TSM/MoEF&CC/BS-30/2022-01/211
May 31, 2022

The Member Secretary
State Environment Impact Assessment Authority, Odisha
Qr.No.5RF-2/1, Unit-IX,
Bhubaneswar-751022

Subject: Submission of Six-Monthly compliance reports of Residential Township of Tata Steel Limited, Meramandali for the period Oct'21 to Mar'22.
Reference: EC vide letters no.2882/SEIAA, dated 28.09.2021

Dear Sir,
This has reference to the captioned subject and cited reference. It is to inform that we are herewith submitting six monthly Compliance reports for the conditions stipulated in the Environment Clearance of Residential Township of Tata Steel Ltd., Meramandali for the period from October 2021 – March 2022 along with monitoring data report for your kind consideration.

The copy of above compliance report is also being sent in soft format through email (roez.bsr-mef@nic.in) for your kind perusal. Also copy of EC compliance is being uploaded on MoEF&CC website on portal http:// environmentalclearance.nic.in.

Hope the above are in line with the statutory requirements.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava
Head Environment

Encl: As above
Copy to:

1. Deputy Director General, Ministry of Environment, Forests and Climate Change, Regional Office (EZ), A/3, Chandrasekharpur, Bhubaneswar-751023
2. The Member Secretary, CPCB, Parivesh Bhawan, East Arjun Nagar, Delhi-110032
3. The Member Secretary, SPCB, Parivesh Bhawan, A/118, Nilakahanta Nagar, Unit- VIII, Odisha, Bhubaneswar-751012.

For Period:
OCTOBER 2021
to
MARCH 2022

HALF YEARLY COMPLIANCE REPORT OF ENVIRONMENT CLEARANCE (EC)

For:

Construction of Residential Quarters (Township) Project.

Letter No.:
2882/SEIAA dated 28.09.2021

At:
Tata Steel Limited Meramandali (Formerly Tata Steel BSL Ltd.), Narendrapur, Dhenkanal, Odisha-759121

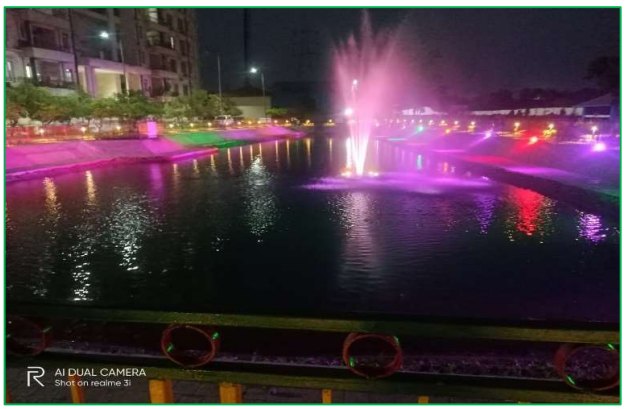
HALF YEARLY COMPLIANCE REPORT

October 2021 to March 2022

Environment clearance for construction of residential quarter (Township) Project
Letter no.: 2882/SEIAA dated 28.09.2021

S.N.	Description	Compliance Status
	Specific Condition	
1	This Environmental Clearance shall not be operational till such time as the Project proponent complies with all the statutory requirements and Judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors as applicable to this project.	All statutory clearances have been obtained (Consent to Operate, Occupancy Certificate, Fire Safety Certificate and Structural Stability (safety) Certificate) Clearances are attached as **Annexure-I.**
2	As per MoEF&CC Notification dated 14.03.2017, followed by MoEF&CC letter F. No. 23-128/2018-IA.III dated 18.09.2020, the project proponent is required to submit a bank guarantee for the cost of implementing (a) the approved remediation plan and (b) natural and community resource augmentation plan with the SPCB. The cost of implementing these plans has been worked out by the PP Rs.2.60 Crores as per projection furnished by them. The bank guarantee of the above amount will be released after successful implementation of the respective plans and the EMP. The project proponent shall be required to fully implement the remediation plan and natural and community resource augmentation plan in a time bound manner within a period of three years	The bank guarantee of Rs. 2,60,00,000/- (Rupees Two Crore Sixty Lakh) towards cost of implementing remediation plan, natural and community resource augmentation plan have been submitted to SPCB, Odisha vide letter no. TSL/OSPCB/BS-30/2021-10/134 dtd. 29.11.2021.
3	The PP is liable to pay penalty at the rate prescribed vide clause 12(ii) of the MoEF&CC, OM No. F.No.22-21/2020/IA.III dated 07.07.2021. The PP is required to furnish the relevant information for computation of the amount payable.	Relevant information was furnished to State Pollution Control Board. Subsequently, Consent to Establish and Consent to Operate have been obtained from SPCB, Odisha.
4	After takeover of BSL by Tata Steel during year 2017 and re-naming of the company as Tata Steel BSL Ltd., revised building plan and area development plan was obtained from TAMDA during 2017 by revising the original approval of 2008. A comparative statement of building construction envisaged during 2008 and revised in 2017 with detailed remarks thereon has to be furnished by PP within 2 months of date of issue of Environmental Clearance.	No change in building construction plan was envisaged after taken over. Layout of building construction and area development plan was submitted vide letter no. TSL/SEIAA/BS-30/2021-12/142 dated 22.12.2021 enclosed as **Annexure-II**.
5	Since this township project over approx.50-acres land has been delinked from the Steel Plant & CPP, the township shall be developed as a gated colony with proper boundary wall having linkage	Township has been developed as a gated colony with a proper boundary wall having linkage to the NH, Water and power supply are being sourced from Steel Plant.

	to road, water supply and power supply, meant for the industrial plant.	
6	The proponent shall obtain Fire Safety Certificate under Odisha Fire Prevention and Fire Safety Rules,2017 (with amendments) and the Structural Stability (safety) certificate from competent authority for the buildings constructed in the township	Fire Safety under Odisha Fire Prevention and Fire Safety Rules, 2017 (with amendments) and the Structural Stability (safety) Certificate enclosed as **Annexure-I.**
7	Notwithstanding the cost projected by PP for CSR activities of entire Steel Plant Complex, the CER and CSR schemes for the Standalone Township project shall be furnished to SEIAA within one month of the issue of the Environmental Clearance.	CER and CSR schemes for standalone township project have been submitted to SEIAA vide letter no. TSL/SEIAA/BS-30/2021-12/142, dated 22/12/2021 enclosed as **Annexure-II**.
8	Preparation of a disaster management plan (DMP) under the provision of Disaster Management Act. 2005 through an expert Organization like OSDMA including Onsite emergency plan for the township with linkage to similar plan of Dhenkanal district has to be kept ready within six months.	Disaster Management Plan (DMP) has been incorporated in the EIA/EMP report as chapter 7. The same is attached as **Annexure-III** for reference. Revised disaster management plan is under preparation.
	Natural Drainage	
9	No construction shall be allowed to obstruct the natural drainage pattern at the site. Check dams are allowed for harvesting rainwater. Cutting and filling of the land should be kept to the minimum, and artificial land shaping has to be avoided.	Every care has been taken not to disturb any natural land by constructional activities. Natural nalla has not been obstructed/disturbed.
	Water Conservation and RainWater Harvesting	
10	No ground water shall be extracted for the project work at any stage during the construction phase or operation phase without obtaining permission from the Water Resources Department, Govt. of Odisha/ CGWB.	The water requirement for the residential complex (township) is being met from Steel Plant. Groundwater was not extracted for construction phase.
11	The Project's total fresh water requirement is reportedly met from TSBSL's water reservoir, which is replenished by drawal from Brahmani River. Regular permission from competent authority (WR Deptt.) for such drawal of river water has to be obtained immediately. Water meter be installed forthwith to measure the quantum of drawal of water from the river.	Permission for drawal of water has been obtained. A water meter has been installed to measure the quantity of drawal of water from the river.
12	The Project Proponent shall strive to achieve zero discharge of used water from the township project area, and no treated water from STP shall be discharged to any natural stream/river nearby. STP of 1000KLD capacity has to be set up and all waste water has to be treated, and recycling of treated waste for all usages other than for	Treated water from STP is being reused for landscaping and in steel plant (low-end application).

	domestic cooking, bathing and cleaning shall be maximized. In fact, all water used for gardens, lawns plantation, air conditioning, flushing of exterior areas, washing of vehicles, etc. shall be recycled water.	
13	The quantity of fresh water usage, water recycling and rainwater harvesting shall be measured and recorded to monitor the water balance of the project. The record shall be submitted along with the six monthly Monitoring reports.	The quantity of freshwater usage for the period Oct'21 to Mar'22 is 292669 m3. 100% of STP water is reused in horticulture, land scaping and low end application of Plant.
14	Installation of dual pipe plumbing for supplying fresh water for drinking, cooking and bathing and internal cleaning and mopping, and separately for supply of recycled water for flushing, landscape irrigation, car washing, air conditioning, etc. shall be done.	Separate freshwater line has been laid for drinking, cooking, and bathing etc. Treated water is being used in landscaping, horticulture, and low-end application in steel plant.
15	Use of water saving devices/ fixtures (viz. low flow flushing systems; use of low flow faucets tap aerators etc.) for water conservation shall be incorporated in the building plan.	Water saving devices like fixtures for showers, aerators, low flow toilet flushing have been installed for water conservation purpose.
16	Any ground water drawl should be properly managed and shall conform to the approvals and the guidelines of the CGWA in the matter. Formal approval shall be taken from the CGWA for any ground water abstraction. The proponent shall also obtain permission from Water Resources Department, Govt. of Odisha for drawal of river water.	Not Applicable.
17	The proponent shall provide for adequate rain water harvesting with necessary structures based on the norm of CGWA on the use of fresh water from underground sources. A complete plan for rainwater harvesting at the project site shall be drawn up and implemented forthwith. The complete rainwater harvesting plan shall be **submitted to SEIAA within one month** from this day. Rain water harvesting pits for ground water recharge shall be installed as per CGWB guidelines.	Rainwater harvesting plan has been submitted to SEIAA vide letter no. TSL/SEIAA/BS-30/2021-12/142 dated 22.12.2021 and is enclosed as **Annexure-II**. Photo of rain water harvesting pond is given below for kind reference. 

18	STP of 1000 KLD capacity shall be installed before start of the operation phase of the building. The treated waste water from STP shall be recycled/reused to the maximum extent possible as recycling is a means of reducing depletion of water resources. Flushing, Washing, watering of the lawns and gardening, low end applications in steel plant facilities are to be met by recycled water. Discharge of unused treated waste water shall conform to the norms and standards of the Odisha State Pollution Control Board. Necessary measures should be taken to mitigate the odor problem from STP. The sewage treatment plant shall be made functional before the operation of the housing complex.	Adequate Capacity of Sewage Treatment Plant (1000 KLD) has been provided for treatment of domestic wastewater. The treated water meets the prescribed standards of OSPCB. Zero effluent discharge is being ensured. Treated water is being used for watering of the lawns and gardening, low end applications in steel plant.
19	The installation of the Sewage Treatment Plant (STP) shall be certified by an independent expert and a report in this regard shall be submitted to the SEIAA, Odisha before the project is commissioned for operation. Periodical monitoring of water quality of treated sewage shall be conducted.	The sewage Treatment Plant (STP) has been retrofitted and certified by an independent expert M/s Voltas Limited. The certificate and test report were submitted to SPCB and SEIAA vide letter no. TSM/SPCB/BS-30/2022-02/195 dated 29.04.2022. enclosed as **Annexure-IV.**
20	The treated water is understood to be discharged to "Kisinda Nala" which is a natural stream. Necessary permission and "NOC" shall be obtained from the concerned authority for the 'Nala' to take additional load of the above waste water.	Zero discharge of treated water is being ensured to Kisinda Nala. Treated wastewater from STP is being reused in landscaping and low-end application of steel plant.
21	Excess treated water shall be discharged to any outside drain only after getting permission from the competent authority. The proponent shall renovate the existing drain to accommodate the discharge and maintain it properly. To this effect the proponent has to give a legal affidavit before going for construction activity.	Zero discharge of treated water is being ensured to any outside drain.
22	The proponent shall provide open drain network of RCC with cover slab and camouflaged with potted plants to take care of wastewater and storm water drainage in the township.	RCC drain network has been constructed with cover slabs to take care of storm water drainage in the township.
23	Comprehensive individual and integrated water management/ water balance, both for township and plant be submitted, taking into consideration fresh water/ surface runoff/ storm water/ waste water/ treated waste water, etc. within 2 months of date of issue of Environmental Clearance.	Comprehensive individual and integrated water management/ water balance, both for township and plant have been submitted vide letter no. TSL/SEIAA/BS-30/2021-12/142 dated 22.12.2021 enclosed as **Annexure-II**.
24	A certificate from the competent authority shall be obtained for discharging treated effluent/ untreated effluents into the Public sewer/disposal/drainage systems along with the final disposal point.	Not applicable as effluent from STP is not being discharged in any public sewer

