DRAFT FOR PUBLIC CONSULTATION

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

ON

SETTING UP OF 1.43 MTPA GREENFIELD INTEGRATED ADVANCED SPECIALTY STEEL PLANT AT VILLAGE GAJAMARA, DISTRICT DHENKANAL, ODISHA

FOR

KALYANI STEELS LIMITED

Schedule 3(a): Metallurgical Industries (ferrous and non-ferrous) (Major Activity)
Schedule 4(b): Coke Oven Plant (Minor Activity)
Schedule 1(d): Thermal Power Plant (Gas based - Minor Activity)

ToR File No: IA-J-11011/320/2024-IA-II dated 31.05.2025
ToR Identification No: TO25A1005OR5309101N

Lab Engaged	: Envirocheck
NABL Certificate No.	: TC - 6014 valid till 12.03.29
Monitoring Period	: October 2024 to December 2024

JUNE 2025

DASTUR

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS

NABET CERTIFICATE NO. NABET/EIA/22-25/SA 0232 valid till Nov 17, 2025

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KALYANI STEELS

CIN – L27104MH1973PLC016350

Undertaking

I hereby give undertaking that the data and information given in the application and enclosures are true to be best of my knowledge and belief and I am aware that if any part of the data and information found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost. In addition to above, I hereby give undertaking that no activity related to the proposed project been taken up yet.

Regards,

Dr Gaurav Shukla

General Manager – Projects
Kalyani Steels Limited
Email – gaurav.shukla@kalyanisteels.com
Phone - +91-99300-22781

DASTUR

UNDERTAKING

We do hereby confirm that the data and information given in the EIA Report are true to the best of our knowledge and all Terms of Reference prescribed for EIA have been complied with.

For M. N. Dastur & Company (P) Ltd



S. K. Mukhopadhyay
Technical Director & HOD (Environment)

M. N. Dastur & Company (P) Ltd
Consulting Engineers

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CIN U74210WB1955PTC022396

Declaration by Experts contributing to the EIA for Setting up of 1.43 MTPA Greenfield Integrated Advance Specialty Steel Plant at Gajamara, Dhenkanal, Odisha for Kalyani Steels Limited.

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA Coordinator:

Name: Mr. Sandarpan Mukherjee

Signature & Date: S Mukherjee 27/6

Team Member with EIA Coordinator: Ms. Aratrika Bhattacharya

Period of involvement: October 2024 onwards

Contact information : Ph : (033)2225-5420/-0500
Fax : (033)2225-1422

Functional area experts:

Sl. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP	Sandarpan Mukherjee Suranjana Neogy (TM)	a) Identifying the sources of emissions and mitigation measures b) Inventorisation of point source stack emissions details c) Site-specific micro-meteorology monitoring d) Ambient Air Quality (AAQ) monitoring, impact predictions and mitigations	S Mukherjee 27/6 Suranjana Neogy 27/6

Sl. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
2	WP	Sandip Kumar Mukhopadhyay Sandarpan Mukherjee Chandrima Ghosh Category B - (TM)	a) Surface water and ground water quality monitoring and assessment, impacts on water environment and mitigations b) Identification, characterization of effluent streams and treatments thereof c) Water balance and conservation measures	27/06/25 S Mukherjee 27/6 Chandrima Ghosh 27.06.25
3	SHW	Prabal Kr. Samanta Sandarpan Mukherjee Chandrima Ghosh Category B - (TM)	a) Non-hazardous solid wastes generation, recycling and disposal b) Storage and management of hazardous solid wastes	Samanta 27/6 S Mukherjee 27/6 Chandrima Ghosh 27.06.25
4	SE	Jogamaya Bai	a) Determination of baseline human environment b) Impact on socio-economic environment and mitigation measures c) Assessment of social needs and benefits	Jogamaya Bai
5	EB	Prabal Kr. Samanta	a) Biological environment status in respect of terrestrial fauna and aquatic eco system b) Impact on ecological environment and its mitigation	Samanta 27/6

Sl. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
6	HG	Sanjeev Raj	a) Ground water resource assessment b) Impact on ground water potential and mitigation measures for avoiding ground water contamination	Sanjeev 27/6/2025
7	GEO	Sanjeev Raj	a) Topography and geological aspects b) Developing geological maps	Sanjeev 27/06/2025
8	SC	Prabal Kr Samanta	a) Monitoring, analysis & characterization of soil b) Assessment of impact on soil quality and mitigation measures	Samanta 27/6
9	AQ	Sandip Kr Mukhopadhyay Aratrika Bhattacharya Category B - (TM)	a) Processing of site-specific micro-meteorological data b) Collection and use of inversion/ mixing height data for modelling c) Air dispersion modelling for prediction of glcs due to PM_{10}, SO_2 and NOx	27/06/25 Aratrika Bhattacharya 27/6
10	NV	Prachi Shah Suranjana Neogy (TM)	a) Analysis of ambient noise quality data b) Impact due to plant noise and abatement measures	R Shah Suranjana Neogy 27/6
11	LU	Sanjeev Raj	a) Analysis of data related to landuse pattern b) Landuse map prep'n c) Impact on land environment in respect to landform change	Sanjeev 27/06/2025

Sl. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
12	RH	Sandip Kr Mukhopadhyay	a) Identification of hazard prone areas b) Environmental risk evaluation c) On-site and Off-site emergency planning	26/06/25

Declaration by the Head of the accredited consultant organization/ authorized person

I, Sandip Kumar Mukhopadhyay, hereby, confirm that the above-mentioned experts prepared the EIA for Setting up of 1.43 MTPA Greenfield Integrated Advance Specialty Steel Plant at Gajamara, Dhenkanal, Odisha for Kalyani Steels Limited. I also confirm that the EIA Coordinator (EC) has gone through the report, and the consultancy organization shall be fully accountable for any misleading information mentioned in this statement.

It is also certified that EIA Report has been analyzed by the system for plagiarism check using Duplichecker software in accordance with good scientific practice. No unethical practices have been carried out and external data / text has not been used without proper acknowledgement, while preparing this EIA report.

Certificate of Plagiarism check	
Title of EIA Report:	Setting up of 1.43 MTPA Greenfield Integrated Advance Specialty Steel Plant at Gajamara, Dhenkanal, Odisha for Kalyani Steels Limited
Name of Accredited Organization:	M. N. Dastur & Company (P) Limited
Unique Identification Number:	ORG000894
Name of EIA Co-ordinator:	Mr. Sandarpan Mukherjee
Name of the Software:	Online Plagiarism Check-www.duplichecker.com
Date of Check:	26.06.25
Time of Check:	11:00 AM

Date and Sign of EIA Co-ordinator: S. Mukherjee 27/6

Name: Mr. Sandarpan Mukherjee

Designation: Principal Engineer - Environment & Carbon

Date and Sign of Head of ACO / authorised person: .....
27/06/25

Name: Sandip Kumar Mukhopadhyay

Designation: Technical Director - Environment & Carbon & ACO Head

Name of the EIA consultant organization: M.N. Dastur & Company (P) Ltd

NABET Certificate No. & Issue Date: NABET/EIA/22-25/SA 0232 dated 5th March 2025

Sl. No.	Functional Area Code	Complete name of the Functional Areas
1	**AP**	Air Pollution Prevention, Monitoring & Control
2	**WP**	Water Pollution Prevention, Control & Prediction of Impacts
3	**SHW**	Solid Waste & Hazardous Waste Management
4	**SE**	Socio-Economics
5	**EB**	Ecology & Biodiversity
6	**HG**	Hydrology, Ground Water & Water Conservation
7	**GEO**	Geology
8	**SC**	Soil Conservation
9	**AQ**	Meteorology, Air Quality Modelling & Prediction
10	**NV**	Noise & Vibration
11	**LU**	Landuse
12	**RH**	Risk Assessment & Hazard Management

COMPLIANCE TO TERMS OF REFERENCE (ToR) POINTS

STANDARD TERMS OF REFERENCE

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	1	Preliminary requirements	
	1.1	EIA/EMP report cover page shall consists of project title with location, applicable schedule of the EIA Notification, 2006, ToR letter No. with date, study period along with EIA consultant & laboratory details with QCI/NABET/NABL accreditation certificate detail.	Complied
	1.2	Besides, following points shall be compiled as per QCI/NABET norms: a. Disclaimer by the EIA consultant. b. Declaration by the Functional Area Experts contributed to the EIA study and declaration by the head of the accredited consultant organization/authorized person. c. Undertaking by the project proponent owning the contents (information and data) of the EIA/EMP report. d. Undertaking by the EIA consultant regarding compliance of ToR issued by MoEF&CC. e. Consultant shall submit the Plagiarism Certificate for the EIA/EMP Report.	Complied
	2	Executive Summary	
	2.1	Table of Contents of the EIA report including list of tables/ figures/annexures/abbreviations/symbols/ notations.	Complied
	2.2	Point wise compliance to the ToR issued by MoEF&CC.	Complied
	2.1	Introduction	
	2.1.1	Name of the project along with applicable schedule and category as per EIA, 2006.	Complied
	2.1.2	Location and accessibility	Complied
	2.2	Project Description	
	2.2.1	Resource requirements (Land; water; fuel; manpower)	Complied
	2.2.2	Operational activity	Complied
	2.2.3	Key pollution concerns	Complied
	2.3	Baseline Environment Studies	
	2.3.1	Ambient air quality	Complied
	2.3.2	Ambient Noise quality	Complied
	2.3.3	Traffic study	Complied
	2.3.4	Surface water quality	Complied
	2.3.5	Ground water quality	Complied
	2.3.6	Soil quality	Complied
	2.3.7	Biological Environment	Complied
	2.3.8	Land use	Complied
	2.3.9	Socio-economic environment	Complied
	2.4	Anticipated impacts	
	2.4.1	Impact on ambient air quality	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	2.4.2	Impact on ambient noise quality	Complied
	2.4.3	Impact on road and traffic	Complied
	2.4.4	Impact on surface water resource and quality	Complied
	2.4.5	Impact on ground water resource and quality	Complied
	2.4.6	Impact on terrestrial and aquatic habitat	Complied
	2.4.7	Impact on socio-economic environment	Complied
	2.5	Alternative analysis	Complied
	2.5.1		
	2.6	Environmental Monitoring program	
	2.6.1	Ambient air, noise, water and soil quality	Complied
	2.6.2	Noise quality management plan	Complied
	2.6.3	Emission and discharge from the plant	Complied
	2.6.4	Green Belt	Complied
	2.6.5	Social Parameters	Complied
	2.7	Additional Studies	
	2.7.1	Risk assessment	Complied
	2.7.2	Public consultation	Complied
	2.7.3	Action plan to address the issues raised during public consultation as per MoEF&CC O.M. dated 30/09/2020	Complied
	2.8	Project Benefits	Complied
	2.8.1		
	2.9	Environment management plan	
	2.9.1	Air quality management plan	Complied
	2.9.2	Noise quality management plan	Complied
	2.9.3	Solid and hazardous waste management plan	Complied
	2.9.4	Effluent management plan	Complied
	2.9.5	Storm water management plan	Complied
	2.9.6	Occupational health and safety management plan	Complied
	2.9.7	Green belt development plan	Complied
	2.9.8	Socio-economic management plan	Complied
	2.9.9	Project cost and EMP implementation budget	Complied
	3.	Introduction	
	3.1	Background about the project	Complied
	3.2	Need of the project	Complied
	3.3	Purpose of the EIA study	Complied
	3.4	Scope of the EIA study	Complied
	4.	Project Description`	
	4.1	Site Details	Complied
	4.1.1	Location of the Project site covering village, Taluka/Tehsil, District and State.	Complied
	4.1.2	Site accessibility	Complied
	4.1.3	A digital toposheet in pdf or shape file compatible to google earth of the study area of radius of 10km and site location preferably on 1:50,000 scale. (including all eco-sensitive areas and environmentally sensitive places).	Complied
	4.1.4	Latest High-resolution satellite image data having 1 m - 5 m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100 m all around the project location.	Complied
	4.1.5	Environment settings of the site and its surrounding along with map.	Complied
	4.1.6	A list of major industries with name, products and	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		distance from plant site within study area (10km radius) and the location of the industries shall be depicted in the study area map.	
	4.1.7	In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/ construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.	Complied
	4.1.8	In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.	Complied
	4.1.9	In case of canal/ nala/ seasonal drain and any other water body passing through project site, the PP shall submit the suitable steps /conservation plan/ mitigation measures along with contouring, Run -off calculations, disposal etc. A robust and full proof Drainage Conservation scheme to protect the natural drainage/water bodies and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be provided in the report.	Complied
	4.1.10	Type of land, land use of the project site needs to be submitted.	Complied
	4.1.11	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.	Complied
	4.1.12	Project proponent shall prepare Engineering layout plan showing all internal roads minimum 6 m width and 9 m turning radius for smooth traffic flow inside including fire tender as per NBC. Road network shall connect all service areas in layout. This drawing shall include area statement showing plot area, area under roads, parking, green belt with calculations and % with respect to plot area of project site and proper indexing. If located within an Industrial area/Estate/ Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.	Complied
	4.1.13	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including Rain Water Harvesting details with calculations mentioning about GW recharge along with relevant drawing.	Complied
	4.1.14	A detailed report covering all aspects of Fire Safety Management and Fire Emergency Plan shall be submitted.	Complied
	4.1.15	Details of drone survey for the site, needs to be included in report and presented before the EAC during appraisal of the project.	Complied
	4.2	Forest and wildlife related issues (if applicable)	
	4.2.1	Status of Forest Clearance for the use of forest land	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		shall be submitted.	
	4.2.2	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10 km radius of national park/sanctuary wherein final ESZ notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.	Complied
	4.2.3	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.	Complied
	4.2.4	Wildlife Conservation Plan duly authenticated by the Competent Authority of the State Government for conservation of Schedule I fauna along with budget and action plan, if any exists in the study area.	Complied
	4.3	Salient features of the project	
	4.3.1	Products with capacities in Tons per Annum for the proposed project.	Complied
	4.3.2	If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.	Complied
	4.3.3	Site preparatory activities.	Complied
	4.3.4	List of raw materials required and their source along with mode of transportation.	Complied
	4.3.5	Other than raw materials, other chemicals and materials required with quantities and storage capacities.	Complied
	4.3.6	Manufacturing process details along with process flow diagram of proposed units.	Complied
	4.3.7	Consolidated materials and energy balance for the project.	Complied
	4.3.8	Total requirement of surface/ ground water and power with their respective sources, status of approval.	Complied
	4.3.9	Water balance diagram	Complied
	4.3.10	Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.	Complied
	4.3.11	Man-power requirement.	Complied
	4.3.12	Cost of project and scheduled time of completion.	Complied
	4.3.13	In case of expansion projects, project proponent shall submit structural stability certificate showing whether existing structure withstand for proposed expansion activity.	Complied
	4.3.14	Brief on present status of compliance (Expansion/ modernization proposals) a. Cumulative Environment Impact Assessment for the existing as well as the proposed expansion/modernization shall be carried out. b. Cumulative Impact Assessment need to be carried out by greenfield projects considering the nearby industries. c. In case of ground water drawl for	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		the existing unit, action plan for phasing out of ground water abstraction in next two years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source. d. Copy of all the Environment Clearance(s) including Amendments/ validity of extension/transfer of EC, there to obtained for the project from MoEF&CC/ SEIAA shall be attached as Annexures. A Certified Compliance Report (CCR) of the Integrated Regional Office of the Ministry of Environment, Forest and Climate Change/ or concerned authority as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022 on the status of compliance of conditions stipulated in all the existing environment clearances including amendments shall be provided. A Certified Compliance Report (CCR) issued by the concerned Authority shall be valid for a period of one year from the date of inspection. e. In case the existing project has not obtained Environment Clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. A proper justification needs to be submitted along with documentary proof. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 1994 or 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of CTO from the Regional Office of the SPCB shall be submitted, as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022. CCR on CTO conditions issued by the concerned SPCBs/PCCs shall be valid for a period of one year from the date of inspection of the project.	
	5.	Description of the Environment	
	5.1	Study period	Complied
	5.2	Approach and methodology for data collection	Complied
	5.3	Interpretation of each environment attribute shall be enumerated and summarized as given below: • Ambient air quality • Ambient Noise quality • Surface water quality • Ground water quality • Soil quality • Biological Environment • Land use • Socio-economic environment	Complied
	5.4	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.	Complied
	6.	Anticipated Environment Impacts and mitigation measures (In case of expansion, cumulative impact assessment shall be carried out)	
	6.1	Identification of potential impacts in the form of a matrix for the construction and operation phase for all the environment components	Complied
	6.2	Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures;	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		Residual impact) a. Construction phase b. Operation phase • Details of stack emissions from the existing as well as proposed activity. • Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any along with wind rose map for respective period • Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.	
	6.3	Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.4	Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.5	Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.6	Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.7	Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.8	Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.9	Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.10	Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	6.11	Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Complied
	7.	Analysis of Alternatives (Technology & Site)	
	7.1	No project scenario	Complied
	7.2	Site alternative	Complied
	7.3	Technical and social concerns	Complied
	7.4	Conclusion	Complied
	8.	Environmental Monitoring Program	
	8.1	Details of the Environment Management Cell	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	8.2	Performance monitoring schedule for all pollution control devices shall be furnished.	Complied
	8.3	Corporate Environment Policy a. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report. b. Does the Environment Policy prescribe for standard operating process /procedures to bring into focus any infringement /deviation /violation of the environment or forest norms /conditions? If so, it may be detailed in the EIA. c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given.Page 9 of 10 d. Does the company have system of reporting of non compliances / violations of environment norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	Complied
	8.4	Action plan for post-project environment monitoring matrix	Complied
	9.	Additional Studies	
	9.1	Project proponent shall submit a study report on Decarbonisation program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage after offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments should be measurable and monitorable with defined time frames.	Complied
	9.2	Details of adoption/ implementation status/plan to achieve the goal of Glasgow COP26 Climate Submit with regard to enhance the non-fossil energy, use of renewable energy, minimization of net carbon emission and carbon intensity with long-term target of "net Zero" emission.	Complied
	9.3	Implementation status/measures adopted for avoiding the generation of single used plastic waste.	Complied
	9.4	In cases the project is located in Critically and Severely Polluted Areas, additional mitigation measures adopted and detailed action plan to be submitted in the EIA/EMP Report as per MoEF&CC O.M. No. 2223/2028-IA.III dated 31/10/2019 and MoEF&CC O.M. No. 22-23/2028-IA.III dated 5/07/2022 has to be submitted.	Complied
	9.5	Public consultation details (Entire proceedings as	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		separate annexure along with authenticated English Translation of Public Consultation proceedings).	
	9.6	As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration. In this regard, time bound action plan as per the MoEF&CC Office Memorandum dated 30/09/2020 shall be submitted.	Complied
	9.7	Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020	Complied
	9.8	Risk assessment • Methodology • Hazard identification • Frequency analysis • Consequence analysis • Risk assessment outcome	Complied
	9.9	Emergency response and preparedness plan	Complied
	10.	Project Benefits	
	10.1	Environment benefits	Complied
	10.2	Social infrastructure	Complied
	10.3	Employment and business opportunity	Complied
	10.4	Other tangible benefits	Complied
	11.	Environment Cost Benefit Analysis	
	11.1	Net present value	Complied
	11.2	Internal rate of return	Complied
	11.3	Benefit cost ratio	Complied
	11.4	Cost effectiveness analysis	Complied
	12.	Environment Management Plan (Construction and Operation phase)	
	12.1	Action plan for hazardous waste management	Complied
	12.2	Action plan for solid waste management	Complied
	12.3	Action plan for e-waste management.	Complied
	12.4	Action plan for plastic waste management, considering the Plastic Waste Management Rules 2016.	Complied
	12.5	Action plan for construction and demolition waste management.	Complied
	12.6	Rain water harvesting plan	Complied
	12.7	Plan for maximum usage of waste water/treated water in the Unit	Complied
	12.8	Green belt development plan: An action plan for Green Belt development consisting of 3 tiers of plantations of native species all along the periphery of the project of adequate width shall be raised in 33% of total area with a tree density shall not less than 2500 per ha within a time frame of one year shall be submitted. Survival rate of green belt shall be monitored on periodic basis to ensure that survival rate not be less than 80 %.	Complied
	12.9	Wildlife conservation plan (In case of presence of schedule I species)	Complied
	12.10	Total capital cost and recurring cost/annum for environment pollution control measures shall be	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		included.	
	12.11	Explore possibilities for recycling and reusing of treated water in the unit to reduce the freshwater demand and waste disposal.	Complied
	12.12	An Action Plan for improving the house-keeping activities in the raw material handling area need to be submitted	Complied
	12.13	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.	Complied
	12.14	Action plan to limit the dust emission from all the stacks below 30 mg/Nm3 shall be furnished.	Complied
	12.15	Action plan for fugitive emission control in the plant premises shall be provided.	Complied
	13.	Conclusion Of The Eia Study	
	14.	In Addition To The Above, Any Litigation Pending Against The Project And/or Any Direction/order Passed By Any Court Of Law Against The Project, If So, Details Thereof Shall Also Be Included. Has The Unit Received Any Notice Under The Section 5 Of Environment (Protection) Act, 1986 Or Relevant Sections Of Air And Water Acts? If So, Details Thereof And Compliance/atr To The Notice(s) And Present Status Of The Case.	Complied
	15.	Air Cooled Condensors Shall Be Used In The Power Plant.	Complied
	16.	Details Of Dry Ash Handling System Along With Supplementary Coal Handling System Shall Be Submitted.	Complied
	17.	Plan For Transportation Of Coal Shall Be Submitted.	Complied
	18.	Plan Along With Technical Details Of Scr Shall Be Submitted.	Complied
	19.	In Case Of Expansion Project, Status Of Ash Utilization Of Previous Years (Up To 5 Years), Action Plan For 100% Ash Utilization Along With Timeline Need To Be Submitted	Complied
	20.	Introduction	
	20.1	Background about the project	Section 1.1 on page 1-1
	20.2	Need of the project	Section 1.2 on page 1-10
	20.3	Purpose of the EIA study	Section 1.3 on page 1-11
	20.4	Scope of the EIA study	Section 1.4 on page 1-11
	21.	Project Description	
	21.1	Site Details	Section 2.1 on page 2-1
	21.1.1	Location of the Project site covering village, Taluka/Tehsil, District and State.	Section 2.1.1 on page 2-1

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	21.1.2	Site accessibility	Section 2.1.2 on page 2-2
	21.1.3	A digital toposheet in pdf or shape file compatible to google earth of the study area of radius of 10km and site location preferably on 1:50,000 scale. (including all eco-sensitive areas and environmentally sensitive places).	Fig. 2-3 on page 2-3
	21.1.4	Latest High-resolution satellite image data having 1 m - 5 m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100 m all around the project location.	Fig. 2-4 on page 2-5
	21.1.5	Environment settings of the site and its surrounding along with map.	Section 2.1.4 on page 2-4 & Fig 2-2 on page 2-2
	21.1.6	A list of major industries with name, products and distance from plant site within study area (10km radius) and the location of the industries shall be depicted in the study area map.	Section 2.1.5 on page 2-5
	21.1.7	In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/ construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.	NA
	21.1.8	In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.	NA
	21.1.9	In case of canal/ nala/ seasonal drain and any other water body passing through project site, the PP shall submit the suitable steps /conservation plan/ mitigation measures along with contouring, Run -off calculations, disposal etc. A robust and full proof Drainage Conservation scheme to protect the natural drainage/water bodies and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be provided in the report.	NA
	21.1.10	Type of land, land use of the project site needs to be submitted.	Section 2.1.6 on page 2-6
	21.1.11	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.	Section 2.1.6 on page 2-6 & Appendix 1-2
	21.1.12	Project proponent shall prepare Engineering layout plan showing all internal roads minimum 6 m width and 9 m turning radius for smooth traffic flow inside including fire tender as per NBC. Road network shall connect all service areas in layout. This drawing shall include area statement showing plot area, area under roads, parking, green belt with calculations and % with respect to plot area of project site and proper	Section 2.1.7 on page 2-7 and Drg. No. 11748-97A-000-ENV-0001 and 11748-97A-000-ENV-0002

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		indexing. If located within an Industrial area/Estate/ Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.	
	21.1.13	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including Rain Water Harvesting details with calculations mentioning about GW recharge along with relevant drawing.	Drg. No. 11748-97A-000-ENV-0003, Section 2.1.8 on page 2-8
	21.1.14	A detailed report covering all aspects of Fire Safety Management and Fire Emergency Plan shall be submitted.	Section 2.1.9 on page 2-9
	21.1.15	Details of drone survey for the site, needs to be included in report and presented before the EAC during appraisal of the project.	Section 2.1.7 on page 2-8
	22.	Project description	
	22.1	Forest and wildlife related issues (if applicable)	NA
	22.1.1	Status of Forest Clearance for the use of forest land shall be submitted.	See Appendix-2-1
	22.1.2	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10 km radius of national park/sanctuary wherein final ESZ notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.	NA
	22.1.3	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.	NA
	22.1.4	Wildlife Conservation Plan duly authenticated by the Competent Authority of the State Government for conservation of Schedule I fauna along with budget and action plan, if any exists in the study area.	See Appendix-3-10
	23.	Project description	
	23.1	Salient features of the project	Section 2.2 on page 2-9
	23.1.1	Products with capacities in Tons per Annum for the proposed project.	Table 2-7 on page 2-11
	23.1.2	If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.	N.A.
	23.1.3	Site preparatory activities.	Section 2.2.3 on page 2-11
	23.1.4	List of raw materials required and their source along with mode of transportation.	Table 2-8 on page 2-12
	23.1.5	Other than raw materials, other chemicals and materials required with quantities and storage capacities.	Section 2.2.5 on page 2-13 & Table 2-9 & 2-10 on page 2-13 & 2-14
	23.1.6	Manufacturing process details along with process flow	Section 2.3 on page

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		diagram of proposed units.	2-14 & Drg. 11748-97A-000-ENV-0004
	23.1.7	Consolidated materials and energy balance for the project.	Drg. 11748-97A-000-ENV-0004
	23.1.8	Total requirement of surface/ ground water and power with their respective sources, status of approval.	Section 2.4 on page 2-35 onwards
	23.1.9	Water balance diagram	Drg. 11748-97A-000-ENV-0005
	23.1.10	Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.	Section 2.5 on page 2-38 onwards
	23.1.11	Man-power requirement.	Section 2.6 on page 2-44
	23.1.12	Cost of project and scheduled time of completion.	Section 2.7 & 2.8 on page 2-44
	23.1.13	In case of expansion projects, project proponent shall submit structural stability certificate showing whether existing structure withstand for proposed expansion activity.	N.A.
	23.1.14	Brief on present status of compliance (Expansion/ modernization proposals) a. Cumulative Environment Impact Assessment for the existing as well as the proposed expansion/modernization shall be carried out. b. Cumulative Impact Assessment need to be carried out by greenfield projects considering the nearby industries. c. In case of ground water drawl for the existing unit, action plan for phasing out of ground water abstraction in next two years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source. d. Copy of all the Environment Clearance(s) including Amendments/ validity of extension/transfer of EC, there to obtained for the project from MoEF&CC/ SEIAA shall be attached as Annexures. A Certified Compliance Report (CCR) of the Integrated Regional Office of the Ministry of Environment, Forest and Climate Change/ or concerned authority as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022 on the status of compliance of conditions stipulated in all the existing environment clearances including amendments shall be provided. A Certified Compliance Report (CCR) issued by the concerned Authority shall be valid for a period of one year from the date of inspection. e. In case the existing project has not obtained Environment Clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. A proper justification needs to be submitted along with documentary proof. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 1994 or 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of CTO from the Regional Office of the SPCB shall be submitted, as per OM No. IA3-22/10/2022-IA.III [E	Section 2-9 on page 2-45

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		1772581], dated 8th June, 2022. CCR on CTO conditions issued by the concerned SPCBs/PCCs shall be valid for a period of one year from the date of inspection of the project.	
	24	Description of the Environment	
	24.1	Study period	Section 3.2 on page 3-1
	24.2	Approach and methodology for data collection	Table 3-5 on page 3-19
	24.3	Interpretation of each environment attribute shall be enumerated and summarized as given below: • Ambient air quality • Ambient Noise quality • Surface water quality • Ground water quality • Soil quality • Biological Environment • Land use • Socio-economic environment	Complied
	24.4	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.	Complied. Original test reports enclosed as Appendix – Field Reports
	25.	Anticipated Environment Impacts and mitigation measures (In case of expansion, cumulative impact assessment shall be carried out)	Complied
	25.1	Identification of potential impacts in the form of a matrix for the construction and operation phase for all the environment components	Page 4-2
	25.2	Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase • Details of stack emissions from the existing as well as proposed activity. • Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any along with wind rose map for respective period • Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.	Section 4.5.5 on page 4-8 and Section 4.6.4 on page 4-12
	25.3	Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.5.6 on page 4-8 and Section 4.6.7 on page 4-20
	25.4	Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.5.7 on page 4-9 and Section 4.6.5 on page 4-18
	25.5	Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.5.3 on page 4-6 & Section 4.6.6 on page 4-19
	25.6	Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.5.1 on page 4-3 and Section 4.6.1 on page 4-9

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	25.7	Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.5.4 on page 4-7 and Section 4.6.2 on page 4-10
	25.8	Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.5.4 on page 4-7 and Section 4.6.3 on page 4-11
	25.9	Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.7 on page 4-23 onwards
	25.10	Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 4.8 on page 4-26 onwards
	25.11	Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Section 10.10 on page 10-10 onwards
	26.	Analysis of Alternatives (Technology & Site)	
	26.1	No project scenario	Section 5.1 on page 5-1
	26.2	Site alternative	Section 5.2 on page 5-1
	26.3	Technical and social concerns	Section 5.3 on page 5-4
	26.4	Conclusion	Section 5.4 on page 5-9
	27.	Environmental Monitoring Program	
	27.1	Details of the Environment Management Cell	Section 6.1 on page 6-1 onwards
	27.2	Performance monitoring schedule for all pollution control devices shall be furnished.	Section 6.3.1 on page 6-6
	27.3	Corporate Environment Policy a. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report. b. Does the Environment Policy prescribe for standard operating process /procedures to bring into focus any infringement /deviation /violation of the environment or forest norms /conditions? If so, it may be detailed in the EIA. c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given.Page 9 of 10 d. Does the company have system of reporting of non	Section 6.2 on page 6-4 & Appendix 6-1

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		compliances / violations of environment norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	
	27.4	Action plan for post-project environment monitoring matrix	Table 6-1 on page 6-6
	28.	Additional Studies	
	28.1	Project proponent shall submit a study report on Decarbonisation program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage after offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments should be measurable and monitorable with defined time frames.	Section 7.1 on page 7-1 onwards
	28.2	Details of adoption/ implementation status/plan to achieve the goal of Glasgow COP26 Climate Submit with regard to enhance the non-fossil energy, use of renewable energy, minimization of net carbon emission and carbon intensity with long-term target of "net Zero" emission.	Section 7.2 on page 7-6 onwards
	28.3	Implementation status/measures adopted for avoiding the generation of single used plastic waste.	Section 7.3 on page 7-8 and Appendix 7-1
	28.4	In cases the project is located in Critically and Severely Polluted Areas, additional mitigation measures adopted and detailed action plan to be submitted in the EIA/EMP Report as per MoEF&CC O.M. No. 2223/2028-IA.III dated 31/10/2019 and MoEF&CC O.M. No. 22-23/2028-IA.III dated 5/07/2022 has to be submitted.	NA
	28.5	Public consultation details (Entire proceedings as separate annexure along with authenticated English Translation of Public Consultation proceedings).	N.A. for Draft EIA
	28.6	As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration. In this regard, time bound action plan as per the MoEF&CC Office Memorandum dated 30/09/2020 shall be submitted.	Table 7-1 on page 7-9
	28.7	Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020	N.A. for Draft EIA
	28.8	Risk assessment • Methodology • Hazard identification • Frequency analysis • Consequence analysis • Risk assessment outcome	Section 7.5 on page 7-12 onwards

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	28.9	Emergency response and preparedness plan	Section 7.6 on page 7-18 onwards
	29.	Project Benefits	
	29.1	Environment benefits	Section 8.1 on page 8-1
	29.2	Social infrastructure	Section 8.1.1 on page 8-2
	29.3	Employment and business opportunity	Section 8.2 on page 8-2
	29.4	Other tangible benefits	Section 8.3 on page 8-3
	30.	Environment Cost Benefit Analysis	
	30.1	Net present value	Page 9-1
	30.2	Internal rate of return	Page 9-1
	30.3	Benefit cost ratio	Page 9-1
	30.4	Cost effectiveness analysis	Page 9-1
	31.	Environment Management Plan (Construction and Operation phase)	
	31.1	Action plan for hazardous waste management	Section 10.1.1 on page 10-1
	31.2	Action plan for solid waste management	Section 10.1.1 on page 10-1
	31.3	Action plan for e-waste management.	Section 10.1.3 on page 10-2
	31.4	Action plan for plastic waste management, considering the Plastic Waste Management Rules 2016.	Section 10.1.4 on page 10-2
	31.5	Action plan for construction and demolition waste management.	Section 10.1.5 on page 10-2
	31.6	Rain water harvesting plan	Section 10.2 on page 10-2
	31.7	Plan for maximum usage of waste water/treated water in the Unit	Section 10.2 on page 10-3
	31.8	Green belt development plan: An action plan for Green Belt development consisting of 3 tiers of plantations of native species all along the periphery of the project of adequate width shall be raised in 33% of total area with a tree density shall not less than 2500 per ha within a time frame of one year shall be submitted. Survival rate of green belt shall be monitored on periodic basis to ensure that survival rate not be less than 80 %.	Section 10.3 on page 10-4 onwards
	31.9	Wildlife conservation plan (In case of presence of schedule I species)	NA
	31.10	Total capital cost and recurring cost/annum for environment pollution control measures shall be included.	Section 10.9 on page 10-9 onwards
	31.11	Explore possibilities for recycling and reusing of treated water in the unit to reduce the freshwater demand and waste disposal.	Section 2.5.3 on page 2-41
	31.12	An Action Plan for improving the house-keeping activities in the raw material handling area need to be submitted	Table 2-22 on page 2-39
	31.13	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.	Section 4.6.3 on page 4-11

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	31.14	Action plan to limit the dust emission from all the stacks below 30 mg/Nm3 shall be furnished.	Section 2.5.1 on page 2-38 onwards
	31.15	Action plan for fugitive emission control in the plant premises shall be provided.	Section 4.6.4 on page 4-12 onwards

STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR METALLURGICAL INDUSTRIES (FERROUS AND NON FERROUS)

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	1.	Standard	
	1.1	A 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.	Fig 3-1 on page 3-4
	1.2	Plan for the implementation of the recommendations made for the proposed Unit in the Corporate Responsibility for Environmental Protection (CREP) guidelines.	Section 4.6.8 page 4-22 & Section 8.3 on page 8-3
	1.3	Plan for solid wastes utilization.	Section 4.6.8 on page 4-22
	1.4	Plan for utilization of energy in off gases (coke oven, blast furnace)	Section 2.2.5 on page 2-13
	1.5	System of coke quenching adopted with full justification.	Section 2.3.1 on page 2-14
	1.6	Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials.	NA
	1.7	Details on toxic metal content in the waste material and its composition and end use (particularly of slag).	Section 4.6.8 on page 4-22
	1.8	Details on toxic content using Toxicity Characteristic Leaching Procedure (TCLP), composition and end use of slag.	Section 6.4 on page 6-8 & Table 6-1 on page 6-8
	1.9	100 % dolo char generated in the plant shall be used to generate power.	NA
	1.10	Fourth Hole fume extraction system shall be provided for SAF.WHR system shall be installed to recover sensible heat from flue gases of EAF. Provision for installation of jigging and briquetting plant to utilise the fines generated in the process.	NA
	1.11	No tailing pond is permitted for Iron ore slimes. Dewatering and filtration system shall be provided.	NA
	1.12	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.	Section 4.6.3 on page 4-11
	1.13	Action plan for developing connecting and internal road in terms of MSA as per IRC guidelines shall be submitted.	Section 4.6.5 on page 4-18
	1.14	Action plan to limit the particulate matter emission from all the stacks below 30 mg/Nm3 shall be furnished.	Section 4.7.2 on page 4-24

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
	1.15	Action plan for 100 % solid waste utilization shall be submitted.	Table 2-24 on page 2-44
	1.16	PM (PM10 and P2.5) present in the ambient air must be analysed for source analysis – natural dust/RSPM generated from plant operations (trace elements) of PM10 to be carried over.	Table 3-7 on page 3-25
	1.17	Emission/effluent norms as per G.S.R 894 (E) dated 4/12/2019 [EPA Rules 1986].	-
	2.	Specific	
	2.1	PP shall secure complete acquisition of land and conversion for industrial purpose and submit the same with the EIA/EMP Report. Further necessary clearance shall be obtained for the forest land and the status of the same shall be submitted with the EIA/EMP Report.	Complied
	2.2	Based on a detailed tree enumeration survey, the number of cashew trees and other species proposed to be felled shall be clearly identified. Girth & height, age and species of the trees and the mode of compensatory plantation proposed against each tree cut (if any) should be given in EIA report. Efforts shall be made to retain other native tree species to the maximum extent possible. Felling of trees shall be undertaken only with prior permission and guidance from the Divisional Forest Officer (DFO) and with proper justification.	Complied
	2.3	There are sensitive area reported within the study area of the project site. PP shall prepare and include in the EIA/EMP Report the environmental safeguard measures to minimise the impact of the project activities on these sensitive areas. A detailed socio-economic survey covering the Project Influence Area (PIA), i.e., within a 10 km radial distance from the project site, shall be conducted and incorporated in the Environmental Impact Assessment (EIA) report. The survey shall assess baseline socio-economic conditions, identify potential impacts including on the vulnerable groups viz., elderly, children, pregnant women and sick especially terminally ill people and propose appropriate mitigation and development measures in consultation with local stakeholders especially covering these vulnerable sections.	Complied
	2.4	The project proponent shall present a detailed Action Plan during the appraisal of the Environmental Clearance proposal, covering all commitments towards socio-economic development of the nearby villages in line with the Ministry's OM dated 30.09.2020. The Action Plan shall include sub-plans for: (i) promoting environmental education and awareness in local educational institutions, including mechanisms for disclosure of the project's environmental performance to the community, and (ii) addressing the specific needs of vulnerable sections of the impacted community—such as the elderly, children, pregnant women, persons with disabilities, and the terminally ill. The plan	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		shall also detail the institutional mechanisms for regular monitoring, stakeholder engagement, and dissemination of information on the status of socio-economic development commitments.	
	2.5	The PP shall submit a plan to adopt the two most affected nearby villages and implement a structured socio-economic development plan in consultation with the local administration. The plan shall include measures for improving health, elderly care, environmental education, formal education, skill development, livelihood, and infrastructure and be reported annually to the concerned authority.	Complied
	2.6	The Project Proponent (PP) shall make all efforts to provide employment opportunities to local residents from nearby areas, especially most project affected villages, to the extent possible and as per their eligibility including in their nursery which needs to support their plantation efforts in their premises and in the project district.	Complied
	2.7	Project Proponent (PP) shall ensure that the two existing ponds (Jalasayas), as identified in the project area, remain outside the project's physical boundary. The PP shall undertake renovation measures—such as desilting, bund maintenance, increasing pond depth, catchment area plantation and improving overall ecological conditions—in consultation with the local authorities. These ponds shall be developed and maintained for the benefit of the local community, with provisions for free and unrestricted access to villagers, including supporting catchment area treatment and protection efforts.	Complied
	2.8	There are water bodies reported within the study area of the project site. A robust and foolproof Drainage Conservation scheme to protect the natural drainage and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be implemented.	Complied
	2.9	Project proponent shall submit a certified map, duly authenticated by the District Forest Officer (DFO), indicating the precise distance of the project boundary from the nearest boundary of the Kapilasa Wildlife Sanctuary Eco-Sensitive Zone (ESZ).	Complied
	2.10	The water requirement for the proposed project is estimated as 18,288 m3 /day and will be met from the Mahanadi river at Phulbari in Cuttack District of Odisha through IDCO. Necessary permission shall be obtained from the Competent Authority. PP shall further secure required permissions for laying the pipeline, if any, for withdrawing water from River. An action plan with defined timelines shall be prepared, and submitted with EIA/EMP Report.	Complied
	2.11	The Project Proponent (PP) shall submit an action plan for Green Belt development covering at least 33% of the total project area. The plan shall	Complied

Sl. No.	Ref. Sl. No. of ToR	Finalised Terms of Reference	Reference in EIA Report
		include three-tier plantations of native species along the project's periphery with an adequate width and a tree density of not less than 2,500 trees per hectare. The green belt shall be initiated in the identified area developed within a period of one year from the start of project implementation. For this nursery shall also commence along with the project work so that required tall plants of identified species are available. The survival rate of the plantation shall be monitored periodically, and damaged or dead saplings shall be replaced in subsequent years to maintain the intended green cover. Additionally, the plan shall include provisions for developing an enhanced green belt towards the nearby habitation. The naturally grown vegetation part of the project site, developed over the last decade, shall be preserved as far as possible and integrated as part of the greenbelt, for this they need to develop and maintain a native plants nursery.	
	2.12	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including rain water harvesting details with calculations mentioning about GW recharge along with relevant drawing	Complied
	2.13	Annual Wind Rose Diagrams (for all seasons) must be constructed, taking data from secondary sources.	Complied
	2.14	The maximum amount of solar power that can be generated within the premises of the Plant must be reported.	Complied
	2.15	An action plan must be drawn up and implemented for maximum harvesting of rain water.	Complied
	2.16	The "input" parameters used in the AAQ modelling be reported.	Complied
	2.17	The "inversion height" and "mixing height" be reported, without any ambiguity.	Complied
	2.18	Necessary coordination shall be made with concerned SPCB (who is responsible for Compliance of OM dated 14-01-2025) regarding streamlining the implementation of GSR 702 and GSR 703 dated 12-11-2024 through which projects requiring prior EC were exempted from requirement of CTE.	Complied

ADDITIONAL TERMS OF REFERENCE

1. Necessary coordination shall be made with concerned SPCB (who is responsible for Compliance of OM dated 14-01-2025) regarding streamlining the implementation of GSR 702 and GSR 703 dated 12-11-2024 through which projects requiring prior EC were exempted from requirement of CTE.

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Drg. 11748-97A-000-ENV-0005 - Water Balance
Drg. 11748-97A-000-ENV-0006 - Land Use

1 - INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

Kalyani Steels Limited ("KSL" or the "Company"), incorporated on February 28, 1973, is part of Kalyani Group ("Group") promoted by Mr. Babasaheb Neelkanth Kalyani. Kalyani Group, established in mid 1960s, is an Indian multi-national conglomerate with engineering & manufacturing capability across critical sectors such as Engineering Steel, Automotive, Defence, Aerospace, Nuclear, Industrial, Renewable Energy, Urban Infrastructure and Specialty Chemicals. With footprints across India, Germany, Sweden, France, and USA, the Group has an annual turnover of more than USD 3 Billion. Bharat Forge Limited ("BFL") is the flagship company of the Kalyani Group and amongst the largest forging companies in the world.

KSL is engaged in the business of manufacturing forging and engineering quality carbon and alloy steel used in manufacturing components of Automobile, Bearing, Energy, Marine, Oil & Gas, Railways, Defence industry etc.

KSL had entered into a Strategic Alliance Agreement with a reputed industrial partner and set up an integrated steel plant in 1998 at Koppal in Karnataka. Iron Making Division and Rolling Mill is set up by KSL and Steel Melting Shop (SMS) is set-up by industrial partner in the strategic alliance ratio i.e. 41.38% KSL and 58.62% industrial partner. Iron making division has a capacity of producing ~850,000 tpa of sinter and ~700,000 tpa of hot metal, SMS has a capacity of ~600,000 tpa and Rolling Mill-1 has a capacity of ~250,000 tpa. Apart from this, KSL put-up a Rolling Mill-2 in 2012 with capacity of ~100,000 tpa which is solely used by KSL (not part of the strategic alliance).

1 - Introduction (cont'd)

In FY2024, KSL achieved total revenues of Rs. 2006.3 Crore growing from Rs. 1,955.8 Crore in FY2023 registering a growth of 2.6%. The Company achieved a net profit of Rs. 247.5 Crore in FY2024 as compared to Rs. 167 Crore in FY2023. The long-term & short-term facilities of KSL have been assigned credit rating of "CARE AA" and "CARE A1+" respectively by CARE Ratings.

Considering the growth potential of the Indian steel sector, Automobile industry and other key user industries, KSL proposes to set up an Integrated Advanced Specialty Steel Plant having an installed capacity 1.43 MTPA of crude steel ("IASSP Project") at Dhenkanal district in Odisha. The IASSP Project will have facilities for production of carbon, alloy steel, stainless steel along with manufacturing of critical components used in end industries like Automotive, Energy, Marine, Oil & gas, Aerospace & Defence, submarine and ship building components, railways, seamless tubes, nuclear power plant, yaw drivers, ultra supercritical power plants, etc.

The proposed project would fall under Category 'A' of item 3(a) "Metallurgical Industries (ferrous and non-ferrous)" as well as 4(b) "Coke Oven Plants" and 1(d) "Thermal Power Plants" of the Schedule to the EIA Notification 2006 and amendments there under vide Notification No. S.O 3067 (E) dated 1st December 2009 under the Environment (Protection) Rules 1986.

In reference to the above MoEFCC notifications, KSL has applied for obtaining Environmental Clearance for the proposed greenfield project.

1 - Introduction (cont'd)

The Standard ToR for EIA of the proposed project was accorded by the MoEFCC vide their File No.: IA-J-11011/320/2024-IA-II dated 31.05.2025 which is furnished in Appendix 1-1.

1.1.1 Identification of the Project

The proposed plant would produce specialty alloy steel for auto components, Micro alloyed, high and low alloy steels for special engineering applications for defense, aerospace etc., Specialty alloy steels for green energy applications incl. green H_2 etc., Bearing steel and stainless steel based on BF-EAF/ZPF route and BF-BOF route. The total land to be allocated to KSL by IDCO is 224.737 ha.

The facilities proposed to be setup in the IASSP Project include Sinter Plant, Coke ovens, Blast Furnace, Pig Casting facility, EAF/Zero Power Furnace, Induction Furnace, Argon Oxygen De-Carburiser, Ladle Furnaces, VD and RH-Degasser, Billet cum Bloom cum Round caster, Ingot casting facilities, Large diameter round caster, Combination Mill, Wire rod mill, & related Heat treatment facilities, Bar finishing and Machining facilities, Lime Calcination plant, Oxygen plant etc. The production facilities are proposed to be supported by necessary balance of plant, auxiliary & infrastructure facilities such as raw material handling, railway linkage and siding, electric power receiving and distribution system, water storage and distribution system, railway siding, WTP, STP, ETP, pollution control equipment, gas treatment facility among others.

1.1.2 Identification of the Project Proponent

Kalyani Steels Ltd (KSL) was established in Feb 1973 in Pune as a part of the Kalyani Group, primarily with the objective of fulfilling the group's in-house requirements of forging quality steel.

1 - Introduction (cont'd)

KSL shifted base to Hospet, Karnataka, to set up a world class integrated steel mill (iron-ore based, blast-furnace route) in 1997, with a hot metal capacity of 290,000 TPA. This establishment was of extreme strategic importance, with southern region being a budding automotive hub, and Karnataka being a state rich in Iron Ore, along with Mangalore port for other raw material imports. With its Head Office in West (Pune) and Plant in South, Kalyani Steels steadily gained a nationwide foothold.

Today, this integrated steel complex has hot metal capacity of 650,000 TPA of carbon and alloy steels, a with three Mini Blast Furnaces, two Rolling Mills, Sinter Plant, Power Plant, BFG fired re-heating furnaces, state-of-the-art testing facilities and many such modern equipment, in a sprawling green 375 acre campus.

The forging industry in India is the primary market for the company's products. Indian and International component manufacturers for commercial vehicles, two wheelers, diesel engines, bearings, tractors, turbines and rail form the significant part of the company's clientele. Additionally, KSL has earned the status of preferred steel supplier for engineering, seamless tube and aluminium-smelting industry.

For more details on KSL please visit their website https://www.kalyanisteels.com/about-us/

General Manager - Projects of KSL is the responsible authority for this EIA Report. The contact information is given below:

Name	-	Dr. Gaurav Shukla
Designation	-	General Manager
Department	-	Projects
Address	-	Kalyani Steels Limited, Gajamara, Dhenkanal, Odisha

1 - Introduction (cont'd)

1.1.3 Nature of the Project

The proposed greenfield project would fall under Category 'A' of item 3(a) "Metallurgical Industries (ferrous and non-ferrous)" as well as 4(b) "Coke Oven Plants" and 1(d) "Thermal Power Plants" of the Schedule to the EIA Notification 2006 and amendments there under vide Notification No. S.O 3067 (E) dated 1st December 2009 under the Environment (Protection) Rules 1986.

1.1.4 Size of the Project

The proposed greenfield project of KSL would comprise production of 1.43 MTPA advanced specialty steel through BF-EAF/ZPF/BOF route at Gajamara in Dhenkanal district of Odisha.

1.1.5 Location of the Project

The project would be located in villages Siaria and Talabarakote in Dhenkanal tehsil of Dhenkanal district of Odisha as shown in Fig. 3-1. The project site is located within latitude 20^{0}33'59.4" to 20^{0}35'8.16" North and longitude 85^{0}37'4.44" to 85^{0}37'41.88" East.

The general location of the project site on the topo map is shown in Fig. 1-1. Specific location of the plant boundary on Google Maps is shown in Fig. 1-2. The details of the plant site are given below:

Village	..	Gajamara
Tehsil	..	Dhenkanal
District	..	Dhenkanal
State	..	Odisha
Plot/Survey/Khasra No.	..	Please see Appendix 1-2 for land details
Pin Code	..	759013
Topo Sheet (OSM) Nos.	..	F45T10, F45O4, F45N16
Maximum elevation (above MSL)	..	45-60 m (avg.)
Distance of nearest Highest Flood Level	..	9.9 km
Seismic Zone	..	III (IS-1983(Part-1):2002)

1 - Introduction (cont'd)

Nearest Railway Station	..	Joranda Road
Nearest Airport	..	Biju Patnaik International Airport,Bhubaneswar located about 70 km Away.
Nearest Sea Port	..	Paradeep about 140 km away from the site.
Nearest Town	..	Athagarh (4.7 km S direction), Dhenkanal (6.8 km, N direction)

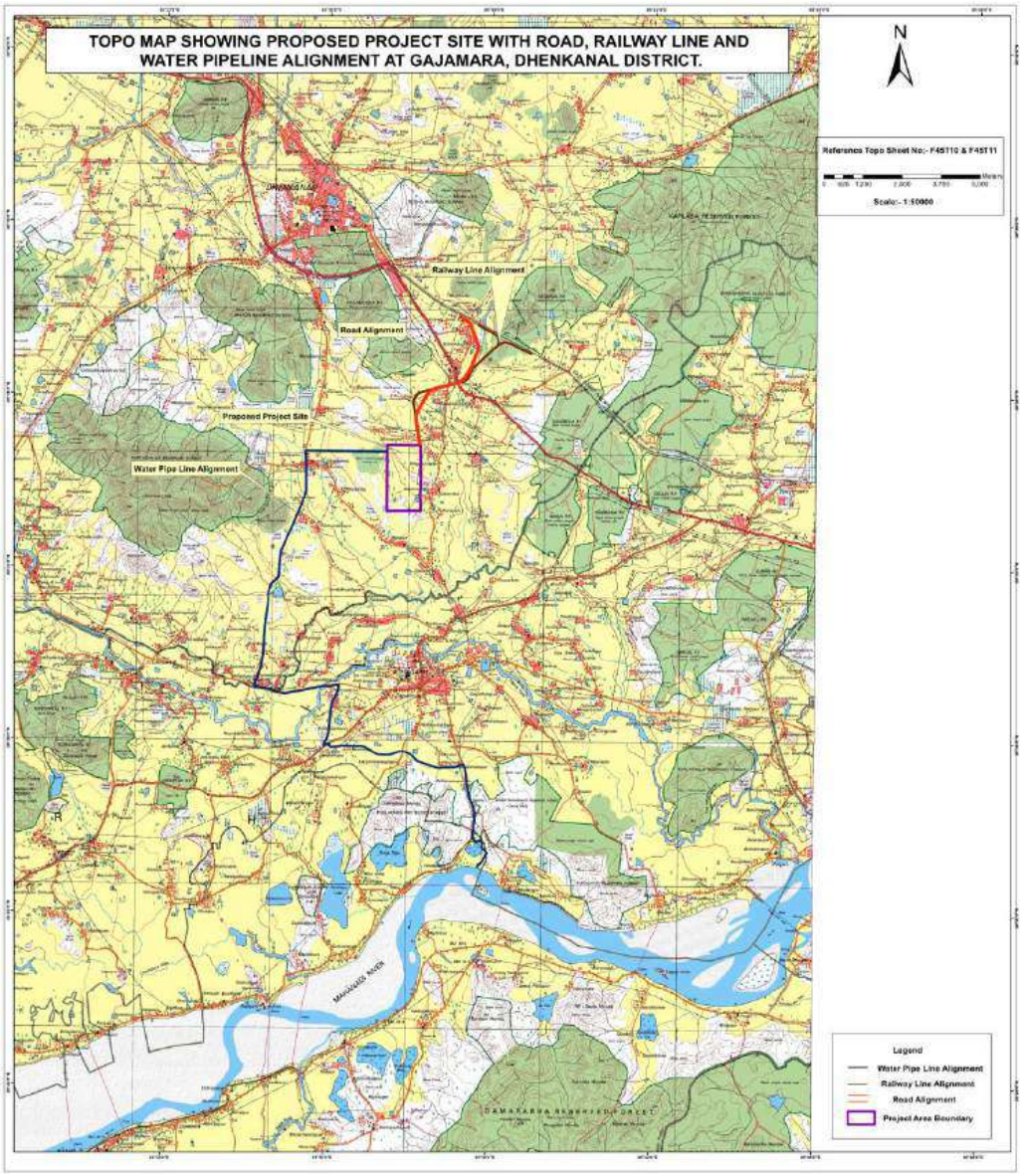


FIG. 1-1 - SITE LOCATION MAP

1 - Introduction (cont'd)

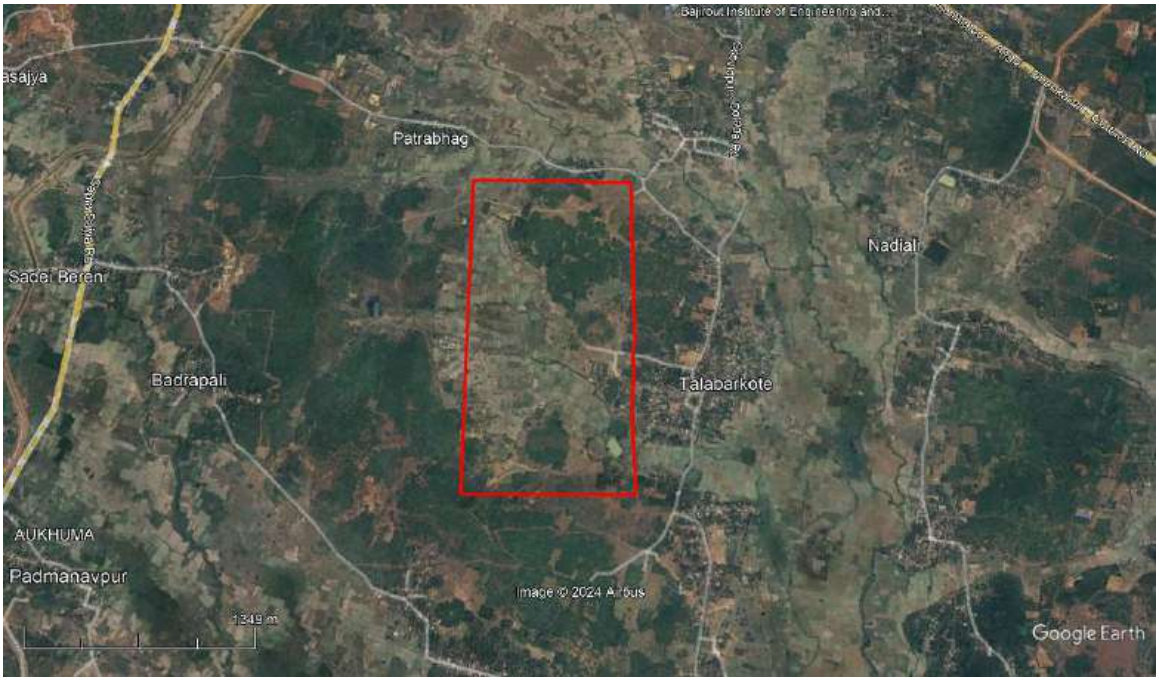


FIG. 1-2 - GOOGLE EARTH SNAPSHOT OF THE PROJECT SITE

1.1.6 Ecological Sensitivity of the location of Project

ESZ of Kapilash Wildlife Sanctuary and Kapilash Wildlife Sanctuary are located 3.35 kms East and 5.8 Kms East of North-East directions respectively.

A map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas is given in Fig. 1-3 and the authenticated document is attached in Appendix 1-3

1 - Introduction (cont'd)

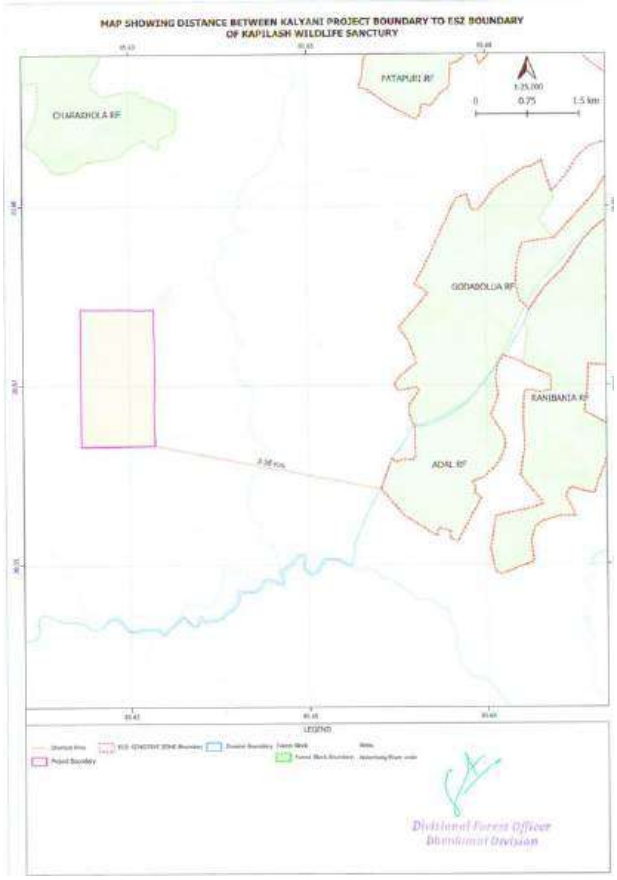


FIG. 1-3 - MAP SHOWING DISTANCE BETWEEN PROPOSED PROJECT BOUNDARY AND ESZ BOUNDARY OF KAPILASH WILDLIFE SANCTUARY

There are no Archaeological/Historical/Ancient Monuments, Biosphere reserve, Coastal zone, State/UT Boundary, International Boundary, areas protected under international convention, national legislation, local legislation, cultural or other related value, wetlands, tourist areas, defense installations within 10 km from the project site. The project area, as well as the study area does not fall under the purview of Severely Polluted Area or Critically Polluted Area.

The following are the few features of the study area.

Hills/valleys .. Saptasajya

Nearest Reserved/ Protected Forest	..	Saptasajya RF (1.5 km in West direction) Mayuri RF (1.6 km in NW direction) Charakhola RF (~1.6 km in N Direction) Patapuri RF (~3.8 km in NE Direction) Gadabola RF (3.9 km in E Direction) Adala RF (3.4 km in E Direction) Ranibania RF (5.4 km in E Direction) Deulia RF (7.2 km in E Direction) Oringa RF (8 km in SE direction) Sorishapal RF (9.2 km in SW direction)
Nearest water bodies	..	Sapua Nadi (~3.8 km in S direction)

1.1.7 Project Highlights

Following are some of the highlights of the proposed project:

Plant Location	..	Villages Siaria and Talabarakote at Gajamara, district Dhenkanal in the state of Odisha
Plant Area	..	The land to be allocated by IDCO to KSL is 224.737 Ha. The total land required for the greenfield IASSP project is about 192.554 ha
Production Planned	..	Integrated Advanced Specialty Steel Plant having an installed capacity 1.43 MTPA of crude steel with facilities for production of carbon, alloy steel, stainless steel along with manufacturing of critical components used in end industries like Automotive, Energy, Marine, Oil & gas, Aerospace & Defence, Railways, Industrial and Green Energy equipments, Nuclear energy
Water Requirement	..	762 cu m/hr
Power Requirement	..	257 MW

1 - Introduction (cont'd)

Employment	..	Operation Phase: 3,000 (Direct) & 7,200 (Indirect/Contractual Basis) Construction Phase: 500 (Direct) and 12,000 (Indirect/Peak contractual workforce)
Estimated Investment	..	₹ 11,058 Cr
Completion Period	..	86 months from obtaining all necessary clearances and placement of order

1.2 NEED OF THE PROJECT

India emerged as the fastest growing large economy in 2024 with an estimated growth rate of 8.2%. As per latest World Economic Outlook from International Monetary Fund (IMF) published in April 2024, India's GDP is poised to grow at 6.5% in 2024 & 2025. India's growth momentum will continue for next 5-10 years due to conducive policies of Central and various State governments. Sectors like Automobile, Defense & Aerospace, Steel, Semiconductors, Fintech etc. would play a significant role in driving growth of India's GDP in coming years.

Globally, India is second largest steel producing country. At an estimated ~141 million tons production in FY 2024, India contributes ~6.6% to total global steel production. Even though, India is second largest steel producer, the per capita steel consumption in India is 81 kg in 2022 whereas the global average per capita consumption is 222 kg.

To achieve the NSP goals of 2030, steel production capacity must increase at a CAGR of 9.3%. This indicates from 2024, ~20 mn tons of steel making capacity needs to be added every year.

In conclusion, the proposed project would contribute to this national mission of creating additional steelmaking capacity catering to critical end use applications in the country.



1.3 PURPOSE OF THE EIA STUDY

The objective of the EIA study report is to gauge the prevailing baseline environmental quality, assess the potential impacts of the proposed project on the environment and plan appropriate mitigation measures to minimize adverse impacts and maximize beneficial impacts of the proposed project.

1.4 SCOPE OF THE STUDY

As per the Environment Protection (EP) Act, 1986 and amendments thereafter and the EIA Notification 2006 and amendments thereafter, it is required to obtain Environmental Clearance (EC) from the MoEFCC and Consent to Establish (CTE) of the proposed Project from the Odisha State Pollution Control Board (OSPCB), prior to taking up any construction activities at the project site.

Accordingly, KSL applied to the MoEFCC vide IA/OR/IND1/527701/2025 dated 10.03.2025 for firming up of the ToR of EIA, which would form the scope for conducting the EIA study. The MoEFCC has evaluated the ToR Application and has firmed up the ToR for EIA of the proposed project vide ToR Identification No. TO25A1005OR5309101N dated 31.05.25.

1.5 DETAILS OF EARLIER CLEARANCES AND CONSENTS

The proposed plant is a greenfield project and hence all the required clearances and consents will be freshly applied.

1.6 APPLICABLE REGULATIONS

The following regulations/policies with amendments thereof have been considered during preparation of the EIA Report and need to be complied with, while monitoring the implementation and performance of the environmental management mitigation measures:

i) Environmental Protection Act 1986 and Rules thereunder



ii) Section 21 of the Air (Prevention and Control of Pollution) Act, 1981

iii) Sections 25 and 26 of the Water (Prevention and Control of Pollution) Act, 1974

v) The Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 (MSIHC) and its subsequent amendments

vi) Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016.

vii) Construction and Demolition Waste Management Rules, 2016.

viii) Plastic Waste Management Rules 2016 and its subsequent amendments

ix) Solid Waste Management Rules, 2016 and its subsequent amendments

x) Odisha Factories Act, 1948 & Factories Rule, 1950 and their subsequent amendments

xi) Odisha Fire Services Act, 1993 and subsequent amendments

xii) E-waste (Management) Rules, 2022 and subsequent amendments

xiii) CREP guidelines for Iron & Steel industry, 2008

xiv) Bio-Medical Waste Management Rules, 2016

xv) Noise Pollution (Regulation and Control) Rules, 2000

xvi) Public Liability Insurance Act, 1991 and subsequent amendments

xvii) The Electricity Act, 2003 & India Electricity Rules, 1956 and their subsequent amendments

xviii) Explosive Act, 1884 & Explosive Rules, 1983 and their subsequent amendments

1.7 STRUCTURE OF THIS REPORT

This Report is prepared in line with the suggested generic structure of EIA prescribed by MoEFCC. There are twelve Chapters complete with relevant Tables, Figures, Drawings, Photographic Exhibits and Appendices including the Social Impact Assessment (SIA) Report as per the following structure.

1 - Introduction (cont'd)

Chapter No.	Contents
Chapter 1	Introduction
Chapter 2	Project Details
Chapter 3	Description of the Environment
Chapter 4	Anticipated Environmental Impacts & Mitigation
Chapter 5	Analysis of Alternatives
Chapter 6	Environment Monitoring Program
Chapter 7	Additional Studies
Chapter 8	Project Benefits
Chapter 9	Environmental Cost Benefit Analysis
Chapter 10	Environment Management Plan (EMP)
Chapter 11	Summary & Conclusion
Chapter 12	Disclosure of the Consultants Engaged

The various field data as recorded for proposed project during field survey (October to December 2024) within the study area of 10 km aerial coverage from the boundary of the plant is attached at the end of this Report in a separate Appendix (Appendix - Field Reports).

1.8 AUTHORIZATION

KSL has appointed M. N. Dastur & Company (P) Ltd, Consulting Engineers, Kolkata (QCI-NABET accredited Company) to undertake EIA Study and prepare EIA Report in accordance with the approved ToR of MoEFCC. The details of the NABET accreditation along with the Certificate are enclosed in Appendix 1-4. The baseline data will be monitored by M/s Envirocheck (NABL & MoEFCC accredited Env. Laboratory) under the supervision of M. N. Dastur & Company (P) Ltd. The accreditation certificates of M/s Envirocheck are attached in Appendix 1-5.

1.9 ACKNOWLEDGEMENT

Consulting Engineers gratefully acknowledge the co-operation and assistance extended by KSL and various Govt. Offices for carrying out the field study and preparation of the EIA report.

2 - PROJECT DESCRIPTION

This chapter outlines the project details covering the descriptions of the various processes, requirement of resources like water, power and other fuels as well as the various emissions and waste generation and the mitigation measures which are an integral part of the process units.

2.1 SITE DETAILS

The IASSP would be located in villages Siaria and Talabarakote in Dhenkanal tehsil of Dhenkanal district of Odisha.

2.1.1 Location of the Project

The project site is located within latitude 20^{0}33'59.4" to 20^{0}35'8.16" North and longitude 85^{0}37'4.44" to 85^{0}37'41.88" East. The general location of the project site is shown in Fig. 2-1. Plant General Layout is shown in Drg. 11748-97A-000-ENV-0001. A snapshot from Google map of the project site is presented in Fig. 2-2.

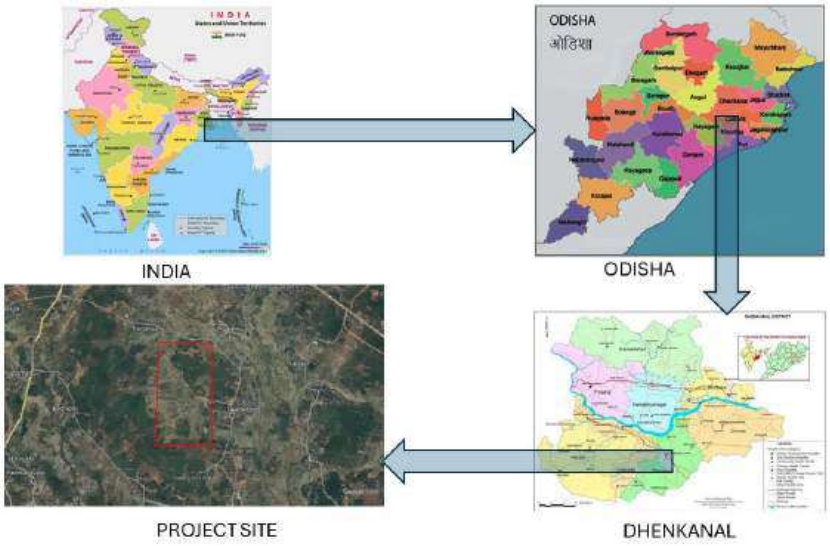


FIG. 2-1 - SITE LOCATION MAP

2 - Project Description (cont'd)

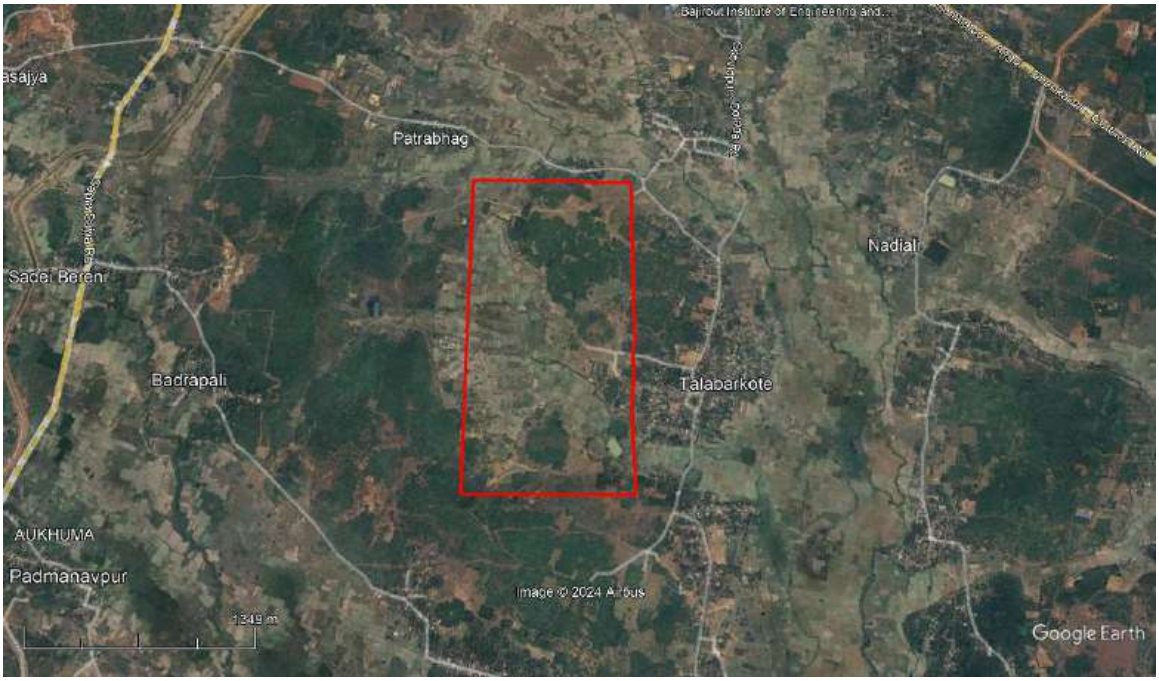


FIG. 2-2 - GOOGLE EARTH SNAPSHOT OF THE PROJECT SITE

2.1.2 Connectivity

NH-55 connecting Cuttack and Sambalpur, lies on the north- east side of the proposed project area about 2.8 km away. The nearest railway station is Joranda Road located on the East Coast railway about 6 km from the project site.

The nearest commercial airport is at Bhubaneswar (Biju Patnaik International Airport), located about 70 km away. The nearest sea port is at Paradeep about 140 km away from the site.

2.1.3 Topography

The project area is part of Mahanadi delta and is a flat land. The general elevation varies from 45 m to 65 m above mean sea level. The topographic features of the study area may be seen from Survey of India OSM Nos. F45T10.

2 - Project Description (cont'd)

The Topo Map showing the study area of radius of 10 km and site location is shown in Fig. 2-3.

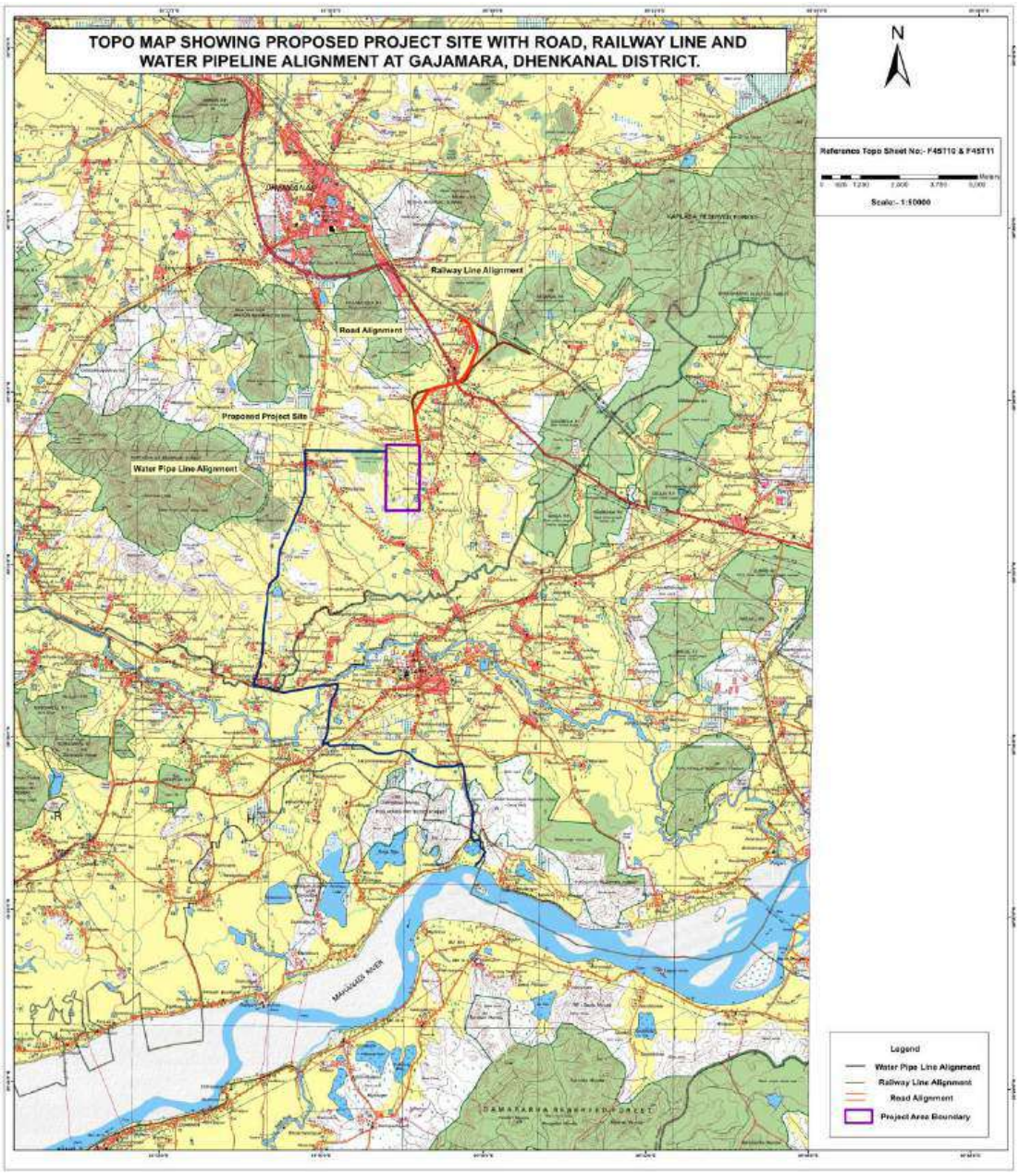


FIG. 2-3 - TOPO MAP SHOWING THE STUDY AREA OF 10 KM RADIUS AND PROJECT SITE

2 - Project Description (cont'd)

2.1.4 Environmental Settings of the Site

The following are the few features of the study area as shown in the topo map (Fig. 2-3).

Nearest Reserved/ Protected Forest	..	Saptasajya RF (1.5 km in West direction) Mayuri RF (1.6 km in NW direction) Charakhola RF (~1.6 km in N Direction) Patapuri RF (~3.8 km in NE Direction) Gadabola RF (3.9 km in E Direction) Adala RF (3.4 km in E Direction) Ranibania RF (5.4 km in E Direction) Deulia RF (7.2 km in E Direction) Oringa RF (8 km in SE direction) Sorishapal RF (9.2 km in SW direction)
Nearest water bodies	..	Sapua Nadi (~3.8 km in S direction)

Latest high-resolution satellite image of the project site covering 100 m all around the project location is shown in Fig. 2-4.

2 - Project Description (cont'd)

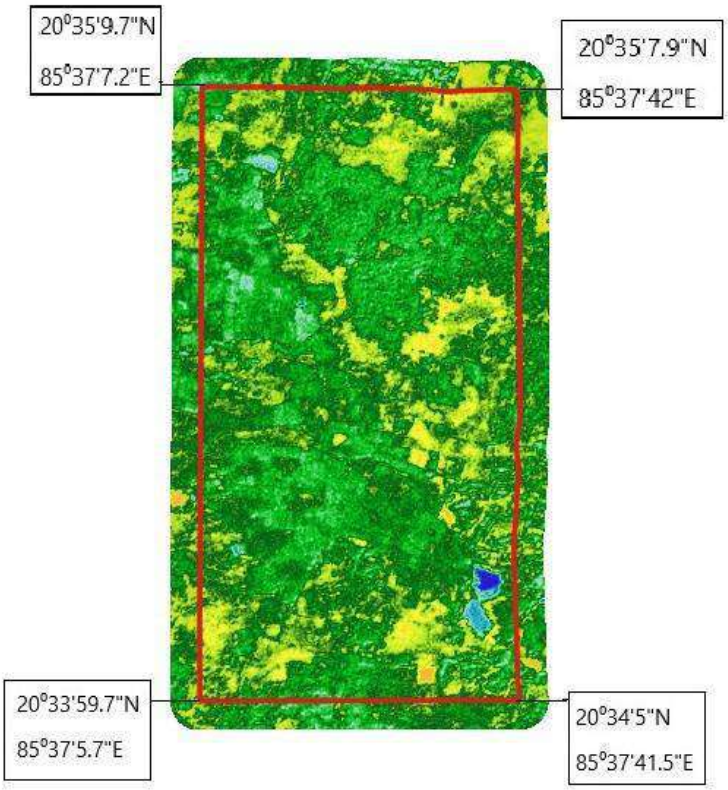


FIG. 2-4 - LATEST HIGH-RESOLUTION SATELLITE IMATE ALONG WITH PLANT BOUNDARY CO-ORDINATES INCLUDING 100 M ALL AROUND THE PROJECT LOCATION

2.1.5 Major Industries in the Study Area

The other major industries which exist within 10 km radial coverage from the plant area as listed in Table 2-1.

TABLE 2-1 - MAJOR INDUSTRIES IN THE STUDY AREA

Sl. No.	Name of the Company	Category	Distance from plant boundary
1	Rahee Infratech Limited	Steel Fabrication Unit	3.55 km SSW
2	Priya Fly Ash Factory	Bricks	5.52 km SSW
3	L&T Rengali UGPL Pipeyard	Pipes	5.38 km SSW
4	OMFED Dairy	Dairy	2.92 km NNE

2 - Project Description (cont'd)

Several other Small & Medium Enterprises (SMEs) are also located within the study area.

2.1.6 Land Classification of the Project Site

The total land required for the greenfield IASSP project is about 192.554 ha. The total land to be allocated to KSL by IDCO is about 224.737 ha including land for future use. The land consists of government land as well as private land and the breakup. The nature of land is shown in Table 2-2. Forest Diversion Proposal was applied by KSL to MoEFCC vide Letter No. FP/OR/IND/526987/2025 dated 09.04.2025 and the same is attached as Appendix 2-1.

TABLE 2-2 - NATURE OF LAND INVOLVED

Sl. No.	Name of the Tahasil	Name of the Village	Total Forest Land in Ha.	Non-Forest Land in (Ha.)			Total Land (Forest + Non-Forest) in Ha.
				Govt. Land in Ha.	Private Land in Ha.	Total Non-Forest Land in Ha.	
1	Dhenkanal	Talabarakot	48.553	16.746	135.653	152.399	200.952
2	Dhenkanal	Siaria	11.650	0.032	12.103	12.135	23.785
Total			**60.203**	**16.778**	**147.756**	**164.534**	**224.737**

Details of land utilization of KSL for the existing and proposed project are given in Tables 2-3 and 2-4.

TABLE 2-3 - PRE PROJECT LANDUSE

Sl. No.	Land Use Type	Area in hectare (ha)
1	Forest Land	60.2
2	Agriculture land	80.13
3	Grazing Land	6.47
4	Barren Land	25.56
5	Surface water bodies	3.84
6	Settlements	1.62
7	Roads / Other infrastructure	4.86
8	Industrial use	42.05
	Total Area	**224.73**

2 - Project Description (cont'd)

TABLE 2-4 - POST PROJECT LANDUSE

Sl. No.	Category	Area (in ha)
1	Plant Unit area	98.806
2	Parking Space	1.373
3	Road & Railway Route	12.700
4	TSDRF Area	1.380
5	Greenbelt inside physical boundary	72.105
6	Vacant Area for future use	32.141
	Total Area within physical boundary	**218.505**
7	Greenbelt outside physical boundary	2.842
8	Natural pond outside physical boundary for access by villagers	3.390
	Total area outside physical boundary	**6.232**
	Grand Total	**224.737**

2.1.7 Layout

The major considerations which have influenced the development of the plant general layout are described below.

a) Flow sheet and plant facilities.
b) Vaastu compliance.
c) DIASSPosition of main production units ensuring smooth and unidirectional flow of materials through the process line.
d) Optimum foot print for plant facilities without compromising smooth operation and plant safety. Building up common facilities to optimize land utilization.
e) 'Greeneries' including peripheral greenbelt.
f) Health, safety and environment.

Based on the above considerations, the conceptual plant general layout for proposed greenfield project has been developed and presented in Plant General Layout Drawing TLN-STT-00-01-00-02-000-00001. The internal road network of the proposed plant has been shown in Drg. 11748-97A-000-ENV-0002 and the drainage network of the proposed plant, its connectivity to the RWH structure & provision for dIASSPosal of excess storm water outside the plant premises has been



superimposed on the contour drawing of the proposed plant site which is shown in Drg. 11748-97A-000-ENV-0003. Suitable roads will be provided all over the plant. Roads will generally be straight as far as possible. All periphery roads shall be 12 m and interconnecting road as 7 m. Considering greenery and other cable trench, fire fighting water pipeline, the alley would be made about 20 m. Width of carriageway of major interconnecting roads will be minimum 7 m with necessary turning radius of 9 m for fire tenders. However, based on the traffic volume, type of movement and area availability, the width of the roads may be increased during actual execution of the Project/actual operation of the plant.

All the in-plant roads will be concrete road with both side berms and storm water drains. Roads of adequate width and strength will be provided for catering inbound and outbound heavy vehicles. Minimum width of main carriageway is 5 m with 1.5 m wide berm on both sides. Considering the movement of substantial number of vehicles, the major freight roads will be of 7 m wide (two lane) carriageway with 1.5 m wide berm on both sides. Contour map of the project site along with drainage disposal system is shown in Drg. 11748-97A-000-ENV-0003.

A drone survey was conducted from 06.02.24 to 15.02.24 to get an overview of the project site and its surroundings.

2.1.8 Rainwater Harvesting

Space for development of a pond for rainwater collection with pumping arrangement has been provided in the layout. The arterial drains will be connected to the trunk drains. Further, trunk drains will lead the storm water to a storm water collection pond for rainwater harvesting. These plant drains will collect the storm water run-off from

2 - Project Description (cont'd)

different areas and rainwater from the roof of buildings and discharge into this pond. However, an overflow line has been kept storm water pond to prevent flooding during heavy rainfall. Details of rainwater collection are shown in Table 2-5.

TABLE 2-5 - DETAILS OF RAINWATER COLLECTION POND

Catchment area, sq m	Average rainfall depth during rainy day, m	Area of SWP, sq m	SWP depth, m	Approx. retention time, hr
1,001,790	0.129	10000	5	14

2.1.9 Fire Safety Management and Fire Emergency Plan

In addition to the yard fire hydrant system, each individual shop would be provided with fire and smoke detection alarm system. Fire detection system would be interlocked with automated water sprinklers as per safety requirement.

The details of fire protection systems envisaged for the new premises are indicated below.

Premises to be covered	Type of fire protection system
Oil cellars and transformer rooms	High velocity water spray system
RMHS for coal	Fire hydrant ring main
Electric control rooms, Pulpits and shop areas	Portable/trolley-mounted fire extinguishers, fire buckets etc.

2.2 PROJECT DESCRIPTION

The proposed greenfield project of KSL would comprise production of 1.43 MTPA advanced specialty steel through BF-EAF/ZPF/BOF route at Gajamara in Dhenkanal district of Odisha.

2.2.1 Plant Unit and Facilities

The configuration of the proposed major plant units and facilities are presented in Table 2-6.

2 - Project Description (cont'd)

TABLE 2-6 - CONFIGURATION OF PLANT

Plant Facilities	Capacity/Configuration
Coke Oven Plant	0.78 MTPA
Blast Furnace	1.5 MTPA
Sinter Plant	2.4 MTPA
Lime Calcination Plant	2 x 300 TPD
Steel Making	
EAF/ZPF	1 x 60 Tons
BOF	1 x 60 Tons
IF	2 x 50 Tons
LF	4 x 60 Tons
VD	1 x 60 Tons
RH degasser	2 x 60 Tons
AOD	2 x 65 Tons
Ingot Casting	0.16 MTPA
CCM	0.65 MTPA - 2 Nos 0.7 MTPA - 2 Nos
Heavy Bar, SBQ & Wire Rod Mill	1 x 0.6 MTPA
Large Bar Mill	1 x 0.8 MTPA
Oxygen Plant	1 x 420 TPD 1 x 460 TPD
Pig Casting Machine	2 x 1,200 TPD
By product fuel gas-based power Plant and BF TRT power generation	18 MW
Coke Oven WHRB Power Plant	64 MW
BF TRT	7.5 MW

The production facilities would be adequately supported by necessary auxiliary facilities such as raw materials unloading and storage, proportioning of raw materials, electric power receiving and distribution stations, various utility facilities, water treatment and distribution system, etc.

2.2.2 Products & By-Products

Details of existing as well as proposed products and by-products are shown in Table 2-7.

2 - Project Description (cont'd)

TABLE 2-7 - DETAILS OF PRODUCTS/BY-PRODUCTS

Sl. No.	Product/By-products	Unit	Proposed Quantity
1	Ingot and CC- As cast	TPA	210,588
2	Heavy bar, SBQ and Wire Rod	TPA	521,454
3	Large Bar	TPA	582,600
4	Coke	TPA	27,300
5	BF Slag	TPA	601,657
6	Pig Iron	TPA	74,926
7	BF Gas	Nm^3/hr	321,950
8	BOF Gas	Nm^3/hr	11,429
9	By-product gas based/waste heat recovery power	MW	82

2.2.3 Site Preparatory Activities

Pre-construction activities/site preparatory work is a prerequisite before commencement of major construction work of any project. The following pre-construction activities are envisaged for this project:

1. Soil Investigation Work, Survey and Underground Mapping
2. Site leveling work
3. Arrangement of water for construction and drinking
4. Arrangement of construction power and lighting system
5. Dismantling and relocation of existing ancillary facilities
6. Development of construction roads and drainage
7. Construction of weigh bridges

2.2.4 Raw Materials

The annual net and gross requirement of raw materials for individual production units is presented in Table 2-8.

2 - Project Description (cont'd)

TABLE 2-8 - ANNUAL NET AND GROSS REQUIREMENT OF RAW MATERIAL FOR INDIVIDUAL PRODUCTION UNITS

Raw Material	Qty Required per annum	Source	Distance from site (km)	Mode of Transportation
Iron ore fines	1759477	Indigenous	140	Rail/Road
Iron ore lump	672451	Indigenous	240	Rail/Road
PCI coal for Coke Ovens	180299	Imported	240	Sea/Rail/Road
PCI coal for Blast Furnace	270032	Imported	140	Rail/Road
Prime coking coal	270449	Imported	240	Sea/Rail/Road
Semi-Hard coking coal	315524	Imported	240	Sea/Rail/Road
Semi Soft coking coal	135224	Imported	240	Sea/Rail/Road
Limestone for Sinter Plant	178659	Indigenous	900	Sea/Rail/Road
Limestone for Blast Furnace	30000	Indigenous	900	Sea/Rail/Road
Dolomite for Sinter Plant	197361	Indigenous	1800	Sea/Rail/Road
Dolomite for blast furnace	37500	Indigenous	1800	Sea/Rail/Road
Lime Stone for Calcining Plant	243069	Indigenous	1800	Sea/Rail/Road
Dolomite for Calcining Plant	27296	Indigenous	1800	Sea/Rail/Road
Calcined Lime Fines	120494	Indigenous/Captive	900	Rail/Road
Ferro-alloy	112780	Indigenous/Imported	100	Rail/Road
Anthracite	32155	Imported	240	Sea/Rail/Road
Quartzite	45000	Indigenous	100	Road

Storage Facilities: Adequate space shall be earmarked in the plant layout for storage of incoming raw material. Appropriate measures will be planned to prevent mixing with the running of water during monsoon.

Road Logistics for Raw Material Transportation: The internal transportation of materials like mill scale, scrap, spares, etc. among various shops are proposed to be carried out in road vehicles. The internal transportation of waste materials will also be carried out by road.

2 - Project Description (cont'd)

2.2.5 Fuels and Chemicals

Blast furnace gas will be available as the by-product gases from the proposed blast furnace. Blast furnace gas generated in the blast furnace of CV: 780-820 Kcal/Nm^3 will be first used to cater heating requirement of stove heating, in PCI, pig casting machine, slag drying etc. Balance blast furnace gas is envisaged to be used as fuel for various heating applications of the steel plant.

The BOF gas recovered is envisaged to be used as fuel in the proposed lime calcining plant.

To utilise BF gas as fuel, it's essential to raise the furnace temperature to BFG auto ignition point of 630 ^oC. To raise the temperature till 630 ^oC it has been envisaged to use PNG as start-up fuel. Fuel Oil/Gas Requirements are shown in Table 2-9.

TABLE 2-9 - FO/LPG REQUIREMENT

Fuel	UOM	Total
Furnace Oil/PNG	Nm^3	11,519,888
LPG	Nm^3	1,211,760

For safe & environment friendly storage of the PNG for plant operations, a fuel storage tank of 100 kL capacity will be installed at the project site and connected gas pipe network will be installed at the end consuming units like LCP, PCI Stove, Boiler, Reheating Furnace, Induration furnace (Sinter Plant).

The generation and consumption of by-product fuel gases in the various plant units are shown in Table 2-10.

2 - Project Description (cont'd)

TABLE 2-10 - BY-PRODUCT FUEL GAS BALANCE

	UOM	Total
BFG Generation	**Nm³/Hr**	**321,950**
BOFG Generation	**Nm³/Hr**	**11,429**
1. Consumption Points in BF		
a) Stove (1,250 ^{O}C)	Nm³/Hr	140,844
b) PCI (200 kg/thm) for BF	Nm³/Hr	10,700
c) Sinter	Nm³/Hr	17,000
d) Ladle Heating	Nm³/Hr	2,150
Total at BF Complex (A)	**Nm³/Hr**	**170,694**
2. Other Consumer Points		
a 1) Lime Kiln (BFG + PCI) - 300 TPD BFG: 550 Nm³/t & PCI: 80 kg/t	Nm³/Hr	6,875
a 2) Lime Kiln (BOFG + PCI) - 300 TPD BOFG: 270 Nm³/t & PCI: 80kg/t	Nm³/Hr	3,375
b1) BF Gas for RHF (@480 m³/TS) at cold Bloom	Nm³/Hr	64,059
b2) BOF Gas for RHF (@200 m³/TS)		7,924
c) SMS Ladle Heating	Nm³/Hr	4,300
Total at Other Consumer Points (B)	**Nm³/Hr**	**78,609**
BF Gas available for power production	Nm³/Hr	72,647
BOF Gas available for power production	Nm3/Hr	130
Power Generation	**MW**	**17.98**

2.3 TECHNOLOGY AND PROCESS DESCRIPTION

The proposed plant would produce specialty alloy steel for auto components, Micro alloyed, high and low alloy steels for special engineering applications for defense, aerospace etc., Specialty alloy steels for green energy applications incl. windmill, chemical, petrochemical, green H_2 etc., Bearing steel and stainless steel based on BF-EAF/ZPF route and BF-BOF route.

The following sections lay down the details of the various process units. The Schematic Process Flow Diagram has been presented in Drg. 11748-97A-000-ENV-0004.

2.3.1 Coke Ovens

Metallurgical coke is one of the prime requirements for production of hot metal through blast furnace route. Coke not only supplies heat to the blast furnace for melting purpose but also acts as a reducing agent inside the blast furnace for reduction of iron oxides to

metallic iron along with burden support. Both active hot carbon of coke, as well as reducing gas generated in the furnace by burning of coke take part in reduction reaction. A number of technologies have been developed for reduction of coke requirement in blast furnaces. Technology like injection of auxiliary fuels like non-coking coal/tar/natural gas through tuyeres of blast furnace is worth mentioning. However, operation of blast furnaces without coke is yet to be established, as only partial replacement of coke by auxiliary fuels has been established. Hence, coke will be required for operation of blast furnace for the proposed plant.

Considering the level of technological development in the coal making area and total requirement of metallurgical coke in the blast furnace, four batteries of non-recovery type stamp charge (SC) coke ovens with 2.1 m cake height have been considered for the proposed coke oven plant having necessary pollution control measures. The coke oven capacity has been selected considering the charge coke requirement in blast furnace. Out of four batteries considered, one battery (in two blocks, having 18 ovens in each block) will be required to produce ~195,000-tons per year of gross coke (Dry basis) on ~95% oven utilization, with four batteries producing total ~780,000 tons of gross coke per annum.

Heat Recovery Power Plant: The hot flue gas (at ~1,050 ^{o}C and with a flow of ~80,000 Nm^{3}/hr) from the Coke Oven batteries shall be led through the underground flue tunnels or overhead flue ducts to the boilers one boiler for each battery with a capacity of 35-40 TPD of superheated steam at 500 ^{o}C and a pressure of 80-100 kg/cm^{2}.

The steam shall be admitted into a turbine followed by a generator of appropriate capacity to generate 32 MW of electricity. This generation shall increase by 32 MW to a total of 64 MW after second phase coke oven battery has been installed.

2 - Project Description (cont'd)

Each battery shall have a chimney of required height to take the outlet gas from the boiler (180 - 200 ^{o}C) through a suitably designed dust extraction system with online emission monitoring system.

2.3.2 Sinter Plant

Two sinter machine of 110 & 130 sq m will be installed to produce ~2.16 MTPA charge sinter, which will be adequate for 70-80 per cent sinter feed to the blast furnace.

Design Basis: The design basis considered for the new sinter plant is given in Table 2-11.

TABLE 2-11 - DESIGN BASIS OF SINTER PLANT

Item	Total
Charge Sinter, tons/year	2,166,845
Operating days/year	330
Daily Product Sinter, tons/day	6,566
No. of Strand	2
Product Sinter Size, mm	5-50
Temperature of Sinter at Cooler Discharge, ^{o}C	100

Raw Materials: The typical analyses of input raw materials (dry basis) for sinter production are given in Table 2-12.

TABLE 2-12 - TYPICAL ANALYSIS OF RAW MATERIALS FOR SINTER PRODUCTION

Items	Fe, %	SiO_2, %	Al_2O_3, %	CaO%	MgO, %	LOI, %
Iron Ore Fines	63	3.50	4.5	-	-	2.40
Limestone	0.50	3.61	0.60	50.74	1.91	41.80
Coke Breeze	0.50	7.30	4.05	-	-	76.00
Flue Dust	37.00	6.50	4.20	3.60	1.10	38.00
Mill Scale	69.50	1.23	1.22	0.68	0.25	5.00
Lime	0.70	2.5	2.00	92.00	1.90	2.00
Dolomite	2.07	0.86	0.52	30.98	20.50	46.97

2 - Project Description (cont'd)

Major Facilities: The sinter plant will comprise following facilities:

i) Proportioning System
ii) Flux and Fuel Crushing
iii) Mixing and Nodulizing System
iv) Sinter Machine Section
v) Sinter Cooler Section
vi) Sinter Stabilizing Section
vii) Sinter Storage and DIASSPatch
viii) Waste Gas Recirculation System (WGRS)
ix) Plant De-dusting System
x) Cranes, Hoists and Elevator
xi) Plant Electrics
xii) Instrumentation and Level- 2 with AI & ML (Provision for Level 3)
xiii) Plant Communication System
xiv) Utility System
xv) Air-conditioning and Ventilation System
xvi) Firefighting System

2.3.3 Blast Furnace

It has been planned to install two Blast Furnaces of 650 m^3 and 800 m^3 to produce ~1.5 MTPA of hot metal per year.

Design Basis: The blast furnace will incorporate all the modern technological features. The design basis of blast furnace is given in Table 2-13.

TABLE 2-13 - DESIGN BASIS OF BLAST FURNACE

Item	Total
Hot metal production, tpa	1.500,000
Daily production capacity, thm/day (avg)	4,286
No. of furnaces	2
Operating days	350
Burden :	
Sinter, %	79
Lump Ore, %	21
O_2 enrichment, %	5
Coke rate (including nut), kg/thm	380 - 400
Coal rate, kg/thm	150 - 200
Slag rate, kg/thm	380
Coke ash, %	12.0
Si in metal, %	0.5 to 0.6

2 - Project Description (cont'd)

Raw Materials: The major raw materials for the blast furnace comprise of iron ore, sinter, additives and coke. Pulverized coal will be injected through tuyeres as auxiliary fuel. The typical analysis of raw materials envisaged is given in Table 2-14.

TABLE 2-14 - TYPICAL RAW MATERIAL ANALYSIS (DRY BASIS)

Item	Fe %	SiO_2 %	Al_2O_3 %	CaO %	MgO %
Sinter	52	2.1	1.88		2.1
Sized ore	63	3.5	4.5	-	3.4
Quartzite	-	96.0	0.55	-	-
Limestone	0.50	3.61	0.60	50.74	3.61
Dolomite	2.07	0.86	0.52	30.98	18.5

Item	Ash %	Moisture %	CSR %	CRI %
Coke	12.0 (min)	0.5 (max)	62	25

Coal for PCI Application:

Ash, % (dry basis)	8 - 10
Fixed Carbon, %	75 - 77

Major Facilities: The plant comprises following facilities:

i) BF proper with bell-less top (BLT)
ii) Cast house.
iii) Slag granulation plant & Ground granulated blast furnace slag processing plant
iv) Hot blast stoves (Top fired)
v) Gas cleaning plant (Dry)
vi) Stock house and charging system.
vii) Hot metal handling system
viii) Cranes and hoists
ix) Pulverised coal injection system (PCI)
x) Pig casting machine and ladle repair shop
xi) Stock house & Cast house de-dusting system
xii) Air blowing system.
xiii) Plant electrics
xiv) Instrumentation, automation and control system
xv) Communication system
xvi) Water system
xvii) Utility system

xviii) Firefighting system.
xix) Air conditioning and ventilation system
xx) TRT & BPRT

2.3.4 Steel Melt Shop 1

Design Basis:

Production Program: Considering the availability of hot metal of about 0.7 MTPA, one 60 MT UHP EAF with 60 MVA transformer has been envisaged. The EAF shall be capable of being changed over to Zero Power Furnace mode and vice-versa, for producing low & high alloy, carbon, stainless steel and super critical alloys for automotive, aerospace and defence applications. The design of the furnace shell and Fume Extraction System (FES) etc. shall be compatible to full oxygen melting mode (ZPF melting). One induction furnace has also been envisaged for melting of ferro alloys and high alloyed return scrap for post addition of molten Fe-alloy into the steel ladle when the furnace is working on zero power mode, for improved recovery of the Fe-alloys.

The production program of liquid steel, semis (billets, blooms and rounds) and ingots as summarized in Table 2-15 and 2-16.

TABLE 2-15 - PRODUCTION OF LIQUID STEEL, SEMIS AND INGOTS (TONS/YEAR)

Production Capacities	Tons
Liquid Steel	736,868
Semis (Billets, Blooms, Rounds)	562,760
Ingots	119,354

TABLE 2-16 - THE GRADE-WISE PRODUCTION OF CRUDE STEEL FROM STEELMELT SHOPS

Segment	Quantity per year
Automobile	171,215
Bearing	72,545
Seamless Tubes	32,926
Tool & Die	6,585
Railways	65,852
Ball for Bearing	26,340
Stainless Steel	26,340
Defence	18,878
Automobile	123,143
Engineering	32,926
Oil & Gas	59,267
Wire Rod	25,024
Wire Rod - Oil & Gas	1,317
Mining	19,756
Total	**682,114**

Depending on the quality and cleanliness of steel to be produced, ladle furnaces (LF) and vacuum degassing units VD and RH degasser have been considered. Considering production of stainless steel and high alloy steels, argon-oxygen decarburiser (AOD) has been considered.

In order to feed the rolling mill, following semis will be cast through continuous casting machines:

Unit	Section Size, mm	Annual tonnage, TPA
CCM 1 (10.25 m)	160x160/180 RD	141,018
	200/220 RD (As Cast)	30,000
	220 RD	128,729
	320 RD	111,998
Sub-Total		**411,745**
CCM 2 (14 m)	400 RD	44,972
	500 RD	41,141
	630 RD	64,341
	As cast	561
Sub-Total		**151,015**
Ingot Casting	M9 ingot for rolling	47,144
	As cast Ingot	72,210
Sub-Total		**119,354**
Total		**682,114**

Based on the above requirement, one billet, bloom and round caster and one large dia. caster for large diameter rounds have been envisaged for making billets, rounds, and blooms.

Provision has also been made for ingot casting, in case of large size ingots are required which cannot be met with large diameter rounds. Accordingly, about ~120,000 tons of ingots through ingot casting route has been provisioned including ingot casting equipment.

Necessary heat treatment facility for the cast ingots shall be provided for the ingots post casting. The hot metal tapped from the blast furnace shall be transferred to the steel melt shop through a hot metal transfer car or hot metal crane where the hot metal will undergo pre-treatment to minimize/eliminate silicon, phosphorus, and sulfur before transferring it to the ZPF. This will ensure the highest cleanliness of the steel for Automobile and Aerospace applications.

One hot metal mixer will be provided to take care of any mismatch during hot metal supply to steel melt shop. Plant return scrap, cold pig iron will be used as basic coolant for EAF/ZPF heats. Iron ore will be used as an additional coolant. Calcined lime and or calcined dolomite will be used as flux for both EAF/ZPF and EAF steel making. Ferro manganese, ferro silicon, silico manganese, aluminum will be used for deoxidizing and alloying of steel. Depending on steel grades production, required type of ferro alloys will be added.

Major Facilities:

Hot Metal Desulphurisation System: The sulphur content in hot metal is 0.045 per cent (max). To meet the requirement of low sulphur content in steel, desulphurization of hot metal has been envisaged prior to feeding into steel making furnaces. Hot metal will be De-sulphurised by deep injection of a combination of De-sulphurising reagent (calcium carbide, lime powder or magnesium) in charging ladle by injection lances. Provision for mono-injection (CaC_2) and co-injection (CaC_2 +Mg) as well as de-slagging will be provided.

Steel Making Facilities:

Electric Arc Furnace (EAF)/Zero Power Furnace (ZPF): An ultra-high power EAF/ZPF with 60 t heat size has been considered. The EAF shall be modified to operate as a Zero

Power Furnace as well with complete oxygen melting. The flexibility to switch between EAF mode and ZPF mode shall be provided to operate the furnace in the most appropriate mode depending on the target steel grade and charge mix. 665,957 tons/annum of liquid steel will be produced about through the melting facility elaborated above. For achieving the desired annual production, it is proposed to install one 60-ton capacity EAF/ZPF, with provision for another furnace for future.

Production of Liquid Steel (from EAF/ZPF)	**Values**
Production (tons/annum)	665,957
EAF/ZPF available days/year	330
No. of installed EAF/ZPF	1
Tap-to-tap time, min.	43
Heat size	60 t

Induction Furnace (IF): One No. 50 Ton capacity IF consisting of two crucible (1 stand by and 1 working) will be installed for melting ferro alloys as required for production of stainless steels and high alloy steels. Major technical parameters are given as follows:

Production of Liquid Steel (from IF)	**Values**
Production (tons/annum)	59,374
Tap-to-tap time of IF, min	120
Number of heats possible	12
Number of operating days	320
Transformer rating, MVA	20

Ladle Furnace: For the purpose of secondary metallurgy, two Nos. ladle furnaces (LF) of 60-ton capacity are envisaged for further treatment of liquid steel including homogenization of chemistry and to raise temperature from EAF/ZPF before degassing and casting.

The LF will also function as a holding unit for facilitating sequence casting of heats in the caster.

Number of Unit	Two stations with arc and inert gas stirring heating
Furnace Cover (Roof)	Water cooled tubular type

Tank and RH Degassing Unit:

Tank Degasser: One No. of 60-ton capacity single station VD degasser and another 60-ton RH degassing station with quick vessel change arrangement unit will be installed for degassing of dissolved gases in the steel.

The salient features of the VD unit or RH degasser unit will be as follows:

Type of unit	Specification	Quantity
Tank Degassing unit	Fixed Chamber & Movable Roof single station vacuum, Steam Ejector System - 60 ton	1 No.
RH Degassing Unit	Fixed type single station vacuum, Mechanical vacuum pump - 60 ton Twin Snorkel	1 No.

The VD units will be complete with vacuum chamber, vessel cover mounted on self-propelled car with lift/lower system, vacuum system including dust catcher, ejectors, condensers, alloy addition system including vacuum hoppers, wire feeding system, temperature measurement and sampling system, electrics and automation system.

