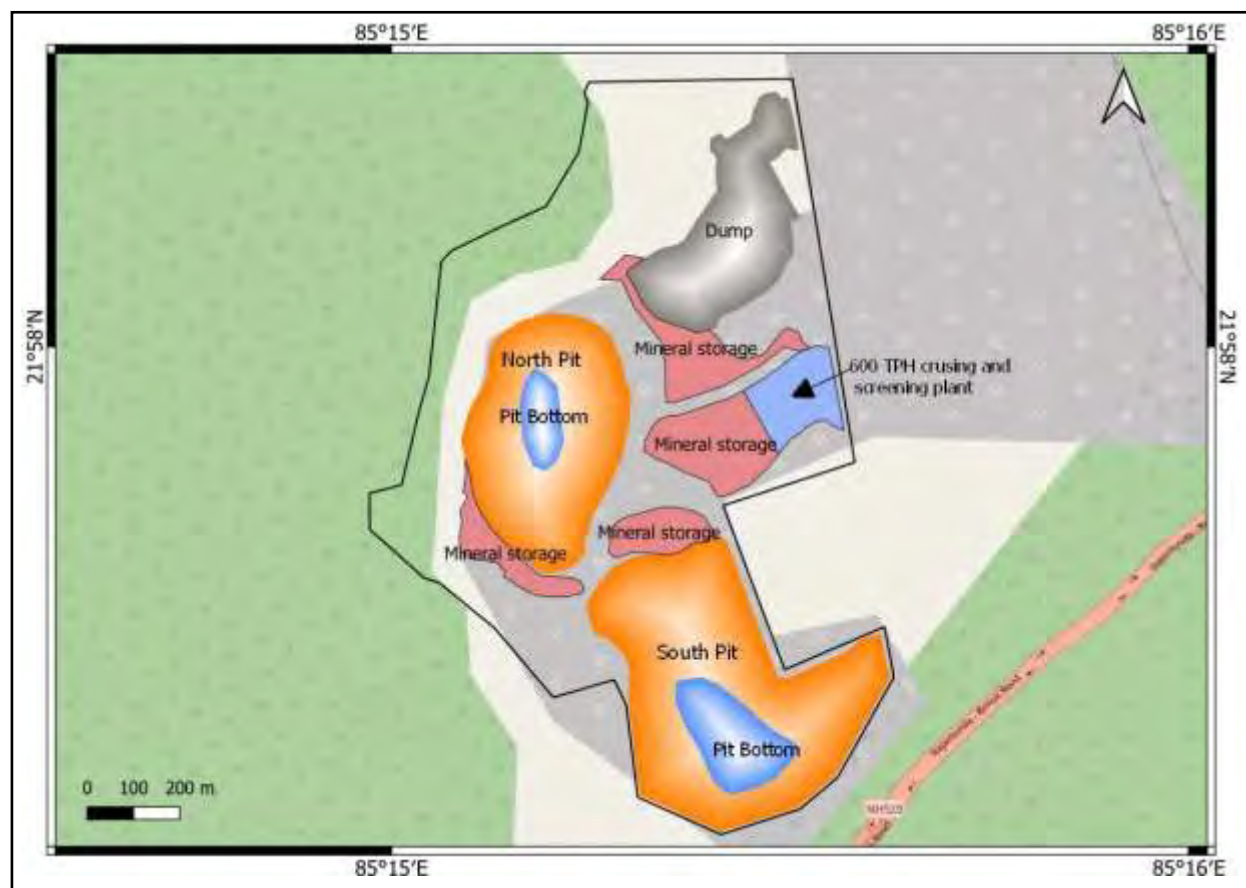


Figure - 23: Surface plan of Nadidihi Fe and Mn mine

5. Estimation of Mine seepage and Mine dewatering plan

The Nadidihi Iron & Mn Ore Mine is situated on a raised plateau having original ground elevation between 557 & 578 m amsl and is dotted with two mounds. The area is underlain by Shale, BHQ, Haematite ore, blue-dust ore and Goethite. Due to undulatory terrain and the presence of shales and phyllites, phreatic aquifer does not support storage of ground water and hence seepage from the phreatic aquifer is not observed in the working mine.

Water is struck between 40 to 60 m depth in the piezometer constructed in the mine lease area and a flow of around 2.5 liter/second (lps) is reported. Hence, the confined aquifer starts contributing water to mine seepage since 50 m depth.

5.1 Estimation of Mine seepage

As described above, confined aquifers in the form of fracture zone contribute seepage to the mine, hence TIL method is used for seepage calculation. As per the pumping test data, the Transmissivity value of 37.2 m²/day & Storativity of 8.93×10^{-4} is considered for seepage calculation. For calculation of hydraulic gradient, the ambience piezometric head is taken from the nearby monitoring bore/tube well data i.e., Nuagaon (Appendix-C). The pre & post monsoon water level (May & November) is calculated to be around 13.19 & 4.51 mbgl. Since the approximate RL of the mine entrance is around 548 m amsl, the pre & post monsoon piezometric head of 534.81 & 543.49 m amsl is considered for seepage calculation. The radius of influence is calculated from Theis's Solution (Theis 1935);

$$s = \frac{Q}{4\pi T} W(u) \quad u = \frac{r^2 S}{4Tt} \text{ where } W(u) \text{ is the well function, which is available in a tabular form for any value of } u.$$

Taking 215 & 150 days as pre-monsoon & post-monsoon period, and taking impact beyond 1 m as nominal, the radius of influence is calculated as 900 & 750 m respectively. The perimeter of the seepage area as given in the progressive mine (Figure - 23) is taken as the length of seepage face. Based on all these data, the groundwater seepage into the Mine is calculated as below:

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Table -4: Estimation of Mine seepage