25	Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.	Sludge generated from STP is being used in horticulture.
	Solid Waste	
26	The provisions of the Solid Waste (Management) Rules, 2016, E-Waste (Management) Rules, 2016, and the Plastics Waste (Management) Rules, 2016 shall be followed. Management and handling of various wastes like solid waste, hazardous waste, bio-medical waste, battery waste, e-waste and construction & demolition wastes including linkage with authorized agencies for disposal and reuse shall conform to the prescriptions of the above Rules and related guidelines.	Solid wastes, E-wastes and plastic wastes generated are being properly collected, segregated, and disposed of as per the provision in Solid Waste (Management) Rules, 2016, E-Waste (Management) Rules, 2016, and Plastics Waste (Management) Rules, 2016. Management and handling of various wastes like solid waste, hazardous waste, bio-medical waste, battery waste, e-waste and construction & demolition wastes are ensured to conform to the rules.
27	Separate wet and dry bins must be provided in each housing unit at the ground level for facilitating segregation of waste into wet garbage and inert materials. Wet garbage shall be composted in Organic Waste Converter. Adequate area shall be provided for solid waste management within the premises which will include area for segregation, composting. The inert waste will be stored at a dumping site, and disposed of to authorised vendors of the NAC.	The solid wastes generated are being properly collected and segregated as per the requirement of the MSW Rules, 2016. Separate bins have been provided in each housing unit for facilitating the segregation of waste into wet garbage and inert materials. The organic waste converter of capacity 0.25 TPD is already installed and 6 TPD organic waste converter installation is in progress target date.
28	A certificate from the competent authority handling municipal solid wastes, indicating the existing civic capacities and their adequacy to cater to the Solid Waste generated from project shall be obtained.	Not Applicable.
29	The project proponent shall provide compost pits so that leaf litter from green belt is converted into compost. Under no circumstances, leaf litter shall be burnt.	Compost pits have been provided for leaf litter.
30	Any wastewater generated from the premises shall not be allowed to mix with rainfall/storm water. The Project Proponent shall ensure separate approved drainage lines for discharge of waste water and that of storm water. Storm water drain shall be passed through guard pond.	No wastewater is being discharged to drain.
	Energy Conservation	
31	The proponent shall provide provision of LED based lighting; energy saving devices, like fans, refrigeration, air conditioning, pumps, and lifts	Energy-saving devices have been installed in the township. LEDs have been installed for lighting the indoor, outdoor, and common areas. Solar power based street light are being installed in phase wise

	shall be adopted. All street lights and all other exterior lighting shall be solar power based.	manner. In first phase 5 nos. of 30W LED solar street lights have been installed. Installation of 60 nos. of solar based LED street lights are in progress.
32	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States which have notified their own ECBC, shall comply with the State ECBC. Outdoor and common area lighting shall be LED.	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency is being ensured. LEDs have been installed for lighting the outdoor and common areas.
33	Energy conservation measures like installation of CFLs / LED for the lighting the area outside the building should be integral part of the project design and should be in place before project commissioning. Used CFLs, TFL and LED shall be properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination.	LEDs have been installed for lighting inside and outside of the building as a part of energy conservation measures. Used CFLs, TFL, LED and other e-waste are being properly collected, segregated, and disposed of to authorized recycler/disposer as per the provision in E-Waste (Management) Rules, 2016.
34	The proponent shall use renewable energy/ solar power of at least 5% of projected power requirement for the township.	5% of the projected power requirement of the township will be made from renewable energy/solar power by Mar'23.
35	The proponent shall provide provision of lighting arrester, earthing for all buildings, under-ground cable network instead of overhead pool cabling for safety of dwellers.	Provision of lighting arresters, earthing for all buildings, and underground cable networks have been provided.
36	Solar power shall be used for lighting in the apartment to reduce the power load on grid. Separate electric meter shall be installed for solar power. Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirement of the local building bye-laws, whichever is higher. Residential buildings are also recommended to meet its hot water demand from solar water heaters, as far as possible.	Solar power based lighting installation in the apartment is in progress to reduce the power load. Separate electric meter installation for solar power will be done by Mar'23. Solar power based water heaters have been planned in the guest house by Mar'23.
37	Use of environment friendly construction materials like bricks, blocks, etc. shall be required to make up at least 20% of the total construction material. These include Fly Ash bricks, hollow bricks, AACs, Fly Ash Lime Gypsum blocks, compressed earth blocks, etc. Fly ash should be used as building material in the construction as per the provision of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003 and 25th January, 2016. Ready mixed concrete shall be preferred in building construction.	In compliance with the provision of fly Ash Notification of September 1999 and its amendments, environmentally friendly construction materials like fly ash bricks and paver blocks are used for the construction of buildings and roads and a quarterly utilisation report in this regard is periodically submitted to SPCB.

38	A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project shall be submitted.	Not applicable as the captive power plant of Tata Steel Limited Meramandali is supplying power to the township.
	Air Quality Management and Noise Management	
39	Regular water sprinkling shall be done at construction area, material transport road through mobile water tanker to reduce fugitive dust. Plastic/tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, morrum and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust. The premises of the township should be paved pucca road and vacant areas shall be covered with grasses, herbs and shrubs.	Regular water sprinkling is being done at construction area, material transport road through mobile water tanker to reduce fugitive dust. All vehicles carrying construction materials are having a top cover to avoid the spreading of dust and a valid PUC certificate. All internal roads have been concreted or blacktopped and vacant areas are covered with grasses, herbs and shrubs. Photo given below for your kind reference.  
40	All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed. All demolition and construction waste shall be managed as per the provisions of the Construction and Demolition Waste Rules, 2016. All workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or working in any area with dust pollution shall be provided with dust mask.	The construction and demolition wastes generated from the project site are being managed and disposed of as per the provision under "Construction & Demolition Wastes Management Rules 2016". Necessary PPEs such as safety helmet, safety shoes, gloves, goggles, dust mask etc. are being provided to all the workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris and working in any area with dust pollution. This is now a mandatory requirement and one of the conditions of employment in our company & also a part of personal safety action plan for each employee.
41	Notification GSR 94(E) dated 25.01.2018 of MoEF&CC regarding Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance shall be complied with.	Agreed and Being Complied.

42	The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. Low sulphur diesel shall be used. The location of the DG set and exhaust pipe height shall be as per the Central Pollution Control Board (CPCB) norms. For indoor air quality the ventilation provisions as per National Building Code of India shall be provided.	Construction of stack of 8.4 m height attached to 250KVA DG set construction is in progress and will be installed by Jul'22. Low Sulphur diesel for running the DG sets and all diesel power generating sets are being used and have acoustic enclosure to prevent noise. Ventilation provision to control indoor air quality in the building.
43	Ambient noise levels shall conform to residential standard both during day and night as per Noise Pollution (Control and Regulation) Rules, 2000. Incremental pollution loads on the ambient air and noise quality shall be closely monitored during construction phase. Adequate measures shall be taken to reduce noise level during construction phase, so as to conform to the stipulated standards by CPCB / SPCB.	The ambient noise levels recorded in the township are well within the prescribed standard as per Noise Pollution (Control and Regulation) Rules, 2000. A CAAQMS station has been established in consultation with SPCB in the township to monitor ambient air quality. Every care has been taken to reduce the noise level during the construction phase. Noise monitoring and AAQ report enclosed as **Annexure-V**.
	Green Cover	
44	Green-belt & avenue plantation of trees over the area of 60,589.2 m2 (**30 % of plot area**) shall be done using native tree species/shrubs improving greenery & keeping in view considerations of aesthetics of the whole complex. The species with evergreen foliage. broad leaves and wide canopy cover are desirable. Professional landscape architects should be engaged to design the green layout to provide for multi-tier plantation and green fencing all around, mitigating various environmental pollutants like dust, noise, emissions etc. The proponent shall provide multi-layer green belt coverage as per the norm excluding landscape around the periphery of the premises. The PP shall get at least 10trees/ha fully established and uniformly spread out (trees=30cm dbh or more) to cover the entire township area.	24.6% of the area is covered with greenbelt. Proper green belt has been designed to attenuate the day and night noise level within the prescribed limit and to serve as sink for pollutants to allow the dust and other particulates to settle on leaves.
45	The proponent shall encourage composting of organic waste, vermiculture, bee-culture, flori-culture and ornamental horticulture for beautification of the township.	Leaf litter and other horticulture wastes are converted into compost.
46	Roof top rain water harvesting shall be adopted **for each proposed Building** as part of the rainwater harvesting at the whole site.	Rooftop rainwater has been adopted for Type-A high rise buildings.
	Parking	
47	Parking shall be prohibited on the access road to the project site.	Noted.

48	The proponent shall provide signage road markings for pedestrian pathway and cycle track, speed limits marking and corner mirrors in all internal roads for smooth movement of traffic within township.	Signage has been provided along all internal roads like road markings for pedestrian pathways, speed limits, etc. for smooth movement of traffic.
49	The proponent shall provide adequate parking area for four wheelers, two wheelers and cycles in the township for the inhabitants and visitors.	Adequate parking areas for four-wheelers, two-wheelers, and cycles in the township for the inhabitants and visitors have been provided
	Top Soil Preservation and Reuse	
50	Topsoil may be stripped to a depth of 20 cm from the areas proposed for buildings, roads, paved areas, and external services. It should be stockpiled appropriately in designated areas and relaid at plantation and such other sites.	Topsoil was used for gardening and plantation purpose.
	Traffic & Transportation	
51	Traffic management/Traffic density and Traffic decongestion study at entry and exit to township and at NH shall be undertaken and study report shall be submitted within 06 months of date of issue of Environmental Clearance.	Traffic management/traffic density and traffic congestion study at entry and exit to the township and NH have been carried out by Centre for Envotech and Management Consultancy Pvt. Ltd. enclosed as **Annexure-VI.**
52	A comprehensive mobility plan, as per Ministry of Urban Development best practices guidelines (URDPFI), shall be prepared to include motorized, non-motorized, public and private networks. Road should be designed with due consideration for environment, and safety of users. The road system can be designed with these basic criteria. • Hierarchy of roads with proper segregation of vehicular and pedestrian traffic. • Traffic calming measures • Proper design of entry and exit points. • Parking norms as per local regulation	
53	A detailed traffic management and traffic decongestion plan shall be drawn up to ensure that the current level of service of the roads within a 01 km radius of the project is maintained and improved upon after the implementation of the project. This plan should be based on cumulative impact of all development and increased habitation being carried out or proposed to be carried out by the project or other agencies in this 01 km radius of the site and the traffic management plan shall be duly validated and certified by the State Urban Development department and the P.W.D./ competent authority for road augmentation and shall also have their consent to the implementation of components of the plan which involve the participation of these departments.	

54	Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards be operated only during non-peak hours.	Only vehicles having valid PUC are being engaged in transportation activity.
55	A dedicated entry/exit and parking shall be provided for commercial activities.	Entry/exit and parking has been provided.
56	Barricades shall be provided around project boundary.	Barricades has been provided around project boundary.
57	Speed of the vehicles shall be restricted upto 15 kmph by erecting speed bumps at regular intervals at project site and proper signage shall be provided for guided vehicular movement and speed restrictions.	Speed bumps have been provided along with signage.
58	Footpath shall be seamless with sufficient width.	Footpaths with sufficient width have been provided.
59	No vehicles shall be allowed to stop and stand in front of the gate on main access.	No vehicles are allowed to stop and stand in front of the gate on main access.
60	A buffer of minimum 10 m shall be maintained between the entry/exit gate and the road to avoid traffic congestion.	A buffer of minimum 10 m has been maintained between the entry/exit gate and the road to avoid traffic congestion.
61	The Traffic Management Plan prepared by the proponent shall be duly validated and certified by the Competent Authority of the State and shall have also their consent before implementation.	Traffic Management Plan have been certified by IIT Bhubaneswar.
	Environment Management Plan	
62	An Environmental Management Plan (EMP) shall be implemented to ensure compliance with the environmental conditions specified above. A dedicated Environment Monitoring Cell with defined functions and responsibility shall be put in place to implement the EMP. The environmental cell shall ensure that the environment infrastructure like Sewage Treatment Plant, tree planting, Rain Water Harvesting. Energy efficiency measures water use efficiency and conservation, solid waste management, renewable energy etc. are kept operational and meet the required standards. The environmental cell shall also keep the record of environment monitoring and those related to the environment infrastructure.	Compliance with all environmental protection measures as recommended in the EMP report is being ensured. A dedicated Environment Monitoring Cell with defined functions and responsibilities have been put in place to implement the EMP.

63	It shall be mandatory for the project management to submit six (06) monthly compliance reports on environmental monitoring in respect of the stipulated terms and conditions in this Environmental Clearance to the State Environment Impact Assessment Authority (SEIAA), Odisha, SPCB & Regional Office of the Ministry of Environment & Forest, Odisha in hard and soft copies on 1st June and 1st December of each calendar year.	Half-yearly compliance reports on environmental monitoring in respect of the stipulated terms and conditions in this Environmental Clearance is e being submitted to SEIAA Odisha, SPCB & Regional Office of the MoEF&CC, Odisha in hard and soft copies.