RH degasser: The salient features of RH unit are as follows:

Vessel refractory heating system	Multipurpose lance to be used for heating and blowing
Micro alloy addition system under vacuum	Mechanized addition of micro alloy Powder and Oxygen Blowing for Extra Low Carbon and Low Sulphur steels

The ladle will be brought to the treatment position on a self-propelled car. The vacuum vessel system will have a vessel lifting system, hot off-take, cooler and will relate to vacuum pump system. A ferro alloy addition system will be provided for addition and trimming alloy under vacuum. The unit will be equipped with temperature and sampling device, vessel exchange and maintenance equipment, vessel heating system, Oxygen blowing facility.

The VD/RH degasser unit will be designed to achieve the following final gas content in steel respectively depending on the initial values:

2 - Project Description (cont'd)

Gas type	VD	RH
Hydrogen	< 1.5 ppm	< 1 ppm
Oxygen	< 20 ppm	< 10 ppm
Nitrogen	< 30 ppm	< 40 ppm
C	< 0.05 %	< 0.02%

Argon Oxygen De-carburisation (AOD) Convertor: One 65-ton AOD converter will be installed for production of stainless steel and high alloy steels. Liquid chrome/ferro alloys from induction furnace (IF) will be poured into the liquid steel ladle tapped from EAF/ZPF, before going to AOD converter for stainless steel production.

The sequence of refining operation in the AOD after tapping from the EAF/ZPF+IF will be decarburization followed by reduction and desulphurization of the melt.

Continuous Casting Machine: 1 No. of 4 strand combi-caster and 1 No. large radius round caster will be installed for casting of billet, blooms and round. Caster 1 will be designed to cast for size ranges of 180 to 320 mm round whereas caster 2 will be designed to cast for large rounds up to 700 mm diameter.

The large diameter round caster shall be provided with latest technology upgrades like DMSR, FEMS and L2 automation system amongst many more.

Ingot Casting: Ingot casting facilities have been envisaged to produce ingots. The installed capacity of ingot casting facilities will be 120,000 tpa of ingots.

Billet Conditioning System: Cast semis which do not require any conditioning will be directly sent to the reheating furnace of the proposed rolling mills. The semis which require conditioning will be ground by grinders and stored in the shop before being sent to the rolling mills. Three Nos. of swings and one No. auto billet grinder have been envisaged for conditioning of semis.

2 - Project Description (cont'd)

2.3.5 Steel Melt Shop 2

Facilities and process route of steelmaking have been envisaged taking into consideration the ultimate plant capacity of about 0.76 MTPA of rolled and as-cast products and availability of hot metal, various steel grades shall be produced.

Considering the best utilization of the raw materials and to produce low and high alloy steels including stainless steel, a BOF-LF-RH-CCM/INGOT route has been envisaged for steel making.

Design Basis:

Production Program: Considering the availability of hot metal of about 800,000 TPA, one 60 MT BOF with waste gas recovery and waste heat recovery shall be capable of producing low & high alloy, ultra-low carbon, Extra Deep Drawing (EDD), American Petroleum Institute (API) line pipe grades, armour plate grades, carbon, stainless steel, forging grades into super critical alloys for automotive, aerospace and defence applications. One induction furnace has also been envisaged for melting of ferro alloys and high alloyed return scrap for post addition of molten Fe-alloy into the steel ladle for improved recovery of the Fe-alloys.

About 93% hot metal and 7% iron ore, has been envisaged as the basic charge mix for the BOF. The production program of liquid steel, semis (blooms and rounds) and ingots as summarized in Table 2-17.

TABLE 2-17 - PRODUCTION OF LIQUID STEEL, SEMIS AND INGOTS (TONS/YEAR)

Production Capacities	Quantity (Tons/Year)
Liquid Steel	822,968
Semis (Blooms, Rounds)	710,306
Ingots	46,162

The grade-wise productions of Crude Steel from Steelmelt Shops are indicated in Table 2-18.

2 - Project Description (cont'd)

TABLE 2-18 - GRADE-WISE PRODUCTION OF CRUDE STEEL FROM STEELMELT SHOPS

Segment	Quantity per year
Automobile	189,878
Bearing	80,453
Seamless Tubes	36,516
Tool & Die	7,303
Railways	73,030
Ball for Bearing	29,212
Stainless Steel	29,212
Defence	20,936
Automobile	136,567
Engineering	36,516
Oil & Gas	65,727
Wire Rod	27,751
Wire Rod - Oil & Gas	1,460
Mining	21,909
Total	**756,468**

Depending on the quality and cleanliness of steel to be produced, ladle furnaces (LF) and RH degasser have been considered.

To achieve the target productions, best utilization of available raw materials, 60 Ton BOF-LF-RH capacity have been selected for installation.

In order to feed the rolling mill, following section sizes of semis will be cast through continuous casting machines:

Type	Size	Production (TPA)
Rounds	Upto 1,200 mm dia.	247,040
Blooms	160 x 160 mm	463,266
	240 x 280 mm	
	320 x 400 mm	
	400 x 400; 800 x 800 mm	
Ingots	4 t - 120 t	46,162
Total Crude Steel Production		**756,468**

Based on the above requirement, bloom-cum-round caster for casting large diameter rounds have been envisaged for making rounds and blooms.

Provision has also been made for ingot casting, in case of large size ingots are required which requires low volumes and high reduction ratios for niche applications. Accordingly, about ~40,000 tons of ingots through ingot casting route has been provisioned including ingot casting equipment and allied annealing facilities for high end forging and defense applications.

Necessary heat treatment facility for the cast ingots shall be provided for the post casting. The hot metal tapped from the blast furnace shall be transferred to the steel melt shop through a hot metal transfer car or hot metal crane where the hot metal will undergo pre-treatment to minimize/ eliminate silicon, phosphorus, and sulfur before transferring it to the BOF. This will ensure the highest cleanliness and least gas pick up of the steel for Automobile and Aerospace applications.

One hot metal mixer will be provided to take care of any mismatch during hot metal supply from BF to steel melt shop. Plant return scrap, cold pig iron will be used as basic coolant in BOF. Iron ore will be used as additional coolant to reduce oxygen and phosphorous with less iron losses. Calcined lime and calcined dolomite which are produced in-house will be used as flux for BOF steel making. Ferro manganese, ferro silicon, silico manganese, aluminium will be used for deoxidizing and alloying of steel. Depending on steel grades production, required type of ferro alloys will be added.

Major Facilities:

Hot Metal Desulphurisation System: The sulphur content in hot metal is 0.045 per cent (max). To meet the requirement of low sulphur content in steel, desulphurization of hot metal has been envisaged prior to feeding into steel making furnaces. Hot metal will be De-sulphurised by deep injection of a combination of De-sulphurising reagent (calcium carbide, Lime Powder or magnesium) in charging ladle by injection lances. Provision for mono-injection (CaC_2) and co-injection (CaC_2 + Mg) as well as de-slagging will be provided. A Mechanical Stirrer type machine shall also be worked out.

Steel Making Facilities:

Basic Oxygen Furnace (BOF): A BOF of 60 T heat size has been considered. 716,151 tons/annum of Liquid steel will be produced through the melting facility elaborated above.

2 - Project Description (cont'd)

Production of liquid steel (from BOF)	**Values**
Production (tons/annum)	716,151
BOF available days/year	330
No. of installed BOF	1
Tap-to-tap time, min.	36
Heat size	60 t

Induction Furnace (IF): One No. 50 Ton capacity IF consisting of two crucible (1 stand by and 1 working) will be installed for melting ferro alloys as required for production of stainless steels and high alloy steels. Major technical parameters are given as follows:

Production of Liquid Steel (from IF)	**Values**
Production (tons/annum)	67,856
Tap-to-tap time of IF, min	120
Number of heats possible	12
Number of operating days	320
Transformer rating, MVA	20

Ladle Furnace: For the purpose of secondary metallurgy, two Nos. ladle furnaces (LF) of 60-ton capacity have been envisaged for further treatment of liquid steel including homogenization of chemistry and to raise temperature from BOF before degassing and casting.

The LF will also function as a holding unit for facilitating sequence casting of heats in the caster.

Number of Unit	2 Stations with arc and inert gas stirring heating
Furnace Cover (Roof)	Water cooled tubular type

RH Degassing Unit:

Tank Degasser: One No. of 60-ton capacity single station RH degassing station with quick vessel change arrangement unit will be installed for degassing of dissolved gases in the steel.

The salient features of the RH degasser unit will be as follows:

Type of unit	Specification	Quantity
RH Degassing Unit	Fixed type single station vacuum, Mechanical vacuum pump - 60 ton Twin Snorkel	1 No.

Argon Oxygen Decarburization (AOD) Converter for S.S. making: One 65-ton AOD converter will be installed for production of stainless steel and high alloy steels. Liquid chrome/ferro alloys from induction furnace (IF) will be poured into the liquid steel ladle tapped from BOF, before going to AOD converter for stainless steel production.

The sequence of refining operation in the AOD after tapping from the BOF+IF will be decarburization followed by reduction and desulphurization of the melt.

Continuous Casting Machine: One Nos. of 4 strand combi-caster and 1 No. large radius caster will be installed for casting of blooms and round. Caster 1 will be designed to cast for size ranges of 320 x 400 mm to 1,200 mm round whereas caster 2 will be designed to cast from 1,280 to 1,560 mm with thickness of 250 to 400 mm.

The large diameter round caster shall be provided with latest technology upgrades like DMSR, FEMS and L2 automation system amongst many more.

The caster shall have liquid core reduction and ultra-high eddy current system with all new technologies.

Ingot Casting: Ingot casting facilities have been envisaged to produce ingots. The installed capacity of ingot casting facilities Phase-2 will be ~40,000 TPA of ingots.

Bloom/Conditioning System: Cast blooms which do not require any conditioning will be directly sent to the reheating furnace of the proposed rolling mills. The Cast blooms which require conditioning will be slow cooled and ground by grinders and stored in the shop before being sent to the rolling mills.

2 - Project Description (cont'd)

2.3.6 Rolling Mills - line 1

The details of rolling mills to be installed under Line-I are described in the following sections. One Rolling Mill, namely a Heavy Bar, SBQ & Wire Rod Mill has been envisaged to be installed as per the required product-mix.

Heavy Bar, SBQ and Wire Rod Mill: One Heavy Bar, SBQ and Wire Rod Mill with annual capacity of 600,000 tons/Year for production of Rounds and RCS will be installed.

Design Basis: The mill will produce about 600,000 tpa of Rounds and RCS of various grades as per the product-mix given in Table.

Product	Wire Rod, Round and RCS
Product size	5.5 mm - 22 mm, 22 mm - 340 mm
Installed capacity	Approx. 600,000 tpa
Finished product	600,000 tpa

Production Program: The production program for HB, SBQ and WRM is given in Table below indicating the size-wise corresponding tonnages per year of finished products, based on the percentage breakdown of the product-mix adopted.

2.3.7 Rolling Mills - Line 2

The details of the rolling mills to be installed under Line-2 are described in the following sections. A Large Bar Mill is considered for installation based on the following envisaged product mix.

Large Bar Mill: One Large Bar Mill with installed capacity of 800,000 tpa for production of Rounds and RCS.

Design Basis: The mill will be capable of producing Rounds and RCS of various grades of steels as per the product-mix given in the following Table.

2 - Project Description (cont'd)

Product	Finished Products-Rounds & RCS
Product Size	38 mm - 365 mm
Installed Capacity	800,000 tpa

The rolled products are divided into three categories.

1. **Semi-Finished Bars:**

   i) Rounds - 200 mm to 365 mm
   ii) RCS - 200 mm to 300 mm

2. **Finished Large Bars:**

   Rounds & RCS - 100 mm to 200 mm

3. **SBQ Bars:**

   Rounds - 38 mm to 100 mm

Bloom Requirement: Keeping in view the modern practices in the production of Rounds and RCS products with improved productivity and yield the following input blooms and ingots are considered.

Ingots .. 650 mm Large End x 490 mm Small End x 1,563 mm High

700 mm Large End x 630 mm Small End x 1,160 mm High

Rounds .. Up to 1,200 mm

Blooms .. 160 mm x 160 mm, 240 mm x 280 mm, 320 mm x 400 mm

Mill Production Capability: Annual production capability of a mill depends mainly on:

i) The rolling rate after allowing for yield, rolling efficiency and gap time between the Blooms/Rounds/Ingots

ii) Mill availability after allowing for the delays and roll changing times as required by the rolling program.

Major Facilities: The proposed mill will comprise of the following major facilities.

i) Bloom, Ingots and Continuous Cast Rounds Storage
ii) Walking Beam type Reheating Furnace -110 t/hr with regenerative Burners

iii) Soaking Pits - Each 60 t/day
iv) Descaling Equipment
v) Cooling Beds

Rolling Mill Area:

i) One reversing Break Down Mill with Hydraulic roll gap control and roll changing device
ii) Finishing Mill with six continuous stands with stand/roll changing devices
iii) Bar Sizing Block with 4-stands
iv) Bar transferring facilities
v) Shears and Saws
vi) Finishing area facilities with bar bundling and tying stations
vii) Oil Lubrication Systems
viii) Grease Lubrication Systems
ix) Hydraulic Systems
x) Pneumatic Systems
xi) Central Oil Storage for Fresh oil and spent oil
xii) Finished Product storage DIASSPatch area
xiii) Scrap and Scale handling systems
xiv) Roll Shop BDM, Continuous Mill & SRM blocks and Area Repair shops
xv) DCW and MCW systems
xvi) Fuel Oils system
xvii) Electrical and automation system (L2)

Additionally, the following facilities will be installed for the Slow Cooling, Annealing, Pickling, and Inspection & Testing of the bars/coils.

1. Slow cooling pits/boxes:

Adequate No. of underground slow cooling pits with covers and boxes with covers for the slow cooling of the bars will be provided.

2. Bar and Coil Annealing/Normalising/Tempering Furnaces:

Adequate number of bogie hearth type annealing furnaces with oil/gas heating with radiant tube fired burners with air/fuel ratio controls will be provided for bars and bell annealing furnaces will be provided for coils. Temperature controls will be PLC based with SCADA.

Additionally, one Solution Annealing Furnace will also be installed.

3. Pickling of SS bars and coils:

To remove surface impurities and scale from the surface of stainless-steel bars and coils batch type tank facilities pickling facilities will be provided. It involves immersing the bars in an acid solution typically nitric-hydrofluoric acid mixture to dissolve the surface oxides.

Facilities for acids storage, handling, and dIASSPosal of the spent acids after neutralization will be provided.

4. Automatic inspection line - 2 lines:

The Automatic Inspection line comprises of Bundle Unscrambler, Chamfering Machines, Straightening Machine, Conditioning Saw, Hydraulic Press for RCS products, Shot Blasting Machine, Magnetic Resonance Tester, MFL and NDT Testing Equipment, MPI for large sizes, Bundling & Testing Equipment and Roller Tables. Additionally portable MFI units will also be provided.

5. Mechanical test laboratory:

Mechanical test laboratory will have facilities like -

Testing machines: Universal Testing machine, Hardness Testers, Impact tester, Fatigue Testing Machine, Torsion Testing Machine for performing different mechanical Tests.

Specimen Preparation Equipment: Cutting, Grinding Polishing Machines and equipment for preparing specimens according to testing standards.

Environmental Chambers: Climate Chambers for controlling and humidity during testing, especially for materials testing under specific environmental conditions

Measuring Instruments: Calipers, Micrometers, Gauges, Rulers etc.

Calibration Facilities: Calibrating facilities for testing equipment and measuring instruments



2.3.8 Calcining Plant

It is proposed to install a calcining plant to produce calcined lime and dolomite to be used as flux for steelmaking.

It is proposed to install two vertical shaft kiln of capacity 300 TPD, to produce calcined materials. The number of working days per year will be 330.

The calcining plant will comprise raw material storage and handling, kilns with kiln feed buildings and calcined product storage. The plants will be provided with kiln waste gas cleaning system and dedusting system for the calcined material handling facilities.

2.3.9 By-Product Fuel Gas based Power Plant

It is proposed to install an 18 MW gas based power plant for utilization of excess BF and BOF gas.

2.3.10 Air Separation Plant/Oxygen Plant

To meet the requirement of industrial gases like oxygen, nitrogen, and argon for various process facilities of the steel plant, two Air Separation Plant (ASP) of 1 x 420 TPD and 1 x 460 TPD are proposed to be installed. The requirement of oxygen, nitrogen, and argon are as given in Table 2-19.

TABLE 2-19 - BREAK-DOWN OF MAJOR PLANT POWER REQUIREMENT

Gas Production	Qty (in TPD)
Oxygen	880
Nitrogen	260
Argon	10

2 - Project Description (cont'd)

2.4 UTILITIES AND SERVICES

2.4.1 Water

The water source for the proposed steel plant is from Mahanadi River. An intake well & pump house is being constructed by IDCO in Mahanadi River at Phulbari in Cuttack District of Odisha for supplying water to this plant. A 15 km long pipeline with maximum carrying capacity 2,500 cu m/hr is being laid by IDCO from the proposed intake well to the reservoir located within this plant. Additionally, water collected from rainwater harvesting would also be used to cater to the plant water requirement. The total plant raw water requirement shall be about 762 cu m/hour for the 1.43 MTPA greenfield project.

Considering the above, the raw water drawn will be stored in a water reservoir with a storage capacity of 700,000 m^3 including dead storage and others for 24 days storage. The raw water shall be sent to Raw Water Treatment Plant (RWTP) to treat the raw water to render it fit for use as makeup water. The treated water shall be collected in a storage water tank. The plant make-up water shall be supplied from the make-up water pump house adjacent to the storage tank to the various consumers. The water comfort letter from IDCO has been attached in Appendix - 2-2.

The water balance diagram showing the unit wise make-up water requirement, wastewater generation and the quantity of wastewater recycled for the proposed plant units are shown in Drg. 11748-97A-000-ENV-0005.

The unit-wise requirement of raw water in the proposed units is provided in Table 2-20.

2 - Project Description (cont'd)

TABLE 2-20 - UNIT-WISE REQUIREMENT OF MAKE UP WATER

Plant Facilities/ Operations	Make-up water required in cu m/hr
Coke Oven and Power Plant	100
Blast Furnace	110
Sinter Plant	16
Lime Calcination Plant	1
FMF, LF, BOF	140
FMF Fume Extrator	14
VD/AOD Units	75
HMPT	2
Heavy Bar, SBQ & Wire Rod Mill Roll Cooling and Large Bar Mill Roll Cooling	41
Heavy Bar, SBQ & Wire Rod Mill Furnace, Oil Cooling, etc and Large Bar Mill Oil Cooling	66
Oxygen Plant	24
Pig Casting Machine	20
Slag Granulation plant	20
Caster Mould Cooling	26
Caster Spray and Open Machine Cooling	14
BFG Based Captive Power Plant	25
Fire fighting	6
DM Plant	100
Softening Plant	25
Miscellaneous	12
Total	**837**
Recycled water from CETP	**75**
Net withdrawal	**762**

The proposed project facilities are being designed suitably to minimize the water consumption with improved efficiency and better usage of plant equipment.

2.4.2 Electrical Power

Source of Power: The power requirement (257 MW) for the project will be met from OPTCL Grid at Neulpoi (located 10 km away) at 220 kV or from Khuntuni (located 4 km away) at 33 kV. The Electricity comfort letter from IDCO has been attached in Appendix - 2-3.

2 - Project Description (cont'd)

The area-wise break-down of major plant power requirements is given in Table 2-21.

TABLE 2-21 - BREAK-DOWN OF MAJOR PLANT POWER REQUIREMENT

Plant Unit	Connected Load MW
Coke Oven Plant including Power Plant auxiliaries	21.4
Blast Furnace	45.7
Sinter Plant	22.9
Lime Calcination Plant	3.4
EAF/ZPF	60.9
BOF	9.0
IF	53.0
LF	28
VD	2.8
RH	5.6
AOD	0.6
Ingot Casting	1.2
CCM	11.2
Heavy Bar, SBQ and Wire Rod Mill	30
Large Bar Mill	30
Raw Material Handling System	2.7
Utilities and Services	53
Total	**381**

Considering in-house power generation of about 89.5 MW, it will be necessary to draw power of about 176 MW power from grid (assuming 0.693 diversity factor and 3% losses). Around 25 MW of power would be obtained from renewable sources.

Emergency Power Supply: Provision will be made for taking emergency lighting power supply in the substations, control rooms etc. from the Static Emergency Power (SEP) units with battery back-up. DG sets of 1 x 8 MVA would be provided for construction power.

2 - Project Description (cont'd)

Conservation of Energy: Energy conservation will be contemplated in technological processes through process optimization and energy recovery measures. Use of VSD drives for variable flow requirement, adoption of energy efficient motors for constant speed application, adoption of power factor compensation equipment, use of energy efficient lamps etc. are some of the measures which substantially reduce the consumption of electrical energy. Lighting distribution circuits will be controlled through PLC/timer, so as to switch off the circuits selectively where lighting is not required in daytime. About 10% of the total power requirement shall be met through installation of solar power.

2.5 POLLUTION MITIGATION MEASURES

In view of the proposed project, any potential environmental impact would be mitigated and addressed by KSL as commitment to excellence in sustainable development with use of leading technologies. The following description gives an overview of the pollution control measures as envisaged for the proposed facilities.

2.5.1 Air Pollution Control (APC) Measures

Various process operations would generate particulate dusts, oxides of Sulphur and nitrogen and carbon dioxide to the environment. There would be point source emission from the stacks as well as fugitive emissions from open and closed areas. The stack details for the proposed plant are furnished below in Appendix 2-4.

The APC measures as presented in Table 2-22 would form an integral part of the project conceptualization and design.

The air pollution control equipment installed as part of the project would be designed to adhere to the Emission Standards stipulated by MoEFCC & CPCB. For Sinter Plant state-of-the-art technology would be implemented to control SO_2, dioxins and furans.

TABLE 2-22 - AIR POLLUTION MITIGATION MEASURES OF PRODUCTIN FACILITIES

Sl. No.	Plant/ Section	Potential sources of pollution	Pollutant emissions	Mitigation measures
1.	Raw materials Handling Section (RMHS)	- Open stockpiles, bedding & blending yard, conveyor transportation for all production facilities	Fugitive dusts	Water sprinkling, covered conveyors, Dry Fogging (DF) at transfer points
		- Closed area crushing/screening bunkers loading	Fugitive dusts	DF and PTFE bag filter based DE system as per ACGIH norms
2.	SMS (EAF/ZPF, BOF, LF, VD and RH)	- Secondary emissions at the time of charging/tapping/ blowing	PM, NOx	Dry type gas cleaning system with Bag filters for cleaning of the gas before using as in-plant fuel & production of power in CPP
			PM/fumes	Dog house with FE system for secondary emission control
		- Fugitive emission from WRP	PM/fumes	Water sprinkling
3.	Calcination Plant	Kiln waste gas	NOx, PM	Bag Filter
4.	Blast Furnace	- Material handling in Stock house	PM	PTFE based bag filters
		- Cast house	PM/fumes	PTFE based bag filters
		- Stove off gas	NOx	
		- Process off gas	PM, NOx	Dry type Gas Cleaning Plant for cleaning of the process gas before using as in-plant fuel & production of power in CPP
5.	Sinter Plant	- Central Plant Dedusting Area	PM, SO_2 & NOx, dioxin, furan	De-dusting system with PTFE lined bag filter
		- Waste Flue gas		ESP for cleaning waste process gases Future provision for hydrated lime injection and 50% of the waste gas to be recycled into sinter machine for reduction of SO_2, PM, dioxin & furan (PCDD/F)
6.	Rolling Mill	Off gas from furnace heating	SO_2, NOx,	Low Nox oxy-fuel burner
		Hydraulic oil	Oil smog	Oil Mist Interceptor (OMI)
7.	Coke Oven	- Furnace heating - Combustion of volatile by-products for generation of waste heat based power	PM, SO_2	Land based pushing emission control, scrubber for SO_2 and low NOx burner

2 - Project Description (cont'd)

2.5.2 Noise Pollution Control Measures

Continuous noise would arise from the operation of pumps, compressors, exhausters, blowers and fans. Intermittent noise would arise from the steam ejection and from machinery for raw material handling.

The design criteria of noise levels for the new equipment and machineries which would remain outdoor would be fixed at 85 dB(A) Leq within 3 m distance from the noise prone equipment.

i) In order to mitigate the work zone noise level, it is proposed to confine all the noise making equipment, which do not require continuous attendance in a separate housing. In addition, for areas where there is crane movement, and other noisy process operations, the operational staff would work from the noise shielded control rooms/pulpits.

ii) At the time of design and engineering of the proposed project, special attention would be given to selection of low noise prone equipment. Rotary equipment prone to vibration would require vibration dampening at the time of grouting of those equipment. In addition, noise due to release of high-pressure steam or exhaust systems would require attenuation by silencers of appropriate designs.

iii) Use of earmuffs by the operational and maintenance personnel would be required to work in noisy environment for a short duration.

iv) Administrative control by preparing appropriate rosters of the operating personnel so that no one stays beyond 8 hrs on a continuous basis in noisy environment of Leq above 85 dB(A).

With the above stated noise mitigation measures, the ambient noise level at the plant boundary would not have adverse impact.

2 - Project Description (cont'd)

2.5.3 Wastewater Management Measures

The effluent streams generated from the proposed plant facilities would mainly comprise of cooling tower blowdown, oil and grease contaminated effluent from direct cooling circuits and plant sanitary wastewater. The other effluents would be treated in an ETP with RO for recycling as plant make up water.

Total blow-down comes to be 182 m^3/hr for the proposed units and additional treated waste water from STP would be 5 m^3/hr. Out of 187 m^3/hr, 25 m^3/hr would be reused in Coke Quenching and the rest would be used for for fire fighting and dust suppression.

The entire IASSP would be designed on Zero Liquid Discharge principle. The storm water and other surface run off would be captured in garland drains with silt traps and reused to the maximum extent possible. Only the excess quantity would be discharged outside plant premises. The water accumulated in quenching pond from Coke Oven Quenching towers shall be recirculated back to the quenching towers for coke quenching. The various effluent generation quantities are shown in the Water Balance Diagram (Drg. 11748-97A-000-ENV-0005). Wastewater generation and its management is shown in Table 2-23.

2 - Project Description (cont'd)

TABLE 2-23 - WASTEWATER GENERATION AND ITS MANAGEMENT

Sl. No.	Plant Unit	Wastewater Quantity (KLD)	Treatment Proposed
	Lime Calcining plant	9.6	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Sinter Plant	120	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Coke Oven with WHRB	720	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Blast Furnace	396	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Basic Oxygen Furnace	960	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	HMPT	624	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Caster Mould Cooling	180	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Heavy Bar, SBQ, Wire Rod Mill, Furnace, Oil Cooling, etc	360	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Oxygen Plant	998.4	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Sanitary Waste Water	120	Treatment in STP for use in Horticulture
	BF Gas based Captive power plant	408	WW generated to be treated in CETP with RO for reuse as make up water and partly for low end use after primary treatment.
	Total	**4,896**	

2.5.4 Solid Waste Generation

BF slag would be granulated and sold to cement manufacturers. ZPF/EAF slag would be used in construction activities like road sub-grade preparation, concrete aggregates etc. APCD dust and mill scale would be recycled in the Sinter Plant. After separation of metallics, BOF slag would be weathered and utilized for construction activities.

2 - Project Description (cont'd)

Apart from this hazardous waste like used oil, discarded paint drums, ETP sludge, RO rejects etc. will be generated and dIASSPosed of through authorized agency. E-waste generated shall be dIASSPosed of through authorized recyclers.

Provision would be kept for temporary storage of hazardous wastes inside plant in an earmarked area for a maximum of 90 days. Solid Waste generation and its utilization is shown in Table 2-24.

TABLE 2-24 SOLID WASTE GENERATION AND ITS UTILIZATION

(Non-Hazardous):

Unit	Description of Waste	Quantity (TPA)	End Use
Coke Oven	Coke Breeze	97,684	Recycled in sinter plant
	GCP Dust	45,227	Recycled in sinter plant
Blast Furnace	BF Slag	60,1657	For cement manufacturing
EAF/ZPF	EAF/ZPF Slag	113,213	Construction of roads
BOF	Slag	121,746	Construction of roads, as railway ballast etc. after weathering
Mills	Mill Scale	51,936	Recycled in sinter plant

(Hazardous):

Unit	Description of Waste	Quantity (TPA)	End Use
ETP RO	RO Reject	1140	Handed over to authorized agency for dIASSPosal at CHWTSDF
Plant Units	Used Oil	100	Co-processed/Recycled in process units/Handed over to authorized agency for recycling or dIASSPosal at CHWTSDF

2 - Project Description (cont'd)

The proposed pollution control measures would be designed based on the criteria as per the prevailing CPCB norms. Routine environmental monitoring of stack emission, ambient air quality, work zone air quality, noise level and wastewater quality would be carried out. The monitored data would be recorded and necessary corrective measures to be implemented to avoid any non-compliance of prevailing Statutory Regulations.

2.6 MANPOWER

During the construction & operation phases both direct & indirect workers would be required. It is estimated that about 3,000 people will be indirectly and 7,200 people will be directly employed during operation phase of this project. During construction phase, there would be around 12,000 contractual workers and 500 people will be directly employed.

2.7 CAPITAL COST

The estimated capital cost of the project is INR 11,058 crore (net of GST).

2.8 SCHEDULE FOR APPROVAL AND IMPLEMENTATION

Mar 2025	..	Submission of Form 1
May 2025	..	ToR issued by MoEFCC
June 2025	..	Draft EIA submitted for PH
Aug 2025	..	Public Hearing
Oct 2025	..	Final EIA submission to EAC

The implementation of the project will be taken up after receipt of Environment Clearance (EC) from MoEFCC and Consent to Establish (CTE) from OSPCB repectively. The project is envisaged to be implemented within a period of Eighty-Six (86) months from receipt of EC and CTE. The project schedule includes various activities like civil works, engineering, procurement, erection and commissioning.

2 - Project Description (cont'd)

The implementation schedule for the proposed project is presented in Fig 2-5.

Sl.No.	Tasks	Start Date	Target Completion Date	CY 2024		CY 2025		CY 2026		CY 2027		CY 2028	
				Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec
1	Land Transfer to the KSL	Milestone	30-Jul-25										
2	Forest Clearance Approval	18-Apr-24	30-Nov-25										
3	Environmental Clearance Approval	18-Apr-24	30-Nov-25										
4	Consent to Establish	1-Sep-25	31-Dec-25										
5	Tech. Order finalization of Main packages	1-Jan-25	15-Nov-25										
6	Placement of order for all main packages* (Blast Furnace, Sinter Plant, Rolling Mill)	16-Nov-25	15-Feb-26										
7	Main Technology Package : Manufacturing and Delivery	11-May-27	8-Sep-27										
8	Auxiliary Plant, Equipment and BOP Ordering	30-Nov-25	31-Jan-28										
9	Plant Engineering	28-Jul-25	7-Dec-27										
10	Site Grading	15-Dec-25	13-Jun-26										
11	Civil and Structural Execution	15-Apr-26	9-Jul-27										
12	Dismantling, Shifting and Refurbishment of Equip.	15-Nov-25	14-Nov-26										
13	Equipment Erection of Kamineni Equipments	15-Dec-26	15-Aug-27										
14	New Equipment Erection	10-Sep-27	4-Sep-28										
15	Start of Cold commissioning	5-Sep-28	5-Oct-28										
16	Start of Hot commissioning	6-Oct-28	31-Oct-28										

*Zero Date is effective date of contract (Date of Ordering + 2weeks for payment)

FIG. 2-5 - IMPLEMENTATION SCHEDULE FOR THE PROPOSED PROJECT

2.9 PRESENT STATUS OF COMPLIANCE

The proposed project is a greenfield one and is yet to apply for EC and other necessary consents.

3 - DESCRIPTION OF THE ENVIRONMENT

The current chapter presents the prevailing environmental setting at the project site & the surrounding area. The pre-project environmental status would provide the base to assess the potential impacts arising out of the proposed project activities at Dhenkenal, Odisha.

3.1 STUDY AREA

For the purpose of environmental impact assessment (EIA), the study area has been classified into two areas, namely,

i) the project area of about 224.737 ha land for future use), where the proposed plant would be set-up; and

ii) the study area surrounding the project site, with an aerial coverage of about 10 km from the periphery of the proposed project site.

3.2 SCHEDULE OF BASELINE STUDY

In order to determine the pre-project environmental status at the study area, field monitoring was carried out during the period from October 2024 to December 2024.

The monitoring was carried out at the specific locations/ villages within the study area for various physico-chemical, geological, biological & human components of the environment. The Monitoring Location Map appended in respective sections indicates the sampling locations selected as per the ToR granted by MoEFCC, for the various physico-chemical components which are listed below:

3 - Description of the Environment (cont'd)

Parameters	Code	Monitoring Locations	Direction from site	Distance from site, km
Soil	S1	Project Site	-	0
	S2	Agriculture Land- Manipur	S	1.8
	S3	Agriculture Land-Siaria	N	2.2
	S4	Forest Soil-Mahulapada	NE	9.8
	S5	Forest Soil- Adala	E	5.2
Surface Water	SW1	Sapua Nadi (DS)Near Parsurampur Vill.	SE	8.4
	SW2	Sapua Nadi (US) Near Kuanal Village	SW	4.9
	SW3	Mahanadi (US) Near Subarnpur Village	SW	14.7
	SW4	Mahanadi (DS) Near Kandarpur Village	SE	12.4
	SW5	Kantola Nala, Near Gourangpur Village	SE	8.1
	SW6	Kantia Nala, Near Gopinathpur Village	SE	4.4
	SW7	Nala (Near Siaria Village)	NE	0.2
	SW8	Pond Water, Near Maniabandhe Village	NW	3.4
Ground Water	GW1	Padmanabhpur Village	SW	2.4
	GW2	Patrabhag Village	N	0.1
	GW3	Regeda Village	SE	2.5
	GW4	Bansaputia Village	N	0.1
	GW5	Talabarkote Village	E	0.3
	GW6	Dhirapatana Village	SW	7.9
	GW7	Manipur Village	S	1.2
	GW8	Siaria Village	NE	0.5
Meteorology	MET	Bodapara, Dhenkanal	N	5.9
Ambient Air	A1	Padmanabhpur Village	SW	2.4
	A2	Patrabhag Village	W	1.6
	A3	Ragada Village	SE	2.5
	A4	Bansaputia Village	N	0
	A5	Talabarkoe Village	E	0.3
	A6	Dhirapatana Village	SW	7.0
	A7	Manipur Village	S	1.3
	A8	Siaria Village	NE	0.5
Noise	N1	Project Site	-	0
	N2	Spinning Mill, Govindpur	NE	1.5
	N3	Badrapali	SW	2.8
	N4	Patrabhag	NW	0.5
	N5	Talabarkote Market	NW	0.7
	N6	Saptasajya Market	W	2.5
	N7	Primary School- Talabarkote	E	0.2
	N8	Ragada High School	SE	2.5
Terrestrial Ecology	TE1	Open Mixed Jungle near Patrabhag Vill.	W	0.50
	TE2	SaptaShajya RF near Padmanavpur Vill.	W	5.5
	TE3	Mayuri RF near Gajamara Village	NW	7.0
	TE4	Charakhola RF near Gobindpur Village	N	3.5
	TE5	Kapilasa RF at near Mahulpada	NE	7.5
	TE6	Gadabola RF near Kasiapada	NE	6.5
	TE7	Adala RF near Regeda	E	5.5
	TE8	Phulabarhi PF near Radhaprasannapur	S	9.0
Aquatic Ecology	AE1	Sapua Nadi – DS-Parsurampur Vill.	NW	2.5
	AE2	Sapua Nadi- US Nr. Kuanla Village	N	2.0

3 - Description of the Environment (cont'd)

Parameters	Code	Monitoring Locations	Direction from site	Distance from site, km
	AE3	Mahanadi R. Nr. Kandarpur ferry ghat	S	12.4
	AE4	Mahanadi R.- US Nr. Subarnpur Village	S	14.7
	AE5	Kantla Nala (Near Gaurangapur Village)	SE	9.6
	AE6	Kantla Nala (Near Gopinathpur Village)	SE	6.5
	AE7	Nala (Near Siaria Village)	N	4.5
	AE8	Pond (Near Mania Bandha Village)	N	2.0
Geo-hydrology	WL1	Talabarkote Vill.	E	0.4
	WL2	Manipur Vill.	SW	0.7
	WL3	Bhadrapali Vill.	W	1.6
	WL4	Bansaputia Vill.	N	0.1
	WL5	Govindpur Vill.	NE	3.2
	WL6	Siaria Vill.	NE	0.6
	WL7	Mahulparha Vill.	NE	5.9
	WL8	Khejurai Vill.	NE	7.8
	WL9	Narhiali Vill.	E	1.7
	WL10	Deopada Vill.	SE	2.4
	WL11	Daroda Vill.	E	1.3
	WL12	Sathilo Vill.	SW	3.7
	WL13	Manjaripada Vill.	SE	8.2
	WL14	Gajamara Vill.	NW	2.5
	WL15	Krushnaprasad	SW	7.8
	WL16	Gangadharprasad Vill.	SW	8
	WL17	Shankarpur Vill.	SW	7.2
	WL18	Guduparha Vill.	SW	8.1
	WL19	Kuanlo Vill.	SW	4.5
	WL20	Padmanavpur Vill.	SW	2.5
	WL21	Tarasingha Vill.	SE	4.0

3.3 PHYSICAL FEATURES OF THE STUDY AREA

3.3.1 Physiography

The district can be broadly divided into four natural physiographic units. These are (i) Southern Mountainous Region, (ii) Eastern Valley and Plain, (iii) Central Undulating Plain and (iv)Northern Mountainous Region. The district is characterized by rugged forest cladded mountainous terrain with narrow intermontane valleys.

The study area lies in the southern mountainous region with the hill ranges trend NNW-ESE and it forms a watershed between the Brahmani and Mahanadi rivers. These hill ranges which form the water divide between the Mahanadi and Brahmani basins are denudational to erosional in nature and covered with moderate to dense forest.

3 - Description of the Environment (cont'd)

3.3.2 Topography

The study area is characterized by undulating to broad flat topography with hills having elevations ranging from 60 to 530 m amsl. The topographic features of the study area may be seen from Survey of India OSM Nos. F45T10 & F45T11 and broad topographic features are presented in Fig. 2-3 of Chapter 2.

The digital elevation model (DEM) of the study area of 10 km radial coverage in black as shown in Fig. 3-1 on the next page, generated from SRTM data (90 m spatial resolution) shows the elevation varying from around 60 m to 530 m above mean sea level.

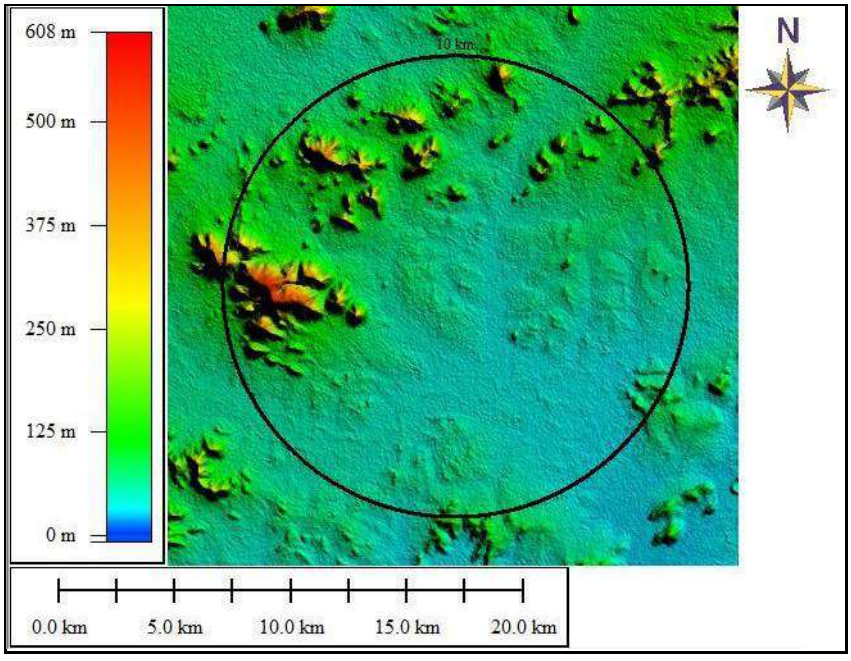


FIG. 3-1 - DIGITAL ELEVATION MAP OF THE STUDY AREA

3.3.3 Drainage

The river Mahanadi and its tributaries control the drainage in the study area. The extreme north-northwestern part of the study area falls in Brahmani & Baitarini river basin and Bara Jora, a tributary of

3 - Description of the Environment (cont'd)

perennial Brahmani River flowing towards south-east drains the same. The nearest river located within the buffer zone of the project site is Sapua river which is 6.5 km from the project site.

The Bara Jora and Benga nadi are tributaries of the Sapua River in the southeastern & southwestern part respectively of the study area and form the catchment of the Mahanadi River basin.

The smaller streams/nalas show dendritic pattern while the major river and its tributaries show sub-parallel drainage, indicating structural control. A few small ponds/water reservoirs which are traditional sources of water storage exist in the study area. The drainage map of the study area is presented in Fig. 3-2.



FIG. 3-2 - DRAINAGE MAP OF THE STUDY AREA

3 - Description of the Environment (cont'd)

3.3.4 Seismicity

As per Seismic Zone India Map, the state of Odisha falls in a region of low to moderate seismic hazard. According to IS: 1893 (Part-1)-2002 of Bureau of Indian Standard (BIS), the district of Dhenkanal lies in the Seismic Zone III in the scale of II to V where V experiences the highest hazard.

3.3.5 Land Use and Land Cover

The land use/land cover mapping was carried out using digital satellite image procured from NRSC, Hyderabad. Details of the satellite data are as given below:

Satellite	Sensor	Scene-Spec	Bands	Date of Pass
RS 2	LISS IV–FMX	106-58-A	2,3,4	23rd Nov 2024

The satellite imagery procured from NRSC is presented in Fig. 3-3.

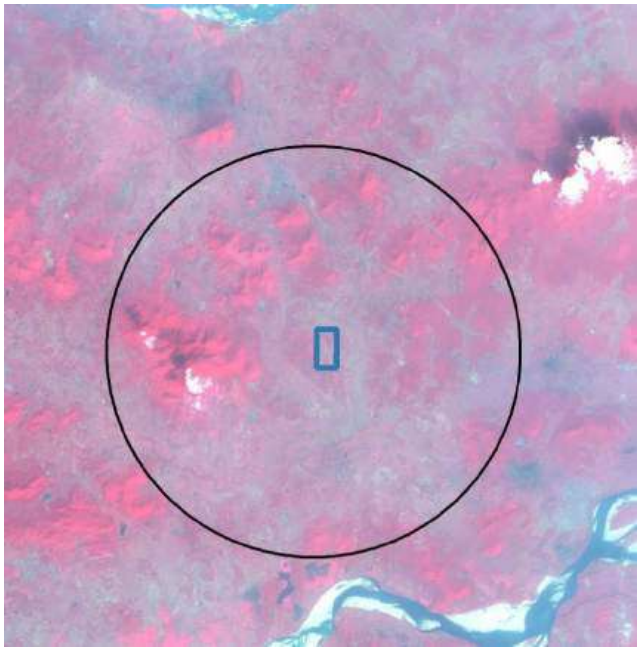


FIG. 3-3 – SATELLITE IMAGERY OF THE STUDY AREA

3 - Description of the Environment (cont'd)

The analysis of data was preceded by collection of ancillary data like the Survey of India OSM Nos. F45T10 & F45T11 of 1:50,000 scale as base information for interpretation. The study area was demarcated on the ancillary map collected.

The landuse study for 10 km radial area coverage from the proposed plant periphery was conducted by mapping the area using satellite imageries by way of digital image processing which includes image rectification; image enhancement; visual interpretation & land use mapping. The Survey of India OSM and Google Earth map were used for the geo-reference and validation. The authentication by some reference data/ground control points through field visit was conducted for finalizing the map.

Finally, from the image analysis, interpretation and generated data of the study area during field validation, a thematic land use map of the study area has been prepared and presented in Drg 11748-97A-000-ENV-0006. Relative distribution of land class units of the core zone and the study area is depicted in Fig. 3-4.

In the core zone of area around 224.737 ha, a total of 8 classes have been mapped and area occupied by each class has been tabulated for pre-project and post-project scenario as shown in in Tables 3-1 & 3-2.

TABLE 3-1 - PRE-PROJECT LANDUSE

Sl. No.	Land Use Type	Area in hectare (ha)
1	Forest Land	60.2
2	Agriculture land	80.13
3	Grazing Land	6.47
4	Barren Land	25.56
5	Surface water bodies	3.84
6	Settlements	1.62
7	Roads/Other infrastructure	4.86
8	Industrial use	42.05
	Total Area	**224.73**

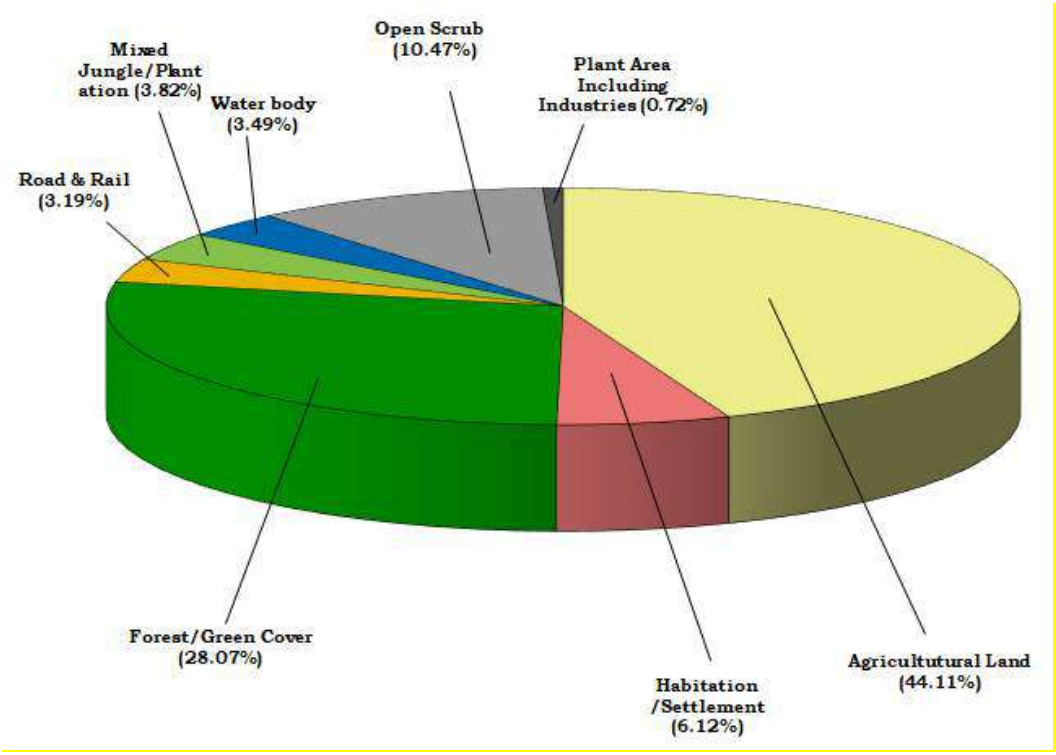
3 - Description of the Environment (cont'd)

TABLE 3-2 - POST-PROJECT LANDUSE

Sl. No.	Category	Area (in ha)
1	Plant Unit area	98.806
2	Parking Space	1.373
3	Road & Railway Route	12.700
4	TSDRF Area	1.380
5	Greenbelt inside physical boundary	72.105
6	Vacant Area for future use	32.141
	Total Area within physical boundary	**218.505**
7	Greenbelt outside physical boundary	2.842
8	Natural pond outside physical boundary for access by villagers	3.390
	Total area outside physical boundary	**6.232**
	Grand Total	**224.737**

In the buffer zone of area around 31,170.97 ha, a total of eight classes have been classified. The most dominant land categories are agricultural land which covers around 44.11% area (13,750.16 ha) followed by forest covering around 28.07% (8,751.01 ha). Waterbodies cover 3.49% (1,088.01 ha) and open scrub covers 10.47% (3,262.56 ha) of the study area. Habitation/Settlement occupies 6.02% (1,907.61 ha) of the study area. Rail/road and mixed jungle including plantation covers about 3.19% (999.85 ha) and 3.82% (1,192.24 ha) respectively of the study area. Industries, including the plant area cover about 0.72% (224.53 ha) of the total buffer zone in the study area.

3 - Description of the Environment (cont'd)



Land Use of the Study Area (31170.97 ha)

FIG. 3-4 - LANDUSE PATTERN OF THE PROJECT SITE AND THE STUDY AREA

3.3.6 Geology

The area under study is a part of Eastern Ghat mobile belt. The area is dominated by rock formations of Eastern Ghat Supergroup of Precambrian age and Gondwana Supergroup. Gondwana Supergroup rocks are younger in age than Eastern Ghat Supergroup of rocks and both are tectonically separated from each other.

Precambrian represented by the rocks of Eastern Ghat Super Group are the oldest rocks in the study area and predominant in its central and southern part and form the basement for the Gondwana Group of rocks. These basement rocks mainly comprise granite and granite- gneisses and Khondalites. At places quartzite and charnockites



are also reported. The exposures of these formations are seen along linear ridges and nala and river courses in the area. The general strike of these rocks is NNW-SSE.

Lower Gondwana rocks ranging in age from Lower Permian to Lower Triassic lie unconformably over the basement of Precambrian age. These rocks are predominant in the northeastern part of the study area.

Lower Gondwana formations are unconformably overlain by alluvium of Quarternary age. The recent to sub-recent alluvium occurs as flood plain and channel deposits along Brahmani River and its associated tributaries and nalas. It is characterized by fine to coarse grained sand, gravel, silt and clay.

The geological succession in the study area is as indicated in Table 3-3 and geological map of the study area is presented in Fig. 3-5.

TABLE 3-3 - GEOLOGICAL SUCCESSION IN THE STUDY AREA

Period	**Age**	**Formation**	**Lithology**
Quaternary	**Recent**	**Alluvium**	**Alluvium**
----------Unconformity----------			
Upper Paleozoic to Lower Mesozoic	Upper Permian to Lower Triassic	Kamthi Formation	Sandstone & Shale
	Upper Permian	Barren Measures	Sandstone & Shale
	Middle Permian	Barakar Formation	Sandstone & Shale
	Lower Permain	Karharbari Formation	Felspathic Sandstone, Shale & coal
	Upper Carboniferous to Lower Permain	Talcher Formation	Sandstone, Shale & coal
----------Unconformity----------			
Pre-Cambrian	Eastern Ghat Supergroup	Granite and Granite Gneiss (Iron Ore Super Group), Khondalite, Charnockite, Granite & Granite Gneiss and Quartzite of (Eastern Ghat Group)	

3 - Description of the Environment (cont'd)

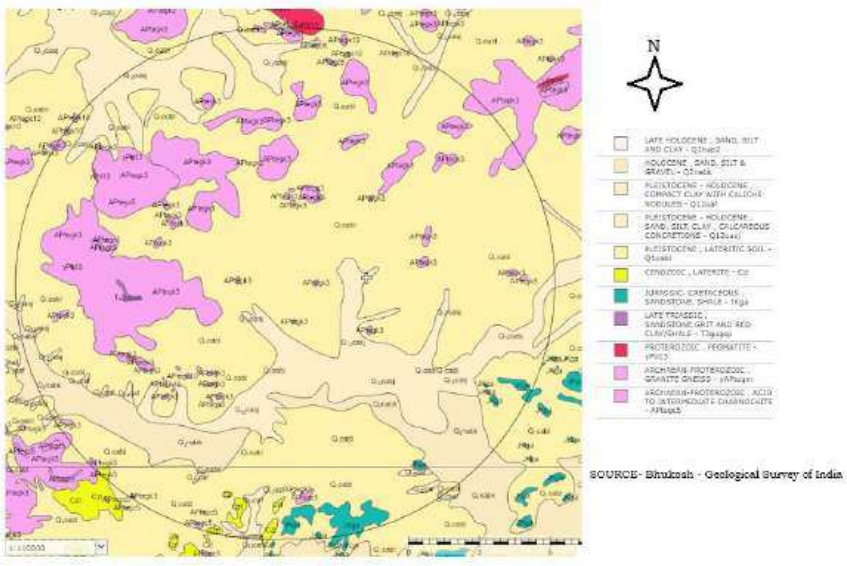


FIG. 3-5 - GEOLOGICAL AND MINERAL MAP OF THE STUDY AREA

3.3.7 Geo-Hydrological Status of the Study Area

The geological set-up of the area primarily governs the occurrence as well as the movement of groundwater in the district. A major part of the district is underlain by hard crystalline rocks and is devoid of any primary porosity and hence when weathered and fractured, secondary porosity is developed. The semi-consolidated Gondwana sandstone forms moderately good aquifer, when weathered and fractured. The recent alluvium, which occurs in limited patches, sustains a very good yield. Since a major part of the district is underlain by hard rocks of diverse lithological compositions and structures, the water-bearing properties of the formations vary widely. Groundwater occurs under water table conditions in recent alluvium as well as in the semi-consolidated formations whereas in the deeper fractured rocks, the groundwater occurs under semi-confined to confined conditions. Depending on the different aquifer systems and their parameters in different litho-units, the major hydrogeological units in the state can be divided into three categories: i) Consolidated formations, ii) Semi-consolidated formations and iii) Un-consolidated formations.

3 - Description of the Environment (cont'd)

Water-bearing properties of the Consolidated Formations: The crystalline rocks like granite, granite gneiss, khondalite etc. that comprise most part of the district is devoid of any primary porosity. But the process of weathering and fracturing imparts secondary porosity in these rocks, permitting storage and transmission of groundwater. The thickness of the weathered zone is usually more in the topographic lows and undulating plains than in the highland areas. Groundwater occurs under water table conditions in the weathered zone and under semi-confined to confined conditions in the deeper fractured zones. The water yielding capacity of the fractured rocks largely depends on the degree of fracturing, their horizontal extent as well as their interconnection.

Aquifer System and Aquifer Parameters of the Different Litho-units: Granite and Granite Gneiss: Major parts in the district are occupied by granite, granite gneiss that are highly weathered and fractured. The thickness of the weathered zone varies from 5m to 20 m, which forms the repository of groundwater at shallow depth. Groundwater occurs under phreatic conditions in this zone and can be developed through dug wells.

Khondalite: These rocks are restricted to higher elevations forming steep linear ridges and hence groundwater potential is limited although the foliated nature of the rock facilitates deep weathering. In pediment areas, the thickness of the weathering zones varies widely.

Water-bearing Properties of the Semi-consolidated Formations: These are represented by rocks of Gondwana formation, which have faulted contact with the Pre-Cambrian rocks. It consists mainly of sandstone and shale. The friable and loosely cemented sandstone forms the aquifer. Ground water occurs in phreatic condition in the weathered zone and semi-confined to confined condition in deeper

fractured and friable sandstone beds. The aquifer in these formations may sustain limited to moderate yield. Auto-flowing conditions have been encountered at Kumuda.

Water-bearing Properties of the Un-consolidated Formations: Laterites and alluvium of Sub-Recent to Recent age constitute the unconsolidated formations which occur as thin, discontinuous patches adjoining the rivers. Laterites occur as capping over the older formations and tapped through dug wells. The aquifer sustains moderate yield. Recent alluvium occurs in thin, discontinuous patches as valley fills and also along the course of major rivers and streams.

Aquifer Characteristics of Crystalline Rocks: In the hard crystalline rocks, the recharge of ground water from precipitation or seepage from surface water bodies percolate into the weathered and semi-weathered (Saprolite) zone. The presence of fractures in the basement rock, which opens to the overlain saprolite zone facilitates downward percolation and movement of the water, which can be tapped through dug wells in the weathered and semi-weathered zone and through bore wells in the deeper horizons. At places, confined condition gives rise auto flowing wells (Kumuda). The groundwater potential of various zones i.e. saprolite (tapped through dug wells), weathered basement rock and shallow fractured rocks (tapped mostly through hand pumps) and deeper fractured rock (tapped through deep bore wells) vary considerably depending upon their lithological and structural characteristics. By conducting pumping tests both in dug wells and in bore wells in different litho-units and by analyzing the data adopting various methods, it has been concluded that granite gneiss forms the most potential aquifer followed by Khondalites. Yield is poor in Gondwana sediments in deeper horizons whereas moderate yield can be obtained in the weathered zone. But the un-consolidated alluvium forms the most prolific aquifer.

3 - Description of the Environment (cont'd)

3.3.8 Aquifer Parameter

As reported by CGWB (Report on Aquifer Mapping & Management Plan in Dhenkanal district, Odisha), the following are the characteristics of aquifer group in Dhenkanal.

Type of Aquifer Group	Formation	Depth range (m bgl)	Yield	Aquifer parameter
Aquifer-I (Phreatic)	Unconsolidated and Weathered Recent: Soil, Alluvium & Laterite Lower Gondwana: Sandstone, Shale and conglomerate Pre-Cambrian: Granite Gneiss, Charnockite, Khondalite	0-30	10-50 m^3 /day	Specific Capacity Index: 0.5-40 lpm/m/m^2
Aquifer-II (Semiconfined to Confined)	Fractured Granite Gneiss, Charnockite, Khondalite, Gondwanas	30-200	Negl. - 2 lps	Transmissivity: 0.95-6

3.3.9 Water Level

Pre-Monsoon: Depth to water level during April 2022 as measured by CGWB (CGWB Groundwater Yearbook of Odisha, 2022-23) for ground water monitoring in Dhenkanal district indicates the following four groups based on the range of water levels.

Range of Water Level (m bgl)	Percentage of sources (Dhenkanal)
0-2	0
2-5	38.46
5-10	56.41
10-20	5.13

As reported, the depth to water level in Dhenkanal ranges from 2.44 to 11.92 m bgl.

Post Monsoon: Depth to water level during November 2022 as measured by CGWB (CGWB Groundwater Yearbook of Odisha, 2022-23) for ground water monitoring in Dhenkanal district indicates the following three groups based on the range of water levels.

Range of Water Level (m bgl)	Percentage of sources (Paschim Bardhhaman)
0-2	34.09
2-5	45.45
5-10	20.45

3 - Description of the Environment (cont'd)

As reported, the depth to water level in Dhenkanal district ranges from 0.26 to 8.0 m bgl.

3.3.10 Water Level Monitored in and around the Plant Area

For groundwater monitoring under the EIA study, water level data of 21 sources (dug wells) were collected during a field visit conducted in October 2024. The compiled monitored data is shown in Table 3-4, and their locations are presented in Fig. 3-6. Exhibit 3-1 shows water level monitoring work during the study.



EXHIBIT 3-1 - WATER LEVEL MONITORING AT TARASINGHA, DHENKANAL

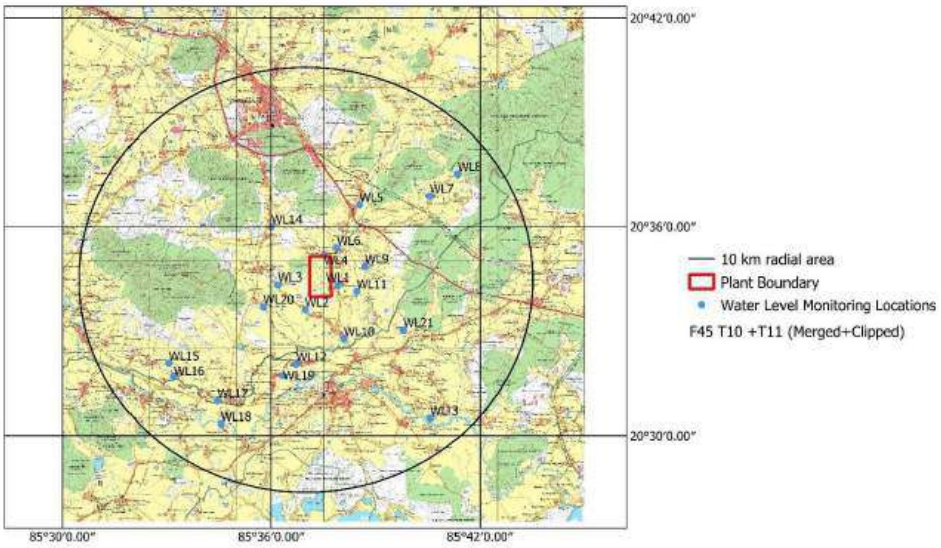


FIG. 3-6 - WATER LEVEL MONITORING STATIONS

3 - Description of the Environment (cont'd)

TABLE 3-4 - WATER LEVEL INFORMATION OF MONITORED SOURCES IN THE STUDY AREA

Stn. Code	Location	Lat	Long	WL (m bgl)	Distance (km) & direction
WL1	Talabarkote Vill.	20°34'19.43"N	85°37'54.51"E	1.9	0.4 E
WL2	Manipur Vill.	20°33'37.10"N	85°36'57.62"E	1.7	0.7 SW
WL3	Bhadrapali Vill.	20°34'19.80"N	85°36'11.63"E	2.2	1.6 W
WL4	Bansaputia Vill.	20°35'10.47"N	85°37'30.55"E	1.6	0.1 N
WL5	Govindpur Vill.	20°36'37.63"N	85°38'31.94"E	0.8	3.2 NE
WL6	Siaria Vill.	20°35'22.64"N	85°37'52.66"E	1.1	0.6 NE
WL7	Mahulparha Vill.	20°36'52.45"N	85°40'33.49"E	3.2	5.9 NE
WL8	Khejurai Vill.	20°37'30.65"N	85°41'20.90"E	1.5	7.8 NE
WL9	Narhiali Vill.	20°34'50.77"N	85°38'41.31"E	3.1	1.7 E
WL10	Deopada Vill.	20°32'46.26"N	85°38'05.01"E	1.7	2.4 SE
WL11	Daroda Vill.	20°34'08.57"N	85°38'27.11"E	2.3	1.3 E
WL12	Sathilo Vill.	20°32'02.45"N	85°36'42.15"E	1	3.7 SW
WL!3	Manjaripada Vill.	20°30'29.43"N	85°40'34.24"E	0.8	8.2 SE
WL14	Gajamara Vill.	20°35'59.37"N	85°36'00.34"E	0.1	2.5 NW
WL15	Krushnaprasad	20°32'04.21"N	85°33'02.71"E	1.7	7.8 SW
WL16	Gangadharprasad Vill.	20°31'41.32"N	85°33'11.66"E	1.7	8.0 SW
WL17	Shankarpur Vill.	20°30'59.26"N	85°34'27.16"E	2.5	7.2 SW
WL18	Guduparha Vill.	20°30'19.43"N	85°34'33.14"E	0.2	8.1 SW
WL19	Kuanlo Vill.	20°31'43.02"N	85°36'20.73"E	1	4.5 SW
WL20	Padmanavpur Vill.	20°33'41.99"N	85°35'46.50"E	2.5	2.5 SW
WL21	Tarasingha Vill.	20°33'01.84"N	85°39'47.56"E	1.4	4.0 SE

Source: Dugwell

The analysis of the water level data collected from the site during field visit in October 2024 (post-monsoon season), shows that the water level of monitored sources ranges from 0.2 - 3.2 m bgl. The same is graphically represented in Fig. 3-7 and the depth to water level map prepared based on the collected data of the study area is presented in Fig. 3-8.

3 - Description of the Environment (cont'd)

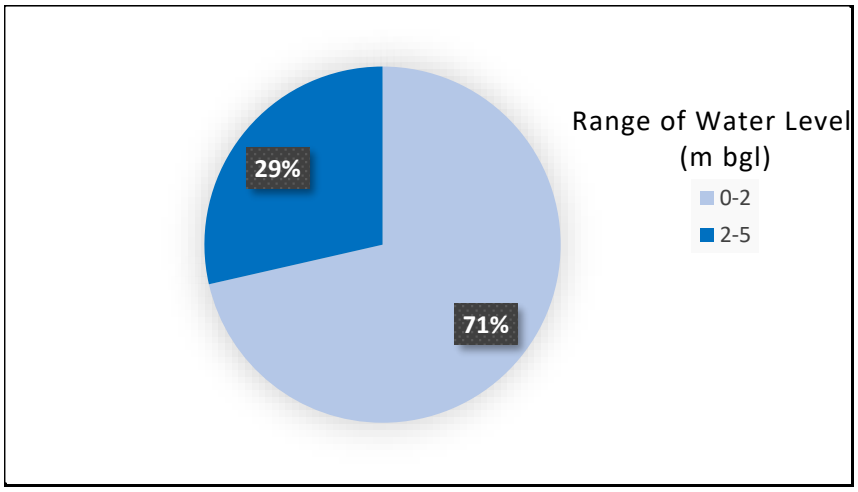


FIG. 3-7 - WATER LEVEL OF THE MONITORED SOURCES

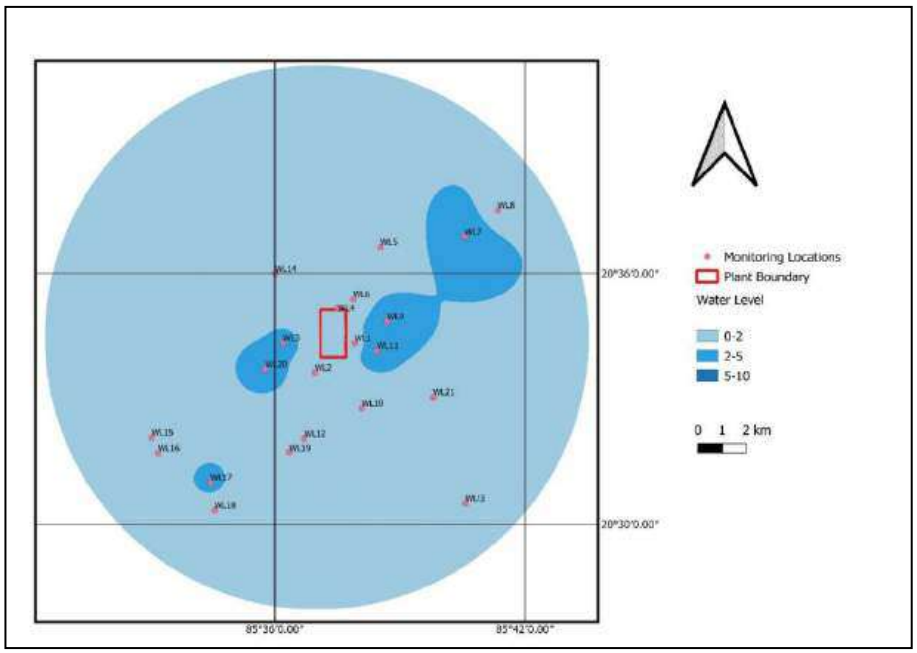


FIG. 3-8 - WATER LEVEL MAP BASED ON MONITORED DATA

3.3.11 Ground Water Resources

The dynamic groundwater resources of Dhenkanal district have been estimated by CGWB (National Compilation of Groundwater Resources of India, 2023) as per Groundwater Estimation Methodology (GEC-2015) are as given below.

3 - Description of the Environment (cont'd)

Particulars	Quantity (HAM)
Total Annual Ground Water Recharge	44773.67
Annual Extractable Ground Water Resource	13294.59
Total Current Annual Ground Water Extraction (Irrigation+ Industrial+ Domestic)	17398.3
Annual GW Allocation for Domestic Use as on 2025	3895.5
Net Ground Water Availability for future use	27243.24
Stage of Ground Water Extraction (%)	38.86 (Safe)

The groundwater resources of the specific Dhenkanal block in which the study area lies as reported by CGWB (National Compilation of Groundwater Resources of India, 2023) are as under:

Particulars	Quantity (HAM)
Annual Extractable Ground Water Resource	5325.87
Total Current Annual Ground Water Extraction (Irrigation+ Industrial+ Domestic)	3525.76
Annual GW Allocation for Domestic Use as on 2025	881.78
Net Ground Water Availability for future use	1761.94
Stage of Ground Water Extraction (%)	66.20 (safe)

The latest report of CGWB (National Compilation on Dynamic Ground Water Resources of India, 2023) categorizes the stage of groundwater extraction for the whole district was estimated as 38.86% and all the eight blocks of the district have been categorized as safe from ground water extraction point of view. Dhenkanal block has the highest ground water utilization at 66.20%.

Although groundwater is not envisaged to be utilized for any industrial requirement in the plant. However, considering the condition of groundwater resource development in Dhenkanal block fast approaching semi-critical condition (>70 %) it is suggested that further development of groundwater in the study area should be done cautiously with close monitoring of water level. As a management measure, artificial recharge of groundwater should be adopted extensively to arrest decline in groundwater level. Conservation of rainwater through rooftop rainwater and surface run-off harvesting will help any water crisis during lean season.

3 - Description of the Environment (cont'd)

3.4 PHYSICO-CHEMICAL COMPONENTS

The physico-chemical aspects comprise of air, meteorology, water, soil and noise. Table 3-5 presents the details of sampling including the methodology followed for individual components.

TABLE 3-5 - SAMPLING DETAILS AND METHODOLOGY FOR PHYSICO-CHEMICAL COMPONENTS

Environmental Component	Sampling Locations	Sampling Parameters	Sampling period	Sampling frequency	Methodology
Meteorology	1 central location	Temperature Wind Speed Wind Direction Rainfall Relative humidity	1season (Oct 2024 - 1st Jan 2025)	Hourly	The meteorology parameters were recorded using automatic micro-meteorological equipment consisting of an anemometer, wind wane and thermometer. Review of secondary data collected from IMD for the last 30 years. Rainfall was recorded every day using Rain Gauge. Humidity was recorded using wet and dry bulb thermometer and Psychrometric charts.
Ambient Air Quality (AAQ)	8 locations within the study area	PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO & O_3	Twice a week for 3 months of monitoring season (Oct - Dec 2024)	Continuous 24 hours	Gravimetric method for $PM_{2.5}$ (USEPA 1997a) and PM_{10} (IS 5182 part-23) Modified West and Gaeke method for SO_2 (IS-5182 part 2) Modified Jacob-Hochheiser method (IS-5182 part 6) for NOx. NDIR method for CO (IS 5182 part 10). UV photometry method for O_3(IS 5182 part 9)
Geohydrology-Ground water level monitoring	20 locations	Total depth & water level	1season (October 2024)	Once during monitoring season	Using Measuring tape

3 - Description of the Environment (cont'd)

Environmental Component	Sampling Locations	Sampling Parameters	Sampling period	Sampling frequency	Methodology
Water Quality	16 locations within the study area (8 surface water, 8 ground water)	pH, TSS, TDS, BOD, COD, Chloride, Cr, Coliform etc.	1season (Oct -Dec 2024)	Thrice in the monitoring season	Grab sampling analysis as per APHA methods.
		Ground water- As per IS: 10500-2012	1season (Oct -Dec 2024)	Thrice in the monitoring season	
Soil	5 locations	Soil profile, Chemical constituents	1season (Oct -Dec 2024)	Once during monitoring season	Analysis was carried out as per standard methods
Noise	8 locations (2 each for Industrial, Residential, Commercial & Silence zones)	Leq as per The Noise Pollution (Regulation and Control) Rules, 2000	1season (Oct -Dec 2024)	Once during study period, hourly for 24 hrs	24 hours equivalent using Noise level meter

3.4.1 Micro-meteorology

In order to determine the micro-meteorological conditions of the study area, a temporary continuous weather monitoring station was installed on the rooftop (around 10 m height) of a house near Shaymacharanpur, Bodapara, Dhenkanal, Odisha. The meteorological station set up for continuous monitoring is presented in Exhibit 3-2. This weather station was operational from 2nd October 2024 to 1st January 2025 and had facilities to record dry and wet bulb temperature, relative humidity, wind direction, wind speed and rainfall. The cloud cover was measured visually. The wind rose of the study area is shown in Fig. 3-9. The site-specific micro-meteorological data as recorded during the study period along with the climatic normal are presented in Table 3-6.

3 - Description of the Environment (cont'd)

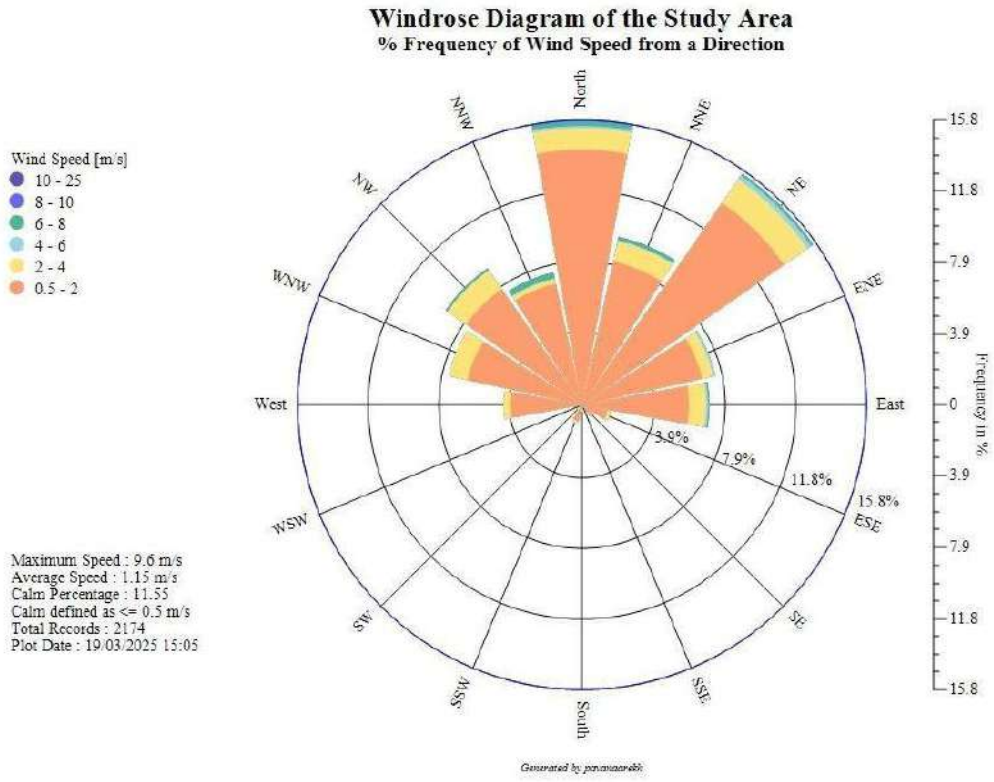


FIG. 3-9 - WINDROSE OF THE STUDY AREA

TABLE 3-6 - SUMMARY OF SITE-SPECIFIC MICRO-METEOROLOGICAL RECORDINGS IN THE STUDY AREA

Monitoring Site
Location: Bodapara, Dhenkanal
Lat/Long: 20°38''N/85°37''E
Elevation above MSL: 37 M

Climatic Normal
Station: Cuttack
Lat/Long: 20°28''N/85°56''E
Elevation above MSL: 27 M

	Summer/ Pre-monsoon (Mar-May)		Monsoon (June-Sep)		Post-monsoon (Oct- Dec)		Winter (Jan-Feb)		Monitored Period (Oct 2024-1st Jan 2025)
Parameters	**M**	**CN**	**M**	**CN**	**M**	**CN**	**M**	**CN**	**M**
Max. DB Temp. (°C)	-	37.2	-	35.1	-	32.6	-	31.8	36.8
Avg. DB Temp. (°C)	-	36.6	-	33.1	-	30.8	-	26.8	25.47
Relative humidity (%)		65.5	-	79.7	-	70.0	-	65	71.94
Avg. wind speed, (kmph)		4.5	-	3.8	-	2.1	-	2.5	1.15
Predominant wind direction		N, E, SE, S	-	S, SE, W	-	N, E, W	-	E, N	N, NE
Total rainfall (mm)		166.2	-	1198.5	-	190.5	-	37	185.62

Notes: M - Monitoring Data, CN - Climatic Normal (1981-2010)

3 - Description of the Environment (cont'd)



EXHIBIT 3-2 - METEOROLOGICAL MONITORING STATION AT SHYAMACHARANPUR VILLAGE

3.4.2 Mixing Height

The site-specific mixing height and atmospheric stability class data were not recorded during the monitoring period. The data required for prediction of ground level concentrations (glcs) of likely air emissions from the plant have been obtained from the CPCB publication on

'Spatial Distribution of Hourly Mixing Depth over Indian Region' - PROBES/88/2002-03.

3.4.3 Ambient Air Quality (AAQ)

The study area for the proposed project is a mixture of rural & urban nature where air pollution is primarily attributed due to vehicular emissions & industrial emission to some extent and other anthropogenic activities. For the present study, AAQ monitoring has been carried out at 8 different locations within 10 km of the study area to measure and assess the prevailing air quality in and around the study area. A sample ambient air quality monitoring is shown in Exhibit 3-3.

3 - Description of the Environment (cont'd)



EXHIBIT 3-3 - AMBIENT AIR QUALITY MONITORING AT DEOPADA

3.4.4 Basis of Location of AAQ Stations

The selection of the eight (8) AAQ monitoring locations is principally governed by the windrose pattern for winter season and likely spots of pollutants fall out as per preliminary air dispersion modeling. In addition, the accessibility of sites was also taken into consideration. The locations of the AAQ stations where monitoring was carried out are shown in Fig. 3-10.

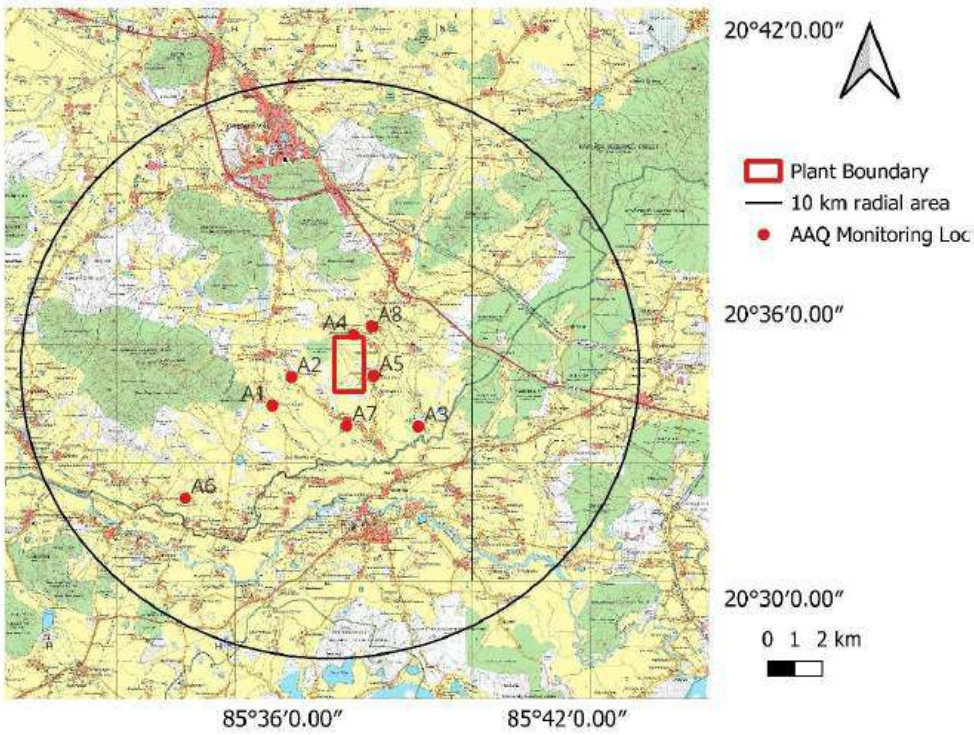
Parameters recorded: The parameters recorded during the data generation for ambient air quality are PM_{10} (≤10 micron), $PM_{2.5}$ (≤2.5 micron), SO_2, NOx, CO, O_3, NH_3, C_6H_6, BaP, Pb, As, and Ni.

Ambient Air Quality as recorded: The specific station wise recorded ambient air quality (AAQ) values for the monitoring period (October 2024 - December 2024) are presented in Table 3-7.

3 - Description of the Environment (cont'd)

It may be seen that the Percentile-98 concentration (24 hrs) of PM_{10} and $PM_{2.5}$ are in the range of 43.95 - 68.88 µg/m³ and 22.77 - 34.44 µg/m³ respectively. The PM_{10} values at the locations are below 100 (maximum 68.88 µg/m³) which are in the range classified as good (National Air Quality Index of India) and the reason for the same is lesser industrial development and vehicular pollution.

The SO_2 and NO_x values are well within the permissible values for rural/industrial areas as set by NAAQS (2009). This may also be seen from the bar diagrams presented in Fig. 3-11 and Fig. 3-12 on the following pages. The CO and O_3 values are either below detection limit (bdl) or much below the values of NAAQS.



A1	Padmanabhpur Vill.	A5	Talabarkote Vill.
A2	Badrapali Vill.	A6	Dhirapatana Vill.
A3	Ragada Vill.	A7	Manipur Vill.
A4	Patrabhag Vill.	A8	Siaria Vill.

FIG. 3-10 - AMBIENT AIR QUALITY MONITORING STATIONS

3 - Description of the Environment (cont'd)

TABLE 3-7 - AMBIENT AIR QUALITY IN THE STUDY AREA

Frequency of Monitoring : Twice a week
Monitoring Period : Oct'24 - Dec'24
Standard : NAAQS 2009 (Refer Appendix 3-1)

[Pollutants in µg/m^3 (24 hrs), BaP, As & Ni in ng/ m^3, CO in mg/m^3]

Stn. Code	Location	Parameter	Max	Min	Avg.	P98
A_1	Padmanabhpur Vill.	PM_{10}	71.50	26.50	48.38	68.88
		$PM_{2.5}$	36.10	14.20	23.15	34.44
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	16.80	7.00	12.18	16.66
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36
A_2	Badrapali Vill.	PM_{10}	45.10	30.00	36.24	43.95
		$PM_{2.5}$	23.60	14.20	17.93	22.77
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	16.50	7.00	11.22	16.50
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36
A_3	Ragada Vill.	PM10	53.10	26.50	40.31	52.50
		PM2.5	28.50	14.10	20.71	27.40
		SO2	<4.0	<4.0	<4.0	<4.0
		NOX	18.20	7.00	12.53	17.42
		O3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36
A_4	Patrabhag Vill.	PM_{10}	51.20	29.20	39.07	49.50
		$PM_{2.5}$	26.50	14.10	19.95	26.18
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	18.20	8.00	13.18	17.42
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36

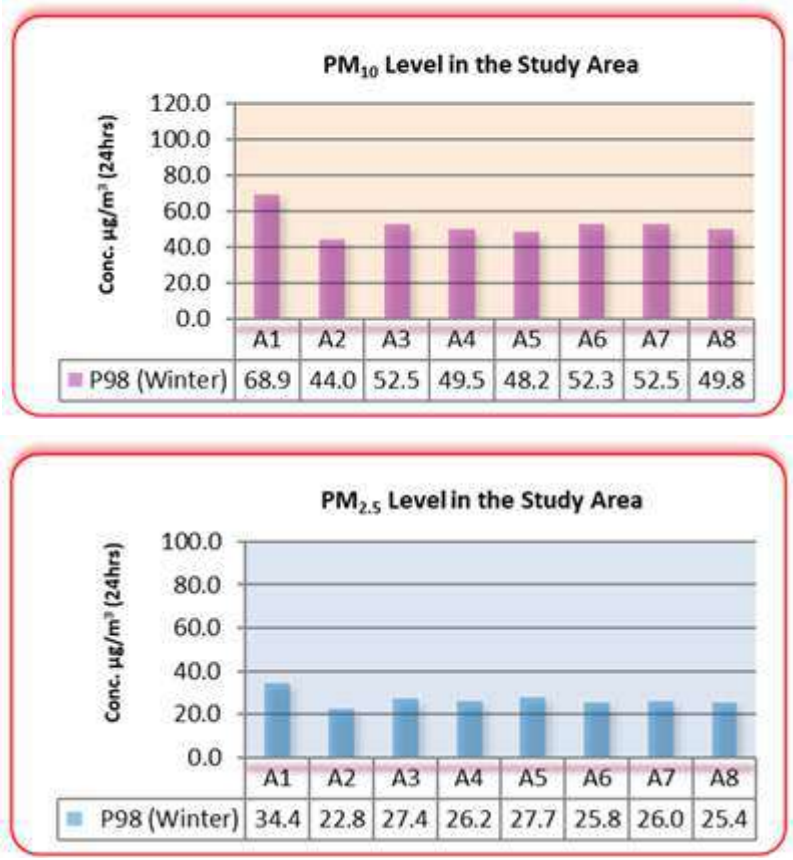
3 - Description of the Environment (cont'd)

TABLE 3-7 (cont'd)

Stn. Code	Location	Parameter	Max	Min	Avg.	P98
A_5	Talabarkote Vill.	PM_{10}	48.20	31.50	40.65	48.20
		$PM_{2.5}$	28.50	14.20	20.31	27.72
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	20.00	8.00	14.59	19.17
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36
A_6	Dhirapatana Vill.	PM_{10}	52.80	29.10	43.30	52.34
		$PM_{2.5}$	26.20	15.00	21.83	25.79
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	22.50	8.00	14.64	22.04
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36
A_7	Manipur Vill.	PM_{10}	52.90	28.50	42.25	52.53
		$PM_{2.5}$	26.80	16.20	21.89	26.02
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	18.50	8.00	13.28	18.36
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36
A_8	Siaria Vill.	PM_{10}	51.20	31.50	42.52	49.82
		$PM_{2.5}$	25.60	8.00	18.86	25.37
		SO_2	<4.0	<4.0	<4.0	<4.0
		NO_x	16.50	8.00	13.50	16.50
		O_3 (8 hrs)	<10	<10	<10	<10
		CO (8 hrs)	<0.1	<0.1	<0.1	<0.1
		NH_3	<4.18	<4.18	<4.18	<4.18
		Pb	<0.01	<0.01	<0.01	<0.01
		C_6H_6	<0.74	<0.74	<0.74	<0.74
		As	<0.01	<0.01	<0.01	<0.01
		Ni	<0.02	<0.02	<0.02	<0.02
		BaP	<0.36	<0.36	<0.36	<0.36

Notes: 1. Method of measurement - as per schedule VII of National Ambient Air Quality Standard (NAAQS of CPCB)
2. For more details, refer Section-I of Appendix - Field Report
2. For more details, refer Section-II of Appendix - Field Data and Report

3 - Description of the Environment (cont'd)

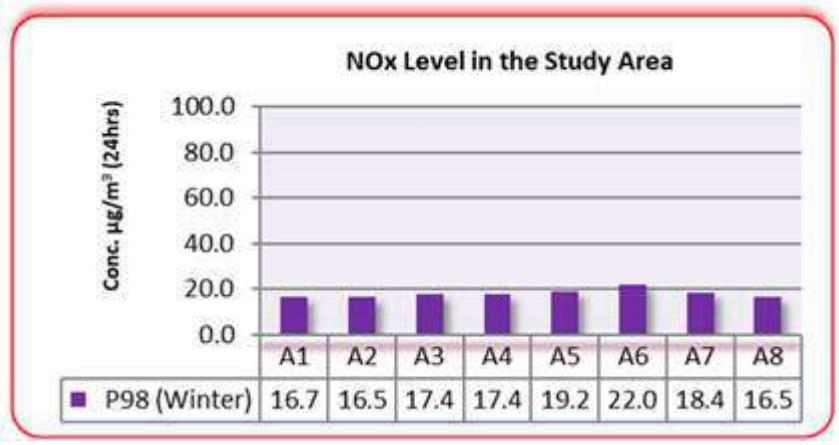


A1	Padmanabhpur Vill.	A5	Talabarkote Vill.
A2	Patrabhag Vill.	A6	Dhirapatana Vill.
A3	Deopada Vill.	A7	Manipur Vill.
A4	Bansaputia Vill.	A8	Siaria Vill.

NAAQS - National Ambient Air Quality Standards

FIG. 3-11 - PM_{10} AND $PM_{2.5}$ LEVEL IN THE STUDY AREA

3 - Description of the Environment (cont'd)



A1	Padmanabhpur Vill.	A5	Talabarkote Vill.
A2	Badrapali Vill.	A6	Dhirapatana Vill.
A3	Ragada Vill.	A7	Manipur Vill.
A4	Patrabhag Vill.	A8	Siaria Vill.

NAAQS - National Ambient Air Quality Standards

FIG. 3-12 - NO_X LEVEL IN THE STUDY AREA

3.4.5 Ground Water Quality

The ground water quality was sampled for eight representative locations of the study area as shown in Fig. 3-13. The groundwater sampling exercise is depicted in Exhibit 3-4. The characteristics of the ground water quality of the collected samples for GW1 to GW4 & GW5 to GW8 have been presented in Tables 3-8 and 3-9 respectively. It may be seen from the tables that ground water of the dug wells/tubewell water of all locations especially Padmanavpur, Patrabhag, Bansaputia, Talabarkote and Siaria villages have presence of coliform (bacteriological contamination) and hence not fit for human consumption without proper disinfection.

The total hardness (TH) and total dissolved solids (TDS) content in ground water are found to be in the range of 31.33-192.72 mg/l and 113.33- 815.00 mg/l respectively at the selected locations as against the allowable standards of 200 mg/l for TH and 500 mg/l for

3 - Description of the Environment (cont'd)

TDS. The pH of sampled water ranges from 6.68 to 7.13. Iron content lies within the range of 0.39-3.57 mg/l which is higher than the permissible limit as per IS-10500-2012. Chromium, lead, arsenic, mercury and other heavy metals are reported to be within or slightly higher than the permissible limit.



EXHIBIT 3-4 - GROUNDWATER SAMPLING AT GANGADHARPRASAD

3.4.6 Surface Water Quality

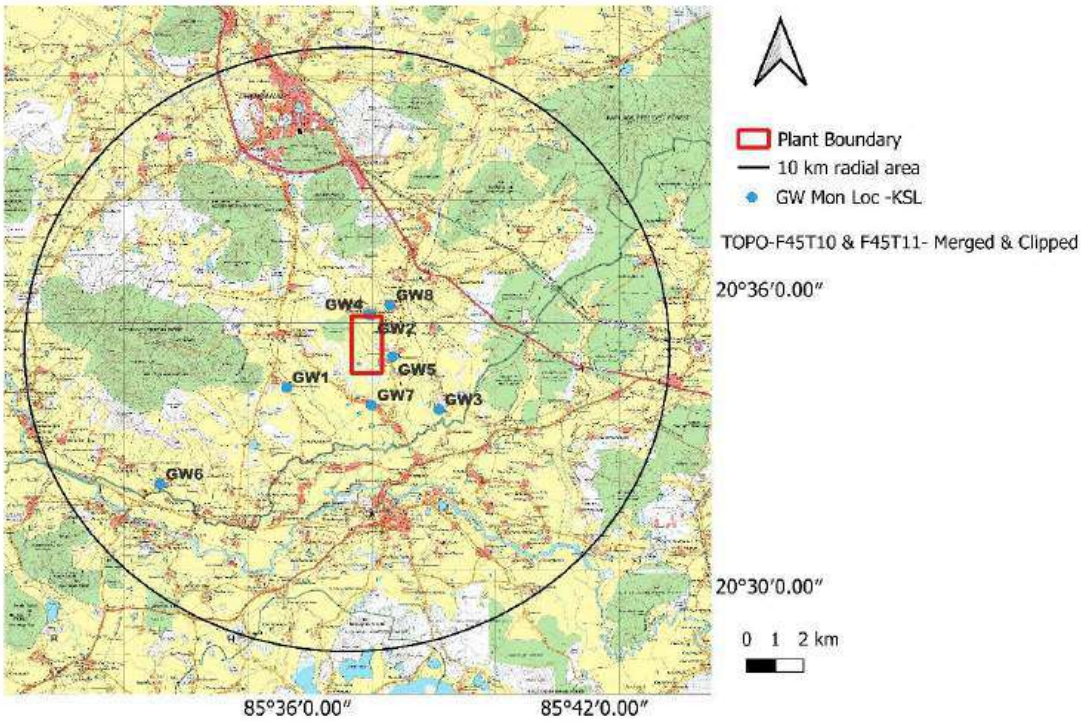
Surface Water Quality was monitored at eight (8) different locations within the study area is shown is shown in Fig. 3-14. Surface water sampling exercise is depicted in Exhibit 3-5. The summary of recorded values of the various parameters are presented in Tables 3-10 and 3-11 for SW1 to SW4 & SW5 to SW8 respectively.

The total hardness of all surface streams has reported ranges from 42.22-80.86 mg/l. The average DO level for all surface streams ranges between 6.07-6.33 mg/l. Total dissolved solids (TDS) ranges from 110.67 - 189.00 mg/l and Total coliform count ranges from 2,100-2,600 CFU/100 ml across various surface water sampling locations. The presence of faecal coliform signifies that the water is not fit for human consumption without disinfection.

3 - Description of the Environment (cont'd)



EXHIBIT 3-5 - SURFACE WATER SAMPLING AT BRAHMANI RIVER (NEAR PANKAPAL VILLAGE)



GW1	Padmanavpur Village	GW5	Talabarkote village
GW2	Patrabhag (Bhadrapali) village	GW6	Krushnaprasad Village
GW3	Deopada Village	GW7	Manipur Village
GW4	Bansaputia Village	GW8	Siaria Chowk

FIG. 3-13 - GROUND WATER MONITORING STATIONS

3 - Description of the Environment (cont'd)

TABLE 3-8 - CHARACTERISTICS OF GROUND WATER QUALITY

Frequency of monitoring : Once a month
Monitoring Period : Oct'24-Dec'24
Standard : IS-10500:2012

GW_1 : Dug well - Padmanavpur Village
GW_2 : Dug well - Patrabhag (Bhadrapali) village
GW_3 : Tubewell - Deopada Village
GW_4 : Dug well - Bansaputia Village

Parameters	**GW1**	**GW2**	**GW3**	**GW4**	**IS-10500-2012**
Physical					
Odour (TON)	Odourless	Odourless	Odourless	Odourless	Unobjectionable
Colour (Hazen)	1.00	1.00	1.00	1.00	5
Taste	Acceptable	Acceptable	Acceptable	Acceptable	Agreeable
Temperature (^{O}C)	23.83	24.67	22.00	23.67	-
Turbidity (NTU)	1.80	<1.0	<1.0	<1.0	1
Chemical (mg/l)					
pH	7.13	6.95	6.94	6.95	6.5-8.5
Total Suspended Solids (mg/l)	<10	<10	<10	<10	
Total Dissolved Solids (mg/l)	815.00	195.67	183.67	189.00	500 (max)
Electrical Conductivity	1272.53	305.20	288.67	294.93	-
Total Hardness	192.72	47.53	48.48	72.61	200 (max)
Dissolved Oxygen	3.27	3.27	3.07	3.17	-
BOD at 27^{0}C for 3 days	<2.0	<2.0	<2.0	<2.0	-
COD	<5.0	<5.0	<5.0	<5.0	-
Carbonate	<0.6	<0.6	<0.6	<0.6	-
Alkalinity	219.58	43.23	40.32	24.67	200 (max)
Total Nitrogen	3.66	3.38	2.92	3.44	-
Phenol	<0.01	<0.01	<0.01	<0.01	0.001 (max)
Nitrate+Nitrite	4.44	2.38	2.06	1.54	45(max)
Chloride	139.66	42.78	40.51	43.37	250 (max)
Fluoride	<0.1	<0.1	<0.1	<0.1	1.0(max)
Sulphate	82.67	15.13	11.27	10.87	200 (max)
Bicarbonate	267.79	52.34	49.19	30.09	-
Residual Chlorine	<0.1	<0.1	<0.1	<0.1	0.2(max)
Ortho-Phosphate	<0.1	<0.1	<0.1	<0.1	-
Calcium	39.28	10.91	11.50	16.34	75(max)
Magnesium	22.73	4.87	4.75	7.64	30(max)
Potassium	3.70	3.88	3.52	4.01	-
Sodium	110.05	21.99	22.02	17.33	-
Manganese	<0.05	<0.05	<0.05	<0.05	0.1 (max)
Boron	<0.1	<0.1	<0.1	<0.1	0.5(max)
Lead	<0.005	<0.005	<0.005	<0.005	0.01 (max)
Arsenic	<0.01	<0.01	<0.01	<0.01	0.01 (max)
Zinc	0.15	0.08	0.07	0.02	5.0 (max)
Iron	0.80	0.39	0.50	0.42	0.3 (max)
Copper	<0.04	<0.04	<0.04	<0.04	0.05 (max)
Chromium (VI)	<0.1	<0.1	<0.1	<0.1	0.01 (max)
Nickel	<0.01	<0.01	<0.01	<0.01	0.02 (max)
Mercury	<0.001	<0.001	<0.001	<0.001	0.001 (max)
Cadmium	<0.002	<0.002	<0.002	<0.002	0.003(max)
Cyanide	<0.01	<0.01	<0.01	<0.01	0.05 (max)
Aluminium	<0.02	<0.02	<0.02	<0.02	0.03 (max)
Bacteriological (CFU/100 ml)					
Total Coliform	174.33	180.67	<1	168.33	Nil
Faecal Coliform	75.00	79.33	<1	77.33	Nil

Note: For more details, refer Section-III of Appendix - Field Report.

3 - Description of the Environment (cont'd)

TABLE 3-9 - CHARACTERISTICS OF GROUND WATER QUALITY

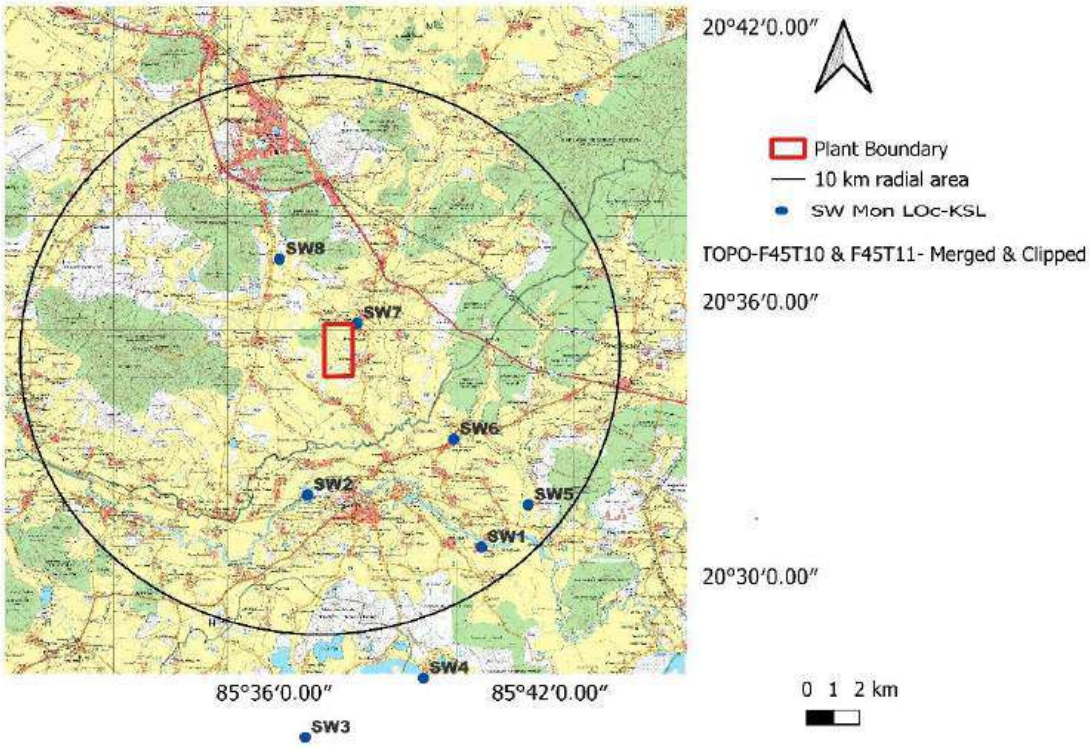
Frequency of monitoring : Once a month
Monitoring Period : Oct'23-Jan'24
Standard : IS-10500:2012

GW_5 : Dug well - Talabarkote village
GW_6 : Tubewell - Krushnaprasad Village
GW_7 : Tubewell - Manipur Village
GW_8 : Dug well - Siaria Chowk

Parameters	**GW5**	**GW6**	**GW7**	**GW8**	**IS-10500-2012**
Physical					
Odour (TON)	Odourless	Odourless	Odourless	Odourless	Unobjectionable
Colour (Hazen)	1.00	1.00	1.00	1.00	5
Taste	Acceptable	Acceptable	Acceptable	Acceptable	Agreeable
Temperature (^{O}C)	24.00	22.33	22.67	24.00	-
Turbidity (NTU)	1.49	1.68	3.65	<1.0	1
Chemical (mg/l)					
pH	6.69	6.81	6.68	7.05	6.5-8.5
Total Suspended Solids (mg/l)	<10	<10	10.2	<10	
Total Dissolved Solids (mg/l)	185.00	569.00	113.33	208.00	500 (max)
Electrical Conductivity	291.30	891.57	177.37	327.10	-
Total Hardness	73.58	162.66	31.33	52.12	200 (max)
Dissolved Oxygen	3.23	2.93	2.80	3.20	-
BOD at 270C for 3 days	<2.0	<2.0	<2.0	<2.0	-
COD	<5.0	<5.0	<5.0	<5.0	-
Carbonate	<0.6	<0.6	<0.6	<0.6	-
Alkalinity	25.20	157.47	22.67	50.53	200 (max)
Total Nitrogen	2.48	3.76	3.29	3.85	-
Phenol	<0.01	<0.01	<0.01	<0.01	0.001 (max)
Nitrate+Nitrite	0.71	2.59	1.43	1.59	45(max)
Chloride	41.75	117.19	16.12	35.47	250 (max)
Fluoride	<0.1	<0.1	<0.1	<0.1	1.0(max)
Sulphate	9.87	26.47	12.27	13.27	200 (max)
Bicarbonate	30.74	192.11	27.65	61.65	-
Residual Chlorine	<0.1	<0.1	<0.1	<0.1	0.2(max)
Ortho-Phosphate	<0.1	<0.1	<0.1	<0.1	-
Calcium	16.27	37.04	6.94	10.77	75(max)
Magnesium	7.92	16.86	3.37	6.06	30(max)
Potassium	6.93	15.09	4.46	12.41	-
Sodium	15.82	34.93	11.74	24.02	-
Manganese	<0.05	<0.05	<0.05	<0.05	0.1 (max)
Boron	<0.1	<0.1	<0.1	<0.1	0.5(max)
Lead	<0.005	<0.005	<0.005	<0.005	0.01 (max)
Arsenic	<0.01	<0.01	<0.01	<0.01	0.01 (max)
Zinc	0.03	0.04	0.13	0.08	5.0 (max)
Iron	0.72	0.87	3.57	0.62	0.3 (max)
Copper	<0.04	<0.04	<0.04	<0.04	0.05 (max)
Chromium (VI)	<0.1	<0.1	<0.1	<0.1	0.01 (max)
Nickel	<0.01	<0.01	<0.01	<0.01	0.02 (max)
Mercury	<0.001	<0.001	<0.001	<0.001	0.001 (max)
Cadmium	<0.002	<0.002	<0.002	<0.002	0.003(max)
Cyanide	<0.01	<0.01	<0.01	<0.01	0.05 (max)
Aluminium	<0.02	<0.02	<0.02	<0.02	0.03 (max)
Bacteriological (CFU/100 ml)					
Total Coliform	133.00	<1	<1	155.33	Nil
Faecal Coliform	71.67	<1	<1	70.33	Nil

Note: For more details, refer Section-III of Appendix - Field Report.

3 - Description of the Environment (cont'd)



SW1	Sapua Nadi (Downstream) Near Parsurampur village	SW5	Kantla Nala - Near Gaurangapur village
SW2	Sapua Nadi (Upstream) Near Kuania village	SW6	Kantla Nala - Near Gopinathpur village
SW3	Sapua Nadi - Near Gudapada village	SW7	Nala (Near Siaria village)
SW4	Kantla Nala (Upstream) Near Badagila village	SW8	Pond (Near Mania Bandha village)

FIG. 3-14 - SURFACE WATER MONITORING STATIONS

3 - Description of the Environment (cont'd)

TABLE 3-10 - CHARACTERISTICS OF SURFACE WATER QUALITY FOR SW1 TO SW4

Frequency of monitoring : Once a month
Monitoring Period : Oct'24-Dec'24

SW_1 : Sapua Nadi (Downstream) Near Parsurampur village
SW_2 : Sapua Nadi (Upstream) Near Kuania village
SW_3 : Sapua Nadi - Near Gudapada village
SW_4 : Kantla Nala (Upstream) Near Badagila Village

Parameters	SW1	SW2	SW3	SW4
Physical				
Odour (T.O.N)	Odourless	Odourless	Odourless	Odourless
Temperature (^{O}C)	24.00	23.00	23.00	23.67
Turbidity (NTU)	1.74	1.41	1.68	1.80
Chemical (mg/l)				
PH	7.34	7.32	7.56	7.57
Total Suspended Solid (mg./l)	10.73	10.50	<10	11.00
Total Dissolved Solid (mg./l)	184.33	169.33	158.67	110.67
Electrical Conductivity	289.27	263.97	246.50	174.63
Total Hardness (mg/l)	69.63	69.60	64.68	42.22
Dissolved Oxygen (mg/l)	6.17	6.20	6.33	6.17
BOD, 3 days at 27^{O}C (mg./l)	3.67	3.00	3.00	5.67
COD (mg./l)	17.41	12.65	11.11	25.43
Oil & Grease (mg./l)	<1.0	<1.0	<1.0	<1.0
Salinity (ppt.)	0.00	0.00	0.00	0.00
Kjeldahl Nitrogen (mg/l)	4.25	3.61	3.57	4.03
NH3–N (mg/l)	<0.1	<1.0	<0.1	<0.1
Nitrate + Nitrite (mg/l)	1.82	1.61	1.65	1.39
Chloride (mg/l)	25.59	21.87	19.13	16.05
Fluoride (mg/l)	<0.1	<1.0	<0.1	<0.1
Sulphates as SO4 (mg/l)	13.93	10.07	9.33	7.40
Alkalinity	32.03	35.18	24.60	22.03
Bi-Carbonate (mg/l)	39.08	42.92	30.01	26.88
Total P (mg/l)	0.71	0.35	0.44	0.49
Phosphate (mg/l)	0.79	0.41	0.52	0.59
Calcium (mg/l)	16.00	15.14	14.75	9.52
Magnesium (mg/l)	7.13	7.64	6.69	4.43
Potassium (mg/l)	4.26	4.24	7.19	1.99
Sodium (mg/l)	20.39	14.02	16.34	5.61
Manganese (mg/l)	<0.05	<0.05	<0.05	<0.05
Boron (mg/l)	<0.1	<0.1	<0.1	<0.1
Lead (mg/l)	<0.005	<0.005	<0.005	<0.005
Arsenic (mg/l)	<0.01	<0.01	<0.01	<0.01
Zinc (mg/l)	0.03	0.04	0.04	0.03
Iron (mg/l)	0.71	0.68	0.66	0.75
Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	<0.02
Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	<0.1
Nickel (mg/l)	<0.01	<0.01	<0.01	<0.01
Mercury (mg/l)	<0.001	<0.001	<0.001	<0.001
Cadmium (mg/l)	<0.002	<0.002	<0.002	<0.002
Bacteriological (CFU/100ml)				
Total Coliform /100 ml.	2.4 x 103	2.1×10^3	2.2×10^3	2.3×10^3
Faecal Coliform /100 ml.	1.6 x 102	1.2×10^2	1.3×10^2	1.4×10^2

Note: For more details, refer to Section-IV of Appendix - Field Report.