Year	Period	reduced level of in respect to MSL (m)	Depth to Water RL (m)	Length of the seepage Face (m)	GW Gradient (m/m)	Transmi ssivity (m ² /day)	Per Day Mine Seepage (m ³ /Day)	Annul Mine Seepage (m ³ /Year)
South Quarry								
2026-27	Non-monsoon	475	475	806	0.06646	37.2	1992.55	839108.17
	Monsoon	475	475	806	0.09132	37.2	2738.07	
2027-28	Non-monsoon	463	463	806	0.07979	37.2	2392.33	997019.69
	Monsoon	463	463	806	0.10732	37.2	3217.80	
North Quarry								
2026-27	Non-monsoon	511	511	539	0.02646	37.2	530.46	244337.93
	Monsoon	511	511	539	0.04332	37.2	868.60	
2027-28	Non-monsoon	499	499	539	0.03979	37.2	797.80	349938.81
	Monsoon	499	499	539	0.05932	37.2	1189.41	

The average ground water entering into the South Quarry is estimated as **2299 & 2732 m³/day** during **2026-27 & 2027-28** period. Similarly, the average ground water seepage into the North Quarry is around **669 & 959 m³/day** during **2026-27 & 2027-28** period. Thus, a total volume of **3691 m³/day** is expected when the mine will reach its maximum depth. The Numerical modeling result gives around **4178 m³/day** is considered as the final mine seepage as per SOP of CGWA. However, this calculation is based on uncertainties like length of seepage face, changes in permeability with area, regional groundwater head and effect of recharge/barrier boundary. Hence the flow meter reading will validate this result.

5.2 Estimation of rainfall accumulation & mine dewatering plan

Rainwater collected over the quarry area flows to the mine bottom and remains in the sump along with the groundwater seepage. The rainfall component is calculated month wise basis presuming the Runoff coefficient as 50% of rainfall considering 10% loss of downpour in air and 40 % loss due to seepage & absorption in loose shale & clay dust. Evaporation from the sump also comes into play and is estimated. The Pan Evaporation data has been taken from Orissa University of Agriculture & Technology, Bhubaneswar for calculation of actual evaporation loss in the sump. The actual evaporation loss (E₀) and net rainwater availability is calculated. Thus, the net Rainwater availability in the North & south pit will be around on an average **300362 m³/year or around 823 m³/day**.

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North pit									
Month	Average Rainfall in mm	Catchment Area in m ²	Runoff coefficient	Runoff generated in m ³	Sump area in m ²	Pan Evaporation (E _p) in cm	Pan Coefficient (E _p /E ₀)	Actual evaporation Loss (E ₀)	Net Rainwater availability in m ³
Jan	15.3	200000	0.5	1529.4	1500	8.4	1.3	96.9	1432.5
Feb	17.5	200000	0.5	1753.8	1500	12	1.3	138.5	1615.3
Mar	23.2	200000	0.5	2321.9	1500	19.8	1.3	228.5	2093.4
Apr	35.4	200000	0.5	3540.0	1500	21.8	1.3	251.5	3288.5
May	83.2	200000	0.5	8322.5	1500	19.9	1.3	229.6	8092.9
Jun	156.6	200000	0.5	15656.3	1500	15.8	1.3	182.3	15473.9
Jul	311.8	200000	0.5	31184.9	1500	10	1.3	115.4	31069.6
Aug	319.9	200000	0.5	31985.6	1500	9.8	1.3	113.1	31872.5
Sep	214.6	200000	0.5	21458.8	1500	10.2	1.3	117.7	21341.1
Oct	91.9	200000	0.5	9190.6	1500	9.1	1.3	105.0	9085.6
Nov	9.2	200000	0.5	918.1	1500	9.2	1.3	106.2	812.0
Dec	15.8	200000	0.5	1575.6	1500	9	1.3	103.8	1471.8
Total	1294.4			129437.4		155		1788.5	127649.0

South pit									
Month	Average Rainfall in mm	Catchment Area in m ²	Runoff coefficient	Runoff generated in m ³	Sump area in m ²	Pan Evaporation (E _p) in cm	Pan Coefficient (E _p /E ₀)	Actual evaporation Loss (E ₀)	Net Rainwater availability in m ³
Jan	15.3	270000	0.5	2064.7	1700	8.4	1.3	109.8	1954.8
Feb	17.5	270000	0.5	2367.6	1700	12	1.3	156.9	2210.6
Mar	23.2	270000	0.5	3134.5	1700	19.8	1.3	258.9	2875.6
Apr	35.4	270000	0.5	4779.0	1700	21.8	1.3	285.1	4493.9
May	83.2	270000	0.5	11235.4	1700	19.9	1.3	260.2	10975.1
Jun	156.6	270000	0.5	21135.9	1700	15.8	1.3	206.6	20929.3
Jul	311.8	270000	0.5	42099.7	1700	10	1.3	130.8	41968.9
Aug	319.9	270000	0.5	43180.6	1700	9.8	1.3	128.2	43052.4
Sep	214.6	270000	0.5	28969.3	1700	10.2	1.3	133.4	28835.9
Oct	91.9	270000	0.5	12407.3	1700	9.1	1.3	119.0	12288.3
Nov	9.2	270000	0.5	1239.5	1700	9.2	1.3	120.3	1119.2
Dec	15.8	270000	0.5	2127.1	1700	9	1.3	117.7	2009.4
Total	1294.4			174740.5		155		2026.9	172713.6

* Source of Pan Evaporation Data: Orissa University of Agriculture & Technology, Bhubaneswar

Pan Coefficient: Linacre, E.T. 1994. Estimating U.S. Class A pan evaporation from few climate data.

Water International, 19, 5-14.

6. Mine water Management

The ground water pumping i.e., dewatering volume depends on the water requirements and for maintaining a safety working condition in the mine. The water accumulation in the mine is around **5001 m³/day** (4178 & 823 m³/day being the groundwater & rainfall component), out of which

4707 m³/day of water will be dewatered. The rest volume i.e., around **294 m³/day** (both seepage & Rainfall) will be stored in the sump & pit bottom (3.24 Ha) to cater to rainfall irregularity. During rainy season, water accumulation will be maximum and can rise the water level up to 3.0 m above the pit bottom. During that period, bench widening will be undertaken for ore extraction.