Sl. No.	Description	Compliance Status
General Condition		
1	The project proponent shall ensure that the guidelines for building and construction projects issued vide MoEF&CC's OM No.19-2/2013-IA.III dated 9th June 2015, are followed to ensure sustainable environmental management.	Noted and the same is being complied.
2	The approval of the Competent Authority shall be obtained in regard to structural safety of buildings against earthquake, adequacy of fire fighting equipment as per National Building Code including protection measures from lightning.	The approval for the structural safety of the building as per the National Building Code of India, 2005 has been obtained.
3	The project proponent shall obtain all necessary clearance/ permission from all relevant agencies including town planning authority before commencement of work. All the construction shall be done in accordance with the local building byelaws.	Complied and noted.
4	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board.	Consent to Establish and Consent to Operate from Odisha State Pollution Control Board vide letter no. 19511/IND-II-CTE-5518 (pt.) dated 06/12/2021 and no. 5425/IND-I-CON-6826 dated 31.03.2012 respectively.
5	Provisions shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	All necessary infrastructure and housing facilities were provided for workers during construction phase of the township. As of now approx. 75% of construction is already completed and source of labourers is mainly from the local area, no temporary housing is provided for construction labourers at the project site. Safe drinking water, toilets etc. facilities are being provided. First aid and medical facilities are available in the township health center and steel plant OHC.

6	A First Aid Room shall be provided in the project both during construction and operations of the project.	A full-fledged health centre is operational in the township.
7	The company shall draw up and implement corporate social Responsibility plan as per the Companies Act of 2013.	Noted and complied.
8	As per the MoEF&CC. Govt. of India Office Memorandum dated 30.09.2020, the project proponent is required to prepare and implement Corporate Environment Responsibility (CER) Plan. Appropriate funds shall be earmarked for the activities such as infrastructure creation for drinking water supply, sanitation, health, skill development. cross drains, solid waste management facilities, rain water harvesting, soil moisture conservation works, avenue plantation. etc. The activities proposed under CER shall be focussed on the project impacted area around the project. The activities proposed for CER shall be implemented and completed within three years and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude & longitude of infrastructure developed & road constructed needs to be submitted to Regional Office MoEF&CC annually along with audited statement and to the District Collector. It should be posted on the website of the project proponent.	CER is under implementation and shall be completed within 3 years.
9	A copy of this Environmental Clearance letter shall be displayed on the website of the Odisha State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.	The EC letter was displayed at the Regional Office, District Industries center and Collector's Office/ Tehsildar's office for 30 days.
10	Officials from the Regional Office of MoEF&CC, Bhubaneswar/SPCB, Odisha who would be monitoring the implementation of environmental safeguards should be given full cooperation, facilities and documents/data by the project proponents during their inspection.	Noted.
11	In the case of any change(s) in the scope of the project, the project would require a fresh clearance by the SEIAA, Odisha.	Noted.

12	The SEIAA, Odisha reserves the right to add additional conditions and safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the conditions, and safeguard measures in a time bound and satisfactory manner.	Agreed, the SEIAA, Odisha reserves the right to add additional conditions and safeguard measures subsequently, if found necessary, and to take action including revoking the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the conditions, and safeguard measures in a time-bound and satisfactory manner.
13	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department. Civil Aviation Department, the Forest Conservation Act. 1980 and the Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	All applicable clearance has been obtained.
14	The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the SEIAA. Odisha. The advertisement shall be made within Seven days from the date of receipt of the Clearance letter and a copy of the same shall be forwarded to the Regional Office of MoEF&CC. Bhubaneswar.	The advertisement was published in both Odia & English newspapers named “Pragatibadi” and “The New Indian Express” respectively on the date 02.10.2021.
15	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	The clearance letter was sent to all concerned and also uploaded to our company website, which can be viewed at http://www.tatasteel.com.
16	The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF&CC, Govt. of India. the respective Zonal Office of CPCB and the SPCB. The	Compliance status will be uploaded on the Company’s website at http://www.tatasteel.com. The compliance report including results of monitored data is being submitted to the Regional Office of MoEF&CC, CPCB and SPCB, Odisha.

	criteria pollutant levels namely; SPM, RSPM, S02, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	
17	The environmental statement for each financial year ending 31st March in Form-V as is mandated be submitted by the project proponent to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently. This shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF & CC, Govt. of India by E-mail.	Environmental Statement for the financial year 2021-22 in Form-V will be submitted before September 30, 2022, to all concerned authorities as prescribed under the Environment (Protection) Rules 1986, and its amendments. And same will be uploaded to the company website along with Half-Yearly EC compliance.

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2561909, Fax: 2562822, 2560955 E-mail: paribesh1@ospcboard.org, Website: www.ospcboard.org

CONSENT ORDER

No. 5425 / IND-I-CON-6826 Dt. 31.03.2022 /

CONSENT ORDER NO. 3005

Sub : Consent for discharge of sewage and trade effluent under Section 25/26 of Water (PCP) Act, 1974 and emission under Section 21 of Air (PCP) Act, 1981 for operation of the township.

Ref : Your online application **ID No.3944895, Dtd.21-01-2022.**

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to;

Name of the Industry **Residential Township of M/s Tata Steel Limited**

Name of the Occupier & Designation: **Sri Subodh Pandey, Vice President (Operation)**

Address: **At: Narendrapur, Meramadali, Dhenkanal - 759121, Odisha**

Details of Township:

Sl. No.	Description	Details
1.	Residential Township, Tata Steel	Built-up Area 1,46,577.0 sq.m

This consent order is valid for the period up to **31.03.2026.**

This consent order is valid for the specified outlets, discharge quantity and quality of effluents (ii) quantity of emission and its quality, specified chimney / stack (iii) quantity of solid waste and its disposal as specified below.

This consent is granted subject to the General and Special Conditions stipulated below:

A. Discharge permitted through the following outlet subject to the standard:

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KLD or KL/hr	Pre-scribed Standard					
				pH	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	Fecal Coliform (MPN/ml)	O & G (mg/l)
1	Outlet of STP for domestic effluent	Used for Horticulture, Toilet Flushing and balance water discharge to plant for low-end application.	1000 KLD	6.5-9.0	30	250	100	1000/ 100	10

B. Emission permitted through the following stack subject to the prescribed standard:

Chimney Stack No.	Description of Stack	Stack height (m)	Quantity of emission	Prescribed Standard		
				PM	SO_2	NO_x

C. Disposal of solid waste permitted in the following manner:

Sl. No.	Type of Solid waste	Quantity generated (Metric Tonne/ Month)	Quantity to be reused on site	Quantity to be reused off site	Quantity disposed off	Description of disposal site.
1.	Municipal Solid Waste	--	--	--	--	Bio-degradable waste convert to compost & non-biodegradable sold to waste recyclers.

D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alternation or deviation made in actual practice from the particulars furnished in the application will also be the ground for liable to review/variation/revocation of the consent order under section 27 of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.
2. The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / products / manufacturing process or quantity /quality of the effluent rate of emission / air pollution control equipment / system etc.
3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.
4. The application shall comply with and carry out the directives/orders issued by the Board in this consent order without any negligence on his/her part. In case of non-compliance of any order/directives issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law.
5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.
6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.
7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.
8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.
9. An inspection book shall be opened and made available to Board's Officers during the visit to the factory.
10. The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.
11. The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.
12. Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.
13. The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.
14. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.
15. Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed impervious.
16. The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.
17. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.
18. If at any time the disposal of treated effiuent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the occupier must adopt alternate satisfactory treatment and disposal measures.
19. The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.
20. The effluent treatment units and disposal measures shall become operative at the time of commencement of production.
21. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Acts or Rules made therein.
22. The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.

23. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.
24. No control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.
25. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner so as to meet the standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).
26. The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.
27. There shall not be any fugitive or episodal discharge from the premises.
28. In case of such episodal discharge/emissions the occupier shall take immediate action to bring down the emission within the limits prescribed by the Board and stop the operation of the plant if required. Report of such accidental discharge /emission shall be brought to the notice of the Board within 24 hours of occurrence.
29. The applicant shall keep the premises and air pollution control equipments clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipments, location, inspection chambers, sampling port holes shall be made easily accessible at all times.
30. Any upset condition in any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned shall be reported to the Headquarters and Regional Office of the Board by E-mail within 2 hours of its occurrence.
31. The occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the premises. This plantation is stipulated over and above the bulk plantation of trees in that area.
32. The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipments collected within the premises of the shall be disposed off scientifically to the satisfaction of the Board.
33. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by :
    i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off.
    ii) Controlled incineration, wherever possible in case of combustible organic material.
    iii) Composting, in case of bio-degradable material.
34. Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handling and disposal of hazardous wastes.
35. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.
36. The applicant, his/heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.
37. The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.
38. Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.
39. The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.
40. In case the consent fee is revised during this period, the occupier shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.
41. The occupier shall comply to the conditions stipulated in CTE order issued by Odisha State Pollution Control Board and conditions stipulated in Environmental Clearances issued by MoEF&CC, Govt. of India.
42. The occupier shall abide by E(P) Act, 1986 and Rules framed there-under.
43. The Board reserves the right to revoke/refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/ stipulate additional conditions as deemed appropriate.

GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs.50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A)

1. The applicant shall analyse the effluent / emissions and Ambient Air Quality every month through approved laboratory for the parameters indicated in TABLE- 'B', 'C' & Part -'B' as mentioned in this order and shall furnish the report thereof to the Board on monthly basis.
2. The following information shall be forwarded to the Member Secretary on or before 10th of every month.

   a) Performance / progress of the treatment plant.
   b) Monthly statement of daily discharge of domestic and/or trade effluent.

3. Non-compliance with effluent limitations

   a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification.

      i) Causes of non-compliance
      ii) A description of the non-compliance discharge including its impact on the receiving waters.
      iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance.
      iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and
      v) Steps to be taken by the applicant too prevent the condition of non-compliance.

   b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

   c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.

4. Proper housekeeping shall be maintained inside the factory premises including process areas by a dedicated team.
5. The occupier must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.
6. The occupier shall engage dedicated qualified manpower to ensure continuous and effective operation of online stack / Ambient Air Quality / Effluent monitoring stations for maintenance of database, real time data transfer to SPCB server, data analysis and co-ordination with concerned personnel of process units for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.

E. SPECIAL CONDITIONS :

1. The domestic effluent generated from the township shall be adequately treated in Sewage Treatment Plant (STP). The treated domestic effluent shall conform to the prescribed standard mentioned in Section-A of this order. The treated wastewater shall be used as per the uses mentioned in Section-A.
2. The sewage collection system and sewage treatment plant shall be properly maintained so as to meet the prescribed standard. In no case the untreated domestic effluent shall be discharged to outside without treatment.
3. Regular monitoring of effluents shall be carried out and report shall be sent to the Board for information.
4. The industry shall obtain Environmental Clearance and Consent to Establish before going for any expansion of township.
5. The sludge generated from STP shall be sued as compost.
6. The industry shall construct a rain water harvesting structure for utilization of the rain water collected from the roof top of all buildings and catchment area of the industry for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.
7. Solid waste / garbage generated from the township shall be collected properly and processed for composting or shall be disposed as per the provision of Solid Waste Management Rule, 2016.
8. The Board may impose further condition or modify the conditions are stipulated in this order during installation and/or at the time of obtaining consent to operate and may revoke this order in case the stipulated conditions are not implemented and / or information is found to have been suppressed / wrongly furnished in the application form.
9. In case the consent fee is revised upwards during this period of consent the unit shall pay the differential amount to the Board (for the remaining years) to

keep the consent order in force. If the industry fails to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

10. The Board reserves the right to revoke / refuse consent at any time during this period in case any violation is observed and modify / stipulate additional conditions as deemed appropriate.