3 - Description of the Environment (cont'd)

TABLE 3-11 - CHARACTERISTICS OF SURFACE WATER QUALITY FOR SW5 TO SW8

Frequency of monitoring : Once a month
Monitoring Period : Oct'24-Dec'24

SW_5 : Kantla Nala (Near Gaurangapur Village)
SW_6 : Kantla Nala - Downstream (Gopinathpur Village)
SW_7 : Nala (Near Siaria Village)
SW_8 : Pond (Near Mania Bandha Village)

Parameters	SW5	SW6	SW7	SW8
Physical				
Odour (T.O.N)	Odourless	Odourless	Odourless	Odourless
Temperature (^{O}C)	23.67	23.83	23.00	20.67
Turbidity (NTU)	1.50	1.84	5.54	1.43
Chemical (mg/l)				
PH	7.24	7.19	7.42	7.42
Total Suspended Solid (mg./l)	10.00	10.47	12.21	10.23
Total Dissolved Solid (mg./l)	125.33	189.00	149.33	175.00
Electrical Conductivity	197.03	296.37	232.23	275.87
Total Hardness (mg/l)	44.53	80.86	53.46	52.45
Dissolved Oxygen (mg/l)	6.33	6.13	6.07	6.20
BOD, 3 days at 27^{O}C (mg./l)	3.00	5.67	6.00	3.67
COD (mg./l)	9.52	23.75	25.37	14.23
Oil & Grease (mg./l)	<1.0	<1.0	<1.0	<1.0
Salinity (ppt.)	0.00	0.00	0.00	0.00
Kjeldahl Nitrogen (mg/l)	3.54	4.05	4.53	3.31
NH3–N (mg/l)	<0.1	<0.1	<0.1	<0.1
Nitrate + Nitrite (mg/l)	1.75	1.56	2.12	1.31
Chloride (mg/l)	18.24	25.44	19.89	50.56
Fluoride (mg/l)	<0.1	<0.1	<0.1	<0.1
Sulphates as SO4 (mg/l)	9.87	14.67	9.13	7.67
Alkalinity	23.03	33.57	32.78	32.65
Bi-Carbonate (mg/l)	28.10	40.95	40.00	39.83
Total P (mg/l)	0.54	0.50	0.46	0.66
Phosphate (mg/l)	0.69	0.60	0.58	0.73
Calcium (mg/l)	9.91	16.87	11.44	11.77
Magnesium (mg/l)	4.75	9.31	5.98	5.54
Potassium (mg/l)	3.49	2.90	4.28	2.40
Sodium (mg/l)	10.29	11.17	13.01	14.55
Manganese (mg/l)	<0.05	<0.05	<0.05	<0.05
Boron (mg/l)	<0.1	<0.1	<0.1	<0.1
Lead (mg/l)	<0.005	<0.005	<0.005	<0.005
Arsenic (mg/l)	<0.01	<0.01	<0.01	<0.01
Zinc (mg/l)	0.02	0.07	0.05	0.04
Iron (mg/l)	0.73	0.83	2.80	0.60
Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	<0.02
Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	<0.1
Nickel (mg/l)	<0.01	<0.01	<0.01	<0.01
Mercury (mg/l)	<0.001	<0.001	<0.001	<0.001
Cadmium (mg/l)	<0.002	<0.002	<0.002	<0.002
Bacteriological (CFU/100ml)				
Total Coliform /100 ml.	2.5×10^3	2.6×10^3	2.4×10^3	2.4×10^3
Faecal Coliform /100 ml.	1.4×10^2	1.6×10^2	1.4×10^2	1.3×10^2

Note: For more details, refer to Section-IV of Appendix - Field Report.

3 - Description of the Environment (cont'd)

3.5 SOIL

In order to ascertain the baseline status of the soil environment, a field study was carried out in the month of December 2024. The locations were selected with the objective of covering the different land use patterns in the study area to get a proper understanding of the soil characteristics as well as impact prediction with respect to the predominant wind direction from the proposed project site during operation phase.

Objective: It is necessary to confirm that there is no change in the soil characteristics and cropping pattern from the prevalent status in the close vicinity due to operation of the KSL project activity. Therefore, it is objective to determine the soil quality in the study area & identify the impact which may arise due to the project activities on the soil along with formulating mitigation measures. The information on soil has been collected from various secondary sources together with soil sampling from prime lands & its analysis reports.

Locations for Soil Sampling and Monitoring: Representative soil samples were collected from five locations comprising i) Project site, ii) Forest lands and iii) Prime agricultural lands within the study area at prevailing major up wind and down wind direction of the project site. Standard procedures (IS-2720) were followed for the sampling and analysis of physico–chemical parameters. Details of soil sampling locations are given in Table-3-10 depicted in Soil sampling location map Fig-3-16.

3 - Description of the Environment (cont'd)

TABLE 3-12 - LOCATION FOR SOIL SAMPLING

Code	Location	Distance & Direction	Latitude	Longitude
Project Site				
S1	Project Site Near Talabarkote		20⁰34'02" N	85⁰37'38" E
Prime Agricultural Lands				
S2	Manipur village	1.8 KM, S	20⁰03'09" N	85⁰37'29" E
S3	Saria village	2.2 KM, N	20⁰35'17" N	85⁰37'53" E
Forest Lands				
S4	Forest Soil at Mahulpada	9.8 KM, NE	20⁰38'04" N	85⁰41'35" E
S5	Forest Soil at Adala	5.2KM, E	20⁰33'54" N	85⁰40'35" E

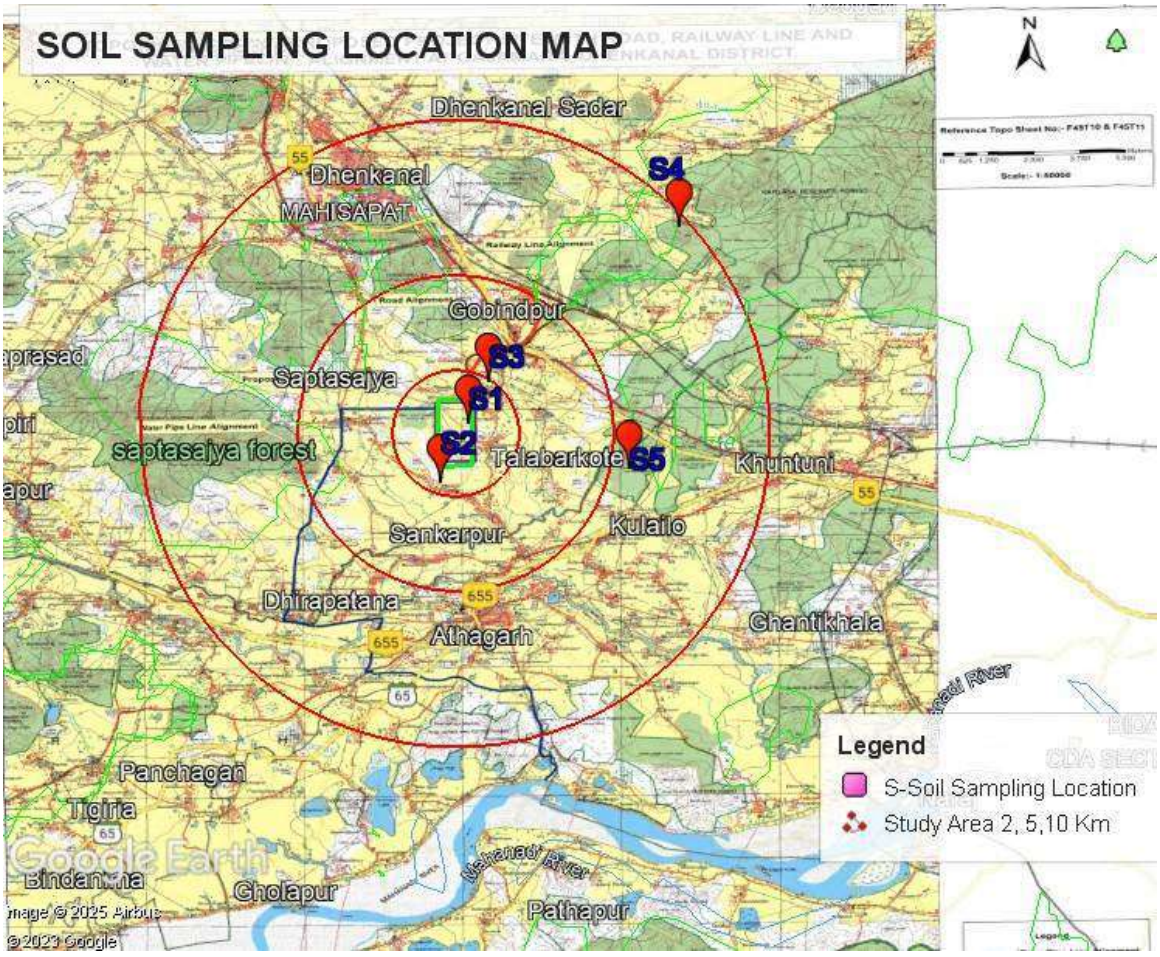


FIG. 3-15 - SURFACE WATER MONITORING STATIONS

3 - Description of the Environment (cont'd)

Baseline Soil Quality and Characteristics: Table 3-13 and Table 3-14 represent the typical characteristics of the soil in the sampled prime land use area within the study area. The soil is slightly reddish to greyish color and sandy loam texture. It is observed that the soil samples have a higher percentage of sand particles than silt and clay particles, which corroborates with the moderate level of porosity in the range of 35.0 - 46%. Hence, soil has a moderate water-holding capacity in the range of 16-28%. The results of soil sample analysis reveal that the soil is neutral to slightly alkaline in nature with pH values ranging from 7.14 to 7.45. Availability of moderate level nutrients having nitrogen in the range of 680 mg/kg to 1,280 mg/kg, phosphate in the range of 320 mg/kg to 750 mg/kg & potassium in the range of 650 mg/kg to 1580 mg/kg, which is corroborated with the total organic carbon present in the soil in the range of 5.2 gm/kg to 6.9 gm/kg and moderate level microbial population in the range of 3.8 x 104 to 8.2 x 104 Nos./ gm. The results of SAR value in the range of 6.60 to 8.95 indicate moderate level of sodium present in soil of the study area indicates soil is marginally suitable for cultivation of crops which is corroborated with the cation exchange capacity (CEC) of soil in the range of 15.4 meq/100 gm to 18.6 meq/100gm and electrical conductivity observed in the range of 1.2- 1.8 ds/m. The iron content in soil varies from 1,250 mg/kg to 2850mg/kg. The concentrations of heavy metals like chromium and lead are reported to be <3.0 mg/kg and <0.2 mg/kg respectively, indicates no potential hazards of heavy metals.

Interpretation:

i) The soil texture in Agricultural soil and forest soil is sandy loam with porosity in the range of 35.0 - 46% indicates moderate levels of water holding capacity.

ii) The pH of soil at prime agricultural land and forest land varies in between 7.14 to 7.45, reveals that the soil is neutral to slightly alkaline in nature.

3 - Description of the Environment (cont'd)

iii) The presence of total organic carbon in Agricultural soil and forest soil in the range of 5.2 gm/kg to 6.9 gm/kg indicates moderate level fertility prevailing in these prime lands.

iv) The levels of macro nutrients Nitrogen (N), Phosphate (P) and Potassium (K) present in soil samples indicate soil fertility is marginally suitable for crop cultivation.

v) The CEC and EC levels in soil samples do not indicate any potential salt hazards.

vi) The comparative characteristics of soil samples in agricultural land and forest land indicate that they are marginally suitable for growth of vegetation.

The soil sampling exercise at the study area is depicted in Fig. 3-16.



EXHIBIT 3-6 - SOIL SAMPLING AT AGRICULTURAL LAND NEAR SIARA VILLAGE (S3)

3 - Description of the Environment (cont'd)

TABLE 3-13 - SOIL CHARACTERISTICS IN THE STUDY AREA

Monitoring Period : December 2024
Frequency : Once in a monitoring period

Key Parameters	Project Site at Talabarkote (S1)	Agricultural Land at Manipur Village (S2)	Agricultural Land at Siaria Village (S3)
Physical:			
Colour	Slightly reddish	Greyish	Greyish
Soil Texture	Sandy loam	Sandy loam	Sandy loam
sand (%)	60	65	65
Silt (%)	15	20	25
Clay (%)	25	15	10
Electrical conductivity (dS/m)	1.5	1.8	1.6
Hydraulic conductivity (cm/sec.)	2.6 x10 -2	1.8x10 -3	1.8x10-3
Bulk Density (gm/ c.c)	1.38	1.5	1.6
Moisture (%)	20	25	25
Water Holding Capacity (%)	18	23	28
Porosity (%)	42	35	36
Infiltration rate(cm/hrs)	1.4	1.2	1.5
PH (1:2)	7.2	7.26	7.23
Alkanity / Acidity	Neutral	Slightly Alkaline	Slightly Alkaline
Available N2 (mg/kg)	850	1150	1280
Available P2O5 (mg/kg)	620	890	980
Available K2O (mg/kg)	780	1580	1280
Chloride (mg/kg)	1280	1120	860
Sulphate (mg/kg)	790	920	820
Sodium absorption ratio (SAR)	8.95	7.63	7.83
Available Organic Carbon (gm/kg)	5.2	6.9	6.8
Calcium (mg/kg)	970	1150	850
Magnesium (mg/kg)	1080	950	1050
Iron (mg/kg)	2850	1250	1890
Copper (mg/kg)	3.6	2.8	1.8
Lead (mg/kg)	<3.0	<3.0	<3.0
Chromium (mg/kg)	<0.20	<0.20	<0.20
Microbial Population (CFU/ gm)	4.6 x 104	8.2 x 104	6.2 x 104
Cation Exchange Capacity (meq/100g)	16.4	16.6	18.6

3 - Description of the Environment (cont'd)

TABLE 3-14 - TYPICAL SOIL CHARACTERISTICS IN THE STUDY AREA

Monitoring Period : December 2024
Frequency : Once in a monitoring period

Key Parameters	Forest land at Mahulpada R.F (S4)	Forest land at Adala R.F (S5)
Colour	Slightly reddish	Slightly reddish
Soil Texture	Sandy loam	Sandy loam
sand (%)	75	70
Silt (%)	15	20
Clay (%)	10	10
Electrical conductivity (dS/m)	1.2	1.2
Hydraulic conductivity (cm/sec.)	1.6x10 -2	1.2 x10-3.
Bulk Density (gm/ c.c)	1.46	1.2
Moisture (%)	10	8
Water Holding Capacity (%)	16	16
Porosity (%)	46	45
Infiltration rate(cm/hrs)	2.3	1.8
PH (1:2)	7.14	7.45
Alkanity / Acidity	Neutral	Slightly Alkaline
Available N2 (mg/kg)	680	860
Available P2O5 (mg/kg)	610	680
Available K2O (mg/kg)	650	920
Chloride (mg/kg)	1450	1250
Sulphate (mg/kg)	660	920
Sodium absorption ratio (SAR)	6.6	6.94
Available Organic Carbon (gm/kg)	5.6	5.8
Calcium (mg/kg)	920	920
Magnesium (mg/kg)	1450	1280
Iron (mg/kg)	2650	2350
Copper (mg/kg)	7.2	2.3
Lead (mg/kg)	<3.0	<3.0
Chromium (mg/kg)	<0.20	<0.20
Microbial Population (CFU/ gm)	3.8 x 104	5.6 x 104
Cation Exchange Capacity (meq/100g)	18.1	15.4

3 - Description of the Environment (cont'd)

3.6 NOISE

The ambient noise levels Leq for one hour interval was recorded at eight different locations once in the monitoring period as shown in the table below. In the industrial areas like project site & Spinning Mill-Govindpur the noise recorded ranges from 70.19 - 73.66 dB(A) and was 61.04 - 62.06 dB(A) at day & nighttime respectively during the monitoring period as against the regulatory standard of 75 dB(A) and 70 dB(A)respectively. The values obtained for the day & night at all locations are within the stipulated norms of CPCB.

In the monitored residential area i.e. Badrapali village & Patrabhag village, the daytime Leq was noise recorded rages from 53.18-54.02 dB(A) and nighttime Leq ranges from 44.63- 54.02 dB(A) as against the allowable regulatory standard limit of 55 dB(A) and 45 dB(A) respectively.

In the monitored commercial area i.e Talabarkote Market & Saptsajya Market, the daytime Leq was noise recorded ranges from 63.17 - 63.7 dB(A) and nighttime Leq ranges from 51.56 - 55.35 dB(A) as against the allowable regulatory standard limit of 65 dB(A) and 55 dB(A) respectively.

The daytime & nighttime Leq for silence zone like Primary School, Talabarkote and Ragada High School were recorded to be in between 52.29 - 52.38 dB(A) and 44.18 - 45.53 dB(A) respectively against regulatory norm of 50 db(A) during daytime and 40 db(A) during night. The slightly elevated noise levels are because of traffic in front of the school. The Regulatory noise levels are mentioned in Appendix 3-1. The noise levels recorded in the study area are presented in Table 3-15. Noise level monitoring is depicted in Exhibit 3-7. Noise Monitoring Stations are depicted in Fig. 3-16.

3 - Description of the Environment (cont'd)

TABLE 3-15 - RECORDED NOISE LEVEL AT THE STUDY AREA

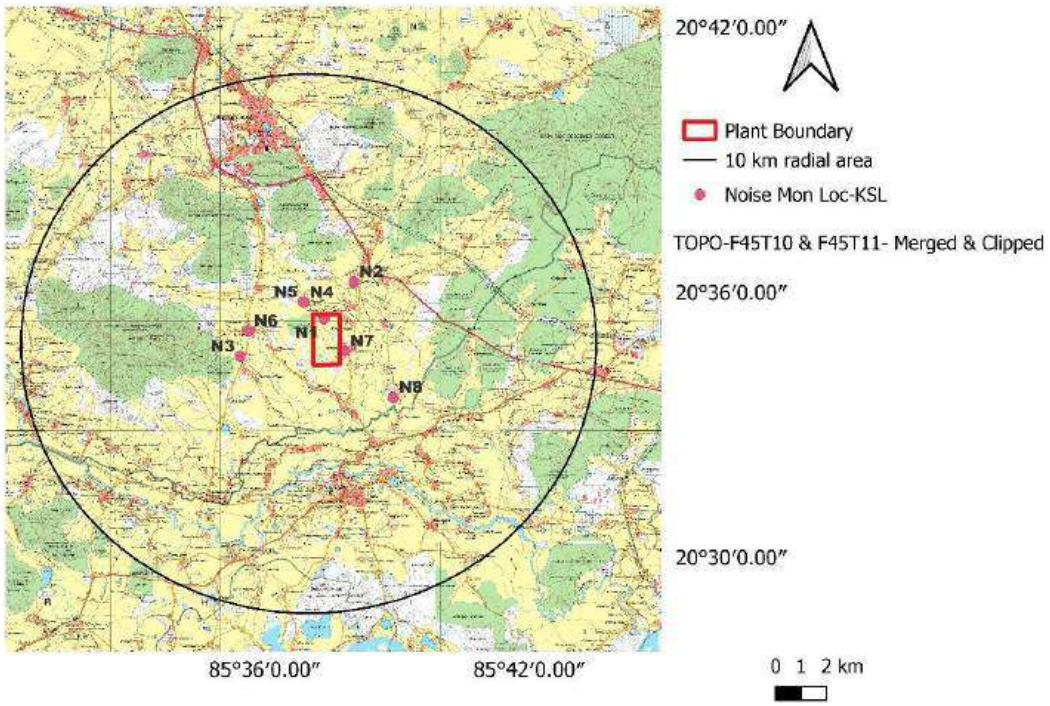
Station	Location	Day Time Leq (db(A))	Night-Time Leq (db(A))
Industrial Zone			
N1	Project Site	73.66	62.06
N2	Spinning Mill, Govindpur	70.19	61.04
Residential Zone			
N3	Badrapali Vill.	54.02	54.02
N4	Patrabhag Village	53.18	44.63
Commercial Zone			
N5	Talabarkote Market	63.7	51.56
N6	Saptsajya Market	63.17	55.35
Silence Zone			
N7	Primary School, Talabarkote	53.29	45.53
N8	Ragada High School	52.38	44.18

Note: i) Day time: 6 AM to 10 PM; Night time: 10 PM to 6 AM
ii) National Ambient Standard for Noise (CPCB) - Refer Appendix 3-1
iii) For more details, please refer Section-VI of Appendix - Field Report



EXHIBIT 3-7 - NOISE SAMPLING AT PRIMARY SCHOOL, TALABARKOTE

3 - Description of the Environment (cont'd)



N1	Project Site	N5	Talabarkote Market
N2	Spinning Mill, Govindpur	N6	Saptasajya Market
N3	Badrapali	N7	Primary School- Talabarkote
N4	Patrabhag	N8	Ragada High School

FIG. 3-16 - NOISE MONITORING STATIONS

3.7 TRAFFIC STUDY

Traffic survey was conducted at three locations namely Talabarkote to Gajamara Road, Saptsajya Road and Gobindpur to Dorada Road for 24 hours on two days (normal/working day & holiday). A continuous volume count was undertaken to obtain a realistic picture of the current volume and composition of the traffic. The analysis of traffic counts provided an estimate of the daily Traffic. The analysis has been carried out in terms of the total number of vehicles as well as with respect to Passenger Car Unit (PCU). Location-wise results of traffic analysis are done.

3 - Description of the Environment (cont'd)

At Talabarkote to Gajamara Road

The survey was conducted on 19.12.2024-20.12.2024 (Normal/Working Day), and 15.12.2024- 16.12.2024 (Holiday) for 24 hours. The total PCU count for Normal/Working day is higher than the other day count. Hence, for post-project impact assessment, volume count on 19th Dec 2024 is considered and shown in Table 3-16.

TABLE 3-16 - SUMMARY OF CLASSIFIED VOLUME COUNT SURVEY AT TALABARKOTE TO GAJAMARA ROAD (19-20 DEC 2024)

Sl. No.	Vehicle Type	Daily Traffic (No.)	Equivalent PCUs factor	Av. Daily Traffic (PCU)
1	Car and Jeep	3143	1.00	3143
2	Bus	365	3.70	1350.5
3	Truck	4499	3.70	16646.3
4	Two-Wheeler	2804	0.75	2103
Total Traffic		**10811**		**23242.8**

At Saptsajya Road

The survey was conducted on 16.12.2024-17.12.2024 (Normal Day) and 25.12.2024-26.12.2024 (Holiday). As the Holiday day's count is on the higher side, we considered 25.12.2024-26.12.2024 (shown in Table 3-17) for further analysis.

TABLE 3-17 - SUMMARY OF CLASSIFIED VOLUME COUNT SURVEY AT SAPTSAJYA ROAD (25-26 DEC 2024)

Sl. No.	Vehicle Type	Daily Traffic (No.)	Equivalent PCUs factor	Av. Daily Traffic (PCU)
1	Car and Jeep	2170	1.00	2170
2	Bus	347	3.70	1283.9
3	Truck	3819	3.70	14130.3
4	Two-Wheeler	3115	0.75	2336.25
Total Traffic		**9451**		**19920.45**

3 - Description of the Environment (cont'd)

At Gobindpur to Dorada Road

At Gobindpur to Dorada Road, the volume count survey was conducted on 23.12.2023-24.12.2024 (Normal Day) and 29.12.2024-30.12.2024 (Holiday). As the Normal day's count is on the higher side, we considered 28.12.2023-29.12.2023 (shown in Table 3-18) for further analysis.

TABLE 3-18 - SUMMARY OF CLASSIFIED VOLUME COUNT SURVEY AT TELIBARI ROAD (28-29 DEC 2023)

Sl. No.	Vehicle Type	Daily Traffic (No.)	Equivalent PCUs factor	Av. Daily Traffic (PCU)
1	Car and Jeep	2821	1.00	2821
2	Bus	298	3.70	1102.6
3	Truck	2521	3.70	9327.7
4	Two-Wheeler	1915	0.75	1436.25
Total Traffic		**7555**		**14687.55**

The Talabarkote to Gajamara Road (4 lane, 2 way, divided) which would be mostly utilized for transportation has been analyzed for the traffic scenario and level of service (LOS). The ADT (PCU) of the given road is 23,242.8 i.e. 968.45 PCU/hr. The capacity of Talabarkote to Gajamara Road is 3,600 PCU/hr (Arterial Road) as per IRC: 106-1990 (Guidelines for capacity of urban roads in plain area). Therefore, the V/C ratio works out to be 0.269 which corresponds to a LOS of B (0.2-0.4) representing a condition of stable traffic flow with un-affected speed for such class of roads.

3.8 BIOLOGICAL ENVIRONMENT

This description provides an overview of the biological environment of the KSL study area in Dhenkanal and Cuttack districts of Odisha. Baseline data generation was focused on the ecology and biodiversity within the project site (core zone) and its surrounding 10 km radius (buffer zone). About one third (1/3) part the study area is undulating land, with distinct patches of green hillock designated as



Reserve Forest, Protected Forest and Open Scrubs at a varying altitude within the Dhenkanal Sadar Block of Dhenkanal District and Athagarh Block of Cuttack District, Odisha. The Sapua Nadi, a perennial river, tributary of Mahanadi River flows South-Easterly through the Southern part of the study area.

The proposed greenfield project has direct and indirect impact on Terrestrial and Aquatic Ecosystem of the study area. Hence, it's essential to evaluate the existing status of the terrestrial and aquatic flora- fauna, impact assessment and formulate a mitigation plan to avoid or minimize the unavoidable impacts of the project activities for sustainable development. In this context, primary data was collected through field surveys in the significant terrestrial and aquatic habitats within the study area, as well as secondary data was also gathered from the record of respective divisional forest office, Forest Department, Govt. of Odisha. The information on flora and fauna was recorded through interaction with the forest officials and residents of the study area, which may not be available during the period of survey. The following paragraphs provide a review of the secondary data and the results of collected primary data as a brief description of biological environmental status of the study area.

3.8.1 Objective

The ecological field survey was carried out with the following objectives in terrestrial and aquatic habitats of the study area:

i) To assess the nature and distribution of flora and fauna in the important habitats available in the study area and formulate an action plan for its protection and management plan.

ii) To assess the existing dominant species and species diversity in vegetation community as well as planktonic population in the study area.

3 - Description of the Environment (cont'd)

iii) To ascertain the existing specie's economic importance, degree of protection schedule provided by the Indian Wildlife Protection Act, 1972 & its subsequent amendments in 2022 and conservation status in IUCN Red List (Version 2025-1).

iv) To ascertain the presence of protected areas, migratory routes of faunal species, presence of breeding grounds and sensitive habitats in the study area, if any.

v) To ascertain impact on aquatic ecosystem due to withdrawal of water/discharge of treated wastewater (if any).

vi) To review the information from secondary sources and discuss issues of concern with the relevant authority, if any.

vii) To predict the impact due to setting up of KSL project at Gajamara, Dhenkanal, Odisha, based on review of data from primary and secondary sources and formulate suitable mitigation measures ensuring to protect existing flora- fauna and their habitats.

viii) Formulating a greenbelt development plan to minimize the impact of air and noise pollution, as well as developing new habitats of flora and fauna in and around the proposed KSL Project at Gajamara, Dhenkanal, Odisha.

Biodiversity and Ecological Importance of the Study Area: Biogeographically the study area falls under zone 06 (Deccan Peninsula, Chhotonagpur) with the presence of isolated hills and dissected plateau covered with moist deciduous forest dominated with Sal (*Shorea robusta*) is depicted in Fig. 3-17. The study area exhibits diverse terrestrial and aquatic habitats, including open mixed jungles/open jungles, Reserve Forests, Protected Forests, open scrublands, afforested areas/plantations, agricultural lands, homestead areas, barren or non-agricultural lands, industrial zones, as well as various water bodies such as ponds, canals, reservoirs, and rivers.

3 - Description of the Environment (cont'd)

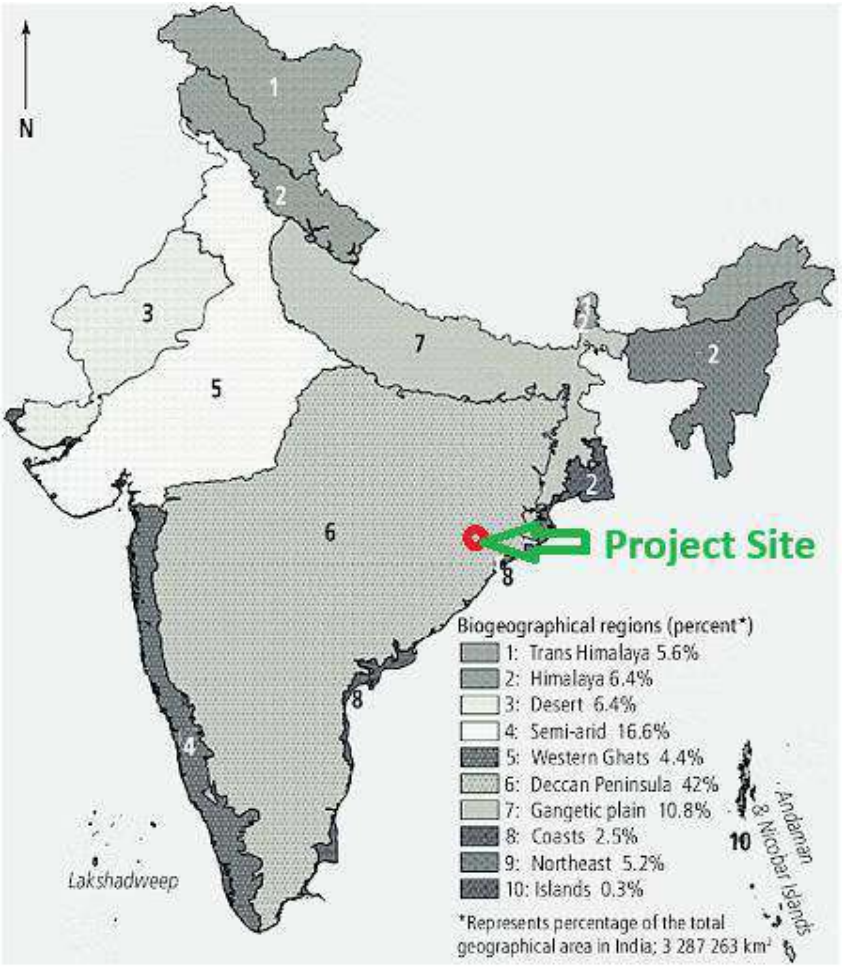


FIG. 3-17 - MAP OF INDIA SHOWING PROJECT SITE AT ZONE DECCAN PENINSULA

The significant terrestrial natural habitats in the study area include Sapta Sajya RF, Mayuri RF, Charakhola RF, Patapuri RF, Kapilas RF (Sanctuary), Megha RF, Gadabola RF, Adala RF, Ranibania RF, Deulia RF, Bauda Bankhadi RF, Oringa RF, and Phulabarhi PF. These forest reserves and protected areas play a vital role in conserving biodiversity and contribute significantly to the socio-economic well-being of the local communities. Details of significant terrestrial habitats are given in Table 3-19 in the study area.

3 - Description of the Environment (cont'd)

TABLE 3-19 - SIGNIFICANT TERRESTRIAL HABITAT IN THE STUDY AREA

Sl. No.	Habitat	Direction & Distance	Name of Location
1	Open Mixed Jungle	West, 0.5 km	Near Sadei berini
2	Open Scrub (OS)	West, 0.5 km	Near Patrabhag
3		Northwest, 8.5 km	Near Madhyasahi
4		East, 5 km	Near Dallaka
5		North, 3.5 km	Near Bhajikusuma
6	Phulabarhi PF	North, 9.5 km	Near Radhaprasannapur
7	Sapta Sajya RF	West, 4.2 km	Near Padmanavpur
8	Mayuri RF	Northwest, 4.5 km	Near Gajamara
9	Charakhola RF	North, 3.5-8.5 km	Near Gobindpur
10	Patapuri RF	Northeast, 5-10 km	Near Bahukhai Hill Forest
11	Kapilas RF (Sanctuary)	Northeast, 7-10 km	Near Mahulpada
12	Megha RF	North, 7.5-8.5 km	Near Barabanka
13	Gadabola RF	East, 4.5-6.5 km	Near Dallaka
14	Adala RF	East, 4.5-6.5 km	Near Gundichapur
15	Ranibania RF	East, 6.5-8.2 km	Near Radharamanpur
16	Deulia RF	East, 9-10 km	Near Khuntuni
17	Bauda Bankhadi RF	South, 9-10 km	Near Bentapada
18	Oringa RF	Southeast, 10 km	Near Talagarh

The study area contains several significant aquatic natural habitats, including the Sapua Nadi and multiple hill streams and nalas. These water bodies carry surface runoff and serve as vital sources of water for fishing and agricultural activities. In addition, the area features numerous ponds and swamps, which provide important habitats for a variety of aquatic and semi-aquatic flora and fauna. Collectively, these ecosystems play a crucial role in supporting the biodiversity and socio-economic livelihood of the local communities. Details of significant aquatic habitats in the study area given in Table 3-20.

3 - Description of the Environment (cont'd)

TABLE 3-20 - SIGNIFICANT AQUATIC HABITAT IN THE STUDY AREA

Sl. No.	Name of the Location	Direction & Distance (km)	Habitat
1.	Sapua Nadi	SW to SE At 4.5 km	Natural Perennial River receives surface runoff from the study area through multiple streams/nalas.
2.	Kantia Nala	SW to SE At 2.8 km	Natural Stream receives surface runoff from the hilltop and surrounding area and drains into Sapua Nadi.
3.	Mahanadi River	SW to SE At 11.5 km	Intake water source for the proposed plant. Receive surface runoff of Sapua Nadi.

Seasonal/Climatic influence on Flora and Fauna: The growth and development of flora and fauna is directly influenced by the seasonal/climatic conditions of an area, as such well reflected on ecosystem and biodiversity. Seasonal/climatic factors like rainfall, soil moisture, humidity, temperature, sunlight, and wind are influencing the habitat characteristic of a region.

According to Koeppen's Scheme - Climatic Regions of India (Fig. 3-18), the study area falls under climate type-Aw (Tropical Savanna) that receives 75 cm annual rainfall and characterized by the distinct wet and dry seasons, hot and humid climate throughout the year, grassy landscapes etc.

3 - Description of the Environment (cont'd)

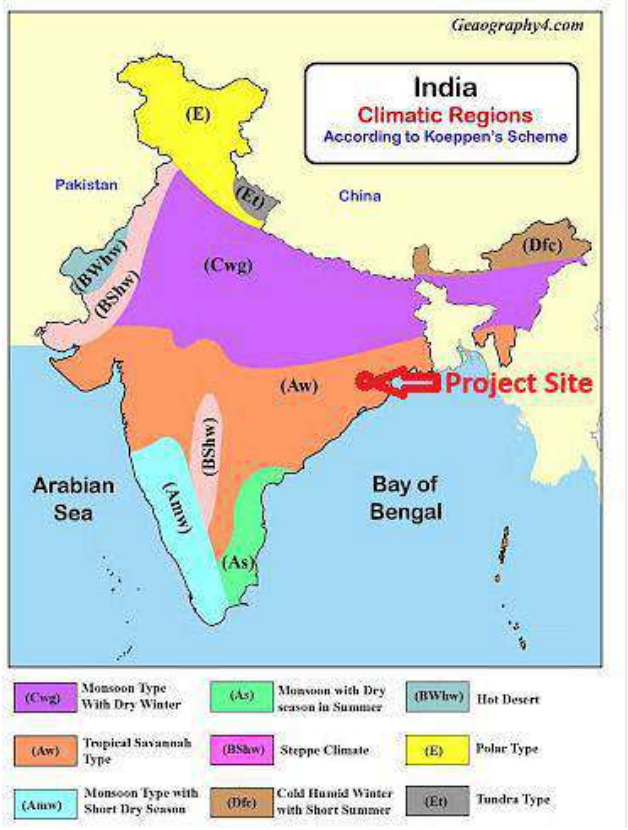


FIG. 3-18 - PROJECT SITE AS PER KOEPPEN'S SCHEME OF CLIMATIC REGIONS OF INDIA

It is characterized by hot and dry summer from March to October, while winters are dry and cooler from November to February. Humidity is high from July to September. The mean annual humidity is nearly 60%. The presence of Brahmani River, Mahanadi River, Sapua Nadi and several streams/nala also influences the natural growth of aquatic and semi aquatic flora and fauna in the vicinity of study area.

Seasonality of Data Collection: Baseline data was collected through field survey during post-monsoon (Winter) season dated 3rd to 6th December 2024. This monitoring period correctly aligned for data collection in the deciduous forest habitats within KSL study area as quadrat laying for vegetation mapping was easier due to clear

understories in deciduous forests. Sparse vegetation allows for easier access and better visibility, facilitating species identification and habitat mapping. The distinct influence of post-monsoon/winter season on the vegetation includes some species trigger flowering and fruiting, shedding leaves, dormancy and reduce growth.

Winter/post-monsoon season provides critical insights into the fauna species adapted to winter conditions and prepare for the dry summer season. During post-monsoon/winter season water recedes, exposing banks and microhabitats for better aquatic and riparian species sampling. Many residents exhibit territorial behaviors or courtship activities, large mammals like deer, wild boar, wild elephants and predators are more active during cooler parts of the day. Tracks and signs (scat, pugmarks) are more visible due to dry conditions. Some faunal species are more visible due to migration, breeding, or seasonal congregation (e.g., migratory waterbirds at wetlands).

Locations for Terrestrial and Aquatic Ecological Sampling: The selection of terrestrial and aquatic ecological sampling and monitoring location was based on land use pattern, topography, eco sensitivity of the habitats, close proximity, upwind & downwind direction of the project site. The project site is located within the Dhenkanal Sadar Block of Dhenkanal District, Odisha. The terrestrial ecological survey was carried out within the major habitats including Reserve Forest (RF), Open Jungles/Open Mixed Jungle - Protected Forest and Open scrub in the study area. The non-forest habitat includes agricultural land, roadsides, homestead lands, urban & semi-urban plantation and private plantation within the study area.

3 - Description of the Environment (cont'd)

The Sapua River is a perineal river carrying surface run off from the study area. The Sapua Nadi and Kantla Nala that receive surface run off from the project influence area and drain into the Mahanadi River. The Mahanadi River is the prime water source for the proposed Steel Plant of KSL that receives water through Pipeline located 11 km from KSL Project Boundary. The aquatic ecological survey was carried out at Mahanadi River, Sapua Nadi, Kantla Nala & Ponds within the study area. The list of sampling locations in terrestrial and aquatic habitat in the study area is given in Table 3-21 and depicted in Ecological Monitoring Location Map in Fig. 3-19.

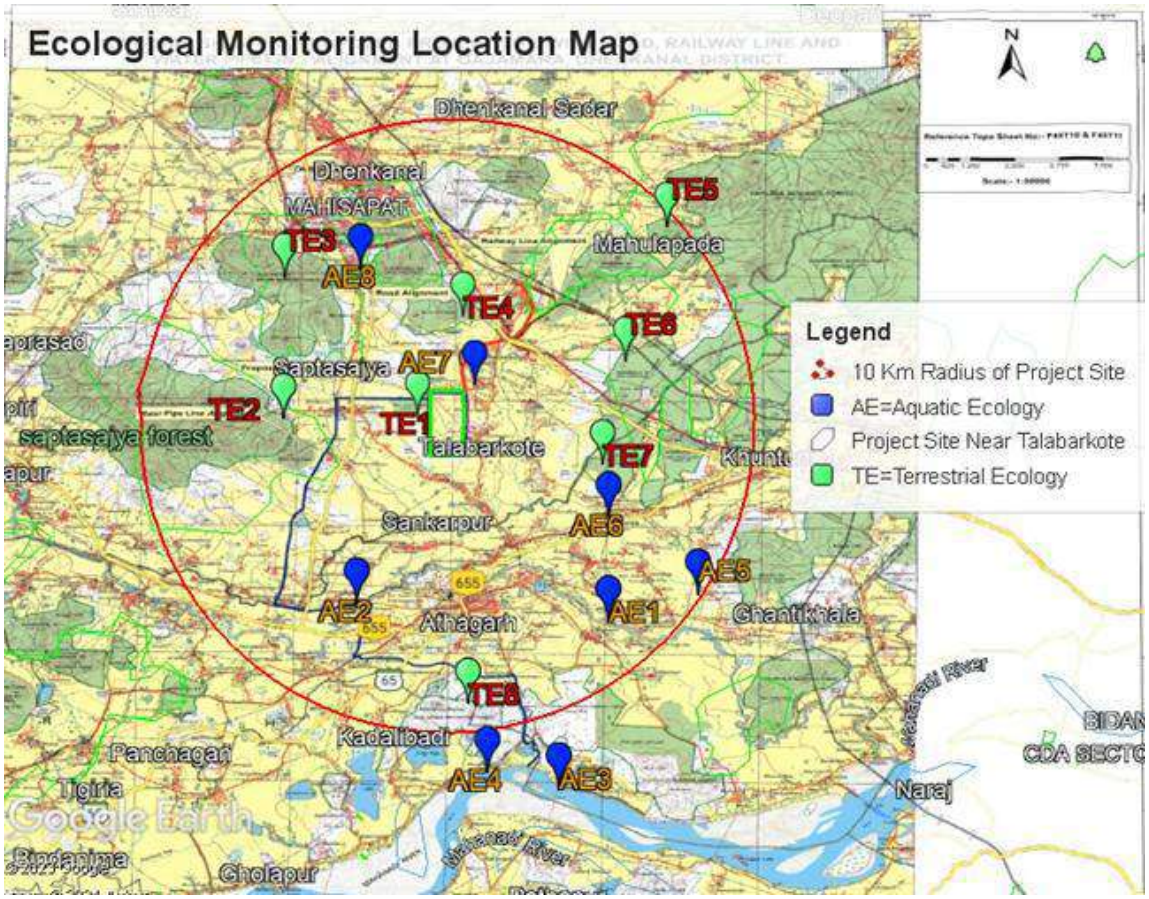


FIG. 3-19 - ECOLOGICAL MONITORING LOCATION MAP IN KSL STUDY AREA

3 - Description of the Environment (cont'd)

TABLE 3-21 - LOCATIONS FOR ECOLOGICAL MONITORING

Location Code	Location of the Habitat with Latitude & Longitude	Rationalization of the location	Distance from project site	Direction from project site
Terrestrial Ecology				
TE1	Open Mixed Jungle near Patrabhag Village 20°34'42.1" N, 20°34'42.1" N	Open Mixed Jungle near Project site	0.50 km	West
TE2	Sapta Shajya RF near Padmanavpur Village 20°34'38.4" N,85°34'19.7" E	Reserve Forest, at Sapta Shajya Hill Up Wind direction of project site	5.5 km	West
TE3	Mayuri RF near Gajamara Village 20°37'08.16" N,85°34' 8.6" E	Reserve Forest at Mayuri Hill Down wind direction of the project site	7.0 km	North West
TE4	Charakhola RF near Gobindpur Village 20°36'27.32"N,85°37'40.9"E	Reserve Forest at Gobindpur Village Down wind direction of the project site	3.5 km	North
TE5	Kapilasa RF at near Mahulpada 20°38'02.94" N,85°41'32.7"E	Reserve Forest at Bahukhali Hill Down wind direction of the project site	7.5 km	North East
TE6	Gadabola RF near Kasiapada 23°42'03.07"N,85°40'45.8" E	Reserve Forest at Down wind direction of the project site	6.5 km	North East
TE7	Adala RF near Regeda 20°33'49.94"N,85°40'20.4" E	Reserve Forest at Cross wind direction of the project site	5.5 km	East
TE8	Phulabarhi PF near Radhaprasannapur 20°29'38.67"N,85°37'50.5" E	Mixed Plantation at Up Wind direction of the project site	9.0 km	South
Aquatic Ecology				
AE1	Sapua Nadi - Downstream Parsurampur Village 20°30'16"N, 85°40'30"E	Natural surface water drainage system drain into Mahanadi River	2.5 km	Northwest
AE2	Sapua Nadi- Upstream Nr. Kuanla Village 20°31'24"N, 85°36'43"E	Natural surface water drainage system drain into Mahanadi River	2.0 km	North
AE3	Mahanadi River Near Kandarpur ferry ghat 20°27'24"N, 85°39'14.8"E	Downstream of Intake water Source	10.5 km	South
AE4	Mahanadi River (upstream of intake point) Near Phulabarhi Village 20°28'27"N, 85°38'13"E	Upstream of Intake water Source	10.4 km	South
AE5	Kantla Nala (Near Gaurangapur Village) 20°31'11"N, 85°41'31"E	Natural surface water body drain to Sapua River	9.6 km	Southeast
AE6	Kantla Nala (Near Gopinathpur Village) 20°32'37"N, 85°49'54"E	Natural surface water body drain to Sapua River	6.5 km	Southeast
AE7	Nala (Near Siaria Village) 20°36'33"N, 85°36'06.99"E	Natural surface water body drain to Sapua River	4.5 km	North
AE8	Pond (Near Mania Bandha Village) 20°36'33"N, 85°36'06"E	Significant domestic water source	2.0 km	North

3 - Description of the Environment (cont'd)

3.9 METHODOLOGY ADOPTED FOR ECOLOGICAL SURVEY

3.9.1 Review of Literature for Biodiversity Assessment

The following list of relevant literature, reports and articles were reviewed to extract information about the general ecology of the study area and prepare a check list of flora and fauna along with their ecological as well as economic significance for conservation.

1. Indian Wildlife Protection Act, 1972 & its amendments in 2022.
2. ENVIS Database, MOEFCC, Govt. of India.
3. Database of Botanical Survey of India (BSI)
4. Database of Zoological Survey of India (ZSI)
5. The IUCN Red List of Threatened Species, 2024-1
6. Working plan for Dhenkanal Forest Division, Govt. of Odisha.
7. Working plan for Athagarh Forest Division, Govt. of Odisha.
8. Journal of Entomology and Zoology study, ISSN 2320-7078 JEZS 2014; 2 (5): 329-334© 2014 JEZS.
9. District gazetteer of Dhenkanal, Odisha https://archive.org/details/dli.ministry.08548/page/27/mode/2up
10. District Environment Plan for Dhenkanal
11. Journal of Entomology and Zoology study, ISSN 2320-7078 JEZS 2014; 2 (5): 329-334© 2014 JEZS

3.9.2 Tool/Equipment Used During Field Survey

The following tools/equipment used during field survey.

Sl. No.	Tool/Equipment	Purpose
1.	Binoculars	To observe flora fauna at distance
2.	Camera with (GPS)	For collecting photographs
3.	Measuring tapes and Scale	Laying quadrate
4.	Plant cutters	To cut floral sample
5.	Plant tags	To carry floral sample
6.	Pocket lens	To observe small flora fauna
7.	Plankton net	To collect planktonic sample
8.	Formalin	To preserve plankton sample
9.	Plastic bottle	To carry planktonic sample
10.	Marker pen	For marking sample
11.	Silt sampler	For collecting benthic flora fauna

3 - Description of the Environment (cont'd)

3.9.3 Methodology Adopted for Terrestrial Ecological Survey

Field survey for terrestrial ecology aims to evaluate the status of flora fauna within the study area. The qualitative estimation of floral inventory was followed through listing of all observed vegetation in all the sampling sites and quantitative estimation through laying down quadrate sample plot at natural vegetative cover area. Quadrate sample plot size of 10 m x 10 m, 5 m x 5 m, 1 m x 1 m was taken for measurement of trees, shrubs and herbs respectively. The appropriate quadrat size was determined using the species-area curve method, wherein quadrat area was increased until the addition of new species plateaued.

Field identification of the species and later identification through photographs were followed. Samples of unidentified species were collected following proper procedure and prepared into herbarium sheets for later identification.

Phyto social community of trees, shrubs and herbs were identified & estimated in the forest land/open scrubs as well as plantation area/homestead lands with the help of morphological characteristics and taxonomical classification by Bentham and Hooker. The economically important flora such as medicinal plants, horticultural crops and agricultural crops grown in the study area were also listed with review of relevant literature, reports journal and articles.

The methodology adopted for faunal survey involved faunal habitat assessment, opportunistic observation, diurnal bird observation, identification of call of birds, active search for reptiles and amphibians, observations of feathers, scats, footprints and excreta etc. During the survey, line transects, and patches were laid at the selected monitoring stations for birds, butterflies, mammals, reptiles and amphibians, where identified by adopting standard field guides and with the help of



10 x 50 Nikon binocular. The faunal species available in the study area was also confirmed with review of relevant literature, reports journal articles, working plan of forest department and interaction with forest officials.

3.9.4 Methodology Adopted for Aquatic Ecological Survey

Field observations were made for listing down macrophytes including free floating, submerged, emergent, marshy and riparian vegetation. The planktonic samples were collected from selected locations in Mahanadi River, Sapua Nadi, Kantia Nala & Ponds for estimation of planktonic population & species diversity index. Observations were also made for listing down semi aquatic birds, fishes, reptiles, amphibians, mollusks, insects, and benthos. The semi aquatic birds were observed and identified with the help of 10 x 50 Nikon Binocular and listed. The Silt samples were also collected by silt samplers to observe and identified with the help of pocket lens and noted.

3.9.5 Collection of Secondary Data

During the field survey, relevant published data on floral & faunal constituent of the study area was collected from the working plan of Dhenkanal & Athagarh Forest Division, Govt. of Odisha and District Environment Plan for Dhenkanal. Additionally, information was also gathered through interaction with the Forest Officials at Dhenkanal and Officials of Athagarh as well as residents of the study area to substantiate the collected primary data.

3.10 TERRESTRIAL ECOLOGICAL STATUS (TES)

3.10.1 Status of Vegetation within the proposed project boundary

The vegetation cover within the proposed Kalyani Steel Plant boundary primarily consists of an open jungle dominated by Cashew (*Anacardium occidentale*), along with sparsely distribution of other



co-dominant tree species such as Teak (*Tectona grandis*), Mango (*Mangifera indica*), Neem (*Azadirachta indica*), Kendu (*Diospyros melanoxylon*), Acacia (*Acacia nilotica*), Ankol (*Alangium salviifolium*), Chakunda (*Dillenia pentagyna*), Seora (*Ventilago denticulata*) and Khejur (*Phoenix sylvestris*) etc.

A total number of about 26,000 trees belonging to 60 species has been enumerated in the project area. The list of trees in the proposed KSL project area presented in Appendix-3-2.

3.10.2 Present Status of Vegetation in Reserve Forest (RF), and Protected Forest (PF) Area.

As per Champion and Seth Forest Classification (1968), the forest type of study area is considered as tropical moist deciduous forests. The Reserved Forests (RF) in the study area are mostly hilltops covered with mixed vegetation dominated by Sal (Shorea robusta) and Segun/Teak (Tectona grandis). The other natural vegetation present in these forests includes Asan (Terminalia elliptica), Bael (Aegle marmelos), Char (Buchanania lanzan), Dhaora (Anogeissus latifolia), Mahua (Madhuca longifolia), Kendu (Diospyros melanoxylon), Kusum (Schleichera oleosa) and Kumbhi (Careya arborea). The understory consists of some evergreen species like Ankol (Alangium salvifolium), Ber (Ziziphus mauritiana), Chotra (Lantana camara), Devil weed (Chromolaena odorata), Garari (*Cleistanthus collinus*), Seora (Streblus asper) and Bamboo clumps. Climbers like Bush-willow (Combretum decandrum), Shora-alu (Dioscorea oppositifolia), Kanta-alu (Dioscorea pentaphylla), Gulanch (Tinospora cordifolia), Satamuli (Asparagus racemosus), Telakucha (Coccinia grandis), Climbing fern (Lygodium japonicum) and grasses like Benaghas (Andropogon muricatus), Cogongrass (Imperata arundinacea), Motha (Cyperus esculentus) were also found in close association with trees and shrubs.

3 - Description of the Environment (cont'd)

3.10.3 Status of Vegetation at Homestead Lands and Roadsides

The common tree species in the homestead lands and roadsides are Arjun (*Terminalia arjuna*), Akashmoni (*Acacia auriculiformis*), Babul (*Acacia nilotica*), Banyan (*Ficus benghalensis*), Bael (*Aegle marmelos*), Cassia (*Cassia siamea*), Copperpod (*Peltophorum pterocarpum*), Debdaru (*Polyalthia longifolia*), Dumur (*Ficus cunea*), Gulmohar (*Delonix regia*), Guava (*Psidium guajava*), Jamun (*Syzygium cumini*), Kachnar (*Bauhinia variegata*), Mango (*Mangifera indica*), Neem (*Azadirachta indica*), Palash (*Butea monosperma*), Pipal (*Ficus religiosa*), Sajna (*Moringa oleifera*), Segun (*Tectona grandis*), Sishoo (*Dalbergia sissoo*) and Siris (*Albizia procera*).

The common shrubs distributed within the roadsides, barren lands, banks of river and canals are Akanda (*Calotropis procera*), Arandi (*Ricinus communis*), Arni (*Clerodendrum phlomidis*), Arhar (*Cajanus cajan*), Ber (*Zizyphus jujuba*), Dhutra (*Datura stramonium*), Ipomoea (*Ipomoea carnea*), Lal Bheranda (*Jatropha gossypifolia*), Lantana (*Lantana camara*), Nisinda (*Vitex nigando*) and Vasaka (*Adhatoda vasica*). Climbers like Biter vine (*Mikania micrantha*), Telakucha (*Coccinia grandis*), Gulancha (*Tinospora cordifolia*) etc were also found in close association with trees and shrubs.

The common herbs and grasses were found as ground cover in close association with shrubs are Ban Tulasi (*Croton bonplandianum*), Laajvanti (*Mimosa pudica*), Congress Grass (*Parthenium hysterophorus),* Coat Buttons (*Tridax procumbens),* Katanotey (*Amaranthus spinosus*), Kukshim (*Vernonia cinerea*), Nut grass (*Cyperus rotundus*) *and* Doob (*Cynodon dactylon*).

3 - Description of the Environment (cont'd)

The Bamboo clumps and Palms species of Tal (*Borassus flabelliform*), Narial (*Cocos nucifera*), Khajur (*Phoenix dactylifera*) were commonly found in homestead lands. The thorny bushes of Phanimansha (*Opuntia dillenii*) and Tesiramonsa (*Euphorbia antiquorum*) were also found along the roadsides and waste lands.

The compiled list of flora in forest and non-forest land as observed during the field survey and through information collected by interacting with the concerned forest officials and local people of the study area is provided in Appendix 3-3. A total of 161 floral species including 61 tree species under 23 families, 2 cactus species under 2 families, 3 Succulent species under 2 families, 3 bamboo species under 1 family, 32 shrub species under 16 families, 32 herb species under 18 families, 9 grass species under 2 families, 6 climber species under 5 families and 7 agricultural crop species under 4 families were recorded at various sampling sites during field survey within the study area.

3.10.4 Quantitative Estimation of Vegetation

It is essential to know the numerical distribution of different species in the vegetation community especially in terms of species richness, evenness index, diversity index and IVI (Important Value Index). For quantitative determination of plant community structure, the line transects with quadrate laid in the selected sample plots in the Reserve Forest (RF) and Protected Forests (PF) land in the study area.

3 - Description of the Environment (cont'd)

Richness, Evenness, Diversity Index & IVI (Important Value Index) of Tree Species in the Vegetation Community: Species diversity was evaluated by using Shannon - Weaver (1963) diversity index, from the data collected through quadrate method at selected sites of the study area. The Shannon - Weaver diversity index (H) is an index that is widely used to characterize species diversity in a vegetation community. Shannon-Wiener index is calculated by the following formula:

'H'= -Σ pi*ln*pi where, pi is the proportion of individuals found in species 'i', this proportion can be estimated as pi = ni/N, where ni is the number of individuals or the population of species 'i' and N is the total number of individuals or total population across species in the community. Richness (R or S) simply quantifies how many different types of species contain. An evenness index is a measure of how evenly distributed species are in a community. This index is calculated by dividing the Shannon diversity index (H) by the natural log of the richness (R or S).

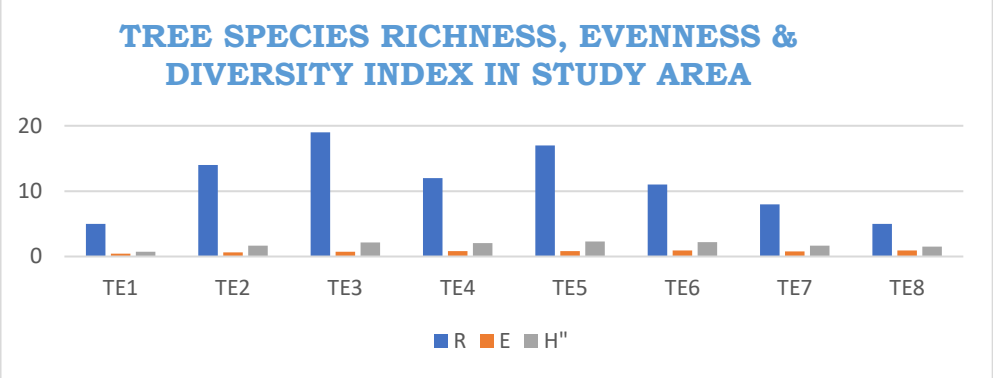
The tree species richness, evenness index and diversity index values were computed for the monitoring locations and the results are presented in Table 3-6. IVI (Important Value Index) of all the available tree species were calculated by addition of Relative density, Relative frequency and Relative abundance to find the dominant species of the habitats presented in Table 3-22.

IVI = (Relative density + Relative frequency + Relative abundance), Highest IVI is considered as Dominant Species within the Community.

3 - Description of the Environment (cont'd)

TABLE 3-22 - TREE SPECIES RICHNESS, EVENNESS, DIVERSITY INDEX & DOMINANT SPECIES

Location Code	Name of the Monitoring Locations	Species Richness (R or S)	Evenness index (E)	Shannon-Weaver diversity index (H')	Dominant Species
TE1	Open Mixed Jungle near Patrabhag Village	5	0.45	0.72	Cashew
TE2	Sapta Shajya RF near Padmanavpur Village	14	0.63	1.67	Segun/Teak
TE3	Mayuri RF near Gajamara Village	19	0.72	2.13	Sal
TE4	Charakhola RF near Gobindpur Village	12	0.82	2.04	Sal
TE5	Kapilasa RF at near Mahulpada	17	0.81	2.30	Segun/Teak
TE6	Gadabola RF near Kasiapada	11	0.91	2.19	Sal
TE7	Adala RF near Regeda	8	0.79	1.64	Sal
TE8	Phulabarhi PF near Radhaprasannapur	5	0.94	1.51	Akashmoni



The Shannon–weaver Diversity Index (H') of trees species in the study area appears to be in the range of 0.72 - 2.30. It has been noticed that trees species diversity (H') is highest at TE5 (Kapilasa RF near Mahulpada) and lowest at TE1 (Open Mixed Jungle) near Patrabhag Village in the study area. The tree species richness (R) appeared to be in the range of 5 - 19, among the monitoring locations. The tree species richness (R) is highest at TE3 (Mayuri RF near Gajamara Village) and lowest at TE1 (Open Mixed Jungle near Patrabhag Village). The Pielou's Evenness index (E) of tree species distribution across the monitoring locations appeared to be in the range of 0.45 - 0.91. That indicates uneven floral distribution in the study area. The Evenness index of tree

species is highest 0.91 at TE8 (Phulabarhi PF near Radhaprasannapur) and lowest 0.45 at TE1 (Open Mixed Jungle near Patrabhag Village). Evenness index in the lower range 0.45 at TE1 indicates possible anthropogenic pressures /natural disturbances reducing diversity of species and evenness index. The Evenness index in the range of 0.63 - 0.94 at TE2 to TE8 indicates a healthier, diverse and stable tree community and likely to experience less dominance by specific species also indicate favorable ecological conditions. In terms of Important value Index (IVI), the highest value was found for Sal (*Shorea robusta*) and Segun/Teak (*Tectona grandis*) considered as dominant tree species in most of the monitoring locations in the study area. While Cashew (*Anacardium occidentale*) and Akashmoni (*Acacia auriculiformis*) were found to be the dominant species at Open Mixed Jungle near Patrabhag Village and Phulabarhi PF near Radhaprasannapur, respectively in the study area.

3.10.5 Medicinal Plants in the Study Area

Some economically important medicinal plant species have been identified among the floral species in the study area. Their ethnic medicinal value plays an important role as herbal medicine and used in treatment of varies ailments particularly benefiting the rural SC and ST population living in forest fringed areas. A total of 39 medicinal plant species under 24 families were identified and preparing a list of medicinal plants is given in Appendix 3-3.

3.10.6 Agricultural Pattern of the Study Area

The main cash crops in the study area is Rice (*Oryza sativa*) followed by Wheat (*Triticum aestivum*), Maize (*Zea mays*), and Sugarcane (*Saccharum officinarum*). Crop productivity in the form of horticultural production includes Cashew, Mango and Bamboo were found and documented during field survey.

3 - Description of the Environment (cont'd)

3.10.7 Terrestrial Fauna

Mammals: During field survey opportunistically observed the wild animals (mammals) like Indian grey mongoose (*Herpestes edwardsii*), Indian palm squirrel (*Funambulus palmarum*), and Langur (*Presbytis entellus*) in the study area. However, the presence of other wild animals has been confirmed by the observed scats, footprints and excreta in the forest area and collected information from forest officials and local peoples.

A total of thirty-seven wild animals (mammals) observed/ reported during interaction with forest officials of Dhenkanal & Athagarh forest division and local peoples are listed in Appendix 3-4.

Domestic animals like Cow (*Bos indicus*), Buffalo (*Bubalus indicus*), Sheep (*Ovis aries*), Goat (*Capra hircus*), Pig (*Sus scrofa domesticus*), Dog (*Canis familiaris*) and Cat (*Felis domesticus*) were also observed during survey in the study area.

Reptiles: Among the reptiles, Garden Lizard (*Calotes versicolor*) and Dhaman (*Ptyas mucosus*) were found during field survey in the study area. A total of seven reptile species as observed and reported during interaction with forest officials of Dhenkanal & Athagarh forest division and local peoples are listed in Appendix 3-4.

Avifauna: Among the avifauna, Black Drongo (*Dicrurus adsimilis*), Common crow (*Corvus splendens*), Common myna (*Acridotheres tristis*), Common Koel (*Eudynamys scolopaceus*), House sparrow (*Passer domesticus*), Red vented bulbul (*Pycnonotus cafer*) and Spotted dove (*Streptopelia chinensis*) were very common bird observed during survey in the study area. The avifauna (birds) observed and reported during interaction with forest officials of Dhenkanal & Athagarh forest division and local people in the study area are listed in Appendix 3-4.

3 - Description of the Environment (cont'd)

Butterflies: Among the invertebrates, only five varieties of butterflies were listed during survey and are listed in Appendix 3-4.

3.11 AQUATIC ECOLOGICAL STATUS (AES)

The Aquatic Ecological survey was conducted at eight selected locations in Mahanadi River, Sapua Nadi, Kantia Nala & Ponds within the study area are depicted in Monitoring Location Map 3-3.

3.11.1 Aquatic Flora

The aquatic macrophytes observed during survey in the study area are listed in Appendix 3-5. Among them *Azolla pinnata, Eichhornia crassipes, Pistia stratiotes, Sagittaria latifolia, Spirogyra sp.* are free floating algae and Water lily (*Nymphaea nouchali*), Lotus (*Nelumbo nucifera*) are free floating but rooted herbs. *Alternanthera philoxeroides, Hygroryza aristata, Justicia americana, Marsilea quadrifolia* are the emergent hydrophytes and semi aquatic plant like *Colocasia esculenta, Cyperus rotundus, Ipomea aquatica, Scirpus grossus, Typha elephantina* are the marshy amphibian. There are also completely submerged vegetations like *Ceratophyllum demersum, Elodea canadensis, Hydrilla verticillata, Potamogeton crispus*. Among the macrophytes, *Ipomoea carnea, Cyperus rotundus, Eichhoria crassipes and Colocasia esculenta* are dominant species & widely distributed in the study area.

Planktonic Population: A total of ten (10) phytoplankton species and eight (8) zooplankton species were identified from the eight (8) surface water monitoring locations within the KSL study area. Among the ten (10) phytoplankton *Zygnema sp.* belongs to the class Zygnematophyceae, *Nostoc.sp. & Oscillatoria sp.* belongs to class Cyanophyceae, *Navicula sp., Cyclotella sp. & Synedra sp.* belongs to class Bacillariophyceae and *Spirogyra sp., Oedogonium sp., Pediastrum sp. & Cladophora sp.* belongs to class Chlorophyceae.

3 - Description of the Environment (cont'd)

Among the eight (8) zooplankton species two water fleas (*Daphnia sp., Moina Sp.*) belongs to the superorder Cladocera of phylum Arthropoda and two worm shaped pseudocoelomate animals (*Brachinus sp., Diaptomus sp.*) belongs to the phylum Rotifera. *Cyclops sp.* is a small crustacean under phylum Arthropoda, *Paramecium sp.* is a unicellular ciliate under phylum Ciliophora, *Euglena sp.* is a single-celled eukaryotes under phylum Euglenozoa and Larvae of *culex sp.* also identified from the significant aquatic habitats within the study area.

To assess the productivity of aquatic ecosystem, present in the study area, the Shannon and Weaver Diversity Index ("H") of planktonic population was calculated for all eight monitoring locations. The "H" values of the respective water bodies are presented in Table 3-23.

TABLE 3-23 - PLANKTONIC DIVERSITY INDEX OF THE MONITORING LOCATIONS

Code	Monitoring Locations	Shanon and Weaver Diversity Index (H)	
		Phytoplankton	Zooplankton
AE1	Sapua Nadi – Downstream Near Parsurampur Village	2.28	2.04
AE2	Sapua Nadi- Upstream Nr. Kuanla Village	2.28	2.06
AE3	Mahanadi River Near Kandarpur ferry ghat	2.29	2.06
AE4	Mahanadi River (upstream of intake point) Near Phulabarhi Village	2.25	1.98
AE5	Kantla Nala (Near Gaurangapur Village)	2.29	2.03
AE6	Kantla Nala (Near Gopinathpur Village)	1.86	2.03
AE7	Nala (Near Siaria Village)	2.29	1.99
AE8	Pond (Near Mania Bandha Village)	2.24	2.05

3 - Description of the Environment (cont'd)

Inference:

1) All aquatic habitats are dominated by the phytoplankton species under class Chlorophyceae, that usually indicates mesotrophic aquatic ecosystem with presence of moderate levels of organic nutrients. It also corroborates with the presence of large number of zooplankton species under the phylum Arthropoda and Rotifer.

2) From the quantitative assessment of phytoplankton and zooplankton, the planktonic diversity Index for phytoplankton and zooplankton varies from 1.86 – 2.29 and 1.98 - 2.06 respectively. The Shannon-Weaver diversity index values indicating presence of moderate levels for phytoplankton and zooplankton and suggest that the water bodies are mesotrophic. Mesotrophic environments typically have an intermediate level of productivity, which means they contain moderate amounts of organic nutrients which corroborate with nitrate, nitrite and phosphate content in the monitoring locations. The available organic nutrient levels are sufficient to sustain a variety of species, but not so high as to cause issues like eutrophication, which would lead to algal blooms and oxygen depletion.

The list of identified planktonic spectrum of phytoplankton and zooplankton is presented in Appendix 3-7.

Aquatic Fauna: The aquatic faunal species which were observed in and around the water bodies include benthos, amphibians, fishes and semi aquatic avifauna.

Benthos: Among the benthic macro-invertebrates three mollusca species like Mud Snail (*Bithynia tentaculata*), Jhinuk (*Lamellidens marginalis*), Pond Snail (*Bellamya crassa*) and two arthropods' species like Damselfly nymphs (*Zygoptera sp.*), Water scorpion (*Laccotrephes sp.*) were found in the water bodies during survey.

3 - Description of the Environment (cont'd)

Amphibian: Only five amphibian species like Indian bull frog (*Rana tigrina*), Indian Pond frog (*Rana hexadectyla*), Paddy field frog (*Rana limnocharis*), Skipping frog (*Rana cyanophlyctis*), Toad (*Bufo melanostictus*) were found available during the study period.

Fish fauna: Total twenty-seven fish species are fairly available in the water bodies as informed during the interaction with the fishermen. The Mahanadi River, Sapua Nadi, Kantia Nala & Ponds are significant aquatic ecosystem supporting fish in the area. The commercial cultivation of fish was not reported during interaction with the local community within the study area. However, local fishermen communities mainly depend on fishing in Mahanadi River, reported during field survey. The maximum abundance of fish was reported during post-monsoon season (October to December) in the Mahanadi River and monsoon period is vital for fish reproduction in Mahanadi River. The reported water quality in Mahanadi River such as DO, pH, Nitrate, Phosphate and Conductivity, indicate favorable fish abundance and diversity. The fishes reported in the Mahanadi River, Sapua Nadi, Kantia Nala & Ponds are given in Appendix 3-5.

Semi Aquatic Birds: The semi aquatic birds observed near Mahanadi River, Sapua Nadi, Kantia Nala & Ponds during survey of the study area are listed in Appendix 3-6. Among them Indian Pond Heron (*Ardeola grayii*), Cattle Egret (*Bubulcus ibis*), Little Egret (Egretta garzetta) and *Little Cormorant (Phalacrocorax carbo) were* commonly found near the water bodies. The semi aquatic birds observed and reported at the Mahanadi River, Sapua Nadi, Kantia Nala & Ponds are given in Appendix 3-6.

3 - Description of the Environment (cont'd)

3.12 REVIEW OF PUBLISHED SECONDARY DATA AND RELEVANT STANDARDS FOR CROSS REFERENCEING AND INTERPRETATION

The Environment Plan of Dhenkanal district of Odisha and working plan of Dhenkanal & Athagarh Forest Division, Govt. of Odisha were collected to review the flora – fauna as secondary source of information. The other related literature and standards available in websites like IUCN Red List, Version 2025-1, Indian Wildlife Protection Act, 1972 and its amendments in 2022 was also reviewed.

3.12.1 Conservation Status of Sighted Flora and Fauna

Conservation status of the sighted flora fauna has been checked in the Indian Wildlife Protection Act, 1972 (IWPA, 1972) and its consequent amendments in 2022 and IUCN Red list (Version 2025-1). Among the sighted flora and fauna, most of the species are listed under Schedule-II and a few of them listed under Schedule-I in Wildlife Protection Act 2022 and consider as Least Concern (LC)/Endangered (EN)/Vulnerable (VU)/Near Threatened (NT) species in IUCN Red list (Version 2025-1). A site-specific Wildlife Conservation Plan with budgetary provision along with implementation schedule would be prepared for conservation of these species. The list of faunal species classified under Schedule-I of the Wildlife (Protection) Act, 1972 and amendments in 2022, identified within the study area is presented in Table 3-24.

TABLE 3-24 - SCHEDULE-I SPECIES REPORTED IN THE STUDY AREA

Sl. No.	Common Name	Scientific Name	Schedule of Protection (IWPA-2022) & Conservation Status (IUCN-2024-2)
MAMMALS			
1	Asiatic jackal	*Canis aureus*	I & LC
2	Bison	*Bos gaurus*	I & VU
3	Civet	*Viverricula indica*	I & LC
4	Four-horned antelope	*Tetracerus*	I & VU

3 - Description of the Environment (cont'd)

Sl. No.	Common Name	Scientific Name	Schedule of Protection (IWPA-2022) & Conservation Status (IUCN-2024-2)
5	Indian crested	*Hystrix indica*	I & LC
6	Indian Elephant	*Elephas maximus*	I & EN
7	Indian wild dog	*Cuon alpinus*	I & EN
8	Langur	*Semnopithecus entellus*	I & VU
9	Leopard (Panther)	*Panthera pardus*	I & VU
10	Leopard cat	*Prionailurus*	I & LC
11	Malayan giant squirrel	*Ratufa bicolor*	I & NT
12	Pangolin	*Manis crassicaudata*	I & EN
13	Porcupine	*Hystrix indica*	I & LC
14	Ratel	*Mellivora capensis*	I & LC
15	Sambar	*Cervus unicolor*	I & VU
16	Sloth bear	*Melursus ursinus*	I & VU
17	Spotted deer	*Axis axis*	I & LC
18	Wild boar	*Sus scrofa cristatus*	I & LC
19	Wolf	*Canis lupus*	I & LC
REPTILES			
20	Cobra Indian	*Naja naja*	I & LC
21	Cobra King	*Naja hannah*	I & VU
22	Cobra Monocallota	*Naja kuothia*	I & LC
23	Dhamana	*Ptyas mucosus*	I & -
24	Indian python	*Python molurus*	I & LC
25	**Land monitor**	*Varanus bengalensis*	I & NT
BIRDS			
26	Eagle Tawny	*Aquila rapax*	I & VU
27	Harrier marsh	*Circus aeruginosus*	I & LC
28	Harrier Pallid	*Circus macrourus*	I & NT
29	Hornbill Malabar-pied	*Anthracoceros*	I & NT
30	Jungle fowl grey	*Gallus sonneratii*	I & LC
31	Kite brahminy	*Haliastur indus*	I & LC
32	Myna Hill	*Gracula religiosa*	I & LC
33	Owl Indian great horned	*Bubo bengalensis*	I & LC
34	Peafowl Indian	*Pavo cristatus*	I & LC
35	Shikra	*Accipiter badius*	I & LC
36	Sparrow hawk eurasian	*Accipiter nisus*	I & LC
37	Vulture White-backed	*Gyps bengalensis*	I & CR
38	Vulture king	*Sarcogyps calvus*	I & CR
39	Woodpecker heart-	*Hemicircus canente*	I & LC
40	Teal cotton pygmy	*Nettapus*	I & LC
41	Tern river	*Sterna aurantia*	I & VU

3 - Description of the Environment (cont'd)

3.12.2 Eco-Sensitive Area

The Reserve Forests (RF) like Sapta Sajya RF, Mayuri RF, Charakhola RF, Patapuri RF, Kapilas RF (Sanctuary), Megha RF, Gadabola RF, Adala RF, Ranibania RF, Deulia RF, Bauda Bankhadi RF, Oringa RF and Protected Forest (PF) like Phulabarhi PF are the significant terrestrial eco-sensitive habitats available in the study area. Floral distributions were found to have moderate to faire level biodiversity prevailing in these habitats within the study area. Hence, it's essential to implement conservation measures to maintain and enhance the biodiversity of these habitats. Additionally, promoting sustainable land use practices and habitat restoration could support the resilience of these floral communities and prevent further biodiversity loss.

The Mahanadi River, Sapua Nadi, Kantia Nala & Ponds are significant aquatic habitats for aquatic and semi aquatic flora fauna that support the ongoing agriculture, fishing practices and industries thus play significant role in livelihood of large population in the study area.

Therefore, the falling of trees in the open jungle/forest area and dumping of solid waste and discharges of wastewater into the Mahanadi River, Sapua Nadi, Kantia Nala & Ponds must be prohibited. Afforestation must be encouraged in private lands as well as protected forests and open jungles through free distribution of sapling and incentives. The Mahanadi River, Sapua Nadi, Kantia Nala & Ponds in the study area may be rejuvenated through the water body conservation and beautification plan that may develop into Eco Park.

	
Quadrat laying in Saptasajya Reserve Forest Area during field survey	**Planktonic Sampling at Mahanadi River**

3.12.3 Outcome Summary of Ecological Baseline Data Collection

1. The study area encompasses a range of significant terrestrial and aquatic habitats. Key terrestrial habitats include several Reserve Forests (RF) such as Sapta Sajya RF, Mayuri RF, Charakhola RF, Patapuri RF, Kapilas RF (Sanctuary), Megha RF, Gadabola RF, Adala RF, Ranibania RF, Deulia RF, Bauda Bankhadi RF, and Oringa RF. Additionally, the region includes Protected Forests (PF), notably Phulabarhi PF. Other terrestrial areas consist of degraded habitats, including open scrublands located near Sadei Berini, Patrabhag, Madhyasahi, Dallaka, and Bhajikusuma Village.

2. Significant aquatic habitats within the study area include the Sapua Nadi, Kantia Nala, and various ponds. The Mahanadi River is the intake water source for the proposed plant. Sufficient water availability has been reported at intake point of the Mahanadi River throughout the year.

3. A total of 161 species of flora including 61 trees, 2 cacti, 3 bamboos, 32 shrubs, 24 herbs, 9 grasses, 6 climbers and 7 agricultural crops were recorded within the study area.

3 - Description of the Environment (cont'd)

4. Among the floral species 39 economically important medicinal plants were identified.

5. Pielou's Evenness in the range 0.45-0.94 highlights ecological heterogeneity across the monitoring location, emphasizing the importance of localized conservation strategies, especially open scrub lands scattered in the study area.

6. Sal (Sorea robusta) and Teak/Sagun (Tectona grandis) are the most dominant trees in the Reserve Forests (RF) within study area.

7. The main cash crops in the study area are Rice (Oryza sativa) followed by Wheat (Triticum aestivum), Maize (Zea mays), and Sugarcane (Saccharum officinarum). Crop productivity in the form of horticultural production includes Cashew, Mango and Bamboo were found and documented during field surveys.

8. A total of thirty-seven (37) wild animals (mammals), thirty (30) reptiles, one hundred fifteen (115) avifaunal species and five (5) butterfly species were observed/reported in the study area.

9. A total of nineteen (19) macrophytes were observed/ reported in the water bodies in the study area.

10. Presence of moderate levels of planktonic diversity in the surface water bodies like Mahanadi River, Sapua Nadi, Kantia Nala & Ponds in the study area, ensures balanced food web that enhances fish productivity in the aquatic ecosystem.

11. A total of twenty-seven (27) fishes and twenty-nine (29) semi aquatic birds observed/reported in the water bodies within the study area.

12. Among the faunal species total of forty-one (41) species are listed under Schedule-I of Indian Wildlife Protection Act, 1972 and its subsequent amendments in 2022 and consider as Least Concern (LC)/Endangered (EN)/ Vulnerable (VU)/Near Threatened (NT) species. A site-specific Wildlife Conservation Plan with budgetary provision along with the implementation schedule has been prepared for the conservation of these species.

3 - Description of the Environment (cont'd)

3.13 HUMAN ENVIRONMENT

The proposed Greenfield project by M/s. Kalyani Steels Limited (KSL) aims to set up an Integrated Advanced Specialty Steel and Automotive Components Manufacturing Complex with an installed capacity of 1.43 MTPA of crude steel. This project is located at Gajamara village in Dhenkanal district, Odisha. To understand the potential socio-economic impacts on the local settlements and to justify the project by suggesting appropriate mitigation measures, a comprehensive Socio-Economic Study and Social Impact Assessment (SIA) were conducted in accordance with the guidelines of the Environmental (Protection) Act, 1986 and the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India EIA Notification dated 14th September 2006. The methodology was specifically designed to meet the requirements for socio-economic assessment and impact analysis. The evaluation of primary data collected during field work facilitated knowhow of the baseline human environment (of the study area); collation of the needs of local population; and an understanding of probable socioeconomic impact of the proposed project.

The objective of the socio-economic study is to assess the existing conditions of the proposed project area and the overall impact of the project on various socio-economic aspects of the local environment. Assessment of the social environment of the study area renders support in analyzing, managing and monitoring both positive as well as negative impacts of the proposed project. This ensures an environmentally bearable, economically viable and socially equitable environment for the local population, leading to sustainability. Additionally, the SIA identifies potential issues and problems arising from the project and suggests compensatory measures for the affected communities by the project owner.

3 - Description of the Environment (cont'd)

The baseline socio-economic scenario within a 10 km radial coverage from the project site has been detailed, followed by an analysis of the socio-economic status. The impacts of the proposed project on the socio-economic environment are also discussed, and a social welfare and upliftment plan has been proposed.

3.13.1 Approach and Methodology

The Social Impact Assessment (SIA) was conducted by incorporating social analyses and participatory processes into the project design and implementation, ensuring responsiveness to social development concerns. The findings of SIA will help enhance the project benefits for poor and vulnerable communities while minimizing or mitigating risks, concerns, and adverse impacts. The systematic assessment of all impact parameters formed the basis for preparing a Social Management Plan.

Methodology:

I. *Secondary Data Reference:* A review of available secondary data was conducted, including the Primary Census Abstract (PCA) for 2011 of Dhenkanal and Cuttack districts of Odisha, the District Census Handbook of Dhenkanal and Cuttack (Census of India 2011), applicable Open Series Maps (OSMs) of Odisha, the official websites of Dhenkanal and Cuttack districts, the Government of Odisha, and documents provided by Kalyani Steels authorities regarding the plant and project details. Additionally, reports related to industrial projects in the Dhenkanal Steel district of Odisha were reviewed. This secondary data supported the study of identified locations (villages/towns) within the periphery of the project area.

II. *Primary Data Collection:* Primary data was collected through meetings with the Kalyani Steels Limited (KSL) authorities, government representatives, and other stakeholders of the project. Structured discussions were held with household representatives from villages/towns within a 10 km radius of the plant location. Additionally, semi-structured in-depth interviews were

conducted with key informants, including community and religious leaders, to gather detailed information about the community and the project area.

1. *Interpretation and Analysis:* After the data collection, the analysis was done.

2. *Draft Report Preparation:* The draft report was prepared and shared for review.

3. *Final Submission:* The suggestions received over the draft report were carefully reviewed and incorporated into the final version of the report. The finalized report was then submitted for review.

4. *Tools and Techniques used for data collection:* For this study, the following tools were used to collect information: Transect Walk, Observation, Interviews (Individual Interviews and Key Informant Interviews), Focus Group Discussions (FGDs), Questionnaires (both open and closed-ended), and Photography. Additionally, non-probability sampling techniques, such as purposive and snowball sampling, were employed to collect data from participants through interviews and FGDs.

   Under purposive sampling, respondents for interviews and FGDs were selected based on parameters such as gender, age, social category, education, occupation, and economic status to gather detailed information about the proposed project. Furthermore, the snowball sampling technique was utilized to access participants for interviews and FGDs. An illustration of FGD exercise is provided in Exhibit 3-8.

5. *Field Work and Data Collection Zones:*

   i) For the fieldwork and data collection, the entire project area was divided into four zones:

      Zone 1 - The area within a 2 km radius from the periphery of the project site is designated as Zone 1.

Zone 2 - The area beyond the 2 km radius and up to a 5 km radius from the project site is designated as Zone 2.

Zone 3 - The area beyond the 5 km radius and up to a 7 km radius from the project site is designated as Zone 3.

Zone 4 - The area beyond the 7 km radius and up to a 10 km radius from the project site is designated as Zone 4.

ii) *Data Collection:* The primary data was collected through fieldwork conducted from December 23 to 28, 2024.

iii) Data Collection from Villages and Towns: Out of the 126 villages and towns in the study area, primary data was collected from 24 villages and towns.

iv) Participant Selection and Interviews: Each participant in the individual interviews and FGDs represented a separate household. Additionally, in-depth interviews were conducted with key informants from the surveyed areas, such as community leaders, religious leaders, and others, to gather first-hand, enriched information.

v) Field Survey Methodology: During the field survey, it was observed that respondents were more comfortable responding in groups rather than individually. As a result, Focus Group Discussions (FGDs) were chosen as the primary tool for collecting information. The list of areas surveyed, along with the number of participants in the detailed FGDs and individual interviews, is presented in Table 3-25. Additionally, the surveyed project areas are shown on the topographic map in Fig. 3-20.

3 - Description of the Environment (cont'd)

TABLE 3-25 - LIST OF AREAS SURVEYED

Sl. No.	Location	Zone *	FGD/KII/Individual Interview	No. of Participants
1	Talabarkote	A	FGD-1	10
			FGD-2	6
			Individual Interview	1
2	Manipur	A	FGD	7
			Individual Interview	1
3	Patrabhag	A	FGD	10
			Individual Interview -1	1
			Individual Interview -2	1
4	Siaria	A	FGD	15
			Individual Interview -1	1
			Individual Interview -2	1
5	Deopada	B	FGD	5
			Individual Interview-1	1
			Individual Interview-2	1
6	Padmanavpur	B	FGD	8
			Individual Interview	1
7	Badrapali	B	FGD	12
			Individual Interview	1
8	Kamaning	B	FGD	7
			Individual Interview-1	1
			Individual Interview-2	1
9	Gobindapur	B	FGD	11
			Individual Interview	1
10	Baladiabandha	B	FGD	13
			Individual Interview	1
11	Paikadahikhor	B	FGD	11
			Individual Interview	1
12	Dallaka	B	FGD	12
			Individual Interview	1
13	Regeda	B	FGD	14
			Individual Interview	1
14	Jagannathpur	C	FGD	11
			Individual Interview	1
15	Saptasajya	C	FGD	10
			Individual Interview	1
			Key Informant Interview (KII)	1
16	Bankual	C	FGD	12
			Individual Interview-1	1
			Individual Interview-2	1
17	Indipur (CT)	C	FGD	15
			Individual Interview	1

3 - Description of the Environment (cont'd)

Sl. No.	Location	Zone *	FGD/KII/Individual Interview	No. of Participants
18	Athagad	C	FGD	9
19	Mahidharpur	D	FGD	8
			Individual Interview-1	1
			Individual Interview-2	1
20	Ichhapur	D	FGD	9
			Key Informant Interview (KII)	1
21	Mangalpur	D	FGD	9
			Individual Interview	1
22	Achhanda	D	FGD	12
			Individual Interview	1
23	Lochapali	D	FGD	13
			Individual Interview	1
24	Haripur	D	FGD	11
			Individual Interview	1
			Key Informant Interview (KII)	1
Total			**25 FGDs, 03 KIIs & 28 Individual Interviews**	**291**

* **a) Zone 1:** 0 to 2 km, **b) Zone 2:** 2 to 5 km,
c) Zone 3: 5 to 7 km, and **d) Zone 4:** 7 to 10 km

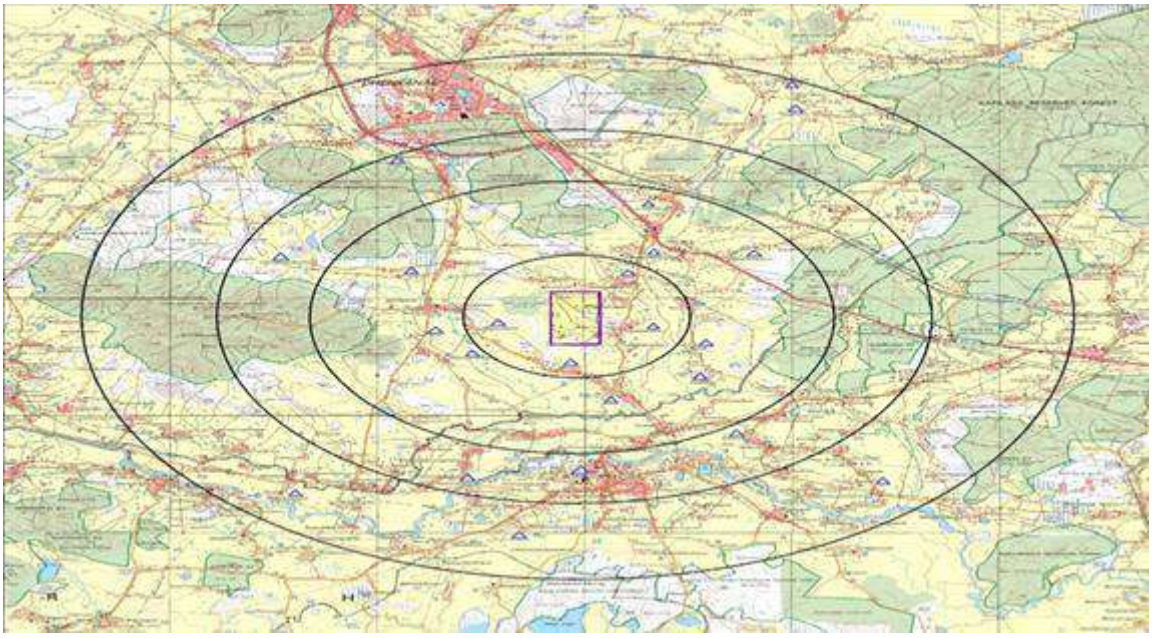


FIG. 3-20 - FGD LOCATION ON TOPOGRAPHIC MAP

3 - Description of the Environment (cont'd)



EXHIBIT 3-8 – FOCUSED GROUP DISCUSSION AT VILLAGE TALABARKOTE

3.13.2 Demographic Profile of the Study Area

The proposed Greenfield project is located in Gajamara village, Dhenkanal district, Odisha encompasses 126 villages and towns, the details of which are provided in Appendix 3-8. The demographic profile of the study area and Decadal variations in population growth of Dhenkanal District in Odisha are presented in Tables 3-26 & 3-27 respectively.

TABLE 3-26 - DEMOGRAPHIC PROFILE OF THE STUDY AREA

Indicators	Ref. Census 2011
Total Population	4,13,939
No. of Households	94,542
Sex Ration	945
Child Population (6 years)	48,195
Literacy Rate (%)	71.35
Scheduled Castes (%)	17.40
Scheduled Tribes (%)	12.85
Total Main Workers (%)	25.19
Total Marginal Workers (%)	11.51
Total Non- Workers (%)	63.30

Source: I. Census of India 2011- Primary Census Abstract, District Dhenkanal, Directorate of Census Operation, Odisha
II. Census of India 2011- Primary Census Abstract, District Cuttack, Directorate of Census Operation, Odisha)

3 - Description of the Environment (cont'd)

TABLE 3-27 - DECADAL VARIATIONS IN POPULATION GROWTH OF DEHNKANAL DISTRICT, ODISHA

District	Year	Total Population	Total Male Population	Total Female Population
Dhenkanal	2001	10,66,878	5,44,001	5,22,877
	2011	11,92,811	6,12,593	5,80,218
Projected Population	2021	13,27,070	6,86,259	6,40,811

Source: https://ceoodisha.nic.in

Overview: The table provides population data for Dhenkanal district across three time points:

i) 2001 Census
ii) 2011 Census
ii) Projected Population for 2021

It includes the total number of persons, males, and females recorded in each period.

Key Observations: Total Population Growth

i) 2001 : 10,66,878
ii) 2011 : 11,92,811 (increase of 1,25,933 people, 11.8% growth in 10 years)
iii) 2021 (Projected) : 13,27,070 (increase of 1,34,259 people, 11.3% projected growth from 2011)
iv) Trend : The population is steadily increasing by around 11-12% per decade.

Male Population Growth:

i) 2001 : 5,44,001
ii) 2011 : 6,12,593 (increase of 68,592, 12.6% growth)
iii) 2021 (Projected) : 6,86,259 (increase of 73,666, 12% projected growth)
iv) Trend : Male population growth is consistent with total population growth.

3 - Description of the Environment (cont'd)

Female Population Growth:

i) 2001 : 5,22,877
ii) 2011 : 5,80,218 (increase of 57,341, 11% growth)
iii) 2021 (Projected) : 6,40,811 (increase of 60,593, 10.4% projected growth)
iv) Trend : Female population is also growing, but at a slightly lower rate compared to males.

Sex Ratio Analysis:

i) 2001 : 961 females per 1,000 males
ii) 2011 : 947 females per 1,000 males
iii) 2021 (Projected) : 934 females per 1,000 males

Observation:

i) The sex ratio is gradually declining over the decades.
ii) In 2001, there were 961 females per 1,000 males**,** which dropped to 947 in 2011 and is projected to further decrease to 934 by 2021.
iii) Implication: A declining sex ratio could indicate gender-based disparities, migration effects, or socio-economic factors affecting female population growth.

Implications and Insights:

i) Population Growth : The district's population is steadily increasing by 11-12% per decade.
ii) Sex Ratio Decline : A decreasing sex ratio may require gender-focused policies to address potential imbalances.
ii) Future Planning : The rising population suggests higher demand for infrastructure, education, healthcare facilities, and employment opportunities.

Further, the distribution of population of the villages and towns (as per the census 2011), where the study was conducted is presented in Table 3-28.

3 - Description of the Environment (cont'd)

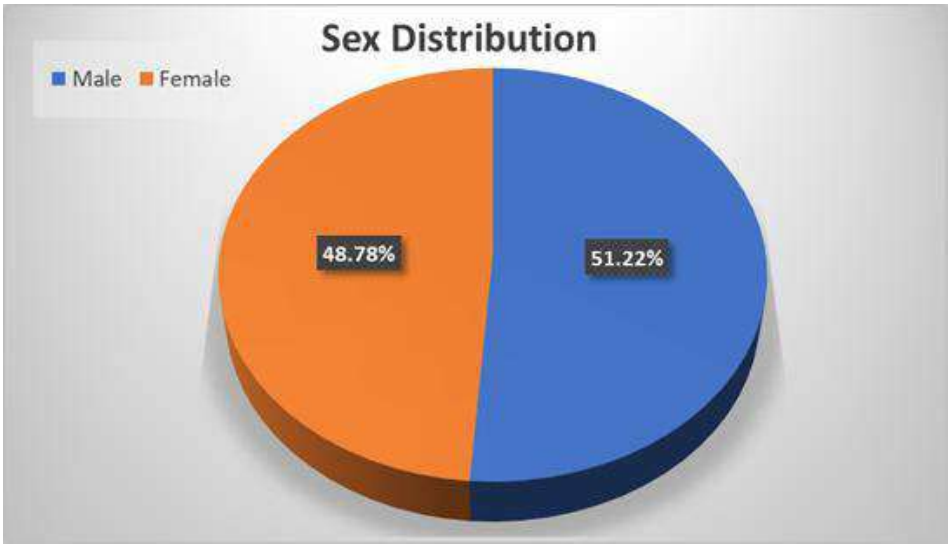
TABLE 3-28 - POPULATION DISTRIBUTIONS IN THE STUDY AREA

Sl. No.	Name of the Villages and Towns	SC Population			ST Population			OBC, General & Others Population			Population up to 6 Years			Total Population		
		M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
1	Mahidhar pur	0	0	0	0	0	0	1	1	2	0	0	0	1	1	2
2	Gobindap ur	327	302	629	0	0	0	170	179	349	41	40	81	497	481	978
3	Jagannath pur	258	269	527	1	1	2	422	387	809	83	67	150	681	657	1338
4	Bankual	122	117	239	199	185	384	435	391	826	90	59	149	756	693	1449
5	Haripur	39	30	69	69	56	125	407	337	744	57	53	110	515	423	938
6	Indipur (CT)	166	147	313	134	148	282	2152	1909	4061	298	271	569	2452	2204	4656
7	Lochapali	50	48	98	237	233	470	59	55	114	52	50	102	346	336	682
8	Achhanda	49	39	88	0	0	0	70	70	140	11	9	20	119	109	228
9	Paikadahi khor	37	35	72	48	39	87	275	250	525	43	34	77	360	324	684
10	Baladiaba ndha	271	246	517	223	247	470	738	728	1466	132	141	273	1232	1221	2453
11	Mangalpur	286	265	551	146	162	308	1113	1001	2114	219	161	380	1545	1428	2973
12	Saptasajy a	20	14	34	252	271	523	276	258	534	89	72	161	548	543	1091
13	Ichhapur	56	55	111	0	0	0	234	183	417	36	26	62	290	238	528
14	Kamaning	6	12	18	103	110	213	123	114	237	32	27	59	232	236	468
15	Patrabhag	311	324	635	414	475	889	707	605	1312	179	150	329	1432	1404	2836
16	Siaria	51	54	105	203	208	411	670	584	1254	96	97	193	924	846	1770
17	Talabarko te	442	459	901	397	385	782	1944	1863	3807	310	305	615	2783	2707	5490
18	Regeda	65	50	115	179	198	377	608	550	1158	116	109	225	852	798	1650
19	Dallaka	2	3	5	4	3	7	294	265	559	40	38	78	300	271	571
20	Deopada	211	215	426	0	0	0	207	211	418	49	48	97	418	426	844
21	Manipur	186	192	378	136	142	278	811	717	1528	148	125	273	1133	1051	2184
22	Padmanav pur	44	50	94	156	148	304	276	276	552	60	54	114	476	474	950
23	Badrapali	28	27	55	0	0	0	82	71	153	16	17	33	110	98	208
24	Athagad	11135	10881	22016	9024	8922	17946	53849	50859	104708	8756	8055	16811	74008	70662	144670
Total		14162	13834	27996	11925	11933	23858	65923	61864	127787	10953	10008	20961	92010	87631	179641

A total of 24 villages and towns were selected through purposive and snowball sampling techniques. The above table shows that the studied villages and towns of the project area is largely dominated by OBC, General & Others community followed by SC community. Out of the total population of the studied villages the SC constitutes 15.59%, ST 13.28%and the rest 71.13% are from OBC, General & Others Community. The sex distribution in these areas is 48.78% for female population and51.22% for male population. Further, the percentage of male literates and female literates from the total literate population are 55.18% and 44.82% respectively.

3 - Description of the Environment (cont'd)

Sex Ratio Overview: The diagram 3D pie chart, illustrating the sex distribution in a given population. It represents the proportion of males and females within the dataset.



Key Observations: The male population is slightly higher than the female population by 2.44 percentage points. The distribution appears almost balanced, indicating no significant gender imbalance in the population.

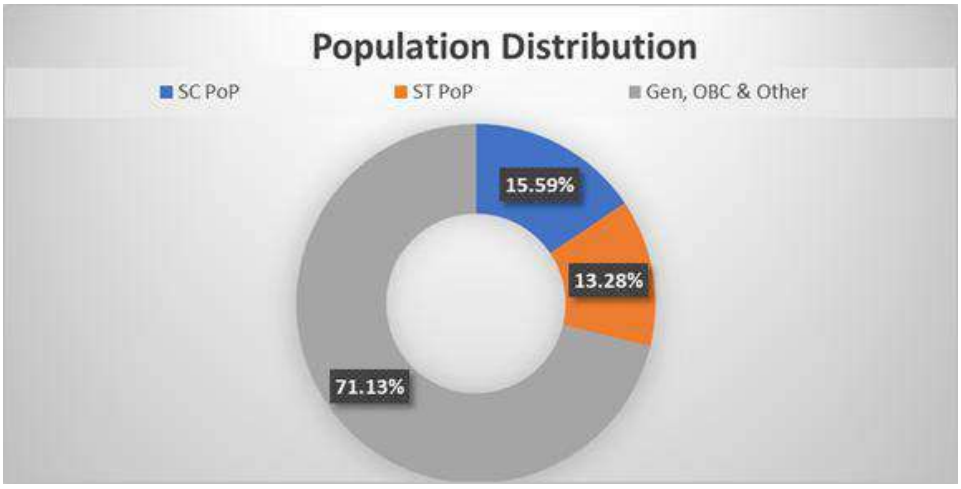
Interpretation: The small difference between male and female percentages suggests a nearly equal representation of both genders. Such a distribution is typically observed in stable populations where birth rates and survival rates are comparable between genders. If this represents a workforce or educational institution, it suggests gender inclusivity with no major disparity.

Implications and Recommendations: Although the distribution is balanced, policies should ensure equal opportunities for both genders in areas like education, employment, and social programs. Continuous monitoring is recommended to ensure gender equality and fair representation in various domains.

Conclusion: The sex distribution in this population is fairly balanced, with males slightly outnumbering females. This indicates a stable demographic structure, which may not require intervention unless further analysis reveals gender-specific disparities in opportunities or outcomes.

3 - Description of the Environment (cont'd)

Population distribution Overview: The donut chart represents the population distribution among different social groups. It categorizes the population into three segments:



i) SC Population (Scheduled Castes) – Blue
ii) ST Population (Scheduled Tribes) – Red
iii) General, OBC & Other Categories – Green

Key Observations:

i) SC Population: 15.59%
ii) ST Population: 13.28%
iii) General, OBC & Other Categories: 71.13%
iii) The General, OBC & Other category has the largest share, accounting for over 71% of the population.
iv) The SC and ST populations together constitute about 28.87% of the total population.

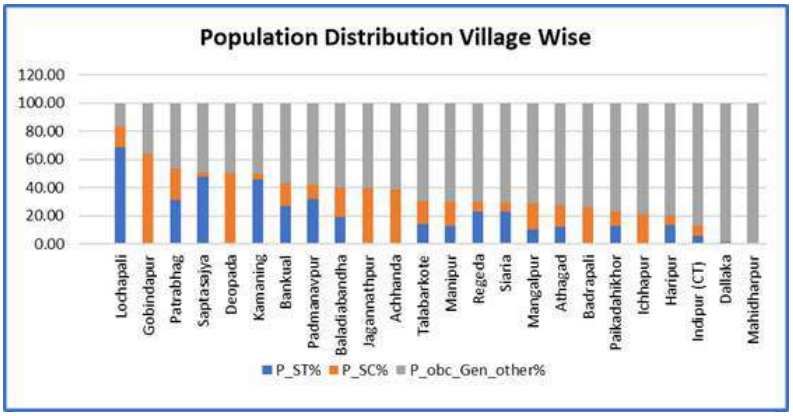
Interpretation: The majority of the population belongs to the General, OBC & Other category, indicating their dominance in numbers. The SC and ST populations together form a significant minority, highlighting the importance of inclusive policies for these groups. The relatively lower percentage of ST population (13.28%) suggests they are a smaller subgroup, which may require targeted development policies to ensure equitable opportunities.

3 - Description of the Environment (cont'd)

Implications and Recommendations: Policy makers and social welfare organizations should focus on inclusive growth strategies to uplift SC and ST communities. Ensuring educational access, employment opportunities, and social welfare programs for marginalized groups can help reduce inequalities. Further analysis of economic participation and literacy rates within these groups could provide deeper insights into their socio-economic conditions.

Conclusion: The population distribution shows that General, OBC & Other categories constitute the majority, while SC and ST groups together form a notable minority. Policymakers should ensure balanced socio-economic development by addressing the specific needs of underrepresented groups through affirmative action and welfare policies.

Distribution of Different Poputaion Overview: The bar chart represents the distribution of different population groups across various locations. The three categories shown are:



i) P_ST% (Scheduled Tribes - Blue bars)
ii) P_SC% (Scheduled Castes - Red bars)
iii) P_obc_Gen_other% (Other Backward Classes, General, and Other Categories - Green bars)

Key Observations: In most regions, the P_obc_Gen_other% (Green bars) dominates, indicating that the majority of the population belongs to the General, OBC, or other categories. The P_ST% (Blue bars) is significantly high in some areas like Lochapali, Gobindapur, and Patrabhag, suggesting a

strong presence of Scheduled Tribe communities. The P_SC% (Red bars) is more prominent in regions like Saptasajya, Deopada, and Kamaning, indicating a higher concentration of Scheduled Caste populations in those areas. Locations such as Mahidharpur, Dallaka, Indipur (CT), and Haripur have very low representation of ST and SC populations, meaning they are predominantly composed of General and OBC groups.

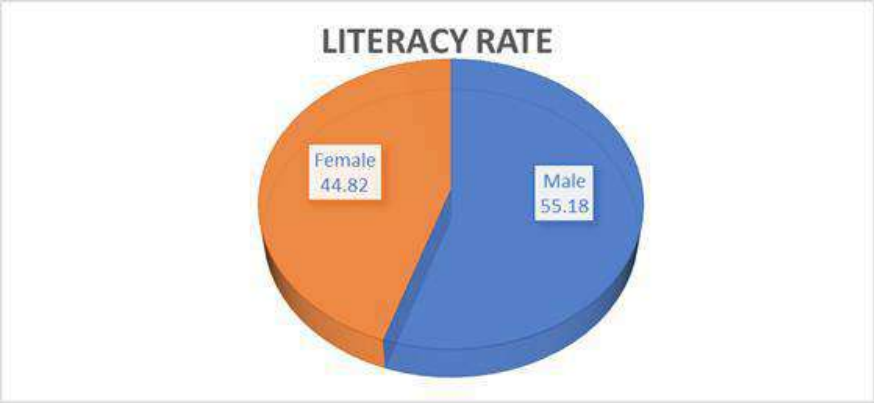
Interpretation: Lochapali, Gobindapur, and Patrabhag have high ST populations, which may indicate tribal-dominated regions with cultural, social, or economic differences from the rest. Saptasajya, Deopada, and Kamaning have significant SC populations, suggesting that policies related to SC welfare, education, and employment might be crucial for these areas. Many regions are dominated by OBC, General, and other populations, which could mean better access to opportunities, education, and employment compared to ST and SC communities. The variation in ST and SC populations across different locations suggests geographical and historical settlement patterns influencing the distribution.

Implications and Recommendations: Regions with higher ST and SC populations might require targeted development programs, including education, skill training, and employment schemes to ensure inclusive growth. Lochapali, Gobindapur, and Patrabhag may need policies focusing on tribal development, including infrastructure, healthcare, and economic opportunities. A deeper analysis is required to understand the economic conditions of ST and SC populations in these regions to implement effective affirmative action policies. Balanced resource allocation is essential to ensure that marginalized communities get fair opportunities in education, jobs, and social welfare.

Conclusion: The chart highlights the uneven distribution of population groups across regions, with some areas having a higher ST or SC presence, while others are dominated by OBC and General categories. Understanding these patterns is crucial for effective policymaking, resource distribution, and community development initiatives.