NOC for one mine pump installed in the sump of the Southern pit is existing. Due to pit bottom expansion, dewatering from another location is required. Hence another mine pump is proposed for this pit for renewal. However, for emergency purpose specially to manage during pump breakdown, provision of one high-capacity standby pump is required. Since appreciable seepage is occurring in the Northern pit, another low-capacity mine pump is also proposed. The pump details are given below;

Table - 5: Details of mine pumps

Sl. No.	Structure/ Year of construction	Diameter & Depth	Present Condition	Mode of Lift	Discharge /Yield m ³ /hrs	Running Hours/day days (year)	Quantity M ³ /day	NOC Status
1	Mine Pump (South Pit)	254 mm/ 77 m	Working	Centrifugal 340 HP	400	5 to 6 hrs	2000	Obtained
	Mine Pump (South Pit)	254 mm/ 77 m	Proposed	Centrifugal 340 HP	400	5 to 6 hrs	2000	Proposed
			Proposed as Standby	Centrifugal 340 HP	400	5 to 6 hrs	2000	Standby
2	Mine Pump (North Pit)	254 mm/ 58 m	Proposed	Centrifugal 100 HP	150	5 to 6 hrs	750	Proposed

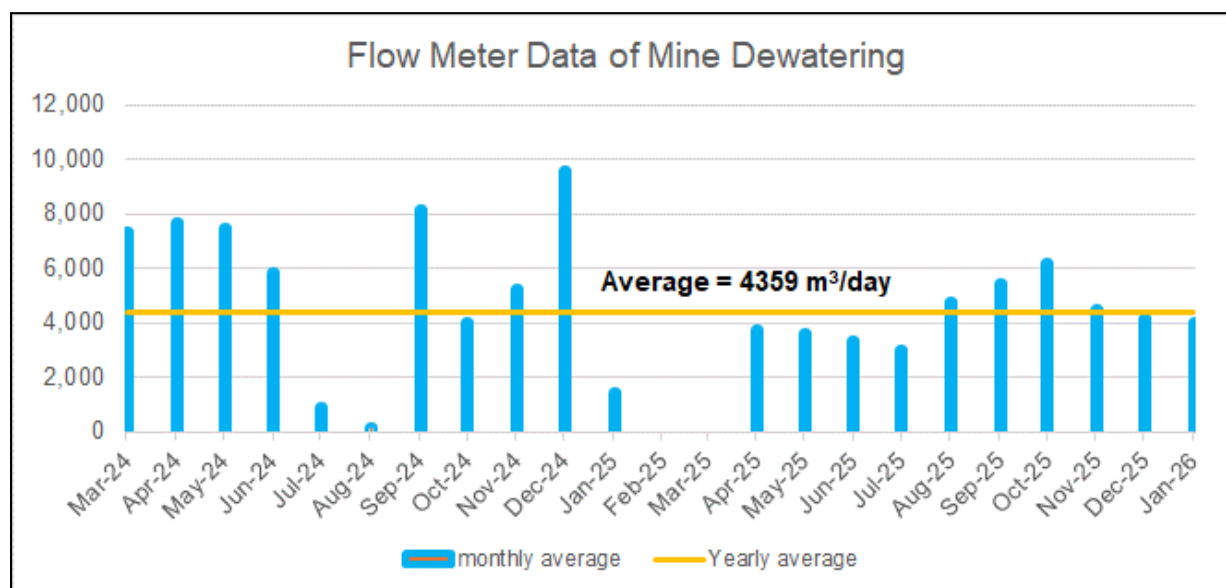


Figure- 24: Flow meter data of mine dewatering

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Table - 6: Proposed Water Balance

Sl. No.	Purpose	Water Requirement (KLD)
Drinking /Domestic use/sanitation (Mine, Plant and Colony)-A		
1	Domestic @16 lpcd, 350 workers	5.6
2	Drinking @4 lpcd, 350 workers	1.4
3	Consumption for Office @45 lpcd, 70 heads	3
4	Consumption for Security Barrack @120 lpcd, 150 residents	20
5	Drinking water supply to village	70
	Total	100
Seepage water pumping (Mine Dewatering)-B		
1	Dust suppression	160
2	Green belt development	80 (20 from groundwater & 60 from recycled water of STP)
3	Others (Flushing)	9
	Total water use from mine dewatering	189
	Total water use for mine activity (A+B)	289
	Discharge to Karo river	4518
Total		4867*

* Out of the required quantity of 4867 KLD, 4807 KLD is from groundwater & 60 KLD from recycled water of the STP.

7. Impact of mine Dewatering/Abstraction and Mitigation measures

Ground water abstraction structures

2 existing bore wells are used to withdraw 100 KLD of groundwater for domestic need.

Table - 7: Groundwater abstraction structure

SL NO.	Structure/ Year of construction	Diameter & Depth of BW/TW	Present Condition	Mode of Lift	Discharge/ Yield m3/hrs	Running Hours/day /days (year)	Quantity	NOC Status
1	Borewell 2011	127 mm 118 m	Working	Submersible 3 HP	5	10 hrs 365 days	50 KLD	Permitted
2	Borewell 2019	203 mm 120 m	Working	Submersible 3 HP	5	10 hrs 365 days	50 KLD	Permitted

7.1 Impact on ground water regime

Theoretically a fully penetrating well produces a depression cone of constant volume in a confined homogeneous aquifer with initial flat potentiometric surface. The circular area on the piezometric surface, the base of the cone in plan view, has a dimension defined by its radius, called the radius of influence (R) in figure - 25. At this distance the drawdown equals zero. The radius of influence is thus derived by putting zero drawdown in the classical Jacob Solution (Copper and Jacob 1946);

$$s = \frac{Q}{4\pi \times T} \ln \frac{2.25 \times T \times t}{r^2 S} \quad \text{----- Eq - 1, where}$$

s = Drawdown Q = Pumping Rate T = Transmissivity of the aquifer

t = Time S = Storativity r_w = radial distance from the pumping well

Using drawdown (s) as zero at R, the above equation can be reduced to:

$$R = \sqrt{\frac{2.25 \times T \times t}{S}} \quad \text{----- Eq - 2}$$

However in this calculation, the pumping rate (Q) is not considered. Moreover, for practical purposes it is often necessary to find a “realistic” value for R giving a threshold value for a small drawdown that can be measured in the field or a value which really affect the ground water regime.