To

The Vice President (Operation),
Residential Township of M/s TATA Steel Ltd.,
At: Narendrapur, Meramadali,
Dhenkanal - 759121

31/08/22

CHIEF ENV. ENGINER (M)
STATE POLLUTION CONTROL BOARD, ODISHA

Memo No._____/Dt._____/
Copy forwarded to :

i) Regional Officer, State Pollution Control Board, **Angul**
ii) District Collector, **Dhenkanal**
iii) DFO, **Dhenkanal**
iv) ACEE, HSM Cell, Head Office
v) SES, Central Laboratory, SPC Board, Bhubaneswar

SR. ENV. ENGINER
STATE POLLUTION CONTROL BOARD, ODISHA

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS

Annexure-I

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS PART – A : EFFLUENTS

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
1.	Colour & odour	Colourless/ Odourless as far as practible	--	See 6 of Annex-1	See 6 of Annex-1
2.	Suspended Solids (mg/l)	100	600	200	a. For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent.
3.	Particular size of SS	Shall pass 850	--	--	--
4.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
5.	Temperature	Shall not exceed 5^0C above the receiving water temperature	--	--	Shall not exceed 5^0C above the receiving water temperature
6.	Oil & Grease mg/l max.	10	20	10	20
7.	Total residual chlorine	1.0	--	--	1.0
8.	Ammonical nitrogen (as N) mg/l max.	50	50	--	50
9.	Total Kajeldahl nitrogen (as NH_3) mg/1 max.	100	--	--	100
10.	Free ammonia (as NH_3) mg/1 max.	5.0	--	--	5.0
11.	Biochemical Oxygen Demand (5 days at (20^0C) mg/1 max.	30	350	100	100
12.	Chemical Oxygen Demand, mg/1 max.	250	--	--	250
13.	Arsenic (as As) mg/1 max.	0.2	0.2	0.2	0.2

CONSENT ORDER
RESIDENTIAL TOWNSHIP OF M/S TATA STEEL LIMITED

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
14.	Mercury (as Hg) mg/1 max.	0.01	0.01	--	0.001
15.	Lead (as pb) mg/1 max.	01	1.0	--	2.0
16.	Cardmium (as Cd) mg/1 max.	2.0	1.0	--	2.0
17.	Hexavalent Chromium (as Cr + 6) mg/l max.	0.1	2.0	--	1.0
18.	Total Chromium (as Cr) mg/l max.	2.0	2.0	--	2.0
19.	Copper (as Cu) mg/l max.	3.0	3.0	--	3.0
20.	Zinc (as Zn) mg/l max.	5.0	15	--	15
21.	Selenium (as Sc) mg/l max.	0.05	0.05	--	0.05
22.	Nickel (as Nil) mg/l max.	3.0	3.0	--	5.0
23.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
24.	Fluoride (as F) mg/l max.	2.0	15	--	15
25.	Dissolved Phosphates (as P) mg/l max.	5.0	--	--	--
26.	Sulphide (as S) mg/l max.	2.0	--	--	5.0
27.	Phennolic compounds as (C_6H_5OH) mg/l max.	1.0	5.0	--	5.0
28.	Radioactive materials a. Alpha emitter micro curle/ml. b. Beta emitter micro curle/ml.	 10^7 10^6	 10^7 10^6	 10^8 10^7	 10^7 10^6
29.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
30.	Manganese (as Mn)	2 mg/l	2 mg/l	--	2 mg/l
31.	Iron (Fe)	3 mg/l	3 mg/l	--	3 mg/l
32.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	--	0.2 mg/l
33.	Nitrate Nitrogen	10 mg/l	--	--	20 mg/l

Annexure-II

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighed Average	Concentrate of Ambient Air		
			Industrial Residential, Rural and other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual * 24 Hours **	50 80	20 80	-Improved west and Gaeke - Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual * 24 Hours **	40 80	30 80	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
3.	Particulate Matter (size less than 10µm) or $PM_{10}\mu g/m^3$	Annual * 24 Hours **	60 100	60 100	-Gravimetric - TOEM - Beta Attenuation
4.	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ $\mu g/m^3$	Annual * 24 Hours **	40 60	40 60	-Gravimetric - TOEM - Beta Attenuation
5.	Ozone (O_3) $\mu g/m^3$	8 Hours ** 1 Hours **	100 180	100 180	- UV Photometric - Chemiluminescence - Chemical Method
6.	Lead (Pb) $\mu g/m^3$	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP method after sampling on EMP 2000 or equivalent filter paper. - ED-XRF using Teflon filter
7.	Carbon Monoxide (CO) mg/m^3	8 Hours ** 1 Hours **	02 04	02 04	- Non Dispersive Infra Red (NDIR) Spectroscopy
8.	Ammonia (NH_3) $\mu g/m^3$	Annual* 24 Hours**	100 400	100 400	-Chemiluminescence - Indophenol Blue Method
9.	Benzene (C_6H_6) $\mu g/m^3$	Annul *	05	05	-Gas Chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP)- Particulate phase only, mg/m^3	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), mg/m^3	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni), mg/m^3	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be 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.

See Rule -14

TALCHER-ANGUL- MERAMANDALI DEVELOPMENT AUTHORITY (TAMDA), ANGUL-759122

Registration No.168/TAMDA Dt.11.2.21 File No. B.P –OC-02/2020

OCCUPANCY CERTIFICATE

The work of erection, re-erection and or for material alteration undertaken in respect of existing B+G+9, B+G+12 and other staff quarters building constructed in favour of Mr. L.K. Tribedy, Vice-President (Infrastructure) BSSL authorised representative of BSSL now at present the applicant Sri Manikant Naik , Chief-Corporate Services of TATA steel BSL Ltd. In respect of plot No.575,576,740,741,786,787,788 & others Khata No.127/421, 127/444 and others of Mouza Narendrapur of Mangalpur G.P. is completed under the supervision of Architect Gourtam Kumar Agarwal (Empanelment No. CA/2016/ 77797 and Structural Engineer Niladri Bihari Mohanty (Empanelment No. RTP/DTP (ST.ER)-017/2017 DTP, Bhubaneswar, Odisha as per completion certificate submitted.

On inspection, it is observed that the erection, re-erection and or alteration undertaken with respect to above Staff quarters buildings has been constructed in accordance with approved plan and the conditions imposed vide permission letter No. 984/BP/TAMDA dt. 11.5.2017.

The Building B+G+9, B+G+12 and other staff quarters buildings are completed for occupancy subject to following conditions.

i. The TATA steel BSL Authority has to ensure & maintain Fire Fighting installations and all the stipulated conditions given in the Fire Safety Certificate submitted by Fire Deptt. vide letter No. 04/FPW dt.19.01.2021.

ii. The Building (staff quarters) shall exclusively used for residential purpose.

iii. All other infrastructure facilities like drainage, sewerage, water supply etc shall be maintained and periodically clearance from the concerned Deptt. shall be obtained regularly including clearance from CGWAI & submitted to TAMDA, Angul.

iv. The Authority shall supply the electricity to colony and staff quarters from their own power plant as per under taking submitted.

v. Open parking space measuring an area of 212125 sqm as shown in the approved plan shall be reserved and no part of it will be used for any other purpose.

vi. The Occupancy certificate cannot be construed as evidence to claim right title interest of plot.

vii. All other conditions as stipulated in the approved plan issued vide permission letter No. 984/BP/TAMDA dt. 11.5.2017 shall be applicable Mutatis Mutandis.

viii. The BSL Authority shall adher to the conditions imposed vide OSPCB letter No. 3639/IND-I-CON-5440 dt. 20.3.2020

ix. The Authority /Structural Engineer/ Architect are fully and jointly responsible for any structural failure of the project due to any structural/construction defect. The Authority will be no way be held responsible for the same in whatsoever manner.

One set of the completion plans certified for occupancy is returned herewith.

By order of Vice-Chairman

10/3/2021

PLANNING MEMBER
TAMDA, Angul

CHIEF FIRE OFFICER, FIRE PREVENTION WING, DIRECTORATE OF FIRE SERVICES, ODISHA, CUTTACK

FORM-V
FIRE SAFETY CERTIFICATE
(See rule-13 (3) of the Odisha Fire Prevention and Fire Safety Rules, 2017)

File No.C-1312-2018

Certificate No.04/FPW **Dated.19-01-2021**

This Certificate is valid up to 18/01/2026
(Apply for renewal at least three months before expiry)

Certified that the **Block-A-1 & A-2 (B+G+9 floors each), Block-C-2, D-1 & D-2 (B+G+12 floors each) of TATA Steel BSL Limited**, situated over Plot No.575, 576, 740, 741, 786, 787, 788 & others, Khata No.127/421, 127/444 & others, Mouza-Narendrapur, Dist-Dhenkanal, Odisha, consisting of total 05 (Five) Nos. of Blocks were inspected by officers of Odisha Fire Service on 07.03.2019, 10.07.2019, 16.02.2020, 20.09.2020 and 17.01.2021 in presence of representative of the buildings & it has been found to comply with the fire prevention and safety requirements in accordance with Odisha Fire Prevention and Fire Safety Rules, 2017 r/w Odisha Fire Prevention and Fire Safety (Amendment) Rules, 2019. Further, in pursuance of Government of Odisha Home Department Notification No-28550/CD, Bhubaneswar Dated. 28.08.2020 i.e. one time relaxation scheme for Odisha Fire Service on requirement of structural Fire Safety parameters have been met envisaged from Sl No-01 to 17 of Form-IV of Odisha Fire Prevention and Fire Safety Rules, 2017, as the said existing building constructed and functioned prior to implementation of Odisha Fire Prevention and Fire Safety Rules, 2017. Hence, the building is fit from fire safety point of views for occupancy or usage as noted hereunder against each subject to compliance to the conditions as prescribed herein below:-

Block - A-1 & A-2			
1.	Basement	---Usage---	Parking and Services
2.	Ground to 9th floor	---Usage---	Residential Apartment
Block - C-2			
1.	Basement	---Usage---	Parking and Services
2.	Ground to 12th floor	---Usage---	Residential Apartment
Block - D-1 & D-2			
3.	Basement	---Usage---	Parking and Services
4.	Ground to 12th floor	---Usage---	Residential Apartment

CONDITIONS: -

1. Fire prevention and safety measures and appliances, availability of water supplies and means of access thereto etc. provided in the building or premises, should be maintained by the occupier (s) in best repairs and efficient working condition at all times for use by the occupants or the members of the Fire Service or both in the event of outbreak of fire.
2. The setbacks, driveways, entrance gates, exits, staircases, corridors and escape ways should not be changed, obstructed or modified in any way.
3. The occupier (s) shall train all staff and occupants periodically to make them well conversant in use and operation of the fire prevention and safety measures.

4. Fire Drills/rehearsals should be organized at least once in six months by involving local fire station.
5. Photocopies of this Certificate should be framed and displayed at all conspicuous places in all lobbies/corridors in all floors of all towers/blocks of building/premises.

19.1.21
(S. Sethi)
Chief Fire Officer,
Fire Prevention Wing

Memo No. 407 /FPW Date. 19 -01-2021

Copy to Sri Suman Singh, Senior Dy. General Manager - Infra & Services, TATA SteeL BSL Limited, Narendrapur, Kusupanga Meramandali, Dhenkanal-759121 for information and necessary action.

19.1.21
Chief Fire Officer,
Fire Prevention Wing

Memo No._____/FPW Date. -01-2021

Copy to Dy. Fire Officer, Angul Circle / Asst. Fire Officer, Dhenkanal Fire Station / Station Officer, Hindol Road Fire Station, Dist-Dhenkanal for information.

Sd/-
Chief Fire Officer,
Fire Prevention Wing

FORM-VI

CERTIFICATE OF COMPLETION

[(See Regulation 18(1) & 67]

(To be given by the Owner and Countersigned by the Registered Architect / Registered Structural Engineer. To be submitted in triplicate.)

(Office Use)

Date of Receipt.....

Amount of fee deposited.....

Receipt No. & Date.....

From :

MANIKANTA NAIK

CHIEF - CORPORATE SERVICES

TATA STEEL BSL LTD, NARENDRAPUR, PO-KUSUPANGA DIST- ~~ANGUL~~ DHENKANAL

(Name & address block letters)

To

THE VICE-CHAIRMAN,
TALCHER ANGUL MERAMANDALI DEVELOPMENT AUTHORITY,
ANGUL.

Sir,

I/We hereby certify that the erection of building as per the schedule below Plot No.681,672,674,697,716,708,747,709,780,740,2248,others..... Khata No.30,39,55,63,7,96,9467,1068 others..... Mouza .....Narendrapur..... Ward No .....—..... has been supervised by me/us and has been completed on ..... Date..... Strictly according to the plan sanctioned vide letter No.985 BP/TAMDA dated ..11./05./2017..... The work has been completed to my/our best satisfaction. All the material (type of grade) have been used strictly in accordance with the general and detail specification. The structural safety with respect to cyclone & earthquake has been taken care as per the provisions of the NBC. The fire safety measures have also been adopted as per the clearance of the fire officer.

No provision of the Orissa Development Authority Act. 1982 & Orissa Development Authority Rule 1983 and the Relevant Building Regulation has been violated. No requision made, conditions imposed or orders issued with respect to the above quoted sanctioned plan have been transgressed in the course of the work. The building is fit for use for which it has been erected.

Signature of the
Owner(s) & Developer

Yours faithfully

Er Niladri Bihari Mohanty
STRUCTRUAL ENGINEER
Regd.No-RTP/DTP(ST.ER)-017/2017
As per ODA (CAF) Rule-2016
Mob-9937025331

Gautam Kr. Agrawal

Signature of Regd. Architect

AR. GAUTAM KUMAR AGRAWAL
CA/2016/77797

Signature of Regd. Str. Engr.