3 - Description of the Environment (cont'd)

Literacy Rate Overview: The diagram 3D pie chart figure number 03, illustrating the literacy rate distribution between males and females. The chart is divided into two sections, representing the proportion of literate males and females within a population.



Key Observations: Male Literacy Rate: 55.18%; Female Literacy Rate:44.82%. The male literacy rate is higher than the female literacy rate by approximately 10.36 percentage points. The gap in literacy rate suggests gender disparity in educational attainment.

Interpretation: A higher male literacy rate indicates that males have greater access to education compared to females. The lower female literacy rate could be due to socio-economic factors, such as cultural norms, lack of access to educational facilities, or gender-based discrimination in education. The literacy rate gap may have implications for workforce participation, economic development, and gender equality in various sectors.

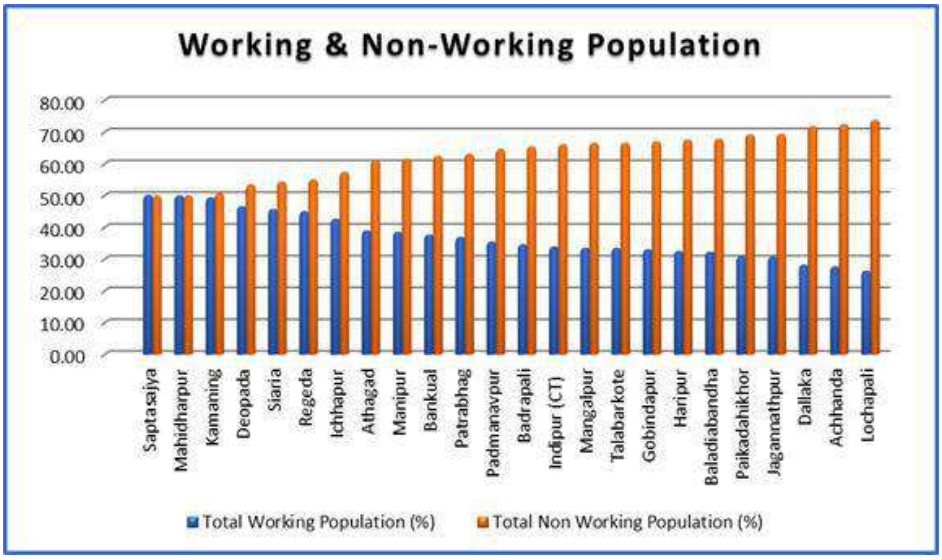
3 - Description of the Environment (cont'd)

Recommendations: It has been recommended to improve the female literacy through implementation of policies that aimed at increasing access to education for girls. Further, encouraging government and non-governmental organizations (NGOs) to support programs that promote female education can also improve the female literacy rate. Addressing social barriers that limit female education, such as early marriage and gender biases increases female literacy too.

Conclusion: The diagram highlights a gender disparity in literacy rates, with males having a higher percentage of literacy compared to females. Closing this gap through targeted educational policies can contribute to greater gender equality and social development.

Working & Non-Working Population Overview: The given bar chart represents the percentage of the total working population (blue bars) and total non-working population (red bars) across different regions or locations. The x-axis lists different locations, while the y-axis indicates the percentage of the population.

Key Observations: Across all locations, the non-working population (red bars) is significantly higher than the working population (blue bars).Some locations, such as Lochapali, Achhanda, and Dallaka, have the highest percentage of non-working population, exceeding 70%. Saptasajya, Mathidharpur, and Kamaning have the highest proportion of the working population, indicating a relatively better employment rate in these areas. The trend indicates a workforce participation gap, where a majority of the population remains non-working.



Interpretation: The high non-working population percentage suggests potential economic dependency, where a smaller workforce supports a larger non-working segment.

i) This could be due to limited job opportunities, socio-economic factors, gender-based employment gaps, or a high student and elderly population.

ii) Areas with higher working population percentages might have better employment facilities, industries, or agricultural activities supporting livelihoods.

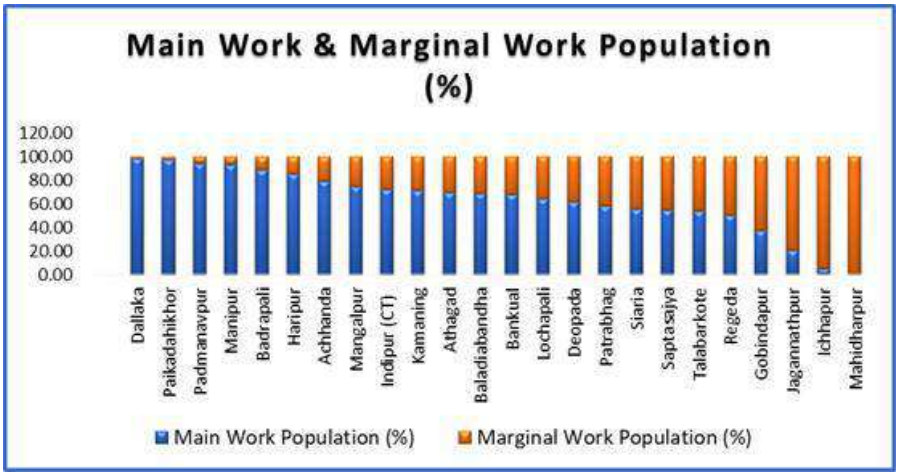
Implications and Recommendations: Employment generation programs and skill development initiatives should be introduced, particularly in regions with high non-working populations. Encouraging entrepreneurship, small businesses, and self-employment schemes can help reduce unemployment. A deeper analysis is required to determine whether the non-working population consists of students, homemakers, elderly, or unemployed individuals to design effective policies.

Conclusion: The analysis highlights a high percentage of the non-working population across all locations, indicating a need for employment-focused policies. Regions like Lochapali, Achhanda, and Dallaka require urgent economic interventions, while locations with higher working populations could be studied to replicate their success in employment generation.

3 - Description of the Environment (cont'd)

Main Work and Marginal Work Population Overview: The bar chart represents the percentage of Main Work Population (blue bars) and Marginal Work Population (red bars) across different locations.

Main Work Population (%): Individuals engaged in stable, long-term jobs.



Marginal Work Population (%): Individuals engaged in seasonal or temporary work.

Key Observations:

i) In most regions, main work population (blue bars) dominates, indicating that a majority of the working population has stable employment.

ii) Some regions, such as Mahidharpur, Ichhapur, and Gobindapur, have a high percentage of marginal workers (red bars), suggesting reliance on temporary employment.

iii) Locations like Dallaka, Paikadahikhor, and Padmanavpur show a high percentage of main workers, indicating better employment stability.

iv) The general trend suggests that while most areas have a dominant main workforce, a considerable number of people are engaged in marginal work.

3 - Description of the Environment (cont'd)

Interpretation: Areas with higher main work populations likely have better job opportunities, industries, or agriculture-based livelihoods.

Regions with higher marginal work percentages may face seasonal employment issues, lack of stable industries, or dependency on temporary labor.

The presence of marginal workers in almost all regions suggests that many people still lack access to permanent jobs.

Implications and Recommendations: Encouraging full-time employment opportunities through industrial development, skill training, and entrepreneurship could reduce marginal work dependency.

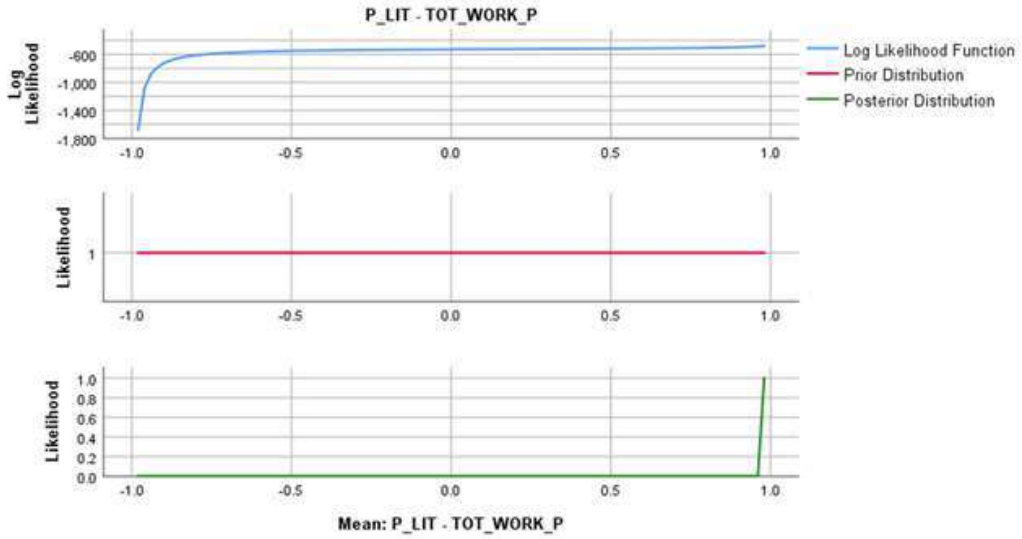
Seasonal employment sectors, like agriculture and construction, could be supplemented with off-season job programs to maintain income stability.

Further investigation is needed to determine sector-wise employment patterns to understand which industries dominate each region.

Conclusion: The diagram highlights the prevalence of stable employment in most regions while also pointing out marginal work issues in certain areas. To enhance economic stability, policies should focus on job security, skill development, and diversified employment opportunities.

Bayesian Estimation Overview: This report presents the results of a Bayesian estimation to examine the relationship between Population Literacy Percentage (P_LIT) and Total Working Population Percentage (TOT_WORK_P). The analysis uses Bayesian inference to estimate the posterior distribution of the parameter (P_LIT - TOT_WORK_P), helping to determine the influence of literacy on workforce participation.

3 - Description of the Environment (cont'd)



Graphical Analysis:

A. Log-Likelihood Function (Top Graph - Blue Line)

i) The log-likelihood function evaluates how well different parameter values explain the observed data.

ii) The curve shows a steep increase initially and then stabilizes, indicating that lower parameter values are less likely, while values near the upper range fit better.

B. Prior Distribution (Middle Graph - Red Line)

i) The prior distribution represents assumptions about the parameter before considering data.

ii) A uniform prior (flat red line) is used, indicating that all values were equally probable before incorporating data.

C. Posterior Distribution (Bottom Graph - Green Line)

i) The posterior distribution combines prior knowledge and observed data to refine the parameter estimate.

ii) The sharp peak near 1 indicates strong evidence that the estimated parameter value is concentrated in that range.

iii) This suggests a high probability that increased literacy is positively associated with a larger working population.

Interpretation of Results:

i) The posterior distribution suggests a strong positive relationship between P_LIT and TOT_WORK_P.

ii) The mean of the posterior distribution is close to 1, indicating that higher literacy rates correlate with higher workforce participation.

iii) The high concentration of the posterior distribution suggests strong confidence in the estimate, with minimal uncertainty.

Conclusion: the Bayesian estimation strongly supports the hypothesis that a higher literacy rate is positively associated with an increase in workforce participation. Given the strong evidence provided by the posterior distribution, policymakers may consider improving literacy as a means to enhance employment rates.

3.14 HUMAN ENVIRONMENTAL COMPONENTS

The establishment of the Integrated Advanced Specialty Steel and Automotive Components Manufacturing Complex at Dhenkanal by Kalyani Steels Limited has a significant socio-economic impact on the region by providing employment, enhancing industrial capabilities, and promoting the growth of ancillary businesses. The potential impacts have been identified by analyzing the existing characteristics of the project area against the parameters of the project design, as well as the views and perceptions of the stakeholders. The potential impacts on physical, social, financial, and cultural infrastructure on the human environment were identified through the baseline study.

3.14.1 Physical Infrastructure

In the context of socio-economic analysis, the physical infrastructure of the project area is crucial, as it directly influences economic development, social well-being, and environmental sustainability in the region. The key indicators studied under physical infrastructure are:

3 - Description of the Environment (cont'd)

Housing pattern: According to the interpreted data from FGDs, individual interviews, and the transit walk of the surveyed locations, most of the respondents in the studied areas, such as Talabarkote, Siaria, Badrapali, Patrabhag, Padmanavpur, Lochapali, Gobindapur, Deopada, Athagad, Baladiabandha, Dallaka, Regeda, Indipur, and Bankual, dwell in pucca houses. While the respondents of Haripur mostly live in kutcha houses, those from Kamaning, Achhanda, Mahidharpur, Saptasajya, Manipur, Jagannathpur, and Mangalpur predominantly reside in semi-pucca houses. Furthermore, almost all the people in the project locations own their homes. The pucca houses in these locations are primarily constructed with financial support from government schemes, such as Indira Awas Yojana and Pradhan Mantri Awas Yojana (both PMAY-Rural and PMAY-Urban).

Water Supply: The main sources of water supply in the studied localities are uncovered wells, tube wells, hand pumps, and tap water for drinking purposes. Additionally, river and pond water are used for bathing and domestic purposes. A few households have personal wells, boring systems, and tap water facilities through motor connections.

The Department of Drinking Water and Sanitation, Government of Odisha, through the Jal Jeevan Mission (JJM), provides piped water supply to rural households through 'Functional Household Tap Connections (FHTC)', also known as Har Ghar Jal. However, this initiative is yet to be fully functional in almost all of the studied villages.

During interactions with the villagers of Talabarkote, they expressed concern about the water crisis they face for both drinking and domestic purposes throughout the year. The villagers have demanded a regular supply of filtered water through taps year-round.

3 - Description of the Environment (cont'd)

In Badrapali village, the tube wells established by the government are mostly defunct. The majority of households rely on private tube wells for water, while a few still use uncovered wells for drinking water.

In Kamaning village, water is lifted from a common borewell to an overhead tank, from which it is supplied to the villagers through tap connections at various points in the village. There is no water scarcity, and the quality of the water is good. However, the villagers have requested a direct water supply to the households through taps.

The respondents of Gobindapur shared that the tap water supplied by the government at common points in the village is non-functional, as most of the taps are broken, and the Gram Panchayat has not taken any action to replace them. Furthermore, they have requested a regular tap water supply for each household in the village.

In Lochapali village, there are no government-supported water supply facilities, except for a few personal wells used for drinking water and a river used for bathing and other domestic purposes. There is also water scarcity during the summer and villagers have demanded a supply of tap water to each household throughout the year.

The piped water supply is not available in Mangalpur and Haripur villages. The villagers mostly use tube well and well water for drinking, which contains high iron levels. They have demanded a supply of filtered tap water to the households.

The inhabitants of Bankual village have shared that drinking water is supplied to each household through taps by the Public Health Engineering Department (PHED) for one hour a day. However, there is a water crisis in the summer, and no alternative water sources are available in the village. The villagers have demanded a regular 24-hour water supply.

3 - Description of the Environment (cont'd)

The inhabitants of Regeda village have expressed concern about the impure drinking water, as well as the high iron content in the water. Furthermore, the people in the area are suffering from gastroenteritis. They have demanded a supply of filtered tap water to the households through the 'Har Ghar Jal' scheme.

The inhabitants of Indipur have shared that there is no tap water facility provided by the government, only an uncovered well and a river. There is scarcity of water in the village during the summer season. They have demanded a supply of tap water through the 'Har Ghar Jal' scheme.

The inhabitants of the locations studied expect the industries operating in their areas to supply filtered water. Furthermore, the inhabitants of Siaria, Dallaka, and Jagannathpur have demanded tap water connections to every household. The locals of Deopada and Icchapur have requested a regular supply of potable tap water throughout the year.

Besides, in Patrabhag, Manipur, Paikadahikhor, Indipur, Padmanavpur, and Lochapali, due to water scarcity during the summer season, people have demanded a supply of tanker water in the summer.

Drainage System: The majority of the studied locations, such as Siaria, Talabarkote, Badrapali, Kamaning, Padmanavpur, Gobindapur, Paikadahikhor, Regeda, and Indipur, lack drainage facilities. Furthermore, the drains that have been constructed are not adequate. They are mostly narrow and not deep enough. Except in a few locations, such as Bankual and Athagad, where drain cleaning is done regularly once a week, in other areas it is very irregular.

3 - Description of the Environment (cont'd)

The inhabitants of Siaria, Haripur, Lochapali, Achhanda, Talabarkote, and Deopada have demanded the construction of a deep drainage system, as there is no proper drainage system in their areas. During the rainy season, waterlogging causes rainwater to enter households. Additionally, the locals of Saptasajya and Jagannathpur have demanded the construction of drains, as there is a drainage system only on one side of the road.

In Patrabhag, an underground drainage system has been constructed on one side of the road. However, 50% of the drainage system is covered, while the remaining 50% is uncovered.

Although in Baladiabandha and Ichhapur the drains are constructed on both sides of the road, they are not covered. The drainage system on one side of the road in Manipur village is narrow and mostly damaged, requiring repair. Furthermore, in Jagannathpur, the drainage system is constructed on one side of the road, is uncovered, and half of it is damaged.

The locals of Ichhapur and Baladiabandha have directed their expectations towards the government and the companies operating in the vicinity to provide regular drain cleaning services.

Road and Means of Communication: The respondents from Indipur, Kamaning, and Achhanda expressed concerns about the poor road conditions and have demanded the construction of proper roads in their villages. In Siaria, Haripur, Gobindapur, and Mangalpur villages, portions of the roads are damaged, and the villagers have requested repairs. Additionally, the roads in Siaria, Mahidharpur, and Padmanavpur are damaged, with water logging occurring during the rainy season due to holes in the roads, requiring repairs.

3 - Description of the Environment (cont'd)

However, the road conditions in the rest of the study area are good. The national highway NH-55, connecting Cuttack and Sambalpur, lies about 2.8 km to the northeast of the proposed project area.

The respondents from the studied villages mentioned that the railway stations accessible to them are located in Dhenkanal, Joranda Road, Hindol Road, Shyama Charanpur Halt, Kapilas, Khuntuni, and Ghantikhal. The bus stops are located at Gobindapur, Sankarpur, Joda, Baladiabandha, Kaimati, Dhenkanal, and Athagad. The nearest commercial airport, Biju Patnaik International Airport in Bhubaneswar, is about 70 km away from the plant site.

Most respondents from the studied locations consider the means of communication, particularly public transport such as auto rickshaws and buses, to be good for traveling to other villages or nearby cities. However, the respondents from Siaria, Badrapali, Patrabhag, Manipur, Dallaka, Kamaning, Deopada, and Mangalpur reported poor means of communication in their localities, particularly the lack of shared auto rickshaws or other forms of public transport. Due to the non-availability of shared auto rickshaws, they often travel to nearby places or villages using their own conveyance, mostly by two-wheelers or occasionally by private vehicles.

Electricity: According to the respondents, electricity connections are provided to almost all households. However, 200 households in Talabarkote, 60 households in Achhanda, 3 households in Haripur, and 6 households in Lochapali have not yet taken an electricity connection. Power cuts occur throughout the year, with acute power cut issues especially during the summer season.

3 - Description of the Environment (cont'd)

The villagers of Siaria, Badrapali, Talabarkote, Gobindapur, Deopada, Regeda, and Bankual are impacted by power cuts for 4-5 hours a day during summer, and 1-2 hours per day in other seasons. In Manipur, Paikadahikhor, Indipur, Jagannathpur, Haripur, Mangalpur, Lochapali, and Achhanda, power cuts last for approximately 10 hours a day during the summer and 3-4 hours per day in other seasons. Furthermore, the villagers of Paikadahikhor reported a low voltage issue in the evening due to the installation of a 100-kilowatt transformer in the village and have demanded a proper power supply, including the installation of an additional transformer.

In comparison to other villages, the people of Manipur, Saptasajya, and Athagad experience negligible power cuts, with only 1-2 hours of power cuts per day during the summer, and no power cut issues in other seasons.

The locals of Patrabhag and Regeda have reported that 50% of the village lacks street lighting. In Manipur, Haripur, Jagannathpur, and Baladiabandha, there are no streetlights at all. Similarly, in Dallaka, Achhanda, and Mahidharpur, although streetlight poles and power supply are available, the lights remain non-functional due to the lack of replacement bulbs. The absence of street lighting poses significant safety risks, leaving areas poorly illuminated at night, which could encourage criminal activity and make residents, especially women and children, feel unsafe. The villagers have demanded action to address this issue.

The TP Central Odisha Distribution Limited (TPCODL), a joint venture between Tata Power and the Government of Odisha, supplies electricity to the regions of Dhenkanal district, Odisha.

3 - Description of the Environment (cont'd)

Additionally, there is a streetlight connection in all the study locations. However, the respondents from Siaria and Talabarkote have demanded the availability of proper street lighting in their villages.

Toilet Facility: The sanitary toilets available in the studied villages have been constructed with support from the government, private agencies, and individual initiatives. However, a significant number of people still practice open defecation in several villages. In villages like Badrapali, Manipur, Deopada, and Siaria, approximately 20% of the population defecates openly, while in Indipur, the percentage is 30%. In Patrabhag, Regeda, Padmanavpur, and Talabarkote, around 50% of the population practices open defecation. The percentage increases further in Jagannathpur and Mangalpur (70%), Lochapali (80%), and Kamaning, Dallaka, Achhanda, and Mahidharpur (90%). This issue primarily arises due to the poor condition of the majority of latrines, caused by low-quality construction and a lack of water connections to the latrines.

In contrast, Gobindapur and Baladiabandha have a much higher toilet usage rate, with approximately 90% of the population using the available facilities. Additionally, there is no open defecation in Bankual, Paikadahikhor, and Athagad villages.

Many households in Talabarkote, Achhanda, and Mangalpur, as well as 15 households in Patrabhag,10 in Mahidharpur, 5 in Indipur, and 7 in Jagannathpur, do not have toilet facilities at all. A public toilet facility is available in Bankual village.

The widespread issue of open defecation negatively affects hygiene, particularly during the monsoon season, when water logging exacerbates the situation. It also poses significant safety risks, such as the increased likelihood of physical injuries from scrubs or snake bites during the rainy season.

3 - Description of the Environment (cont'd)

Solid Waste Management: (Dumping Yard or Segregation Shed & Collection Point).

Almost all of the studied locations lack a proper solid waste management system, with the exceptions being Saptasajya, Gobindapur, and Athagad. These locations are missing essential infrastructure, such as a dumping yard, segregation shed, and designated collection points, which are crucial for effective waste management and need to be developed. While some individual households have taken the initiative to manage solid waste, collective community action is necessary to create a sustainable and successful waste management system.

Respondents from Saptasajya have reported that Gram Panchayat collects both solid and liquid waste from the area every three days. In Gobindapur and Athagad, waste collection occurs daily.

3.14.2 Social Infrastructure

Under the social infrastructure indicators that were assessed are as follows:

Education: (Schools, colleges and universities) Pre-primary schools (Anganwadi Centres) are available in all the studied villages and towns except Baladiabandha, Jagannathpur, and Indipur. In Dallaka village, the Anganwadi Centres do not have buildings and function from the school verandah.

Furthermore, primary schools are available in all the studied villages except Badrapali and Jagannathpur. For primary to higher secondary education, children from Badrapali travel 1 km to the nearby Saptasajya village. The primary school in Badrapali was closed in the 2020-21 academic year due to insufficient student enrollment, as per government criteria, and was merged with the primary school of Saptasajya.

3 - Description of the Environment (cont'd)

Children from Jagannathpur travel 500 meters to the nearby Raghunathpur village for primary education and 2 km to the nearby Samsharpur village for classes 6-10. Upper primary and high schools, as reported by respondents, are available in Regeda, Achhanda, Manipur, Siarai, Patrabhag, and Badagila. Higher secondary education is available in Gobindapur and Athagad. Additionally, residential schools for Scheduled Caste and Scheduled Tribe children are available in Saptasajya up to class 8. Odisha Adarsha Vidyalayas, offering education up to classes 10 and 12, are present in various locations across Dhenkanal district.

Children from Kamaning travel 2 km to Saptasajya for classes 6-10, while children from Deopada travel 2 km to Manipur village for the same. Similarly, children from Paikadahikhora go to Baladiabandha for classes 6-8, and those from Lochapali village travel 2 km to Kaimati village for classes 6-10.

Apart from government schools, private English medium schools are available up to standard 10. In Baladiabandha, one private English medium school, Aurobindo Vidya Mandir, offers education up to standard 8. Other private and government English medium schools in the study area include:

i) Delhi Public School (DPS) - Up to standard 12 at Mahispatana
ii) Delhi Public School Synergy - Up to standard 12 at Banamaliprasad
iii) Montfort School - Up to class 10 in Dhenkanal
iv) GMR Varalakshmi DAV Public School - Up to standard 12 in Dhenkanal
v) Kendriya Vidyalaya - Up to class 12 in Dhenkanal
vi) Jawahar Navodaya Vidyalaya - Up to standard 12 in Dhenkanal
vii) Sanskar Public School - Up to standard 10 in Dhenkanal

3 - Description of the Environment (cont'd)

viii) Royal International Public School - Up to standard 10 in Dhenkanal
ix) Saraswati Shishu Vidya Mandir - Up to standard 7 in Gobindapur and up to class 5 in Manipur
x) Saint Xavier's School (Secondary) - Up to standard 10 in Dhenkanal and Athagad

Colleges are primarily located in Dhenkanal, Athagarh, and Khuntuni.

A significant number of people in the studied localities are literate. The highest qualification among residents of Badrapali and Athagad is post-graduation, with engineers and doctors residing in these villages. In Achhanda, Padmanavpur, Mahidharpur, Indipur, and Regeda, the highest level of education attained is graduation, with engineers also present in Padmanavpur. In Lochapali village, the highest education level among residents is higher secondary.

Technical and Vocational Training: Most of the ITI centers are located in Dhenkanal and Cuttack. Furthermore, a government ITI center is available in Borapada, Dhenkanal. A government engineering school or polytechnic college is located in Dhenkanal, while a private ITI college is situated in Chandrasekharpur and Mahisapatana.

Computer training and spoken English classes are offered to students by all private schools. Additionally, government and government-aided schools provide computer training from Class 8 onwards.

Moreover, private spoken English and computer education institutes are located in Athagad and Dhenkanal. A private ITI college is also available in Dhenkanal, Banamaliprasad, Khuntuni (Cuttack), and Dhabaleswar.

3 - Description of the Environment (cont'd)

Government vocational training centers are primarily available in Dhenkanal and Athagad, while private vocational training centers are also accessible.

Health: The cases of waterborne diseases, particularly jaundice, negatively affect the villagers. The locals associate skin allergies, skin diseases, eye infections, asthma, and tuberculosis with dust and water pollution in the industrial zone.

The locals of Siaria, Dallaka, Indipur, and Padmanavpur are suffering from diabetes and high blood pressure, whereas the locals of Talabarkote and Mangalpur are suffering from cancer and kidney disease. The locals of Manipur are primarily suffering from diabetes, while in Saptasajya village, the people mostly suffer from kidney problems. The locals of Mahidharpur are mainly suffering from cold, cough, kidney, and heart diseases. The locals of Indipur, Baladiabandha, and Patrabhag expressed that there are no major diseases in the area, except for common colds and coughs.

The government provides a mobile medical health care facility to the locals of Saptasajya and Mangalpur once a week. The district hospital is located in Dhenkanal, while the Sub-Divisional hospital is in Athagad. The Community Health Centre (CHC) is available in Patrabhag, and the Primary Health Centres are located in Baladiabandha, Shankarpur, Gobindapur, and Joranda. In addition to government healthcare facilities, private hospitals are located in Dhenkanal and Athagad.

A Health and Wellness Centre, also known as the Ayushman Bharat Health and Wellness Centre, is under construction in Ichhapur village.

3 - Description of the Environment (cont'd)

Private allopathic and homeopathic clinics are available in Badagila, Saptasajya, and Bandhadiha. Additionally, private homeopathic treatment is available in Dhenkanal and Athagad. Quack doctors provide services in Saria and Kamaning villages, offering treatment for minor ailments.

The locals of Siaria, Talabarkote, Manipur, Mangalpur, and Lochapalli have demanded proper healthcare facilities or a CHC in their area.

The Anganwadi Centres (AWC) in the study area work toward early childhood education and address malnutrition by providing supplementary nutrition. Asha Karmis is also working in all the studied locations.

3.14.3 Financial Infrastructure

Financial Institutions: (Banking and SHG) According to the respondents of the villages studied, the Self-Help Groups (SHGs) and their federations are functional in each village. The households are covered under the State Rural Livelihoods Mission and are provided livelihood skill training such as tailoring, mushroom cultivation, embroidery, incense stick and candle making, and food processing, in addition to leadership training. Furthermore, they are mainly engaged in petty businesses, livestock rearing, agriculture, vegetable vending, and various entrepreneurial activities.

Almost all respondents have bank accounts under the Jan Dhan Yojana, and some households also have savings accounts in the post office. The commercial banks operating in the studied villages include State Bank of India, Punjab National Bank, Bank of India, HDFC Bank, Canara Bank, Bandhan Bank, IDBI Bank, United Bank of India, Bank of Baroda, Central Bank of India, ICICI Bank, Oriental Bank of

3 - Description of the Environment (cont'd)

Commerce, Federal Bank, Kotak Mahindra Bank, IDFC First Bank, Axis Bank, and Odisha Gramya Bank. In addition, there is a cooperative bank operating in the studied areas.

Livelihood Activities Irrigation has long been recognized as a basic necessity for sustaining high crop productivity, especially in areas where rainfall is seasonal and uncertain. The primary crop in the studied areas during the Kharif season is paddy, while in the Rabi season, the major crops include maize, ragi, groundnut, black gram, green gram, and sugarcane. Additionally, people in the area produce various seasonal vegetables in their agricultural lands and backyards. During the study, the respondents mentioned that a few households are engaged in poultry farming and other agriculture-related activities.

However, most of the farmers in the region are small and marginal, and the income from agriculture is insufficient to support their households. Many people in the studied areas also work as daily wage laborers. A few individuals are employed in government jobs, such as teachers, police officers, air force service, railway joband military personnel. A few people of Siaria village the primary occupation is collecting fire wood from the forest and selling them in nearby cities.

Furthermore, respondents mentioned that people in the area are also engaged in small businesses, transport services, and work under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). Migrants working in the study area mainly come from the states of Bihar and West Bengal. Additionally, there is a prevalence of out-migration, with residents of the studied villages working as daily laborers in various states and Union Territories of India, including Maharashtra, Goa, Gujarat, Andhra Pradesh, Hyderabad, Kerala, Tamil Nadu, Chennai, Chhattisgarh, Karnataka, Delhi, Chandigarh, and more.

3 - Description of the Environment (cont'd)

However, unemployment remains high in the studied areas due to a lack of vocational and skill training opportunities. As a result, many people are unable to find permanent employment and are engaged in contractual work, primarily as contract laborers at construction siteTop of FormBottom of Form

3.14.4 Cultural Infrastructure

Under cultural infrastructure, public libraries, theatres, and cinema halls are available in Dhenkanal. Additionally, libraries are available in Manipur, Saptasajya, Baladiabandh, and Dallaka. Apart from these, recreational facilities such as playgrounds are available in Saptasajya, Baladiabandh, Padmanavpur, Dallaka, and Mangalpur. A park is also available in Saptasajya, while the park in Manipur and Paikadahikhorr is under construction.

Youth clubs and community centres are available in Mangalpur, Deopada, Baladiabandh, Gobindapur, Talabarkote, Patrabhag, Kamaning, Manipur, and Saptasajya. Respondents from Siaria, Talabarkote, Badrapali, Gobindapur, Paikadahikhorr, and Patrabhag have requested playgrounds in their villages. The inhabitants of Indipur and Patrabhag have requested a library in their locality, while the villagers of Paikadahikhorr and Dallaka have asked for the construction of community centres.

Fairs, festivals, rituals, and functions celebrated by diverse communities in the study area are major sources of recreation, in addition to cricket and football matches, and Kho Kho competitions. The festivals celebrated by villagers include Dola Purnima, Kartika Purnima, Kali Puja, Magha Parba, Nua Khai, Raja Parba, Chandi Parba, Durga Puja, Ganesh Puja, and Laxmi Puja. The Muslim community in the area celebrates Moharram, Id-ul-Fitr, and Bakrid.

3 - Description of the Environment (cont'd)

Additionally, the Scheduled Castes in the area include Pana, Haadi, and Dewar, while the tribal groups include Sabar, Munda, Juang, Santhal, Ho, and Kandha.

The people in the studied villages use Odia, Hindi, and English to express their views and opinions. Furthermore, tribal groups in the area communicate in Mundari, Santhali, and Juang languages.

During the transect walk and informal discussions with community members, it was found that cow dung and wood are common sources of fuel used by households in the area. Additionally, households use LPG gas for cooking, and a few respondents mentioned using induction cookers and firewood. The households in the surveyed villages benefit from the 'Ujala Yojana.' Most people prefer rice as their staple food. The majority of women are engaged in household chores, while the youth and male members of the community are often involved in alcohol and tobacco consumption.

Moreover, the people of the studied areas benefit from government schemes such as MGNREGA, Health Insurance (Biju Swasthya Kalyan Yojana - BSKY, Smart Health Card), Life Insurance, Destitute Pension, Janani Suraksha Yojna, Free Education, Awas Yojana, Crop Seed Distribution, and Self-Help Groups. Additionally, women beneficiaries aged between 21 and 60 years are receiving financial assistance under the newly launched Subhadra Yojana of the Government of Odisha.

4 - ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

This chapter discusses the anticipated impact of the proposed project at its construction & operational stage from the environmental point of view and the mitigation measures to be adopted to minimise the adverse impacts on the prevailing environment.

4.1 OBJECTIVES OF EIA

The objective of conducting EIA during conceptual stage of the project is to assess the overall impacts due to the proposed project activities, identify & predict the probable environmental impacts and plan suitable mitigation measures for the entire life cycle of the project, that is, from concept to operation for sustainability of the project.

4.2 SCOPING OF EIA

In consideration of the proposed project, MoEFCC has firmed up the scoping for the EIA, as stated in the ToR of EIA.

4.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

In the earlier chapters, the process technology to be adopted for the proposed project has been discussed with reference to environmental impact potential. The following analysis covers the impacts on the prevailing environment and the suggested mitigation measures.

4.4 SCOPING OF IMPACTS

In consideration to the proposed project and prevailing site environment, impact on the following aspects of the environment would be assessed during construction as well as operation phase:

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

i) Impact on land
ii) Impact on soil quality
iii) Impact on water resource & quality
iv) Impact on air environment
v) Impact due to plant noise generation
vi) Impact due to solid wastes generation
vii) Impact on biological environment, both terrestrial & aquatic ecology
viii) Impact on social environment

Identification of the potential impacts in the form of a matrix for the construction & operation phase is given below.

	Activity	Environment	Ecological	Socio-economic
Construction phase	Land preparation and grading	Generation of fugitive dust	Loss of vegetation	-
	Transport of construction material to site	Generation of fugitive dust due to truck movement & handling of construction materials Impact on traffic due to truck movement	-	Generation of indirect employment for truck drivers
	Construction works	Generation of fugitive dust Generation of C&D waste	-	Generation of indirect employment for construction labours
	Operation of DG set	Generation of dust	Various adverse effects including hearing & other health issues due to noise	-
Operation phase	Process stacks and Dedusting stacks	Emission of pollutants	-	-
	Noise prone equipment	-	Various adverse effects including hearing & other health issues due to noise	-
	Transport of raw materials	Fugitive dust generation due to raw material transport & handling	-	-
	Despatch of finished products	Impact on traffic	-	-
	Various plant operations	-	-	Generation of direct & indirect employment for operating the plant



4.5 IMPACT DURING CONSTRUCTION PERIOD

The construction activities involve site preparation, earth work, concreting, structural steel work and erection. It is expected that most of the civil construction materials like steel, cement, sand & stone chips would come by rail & road from adjoining regions and plant & machineries by rail/road from different parts of India and by sea from abroad. The construction period would be 86 months from "Go-Ahead date".

4.5.1 Impact on Land Use

The proposed project is a greenfield one and some amount of impact is expected on the land environment in terms of loss of agricultural land and vegetation.

Impact due to loss of Vegetation: The tree enumeration data provides a detailed breakdown of the vegetation in both forest and non-forest areas proposed for clearing to facilitate industrial development as shown in Appendix 4-1. In the forest land, a total of 14,379 trees have been documented, with the overwhelming majority being Kaju (Cashew), accounting for 12,355 trees or approximately 86% of the total tree population. These Kaju trees are predominantly small to medium-sized, with girths ranging from 30-89 cm, indicating a relatively young or uniformly managed plantation. Beyond Kaju, other significant species include Chakunda (254 trees), which shows a wider girth distribution up to 209 cm, suggesting some mature individuals. Mango trees (663 total) are also present, with a subset reaching substantial sizes - 23 trees in the 120-149 cm range and a few exceeding 300 cm, likely representing older, well-established specimens. Additionally, Teak (380 trees) appears mostly in smaller girth classes, while scattered large trees like Bara (2 trees, one exceeding 390 cm) and Sala (11 trees, some with girths up to 299 cm) highlight pockets of older growth within the forest.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

The non-forest land contains 11,765 trees, with Kaju (8,409 trees) again being the most numerous but representing a smaller proportion (71.5%) compared to the forest. Unlike the forest, this area exhibits greater species diversity and a higher presence of mature trees. Mango (255 trees) is well-represented, including 22 trees with girths of 120-149 cm, 15 trees in the 150-179 cm range, and a few exceptionally large individuals surpassing 360 cm. Neem (1,034 trees) is another dominant species, with most trees in the 30-89 cm range but a few exceeding 390 cm. Teak (1,049 trees) is more abundant here than in the forest, though still mostly medium-sized. Notably, the non-forest area hosts several very large trees, such as Kusuma (6 trees, one over 390 cm) and Sala (65 trees, with 20 in the 150-179 cm range and 14 in the 180-209 cm range), suggesting a mix of natural aging and possible conservation or agroforestry practices. Miscellaneous species like Maha Neem (27 trees), Palasha (97 trees), and Sirisa (13 trees) further contribute to the ecological variety of this zone. About 7,200 trees would be felled in the non-forest area.

Mitigation Measures: The total land area requirement is 224.737 ha, out of which 33.34% is to be developed as greenbelt. Hence the total greenbelt area is 74.93 ha. The total number of trees needed to be felled in the non-forest region is estimated to be 7,200 out of a total of 11,765 as enumerated during the survey. In order to comply with the norm of 2500 saplings per ha, a total of 1,87,325 total saplings have to be accommodated in the greenbelt area. In view of the trees to be preserved in the non-forest area the total number of saplings to be planted would be 1,82,760 which includes the compensatory afforestation for the trees to be felled in the non-forest area.

The total number of trees to be felled in the forest region has been counted to be 14,379. As per FC application norms, CA land of 61.327 ha has been identified in Bolangir Forest Division, Bolangir

district and approved by PCCF. Additionally, to ensure plantation of 61,327 seedlings against CA scheme, additional DFL CA land of 35 ha has been identified and approved in Bargarh Forest Division in Bargarh district. The CA Land Allotment Letter has been attached in Appendix 4-2. The FC application is in advanced stage of Stage 1 approval.

4.5.2 Impact due to Solid Waste Generation

Solid waste during the construction phase would consist primarily of Construction & Demolition (C & D) waste like excess concrete & cement, rejected components & materials, packing & shipping materials including waste plastics, hazardous wastes like paint containers and used oil & grease as well as Municipal Solid Waste (MSW) including kitchen waste, canteen waste, waste from landscaping & greenery development etc. Proper disposal of the solid wastes as per the provisions laid down in C & D Waste Management Rules 2016, Solid Waste Management Rules 2016, Plastic Waste management Rules 2022 & Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 would be carried out to avoid adverse impact due to these wastes.

Mitigation Measures:

i) Onsite segregation of the wastes generated would be carried out as per the regulations.

ii) The recyclable materials would be segregated and sold to external agencies for secondary use.

iii) Hazardous waste would be stored in a separate earmarked area and disposed as per prevalent regulations.

iv) Cleaning of site from all sorts of construction wastes would be done from the respective construction zones. The construction wastes would be stockpiled in earmarked area within the plant, recycled wherever applicable.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

v) The balance material would be cleared from the site by authorised external agencies for proper disposal as per prevalent regulations.

vi) MSW produced during construction would be collected in colour coded bins for segregation and disposed as per prevalent regulations.

vii) Possibility of producing bio-gas from the MSW would be explored.

4.5.3 Impact on Soil quality due to Construction & Demolition (C & D) Waste and Hazardous Waste Generation

Generated Solid wastes during construction phase are primarily consisting of Hazardous and Non-hazardous waste. The hazardous waste during construction phase may include oil & grease from construction machineries, DG sets and transportation vehicles. The Non-hazardous waste includes Construction & Demolition (C & D) waste like excess concrete & cement, rejected components & materials, excavated earth materials etc, as well as Municipal Solid Waste (MSW) including packing & shipping materials, waste plastics, wooden boards, cartoons & canteen waste etc, may have adverse impact on soil quality as well as air quality, surface water quality and ground water quality.

Mitigation Measures:

i) The construction and demolition waste materials would be segregated and reuse as filling materials wherever require to land levelling for establishment of the plant facilities. Runoff construction wastewater settling basin and rainwater harvesting structure would be adopted to minimize soil erosion and adverse impact on natural drainage system. However, soil erosion and fugitive dust emission due to these activities would be limited to the initial period of construction phase only.

ii) Proper segregation and disposal of the solid waste as per the provisions laid down in C & D Waste Management Rules 2016, Solid Waste Management Rules 2016, Plastic Waste Management Rules 2016, Hazardous Waste and Other waste (Management & Transboundary movement) Amendment rules, 2019, would be carried out to avoid adverse impact due to

these wastes. E-waste would be handed over to authorised recyclers as laid down in E-waste management Rules, 2016 and its subsequent amendments.

iii) The recyclable materials would be segregated and sold to external agencies for secondary use.

iv) Cleaning of site from all sorts of construction wastes would be done from the respective construction zones. The construction wastes would be stockpiled in earmarked area within the plant, recycled wherever applicable.

v) The balance material would be cleared from the site by authorised external agencies for proper disposal as per prevalent regulations.

vi) MSW produced during construction would be collected in colour coded bins for segregation and disposed as per prevalent regulations.

vii) The used oil & grease from construction machineries, DG sets and transportation vehicles would be collected in drum and temporarily stored at designated area for handover to authorised agency.

4.5.4 Impact on Water Resource and Quality

There would be a marginal impact on surface water resource of Mahanadi river due to the requirement of about 1,000 KLD during construction period. There would also be generation of wastewater including surface run-off, sanitary and kitchen wastewater during the construction phase, which if released untreated would have adverse impact on ground water quality due to percolation to the ground water table.

Mitigation Measures:

i) Modular bio-toilets would be constructed during construction phase

ii) The construction materials would be kept in a protected area and the area would have adequate teporarary dranage system leading to the main plant surface runoff drain having catch pit to settle suspended solids. The water collected in the catch pit of the drain would be reused for construction.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

4.5.5 Impact on Air Quality

Particulate matter would be the predominant pollutant affecting the air quality during the construction phase. The following activities would generate considerable amount of dusts & fumes:

i) Excavation for foundations and backfilling activities
ii) Concreting work
iii) Road making activities
iv) Vehicle transportation for sourcing of building material to site
v) Running of DG sets

Mitigation Measures:

i) Unloading of construction materials like stone chips & sand and stockpiling of the same at the earmarked site would be provided with water sprinkling to arrest fugitive dust emission. Additionally, wind barrier screen may be provided to reduce the wind speed and consequently, reduce the fugitive dust emission.

ii) Logistics would be designed to maximize transportation of materials by rail, minimizing movement of trucks. Optimization of the quantity of construction materials stored at site will be administered.

4.5.6 Impact of Noise Level

The major noise generating source during the construction phase would be vehicular traffic, construction equipments like dozer, scrapers, concrete mixer, crane, generators pumps, and compressor, rock drills, pneumatic tools, vibrators, DG sets, etc. Though temporary, exposure to higher noise levels during construction period may cause various adverse effects including hearing & other health issues and overall ecological disturbance.

Mitigation Measures:

i) Provision of Personal Protective Equipment (PPE) like ear muffs, ear plugs etc.

ii) DG sets would conform to the latest regulatory norms and would be provided with integral acoustic enclosure.



4.5.7 Impact on Traffic

The construction materials like cement, sand, steel, sheeting material, aggregates etc. shall arrive at the plant premises by road. Therefore, it is estimated that there would be about 50 Nos. of truck movement per day during transportation of construction materials.

4.6 IMPACT DURING OPERATION PHASE

4.6.1 Impact on Land Environment

KSL proposes to set up an Integrated Advanced Specialty Steel Plant having an installed capacity 1.43 MTPA of crude steel ("IASSP Project") at Dhenkanal district in Odisha.

The post project land use would not only comprise of the plant units but also other supporting infrastructure such as utility systems, roads, conveyors, water reservoirs, water treatment units, area for solid waste management, truck parking, administrative buildings and 33.34% greenery.

There would be some impact on the land environment in terms of loss of agricultural land or loss of vegetation and due to temporary storage of raw materials and solid waste due to leaching.

The proposed project would further lead to enhancement of trade and commerce, commercial establishments, generation of employment, etc. In other words, the project would have beneficial impact on the land valuation, benefitting private land owners.

Mitigation Measures: As stated earlier there would be marginal impact on land environment due to temporary storage of raw materials & solid wastes. The following measures would be undertaken to mitigate the same:

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

i) All raw material stockpiles would be compacted & hardbound and stored in paved areas to avoid leaching of toxic materials.

ii) The aim for solid waste management would be maximum reuse/recycling of the solid wastes through practicable ventures. The solid wastes management plan has been discussed separately under 'Impact due to solid wastes' in this chapter as well as in Chapter-2, where it has been proposed how solid wastes dumping can be avoided to the extent possible.

4.6.2 Impact on Surface Water Resource

The total plant raw water requirement shall be about 762 cu m/hour for the 1.43 MTPA greenfield project which will be sourced from Mahanadi River at Phulbari in Cuttack District of Odisha. Additionally, water collected from rainwater harvesting would also be used to cater to the plant water requirement. Since the project is conceived on ZED, there would be no impact on the water quality of existing surface water bodies.

Mitigation Measures: In view of the moderate negative impact rendered due to additional withdrawal, the following water conservation measures have been considered:

i) Closed loop/direct-cooling circuit for each production unit requiring water for cooling purpose

ii) Use of treated wastewater from the respective production units as well as non-production facilities.

iii) Use of blow down water from respective production units in various low-end uses like dust suppression, dry fogging, slag quenching and gardening.

iv) Harvesting of rainwater and collection in the Storm Water storage pond which would provide make up water during lean season and reduce stress on the surface water resource.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

v) Adoption of 'ZED' i.e. complete recycling of treated wastewater within the plant

vi) Calculation of water footprint, water auditing and provision of water consumption meters for each production facility to facilitate water budgeting, minimize losses and monitor water consumption on regular basis.

With these conservation measures and harvesting of rain water, the withdrawal of surface water would be optimized. With the present plan of water conservation, it is estimated that make-up water requirement would be 4.6 cu m/t of crude steel post project.

Storm water would be utilised to the extent possible and only the excess amount is discharged intermittently following CPCB guidelines. Monitoring would be conducted periodically as per the norms at the outlet of storm water discharge.

4.6.3 Impact on Ground Water Resource and Quality

The proposed project has not been planned based on ground water extraction as water source. Thus, there would be no impact on ground water resource.

There may be contamination of ground water due to seepage, if untreated wastewater is discharged. There may also be impact on ground water quality due to leaching from the raw materials stockpiles & solid wastes stored temporarily on the ground.

Mitigation Measures: The proposed project has been designed on Zero Effluent Discharge, hence the possibility of any ground water contamination due to release of plant wastewater is ruled out. Moreover, concrete box drains would be constructed to prevent any water loss through seepage and subsequent ground water contamination. Run



off from solid wastes storage site would have surrounding garland drains with catch pits to collect the rain water to separate out the suspended solids for in-plant use.

In view of the above mitigation measures, the impact on ground water quality would be insignificant.

4.6.4 Impact on Air Environment

As mentioned in Chapter 2, there would be 63 stacks post implementation of the proposed project at 1.43 MTPA stage. The proposed complex would emit particulate matter (PM), SO_2, NOx, etc. from the proposed units.

Further to the point source emission, there would also be fugitive emissions from open and closed areas of different shops.

The controlled emission inventories of PM, SO_2 and NO_X during post project are indicated in Table 4-1 as extracted from Stack Schedule.

TABLE 4-1 - ESTIMATED CONTROLLED EMISSION INVENTORIES FOR PROPOSED PROJECT

Sources	Nos.	Estimated controlled emissions (G/S)		
		PM	SO_2	NO_x
Combustion stacks	33	12.4	65.6	124.4
Dust extraction stacks	30	26.4	-	-
Total Load	**63**	**38.8**	**65.6**	**124.4**

To predict the incremental ground level concentrations (glcs) of PM, SO_2 and NOx respectively, BREEZE AERMOD ISC, US-EPA approved software was used. The input provided to the model comprises of the stack data for the proposed units, the site-specific meteorological

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

data for the monitoring period (October 2024 - December 2024) and the terrain elevation data (SRTM - 1 arc second elevation data from USGS). Cartesian grid type receptors and discrete receptors (for AAQ monitoring stations) were considered with flagpole height of 1.5 m (average breathing height).

The glcs determined for the proposed project have been shown in Fig. 4-1, 4-2, 4-3 & 4-4. The incremental contribution due to the project at the air quality monitoring locations distributed within the study area is presented in Table 4-2.

TABLE 4-2 - PREDICTED AMBIENT AIR QUALITY POST PROJECT

AAQ Monitoring Location and its distance from the Plant boundary, km	Parameters	Present baseline (P98), µg/cu m	Incremental contribution due to proposed project, µg/cu m	Projected air quality post project, µg/cu m
A1 - Padmanabhapur Villag	**PM_{10}**	68.88	4.8	73.68
	$PM_{2.5}$	34.44	3.22	37.66
	SO_2	<4.0	6.02	10.02
	NO_x	16.66	16.1	32.76
A2 - Badrapali Village	**PM_{10}**	43.95	4.58	48.53
	$PM_{2.5}$	22.77	3.06	25.83
	SO_2	<4.0	4.56	8.56
	NO_x	16.50	18.9	35.4
A3 - Ragada Village	**PM_{10}**	52.50	6.6	59.1
	$PM_{2.5}$	27.40	3.64	31.04
	SO_2	<4.0	9.18	13.18
	NO_x	17.42	17.5	34.92
A4 - Patrabhag Village	**PM_{10}**	49.50	5.37	54.87
	$PM_{2.5}$	26.18	2.57	28.75
	SO_2	<4.0	4.29	8.29
	NO_x	17.42	14.4	31.82
A5 - Talabarkote village	**PM_{10}**	48.20	3.54	51.74
	$PM_{2.5}$	27.72	2.41	30.13
	SO_2	<4.0	5.81	9.81
	NO_x	19.17	23.4	42.57
A6 - Dhirapatana Village	**PM_{10}**	52.34	6.19	58.53
	$PM_{2.5}$	25.79	4.13	29.92
	SO_2	<4.0	6.24	10.24
	NO_x	22.04	17.8	39.84
A7 - Manipur Village	**PM_{10}**	52.53	7.61	60.14
	$PM_{2.5}$	26.02	5.08	31.1
	SO_2	<4.0	9.78	13.78
	NO_x	18.36	28.3	46.66
A8 - Siaria Village	**PM_{10}**	51.20	3.72	54.92
	$PM_{2.5}$	25.60	2.48	28.08
	SO_2	<4.0	3.14	7.14
	NO_x	16.50	13.7	30.2

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

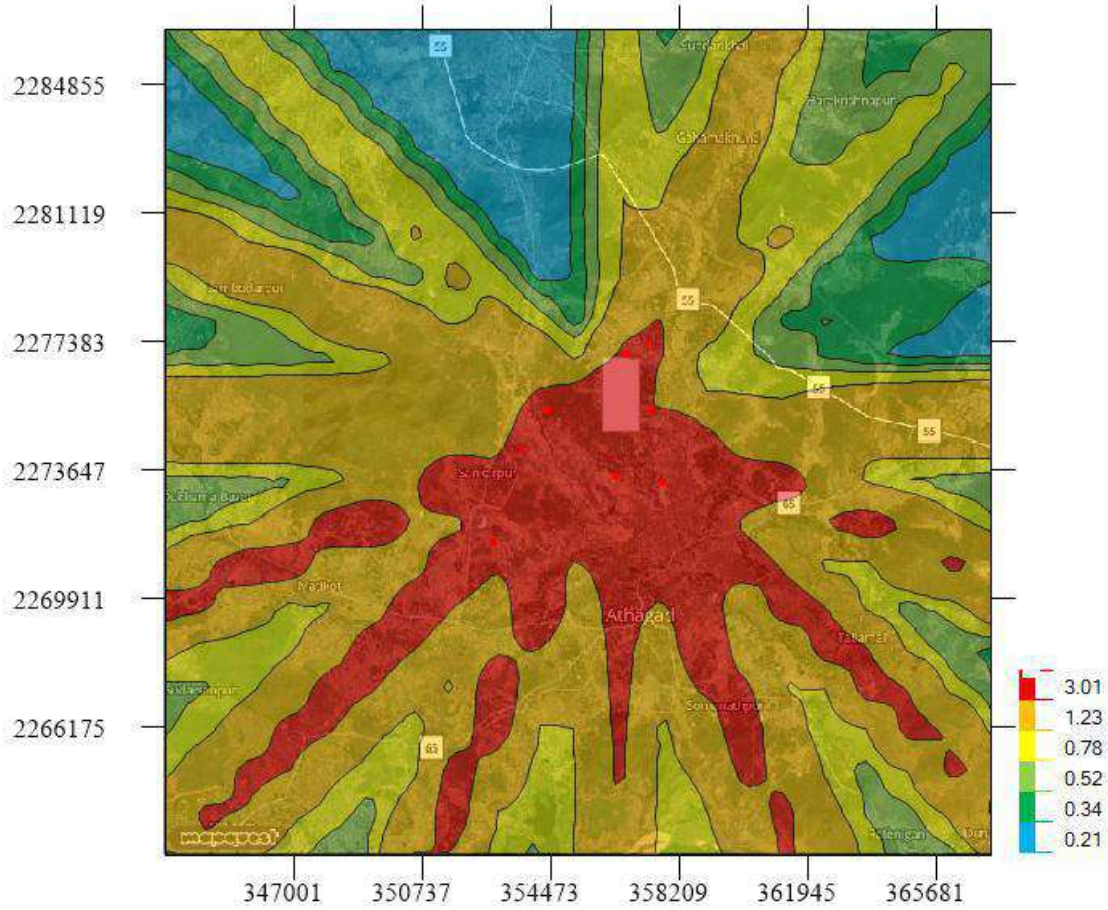


FIG. 4-1 - PREDICTED 24-HOURLY AVERAGE GLC OF PM_{10} IN µG/CUM

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

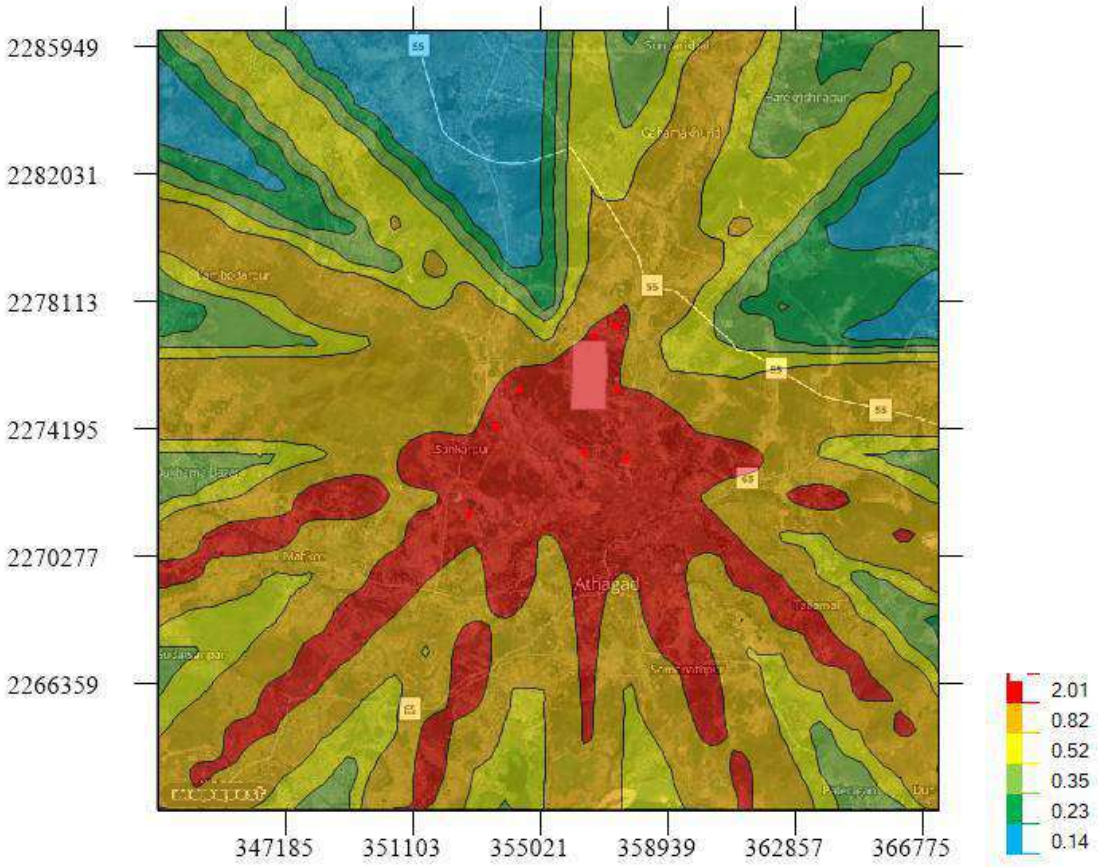


FIG. 4-2 - PREDICTED 24-HOURLY AVERAGE GLC OF $PM_{2.5}$ IN µG/CUM

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

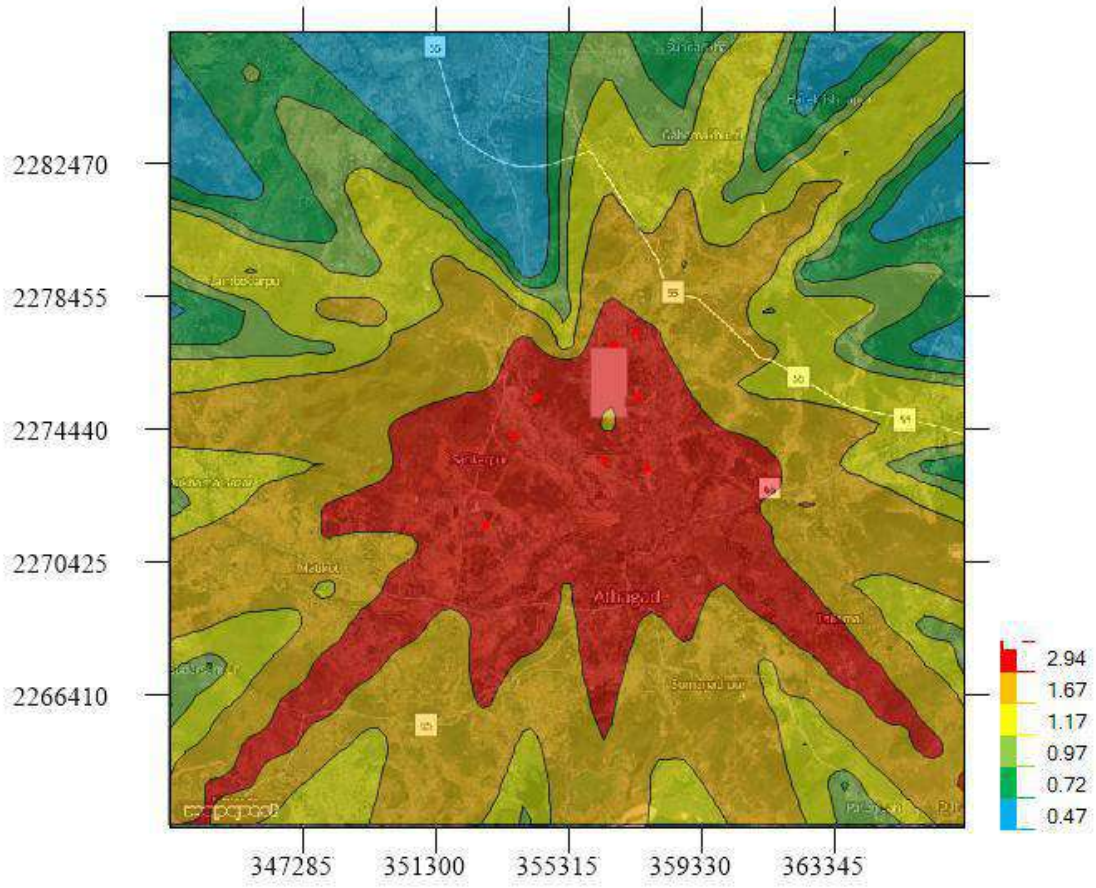


FIG. 4-3 - PREDICTED 24-HOURLY AVERAGE GLC OF SO_2 IN µG/CUM

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

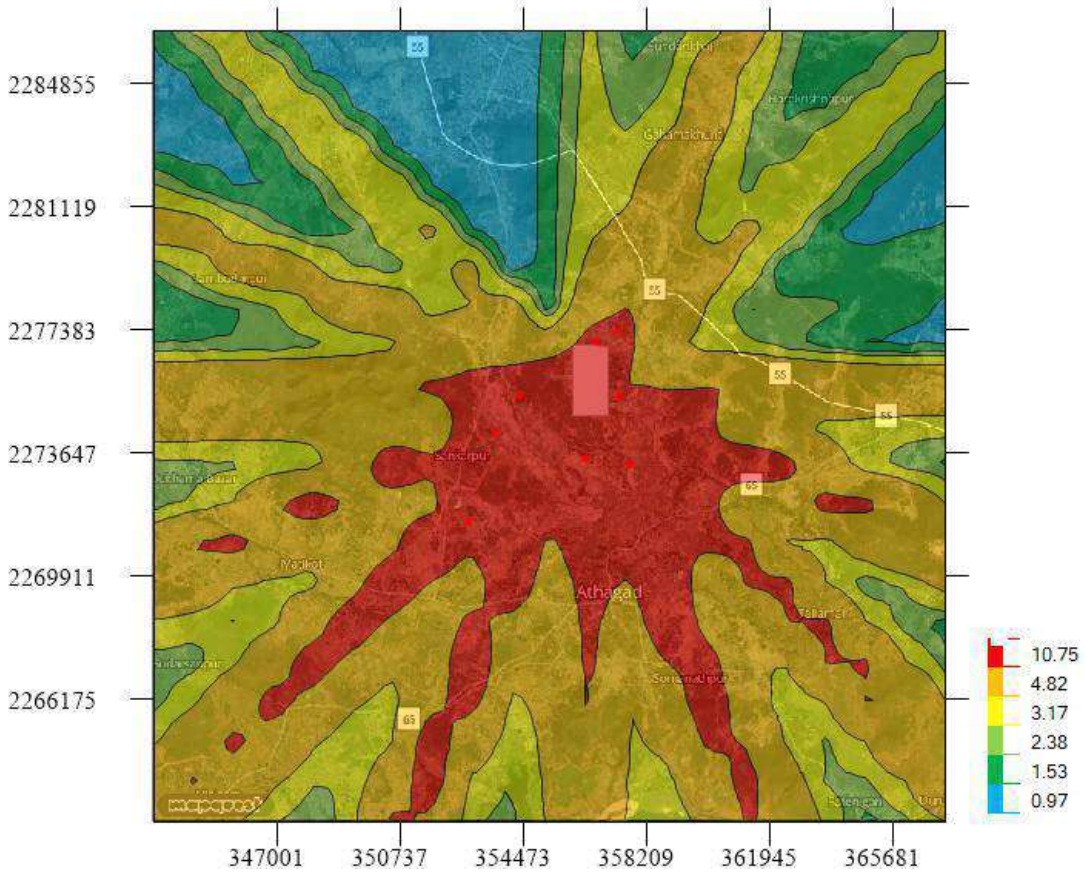


FIG. 4-4 - PREDICTED 24-HOURLY AVERAGE GLC OF NO_x IN µG/CUM

Management Measures for Air Pollution: The management measures adopted for air pollution have been described in Section 2.12.1 of Chapter 2.

In addition to the mitigation measures stated in chapter-2, other management measures would be implemented to further improve the air quality.

i) Pneumatic or covered truck transportation would be employed for the collected dusts from the dust catchers of various units.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

ii) Plant roads would be black topped & kept dust free by using industrial vacuum cleaners at dust prone areas and water sprinkling would be carried out at regular intervals.

iii) Installation of tyre washing system at the strategic locations of the plant to reduce the fugitive dust due to movement of heavy vehicles.

iv) Provision of wind barrier/curtain specially around stockpiles to reduce wind-borne emissions

v) Plantation would be carried out along the external roads to absorb the fugitive emissions due to vehicular movement

vi) Water sprinkling would be carried out twice daily in the roads immediately adjacent to the plant

viii) All unpaved areas subject to vehicular movement would be concreted

4.6.5 Projected Vehicular Load

It is envisaged that the proposed project would entail transportation of about 0.5 MTPA of raw material and 1.14 MTPA finished product by road. There would be truck/trailer traffic of about 150 trucks per day due to the proposed project. In addition to the above it is envisaged that there would be about 50 passenger cars, 200 two wheelers and 5 bus trips per day in view of the manpower. The increase in average PCU per day due to above vehicular movement is about 525 PCU. The V/C ratio at the post project scenario would be 0.41 and the LOS would be maintained at B.

In order to mitigate the additional impact due to increased vehicular load, it is proposed to ensure that vehicles moving within the study area shall meet the latest Emission Standards applicable in the region. The roads in the region would be widened to accommodate the plant traffic. Roads and crossings would be suitably planned to avoid

traffic congestion. Heavy trucks would be parked in a separate place and idle running would be avoided. Further, major raw materials would come by rail and transported to the shop area through covered conveyor system to reduce the emission of particulate dust.

Fugitive emission arising from vehicular movement for transportation of raw materials & finished products would be mitigated by installation of tyre washing system as mentioned earlier.

4.6.6 Impact on Soil Quality

Impact on Soil Quality from Air Pollutants:

i) During the operation phase, there would be deposition of the emitted suspended particulate matter on the forest and agricultural lands within the study area leading to potential changes in soil characteristics.

ii) Emissions of SO_2 and NOx may form acid droplets and settle down on soil in the study area leading to adverse impact on soil quality of agricultural lands and forest lands.

Mitigation Measures: Considering the significance of impact on soil quality adequate air pollution control measures including ESP, Bag filter and other mitigation measures have been adopted for air emissions as detailed mention in Chapter-2. Hence, insignificant impact is envisaged on soil quality owing to implementation of proposed air pollution control measures. Moreover, soil testing would be carried out following nutrient cycle of soil to ensure conservation of the existing soil fertility in prime lands of the study area.

Impact on Soil Quality from Solid Waste: Solid and Hazardous waste would be generated from KSL plant production capacity includes BF and BOF slag, EAF slag, mill scale, and waste oils etc. that are generated during operation phase at different quantities. They may have adverse impact on soil characteristics and may leach to ground water.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

Mitigation Measures: Considering the significance of impact on soil quality, adequate solid waste management measures have been adopted as detailed mention in Chapter-2. Additionally, Toxicity Characteristic Leaching Procedure (TCLP) analysis would be carried out once a year within the plant area to assess the leachability of toxic materials from the solid wastes. In view of the above, the impact of the proposed project on the soil quality of the study area would be insignificant.

4.6.7 Impact due to Noise

Construction activities would add to the noise level generated by existing units & activities. Elevated noise levels would have detrimental impact on the health of working personnel in and around the plant premises. Health effects due to noise include hearing impairment, hypertension, cardiovascular diseases and sleep disturbance. Beyond these effects, elevated noise levels can create stress, increase workplace accident rates, and stimulate aggression and other anti-social behaviours. Higher noise levels also have traumatizing effect on animals.

Noise modelling was carried out using SPM 9613 for the project and the noise isophones were plotted on the layout as shown in Fig. 4-5. As seen from the modelling output, the predicted noise level at the plant boundary would be within 35 dB(A) which is much lower than stipulated standards. The modelling was carried out for the worst case scenario without accounting for greenbelt or other structures and barriers. In view of the greenbelt and other natural noise attenuating structures, the noise levels at the boundary would be even lower than predicted.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)



FIG. 4-5 - PREDICTED NOISE LEVELS

Noise mitigation measures have been considered as a part of plant design as described in Chapter 2. The monitored baseline data shows that the existing noise level for industrial area are mostly within the regulatory standards. The integrated noise mitigation measures would control the generated noise due to the proposed project and there would be no impact due to the additional generation of noise. Apart from these measures, the peripheral greenbelt would help in containing the generated noise within the plant boundary.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

4.6.8 Impact due to Solid Waste Generation

There would be generation of solid waste as detailed in Chapter 2. Maximum effort would be taken to reuse/recycle the generated wastes, including recovery of valuable products. Land area has been reserved within the existing plant for temporary storage of non-hazardous wastes. Recommendations made for the steel plants in the CREP guidelines would be conformed to for management of solid wastes.

The solid waste generated, if not properly handled and reused/recycled, would have negative impact on health & environment. Direct health risks concern mainly the working personnel who need to be protected, as far as possible, from contact with hazardous wastes like used oil, other oily wastes, and discarded containers. The amount of solid waste generated in the plant would have a detrimental effect on the land use of the region as it would occupy a significant land area if not reused/recycled adequately. The generated solid waste would also cause secondary issues like fugitive emissions if not stored and disposed in a proper manner. E-waste generated from the plant would contain trace metals like mercury, lead, cadmium etc. which are toxic in nature and possess the potential to contaminate soil and ground water.

Management Measures for Solid Waste: The reuse/ recycling techniques that have been envisaged for the proposed project are standard practices which form an integral part of the process flow. The solid waste re-utilisation techniques have already been described in detail in Chapter 2. Apart from the proposed measures, as per the 4R principle, attempt would be made to reduce the generation of solid waste by use of good quality raw materials, optimization of process parameters and recovery of valuable materials from the waste. Some hazardous waste would be handed over to authorised agency for recycling or disposal to the Common Hazardous Waste Treatment, Storage and



Disposal facility (CHWTSDF) located at Sukinda operated by Ramky as per the prevalent practice. Other hazardous wastes would be co-processed or recycled in the process as per their characteristics. E-waste would be handed over to authorised recyclers as laid down in E-waste management Rules, 2016.

After adoption of the mentioned waste utilization/disposal techniques it is envisaged that the impact due to solid waste generation from the proposed project would be insignificant.

4.7 IMPACT ON BIOLOGICAL ENVIRONMENT

4.7.1 Impact and Mitigation on Terrestrial Ecology during Construction Phase

Impact due to cutting/felling of vegetation: Impact of construction activities for the greenfield project site development works, would lead to levelling, filling and clearing the trees and shrubs. Thus, site development works would have significant impact on ecology and micro climatic condition, due to clearing of these trees and shrubs.

Mitigation Measures: Effort to modify layout design to minimize tree felling and proposed to transplant important trees in the designated area for greenery development. Apart from 33% greenbelt area for plantation within the project area, social afforestation programme needs to be considered through distribution of sapling at free of cost, in consultation with local panchayat and forest officials within the study area.

Impact from Fugitive Dust on surrounding vegetation: Construction activities leads to leveling, filling and removal of topsoil, often leads to soil erosion that generate fugitive dust due to vehicular movement. The generation of fugitive dust due to vehicular movement would have negative impact on the surrounding vegetations due to deposition of dust on pubescent leaves which may lead to temporary reduction of photosynthesis.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

Mitigation Measures: This dust generation would be confined to the initial periods of the construction phase and would be minimized through water sprinkling, paving roads and phase wise judicious construction management plan within KSL project boundary.

Impact for Noise Pollution on Resident Fauna: Vehicular movement for import of construction materials and operation of construction machineries may lead to increase of noise level in the surrounding environment causes disturbance to local faunal species may drive away from the project area.

Mitigation Measures: The noise pollution certified construction machinery would be allowed during the daytime only for operation within the KSL project area. Moreover, Project boundary wall and greenbelt already in developed so noise level at boundary expected to be within the permissible limit.

Impact on Nocturnal Animals due to floodlight: High intensity flood light at night may cause disturbance to the nocturnal animals around the construction site.

Mitigation Measures: It will be minimized by down facing the lights towards construction site only.

4.7.2 Impact and Mitigation on Terrestrial Ecology during Operation Phase

Impact from Air Pollutants on Ecology: During the Operation phase, the air emission contained SO_2, NOx, Particulate Matters ($PM_{2.5}$ & PM_{10}) and fugitive dust at higher concentration causes chlorosis, necrosis, clogging of stomata on leaf, leading to reduction in photosynthesis, transpiration and other metabolic activities of vegetation. That causes stunted growth, defoliation of vegetation and significant reduction in productivity of agricultural crops.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

Mitigation Measures for control of Air Pollutants: Considering the anticipated impact on vegetation and agricultural crops from air emission and fugitive dust would be mitigated through implementation of necessary control measures like ESP (Electrostatic Precipitator), Bag filter and several other mitigation measures for air pollution as detailed mention in section 2.12.1 of Chapter-2. With the effective implementation of the Environment Management Plan (EMP) during the plant activities, the proposed project can proceed without significant negative impact on environment.

Thus, impact on terrestrial flora & fauna in the study area would be minimized and micro climatic condition would be stabilized.

Impact for Noise Pollution on Ecology: The noise due to operational activities causes disturbance to the resident faunal species in the protected forests and open jungles within study area that may drive away to the surrounding forest area.

Mitigation measures for control of noise pollution: Disturbance due to noise would be mitigated through necessary control measures like separate housing for noise prone equipment, selection of low noise prone equipment etc. for noise pollution, as detailed mention in section 2.12.2 of Chapter-2. In addition to that, well developed green belt and boundary wall will reduce significant noise level beyond the plant boundary. Hence, the impact on faunal species would be insignificant.

4.7.3 Impact on Aquatic Ecology and Mitigation Measures

During Construction Phase: During construction, runoff water would be treated by settling and reused in water sprinkling for fugitive dust suppression and greenbelt development. Therefore, there would be no discharge to surface water bodies. Hence, the impact of the project on aquatic ecology would be insignificant.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

During Operation Phase: Considering "Zero Effluent Discharge", effluent from the proposed project will be totally re-used after necessary treatment. Therefore, no impact on the aquatic ecosystem is envisaged.

4.8 IMPACT ON SOCIAL ENVIRONMENT

The baseline assessment of the proposed project reveals its potential impact on local economy, employment opportunities, infrastructure and consequently the socio-economic environment of the studied areas.

Before analyzing the current and possible socio –economic impact of the project, it is essential to highlight the perception of the local people about the industrialization in the study area.

4.8.1 The perception of the local people on industrialization in the study area

Unemployment: The people had hoped that the setting up of industries in their locals would open new avenues of employment leading to the creation of permanent jobs for the people of the area and economic growth of the region. As per the perception of the people, despite the operation of large number of industries the unemployment issue in the area is persisting.

Preference by the industries for the permanent and higher position to the locals: The employment opportunity in the industries is limited to contractual work for the local people. Industries are mostly hiring the local people as the daily wage laborers and local women are mostly employed by the factories for cleaning, cooking, sweeping, etc., the marginal work. The technical and higher positions in the industries are filled by the outsiders.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

Regular Income: People of the studied area have view that the employment in the factories will ensure regular income rather than engagement in agriculture and its allied sectors and consequently assures the economic stability for the next generation.

Growth of the Local Economy: The people of the local area have opinion that with the establishment and expansion of the industries in the area, its allied trade and services, like transport services, food processing and supply, etc. will be improved leading towards growth of the local economy.

Impact on the Drinking Water: During the field interaction with people, they have shared that the sources of ground water is not good in their areas. Further, they told that the setting up industries in their areas may have adverse impact on the sources of ground water and consequently affect the quality of drinking water.

Impact on the Agricultural Yield: The local people of the studied villages have shared that the setting of factories in their areas have led to environmental pollution leading to destruction of the fertility of the soil and have a negative impact on agricultural yields.

Impact on Health: The people of the studied villages have shared that industrialization have an adverse impact on their health and due to it the people of their areas have been suffering from vector borne diseases like Malaria, dengue, chikungunya, skin related diseases such as dermatitis, scabies, eczema & hives, etc., and water borne disease, such as diarrhea, jaundice, etc.

Air Pollution: The local people have shared that the industrial dust and smoke pollutes the surrounding air and causes the air borne related health issues.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

Requiremennt of more attention by the industries for the development of the area: Through Focus Group Discussion and Individual Interview with the people of the studied villages, they have expressed that the industries are required to pay more attention to development of their areas such as education, skill training, medical facility, drainage system, etc.

The current and possible socio-economic impact of the proposed project is presented below:

Evaluation of Socio-economic Impacts arising from the proposed Project

Impact Factors	Current Situation	Impacts of the proposed Project	Mitigation Measures
Employment Opportunities	KSL will generate employment opportunities in the surveyed villages. Requirement of Technical and skilled persons for engagement in the industry is lacking in the area.	The proposed greenfield project of KSL will certainly generate the employment opportunities for the locals. However, it may be limited to the contractual work due to lack of required technical skills among the locals. Consequently, the underemployment will continue in the study area.	All attempts need to be taken to employ suitable, locally available & skilled personnel from the nearby area. In case of non-availability of skilled persons, people will be employed from outside area.
	The employment opportunities are primarily limited to contractual work with low payments. Lack of technical and vocational (livelihood) skill amongst local population is restricting their employment in the industries.	The establishment of KSL will create a huge employment opportunity and change the mindset of the rural people to work in the industry rather than in agriculture and allied sectors. It has aggravated the need for skilled employment opportunities for the rural people through the creation of demand in the industry.	Preference to be given by KSL to local employable (both men & women) persons for employment as per their skills in both establishment and operation phases of the industry. Support by KSL towards vocational and industrial training of local population (both men & women) having the basic qualification for up- gradation of skills and better employment opportunities.
	Migrant workers with the required skill set will be employed in KSL	Influx of migrants in the region due to the proposed project	The KSL authorities need to ensure the minimum wage for the workers of the industry as per the applicable regulation.

4 - Anticipated Environmental Impacts & Mitigation Measures (cont'd)

Impact Factors	Current Situation	Impacts of the proposed Project	Mitigation Measures
	The contractors will provide employment opportunities to migrants due to non- availability of Technically competent candidates in the study area.	In construction and operation phases, contractors may pay wages below the applicable regulations (for both local and migrant workers) and conduct the recruitment process based on personal networking.	The KSL authorities need to ensure PPF & ESI contribution for the workers as per the norms.
Growth of the local Economy	Expansion of the Local Economy with the establishment of industries in the area through business and services. Young adults of the study area do not intend to engage in the field of agriculture rather showing the interest to work in factories with regular wages.	The road transportation will improve due to the industrialization, which will create opportunity for the other allied industries.	Promotion of small and medium entrepreneurship related to agriculture and allied sectors.
Impact on drinking water	The irregular supply water in the project area villages. The ground water is contaminated.	The people are receiving the tap water irregularly. The villagers are suffering from water borne diseases.	Ensure the regular supply of water. Appropriate measure to be taken for the purification of water.
Air Pollution	Dust Pollution in the industrial zone is impacting negatively on the quality of air and surface water, agricultural Yield and human health.	Dust pollution increased during the construction & operation Phases.	Adherence of appropriate air control measures to address the issue.
Impact on Health	The factories have aggravated the causes of morbidity.	Increased the vector borne, water borne& skin related diseases	Ensure the regular health checkup by the qualified health personnel. Creation of awareness for prevention of vector borne, water borne and skin related diseases on a regular basis. Ensure the appropriate use of chemicals, like synthetic to control the vectors on a regular basis.

The evaluation of potential negative impacts of the project leads to appropriate needs assessment of the region and formulation of strong mitigation measures to alleviate the adverse impacts on the economic and social environment of the study area.

5 - ANALYSIS OF ALTERNATIVES

The preceding chapters describe the proposed greenfield project, the pre-project environmental status along with anticipated impacts with mitigations. This chapter discusses the aspect of analysis of alternative site and technologies considered for the proposed project.

5.1 NO PROJECT SCENARIO

The proposed project would be a significant contributor to India's goal of achieving 300 MT steel production. In the event of "No project scenario", the economic progress of the nation would be affected along with an impact on the contribution to exchequer through direct and indirect taxes, lack of greater economic upliftment of the region and reduced employment opportunities.

5.2 PROJECT SITE LOCATION

The IASSP would be located in villages Siaria and Talabarakote in Dhenkanal tehsil of Dhenkanal district of Odisha.

The following alternate sites were considered for the proposed greenfield project.

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
1	Location	Gajamara Dhenkanal	Kamakhya Nagar Dhenkanal	Kandarei Dhenkanal	
2	Land Availability	(224.73 Ha)	(303.51 Ha)	(136.38 Ha)	**Site 1 & Site 2** have sufficient land for the proposed project (min 192.554 Ha of land required including green belt) whereas **Site 3** was not suitable.

5 - Analysis of Alternatives (cont'd)

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
3	Type of Land	**Site 1** is vacant land, free of any known encumbrance.	**Site 2** was under cultivation (double crop land mostly used for agriculture).	**Site 3** is within the buffer zone of Kapilash Wildlife Sanctuary.	**Site-1** is preferred as the site it is a vacant land without encumbrances and no proximity to eco-sensitive areas
4	Requirement of R&R	No Land acquisition will be carried out by IDCO through a mix of private of government land acquisition.	Yes	Yes	**Site-1** is preferred as no R & R is involved for the implementation of the subject project.
5	Any perennial river, Streams , water body within the plot	No	No	No	**Site-1, 2 & 3** all are not having any perennial river & streams within the plot. **Site 1** is preferred as the sufficient raw water for the project will be available through Mahanadi located about 15 km away.
6	Power Demand Distance from nearby 220 kV/ 33 kV Substation.	10 km (Neulpoi 400KV/220 KV GIS) 4 km (Khuntuni 33 kV Substation)	18 - 20 km (Meramandali 400 kV/220 kV GIS) 8 km (Kamakhyanagar 132 kV/33 kV Substation)	Land was not sufficient	**Site 1** is preferred due to availability of 220 kV power from Neulpoi Substation at 10 km distance, and 33 kV Construction power from Khuntuni Substation at 4 km distance.
7	Road Access/ Connectivity	**Site 1** is well connected to Mumbai - Cuttack National Highway (NH- 55) which is 2.8 km away from the North East corner of the project site. **Site 1** is directly connected to the Saptasajya Dhenkanal road at North west corner.	The nearest highway is Mumbai - Cuttack National Highway (NH-55) which is 15 km away from the project site.	Land was not sufficient	**Site -1** is preferred due existence of multiple and better road connectivity in the vicinity of the project site for transportation of incoming & outgoing saleable materials.

5 - Analysis of Alternatives (cont'd)

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
8	Rail Access/ Connectivity	Nearest Take-up point for dedicated railway siding is Joranda Road Station - 6 km	Nearest Take-up point for dedicated railway siding is Kamakhya Nagar Station - 12 km The site is at a significant uphill gradient from the Kamakhya Nagar station. The overall viability of railway siding was found to be negative due to uphill gradient and involvement of forest land patches.	Land was not sufficient	**Site 1** is preferred due to proximity to (6 km) with Joranda Road station on Sambalpur - Cuttack Main line for the construction of dedicated railway siding.

A scoring system was adopted based on techno commercial parameters like land, water, inward logistics, Rail Linkage, port linkage, power, road connectivity and Social and Environmental parameters like R&R and other people related issues, proximity to eco sensitive areas, probable number of tree felling in non forest land, etc. as presented in Appendix 5-1.

Based on the weightages given to each parameter,

i) **Site 1 (Gajamara)** shows the best overall balance with strong land availability, acceptable land use pattern, and good proximity to water and hence scored the highest points.

ii) **Site 2 (Kamakhyanagar)** though similar in land availability, falls behind in land use and water access.

iii) **Site 3 (Kandarei)** suffers due to insufficient land availability despite having favorable land use and terrain.

Site-1 offers several strategic advantages. The company already possesses adequate land for the project, ensuring smooth installation without acquisition delays. The location also allows for the

sharing of existing infrastructure, including connectivity and employee housing, thereby reducing initial setup costs. Its proximity to key mineral resource belts ensures the easy availability of major raw materials, facilitating both acquisition and product transportation.

Additionally, the area benefits from an economical labour force. Importantly, the site does not fall within a critically polluted area as identified by the CPCB, and there are no nearby polluted river stretches, minimizing environmental compliance risks. Furthermore, the project has strong potential to contribute to regional development.

The total land required for the greenfield IASSP project is about 192.554 ha. The total land to be allocated to KSL by IDCO is about 224.737 ha including land for future use. The land consists of government land as well as private land. The site is suitably catered in terms of infrastructural support like connectivity, easy access to water & power sources.

5.3 ALTERNATIVE PROCESS TECHNOLOGIES

KSL proposes to set up an Integrated Advanced Specialty Steel Plant having an installed capacity of 1.43 MTPA of crude steel. The IASSP Project will have facilities for production of carbon, alloy steel, stainless steel along with manufacturing of critical components used in end industries like Automotive, Energy, Marine, Oil & gas, Aerospace & Defence, submarine and ship building components, railways, seamless tubes, nuclear power plant, yaw drivers, ultra supercritical power plants, etc.

The facilities proposed to be setup in the IASSP Project include Coke Oven, Sinter Plant, Blast Furnace, Hot Metal Pre Treatment & Pig Casting facilities, EAF/Zero Power Furnace, Basic Oxygen Furnace , Induction Furnace, Argon Oxygen De-Carburiser, Ladle Furnaces, VD

and RH-Degasser, Ingot casting facilities , Billet Bloom & Round caster, Large round caster, Heavy Bar , SBQ & Wire rod mill, & related Heat treatment facilities, Bar finishing and Machining facilities, Lime Calcination plant, Oxygen plant etc. The production facilities are proposed to be supported by necessary balance of plant, auxiliary & infrastructure facilities such as raw material handling, railway linkage and siding, electric power receiving and distribution system, water storage and distribution system, railway siding, WTP, STP, ETP, pollution control equipment, gas treatment facility among others.

The following sections describe the various process routes that are employed for production of iron and steel worldwide.

There are basically two main routes adopted globally to produce steel in an IASSP, one is based on Blast Furnace (BF) for iron making and conversion of hot metal to liquid steel in Basic Oxygen Furnace (BOF) and other is based on production of steel in Electric Arc Furnace (EAF)/Induction Furnace (IF) using scrap or direct reduced iron (DRI).

The proposed plant would produce specialty alloy steel for auto components, Micro alloyed, high and low alloy steels for special engineering applications for defense, aerospace etc., Specialty alloy steels for green energy applications incl. windmill, chemical, petrochemical, green H_2 etc., Bearing steel and stainless steel based on BF-EAF/ZPF route and BF-BOF route.

The other route is based on the melting of metallic in the electric arc furnace where traditionally scrap is used as the main raw material, but the use of DRI is becoming a common and advantageous practice during melting in the electric arc furnace. This technology has the following features:

i) Simplicity in the plant operation

ii) Flexibility to operate at smaller capacities down to 150,000 ton/year with an attractive production cost

iii) It requires a relatively large area to achieve 1.0 MTPA and higher production capacities

iv) Raw material handling, product screening and handling would generate a significant amount of fugitive dust

v) It has high maintenance and high manpower requirement

vi) High energy requirement for steel making

5.3.1 Iron Making Technology

Iron making through BF route is the most versatile, reliable, well-proven and globally preferred technology for a large IASSP.

The BF route of iron making requires upstream processes, that is, coking and agglomeration of iron ore fines to produce sinter/ pellet as a burden material.

These two upfront process units are not that clean technology, compared with reformed gas-based iron making. Coking of coal in by-product recovery type of coke ovens produces by-product fuel gas that is coke oven gas (COG) of high calorific value (CV) of about 4,300 kcal/N cu m, and recovery of economically valuable by-products like sulphur, benzol, naphthalene, tar, etc. But the process has got inherent pollution potential both in respect of air as well as water.

In non-recovery/heat recovery type coke making, the volatile matter are burnt inside the ovens to generate heat that is utilized for carbonization of the coal inside the oven and the burnt flue gas contaminated with SOx & NOx is released in the atmosphere. Also, no by-product fuel gas is generated. There would be practically no water

pollution as there is no release of toxic effluent containing ammonia, phenolics, cyanide compounds, etc like by-product recovery type. By-product recovery type coke ovens which is more polluting w.r.t water but less polluting w.r.t air is generally preferred in an integrated steel plant as the high calorie fuel gas is available to meet the fuel requirement of the plant.

Agglomeration of iron ore fines (dust) with other fine materials in sinter plants at high temperature produces sinter that can be efficiently used in a blast furnace. Recycling solid waste like flue dust, mill scale, lime dust and sludge, generated in the plant, is one of biggest benefits achieved through sinter plant. Sintering plants help to reduce solid waste by recycling waste products and capturing iron present in the waste material. Processing sinter helps eliminate raw flux, which is a binding material used to agglomerate materials, which saves the heating material, coke, and improves furnace productivity.

Pelletizing produces hardened lumps of 8-16 mm diameter using very finely ground iron ore fines of size less than 200 mesh and additives like bentonite. The biggest advantage of pelletization is the use of finer iron ore for its formation. Pellets have good reducibility because of high porosity (25-30%). Pellets have higher iron content varying from 62% to 65% depending on the Fe content of Ore fines. Absence of LOI is another advantage of using pellets. Pellets have high and uniform mechanical strength and can be transported to long distances without generation of fines. Further it has got resistance to disintegration. High mechanical and uniform strength of pellets is good even under thermal stress in reducing atmosphere.

There are alternate energy-efficient technologies applicable to the iron making processes like COREX, MIDREX, FINEX, HYL, HISMELT, ITmk3, etc. Basic role of alternative iron making is to meet

small capacity requirements. But these processes are reported to be sensitive to raw materials quality and in some case have capacity limitations too. COREX, FINEX and Coal-Based HYL Process are very promising alternative iron making technologies but have very low adoption rate in the steel industry worldwide because of several inherent issues. These alternative routes are not economically viable for the proposed plant capacity.

The BF operation is more flexible and versatile in operation on a sustained basis with variable quality of raw materials. This has further added to the adoption of BF process route.

5.3.2 Steel Making Technology

Steel is produced via two main routes:

i) Integrated smelting involving blast furnace (BF) ironmaking followed by basic oxygen furnace (BOF)

ii) Electric arc furnaces (EAF) & Induction Furnace (IF)

Out of the two processes of steel making the most applied process for steelmaking is the integrated steel-making process via the BF-BOF, which comprises about 70% of global steel production.

In the BOF, the iron is combined with varying amounts of steel scrap and flux. A lance is introduced in the vessel and blows 99% pure oxygen causing a temperature rise to 1,700^{o}C. The scrap melts, impurities are oxidised, and the carbon content is reduced to the required levels.

Other processes follow - secondary steel-making processes - where the properties of steel are determined by the addition of other alloying elements, such as boron, chromium, and molybdenum, among others, ensuring to meet the exact specification.

5 - Analysis of Alternatives (cont'd)

The EAF/IF process does not involve ironmaking. It can reuse scrap steel, avoiding the need for raw materials and their processing. In EAF process, the furnace is charged with steel scrap, it can also include some direct reduced iron (DRI), hot metal or pig iron for chemical balance. There is also security issues related to Natural Gas/Scrap etc for DR-EAF route.

The EAF operates based on an electrical charge between two electrodes providing the heat for the process. The power is supplied through the electrodes placed in the furnace, which produce an arc of electricity through the scrap steel (around 35 million watts), which raises the temperature to 1,600 ^{O}C, melting the scrap. Any impurities may be removed using fluxes and draining off slag through the tap hole. EAFs do not use coal as a raw material, but many are reliant on the electricity generated by coal-fired power plant elsewhere in the grid.

5.4 CONCLUSION

It may be concluded that the globally most adopted BF-BOF route has been prudently proposed to be undertaken for the proposed greenfield project. Additionally, the ZPF and other secondary refining processes allows for manufacturing of advanced specialty steel.

6 - ENVIRONMENTAL MONITORING PROGRAM

This Chapter describes the environmental monitoring plan for the proposed greenfield project including monitoring schedule, frequency, location, data analysis along with other necessary details.

6.1 ENVIRONMENT MANAGEMENT CELL

The Environment Management Cell would be responsible for the compliance of the environmental conditions and other statutory responsibilities like submission of six-monthly compliance reports to the EC conditions to OSPCB and IRO, MoEFCC. In case of violation of any statutory conditions including conditions laid down in the EC, the same would be reported to the Board of Directors & MD and other stakeholders and corrective action would be taken, for which a standard operating procedure has been formulated and included in the Corporate Environment Policy. Any violation related to the project will be brought to the notice of Head, Environment Safety and Health (ESH) who further in consultation with Environmental Management Cell shall report the case to MD and Board of Directors and stake holders for taking corrective action.

The main responsibilities of Environment Management Cell comprising ESH dept. would cover the following:

i) Conducting environmental inspection/audit of the pollution control equipment/systems on regular basis

ii) Environmental monitoring through in-house environmental lab and NABL accredited labs, compilation of data & its analysis and reporting



iii) Initiation and implementation of corrective measures as and when required for the above in coordination with respective departments. Periodically assess and monitor the implimentation of corrective/mitigative measures.

iv) Ensuring compliance of legal/statutory requirements as applicable and updating any new compliance requirements to the management and respective dept. Liasoning with statutory bodies.

v) Maintenance and calibration of online monitoring systems

vi) Ensuring implementation of environmental monitoring program and Green Belt development.

vii) Training of operation and maintenance personnel in EHS by inhouse & expert ESH personnel for effective implementation of policy & guidelines

viii) Safety officers & stewards of the department are responsible for safety surveillance and safety audit. The doctor specialized in Occupational Health is responsible for Occupational health monitoring, implementation of occupational health care program and for maintaining health statistics of the employees.

The organizational Structure to deal with the environmental, health & safety issues and ensure compliance with the stipulations is presented in Fig. 6-1.

KSL shall create an Environment Management Cell (EMC) under the administrative control of Head, ESH who shall head the cell and report to Director of Projects and MD, KSL. The Head, ESH would be assisted by Manager (Environment & Health) and Safety Officers.

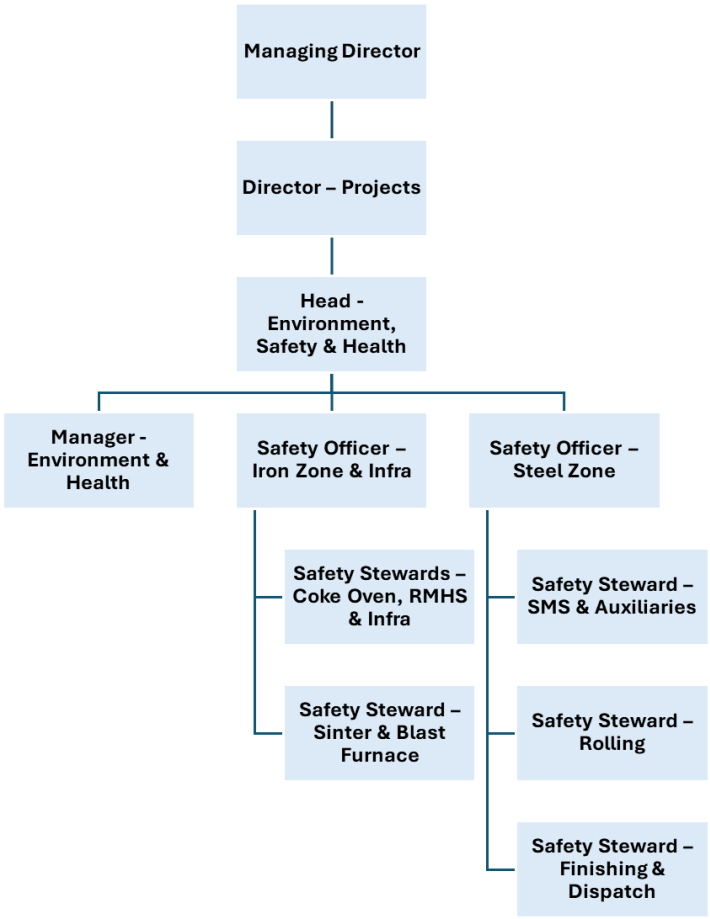


FIG. 6-1 - ORGANISATION STRUCTURES OF THE EMC

6.1.1 Roles and Responsibilities

MD:

i) Developing policies to offer overarching guidance and establish strategic direction
ii) Allocating necessary resources to support the efficient and effective operation and maintenance of the Plant
iii) Ensuring identification and compliance with all relevant statutory requirements and regulations
iv) Enhancing the quality of life for employees and the surrounding community

Head (Environment, Safety & Health):

i) Identify and assess all relevant statutory requirements applicable to the site.

ii) Secure required permissions, approvals, clearances, and licenses pertaining to environmental regulations.
iii) Oversee, track, and evaluate the execution of environmental protection measures.
iv) Develop, coordinate, assess, and document the monitoring of environmental parameters.
v) Ensure timely submission of reports, returns, statements, and compliance status to the MoEF&CC/OSPCB/CPCB.
vi) Provide management with insights and updates on environmental compliance reviews.
vii) Plan, implement, and evaluate afforestation initiatives within the project.
viii) Develop and execute strategies for the safety management plan.
ix) Enhance employee and team competency in safety standards through training.
x) Ensure the occupational health and well-being of employees and vendor partners.

6.2 CORPORATE ENVIRONMENT POLICY

KSL has an existing Corporate Environmental Policy (Appendix 6-1) and is committed to maintaining environmentally friendly, safe, healthy and sustainable working conditions in all its operations.

6.3 MONITORING SCHEDULE AND PARAMETERS

Environmental monitoring is of paramount importance with respect to evaluating the performance of pollution control equipment installed for the project. The monitoring for various parameters of air, water, soil, noise etc. as per current practice in the existing plant would be carried out by an authorized laboratory (NABL/MoEFCC accredited) as per the given monitoring schedule. Monitoring of different environmental parameters on a regular basis helps in identifying the critical changes that may occur due to the project and suggests preventive/mitigation measures to be undertaken by the project authorities.

6 - Environmental Monitoring Program (cont'd)

To evaluate the effectiveness of environmental pollution control systems vis-à-vis the environment management drive, regular monitoring of the important environmental parameters would be done to ascertain the following:

i) Pollution control status within the plant area
ii) Effectiveness of pollution control measures
iii) To assess environmental impacts
iv) To monitor & assess the trend of parameters which have been identified as critical
v) To ensure compliances to the conditions of the EC, CTE and CTO
vi) Submit periodical compliance reports to the concerned Regulatory authorities

The attributes, which require regular monitoring, are as follows:

i) Meteorology - Meteorological parameters

ii) Air quality - Ambient air quality & work zone air quality monitoring

iii) Water quality - Ground water & surface water

iv) Noise levels - ambient & work zone

v) Soil quality - Soil characteristics & TCLP Test to assess the leachability of toxic elements into ground water near the waste storage area

vi) Inventory of solid waste including hazardous waste

vii) Water consumption, Energy consumption and performance of Pollution control devices

6 - Environmental Monitoring Program (cont'd)

6.3.1 Performance Monitoring Schedule of Pollution Control Devices

Sl. No.	Parameter	Pollution Control Device	Monitoring Frequency
1.	Air	ESP Bag Filter Dry fogging system	Fortnightly
2.	Water	CETP STP	Fortnightly
3.	Noise	Silencers	Once in a fortnight

The schedule, duration and parameters for monitoring for the proposed facilities are as given in Table 6-1.

TABLE 6-1 - MONITORING PARAMETERS AND SCHEDULE

Sl. No.	Activity	Aspect	Parameter	Location	Frequency of monitoring	Responsibility
Construction Phase						
1.	Construction activities	Deteoriration of ambient air quality due to construction activities	Air Quality Monitoring Parameters: PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Three (3) monitoring locations would be set up covering upwind and downwind directions. There are 3 existing CAAQMS monitoring stations within the plant.	Online Continuous monitoring	Head (Environment Safety and Health)
2.	Construction activities	Generation of C&D waste	Inventorization of C&D waste	Overall plant site	Monthly	Head (Environment Safety and Health)
Operation Phase						
1.	Operation	Measurement of site specific micro meteorological data	Meteorology: Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind direction and rainfall	One permanent station at the Admin building. The wind sensor shall be preferably at 10 m height above the ground without any surrounding hindrances that may affect the free flow of wind	Online continuous monitoring	Manager (Environment and Health)

6 - Environmental Monitoring Program (cont'd)

Sl. No.	Activity	Aspect	Parameter	Location	Frequency of monitoring	Responsibility
2.	Operation	Stack emission Fugitive Dust Emission Emissions from coal/coke pushing , charging, and quenching	Air Quality Monitoring Parameters: PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, O_3, NH_3, C_6H_6, BaP, Pb, As and Ni Work zone air quality	Four (4) monitoring locations One (1) within the plant premises & three (3) monitoring locations would be set up outside the plant area at an angle of 120^0 covering upwind and downwind directions. Two locations near the fugitive dust emitting operations and two locations near the dust prone raw material stockpile areas	Continuous ambient air quality monitoring stations (CAAQMS) as per the MoEFCC/CPCB guidelines, whichever is most stringent. Monthly once for each location	Manager (Environment and Health) Manager (Environment and Health)
	Operation	Fugitive Dust Emission	Fugitive dust monitoring	Fugitive dusts near raw material stockpiles	Monthly once through labs recognized by NABL and MoEFCC.	Manager (Environment and Health)
	Operation	Stack emission	Stack Monitoring		Continuous	-
	Operation	CT Blowdown Water from Spray Cooling Water from billet cooling	Water Quality - effluent water, surface and ground as per CPCB standard.	Ground water - Two within plant, one on down gradient, one on up gradient of plant and two near raw material storage area. Surface water – Three (3) Locations Piezometer with continuous online pH & conductivity meter – 4 Nos. around the raw material storage area	Ground water quality analysis- Monthly once Surface water quality - Monthly once Surface & ground water - in pre & post monsoon	Manager (Environment and Health)

6 - Environmental Monitoring Program (cont'd)

Sl. No.	Activity	Aspect	Parameter	Location	Frequency of monitoring	Responsibility
	Operation	Noise due to Rotary Equipment Noise due tom venting of high pressure steam or air	Ambient noise level	One near plant main gate and at three locations around the plant boundary	Monthly once for each location	Manager (Environment and Health)
			Work zone noise level	Four locations near the noise generating equipment	Monthly once for each location	Manager (Environment and Health)
			Soil quality	Two (2) locations within the plant (raw material storage area, solid waste storage area) and one (1) from outside plant area.	As per nutrient cycle/Yearly once by NABL/MoEFCC approved agency	Manager (Environment and Health)
	Operation	Leachate	TCLP test for solid wastes	Two location for BF and BOF/ZPF slag to ascertain the heavy metals & toxic elements	Yearly	Manager (Environment and Health)
	Operation		Inventory of hazardous waste	Within plant	Six monthly or as directed by OSPCB	Manager (Environment and Health)
	Operation		Water Consumption	At all consumer points through water meter	Continuous	Head (Utility)
	Operation		Energy Consumption	At all consumer points through energy meter	Continuous	Head (Utility)

6.4 MONITORING METHODS AND DATA ANALYSIS

A continuous Emission Monitoring system will be provided at boiler stack to measure PM, SOx, NOx and CO for controlling emission level within norms. It is proposed to have additional three continuous on-line monitoring of ambient air quality (AAQ) at different locations outside the plant area. The pollutants monitored would be PM_{10}, $PM_{2.5}$, SO_2, NOx and CO, as per the MoEFCC Notification No. GSR 826(E) dated 16th November 2009. The AAQ stations sensors would be directly connected to the central monitoring system. These permanent AAQ monitoring locations would be suitably distributed based on maximum coverage by the downwind and exposure to human settlements.

6 - Environmental Monitoring Program (cont'd)

Additionally, O_3, NH_3, C_6H_6, BaP, Pb, As and Ni would be monitored manually. A permanent meteorological station would be set up to record dry bulb temperature, relative humidity (RH), wind speed, wind direction and rainfall. The wind sensor would be set up preferably at 10 m height above the ground without any surrounding hindrances that may affect free flow of wind.

Similarly, on-line continuous monitoring of pH, temperature, conductivity will be carried out. However, the other regular parameters such as chloride, fluoride, cyanide and iron and routine monitoring of plant effluent from the ETP would be carried out as per Guidelines for Water Quality Monitoring' (MINARS/27/2007-08) by CPCB to record TSS, TDS, BOD, COD, oil and grease and toxic heavy metals & trace elements.

Also, a Toxicity Characteristics Leaching Procedure (TCLP) test of generated slag would be carried out once a year. The TCLP test indicates presence of any heavy metals or toxic trace elements in waste which is leachable and guides in planning appropriate management measures so as to avert any secondary pollution in ground water table. Water and energy consumption trends would be monitored daily through water and energy meters.

6.5 ENVIRONMENTAL DATA PROCESSING SYSTEM

The monitored data would be recorded in a centralized database for trend analysis, compliance performance and planning for continual improvement and taking corrective actions. The Safety, Health and Environment (SHE) department will be equipped with a computerized supervision and monitoring system having the necessary hardware and software for data acquisition and support functions.

6 - Environmental Monitoring Program (cont'd)

The online monitoring systems shall be uplinked with the servers of OSPCB and CPCB and the data would be transmitted through internet based communication network.

6.6 REPORTING PROCEDURE

The rationale behind routine monitoring of environmental parameters is to have a continuous check whether the plant is running within the design target of emission norms, discharge norms of wastes release quality and its quantity. If there is any deviation from the design norms in all facilities, the shift-in-charge and the plant head would be cautioned and advised to rectify the operation of anti-pollution equipment/systems. If faults are not rectified within a reasonable timeframe, the issues need to be brought to the notice of higher management with a formal recording of the episode, duration, deviation from the design target, its impact on environment and remedial measures thereof.

Based on the routine performance monitoring of the pollution mitigation units, waste disposal, the SHE department will prepare short term planning of those systems falling short of the performance target. Planning will include preparation of performance database, compare with the allowable norms as per regulation and benchmark targets.