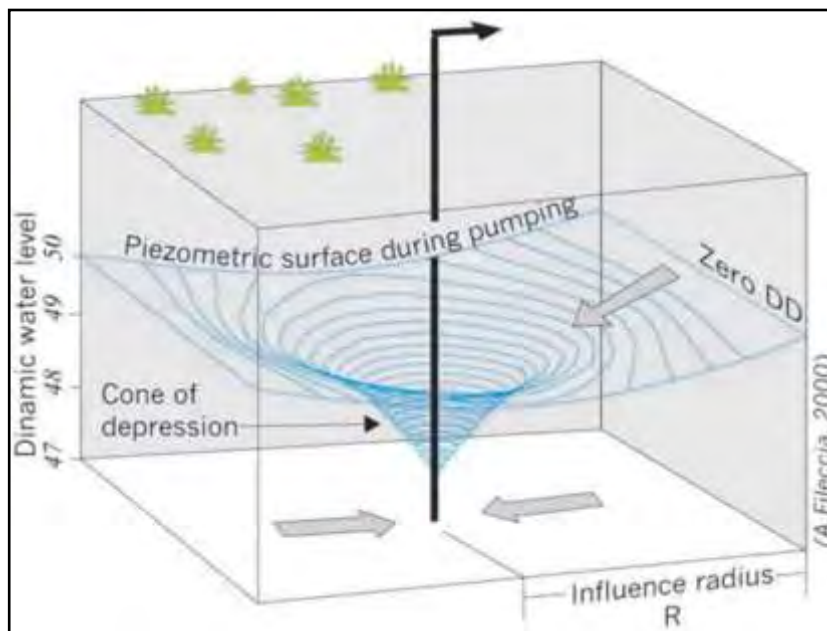


Figure - 25: Cone of Depression produced due to ground water dewatering/abstraction

Thus, to get the actual radius of influence, the classical Theis's Solution (Theis 1935) is used.

$$s = \frac{Q}{4\pi T} W(u) \quad u = \frac{r^2 S}{4Tt} \quad \text{where,}$$

$W(u)$ is the well function, which is available in a tabular form for any value of u .

Using Theis's solution and taking T & S as $37.2 \text{ m}^2/\text{day}$ & 8.93×10^{-4} respectively, the predicted drawdown at different distance from the pumping well is calculated and is tabulates below;

Table - 8: Radius of Influence details due to pumping

Items Well Name	Pumping Rate (m^3 / day)	Pumping days	Radii of Influence (for 2.0 m drawdown)	Radii of Influence (for 5.0 m drawdown)
Mine dewatering	4178 (48.4 lps)	215	5900	4200

Hence the impact of mine dewatering is around 5 Km from the mine center and thus an area upto 4 Km from mine lease boundary will be affected. The impact is only on the deeper aquifer and its impact is again minimised due to recharge from the top aquifer. Hence the actual mining impact on ground water regime will be better predicted by numerical modelling and is given in the modelling chapter.

7.2 Impact on surface water resources

No major drainage diversion is involved during the mining operation and hence the impact on the surface water resources is minimal. The mine lease area is near to the Karo Nadi and protective measures like check-bunds, silt settling ponds, plantation and coir matting on matures portion of dump slopes etc has been proposed so that siltation will not occur in the main channel due to mining.

7.3 Impact on water quality

There is no impact of mining on water quality of the surrounding area as the analyzed water quality of bore wells and dug wells are under permissible limit. However, retaining wall and garland drain will be developed around the waste dump to collect the leachate water.

7.4 Mitigation measures

A Sewage Treatment Plant (STP) process treats wastewater through four main stages: preliminary (screening), primary (sedimentation), secondary (biological decomposition), and tertiary

(filtration/disinfection) to remove pollutants, bacteria, and debris. Key steps include removing large solids, aeration for bacteria to break down organic matter, and final water disinfection for reuse. 60 KLD Sewage Treatment Plant has been installed in the mine. After necessary treatment of the domestic waste water, the waste will be used as manure and treated water will be used in plantation and haul road for dust suppression.



Figure - 26: 60 KLD STP in Nadidihi Iron and Manganese mines

Rainwater harvesting

In order to augment the ground water resources, ground water recharge is planned by storing rooftop water & runoff by creating surface storage facilities, which will facilitate the retention of water for long period and act as source of water for recharge.

Water availability is estimated by taking the average annual rainfall and runoff coefficients based on land-use pattern of the project area. Rooftop areas & infrastructure units, unused pit, plantation and greenbelt area are found to be feasible for taking up rainwater harvesting measures which can be used for non-potable purpose. The total volume of runoff available for harvesting amounts to 195485.2 m³ per year, the breakup of which is given below:

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Sl. No.	Location	Approximate Area (m ²)	Annual Rain fall (m)	Runoff Coefficient	Volume (m ³)
1	Greenbelt area	96590	1.384	0.15	20052.08
2	Open land	590549	1.384	0.20	163464
3	Road/paved area	7168	1.384	0.65	6448.333
4	Rooftop area of buildings/shed	4693	1.384	0.85	5520.845
	Total	699000			195485.2

Since the mine lease area is small (117.2 Ha), limited storage facility of 14,800 m³ is created by the construction of four settling ponds (Table - 2). The collected water stored in settling ponds are used for non-potable requirements, such as dust suppression, plantation and green belt development. Since the mine lease area is small, negotiation with the nearby villages is going for creating suitable rain water harvesting structures and storage ponds to keep the released mine water for use during dry seasons.

Sl No.	Name	Latitude	Longitude	Area (m ²)	Depth (m)	Storage Capacity (m ³)
1	Settling pond 1	21.95993	85.25408	800	2.50	2,000
2	Settling Pond 2	21.96095	85.25259	4300	2	8,600
3	Settling pond 3	21.96154	85.25190	2070	1.8	3,726
4	Settling Pond 4	21.96178	85.25142	250	2	500
Total				7420		14,826

Taking the pond floor area as 7420 m² and seepage factor as 1.4 mm / day (as per the recommendation of GEC-2015 for Seepage from Tanks & Ponds), the annual recharge from these settling ponds is estimated as 3791.6 m³.