FORM-VII

[(See Regulation 52(1) (v)]

STRUCTURAL STABILITY CERTIFICATE

(To be furnished by the registered Structural Engineer/Architect)

This is to certify that I/~~We/M/s~~ Er. Niladri Bihari Mohanty

has/have prepared the structural design of the building over Plot No. 681, 672, 674, 697, 716, 708, 747, 780, 709, 740, 224, 745 & others

.....Khata No. 1303, 955, 68, 796, 94, 67, 1065 others Mouza. Narendrapur

For construction of ~~G, G+1, G+3, B, B+G+2, B+G+9~~ B+G+12 storey building as per the provisions of National Building Code. I undertake the responsibility with regard to supervision of the work at each stage of construction, (after lying of foundation & after casting of each floor) and submit the report to TAMDA to the effect that the building is being constructed confirming to the approved plan and as per the structural design prepared be me/firm as per the provisions of NBC taking into account the safety factors like cyclone & earth quake etc. I/We will be responsible and liable for action by TAMDA / Govt. if the plan / design submitted contain misrepresentation or fraud and construction is made in deviation of approved plan or if there is structural failure & fire endangering the inmates & the public.

(i) **Signature and Seal**
Registered Structural Engineer

Er Niladri Bihari Mohanty
STRUCTRUAL ENGINEER
Regd.No-RTP/DTP(ST.ER)-017/2017
As per ODA (CAF) Rule-2016
Mob-9937025331

(i) Present and Permanent Address

Er. Niladri Bihari Mohanty.
Plot No- 1329/2356 (New), 3311 (Old)
Kharakhia Baidyanath Lane, Old town
Bhubaneswar 751002.

(ii) Present and Permanent Address

(iii) Signature of the Plot Owner/
Owner & Developer/Builder.

TSL/SEIAA/BS-30/2021-12/142
22nd Dec' 2021

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

Sub: Compliance to specific conditions of environmental clearance for construction residential township of Tata Steel Ltd. (formerly Tata Steel BSL Ltd.)

Ref: SEIAA letter No.2882 dtd.29.09.21

Dear Sir,

With reference to the captioned subject and cited reference, we would like to inform you that State Environment Impact Assessment Authority (SEIAA) has granted Environmental Clearance vide letter No. 2882/SEIAA dtd. 28.09.21 for construction of Residential Quarter (Township) projects for staffs of Tata Steel Ltd. (formerly Tata Steel BSL Ltd.), Meramandali, Dhenkanal.

We are submitting herewith the following layout/documents to comply the specific conditions of Environmental Clearance.

I. Layout of building construction and area development plan.
II. CER and CSR plan for township.
III. Layout of rainwater harvesting pond.
IV. Water balance diagram.

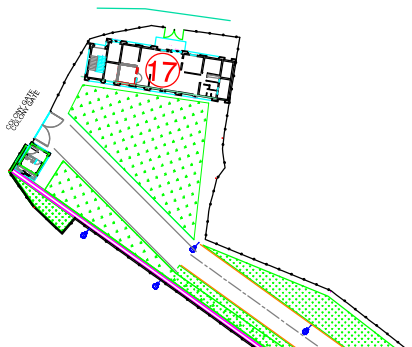
Hope, this is in line with your requirements.

Thanking you,

Yours faithfully,
f: Tata Steel Limited

Saroj Kumar Banerjee
Chief Environment

Encl: As above

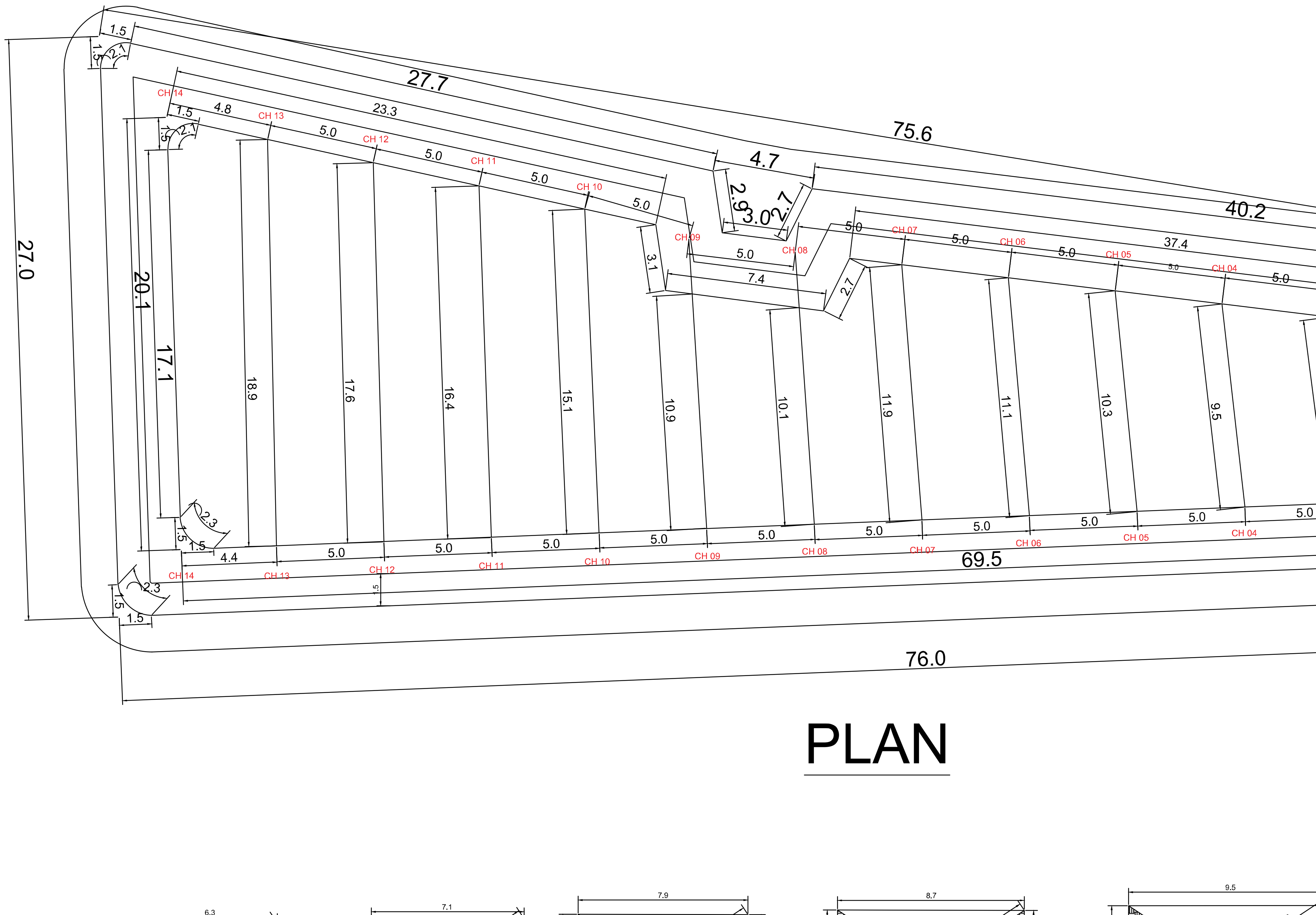


NA

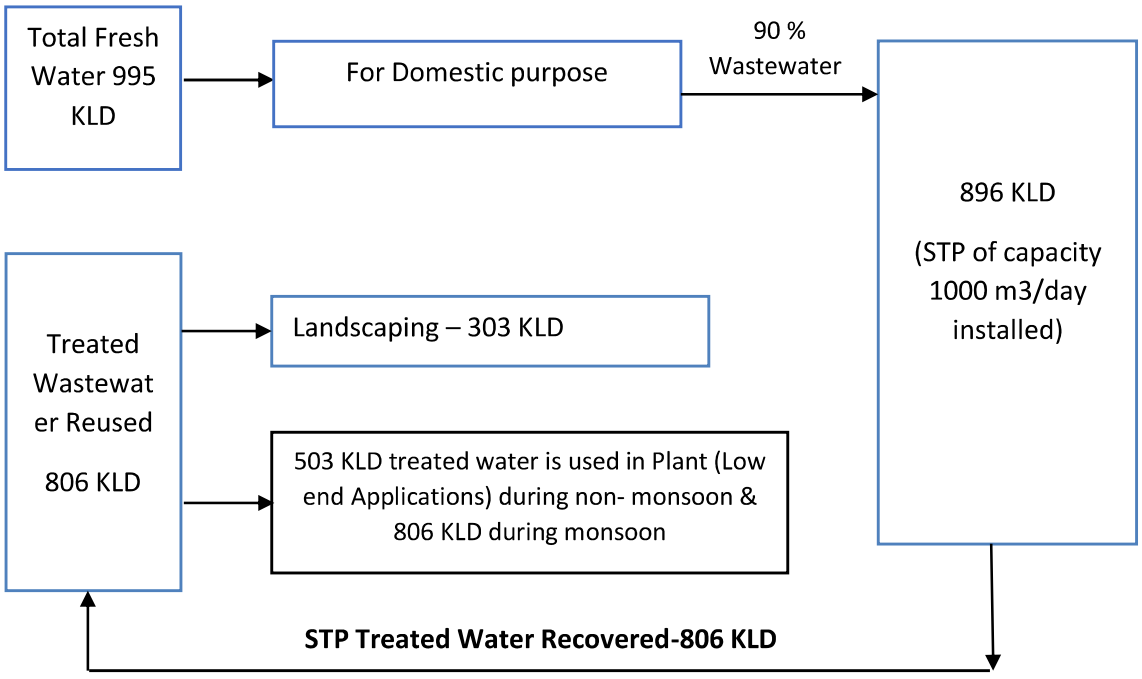
V

CER & CSR Schemes for standalone township of Tata Steel Ltd. Meramandali

VERTICAL	ACTIVITY	Budget in Lakhs		
		FY 22	FY 23	FY 24
HEALTH & DRINKING WATER	Dengue/Malaria control thro' anti larvae, fogging and awareness activities	15	8	7
	Drinking water	1.8	6	9
	Nutrition garden under Maternal Health	5.07	-	-
ENVIRONMENT	Plantation	3	3.8	5
	DPR for Pond renovation of Sarpa and Nuagaon	8	8	-
	Solar light 100 nos	21.5	-	-
	Creation Drainage system & repair of Culvert	0	9.6	
INFRASTRUCTURE	Road repair and maintenance	0	6	4
LIVELIHOOD	Pisciculture	11.92	6	4
Total		**66.29**	**47.4**	**29**


PLAN
75.6
27.7
40.2
37.4
23.3
4.7
4.8
2.9
3.0
2.7
3.1
7.4
27.0
20.1
17.1
18.9
17.6
16.4
15.1
10.9
10.1
11.9
11.1
10.3
9.5
69.5
76.0
4.4
1.5
2.1
2.3
5.0
CH 04
CH 05
CH 06
CH 07
CH 08
CH 09
CH 10
CH 11
CH 12
CH 13
CH 14
6.3
7.1
7.9
8.7
9.5

Water Balance Diagram



CHAPTER – VII

ADDITIONAL STUDIES

7.1 PUBLIC CONSULTATION

Public hearing is not applicable for this project as per MoEF&CC notification vide letter no. F.No.Z-11013/22/2017-IA.II(M) dated 10.06.2019 stating "the projects covered under category 8(a) of the schedule of the EIA Notification which are in violation of the said notification are appraised by the Ministry as per the provisions of the OM dated 16.03.2018 without the requirement of public hearing".

7.2 REHABILITATION & RESETTLEMENT PLAN

No rehabilitation or resettlement plan is proposed as there are no habitations in the project site.

7.3 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

Risk assessment forms an integral part of EIA study. Risk assessment study deals with identifying and evaluating the magnitude of impending risks to which the neighboring population is exposed due to occurrence of accidents involved in the project construction and implementation. This assists in illustrating the guidelines for preparation of disaster management plan which will be executed to handle the situation, if any emergency occurs.

RULES & REGULATIONS INVOLVING SAFETY

The responsibility of the management of any project is awareness and compliance with the provisions of various statutory rules and regulations on Safety, Health and Environment

1) COMPLIANCE OF STATUTORY ACTS & RULES

Following Acts & Rules under Environment (Protection Act), 1986 as amended to-date:

(a) The Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules 1989 amended in 1994, 2000, 2008 and 2016;

(b) The Chemical Accidents (Emergency Planning, Preparedness & Response) Rules 1996;

(c) Hazardous and Other Wastes (Management & Trans-boundary Movement) Rules, 2016;

(d) The Bio-Medical Waste (Management and Handling) Rules, 1998;

(e) Battery Management Rules, 2001.

(f) Solid Waste Management Rules, 2016.

(g) Plastic Waste Management Rules, 2016.

(h) Construction and Demolition Waste Management Rules, 2016.

(i) E - Waste Management Rules, 2018.

Municipal solid wastes, construction wastes, and domestic hazardous wastes shall be disposed off as per the provisions of the above-mentioned Acts & Rules.

2) GUIDELINES FOR STORAGE OF PETROLEUM PRODUCTS

The Petroleum Rules 2002 dated 13th March 2002, license is required for storage, handling and transport of any such product (i.e. petroleum Class B) if the total quantity in possession exceed 2500 liters in non-bulk (i.e. drums) or 1000 liters in a receptacle / tank (i.e. bulk).