6.7 EMERGENCY PROCEDURES

In an emergency shutdown, all the safety precautions will be taken as per the procedure given by the respective equipment supplier.

7 - ADDITIONAL STUDIES

The outlines of the proposed project, the pre-project environmental status and the impact assessment along with proper mitigation measures have been duly addressed in the previous Chapters. This Chapter briefly encompasses the additional aspects that were also dealt upon while conducting EIA study for the proposed project.

7.1 DECARBONIZATION PROGRAM

In a specialty steel plant, it is important to note that almost each heat is a different steel grade since it is a 'Make to Order' business. Depending on the steel grade, emission intensity changes due to change in type & quantity of alloying elements viz. ferro alloys.

7.1.1 Estimation of Carbon Emission Intensity

Considering estimated consumption parameters for raw materials, fuels, gases, ferro alloys, electricity, in-plant electricity generation, consumables, fluxes etc., the estimated carbon footprint per ton of final product was derived based on methodology provided by World Steel Association (WSA).

The estimated carbon footprint is as follows:

Particular	Average Value (tCO_2/ton of Crude Steel)	Remarks
Scope 1	2.41 tCO_2/ton	Direct Emissions
Scope 2	0.11 tCO_2/ton	Indirect Emission due to electricity
Scope 1 + Scope 2	**2.52 tCO_2/ton**	

7 - Additional Studies (cont'd)

7.1.2 Industry Best Practices

Various decarbonisation and energy saving industry best practices shall be undertaken during the project implementation phase itself as follows:

Installation of Top Pressure Recovery Turbines (TRT's) at Blast Furnaces: The heat and pressure of the top gas of the blast furnace is used to drive a turbine generator which generates electricity. After the pressure is recovered, this blast furnace gas is further used as a fuel in the steelmaking process and/or in captive power plants. This gives an additional in-house power generation replacing fossil fuels and thereby reducing the GHG emissions.

Utilisation of Blast Furnace Gas (BFG): Blast Furnace Gas (BFG) is a byproduct of the iron-making process in a blast furnace. It is a low-calorific-value fuel that is rich in carbon monoxide (CO) and nitrogen (N_2), with smaller amounts of carbon dioxide (CO_2) and hydrogen (H_2). Though it has a low heating value (~700–900 kcal/Nm^3), it is widely used in steel plants for both reheating and energy generation purposes.

BFG will be used for following purposes:

Usage Area	Purpose	Benefits
Hot Blast Stoves	Heating air for blast furnace injection	Recycles energy, reduces external fuel consumption thereby helps in reduction of GHG emissions
Sintering Plant	Fuel for sinter strand burners	Reduces reliance on external fuel thereby helps in reduction of GHG emissions
Reheating Furnaces	Heating steel before rolling	Recycles energy, Replacing external fossil fuel consumption thereby helping in reduction of GHG emissions
Gas Turbines	Direct combustion of BFG to produce steam in a WHR boiler to use in a steam turbine to generate power	Recycling of energy for power generation thereby reducing dependence of external power requirement

7 - Additional Studies (cont'd)

WHR Coke Oven Power Plant: In the non-recovery-heat recovery coking process, coking coal is heated to high temperatures (around 1,200 - 1,300°C) in an oven to produce metallurgical coke, a vital input for the blast furnace. This process generates large amounts of hot flue gases because of burning of coal chemicals in the oven that is traditionally vent out as waste. A waste heat recovery (WHR) power plant captures this thermal energy from the coke oven flue gases to produce steam, which is then used to drive a steam turbine and generate electricity which helps in reducing usage of fossil fuels.

This helps in converting waste heat into usable power without extra fuel thereby reducing the GHG emissions.

Utilisation of Scrap generated in-house: Due to various downstream processes, the plant would generate good amount of scrap. Such scrap will be recycled during the steelmaking process thereby reducing the consumption of natural resources.

Waste Gas Recycling in Sinter Plant: In a sinter plant, the flue gas generated during the sintering process, which is rich in CO, is partially recirculated back into the sintering process through a WGRS hood after cleaning in an ESP. This helps reduce fuel consumption, lower emissions, and decrease the overall volume of stack gas released. By reusing waste gas, the system can also improve the efficiency of the sintering process.

Heat recovery from GCP Water-Cooled Duct: The hot water from water cooled duct is used in a Chilled Water Unit working with Vapour Absorption System to drive a refrigeration cycle. This system typically employs a refrigerant (often water) and an absorbent (like lithium bromide) to create a cooling effect. The process involves

evaporation, absorption, desorption (or regeneration), and condensation, all driven by heat. An air handling unit (AHU) installed at the space needing air conditioning, cools the air by a heat exchange with the chilled water, and cools the atmosphere.

This saves substantial electrical energy effecting an energy conservation and reduced carbon footprint.

7.1.3 Decarbonisation Plan

Multiple Decarbonization pathways have been envisaged considering Best Available Technologies across globe and their respective Technology Readiness Levels (TRL). The decarbonisation roadmap is divided into following parts:

Energy & Fuel Efficiency: Increasing energy & Fuel efficiency shall be a continuous target. As part of this initiative, best practices will be taken from many successful projects across the globe and replicated in the proposed project.

Optimal Raw Materials selection and use: The quality of iron ore and coking coal has a direct impact on energy intensity and CO_2 emissions. Industry best practices shall be implemented to ensure optimal quality of iron ore & coking coal which would significantly improve operational performance.

Yield Improvement: Yield improvement in steelmaking is a key decarbonisation pathway that focuses on reducing material losses across the production chain. By maximizing the conversion of raw materials into finished steel, it lowers energy consumption and associated CO_2 emissions per ton of output. The highest possible yield levels would be aimed for all the products.

7 - Additional Studies (cont'd)

Scrap based EAF Steelmaking: IASSP will have an EAF and ZPF in switchover mode. It means both ZPF and EAF shall be operated alternatively. This flexibility in operation would help produce steel with ultra-low emission intensity using Scrap as major input.

Use of Renewable Energy: The use of renewable energy is pivotal in the decarbonisation of the steel industry. In an integrated steel plant, majority of the power is generated in-house using WHR based Coke oven power plant, BF gas power plant, Top pressure recovery turbine in Blast furnace etc. However, total power generation is not sufficient to power the entire operations, hence there always be power purchased through the national grid which would largely be based on fossil fuels such as Coal. To reduce the Scope 2 emissions arising due to such purchased power, PPA with RE developers would be implemented for RE power purchase. Additionally, solar panels would be installed within the plant premises wherever possible in phase wise manner to completely shift the non-operational power such as streetlights, office, canteen etc. usage into RE power.

Green Hydrogen based DRI production: Green Hydrogen-based DRI making is an emerging low-carbon steelmaking route where green hydrogen is used instead of natural gas or Coke to reduce iron ore into sponge iron. The process emits water vapor instead of carbon dioxide, making it a clean alternative to traditional DRI.

Currently, globally and in India multiple pilot projects are underway along with construction of large-scale plant in Sweden.

7 - Additional Studies (cont'd)

Renowned technology suppliers & industry partners would be roped in to implement this technology in the plant basis the techno-economic viability of the same. It is expected that this technology shall be commercially available & viable in next 15-20 years for large scale adoption.

7.1.4 CO_2 Emission Intensity Reduction Plan

By integrating above technologies subject to their respective techno-economic feasibility & maturity into the plant's design and operations, the project aims to significantly lower its carbon footprint. These efforts will ensure compliance with future climate regulations. Overall, the initiative reflects a forward-looking & practical approach to decarbonisation and long-term operational resilience.

The project aims to reduce emissions to 1.98 tCO_2/tcs by 2036 and net zero by 2070 which aligns closely with India's national commitment to reduce emissions in the steel sector and achieve net-zero emission intensity by 2070. The decarbonization measures shall be implemented subject to availability and feasibility of the technology.

7.2 ENERGY CONSERVATION MEASURES

Renewable energy is an energy that comes from resources which are naturally replenished on a human time scale such as sunlight, wind, rain, tides, waves and geothermal heat. Renewable energy should replace conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels, and rural (off-grid) energy services. Renewable power generation can help meeting the sustainable development goals through provision of access to clean, secure, reliable and affordable energy.

7 - Additional Studies (cont'd)

Energy conservation measures would be enhanced to ensure that the use of non-renewable resources is minimised. A key component of achieving energy conservation would be the development of an Energy Management Action Plan. This plan would be included as part of the Construction and Operational EMPs. The Energy Management Action Plan would be consistent with the energy conservation measures during both construction and operation phase.

Energy Conservation during Construction Phase: The following mitigation measures would be undertaken during construction works.

i) Efficient work scheduling and methods that minimise equipment idle time and double handling of material

ii) Throttling down and switching off construction equipment when not in use

iii) Switching off truck engines while they are waiting to access the site and while they are waiting to be loaded and unloaded

iv) Switching off site office equipment and lights and using optimum lighting intensity for security and safety purposes

v) Careful design of temporary roads to reduce transportation distances

vi) Regular maintenance of equipment to ensure optimum operations and fuel efficiency.

Energy Conservation during Operation Phase: The following mitigation measures would be implemented during site operations.

i) Design of buildings and terminal layout would aim to achieve the following energy efficiencies:

   a) Employing renewable energy sources such as day lighting and passive solar heating

7 - Additional Studies (cont'd)

a) Designing roads on the site to reduce transportation distances.

Energy Efficient Equipment: Large energy savings could be achieved in using energy efficient equipment. The following actions are examples of how energy savings could be achieved by the terminal operator(s):

i) Using energy efficient electrical appliances

ii) Installing LED lighting control devices where appropriate and linking to photo-electric dimming; and

iii) Providing sufficient energy metering and switching for energy management.

Energy would also be conserved through efficiency in work schedules and practices such as:

i) Use of modern container yard management systems for the efficient stacking and retrieval of containers and to minimise vehicles waiting times

ii) Road transport scheduling to minimise energy use and wastage, e.g. increasing back loading and minimising waiting times;

iii) Regular maintenance of all powered equipment to ensure appropriate fuel consumption rates; and

iv) Communication and education of energy conservation measures to employees.

7.3 MEASURES TAKEN TO AVOID GENERATION OF SINGLE USE PLASTIC

KSL has a single use plastic policy approved by the MD. Policy guidelines aims at investing in and promoting the use of single use plastic and other more sustainable alternatives. The plastic use policy is enclosed as Appendix 7-1.

7 - Additional Studies (cont'd)

7.4 CER AND VILLAGE ADOPTION

KSL would adopt the two nearest villages Talabarkote and Siaria with a projected expenditure of INR 43 crore. The tentative activities are shown in Table 7-1. This would be fine tuned post public hearing to address the PH demands.

TABLE 7-1 - TENTATIVE ACTIVITIES

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)	Year-wise Budget Deployment Schedule (INR Cr)				
			Y1	Y2	Y3	Y4	Y5
1	Concrete Drain	Garland drains with catch pits will be constructed surrounding the solid wastes storage sites to contain run-offs thus preventing it from carrying sediment and other pollutants into surrounding water bodies	1.5	1.5	1.5	1.5	1.5
2	Solar Street Lighting	Establishmen of 250 No of solar lighting units with battery storage in nearby villages including Talabarkot & Siaria	0.5	0.5	0.5	0.5	0.5
3	Kalyan Mandap	Construction of 2 Kalyan Mandaps - 1 each in Talabarkot & Siaria Village	1.4	1.4	1.4	1.4	1.4
4	Support to Existing Aaganwadi	One time support (INR 3 L) for each Aanganwadi to improve their existing operational facilities	0.1	0.1	0.1	0.1	0.1
5	Support to Existing Self-Help Groups (SHGs)	One time support (INR 3 L) for each SHG to improve their existing operational facilities	0.1	0.1	0.1	0.1	0.1
6	Support to Existing Youth Clubs	One time support (INR 10 L) for each Youth Club to improve their existing facilities & infrastructure	0.1	0.1	0.1	0.1	0.1
7	Primary Schools (upto 5th Class)	Strengthening of library in existing village schools Up gradation of existing village schools by providing Chair, table & black board etc. Facilitation & Upgradation of Existing School Infrastructure	0.2	0.2	0.2	0.2	0.2

7 - Additional Studies (cont'd)

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)	Year-wise Budget Deployment Schedule (INR Cr)				
			Y1	Y2	Y3	Y4	Y5
8	High Schools	Establishment of fully functional computer center (upto 20 systems) in each existing high school with online learning facilities	0.3	0.3	0.3	0.3	0.3
9	Graduate/Post Graduate Colleges (within 10 km radius of project site)	Upgradation of online learding facility by acquiring new subscriptions and softwares	0.1	0.1	0.1	0.1	0.1
10	Public Health Center (PHC)	Addition of Critically Required Infrastructure: X-Ray Unit, ECG Unit, Ultrasound Unit & Blood Bank. Health care facilities will be upgraded/established in consultation with local & state level authorities.	0.8	0.8	0.8	0.8	0.8
11	Auxiliary Nurse and Midwife (ANM) Centers	Addition of new infrastucture: NICU for new born babies.	0.1	0.1	0.1	0.1	0.1
12	Bus Shelters	Construction of 6 new bus shelters at locations identified within 10 km raidus from the project site	0.1	0.1	0.1	0.1	0.1
13	Drinking Water (ground water) - Handpumps with water filtration facilities	Construction of 4 new filtered drinking water facilities at locations identified within 10 km raidus from the project site	0.0	0.0	0.0	0.0	0.0
14	Welcome Entry Gates for Villages	Construction of entry gates for project area villages - Talabarkot & Siaria	0.5	0.5	0.5	0.0	0.0
15	Upgradation & restoration of Jagganath Temple	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
16	Upgradation & restoration of Shiv Temple	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
17	Upgradation & restoration of Sidha Ramchandi Temple	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
18	Upgradation & restoration of Shani Temple	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
19	Upgradation & restoration of Mangla Temple	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
20	Upgradation & restoration of Ram Mandir	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
21	Upgradation & restoration of Masjid	Upgradation & Restoration	0.1	0.0	0.0	0.0	0.0
22	Development of Ponds (2 Nos) with rain water Collection	Renovation and upgradation of 2 existing perennial ponds in Talabarkot Village	1.0	1.0	1.0	1.0	1.0

7 - Additional Studies (cont'd)

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)	Year-wise Budget Deployment Schedule (INR Cr)				
			Y1	Y2	Y3	Y4	Y5
23	Multi purpose Sport Complex	Establishment of Multi-purpose sports complex within Talabarkot village (Land to be provided by Govt of Odisha)	0.3	0.3	0.0	0.0	0.0
24	Children Play Complex	Establishment of Children Play complex within Talabarkot village (Land to be provided by Govt of Odisha)	0.2	0.2	0.0	0.0	0.0
25	Solid Waste Managemant	Solid wastes to be stored in suitably lined & earmarked storage yard to avoid leaching through soil bed leading to contamination of ground water.	0.1	0.1	0.1	0.1	0.1
26	Skill Development Center	Establishment of advanced manufacturing skill development center in collaboration with the Skill development Dept, Govt of Odisha within 10 km radius of project site.	0.8	0.8	0.8	0.8	0.8
		Skill development training on civil & construction, mechanical maintenance, welding, electrician, machinery, carpentry etc. Skill development for women empowerment - training programmes in nursing, tailoring, textiles, craft and online sales	0.2	0.2	0.2	0.2	0.2
27	Upgradation of Agricultural Skills for better livelihood	Collaboration with CRRI (Indian Council of Agricultural Research - Directorate of Cashew Research) to develop value maximization strategies for local villagers from existing cashew plantations in the surrounding areas.	0.20	0.00	0.00	0.00	0.00

7 - Additional Studies (cont'd)

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)	Year-wise Budget Deployment Schedule (INR Cr)				
			Y1	Y2	Y3	Y4	Y5
28	Swatchh Bharat Abhiyan	Management of solid waste and effluents colection from village house holds & garbage collection vehicle for garbage lifting and transportation to identified dump yard created by Govt. of Odisha. Construction of common use toilet facilities in 2 adopted villages as well as nearby villages. Total population to be impacted - approx 4000 people	0.5	0.5	0.5	0.5	0.5
29	Tuberculosis Elimination Movement	Support to the Tuberculosis Elimanation Movement in the Dhenkanal District	0.1	0.1	0.1	0.1	0.1
	Total Corporate Environmnetal & Social Responsi-bility Expense (INR Cr)	**43**	**10**	**9**	**8**	**8**	**8**

7.5 ENVIRONMENTAL RISK ASSESSMENT

Environmental risk assessment is a systematic approach for identification, evaluation, mitigation and control of hazards that could occur as a result of failures in process, procedures, or equipment. Increasing industrial accidents, loss of life & property, public scrutiny, statutory requirements and intense industrial processes all contribute to a growing need to ensure that risk management is conducted and implemented.

Industries have recognized the significance of Safe Working Environment and are progressively trying to prevent hazardous events, avoid production & manpower losses and other fallouts associated with industrial accidents by conducting risk assessment, onsite & off-site management plan and adopting the safety measures. This also assists industries to enhance employee knowledge of operations, improve

technical procedures, maintain accurate process safety information and increase overall productivity. This Chapter gives an outline of the associated environmental and other risks, their assessment and remedial measures. It also describes an approach for emergency planning to be adopted by the Plant management.

7.5.1 Objectives

The objectives of environmental risk assessment are governed by the following, which excludes natural calamities:

a) Identifying the potentially hazardous areas so that adequate safety measures can be adopted to reduce the likelihood of accidental events.

b) Identifying the stakeholders and evaluating their risk along with proposing adequate control techniques.

c) Managing emergency situations or a disastrous event, if any, during the plant operation.

7.5.2 Definition of Environmental Risks

The following terms related to environmental risks are defined before reviewing the environmental risks:

Harm	..	Damage to person, property or environment.
Hazard	..	Situation that poses a level of threat to life, health, property, or environment. A hazardous situation that has come to pass is called an incident. Hazard and possibility interact together to create risk. An environmental hazard is thus going to be a set of circumstances, which leads to direct or indirect degradation of the environment and damage to life and property.
Risk	..	The probability of harm or likelihood of harmful occurrence and its severity. Environmental risk is a measure of the potential threats to the environment, life and property.

7 - Additional Studies (cont'd)

Consequence	..	Effect due to occurrence of the event, which may endanger the environment permanently or temporarily and, or loss of life and property.
Environmental Disaster	..	The consequence can extensively damage any one or all the four components of the environment namely, (i) physico-chemical, (ii) biological, (iii) human and (iv) aesthetics

7.5.3 Environmental Risk Evaluation

Environmental Risk Evaluation acts as a scrutinizing vehicle for establishing the priority in risk management that concerns human health, loss of productivity and environmental quality in general. The proposed facility would have installations, such as, storage and handling of fuel oil and fuel gases which would be under the purview of Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and its amendments thereof.

Risk is the determination of likelihood and severity of the credible accident/event sequences in order to determine magnitude and to priorities identified hazards. The likelihood of occurrence & Severity of consequence are described as follows:

Likelihood (L)	**Description**	**Rating**
Most Likely	Expected in normal circumstances	5
Likely	Likely to occur in normal circumstances	4
Possible	May occur in normal circumstances	3
Unlikely	Remote chance of occurrence but conceivable	2
Inconceivable	Not conceivable even in future	1
Severity (S)	**Description**	**Rating**
Catastrophic	Casualties, Disastrous Environmental damage, financial loss (>1000 crore)	5
Major	Major injuries & Environmental damage, financial loss (>100 crore)	4
Moderate	Moderate injuries & Environmental damage, financial loss (>10 crore)	3
Minor	Minor injuries & Environmental damage, financial loss (>1 crore)	2
Insignificant	No injuries & Environmental damage, financial loss (>0.1 crore)	1

7 - Additional Studies (cont'd)

Risk assessment is done using qualitative method with likelihood & severity as indicators and the Risk Potential is presented in form of a matrix below. Risk can be calculated using the following formula:

L x S = Risk Potential (R)

Likelihood (L)	Severity (S)				
	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

High Medium Low

The relative risk potential can be used to prioritize necessary actions to effectively manage hazards as per the risk value defined below:

Risk	Risk priority	Action
15-25	High	Immediate action
5-12	Medium	Planned approach required to mitigate the risk
1-4	Low	Immediate action may not be required but should be controlled gradually

Events categorized under "High Risk" must have immediate actions, to resolve risk to life and/or the environment. Department/ Personnel responsible for actions must be clearly identified including demarcation of proper follow-up procedure. A further detailed risk assessment method such as quantitative risk assessment may be required to determine suitable controls measures.

Based on the above stated criteria for assessing the risk, a summarized list of environmental risk potential for the likely events is presented in Table 7-2.

7 - Additional Studies (cont'd)

This assessment is based on experience in the operation of existing plant, similar installations and best practicable designs for the proposed project. The present risk potential evaluation is primarily based on human errors or faulty operation or failure of the control systems.

TABLE 7-2 - ENVIRONMENTAL RISK POTENTIAL EVALUATION

Sl. No.	Event	Rank			
		Likelihood of occurrence	Likelihood of detection	Severity of consequence	Risk potential
i)	Fuel gas leaks from the pipe line/valves/gas holders	Very Low (1)	Low (4)	High (10)	40
ii)	Propane storage and handling	Very low (1)	High (2)	High (10)	30
iii)	Unsafe disposal of oily wastes of Rolling Mills	Moderate (3)	Low (4)	Moderate (8)	56
iv)	Occurrence of static electricity/electric spark in the Mill Cellar Room	Very low (1)	Very low (5)	High (10)	60
v)	Leakage of acids/ alkalis	Low (2)	Very low (5)	Moderate (8)	56
vi)	Uncontrolled dust emissions/failure of emission control system	High (4)	Moderate (3)	Moderate (8)	56
vii)	Failure of Gas Cleaning Plant/Fume Extraction System	Moderate (3)	High (2)	High (10)	50
viii)	Wet scrubbers running dry	Low (2)	Moderate (3)	High (10)	50
ix)	Oil wastes/oil sludge handling	Low (2)	High (2)	Moderate (8)	32
x)	Collapsing of Gas Holder	Very low (1)	High (2)	High (10)	30
xi)	Splashing of molten metal and slag	Low (2)	Very High (1)	High (10)	30
xii)	Release of untreated wastewater	Low (2)	Very high (1)	High (10)	30
xiii)	Collapsing of acid/ alkali storage tanks	Very low (1)	High (2)	High (10)	30

7 - Additional Studies (cont'd)

From the Table 7-2, it appears that some events carry risk potential above 50. These would be considered as hazardous events, where effective safe-design for operation and maintenance is highly essential to reduce the risk. As risk from fuel leaks is maximum, has the maximum severity of consequence, consequence modeling for leakage blast furnace gas holder and BOF gas holder has been carried out using DNV Phast Lite 7.1 to quantify the extent of the impact from these events.

For BF and BOF gas holders, toxic exposure from failure of gas holders has been considered due to relatively high concentration of Carbon monoxide gas in BF and BOF gas.

Fig. 7-1 shows the maximum concentration footprint of leaked gas from catastrophic rupture of the BF gas holder. The concentration of interest (555 ppm) corresponding to the STEL value of BF gas extends up to a maximum distance of around 1,550 m downwind.

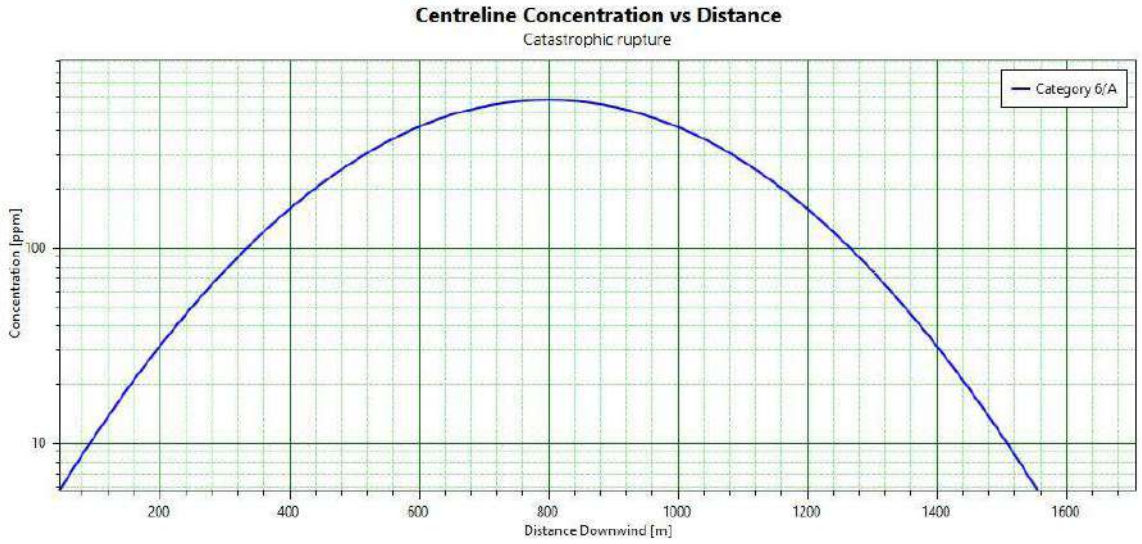


FIG. 7-1 - MAXIMUM CONCENTRATION FOOTPRINT FOR BF GAS HOLDER

7 - Additional Studies (cont'd)

Fig. 7-2 shows the maximum concentration footprint of leaked gas from catastrophic rupture of the LD gas holder. The concentration of interest (151.5 ppm) corresponding to the STEL value of LD gas extends up to a maximum distance of around 640 m downwind.

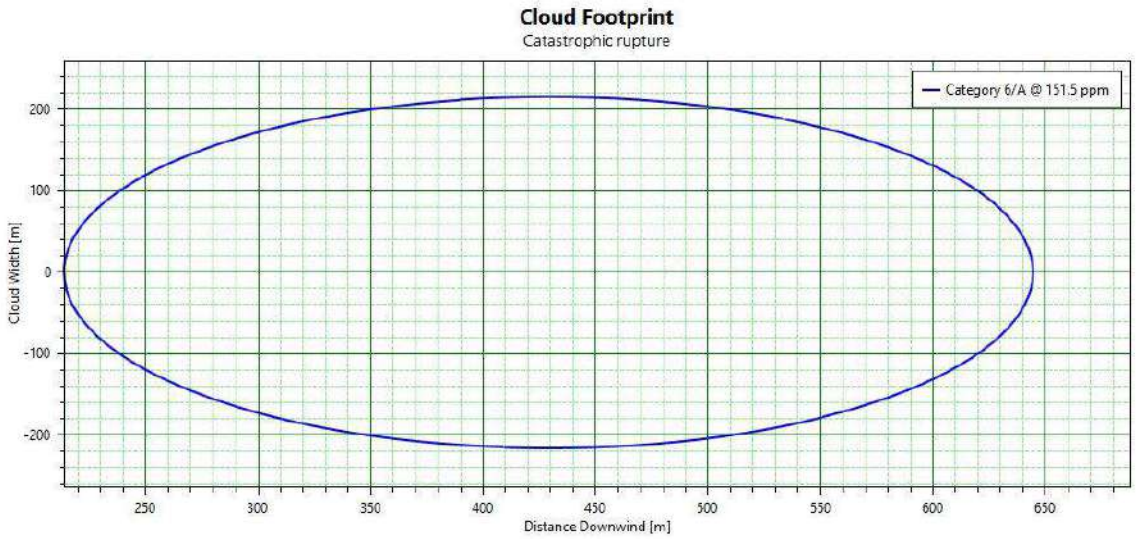


FIG. 7-2 - MAXIMUM CONCENTRATION FOOTPRINT FOR LD GAS HOLDER

A HAZOP Study for the selected units/areas needs to be undertaken at the 'design-freeze' stage, when P&I diagrams, shop layout drawings, control logic diagrams, technical specifications etc. are made ready. For these areas, 'Fault Tree Analysis' of the failure of equipment/ valve component or due to human error can be carried out to assess more realistically the risk involved and draw up final management measures.

7.6 ON-SITE AND OFF-SITE DISASTER PREPAREDNESS EMERGENCY MANAGEMENT PLAN

Emergency planning is an integral part of the overall loss control program and is important for effective management of an accident to minimize the losses to the people and property, both in and around the facility.

7 - Additional Studies (cont'd)

7.6.1 Emergency Command Structure

The emergency command structure of KSL is described in details in the following section.

Works Main Controller (WMC): He is Head of the works and is generally available in the factory except on tour. On emergency, he can reach work site at any odd hour within short time.

On being informed of an incident, he must:

i) Rush to the Emergency Site, collect all information from SIC.

ii) Decide if emergency is to be declared and advise Site Incident Controller (SIC) accordingly and reach Emergency Control Room (ECR).

iii) Advise Rescue Team Leader (RTL)/Security Gate to blow the wailing siren with appropriate code for declaration of emergency.

Type	Duration
Normal Factory Siren	Continuous Siren for 1 Minute ONLY ONCE
In case of Fire	30 Sec ON and 15 Sec OFF - 2 Times
For Heavy BFG/ LDG Leak	30 Sec ON and 15 Sec OFF - 3 Times
All clear signal	Continuous Siren for 2 Minutes ONLY ONCE

Release of gases:

i) Advice (Auxiliary Team Leader) ATL for communication to statutory authorities and for mutual aid as required.

ii) Through (Auxiliary Team Leader) ATL ensure constant communication to Statutory Authorities and to mutual aid partners as required.

iii) Maintain continuous communication with Site Incident Controller (SIC) to review the situation and assess the possible course of action for emergency operations.

iv) To declare normalcy at the end of operation and advise Rescue Team Leader (RTL)/Security Gate to blow "all clear siren" as mentioned above.

7 - Additional Studies (cont'd)

v) Ensure the record keeping of emergency operations chronologically.

Site Incident Controller (SIC): He is available at the factory or in his residence near by the factory. After getting the information at any point of time and on being informed about the incident, he has to:

i) Intimate the Works Main Controller (WMC) and proceed to the emergency site.

ii) Take the necessary instruction from Combat Team Leader (CTL), assess the situation and call Rescue Team Leader (RTL) and Auxiliary Team Leader (ATL).

iii) Inform Works Main Controller (WMC) regarding the situation.

iv) Take necessary steps and provide guidance to Combat Team, Rescue Team, and Auxiliary Team Leader to mitigate the emergency situation.

v) Examine for major emergency shut down operation activities, decide safe escape routes and announce for evacuation to Assembly Point.

vi) Inform Works Main Controller (WMC) about the status of the situation at regular intervals.

Combat Team Leader (CTL): He is the leader to attend to the emergency and should be available in the factory or nearer to the factory site.

On being informed about the incident, he has to immediately activate his team member to meet the emergency situation.

i) Immediately rush to the site and lead the team to control the situation.

ii) Inform Site Incident Controller (SIC) about the incident and ask him for rushing to the Spot immediately.

7 - Additional Studies (cont'd)

iii) Instruct the Rescue Team Leader (RTL) for rescue and medical assistance.

iv) Co-ordinate the activities of team members and combat the emergency, so as to eliminate the route cause of the hazard.

v) Shut-down the plant if necessary to take up repair measures.

vi) To arrest the leakage and spillage from various equipment, shut down the concerned equipment.

vii) Take necessary action to remove unwanted persons from the site of the incident.

viii) Keep informed about the developments to Site Incident Controller (SIC).

Rescue Team Leader (RTL): He is the person who conducts rescue operations and should be available at any instant. On receiving the information about the incident he has to:

i) Rush to the site of emergency through safe route.

ii) Ensure presence of all his team members, availability of air breathing apparatus, resuscitation equipment/ firefighting equipment and take necessary action to arrest the fire/gas leakage.

iii) Arrange for safe escape of entrapped persons.

iv) Make necessary arrangements to send the affected persons for immediate medical attention through the medical officer.

v) Search for the missing persons on the basis of role call taken by Auxiliary Team Leader (ATL).

vi) Give the feedback to the Site Incident Controller (SIC) about the developments.

7 - Additional Studies (cont'd)

Auxiliary Team Leader (ATL): He is the communication manager for the crisis management. On being informed of the emergency, he should proceed to Emergency Control Room (ECR) and

i) Keep in constant touch with Works Main Controller (WMC) and Site Incident Controller (SIC).

ii) Inform the Statutory Authorities and District Administration.

iii) Communicate to Mutual Aid Partners i.e. the nearby industries with whom prior mutual understanding have been made, Fire service stations at J. K. road.

iv) Send communications to hospitals at Dhenkanal and Athagarh for rendering emergency medical services.

v) Inform the relatives of causalities and send them to their residence or hospital as the case may be.

vi) Take roll call to find out the list of missing persons on the work spot.

vii) Take care of visit of the authorities to the Emergency Site.

viii) Give feedback to Works Main Controller (WMC) about the status with respect to his areas of activities.

7.6.2 Action Plan for Fire Hazard/Release of Toxic Gases

Action plan for fire hazard/release of toxic gases is shown in Table 7-3.

7 - Additional Studies (cont'd)

TABLE 7-3 - ACTION PLAN FOR FIRE HAZARD/RELEASE OF TOXIC GASES

Step No.	Initiator	Action to Take
1.	The person noticing the emergency	In case of fire shout FIRE, Fire, Fire and in case of Gas Leak shout gas leak... gas leak and inform to the concerned Shift-in-charge who in turn will inform to Combat Team Leader immediately regarding the fire hazard.
2.	Combat Team Leader (CTL)	Informs Site Incident Controller (SIC) through common dialing system and rush to spot for combating the situation. Take charge of the situation, arrange for evacuation of people not directly concerned. Organizes for trained personnel equipped with firefighting appliances and call for fire tender at the place of fire. Start combating, shutting down equipments and takes steps to extinguish fire with fire fighting facilities. Finds out the root cause of fire and to take necessary action for prevention of fire. To find the root cause of gas leak and isolates the identified segment by isolating valves putting on appropriate breathing apparatus.
3.	Site Incident Controller (SIC)	Inform Works Main Controller (WMC) and rushes to Site. In case of failure of electronic communication system, the standby available provision for runner with bike will be there to pass on the command as advised. Discusses with Combat Team Leader (CTL), assesses the situation and calls the Rescue Team Leader (RTL) & Auxiliary Team Leader (ATL). Informs to the Rescue Team leader, and Auxiliary Team leader to send the Rescue Team to site. Arranges to evacuate the unwanted persons and calls for additional help. Time to time to pass information to the Works Main Controller (WMC) about the situation at site.

7 - Additional Studies (cont'd)

Step No.	Initiator	Action to Take
4.	Works Main Controller (WMC)	Rushes to Emergency Site and observe the ongoing activities. Takes stock of the situation in consultation with the SIC. Moves to Emergency Control Room. Takes decision on declaration of emergency and ask for emergency wailing siren. Advises Auxiliary Team Leader to inform the statutory authorities and seek help of mutual aid if required. Decides on declaration of normalcy of emergency after combating the situation. Ensures that the emergency operations are recorded chronologically.
5.	Rescue Team (RTL)	Consults with Site Incident Controller (SIC) and Rush to Emergency Site through safe route along with the team members and start the rescuing work. Shifts the injured persons to hospital by ambulance after providing necessary first aid. Informs the Auxiliary Team Leader for necessary help from Mutual Aid Partners.
6.	Auxiliary Team (ATL)	On being directed by Works Main Controller (WMC) informs about the emergency to Statutory Authorities depending upon the situation. Seeks help of Mutual Aid Partners and Coordinate with Mutual Aid Partners to render their service if required. Takes role call to find out the missing persons if any. Arranges to inform the relatives of Casualties. Takes care of visit of the authorities to the Emergency Site.
7.	Team Members	Each of the team members should follow the instruction of concerned team leader to mitigate the emergency.
8.	Head Safety	He has the overall responsibility to keep liasion with every one of command structure for smooth operation of Onsite Emergency situation.

7 - Additional Studies (cont'd)

7.6.3 Silent Hour Command Structure

Silent Hour is the time when the Works Men Controller (WMC), Site Incident Controller (SIC), Auxiliary Team Leader (ATL), Combat Team Leader (CTL) & Rescue Team Leader (RTL) are not available at site i.e. after the general shift hours.

The command structure for the silent hour is as given below but the action plan is same as during normal hour.

i) Since WMC, SIC, CTL, RTL & ATL may not be available inside the plant, they shall be informed by the SIC In-Charge either by telephone or by sending special messengers to their residences.

ii) On receiving the information WMC, SIC, CTL, RTL & ATL shall reach the site immediately & simultaneously take actions to ensure the presence of their respective team members.

There after the action plan as well as the role of key person shall be same as the normal hour execution of Command Structure.

7.6.4 Activation and Closing Procedure for ON-site Emergency

Activation procedure:

i) The person noticing the incident of Fire/Toxic release shall inform about the location & nature of Fire/Toxic Release of Gas to the Security Gate and concerned Shift-in-charge, who in turn shall inform Combat Team Leader (CTL).

ii) Combat Team Leader (CTL) shall inform Site Incident Controller (SIC) and shall rush to the site immediately. He shall arrange for firefighting and first aid available at site. He shall arrange to take necessary steps to eliminate the root cause of fire/toxic release. If it is a case of toxic release he should arrange adequate No. of breathing apparatus and try to isolate the dangerous of leakage.

7 - Additional Studies (cont'd)

iii) Site Incident Controller (SIC) on getting information shall inform the WMC and reach the site at the earliest. He shall take over the charge and shall direct Rescue Team Leader (RTL) to carry out rescue and evacuation operations including firefighting and medical attention. Site Incident Controller (SIC) shall co-ordinate with Combat Team Leader (CTL) to eliminate the root cause of fire/toxic release.

iv) Works Main Controller (WMC), on arrival at site shall take stock of the situation from Site Incident Controller (SIC) and then rush to Emergency Control Room (ECR) to declare emergency on the basis of assessment made by (Site Incident Controller (SIC). He shall give direction to the Security Gate/(Rescue Team Leader) RTL to activate siren.

Rescue Team Leader (RTL) shall mobilize resources for firefighting and toxic release abatement to site and shall assist (Site Incident Controller) SIC.

i) Chief of Security and (member of Rescue Team) shall co-ordinate the safety aspects of emergency rescue teams. He shall ensure safety of all working personnel and equipments etc.

ii) Auxiliary Team Leader (ATL) shall take charge of Emergency Control Room (ECR), shall ensure smooth operation of ECR and shall inform relatives of casualties. Informs Mutual Aid Partners and ensures their arrival at site if required.

iii) Auxiliary Team Leader (ATL) informs statutory authorities and district administration regarding emergency suitably and coordinates their visit at site.

iv) Works Main Controller (WMC) coordinates and keeps the track of all the activities at site and off the site and arranges the recording of the activities in a chronological manner for review of the On Site Emergency Plan.

Closing procedure:

i) Works Main Controller (WMC) shall declare normalcy after full control of the emergency situation.

7 - Additional Studies (cont'd)

ii) Works Main Controller (WMC) shall direct Auxiliary Team Leader (ATL)/Security Gate to blow "all clear siren continuously for duration of two minute".

iii) Information is sent to statutory authorities by Chief of Personnel.

iv) Information is given to police (if required) & local authorities by ATL.

v) Analysis of emergency and future precautionary measures shall be taken up by the On-Site Emergency Plan Committee consisting of following members: WMC, SIC, ATL, CTL, RTL, Chief of Safety and fire, and Chief of Security. Review of On Site Emergency Plan (if required) shall be done by the above Committee. Revision shall be approved by Work Main Controller (WMC) for implementation

Assembly Point: In any emergency it will be necessary to evacuate people from affected Zones or the zones likely to be affected, to a safer place. Safer places are identified and designated as Assembly Points. Taking the area and hazard zones into consideration three assembly points have been marked in three areas i.e. one near the SMS Area (Assembly Point -1), one near the Site Office (Assembly Point - 2) and near Administrative Building (Assembly Point - 3). All the three points are well connected to the plant road and facilities like drinking water, temporary shelter and first aid is available. These points have been well marked in the layout map as well as in the factory.

Escape Route: Escape routes are those that allow reasonably safe passage of persons from the work area to the assembly point during emergency situation. These routes would be different depending on wind direction, Fire and explosion scenario. Escape routes are marked on the drawings as well as on the routes, which will facilitate all for safe evacuation. Wind shocks fixed a height to indicate the wind direction, guides the persons to take safe escape routes.

7 - Additional Studies (cont'd)

Emergency Control Room: The emergency Control Room is a place for which all emergency management operations are directed and coordinated. Also, it is the place from where all communication will be established, with outside agencies and district authority also. The location of Emergency Control Room is mark done the plot plan.

Note: Mock drill is to be conducted half yearly for updating any modification/which is to be approved by the Director of Factories & Boilers, finally it is to be incorporated in the on-site revised report.

7.7 REHABILITATION AND RESETTLEMENT PLAN

The land for the proposed project would be handed over to KSL in an encumbrance free manner and therefore does not involve R&R under the purview of KSL.

8 - PROJECT BENEFITS

The proposed project would entail an investment of Rs. 11,058.00 Crores. A part of the total investment amount would be allocated towards socio-economic upliftment activities after the Public Hearing is conducted. The implementation of the proposed project of KSL in Dhenkanal District of Odisha would be beneficial to the society of the region. Due to the investment in the Project, the overall importance of the area will increase substantially. Such a project is also expected to accelerate the rate of peripheral development.

8.1 ENVIRONMENTAL AND SOCIAL BENEFITS

The project would lead to acceleration of infrastructure development like improvement in the existing road condition for catering to the requirement of the plant operation and proposed project. It will further improve transport facilities like roads, railways and local transport facilities in the plant & adjoining areas.

The project will additionally create community infrastructures like installation/repair of hand pumps and bore wells, de-siltation and deepening of dug wells, recreational spaces such as parks, playgrounds, community halls etc.

Initiatives like urban plantation would improve the ecology and air quality of the region.

This greenfield project would lead to the following significant socio-economic development:

i) The proposed project is expected to bring more shopping facilities, hotel & restaurant, education facilities etc. in the region.

8 - Project Benefits (cont'd)

ii) Promote industrial, vocational and livelihood training programmes for local youth leading to diversification in skill set

iii) Address issues related to potable water

iv) Contribute to local economy through generation of local income, enhancement of purchasing power and boost in local land prices

8.1.1 Socio Economic Upliftment Activities

As per MoEFCC OM dated 30th September 2020, Corporate Environment Responsibility (CER) has been replaced with monitorable physical activities for addressing issues raised during the Public Hearing (PH) and issues arising from needs assessment during SIA study. The total expenditure towards Socio Economic Upliftment activities as part of Environmental Management Plan for the proposed project shall be determined after Public Hearing.

8.2 EMPLOYMENT POTENTIAL

8.2.1 Direct and Indirect Employment

For the proposed project during the construction and operation phases both permanent & contractual workers would be required. Total workers required for different projects are given below:

Manpower	Construction Phase	Operation Phase
Permanent	500	3,000
Contractual	12,000	7,200

Local people will be given the preference in employment as per their skill and qualification. This will enhance the present socio-economic status of the local people.

8 - Project Benefits (cont'd)

8.2.2 Other Indirect Employment

The project is also expected to create opportunities for indirect employment in the form of drivers and attendants of new trucks & passenger carrying vehicles, plumbers, electricians, security personnel and masons. Ancillary growth of shop establishments (like that of grocery shops, garment shops, furniture shops), medical stores etc. will also create opportunities for indirect employment.

8.3 OTHER TANGIBLE BENEFITS

i) Apart from contributing to the local economy, the project would lead to direct and indirect revenue generation for both State and Central Government through road tax, income by registration of trucks and trailers, income tax, corporate tax etc.

ii) Corporate Responsibility for Environmental Protection (CREP) for the steel industry would be fully complied. This would result in low emissions, water conservation, recycling of treated wastewater, solid waste management etc. resulting in the low cost of production.

9 - ENVIRONMENTAL COST BENEFIT ANALYSIS

Financial appraisal has been done based on the capital and production costs for crude steel production of 1.43 MTPA.

Salient techno-economic indices are presented in the table below.

Financial Metrics	Total Capacity - 1.43 MTPA	
	Phase 1 - 0.67 MTPA	Phase 2 - 0.76 MTPA
Project IRR (Pre-Tax)	13.5%	13.1%
Equity IRR (Pre-Tax)	28.4%	29.2%
Payback Period in years, after commissioning (Post Tax)	6.5	6.2
EBITDA % (Average)	21.7%	21.9%
Net Present Value (INR Cr.)	2,519	3,559

Note: Project scoping and detailing are being finalised and based on the detailed project configurations during detail engineering, the financials may undergo a change.

10 - ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This Chapter describes the administrative aspects covering organizational structure for effective implementation of mitigation measures recommended for the proposed project. It also covers occupational health care of plant personnel and workers.

10.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proposed management measures for pollution control and environmental management in the project area are provided in Chapter 2 and Chapter-4. Besides maintaining the existing EMPs, the proposed future EMPs would be implemented before commencement of operations of various phases of project. Monitoring of all EMPs would be carried out by submission of compliance report to MoEFCC on a six- monthly basis.

Some of the specific EMP's are elaborated in the following sections.

10.1.1 Action plan for Solid & hazardous waste management

The action plan adopted for solid & hazardous waste management have been discussed in Section 2.5.4 of Chapter 2 & in Section 4.6.8 of Chapter 4.

10.1.2 Effluent management plan

The action plan adopted for effluent management has been discussed in Section 2.5.3 of Chapter 2.

10 - Environmental Management Plan (EMP) (cont'd)

10.1.3 Action plan for e-waste management

The ESH department will prepare, maintain and routinely update the inventory of 'E-Waste' that is generated from various units within the plant and facilitate & ensure its proper disposal to 'E-Waste' management agency at periodic intervals. E-waste would be handed over to authorised recyclers as laid down in E-waste management Rules, 2016 and its subsequent amendments.

10.1.4 Action plan for plastic waste management

Necessary steps would be taken for segregation and handling of plastic wastes as per provisions laid down in Plastic Waste Management (Amendment) Rules, 2022 generated from the plant. Once the wastes are segregated, it will be handed over to the registered recycler for further processing. KSL also has a Plastic Usage Policy as mentioned in Chapter 7.

10.1.5 Action Plan for Construction & Demolition Waste Management

Construction & demolition wastes shall be segregated at source and shall be mostly reused within the plant for land filling & site leveling activities. The rest shall be sold to external agencies for secondary use. Details of management measures of C&D waste are elaborated in Section 4.5.2 of Chapter 4.

10.2 RAINWATER HARVESTING PLAN

In an effort to conserve water resources, it is strongly recommended that an industry adopt rainwater harvesting system in an extensive way. Other than improvement in groundwater situation in the area by adopting appropriate rooftop rainwater harvesting and artificial recharge measures, the harvested water can also be stored in tank to meet part of the plant make-up water requirement and utilized for firefighting and green belt development.

10 - Environmental Management Plan (EMP) (cont'd)

The technique of collection and storage of rainwater for industrial use is now a successful concept, especially as it helps to preserve/recycle an important natural resource like water. Rainwater harvesting (RWH) measures at plant site from roof-tops and storm water drains would be used for storage for further use in various secondary purposes within the plant. During the monsoon season, surface runoff from the plant would flow through the drains and get collected in the RWH structure. The impounded water would conserve fresh water, reduce the overall water requirement from other sources and also serves as water source during lean season.

Rooftop rainwater harvesting will be done for individual buildings by constructing appropriate structure i.e underground /above ground tank, recharge pit, recharge trench based on the detailed hydro-geological study.

The rainwater harvesting structure would be designed with the following considerations:

1. The size of the recharge structure should depend on the availability of water. In case of huge volume of water, multiple structures may be constructed.

2. The pit or trench will be filled with boulders (5-20 cm) at the bottom, gravels (5-10 mm) in between and coarse sand (1.5-2.0 mm) at the top so that the silt content coming through runoff is deposited at the top of the coarse sand layer and could be easily removed.

3. A mesh would be provided at the roof so that leaves or any other solid/waste debris is prevented from entering the pit and a de-silting/collection chamber will be provided at the ground to arrest the flow of finer particles into the recharge pit. The top layer should be cleaned periodically to maintain the recharge rate.

4. By-pass arrangement be provided before the collection chamber to reject the first showers.

In addition to rainwater harvesting in the plant area, it will be ensured that appropriate similar interventions are done in adjoining/ nearby areas after detailed studies and planning, so that 100% of estimated water requirement is harvested. This will help in achieving the plant water neutral status.

10.3 GREENBELT DEVELOPMENT AND MAINTENANCE PROGRAMME

Enhancing micro climatic conditions are some of the other objectives of greenbelt development.

The plan for development of a total of 75.93 Ha as greenbelt area (33.34% of 224.737 Ha project area) has been considered that is a statutory requirement for environmental clearance. The area surrounding the pond at Talabarkote village would be developed with raising bund, retain existing trees and plantation of native species as part of greenbelt area. Moreover, as a compensatory afforestation (CA), a land of 61.327 ha in Bolangir Forest Division and an additional 35 ha in Bargarh Forest Division have been identified and approved.

Greenery would be developed along the periphery of the plant boundary and other vacant areas in various patches within the plant and along the internal roadsides. The greenbelt is shown in the plant general layout.

10 - Environmental Management Plan (EMP) (cont'd)

The plantation pattern along the boundary would be in three tier systems for greenbelt development as given in Table 10-1 and species considered for each layer is shown in Table 10-2. A list of trees and shrubs that have been prepared for greenery development are listed in Table 10-3.

TABLE 10-1 - PLANTATION PATTERN FOR GREENBELT

Tier	Habit	Height (m)
Ist Tier (Towards boundary)	Trees	> 10
2nd Tier (Middle layer)	Small Trees	5-10
3rd Tier (Towards Plant)	Shrubs	< 5

10.4 SELECTION OF PLANT SPECIES

Selection of the plant species has been conducted to adhere to the following specific requirements and review CPCB (March 2000), guidelines for greenbelt development:

i) Availability of seed material and resistance to specific air pollutants.

ii) Tolerance to wide adaptability to eco-physiological conditions.

iii) Fast growing, native and large canopy.

iv) Capacity to endure water stress and climatic extremes after initial establishment.

v) Differences in height, growth habits and bole shapes.

10 - Environmental Management Plan (EMP) (cont'd)

TABLE 10-2 - PLANTATION DESIGN IN TREE TIER GREENBELT LAYER

Greenbelt Layer	Common Name	Scientific Name
1st Layer (Curtain Belt)	Akashmoni	*Acacia auriculiformis*
	Chakundi	*Cassia siamea*
	Debadaru	*Polyalthia longifolia*
	Jamun	*Syzygium cumini*
	Kadamba	*Anthocephalus cadamba*
	Karanja	*Pongamia glabra*
	Mahogany	*Sweitenia mahogini*
	Neem	*Azadirachta indica*
	Sagun	*Tectona grandis*
	Sisoo	*Dalbergia sissoo*
2nd Layer (Middle Belt)	Peepal	*Ficus religiosa*
	Pakad	*Ficus virens*
	Chakundi	*Cassia siamea*
	Jarul	*Lagerstroemia speciosa*
	Kadamba	*Anthocephalus cadamba*
	Karanja	*Pongamia glabra*
	Neem	*Azadirachta indica*
	Tamarind	*Tamarindus indica*
3rd Layer (Inner Belt)	Ashok	*Saraca indica*
	Babool	*Acacia arabica*
	Bougainvillea	*Bougainvillea spectabilis*
	Karanja	*Pongamia glabra*
Inner Avenue Plantation	Amaltas	*Cassia fistula*
	Amla	*Phyllanthus emblica*
	Bakul	*Mimusops elengi*
	Bougainvillea	*Bougainvillea spectabilis*
	Chakundi	*Cassia siamea*
	Chatim	*Alstonia scholaris*
	Debadaru	*Polyalthia longifolia*
	Gulmohar	*Delonix regia*
	Kadamba	*Anthocephalus cadamba*
	Karabi	*Nerium indicum*
	Portia	*Thespesia populnea*
	Pakad	*Ficus virens*

10 - Environmental Management Plan (EMP) (cont'd)

TABLE 10-3 - LIST OF PLANT SPECIES SUGGESTED FOR GREENBELT DEVELOPMENT

Plant species	Height (Meter)	Anticipated Performance Index (API), Grade Allotted % scoring	Assessment
Akashmoni (*Acacia auriculiformis*)	16	-	-
Ashok (*Saraca asoca*)	5	81	Excellent
Amla (*Phyllanthus emblica*)	8	-	-
Amaltas (*Cassia fistula*)	12	-	-
Bakul (*Mimusops elengi*)	10	-	Evergreen
Bougainvillea (*Bougainvillea spectabilis*)	8	-	-
Chakundi (*Cassia siamea*)	12	-	Evergreen
Chatim (*Alstonia scholaris*)	15	56	Moderate
Devdaru (*Polyalthia longifolia*)	15	62	Good
Gulmohar (*Delonix regia*)	15	-	Fast growing
Jamun (*Syzygium cumini*)	20	-	Evergreen
Jarul (*Lagerstroemia speciosa*)	10	-	Evergreen
Kadamba (*Anthocephalus cadamba*)	20	-	Fast growing
Karanja (*Pongamia glabra*)	15	-	Fast growing
Karabi (*Nerium indicum*)	5	-	Evergreen
Mahogany (*Sweitenia mahogini*)	15	87	Excellent
Neem (*Azadirachta indica*)	20	-	Evergreen
Pakad (*Ficus virens*)	20	31	Very Poor
Peepal (*Ficus religiosa*)	20	69	Good
Portia (*Thespesia populnea*)	10	-	Dust Tolerant
Segun (*Tectona grandis*)	20	-	Dust Tolerant
Sissoo (*Dalbergia sissoo*)	20	56	Moderate
Tamarind (*Tamarindus indicus*)	20	-	Evergreen

Sources: CPCB (March, 2000), Guidelines for developing green belts PROBES/75/1999-2000

10.5 PLANTATION TECHNIQUE

The plantation density would be 2,500 trees per hector (as per TOR) in combination of trees and shrubs depending on factors such as species and location of plantation.

Miyawaki technique of plantation would be followed for green belt development. The plant species would be planted using pitting techniques at a density of 2,500 trees and shrubs per hectare. The pit size should be 45 cm x 45 cm x 45 cm for Shrubs and 60 cm x 60 cm x 60 cm for trees. Soil used for filling the pit should be mixed with well decomposed Farmyard Manure (FYM) or Sewage sludge at the rate of 2.5 kg (on dry weight basis) and 4 kg (on dry weight basis) for shrubs and trees respectively. The filling of soil should be completed at least a week before actual plantation. The pits measuring 60 cm x 60 cm x 60 cm for trees are to be dug up at desired points in triangular pattern. For plantation design, 2 m spacing between the planting rows of trees & shrubs is sufficient to accommodate 2,500 trees and shrubs per hectare following Miyawaki techniques.

10.6 PLANTATION WORK PLAN

A detailed species-wise and location-specific plantation plan will be outlined on a general layout map prior to the commencement of actual plantation activities. The required seedlings will either be raised in a dedicated on-site nursery or procured from local forest departments, certified private nursery growers, or authorized agencies to meet the plantation requirements.

The plan will include provisions for adequate watering - especially during the early growth years - along with regular weeding, hoeing, and the replacement of dead or underperforming saplings to ensure optimal plant survival and growth. All maintenance measures will be systematically scheduled and implemented to support the long-term success of the plantation effort.

10 - Environmental Management Plan (EMP) (cont'd)

10.7 PLANTATION SCHEDULE FOR GREENBELT DEVELOPMENT

The plantation schedule of greenbelt development would be for consecutive 3-years plan as shown in Table 10-4.

TABLE 10-4 - SCHEDULE OF PLANTATION PROGRAMME FOR GREENERY DEVELOPMENT

Plan Period	Area, Ha	No. of Trees	Plantation Area	Tree Species
1st year	37	92,500	Along the periphery	Chakundi, Debdaru, Jamun, Jarul, Kadam, Gulmohar, Mango, Mahogany, Neem, Pakad, Peepal, Segun, Sissoo, Tamarind.
2nd year	19	47,500	Internal roadside plantation	Bakul, Chatim, Devdaru Karabi, Karanja, Mahogany, Segun, Portia,
3rd year	18	45,000	Within vacant area	Ashok, Bakul, Bougainvillea, Guava, Karabi, Segun, Portia, Yellow oleander.

10.8 BUDGETARY ALOCATION FOR GREENERY

Approximately Rs. 14.6 Crore budgetary allocations have been considered for development and maintenance of greenbelt.

10.9 ENVIRONMENTAL MITIGATION COST

For implementation of the proposed environmental mitigation measures considering the proposed project, the estimated additional capital expenditure (CAPEX) would be of Rs. 594.6 crores i.e. about 5.26% of the project cost. The relative allocation of the CAPEX would be as shown in Table 10-5.

10 - Environmental Management Plan (EMP) (cont'd)

TABLE 10-5 - ENVIRONMENTAL MITIGATION COST

EMP Category	CAPEX	OPEX
	Rs. In crore	
Water Pollution & Conservation and Wastewater Treatment	150	10
Air Pollution Control Measure	350	30
Solid Waste Management	30	2
Energy Conservation	20	1
Greenbelt Development	14.6	0.1
Rainwater Harvesting/Water Management	5	0.5
On-line Monitoring & Environmental Laboratory	25	2
Total	**594.6**	**45.6**

The annual operation expenses (OPEX) for operation and maintenance of pollution control measures would be around Rs. 45.6 crores. However, these estimates may vary at the time of project execution.

10.10 OCCUPATIONAL HEALTH AND SAFETY

Occupational Health function of KSL would administered under Environment, Safety and Health department.

Occupational health & safety aspects of the plant would overseen by the Medical Officer.

The nature of health hazard associated with the operation and maintenance of the plant include hazards related to exposure to heat, noise, dust, acid & alkali fumes, gas leaks, hazardous wastes etc. The occupational health care issues look into reducing impacts of dust emissions, noise etc on employees, and also look into general health and issues associated with tobacco, alcohol and other intoxications.

The common causes of injury and illness are as follows:

i) Slips, trips and falls on the same level; falls from height; unguarded machinery; falling objects

ii) Engulfment; working in confined spaces; moving machinery, on-site transport, forklifts and cranes

iii) Exposure to controlled and uncontrolled energy sources; exposure to inhalable agents (gases, vapours, dusts and fumes)

iv) Skin contacts with chemicals

v) Fire and explosion; extreme temperatures; radiation (non-ionizing, ionizing)

vi) Noise and vibration; burns and electric shock

vii) Manual handling and repetitive work; failures due to automation; poor ergonomics

viii) Lack of OHS training, poor work organization

ix) Inadequate accident prevention and inspection; inadequate emergency first-aid and rescue facilities; lack of medical facilities and social protection

In the construction stage, there would be strict monitoring of Contractors' workers' health and safety. All the safety and health measures discussed above would be implemented for the construction workers including medical screening. Before commencing the work, the Contractors' workers would be given awareness training on Safety procedures.

During the construction phase, casual labourers would be provided with toilet facility (both for male and female workers) and drinking water. Additionally rest shelters (with proper ventilation and lighting facilities) at convenient locations would be constructed. These facilities related to infrastructure would also be extended to casual labourers and vehicle operators during the operation phase.

10 - Environmental Management Plan (EMP) (cont'd)

The health of workers would be evaluated by routine periodic medical examination. Emergency treatment would be carried out as per the standard practices. The schedule of medical check-up during operational phase is detailed as follows:

Sl. No.	Occupational group	Age group	Periodicity	Parameters	Objective
1	Employees of Works	21-60 years	Annually	**General examination** : Height, weight, body mass index, pulse, blood pressure, Signs for Anaemia, Jaundice etc. Examination of CNS, CVS, Respiratory System, Musculo-Skeletal System, Any deformity etc. **Investigation**: Blood- TC, DC, Hb%, sugar, cholesterol, creatinine Lung Function Test Chest X-Ray	Promotion of physical fitness by early detection, prevention and treatment of diseases like diabetes mellitus, obesity, hypertension, and occupational diseases

PPEs provide supplementary protection against exposure to hazardous conditions where the safety of workers cannot be ensured by other means, such as eliminating the hazard, controlling the risk at source or minimizing the risk. PPEs provided would comply with the relevant national standards. While selection of PPE, care is taken in assuring correctness & fitness for the people who use it, the nature of the hazards the equipment is intended to protect against, comfort level, and the consequences of poor performance or equipment failure.

The common PPEs used are as follows:

i) Head- Helmets
ii) Face & Eye Protection - Face shields, Goggles
iii) Feet - Safety Shoe
iv) Respiratory Protective Equipment - Face mask
v) Hearing Protection - Earplugs, Earmuffs
vi) Protection from Falls- fall protection equipment, such as harnesses and lifelines.

10 - Environmental Management Plan (EMP) (cont'd)

Health education program would be conducted that would include occupational health, cardiac risk reduction, stress management, ergonomics, early diagnosis & treatment, burn safety & eye care, gas & heat hazards, occupational lung diseases, physical fitness, nutrition etc.

The health care surveillance of its employees for the proposed project would be carried out by audiometric examination & hearing conservation (especially for the employees exposed to high noise levels), statutory eye examination, X-ray investigation, blood examination, lung function test etc. Mandatory special medical check would be institutionalized for people working at height and enclosed area. The Occupation Health & Safety Departments would play a key role in maintaining the best safety practices so as to ensure zero accidents.

Routine safety surveillance is carried out by the Safety Departments. This would be in accordance with the plant safety manual for all primary and supporting production facilities. Fire Safety protection features like fire hydrants, sprinklers, extinguishers etc shall be routinely checked and mock drills of the same at periodic intervals would be done to ensure functionality. The hazard potential of hazardous chemicals and fuels to be used in the plant would be informed to the concerned Personnel. They should also be made aware of the immediate first aid measures in the event of an accident. Maintenance work on all electrical installations shall have prior safety permit from the designated official of the Department. Safety permits for 'Hot work' and 'Work at Height' would be mandatory. The plant would have an occupational health care manual and adopt international practice of occupational health care as required by the Regulations.

10 - Environmental Management Plan (EMP) (cont'd)

The proposed CAPEX budget for OHS for the proposed project is furnished below:

Sl. No.	Categories	CAPEX Budget (In Rs. Crore)
1	Fire & Safety	8
2	Occupational Health	2
	Total Budget	**10**

The OPEX to be incurred each year for OHS would be about Rs. 1 Crore (0.9 crore in Fire & Safety and 0.1 crore in Occupational Health).

11 - SUMMARY AND CONCLUSION

11.1 INTRODUCTION

Kalyani Steels Limited ("KSL" or the "Company"), incorporated on February 28, 1973, is part of Kalyani Group ("Group") promoted by Mr. Babasaheb Neelkanth Kalyani. Kalyani Group, established in mid 1960s, is an Indian multi-national conglomerate with engineering & manufacturing capability across critical sectors such as Engineering Steel, Automotive, Defence, Aerospace, Nuclear, Industrial, Renewable Energy, Urban Infrastructure and Specialty Chemicals. With footprints across India, Germany, Sweden, France, and USA, the Group has an annual turnover of more than USD 3 Billion. Bharat Forge Limited ("BFL") is the flagship company of the Kalyani Group and amongst the largest forging companies in the world.

KSL had entered into a Strategic Alliance Agreement with a reputed industrial partner and set up an integrated steel plant in 1998 at Koppal in Karnataka. Iron Making Division and Rolling Mill are set up by KSL and Steel Melting Shop (SMS) is set up by an industrial partner in the strategic alliance ratio i.e. 41.38% KSL and 58.62% industrial partner. The iron making division has a capacity of producing ~8,50,000 tpa of sinter and ~700,000 tpa of hot metal, SMS has a capacity of ~600,000 tpa and Rolling Mill-1 has a capacity of ~2,50,000 tpa. Apart from this, KSL put up a Rolling Mill-2 in 2012 with capacity of ~100,000 tpa which is solely used by KSL (not part of the strategic alliance).

11 - Summary and Conclusion (cont'd)

Considering the growth potential of the Indian steel sector, Automobile industry and other key user industries, KSL proposes to set up an Integrated Advanced Specialty Steel Plant having an installed capacity 1.43 MTPA of crude steel ("IASSP Project") at Dhenkanal district in Odisha. The IASSP Project will have facilities for production of carbon, alloy steel, stainless steel along with manufacturing of critical components used in end industries like Automotive, Energy, Marine, Oil & gas, Aerospace & Defence, submarine and ship building components, railways, seamless tubes, nuclear power plant, yaw drivers, ultra supercritical power plants, etc.

KSL has applied to MoEF&CC to obtain Environmental Clearance for the proposed plan. The Standard ToR for EIA of the proposed project was accorded by the MoEFCC vide their File No. IA-J-11011/404/2023-IA-II(IND-I) dated 08.01.2024.

11.2 PROJECT DESCRIPTION

The proposed project will be carried out within KSL's existing plant premises located at Gajamara in Dhenkanal district of Odisha. The project site lies within latitude 20°33'59.4" to 20°35'8.16" North and longitude 85°37'4.44" to 85°37'41.88" East. The proposed project would comprise of establishment of 1.43 MTPA greenfield integrated advanced specialty steel plant (Ingot, CC, Heavy bar, SBQ, Wire Rod and Large Bar). The configuration of proposed major plant units and facilities are presented in Table below.

11 - Summary and Conclusion (cont'd)

CONFIGURATION OF THE PLANT

Plant Facilities	UoM	Capacity/Configuration
Coke Oven Plant	MTPA	1 x 0.78
Blast Furnace	MTPA	1 x 1.5
Sinter Plant	MTPA	1 x 2.4
Lime Calcination Plant	TPD	2 x 300
Steel Making		
EAF/ZPF	Tons	1 x 60
BOF	Tons	1 x 60
IF	Tons	2 x 50
LF	Tons	4 x 60
VD	Tons	1 x 60
RH degasser	Tons	2 x 60
AOD	Tons	2 x 65
Ingot Casting	MTPA	0.16
CCM	MTPA	2 x 0.65 2 x 0.7
Heavy Bar, SBQ & Wire Rod Mill	MTPA	1 x 0.6
Large Bar Mill	MTPA	1 x 0.8
Oxygen Plant	TPD	1 x 420 1 x 460
Pig Iron Casting Machine	TPD	2 x 1,200
By product fuel gas-based power Plant and BF TRT power generation	MW	1 x 18
Coke Oven WHRB Power Plant	MW	1 x 64
BF TRT	MW	1 x 7.5

The total requirement of raw materials for the steel plant shall be 4.63 MTPA. The same shall be obtained from existing sources.

Maximum Power requirement of the plant shall be 257 MW (including ongoing sustenance loads like ZED, PCI, CH FES, Secondary Emissions etc.). Considering in-house power generation of about 89.5 MW, it will be necessary to draw power of about 176 MW power from grid (assuming 0.693 diversity factor and 3% losses). Around 25 MW of power would be obtained from renewable sources.

11 - Summary and Conclusion (cont'd)

The total plant raw water requirement shall be about 762 cu m/hour for the 1.43 MTPA greenfield project. Raw water shall be sourced from Mahanadi River at Phulbari in Cuttack District.

The estimated total cost for the proposed project is around INR INR 11,058 crore (net of GST). The project during the operation phase is likely to generate 3,000 direct and 7,200 indirect employments. During construction phase, there would be around 12,000 contractual workers and 500 people will be directly employed.

11.3 BASELINE ENVIRONMENTAL STATUS

Baseline environmental data was generated during the period from October 2024 to December 2024. The monitoring was carried out at the specific locations/ villages within the study area surrounding the project site, with an aerial coverage of about 10 km from the periphery of the proposed project site. This includes monitoring of site-specific Micro-meteorology, Ambient Air Quality (8 locations), Ground water quality.

(8 locations), Surface water quality (8 locations) Noise Levels Monitoring (8 locations), Soil quality (5 locations), Geo-hydrology | (20 locations), Terrestrial ecology (8 locations), Aquatic ecology (8 locations). Further, existing socio-economic features were also studied. Traffic density was also measured on roads which are used by traffic originating from & destined for the plant.

It may be seen that the Percentile-98 concentration (24 hrs) of PM10 and PM2.5 are in the range of 43.95 – 68.88 µg/m3 and 22.77 - 34.44 µg/m3 respectively. The PM10 values at the locations are below 100 (maximum 68.88 µg/m3) which are in the range classified as good (National Air Quality Index of India). The SO2 and NOx values are well within the permissible values for rural/industrial areas as set by NAAQS (2009). The CO and O3 values are either below detection limit (bdl) or much below the values of NAAQS.

11 - Summary and Conclusion (cont'd)

The total hardness (TH) and total dissolved solids (TDS) content in ground water are found to be in the range of 31.33 - 192.72 mg/l and 113.33- 815.00 mg/l respectively at the selected locations as against the allowable standards of 200 mg/l for TH and 500 mg/l for TDS. Iron content lies within the range of 0.39-3.57 mg/l which is higher than the permissible limit as per IS-10500-2012. which is higher than the permissible limits as per IS-10500-2012. Chromium, lead, arsenic, mercury and other heavy metals are reported to be within or slightly higher than the permissible limit.

The total hardness of all surface streams has reported ranges from 42.22-80.86 mg/l. The average DO level for all surface streams ranges between 6.07-6.33 mg/l. Total dissolved solids (TDS) ranges from 110.67 - 189.00 mg/l and Total coliform count ranges from 2,100 - 2,600 CFU/100 ml across various surface water sampling locations. The presence of faecal coliform signifies that the water is not fit for human consumption without disinfection.

The soil is slightly reddish to greyish in colour and has a sandy loamy texture. The chemical characteristics of soil samples reveal that the soil is neutral to slightly alkaline in nature with pH values ranging from 7.14 to 7.45. The electrical conductivity (EC) in the range of 1.2 - 1.8 ds/m in the study area indicates marginal potential of salinity in soil that is marginally harmful for cultivation of crops.

In the industrial areas like project site & Spinning Mill-Govindpur the noise recorded ranges from 70.19 - 73.66 dB(A) and was 61.04 – 62.06 dB(A) at day & nighttime respectively during the monitoring period as against the regulatory standard of 75 dB(A) and 70 dB(A)respectively. The values obtained for the day & night at all locations are within the stipulated norms of CPCB. The daytime & nighttime Leq for silence zone like Primary School, Talabarkote and Ragada High School were recorded to be in between 52.29 - 52.38 dB(A)



and 44.18 - 45.53 dB(A) respectively against regulatory norm of 50 db(A) during daytime and 40 db(A) during night. The slightly elevated noise levels are because of traffic in front of the school.

The forest type of the study area is tropical moist deciduous forests. The Reserved Forests (RF) in the study area are mostly hilltops covered with mixed vegetation dominated by Sal (Shorea robusta) and Segun/Teak (Tectona grandis). The vegetation cover within the proposed Kalyani Steel Plant boundary primarily consists of an open jungle dominated by Cashew (Anacardium occidentale).

A total of thirty-seven wild animals (mammals) were observed /reported during interaction with forest officials of Dhenkanal & Athagarh forest division and local peoples. Total twenty-seven fish species are fairly available in the water bodies as informed during the interaction with the fishermen.

Among the sighted fauna, 44 species are listed under Schedule-I, the rest are under Schedule-II, III & IV.

11.4 ENVIRONMENTAL IMPACTS ASSESSMENT & MITIGATION

Impact of project activities on environmental attributes in study areas including ambient air quality, surface & ground water quality, noise level, soil quality, socio-economic profile & flora & fauna and drainage pattern have been assessed. The proposed greenfield project would be set up at Gajamara in Dhenkanal district of Odisha. There would be impact on terrestrial ecology due to removal of vegetation to the tune of 14,800 trees in the forest area covering 60.204 ha and about 7,200 trees in the non-forest area. Apart from this the project site is mainly comprised of single crop agricultural land, some barren land and two water bodies (which would be kept outside the physical boundary of the project area). The predicted post project AAQ is shown below:

11 - Summary and Conclusion (cont'd)

AAQ Monitoring Location and its distance from the Plant boundary, km	Parameters	Present baseline (P98), µg/cu m	Incremental contribution due to proposed project, µg/cu m	Projected air quality post project, µg/cu m
A1 - Padmanabhapur Villag	**PM_{10}**	68.88	4.8	73.68
	$PM_{2.5}$	34.44	3.22	37.66
	SO_2	<4.0	6.02	10.02
	NO_X	16.66	16.1	32.76
A2 - Badrapali Village	**PM_{10}**	43.95	4.58	48.53
	$PM_{2.5}$	22.77	3.06	25.83
	SO_2	<4.0	4.56	8.56
	NO_X	16.50	18.9	35.4
A3 - Ragada Village	**PM_{10}**	52.50	6.6	59.1
	$PM_{2.5}$	27.40	3.64	31.04
	SO_2	<4.0	9.18	13.18
	NO_X	17.42	17.5	34.92
A4 - Patrabhag Village	**PM_{10}**	49.50	5.37	54.87
	$PM_{2.5}$	26.18	2.57	28.75
	SO_2	<4.0	4.29	8.29
	NO_X	17.42	14.4	31.82
A5 - Talabarkote village	**PM_{10}**	48.20	3.54	51.74
	$PM_{2.5}$	27.72	2.41	30.13
	SO_2	<4.0	5.81	9.81
	NO_X	19.17	23.4	42.57
A6 - Dhirapatana Village	**PM_{10}**	52.34	6.19	58.53
	$PM_{2.5}$	25.79	4.13	29.92
	SO_2	<4.0	6.24	10.24
	NO_X	22.04	17.8	39.84
A7 - Manipur Village	**PM_{10}**	52.53	7.61	60.14
	$PM_{2.5}$	26.02	5.08	31.1
	SO_2	<4.0	9.78	13.78
	NO_X	18.36	28.3	46.66
A8 - Siaria Village	**PM_{10}**	51.20	3.72	54.92
	$PM_{2.5}$	25.60	2.48	28.08
	SO_2	<4.0	3.14	7.14
	NO_X	16.50	13.7	30.2

To mitigate the anticipated short-term impacts on the environment during construction phase as well as long-term impacts during operational phase of the proposed facility, a comprehensive Environmental Management Plan has been prepared for all aspects of the environment, including air, water, noise, ecology & biology as well as socio-economic conditions in the study area. Site specific and practically suitable mitigation measures are recommended to mitigate the identified impacts.

11 - Summary and Conclusion (cont'd)

Suitable dust extraction system with air pollution control devices shall be installed to minimize the negative impact on air environment. Since the project is conceived on ZLD, there would be no impact on the water quality of existing surface water bodies. With the present plan of water conservation, it is estimated that make-up water requirement would be 4.6 cu m/t of crude steel post project. Storm water is utilised to the extent possible and only the excess amount is discharged intermittently following CPCB guidelines. The proposed project has not been planned based on ground water extraction as water source. Thus, there would be no impact on ground water resource. Solid waste generated in the plant will be mostly recycled back in the process.

Further, a suitable monitoring plan has been designed to monitor the effectiveness of envisaged mitigation measures during the post-EC phase. The implementation of these environmental mitigation measures recommended in the present study will bring the anticipated impacts to a minimum.

11.5 ANALYSIS OF ALTERNATIVES

Alternative technologies for all the units have been taken into consideration and after sufficient reasoning suitable energy efficient & environment friendly technologies have been chosen.

The following alternate sites were considered for the proposed greenfield project.

11 - Summary and Conclusion (cont'd)

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
1	Location	Gajamara Dhenkanal	Kamakhya Nagar Dhenkanal	Kandarei Dhenkanal	
2	Land Availability	(224.73 Ha)	(303.51 Ha)	(136.38 Ha)	**Site 1 & Site 2** have sufficient land for the proposed project (min 192.554 Ha of land required including green belt) whereas **Site 3** was not suitable.
3	Type of Land	**Site 1** is vacant land, free of any known encumbrance.	**Site 2** was under cultivation (double crop land mostly used for agriculture).	**Site 3** is within the buffer zone of Kapilash Wildlife Sanctuary.	**Site-1** is preferred as the site. It is a vacant land without encumbrances and no proximity to eco-sensitive areas
4	Requirement of R&R	No Land acquisition will be carried out by IDCO through a mix of private or government land acquisition.	Yes	Yes	**Site-1** is preferred as no R & R is involved for the implementation of the subject project.
5	Any perennial river, Streams, water body within the plot	No	No	No	**Site-1, 2 & 3** all do not have any perennial river & streams within the plot. **Site 1** is preferred as sufficient raw water for the project will be available through Mahanadi located about 15 km away.
6	Power Demand Distance from nearby 220 kV/ 33 kV Substation.	10 km (Neulpoi 400KV/220 KV GIS) 4 km (Khuntuni 33 kV Substation)	18 - 20 km (Meramandali 400 kV/220 kV GIS) 8 km (Kamakhyanagar 132 kV/33 kV Substation)	Land was not sufficient	**Site 1** is preferred due to the availability of 220 kV power from Neulpoi Substation at 10 km distance, and 33 kV Construction power from Khuntuni Substation at 4 km distance.
7	Road Access/ Connectivity	**Site 1** is well connected to Mumbai - Cuttack National Highway (NH- 55) which is 2.8 km away from the Northeast corner of the project site.	The nearest highway is Mumbai - Cuttack National Highway (NH-55) which is 15 km away from the project site.	Land was not sufficient	**Site -1** is preferred due to the existence of multiple and better road connectivity in the vicinity of the project site for transportation of incoming & outgoing saleable materials.

11 - Summary and Conclusion (cont'd)

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
		Site 1 is directly connected to the Saptasajya Dhenkanal road at Northwest corner.			
8	Rail Access/ Connectivity	Nearest Take-up point for dedicated railway siding is Joranda Road Station - 6 km	Nearest Take-up point for dedicated railway siding is Kamakhya Nagar Station - 12 km The site is at a significant uphill gradient from the Kamakhya Nagar station. The overall viability of railway siding was found to be negative due to uphill gradient and involvement of forest land patches.	Land was not sufficient	**Site 1** is preferred due to proximity to (6 km) with Joranda Road station on Sambalpur - Cuttack Main line for the construction of dedicated railway siding.

11.6 ENVIRONMENTAL MONITORING PROGRAMME (EMP)

The monitoring for various parameters of air, water, soil, noise etc. as per current practice in the existing plant would be carried out by an authorized laboratory (NABL/MoEFCC accredited) as per the given monitoring schedule. E-waste generated shall be handled by authorised recyclers.

The monitoring parameters and schedule are summarized below.

11 - Summary and Conclusion (cont'd)

Sl. No.	Activity	Aspect	Parameter	Location	Frequency of monitoring	Responsibility
Construction Phase						
1.	Construction activities	Deteoriration of ambient air quality due to construction activities	Air Quality Monitoring Parameters: PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Three (3) monitoring locations would be set up covering upwind and downwind directions. There are 3 existing CAAQMS monitoring stations within the plant.	Online Continuous monitoring	Head (Environment Safety and Health)
2.	Construction activities	Generation of C&D waste	Inventorization of C&D waste	Overall plant site	Monthly	Head (Environment Safety and Health)
Operation Phase						
1.	Operation	Measurement of site specific micro meteorological data	Meteorology: Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind direction and rainfall	One permanent station at the admin building. The wind sensor shall be preferably at 10 m height above the ground without any surrounding hindrances that may affect the free flow of wind	Online continuous monitoring	Manager (Environment and Health)
2.	Operation	Stack emission Fugitive Dust Emission Emissions from coal/coke pushing, charging, and quenching	Air Quality Monitoring Parameters: PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, O_3, NH_3, C_6H_6, BaP, Pb, As and Ni Work zone air quality	Four (4) monitoring locations One (1) within the plant premises & three (3) monitoring locations would be set up outside the plant area at an angle of 120^0 covering upwind and downwind directions. Two locations near the fugitive dust emitting operations and two locations near the dust prone raw material stockpile areas	Continuous ambient air quality monitoring stations (CAAQMS) as per the MoEFCC/CPCB guidelines, whichever is most stringent. Monthly once for each location	Manager (Environment and Health) Manager (Environment and Health)

11 - Summary and Conclusion (cont'd)

Sl. No.	Activity	Aspect	Parameter	Location	Frequency of monitoring	Responsibility
	Operation	Fugitive Dust Emission	Fugitive dust monitoring	Fugitive dusts near raw material stockpiles	Monthly once through labs recognized by NABL and MoEFCC.	Manager (Environment and Health)
	Operation	Stack emission	Stack Monitoring		Continuous	-
	Operation	CT Blowdown Water from Spray Cooling Water from billet cooling	Water Quality - effluent water, surface and ground as per CPCB standard.	Ground water - Two within plant, one on down gradient, one on up gradient of plant and two near raw material storage area. Surface water – Three (3) Locations Piezometer with continuous online pH & conductivity meter – 4 Nos. around the raw material storage area	Ground water quality analysis- Monthly once Surface water quality - Monthly once Surface & ground water - in pre & post monsoon	Manager (Environment and Health)
	Operation	Noise due to Rotary Equipment Noise due tom venting of high-pressure steam or air	Ambient noise level	One near the plant main gate and at three locations around the plant boundary	Monthly once for each location	Manager (Environment and Health)
			Work zone noise level	Four locations near the noise generating equipment	Monthly once for each location	Manager (Environment and Health)
			Soil quality	Two (2) locations within the plant (raw material storage area, solid waste storage area) and one (1) from outside plant area.	As per nutrient cycle/Yearly once by NABL/MoEFCC approved agency	Manager (Environment and Health)
	Operation	Leachate	TCLP test for solid wastes	Two locations for BF and BOF/ZPF slag to ascertain the heavy metals & toxic elements	Yearly	Manager (Environment and Health)

11 - Summary and Conclusion (cont'd)

Sl. No.	Activity	Aspect	Parameter	Location	Frequency of monitoring	Responsibility
	Operation		Inventory of hazardous waste	Within plant	Six months or as directed by OSPCB	Manager (Environment and Health)
	Operation		Water Consumption	At all consumer points through water meter	Continuous	Head (Utility)
	Operation		Energy Consumption	At all consumer points through energy meter	Continuous	Head (Utility)

11.7 ADDITIONAL STUDIES

11.7.1 Risk Assessment and Disaster Management Plan

The proposed facility would have installations, such as, storage and handling of fuel oil and fuel gases which would be under the purview of Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and its amendments thereof.

As risk from fuel leaks is maximum, has the maximum severity of consequence, consequence modeling for leakage blast furnace gas holder, BOF gas holder and coke oven gas holder has been carried out using DNV Phast Lite 7.1 to quantify the extent of the impact from these events. The results show that the consequences shall be limited within the plant premises.

KSL has an existing emergency command structure headed by 'Works Main Controller' who is Head of the works. The existing Action Plan for Fire Hazard/Release of Toxic Gases shall be followed in the proposed plant in case of emergency.

11.7.2 Socio-Economic Study

A need-based socio-economic impact assessment of the study area has been carried out starting with scoping of issues related to potential significance like education, health, drinking water facility, employment and income etc. Most of the respondents' dwell in semi-



pucca houses. Electric connection is provided to almost all houses. The main sources of water supply of the studied area are Tube well, hand pump, uncovered well and Tap water for the drinking purpose.

The literacy rate in the studied villages is 44.82% for females and 55.18%.for males. The pre -primary schools are (Aganwadi Centres) are available in all studied villages. Schools are available in the study area. The Community Health Centre (CHC) is available in Patrabhag, and the Primary Health Centres are located in Baladiabandha, Shankarpur, Gobindapur, and Joranda. The government provides a mobile medical health care facility to the locals of Saptasajya and Mangalpur once a week. The district hospital is located in Dhenkanal, while the Sub-Divisional hospital is in Athagad. The maximum respondents have bank account under Jan Dhan Yojna. Several commercial banks are operating in the studied villages. Library, theatre or cinema hall are available at Jajpur. The people of the studied areas are availing the benefits from the government schemes, such as MGNREGA, Health Insurance, Life Insurance, and Destitute pension, Janani Suraksha Yojna, Free Education, Awas Yojna, Crop Seed and Self- Help Group.

KSL would adopt the two nearest villages Talabarkote and Siaria with a projected expenditure of INR 43 crore. The following activities have been planned.

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)
1	Concrete Drain	Garland drains with catch pits will be constructed surrounding the solid wastes storage sites to contain run-offs thus preventing it from carrying sediment and other pollutants into surrounding water bodies
2	Solar Street Lighting	Establishment of 250 No of solar lighting units with battery storage in nearby villages including Talabarkot & Siaria
3	Kalyan Mandap	Construction of 2 Kalyan Mandaps - 1 each in Talabarkot & Siaria Village
4	Support to Existing Aaganwadi	One time support (INR 3 L) for each Aanganwadi to improve their existing operational facilities

11 - Summary and Conclusion (cont'd)

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)
5	Support to Existing Self-Help Groups (SHGs)	One time support (INR 3 L) for each SHG to improve their existing operational facilities
6	Support for Existing Youth Clubs	One time support (INR 10 L) for each Youth Club to improve their existing facilities & infrastructure
7	Primary Schools (up to 5th Class)	Strengthening of library in existing village schools Up gradation of existing village schools by providing Chair, table & black board etc. Facilitation & Upgradation of Existing School Infrastructure
8	High Schools	Establishment of fully functional computer center (upto 20 systems) in each existing high school with online learning facilities
9	Graduate/Post Graduate Colleges (within 10 km radius of project site)	Upgradation of online learning facility by acquiring new subscriptions and software
10	Public Health Center (PHC)	Addition of Critically Required Infrastructure: X-Ray Unit, ECG Unit, Ultrasound Unit & Blood Bank. Health care facilities will be upgraded/established in consultation with local & state level authorities.
11	Auxiliary Nurse and Midwife (ANM) Centers	Addition of new infrastructure: NICU for newborn babies.
12	Bus Shelters	Construction of 6 new bus shelters at locations identified within 10 km radius from the project site
13	Drinking Water (ground water) - Handpumps with water filtration facilities	Construction of 4 new filtered drinking water facilities at locations identified within 10 km radius from the project site
14	Welcome Entry Gates for Villages	Construction of entry gates for project area villages - Talabarkot & Siaria
15	Upgradation & restoration of Jagannath Temple	Upgradation & Restoration
16	Upgradation & restoration of Shiv Temple	Upgradation & Restoration
17	Upgradation & restoration of Sidha Ramchandi Temple	Upgradation & Restoration
18	Upgradation & restoration of Shani Temple	Upgradation & Restoration
19	Upgradation & restoration of Mangla Temple	Upgradation & Restoration
20	Upgradation & restoration of Ram Mandir	Upgradation & Restoration
21	Upgradation & restoration of Masjid	Upgradation & Restoration
22	Development of Ponds (2 Nos) with rainwater Collection	Renovation and upgradation of 2 existing perennial ponds in Talabarkot Village
23	Multipurpose Sport Complex	Establishment of multi-purpose sports complex within Talabarkot village (Land to be provided by Govt of Odisha)

11 - Summary and Conclusion (cont'd)

Sl. No.	Name & Details of Facility / Activity to be developed under Corporate Environmental & Social Responsibility Plan	Details of Works to be undertaken through proposed budget (5 Yrs)
24	Children Play Complex	Establishment of Children Play complex within Talabarkot village (Land to be provided by Govt of Odisha)
25	Solid Waste Management	Solid waste to be stored in suitably lined & earmarked storage yard to avoid leaching through soil beds leading to contamination of ground water.
26	Skill Development Center	Establishment of advanced manufacturing skill development center in collaboration with the Skill development Dept, Govt of Odisha within 10 km radius of project site.
		Skill development training on civil & construction, mechanical maintenance, welding, electrician, machinery, carpentry etc. Skill development for women empowerment - training programmes in nursing, tailoring, textiles, craft and online sales
27	Upgradation of Agricultural Skills for better livelihood	Collaboration with CRRI (Indian Council of Agricultural Research - Directorate of Cashew Research) to develop value maximization strategies for local villagers from existing cashew plantations in the surrounding areas.
28	Swatchh Bharat Abhiyan	Management of solid waste and effluents collection from village households & garbage collection vehicle for garbage lifting and transportation to identified dump yard created by Govt. of Odisha. Construction of common use toilet facilities in 2 adopted villages as well as nearby villages. Total population to be impacted - approx. 4000 people
29	Tuberculosis Elimination Movement	Support to the Tuberculosis Elimination Movement in the Dhenkanal District

11.8 PROJECT BENEFITS

The National Steel Policy 2017 has set a target of 300 million tons (MT) of steel production by 2030. Steel being a basic commodity for all industrial activities, the quantum of its consumption is considered as an index of industrial prosperity. KSL is well positioned to fulfil its role in the nation's quest for higher growth and development in the new millennium. The project would lead to acceleration of infrastructure development like improvement in the existing road condition for catering to the requirement of the plant operation and proposed project. It will further improve transport facilities like roads, railways and local transport facilities in the plant & adjoining areas. The project will additionally create community infrastructures like installation/ repair of hand pumps and bore wells, de-siltation and deepening of dug wells, recreational spaces such as parks, playgrounds, community halls etc.



11.9 ENVIRONMENT MANAGEMENT PLANT (ADMINISTRATIVE ASPECTS)

The Environment Management Cell under the administrative control of Head, ESH would be responsible for the compliance of the environmental conditions and other statutory responsibilities like submission of six-monthly compliance reports to the EC conditions to OSPCB and IRO, MoEFCC. In case of violation of any statutory conditions including conditions laid down in the EC, the same would be reported to the Director of Projects & MD, and other stakeholders and corrective action would be taken, for which a standard operating procedure has been formulated and included in the Occupational Health & Safety (OHS) Policy.

11.10 CONCLUSION

In the design of the proposed project, the latest state-of-the-art technology has been envisaged to meet the desired air emissions and noise level standards from plant operations levels. Discharge of effluents beyond plant boundary will be negligible as the plant facilities have been implemented with "Zero Effluent Discharge" concept. Wastewater generated at the plant shall be treated in the common Effluent Treatment Plant (ETP) and recycled. Plant generated solid waste will be mostly recycled back into the process. The implementation of environmental mitigation measures recommended in the report will bring the anticipated impacts to a minimum. Site specific suitable mitigation measures are recommended to mitigate the impacts. Further, a suitable monitoring plan has been designed to monitor the effectiveness of envisaged mitigation measures during the operation phase.

12 - DISCLOSURE OF CONSULTANT ENGAGED

KSL has appointed M. N. Dastur & Company (P) Ltd, Consulting Engineers, Kolkata to undertake EIA Study and prepare EIA Report in accordance with the approved ToR of MoEFCC.

12.1 ABOUT THE CONSULTANCY COMPANY

M. N. Dastur & Company (P) Limited was founded in 1955 by Dr. Minu Nariman Dastur, the pioneer in providing consulting engineering services in India. The company offers integrated design and engineering consultancy services, from concept to commissioning, for a wide range of projects related to metallurgical, mining, chemical, oil & gas, cement, power, environment, infrastructure and other allied industries. DASTUR specializes in project planning and appraisal, economic evaluation, design and detailed engineering, procurement assistance services, supervision of construction and erection, environmental engineering and pollution control, energy management and optimization, human resources development, and management consultancy. DASTUR has a dedicated team for Project Management services and to implement sound project management practices in the organization by providing professional training and PMP certification to large group of employees and thus becoming a constructive partner of Project Management community. We are approved as a Registered Education Provider (R.E.P) by the Project Management Institute (PMI), USA.

Dastur Business & Technology Consulting (DBTC), a division of DASTUR, offers specialized and end-to-end expertise to enable clients meet the needs of a rapidly changing global business and technological environment.

Dastur Innovation Labs (DIL), headquartered in Toronto, is a part of Dastur - the global metals, mining and energy consulting firm. DIL carries out cutting-edge applied research, process and operations modelling, and design, to solve difficult challenges faced by our customers. Our work spans the areas of quality, yield, throughput, logistics and metallurgical process improvements across ferrous and non-ferrous industries.

Over the years, DASTUR has built up a multidisciplinary team of over 700 professionals and technical staff with varied experience, fully abreast of the 'state-of-the-art' technologies, with intimate understanding of the latest trends, combining creativity with initiative. DASTUR provides a unique blend of experience and talent, catering to the specific requirements of each project.

DASTUR is internationally recognised as one of the largest independent consulting engineering organisations in the world. DASTUR is headquartered in Kolkata with offices in Chennai, Mumbai, Bengaluru, New Delhi, Bhubaneswar, and Hyderabad. International operations are based out of Düsseldorf in Germany, Tokyo in Japan, Abu Dhabi in UAE, Manama in Bahrain and New Jersey in USA.

DASTUR has earned global appreciation for its dedication and teamwork. Today, DASTUR is synonymous with excellence in engineering consultancy and business & technology consulting services.

12.2 ACCREDITATIONS

1. ISO 9001-2008 - Management System certified organization.

2. ISO 27001:2013 - Information Security Management System certified organization.

3. Environmental Engg. Dept. accredited under NABET (National Accreditation Board of Education & Training).

4. ISO 14001:2015- Environment Management System certified organization

5. ISO 45001: 2018- Occupational Health and Safety Management System certified organisation

6. ISO 17020:2012-Accredited Inspection Body

12.3 CONSULTANCY FOR ENVIRONMENTAL ENGINEERING/ MANAGEMENT SERVICES

For the Environmental Management Services, Dastur has dedicated environmental engineering department consisting of QCI-NABET Accredited Professionals for the following approved sectors:

- Thermal Power Plants (Sector- 4)
- Mineral Beneficiation (Sector -7)
- Metallurgical Industries (Sector 8)
- Coke oven plants (Sector-11)
- Ports, harbours, break waters & dredging (Sector-33)

12.4 RANGE OF SERVICES

M N Dastur offers diverse services ranging from integrated engineering, management consultancy to various studies as listed in the following sections.

RANGE OF SERVICES		
Studies	**Integrated Engineering Services**	**Management Consultancy**
• Concept Note • Market Surveys • Site selection studies • Master Plan studies • Feasibility Report • Techno-Economic Feasibility studies • Basic Engineering Report • Detailed Project Report • Productivity Review • Due Diligence studies • Energy Audit • Technology Evaluation	• Basic Engineering • Shop and Plant General Layout • Vendor Drawing Scrutiny • Bulk Material Handling • Architecture • Civil Engineering • Structural Steelwork • Electric Power Systems • Automation and Computerisation • Instrumentation and Control Systems • Piping Systems • Environmental Control Systems • Heating, Ventilation, Air-Conditioning Systems • Communication Systems • Roads, Drainage and Sewerage Systems	• Corporate Planning • Manpower Planning • Market Studies • Recruitment and Human Resource Development • Financial Assessment • Organisation & Methods, and Management Information Systems • Valuation of Assets • Lender's Engineering
Environment Management Services	**Project Management**	**Inspection & Quality Assurance**
• Environmental Impact Assessment • Locational Evaluation • Environment Audit & Compliance • Social Environmental impact Assessment (SEIA) • Environment Management Planning • Risk Assessment & Disaster Management Plans • Environmental Pollution Control Measures • Rainwater harvesting • Greenbelt Development Planning and Landscaping • Evaluation of Pollution Standards • Strategic Environment Assessment • Hydro-geological study • Social Cost Benefit Studies • Other Environmental Management services	• Project Governance • Procurement Management Services • Planning, Monitoring and Control • Construction Management • Project Risk Management • Cost Monitoring and Reporting • Contract Management • Management Information System • Project Closure	• Inspection of plant and equipment of different industries • Inspection of technological, flyover and building structures • Inspection of Power Distribution, Shop Electrics, Instrumentation, Automation, Power Electronics and tele-communication items • Inspection of Spares and Consumables • Inspection of Refractory Materials • Inspection of Pipelines • Vendor Assessment • Approval of welding electrodes • Inspection of unfired pressure vessels under SMPV rule • Inspection of IBR valves, pipes and pipe fittings • Expediting and follow up services
Site Services • Construction Planning • Planning of Construction facilities • Constructability Study • Construction Supervision • Quality Audit • Safety Audit • Bill Certification • Assistance during Commissioning and Performance Guarantee Tests • Assistance and Support during 'Ramp-up' • Contract administration and Claim Settlement • Safety Surveillance • Implementation of database management system on safety observations and Safety		

management system
- Material management
- Implementation of Material indenting system (for Free-issue items)

12.5 CLIENTELE

With core competencies spanning technology, engineering, operations, economics, cost, finance, and data science, Dastur is equipped to serve clients in a broad range of industry verticals. Its major clients include global organizations, government and state enterprises. Some of our key clients over the years include:

- Aditya Birla
- Arcelor Mittal
- Bhushan Power & Steel Limited
- Bhushan Steel Limited
- BUA International
- ESSAR
- Garmco
- GPH Ispat Ltd
- Hindalco
- Imerys Steelcasting India Pvt. Ltd
- Indian Oil Corporation Limited
- Jindal Coke Limited
- Jindal Steel & Power Limited
- Jindal Stainless Limited
- Jindal United Steel Limited
- JSW Steel
- JSW Utkal Steel Limited
- Kalyani Steels Limited
- Libya Iron and Steel Company
- Mitsui & Co. Steel Ltd.
- Nalco
- Nova Iron & Steel Limited
- Omzest
- Orissa Alloy Steel Pvt. Ltd.
- Orissa Metaliks Private Limited
- POSCO India
- Rashtriya Ispat Nigam Limited
- Rio - Tinto
- Qatar Steel
- SAIL
- SENAAT
- Spintech Tubes Private Limited
- Tata Steel Limited
- Tata Steel Kalinganagar
- Tata Metaliks Limited
- Vedanta
- Welspun Steel Limited
- West Bengal Power Development Corporatioin Limited

APPENDICES

APPENDICES

Appendix 1-1- Terms of Reference

File No: IA-J-11011/320/2024-IA-II

Government of India

Ministry of Environment, Forest and Climate Change

IA Division

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Dated **31/05/2025**

To,

M/s. KALYANI STEELS LTD
MUNDHWA PUNE 411036, PUNE, MAHARASHTRA, 411036
Email: gaurav.shukla@kalyanisteels.com

Subject: **Setting up of 1.43 MTPA Greenfield Integrated Advanced Specialty Steel Plant by M/s Kalyani Steels Limited, located at Gajamara, Dhenkanal District, Odisha-– Grant of TOR -Regarding.**

Sir/Madam,

This is with reference to your online application for Grant of Terms of Reference vide proposal no. IA/OR/IND1/527701/2025 dated 10.03.2025 along with the application in prescribed format (CAF, Form – I Part A & B), copy of pre-feasibility report and proposed ToRs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25A1005OR5309101N
(ii) File No.	IA-J-11011/320/2024-IA-II
(iii) Clearance Type	Fresh ToR
(iv) Category	A
(v) Project/Activity Included Schedule No.	3(a) Metallurgical Industries (ferrous and non ferrous),4(b) Coke oven plants,1(d) Thermal Power Plants
(vi) Sector	Industrial Projects - 1
(vii) Name of Project	Setting up of 1.43 MTPA Greenfield Integrated Advanced Specialty Steel Plant at village Gajamara, district Dhenkanal, Odisha
(viii) Name of Company/Organization	KALYANI STEELS LTD
(ix) Location of Project (District, State)	DHENKANAL, ODISHA
(x) Issuing Authority	MoEF&CC
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. 3. The proposed project activity is listed at schedule no. 3(a) Metallurgical industries (ferrous and non-ferrous) under Category “A” of the schedule of the EIA Notification, 2006 and being appraised at Central Level.

4. The proposal was considered in1st meeting of the EAC for Industry-I sector held on 3rd, 4th & 7th April, 2025 and further 3rd EAC Meeting held during 8th -9th May, 2025. The minutes of the meeting and all the project documents are available on PARIVESH portal which can be accessed at https://parivesh.nic.in.

Details submitted by Project proponent

5. The project of M/s Kalyani Steels Limited located in Villages Talabarkote and Siaria, Dhenkanal Tehsil, Dhenkanal District, Odisha State is for setting up of a new Greenfield Integrated Advanced Specialty Steel Product Plant for production of 1.43 Million Tons Per Annum (MTPA) crude steel.

6. The environmental setting of the proposed project is given at **Annexure-II** and the Unit configuration and capacity is at **Annexure-III**.

7. The water requirement for the proposed project is estimated as 18,288 m3 /day and will be met from the Mahanadi river at Phulbari in Cuttack District of Odisha through IDCO. The comfort letter for drawl of surface water is obtained from IDCO vide Lr. No. No.HO/P&C/EST/E-2626/01/2024/14868 dated 13.05.2024

8. The power requirement for the proposed project is estimated as 257 MW, out of which the grid power requirement of about 176 MW for the project (inclusive of ~ 8 MW of estimated transmission losses) will be met from OPTCL Grid at Neulpoi (located 10 km away) at 220 kV or from Khuntuni (located 4 km away) at 33 kV. Rest 89.5 MW will be generated from captive sources.

9. The capital cost of the project is Rs 11,058 Crores and the capital cost for environmental protection measures is proposed as Rs 550 Crores. The employment generation from the proposed project is 3,000 people will be directly and 7,200 people will be indirectly employed during operation phase of this project. During the construction phase, there would be around 12,000 contractual workers and 500 people will be directly employed.

10. It is reported that there are no violations under EIA, 2006/court case/show cause/direction related to the project under consideration.

11. The proposal was considered during the 1st meeting of the EAC for Industry-I sector held on 3rd, 4th & 7th April, 2025 wherein after deliberations, the Committee recommended to defer the proposed project and recommended for site visit. The deliberations and recommendations of EAC are as follows:

Deliberations of Committee (EAC during 3rd, 4th & 7th April, 2025):

The Committee noted the following:
i. The EAC deliberated on the land details submitted by the Project Proponent (PP) and noted that the proposed project involves 224.737 ha of land, including 60.203 ha of forest land. The Committee enquired PP whether there is any change in the earlier-selected site. The PP informed that based on the EAC’s recommendations, the State Agencies were approached. However, there was no alternate site available with the State Government matching the project specific requirements. Accordingly, PP proceeded to fulfil additional requirements, including identification and allotment of CA land to indicate its commitment to meet the prescribed rules and procedures w.r.t. forest clearance. EAC observed that the proposal needs to be carefully examined as it involves tree felling and conversion of prime agricultural and forestland for industrial use.

ii. EAC noted that there is a need to undertake a comprehensive analysis incorporating land-use, land-cover analysis, land capability assessment, rationalization of land utilization for the project, socio-economic assessment of the core area, immediate adjacencies of the project, and the impact of project in various socio-economic and environmental attributes of the study area. The analysis would help in gaining further understading of ecological impact and required

mitigation measures.

iii. In view of the above, the EAC recommended that a site visit be conducted by a three-member EAC Sub-Committee to assess the ground reality. The Sub-Committtee shall comprise of Dr. Ranjit Prasad, Dr. WG Prasanna Kumar and a MoEFCC representative. The visit would help in analysis of the issues related to the selection of site and related mitigation measures, and shall be carried out jointly with presence of represetatives from State Revenue and Forest departments, and State Pollution Control Board to incorporate their suggestions and views in the appraisal process. The site visit report will serve as a critical input for further deliberation and decision-making regarding the proposal.

Recommendations of the Committee (EAC during 3rd, 4th & 7th April, 2025):

12. In view of the foregoing and after deliberations, the Committee recommended to defer the proposed project and recommended for site visit of the Sub-Committee, along with officials from concerned RO MoEF&CC, State Revenue and Forest departments, and State Pollution Control Board. The proposal shall be further appraised based on the findings of the sub-committee and deliberation of EAC.

13. Accordingly, the site visit to proposed project area of M/s Kalyani Steels Limited, located at Gajamara, Dhenkanal District, and Odisha was undertaken during 28th and 29 April 2025 by the Sub-Committee and the report was submitted.

14. PP submitted the response to the ADS raised on 02.05.2025, the proposal was re-considered during the 3rd meeting of the EAC for Industry-I sector held on 8th – 9th May, 2025. The deliberations and recommendations of EAC are as follows:

Deliberation by the Committee:

15. The Committee noted the following:

i. The instant proposal is for setting up of a new Greenfield Integrated Advanced Specialty Steel Product Plant for production of 1.43 Million Tons Per Annum (MTPA) crude steel.

ii. The EAC took into consideration the drone survey of the project site and kml file on the Google Earth presented by the project proponent along with DSS of the project site on PARIVESH and made following deliberations accordingly.

iii. The EAC also took into consideration the observations and recommendations of the sub committee made during the site visit.

iv. PP reported that the total project area spans 224.737 ha, comprising 147.756 ha of private (IDCO deed) land and 76.981 ha of government land, including 60.203 ha of revenue forest mainly with cashew trees. A detailed tree enumeration confirmed that 80% of the vegetation consists of cashew trees. After evaluating alternate sites, the Gajamara land parcel was found most suitable based on techno-commercial and ecological criteria. IPICOL and IDCO confirmed that no other suitable land is available. The forest diversion proposal (FP/OR/IND/526987/2025) was accepted by the Project Screening Committee on 9th April, 2025. As per norms, compensatory afforestation (CA) land of 61.327 ha in Bolangir Forest Division and an additional 35 ha in Bargarh Forest Division have been identified and approved. The proposal is in an advanced stage of Stage-I Forest Clearance. The EAC opined that PP shall secure complete acquisition of land and conversion for industrial purpose and submit the same with the EIA/EMP Report. Further necessary clearance shall be obtained for the forest land and the status of the same shall be submitted with the EIA/EMP Report.

v. The EAC advised that based on a detailed tree enumeration survey, the number of cashew trees and other species proposed to be felled shall be clearly identified. Girth & height, age and species of the trees and the mode of compensatory plantation proposed against each tree cut (if any) should be given in EIA report. Efforts shall be made to

retain other native tree species to the maximum extent possible. Felling of trees shall be undertaken only with prior permission and guidance from the Divisional Forest Officer (DFO) and with proper justification.

vi. There are sensitive area reported within the study area of the project site. The EAC is of the opinion that PP shall prepare and include in the EIA/EMP Report the environmental safeguard measures to minimise the impact of the project activities on these sensitive areas. A detailed socio-economic survey covering the Project Influence Area (PIA), i.e., within a 10 km radial distance from the project site, shall be conducted and incorporated in the Environmental Impact Assessment (EIA) report. The survey shall assess baseline socio-economic conditions, identify potential impacts including on the vulnerable groups viz., elderly, children, pregnant women and sick especially terminally ill people and propose appropriate mitigation and development measures in consultation with local stakeholders especially covering these vulnerable sections.

vii. The PP shall adopt the two most affected nearby villages and implement a structured socio-economic development plan in consultation with the local administration. The plan shall include measures for improving health, elderly care, environmental education, formal education, skill development, livelihood, and infrastructure and be reported annually to the concerned authority.

viii. The Project Proponent (PP) shall make all efforts to provide employment opportunities to local residents from nearby areas, especially most project affected villages, to the extent possible and as per their eligibility including in their nursery which needs to support their plantation efforts in their premises and in the project district

ix. There is a pond at Talabarkote village. PP reported that the pond will be kept outside the physical boundary of the proposed plant and access will be made available to villagers. The area surrounding the pond shall be developed as greenbelt. The EAC opined that Project Proponent (PP) shall ensure that the two existing ponds (Jalasayas), as identified in the project area, remain outside the project's physical boundary. The PP shall undertake renovation measures—such as desilting, bund maintenance, increasing pond depth, catchment area plantation and improving overall ecological conditions—in consultation with the local authorities. These ponds shall be developed and maintained for the benefit of the local community, with provisions for free and unrestricted access to villagers, including supporting catchment area treatment and protection efforts.

x. There are water bodies reported within the study area of the project site. The EAC further opined that a robust and full-proof Drainage Conservation scheme to protect the natural drainage and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be implemented.

xi. The project site is located at a distance of 5.8 km from the Kapilash Wildlife Sanctuary, while the nearest boundary of the notified Eco-Sensitive Zone (ESZ) of the sanctuary lies approximately 4 km away. The EAC opined that the project proponent shall submit a certified map, duly authenticated by the District Forest Officer (DFO), indicating the precise distance of the project boundary from the nearest boundary of the Kapilasa Wildlife Sanctuary Eco-Sensitive Zone (ESZ).

xii. The water requirement for the proposed project is estimated as 18,288 m3 /day and will be met from the Mahanadi river at Phulbari in Cuttack District of Odisha through IDCO. The EAC opined that necessary permission shall be obtained from the Competent Authority. PP shall further secure required permissions for laying the pipeline, if any, for withdrawing water from River. An action plan with defined timelines shall be prepared, and submitted with EIA/EMP Report.

xiii. The Project Proponent (PP) shall submit an action plan for Green Belt development covering at least 33% of the total project area. The plan shall include three-tier plantations of native species along the project’s periphery with an adequate width and a tree density of not less than 2,500 trees per hectare. The green belt shall be initiated in the identified area developed within a period of one year from the start of project implementation. For this nursery shall also commence along with the project work so that required tall plants of identified species are available. The survival rate of the plantation shall be monitored periodically, and damaged or dead saplings shall be replaced in subsequent years to maintain the intended green cover. Additionally, the plan shall include provisions for developing an enhanced green belt towards the nearby habitation. The naturally grown vegetation part of the project site, developed over the

last decade, shall be preserved as far as possible and integrated as part of the greenbelt, for this they need to develop and maintain a native plants nursery.

xiv. Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including rain water harvesting details with calculations mentioning about GW recharge along with relevant drawing.