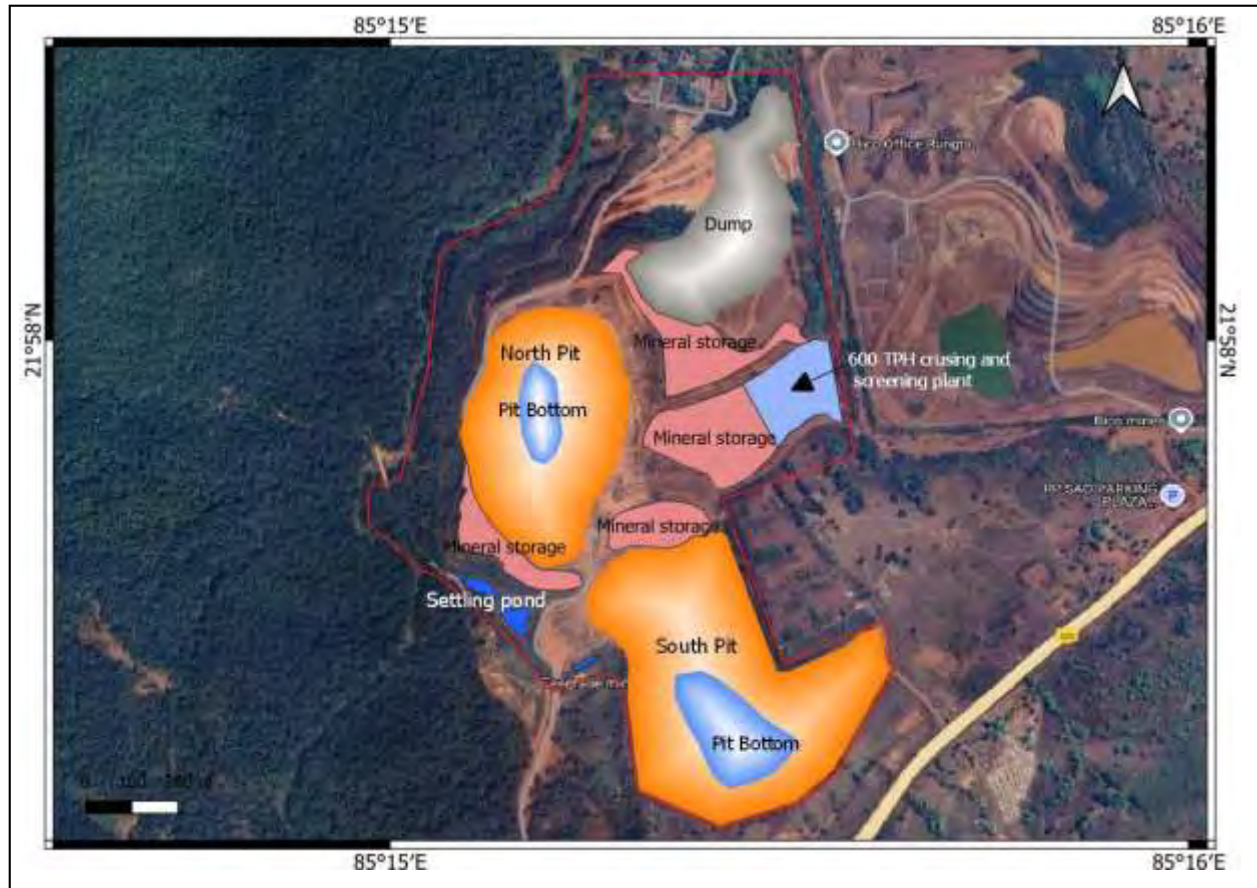


Figure - 27: Location of settling pond and mine pit bottom for rainwater harvesting

7.5 Saline water disposal strategies (In case of saline water abstraction)

As the mining project is not engaged in drawing saline water, it is not applicable.

8. Any Other details pertaining to the project

9. Summary and conclusion

Mining at Nadidihi is undertaken through two quarries and as both of them are operating below the regional water table, appreciable seepage into the mine is observed. The planned mine depth for 2027-28 will be 94 & 79 mbgl for the Southern & Northern Quarry respectively. The ground water seepage estimated through analytical method is **3691 m³/day during 2027-28**. However, the numerical modelling study has predicted seepage of around **4178 m³/day** and is considered as the final seepage. The rainwater accumulation in the mine pit is calculated as **823 m³/day**. Hence the total water accumulation in the mine pit will be **5001 m³/day**, out of which **4707**

m³/day will be pumped out to create a safe working atmosphere in the mine. The rest volume i.e., **294 m³/day** will be kept in the sump & pit bottom (3.24 Ha) which is large enough to accommodate. Moreover, in case of drought and other similar situations, the water can be utilized. In addition, the existing permission of **100 m³/day for domestic use** needs to be renewed. Hence, NOC for **4807 m³/day** is applied for renewal. The impact zone of dewatering is limited only to **3.0 Km** surrounding the mine and will mainly affect the deeper aquifer. The impact will further be nullified by recharge and seepage from the top aquifers. Beyond that, the mining impact is minimal and will not post any detrimental impact on the ground water regime. Moreover, part of the water withdrawn from the mine will be used for fruitful purposes and the rest amount will be released to the Karo River, which will increase the baseflow during dry season.

10. Accreditation certificate



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Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2011	47	11	17	113.5	0	247.6	146.5	342	482	57	0	0	1463.6
2012	21	9	0	38	0	68	303	397.5	223	35	14	1	1109.5
2013	3	0	5	60.5	46	192	436.1	288	212	351	0	0	1593.6
2014	0	40	78	0	29	141	484	488	166	62	0	0	1488
2015	2	0	0	51	5	347	449	154	113	0	0	16	1137
2016	0	27	4	0	70	76.1	267.7	383.4	267.4	35.4	0	0	1131
2017	0	0	0	0	56	201.3	546	132	90	107	9	0	1141.3
2018	0	0	1	44	152	106.4	482	379.3	334	53	0	113	1664.7
2019	0	85	59	60	69	151	201	316	188	185	0	3	1317
2020	37	41	95	131	207	206	115	608.9	177	54	2	0	1673.9
2021	0	7	27	0	433	228.3	301.9	115.5	335.2	147.2	69	62	1726.1
2022	76	35	0	38	54.6	120.5	295.3	571.6	223	121.4	0	0	1535.4
2023	10.7	17.2	17.3	29.6	69.1	188.5	333.2	320.5	215.1	95.3	8.9	12.8	1318.2
2024	48	5.4	68.2	0.8	42.6	60.6	177.19	360.7	193.2	107.6	4	18.8	1087.09
Average	17.5	19.8	26.5	40.5	88.1	166.7	324.1	347.0	229.9	100.8	7.6	16.2	1384.7
Max	76	85	95	131	433	347	546	608.9	482	351	69	113	1726.1
Min	0	0	0	0	0	60.6	115	115.5	90	0	0	0	1087.09