3) SAFETY CODES FOR BUILDINGS AND FIRE FIGHTING SYSTEM

The project falls under Category IV of the seismic Zone. Construction of the residential and commercial buildings has been designed as per the provisions of National Building Code 2016. the fire-fighting system has been provided in consideration of the following codes, manuals, and guidelines:

a) National Building Code (NBC) of India 2016; NBCI-Part-IV

c) As per requirement of fire officer / local fire approving authorities; and

d) As per Indian Standard Code for Fire Protection (IS Codes)

e) Rules of Insurance Company & TAC Manual (for reference and guideline).

7.3.1 HAZARD ASSESSMENT AND EVALUATION

The method for assessment and evaluation of the hazards in the project has been discussed below. This is followed by consequence analysis to quantify these hazards. The methodology of managing the risk is as follows:

i) Live with low level of risks

ii) Manage to change the medium level of risk to low level by controlling the hazards and

iii) Reducing the risk level by suitable mitigation measures, to make the risk manageable. Avoid activities with high risk.

The risk analysis may be determined from the level of the hazard and from the failure frequency. The risk assessment determines whether the risks are tolerable or if risk mitigation measures are required to reduce the risk to a level which can be "**As Low as Reasonably Practicable (ALARP)"**. All the activities are done under strict supervision / control to avoid anticipated accidents so that the risk is reduced to a level considered "as low as reasonably practicable (ALARP)" conditions which are adequately safe and healthy. The risk involved in any activity is a combination of severity of hazard and probability (frequency) of occurring of undesired event. The risk involved is quantified from the following:

Risk = Consequence (C) x Frequency (L),

where C is Consequence of interaction (severity of impact), and L is Likelihood that it will occur (frequency).

The severity of the possible hazards that can take place in various activities can be classified into following three categories: -

1. **Low:** i) Minor emissions which would cause little or no harm to the environment or health.
   ii) Minor or trivial injuries or near miss incidences.
   iii) Limited damage or loss on property.
2. **Medium:** i) Minor injuries and lost time accidents.
   ii) Limited/localized evacuation and short-term sheltering.
   iii) Losses easily recovered.
3. **High:** i) Large number of injuries or death.
   ii) Major damage or disruption to property;
   iii) Massive evacuation or sheltering

Frequency or the likelihood of occurrence of hazards can be categorized into the following**:**

1. **Rare** : Hazard event is likely to occur in less than once every 5 years
2. **Occasional** : Hazard event is likely to occur once in 1-5 years
3. **Frequent :** Hazard event is likely to occur once in a month to once in a year. For each hazard, the risk involved shall be evaluated from the level of the Hazard and its frequency of occurrence.

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	No t conceivable even in future	1
Severity (S)	**Description**	**Rating**
Catastrophic	Casualties, Disastrous Environmental damage, Financial loss (>1 ,000 core)	5
Major	Major injuries & Environmental damage,	4
Moderate	Moderate injuries & Environmental damage,	3
Minor	Minor injuries & Environmental damage,	2
In significant	No injuries & Environmental damage	1

7.3.2 HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA)

The following vulnerable zones of accident have been identified.

7.3.2.1 Frequent Causes of Accidents

1. Fire and explosion: explosives, flammable materials

1) Being struck by falling objects 2) Snapping of cables, ropes, chains, slings 3) Handling heavy objects 4) Electricity 5) Falls from high rise structures 8) Struck by moving objects

7.3.2.2 Physical Hazards

Physical hazards Physical hazards are present in every construction project. These hazards include noise, heat and cold, radiation, vibration, and barometric pressure. Construction work often must be done in extreme heat or cold, in windy, rainy, or foggy weather or at night. Ionizing and non-ionizing radiation is encountered, as are extremes of barometric pressure

7.3.2.3 Hazardous Substances and Wastes

The project is having residential buildings and shall involve handling of following hazardous and toxic materials:

1) Heavy and toxic metals (lead batteries, mercury thermometers, cadmium, copper, zinc, etc.)

2) Lack of hazard communication (storage, labeling, material safety data sheets)

3) Batteries, fire-fighting liquids

4) PCBs and PVCs 5) Volatile organic compounds solvents

Hazard Prone Areas

At the proposed housing project, hazard occurrence may result in on-site implications like:

1. Fire and/or explosion.
2. Leakage of flammable material and catching fire.
3. Natural calamities like earthquake, cyclone etc.

7.3.2.4 Fire

Fire is a serious hazard and is normally regarded as having a disaster potential less than natural hazard that can be controlled at the incipient stage. The fire fighting facilities provided for the project is as presented in Chapter 2, Section 2.3.2.1.9 on page no. 56. The Fire-fighting network followed by Emergency Response Mock Drills is being followed as essential part of Risk Control Measures.

There are two worst-case scenarios for fires in very tall buildings:

- A fire burns out of control on the structure's lower floors at such a high intensity that, once extinguished, the structural damage is enough to cause the building to be considered a constructive total loss.
- A fire originating on the building's lower floors is able to spread throughout all the levels of the structure.

Despite the clear gravity of the above scenarios, these types of fire have happened infrequently in very tall buildings. More typically, fires in very tall buildings yield only partial structural damage. However, losses of life and property can still be substantial.

Emergency prevention through good design, operation, maintenance, and inspection are essential to reduce the probability of occurrence and consequential effect of such eventualities. However, it is not possible to totally eliminate such eventualities and random failures of equipment or human errors, omissions and unsafe acts cannot be ruled out. An essential part of major hazard control has therefore, to be concerned with mitigating the effects of such Emergency and restoration to normalcy at the earliest.

The overall objective of a disaster management plan is to make use of the combined resources at the site and outside services to achieve the following:

- To localize the emergency and if possible, eliminate it.
- To minimize the effects of the accident on people and property.
- Effect the rescue and medical treatment of casualties.
- Safeguard other people.
- Evacuate people to safe areas.
- Informing and collaborating with statutory authorities.
- Provide authoritative information to news media.
- Initially contain and ultimately bring the incident under control.
- Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency; and
- Investigating and taking steps to prevent reoccurrence.

7.3.2.5 Leakage of flammable material and catching fire Explosion.

LPG is flammable. So, it becomes necessary for all of us in our day today life to be aware of the hazards. Heavier than air, tends to settle at the floor level during leakage. Highly combustible, causes extensive loss to life and property. Catches fire when it forms 2% or above mixture with air.

Fire Safety: precautions while using LPG

1. **Ventilation:** Before using PNG, make sure the room has enough ventilation. Open the doors and windows, so that in case of any leakage, the gas would disperse quickly.
2. **Leakage:** A distinctive odor is added to the gas for easy identification. Also, if there is a hissing sound near a pipeline, it may indicate leaking natural gas.

If there is a leakage, close the valve that supplies gas to your stove and seek the help of your gas supplier. Do not light a match or a lighter or any naked flame. Do not move an electrical appliance or turn off or turn on an electrical appliance.

7.3.2.6 Electrocution:

Electrical fires in residential buildings result in more damage and higher death rates per 1,000 fires on average than

nonelectrical residential fires (Table 7.1). loss per fire for residential building electrical fires is more than double that for nonelectrical residential building fires; deaths per 1,000 fires is about 70% higher for residential building electrical fires. The injury rates resulting from residential building electrical and nonelectrical fires, however, are roughly the same, at 28 to 29 injuries per 1,000 fires.

It is important to ensure that the electrical panels, outlets, switches, and junction boxes in your home are correctly installed and not damaged or modified by unlicensed electricians. Do not use extension cords and multiple plug-in devices as a replacement for new circuits. Since 15% of residential building electrical fires start in a bedroom, upgrade bedrooms with AFIs where possible. Never use water on suspected electrical fires and inform your local fire department.

Precautionary measures

1. Flexible cords connected to appliance should be wired to confirm to the international colour code. Colour of the insulation on the wire is:
2. Brown represents live wire.
3. Blue represents neutral wire and Green/yellow stripes represent earth wire
4. Avoid using handheld appliances when your hand and/or body are wet
5. Repair of appliances and replacement of flexible cords should be carried out only by competent persons
6. Take precaution when working in the vicinity of overhead lines to avoid any unforeseen incident
7. High voltage points and instruments to be secured and labeled prominently.

7.3.2.7 Natural and Manmade Calamities which can lead to Emergency

- **Earthquake**

An earthquake poses a major threat to the property, life, and environment. Some of the effects of an earthquake are ground shaking, ground lateral displacement, ground uplift, ground settlement, soil liquefaction and fires. Though the earthquake is not a regular phenomenon in this region, the

possibility of its occurrence cannot be ruled out especially since occasional shocks are perceived sometimes.

As per the seismic Zone Map of Odisha published by OSDMA,2002, Project area is categorized in the III which comes under the Lower to moderate risk zone of the seismic zonation shown in Figure 2.18 on page no. 55. The structural design is as per Zone III to safeguard the structures from the risk of earthquake.

Precautionary measures

1. BIS codes relevant to the project site shall be adopted for building standards.
2. Heavy items such as pictures and mirrors to be hanged away from beds, settees, and other sitting places.
3. Overhead light and fixtures to be braced securely, heavy/large objects to be stored on lower shelves.
4. Repair defective electrical wiring and leaky gas connections.
5. Safe places to be identified, indoors and outdoors, during tremors.
6. Emergency centers like hospitals, fire station, police station etc. with telephone/cell numbers to be displayed.

SOP during earthquake

1. Once you feel tremors/shaking, do not panic and stay calm
2. Cover under a nearest sturdy table, desk, bed or kitchen table, do not run
3. Brace yourself inside a corner or interior wall away from windows
4. Cover head with pillows/hands
5. Once shaking stops, immediately vacate the building through staircase
6. Don't forget about aftershocks

- **Cyclone**

  All the construction work is designed to withstand wind speed. The strategic actions during a cyclone can be activated by receiving advance information from the local meteorological department as well as from Disaster Management Centre of Govt. of India. While establishing strategic actions that need to be taken during such scenarios, factors such as poor communication, loss of utilities, disrupted logistics and life-threatening rescue facilities will be considered. As per the Vulnerability Atlas Published by BMTPC Govt of India , Project area is

categorized in the Moderate Risk Zone of the Wind & Cyclone Zone of the Odisha shown in Figure 2.19 on page no. 55.

- **Flood**

  A flood is an overflow of water that submerges land, which is normally dry. Floods can happen on flat or low-lying areas when the ground is saturated and water either cannot run off or cannot run off quickly enough to stop accumulating. Project site area is almost flat with adequate drainage pattern network so storm water cannot flood the area. Slopes are given along with the roadside, so that Rainwater will get collected in collection pits and eventually flow through the storm water network.

- **Material/Transport Emergency**

  During transportation of the materials, emergencies like fire, leakage or spillage are possible. It may be outside the project premises, at nearby or far locations. Necessary emergency actions will be initiated from internal or external resources as per the nature of the emergency.

- **Terrorist/mob attack/bomb threat**

  Terrorist attacks may not be eliminated completely, but the effects of these attacks on buildings and structures can be mitigated to a large extent with precautions and preemptive strategies.

- **Explosion**

  The detonator can be carried by hand, delivered by vehicles, hurled as projectiles, or placed in the usual supplies to the resort/hotel building.

- **Arson/Burning**

  The detonator can be carried by hand, delivered by vehicles, hurled as projectiles, or placed in the usual supplies to the resort/hotel building. The damage can vary over the whole spectrum – from non-structural element loss, structural elements damage, structural element collapse, to progressive failure of part/whole area.

Precautionary measures

1. The resort will be fully secured all around the periphery and there will be emergency exit provided in each building.
2. The entry and exit points will be manned for 24 hours with specially trained security staff fully equipped with latest security gadgets including CCTVs monitoring all sensitive areas within the resort complex.
3. A logbook will be maintained to record the identities of all vehicles/ residents/guests/ visitors entering and leaving the resort

4. All persons/ vehicles entering the resort will be checked for explosives and weapons.

SOP for staff

1. Screen the guests/visitors at all the entrance.
2. In case of breach in security and terrorist attack, guests to be safeguarded and evacuated to safer place, if possible
3. Keep all helpline numbers such as numbers of hospitals, blood banks, police stations, etc. handy.
4. Alerting procedure begins on receipt of the warning/first information only after informed by appropriate authority.

SOP for GUEST

1. If you see any suspicious stuff, inform hotel staff immediately.
2. Avoid being misled by rumors.
3. In case, you hear firing inside hotel, stay inside your room, lock the room, sit silent and wait till the way is clear to be evacuated.