Recommendations of the Committee

16. After deliberations, the Committee recommended the proposal for prescribing specific ToRs for undertaking detailed EIA and EMP study alongwith Public Hearing in addition to the generic ToRs enclosed at Annexure read with additional ToRs at Annexure. The EAC categorically noted that the recommendation to grant ToR is technical in nature under the provisions of the EIA Notification 2006. The recommendation does not create an obligation for authorities that handle issues related and relevant to construction and operation of the project under other independent procedures/ statutes, including the provisions stipulated in the Land Acquisition (R&R) Act, 2013. The specific ToRs are mentioned below(Annexure I):

17. The undersigned is directed to inform that Ministry of Environment, Forest and Climate Change has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the Expert Appraisal Committee (Industry-1) duly noting that the grant of ToR is technical in nature under the provisions of the EIA Notification 2006. The recommendation does not create an obligation for authorities that handle issues related and relevant to construction and operation of the project under other independent procedures/ statutes, including the provisions stipulated in the Land Acquisition (R&R) Act, 2013. Accordingly, it is hereby decided to accord above-said specific ToRs, in addition to the standard ToRs and Sector Specific ToRs as enclosed at **Annexure-I** read with additional ToRs for carrying out detailed EIA/EMP for the above project.

18. It is requested that the draft EIA Report may be prepared in accordance with the above-mentioned specific ToRs and enclosed generic ToRs and additional ToRs and thereafter further necessary action may be taken for obtaining Environment Clearance in accordance with the procedure prescribed under the EIA Notification, 2006 as amended.

19. The ToRs are valid for a period of four years from date of issue of this letter as per the Ministry's Notification S.O. 751 (E) dated 17/02/2020.

20. This issue with the approval of the Competent Authority.

3.

(Dinesh Runiwal)
Scientist 'F'/Director
Tel: 011-20819346
Email-d.runiwal@gov.in

Copy To

1. Secretary, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.

2. Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

3. Regional Officer, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, A/3, Chandersekharpur, Bhubaneswar – 751023.

4. **Chairman, Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII,**

Bhubaneshwar 751012 - with a request to initiate action in line with the provisions of OM dated 14-01-2025

5. Chief Wildlife Warden, Govt. of Odisha, 5th Floor, BDA Apartments, Prakruti Bhawan, Nilakantha Nagar, Nayapalli, Bhubaneshwar-751012

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

7. District Collector, Gajamara, Dhenkanal District, Odisha.

8. Guard File/Monitoring File/Website/Record File/Parivesh Portal.

Annexure 1

Specific Terms of Reference for (Metallurgical Industries (Ferrous And Non Ferrous))

1. Specific

S. No	Terms of Reference
1.1	PP shall secure complete acquisition of land and conversion for industrial purpose and submit the same with the EIA/EMP Report. Further necessary clearance shall be obtained for the forest land and the status of the same shall be submitted with the EIA/EMP Report.
1.2	Based on a detailed tree enumeration survey, the number of cashew trees and other species proposed to be felled shall be clearly identified. Girth & height, age and species of the trees and the mode of compensatory plantation proposed against each tree cut (if any) should be given in EIA report. Efforts shall be made to retain other native tree species to the maximum extent possible. Felling of trees shall be undertaken only with prior permission and guidance from the Divisional Forest Officer (DFO) and with proper justification.
1.3	There are sensitive area reported within the study area of the project site. PP shall prepare and include in the EIA/EMP Report the environmental safeguard measures to minimise the impact of the project activities on these sensitive areas. A detailed socio-economic survey covering the Project Influence Area (PIA), i.e., within a 10 km radial distance from the project site, shall be conducted and incorporated in the Environmental Impact Assessment (EIA) report. The survey shall assess baseline socio-economic conditions, identify potential impacts including on the vulnerable groups viz., elderly, children, pregnant women and sick especially terminally ill people and propose appropriate mitigation and development measures in consultation with local stakeholders especially covering these vulnerable sections.
1.4	The project proponent shall present a detailed Action Plan during the appraisal of the Environmental Clearance proposal, covering all commitments towards socio-economic development of the nearby villages in line with the Ministry's OM dated 30.09.2020. The Action Plan shall include sub-plans for: (i) promoting environmental education and awareness in local educational institutions, including mechanisms for disclosure of the project's environmental performance to the community, and (ii) addressing the specific needs of vulnerable sections of the impacted community—such as the elderly, children, pregnant women, persons with disabilities, and the terminally ill. The plan shall also detail the institutional mechanisms for regular monitoring, stakeholder engagement, and dissemination of information on the status of socio-economic development commitments.
1.5	The PP shall submit a plan to adopt the two most affected nearby villages and implement a

S. No	Terms of Reference
	structured socio-economic development plan in consultation with the local administration. The plan shall include measures for improving health, elderly care, environmental education, formal education, skill development, livelihood, and infrastructure and be reported annually to the concerned authority.
1.6	The Project Proponent (PP) shall make all efforts to provide employment opportunities to local residents from nearby areas, especially most project affected villages, to the extent possible and as per their eligibility including in their nursery which needs to support their plantation efforts in their premises and in the project district.
1.7	Project Proponent (PP) shall ensure that the two existing ponds (Jalasayas), as identified in the project area, remain outside the project's physical boundary. The PP shall undertake renovation measures—such as desilting, bund maintenance, increasing pond depth, catchment area plantation and improving overall ecological conditions—in consultation with the local authorities. These ponds shall be developed and maintained for the benefit of the local community, with provisions for free and unrestricted access to villagers, including supporting catchment area treatment and protection efforts.
1.8	There are water bodies reported within the study area of the project site. A robust and foolproof Drainage Conservation scheme to protect the natural drainage and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be implemented.
1.9	Project proponent shall submit a certified map, duly authenticated by the District Forest Officer (DFO), indicating the precise distance of the project boundary from the nearest boundary of the Kapilasa Wildlife Sanctuary Eco-Sensitive Zone (ESZ).
1.10	The water requirement for the proposed project is estimated as 18,288 m3 /day and will be met from the Mahanadi river at Phulbari in Cuttack District of Odisha through IDCO. Necessary permission shall be obtained from the Competent Authority. PP shall further secure required permissions for laying the pipeline, if any, for withdrawing water from River. An action plan with defined timelines shall be prepared, and submitted with EIA/EMP Report.
1.11	The Project Proponent (PP) shall submit an action plan for Green Belt development covering at least 33% of the total project area. The plan shall include three-tier plantations of native species along the project’s periphery with an adequate width and a tree density of not less than 2,500 trees per hectare. The green belt shall be initiated in the identified area developed within a period of one year from the start of project implementation. For this nursery shall also commence along with the project work so that required tall plants of identified species are available. The survival rate of the plantation shall be monitored periodically, and damaged or dead saplings shall be replaced in subsequent years to maintain the intended green cover. Additionally, the plan shall include provisions for developing an enhanced green belt towards the nearby habitation. The naturally grown vegetation part of the project site, developed over the last decade, shall be preserved as far as possible and integrated as part of the greenbelt, for this they need to develop and maintain a native plants nursery.
1.12	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including rain water harvesting details with calculations mentioning about GW recharge along with relevant drawing
1.13	Annual Wind Rose Diagrams (for all seasons) must be constructed, taking data from secondary

S. No	Terms of Reference
	sources.
1.14	The maximum amount of solar power that can be generated within the premises of the Plant must be reported.
1.15	An action plan must be drawn up and implemented for maximum harvesting of rain water.
1.16	The ”input” parameters used in the AAQ modelling be reported.
1.17	The “inversion height” and “mixing height” be reported, without any ambiguity.
1.18	Necessary coordination shall be made with concerned SPCB (who is responsible for Compliance of OM dated 14-01-2025) regarding streamlining the implementation of GSR 702 and GSR 703 dated 12-11-2024 through which projects requiring prior EC were exempted from requirement of CTE.

Standard Terms of Reference for Industrial Projects - 1

1. Preliminary Requirements

S. No	Terms of Reference
1.1	EIA/EMP report cover page shall consists of project title with location, applicable schedule of the EIA Notification, 2006, ToR letter No. with date, study period along with EIA consultant & laboratory details with QCI/NABET/NABL accreditation certificate detail.
1.2	Besides, following points shall be compiled as per QCI/NABET norms: a. Disclaimer by the EIA consultant. b. Declaration by the Functional Area Experts contributed to the EIA study and declaration by the head of the accredited consultant organization/authorized person. c. Undertaking by the project proponent owning the contents (information and data) of the EIA/EMP report. d. Undertaking by the EIA consultant regarding compliance of ToR issued by MoEF&CC. e. Consultant shall submit the Plagiarism Certificate for the EIA/EMP Report.

2. Executive Summary

S. No	Terms of Reference
2.1	Table of Contents of the EIA report including list of tables/figures/annexures/abbreviations/symbols/notations.
2.2	Point wise compliance to the ToR issued by MoEF&CC.

2.1 Introduction

S. No	Terms of Reference
2.1.1	Name of the project along with applicable schedule and category as per EIA, 2006.

S. No	Terms of Reference
2.1.2	Location and accessibility

2.2 Project Description

S. No	Terms of Reference
2.2.1	Resource requirements (Land; water; fuel; manpower)
2.2.2	Operational activity
2.2.3	Key pollution concerns

2.3 Baseline Environment Studies

S. No	Terms of Reference
2.3.1	Ambient air quality
2.3.2	Ambient Noise quality
2.3.3	Traffic study
2.3.4	Surface water quality
2.3.5	Ground water quality
2.3.6	Soil quality
2.3.7	Biological Environment
2.3.8	Land use
2.3.9	Socio-economic environment

2.4 Anticipated Impacts

S. No	Terms of Reference
2.4.1	Impact on ambient air quality
2.4.2	Impact on ambient noise quality
2.4.3	Impact on road and traffic
2.4.4	Impact on surface water resource and quality
2.4.5	Impact on ground water resource and quality
2.4.6	Impact on terrestrial and aquatic habitat

S. No	Terms of Reference
2.4.7	Impact on socio-economic environment

2.5 Alternative Analysis

S. No	Terms of Reference
2.5.1	No Data Found

2.6 Environmental Monitoring Program

S. No	Terms of Reference
2.6.1	Ambient air, noise, water and soil quality
2.6.2	Noise quality management plan
2.6.3	Emission and discharge from the plant
2.6.4	Green Belt
2.6.5	Social Parameters

2.7 Additional Studies

S. No	Terms of Reference
2.7.1	Risk assessment
2.7.2	Public consultation
2.7.3	Action plan to address the issues raised during public consultation as per MoEF&CC O.M. dated 30/09/2020

2.8 Project Benefits

S. No	Terms of Reference
2.8.1	No Data Found

2.9 Environment Management Plan

S. No	Terms of Reference
2.9.1	Air quality management plan
2.9.2	Noise quality management plan
2.9.3	Solid and hazardous waste management plan

S. No	Terms of Reference
2.9.4	Effluent management plan
2.9.5	Storm water management plan
2.9.6	Occupational health and safety management plan
2.9.7	Green belt development plan
2.9.8	Socio-economic management plan
2.9.9	Project cost and EMP implementation budget.

3. Introduction

S. No	Terms of Reference
3.1	Background about the project
3.2	Need of the project
3.3	Purpose of the EIA study
3.4	Scope of the EIA study

4. Project Description

4.1 Site Details

S. No	Terms of Reference
4.1.1	Location of the project site covering village, Taluka/Tehsil, District and State.
4.1.2	Site accessibility
4.1.3	A digital toposheet in pdf or shape file compatible to google earth of the study area of radius of 10km and site location preferably on 1:50,000 scale. (including all eco-sensitive areas and environmentally sensitive places).
4.1.4	Latest High-resolution satellite image data having 1 m - 5 m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100 m all around the project location.
4.1.5	Environment settings of the site and its surrounding along with map.
4.1.6	A list of major industries with name, products and distance from plant site within study area (10km radius) and the location of the industries shall be depicted in the study area map.
4.1.7	In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/construction zone. If it's near the wetland,

S. No	Terms of Reference
	Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.
4.1.8	In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.
4.1.9	In case of canal/ nala/ seasonal drain and any other water body passing through project site, the PP shall submit the suitable steps /conservation plan/mitigation measures along with contouring, Run - off calculations, disposal etc. A robust and full proof Drainage Conservation scheme to protect the natural drainage/water bodies and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be provided in the report.
4.1.10	Type of land, land use of the project site needs to be submitted.
4.1.11	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.
4.1.12	Project proponent shall prepare Engineering layout plan showing all internal roads minimum 6 m width and 9 m turning radius for smooth traffic flow inside including fire tender as per NBC. Road network shall connect all service areas in layout. This drawing shall include area statement showing plot area, area under roads, parking, green belt with calculations and % with respect to plot area of project site and proper indexing. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.
4.1.13	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including Rain Water Harvesting details with calculations mentioning about GW recharge along with relevant drawing.
4.1.14	A detailed report covering all aspects of Fire Safety Management and Fire Emergency Plan shall be submitted.
4.1.15	Details of drone survey for the site, needs to be included in report and presented before the EAC during appraisal of the project.

4.2 Forest And Wildlife Related Issues (If Applicable)

S. No	Terms of Reference
4.2.1	Status of Forest Clearance for the use of forest land shall be submitted.
4.2.2	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10 km radius of national park/sanctuary wherein final ESZ notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.
4.2.3	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project

S. No	Terms of Reference
	proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.
4.2.4	Wildlife Conservation Plan duly authenticated by the Competent Authority of the State Government for conservation of Schedule I fauna along with budget and action plan, if any exists in the study area.

4.3 Salient Features Of The Project

S. No	Terms of Reference
4.3.1	Products with capacities in Tons per Annum for the proposed project.
4.3.2	If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.
4.3.3	Site preparatory activities.
4.3.4	List of raw materials required and their source along with mode of transportation.
4.3.5	Other than raw materials, other chemicals and materials required with quantities and storage capacities.
4.3.6	Manufacturing process details along with process flow diagram of proposed units.
4.3.7	Consolidated materials and energy balance for the project.
4.3.8	Total requirement of surface/ ground water and power with their respective sources, status of approval.
4.3.9	Water balance diagram
4.3.10	Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.
4.3.11	Man-power requirement.
4.3.12	Cost of project and scheduled time of completion.
4.3.13	In case of expansion projects, project proponent shall submit structural stability certificate showing whether existing structure withstand for proposed expansion activity.
4.3.14	Brief on present status of compliance (Expansion/modernization proposals) a. Cumulative Environment Impact Assessment for the existing as well as the proposed expansion/modernization shall be carried out. b. Cumulative Impact Assessment need to be carried out by greenfield projects considering the nearby industries. c. In case of ground water drawl for the existing unit, action plan for phasing out of ground water abstraction in next two years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source. d. Copy of all the Environment Clearance(s) including Amendments/validity of extension/transfer of EC, there to obtained for the

S. No	Terms of Reference
	project from MoEF&CC/SEIAA shall be attached as Annexures. A Certified Compliance Report (CCR) of the Integrated Regional Office of the Ministry of Environment, Forest and Climate Change/ or concerned authority as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022 on the status of compliance of conditions stipulated in all the existing environment clearances including amendments shall be provided. A Certified Compliance Report (CCR) issued by the concerned Authority shall be valid for a period of one year from the date of inspection. e. In case the existing project has not obtained Environment Clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. A proper justification needs to be submitted along with documentary proof. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 1994 or 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of CTO from the Regional Office of the SPCB shall be submitted, as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022. CCR on CTO conditions issued by the concerned SPCBs/PCCs shall be valid for a period of one year from the date of inspection of the project.

5. Description Of The Environment

S. No	Terms of Reference			
5.1	Study period			
5.2	Approach and methodology for data collection as furnished below **Attributes** Air Environment Micro-Meteorological • Wind speed (Hourly) • Wind direction • Dry bulb temperature • Wet bulb temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental • Lapse Rate Pollutants • PM10 • SO2	**Sampling** Network Minimum 1 site in the project impact area At least 8-12 locations	Frequency hourly continuous As per National Ambient Air Quality Standards,CPCB Notification.	**Remarks** IS 5182 Part 1-20 • Site specific primary data is essential • Secondary data from IMD, New Delhi • CPCB guidelines to be considered. • Sampling as per CPCB guidelines • Collection of AAQ data (except in monsoon

S. No	Terms of Reference
	• NOx • CO • HC • Other parameters relevant to the project and topography of the area season) • Locations of various stations for different parameters should be related to the characteristic properties of the parameters. • The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16/11/2009 and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests, • Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM Notification of 16/11/2009 along with min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report. Noise Hourly equivalent noise levels — At least 8-12 locations — s per CPCB norms Water Parameters for water quality • pH, temp, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity • Total nitrogen, total phosphorus, DO, BOD, COD, Phenol • Heavy metals Samples for water quality should be collected and analyzed as per: • IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents • Standard methods for examination of water and wastewater analysis published by American Public Health Association

S. No	Terms of Reference		
	• Total coliforms, faecal coliforms • Phyto plankton • Zoo plankton For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen Demand • Free NH4 • Boron • Sodium Absorption Ratio • ElectricalConductivity	Surface water quality of the nearest River (60m upstream and downstream) and other surface water bodies	• Yield of water sources to be measured during critical season • Standard methodology for collection of surface water (BIS standards)
	For Ground Water	Ground water monitoring data should be collected at minimum of 8 locations (from existing wells /tube wells/existing current records) from the study area and shall be included.	
	Traffic Study Type of vehicles • Frequency of vehicles for transportation of materials • Additional traffic due to proposed project	Land Environment	
	Soil • Particle size distribution • Texture • pH • Electrical conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR • Permeability Water holding capacity	Soil samples be collected as per BIS specifications	

S. No	Terms of Reference
	• Porosity Land use/Landscape • Location code • Total project area • Topography • Drainage (natural) Cultivated, forest,plantations, water bodies, roads and settlements Biological Environment 1. Aquatic • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zoo plankton and benthos • Fisheries Diversity indices • Trophic levels • Rare and endangered species • Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ) 2. Terrestrial • Vegetation-species list, economic importance, forest produce,medicinal value • Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered • Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. Indicator species which indicate ecological and environment degradation should be identified and included to clearly state whether the proposed project would result in to any adverse effect on any species. • Samples to collect from upstream and downstream of discharge point, nearby tributaries at downstream, and also from dug wells close to activity site. • For forest studies, direction of wind should be considered while selecting forests. • Secondary data to collect from Government offices, NGOs, published literature.

S. No	Terms of Reference

species

- Sanctuaries / National park / Biosphere reserve
- Migratory routes

socio-economic
Demographic structure

- Infrastructure resource base
- Economic resource base
- Health status:Morbidity pattern
- Cultural and aesthetic attributes.
- Education

Socio-economic survey is based on proportionate, stratified and random sampling method.

- Primary data collection through questionnaire
- Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies

Approach and methodology for data collection as furnished below

Attributes	Sampling		Remarks
	Network	Frequency	
Air Environment Micro-Meteorological • Wind speed (Hourly) • Wind direction • Dry bulb temperature • Wet bulb temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental • Lapse Rate	Minimum 1 site in the project impact area	hourly continuous	IS 5182 Part 1-20 • Site specific primary data is essential • Secondary data from IMD, New Delhi • CPCB guidelines to be considered.
Pollutants • PM10 • SO2 • NOx	At least 8-12 locations	As per National Ambient Air Quality Standards,CPCB Notification.	• Sampling as per CPCB guidelines • Collection of AAQ data (except in monsoon

S. No	Terms of Reference
	• CO • HC • Other parameters relevant to the project and topography of the area season) • Locations of various stations for different parameters should be related to the characteristic properties of the parameters. • The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16/11/2009 and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests, • Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM Notification of 16/11/2009 along with min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report. Noise Hourly equivalent noise levels — At least 8-12 locations — s per CPCB norms Water Parameters for water quality • pH, temp, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity • Total nitrogen, total phosphorus, DO, BOD, COD, Phenol • Heavy metals Samples for water quality should be collected and analyzed as per: • IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents • Standard methods for examination of water and wastewater analysis published by American Public Health Association

S. No	Terms of Reference		
	• Total coliforms, faecal coliforms • Phyto plankton • Zoo plankton For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen Demand • Free NH4 • Boron • Sodium Absorption Ratio • ElectricalConductivity	Surface water quality of the nearest River (60m upstream and downstream) and other surface water bodies	• Yield of water sources to be measured during critical season • Standard methodology for collection of surface water (BIS standards)
	For Ground Water	Ground water monitoring data should be collected at minimum of 8 locations (from existing wells /tube wells/existing current records) from the study area and shall be included.	
	Traffic Study Type of vehicles • Frequency of vehicles for transportation of materials • Additional traffic due to proposed project	Land Environment	
	Soil • Particle size distribution • Texture • pH • Electrical conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR • Permeability Water holding capacity	Soil samples be collected as per BIS specifications	

S. No	Terms of Reference
	• Porosity Land use/Landscape • Location code • Total project area • Topography • Drainage (natural) Cultivated, forest,plantations, water bodies, roads and settlements Biological Environment 1. Aquatic • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zoo plankton and benthos • Fisheries Diversity indices • Trophic levels • Rare and endangered species • Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ) 2. Terrestrial • Vegetation-species list, economic importance, forest produce,medicinal value • Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered • Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. Indicator species which indicate ecological and environment degradation should be identified and included to clearly state whether the proposed project would result in to any adverse effect on any species. • Samples to collect from upstream and downstream of discharge point, nearby tributaries at downstream, and also from dug wells close to activity site. • For forest studies, direction of wind should be considered while selecting forests. • Secondary data to collect from Government offices, NGOs, published literature.

S. No	Terms of Reference
	species • Sanctuaries / National park / Biosphere reserve • Migratory routes socio-economic Demographic structure • Infrastructure resource base • Economic resource base • Health status:Morbidity pattern • Cultural and aesthetic attributes. • Education Socio-economic survey is based on proportionate, stratified and random sampling method. • Primary data collection through questionnaire • Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies
5.3	Interpretation of each environment attribute shall be enumerated and summarized as given below: • Ambient air quality • Ambient Noise quality • Surface water quality • Ground water quality • Soil quality • Biological Environment • Land use • Socio-economic environment
5.4	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.

6. Anticipated Environment Impacts And Mitigation Measures (In Case Of Expansion, Cumulative Impact Assessment Shall Be Carried Out)

S. No	Terms of Reference
6.1	Identification of potential impacts in the form of a matrix for the construction and operation phase for all the environment components **Activity** **Environment** **Ecological** **Socio-economic** Construction phase Operation phase
6.2	Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase • Details of stack emissions from the existing as well as proposed activity. • Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors,

S. No	Terms of Reference
	if any along with wind rose map for respective period • Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.
6.3	Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.4	Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.5	Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.6	Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.7	Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.8	Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.9	Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.10	Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.11	Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase

7. Analysis Of Alternatives (Technology & Site)

S. No	Terms of Reference
7.1	No project scenario
7.2	Site alternative
7.3	Technical and social concerns
7.4	Conclusion

8. Environmental Monitoring Program

S. No	Terms of Reference
8.1	Details of the Environment Management Cell

S. No	Terms of Reference
8.2	Performance monitoring schedule for all pollution control devices shall be furnished.
8.3	Corporate Environment Policy a. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report. b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environment or forest norms / conditions? If so, it may be detailed in the EIA. c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given.Page 9 of 10 d. Does the company have system of reporting of non compliances / violations of environment norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report
8.4	Action plan for post-project environment monitoring matrix: **Activity Aspect Monitoring Parameter Location Frequency Responsibility** Construction phase Operation phase

9. Additional Studies

S. No	Terms of Reference
9.1	Project proponent shall submit a study report on Decarbonisation program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage after offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments should be measurable and monitorable with defined time frames.
9.2	Details of adoption/ implementation status/plan to achieve the goal of Glasgow COP26 Climate Submit with regard to enhance the non-fossil energy, use of renewable energy, minimization of net carbon emission and carbon intensity with long-term target of "net Zero" emission.
9.3	Implementation status/measures adopted for avoiding the generation of single used plastic waste.
9.4	In cases the project is located in Critically and Severely Polluted Areas, additional mitigation measures adopted and detailed action plan to be submitted in the EIA/EMP Report as per MoEF&CC O.M. No. 22-23/2028-IA.III dated 31/10/2019 and MoEF&CC O.M. No. 22-23/2028-IA.III dated 5/07/2022 has to be submitted.
9.5	Public consultation details (Entire proceedings as separate annexure along with authenticated English Translation of Public Consultation proceedings).

S. No	Terms of Reference
9.6	As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration. In this regard, time bound action plan as per the MoEF&CC Office Memorandum dated 30/09/2020 shall be submitted.
9.7	Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020 **S.No** / **Physical activity and action plan** (Name of the Activity; Physical Targets) / **Year of implementation (Budget in INR)** (1st; 2nd; 3rd) / **Total Expenditure (Rs. in Crores)**
9.8	Risk assessment • Methodology • Hazard identification • Frequency analysis • Consequence analysis • Risk assessment outcome
9.9	Emergency response and preparedness plan

10. Project Benefits

S. No	Terms of Reference
10.1	Environment benefits
10.2	Social infrastructure
10.3	Employment and business opportunity
10.4	Other tangible benefits

11. Environment Cost Benefit Analysis

S. No	Terms of Reference
11.1	Net present value
11.2	Internal rate of return
11.3	Benefit cost ratio

S. No	Terms of Reference
11.4	Cost effectiveness analysis

12. Environment Management Plan (Construction And Operation Phase)

S. No	Terms of Reference
12.1	Air quality management plan
12.2	Noise quality management plan
12.3	Action plan for hazardous waste management
12.4	Action plan for solid waste management
12.5	Action plan for e-waste management.
12.6	Action plan for plastic waste management, considering the Plastic Waste Management Rules 2016.
12.7	Action plan for construction and demolition waste management.
12.8	Effluent management plan
12.9	Storm water management plan
12.10	Rain water harvesting plan
12.11	Plan for maximum usage of waste water/treated water in the Unit
12.12	Occupational health and safety management plan
12.13	Green belt development plan: An action plan for Green Belt development consisting of 3 tiers of plantations of native species all along the periphery of the project of adequate width shall be raised in 33% of total area with a tree density shall not less than 2500 per ha within a time frame of one year shall be submitted. Survival rate of green belt shall be monitored on periodic basis to ensure that survival rate not be less than 80 %.
12.14	Socio-economic management plan
12.15	Wildlife conservation plan (In case of presence of schedule I species)
12.16	Total capital cost and recurring cost/annum for environment pollution control measures shall be included.
12.17	Explore possibilities for recycling and reusing of treated water in the unit to reduce the freshwater demand and waste disposal.
12.18	An Action Plan for improving the house-keeping activities in the raw material handling area need to be submitted

S. No	Terms of Reference
12.19	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.
12.20	Action plan to limit the dust emission from all the stacks below 30 mg/Nm3 shall be furnished.
12.21	Action plan for fugitive emission control in the plant premises shall be provided.

13. Conclusion Of The Eia Study

S. No	Terms of Reference
13.1	No Data Found

14. In Addition To The Above, Any Litigation Pending Against The Project And/or Any Direction/order Passed By Any Court Of Law Against The Project, If So, Details Thereof Shall Also Be Included. Has The Unit Received Any Notice Under The Section 5 Of Environment (Protection) Act, 1986 Or Relevant Sections Of Air And Water Acts? If So, Details Thereof And Compliance/atr To The Notice(s) And Present Status Of The Case.

S. No	Terms of Reference
14.1	No Data Found

15. Air Cooled Condensors Shall Be Used In The Power Plant.

S. No	Terms of Reference
15.1	No Data Found

16. Details Of Dry Ash Handling System Along With Supplementary Coal Handling System Shall Be Submitted.

S. No	Terms of Reference
16.1	No Data Found

17. Plan For Transportation Of Coal Shall Be Submitted.

S. No	Terms of Reference
17.1	No Data Found

18. Plan Along With Technical Details Of Scr Shall Be Submitted.

S. No	Terms of Reference
18.1	No Data Found

19. In Case Of Expansion Project, Status Of Ash Utilization Of Previous Years (Up To 5 Years), Action Plan For 100% Ash Utilization Along With Timeline Need To Be Submitted

S. No	Terms of Reference
19.1	No Data Found

Standard Terms of Reference for (Metallurgical Industries (ferrous and non ferrous))

1.

S. No	Terms of Reference
1.1	A 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.
1.2	Plan for the implementation of the recommendations made for the proposed Unit in the Corporate Responsibility for Environmental Protection (CREP) guidelines.
1.3	Plan for solid wastes utilization.
1.4	Plan for utilization of energy in off gases (coke oven, blast furnace)
1.5	System of coke quenching adopted with full justification.
1.6	Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials.
1.7	Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
1.8	Details on toxic content using Toxicity Characteristic Leaching Procedure (TCLP), composition and end use of slag.
1.9	100 % dolo char generated in the plant shall be used to generate power.
1.10	Fourth Hole fume extraction system shall be provided for SAF.WHR system shall be installed to recover sensible heat from flue gases of EAF. Provision for installation of jigging and briquetting plant to utilise the fines generated in the process.
1.11	No tailing pond is permitted for Iron ore slimes. Dewatering and filtration system shall be provided.
1.12	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.
1.13	Action plan for developing connecting and internal road in terms of MSA as per IRC guidelines shall be submitted.
1.14	Action plan to limit the particulate matter emission from all the stacks below 30 mg/Nm3 shall be furnished.

S. No	Terms of Reference
1.15	Action plan for 100 % solid waste utilization shall be submitted.
1.16	PM (PM10 and P2.5) present in the ambient air must be analysed for source analysis – natural dust/RSPM generated from plant operations (trace elements) of PM10 to be carried over.
1.17	Emission/effluent norms as per G.S.R 894 (E) dated 4/12/2019 [EPA Rules 1986].

Additional Terms of Reference

Necessary coordination shall be made with concerned SPCB (who is responsible for Compliance of OM dated 14-01-2025) regarding streamlining the implementation of GSR 702 and GSR 703 dated 12-11-2024 through which projects requiring prior EC were exempted from requirement of CTE.

The environmental setting of the proposed project

<table>
<tr><th>Sl. No.</th><th>Particulars</th><th>Details</th><th>Remarks</th></tr>
<tr><td>1.</td><td>Total Land</td><td>224.737 ha [Private (IDCO Deed Land): 147.755 ha; Govt: 76.982 ha;]</td><td>--</td></tr>
<tr><td>2.</td><td>Land acquisition details as per MoEF&CC O.M. dated 7/10/2014</td><td>• Land allocated to KSL by IDCO vide letter no 14213 dated 06.05.2024
• Revised Land Recommendation issued by IPICOL vide letter no 2897 dated 10/07/2024
• IDCO have completed the acquisition of 368.28 Acre (149.10 Ha) of land as per their letter no 26805 dated 06/09/2024 and transfer of balance Govt land to IDCO is under progress.</td><td>--</td></tr>
<tr><td>3.</td><td>Existence of habitation & involvement of R&R, if any</td><td>Project site: Talabarakote, Siaria
Study Area:<table><tr><th>Habitation</th><th>Distance</th><th>Direction</th></tr><tr><td>Athagarh</td><td>4.7 km</td><td>South</td></tr><tr><td>Dhenkanal Town</td><td>6.8 km</td><td>North</td></tr></table></td><td>Statue of R&R: No R&R envisaged. Encumbrance Free Land will be handed over by IDCO to KSL</td></tr>
<tr><td>4.</td><td>Latitude and longitude of all corners of the project site</td><td><table><tr><th>Point</th><th>Latitude</th><th>Longitude</th></tr><tr><td>A</td><td>20°35'8.20"N</td><td>85°37'5.42"E</td></tr><tr><td>B</td><td>20°35'7.99"N</td><td>85°37'42.37"E</td></tr><tr><td>C</td><td>20°33'59.47"N</td><td>85°37'5.74"E</td></tr><tr><td>D</td><td>20°33'59.69"N</td><td>85°37'42.87"E</td></tr></table></td><td></td></tr>
<tr><td>5.</td><td>Elevation of the project site</td><td>55 m – 76 m above mean sea level</td><td>--</td></tr>
<tr><td>6</td><td>Involvement of Forest Land, if any</td><td>Status of stage I Forest Clearance:
Area of the forest land involved: 60.203 ha.
Forest Diversion Proposal Submitted:
FP/OR/IND/526987/2025</td><td>--</td></tr>
<tr><td>7.</td><td>Water body (Rivers, Lakes, Pond, Nala, Natural</td><td>Project site: 1 pond at Talabarkote village

Study Area:</td><td>--</td></tr>
</table>

<table>
<tr><th>Sl. No.</th><th>Particulars</th><th>Details</th><th>Remarks</th></tr>
<tr><td></td><td>Drainage, Canal etc.) exists within the project site as well as study area</td><td>
<table>
<tr><th>Water Body</th><th>Distance</th><th>Direction</th></tr>
<tr><td>Sapua Nadi</td><td>3.8</td><td>South</td></tr>
</table>
The pond will be kept outside the physical boundary of the proposed plant and access will be made available to villagers. The area surrounding the pond shall be developed as greenbelt.
</td><td></td></tr>
<tr><td>8.</td><td>Existence of ESZ/ ESA/ national park/ wildlife sanctuary/ biosphere reserve/ tiger reserve/ elephant reserve etc. if any within the study area</td><td>
Study area:
a) Kapilash Wildlife Sanctuary – 5.8 km
b) ESZ of Kapilash Wildlife Sanctuary (Notified)– 4 km

List of Reserved and protected forests:
a) Saptasajya RF (1.5 km in West direction)
b) Mayuri RF (1.6 km in NW direction)
c) Charakhola RF (~1.6 km in N Direction)
d) Patapuri RF (~3.8 km in NE Direction)
e) Gadabola RF (3.9 km in E Direction)
f) Adala RF (3.4 km in E Direction)
g) Ranibania RF (5.4 km in E Direction)
h) Deulia RF (7.2 km in E Direction)
i) Oringa RF (8 km in SE direction)
j) Sorishapal RF (9.2 km in SW direction)
</td><td>--</td></tr>
</table>

The unit configuration and capacity of proposed project is given as below:

Sl. No.	Plant Unit	Capacity/Configuration
1	Heat Recovery Coke Oven Plant	0.78 MTPA
2	Blast Furnace	1.5 MTPA
3	Sinter Plant	2.4 MTPA
4	Lime Calcination Plant	2 x 300 TPD
5	EAF/ZPF	1 x 60 Tons
6	BOF	1 x 60 Tons
7	IF	2 x 50 Tons
8	LF	4 x 60 Tons
9	VD	1 x 60 Tons
10	RH degasser	2 x 60 Tons
11	AOD	2 x 65 Tons
12	Ingot Casting	0.16 MTPA
13	CCM	0.65 MTPA - 2 Nos 0.70 MTPA - 2 Nos
14	Heavy Bar, SBQ & Wire Rod Mill	1 x 0.6 MTPA
15	Large Bar Mill	1 x 0.8 MTPA
16	Oxygen Plant	1 x 420 TPD 1 x 460 TPD
17	Pig Casting Machine	2 x 1200 TPD
18	By product fuel gas-based power plant	18 MW
19	Coke Oven WHRB Power Plant	64 MW
20	BF TRT	7.5 MW

Signature Not Verified

Digitally Signed by : Shri Dinesh Runiwal
Member Secretary, MoEFCC (EC)

Date: 31/05/2025

ABSTRACT OF LAND SCHEDULE AS PER CURRENT LAYOUT PLAN FOR KSL PROJECT AS ON 25.10.1980							
Sl. No.	Name of the Village	Non - Forest Govt. Land	Non - Forest Pvt. Land	Forest Land		Total Forest Land in Ac.	Grand Total Area in Ac.
				HAL	Sabik		
1	Siaria	0.080	29.907	0.000	28.787	28.787	58.774
2	Talabarakot	41.380	335.199	21.110	98.865	119.975	496.554
Total		**41.460**	**365.106**	**21.110**	**127.652**	**148.762**	**555.328**

08-08-24
TAHASILDAR
DHENKANAL

Divisional Forest Officer
Dhenkanal Division

Has: No Objection
NTPC

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

ABSTRACT OF GOVT. LAND (Non-FOREST)					
Sl. No.	Name of the Village	Total area in Ac. (Hal)	Required area in Ac. (Hal)	Required area in Ha. (Hal)	Remarks
1	Siaria	0.080	0.080	0.032	
2	Talabarakot	45.400	41.380	16.746	
Total		**45.480**	**41.460**	**16.778**	

Divisional Forest Officer
Dhenkanal Division

TAHASILDAR
DHENKANAL

For (NTPC)

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

ABSTRACT OF PRIVATE LAND (NON-FOREST)					
Sl. No.	Name of the Village	Total area in Ac. (Hal)	Required area in Ac. (Hal)	Required area in Ha. (Hal)	Remarks
1	Siaria	35.555	29.907	12.103	
2	Talabarakot	356.902	335.199	135.653	
Total		**392.457**	**365.106**	**147.756**	

Divisional Forest Officer
Dhenkanal Division

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

ABSTRACT OF FOREST LAND					
Sl. No.	Name of the Village	Total area in Ac. (Hal)	Required area in Ac. (Hal)	Required area in Ha. (Hal)	Remarks
1	Siaria	34.680	28.787	11.650	
2	Talabarakot	176.595	119.975	48.553	
Total		**211.275**	**148.762**	**60.203**	

Hari Hara Behera

08-08-24
TAHASILDAR
DHENKANAL

Divisional Forest Officer
Dhenkanal Division

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Appendix 1-3 - DFO Approved Map

OFFICE OF THE DIVISIONAL FOREST OFFICER, DHENKANAL FOREST DIVISION

Tele Fax No-06762226717, E-mail ld-dfo.dhenkanal@odisha.gov.in

Letter No 3855 **4F/Misc/958/2025/dt.** 03-06-2025

To

The General Manager Projects,
Kalyani Steel Limited, Space No.DCB016,
DLF Cyber City, Road/Street, Technology Corridor,
Info City, Patia, Bhubaneswar.
Email-gaurav.shukla@kalyanisteels.com

Sub: Request for certified Map indicating the Precise distance of the project boundary from the nearest boundary of the Kapilash Wildlife Sanctuary Eco Sensitive Zone (ESZ) as per Specific ToR condition stipulated by Expert Appraisal Committee (EAC), MoEF & CC.

Ref: Your Letter No.KSL/ISP/OD/2025/240406 dt.27.05.2025.

Sir,

As requested, vide your letter cited above, the Map duly certified indicating the Precise distance of the project boundary from the nearest boundary of the Kapilash Wildlife Sanctuary and Eco Sensitive Zone (ESZ) is sent here with for your information and necessary action.

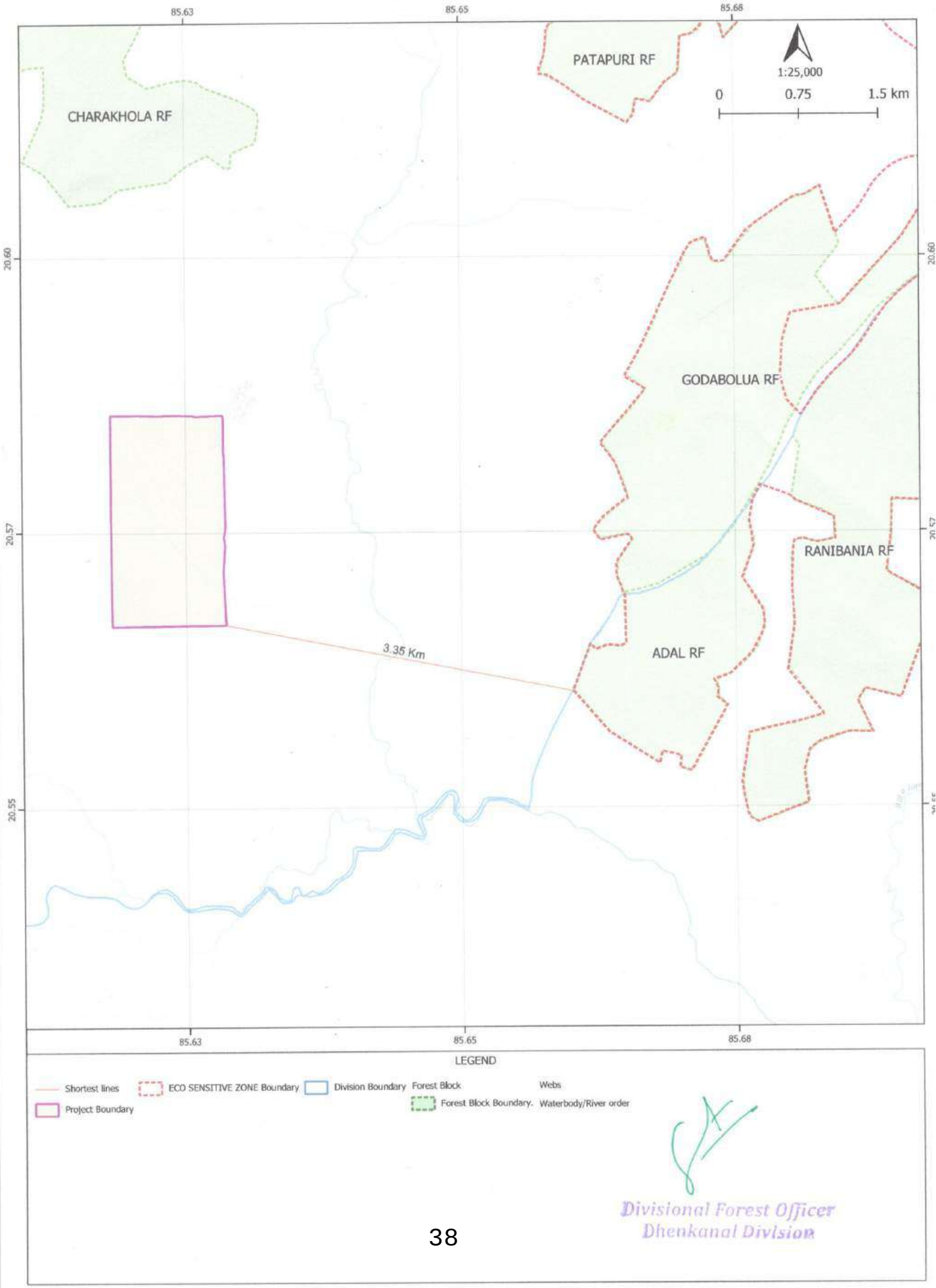
Encl: As above.

Yours faithfully

3/6/2025

Divisional Forest Officer,
Dhenkanal Division

MAP SHOWING DISTANCE BETWEEN KALYANI PROJECT BOUNDARY TO ESZ BOUNDARY OF KAPILASH WILDLIFE SANCTURY



Divisional Forest Officer
Dhenkanal Division

APPENDIX-1-3 - DETAILS OF NABET ACCREDITATION

भारतीय गुणवत्ता परिषद
QUALITY COUNCIL OF INDIA
QCI Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

M N Dastur and Company Private Limited, Kolkata

P – 17, Mission Row Extension, Kolkata – 700013, West Bengal

*The organization is accredited as **Category-A** under the QCI-NABET **Scheme for Accreditation of EIA Consultant Organization, Version 3**: for preparing EIA/EMP reports in the following Sectors-*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Thermal power plants	4	1 (d)	A
2.	Mineral beneficiation	7	2 (b)	A
3.	Metallurgical industries (Ferrous & Non-ferrous)	8	3 (a)	A
4.	Coke Oven Plants	11	4 (b)	A
5.	Ports, harbours, break waters and dredging	33	7 (e)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated February 28, 2025, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/25/3527 dated February 28, 2025. The accreditation needs to be renewed before the expiry date M N Dastur and Company Private Limited, Kolkata following due process of assessment.

Valid up to
November 17, 2025

Issue Date
March 05, 2025

Certificate No.
NABET/EIA/22-25/SA 0232

Varinder Kanwar

Prof (Dr) Varinder S Kanwar
CEO - NABET

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

APPENDIX-1-4 - NABL AND MOEFCC CERTIFICATES OF MONITORING AGENCY

National Accreditation Board for Testing and Calibration Laboratories

NABL

CERTIFICATE OF ACCREDITATION

ENVIROCHECK

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

63/B, 189, 190 & 192 RASTRAGURU AVENUE, 24 PARGANAS (N), WEST BENGAL, INDIA

in the field of

TESTING

Certificate Number: TC-6014

Issue Date: 13/01/2025 Valid Until: 12/01/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: ENVIROCHECK

Signed for and on behalf of NABL

Anuja Anand
Director

N. Venkateswaran
Chief Executive Officer

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT FOREST & CLIMATE CHANGE GOVT OF INDIA

CPCB/एलबी-2021/7/99/इंस्टलैब-एचओ-सीपीसीबी-एचओ /प्राइवेट /553 12 जून 2025

मान्यता पत्र

सेवा में,

प्रयोगशाला प्रमुख,
मैसर्स एनवीरोचेक,
189, 190, 192 **राष्ट्रगुरु एवेन्यू,**
दमदम, 24 **परगना** (एन)-700028,
पश्चिम बंगाल।

विषय: पर्यावरण (संरक्षण) अधिनियम, 1986 **के अंतर्गत पर्यावरणीय प्रयोगशाला के रूप में मैसर्स एनवीरोचेक,** 189, 190, 192 **राष्ट्रगुरु एवेन्यू, दमदम,** 24 **परगना** (एन)-700028, **पश्चिम बंगाल की मान्यता के बारे में।**

महोदय,

केंद्रीय प्रदूषण नियंत्रण बोर्ड (के.प्र.नि.बोर्ड) को पर्यावरण (संरक्षण) अधिनियम, 1986 के अंतर्गत पर्यावरण प्रयोगशालाओं की मान्यता के लिए दिशानिर्देशों के निबंधन और शर्तों की स्वीकृति के साथ आपके दिनांक 16/12/2024 के प्रस्तुत आवेदन के संदर्भ में, के.प्र.नि.बोर्ड के सक्षम प्राधिकारी ने पर्यावरण प्रयोगशाला और सरकार के विश्लेषक की मान्यता के नवीनीकरण को अनुमोदन प्रदान किया है। तत्पश्चात, **मैसर्स एनवीरोचेक,** 189, 190, 192 **राष्ट्रगुरु एवेन्यू, दमदम,** 24 **परगना** (एन)-700028, **पश्चिम बंगाल** को भारत की राजपत्र अधिसूचना में **प्रयोगशाला की अनिवार्य प्रत्यायन/प्रमाणन की वर्तमान अपेक्षा को ध्यान में रखते हुए दिनांक 12/01/2028 (तीन साल) तक आईएसओ/ आईईसी** 17025 **और आईएस/आईएसओ** 45001 **की वैधता के साथ अधिसूचित किया जाएगा।**

2. निम्नलिखित विश्लेषकों को सरकारी विश्लेषक के रूप में अनुमोदित किया गया है:
   1. श्रीमती इंद्राणी भट्टाचार्य
   2. श्रीमती प्रियंका मुखर्जी
   3. श्री शाश्वत बर्मन रॉय

3. प्रयोगशाला अनिवार्य रूप से स्वीकृत निबंधन और शर्तों का पालन करते हुए निम्नलिखित परीक्षणों करेगी:
   क. **भौतिक परीक्षण:** चालकता, रंग, पीएच, स्थिर और वाष्पशील ठोस, कुल ठोस, कुल विलीन ठोस, कुल निलंबित ठोस, आविलता, तापमान, वेग एवं निर्वहन औद्योगिक बहि:स्राव धारा का विसर्जन मापन, गंध, निपटानयोग्य ठोस और आपंक वॉल्यूम इंडेक्स (एसवीआई)।
   ख. **अकार्बनिक (सामान्य और गैर-धात्विक):** अम्लता, क्षारीयता, अमोनिकल नाइट्रोजन, क्लोराइड, क्लोरीन अवशिष्ट, विलीन ऑक्सीजन, फ्लोराइड, कुल कठोरता, कुल केजेल्डहल नाइट्रोजन (टीकेएन), नाइट्राइट नाइट्रोजन, नाइट्रेट नाइट्रोजन, फॉस्फेट, सल्फेट, साइनाइड, सिलिका और सल्फाइड।
   ग. **अकार्बनिक (सूक्ष्म मात्रिक धातु):** बोरोन, कैडमियम, कैल्शियम, टोटल क्रोमियम, क्रोमियम हेक्सावलेंट, तांबा, लोहा, सीसा, मैग्नीशियम, पारा, निकल, पोटेशियम, सोडियम, सोडियम अवशोषण अनुपात (एसएआर), जिंक, आर्सेनिक, एल्युमीनियम, एंटीमनी, बेरियम, बेरिलियम, कोबाल्ट, मैंगनीज, सेलेनियम, सिल्वर, स्ट्रोंटियम, टिन और वैनेडियम ।
   घ. **ऑर्गेनिक्स (सामान्य) और ट्रेस ऑर्गेनिक्स:** बायोकेमिकल ऑक्सीजन डिमांड (बीओडी), रासायनिक ऑक्सीजन डिमांड (सीओडी), तेल और ग्रीस, फेनोलिक यौगिक, कीटनाशक (प्रत्येक) (ऑर्गेनो-क्लोरीन और ऑर्गेनो नाइट्रोजन-फॉस्फोरस), पॉली-क्लोरिनेटेड बाइफिनाइल (पीसीबी) (प्रत्येक), पॉलीन्यूक्लियर एरोमैटिक हाइड्रोकार्बन (पीएएच) और सर्फेक्टेंट।
   ङ. **सूक्ष्म जीवविज्ञान परीक्षण:** टोटल कोलीफॉर्म, फीकल कोलीफॉर्म, *ई.कोली*, फीकल स्ट्रेप्टोकोक्की, टोटल प्लेट काउंट और एंटरोकोकस।
   च. **आविष विज्ञानी परीक्षण:** मछली का उपयोग करके विषाक्तता के मूल्यांकन के लिए जैव परख विधि (100% प्रवाह में 96 घंटे के बाद मछली का 90% जीवित रहना) और ज़ेबरा मछली (आयाम रहित विषाक्तता परीक्षण) का उपयोग करके विषाक्तता कारक का मापन।
   छ. **जैविक परीक्षण:** प्लवक पहचान गणना, विभिन्न विविधता सूचकांक का माप, सैप्रोबिटी सूचकांक और क्लोरोफिल।

जारी..

ज. **परिसंकटमय अपशिष्ट का लक्षण वर्णन:** निक्षालक (टीसीएलपी अर्क/जल अर्क) तैयार करना, विषाक्तता और अपशिष्ट & निक्षालक में भारी धातुओं/पीड़कनाशियों का मापन।

झ. **मृदा/आपंक/तलछट और ठोस अपशिष्ट:** बोरॉन, कटियन एक्सचेंज क्षमता (सीईसी), विद्युत चालकता, नाइट्रोजन (उपलब्ध), कार्बनिक कार्बन/पदार्थ (रासायनिक विधि), पीएच, फास्फोरस (उपलब्ध), फॉस्फेट (ऑर्थो), फॉस्फेट (कुल), पोटेशियम, मृदा के अर्क में एसएआर, सोडियम, मृदा की नमी, टीकेएन, कैलोरी मान, कैल्शियम, कैल्शियम कार्बोनेट, विनिमेय सोडियम प्रतिशत (ईएसपी), भारी धातु, मैग्नीशियम, नाइट्रेट, नाइट्राइट, पीएएच, सल्फेट, कुल कार्बनिक कार्बन (टीओसी) और जल धारण क्षमता।

ञ. **परिवेशी वायु/पलायक उत्सर्जन:** नाइट्रोजन डाइऑक्साइड (NO_2), सल्फर डाइऑक्साइड (SO_2), कुल निलंबित विविक्त कण, श्वसन योग्य निलंबित कण पदार्थ (PM_{10}), अमोनिया, कार्बन मोनोऑक्साइड, गैर मीथेन हाइड्रोकार्बन, सीसा, मीथेन, ओजोन, बेंजीन टोल्यूनि ज़ाइलीन (बीटीएक्स), पॉलीसाइक्लिक एरोमैटिक हाइड्रोकार्बन (पीएएच) बेंजो-ए-पाइरिन और अन्य, $PM_{2.5}$ और वाष्पशील कार्बनिक कार्बन।

ट. **चिमनी गैसें/स्रोत उत्सर्जन:** पार्टिकुलेट मैटर, सल्फर डाइऑक्साइड, वेग और प्रवाह, कार्बन डाइऑक्साइड, कार्बन मोनोऑक्साइड, तापमान, ऑक्सीजन, नाइट्रोजन के ऑक्साइड, फ्लोराइड (पार्टिकुलेट), फ्लोराइड (गैसीय), कुल हाइड्रोकार्बन, हाइड्रोजन सल्फाइड और कार्बन डाइसल्फ़ाइड।

ठ. **रव (शोर) स्तर:** शोर स्तर माप (20 से 140 डीबीए) और परिवेश रव & स्रोत विशिष्ट रव।

ड. **मौसम संबंधी:** परिवेश का तापमान, हवा की दिशा, हवा की गति, सापेक्ष आर्द्रता और वर्षा।

4. प्रयोगशाला और विश्लेषकों की क्षमता का पता लगाने के लिए प्रयोगशाला को के.प्र.नि.बोर्ड द्वारा आयोजित विश्लेषणात्मक गुणवत्ता नियंत्रण) एक्यूसी (अभ्यास में अनिवार्य रूप से भाग ले ना होगा। प्रयोगशाला किए गए नमूना विश्लेषण पर के.प्र.नि.बोर्ड को तिमाही प्रगति रिपोर्ट प्रस्तुत करेगी।

5. अधिसूचना के अनुसार, एक संयुक्त दल द्वारा मान्यता प्राप्त पर्यावरण प्रयोगशाला का औचक निरीक्षण/आवधिक निगरानी उस के उचित कामकाज , व्यवस्थित प्रचालन और प्रयोगशाला में तैयार किए गए आंकड़ों की विश्वसनीयता का निर्धारण करने के लिए की जाएगी।

6. प्रयोगशाला के पास नियमानुसार ISO/IEC: 17025)2017(और IS/ ISO: 45001का अपेक्षित प्रत्यायन और प्रमाण पत्र होना चाहिए। यह मान्यता यथा लागू प्रत्यायन और नवीनीकरण के अधीन है और किसी भी निबंधन और शर्तों के गंभीर गैर-अनुपालन के मामले में , प्रयोगशाला को न्यूनतम दो साल की अवधि के लिए ब्लैकलिस्ट किया जा सकता है और सरकार की ओर से अनधिकृत तरीके से कार्य करने के लिए , यथा लागू सिविल/आपराधिक कार्यवाही शुरू की जा सकती है।

7. **मैसर्स एनवीरोचेक, 24 परगना (एन), पश्चिम बंगाल** को संबंधित अनिवार्य प्रत्यायन/प्रमाणीकरण के साथ मान्यता की समाप्ति से पूर्व केंद्रीय प्रदूषण नियंत्रण बोर्ड के वेबपोर्टल (https://cpcbepalab.in/epalab) का उपयोग कर के ऑनलाइन मान्यता के नवीनीकरण के लिए आवेदन करना अपेक्षितहै।

भवदीय,

12/6/2025

प्रभागप्रमुख
उपकरणीय प्रयोगशाला

ेर्ड
RD
रकार
INDIA

F. No. LB/99/7/2021-INST LAB-HO-CPCB-HO/Pvt./ 553

12th June 2025

Recognition Letter

To,

The Head of Laboratory,
M/s Envirocheck,
189, 190, 192 Rastraguru Avenue,
Dumdum, 24 Parganas (N)-700028,
West Bengal.

Subject: Recognition of M/s Envirocheck, 189, 190, 192 Rastraguru Avenue, Dumdum, 24 Parganas (N)-700028, West Bengal asEnvironmental laboratory under the Environmental (Protection) Act- 1986– reg.

Sir,

With reference to your application dated 16/12/2024 along with acceptance of the terms & conditions of the guidelines for recognition of environmental laboratories under the Environmental (Protection) Act, 1986, submitted to Central Pollution Control Board (CPCB), the Competent Authority of CPCB has accorded approval for renewal of recognition of Environmental laboratory and Govt. Analysts. Subsequently,**M/s Envirocheck, 189, 190, 192 Rastraguru Avenue, Dumdum, 24 Parganas (N)-700028, West Bengal** shall be notified considering the current requirement of mandatory accreditation / certifications of the laboratory **with a validity up to 12/01/2028 (for three years), subject to validity of ISO/IEC 17025 and IS/ISO 45001**.

2. The following analysts have been approved as Government Analysts:
   1. Smt. Indrani Bhattacharyya
   2. Smt. Priyanka Mukherjee
   3. Sh.Saswata Burman Roy

3. The laboratory should compulsorily follow the accepted terms and conditions and may undertake the following tests:
   a) **Physical Tests:** Conductivity, Colour, pH, Fixed & Volatile Solids, Total Solids, Total Dissolved Solids, Total Suspended Solids, Turbidity, Temperature, Velocity & Discharge Measurement of Industrial Effluent Stream, Odour, Settleable Solidsand Sludge Volume Index(SVI).
   b) **Inorganic (General and Non-metallic):** Acidity, Alkalinity, Ammonical Nitrogen, Chloride, Chlorine Residual, Dissolved Oxygen, Fluoride, Total Hardness, Total Kjeldahl Nitrogen (TKN), Nitrite Nitrogen, Nitrate Nitrogen, Phosphate, Sulphate, Cyanide, Silica and Sulphide.
   c) **Inorganic (Trace Metals):** Boron, Cadmium, Calcium, Total Chromium, Chromium Hexavalent, Copper, Iron, Lead, Magnesium, Mercury, Nickel, Potassium, Sodium, Sodium Absorption Ratio(SAR), Zinc, Arsenic, Aluminium, Antimony, Barium, Beryllium, Cobalt, Manganese, Selenium, Silver, Strontium, Tinand Vanadium.
   d) **Organics (General) and Trace Organics:** Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Phenolic Compounds, Pesticides (each) (Organo-Chlorine and Organo Nitrogen-Phosphorus), Poly-Chlorinated Biphenyl (PCB's) each, Polynuclear Aromatic Hydrocarbon (PAH) and Surfactants.
   e) **Microbiological Test:** Total Coliform, Faecal Coliform, *E. coli*, Faecal Streptococci,Total Plate Count and Enterococcus.
   f) **Toxicological Tests:** Bioassay Method for Evaluation of Toxicity Using Fish (90% survival of fish after 96 hrs in 100% effluent) and Measurement of toxicity factor using Zebra fish (dimensionless toxicity test).

contd..

g) **Biological Test:** Planktonic Identification Count, Measurement of Various Diversity Index, Saprobity Index and Chlorophyll.

h) **Characterization of Hazardous Waste:** Preparation of Leachate (TCLP Extract/Water Extract), Toxicity and Measurement of Heavy Metals/Pesticides in the Waste/Leachate.

i) **Soil/Sludge/Sediment and Solid Waste:** Boron, Cation Exchange Capacity (CEC), Electrical Conductivity, Nitrogen (Available), Organic Carbon/Matter (Chemical Method), pH, Phosphorous (Available), Phosphate (Ortho), Phosphate (Total), Potassium, SAR in Soil Extract, Sodium, Soil Moisture, TKN, Calorific Value, Calcium, Calcium Carbonate, Exchangeable Sodium Percentage(ESP), Heavy Metal, Magnesium, Nitrate, Nitrite, PAH, Sulphate, Total Organic Carbon (TOC) and Water Holding Capacity.

j) **Ambient Air/ Fugitive Emissions:** Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Total Suspended Particulate Matter, Respirable Suspended Particulate Matter (PM_{10}), Ammonia, Carbon monoxide, Non Methane Hydrocarbon, Lead, Methane, Ozone, Benzene Toluene Xylene (BTX), Polycyclic Aromatic Hydrocarbon (PAH) Benzo-a-Pyrine& others, $PM_{2.5}$ and Volatile Organic Carbon.

k) **Stack Gases/ Source Emission:** Particulate Matter, Sulphur Dioxide, Velocity & Flow, Carbon Dioxide, Carbon Monoxide, Temperature, Oxygen, Oxides of Nitrogen, Fluoride(Particulate), Fluoride(Gaseous), Total Hydrocarbon, Hydrogen Sulphide and Carbon Disulphide.

l) **Noise Level:** Noise level measurement (20 to 140 dba) and Ambient Noise & Source Specific Noise.

m) **Meteorological:** Ambient Temperature, Wind Direction, Wind Speed, Relative Humidity and Rain Fall.

4. The laboratory shall compulsorily participate in the Analytical Quality Control (AQC) Exercise conducted by the CPCB to ascertain the capability of the laboratory and analysts. The lab shall submit quarterly progress report on the sample analysis carried out to CPCB.

5. The surprise inspection / periodic surveillance of the recognized environment laboratory will be undertaken to assess its proper functioning systematic operation and reliability of data generated at the laboratory by a Joint Team as per the Notification.

6. The laboratory should have the mandatory requisite accreditation and certificate of the ISO: 17025 and ISO: 45001 as per rules. This recognition is subject to such accreditations and renewals as applicable and in case of serious non-compliance of any of the terms and conditions, the laboratory may be black listed for a minimum period of two years and civil/criminal proceedings, as applicable, may be initiated for performing functions on behalf of the Government in an unauthorized manner.

7. **M/s Envirocheck, 24 Parganas (N), West Bengal** is required to apply for further renewal of recognition through online using CPCB web portal (https://cpcbepalab.in/epalab) before expiry of recognition with mandatory accreditation / certification concerned.

Yours faithfully,

19/6/2024

Divisional Head
Instrumentation Laboratory

Minutes of the 67th Meeting of Project Screening Committee (PSC) for processing of the Forest Diversion Proposals filed online in PARIVESH- 2.0 for approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 held on 09.04.2025 at 4.00 PM through virtual mode.

The meeting was chaired by the Addl. Principal Chief Conservator of Forests, Forest Diversion & Nodal Officer, FC Act, Odisha. The list of the members present is at ***Annexure-I.***

At the outset, Addl. Principal Chief Conservator of Forests, Forest Diversion & Nodal Officer, FC Act, Odisha and Chairman of the committee welcomed all the participants and briefed them regarding the Project Screening Committee (PSC). In the PSC, **12 (Twelve)** number of Forest Diversion Proposals (FDP) were examined and the following were discussed decision taken thereof:-

01	**DIVERSION OF FOREST LAND FOR NON-FOREST PURPOSE IN NARAYANPOSHI IRON & MN MINES OF M/S JSW STEEL LTD.** **PROJECT CATEGORY : MINING / QUARRYING** **FOREST AREA- 19.256 HA (2.272 RESERVE FOREST + 15.676 HA REVENUE FOREST +1.308 PROPOSED RESERVE FOREST)** **PROPOSAL NO- FP/OR/MIN/QRY/441754/2023** **FOREST DIVISION- BONAI FOREST DIVISION**

Naraynposhi block for Iron ore and Manganese in Koira, Kasira and Kathamala RF over 347.008 ha area was allotted to M/s JSW Steel Ltd for a period of 50 years through e-auction dated 01.02.2020.

The PSC accepted the proposal in its 60th meeting held on dated 29.11.2024. Thereafter, the proposal has been scrutinized by the DFO, Bonai Forest Division and RCCF, Rourkela Circle and is taken up in PSC-II meeting for recommending the proposal to State Govt.

On scrutiny of the online proposal on Parivesh Portal for PSC-II meeting, the following shortcomings were noticed:-

i. For the instant project 6.359 ha of land acquired from NH area (1.425 ha of forest land and 4.934 ha of non-forest land) in existing land use plan as well as proposed land use plan. But the required NOC from NH Authority has not been uploaded.

ii. The Certificate of minimum use of forest land has not been uploaded.

iii. The component wise break-up of forest land proposed for diversion uploaded in Sl. No.3 of Form-A Part-I has not been reflected in the mining plan or revised KML file of 19.256 ha vetted by DFO.

iv. The reason for not taken the forest clearance for earlier 1.014 ha forest land of SZ as per circular No.FC-1/151/2022 dated 07.11.2023 of GoI, MoEF&CC, New Delhi has not been uploaded.

In view of above observation, the PSC recommended the proposal to be forwarded to the State Govt. for grant of forest clearance as per Section-9 (16) of Van (Sanrakshan Evam Samvardhan) Rules, 2023. The user agency has requested to comply the deficiencies noted above immediately for taking further action in the matter.

02	**CONSTRUCTION OF LAPANGA - BRAJARAJNAGAR 132KV D/C LINE FROM LAPANGA GSS TO Loc No.51 AND 220KV D/C BUDHIPADAR – ADITYA ALUMINIUM LINE FROM Loc No.23 TO Loc No.54 FROM THE PREMISES OF M/s. NLC INDIA Ltd. IN SAMBALPUR & JHARSUGUDA DISTRICT BY M/S OPTCL** **PROJECT CATEGORY: POWER TRANSMISSION LINE** **FOREST AREA- 12.33 HA (0.532 HA REVENUE FOREST + 11.798 HA DLC FOREST)** **PROPOSAL NO- FP/OR/PWR TRANS/529243/2025** **FOREST DIVISION- SAMBALPUR & JHARSUGUDA DIVISIONS**

The purpose for construction of these transmission lines is to divert the part of existing corridor i.e. part of 132 KV D/C Lapanga-Brajrajnagar power transmission line from Lapanga Grid Sub-station to Loc No.51, and 220KV D/C Budhipadar-Aditya Aluminium line from Loc No.23 to Loc No.54 from the premises of M/s. NLC India Ltd. to facilitate the construction of proposed 2400MW ultra mega power plant by M/s. NLC India Ltd. The proposed corridor is coming under the jurisdiction of two Tahasils of two districts i.e. Rengali Tahasil of Sambalpur district & Jharsuguda Tahasil of Jharsuguda district and also, in two Forest Divisions i.e. Sambalpur & Jharsuguda Forest Divisions. The project will be executed by E.H.T (C) Division, OPTCL, Jharsuguda, Odisha.

On scrutiny of the online proposal on Parivesh Portal, the following shortcomings were noticed:-

i. For the instant project CA over 25.0 ha degraded forest land in Kankurpal RF, Chhendipada Range of Angul Forest Division has been identified. But the DSS analysis report duly signed by the DFO, Angul Forest Division has not been uploaded.

ii. CA scheme has not been uploaded.

iii. Species wise and girth class wise enumeration list of trees and abstract thereof for non-forest land (Govt. & Pvt.) in Jharsuguda Forest Division have not signed by the Tahasildar, Jharsuguda.

In view of the observation, the PSC accepted the proposal and directed the user agency to comply the deficiencies raised above and submit the correct revise proposal for scrutiny by the DFO, Sambalpur Forest Division.

03	**DIVERSION-CUM-HEIGHTENING OF 400 KV D/C IB-LAPANGA LINE FROM LOC. NO. 22 TO LOC. NO. 30 UNDER PASSING OF PROPOSED DIVERSION OF 132 KV D/C LAPANGA-BRAJRAJNAGAR LINE AND 220 KV BUDHIPADAR-ADITYA ALUMINIUM LINE IN SAMBALPUR DISTRICT OF ODISHA BY M/S OPTCL** **PROJECT CATEGORY: Power Transmission Line** **FOREST AREA- 7.007 HA (0.212 HA REVENUE FOREST + 6.795 HA DLC FOREST)** **PROPOSAL NO- FP/OR/PWR TRANS/528974/2025** **FOREST DIVISION- SAMBALPUR DIVISION**

M/s. Odisha Power Transmission Corporation Ltd. (OPTCL) at present is the leading power transmission utility in Odisha and established to carry out business on Intra-state transmission of electricity through Extra High Tension (EHT) line. By developing new technology through R&D and adopting the same for transmission of power at an affordable price to meet the expectation of

consumers. The company is executing all the power transmission projects within the state and ensuring that the quality of supply to consumers is maintained and improved.

The PSC deferred the proposal vide its 66th meeting held on dated 21.03.2025.

On scrutiny of the online proposal on Parivesh Portal, the following shortcomings were noticed:-

i. For the instant project, CA over 15.0 ha degraded forest land in Katuda RF, Jarapada Range of Angul Forest Division has been identified. But the land schedule of CA land duly signed by the UA and DFO concerned has not been uploaded.

ii. CA scheme has not been uploaded.

iii. All documents uploaded as well as CA land have not been countersigned by both the DFOs.

iv. Undertaking for CA and NPV have not been uploaded.

In view of the observation, the PSC accepted the proposal and directed the user agency to comply the deficiencies raised above and submit the correct revise proposal for scrutiny by the DFO, Sambalpur Forest Division.

04	**CONSTRUCTION OF BYPASS ROAD ON NH-26 FOR NABARANGPUR TOWN IN THE STATE OF ODISHA OF NH DIVISION, KESINGA.** **PROJECT CATEGORY : CONSTRUCTION / WIDENING OF ROAD INCLUDING APPROACH ROAD TO ROADSIDE ESTABLISHMENTS INCLUDING BRIDGES** **FOREST AREA- 8.943 HA (3.477 HA DLC FOREST + 2.641 HA REVENUE FOREST + 2.825 HA RESERVE FOREST)** **PROPOSAL NO- FP/OR/ROAD/527310/2025** **FOREST DIVISION- NABARANGPUR FOREST DIVISION**

NH-26 serves as the main arterial road connecting Vizag to the district of Koraput, Nabarangpur, Bhawanipatna, and Bolangir. The nearest railway station is located 45 km away in Jeypore. Within the Nabarangpur town area, six rural roads connect to NH-26, while a project road linking to the Indravati Multipurpose River Project marks the western boundary of the township.The town area is intersected by 75 colony roads with mixed vehicular traffic, which connect to NH-26 over a stretch of 3 km. This heavy local traffic interferes with the smooth flow of highway traffic, causing frequent congestion and significant delays.

The PSC deferred the proposal vide its 66th meeting held on dated 21.03.2025.

On scrutiny of the online proposal on Parivesh Portal, the following shortcoming was noticed:-

1. CA land identified and allotted by the Collector, Nabarangapur in village Barihaghat under Tentulikhunti Tahasil in Plot No.278 & 279 over an area of 1.619 ha and 8.094 ha respectively. But as per ORSAC vetted DGPS map, it shows 2.665 ha in Plot No.278 (P) and 7.048 ha in Plot No.279 (P) which find discrepancy of 64.60% and 12.92% respectively. The User Agency may be requested to justify such discrepancy.

In the meeting, the ADM, Nabarangpur assured to rectify the plot wise area identified for CA land.

In view of the observation, the PSC accepted the proposal and directed the user agency to comply the deficiency noted above and submit the proposal at the level of DFO, Nabarangapur Forest Division for taking further necessary action in the matter.

05	**FOR OBTAINING FOREST CLEARANCE FOR SETTING UP INTEGRATED ADVANCED SPECIALTY STEEL AND AUTO COMPONENTS COMPLEX AT GAJAMARA UNDER DHENKANAL BY KALYANI STEELS LIMITED.** **PROJECT CATEGORY : INDUSTRY** **FOREST AREA- 60.203 HA (REVENUE FOREST)** **PROPOSAL NO- FP/OR/IND/526987/2025** **FOREST DIVISION- DHENKANAL FOREST DIVISION**

The High-Level Clearance Authority (HLCA) of Odisha in its 34th meeting held on 16th January 2024 has considered the proposal of M/s Kalyani Steels Limited for setting up an Integrated Advanced Specialty Steel and Auto components Complex at Gajamara in Dhenkanal District of Odisha. The State Level Facilitation Cell (SLFC) has recommended the allotment of 560.0 Ac of land at Gajamara, Dhenkanal to Kalyani Steel Ltd for setting up the project. Accordingly, IPICOL has issued the recommendation letter to IDCO for the allocation for 560.0 Ac of land to M/s Kalyani Steel Ltd.

The PSC deferred the proposal vide its 66th meeting held on dated 21.03.2025.

On scrutiny of the online proposal on Parivesh Portal, the following shortcomings were noticed:-

i. As per Chapter-1 of Para 1.10 (i) of Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 utilization of forest area for establishing industries cannot be considered as a rule as it is a non-site specific project and involved 60.203 ha of forest land.

ii. The KML file of proposed land use map has not been uploaded.

iii. The approval letter of High Level Clearance Authority (HLCA) of Odisha has not been uploaded.

iv. The DSS analysis report of CA land identified in Bolangir District has not been uploaded by the DFO, Bolangir.

v. The signature of the authorization officer has not been authenticated by the competent officers.

In view of the observation, the PSC accepted the proposal and directed the user agency to comply the deficiencies noted above and submit the proposal at the level of DFO, Dhenkanal Forest Division for taking further necessary action in the matter.

06	**APPROACHES FOR CONSTRUCTION OF ANALJODI H.L. BRIDGE OF MATHILI TAHASIL AND MAHARAJPALLI H.L. BRIDGE OF KALIMELA TAHASIL IN MALKANGIRI DISTRICT OF ODISHA BY EXECUTIVE ENGINEER, NH DIVISION, JEYPORE** **PROJECT CATEGORY: CONSTRUCTION / WIDENING OF ROAD INCLUDING APPROACH ROAD TO ROADSIDE ESTABLISHMENTS INCLUDING BRIDGES** **FOREST AREA- 6.72 HA (REVENUE FOREST)** **PROPOSAL NO- FP/OR/ROAD/438287/2023** **FOREST DIVISION- MALKANGIRI FOREST DIVISION**

The above project involves 11.824 ha land in total which comprises 6.72 ha Revenue Forest Land and 5.104 ha of non-forest land. The user agency has identified 20.040 ha of Degraded Revenue Forest Land in village Kathiguda under Mathili Tahasil of Malkangiri Forest Division for the purpose of CA in lieu of diversion of forest land for this project.

The PSC accepted the proposal vide its 20th meeting held on dated 18.08.2023. Thereafter, the proposal has been scrutinized by the DFO, Malkanagiri Forest Division and RCCF, Koraput Circle and was taken up in PSC-II meeting (62nd PSC) held on dated 16.01.2025 for recommending the proposal to the State Govt.

But in PSC-II meeting, some shortcomings were noticed and PSC returned back the proposal to the DFO, Malkanagiri with a direction to furnish a detailed report and also furnished the required documents regarding CA land, tree enumeration report, three alternative route, status of land as on 25.10.1980, ORSAC vetted DGPS maps, toposheet maps, layout plan, undertakings etc and the DFO, Malkanagiri Forest Division has complied all the shortcomings pointed out.

The proposal is found to be complete in all respect.

In view of above observation, the PSC recommended the proposal to be forwarded to the State Govt. for grant of forest clearance as per Section-9 (16) of Van (Sanrakshan Evam Samvardhan) Rules, 2023.

07	**BASUNDHARA (WEST) EXTENSION OCP BY MAHANADI COALFIELDS LIMITED.** **PROJECT CATEGORY: MINING / QUARRYING** **FOREST AREA- 227.62 HA** **FOREST DIVISION- SUNDARGARH FOREST DIVISION** **PROPOSAL NO- FP/OR/MIN/QRY/521279/2025**

The proposed Basundhara (West) Extension OCP has been formulated within Chaturdhara block in the Gopalpur Sector of Ib-valley coalfield. The Chaturdhara block is located in the north-western central part of Ib River coalfield of Odisha, known as Gopalpur sector. This coalfield is in the southern middle part of lower Gondwana basin of Sone- Mahanadi Valley and occupies an area of about 1460 sq.km with potential coal bearing area of around 1050 sq.km the Ib River coalfield lies in between latitude 21°31′ to 22°14′ North and longitude 83°32′ to 84°10′ East and falls mainly in Sundargarh, Jharsuguda and Sambalpur districts of Odisha. Basundhara (West) Extension has a peak coal production capacity of 8.75 MT and the life of the mines is 12 years. The total mineable reserves is 92.73 MT and total Overburden to be removed is 97.22 MM3. The total mining lease area comprises of 323.92 Ha. Out of which 45.010 Ha is Govt. Non-Forest land, 51.290 Ha is tenancy land 227.62 Ha is forest land.

The PSC deferred the proposal vide its 66th meeting held on dated 21.03.2025.

On scrutiny of the online proposal on Parivesh Portal, the following shortcomings were noticed:-

i. Legible copy of Gazette Notification No.3055 dated 29.10.1990 of Ministry of Energy, GoI wherein the land has been vested to South Eastern Coalfield Ltd., Bilaspur (GoI Company) as per the CBA, 1957 needs to be submitted.
ii. Copy of Vesting Order dated 22.03.2017 to be furnished.
iii. Stage-II compliance of the earlier adjacent project to the applied project need to be furnished.
iv. Area in KML file of the applied land for diversion as provided in the Item No.2.4 of the application and the area details provided in application does not match. Justification in this regard is required.

v. Total forest land proposed for diversion is mentioned as 227.62 ha. But in the location details of forest patches, the cumulative forest land uploaded is 224.678 ha. The discrepancy may be furnished.

vi. ORSAC vetted village / RF wise DGPS map of forest land proposed for diversion with statistics of land has not furnished.

vii. The pattern of utilization of forest land mentioned in Item No.3 of Part-I Form-A is not as per the prescription mentioned in the approved mining plan. The copy of the page of mining plan where the detailed pattern of utilization of forest land mentioned as furnished in Item No.3 be furnished.

viii. Map showing existing land use has not been furnished.

ix. Map showing proposed land use has not been furnished.

x. Map showing mine closure plan has not been furnished.

xi. The tree enumeration list has been prepared for both non-forest Govt. and non-forest private land combinedly. The segregated list needs to be furnished.

xii. No site suitability certificate has been issued for the notified DFL identified for CA in Koraput Forest Division.

xiii. KML file of the CA land has not been furnished.

xiv. KML file of proposed land use has not been furnished.

xv. Map showing the distance of PA from applied site has not been furnished.

In view of the observation, the PSC raised EDS to user agency and directed to comply the deficiencies noted above at an early date and submit the correct revise proposal for taking it in subsequent PSC.

08	**CONSTRUCTION OF NEW BG RAILWAY LINE BETWEEN DUBURI STATION & TATA STEEL PLANT, KALINGA NAGAR (UPTO BOUNDARY) IN CONNECTION WITH ANGUL SUKINDA NEW BG RAIL LINK PROJECT BY MINISTRY OF RAILWAY** **PROJECT CATEGORY: RAILWAY** **FOREST AREA- 32.71 HA (REVENUE FOREST)** **PROPOSAL NO- FP/OR/RAIL/520679/2025** **FOREST DIVISION- CUTTACK DIVISION**

To Run the Steel plant Raw materials like iron ore, manganese etc. are essentially required which are to be imported from nearby mines. To transport the raw materials to the plant site and to export the product produced at the plant to different places Railway line is essential. The nearby Railway station is Jajpur-Keonjhar Road which is also about 15 kms from the plant.

Previously, the proposal was discussed in 64th PSC meeting held on dated 18.02.2025 and raised EDS to UA to comply the deficiencies noted on Joint Verification Report, Site Suitability

Certificate, DSS analysis report of identified CA land, start point and end point of the project, abstract of land schedule and discrepancy in forest land proposed.

On further scrutiny of the online proposal on Parivesh Portal, the following shortcomings were also noticed:-

i. The abstract of details forest land schedule village wise authenticated by both the DFO, Cuttack Forest Division and Tahasildar, Sukinda Tahasil is mismatching with the forest area to be acquired for the project as has been shown on the ORSAC vetted and DGPS surveyed maps as follows:-

Sl. No.	Name of the village	Forest area proposed to be acquired shown as per the land schedule	Forest area proposed to be acquire shown as per the ORSAC vetted DGPS surveyed map
1	Sansailo (Sheet No.1, 2 & 3)	13.371 ha	13.369 ha
2	Abhayapur	6.188 ha	6.185 ha
3	Baragadia	0.840 ha	0.839 ha
4	Hatimunda	4.407 ha	4.406 ha
5	Olia	1.659 ha	1.658 ha
6	Gobarghati	4.614 ha	4.614 ha
7	Duburi	1.631 ha	1.631 ha
	Total	**32.710 ha**	**32.702**

ii. (1) CA Scheme – CA land identified as per land schedule provided by the Collector, Rayagada is in (Asharagudi village under Padampur Taahsil over 9.551 ha + Tingirijhola village under Kolnara Taahsil over 20.244 ha + Dambalu village under Muniguda Tahasil over 3.077 ha = 32.872 ha), but as per Joint Verification Report of the CA land shown to be (Asharagudi village over 9.441 ha + Tingirijhola village over 20.235 ha + Dambalu village over 3.077 ha = 32.753 ha) under Rayagada Division of Rayagada District.

(2) As per DSS report uploaded for the CA land, the following area has been found to be suitable for raising of CA.

a. Asharagudi – Out of 9.551 ha of CA land, area suitable for plantation is over 5.00 ha for which seedlings are to be planted over @200 seedlings/ha = 1000 nos., which has been shown to be 1888 nos.
b. Tingirijhola – Out of 20.244 ha of CA land, area suitable for plantation is over 9.00 ha for which seedlings are to be planted over @200 seedlings / ha = 1800 nos., which has been shown to be 4047 nos.
c. Dambalu – Out of 3.077 ha of CA land, area suitable for plantation is over 3.077 ha for which seedlings are to be planted over @1600 seedlings / ha = 4923 nos., which has been shown to be 4923 nos.

Taking above facts into consideration, total amount of seedings which can be planted over 32.872 ha of CA land under Rayagada Division of Rayagada District has been found to be 7723 nos. But, as per the report uploaded regarding plantation to be raised is over 10858 nos., whereas the forest land proposed to be diverted being 32.710 ha, the seedlings to be planted as CA should be 32710 nos. So, in that regard, the UA to please explain regarding the **area over which** the balance no. of seedlings (32710 – 10858 = 21852 nos) shall be planted.

In view of the observation, the PSC raised EDS and returned back the proposal to user agency with direction to comply the deficiencies noted above and submit the correct revise proposal for scrutiny. The DFO, Cuttack Forest Division has requested to identify suitable ACA land for plantation of balance no. of seedlings.

09	**CHANGE IN LAND USE PATTERN FOR 6.682 HA OF FOREST LAND DIVERTED FOR LAYING OF RAILWAY LINE WITH 1.212 HA FOREST LAND AND 5.47 HA FOREST LAND FOR INFRASTRUCTURAL FACILITIES LIKE PIPE CONVEYOR, 33KV TRONSMISSION LINE, WATER PIPELINES(UNDERGROUND) AND SERVICE ROAD BY JINDAI STEEL AND POWER LTD. (JSPL).** **PROJECT CATEGORY: RE-DIVERSION** **FOREST AREA- 6.682 HA** **FOREST DIVISION- ANGUL FOREST DIVISION** **PROPOSAL NO- FP/OR/REDIV/479437/2024**

The diverted 6.682 ha of forest land for Jindal Steel & Power Ltd includes 1.212 ha forest land for Railway link line RoW and 5.47 ha forest land for infrastructure facilities for Coal Pipe Conveyor RoW which is spread over a length of 3647 Mtr and width of 15 Mtr, Pipe conveyor width of 7 Mtr, 33 KV overhead transmission line width of 4 Mtr and service road with underground water pipeline below it having width of 4 Mtr. These are the facilities in the approved land use.

The proposal was previously discussed in the 64th PSC meeting held on dated 18.02.2025 and raised EDS to User Agency to comply the deficiencies noted on KML wise project area, required NOC from competent authority for pipeline / Rail link passing through NH-63 and report of the DFO, Angul Forest Division on violation committed.

On further scrutiny of the online proposal on Parivesh Portal, it is found that the report of the DFO, Angul Forest Division related to violation committed by the User Agency which has been raised by the Deputy Inspector General, MoEF&CC, Regional Office, Bhubaneswar vide their Letter No.5-ORC248/2015-BHU dated 13.01.2025 has not been uploaded.

In view of the observation, the PSC accepted the proposal and directed the user agency to submit the proposal at the level of DFO, Angul Forest Division for taking necessary action in the matter. The DFO, Angul Forest Division has requested to upload the report of violation committed by the user agency alongwith Part-II and Site Inspection report.

10	**PROPOSAL FOR DIVERSION OF 9.1542 HA FOREST LAND OUT OF TOTAL ALLOTTED AREA 133.6833 HA AS PER PROVISION UNDER SECTION 2 (1) (II) OF THE VAN (SANRAKSHAN EVAM SAMVARDHAN) ADHINIYAM, 1980 TO BE UTILIZED FOR FUTURE EXPANSION (INTEGRATED STEEL PLANT) BY M/S SREE METALIKS LIMITED AT VILLAGE ANRA, TEHSIL BANSPAL, DIST KEONJHAR, ODISHA** **PROJECT CATEGORY: INDUSTRY** **FOREST AREA- 9.1542 HA (VILLAGE FOREST)** **PROPOSAL NO- FP/OR/IND/497356/2024** **FOREST DIVISION- KEONJHAR FOREST DIVISION**

The M/s Sree Metaliks Ltd. is a private limited company, established Iron Ore Beneficiation Plant and Palletization Plant at village Anra and Amuni under Banspal Tahasil of Keonjhar District.

The existing plant spreads over 48.56 ha of non-forest land including 40.36 ha private land and 8.20 ha Govt. land. The project was allotted total 133.6833 ha land by IDCO vide letter No. 21359 dated 22.08.2022 which comprises 9.1542 ha forest land and 124.4291 ha non-forest land.

Previously, the proposal was discussed in 56th PSC meeting held on dated 07.10.2024 and EDS raised to the User Agency to comply the deficiencies noted on establishment of industry in forest land, document of CA land duly countersigned both by the officials of forest and revenue, component wise break up of total forest land, tree enumeration list, land schedule of forest land involved in the project, required undertakings etc.

On further scrutiny of the online proposal on Parivesh Portal, the following shortcomings were noticed:-

i. The Site Suitability Certificate and DSS analysis report of the CA land identified has not been uploaded.

The KML file of the CA land at Panasanasa village has been shown to be over 9.272 ha whereas the DGPS surveyed and ORSAC vetted CA land acquired area has been shown to be over 9.154 ha.

ii. Component wise break-up of total forest and non-forest land involved in the project though uploaded has not been authenticated by the User Agency and the DFO, Keonjhar Forest Division.

Requirement of forest land over 9.1542 ha and non-forest land over 124.5289 ha, though uploaded has not been authenticated by the DFO and Tahasildar concerned. In ORSAC vetted DGPS index map of the project, the forest area and abstract of forest and non-forest land schedule found to be mismatched and not correct. In Index map forest area has been shown to be 9.1542 ha whereas in the abstract the forest area has been shown to be 8.1831 ha. Out of diversion of 9.1542 ha of forest land, Collector, Keonjhar in the meanwhile has issued FRA over 0.9711 ha of forest land. Hence, the balance diversion left for the User Agency is not 9.1542 ha but (9.1542 ha – 0.9711 ha= 8.1831 ha) which has been shown under the abstract of forest and non-forest land schedule required for this project duly countersigned by both the DFO and Tahasildar concerned.

iii. Detailed tree enumeration report over non-forest Govt. land in village Amuni over 124 nos. has not been uploaded.

iv. The undertaking regarding submission of FRA certificate before Stage-II approval has not been uploaded by the User Agency.

v. The certificate for minimum use of forest land has not been uploaded as shown to be uploaded under **Annexure-11**.

vi. Detailed note for execution of this project with reference to the existed Steel Plant of M/s Sree Metallics Ltd. has not been uploaded though has been shown to be uploaded under **Annexure-12**.

vii. Undertaking for payment of Addl. NPV, Addl. CA, Penal CA etc. required for this project has not been uploaded though has been shown to be uploaded under **Annexure-13**.

In the meeting, the user agency stated that the Collector, Keonjhar has to take a decision regarding issued of Patta under FRA over 0.9711 ha of forest land.

In view of the observation, the PSC raised EDS to user agency to comply the deficiencies noted above and submit the correct revise proposal for scrutiny.

11	**SARADEGA-BARPALI RAILWAY LINE (PHASE-II) OF MAHANADI COALFIELDS LIMITED.** **PROJECT CATEGORY : RAILWAY** **FOREST AREA: 11.947 HA (RESERVE FOREST)** **PROJECT PROPOSAL NO- FP/OR/RAIL/528364/2025** **DIVISION- SUNDARGARH FOREST DIVISION**

Mahanadi Coalfields Limited (MCL) is one of the major coal producing company of India. Presently, about 20 million Tonnes per year (MTPA) of coal is being transported from MCL siding at Sardega Railway station @ 14 rakes per day. MCL intends to transport additional 20 MTPA and total 40 MTPA of coal from Sardega loading yard. In order to accomplish loading of such a large volume of coal from Sardega loading yard, MCL intends to develop additional rail infrastructure at Sardega yard with provision of two (2) numbers of Rapid Loading System (Surge Bin). The section between JSG and Sardega is planned for Double line rail alignment. Considering the distance between Take-off point and 1st point of newly proposed loading yard, it is advised by Railway to develop a Holding Yard with provision of 1 or two more lines near the Take-off arrangement, thus justifying the need for forest diversion of the additional forest land for the project.

The PSC deferred the proposal vide its 66th meeting held on dated 21.03.2025.

On scrutiny of the online proposal on Parivesh Portal, the following shortcomings were noticed:-

i. The User Agency (M/s MCL) has provided 12.25 ha non-forest CA land in village Tikilipara and Saradega against diversion of 11.947 ha forest land. The CA land of 12.25 ha spreads over 73 small patches.

M/s MCL has provided the tenant land vested to them in Basundhara (West) Extension OCP under CBA, 1957 as CA land. Govt. of India, Ministry of Coal vested 4941.05 ha land for Basundhara (West) OCP for coal mining. M/s MCL has provided the non-coal bearing tenant lands within this OCP for CA against the instant diversion proposal. As per VSSA, 1980 this land cannot be taken as CA.

Further, Village Tikilipara is included in the land schedule of Basundhar (West) OCP as uploaded by the User agency, but village Saradega is not there in this land schedule. Moreover, in point No. 4 of the vesting order, it is mentioned that," the Govt. Company shall have no power to transfer the said lands or rights to any other person without the previous approval of the Central Govt."

As observed from the KML file, some portion of the CA land fall over water bodies.

ii. In location details Topo Sheet No. of 1.001 ha forest land in village Kalatapani is mentioned as F44L16 whereas other patches of village Kalatapani, the No. is mentioned as F44L12. Please clarify.

iii. Signature of concerned DFO is wanting in some documents.

iv. DFO has not signed in the suitability certificate of CA land.

v. DGPS Map of CA land in Saradega village is not signed by DFO.

vi. Sol Topo map depicting the project area seems wrong.

Considering the above fact, as it is an incomplete proposal specifically in term of CA land, the PSC rejected the proposal. The user agency is at liberty to file a fresh, complete and correct proposal.

12	**UPPER INDRAVATI PUMPED STORAGE PROJECT BY ODISHA HYDRO POWER CORPORATION LIMITED** **FOREST AREA- 107.596 HA (0.774 ha Reserve Forest + 2.569 ha Revenue Forest + 104.253 ha Jungle Block)** **PROJECT CATEGORY: HYDEL / IRRIGATION** **PROPOSAL NO- FP/OR/HYD/IRRIG/500690/2024** **FOREST DIVISION- KALAHANDI SOUTH DIVISION**

Odisha Hydro Power Corporation Limited is a State PSU of Govt. of Odisha is going to construct a 600 MW Upper Indravati Pumped Storage Project (UIPSP) on existing Upper Indravati Reservoir at Mukhiguda of Kalahandi District. The scheme can be economically implemented as it will use the upper reservoir of the existing Upper Indravati Hydro Electric Project. Water Resource Department, Govt. of Odisha and Central Electricity Authority of India accorded approval for UIPSP layout.

The PSC accepted the proposal vide its 57th meeting held on dated 23.10.2024. The proposal thereafter has been scrutinized by the DFO, Kalahandi (S) Division and RCCF, Bhawanipatna Circle and is taken up in PSC-II meeting for recommending the proposal to State Govt.

On further scrutiny of the online proposal on Parivesh Portal, the following shortcomings are noticed:-

i. 25.10.1980 status not mentioned in Govt. non-forest and private land schedule of Mahulpatna & Sukuli village under Th. Rampur Tahasil.

ii. In Govt. non-forest land schedule of Mahulpatna village, the area of Plot No.11 is mentioned as 122.52 Ac where as in Bhulekh the area of the plot is mentioned as 120.52 Ac.

iii. Tahasildar, Jaypatna signature is wanting in tree enumeration report of forest land in Kaduabeda Dangar, Kudeighati Dangar and Udyapur RF.

iv. Tree enumeration of forest land in Sutabandha Block (0.06 ha) is not mentioned in the list.

v. User Agency sign is wanting in tree enumeration report.

vi. GPS maps of Additional CA lands in Khariar and Bolangir Division duly signed by all concerned have not been uploaded.

In view of above observation, the PSC recommended the proposal to be forwarded to the State Govt. for grant of forest clearance as per Section-9 (16) of Van (Sanrakshan Evam Samvardhan) Rules, 2023. The user agency has requested to comply the deficiencies noted above immediately for taking further action in the matter.

The meeting ended with vote of thanks to the chair.

Addl. Principal Chief Conservator of Forests
Forest Diversion & Nodal Officer, FC Act

Appendix 2-1 -Water Comfort letter

Er. Bijoy Chandra Tripathy
Chief General Manager (P&C)

No.HO/P&C/EST/E-2626/01/2024/ 14868 **Dated 13.05.2024**

To

Dr. Gaurav Shukla,
General Manager – Projects
Kalyani Steel Limited
Kalyani Steel Limited Corporate Building, 2nd Floor
Mundhwa, Pune – 411306.
(E-mail: gaurav.shukla@kalyanisteels.com)
Phone: +91 – 9930022781

Sub: Issue of comfort letter in favour of M/s Kalyani Steels Limited on allocation of 25 MLD (10.23 cusec) of raw water for setting up Integrated Speciality Steel & Auto Components and Integrated Titanium Metal / Alloy & Aerospace Component Project at Gajamara in Dhenkanal District.

Ref: (1) Your letter No. KSL/ISP/OD/2024/240304 dated 19th March, 2024 addressed to IPICOL.

(2) Minutes of the review meeting dated 22nd March, 2024 communicated from Industries Department letter No.IND-HI1-MATS-0031-2019 – 2397 dated 30.03.2024.

Sir,

With reference to the above, I am directed to intimate that the Management has been pleased to issue this **Comfort Letter** in favour of M/s Kalyani Steels Limited on allocation of 25 MLD (10.23 cusec) of raw water for setting up Integrated Speciality Steel & Auto Components and Integrated Titanium Metal / Alloy & Aerospace Component Project at Gajamara in Dhenkanal District.

The water allocation shall be as per phase-wise requirement submitted by you vide Ref.(1). The allocation shall begin from October, 2025 and full quantity of 25 MLD (10.23 cusec) shall be provided by April, 2028.

Yours faithfully,

13.5.24

Chief General Manager (P&C)

Odisha Industrial Infrastructure Development Corporation
(A Government of Odisha Undertaking)
IDCO, IDCO Towers, Janpath, Bhubaneswar – 751022, Odisha, INDIA
+91-0674 –254246 | Fax:2541982 / 2542956
E-mail: cgmpc@idco.in / | www.idco.in

Memo No. 14869 **/ Dated 13.05.2024**

Copy to Sr. Private Secretary to Managing Director, IDCO for favour of kind information of Managing Director.

13.5.24

Chief General Manager (P&C)

Memo No. 14870 **/ Dated 13.05.2024**

Copy to Special Secretary, Industries Department, Government of Odisha, Kharavel Bhawan, Bhubaneswar for information.

13.5.24

Chief General Manager (P&C)

Memo No. 14871 **/ Dated 13.05.2024**

Copy to Executive Director, IPICOL, IPICOL House, Janpath, Bhubaneswar (E-mail: info@investodisha.org) for information and necessary action.

Copy to Collector & District Magistrate, Dhenkanal / Chief Engineer (Planning), O/o EIC, DoWR, Govt. of Odisha, Secha Sadan, Bhubaneswar / Divisional Heads, IDCO, (WS&EC-II / Angul) / Shri Siddhartha Patnaik, IPICOL, IPICOL House, Bhubaneswar (Coordinator for KSL Project) / Shri Gyanchand Lenka, Team Leader, PMU (Deloitte), IDCO, Bhubaneswar for information and necessary action.

13.5.24

Chief General Manager (P&C)

Odisha Industrial Infrastructure Development Corporation
(A Government of Odisha Undertaking)
IDCO, IDCO Towers, Janpath, Bhubaneswar – 751022, Odisha, INDIA
+91-0674 –254246 | Fax:2541982 / 2542956
E-mail: cgmpc@idco.in / | www.idco.in

Appendix 2-2 - Electricity Comfort letter

Er. Bijoy Chandra Tripathy
Chief General Manager (P&C)

idco Your power to grow | ODISHA NEW OPPORTUNITIES

No. IDCO/HO-P&C/A-10693/03/2023/V-1 16588 **Date:** 31.05.24

To,

The General Manager – Projects
M/s Kalyani Steel Limited, Kalyani Steel Limited Corporate Building, 2nd Floor,
Mundhwa, Pune – 411306
Email: gaurav.shukla@kalyanisteels.com
Phone: +91 - 9930022781

Sub : Issue of comfort letter in favour of M/s Kalyani Steels Limited on allocation of 203 MW (220 KV) Operation Power and 5 MW (33 KV) Construction Power for setting up Integrated Specialty Steel & Auto Components and Integrated Titanium Metal/Alloy & Aerospace Component project at Gajamara in Dhenkanal District.

Kind Attention: Dr. Gaurav Shukla.

Ref: i. Your letter to IPICOL vide its no KSL/ISP/OD/2024/240303 dated 19 March 2024

ii. Minutes of the review meeting dated 22 March 2024 vide its letter from Industries Department bearing no IND-HI1-MATS-0031-2019 – 2397 dated 30/03/2024.

iii. This office L.N. 13400 dated 30.04.24 to OPTCL regarding Power Supply requirements to Gajamara I.E. at 33 kV from 132/33 kV GSS, Khuntuni.

Sir,

With reference to the above, it is to intimate that the Management has been pleased to issue this **Comfort Letter** in favor of M/s Kalyani Steels Limited on extending support to get power supply arrangement of 203 MW (220 KV) Operation Power and 5 MW (33 KV) Construction Power from OPTCL and TPCODL for setting up Integrated Specialty Steel & Auto Components and Integrated Titanium Metal / Alloy & Aerospace Component project at Gajamara in Dhenkanal District.

Yours faithfully

Encl: As above

Chief General Manager (P&C)
31/5/24

Memo No 16589 **/dated** 31.05.24

Copy to Private Secretary to Managing Director, IDCO for favour of kind information of Managing Director.

Chief General Manager (P&C)

Memo No 16590 **/dated** 31.05.24

Copy submitted to the Executive Director, IPICOL, IPICOL House, Bhubaneswar (E-mail: info@investodisha.org) for kind information.

Chief General Manager (P&C)

Memo No 16591 **/dated** 31.05.24

Copy submitted to the Collector & District Magistrate, Dhenkanal / Executive Director, Central Zone , OPTCL , Bhoinagar, Janpath Bhubaneswar , Pin- 751022, Email : zone.bhubaneswar@optcl.co.in / Chief Executive Officer, TPCODL, Power House Square, Unit-8, Bhubaneswar-751 012, E-mail: ceo@tpcentralodishsa.com / Divisional Head(Electrical) of IDCO / Divisional Head, Angul, Angul Division of the IDCO / Shri Siddhartha Patnaik, IPICOL, Bhubaneswar (Coordinator for KSL Project) / Shri Gyanchand Lenka, Team Leader, PMU (Deloitte), IDCO, Bhubaneswar

Chief General Manager (P&C)

KALYANI STEELS

CIN - L27104MH1973PLC016350

Dy no- 1995 /IPE 8/4/24

Date - 19 March 2024

To
Executive Director
Industrial Promotion & Investment Corporation of Odisha
Government of Odisha

Letter No – KSL/ISP/OD/2024/240303

Reg – Request for Issuance of Recommendation Letter for the allocation of 203 MW (220 KV) Operation Power and 5 MW (33 KV) Construction Power, for KSL's Integrated Speciality Steel & Auto components and Integrated Titanium Metal/Alloy & Aerospace Component Project at Gajamara, Dhenkanal, Odisha

Ref: Your letter intimating HLCA approval for our proposals as below:

1. **SJ/HLCA-221/17-18/509, dated 06/02/2024 for Integrated Specialty Steel & Auto Components Complex**
2. **SJ/HLCA-221/17-18/509, dated 06/02/2024 for Integrated Titanium Metal/Alloy Mill Products and Aerospace & Défense Components Complex**

Dear Sir

To initiate the early implementation of our proposed projects at Gajamara, Dhenkanal and apply for the grant of environmental clearance, we request you to issue the recommendation letter to OPTCL & IDCO **for the allocation of 203 MW (220 KV) Operation Power and 5 MW (33 KV) Construction Power** to Kalyani Steels Limited for the above mentioned HLCA approved projects.

Project & year wise power requirements for our projects are detailed below :

Project	Phase	Year (s)	Power Requirement (MW)
Integrated Specialty Steel & Auto Components Manufacturing Complex	Construction Phase	2025-2027	4
	Commissioning Phase	2027-2028	100
	Operation Phase	2028-2029	100
		2029-2030	100
		2030-2031	100
Integrated Ti Metal/Alloy & Aerospace Components Manufacturing Complex	Construction Phase	2025-2028	1
	Commissioning Phase	2028-2029	103
	Operation Phase	2029-2030	103
		2030-2031	103
		2031-2032	103

KALYANI STEELS

CIN - L27104MH1973PLC016350

Annual Construction Phase Power Requirement for both projects (MW)	**5**
Annual Operation Phase Power Requirement for both projects (MW)	**203**

We also request IPICOL to issue directions to the OPTCL & IDCO for enabling the required power supply infrastructure to the project site as soon as possible.

Regards,

Dr Gaurav Shukla

General Manager – Projects
Kalyani Steels Limited
Email – gaurav.shukla@kalyanisteels.com
Phone - +91-99300-22781

Er. Bijoy Chandra Tripathy
Chief General Manager(P & C)

No. IDCO/P&C/A-10693/03/2023/V-1 13400 **Date:** 30-04-24

To

The Executive Director,
Central Zone,
Odisha Power Transmission Corporation Limited,
Janpath, Bhubaneswar-751022
Email ID: zone.bhubaneswar@optcl.co.in

Sub: **Requirement of Power supply to Gajamara Industrial Estate at 33 KV from 132/33 KV GIS Grid Sub-station, Khuntuni.**

Ref: Minutes of meeting held on 22.3.2024 for various issues of Gajamara I.E duly convened by Principal Secretary to Govt. Industries Department, Odisha.

Sir,

With reference to the above, this is bring it to your kind notice that M/S Kalyani Steel Limited (Kalyani Group) has proposed to set up a titanium metal and aerospace components manufacturing & integrated advanced specialty steel and automotive component manufacturing complex at Gajamara Industrial Estate in the district of Dhenkanal. In this regard a meeting was convened by the Principal Secretary to Govt. Industries Department, Odisha on dated 22.3.2024 for various issues and where in it has been opined to consider 33 KV Power supply source from 132/33 KV GSS at Khuntuni. The minutes of meeting are enclosed herewith for your perusal. The approximate power requirement shall be 5 MW for construction of the complex and other activities.

The Principal Secretary to Govt. Industries Department, Odisha has also convened another meeting on 30.4.2024 for the aforesaid power requirement and reviewed about the power requirement arrangement to M/S Kalyani Steel Limited and asked for **a joint site visit with OPTCL, TPCODL & Kalyani Steel at the earliest.** Therefore, it is proposed herewith that a joint site visit shall be organized on **03.5.2024 at 7:30 AM. The meeting point shall be 132/33 GIS Grid S/S Khuntuni.**

You are hereby requested to depute your representative for the joint site visit.