Comprehensive Hydrogeological Report
Nadidihi Iron and Manganese Ore Mine of M/S ESL Steel Limited

Appendix - B:
Pumping test data (OW)

Pumping Data				Pumping Data		
Time(m)	PWL (mbmp)	Drawdown (m)	SWL (mbmp)	Time(m)	PWL (mbmp)	Drawdown (m)
2	8.57	0.07	8.5	70	9.3	0.8
4	8.61	0.11		80	9.35	0.85
6	8.65	0.15		90	9.4	0.9
8	8.7	0.2		100	9.45	0.95
10	8.75	0.25		110	9.5	1
12	8.8	0.3		120	9.55	1.05
14	8.84	0.34		130	9.6	1.1
16	8.88	0.38		140	9.65	1.15
18	8.92	0.42		150	9.7	1.2
20	8.96	0.46		160	9.75	1.25
25	9.02	0.52		170	9.8	1.3
30	9.06	0.56		180	9.85	1.35
35	9.1	0.6		200	9.9	1.4
40	9.14	0.64		220	9.95	1.45
45	9.18	0.68		240	10.01	1.51
50	9.22	0.72		260	10.06	1.56
60	9.26	0.76				

Recovery data		
Time	RWL (mbmp)	RDD (m)
2	9.8	1.3
4	9.65	1.15
6	9.55	1.05
8	9.45	0.95
10	9.35	0.85
12	9.25	0.75
14	9.15	0.65
16	9.05	0.55
18	8.92	0.42
20	8.85	0.35
25	8.75	0.25
30	8.65	0.15
35	8.61	0.11

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Appendix - C: Depth to Water Level data of monitoring Dug wells

Sl. No.	latitude	Longitude	Location	May 2025 DTWL (mbgl)	Dec 2025 DTWL (mbgl)	Fluctuation (m)	EC Dec 2025
1	21.91	85.3452	Mandajoda	4.47	3.13	1.34	192
2	21.9999	85.3202	Rugudihi	6.6	5.5	1.1	83
3	21.9141	85.2274	Harischandrapur	7.82	5.32	2.5	92
4	21.9048	85.2192	Nuagaon	6.2	6.46	-	67
5	21.8975	85.2006	Bandhala	8.55	7.03	1.52	95
6	21.913	85.2039	Rangua	10.16	5.13	5.03	105
7	21.8955	85.2359	Kadodihi	12.37	4.86	7.51	107
8	21.9022	85.2505	Koira	5.35	4.55	0.8	102
9	21.9039	85.2615	Dhubalbeda	10.9	5.35	5.55	95
10	21.9534	85.2485	Rangelbeda	6.78	3.85	2.93	55
11	21.9662	85.2165	Kalta	2.75	1.62	1.13	43
12	21.9709	85.274	Nuagaon	4.36	3.57	0.79	67
13	21.981	85.2606	Guali	4	5.6	-	76
14	21.9925	85.2857	Patliposi	2.9	2.07	0.83	72
15	22.0565	85.2892	Dhanurjaypur	3.48	2.39	1.09	163
16	21.9945	85.2696	Kendudihi	14.66	6.69	7.97	85
17	21.9705	85.1774	Toda	2.75	2.56	0.19	90
18	22.065	85.2263	Bhangaon	4.88	4.8	0.08	168
19	21.9187	85.321	Jodipada	3.2	3.57	-	175
20	21.9525	85.3197	kolmang	9.43	6.71	2.72	181
21	21.9104	85.305	Badaindpur	10.43	6.94	3.49	155
22	21.9024	85.3038	Sargigarh	12.44	5.33	7.11	161
23	21.8871	85.306	Ranisal	5.44	4.55	0.89	165
24	21.8775	85.2984	Baldihi	4.07	3.74	0.33	90
25	21.8841	85.3228	Amla amba	5.09	4.78	0.31	145
26	21.9731	85.2677	Nadidihi	10.13	5.94	4.19	75
27	21.9129	85.3069	Sanindpur	6.61	4.59	2.02	165
28	21.9718	85.2687	Nodikashira(A)	4.93	10.04	-	120
29	21.9682	85.3105	Badapada	6	5.13	0.87	185

Comprehensive Hydrogeological Report
Nadidihi Iron and Manganese Ore Mine of M/S ESL Steel Limited

Depth to Water Level data of monitoring tube well (depth between 60 to 90 m)