7.3.2.8 High Risk Categories and Preventive Measures

Risk = Consequence (C) x Frequency (L),

Likelihood						
	F1 (Almost Certain)					I
	F2 (Likely)			II		
	F3 (Possible)		III			
	F4 (Un Likely)					
	F5 (Rare)	IV				
		C1	C2	C3	C4	C5
		Consequence				

Risk	Risk priority	Action
Red	Very High	Requires Immediate action
Yellow	High	Requires planned approach for mitigation the risk
Blue	Medium	No requirement of Immediate action but requires attention for attenuation to avoid future events
Green	Low	No requirement of action

7.3.2.9 Measures for control of Occupational Health Hazards

- Dust Exposure level of shop floor workers is to be appropriately monitored.
- Check of the effectiveness of preventive and control measures on regular basis.
- Adequate supplies of potable drinking water are to be provided. Water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) are to be according to drinking water quality standards.
- Where there is potential for exposure to harmful dusts, ingestion arrangements are to be made for clean eating areas, where workers are not exposed to the hazardous or noxious substances.
- Periodic medical hearing checks are to be performed on workers exposed to high noise levels
- Provisions are to be made to provide OHS orientation training to all new employees to ensure that they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees.
- Contractors that have the technical capability to manage the occupational health and safety issues of their employees are to be hired, extending the application of the hazard management activities through formal procurement agreements.
- Ambulances and First aid treatment facilities are to be made available for any emergency.

7.3.3 Disaster Management Plan

7.3.3.1 Objective

The objective of Disaster Management plan is to give a broad framed layout to tackle emergency situation that may lead to a hazardous situation. It defines detail organizational responsibilities, actions, reporting requirements, broad and specific key roles and responsibilities of personnel with Organograms and organisation charts. The overall objectives of the emergency plan will be:

- Ensure safety of people, protect the environment
- To ensure localization of risk

- To minimize and reduce the effects of the accident on people and property.
- Immediate response to emergency scene with effective communication network and organized procedures.
- To obtain and mitigate early warning of emergency conditions so as to prevent impact on personnel, assets and environment.
- To prevent injuries by following proper onsite, offsite emergency plans that can protect personnel from the hazard.

7.3.3.2 Onsite Disaster Management Plan

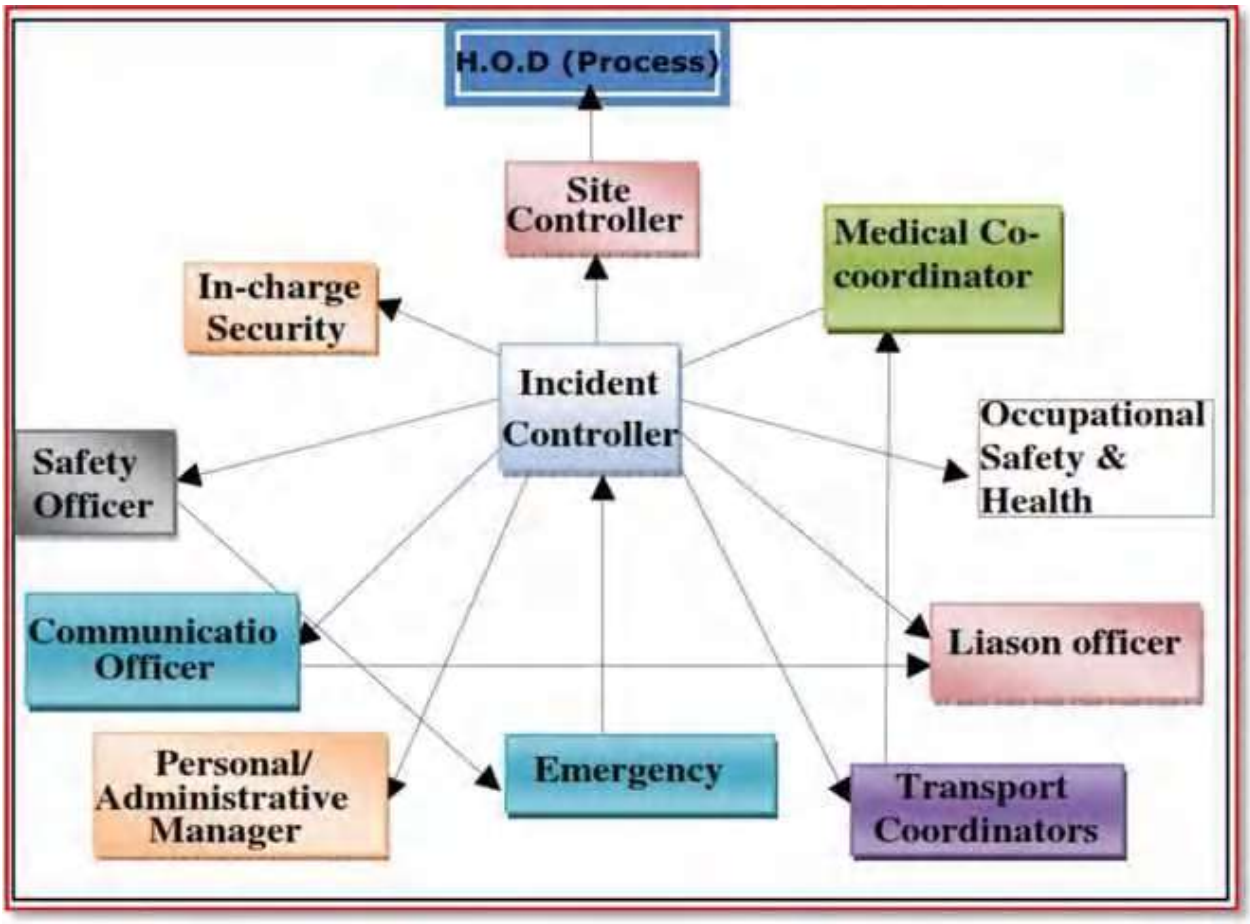
Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster which limits the damage to the minimum and follow the on-site emergency planning.

The onsite emergency is an unpleasant situation that causes extensive damage to plant personnel and surrounding area and its environment due to in operation, maintenance, design and human error. Following point are taken into consideration:

- To identify, assess, foresee, and work out various kinds of possible hazards, their places, potential and damaging capacity, and area in case of above happenings.
- Review, revise, redesign, replace, or reconstruct the process, plant, vessels and control measures if so assessed.
- Measures to protect persons and property of processing equipments in case of all kinds of accidents, emergencies, and disasters.
- To inform people and surroundings about emergency if it is likely to adversely affect them.

7.3.3.3 Disaster control Management system

Disaster Management group plays an important role in combating emergency in a systematic manner. Schematic representation of Emergency Control Management system is shown in Fig. 7.1



7.3.3.4 On-Site Emergency Control Plan (ECP)

The fundamental need of an Emergency Control Plan (ECP) is to establish two control centers, one at the affected site as Emergency Control Centre (ECC) and the other one reasonably away from the affected site as Central Control Centre (CCC).

7.3.3.5 Roles and Responsibility

A team of following Essential persons shall be taking necessary action during the event of emergency. The roles and responsibilities of these personnel are defined subsequently:

A. Head of the Department / Section In-charge or Incident Controller

- Quickly assess cause/source of the hazards and its effects.
- Discuss with the Site Controller and coordinate the necessary action required to control/contain the emergency situation.

- Continuously monitor the work of firefighting personnel and other persons engaged in the emergency actions so that all actions are carried out safely.

B. Site Controller –Head (Environnement)

- Responsible for the overall control of the emergency situation.
- Discuss with the Incident Controller about the situation and evaluate the Major Emergency situation. The initial assessment of the situation is done by the concerned HOD immediately after the incident happens.

  Ensure communication to the following authorities if necessary: -

  a. Fire Brigade

  b. Local Hospitals

  c. Civil Authorities

  d. Electricity Board
- Ensure communication to the neighboring Building and villages of the incident, if required.
- Maintain a speculative continuous review of possible developments and assess these to determine most probable course of events.
- Ensure proper preservation of evidence for subsequent investigation. Inform the Company Officers at the Corporate Office.

C. Safety Officer

- Ensure overall safety of the Emergency Operations.
- Assist in controlling the Emergency.
- Keep Central Control Center (CCC) informed of the developments from time to time.
- Mobilize all available resources for controlling the incident.
- Help in carrying out search and rescue operations, if required.

D. Security Officer

- Ensure that unauthorized persons do not enter the emergency area.
- Ensure cordoning off the prohibited area.
- Ensure availability of the firefighting personnel.
- Act as per the instructions of the Incident Controller.

E. Process & Maintenance Personnel of Affected & Non- Affected Areas

- Persons of the unaffected area shall ensure the smooth operation of their own areas and shall not create a crowd at the emergency site. They are to extend their full co-operation to the staff

fighting with the emergency, if the need arises.

- Persons of the affected area shall not create hue and cry and before arrival of the Security Staff, should initiate first aid action against the emergency. They shall extend help to the firefighting staff as per their requirement. The maintenance staff shall ensure availability of crane, gas cutting and welding facilities to meet any emergency requirement. The electrical staff shall ensure electrical isolation of the area, if required, and shall arrange emergency lights to lighten the area.
- Persons are to remove the materials from emergency area prone to fire / explosion etc.
- Conduct emergency control operations as per the instructions of the Incident Controller

F. Role of the Store Personnel

- The Store Department shall ensure that in emergency it is open to issue Personnel Protective Equipment (PPEs) and other materials required to tackle the emergency.

7.3.3.6 Evacuation Plan

General Building Evacuation Procedure

At recognition of Fire / hearing the shouting "Fire", it is the responsibility of all building occupants to evacuate immediately and proceed to predetermined assembly points, away from the building. Building occupants are also responsible for ensuring that their visitors/customers follow the evacuation procedure described herein, and leave the building along with all other occupants. Designated essential personnel needed to continue or shut down critical operations, while an evacuation is underway, are responsible for recognizing and/or determining when to abandon the operation and evacuate themselves. Contract workers will be made familiar with the procedures outlined herein, and are expected to leave the building when the alarm sounds.

Whenever Recognize SMOKE OR A FIRE --> REMEMBER - R.A.C.E.

- RELOCATE - If it is safe to do so, Relocate people. Instruct others to report to their designated gathering areas. Be aware of persons who may need assistance.
- ALARM – Sought "FIRE" to alert all occupants. Move to a safe location. Call Security & Fire.
- CONFINE - Close all doors, windows and other openings to confine the fire, if this can be done safely.
- EVACUATE - Evacuate from building & assemble at assembly point.

B. Evacuation Instructions

On ringing of the building alarm or upon information of a general building emergency, following instructions are to be followed:

- Do not be panic.
- Do not ignore alarm.
- Leave the building immediately, in an orderly fashion.
- Follow quickest evacuation route from where you are.
- Do not go back to your office area for any reason.
- Proceed to the designated emergency assembly point for your area. If the designated assembly point/area is unsafe or blocked due to the emergency, proceed to the alternate assembly point.
- Report to your Work Area Reporting officer at the assembly point to be checked off as having evacuated safely; also report any knowledge you may have of missing persons.
- Return to the building only after emergency officials or building monitors give the all-clear signal. Silencing the Alarm doesn't mean the emergency is over.

C. Emergency Evacuation Personnel

For the purpose of this Plan, Emergency Evacuation Personnel, and their alternates are regular employees who have been selected to ensure that building evacuation is carried out as planned, evacuated building occupants are directed to assign assembly points where they will be accounted for, and persons needing assistance to evacuate are attended to. Building emergency evacuation personnel and their alternates shall be selected among building occupants, and on a voluntary basis.

F. Role of the Store Personnel

- The Store Department shall ensure that in emergency it is open to issue Personnel Protective Equipment (PPEs) and other materials required to tackle the emergency.

7.3.3.7 Fire Fighting Equipment

The fire fighting facilities provided for the project is as presented in Chapter 2, Section 2.3.2.1.9 on page no. 56. The Fire-fighting network followed by Emergency Response Mock Drills is being followed as essential part of Risk Control Measures.

7.3.3.8 First Aid

First aid centre with adequate facilities are provided with in the premises of Township . It is to be maintained round the clock by a compounder cum dresser and a doctor. An ambulance is to be made available for emergency scenario. It is to be used at site to carry affected people to hospital.

7.3.3.9 Assembling Point / Refuse Area for Evacuation

Assembling Points have been earmarked in the project area for safe gathering in case of any emergency. The project proponent has provided Assembling Points of one refuge area till 24 meter

and one till 39 meter each have been provided, as per National Building Code.

7.3.3.10 Off-Site Emergency Planning

A major emergency in any situation is one, which has the potential to cause serious injury or loss of life, which may cause extensive damage to the structure in vicinity and environment and could result in serious disruption to normal operation both inside and outside the premises of the project. Depending on the magnitude of the emergency, service of the outside agencies is being envisaged. The management must take effective steps to assess, minimize and wherever feasible, eliminate the risk to a large extent. Accident may still occur, and it is necessary to be fully prepared to tackle all such emergencies if and when they occur.

It is likely that the consequences of such emergencies will be confined to the units concerned or may affect outside as well. If the consequences are confined within the plant boundary, it will be controlled by **Chief Emergency Controller**. The most widely used techniques in practice will be based on experience accumulated over many years and the safety audits.