Yours faithfully,

Encl: as above

30/4/24

Chief General Manager(P & C)

(P.T.O.)

Memo No.: 13401 **Dt.:** 30.04.24

Copy to the PS to M.D. for the kind information of the Managing Director.

Chief General Manager(P & C) 30/4/

Memo No: 13402 **Date:** 30.04.24

Copy forwarded to General Manager (Elect), O&M Circle, OPTCL Cuttack, Email Id: ertm.cle.ctc@optcl.co.in / D.G.M (Elect) O&M Division, OPTCL Choudwar Email Id: ertm.div.cdw@optcl.co.in for information and necessary action.

Chief General Manager(P & C) 30/4/24

Memo No.: 13403 **Dt.:** 30.04.24

Copy to the Head (E & Q), TPCODL , 6th Floor , JSS Tower Infocity Area, Chandrasekharpur, Bhubaneswar-751024. Email- Pourush.Garg@tpcentralodisha.com for information and with a request to participate in the said joint site visit to assess the feasibility of assuring power supply to M/S Kalyani Steel Limited.

Chief General Manager(P & C) 30/4/24

Memo No.: 13404 **Dt.:** 30.04.24

Copy to the General Manager(Electrical) , IDCO for information and advised to organize the joint site visit/ Copy to the Divisional Head(Electrical), IDCO for information and advised to coordinate with the officials responsible from OPTCL, TPCODL, M/S Kalyani Steel Limited for attending the said joint site visit / Copy to M/s Kalyani Steels Limited, Corporate Building, 2nd Floor, Mundhwa, Pune-411036, Email - gaurav.shukla@kalyanisteels.com for information and with a request to depute their representative for the said joint site visit.

Chief General Manager(P & C) 30.4.24

Appendix 2-2 - Stack Details

Index	Description	Stack height (m)	Stack Temp (K)	Stack vel (m/s)	Stack dia (m)	Estimated Gas Volume (Nm3/hr)	SO2 (mg/Nm3)	NOX (mg/Nm3)	PM (mg/Nm3)
1	COB1#1	65	623	3.11	4.5	145425	30	200.00	20.00
2	COB1#2	65	623	3.11	4.5	145425	30	200.00	20.00
3	COB1#WHRB1#1	65	623	3.11	4.5	52976	30	200.00	20.00
4	COB1#WHRB1#2	65	623	3.11	4.5	52976	30	200.00	20.00
5	COB2#1	65	623	3.11	4.5	145425	30	200.00	20.00
6	COB2#2	65	623	3.11	4.5	145425	30	200.00	20.00
7	COB2#WHRB2#1	65	623	3.11	4.5	52976	30	200.00	20.00
8	COB2#WHRB2#1	65	623	3.11	4.5	52976	30	200.00	20.00
9	Primary Crushing Unit#1	40	423	14.72	2.5	15000	-	-	30.00
10	Primary Crushing Unit#2	40	423	14.72	2.5	15000	-	-	30.00
11	Secondary Crushing Unit#1	40	423	14.72	2.5	15000	-	-	30.00
12	Secondary Crushing Unit#2	40	423	14.72	2.5	15000	-	-	30.00
13	Screen House#1	40	423	14.72	2.5	15000	-	-	30.00
14	Screen House#2	40	423	14.72	2.5	15000	-	-	30.00
15	Grinding#1	50	423	2.29	2.5	20250	-	-	20.00
16	Grinding#2	50	423	2.29	2.5	20250	-	-	20.00
17	Kiln 1#1	50	423	2.29	2.5	20250	-	-	20.00
18	Kiln 1#2	50	423	2.29	2.5	20250	-	-	20.00
19	Kiln 2#1	50	423	2.29	2.5	20250	-	-	20.00
20	Kiln 2#2	50	423	2.29	2.5	20250	-	-	20.00
21	Proportioning house#1	30	453	6.40	4.4	127110	-	-	20.00
22	Proportioning house#2	30	453	6.40	4.4	127110	-	-	20.00
23	Sinter Machine#1	85	453	10.96	4.4	530712	200	200	20.00
24	Sinter Machine#2	85	453	10.96	4.4	530712	200	200	20.00
25	Product Bunker#1	55	363	12.09	3.2	176904	-	-	20.00
26	Product Bunker#2	55	363	12.09	3.2	176904	-	-	20.00
27	Cooler End Stack#1	45	363	12.09	3.2	281438	-	-	20.00
28	Cooler End Stack#2	45	363	12.09	3.2	281438	-	-	20.00
29	Stock House#1	35	353	14.74	3	335342	-	-	20.00

30	Stock House#2	35	353	14.74	3	335342	-	-	20.00
31	Hot Blast Stove#1	50	623	2.56	4.4	56623	-	200	5.00
32	Hot Blast Stove#2	50	623	2.56	4.4	56623	-	200	5.00
33	Cast House Dedusting#1	45	303	19.35	3.2	310342	-	-	20.00
34	Cast House Dedusting#2	45	303	19.35	3.2	310342	-	-	20.00
35	Slag Granulation #1	30	303	2.07	3.2	15517	-	-	5.00
36	Slag Granulation #2	30	303	2.07	3.2	15517	-	-	5.00
37	PCI#1	50	303	2.42	3.2	35000	-	-	0.03
38	PCI#2	50	303	2.42	3.2	35000	-	-	0.03
39	Power Plant#1	30	303	5.18	3.2	75000	-	-	5.00
40	Power Plant#2	30	303	5.18	3.2	75000	-	-	5.00
41	BOF GCP#1	40	373	18.32	4.5	75000	-	-	10.00
42	ZPF#2+SD#1	40	381	12.00	5.0	548500	-	-	30.00
43	IF#1 + VD#1+RH#1+LF#1+ZPFMHS	40	381	12.00	5.0	300000	-	-	30.00
44	BOF SD#2	40	381	14.70	3.0	250000	-	-	30.00
45	IF#2+VD#2+RH#2	40	381	14.70	3.0	100000	-	-	30.00
46	AOD#1	50	373	14.66	4.8	150000	-	-	20.00
47	AOD#2	50	373	14.66	4.8	150000	-	-	20.00
48	Ingot Annealing Furnace#1	30	373	3.54	2	5000	-	300.00	10.00
49	Ingot Annealing Furnace#2	30	373	3.54	2	5000	-	300.00	10.00
50	Reheating Furnace #1	60	523	6.23	2.5	35000	-	300.00	10.00
51	Reheating Furnace #2	60	523	6.23	2.5	35000	-	300.00	10.00
52	Soaking Pit#1	60	523	6.19	2	35000	-	300.00	10.00
53	Soaking Pit#2	60	523	6.19	2	35000	-	300.00	10.00
54	Annealing Furnace#1	30	523	7.22	1.4	5000	-	300.00	10.00
55	Annealing Furnace#2	30	523	7.22	1.4	5000	-	300.00	10.00
56	Annealing Furnace#3	30	523	7.22	1.4	5000	-	300.00	10.00
57	Annealing Furnace#4	30	523	7.22	1.4	5000	-	300.00	10.00
58	Annealing Furnace#5	30	523	7.22	1.4	5000	-	300.00	10.00
59	Annealing Furnace#6	30	523	7.22	1.4	5000	-	300.00	10.00
60	Shot Blast Machine#1	30	323	9.83	1.2	5000	-	-	10.00

61	Shot Blast Machine#2	30	323	9.83	1.2	5000	-	-	10.00
62	Pickling #1	30	333	3.21	2.1	5000	-	-	10.00
63	Pickling #2	30	333	3.21	2.1	5000	-	-	10.00

APPENDIX-3-1 - APPLICABLE REGULATORY STANDARDS

NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutants	Time weighted average	Concentration in Ambient Air	
		Industrial, Residential, Rural and other areas	Ecologically Sensitive Area (Notified by Central Government)
Sulphur Dioxide (SO_2), µg/m³	Annual * 24 hours **	50 80	20 80
Nitrogen Dioxide (NO_2), µg/m³	Annual * 24 hours **	40 80	30 80
Particulate Matter (Size less than 10 µm) or PM_{10}, µg/m³	Annual * 24 hours **	60 100	60 100
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$, µg/m³	Annual * 24 hours **	40 60	40 60
Ozone (O_3), µg/m³	8 hours * 1 hour **	100 180	100 180
Lead (Pb), µg/m³	Annual * 24 hours **	0.50 1.0	0.50 1.0
Carbon Monoxide(CO), mg/m³	8 hours * 1 hour **	02 04	02 04
Ammonia (NH_3), µg/m³	Annual * 24 hours **	10 400	10 400
Benzene (C_6H_6), µg/m³	Annual *	05	05
Benzo(a)Pyrene (BaP) Particulate phase only, ng/m³	Annual *	01	01
Arsenic (As), ng/m³	Annual *	06	06
Nickel (Ni), ng/m³	Annual *	20	20

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigations.

Appendix-3-1 - Applicable Regulatory Standards (cont'd)

DRINKING WATER SPECIFICATIONS (IS 10500:2012)

Characteristics	Desirable limit	Permissible limit
Colour, Hazen Units, Max	5	15
Odour	Agreeable	Agreeable
Taste	Agreeable	Agreeable
Turbidity, NTU, Max	1	5
pH value	6.5 to 8.5	-
Total Hardness (as $CaCO_3$), mg/l, Max	200	600
Iron (as Fe), mg/l, Max	0.3	-
Chlorides (as Cl), mg/l, Max	250	1,000
Residual free chlorine, mg/l, Max	0.2	1.0
Dissolved solids, mg/l, Max	500	2,000
Calcium (as Ca), mg/l, Max	75	200
Magnesium (as Mg), mg/l, Max	30	100
Copper (as Cu), mg/l, Max	0.05	1.5
Manganese (as Mn), mg/l, Max	0.1	0.3
Sulphate (as SO_4), mg/l, Max	200	400
Nitrate (as NO_3), mg/l, Max	45	-
Fluoride (as F), mg/l, Max	1.0	1.5
Phenolic compounds (as C_6H_5OH), mg/l, Max	0.001	0.002
Mercury (as Hg), mg/l, Max	0.001	-
Cadmium (as Cd), mg/l, Max	0.003	-
Selenium (as Se), mg/l, Max	0.01	-
Arsenic (as As), mg/l, Max	0.01	0.05
Cyanide (as CN), mg/l, Max	0.05	
Lead (as Pb), mg/l, Max	0.01	-
Anionic detergents (as MBAS), mg/l, Max	0.02	1.0
Total Chromium (as Cr), mg/l, Max	0.05	-
PAH, mg/l, Max	0.0001	-
Mineral oil, mg/l, Max	0.05	-
Alkalinity, mg/l, Max	200	600
Aluminum (as Al), mg/l, Max	0.03	0.2
Boron, mg/l, Max	0.5	1.0

Appendix-3-1 - Applicable Regulatory Standards (cont'd)

AMBIENT NOISE STANDARDS

Area code	Category of area	Limit in DB (A) LEQ	
		Day time	Night time
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence zone	50	40

Note:

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.

2. Night time shall mean from 10.00 p.m. to 6.00 a.m.

3. Silence zone is defined as areas upto 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority

4. Mixed categories of areas should be declared as "one of the four above mentioned categories by the competent authority and the corresponding standard shall apply

   - dB (A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
   - A "decibel" is a unit in which noise is measured.
   - "A" in dB (A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.
   - Leq: It is an energy mean of the noise level over a specified period.

APPENDIX-3-2 - LIST OF TREES ENUMERATED IN KSL PROJECT BOUNDARY

Sl.	Name of Tree	Scientific Name	Forest	Non-forest Land	Total
1	Achu	*Morinda pubescens*	1	-	1
2	Acacia	*Acacia nilotica*	33	94	127
3	Ankola	*Alangium*	3	83	86
4	Arjun	*Terminalia arjuna*	-	4	4
5	Asan	*Terminalia elliptica*	-	1	1
6	Bahada	*Terminalia bellirica*	2	13	15
7	Bandhan	*Ougeinia oojeinensis*	-	2	2
8	Bara	*Ficus benghalensis*	2	13	15
9	Bara Koli	*Ziziphus mauritiana*	2	8	10
10	Boula	*Mimusops elengi*	-	1	1
11	Bela	*Aegle marmelos*	2	12	14
12	Bhalia	*Semecarpus*	-	3	3
13	Bhrusanga	*Murraya koenigii*	-	1	1
14	Chakhunda	*Dillenia pentagyna*	254	212	466
15	Chatiana	*Alstonia scholaris*	3	-	3
16	Demucha	*Artocarpus lacucha*	1	-	1
17	Dhaura	*Anogeissus latifolia*	-	8	8
18	Dimiri	*Ficus racemosa*	2	7	9
19	Fasi	*Anogeissus*	9	-	9
20	Gambhari	*Gmelina arborea*	7	11	18
21	Gohira	*Senegalia pennata*	-	10	10
22	Harida	*Terminalia chebula*	6	6	12
23	Jamu	*Syzygium cumini*	11	32	43
24	Kadamba	*Neolamarckia*	-	3	3
25	Kaju	*Anacardium*	12355	8412	20767
26	Kamala	*Mallotus philippensis*	-	6	6
27	Kalichia	*Diospyros sylvatica*	12	-	12
28	Karanja	*Millettia pinnata*	15	12	27
29	Kashi	*Bridelia retusa*	55	9	64
30	Kendu	*Diospyros*	48	34	82
31	Khasia	*Pinus kesiya*	3	60	63
32	Kosi	*Spinous kino*	2	-	2
33	Kuchela	*Strychnos nux-vomica*	-	3	3
34	Kumbhi	*Careya arborea*	1	-	1
35	Kurei,Kurichi	*Holarrhena*	22	15	37
36	Kusum	*Schleichera oleosa*	1	6	7
37	Maha neem	*Melia dubia*	5	27	32
38	Mahula	*Madhuca longifolia*	20	6	26
39	Mai	*Ochna integerrima.*	-	12	12
40	Mandara	*Hibiscus rosa-*	3	-	3
41	Mango	*Mangifera indica*	663	255	918
42	Neem	*Azadirachta indica*	333	1034	1367
43	Nilgari	*Eucalyptus globulus*	-	7	7
44	Orange	*Citrus sinensis*	2	-	2
45	Osta	*Ficus religiosa*	-	9	9
46	Palsha	*Butea monosperma*	1	97	98
47	Panasha	*Artocarpus*	23	17	40
48	Patas	*Eucalyptus*	2	-	2
49	Pijuli	*Psidium guajava*	-	20	20

Appendix-3-2 - List of trees enumerated in KSL project boundary (cont'd)

50	**Radhachura**	***Caesalpinia***	**-**	**6**	**6**
51	**Sahada**	***Streblus asper***	**5**	**3**	**8**
52	**Sahaj**	***Terminalia***	**11**	**40**	**51**
53	**Sala**	***Shorea robusta***	**11**	**65**	**76**
54	**Siju**	***Euphorbia neriifolia***	**1**	**-**	**1**
55	**Simli**	***Bombax ceiba***	**29**	**9**	**38**
56	**Sirisa**	***Albizia lebbeck***	**13**	**3**	**16**
57	**Sissoo**	***Dalbergia sissoo***	**-**	**4**	**4**
58	**Sunari**	***Cassia fistula***	**4**	**1**	**5**
59	**Teak**	***Tectona grandis***	**380**	**1049**	**1429**
60	**Tentuli**	***Tamarindus indica***	**15**	**14**	**29**
			14379	**11765**	**26144**

APPENDIX-3-3 - LIST OF FLORA IN STUDY AREA OF KSL, DHENKANAL

NATURAL VEGETATION IN THE FOREST AREA				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
Trees:				
1	Anacardiaceae	1	Bhilwa	*Semecarpus anacardium*
		2	Cashew	*Anacardimum occidentale*
		3	Char, Chironji	*Buchanania lanzan*
2	Apocynaceae	4	Kurchi	*Holarrhena antidysenterica*
3	Caesalpinaceae	5	Palash	*Butea monosperma*
4	Combretaceae	6	Asan/Sahaj	*Terminalia tomentosa*
		7	Bahera	*Terminalia bellirica*
		8	Dhaura	*Anogesus latifolia*
5	Dipterocarpaceae	9	Sal	*Shorea robusta*
6	Ebenaceae	10	Kendu	*Diospyros melanoxylon*
7	Euphorbiaceae	11	Amla	*Emblica officinalis*
		12	Chikini/Kalchua	*Glochidion zeylanicum*
8	Fabaceae	13	Babul	*Acacia nilotica*
		14	Bandhan/Tinsa	*Ougeinia oojeinensis*
		15	Chakunda/Cassia	*Cassia siamea*
		16	Khair	*Acacia catechu*
9	Lamiaceae	17	Teak	*Tectona grandis*
10	Meliaceae	18	Neem	*Azadirachta indica*
11	Moraceae	19	Dumur	*Ficus cunia*
12	Myrtaceae	20	Jamun	*Syzygium cumini*
13	Rhamnaceae	21	Ber	*Ziziphus mauritiana*
14	Rutaceae	22	Bael	*Aegle marmelos*
		23	Kaitha, Wood apple	*Limonia acidissima*
		24	Bheru/Cylon	*Chloroxylon swietenia*
15	Sapindaceae	25	Kusum	*Schleichera oleosa*
16	Sapotaceae	26	Mahua	*Madhuca indica*
PALM				
1	Arecaceae	1	Khajur	*Phoenix sylvestris*
		2	Nariyal	*Cocos nucifera*
		3	Tal	*Borassus flabellifer*
BAMBOO				

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

NATURAL VEGETATION IN THE FOREST AREA				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
1	Poaceae	1	Bans	*Dendrocalamus strictus*
		2	Kanta bans	*Bambusa arundinacea*
SHRUBS				
1	Asteraceae	1	Devil weed	*Chromolaena odorata*
2	Cornaceae	2	Ankol	*Alangium salviifolium*
3	Euphorbiaceae	3	Garari	*Cleistanthus collinus*
4	Lamiaceae	4	Bonjui	*Clerodendrum inerme*
		5	Lal guma	*Leonotis nepetifolia*
		6	Ramotulsi	*Ocimum gratissimum*
5	Malvaceae	7	Bon okra	*Urena lobata*
6	Mimosaceae	8	Lajjabati	*Mimosa pudica*
7	Moraceae	9	Seora	*Streblus asper*
8	Rhamnaceae	10	Ber	*Ziziphus oenoplia*
9	Verbenaceae	11	Chotra	*Lantana camara*
SCCULENT				
1	Asparagaceae	1	Century plant	*Agave sp.*
		2	Labdu	*Agave americana*
CLIMBERS				
1	Combretaceae	1	Bushwillow	*Combretum roxburghii*
2	Cucurbitaceae	2	Telakucha	*Coccinia grandis*
3	Dioscoriaceae	3	Kanta-alu	*Dioscorea pentaphylla*
		4	Shora-alu	*Dioscorea oppositifolia*
4	Liliaceae	5	Satamuli	*Asparagus racemosus*
5	Menispermaceae	6	Gulanch	*Tinospora cordifolia*
6	Lygodiaceae	7	Climbing fern	*Lygodium japonicum*
HERBS				
1	Acanthaceae	1	Kalmegh	*Andrographis paniculata*
		2	Vasaka	*Adhatoda vasica*
2	Apocynaceae	3	Ananthamul	*Hemidesmus indicus*

VEGETATION IN ROADSIDES, HOMESTEAD LAND AND AFFORESTED LAND				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
TREES				
1	Anacardiaceae	1	Cashew	*Anacardium occidentale*
		2	Mango	*Mangifera indica*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

VEGETATION IN ROADSIDES, HOMESTEAD LAND AND AFFORESTED LAND				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
2	Annonaceae	3	Debdaru	*Polyalthia longifolia*
		4	Sitaphal	*Annona squamosa*
3	Apocynaceae	5	Chatim	*Alstonia scholaris*
4	Caesalpinaceae	6	Palash	*Butea monosperma*
5	Caricaceae	7	Papita	*Carica papaya*
6	Casuarinaceae	8	Jhaun	*Casuarina equisetifolia*
7	Combretaceae	9	Arjun	*Terminalia arjuna*
		10	Kath badam	*Terminalia catappa*
8	Euphorbiaceae	11	Amla	*Emblica officinalis*
9	Fabaceae	12	Akashmoni	*Acacia moniliformis*
		13	Babul	*Acacia nilotica*
		14	Cassia	*Cassia siamea*
		15	Copperpod	*Peltophorum pterocarpum*
		16	Gulmohor	*Delonix regia*
		17	Imli	*Tamarindus indica*
		18	Kachnar	*Bauhinia purpurea*
		19	Karanja	*Pongamia glabra*
		20	Sisoo	*Dalbergia sissoo*
		21	Siris	*Albizia lebbeck*
		22	Subabul	*Leucaena leucocephala*
10	Lamiaceae	23	Gamhar	*Gmelina arborea*
		24	Teak	*Tectona grandis*
11	Malvaceae	25	Semal	*Bombax ceiba*
12	Meliaceae	26	Bakan-nimb	*Melia azedarach*
		27	Mahogany	*Swietenia mahagoni*
		28	Neem	*Azadirachta indica*
13	Moraceae	29	Banyan	*Ficus benghalensis*
		30	Dumur	*Ficus cunea*
		31	Kathal	*Artocarpus heterophyllus*
		32	Pipal	*Ficus religiosa*
		33	White Fig	*Ficus infectoria*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

VEGETATION IN ROADSIDES, HOMESTEAD LAND AND AFFORESTED LAND				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
14	Moringaceae	34	Sajna	*Moringa oleifera*
15	Myrtaceae	35	Guava	*Psidium guajava*
		36	Jamun	*Syzygium cumini*
		37	Nilgari	*Eucalyptus citriodora*
16	Rhamnaceae	38	Ber	*Ziziphus mauritiana*
17	Rubiaceae	39	Kadam	*Anthocephalus cadamba*
18	Rutaceae	40	Bael	*Aegle marmelos*
19	Sapotaceae	41	Bakul	*Mimusops elengi*
		42	Mahua	*Madhuca longifolia*
PALM				
1	Arecaceae	1	Khajur	*Phoenix sylvestris*
		2	Nariyal	*Cocos nucifera*
		3	Tal	*Borassus flabellifer*
BAMBOO				
1	Poaceae	1	Bans	*Dendrocalamus strictus*
		2	Common bamboo	*Bambusa vulgaris*
		3	Kanta bans	*Bambusa arundinacea*
SHRUBS				
1	Acanthaceae	1	Vasaka	*Adhatoda vasica*
2	Apocynaceae	2	Ananthamul	*Hemidesmus indicus*
		3	Karabi	*Nerium oleander*
		4	Kolkey phul	*Thevetia peruviana*
		5	Tagar	*Tabernaemontana coronaria*
3	Asclepiadaceae	6	Shet-Akanda	*Calotropis procera*
4	Convolvulaceae	7	Bush Morning Glory	*Ipomoea carnea*
5	Euphorbiaceae	8	Arandi	*Ricinus communis*
		9	Jangli erandi	*Jatropha glandulifera*
		10	Lal Bheranda	*Jatropha gossypifolia*
6	Fabaceae	11	Amaltas	*Cassia fistula*
		12	Arhar	*Cajanus cajan*
		13	Kalkasunda	*Cassia sophera*
		14	Krishnachura	*Caesalpinia pulcherrima*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

VEGETATION IN ROADSIDES, HOMESTEAD LAND AND AFFORESTED LAND				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
7	Malvaceae	15	Jaba	*Hibiscus rosa sinensis*
		16	Kapas	*Gossypium herbaceum*
		17	Petari	*Abutilon indicum*
8	Nyctaginaceae	18	Bougainvillea	*Bougainvillea spectabilis*
9	Rhamnaceae	19	Chani ber	*Ziziphus nummularia*
10	Rubiaceae	20	Rangan	*Ixora coccinea*
11	Solanaceae	21	Dhatura	*Datura metel*
		22	Titabegun	*Solanum torvum*
		23	Chotra	*Lantana camara*
SCCULENT				
1	Asparagaceae	1	Century plant	*Agave sp.*
		2	Labdu	*Agave americana*
2	Asphodelaceae	3	Ghritakumari	*Aloe vera*
CACTUS				
1	Cactaceae	1	Phanimansha	*Opuntia dillenii*
2	Euphorbiaceae	2	Tesiramonsa	*Euphorbia antiquorum*
HERBS				
1	Acanthaceae	1	Kalmegh	*Andrographis paniculata*
		2	Kantakalia	*Hydrophila longifolia*
2	Amaranthaceae	3	Apang	*Achyranthes aspera*
		4	Katanotey	*Amaranthus spinosus*
3	Apocynaceae	5	Nayantara	*Catharanthus roseus*
4	Asteraceae	6	Coatbuttons	*Tridax procumbens*
		7	Congress Grass	*Parthenium hysterophorus*
		8	Goat Weed	*Ageratum conyzoides*
		9	Kesutti	*Eclipta prostrata*
		10	Kukshim	*Vernonia cinerea*
5	Boraginaceae	11	Hatisur	*Heliotropium indicum*
6	Commelinaceae	12	Kansiri	*Commelina benghalensis*
7	Caesulpinaceae	13	Sickle Senna	*Cassia tora*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

VEGETATION IN ROADSIDES, HOMESTEAD LAND AND AFFORESTED LAND				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
8	Convolvulaceae	14	Morning Glory	*Ipomea fistulosa*
9	Euphorbiaceae	15	Ban Karni	*Euphorbia hirta*
		16	Ban Tulasi	*Croton bonplandianum*
10	Fabaceae	17	Anshumati	*Desmodium gangeticum*
11	Lamiaceae	18	Bush Mint	*Hyptis suaveolens*
		19	Priyangu	*Callicarpa macrophylla*
		20	Raktadrones	*Leonurus sibiricus*
		21	Shetadrones	*Leaucas aspera*
		22	Tulsi	*Ocimum sanctum*
12	Malvaceae	23	Lal Berela	*Sida rhombifolia*
		24	Sida	*Sida acuta*
13	Mimosaceae	25	Laajvanti	*Mimosa pudica*
14	Musaceae	26	Kodoli	*Musa balbisiana*
		27	Kanch-kala	*Musa paradisiaca*
		28	Banana	*Musa paradisiaca*
15	Rubiaceae	29	Bhuipat	*Dentella repens*
16	Solanaceae	30	Kakmachi	*Solanum nigrum*
17	Umbelliferae	31	Thankuni	*Centella asiatica*
18	Verbenaceae	32	Bhui Okra	*Lippia nodiflora*
GRASSES				
1	Cyperaceae	1	Motha	*Cyperus esculentus*
2	Poaceae	2	Chinese Lovegrass	*Eragrostis unioloides*
		3	Chorkanta	*Chrysopogon aciculatus*
		4	Doob	*Cynodon dactylon*
		5	Kashatandi	*Saccharum spontaneum*
		6	Kodua	*Paspalum scrobiculatum*
		7	Kush	*Vetiveria zizanioides*
		8	Panighasa	*Eragrostis japonica*
		9	Sacaton grass	*Sporobolus marginatus*
CLIMBERS				
1	Caesalpiniaceae	1	Maloo Creeper	*Bauhinia vahlii*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

VEGETATION IN ROADSIDES, HOMESTEAD LAND AND AFFORESTED LAND				
Sl. No.	**Family**	**Sl. No**	**Local Name**	**Scientific Name**
2	Convolvulaceae	2	Amar bel	*Cuscuta reflexa*
		3	Kunjlata	*Ipomoea quamoclit*
3	Dioscoreaceae	4	Pitalu	*Dioscorea bulbifera*
4	Fabaceae	5	Crab's eye	*Abrus precatorius*
5	Liliaceae	6	Satamuli	*Asparagus racemosus*
MAJOR AGRICULTURAL CROP				
1	Poaceae	1	Rice	*Oriza sativa*
MINOR AGRICULTURAL CROPS				
1	Fabaceae	1	Groundnut	*Arachis hypogaea*
2	Brassicaceae	2	Mustard seed	*Brassica nigra, B. hirta*
3	Pedaliaceae	3	Sesame	*Sesamum indicum*
4	Poaceae	4	Maize	*Zea mays*
		5	Sugarcane	*Saccharum officinarum*
		6	Wheat	*Triticum aestivum*
COMMERCIAL PLANTATION				
1	Anacardiaceae	1	Mango	*Mangifera indica*
		2	Cashew	*Anacardium occidentale*
2	Poaceae	3	Common bamboo	*Bambusa vulgaris*

LIST OF MEDICINAL PLANTS IN STUDY AREA OF KSL, DHENKANAL

Sl. No.	**Family**	**Sl. No.**	**Local Name**	**Scientific Name**
1	Acanthaceae	1	Kalmegh	*Andrographis paniculata*
		2	Vasaka	*Adhatoda vasica*
2	Amaranthaceae	3	Apang	*Achyranthes aspera*
		4	Katanotey	*Amaranthus spinosus*
3	Apocynaceae	5	Ananthamul	*Hemidesmus indicus*
		6	Chatim	*Alstonia scholaris*
		7	Kurchi	*Holarrhena antidysenterica*
		8	Nayantara	*Catharanthus roseus*
4	Asclepiadaceae	9	Shet-Akanda	*Calotropis procera*
5	Asteraceae	10	Coat Buttons	*Tridax procumbens*
		11	Kesutti	*Eclipta prostrata*
6	Asphodelaceae	12	Ghritakumari	*Aloe vera*
7	Malvaceae	13	Semal	*Bombax ceiba*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

8	Caesalpiniaceae	14	Kalkasunda	*Cassia sophera*
9	Cucurbitaceae	15	Telakucha	*Coccinia grandis*
10	Dioscoriaceae	16	Shora-alu	*Dioscorea oppositifolia*
11	Euphorbiaceae	17	Arandi	*Ricinus communis*
		18	Ban karni	*Euphorbia hirta*
		19	Ban tulsi	*Croton bonplandianum*
12	Fabaceae	20	Amaltas	*Cassia fistula*
		21	Khair	*Acacia catechu*
13	Lamiaceae	22	Priyangu	*Callicarpa macrophylla*
		23	Shetadrones	*Leaucas aspera*
		24	Tulasi	*Ocimum sanctum*
14	Liliaceae	25	Satamuli	*Asparagus racemosus*
15	Malvaceae	26	Lal Berela	*Sida rhombifolia*
		27	Sida	*Sida acuta*
16	Meliaceae	28	Neem	*Azadirachta indica*
17	Mimosaceae	29	Laajvanti	*Mimosa pudica*
18	Moraceae	30	Bargad	*Ficus benghalensis*
19	Myrtaceae	31	Jamun	*Syzygium cumini*
20	Phyllanthaceae	32	Amla	*Emblica officinalis*
21	Poaceae	33	Kanta bans	*Bambusa arundinacea*
		34	Kush	*Vetiveria zizanioides*
22	Rutaceae	35	Bael	*Aegle marmelos*
23	Solanaceae	36	Dhatura	*Datura metel*
		37	Kakmachi	*Solanum nigrum*
		38	Titabegun	*Solanum torvum*
24	Umbelliferae	39	Thankuni	*Centella asiatica*

HYDROPHYTES IN SURFACE WATER BODIES OF KSL STUDY AREA

AQUATIC AND SEMI AQUATIC MACROPHYTES				
Sl. No.	**Family**	**Sl. No.**	**Local Name**	**Scientific Name**
1	Amaranthaceae	1	Alligator Weed	*Alternanthera philoxeroides*
2	Araceae	2	Taro	*Colocasia esculenta*
3	Ceratophyllaceae	3	Ceratophyllum	*Ceratophyllum demersum*
4	Convolvulaceae	4	Bush Morning Glory	*Ipomoea carnea*
		5	Water spinach	*Ipomoea aquatica*
5	Cyperaceae	6	Nut grass	*Cyperus rotundus*
		7	Scirpus	*Scirpus grossus*
6	Hydrocharitaceae	8	Hydrilla	*Hydrilla verticillata*
		9	Water Thyme	*Elodea canadensis*

Appendix-3-3 - List of FLORA in Study Area OF KSL, DHENKANAL (cont'd)

7	Lythraceae	10	Rotala	*Rotala indica*
8	Marsileaceae	11	Susni	*Marsilea quadrifolia*
9	Poaceae	12	Dichanthium	*Dichanthium sp.*
		13	Kans grass	*Saccharum spontaneum*
		14	Sand lovegrass	*Eragrostis trichodes*
		15	Torpedograss	*Panicum repens*
10	Pontederiaceae	16	Kachuripana	*Eichhornia crassipes*
11	Potamogetonacea	17	Potamogeton	*Potamogeton crispus*
12	Salviniaceae	18	Azolla	*Azolla pinnata*
13	Typhaceae	19	Typha	*Typha elephantina*

APPENDIX-3-4 - LIST OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KSL, DHENKANAL

Sl. No	Common Name	Scientific Name	Schedule of Protection (IWPA-2022) & Conservation Status (IUCN-2024-2)
MAMMALS (WILD ANIMALS)			
1	Asiatic jackal	*Canis aureus*	I & LC
2	Bandicot rat	*Bandicota bengalensis*	IV & LC
3	Barking deer	*Muntiacus muntjak*	- & LC
4	Bison	*Bos gaurus*	I & VU
5	Blue bull	*Boselaphus tragocamelus*	- & LC
6	Civet	*Viverricula indica*	I & LC
7	Common hares	*Lepus nigricollis*	- & LC
8	Common jungle cat	*Felis chaus affinis*	- & LC
9	Common mongoose	*Herpestes edwardsii*	- & LC
10	Four-horned antelope	*Tetracerus quadricornis*	I & VU
11	Fox	*Vulpes bengalensis*	- & LC
12	Gaint Indian squirrel	*Ratufa indica*	I & LC
13	Grey musk shrew	*Suncus murinus*	- & LC
14	Hyaena	*Hyaena hyaena*	- & NT
15	Rat	*Rattus rattus*	- & LC
16	Indian crested porcupine	*Hystrix indica*	I & LC
17	Indian Elephant	*Elephas maximus*	I & EN
18	Indian flying fox	*Pteropus giganteus*	II & NT
19	Indian wild dog	*Cuon alpinus*	I & EN
20	Langur	*Semnopithecus entellus*	I & VU
21	Leopard (Panther)	*Panthera pardus*	I & VU
22	Leopard cat	*Prionailurus bengalensis*	I & LC
23	Long tailed tree mouse	*Vandeleuria oleracea*	- & LC
24	Malayan giant squirrel	*Ratufa bicolor*	I & NT
25	Monkey	*Macaca mulatta*	II & -
26	Mouse deer	*Tragulus meminna*	- & LC
27	Pangolin	*Manis crassicaudata*	I & EN

Appendix-3-4 - LIST OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KSL, DHENKANAL (cont'd)

28	Porcupine	*Hystrix indica*	I & LC
29	Ratel	*Mellivora capensis*	I & LC
30	Sambar	*Cervus unicolor*	I & VU
31	Short-nosed fruit bat	*Cynopterus sphinx*	- & LC
32	Sloth bear	*Melursus ursinus*	I & VU
33	Spotted deer	*Axis axis*	I & LC
34	3 Striped palm squirrel	*Funambulus palmarum*	- & LC
35	5 Striped palm squirrel	*Funambulus pennant*	- & LC
36	Wild boar	*Sus scrofa cristatus*	I & LC
37	Wolf	*Canis lupus*	I & LC
REPTILES - Snakes			
1	Bamboo pit viper	*Trimeresurus gramineus*	- & LC
2	Chandra bora/Russels viper	*Ophiophagus hannah*	- & VU
3	Chandra mutia	*Echis carinatus*	- & LC
4	Checkeered keel back	*Natrix piscator*	- & LC
5	Common green whipsnake	*Dryophis nasutrus*	-
6	Cobra Indian	*Naja naja*	I & LC
7	Cobra King	*Naja hannah*	I & VU
8	Cobra Monocallota	*Naja kuothia*	I & LC
9	Copper head	*Elpha radiate*	-
10	Dhanda	*Xenochrophis piscator*	IV, APENDIX-III & LC
11	Dhamana	*Ptyas mucosus*	I & -
12	Dhandaboda-Russel's viper	*Vipera russelli*	- & LC
13	Dhulinag- Sawscale viper	*Echis carinatus*	- & LC
14	Green keel back	*Macropisthodon plumbicolor*	- & LC
15	Indian python	*Python molurus*	I & LC
16	Krait Banded	*Bungarus fasiatus*	-
17	Krait Common	*Bungarus caeruleus*	- & LC
18	Rusel's earth boa	*Eryx conicus*	- & NT
19	Tree snake	*Dendrelaphis tristis*	- & LC
20	Tree snake	*Lycodon striatus*	- & LC
21	Vine snake	*Ahetulla sp.*	-
REPTILES - Lizards			

Appendix-3-4 - LIST OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KSL, DHENKANAL (cont'd)

1	Banded geeko	*Crytodoctylu sp.*	-
2	Fattailed geeko	*Eublephari sp.*	-
3	Garden lizard	*Calotes versicolor*	- & LC
4	Indian chameleon	*chamaeleo zeylanicus*	I & LC
5	House lizard	*Hemidactylus flaviviridis*	- & LC
6	Land monitor	*Varanus bengalensis*	I & NT
7	Skink	*Mabuya bibro*	-
8	Rock geeko	*Hemidactylus maculates*	-
9	Water monitor	*Varanus salvador*	I & LC
BIRDS			
1	Babbler common	*Turdoides caudata*	II & LC
2	Babbler jungle	*Turdoides striatus*	II & LC
3	Babbler rufous	*Argya subrufa*	II & LC
4	Babbler rufous bellied	*Dumetia hyperythra*	II & LC
5	Barbet crimson	*Megalaima haemacephala*	II & -
6	Barbet large green	*Psilopogon zeylanicus*	II & -
7	Baya weaver bird	*Ploceus philippinus*	II & -
8	Bee eater (blue tailed)	*Merops philippinus*	II & LC
9	Bee eater (small green)	*Merops orientalis*	II & LC
10	Blue rock pigeon	*Columba livia*	II & -
11	Bulbul (red vented)	*Pycnonotus cafer*	II & LC
12	Chloropsis (Gold fronted)	*Chloropsis aurifrons*	II & LC
13	Chloropsis (Gold mantled)	*Chloropsis cochinchinensis*	II & EN
14	Crow house	*Corvus splendens*	- & LC
15	Crow jungle	*Corvus macrorhynchos*	II & LC
16	Crow pheasant	*Centropus sinensis*	- & LC
17	Cuckoo common hawk	*Cuculus varius*	- & LC
18	Cuckoo indian	*Cuculus micropterus*	II & LC
19	Cuckoo pied crested	*Clamator jacobinus*	II & LC
20	Drongo (black)	*Dicrurus macrocercus*	II & LC
21	Drongo (rocket tailed)	*Dicrurus paradiseus*	II & -
22	Dove King	*Streptopelia decaocto*	II & LC
23	Dove spotted	*Spilopelia chinensis*	- & LC

Appendix-3-4 - LIST OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KSL, DHENKANAL (cont'd)

24	Dove emraldor bronze	*Chalcophaps indica*	II & LC
25	Eagle Crested Hawk	*Nisaetus cirrhatus*	I & LC
26	Eagle Crested serpent	*Spilornis cheelo melanotis*	-
27	Eagle grey headed fishing	*Ichthyophaga ichthyaetus*	-
28	Eagle Tawny	*Aquila rapax*	I & VU
29	Eagle lesser spotted	*Aquila pomarina*	- & LC
30	Falcon shaheen	*Falco peregrinus peregrinator*	I & -
31	Flowerpecker thick billed	*Dicaeum agile*	II & LC
32	Flycatcher black-naped blue	*Hypothymis azurea*	II & LC
33	Flycatcher grey-headed	*Culicicapa ceylonensis*	II & LC
34	Flycatcher blue throated	*Muscicapa rubeculoides*	-
35	Flycatcher Indian paradise	*Terpsiphone paradisi*	II & LC
36	Flycatcher red-breasted	*Ficedula parva*	II & -
37	Flycatcher Tickell's blue	*Cyornis tickelliae*	II & LC
38	Flycatcher verditer	*Eumyias thalassinus*	II & -
39	Harrier marsh	*Circus aeruginosus*	I & LC
40	Harrier Pallid	*Circus macrourus*	I & NT
41	Hoopoe	*Upupa epops*	II & LC
42	Hornbill common grey	*ocyceros birostris*	II & LC
43	Hornbill Malabar-pied	*Anthracoceros coronatus*	I & NT
44	House sparrow	*Passer domesticus*	II & LC
45	Iora common	*Aegithina tiphia*	II & LC
46	Indian koel	*Eudynamys scolopaceus*	II & LC
47	Indian robin	*Saxicoloides fulicatus*	II & LC
48	Indian roller	*Coracias benghalensis*	II & LC
49	Jungle fowl grey	*Gallus sonneratii*	I & LC
50	Jungle fowl red	*Gallus gallus*	II & LC
51	Jungle crow	*Corvus macrorhynchos*	II & LC
52	Kestrel common	*Falco tinnunculus*	II & LC
53	Kestrel lesser	*Falco naumanni*	II & LC
54	Kite common pariak	*Milvus migrans*	II & LC
55	Kite brahminy	*Haliastur indus*	I & LC
56	Kingfisher brown headed	*Pelargopsis capensis*	II & LC
57	Kingfisher blue eared	*Alcedo meninting*	II & LC

Appendix-3-4 - LIST OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KSL, DHENKANAL (cont'd)

58	Kingfisher small blue	*Alcedo atthis*	II & LC
59	Kingfisher white breasted	*Halcyon smyrnensis*	II & LC
60	Kingfisher pied	*Ceryle rudis*	II & LC
61	Koel	*Eudynamys scolopaceus*	II & LC
62	Lark bush singing	*Mirafra cantillans*	II & LC
63	Malkoha small green-billed	*Phaenicophaeus viridirostris*	II & LC
64	Minivet scarlet	*Pericrocotus speciosus*	II & -
65	Munia spotted	*Lonchura punctulata*	II & LC
66	Myna Indian	*Acridotheres tristis*	II & LC
67	Myna pied	*Gracupica contra*	II & LC
68	Myna Hill	*Gracula religiosa*	I & LC
69	Myna bank	*Acridotheres ginginianus*	II & LC
70	Myna jungle	*Acridotheres fuscus*	II & LC
71	Nightjar common Indian	*Caprimulgus asiaticus*	II & LC
72	Nightjar jungle Indian	*Caprimulgus indicus*	II & LC
73	Nightjar long tailed	*Caprimulgus macrurus*	II & LC
74	Oriole black headed	*Oriolus xanthornus*	II & LC
75	Owlet spotted	*Athene brama*	II & LC
76	Owl collared scops	*Otus lettia*	II & LC
77	Owl Indian great horned	*Bubo bengalensis*	I & LC
78	Owl dasky horned	*Bubo coromandus*	II & LC
70	Owl grass	*Tyto longimembris*	II & LC
80	Owlet scops	*Otus scops*	II & LC
81	Parakeet large Indian	*Psittacula eupatria*	II & NT
82	Parakeet blossom headed	*Psittacula roseata*	II & NT
83	Parakeet rose ringed	*Psittacula krameri*	II & LC
84	Patridge grey	*Perdix perdix*	- & LC
85	Peafowl Indian	*Pavo cristatus*	I & LC
86	Pigeon blue rock	*Columba palumbus*	II & LC
87	Pigeon imperial green	*Ducula aenea*	II & NT
88	Pipit Indian	*Anthus rufulus*	II & LC
89	Pipit tree	*Anthus trivialis*	II & LC
90	Pitta Indian	*Pitta brachyura*	II & LC
91	Robin Indian	*Saxicoloides fulicatus*	- & LC

Appendix-3-4 - LIST OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KSL, DHENKANAL (cont'd)

92	Robin red bellied magpai	*Urocissa erythroryncha*	II & LC
93	Sparrow house	*Passer domesticus*	II & LC
94	Shama white-rumped	*Copsychus malabaricus*	II & LC
95	Shikra	*Accipiter badius*	I & LC
96	Sparrow hawk eurasian	*Accipiter nisus*	I & LC
97	Spinetail White-rumped	*Zoonavena sylvatica*	II & LC
98	Spurfowl red	*Galloperdix spadicea*	II & LC
99	Sunbird purple-rumped	*Leptocoma zeylonica*	II & LC
100	Swallow wire-tailed	*Hirundo smithii*	II & LC
101	Thrush white-throated	*Turdus assimilis*	- & LC
102	Treepie rufous	*Dendrocitta vagabunda*	II & LC
103	Trogon Southern Surucua	*Trogon surrucura*	- & LC
104	Vulture White-backed or	*Gyps bengalensis*	I & CR
105	Vulture king	*Sarcogyps calvus*	I & CR
106	Wagtail large pied	*Motacilla maderaspatensis*	II & LC
107	Wagtail white	*Motacilla alba*	II & LC
108	Wagtail yellow	*Motacilla flava*	II & LC
109	Warbler wren ashy	*Prinia socialis*	II & LC
110	Warbler warren indian	*Prinia socialis*	II & LC
111	Warbler warren jungle	*Prinia sylvatica*	II & LC
112	Woodpecker Golden-backed	*Dinopium benghalense*	II & LC
113	Woodpecker large	*Dryocopus pileatus*	- & LC
114	Woodpecker heart-spotted	*Hemicircus canente*	I & LC
115	Woodpecker blacknaped	*Picus canus*	II & LC
BUTTERFLIES			
1	Common grass yellow	*Eurema hecabe*	- & LC
2	Common sailor	*Neptis hylas*	-
3	Crimson rose	*Pachliopta hector*	II & LC
4	Great egg fly	*Hypolimnas bolina*	-
5	Lime butterfly	*Papilio demoleus*	-

Source: Working Plan of Dhenkanal & Athagarh Forest Division for 2016-17 to 2025-26 and reported by local residents & forest officials / observed during survey within study area.

APPENDIX-3-5 - LIST OF AQUATIC & SEMI AQUATIC FAUNA IN THE STUDY AREA OF KSL, DHENKANAL

Sl. No	Common Name	Scientific Name	Schedule of Protection (IWPA-2022) & Conservation Status (IUCN-2024-2)
AMPHIBIANS			
1	Paddy field frog	*Rana limnocharis*	- & LC
2	Toad	*Bufo melanostictus*	- & LC
MOLLUSCA			
1	Apple Snails	*Pila globosa*	- & LC
2	Mud Snail	*Bithynia tentaculata*	- & LC
ARTHROPODS			
1	Damselfly nymphs	*Zygoptera sp.*	- & LC
2	Prawn	*Penaeus indicus*	- & LC
FISH SPECIES AVAILABLE IN SAPUA NADI AND MAHANADI RIVER			
1	Bauspati	*Ailia coila*	- & NT
2	Bakur	*Catla catla*	- & LC
3	Balia	*Wallago attu*	- & VU
4	Baligarada	*Glossogobius giuris*	- & LC
5	Chenga	*Ophiocephalus giuris*	-
6	Chital	*Notopterus chitala*	-
7	Dandkiri	*Esomus danricus*	- & LC
8	Gadisa	*Ophiophagus punctatus*	-
9	Jalanga	*Pangasius pangasius*	- & LC
10	Jellah	*Chela laubuca*	- & NT
11	Kantia	*Mystus cavasius*	- & LC
12	Kerandi	*Barbus ambassis*	- & DD
13	Khejura	*Tor putitora*	- & EN
14	Kou	*Anabas testudineus*	- & LC
15	Magura	*Clarias batrachus*	- & LC
16	Mohurali	*Amblypharyngodon mola*	- & LC
17	Mrigali	*Cirrhinus mrigala*	- & LC
18	Neuli	*Gobiopterus chuno*	- & DD
19	Pabda	*Callichrous bimaculatus*	- & LC
20	Phali	*Notopterus notopterus*	- & LC
21	Pohali (Chuna)	*Cirrhinus reba*	- & LC
22	Pohali (Denga)	*Labeo bata*	- & LC
23	Rohi	*Labeo rohita*	- & LC
24	Serena	*Burbus serana*	-
25	Seula	*Ophiocephalus striatus*	- & LC
26	Singi	*Heteropneustes fossilis*	- & LC

Appendix-3-5 - LIST OF AQUATIC & SEMI AQUATIC FAUNA IN THE STUDY AREA OF KSL, DHENKANAL (cont'd)

27	Todi	*Mastacembelus armatus*	- & DD

Source: Working Plan of Dhenkanal & Athagarh Forest Division for 2016-17 to 2025-26 and observed during field survey & interaction with local people and forest officials.

APPENDIX-3-6 - LIST OF SEMI-AQUATIC BIRDS

Sl. No	Common Name	Scientific Name	Schedule of Protection (IWPA-2022) & Conservation Status (IUCN-2024-2)
SEMI AQUATIC BIRDS IN SAPUA NADI AND MAHANADI RIVER			
1	Cormorant little	*Microcarbo niger*	II & LC
2	Egret Cattle	*Bubulcus ibis*	II & LC
3	Egret little	*Egretta garzetta*	II & LC
4	Duck Brahminy	*Tadorna ferruginea*	- & LC
5	Duck spot-billed	*Anas poecilorhyncha*	II & LC
6	Grebe little	*Tachybaptus ruficollis*	II & LC
7	Gull black-headed	*Chroicocephalus ridibundus*	II & LC
8	Gull pallas's	*Larus ichthyaetus*	- & LC
9	Heron pond	*Ardeoloa grayii*	-
10	Ibis white	*Threskiornis aethiopicus*	- & LC
11	Kingfisher blue eared	*Alcedo meninting*	II & LC
12	Kingfisher small blue	*Alcedo atthis*	II & LC
13	Kingfisher pied	*Ceryle rudis*	II & LC
14	Kingfisher greyheaded	*Pelargopsis capensis*	II & LC
15	Kingfisher white-throated	*Halcyon smyrnensis*	- & LC
16	Lapwing red-wattled	*Vanellus indicus*	II & LC
17	Lapwing yellow-wattled	*Vanellus malabaricus*	II & LC
18	Lapwing spur-winged	*Vanellus spinosus*	- & LC
19	Plover little ringed	*Charadrius dubius*	II & LC
20	Sandpiper common	*Actitis hypoleucos*	II & LC
21	Snipe common	*Gallinago gallinago*	II & LC
22	Stilt black-winged	*Himantopus himantopus*	II & LC
23	Stork white-necked	*Ciconia episcopus*	II & LC
24	Teal common	*Anas crecca*	II & LC
25	Teal cotton pygmy	*Nettapus coromandelianus*	I & LC
26	Teal lesser whistling	*Dendrocygna javanica*	II & LC
27	Teal, grey	*Anas gibberifrons*	- & NT
28	Tern common	*Sterna hirundo*	II & LC
29	Tern river	*Sterna aurantia*	I & VU

Source: Working Plan of Dhenkanal & Athagarh Forest Division for 2016-17 to 2025-26 and observed during field survey & interaction with local people and forest officials.

APPENDIX-3-7 - LIST OF PLANKTONIC SPECTRUM IN THE STUDY AREA

No.	Phytoplankton species	Sampling station (Plankton count x $10^3/m^3$)							
		AW1	AW2	AW3	AW4	AW5	AW6	AW7	AW8
1.	*Navicula sp* (Diatom)	2.8	3.2	3.8	1.2	1.2	2.3	3.8	3.8
2.	*Cyclotella sp* (Diatom)	4.2	3.2	6.2	2.3	3.6	3.6	2.3	2.6
3.	*Synedra sp* (Diatom)	3.5	5.2	2.5	3.8	2.6	1.6	4.6	4.6
4.	*Cladophora sp.*	2.3	3.5	2.1	3.5	1.2	4.6	5.2	3.5
5.	*Oscillatoria sp*	4.5	3.8	4.8	2.6	8.5	6.2	1.8	3.8
6.	*Nostoc.sp*	6.2	4.5	5.8	5.2	2.3	1.2	2.6	2.8
7.	*Oedogonium sp.*	6.5	6.2	2.1	2.6	6.8	8.5	6.5	3.6
8.	*Spirogyra sp.*	2.5	3.8	1.5	1.5	1.5	6.2	2.3	4.8
9.	*Pediastrum.sp*	3.5	4.5	2.8	2.8	2.6	6.8	1.8	3.6
10.	*Zygnema sp.*	2.8	3.8	1.2	3.6	1.2	1.6	1.2	2.8
N = Total Plankton Count x $10^3/m^3$		**38.8**	**41.7**	**32.8**	**29.1**	**31.5**	**42.6**	**32.1**	**35.9**
H = Shannon Index		**2.24**	**2.28**	**2.17**	**2.52**	**2.05**	**2.13**	**2.18**	**2.28**

No.	Zooplankton species	Sampling station (Plankton count x m^3)							
		AW1	AW2	AW3	AW4	AW5	AW6	AW7	AW8
1	*Daphnia sp.*	850	650	845	950	820	620	950	1250
2	*Moina.sp*	1425	1210	1050	1285	912	512	1285	620
3	*Cyclops sp.*	1285	1250	980	820	385	485	620	385
4	*Brachinus sp.*	845	920	1285	1168	680	480	985	380
5	*Diaptomus*	620	528	658	580	685	725	1250	612
6	*Paramecium sp.*	845	920	1285	1168	680	480	985	380
7	*Euglena sp.*	1280	985	1250	1120	920	780	320	480
8	Larvae of *culex sp.*	148	230	380	285	780	920	680	620
N = Total Plankton Count /m^3		**7295.0**	**6793.0**	**7400.0**	**7033.0**	**5667.0**	**4842.0**	**6940.0**	**5027.0**
H = Shanon Weaver Index		**1.96**	**1.68**	**2.02**	**2.00**	**2.04**	**2.03**	**2.01**	**2.00**

AW1	Sapua Nadi – Downstream Near Parsurampur Village	River
AW2	Sapua Nadi- Upstream Nr. Kuanla Village	River
AW3	Mahanadi River Near Kandarpur ferry ghat	River
AW4	Mahanadi River (upstream of intake point) Near Phulabarhi Village	River
AW5	Kantla Nala (Near Gaurangapur Village)	Nala
AW6	Kantla Nala (Near Gopinathpur Village)	Nala

Appendix-3-7 - LIST OF PLANKTONIC SPECTRUM IN THE STUDY AREA (cont'd)

AW7	Nala (Near Siaria Village)	Nala
AW8	Pond (Near Mania Bandha Village)	Pond

APPENDIX-3-8 - LIST OF VILLAGES & TOWNSOF THE STUDY AREA

Sl. No.	Village/ Town List (As per the topographic map)	No. of Households (2011)	Total Population (2011)	Zone	Remark
1	Talabarkote	1471	5490	A	Odisha
2	Manipur	606	2184	A	Odisha
3	Patrabhag	672	2836	A	Odisha
4	Talasahi	198	883	A	Odisha
5	Siaria	451	1770	A	Odisha
6	Deopada	240	844	B	Odisha
7	Shyamasundarpur	27	115	B	Odisha
8	Sathilo	595	2675	B	Odisha
9	Basudevpur	332	1264	B	Odisha
10	Talabasta	80	363	B	Odisha
11	Mundamari	95	411	B	Odisha
12	Jenasahu Patna	123	485	B	Odisha
13	Padmanavpur	232	950	B	Odisha
14	Badrapali	49	208	B	Odisha
15	Badagola	74	369	B	Odisha
16	Kamaning	109	468	B	Odisha
17	Maniabandha	989	4264	B	Odisha
18	Kanteikolia	40	208	B	Odisha
19	Joranda	646	2931	B	Odisha
20	Gobindapur	225	978	B	Odisha
21	Baladiabandha	583	2453	B	Odisha
22	Paikadahikhor	147	684	B	Odisha
23	Saradahikhor	67	292	B	Odisha
24	Dallaka	138	571	B	Odisha
25	Regeda	396	1650	B	Odisha
26	Chunapada	80	338	B	Odisha
27	Tarasingha	88	392	B	Odisha
28	Iswara	116	500	B	Odisha
29	Radhapatipur	97	415	C	Odisha
30	Jagannathpur	343	1338	C	Odisha
31	Samasarapur	572	2509	C	Odisha
32	Amrutamonahipatana	93	462	C	Odisha
33	Koranga	121	521	C	Odisha
34	Kuanla	190	757	C	Odisha
35	Saptasajya	268	1091	C	Odisha
36	Bankual	305	1449	C	Odisha

Appendix-3-8 - LIST OF VILLAGES & TOWNSOF THE STUDY AREA (cont'd)

Sl. No.	Village/ Town List (As per the topographic map)	No. of Households (2011)	Total Population (2011)	Zone	Remark
37	Barapada	223	942	C	Odisha
38	Barabanka	64	256	C	Odisha
39	Kuspada	81	305	C	Odisha
40	Mahulapada	232	930	C	Odisha
41	Radhakrushnapur	373	2110	C	Odisha
42	Radharamanpur	58	263	C	Odisha
43	Radhasaranpur	41	168	C	Odisha
44	Kulailo	286	1293	C	Odisha
45	Gundichapur	146	653	C	Odisha
46	Udayapur	125	455	C	Odisha
47	Patalinga	29	144	C	Odisha
48	Gopinathapur	147	746	C	Odisha
49	Karakamal	69	300	C	Odisha
50	Nauratha	42	180	C	Odisha
51	Indipur (CT)	1102	4656	C	Odisha
52	Joranda	646	2931	C	Odisha
53	Kantol	156	958	C	Odisha
54	Tentulia	51	218	C	Odisha
55	**Athagad**	**31361**	**144670**	C	Odisha
56	Radhamohanpur	56	286	D	Odisha
57	Mahidharpur	1	2	D	Odisha
58	Laxminarayanapur	518	2163	D	Odisha
59	Ankula	271	1339	D	Odisha
60	Budhiapatana	70	325	D	Odisha
61	Ramachandrapur	6	27	D	Odisha
62	Khuntakata	596	2644	D	Odisha
63	Regedapada	285	1405	D	Odisha
64	Sankarpur	196	751	D	Odisha
65	Tentuliapatna	420	1919	D	Odisha
66	Ichhapur	114	528	D	Odisha
67	Bhagirathipur	211	773	D	Odisha
68	Arakhapatana	151	760	D	Odisha
69	Ratanpur	379	1700	D	Odisha
70	Patanda	265	1157	D	Odisha
71	Pathargarh	198	874	D	Odisha
72	Dhirapatana	220	952	D	Odisha
73	Krushnaprasad	175	655	D	Odisha
74	Kamadhenukota	328	1325	D	Odisha

Appendix-3-8 - LIST OF VILLAGES & TOWNSOF THE STUDY AREA (cont'd)

Sl. No.	Village/ Town List (As per the topographic map)	No. of Households (2011)	Total Population (2011)	Zone	Remark
75	Saradhapur	265	1268	D	Odisha
76	Gohirakhal	117	487	D	Odisha
77	Majuri	24	97	D	Odisha
78	Mangalpur	664	2973	D	Odisha
79	Panchakahania	54	257	D	Odisha
80	Dhenkanal Sadar (Sadar)	36405	152932	D	Odisha
81	Badapal	133	615	D	Odisha
82	Sundarikhal	39	167	D	Odisha
83	Borapadakhamar	72	309	D	Odisha
84	Sarakhiataila	0	0	D	Odisha
85	Gahamakhunti	185	721	D	Odisha
86	Achhanda	58	228	D	Odisha
87	Kainso	94	439	D	Odisha
88	Lochapali	172	682	D	Odisha
89	Sankhua	185	720	D	Odisha
90	Harekrishnapur	130	544	D	Odisha
91	Khajuria	43	167	D	Odisha
92	Ranibania	161	672	D	Odisha
93	Mahalaxmipur	234	908	D	Odisha
94	Parbatipur	25	99	D	Odisha
95	Manitri	229	873	D	Odisha
96	Saharsahi	0	0	D	Odisha
97	Krushnashyampur	59	357	D	Odisha
98	Champia	114	478	D	Odisha
99	Bhogara	207	1012	D	Odisha
100	Mathurapur	116	414	D	Odisha
101	Totapada	85	349	D	Odisha
102	Dalabhaga	241	1113	D	Odisha
103	Chhenakhianuagan	94	434	D	Odisha
104	Shilapata	480	2129	D	Odisha
105	Birijinga	3	16	D	Odisha
106	Gaurangapur	40	199	D	Odisha
107	Tarading	293	1512	D	Odisha
108	Gajaamba	77	339	D	Odisha
109	Bailo	115	628	D	Odisha
110	Karikol	209	1084	D	Odisha
111	Haripur	237	938	D	Odisha
112	Haridagahir	68	296	D	Odisha

Appendix-3-8 - LIST OF VILLAGES & TOWNSOF THE STUDY AREA (cont'd)

Sl. No.	Village/ Town List (As per the topographic map)	No. of Households (2011)	Total Population (2011)	Zone	Remark
113	Manapur	343	1515	D	Odisha
114	Parsurampur	262	997	D	Odisha
115	Dahisara	232	1033	D	Odisha
116	Bentapada	483	2153	D	Odisha
117	Balipada	0	0	D	Odisha
118	Banakhandi	44	213	D	Odisha
119	Chhatabar	73	448	D	Odisha
120	Somanathpur	49	276	D	Odisha
121	Dhaipur	285	1416	D	Odisha
122	Gadadharpur	113	503	D	Odisha
123	Radhaballaavapur	176	852	D	Odisha
124	Radhagobindapur	480	2301	D	Odisha
125	Radhamadhabpur	88	403	D	Odisha
126	Radhaprasanapur	32	123	D	Odisha

ABSTRACT OF TREE ENUMERATION LIST OF FOREST LAND INVOLVED IN PROPOSED INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL BY M/S KALYANI STEELS LTD.

Sl. No.	Name of Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Achu	1	-	-	-	-	-	-	-	-	-	-	-	-	1
2	Acacia	15	9	9	-	-	-	-	-	-	-	-	-	-	33
3	Ankola	3	-	-	-	-	-	-	-	-	-	-	-	-	3
4	Bahada	1	1	-	-	-	-	-	-	-	-	-	-	-	2
5	Bara	-	-	-	-	-	-	-	-	-	-	1	-	1	2
6	Bara Koli	1	-	1	-	-	-	-	-	-	-	-	-	-	2
7	Bela	1	1	-	-	-	-	-	-	-	-	-	-	-	2
8	Chakhunda	115	93	38	7	-	1	-	-	-	-	-	-	-	254
9	Chhatiana	3	-	-	-	-	-	-	-	-	-	-	-	-	3
10	Demucha	1	-	-	-	-	-	-	-	-	-	-	-	-	1
11	Dimiri	2	-	-	-	-	-	-	-	-	-	-	-	-	2
12	Fasi	1	3	5	-	-	-	-	-	-	-	-	-	-	9
13	Gambhari	3	3	1	-	-	-	-	-	-	-	-	-	-	7
14	Harida	2	4	-	-	-	-	-	-	-	-	-	-	-	6
15	Jamu	8	3	-	-	-	-	-	-	-	-	-	-	-	11
16	Kaju	9185	2861	281	28	-	-	-	-	-	-	-	-	-	12355
17	Kalichia	11	1	-	-	-	-	-	-	-	-	-	-	-	12
18	Karanja	8	7	-	-	-	-	-	-	-	-	-	-	-	15
19	Kashi	29	18	4	4	-	-	-	-	-	-	-	-	-	55
20	Kendu	37	10	1	-	-	-	-	-	-	-	-	-	-	48
21	Khaisa	1	1	1	-	-	-	-	-	-	-	-	-	-	3
22	Kosi	2	-	-	-	-	-	-	-	-	-	-	-	-	2
23	Kumbhi	1	-	-	-	-	-	-	-	-	-	-	-	-	1
24	Kurei	18	3	1	-	-	-	-	-	-	-	-	-	-	22
25	Kusuma	-	-	-	-	-	-	-	-	1	-	-	-	-	1

Divisional Forest Officer
Dhenkanal Division

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Revenue Inspector
MANIPUR

Forester
Baladiabandha Section

Forest Range Officer
Dhenkanal Range

Sl. No.	Name of Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
26	Maha Neem	3	-	-	1	1	-	-	-	-	-	-	-	-	5
27	Mahula	8	8	4	-	-	-	-	-	-	-	-	-	-	20
28	Mandara	3	-	-	-	-	-	-	-	-	-	-	-	-	3
29	Mango	463	130	30	23	3	2	4	1	2	3	2	-	-	663
30	Neem	167	111	43	8	4	-	-	-	-	-	-	-	-	333
31	Orange	1	1	-	-	-	-	-	-	-	-	-	-	-	2
32	Palsa	-	1	-	-	-	-	-	-	-	-	-	-	-	1
33	Panasa	16	4	1	2	-	-	-	-	-	-	-	-	-	23
34	Patas	1	1	-	-	-	-	-	-	-	-	-	-	-	2
35	Sahada	5	-	-	-	-	-	-	-	-	-	-	-	-	5
36	Sahaj	9	2	-	-	-	-	-	-	-	-	-	-	-	11
37	Sala	-	-	2	1	5	2	-	-	1	-	-	-	-	11
38	Siju	1	-	-	-	-	-	-	-	-	-	-	-	-	1
39	Simli	16	8	3	2	-	-	-	-	-	-	-	-	-	29
40	Sirisa	3	5	3	1	1	-	-	-	-	-	-	-	-	13
41	Sunari	4	-	-	-	-	-	-	-	-	-	-	-	-	4
42	Teak	277	94	9	-	-	-	-	-	-	-	-	-	-	380
43	Tentuli	8	2	3	2	-	-	-	-	-	-	-	-	-	15
44	Bhalia	1	2	-	-	-	-	-	-	-	-	-	-	-	3
45	Miscellaneous	2	1	-	-	-	-	-	-	-	-	-	-	-	3
	Total	**10437**	**3388**	**440**	**79**	**14**	**5**	**4**	**1**	**4**	**3**	**3**	**-**	**1**	**14379**

Divisional Forest Officer
Dhenkanal Division

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD. MUNDHWA PUNE-411036

Revenue Inspector
MANIPUR

Forester
Baladiabandha Section

Forest Range Officer
Dhenkanal Range

ABSTRACT OF TREE ENUMERATION LIST OF TALABARKOT VILLAGE FOREST LAND INVOLVED IN PROPOSED INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL BY M/S KALYANI STEELS LTD.

Sl. No.	Name of Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Achu	1	-	-	-	-	-	-	-	-	-	-	-	-	1
2	Acacia	6	7	6	-	-	-	-	-	-	-	-	-	-	19
3	Ankola	3	-	-	-	-	-	-	-	-	-	-	-	-	3
4	Bahada	1	1	-	-	-	-	-	-	-	-	-	-	-	2
5	Bara	-	-	-	-	-	-	-	-	-	-	1	-	1	2
6	Bara Koli	1	-	1	-	-	-	-	-	-	-	-	-	-	2
7	Bela	-	1	-	-	-	-	-	-	-	-	-	-	-	1
8	Chakhunda	101	82	35	7	-	1	-	-	-	-	-	-	-	226
9	Chhatiana	3	-	-	-	-	-	-	-	-	-	-	-	-	3
10	Demucha	1	-	-	-	-	-	-	-	-	-	-	-	-	1
11	Dimiri	2	-	-	-	-	-	-	-	-	-	-	-	-	2
12	Fasi	1	3	5	-	-	-	-	-	-	-	-	-	-	9
13	Gambhari	3	3	1	-	-	-	-	-	-	-	-	-	-	7
14	Harida	2	4	-	-	-	-	-	-	-	-	-	-	-	6
15	Jamu	8	1	-	-	-	-	-	-	-	-	-	-	-	9
16	Kaju	8227	2589	247	22	-	-	-	-	-	-	-	-	-	11085
17	Kalichia	11	1	-	-	-	-	-	-	-	-	-	-	-	12
18	Karanja	3	4	-	-	-	-	-	-	-	-	-	-	-	7
19	Kashi	27	18	4	4	-	-	-	-	-	-	-	-	-	53
20	Kendu	21	4	-	-	-	-	-	-	-	-	-	-	-	25
21	Khaisa	1	1	-	-	-	-	-	-	-	-	-	-	-	2
22	Kosi	1	-	-	-	-	-	-	-	-	-	-	-	-	1

Divisional Forest Officer
Dhenkanal Division

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD. MUNDHWA PUNE-411036

Revenue Inspector
MANIPUR

Forester
Baladiabandha Section

Forest Range Officer
Dhenkanal Range

Sl. No.	Name of Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
23	Kumbhi	1	-	-	-	-	-	-	-	-	-	-	-	-	1
24	Kurei	13	2	1	-	-	-	-	-	-	-	-	-	-	16
25	Kusuma	-	-	-	-	-	-	-	-	1	-	-	-	-	1
26	Maha Neem	3	-	-	1	1	-	-	-	-	-	-	-	-	5
27	Mahula	8	8	4	-	-	-	-	-	-	-	-	-	-	20
28	Mandara	3	-	-	-	-	-	-	-	-	-	-	-	-	3
29	Mango	450	128	29	22	3	2	4	1	2	3	2	-	-	646
30	Neem	136	88	35	5	3	-	-	-	-	-	-	-	-	267
31	Palsa	-	1	-	-	-	-	-	-	-	-	-	-	-	1
32	Panasa	16	4	1	2	-	-	-	-	-	-	-	-	-	23
33	Patas	1	1	-	-	-	-	-	-	-	-	-	-	-	2
34	Sahada	5	-	-	-	-	-	-	-	-	-	-	-	-	5
35	Sahaj	9	2	-	-	-	-	-	-	-	-	-	-	-	11
36	Sala	-	-	2	1	5	2	-	-	1	-	-	-	-	11
37	Simli	14	7	3	1	-	-	-	-	-	-	-	-	-	25
38	Sirisa	3	5	3	1	1	-	-	-	-	-	-	-	-	13
39	Sunari	4	-	-	-	-	-	-	-	-	-	-	-	-	4
40	Teak	243	78	9	-	-	-	-	-	-	-	-	-	-	330
41	Tentuli	8	2	3	2	-	-	-	-	-	-	-	-	-	15
42	Bhalia	1	2	-	-	-	-	-	-	-	-	-	-	-	3
43	Miscellaneous	2	1	-	-	-	-	-	-	-	-	-	-	-	3
	Total	**9344**	**3048**	**389**	**68**	**13**	**5**	**4**	**1**	**4**	**3**	**3**	-	**1**	**12883**

Divisional Forest Officer
Dhenkanal Division

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Revenue Inspector
MANIPUR

Forester
Baladiabandha Section

Forest Range Officer
Dhenkanal Range

ABSTRACT OF TREE ENUMERATION LIST OF SIARIA VILLAGE FOREST LAND INVOLVED IN PROPOSED INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL BY M/S KALYANI STEELS LTD.															
Sl. No.	Name of Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Acacia	9	2	3	-	-	-	-	-	-	-	-	-	-	14
2	Bela	1	-	-	-	-	-	-	-	-	-	-	-	-	1
3	Chakhunda	14	11	3	-	-	-	-	-	-	-	-	-	-	28
4	Jamu	-	2	-	-	-	-	-	-	-	-	-	-	-	2
5	Kaju	958	272	34	6	-	-	-	-	-	-	-	-	-	1270
6	Karanja	5	3	-	-	-	-	-	-	-	-	-	-	-	8
7	Kashi	2	-	-	-	-	-	-	-	-	-	-	-	-	2
8	Kendu	16	6	1	-	-	-	-	-	-	-	-	-	-	23
9	Khaisa	-	-	1	-	-	-	-	-	-	-	-	-	-	1
10	Kosi	1	-	-	-	-	-	-	-	-	-	-	-	-	1
11	Kurei	5	1	-	-	-	-	-	-	-	-	-	-	-	6
12	Mango	13	2	1	1	-	-	-	-	-	-	-	-	-	17
13	Neem	31	23	8	3	1	-	-	-	-	-	-	-	-	66
14	Orange	1	1	-	-	-	-	-	-	-	-	-	-	-	2
15	Siju	1	-	-	-	-	-	-	-	-	-	-	-	-	1
16	Simli	2	1	-	1	-	-	-	-	-	-	-	-	-	4
17	Teak	34	16	-	-	-	-	-	-	-	-	-	-	-	50
	Total	**1093**	**340**	**51**	**11**	**1**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**1496**

Forester
Baladiabandha Section

KALYANI STEELS LTD. MUNDHWA PUNE-411036

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

Divisional Forest Officer
Dhenkanal Division

TOTAL ABSTRACT OF NON-FOREST LAND (GOVT. & PRIVATE) TREE ENUMERATION LIST OF TALABARKOT & SIARIA VILLAGES FOR INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL DISTRICT BY M/s KALYANI STEELS LTD.

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Acacia	53	31	10											94
2	Ankola	73	8	1	1										83
3	Arjun	1		1		1	1								4
4	Asana	1													1
5	Bahada	5	7	1											13
6	Bandhan	1	1												2
7	Bara	5		1	1		1			1		1	1	2	13
8	Bara Koli	7	1												8
9	Bela	9	3												12
10	Bhalia	2	1												3
11	Bhrusanga	1													1
12	Boula	1													1
13	Chakunda	85	67	38	13	6	1					1		1	212
14	Dhaura	4	3	1											8
15	Dimiri	7													7
16	Gamhari	10	1												11
17	Gohira	3	4	3											10
18	Harida	5		1											6
19	Jamu	14	13	5											32
20	Kadamba		3												3
21	Kaju	6354	1789	234	33	1	1								8412
22	Kamala	5	1												6
23	Karanja	8	3	1											12
24	Kasi	7	2												9
25	Kendu	31	1	2											34
26	Khaisa	29	20	9	2										60

Forester
Baladiabandha Section

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

Divisional Forest Officer
Dhenkanal Division

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
27	Kuchela	2	1												3
28	Kurei	14	1												15
29	Kurichi	4													4
30	Kusuma	1		1	2		1						1		6
31	Maha Neem	8	9	8	1	1									27
32	Mahula	3	3												6
33	Mai	10	1	1											12
34	Mango	83	78	36	22	15	7	2	4	5		2	1		255
35	Neem	555	349	104	23	1	1							1	1034
36	Nilgiri	3	2	2											7
37	Osta	2	1	1				2						3	9
38	Palsha	76	13	5	2	1									97
39	Panasha	6	10	1											17
40	Pijuli	15	5												20
41	Radha Chuda	6													6
42	Sahada	3													3
43	Sahaj	38	1	1											40
44	Sala			6	22	20	14	3							65
45	Simli	2	5	1	1										9
46	Sirisa	2	1												3
47	Sissoo	1	1	1	1										4
48	Sunari		1												1
49	Teak	729	288	28	4										1049
50	Tentuli	3	4	4	2						1				14
51	Miscelaneous	2													2
	Total	**8289**	**2733**	**508**	**130**	**46**	**27**	**7**	**4**	**6**	**1**	**4**	**3**	**7**	**11765**

Forester
Baladiabandha Section

Divisional Forest Officer
Dhenkanal Division

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

COMBINED ABSTRACT OF NON-FOREST LAND (BOTH GOVT. & PRIVATE) TREE ENUMERATION LIST OF TALABARKOT VILLAGE FOR INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL DISTRICT BY M/s KALYANI STEELS LTD.

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Acacia	42	29	10											81
2	Ankola	73	8	1	1										83
3	Arjun	1		1		1	1								4
4	Asana	1													1
5	Bahada	5	7	1											13
6	Bandhan	1	1												2
7	Bara	5		1	1		1			1		1	1	2	13
8	Bara Koli	7	1												8
9	Bela	9	3												12
10	Bhalia	2	1												3
11	Bhrusanga	1													1
12	Chakunda	75	56	35	13	6	1					1		1	188
13	Dhaura	4	3	1											8
14	Dimiri	7													7
15	Gamhari	10	1												11
16	Gohira	3	4	3											10
17	Harida	5		1											6
18	Jamu	12	13	5											30
19	Kadamba		3												3
20	Kaju	6131	1706	233	33	1	1								8105
21	Kamala	5	1												6
22	Karanja	7	3	1											11
23	Kasi	7	2												9
24	Kendu	21	1	2											24
25	Khaisa	28	20	9	2										59

Forester
Baladiabandha Section

Divisional Forest Officer
Dhenkanal Division

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
26	Kuchela	2	1												3
27	Kurei	12	1												13
28	Kurichi	4													4
29	Kusuma	1		1	2		1						1		6
30	Maha Neem	8	9	8	1	1									27
31	Mahula	3	3												6
32	Mai	10	1	1											12
33	Mango	80	75	36	22	15	7	2	4	5		2	1		249
34	Neem	503	301	92	21	1	1							1	920
35	Nilgiri	3	2	2											7
36	Osta	2	1	1				2						3	9
37	Palsha	76	13	5	2	1									97
38	Panasha	6	9	1											16
39	Pijuli	14	5												19
40	Radha Chuda	6													6
41	Sahada	3													3
42	Sahaj	38	1	1											40
43	Sala			6	22	20	14	3							65
44	Simli	2	5	1	1										9
45	Sirisa	2	1												3
46	Sissoo	1	1	1	1										4
47	Sunari		1												1
48	Teak	709	273	27	4										1013
49	Tentuli	3	4	4	2						1				14
50	Miscelaneous	2													2
	Total	**7952**	**2570**	**491**	**128**	**46**	**27**	**7**	**4**	**6**	**1**	**4**	**3**	**7**	**11246**

Divisional Forest Officer
Dhenkanal Division

Forester
Baladiabandha Section

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

ABSTRACT OF NON-FOREST GOVT. LAND TREE ENUMERATION LIST OF TALABARKOT VILLAGE FOR INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL DISTRICT BY M/s KALYANI STEELS LTD.

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Acacia	14	4												18
2	Ankola	52	4												56
3	Bahada	1	1												2
4	Bandhan	1	1												2
5	Bara											1			1
6	Bara Koli	4													4
7	Bela	1	3												4
8	Bhalia	1													1
9	Chakunda	20	15	8	2	1								1	47
10	Dhaura	2	1												3
11	Gambhari	2													2
12	Harida	4													4
13	Jamu	4	2	3											9
14	Kadamba		3												3
15	Kaju	654	173	18	2										847
16	Kamala	1													1
17	Karanja	6		1											7
18	Kasi	4													4
19	Kendu	3	1												4
20	Khaisa	8	4	2											14
21	Kuchela	2	1												3
22	Kurei	3													3
23	Kurichi	2													2
24	Maha Neem	1		2		1									4
25	Mahula	2	1												3
26	Mango	9	8	10	3	3	2			1					36

Divisional Forest Officer
Dhenkanal Division

Forester
Baladiabandha Section

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
27	Neem	72	48	14	5										139
28	Nilgiri	3	2	2											7
29	Osta	1	1	1				2						3	8
30	Panasha	1													1
31	Pijuli	3													3
32	Radha Chuda	6													6
33	Sahaj	1													1
34	Sirisa	1													1
35	Sissoo		1		1										2
36	Sunari		1												1
37	Teak	106	48	11											165
38	Tentuli	1	1		1						1				4
	Total	**996**	**324**	**72**	**14**	**5**	**2**	**2**		**1**	**1**	**1**		**4**	**1422**

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Forester
Baladiabandha Section

Divisional Forest Officer
Dhenkanal Division

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

ABSTRACT OF NON-FOREST PRIVATE LAND TREE ENUMERATION LIST OF TALABARKOT VILLAGE FOR INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL DISTRICT BY M/s KALYANI STEELS LTD.															
Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Acacia	28	25	10											63
2	Ankola	21	4	1	1										27
3	Arjun	1		1		1	1								4
4	Asana	1													1
5	Bahada	4	6	1											11
6	Bara	5		1	1		1			1			1	2	12
7	Bara Koli	3	1												4
8	Bela	8													8
9	Bhalia	1	1												2
10	Bhrusanga	1													1
11	Chakunda	55	41	27	11	5	1					1			141
12	Dhaura	2	2	1											5
13	Dimiri	7													7
14	Gamhari	8	1												9
15	Gohira	3	4	3											10
16	Harida	1		1											2
17	Jamu	8	11	2											21
18	Kaju	5477	1533	215	31	1	1								7258
19	Kamala	4	1												5
20	Karanja	1	3												4
21	Kasi	3	2												5
22	Kendu	18		2											20
23	Khaisa	20	16	7	2										45
24	Kurei	9	1												10
25	Kurichi	2													2

Divisional Forest Officer
Dhenkanal Division

Forester
Baladiabandha Section

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
26	Kusuma	1		1	2		1						1		6
27	Maha Neem	7	9	6	1										23
28	Mahula	1	2												3
29	Mai	10	1	1											12
30	Mango	71	67	26	19	12	5	2	4	4		2	1		213
31	Neem	431	253	78	16	1	1							1	781
32	Osta	1													1
33	Palsha	76	13	5	2	1									97
34	Panasha	5	9	1											15
35	Pijuli	11	5												16
36	Sahada	3													3
37	Sahaj	37	1	1											39
38	Sala			6	22	20	14	3							65
39	Simili	2	5	1	1										9
40	Sirisa	1	1												2
41	Sissoo	1		1											2
42	Teak	603	225	16	4										848
43	Tentuli	2	3	4	1										10
44	Miscelaneous	2													2
	Total	**6956**	**2246**	**419**	**114**	**41**	**25**	**5**	**4**	**5**		**3**	**3**	**3**	**9824**

Divisional Forest Officer
Dhenkanal Division

Forester
Baladiabandha Section

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

ABSTRACT OF NON-FOREST PRIVATE LAND TREE ENUMERATION LIST OF SIARIA VILLAGE FOR INTEGRATED ADVANCED SPECIALTY STEEL & AUTO COMPONENTS COMPLEX AT GAJAMARA, DHENKANAL DISTRICT BY M/s KALYANI STEELS LTD.															
Sl. No.	Name of the Tree	Girth 30-59 in cm	Girth 60-89 in cm	Girth 90-119 in cm	Girth 120-149 in cm	Girth 150-179 in cm	Girth 180-209 in cm	Girth 210-239 in cm	Girth 240-269 in cm	Girth 270-299 in cm	Girth 300-329 in cm	Girth 330-359 in cm	Girth 360-389 in cm	Girth 390 & above in cm	Total
1	Acacia	11	2												13
2	Boula	1													1
3	Chakunda	10	11	3											24
4	Jamu	2													2
5	Kaju	223	83	1											307
6	Karanja	1													1
7	Kendu	10													10
8	Khaisa	1													1
9	Kurei	2													2
10	Mango	3	3												6
11	Neem	52	48	12	2										114
12	Panasha		1												1
13	Pijuli	1													1
14	Teak	20	15	1											36
	Total	**337**	**163**	**17**	**2**										**519**

Forester
Baladiabandha Section

Range Officer
Dhenkanal Range

Revenue Inspector
MANIPUR

TAHASILDAR
DHENKANAL

KALYANI STEELS LTD.
MUNDHWA
PUNE-411036

Divisional Forest Officer
Dhenkanal Division

Appendix 4-2 - Compensatory Land Allotment letter

OFFICE OF THE COLLECTOR & DISTRICT MAGISTRATE, BALANGIR
(REVENUE SECTION)

No 80 **/ Rev. Date** 07.01.2025

To

The Collector,
Dhenkanal.

Sub: Identification of Non-forest Govt. land for Compensatory Afforestation.

Ref: This office Letter No.1752 dtd.28.11.2024 & your Letter no.7690 dtd.19.07.2024.

Sir,

With reference to the letters and subject cited above and in continuation of our above letter, I am to say that the joint verification of the identified lands have been conducted by Revenue, Forest and Mining Department Officials, which revealed that the following schedule of Non-forest Govt. land can be allotted for raising of compensatory afforestation in Titilagarh and Tusura Tahasil area under this district.

Land Schedule

Tahasil	Mouza	Holding No.	Plot No.	Kissam	Total Area of the plot (in Ac.)	Identified Area for CA (in Ac.)	Identified Area (in Ha.)
Titilagarh	Tankarupada	81	7(P)	Dungri	77.000	51.543	20.859
	Junapara	24	1	Dungri	76.00	18.385	7.440
			2	Dungri	170.52	6.615	2.677
Total						**76.543**	**30.976**
Tusura	Nimursingha	21 (AAA)	51	Dungri	109.30	75.00	30.351
Grand Total						**151.543**	**61.327**

So, you are hereby requested to take necessary action for filing of requisition in the office of the concerned Tahasildars for settlement of above land for the required purpose.

Yours faithfully,

07-1-25

Collector, Balangir.

Memo No. 81 **Date.** 07.01.2025

Copy to

1. CGM (Land), IDCO for information and necessary action with reference to his Office Letter No. 21206 Dt.22.07.2024.
2. Addl. Secretary, Revenue & DM Deptt for information with reference to Letter No. 28053/R&DM/20.08.2024.
3. Sub-Collector, Titilagrah/Balangir for information.
4. Tahasildar, Titilagarh/Tusura for information and necessary action

Collector, Balangir.

Appendix 5-1 - Alternate Site Analysis

DETAILS OF ALTERNATE SITES CONSIDERED AND THE BASIS OF SELECTING THE PROPOSED SITE

The site for the proposed greenfield project of KSL has the following advantages:

i) Availability of adequate land in possession for installation of greenfield project

ii) Suitability of sharing existing infrastructure in terms of connectivity and housing for employees

iii) Availability of major raw materials due to proximity to the mineral resource belts

iv) Ease of raw materials acquisition and products transportation

v) Availability of economical labour force

vi) The area does not come under the critically polluted area as identified by CPCB and no polluted stretch of river nearby

vii) Scope for regional development

The following alternate sites were considered for the proposed greenfield project.

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
1	Location	Gajamara Dhenkanal	Kamakhya Nagar Dhenkanal	Kandarei Dhenkanal	
2	Land Availability	(224.73 Ha)	(303.51 Ha)	(136.38 Ha)	**Site 1 & Site 2** have sufficient land for the proposed project (min 192.554 Ha of land required including green belt) whereas **Site 3** was not suitable.
3	Type of Land	**Site 1** is vacant land, free of any known encumbrance.	**Site 2** was under cultivation (double crop land mostly used for agriculture).	**Site 3** is within the buffer zone of Kapilash Wildlife Sanctuary.	**Site-1** is preferred as the site it is a vacant land without encumbrances and no proximity to eco-sensitive areas
4	Requirement of R&R	No Land acquisition will be carried out by IDCO through a mix of private of government land acquisition.	Yes	Yes	**Site-1** is preferred as no R & R is involved for the implementation of the subject project.

Sl. No.	Parameter	Site-1	Site-2	Site-3	Selected Site with Justification
5	Any perennial river, Streams , water body within the plot	No	No	No	**Site-1, 2 & 3** all are not having any perennial river & streams within the plot. **Site 1** is preferred as the sufficient raw water for the project will be available through Mahanadi located about 15 km away.
6	Power Demand Distance from nearby 220 kV/ 33 kV Substation.	10 km (Neulpoi 400KV/220 KV GIS) 4 km (Khuntuni 33 kV Substation)	18 - 20 km (Meramandali 400 kV/220 kV GIS) 8 km (Kamakhyanagar 132 kV/33 kV Substation)	Land was not sufficient	**Site 1** is preferred due to availability of 220 kV power from Neulpoi Substation at 10 km distance, and 33 kV Construction power from Khuntuni Substation at 4 km distance.
7	Road Access/ Connectivity	**Site 1** is well connected to Mumbai - Cuttack National Highway (NH- 55) which is 2.8 km away from the North East corner of the project site. **Site 1** is directly connected to the Saptasajya Dhenkanal road at North west corner.	The nearest highway is Mumbai - Cuttack National Highway (NH-55) which is 15 km away from the project site.	Land was not sufficient	**Site -1** is preferred due existence of multiple and better road connectivity in the vicinity of the project site for transportation of incoming & outgoing saleable materials.
8	Rail Access/ Connectivity	Nearest Take-up point for dedicated railway siding is Joranda Road Station - 6 km	Nearest Take-up point for dedicated railway siding is Kamakhya Nagar Station - 12 km The site is at a significant uphill gradient from the Kamakhya Nagar station. The overall viability of railway siding was found to be negative due to uphill gradient and involvement of forest land patches.	Land was not sufficient	**Site 1** is preferred due to proximity to (6 km) with Joranda Road station on Sambalpur - Cuttack Main line for the construction of dedicated railway siding.

A scoring system was adopted based on techno-commercial as well as environmental and socio economic parameters and based on the output of the score analysis, Site 1 was selected for the proposed project. The detail of the scoring system adopted is enclosed as Annexure 1.

Ideal Site Attributes	Weightage	Score Card based Justification for Site Selection (Site 1 - Gajamara) for KSL Integrated Advanced Speciality Steel and Autocomponents Manufacturing Complex Project					
Techno-commercial parameters		**Site-1 (Gajamara, Dhenkanal) Score**	**Justification**	**Site-2 (Kamakhyanagar, Dhenkanal) Score**	**Justification**	**Site-3 (Kandarei, Dhenkanal) Score**	**Justification**
LAND	**15**						
Land availability - Minimum Required: 200 ha	5	5	About 224 ha available	5	About 303 ha available	1	**Only about 136 ha available (not-sufficient to setup the proposed project)**
Current land use pattern (prime agricultural, single crop agricultural land, non agricultural, barren land, habitation, streams/water body)	7	6	Presence of one no. village pond, single crop agricultural land about 20%. No R&R.	4	About 70% single crop agricultural land. Presence of 3 nos. settlements and one newly constructed black topped village road through the land parcel	7	Industrial land. No R&R requirement
Terrain (flat, undulating, presence of hillocks, marshy land)	3	2	Presence of one small hillock	3	Flat land	3	Flat land
WATER	**10**						
Availability of sufficient raw water	5	5	Required water is available from Mahanadi River	5	Required water is available Bramhani River	5	Required Water is available from Mahanadi River
Distance from source	5	4	15 km	3	20 km	2	25 km
INWARD LOGISTICS	**5**						
Distance from Dhenkanal/Cuttack/Angul	5	4	About 7 km from Dhenkanal	2	About 22 km from Dhenkanal	4	About 15 km from Cuttack
RAIL LINKAGE	**10**						
Distance from nearest railway station/siding	4	3	Joranda Road about 6 km away	1	Nearest rail line about 15 km away on opposite bank of Brahmani river	4	500 m from nearest rail head at Raj Athagarh Rly Station on ECR
Linkage to Mines	3	2	Daitari Iron Ore Mine (120 KM) will be connected to site via dedicated railway siding from Joranda Road Railway Station on ECR	1	Railway connectivity of Site -2 with Mines is not well established	2	Daitari Iron Ore Mine (120 KM) will be connected to site via dedicated railway siding from Rajathagarh Railway Station on ECR
Linkage to Markets	3	2	To access the markets, Paradeep port and other commercial centers in the country are directly connected through Cuttack - Sambalpur East Coast Railway line	1	Railway connectivity of Site -2 with Markets is not well established	2	To access the markets, Paradeep port and other commercial centers in the country are directly connected through Cuttack - Sambalpur East Coast Railway line
PORT LINKAGE	**5**						
Rail distance from nearest port [Taken from Paradeep/Dhamra]	5	3	Paradeep port about 120 km away	2	Paradeep port about 150 km away	3	Paradeep port about 110 km away
ROAD CONNECTIVITY	**10**						
Distance to nearest SH/NH	5	4	About 3 km	2	About 8 km	4	About 2 km
Road connectivity - Local Mines	3	2	120 km (Daitari IOM)	2	110 km (Daitari IOM)	2	120 km (Daitari IOM)
Road connectivity - Markets	2	2	120 km (Paradeep port), other commercial centers directly connected via NH 55 (3 KM)	1	150 km (Paradeep port), other commercial centers directly connected via NH 55 (8 KM)	2	110 km (Paradeep port), other commercial centers directly connected via NH 55 (2 KM)
POWER	**5**						
Distance from source/substation	**5**	5	10 km away	3	20 km away	3	8 km away
Social & Environmental parameters							
R&R / PEOPLE-RELATED ISSUES	**15**						
No of project affected people (PAP), Project displaced families	10	10	No R&R required	2	**3 Major settlements to be displaced; Huge R &R effort required which might make the project unviable.**	7	No R&R required however defunct coal based power plant infrastructure (KVK Nilachal) which is standing on the site will need to be dismantled and removed.
General perceived acceptability towards industrialization	5	5	Excellent	2	Local residents are generally against the setting up of any plant on the site	4	Minor resistance by local residents against setting up of any plant on the site as the site is in very close proximity to Kapilash Temple and Wild Life Sanctuary (< 1 km)
Environmental parameters	**25**						
Proximity to Eco sensitive zone of WLS	8	6	Within 10 km radius	7	Outside 10 km radius	2	**Almost adjacent to Kapilash WLS**
Proximity to heritage/archaeological centers/wild life corridor	3	4	Nearest wildlife corridor more than 25 km away	2	8 km from Kapilash - Jiridimali Notified elephant corridor	0	Almost adjacent to Kapilash - Jiridimali Notified Elephant corridor and very close to Ancient Kapilash Shiva Temple
Proximity to large town with substantial population	3	3	Dhenkanal about 10 km away	2	Kamakhyanagar Town is about 8 km away	3	Dhenkanal Town about 15 km away
Probable Number of tree felling in non-forest land	5	2	~7200	1	**~28000**	1	**~15000**
Probable Number of tree felling in forest land	3	1	~14000	3	NA	1	No information at present, however the site is very close to the Kapilash Wild Life Sanctuary
Wild Life Clearance Requirement	3	3	Not Required	3	Not Required	0	Wild Life Clearance will be required
TOTAL	**100**	**83**		**57**		**62**	

KALYANI STEELS LIMITED

Appendix 6-1 - Corporate Environment Policy



Corporate Environmental Policy

Name of the Document	Corporate Environmental Policy
Version	01
Document owner	Environment and Safety Department; Kalyani Steels Ltd.
Issuing Authority	Mr. R.K.Goyal I Managing Director
Date of Issue	18.05.2025

A. PURPOSE

Kalyani Steels Limited (hereinafter referred as "KSL") is one of the leading & most preferred speciality steel manufacturers based in India. KSL recognizes that its activities can have a significant impact on the environment. Incorporating Sustainable & Eco-friendly practices within the operations is vital to mitigate such impact.

KSL, in its endeavour to strengthen environmental management and uphold a clean, sustainable environment in and around its manufacturing facilities and offices, is committed to the following principles as part of its Corporate Environmental Policy.

B. SCOPE AND APPLICABILITY

This Policy applies to all sites and individuals working at all levels /grades of KSL, its subsidiaries, joint ventures, and affiliates anywhere in the world (collectively referred to as the "Company")

C. POLICY GUIDELINES

i. Protect the environment by integrating sound environmental practices for control and prevention of pollution from all its activities.

ii. Comply with legal and other statutory requirements pertaining to the environment, forests and wildlife and to go beyond.

iii. Contribute towards mitigation of climate change through adoption of measures to reduce emission of greenhouse gases, enhancing green coverage, adopting energy efficient technologies, enhancing use of green energy.

iv. Promoting innovative environment-friendly processes and products.

v. Promote ecological restoration efforts in degraded out areas within the premises.

vi. Developing new grades of steel & adoption of innovative processes to reduce the carbon footprints.

vii. Integrate principle of "Reduce, Recover, Recycle and Reuse" in its operations for conservation of natural resources, including water, to ensure sustainable future.

viii. Continual improvement of environmental performance by setting challenging targets, transparent reporting system and robust review mechanism.

ix. Continuously monitor emissions, discharges and ambient air quality and uplink with SPCB and CPCB portals for self-regulation of environmental deviations, if any.

x. Communicate environmental performance to all stakeholders through annual report, Board report, Corporate Sustainability Report and all such means from time-to-time.

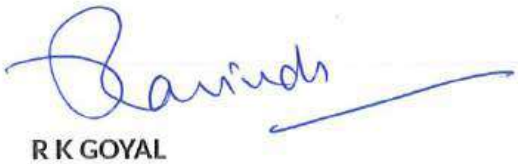
xi. Engaging employee for commitment and responsibility towards environment protection through capacity building.

xii. Promoting environmentally responsible behaviour amongst all stakeholders

D. AMENDMENTS

The Company reserves its right to amend or modify this Policy in whole or in part, at any time without assigning any reason whatsoever. However, this policy, in whole or in part, shall stand modified/amended from time to time, without any further action on the part of the Company, as and when there would be any statutory modification(s) / amendment(s) / revision(s) to the applicable provisions to it.

KALYANI STEELS LTD.



R K GOYAL

MANAGING DIRECTOR

KALYANI STEELS LIMITED

KALYANI
DRIVING INNOVATION

Plastic Use Policy

Name of the Document	Plastic Use Policy
Version	01
Document owner	Environment and Safety Department; Kalyani Steels Ltd.
Issuing Authority	Mr. R.K.Goyal I Managing Director
Date of Issue	18.05.2025





A. PURPOSE

Kalyani Steels Limited (hereinafter referred as "KSL") recognizes that its activities can have a significant impact on the environment. Incorporating Sustainable & Eco-friendly practices within the operations is vital to mitigate such impact.

Plastic, particularly single-use plastics, leads to severe environmental impacts including clogging landfills and polluting oceans to harming wildlife and entering the food chain.

To help minimize plastic usage and eliminate single-use plastics, thereby reducing our ecological footprint, we have implemented a "Plastic Use Policy" across our day-to-day operations.

B. SCOPE AND APPLICABILITY

This Policy applies to all sites and individuals working at all levels /grades of KSL, its subsidiaries, associates, joint ventures, and affiliates anywhere in the world (collectively referred to as the "Company")

C. POLICY GUIDELINES

Plastic free workplace:

- Procurement team will avoid procurement of single-use plastics in our operations and instruct the suppliers to ensure single-use plastics is not used for purchased materials.
- All employees are expected & encouraged to ensure that their respective workplace is plastic-free by avoiding the usage of single-use plastics.
- As far as possible, suitable alternative sustainable options should be utilized.

Sustainable Alternatives:

- KSL will invest in and promote the use of sustainable alternatives to the single use plastic products throughout the operations, such as biodegradable or compostable or recyclable materials.
- Procurement team should prioritize & give preference to suppliers offering & promoting sustainable, biodegradable, recyclable packaging and materials.

Plastic Waste Management:

- Proper waste management systems should be in place to ensure effective disposal and recycling of plastic waste.
- Employees should segregate plastic waste from other types of waste and dispose them in designated bins provided by the company

Training and Monitoring:

- Regular awareness drives shall be conducted to educate employees on proper plastic waste management and recycling practices.

- KSL will establish a system to monitor plastic waste generation and disposal for effective implementation of this policy

D. AMENDMENTS

The Company reserves its right to amend or modify this Policy in whole or in part, at any time without assigning any reason whatsoever. However, this policy, in whole or in part, shall stand modified/amended from time to time, without any further action on the part of the Company, as and when there would be any statutory modification(s) / amendment(s) / revision(s) to the applicable provisions to it.

KALYANI STEELS LTD.