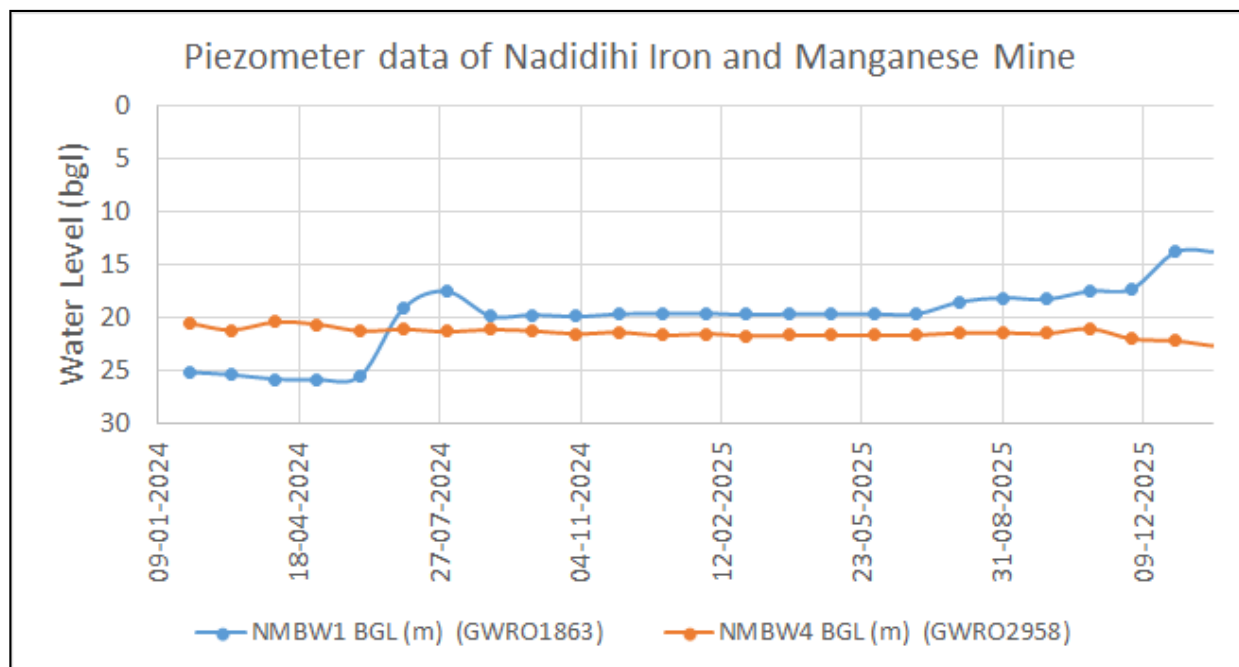
SL.no	Latitude	Longitude	Location	May 2025 DTWL (mbgl)	Dec 2025 DTWL (mbgl)	Fluctuation (m)	EC Dec 2025
1	21.8873	85.3046	Ranisal	17.4	7.16	10.24	165
2	21.8766	85.2971	Baldihi	15.13	6	9.13	90
3	21.9041	85.2622	Dubalbeda	13.78	8.13	5.65	200
4	21.9254	85.2117	Kamanda	13.98	6.76	7.22	180
5	21.9138	85.2044	Harischandrapur	14.58	7.7	6.88	175
6	21.9089	85.1986	Nuagaon	12.74	7.1	5.64	185
7	21.9007	85.1992	Bandhala	9.68	4.69	4.99	187
8	21.9193	85.2082	Rangua	13.29	6.29	7	190
9	21.8961	85.2368	Kadodihi	8.11	6.89	1.22	200
10	21.9075	85.2535	Koira	7.98	4.98	3	215
11	21.9652	85.2145	Kalta	7.87	6.87	1	58
12	21.9953	85.3242	Rugudih	8.2	5.07	3.13	250
13	21.9799	85.2899	Guali	15.87	5.82	10.05	100
14	21.972	85.2717	Nuagaon	13.19	4.51	8.68	115
15	21.993	85.2854	Patliposhi	12.48	5.89	6.59	120
16	22.0567	85.2893	Dhanurjaypur	18.09	7.1	10.99	250
17	21.9187	85.321	Jodipada	12.85	7.96	4.89	150
18	21.9416	85.3092	Sankhapada	14.42	6.88	7.54	145
19	21.914	85.3063	Sanindpur	12.78	7.78	5	155
20	21.904	85.3056	Sargigarh	11.34	7.2	4.14	160

Comprehensive Hydrogeological Report
Nadidihi Iron and Manganese Ore Mine of M/S ESL Steel Limited

Appendix - D: Groundwater quality data of study area

Sl. No.	Location	Na	K	Ca	Mg	HCO ₃	Cl	SO ₄	Fe	NO ₃	F
Dugwell											
1	Koira	8.3	3.5	8.01	0	5	7.49	0.51	0.35	18.27	1.67
2	Kadodihi	2.7	1	11.22	0	5	4.99	0.83	0.16	19.02	0.7
3	Nuagaon	2.6	1	6.41	0	5	2.49	0.53	0.66	8.39	0.93
4	Baldihi	1.3	1	9.61	0	15	2.49	0.3	0.58	2.39	1.19
5	Sargigarh	1.1	1	17.63	0	20	7.49	7.24	1.08	2.83	1.34
6	Mandajoda	4.7	2.6	16.03	0	5	19.99	0.56	1.25	32.58	0.93
7	Kolmong	1.9	1	20.84	0	30	12.49	3.01	0.52	0.99	1.29
8	Rugudihi	2.5	1.1	9.61	0	10	4.99	4.54	0.71	5.44	0.74
9	Guali	12.7	2.1	1.6	0	10	4.99	0.16	0.14	19.61	0.05
10	Kalta	14.3	3.2	30.46	2.91	5	57.48	6.42	1.17	16.85	1.76
Tubewell											
11	Toda	4.5	1.2	6.41	0	15	4.99	9.26	0.32	1.41	0.35
12	Bhangaon	2.1	1	9.61	0	15	4.99	6.92	0.18	2.99	0.91
13	Dhanurjappur	1.5	1	16.03	0	25	2.49	6.92	0.47	3.28	1.08
14	Koira	17.4	5.2	16.03	0	5	29.99	1.82	0.39	34.45	0.63
15	Mine water	8.9	2.5	4.8	0	10	4.99	8.37	1.07	0.87	1.27

Appendix - E: Piezometer graph of Nadidihi Iron and Manganese mine



Annexure 4

Report on Ground water recharge

We hereby submit the Annual Groundwater Recharge Report for FY 2025-2026 of Nadidihi Iron and Manganese Ore Mine

For FY 2025-26, the onsite rainfall monitoring system recorded total rainfall of 2186.9 mm. The mine has a total catchment area of 6,420 m² contributing to groundwater recharge through established structures.

Recharge has been calculated using the standard runoff coefficient method. Details are provided below:

Catchment area (m ²)	Rainfall (mm)	Run off coefficient	Total water recharged (m ³)
6420	2186.9	0.7	9827.93



Mr. Vikil N Kawale

Mines Manager

Nadidihi Iron and Manganese Ore Mine



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CIN: U27310JH2006PLC012663

Corporate Office: Lohanchal Colony, Plot No. 10, Beside Sector 12, Bokaro Steel City - 827012
Jharkhand, India

Annexure 5

Occupational Health Survey Report

Initial & Periodical Examination details

Nadidihi Iron and Manganese Ore Mine

Total PME has done from September 2025 to March 2026 – 17

Total IME has completed September 2025 to March 2026 – 17

Periodical Medical Examination Details

Name of the person	Age	Gender	Designation	IME No	Date
Debasis Nayak	33	M	Medical Officer	CARE/26/1722	12-03-2026
Soubhagya Rana	24	M	Pharmacist	CARE/26/1723	12-03-2026
Priyanka Mallick	25	F	Nursing Officer	CARE/26/1721	12-03-2026
Birendra Jena	26	M	Nursing Officer	CARE/26/1730	12-03-2026
Manas Jena	26	M	Nursing Officer	CARE/26/1731	12-03-2026
Jugendra Apat	27	M	Ambulance Driver	CARE/26/1728	12-03-2026
Santosh Kumar Panda	47	M	Deputy Manager	CARE/26/1664	12-03-2026
Shrikrishna Mahadev Puajari	54	M	Manager	CARE/26/1667	12-03-2026
Pradeepta Kumar Biswal	52	M	Asst. Manager	CARE/26/1669	12-03-2026
Deepak Asok Gandhi	53	M	Manager	CARE/26/1668	12-03-2026
Mithilesh Kumar	53	M	Deputy Manager	CARE/26/2012	19-03-2026
Biswanath Sahoo	43	M	COO	CARE/26/2011	19-03-2026
Abhishek Modi	44	M	CFO	CARE/26/1705	12-03-2026
Abani Kumar Dash	46	M	Head Geologist & Corporate affairs	CARE/26/1690	12-03-2026
Hanuman Jagannath Pednekar	58	M	Deputy Manager	CARE/26/1695	12-03-2026

INITIAL MEDICAL EXAMINATION DETAILS

Name of the person	Age	Gender	Designation	IME No	Date
Satyabrata Malik	53	M	Head Cook(Ks)	JSW/514	06-11-2025
Kush Parmanik	44	M	Asst. Cook(Ks)	JSW/512	06-11-2025
Goura Chandra Jena	39	M	Kitchen Helper	JSW/513	06-11-2025
Surajit Sardar	26	M	Service Boy	JSW/556	23-12-2025
Pravat Kumar Nath	23	M	Chef Cook	JSW/555	23-12-2025
Suresh Kumar Sethy	41	M	Canteen Manager	JSW/554	23-12-2025
Tapan Dash	31	M	Service Boy	JSW/511	06-11-2025
Kamala Kanta Nohanta	48	M	Sampler	CN/5576	26-09-2025
Saktimay Jena	21	M	Sampler	CN/5611	25-10-2025
Babula Giri	24	M	Chemist	CN/5714	13-01-2026
Jaga Sethi	23	M	Sampler	CN/5697	06-01-2026
Dileswar Mohanta	26	M	Lab Assistant	CN/5762	22-02-2026
Ranjan Kisan	21	M	Sampler	JSW/700	03-03-2026
Sushil Kumar Giri	33	M	G4S	CN/5735	04-02-2026
Bhupati Giri	36	M	G4S	JSW/660	19-02-2026
Aushil Kumar Giri	32	M	G4S	JSW/658	19-02-2026
Kartika Giri	27	M	G4S	JSW/659	19-02-2026

Occupational Health Survey Summary:

A monthly health camp has occurred in both the mines. The Total number of employees covered in health camp from the month of October 2025 to March 2026 is: 212

There are no such instances of occupational health diseases, and there have been no significant findings related to chronic diseases or health-related abnormalities that may impact their work profile. Some of them have some metabolic disorders like hypertension & diabetes, which have been followed up every month in OHC.

An annual health surveillance for occupational health related disorders like pneumoconiosis, silicosis etc., has been planned to diagnose through chest x ray & other medical test for persons who are dust affected have been tracked soon.

Preventive measures advised during health camp:



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1. Diet Modification by advising reduce salt & sugar intake in their daily diet.
2. Reduce oily, spices & fatty raw foods with advice for regular exercise, yoga & lifestyle modification.
3. Cessation of smoking and alcohol. Complete avoid & stop all tobacco, nicotinic elements and sedative things.
4. Attend the regular medical checkup and follow the treatment protocol advised by doctor.
5. Regular tracking of all hypertensive & diabetic patients by regular checking their RBS & BP value by proper monitoring & tracking

Awareness program held for mine workers during these months :

- Training sessions on burn case management, shock and emergency aid.
- Awareness program on sunstroke and heat stress management.
- Basic first aid management & training on Cardiopulmonary resuscitation.
- Training on tobacco & smoking control with cancer management.
- Training in Ergonomics and work-related stress management.
- Training in biomedical waste management.
- Awareness program on HIV- AIDS, its prevention & control.
- Training on Tuberculosis & Covid 19, 2 & H3N2.
- Awareness program on food hygiene, safety, & diet plan.



Medical Officer
Nadidihi Iron and Manganese ore Mine



Mines Manager
Nadidihi Iron and Manganese ore Mine



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Annexure 6

Expenditure Report on Environmental Protection, Monitoring & Awareness

S.no	Line item	Amount spent (In Rs)
1	Maintenance of Continuous Ambient air quality monitoring station	80,000
2	Plantation in mines	1,10,000
3	Fencing of safety zone and mine lease boundary	13,00,000
4	Monitoring of Environmental parameters	15,06,840
5	Awareness celebration In Mine Environmental week & Swachhhata Hi Seva – Cleanliness Drive	1,50,000
6	Operation and Maintenance of STP	6,00,000
7	Biomedical waste disposal	4,20,000



Mr. Vikil N Kawale

Mines Manager

Nadidihi Iron and Manganese Ore Mine



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NADIDIHI IRON ORE MINES & NADIDIHI IRON AND MANGANESE ORE MINE

Environment Management Committee

S.no	MEMBERS NAME	DESIGNATION
1	Biswanath Sahoo	Chairman
2	Vikil N Kawale	Secretary
3	Abani Kumar Das	Member
4	Abhishek Modi	Member
5	Aliv Jyoti Jena	Member
6	Deepak A Gandhi	Member
7	Dharani Dharan D	Member
8	Saithala Appalaraju	Member
9	Sambit Nayak	Member
10	Sambit Viswanandan Sahoo	Member
11	Pritish Ranjan Mishra	Member



Mr. Biswanath Sahoo
Chief Operating Officer