R K GOYAL

MANAGING DIRECTOR

APPENDIX – FIELD REPORTS (OCTOBER 2024 – DECEMBER 2024)

AMBIENT AIR QUALITY

AMBIENT AIR QUALITY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : PADMANABHPUR VILLAGE Latitude: $20^0 33'41"N$ STATION TYPE : Fixed
STATION CODE : A1 Longtitude: $85^0 35'46"E$ Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m³								Pollutants level in ng/m³			mg/m³
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
02.10.24	32.5	16.5	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
06.10.24	26.5	14.8	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
10.10.24	39.2	20.5	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
14.10.24	47.1	24.6	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
18.10.24	53.2	16.8	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
22.10.24	31.5	14.2	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.10.24	36.1	16.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.10.24	41.2	20.8	<4.0	16.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.11.24	46.5	23.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.11.24	57.2	25.1	<4.0	14.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.11.24	49.5	26.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.11.24	54.8	24.1	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.11.24	57.2	26.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.11.24	61.8	32.5	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
27.11.24	71.5	36.1	<4.0	10	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.12.24	65.8	30.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.12.24	61.7	29.5	<4.0	15	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.12.24	54.6	24.6	<4.0	10	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.12.24	52.8	22.8	<4.0	9	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.12.24	49.8	23.8	<4.0	7.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.12.24	32.5	16.5	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.12.24	36.2	18.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.12.24	53.6	26.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.12.24	48.2	23.8	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal : ENVIROCHECK Kolkata 700 025 Rashtraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :

ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION : PATRABHAG VILLAGE
STATION CODE : A2

Latitude: $20^0$34'18"N
Longtitude: $85^0$36'11"E

STATION TYPE : Fixed
Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m³								Pollutants level in ng/m³			mg/m³
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
02.10.24	35.2	16.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
06.10.24	34.1	15.1	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
10.10.24	38.2	14.2	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
14.10.24	41.2	18.2	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
18.10.24	35.1	14.2	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
22.10.24	30.0	14.2	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.10.24	32.5	18.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.10.24	31.5	16.5	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.11.24	34.5	18.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.11.24	30.2	16.1	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.11.24	36.2	19.5	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.11.24	34.2	16.8	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.11.24	38.2	18.5	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.11.24	42.6	23.6	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
27.11.24	45.1	21.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.12.24	41.8	20.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.12.24	35.2	18.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.12.24	34.8	19.5	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.12.24	38.2	20.1	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.12.24	41.8	21.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.12.24	32.8	16.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.12.24	36.1	15.1	<4.0	7.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.12.24	38.5	19.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.12.24	31.8	18.5	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal :

ENVIROCHECK Kolkata 700 028 249 Kashiteguri Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : RAGADA VILLAGE
STATION CODE : A3

Latitude: $20^0$33'11"N
Longtitude: $85^0$38'45"E

STATION TYPE : Fixed
Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in μg/m³								Pollutants level in ng/m³			mg/m³
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
04.10.24	38.2	16.5	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
08.10.24	26.5	14.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
12.10.24	43.5	22.8	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
16.10.24	32.5	16.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
20.10.24	39.2	19.5	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
24.10.24	28.5	16.2	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.10.24	41.5	21.6	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.11.24	43.6	22.1	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.11.24	35.2	18.6	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.11.24	41.8	20.5	<4.0	16.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.11.24	39.2	16.8	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.11.24	46.2	23.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.11.24	41.8	21.8	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.11.24	45.2	24.1	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
29.11.24	34.1	18.5	<4.0	7.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.12.24	45.9	26.1	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.12.24	51.8	28.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.12.24	53.1	26.1	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.12.24	41.8	22.8	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.12.24	30.2	15.2	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.12.24	33.6	14.1	<4.0	7.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.12.24	41.8	21.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
29.12.24	45.2	23.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
31.12.24	47.1	26.1	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal : ENVIROCHECK Kolkata 700 028 169 Rashtraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : BANSAPUTIA VILLAGE Latitude: $20^0$35'04"N STATION TYPE : Fixed
STATION CODE : A4 Longtitude: $85^0$37'25"E Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
02.10.24	31.5	16.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
06.10.24	29.2	14.5	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
10.10.24	43.2	21.8	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
14.10.24	41.6	19.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
18.10.24	35.1	16.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
22.10.24	42.6	21.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.10.24	30.2	14.8	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.10.24	37.1	18.2	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.11.24	39.2	16.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.11.24	35.1	15.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.11.24	32.5	16.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.11.24	36.1	18.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.11.24	41.2	23.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.11.24	45.8	22.8	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
27.11.24	47.2	24.8	<4.0	15.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.12.24	46.8	23.6	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.12.24	41.2	22.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.12.24	43.6	23.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.12.24	38.2	21.5	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.12.24	32.8	24.6	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.12.24	39	14.1	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.12.24	29.8	15.2	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.12.24	47.5	26.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.12.24	51.2	25.8	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal :

ENVIROCHECK Kolkata 700 028 249 Kashiteguri Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : TALABARKOTE VILLAGE Latitude: $20^0$34'19"N STATION TYPE : Fixed
STATION CODE : A5 Longtitude: $85^0$37'55"E Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m³								Pollutants level in ng/m³			mg/m³
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
04.10.24	46.2	28.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
08.10.24	36.2	18.5	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
12.10.24	42.3	24.2	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
16.10.24	39.5	19.5	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
20.10.24	45.1	26.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
24.10.24	37.5	16.5	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.10.24	32.6	18.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.11.24	35.1	16.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.11.24	36.5	19.2	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.11.24	39.2	20.0	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.11.24	48.2	21.5	<4.0	20.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.11.24	41.6	21.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.11.24	45.7	23.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.11.24	47.2	24.8	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
29.11.24	31.5	15.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.12.24	46.2	21.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.12.24	45.1	20.4	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.12.24	43.2	21.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.12.24	39.5	18.2	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.12.24	32.8	14.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.12.24	31.5	14.8	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.12.24	48.2	22.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
29.12.24	43.5	21.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
31.12.24	41.2	18.2	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal : ENVIROCHECK Kolkata 700 028 199, Rashtraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : DHIRAPATANA VILLAGE Latitude: $20^0$32'04"N STATION TYPE : Fixed
STATION CODE : A6 Longtitude: $85^0$35'08"E Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m³								Pollutants level in ng/m³			mg/m³
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
02.10.24	36.2	18.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
06.10.24	29.5	15.0	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
10.10.24	41.2	21.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
14.10.24	43.5	23.2	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
18.10.24	48.3	25.1	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
22.10.24	47.2	24.6	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.10.24	32.5	18.5	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.10.24	51.8	26.2	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.11.24	46.2	22.6	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.11.24	38.2	19.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.11.24	39.2	20.1	<4.0	11.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.11.24	45.1	23.6	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.11.24	48.2	24.1	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.11.24	46.2	23.1	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
27.11.24	51.2	23.5	<4.0	21.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.12.24	47.2	21.8	<4.0	20.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.12.24	52.8	25.1	<4.0	22.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.12.24	46.2	22.8	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.12.24	41.8	21.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.12.24	51.8	25.3	<4.0	19.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.12.24	31.5	16.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.12.24	29.1	15.1	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.12.24	48.1	22.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
30.12.24	46.2	24.1	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal : ENVIROCHECK Kolkata 700 028 169, Rashtraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : MANIPUR VILLAGE Latitude: $20^0$33'16"N STATION TYPE : Fixed
STATION CODE : A7 Longtitude: $85^0$37'20"E Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m³								Pollutants level in ng/m³			mg/m³
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
04.10.24	41.5	23.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
08.10.24	31.5	18.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
12.10.24	47.5	24.1	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
16.10.24	36.5	19.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
20.10.24	38.2	20.1	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
24.10.24	34.8	16.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.10.24	43.6	21.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.11.24	52.1	26.8	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.11.24	43.8	22.5	<4.0	12.8	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.11.24	49.2	25.1	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.11.24	46.1	23.8	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.11.24	48.2	23.6	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.11.24	52.9	25.1	<4.0	18.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.11.24	47.2	22.8	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
29.11.24	28.5	16.5	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.12.24	41.2	21.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.12.24	46.5	23.9	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.12.24	48.2	24.8	<4.0	18.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.12.24	44.1	22.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.12.24	31.5	18.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.12.24	33.6	16.5	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.12.24	41.6	22.6	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
29.12.24	42.5	23.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
31.12.24	43.2	22.6	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal : ENVIROCHECK Kolkata 700 028 169 Rashtraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

AMBIENT AIR QUALITY MONITORING REPORT
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :	MONITORING MONTH & YEAR : OCT'24 - DEC'24	ASSIGNED BY :
ENVIROCHECK 189, Rastraguru Avenue, Kolkata - 700 028		M.N.DASTUR & COMPANY (P) LTD. Consulting Engineers P - 17, Mission Row Extension, Kol - 13

LOCATION : SIARIA VILLAGE Latitude: $20^0$35'22"N STATION TYPE : Fixed
STATION CODE : A8 Longtitude: $85^0$37'52"E Date of Report preparation : 23.01.2025

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
04.10.24	46.2	22.6	<4.0	14.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
08.10.24	35.1	19.2	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
12.10.24	41.6	20.8	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
16.10.24	45.1	23.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
20.10.24	38.5	19.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
24.10.24	32.8	18.1	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
28.10.24	41.6	19.2	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
01.11.24	45.1	22.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
05.11.24	43.2	24.1	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
09.11.24	47.5	25.6	<4.0	14.2	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
13.11.24	42.8	21.8	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
17.11.24	51.2	25.1	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
21.11.24	48.1	23.6	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
25.11.24	43.5	22.8	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Date of sampling	Pollutants level in µg/m^3								Pollutants level in ng/m^3			mg/m^3
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	C_6H_6	NH_3	O_3	Lead	As	Ni	B(a)P	CO
29.11.24	31.5	18.2	<4.0	9.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
03.12.24	46.2	16.5	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
07.12.24	45.1	15.0	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
11.12.24	48.2	18.2	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
15.12.24	44.1	16.2	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
19.12.24	35.2	9.0	<4.0	10.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
23.12.24	32.8	8.0	<4.0	8.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
26.12.24	46.8	16.5	<4.0	16.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
29.12.24	45.1	14.2	<4.0	15.0	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1
31.12.24	43.2	12.5	<4.0	12.5	<0.74	<4.18	<10	<0.01	<0.01	<0.02	<0.36	<0.1

Notes :

I) Sampling & analysis Procedure

RSPM<10 : As per IS 5182 (Part - 23) NOx : As per IS 5182 (Part 6)

PM2.5 : As per USEPA 1997a. CO : As per IS 5182 (Part 10)

SO2 : As per IS 5182 (Part 2) Ozone : As per IS 5182 (Part IX)

Analyzed by : (Signature)

Indrani Bhattacharyya

(Analyst)

For ENVIROCHECK

Date of Issue : 23.01.2025

Place : Kolkata

Checked by : (Signature)

Name : Dr. AJOY PAUL

Seal : ENVIROCHECK Kolkata 700 028 168 Rashtraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

GROUND WATER QUALITY

GROUND WATER QUALITY

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW1 : Dugwell - Padmanabhpur Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	25.5	24	22	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	830	802	813	APHA 23rd Ed. 2540B
7	Electrical Conductivity	1294.8	1267.4	1255.4	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	1.88	1.61	1.91	APHA 23rd Ed. 2130 B
9	pH	7.17	7.12	7.11	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	193	195.03	190.12	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	3.5	3.1	3.2	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	225	215.25	218.5	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	3.95	3.33	3.69	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	4.59	4.31	4.42	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	141.94	139.36	137.67	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	86	82	80	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	274.5	262.31	266.57	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	38.48	40.08	39.28	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	23.28	22.81	22.11	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	4.01	3.41	3.69	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	109.98	107.55	112.62	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.22	0.09	0.13	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.82	0.79	0.78	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	189	171	163	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	76	77	72	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW2 : Dugwell - Patrabhag (Bhadrapali) village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	26	25	23	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	199	193	195	APHA 23rd Ed. 2540B
7	Electrical Conductivity	309.6	302.8	303.2	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	<1.0	<1.0	<1.0	APHA 23rd Ed. 2130 B
9	pH	6.84	6.98	7.03	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	48	50.49	44.1	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	3.21	3.2	3.4	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	46	40.95	42.75	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	3.44	3.15	3.55	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	2.25	2.53	2.37	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	42.4	40.2	45.73	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	14	15	16.4	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	54.9	49.96	52.16	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	11.02	11.9	9.82	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	4.92	4.99	4.7	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	4.41	3.11	4.11	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	21	24.03	20.94	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.08	0.1	0.05	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.31	0.41	0.45	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	182	175	185	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	80	69	89	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW3 : Tubewell - Deopada Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	23	22	21	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	180	188	183	APHA 23rd Ed. 2540B
7	Electrical Conductivity	281.8	299.6	284.6	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	<1.0	<1.0	1.28	APHA 23rd Ed. 2130 B
9	pH	6.87	6.91	7.05	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	45	48.51	51.94	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	3	3	3.2	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	40	42	38.95	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	3.12	2.69	2.96	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	2.03	2.18	1.96	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	40.55	44.67	36.3	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	11.2	12.8	9.8	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	48.8	51.24	47.52	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	10.42	12.3	11.78	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	4.56	4.28	5.41	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	3.96	2.83	3.77	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	21.54	22.43	22.09	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.08	0.06	0.07	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.46	0.48	0.56	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	<1	<1	<1	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	<1	<1	<1	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW4 : Dugwell - Bansaputia Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	25	23	23	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	185	189	193	APHA 23rd Ed. 2540B
7	Electrical Conductivity	290.5	295.9	298.4	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	<1.0	<1.0	<1.0	APHA 23rd Ed. 2130 B
9	pH	6.89	7.02	6.93	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	73	75.24	69.58	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	3.2	3.1	3.2	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	22	27.3	24.7	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	3.68	3.26	3.38	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	1.39	1.72	1.52	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	45.16	41.09	43.85	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	10.2	11.4	11	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	26.84	33.31	30.13	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	17.03	16.27	15.71	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	7.32	8.32	7.29	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	4.1	2.99	4.93	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	16.86	15.68	19.44	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.02	0.02	0.03	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.38	0.45	0.42	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	166	158	181	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	81	75	76	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW5 : Dugwell - Talabarkote Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	26	24	22	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	183	182	190	APHA 23rd Ed. 2540B
7	Electrical Conductivity	287.5	288.6	297.8	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	1.63	1.52	1.31	APHA 23rd Ed. 2130 B
9	pH	6.47	6.73	6.88	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	74	71.28	75.46	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	3.5	3	3.2	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	24	23.1	28.5	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	2.24	2.85	2.35	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	0.44	0.73	0.95	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	41.02	45.11	39.13	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	8.6	9.8	11.2	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	29.28	28.18	34.77	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	17.23	15.08	16.5	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	7.44	8.08	8.23	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	7.86	5.93	6.99	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	14.99	16.14	16.32	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	<0.02	0.04	0.03	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.68	0.75	0.72	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	132	122	145	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	72	68	75	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW6 : Tubewell - Krushnaprasad Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	24	22	21	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	586	558	563	APHA 23rd Ed. 2540B
7	Electrical Conductivity	916.5	875.1	883.1	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	1.83	1.77	1.45	APHA 23rd Ed. 2130 B
9	pH	6.73	6.79	6.91	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	162	158.4	167.58	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	2.8	3	3	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	161	157.5	153.9	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	3.89	3.41	3.97	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	2.87	2.47	2.43	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	112	117.92	121.64	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	28.8	25	25.6	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	196.42	192.15	187.76	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	40.08	33.73	37.31	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	14.88	17.82	17.88	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	17.17	13.52	14.59	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	32.21	37.51	35.08	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.04	0.05	0.03	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.89	0.88	0.83	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	<1	<1	<1	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	<1	<1	<1	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW7 : Tubewell - Manipur Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	24	23	21	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	10.8	<10	10.2	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	105	114	121	APHA 23rd Ed. 2540B
7	Electrical Conductivity	165.9	180.6	185.6	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	3.86	3.48	3.62	APHA 23rd Ed. 2130 B
9	pH	6.59	6.81	6.65	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	29	31.68	33.32	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	2.7	2.8	2.9	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	20	25.2	22.8	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	3.39	3.26	3.21	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	1.31	1.44	1.55	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	15.21	14.29	18.86	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	11.6	12.8	12.4	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	24.4	30.74	27.82	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	5.81	7.14	7.86	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	3.48	3.33	3.29	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	4.47	5.03	3.89	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	9.12	11.78	14.32	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.17	0.11	0.11	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	3.65	3.59	3.48	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	<1	<1	<1	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	<1	<1	<1	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

GROUND WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue, Kolkata - 700028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
P - 17, Mission Row Extension, Kol - 13

GW8 : Dugwell - Siaria Village

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	10.12.2024	
1	Odour (TON)	Odourless	Odourless	Odourless	APHA 23rd Ed. 2150 B
2	Colour (Hazen)	1	1	1	APHA 23rd Ed. 2120 B
3	Taste	Acceptable	Acceptable	Acceptable	APHA 23rd Ed. 2160 C
4	Temperature (^{0}C)	26	24	22	APHA 23rd Ed. 2550 B
5	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 23rd Ed. 2540D
6	Total Dissolved Solid (mg/l)	202	209	213	APHA 23rd Ed. 2540B
7	Electrical Conductivity	314.6	331.6	335.1	APHA 23rd Ed. 2510-B
8	Turbidity (NTU)	<1.0	<1.0	<1.0	APHA 23rd Ed. 2130 B
9	pH	6.92	7.13	7.11	APHA 23rd Ed. 4500H+B
10	Total Hardness (mg/l)	49	54.45	52.92	APHA 23rd Ed. 2340C
11	Dissolved Oxygen (mg/l)	3.3	3	3.3	APHA 23rd Ed. 4500 OC
12	BOD at 27^{0}C for 3 days (mg/l)	<2.0	<2.0	<2.0	APHA 23rd Ed. 5210 B
13	COD (mg/l)	<5.0	<5.0	<5.0	APHA 23rd Ed. 5220 B & D
14	Carbonate (mg/l)	<0.6	<0.6	<0.6	APHA 23rd Ed. 2320 B
15	Alkalinity (mg/l)	48	50.4	53.2	APHA 23rd Ed. 2320 B
16	Total Nitrogen (mg/l)	4.03	3.66	3.87	APHA 23rd Ed. 4500 N C
17	Phenol (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 5530 D
18	Nitrate + Nitrite (mg/l)	1.75	1.63	1.38	APHA 23rd Ed. 4500 NO_3 E
19	Chloride (mg/l)	31.8	35.73	38.89	APHA 23rd Ed. 4500 Cl- B&D
20	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 F- C
21	Sulphate (mg/l)	12.8	13.4	13.6	APHA 23rd Ed. 4500 SO_4^{2-} E
22	Bi Carbonate (mg/l)	58.56	61.49	64.9	APHA 23rd Ed. 2320 B
23	Residual Chlorine (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 Cl B
24	Ortho-Phosphate (mg/l)	<0.1	<0.1	<0.1	EPA method 365.1,1993
25	Calcium (mg/l)	8.82	12.1	11.39	APHA 23rd Ed. 3500 Ca B
26	Magnesium (mg/l)	6.48	5.82	5.88	APHA 23rd Ed. 3500 Mg B
27	Potassium (mg/l)	14.16	11.68	11.39	APHA 23rd Ed. 3500 K
28	Sodium (mg/l)	20.79	27.22	24.05	APHA 23rd Ed. 3500 Na B
29	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 23rd Ed. 3111B
30	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
31	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111B
32	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3500 As B
33	Zinc (mg/l)	0.08	0.07	0.1	APHA 23rd Ed. 3111 B
34	Iron (mg/L)	0.55	0.68	0.63	APHA 23rd Ed. 3111 B
35	Copper (mg/l)	<0.04	<0.04	<0.04	APHA 23rd Ed. 3111 B
36	Chromium (VI) (mg/l)	<0.1	<0.1	<0.1	ASTM Vol. 11.01,1990
37	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
38	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
39	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111 B
40	Cyanide (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 4500 CN- F
41	Aluminium (mg/l)	<0.02	<0.02	<0.02	APHA 23rd Ed. 3500 Al B
42	Total Coliform (CFU/100 ml)	158	147	161	APHA 23rd Ed. 9222 B
43	Fecal Coliform (CFU/100 ml)	69	68	74	APHA 23rd Ed. 9222 D

<1 indicates No Colony developed

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

SURFACE WATER QUALITY

SURFACE WATER QUALITY

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW1 : SAPUA NADI (Downstream) - Parsurampur Village

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		03.10.2024	27.11.2024	04.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	24	25	23	APHA 22nd Ed. 2550 B
3	pH	7.54	7.28	7.21	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	11	10.8	10.4	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	177.0	186	190	APHA 22nd Ed. 2540B
6	Electrical Conductivity	278.5	292.5	296.8	APHA 23rd Ed. 2510B
7	Turbidity	1.73	1.81	1.68	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	72	69.58	67.32	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.4	6.1	6	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	3.0	4.0	4.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	14.7	18.48	19.04	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	3.99	4.23	4.53	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	1.68	1.83	1.95	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	23.96	27.35	25.46	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	13.80	13.0	15.0	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	28.0	31.35	36.75	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	34.16	38.25	44.84	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.8	0.64	0.68	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.89	0.78	0.7	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	16.83	15.71	15.47	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	7.2	7.29	6.89	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	5.4	4.1	3.29	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	18.04	22.31	20.82	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.02	0.04	0.03	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.64	0.72	0.78	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.8×10^3	2.3×10^3	2.1×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.8×10^2	1.6×10^2	1.2×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharyya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW2 : Sapua Nadi (Upstream) Near Kuania village

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	04.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	23	24	22	APHA 22nd Ed. 2550 B
3	pH	7.47	7.31	7.18	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	11	10.5	10	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	160.0	180	168	APHA 22nd Ed. 2540B
6	Electrical Conductivity	251.5	281.1	259.3	APHA 23rd Ed. 2510B
7	Turbidity	1.64	1.29	1.31	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	69	75.46	64.35	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.3	6.2	6.1	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	3.0	3.0	3.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	9.8	13.9	14.28	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	3.21	3.60	4.02	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	1.41	1.65	1.76	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	18.89	22.16	24.57	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	10.40	9.6	10.2	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	41.0	35.2	29.4	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	50.02	42.88	35.87	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.28	0.28	0.5	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.35	0.33	0.55	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	14.23	16.5	14.68	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	8.04	8.23	6.65	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	4.4	4.28	4.03	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	12.68	14.29	15.08	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.06	0.03	0.03	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.57	0.7	0.76	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.2×10^3	2.0×10^3	2.1×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.2×10^2	1.1×10^2	1.2×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW3 : Sapua Nadi - Near Gudapada Village

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	27.11.2024	04.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	24	23	22	APHA 22nd Ed. 2550 B
3	pH	7.58	7.63	7.46	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	<10	<10	<10	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	152.0	160	164	APHA 22nd Ed. 2540B
6	Electrical Conductivity	237.4	246.9	255.2	APHA 23rd Ed. 2510B
7	Turbidity	1.81	1.68	1.55	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	64	61.74	68.31	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.5	6.4	6.1	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	3.0	3.0	3.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	9.8	9.24	14.28	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	3.58	3.35	3.77	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	1.55	1.86	1.54	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	17.05	19.8	20.55	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	8.80	9	10	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	22.0	26.6	25.2	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	26.84	32.45	30.74	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.43	0.34	0.56	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.44	0.55	0.57	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	15.23	13.75	15.28	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	6.24	6.59	7.25	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	7.55	6.81	7.22	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	17.71	16.64	14.68	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	0.32	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.04	0.05	0.02	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.66	0.63	0.68	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.2×10^3	2.0×10^3	2.3×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.4×10^2	1.2×10^2	1.3×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) | Compiled by (Dr. A. Paul) | Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW4 : Kantla Nala - Upstream (Near Badagila Village)

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		05.10.2024	28.11.2024	05.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	25	24	22	APHA 22nd Ed. 2550 B
3	pH	7.55	7.6	7.55	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	11	12	10	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	97.0	111	124	APHA 22nd Ed. 2540B
6	Electrical Conductivity	151.7	175.6	196.6	APHA 23rd Ed. 2510B
7	Turbidity	2.1	1.87	1.43	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	37	43.12	46.53	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.4	6.1	6	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	6.0	6.0	5.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	29.4	23.1	23.8	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	4.19	4.01	3.89	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	1.49	1.22	1.45	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	11.06	17.44	19.65	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	6.80	7.2	8.2	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	18.0	21.85	26.25	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	21.96	26.66	32.03	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.45	0.43	0.60	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.55	0.60	0.63	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	8.42	9.43	10.71	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	3.84	4.7	4.75	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	2.2	1.63	2.15	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	6.96	4.53	5.35	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.02	0.03	0.03	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.68	0.81	0.75	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.4×10^3	2.2×10^3	2.3×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.5×10^2	1.4×10^2	1.4×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW5 : Kantla Nala (Near Gaurangapur Village)

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		05.10.2024	28.11.2024	05.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	25	23.5	22.5	APHA 22nd Ed. 2550 B
3	pH	7.27	7.18	7.26	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	10.4	<10	10.5	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	121.0	125	130	APHA 22nd Ed. 2540B
6	Electrical Conductivity	188.1	201.3	201.7	APHA 23rd Ed. 2510B
7	Turbidity	1.54	1.5	1.46	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	43	48.02	42.57	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.5	6.3	6.2	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	3.0	3.0	3.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	9.8	9.24	9.52	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	3.69	3.28	3.65	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	2.1	1.89	1.27	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	14.75	20.75	19.21	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	9.20	10.0	10.4	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	25.0	19.95	24.15	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	30.5	24.34	29.46	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.4	0.59	0.63	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.61	0.72	0.74	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	9.42	10.8	9.52	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	4.68	5.06	4.51	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	3.06	3.48	3.92	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	8.36	10.24	12.28	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.02	0.03	0.02	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.72	0.75	0.73	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.5×10^3	2.5×10^3	2.4×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.5×10^2	1.4×10^2	1.4×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW6 : Kantla Nala - Downstream (Gopinathpur Village)

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	29.11.2024	10.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	25	24	23	APHA 22nd Ed. 2550 B
3	pH	7.24	7.25	7.09	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	10.6	10.8	10	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	185.0	189	193	APHA 22nd Ed. 2540B
6	Electrical Conductivity	288.9	294.9	305.3	APHA 23rd Ed. 2510B
7	Turbidity	1.88	1.98	1.66	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	83	79.38	80.19	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.4	6.2	5.8	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	4.0	5.0	8.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	19.6	23.1	28.56	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	4.06	4.13	3.97	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	1.22	1.35	2.12	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	27.19	25.46	23.67	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	14.40	15.0	14.6	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	31.0	36.1	33.6	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	37.82	44.04	40.99	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.36	0.53	0.62	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.43	0.74	0.63	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	17.64	16.3	16.67	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	9.36	9.29	9.27	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	3.18	2.64	2.88	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	11.38	10.08	12.04	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	0.15	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.1	0.06	0.05	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.86	0.8	0.83	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.6×10^3	2.6×10^3	2.5×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.5×10^2	1.6×10^2	1.6×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW7 : Nala (Near Siaria Village)

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		04.10.2024	29.11.2024	10.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	25	23	21	APHA 22nd Ed. 2550 B
3	pH	7.43	7.51	7.33	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg/l)	12.22	12.6	11.8	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg/l)	137.0	143	168	APHA 22nd Ed. 2540B
6	Electrical Conductivity	214.8	224.1	257.8	APHA 23rd Ed. 2510B
7	Turbidity	6.13	5.86	4.63	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	53	50.96	56.43	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.3	6	5.9	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg/l)	5.0	7	6	APHA 22nd Ed. 5210 B
11	COD (mg/l)	24.6	27.72	23.8	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg/l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	5.18	4.24	4.16	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	1.89	2.15	2.32	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	21.66	17.92	20.1	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	9.00	9.6	8.8	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	27.0	30.4	40.95	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	32.94	37.09	49.96	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.34	0.47	0.57	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.52	0.63	0.59	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	11.42	11	11.9	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	5.88	5.64	6.42	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	3.17	4.25	5.42	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	9.16	10.45	19.42	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	0.13	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.06	0.05	0.05	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	2.68	2.93	2.78	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.4×10^3	2.5×10^3	2.2×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.4×10^2	1.5×10^2	1.3×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SURFACE WATER ANALYSIS REPORT FOR
KALYANI STEEL LIMITED, DHINKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Kolkata - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

LOCATION OF SAMPLING :
SW8 : Pond (Near Mania Bandha Village)

MODE OF SAMPLING: Grab & mixed.

No.	Parameters	Date of Sampling			Mehod used
		03.10.2024	29.11.2024	10.12.2024	
1	Odour (T.O.N)	Odourless	Odourless	Odourless	APHA 22nd Ed. 2150 B
2	Temperature (0C)	21	21	20	APHA 22nd Ed. 2550 B
3	pH	7.4	7.46	7.41	APHA 22nd Ed. 4500 H+B
4	Total Suspended Solid (mg./l)	10.2	10	10.5	APHA 22nd Ed. 2540D
5	Total Dissolved Solid (mg./l)	169.0	179	177	APHA 22nd Ed. 2540B
6	Electrical Conductivity	263.8	281.2	282.6	APHA 23rd Ed. 2510B
7	Turbidity	1.49	1.53	1.28	APHA 23rd Ed. 2130B
8	Total Hardness (mg/l)	50	54.88	52.47	APHA 22nd Ed. 2340C
9	Dissolved Oxygen (mg/l)	6.4	6.3	5.9	APHA 22nd Ed. 4500 OC
10	BOD , 3 days at 27^0C (mg./l)	3.0	4.0	4.0	APHA 22nd Ed. 5210 B
11	COD (mg./l)	9.8	13.86	19.04	APHA 22nd Ed. 5220 B & D
12	Oil & Grease (mg./l)	<1.0	<1.0	<1.0	APHA 22nd Ed. 5520 B
13	Salinity (ppt.)	0.00	0.00	0.00	APHA 22nd Ed. 2520 B & C
14	Kjeldahl Nitrogen (mg/l)	3.10	3.15	3.68	APHA 22nd Ed. 4500 Norg
15	NH_3 - N (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 NH_3 B&F
16	Nitrate + Nitrite (mg/l)	0.98	1.25	1.69	APHA 23rd Ed. 4500 NO_3 E
17	Chloride (mg/l)	52.08	50.92	48.69	APHA 22nd Ed. 4500 Cl- B&D
18	Fluoride (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 4500-F D
19	Sulphates as SO4 (mg/l)	7.20	7.8	8.0	APHA 22nd Ed. 4500 SO42- E
20	Alkalinity	29.0	33.25	35.7	APHA 23rd Ed. 2320 B
21	Bi-Carbonate (mg/l)	35.38	40.57	43.55	APHA 22nd Ed. 2320 B
22	Total P (mg/l)	0.74	0.58	0.67	APHA 23rd Ed. 4500 - PE
23	Phosphate (mg/l)	0.76	0.71	0.73	APHA 22nd Ed. 4500 P E
24	Calcium (mg/l)	12.02	12.2	11.11	APHA 22nd Ed. 3500 Ca B
25	Magnesium (mg/l)	4.8	5.88	5.94	APHA 22nd Ed. 3500 Mg B
26	Potassium (mg/l)	1.86	2.19	3.16	APHA 23rd Ed. 2500K
27	Sodium (mg/l)	14.71	15.68	13.25	APHA 22nd Ed. 3500 Na B
28	Manganese (mg/l)	<0.05	<0.05	<0.05	APHA 22nd Ed. 3111 B
29	Boron (mg/l)	<0.1	<0.1	<0.1	APHA 23rd Ed. 4500 B B
30	Lead (mg/l)	<0.005	<0.005	<0.005	APHA 23rd Ed. 3111 B
31	Arsenic (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3114 B
32	Zinc (mg/l)	0.03	0.05	0.05	APHA 22nd Ed. 3111 B
33	Iron (mg/l)	0.62	0.56	0.61	APHA 22nd Ed. 3111 B
34	Chromium (Total) (mg/l)	<0.02	<0.02	<0.02	APHA 22nd Ed. 3111 B
35	Hexavalent Chromium (mg/l)	<0.1	<0.1	<0.1	APHA 22nd Ed. 3500 Cr-B
36	Nickel (mg/l)	<0.01	<0.01	<0.01	APHA 23rd Ed. 3111 B
37	Mercury (mg/l)	<0.001	<0.001	<0.001	APHA 23rd Ed. 3112 B
38	Cadmium (mg/l)	<0.002	<0.002	<0.002	APHA 23rd Ed. 3111B
39	Total Coliform / 100 ml.	2.5×10^3	2.4×10^3	2.3×10^3	APHA 22nd Ed. 9222 B
40	Fecal Coliform /100 ml.	1.3×10^2	1.3×10^2	1.4×10^2	APHA 22nd Ed. 9222 D

Reporting Date : 14.01.2025

Indrani Bhattacharya

Analysis by (Indrani Bhattacharya) Compiled by (Dr. A. Paul) Certified by (Dr. S. B. Chowdhury)

SOIL QUALITY

SOIL QUALITY

SOIL ANALYSIS REPORT FOR
KSL - KALYANI STEELS LIMITED
DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Calcutta - 13

LOCATION OF SAMPLING :		**(Latitude/Longitude) :**	**Date of Sampling**
S1 :	Project site (Near Talabarkote)	$20^0$34'43"N/ $85^0$37'38"E	04.12.2024
S2:	Agricultureal land at Manipur Village	$20^0$33'09"N/ $85^0$37'29"E	11.12.2024
S3 :	Forest Soil at Mahulapada	$20^0$38'04"N/ $85^0$41'35"E	04.12.2024

No.	Parameters	S1	S2	S3
1	Colour	Slightly reddish	Greyish	Slightly reddish
2	Soil Texture	Sandy loam	Sandy loam	Sandy loam
3	sand (%)	60	65	75
4	Silt (%)	15	20	15
5	Clay (%)	25	15	10
6	Electrical conductivity (dS/m)	1.5	1.8	1.2
7	Hydraulic conductivity (cm/sec.)	2.6×10^{-2}	1.8×10^{-3}	1.6×10^{-2}
8	Bulk Density (gm/ c.c)	1.38	1.5	1.46
9	Moisture (%)	20	25	10
10	Water Holding Capacity (%)	18	23	16
11	Porosity (%)	42	35	46
12	Infiltration rate(cm/hrs)	1.4	1.2	2.3
13	PH (1:2)	7.2	7.26	7.14
14	Alkanity / Acidity	very slightly basic	slightly basic	very slightly basic
15	Available N_2 (mg/kg)	850	1150	680
16	Available P_2O_5 (mg/kg)	620	890	610
17	Available K_2O (mg/kg)	780	1580	650
18	Chloride (mg/kg)	1280	1120	1450
19	Sulphate (mg/kg)	790	920	660
20	Sodium absorption ratio (SAR)	8.95	7.63	6.6
21	Available Organic Carbon (gm/kg)	5.2	6.9	5.6
22	Calcium (mg/kg)	970	1150	920
23	Magnesium (mg/kg)	1080	950	1450
24	Iron (mg/kg)	2850	1250	2650
25	Copper (mg/kg)	3.6	2.8	7.2
26	Lead (mg/kg)	<3.0	<3.0	<3.0
27	Chromium (mg/kg)	<0.20	<0.20	<0.20
28	Microbial Population (CFU/ gm)	4.6×10^4	8.2×10^4	3.8×10^4
29	Cation Exchange Capacity (meq/100g)	16.4	16.6	18.1

Compiled by : (Signature)

Dr. Ajoy Paul

Date : 20.01.2025

Seal :

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Certified by : (Signature)

Dr. S. B. Chowdhury

SOIL ANALYSIS REPORT FOR
KSL - KALYANI STEELS LIMITED, DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Calcutta - 13

LOCATION OF SAMPLING :		**(Latitude/Longitude) :**	Date of Sampling
S4 :	Agricultural land at Siaria Village	$20^0$35'17"N/ $85^0$37'53"E	11.12.2024
S5:	Reserve Forest, Adala	$20^0$33'54"N/ $85^0$40'35"E	04.12.2024

No.	Parameters	S4	S5
1	Colour	Greyish	Slightly reddish
2	Soil Texture	Sandy loam	Sandy loam
3	sand (%)	65	70
4	Silt (%)	25	20
5	Clay (%)	10	10
6	Electrical conductivity (dS/m)	1.6	1.2
7	Hydraulic conductivity (cm/sec.)	$1.8x10^{-3}$	$1.2 x10^{-3.}$
8	Bulk Density (gm/ c.c)	1.6	1.2
9	Moisture (%)	25	8
10	Water Holding Capacity (%)	28	16
11	Porosity (%)	36	45
12	Infiltration rate(cm/hrs)	1.5	1.8
13	PH (1:2)	7.23	7.45
14	Alkanity / Acidity	slightly basic	slightly basic
15	Available N_2 (mg/kg)	1280	860
16	Available P_2O_5 (mg/kg)	980	680
17	Available K_2O (mg/kg)	1280	920
18	Chloride (mg/kg)	860	1250
19	Sulphate (mg/kg)	820	920
20	Sodium absorption ratio (SAR)	7.83	6.94
21	Available Organic Carbon (gm/kg)	6.8	5.8
22	Calcium (mg/kg)	850	920
23	Magnesium (mg/kg)	1050	1280
24	Iron (mg/kg)	1890	2350
25	Copper (mg/kg)	1.8	2.3
26	Lead (mg/kg)	<3.0	<3.0
27	Chromium (mg/kg)	<0.20	<0.20
28	Microbial Population (CFU/ gm)	$6.2 x 10^4$	$5.6 x 10^4$
29	Cation Exchange Capacity (meq/100g)	18.6	15.4

CFU : Colony Forming Unit

Compiled by : (Signature) Date : 20.01.2025 Certified by : (Signature)

Dr. Ajoy Paul Seal : Dr. S. B. Chowdhury

NOISE LEVEL SURVEY

NOISE LEVEL SURVEY

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Project Site, Future Industrial Zone (N1)	Date of Study :	08.12.2024 (Holiday)
Category :	Industrial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	50.3	54.1	52.12	
7:00 AM to 8:00 AM	51.8	55.6	53.34	
8:00 AM to 9:00 AM	51.0	56.4	54.49	
9:00 AM to 10:00 AM	50.6	54.4	52.90	
10:00 AM to 11:00 AM	51.6	55.7	54.12	
11:00 AM to 12:00 PM	52.3	54.6	53.60	
12:00 PM to 1:00 PM	49.3	53.4	51.82	
1:00 PM to 2:00 PM	53.7	56.3	55.19	53.33
2:00 PM to 3:00 PM	52.1	54.8	53.66	
3:00 PM to 4:00 PM	51.5	55.3	53.80	
4:00 PM to 5:00 PM	52.4	54.3	53.45	
5:00 PM to 6:00 PM	51.0	56.4	54.49	
6:00 PM to 7:00 PM	50.6	54.4	52.90	
7:00 PM to 8:00 PM	51.6	55.7	54.12	
8:00 PM to 9:00 PM	48.6	52.3	50.10	
9:00 PM to 10:00 PM	47.5	51.2	49.56	

Date of Study :	08.12.2024 - 09.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	39.4	44.8	41.89	
11:00 PM to 12:00 AM	36.3	42.4	39.28	
12:00 AM to 1:00 AM	39.3	41.6	40.60	
1:00 AM to 2:00 AM	37.6	40.6	39.35	42.98
2:00 AM to 3:00 AM	43.6	48.1	46.41	
3:00 AM to 4:00 AM	41.8	45.9	44.32	
4:00 AM to 5:00 AM	41.0	44.2	42.89	
5:00 AM to 6:00 AM	42.5	45.0	43.93	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK * Kolkata 700 028 * 189, Rashtraguru Avenue *

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date :07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Textile Mill, Bhogora near Khuntuni (N2)	Date of Study :	08.12.2024 (Holiday)
Category :	Industrial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	46.1	49.4	48.06	
7:00 AM to 8:00 AM	49.3	53.5	51.89	
8:00 AM to 9:00 AM	50.4	54.9	53.21	
9:00 AM to 10:00 AM	51.7	55.2	53.79	
10:00 AM to 11:00 AM	52.4	54.6	53.64	
11:00 AM to 12:00 PM	52.8	54.9	53.98	
12:00 PM to 1:00 PM	53.2	55.7	54.63	
1:00 PM to 2:00 PM	52.4	55.9	54.49	51.73
2:00 PM to 3:00 PM	51.3	53.4	52.48	
3:00 PM to 4:00 PM	50.6	52.8	51.84	
4:00 PM to 5:00 PM	49.9	51.6	50.83	
5:00 PM to 6:00 PM	45.2	50.6	48.69	
6:00 PM to 7:00 PM	44.9	49.6	47.86	
7:00 PM to 8:00 PM	43.1	47.6	45.10	
8:00 PM to 9:00 PM	42.5	46.4	44.38	
9:00 PM to 10:00 PM	40.9	43.8	41.80	

Date of Study :	08.12.2024 - 09.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	41.5	44.8	43.46	
11:00 PM to 12:00 AM	40.1	42.9	41.72	
12:00 AM to 1:00 AM	39.2	41.6	40.56	
1:00 AM to 2:00 AM	36.1	40.4	38.76	41.89
2:00 AM to 3:00 AM	34.2	38.4	36.79	
3:00 AM to 4:00 AM	36.4	39.9	38.49	
4:00 AM to 5:00 AM	40.2	43.8	41.58	
5:00 AM to 6:00 AM	44.6	47.9	46.18	

L_{min} : Minimum Noise level L_{max} :Maximum Noise leve' L_{eq} :Equivalent sound energy



Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Spinning Mill - Near Govindapur (N3)	Date of Study :	15.12.2024 (Holiday)
Category :	Industrial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	49.6	57.5	55.10	
7:00 AM to 8:00 AM	50.2	56.7	55.38	
8:00 AM to 9:00 AM	51.8	57.6	55.60	
9:00 AM to 10:00 AM	50.4	55.8	53.89	
10:00 AM to 11:00 AM	53.9	56.8	55.59	
11:00 AM to 12:00 PM	52.2	56.4	54.79	
12:00 PM to 1:00 PM	52.7	59.8	57.56	
1:00 PM to 2:00 PM	51.9	57.6	55.62	54.16
2:00 PM to 3:00 PM	52.4	54.1	53.33	
3:00 PM to 4:00 PM	50.6	53.7	52.42	
4:00 PM to 5:00 PM	50.6	56.2	54.25	
5:00 PM to 6:00 PM	50.0	55.6	53.84	
6:00 PM to 7:00 PM	48.1	51.2	49.92	
7:00 PM to 8:00 PM	47.9	53.7	51.70	
8:00 PM to 9:00 PM	46.8	49.8	48.55	
9:00 PM to 10:00 PM	45.8	50.6	48.83	

Date of Study :	15.12.2024 - 16.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	44.1	48.6	46.91	
11:00 PM to 12:00 AM	43.7	46.1	45.06	
12:00 AM to 1:00 AM	40.2	44.6	42.98	
1:00 AM to 2:00 AM	39.4	41.8	40.56	43.66
2:00 AM to 3:00 AM	40.7	43.2	42.13	
3:00 AM to 4:00 AM	40.2	42.8	41.69	
4:00 AM to 5:00 AM	41.5	43.9	42.86	
5:00 AM to 6:00 AM	42.6	44.5	43.65	

L_{min} : Minimum Noise level L_{max} :Maximum Noise lev L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Badrapali (N4)	Date of Study :	15.12.2024 (Holiday)
Category :	Residential Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	46.2	56.8	54.15	
7:00 AM to 8:00 AM	44.6	54.2	51.64	
8:00 AM to 9:00 AM	43.4	56.8	53.98	
9:00 AM to 10:00 AM	42.3	54.0	51.27	
10:00 AM to 11:00 AM	40.2	50.2	47.60	
11:00 AM to 12:00 PM	48.2	53.7	51.77	
12:00 PM to 1:00 PM	40.2	52.6	49.83	
1:00 PM to 2:00 PM	44.8	56.8	54.06	51.98
2:00 PM to 3:00 PM	47.4	56.3	53.82	
3:00 PM to 4:00 PM	46.2	54.2	51.83	
4:00 PM to 5:00 PM	44.6	56.8	54.04	
5:00 PM to 6:00 PM	42.2	54.6	51.83	
6:00 PM to 7:00 PM	40.6	52.5	49.76	
7:00 PM to 8:00 PM	42.6	54.6	51.86	
8:00 PM to 9:00 PM	41.8	52.9	50.21	
9:00 PM to 10:00 PM	40.2	45.9	43.92	

Date of Study :	15.12.2024 - 16.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	34.8	41.5	39.33	
11:00 PM to 12:00 AM	33.0	38.4	36.49	
12:00 AM to 1:00 AM	32.4	36.7	35.06	
1:00 AM to 2:00 AM	32.0	35.4	34.02	36.43
2:00 AM to 3:00 AM	31.8	34.2	33.16	
3:00 AM to 4:00 AM	32.5	36.2	34.73	
4:00 AM to 5:00 AM	33.9	38.4	36.71	
5:00 AM to 6:00 AM	34.2	40.3	38.24	

L_{min} : Minimum Noise level 34.Minimum L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	PATRABHAG (N5)	Date of Study :	15.12.2024 (Holiday)
Category :	Residential Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	47.5	50.2	49.06	
7:00 AM to 8:00 AM	48.1	51.9	50.40	
8:00 AM to 9:00 AM	49.2	54.6	52.69	
9:00 AM to 10:00 AM	48.3	51.6	50.26	
10:00 AM to 11:00 AM	50.6	53.7	52.42	
11:00 AM to 12:00 PM	53.8	55.9	54.98	
12:00 PM to 1:00 PM	52.3	54.7	53.66	
1:00 PM to 2:00 PM	51.6	54.8	53.49	51.85
2:00 PM to 3:00 PM	53.8	55.1	54.50	
3:00 PM to 4:00 PM	52.9	54.3	53.66	
4:00 PM to 5:00 PM	51.6	53.8	52.84	
5:00 PM to 6:00 PM	48.6	50.1	49.41	
6:00 PM to 7:00 PM	49.9	50.2	50.05	
7:00 PM to 8:00 PM	46.3	49.8	48.39	
8:00 PM to 9:00 PM	43.1	46.2	44.92	
9:00 PM to 10:00 PM	42.5	45.9	44.52	

Date of Study :	15.12.2024 - 16.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	40.7	43.2	42.13	
11:00 PM to 12:00 AM	40.2	42.8	41.69	
12:00 AM to 1:00 AM	41.5	43.9	42.10	
1:00 AM to 2:00 AM	33.0	37.2	35.59	39.44
2:00 AM to 3:00 AM	32.1	36.4	34.76	
3:00 AM to 4:00 AM	33.8	37.1	35.70	
4:00 AM to 5:00 AM	34.5	38.2	36.73	
5:00 AM to 6:00 AM	36.9	40.5	39.06	

L_{min} : Minimum Noise level L_{max} :Maximum Noise leve L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	TALABARKOTE (N6)	Date of Study :	22.12.2024 (Holiday)
Category :	Commercial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	46.2	50.9	49.16	
7:00 AM to 8:00 AM	47.3	51.4	49.82	
8:00 AM to 9:00 AM	48.3	52.5	50.89	
9:00 AM to 10:00 AM	49.6	53.8	52.19	
10:00 AM to 11:00 AM	50.6	53.7	52.42	
11:00 AM to 12:00 PM	53.8	55.9	54.98	
12:00 PM to 1:00 PM	52.3	54.7	53.66	52.14
1:00 PM to 2:00 PM	51.6	54.8	53.49	
2:00 PM to 3:00 PM	53.8	55.1	54.50	
3:00 PM to 4:00 PM	52.9	54.3	53.66	
4:00 PM to 5:00 PM	51.6	53.8	52.84	
5:00 PM to 6:00 PM	48.6	50.1	49.41	
6:00 PM to 7:00 PM	49.9	50.2	50.05	
7:00 PM to 8:00 PM	47.9	52.8	51.01	
8:00 PM to 9:00 PM	48.3	51.8	50.39	
9:00 PM to 10:00 PM	45.2	50.9	48.92	

Date of Study :	22.12.2024 - 23.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	42.2	47.4	45.54	
11:00 PM to 12:00 AM	40.7	45.3	43.58	
12:00 AM to 1:00 AM	40.2	44.8	43.08	
1:00 AM to 2:00 AM	41.4	43.7	42.70	44.87
2:00 AM to 3:00 AM	42.5	44.2	43.43	
3:00 AM to 4:00 AM	43.8	46.4	45.29	
4:00 AM to 5:00 AM	44.2	47.3	46.02	
5:00 AM to 6:00 AM	45.8	48.2	47.16	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy



Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	SAPTASAJYA - MARKET COMPLEX (N7)	Date of Study :	22.12.2024 (Holiday)
Category :	Commercial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	50.6	53.7	52.42	
7:00 AM to 8:00 AM	53.8	55.9	54.98	
8:00 AM to 9:00 AM	52.3	54.7	53.66	
9:00 AM to 10:00 AM	51.6	54.8	53.49	
10:00 AM to 11:00 AM	53.8	55.1	54.50	
11:00 AM to 12:00 PM	52.9	54.3	53.66	
12:00 PM to 1:00 PM	51.6	53.8	52.84	53.22
1:00 PM to 2:00 PM	53.5	59.9	57.79	
2:00 PM to 3:00 PM	52.4	58.3	56.28	
3:00 PM to 4:00 PM	52.8	58.7	56.68	
4:00 PM to 5:00 PM	45.5	49.6	48.02	
5:00 PM to 6:00 PM	43.4	48.2	46.43	
6:00 PM to 7:00 PM	42.8	45.4	44.29	
7:00 PM to 8:00 PM	43.4	46.1	44.96	
8:00 PM to 9:00 PM	42.9	45.3	44.26	
9:00 PM to 10:00 PM	41.6	44.8	43.49	

Date of Study :	22.12.2024 - 23.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	40.4	44.3	42.77	
11:00 PM to 12:00 AM	40.1	43.9	42.40	
12:00 AM to 1:00 AM	39.7	42.8	41.52	
1:00 AM to 2:00 AM	38.4	42.7	41.06	47.42
2:00 AM to 3:00 AM	43.7	49.2	47.27	
3:00 AM to 4:00 AM	44.6	51.5	49.30	
4:00 AM to 5:00 AM	45.8	52.6	50.41	
5:00 AM to 6:00 AM	46.2	53.4	51.15	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
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P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	TALABARKOTE PRIMARY SCHOOL (N8)	Date of Study :	22.12.2024 (Holiday)
Category :	Sensitive Zone	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	52.9	54.3	53.66	
7:00 AM to 8:00 AM	51.6	53.8	52.84	
8:00 AM to 9:00 AM	48.6	50.1	49.41	
9:00 AM to 10:00 AM	46.2	51.5	49.60	
10:00 AM to 11:00 AM	47.9	52.8	51.01	
11:00 AM to 12:00 PM	48.3	51.8	50.39	
12:00 PM to 1:00 PM	49.9	52.8	51.59	
1:00 PM to 2:00 PM	45.5	49.6	48.02	48.76
2:00 PM to 3:00 PM	43.7	46.1	45.06	
3:00 PM to 4:00 PM	40.2	44.6	42.98	
4:00 PM to 5:00 PM	39.4	41.8	40.56	
5:00 PM to 6:00 PM	40.7	43.2	42.13	
6:00 PM to 7:00 PM	40.2	42.8	41.69	
7:00 PM to 8:00 PM	41.5	43.9	42.86	
8:00 PM to 9:00 PM	42.6	44.5	43.65	
9:00 PM to 10:00 PM	41.2	43.9	42.76	

Date of Study :	22.12.2024 - 23.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	40.7	43.2	42.13	
11:00 PM to 12:00 AM	41.5	44.7	43.39	
12:00 AM to 1:00 AM	38.2	43.5	41.61	
1:00 AM to 2:00 AM	37.6	40.6	39.35	41.29
2:00 AM to 3:00 AM	35.3	39.1	37.60	
3:00 AM to 4:00 AM	36.4	42.1	40.12	
4:00 AM to 5:00 AM	37.8	43.5	41.52	
5:00 AM to 6:00 AM	38.2	44.1	42.08	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189 Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
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Calcutta – 13

Name of Sampling Station :	RAMCHANDRA VIDYAPITH (N9)	Date of Study :	29.12.2024 (Holiday)
Category :	Sensitive Zone	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	48.6	51.3	50.16	
7:00 AM to 8:00 AM	49.3	53.5	51.89	
8:00 AM to 9:00 AM	50.4	54.9	53.21	
9:00 AM to 10:00 AM	51.7	55.2	53.79	
10:00 AM to 11:00 AM	52.4	54.6	53.64	
11:00 AM to 12:00 PM	52.8	54.9	53.98	
12:00 PM to 1:00 PM	53.2	55.7	54.63	52.09
1:00 PM to 2:00 PM	52.4	55.9	54.49	
2:00 PM to 3:00 PM	51.3	53.4	52.48	
3:00 PM to 4:00 PM	50.6	52.8	51.84	
4:00 PM to 5:00 PM	49.9	51.6	50.83	
5:00 PM to 6:00 PM	48.6	51.2	50.09	
6:00 PM to 7:00 PM	48.4	51.0	49.89	
7:00 PM to 8:00 PM	45.2	50.6	48.69	
8:00 PM to 9:00 PM	44.9	49.6	47.86	
9:00 PM to 10:00 PM	43.6	48.2	46.48	

Date of Study :	29.12.2024 - 30.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	39.4	41.8	40.76	
11:00 PM to 12:00 AM	35.4	40.2	38.43	
12:00 AM to 1:00 AM	33.2	39.4	37.32	
1:00 AM to 2:00 AM	32.5	36.2	34.73	38.31
2:00 AM to 3:00 AM	33.1	36.9	35.40	
3:00 AM to 4:00 AM	34.5	37.2	36.06	
4:00 AM to 5:00 AM	35.8	41.5	39.52	
5:00 AM to 6:00 AM	36.2	42.3	40.24	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Regera High School (N10)	Date of Study :	29.12.2024 (Holiday)
Category :	Sensitive Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	40.0	45.6	43.65	
7:00 AM to 8:00 AM	41.6	48.3	46.13	
8:00 AM to 9:00 AM	42.8	51.6	49.13	
9:00 AM to 10:00 AM	45.7	54.6	52.12	
10:00 AM to 11:00 AM	49.4	56.3	54.10	
11:00 AM to 12:00 PM	48.1	55.3	53.05	
12:00 PM to 1:00 PM	51.2	58.3	56.06	53.90
1:00 PM to 2:00 PM	52.1	59.6	57.30	
2:00 PM to 3:00 PM	53.5	59.2	57.22	
3:00 PM to 4:00 PM	52.8	59.6	57.41	
4:00 PM to 5:00 PM	51.6	59.2	56.89	
5:00 PM to 6:00 PM	50.9	58.3	56.02	
6:00 PM to 7:00 PM	43.7	55.8	53.05	
7:00 PM to 8:00 PM	41.8	44.3	43.23	
8:00 PM to 9:00 PM	40.3	43.8	42.39	
9:00 PM to 10:00 PM	40.0	42.3	41.30	

Date of Study :	29.12.2024 - 30.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	38.5	40.3	39.49	
11:00 PM to 12:00 AM	37.5	40.0	38.93	
12:00 AM to 1:00 AM	36.5	39.9	38.52	
1:00 AM to 2:00 AM	38.6	42.8	41.19	41.11
2:00 AM to 3:00 AM	39.4	41.9	40.83	
3:00 AM to 4:00 AM	40.1	43.5	42.12	
4:00 AM to 5:00 AM	41.5	42.8	42.20	
5:00 AM to 6:00 AM	42.7	43.4	43.28	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
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P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	PROJECT SITE, Future Industrial Zone (N1)	Date of Study :	11.12.2024 (Any Day)
Category :	Industrial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	67.3	70.1	68.92	
7:00 AM to 8:00 AM	71.0	74.0	72.75	
8:00 AM to 9:00 AM	73.6	76.8	75.49	
9:00 AM to 10:00 AM	74.1	77.3	75.99	
10:00 AM to 11:00 AM	73.9	77.2	75.86	
11:00 AM to 12:00 PM	72.3	75.8	74.39	
12:00 PM to 1:00 PM	70.0	77.9	75.54	73.66
1:00 PM to 2:00 PM	71.2	74.5	73.16	
2:00 PM to 3:00 PM	70.4	74.3	72.77	
3:00 PM to 4:00 PM	74.2	76.7	75.63	
4:00 PM to 5:00 PM	71.3	75.4	73.82	
5:00 PM to 6:00 PM	72.3	77.2	75.41	
6:00 PM to 7:00 PM	68.2	75.9	73.57	
7:00 PM to 8:00 PM	64.6	69.1	67.41	
8:00 PM to 9:00 PM	62.8	65.9	64.62	
9:00 PM to 10:00 PM	60.5	62.6	61.68	

Date of Study :	11.12.2024 - 12.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	57.9	61.4	59.99	
11:00 PM to 12:00 AM	57.5	58.3	57.92	
12:00 AM to 1:00 AM	57.2	59.9	58.76	
1:00 AM to 2:00 AM	58.1	62.7	60.98	62.06
2:00 AM to 3:00 AM	57.9	63.5	61.55	
3:00 AM to 4:00 AM	56.8	64.6	62.26	
4:00 AM to 5:00 AM	62.5	65.3	64.12	
5:00 AM to 6:00 AM	63.8	66.7	65.49	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Textile Mill, Bhogora near Khuntuni (N2)	Date of Study :	19.12.2024 (Any Day)
Category :	Industrial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	63.8	72.5	70.04	
7:00 AM to 8:00 AM	64.1	73.8	71.23	
8:00 AM to 9:00 AM	65.8	74.1	71.69	
9:00 AM to 10:00 AM	66.4	75.8	73.26	
10:00 AM to 11:00 AM	67.2	75.5	73.09	
11:00 AM to 12:00 PM	68.2	74.6	72.49	
12:00 PM to 1:00 PM	68.5	75.7	73.45	
1:00 PM to 2:00 PM	69.1	74.9	72.90	71.74
2:00 PM to 3:00 PM	67.9	78.7	76.04	
3:00 PM to 4:00 PM	66.1	76.4	73.78	
4:00 PM to 5:00 PM	65.9	72.8	70.60	
5:00 PM to 6:00 PM	64.7	72.1	69.82	
6:00 PM to 7:00 PM	64.9	68.6	65.96	
7:00 PM to 8:00 PM	63.9	70.8	65.15	
8:00 PM to 9:00 PM	62.4	68.5	66.44	
9:00 PM to 10:00 PM	60.3	67.4	65.16	

Date of Study :	19.12.2024 - 20.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	61.4	64.8	63.42	
11:00 PM to 12:00 AM	60.2	64.5	62.86	
12:00 AM to 1:00 AM	60.5	69.9	67.36	
1:00 AM to 2:00 AM	59.9	64.3	62.63	65.10
2:00 AM to 3:00 AM	59.1	62.5	61.12	
3:00 AM to 4:00 AM	60.9	68.7	66.36	
4:00 AM to 5:00 AM	62.8	69.4	67.25	
5:00 AM to 6:00 AM	63.1	70.8	68.47	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
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Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Spinning Mill - Near Govindapur (N3)	Date of Study :	09.12.2024 (Any Day)
Category :	Industrial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	62.6	68.3	66.32	
7:00 AM to 8:00 AM	64.6	71.5	69.30	
8:00 AM to 9:00 AM	63.9	75.3	72.59	
9:00 AM to 10:00 AM	65.4	76.2	73.54	
10:00 AM to 11:00 AM	66.1	73.8	71.47	
11:00 AM to 12:00 PM	67.2	76.9	74.33	
12:00 PM to 1:00 PM	64.7	72.1	69.82	
1:00 PM to 2:00 PM	64.9	68.6	65.96	70.19
2:00 PM to 3:00 PM	63.9	70.8	65.15	
3:00 PM to 4:00 PM	65.1	73.5	71.08	
4:00 PM to 5:00 PM	68.9	76.7	74.36	
5:00 PM to 6:00 PM	65.9	69.7	67.78	
6:00 PM to 7:00 PM	62.3	68.4	66.34	
7:00 PM to 8:00 PM	61.9	64.5	63.39	
8:00 PM to 9:00 PM	60.2	63.5	62.16	
9:00 PM to 10:00 PM	60.0	62.8	61.62	

Date of Study :	09.12.2024 - 10.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	59.5	62.5	61.25	
11:00 PM to 12:00 AM	58.4	60.8	59.76	
12:00 AM to 1:00 AM	57.3	59.4	58.48	
1:00 AM to 2:00 AM	53.7	57.8	56.22	61.04
2:00 AM to 3:00 AM	52.4	56.8	55.13	
3:00 AM to 4:00 AM	60.4	62.9	61.83	
4:00 AM to 5:00 AM	61.6	64.8	63.49	
5:00 AM to 6:00 AM	62.9	65.3	64.26	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Badrapali (N4)	Date of Study :	09.12.2024 (Any Day)
Category :	Residential Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	40.2	50.1	47.51	
7:00 AM to 8:00 AM	41.9	51.5	48.94	
8:00 AM to 9:00 AM	42.8	51.6	49.13	
9:00 AM to 10:00 AM	45.7	54.6	52.12	
10:00 AM to 11:00 AM	49.4	56.3	54.10	
11:00 AM to 12:00 PM	48.1	55.3	53.05	
12:00 PM to 1:00 PM	51.2	58.3	56.06	
1:00 PM to 2:00 PM	52.1	59.6	57.30	54.02
2:00 PM to 3:00 PM	53.5	59.2	57.22	
3:00 PM to 4:00 PM	52.8	59.6	57.41	
4:00 PM to 5:00 PM	51.6	59.2	56.89	
5:00 PM to 6:00 PM	50.9	58.3	56.02	
6:00 PM to 7:00 PM	43.7	55.8	53.05	
7:00 PM to 8:00 PM	40.7	50.6	48.01	
8:00 PM to 9:00 PM	40.2	43.5	42.16	
9:00 PM to 10:00 PM	40.0	42.8	41.62	

Date of Study :	09.12.2024 - 10.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	38.2	41.9	40.43	
11:00 PM to 12:00 AM	37.5	40.2	39.06	
12:00 AM to 1:00 AM	36.5	39.9	38.52	
1:00 AM to 2:00 AM	38.6	42.8	41.19	42.60
2:00 AM to 3:00 AM	39.4	41.9	40.83	
3:00 AM to 4:00 AM	40.1	43.5	42.12	
4:00 AM to 5:00 AM	40.9	42.6	41.83	
5:00 AM to 6:00 AM	42.6	50.3	47.97	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy



Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	PATRABHAG (N5)	Date of Study :	09.12.2024(Any Day)
Category :	Residential Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	45.9	50.2	48.56	
7:00 AM to 8:00 AM	47.4	53.8	51.69	
8:00 AM to 9:00 AM	47.3	56.6	54.07	
9:00 AM to 10:00 AM	48.4	52.7	51.06	
10:00 AM to 11:00 AM	46.7	53.4	51.23	
11:00 AM to 12:00 PM	51.2	55.9	53.16	
12:00 PM to 1:00 PM	52.2	56.5	54.86	
1:00 PM to 2:00 PM	49.9	52.4	51.33	53.18
2:00 PM to 3:00 PM	50.7	53.9	52.59	
3:00 PM to 4:00 PM	51.7	55.8	53.22	
4:00 PM to 5:00 PM	57.8	59.4	58.67	
5:00 PM to 6:00 PM	56.5	58.2	57.43	
6:00 PM to 7:00 PM	40.6	48.3	45.97	
7:00 PM to 8:00 PM	49.9	51.6	50.83	
8:00 PM to 9:00 PM	44.2	50.4	48.32	
9:00 PM to 10:00 PM	43.1	46.8	45.33	

Date of Study :	09.12.2024 - 10.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	40.2	47.9	45.57	
11:00 PM to 12:00 AM	40.0	41.6	40.87	
12:00 AM to 1:00 AM	38.3	40.2	39.35	
1:00 AM to 2:00 AM	39.9	42.5	41.39	44.63
2:00 AM to 3:00 AM	41.6	45.9	44.26	
3:00 AM to 4:00 AM	41.2	45.3	43.72	
4:00 AM to 5:00 AM	41.6	45.8	44.19	
5:00 AM to 6:00 AM	45.9	51.2	49.31	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	TALABARKOTE (N6)	Date of Study :	27.12.2024 (Any Day)
Category :	Commercial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	60.2	62.5	61.50	
7:00 AM to 8:00 AM	61.5	64.2	63.06	
8:00 AM to 9:00 AM	62.8	65.9	64.62	
9:00 AM to 10:00 AM	62.2	65.8	64.36	
10:00 AM to 11:00 AM	61.3	64.8	63.39	
11:00 AM to 12:00 PM	62.4	64.9	63.83	
12:00 PM to 1:00 PM	63.2	65.7	64.63	
1:00 PM to 2:00 PM	64.9	66.8	65.95	63.70
2:00 PM to 3:00 PM	63.1	65.6	64.53	
3:00 PM to 4:00 PM	65.4	67.8	66.76	
4:00 PM to 5:00 PM	64.3	66.4	65.48	
5:00 PM to 6:00 PM	63.1	64.1	63.63	
6:00 PM to 7:00 PM	61.3	63.7	62.66	
7:00 PM to 8:00 PM	59.4	63.5	61.92	
8:00 PM to 9:00 PM	48.3	53.1	51.33	
9:00 PM to 10:00 PM	44.2	49.6	47.69	

Date of Study :	27.12.2024 - 28.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	42.8	48.3	46.37	
11:00 PM to 12:00 AM	41.4	46.7	44.81	
12:00 AM to 1:00 AM	39.9	43.8	42.27	
1:00 AM to 2:00 AM	38.6	42.5	40.97	51.56
2:00 AM to 3:00 AM	39.2	43.1	41.57	
3:00 AM to 4:00 AM	42.8	49.6	47.41	
4:00 AM to 5:00 AM	51.2	58.6	56.32	
5:00 AM to 6:00 AM	53.4	59.4	57.36	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	SAPTASAJYA - MARKET COMPLEX (N7)	Date of Study :	17.12.2024 (Any Day)
Category :	Commercial Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	55.1	60.2	58.36	
7:00 AM to 8:00 AM	56.3	61.4	59.56	
8:00 AM to 9:00 AM	56.9	62.3	60.39	
9:00 AM to 10:00 AM	55.4	63.7	61.29	
10:00 AM to 11:00 AM	58.1	64.6	62.47	
11:00 AM to 12:00 PM	59.3	65.2	63.18	
12:00 PM to 1:00 PM	62.5	67.4	65.61	63.17
1:00 PM to 2:00 PM	63.4	68.2	66.43	
2:00 PM to 3:00 PM	64.9	69.4	67.71	
3:00 PM to 4:00 PM	62.5	66.3	64.80	
4:00 PM to 5:00 PM	62.0	64.2	63.24	
5:00 PM to 6:00 PM	61.7	63.8	62.88	
6:00 PM to 7:00 PM	60.8	62.4	61.67	
7:00 PM to 8:00 PM	59.6	61.3	60.53	
8:00 PM to 9:00 PM	58.4	60.4	59.51	
9:00 PM to 10:00 PM	57.5	60.2	59.06	

Date of Study :	17.12.2024 - 18.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	53.8	59.2	57.29	
11:00 PM to 12:00 AM	52.6	58.4	56.40	
12:00 AM to 1:00 AM	51.3	57.6	55.50	
1:00 AM to 2:00 AM	49.6	53.1	51.69	55.35
2:00 AM to 3:00 AM	49.9	52.8	51.59	
3:00 AM to 4:00 AM	51.3	54.2	52.99	
4:00 AM to 5:00 AM	52.8	55.6	54.42	
5:00 AM to 6:00 AM	53.9	60.2	58.10	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	TALABARKOTE PRIMARY SCHOOL (N8)	Date of Study :	17.12.2024 (Any Day)
Category :	Sensitive Zone	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	44.1	51.6	49.30	
7:00 AM to 8:00 AM	46.7	55.9	53.38	
8:00 AM to 9:00 AM	47.3	56.6	54.07	
9:00 AM to 10:00 AM	48.4	52.7	51.06	
10:00 AM to 11:00 AM	46.7	53.4	51.23	
11:00 AM to 12:00 PM	51.2	55.9	53.16	
12:00 PM to 1:00 PM	52.2	56.5	54.86	
1:00 PM to 2:00 PM	49.9	52.4	51.33	53.29
2:00 PM to 3:00 PM	50.7	53.9	52.59	
3:00 PM to 4:00 PM	51.7	55.8	53.22	
4:00 PM to 5:00 PM	57.8	59.4	58.67	
5:00 PM to 6:00 PM	56.5	58.2	57.43	
6:00 PM to 7:00 PM	40.6	48.3	45.97	
7:00 PM to 8:00 PM	49.9	51.6	50.83	
8:00 PM to 9:00 PM	45.6	49.9	48.26	
9:00 PM to 10:00 PM	43.2	47.6	45.93	

Date of Study :	17.12.2024 - 18.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	41.6	46.2	44.48	
11:00 PM to 12:00 AM	40.9	44.6	43.13	
12:00 AM to 1:00 AM	40.0	43.4	42.02	
1:00 AM to 2:00 AM	39.9	42.5	41.39	45.53
2:00 AM to 3:00 AM	41.6	45.9	44.26	
3:00 AM to 4:00 AM	43.8	47.5	46.03	
4:00 AM to 5:00 AM	40.2	46.9	43.78	
5:00 AM to 6:00 AM	43.8	51.6	45.31	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189 Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date :

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	RAMCHANDRA VIDYAPITH (N9)	Date of Study :	04.12.2024 (Any Day)
Category :	Sensitive Zone	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	45.3	51.4	49.34	
7:00 AM to 8:00 AM	46.7	52.9	50.82	
8:00 AM to 9:00 AM	47.3	53.9	51.75	
9:00 AM to 10:00 AM	48.4	52.7	51.06	
10:00 AM to 11:00 AM	46.7	53.4	51.23	
11:00 AM to 12:00 PM	51.2	55.9	53.16	
12:00 PM to 1:00 PM	52.2	56.5	54.86	
1:00 PM to 2:00 PM	49.9	52.4	51.33	52.78
2:00 PM to 3:00 PM	50.7	53.9	52.59	
3:00 PM to 4:00 PM	51.7	55.8	53.22	
4:00 PM to 5:00 PM	50.8	54.6	52.10	
5:00 PM to 6:00 PM	52.6	55.3	54.16	
6:00 PM to 7:00 PM	53.9	55.6	54.83	
7:00 PM to 8:00 PM	50.2	56.1	54.08	
8:00 PM to 9:00 PM	50.0	55.3	53.41	
9:00 PM to 10:00 PM	51.4	53.2	52.39	

Date of Study :	04.12.2024 - 05.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	41.6	46.2	44.48	
11:00 PM to 12:00 AM	40.9	44.6	43.13	
12:00 AM to 1:00 AM	40.0	43.4	42.02	
1:00 AM to 2:00 AM	39.9	42.5	41.39	43.53
2:00 AM to 3:00 AM	41.6	45.9	44.26	
3:00 AM to 4:00 AM	43.8	47.5	46.03	
4:00 AM to 5:00 AM	40.2	46.9	43.78	
5:00 AM to 6:00 AM	43.8	51.6	45.31	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy

ENVIROCHECK Kolkata 700 028 189, Rashtraguru Avenue

Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

REPORT ON NOISE LEVEL SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

ASSIGNED BY :
M.N.DASTUR & COMPANY (P) LTD.
Consulting Engineers
P - 17, Mission Row Extension,
Calcutta – 13

Name of Sampling Station :	Regera High School (N10)	Date of Study :	11.12.2024 (Any Day)
Category :	Sensitive Area	Day time :	6 AM to 10 PM

Time (hrs.)	L_{min}	L_{max}	L_{eq}	Day time L_{eq}
6:00 AM to 7:00 AM	48.9	51.5	50.39	
7:00 AM to 8:00 AM	48.2	52.8	51.08	
8:00 AM to 9:00 AM	49.4	55.1	53.12	
9:00 AM to 10:00 AM	48.3	51.6	50.26	
10:00 AM to 11:00 AM	50.6	53.7	52.42	
11:00 AM to 12:00 PM	53.8	55.9	54.98	
12:00 PM to 1:00 PM	52.3	54.7	53.66	
1:00 PM to 2:00 PM	51.6	54.8	53.49	52.38
2:00 PM to 3:00 PM	53.8	55.1	54.50	
3:00 PM to 4:00 PM	52.9	54.3	53.66	
4:00 PM to 5:00 PM	51.6	53.8	52.84	
5:00 PM to 6:00 PM	48.6	50.1	49.41	
6:00 PM to 7:00 PM	49.9	50.2	50.05	
7:00 PM to 8:00 PM	47.9	52.8	51.01	
8:00 PM to 9:00 PM	48.3	51.8	50.39	
9:00 PM to 10:00 PM	49.9	52.8	51.59	

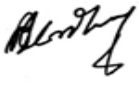
Date of Study :	11.12.2024 - 12.12.2024	Night time :	10 PM to 6 AM

Time(hrs.)	L_{min}	L_{max}	L_{eq}	Night time L_{eq}
10:00 PM to 11:00 PM	44.6	46.5	45.65	
11:00 PM to 12:00 AM	43.7	46.1	45.06	
12:00 AM to 1:00 AM	42.5	47.6	45.76	
1:00 AM to 2:00 AM	41.8	45.8	44.25	44.18
2:00 AM to 3:00 AM	40.7	43.2	42.13	
3:00 AM to 4:00 AM	40.2	42.8	41.69	
4:00 AM to 5:00 AM	43.5	44.6	44.08	
5:00 AM to 6:00 AM	44.1	48.2	46.62	

L_{min} : Minimum Noise level L_{max} :Maximum Noise level L_{eq} :Equivalent sound energy







Compiled by : (Signature)
Dr. Ajoy Paul

Envirocheck Seal
Date : 07.01.2025

Certified by : (Signature)
Dr. S. B. Chowdhury

TRAFFIC SURVEY REPORT

TRAFFIC SURVEY REPORT

TRAFFIC DENSITY SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

SURVEY SITE (T1) : TALABAR kote To Gajamara Road (Normal Day) DATE : 19.12.2024 to 20.12.2024

Time	Car & Jeep	Bus	Truck	Two Wheeler	Total
8:00 – 9:00 A.M	80	20	102	123	325
9:00 – 10:00 A.M	130	30	144	178	482
10:00 – 11:00 A.M	165	35	214	214	628
11:00 – 12:00 P.M	245	38	235	265	783
12:00 – 1:00 P.M	364	32	287	278	961
1:00 – 2:00 P.M	387	22	315	378	1102
2:00 – 3:00 P.M	312	18	354	234	918
3:00 – 4:00 P.M	368	27	389	136	920
4:00 – 5:00 P.M	298	20	265	89	672
5:00 – 6:00 P.M	168	18	123	154	463
6:00 – 7:00 P.M	136	12	89	245	482
7:00 – 8:00 P.M	102	15	124	123	364
8:00 – 9:00 P.M	65	10	156	89	320
9:00 – 10:00 P.M	45	6	278	45	374
10:00 - 11:00 PM	45	6	312	12	375
11:00 – 12:00 A.M	32	0	354	8	394
12:00 – 1:00 A.M	12	2	265	2	281
1:00 – 2:00 A.M	10	0	102	0	112
2:00 – 3:00 A.M	8	0	72	0	80
3:00 – 4:00 A.M	0	3	65	5	73
4:00 – 5:00 A.M	12	5	41	15	73
5:00 – 6:00 A.M	36	12	56	45	149
6:00 – 7:00 A.M	57	16	75	74	222
7:00 – 8:00 A.M	66	18	82	92	258

Compiled by : (Signature)

Name : DR. AJOY PAUL
Date of Issue : 15.01.2025
Place : Calcutta

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

Seal :

TRAFFIC DENSITY SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

SURVEY SITE (T1) : TALABAR kote To Gajamara Road (Holiday) DATE : 15.12.2024 to 16.12.2024

Time	Car & Jeep	Bus	Truck	Two Wheeler	Total
8:00 – 9:00 A.M	65	18	82	80	245
9:00 – 10:00 A.M	89	20	135	112	356
10:00 – 11:00 A.M	102	26	167	156	451
11:00 – 12:00 P.M	123	28	195	189	535
12:00 – 1:00 P.M	168	32	235	214	649
1:00 – 2:00 P.M	245	28	158	265	696
2:00 – 3:00 P.M	287	22	123	274	706
3:00 – 4:00 P.M	168	18	89	312	587
4:00 – 5:00 P.M	112	15	68	354	549
5:00 – 6:00 P.M	89	22	45	275	431
6:00 – 7:00 P.M	165	26	72	231	494
7:00 – 8:00 P.M	189	15	156	200	560
8:00 – 9:00 P.M	125	10	187	154	476
9:00 – 10:00 P.M	102	7	236	102	447
10:00 - 11:00 PM	89	6	387	89	571
11:00 – 12:00 A.M	75	4	312	45	436
12:00 – 1:00 A.M	56	0	356	12	424
1:00 – 2:00 A.M	45	0	245	8	298
2:00 – 3:00 A.M	5	0	123	6	134
3:00 – 4:00 A.M	6	2	67	2	77
4:00 – 5:00 A.M	12	5	34	12	63
5:00 – 6:00 A.M	25	10	12	25	72
6:00 – 7:00 A.M	67	12	45	55	179
7:00 – 8:00 A.M	88	15	68	70	241

Compiled by : (Signature)

Name : DR. AJOY PAUL
Date of Issue : 15.01.2025
Place : Calcutta

ENVIROCHECK Kolkata 700 028 189, Rastraguru Avenue

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

Seal :

TRAFFIC DENSITY SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

SURVEY SITE : (T2) Sapta Sajya Road (Normal Day) DATE : 16.12.2024 to 17.12.2024

Time	Car & Jeep	Bus	Truck	Two Wheeler	Total
8:00 – 9:00 A.M	78	22	89	85	274
9:00 – 10:00 A.M	102	18	132	123	375
10:00 – 11:00 A.M	136	15	168	142	461
11:00 – 12:00 P.M	165	12	123	174	474
12:00 – 1:00 P.M	178	18	102	187	485
1:00 – 2:00 P.M	213	23	89	231	556
2:00 – 3:00 P.M	254	19	45	265	583
3:00 – 4:00 P.M	289	15	72	312	688
4:00 – 5:00 P.M	312	12	123	274	721
5:00 – 6:00 P.M	255	22	165	214	656
6:00 – 7:00 P.M	156	18	189	135	498
7:00 – 8:00 P.M	112	12	241	89	454
8:00 – 9:00 P.M	89	12	275	45	421
9:00 – 10:00 P.M	65	8	298	75	446
10:00 - 11:00 PM	42	6	312	42	402
11:00 – 12:00 A.M	28	6	345	36	415
12:00 – 1:00 A.M	12	0	246	12	270
1:00 – 2:00 A.M	12	0	201	8	221
2:00 – 3:00 A.M	6	0	135	4	145
3:00 – 4:00 A.M	6	5	112	2	125
4:00 – 5:00 A.M	12	8	65	10	95
5:00 – 6:00 A.M	15	10	45	23	93
6:00 – 7:00 A.M	36	15	44	34	129
7:00 – 8:00 A.M	65	16	65	55	201

Compiled by : (Signature)

Name : DR. AJOY PAUL
Date of Issue : 15.01.2025
Place : Calcutta

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

Seal :

TRAFFIC DENSITY SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

SURVEY SITE : (T2) Sapta Sajya Road (Holiday) DATE : 25.12.2024 to 26.12.2024

Time	Car & Jeep	Bus	Truck	Two Wheeler	Total
8:00 – 9:00 A.M	65	18	65	82	230
9:00 – 10:00 A.M	89	22	92	112	315
10:00 – 11:00 A.M	102	24	112	142	380
11:00 – 12:00 P.M	125	28	136	169	458
12:00 – 1:00 P.M	145	32	149	192	518
1:00 – 2:00 P.M	178	22	195	215	610
2:00 – 3:00 P.M	192	18	224	246	680
3:00 – 4:00 P.M	215	24	132	276	647
4:00 – 5:00 P.M	246	22	102	289	659
5:00 – 6:00 P.M	182	18	135	339	674
6:00 – 7:00 P.M	142	15	165	242	564
7:00 – 8:00 P.M	102	10	187	212	511
8:00 – 9:00 P.M	82	8	245	182	517
9:00 – 10:00 P.M	65	8	287	132	492
10:00 - 11:00 PM	32	12	323	89	456
11:00 – 12:00 A.M	45	18	285	42	390
12:00 – 1:00 A.M	28	12	254	32	326
1:00 – 2:00 A.M	22	6	232	22	282
2:00 – 3:00 A.M	12	0	165	8	185
3:00 – 4:00 A.M	8	0	132	2	142
4:00 – 5:00 A.M	6	0	89	4	99
5:00 – 6:00 A.M	18	8	45	12	83
6:00 – 7:00 A.M	23	10	22	32	87
7:00 – 8:00 A.M	46	12	46	42	146

Compiled by : (Signature)

Name : DR. AJOY PAUL
Date of Issue : 15.01.2025
Place : Calcutta

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

Seal :

TRAFFIC DENSITY SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

SURVEY SITE : (T3) Gobindpur To Dorada Road (Normal Day) DATE : 23.12.2024 to 24.12.2024

Time	Car & Jeep	Bus	Truck	Two Wheeler	Total
8:00 – 9:00 A.M	65	8	74	102	249
9:00 – 10:00 A.M	45	12	102	133	292
10:00 – 11:00 A.M	89	15	65	89	258
11:00 – 12:00 P.M	105	18	95	131	349
12:00 – 1:00 P.M	146	21	132	145	444
1:00 – 2:00 P.M	179	24	145	167	515
2:00 – 3:00 P.M	225	18	187	121	551
3:00 – 4:00 P.M	252	22	205	154	633
4:00 – 5:00 P.M	282	15	232	175	704
5:00 – 6:00 P.M	242	25	254	144	665
6:00 – 7:00 P.M	183	18	274	121	596
7:00 – 8:00 P.M	249	12	189	102	552
8:00 – 9:00 P.M	142	10	145	89	386
9:00 – 10:00 P.M	126	8	121	44	299
10:00 - 11:00 PM	84	18	85	23	210
11:00 – 12:00 A.M	72	12	45	18	147
12:00 – 1:00 A.M	55	8	32	12	107
1:00 – 2:00 A.M	89	6	12	8	115
2:00 – 3:00 A.M	55	2	18	4	79
3:00 – 4:00 A.M	32	0	10	2	44
4:00 – 5:00 A.M	18	0	8	0	26
5:00 – 6:00 A.M	12	6	12	12	42
6:00 – 7:00 A.M	32	8	34	45	119
7:00 – 8:00 A.M	42	12	45	74	173

Compiled by : (Signature)

Name : DR. AJOY PAUL
Date of Issue : 15.01.2025
Place : Calcutta

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

Seal :

TRAFFIC DENSITY SURVEY
KSL - DHENKANAL, ODISHA

MONITORED BY :
ENVIROCHECK
189, Rastraguru Avenue,
Calcutta - 700 028

CONSULTING ENGINEERS :
M. N. DASTUR & COMPANY PVT. LTD.
Consulting Engineers
P - 17, Mission Row Extension, Kol - 13

SURVEY SITE : (T3) Gobindpur To Dorada Road (Holiday) DATE : 29.12.2024 - 30.12.2024

Time	Car & Jeep	Bus	Truck	Two Wheeler	Total
8:00 – 9:00 A.M	65	8	62	74	209
9:00 – 10:00 A.M	87	10	78	89	264
10:00 – 11:00 A.M	112	18	65	102	297
11:00 – 12:00 P.M	135	12	105	135	387
12:00 – 1:00 P.M	154	15	121	92	382
1:00 – 2:00 P.M	172	10	132	74	388
2:00 – 3:00 P.M	189	8	165	136	498
3:00 – 4:00 P.M	132	15	185	154	486
4:00 – 5:00 P.M	89	18	202	182	491
5:00 – 6:00 P.M	72	6	154	152	384
6:00 – 7:00 P.M	125	4	122	102	353
7:00 – 8:00 P.M	136	12	165	85	398
8:00 – 9:00 P.M	164	10	187	53	414
9:00 – 10:00 P.M	136	6	121	32	295
10:00 - 11:00 PM	101	4	90	18	213
11:00 – 12:00 A.M	72	2	55	10	139
12:00 – 1:00 A.M	62	0	28	8	98
1:00 – 2:00 A.M	32	0	10	6	48
2:00 – 3:00 A.M	18	0	20	0	38
3:00 – 4:00 A.M	8	0	8	0	16
4:00 – 5:00 A.M	6	4	6	0	16
5:00 – 6:00 A.M	23	6	15	12	56
6:00 – 7:00 A.M	31	10	36	45	122
7:00 – 8:00 A.M	46	12	41	74	173

Compiled by : (Signature)

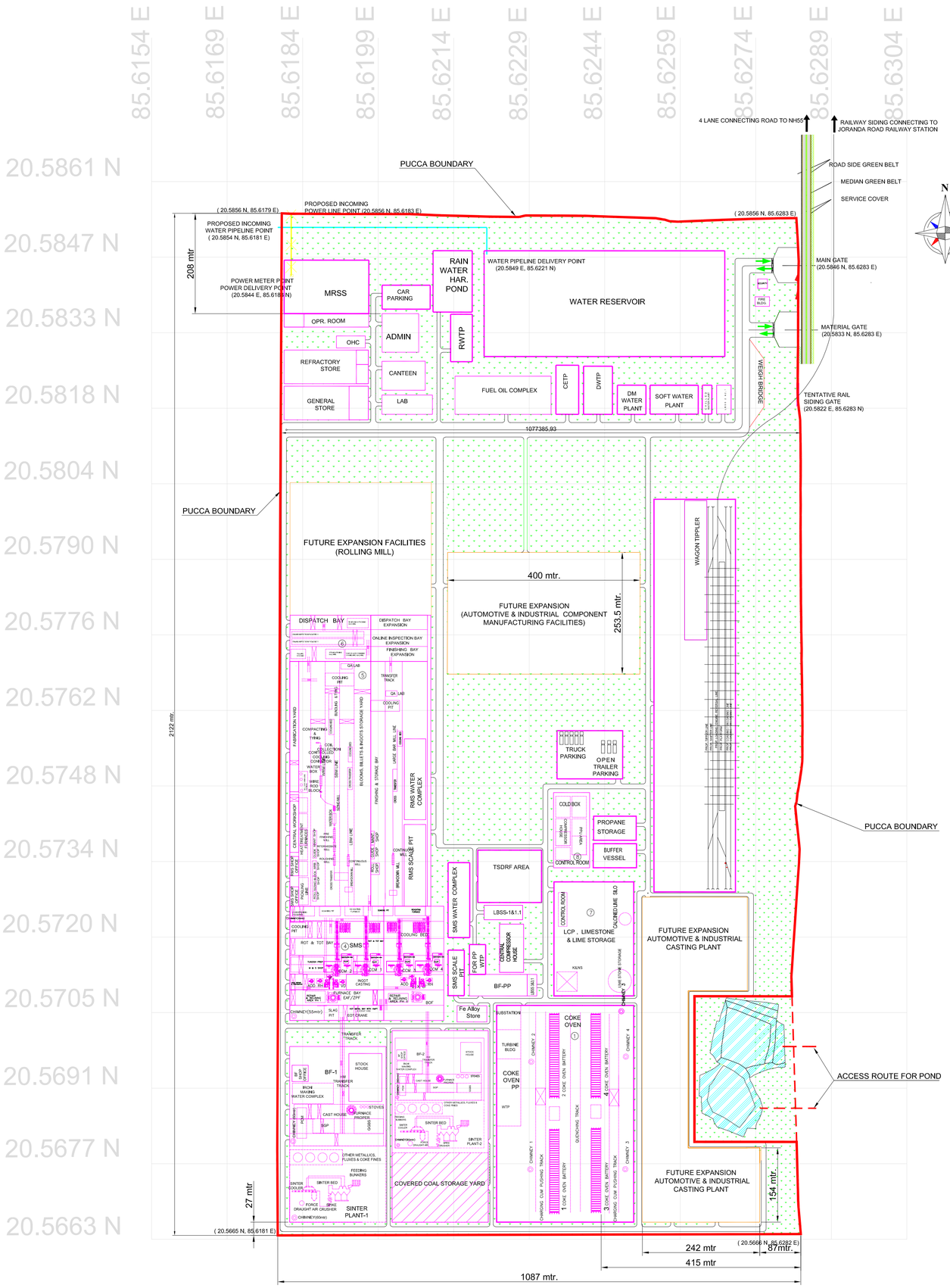
Name : DR. AJOY PAUL
Date of Issue : 15.01.2025
Place : Calcutta

Certified by : (Signature)

Name : DR. S.B.CHOWDHURY

Seal :

DRAWINGS



LEGENDS :-

- : INTERNAL SINGLE ROAD
- : INTERNAL DOUBLE ROAD
- : PROPOSED FACILITIES
- : PLANT BOUNDARY
- : RAILWAY LINE
- : ELECTRICITY LINE
- : WATER PIPELINE
- :GREENBELT
- : POND (OPEN ACCESS)

1. COKE OVEN
2. SINTER PLANT
3. BLAST FURNACE
4. STEEL MELT SHOP
5. ROLLING MILLS
6. FINISHING AREA
7. LCP
8. ASU PLANT

AREA STATEMENT

SL.NO.	CATEGORY	AREA (IN Ha)
1	PLANT UNIT AREA	98.806
2	PARKING SPACE	1.373
3	ROAD & RAILWAY ROUTE	12.7
4	TSDRF AREA	1.38
5	GREENBELT INSIDE PHYSICAL BOUNDARY	72.105
6	VACANT AREA FOR FUTURE USE	32.141
A	**TOTAL AREA WITHIN PHYSICAL BOUNDARY**	**218.505**
7	GREENBELT OUTSIDE PHYSICAL BOUNDARY	2.842
8	NATURAL POND OUTSIDE PHYSICAL BOUNDARY FOR ACCESS BY VILLAGERS	3.39
B	**TOTAL AREA OUTSIDE PHYSICAL BOUNDARY**	**6.232**
	GRAND TOTAL (A+B)	**224.737**

DASTUR

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS, KOLKATA

FOR :

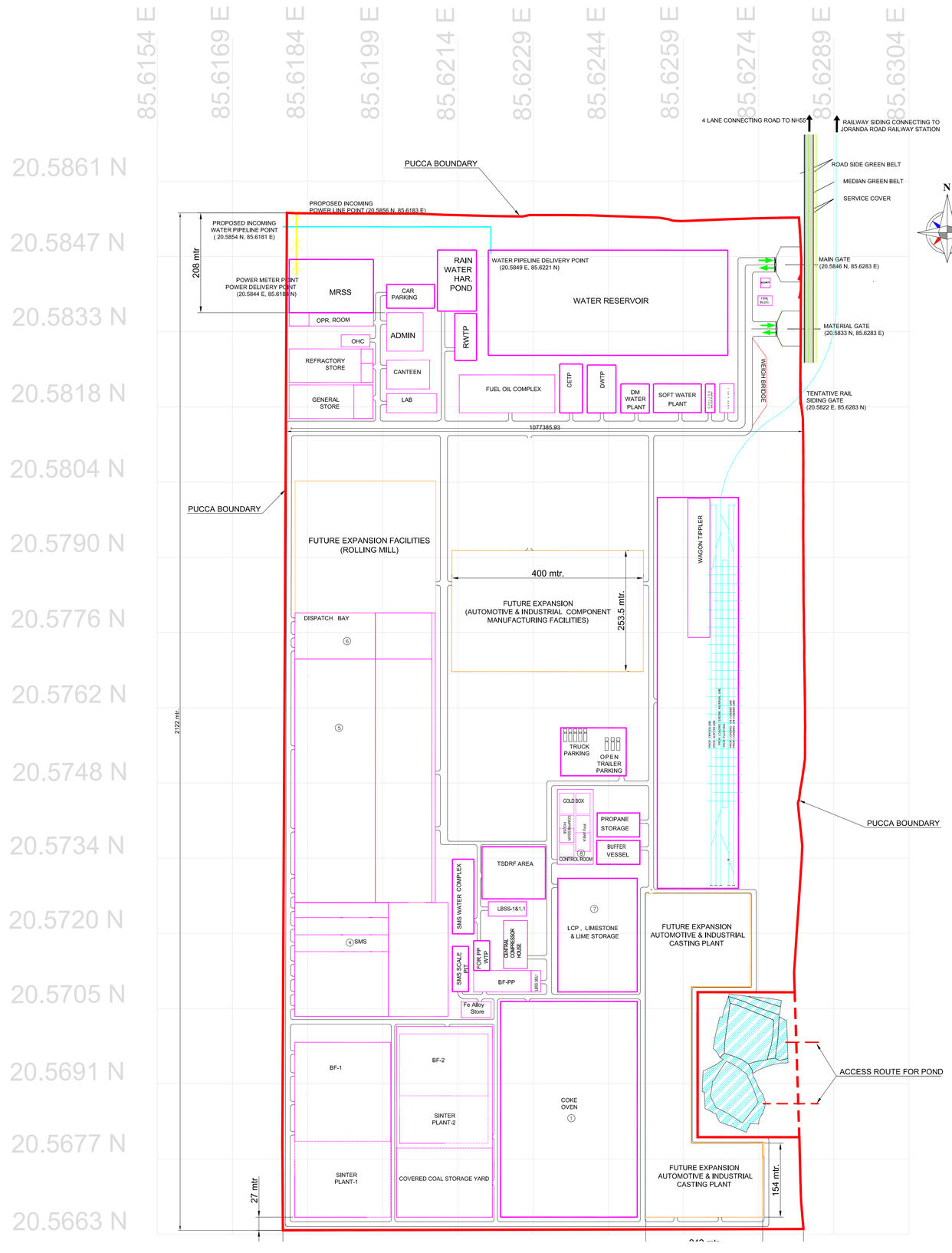
KALYANI STEELS LIMITED

SETTING UP OF GREENFIELD 1.43 MTPA
INTEGRATED ADVANCED SPECIALTY STEEL PLANT
AT GAJAMARA, DIST. DHENKANAL, ODISHA

Plant General Layout

DRAWN	SUS	09.07.2024	DRG. No.	REV.
APPROVED	SM	24.09.2024	11748-97A-000-ENV-0001	0

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LEGENDS :-

- : INTERNAL SINGLE ROAD
- : INTERNAL DOUBLE ROAD
- : PROPOSED FACILITIES
- : PLANT BOUNDARY
- : RAILWAY LINE
- : ELECTRICITY LINE
- : WATER PIPELINE
- : POND (OPEN ACCESS)

1. COKE OVEN
2. SINTER PLANT
3. BLAST FURNACE
4. STEEL MELT SHOP
5. ROLLING MILLS
6. FINISHING AREA
7. LCP
8. ASU PLANT

DASTUR

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS, KOLKATA

FOR :

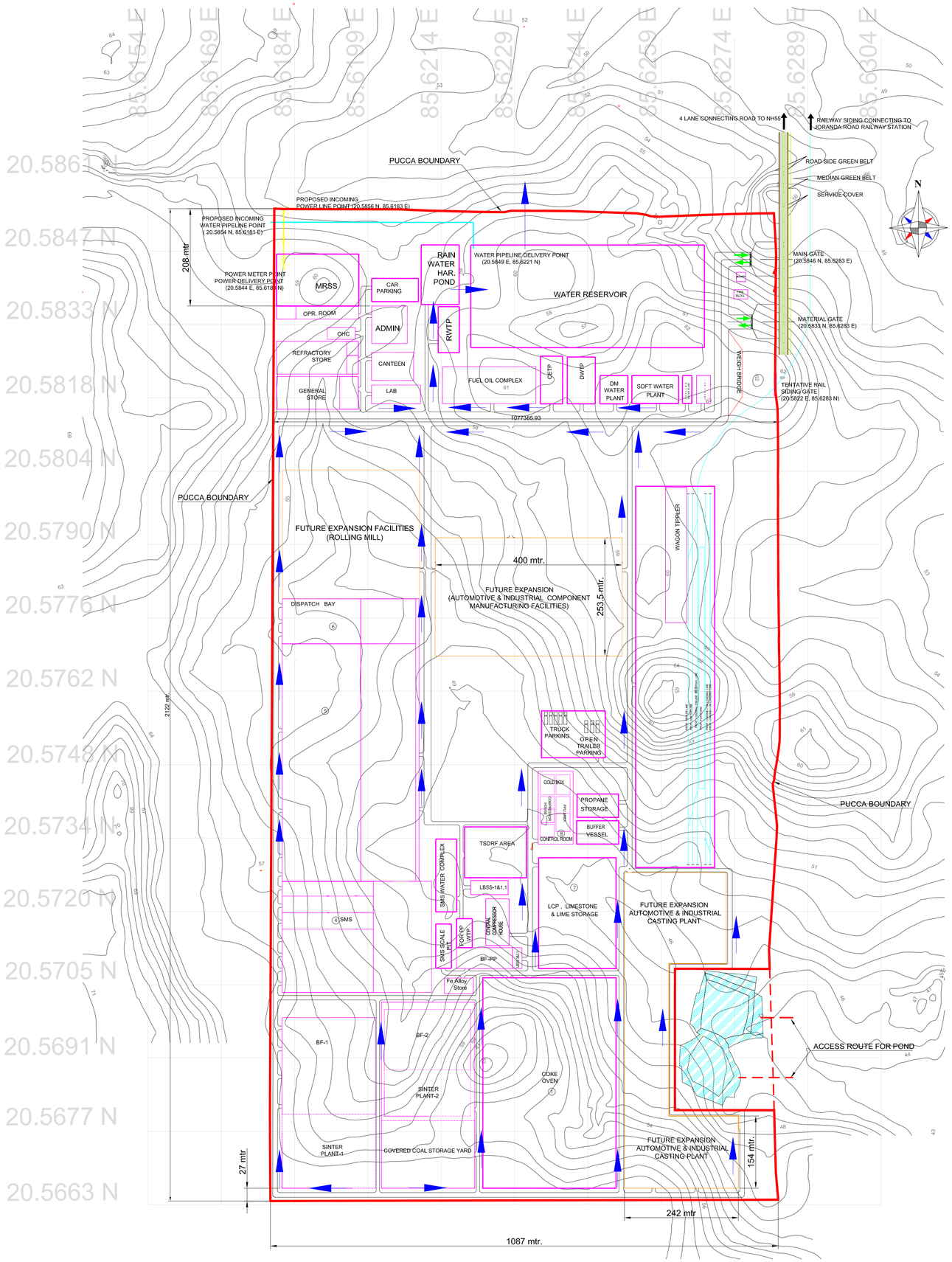
KALYANI STEELS LIMITED

SETTING UP OF GREENFIELD 1.43 MTPA
INTEGRATED ADVANCED SPECIALTY STEEL PLANT
AT GAJAMARA, DIST. DHENKANAL, ODISHA

Road Layout

DRAWN	SUS	09.07.2024	DRG. No.	REV.
APPROVED	SM	09.07.2024	11748-97A-000-ENV-0002	0

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LEGENDS :-

- : INTERNAL SINGLE ROAD
- : INTERNAL DOUBLE ROAD
- : PROPOSED FACILITIES
- : PLANT BOUNDARY
- : RAILWAY LINE
- : ELECTRICITY LINE
- : WATER PIPELINE
- : STORM WATER DRAINAGE
- : POND (OPEN ACCESS)
- : CONTOUR LINE

1. COKE OVEN
2. SINTER PLANT
3. BLAST FURNACE
4. STEEL MELT SHOP
5. ROLLING MILLS
6. FINISHING AREA
7. LCP
8. ASU PLANT

DASTUR

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS, KOLKATA

FOR :

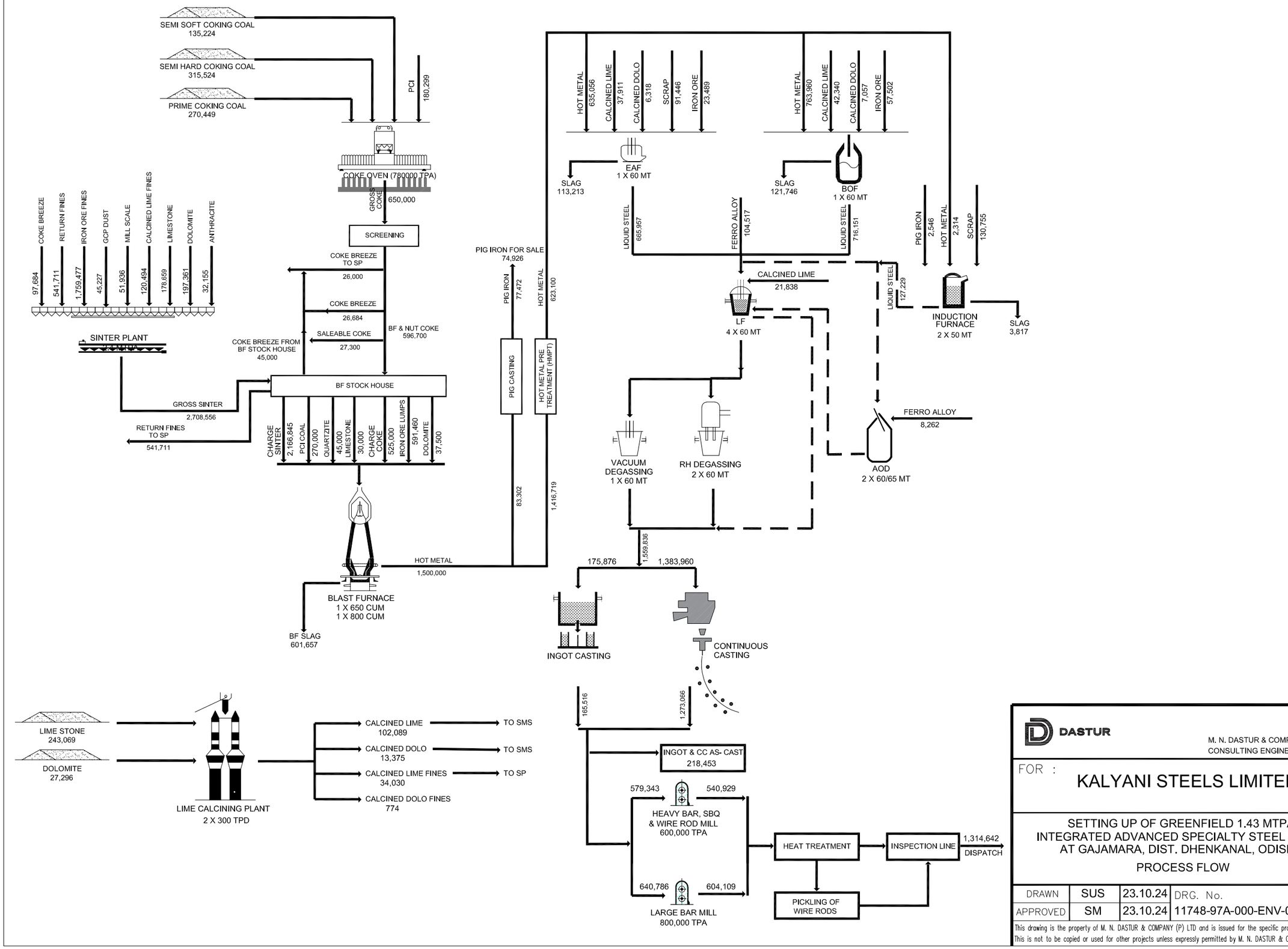
KALYANI STEELS LIMITED

SETTING UP OF GREENFIELD 1.43 MTPA
INTEGRATED ADVANCED SPECIALTY STEEL PLANT
AT GAJAMARA, DIST. DHENKANAL, ODISHA

Drain Layout

DRAWN	SUS	09.07.2024	DRG. No.	REV.
APPROVED	SM	09.07.2024	11748-97A-000-ENV-0003	0

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M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS, KOLKATA

FOR :

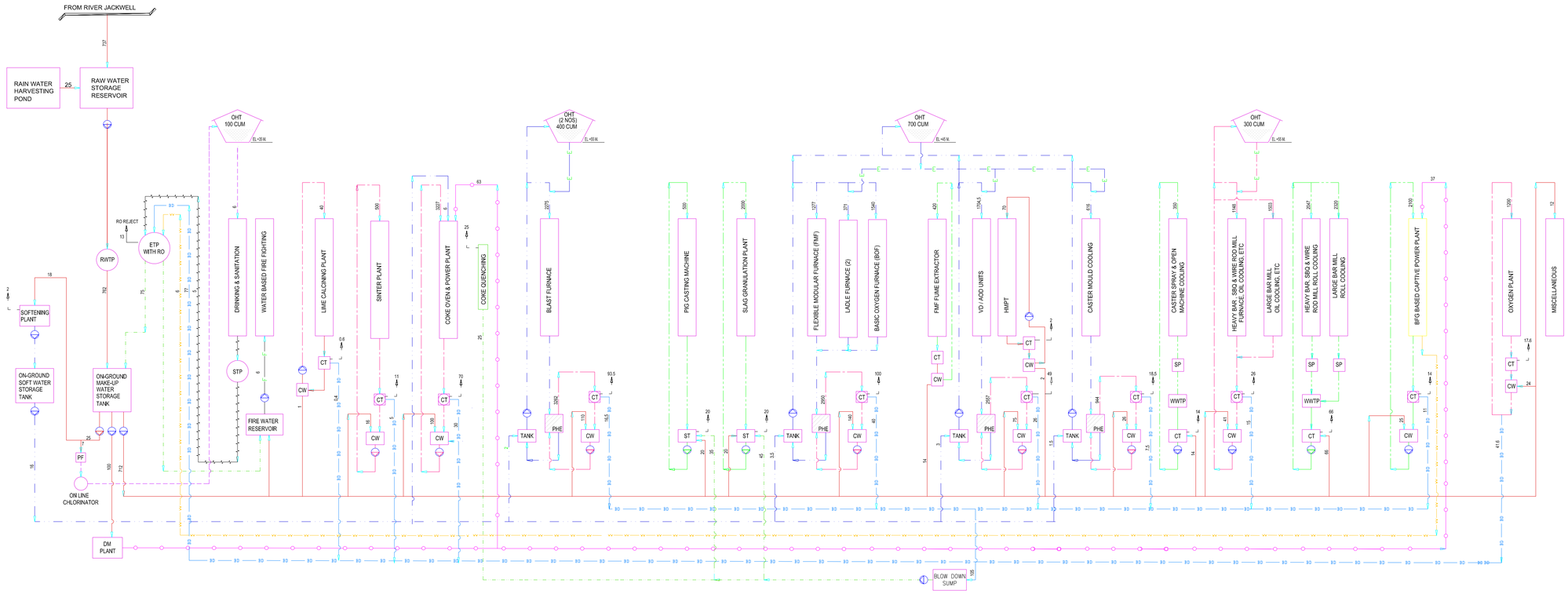
KALYANI STEELS LIMITED

SETTING UP OF GREENFIELD 1.43 MTPA
INTEGRATED ADVANCED SPECIALTY STEEL PLANT
AT GAJAMARA, DIST. DHENKANAL, ODISHA

PROCESS FLOW

DRAWN	SUS	23.10.24	DRG. No.	REV.
APPROVED	SM	23.10.24	11748-97A-000-ENV-0004	0

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LEGENDS :

RWTP - RAW WATER TREATMENT PLANT
OHT - OVER HEAD TANK
GCP - GAS CLEANING PLANT
ETP - EFFLUENT TREATMENT PLANT
STP - SEWAGE TREATMENT PLANT
DM - DEMINERALISED
ST - SETTLING TANK
CT - COOLING TOWER
CW - COLD WELL
PF - PRESSURE FILTER
SP - SCALE PIT
PHE - PLATE HEAT EXCHANGER
WWTP - WASTE WATER TREATMENT PLANT
TRT - TOP RECOVERY TURBINE
BFG - BLAST FURNACE GAS

- MAKE-UP WATER
- DM WATER
- SOFT WATER
- INDIRECT COOLING WATER
- DIRECT COOLING WATER
- DRINKING WATER
- WASTE EFFLUENT LINE
- BLOW DOWN WATER
- TREATED SEWAGE
- TREATED WASTE WATER
- FIRE WATER
- EMERGENCY WATER
- PUMP

NOTES :

1. ALL FIGURES AS MENTIONED ARE IN Cu.M./HR. UNLESS OTHERWISE SPECIFIED.
2. TOTAL MAKE-UP WATER REQUIREMENT IS 762 Cu.M./HR.
3. THE FLOW SHEET HAS BEEN PREPARED BASED ON ZERO DISCHARGE CONCEPT.
4. ETP COMPRISING SECONDARY AND TERTIARY TREATMENT UNITS (UF & RO SYSTEM)

DASTUR

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS, KOLKATA

FOR :

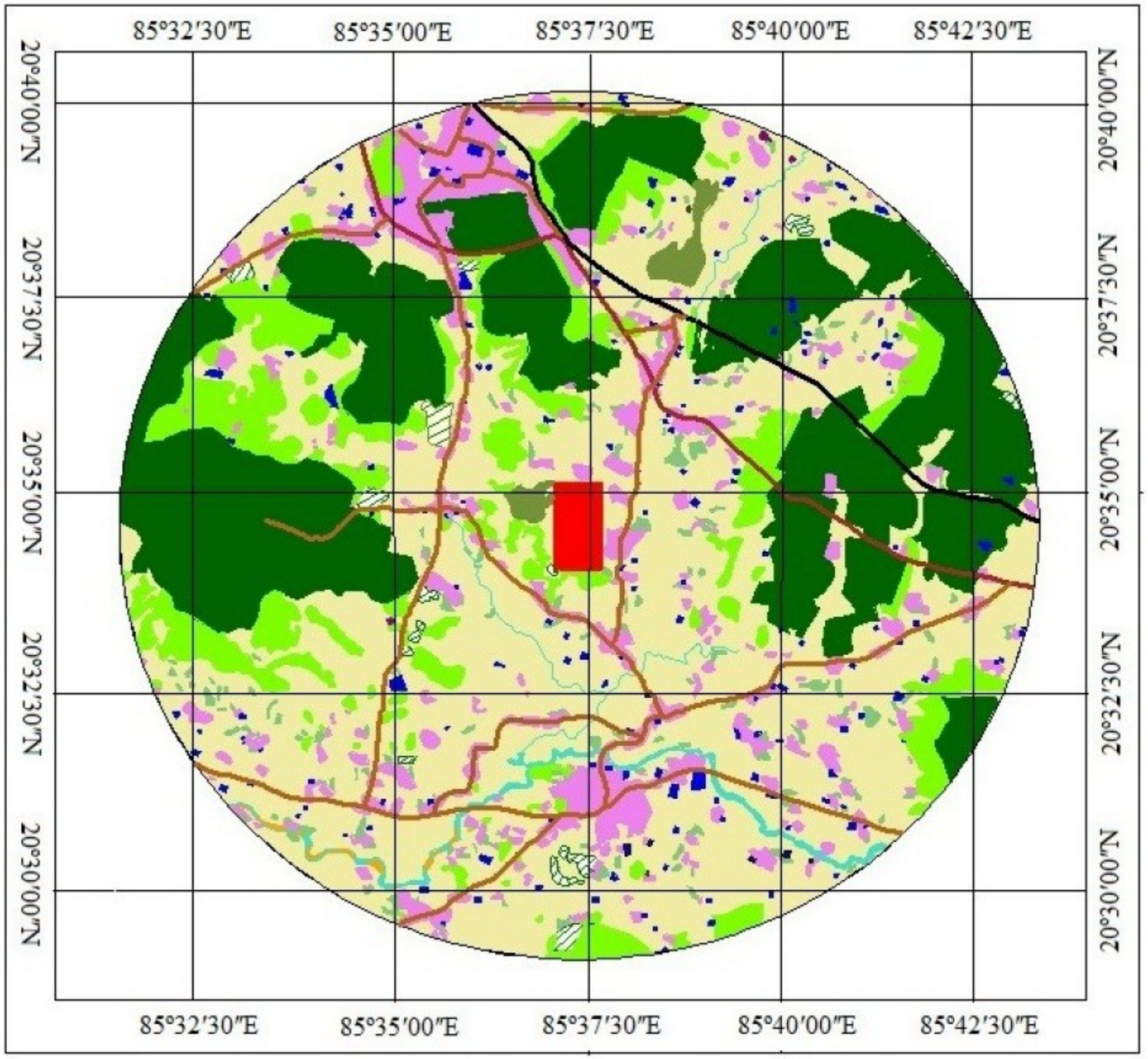
KALYANI STEELS LIMITED

SETTING UP OF GREENFIELD 1.43 MTPA
INTEGRATED ADVANCED SPECIALTY STEEL PLANT
AT GAJAMARA, DIST. DHENKANAL, ODISHA

Water Balance Diagram

DRAWN	SUS	10.07.2024	DRG. No.	REV.
APPROVED	SM	10.07.2024	11748-97A-000-ENV-0005	0

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10 KM

N

LEGEND

- Project Site
- Reserve Forest
- Open Scrub
- Mixed Jungle
- Other Vegetation Cover
- Plantation
- Agricultural Land
- Settlement
- Stone Quarry
- River
- River Sand
- Waterbody
- Railway
- National Highway
- Other Major Roads

DATA SOURCE:

SOI OSM- F45T10 & F45T11

SATELLITE: RESOURCESAT 2; SENSOR- LISS-IV

DASTUR

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS, KOLKATA

FOR :

KALYANI STEELS LIMITED

Setting up of 1.43 MTPA Integrated Advanced Specialty Steel Plant at Gajamara, Dhenkanal District, Odisha

LANDUSE MAP OF THE STUDY AREA

DRAWN	SJRA	07.05.2025	**11748-97A-000-ENV-0006**
APPROVED	SKM	07.02.2025	

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