Incidents having off-site implications can be:

1. Natural calamities like earthquake, cyclone, landslide etc.
2. Chlorine and other Toxic Gas Leaks.
3. Major Fire involving combustible materials like oil and Gas spreading from other nearby facilities or installations.
4. Air raids/Crashing of aircraft or flying objects. Incidents, which could also lead to a disaster.
5. Agitation/forced entry by external group of people.
6. Sabotage.

In an extremely rare event of massive disaster which will have potential to affect areas outside the Project premises, needs to be informed to the District Authorities responsible for the preparation and implementation of Off -Site Disaster Management Plan. **The measures will include - Allocation of duties among the Project Fire Brigade, Police and Auxiliary Force.**

Under the Environmental (Protection) Act, 1986, **the responsibility of preparation of Off-Site Emergency Plan lies with the State Government.** The Collector, Deputy Collector by virtue of their occupation is normally nominated by the concerned State government to plan Off-Site Emergency Plan.

The District Collector or his nominated representative would be the Team Leader of the planning team, who shall conduct the planning task in a systematic manner. The members of the Planning Team for Off -Site Emergencies are Collector, Deputy Collector, District Authorities In-Charge of Fire Services and Police, members drawn from Medical Services, Factory Inspectorate, Pollution Control Board and

Industries & Transport Departments. In addition to these members, there are cooperative Members also from the district authorities concerned, Civil Defense, and Publicity Department, Municipal Corporation, and non-officials such as representatives (MPs, MLAs, Voluntary Organizations, NGOs etc).

7.3.3.11 EMERGENCY PREPAREDNESS

a) Maintenance Schedule for all the construction equipments and vehicles are prepared as per recommendations of manufacturer's user manuals.

b) Information of minor incidents and accidents at site shall be collected and recordings of near emergencies that were averted which gives indication of likely or unlikely site facing emergencies shall be kept ready for information and analysis of the emergency.

7.4 OCCUPATIONAL HEALTH STUDY

7.4.1 Purpose:

Occupational safety and health (OSH) risks in construction of healthy housing (HH) have not been examined and collaboration between HH and OSH professionals is inadequate. The World Health Organization is developing international HH guidelines and the International Labour Organization is working to improve OSH in construction globally.

7.4.2 Methods:

We searched for exemplary reports (including gray literature) on construction hazards; preventive measures for occupants and workers; OSH frameworks, laws, and regulations; definitions; and HH.

7.4.3 Results:

Healthy housing construction typically improves ventilation, moisture and mold, pest control, injury hazards, cleanability, maintenance, accessibility, thermal conditioning, and avoidance of toxic building materials. To date, this work is done without explicit requirements for worker health. Construction is among the most hazardous sectors around the globe, although protective measures are well known, including engineering and administrative controls and provision of personal protective equipment. Residential construction, renovation, repair, and maintenance are fragmented, consisting mostly of small companies without proper OSH training, equipment, and

knowledge of HH principles. Residential construction is often undertaken by informal or unauthorized workers, putting them at high risk. Reduced exposure to toxic building materials is an example of a benefit for both workers and occupants if OSH and HH collaboration can be improved. By recognizing that homes under new construction or renovation are both a workplace and a residence, HH and OSH initiatives can apply public health principles to occupants and workers simultaneously. This article publishes key definitions, hazards and interventions common to both fields.

7.5 DISCUSSIONS & RECOMMENDATIONS FOR PREVENTION HEALTH IMPACTS

A global increase in residential construction and renewed global interest in HH poses both risks and opportunities for primary prevention. Policy and practice interventions can benefit the health of occupants and those who work on their homes. Improvements in legislation, regulation, and international frameworks are needed to maximize OSH and HH collaboration and realize significant co benefits. Occupational safety and health and HH standards should include requirements to protect both workers and occupants. Because homes can also be workplaces, both workers and housing occupants will receive important co benefits when OSH and HH standards use proven interventions to protect workers and occupants.

7.6 SOCIAL IMPACT ASSESSMENT

7.6.1 Integrating hazard and disaster risk into the SIA process

According to the Centre for Good Governance (2006), a conventional SIA process comprises the following ten steps, which are set out below with comments about how hazards and related disaster risks can be incorporated into the process.

Step 1. Develop public involvement programme The first step is to develop an effective plan to involve the public. This requires identifying and working with all potentially affected groups. It should explicitly include those who might be exposed to greater (or lesser) hazard risk as a result of the project. Stakeholder engagement is vital to SIA and should take place throughout the assessment. This should involve genuine participation in the process, not merely consultation.

Step 2. Describe proposed action and alternatives

The proposed action or policy change (and alternative approaches, if appropriate) is described in enough detail to begin to identify the data requirements for an SIA and design the frame- work for

assessment. Potentially key types of social impact, including those related to disasters, should be identified and plans made to obtain relevant data. This step is equivalent to the screening stage in an EIA.

Step 3. Describe relevant human environment and zones of influence

Relevant data on the geographical and human environments related to the project are collected and reviewed through a baseline study or community profile. This study could cover relationships between people and their biophysical environment (e.g., ecological setting, aspects of the environment seen as resources or problems, patterns of resource use) and culture, attitudes and social–psychological conditions (e.g., risk perception, psychological coping).

Step 4. Identify probable impacts (scoping)

This stage seeks to identify the full range of possible social impacts (including those perceived by affected groups). Early, comprehensive and systematic screening can identify potential hazards and associated risks that might affect the project and communities at any stage in the project cycle, as well as the impact the project itself might have on disaster risk. It is important that the views of all affected people, including those vulnerable to hazards, are taken into account.

Step 5. Investigate probable impacts

Investigation of the social impacts identified during scoping is the most important component of the SIA. A range of methods, including modeling and scenarios, can be deployed to investigate probable future impacts. Hazardous events (as external factors or consequences of the project) and their risk or uncertainty should be included in trend and scenario analysis. As part of the latter, scenarios should be developed of the social consequences of exposure to the hazards identified (e.g., using fault- or event-tree procedures).2 Records of previous experiences (including disaster events) provide valuable data for this process.

Step 6. Determine probable response

The responses of all affected groups to the impacts are assessed, in terms of attitude and actions. This should include responses to changes in social vulnerability as a consequence of the project and to a disaster event with an impact on the project. Differential vulnerability between social groups should be recognized.

Step 7. Estimate secondary and cumulative impacts

Secondary (indirect) and cumulative project impacts are assessed, although it is almost impossible to identify all dimensions of social impacts because of the way in which one change leads to others.

Future patterns of vulnerability, both as long-term results of the project and due to other factors (e.g., climate change), should be considered in this stage.

Step 8. Recommend changes or alternatives

The consequences of changes to the plan or alternative interventions are assessed as in step 5 (though usually on a more modest scale) and the same key issues should be considered.

Step 9. Mitigation, remediation and enhancement plan

A plan is developed for mitigating adverse impacts, by not taking or modifying an action, minimizing its impacts through design and operational changes, or compensating for its impact by providing alternative facilities, resources or opportunities. This might include risk mitigation strategies. Impact avoidance should be the first priority, impact reduction or minimization undertaken if avoidance is not possible, and offsetting or compensation for adverse impact used only when no other options are available.

Step 10. Develop and implement monitoring programme

A monitoring programme is developed to track project or programme development and compare actual impacts with projected ones.

7.6.2 Conclusion

When placed in the context of sustainable development, disaster management represents an important aspect of socio-economic and national security, therefore facilitating a continuous development process. Disaster reduction policies and measures need to be implemented with a two-fold aim; to increase the resilience to natural hazard while ensuring that development efforts do not increase vulnerability to these hazards.

TSM/SPCB/BS-30/2022-02/195
April 29, 2022

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

Subject: Submission of Sewage Treatment Plant certification report of Residential Township of TSL Meramandali (Formerly Tata Steel BSL Ltd.)

Reference: EC letter No. 2882/SEIAA, dtd. 28.09.2021

Dear Sir,

In reference to the captioned subject and letter cited above. We would like to inform you that Environmental Clearance was granted in favour of Tata Steel Ltd. (Formerly Tata Steel BSL Ltd.).) for construction of residential township with specific condition that "Installation of Sewage Treatment Plant shall be certified by an independent expert and report in this regard shall be submitted to the SEIAA Odisha".

In compliance to the above-mentioned specific condition, the Sewage Treatment Plant (STP) has been retrofitted and certified by an independent expert namely M/s Voltas Limited. The certificate and test report are enclosed as **Annexure -1** for kind reference.

Hope, this is in line with the requirement.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Head-Environment, Tata Steel Meramandali.

Enclosure: As above.

Copy to: The Regional Officer, State Pollution Control Board, Odisha, Angul

REGIONAL OFFICE ORISSA POLLUTION CONTROL BOARD ANGUL Received Dt. 18/05/2022

TATA STEEL LIMITED
Narendrapur Kusupanga Meramandali Dhenkanal 759 121 Odisha India Tel 91 6762 352000
Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India Tel 91 22 66654282 Fax 91 22 66657724
Corporate identity Number L27100MH1907PLC000260 Website www.tatasteel.com

VOLTAS

Retrofit Service Certificate

Ref. No: Voltas/WB/SERO/462 Dated: 21.12.2021

Project Name: 1.0 MLD Sewage Treatment Plant, TSL Township

Location: Tata Steel Limited, Meramandali

Dear Sir,

We hereby inform you that we have carried over a complete retrofit job in your 1.0 MLD STP as per your order no: 3099901666/A06, and completed the job as per list of work given in the order.

After completion of the retrofit job the Quality & Quantity of treated water was checked through a third party NABL certified lab and found to be matching with the desired limits.

The present treated water flow checked and found an average flow rate of 45m3/hr.

The test report from NABL Certified third party lab is enclosed herewith for reference.

VOLTAS LIMITED Plot No-172 District Centre Chandrasekharpur BHUBANESWAR-751016

Matrudatta Barik

Manager -Water Business

Voltas Limited

9601129429

RAICON

TEST REPORT

Description of Sample:	STP Water (Inlet)	**ULR TC:**	TC598321000002399F
Ref. No:	Nil	**Date of Report:**	17/12/2021
Letter Dated:	10/12/2021	**Date of Testing:**	11-16/12/2021
Sample Qty:	1 Ltr.	**Date of Receipt:**	11/12/2021
Issued To:	M/s Tata Steel BSL Ltd., Meramandali, Odisha.		

S.No.	Parameters	Test Value	Requirement as per OSPCB	Method of Test
1	pH	7.2	6.5 – 8.5	IS-3025 (P-11) 1983
2	Total Suspended Solids, mg/l	54	100 Max.	IS-3025 (P-17)-1984
3	COD, mg/l	62	250 Max.	IS-3025 (P-58)-2006
4	BOD (5days at 29°C), mg/l	86	30 Max.	IS-3025 (P-44)-1993
5	Oil & Grease, mg/l	4	10 Max.	IS-3025 (P-39)-1991

End

Checked By

Subject to Terms & Conditions Overleaf

RAICON LABS PVT. LTD. Authorised Signatory

RAICON LABS PVT. LTD.
ISO 9001:2015, 14001:2015, 17025:2017 (NABL) Accredited lab.
Contact us:
Plot No. 2943/7047, Saptasati Vihar, Rasulgarh, Mancheswar, Bhubaneswar, Odisha - 751010
Ph.: +91 7419906953 | +91 7206693044
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RAICON

TEST REPORT

Description of Sample:	STP Water (Outlet)	**ULR TC:**	TC598321000002400F
Ref. No:	Nil	**Date of Report:**	17/12/2021
Letter Dated:	10/12/2021	**Date of Testing:**	11-16/12/2021
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3	COD, mg/l	7.0	250 Max.	IS-3025 (P-58)-2006
4	BOD (5 days at 29°C), mg/l	9	30 Max.	IS-3025 (P-44)-1993
5	Oil & Grease, mg/l	2	10 Max.	IS-3025 (P-39)-1991

End

Checked by

Subject to Terms & Conditions Overleaf

Authorised Signatory

RAICON LABS PVT. LTD.

ISO 9001:2015, 14001:2015, 17025:2017 (NABL) Accredited lab.

Contact us:
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Residential Quarters (Township) Monitoring Report
PERIOD: From October'21 to March'22

SUMMARY OF AMBIENT NOISE MONITORING

S.N	Location	Noise level in dB(A) Leq (Day time-Range)	Noise level in dB(A) Leq (Night time-Range)	Standard (Day Time) in dB(A)
1.	Colony	49.6-53.2	44.6-45.9	55

SUMMARY OF AMBIENT AIR QUALITY

Month	Pollutant	NAAQ Standard	CAAQMS #01 Near Township
			Monthly Average Values
October 2021	PM10 (ug/m^3)	100	30.34
	PM2.5 (ug/m^3)	60	7.47
	SO_2(ug/m^3)	80	14.50
	NOx(ug/m^3)	80	15.02
	CO(mg/m^3)	2	0.26
November 2021	PM10 (ug/m^3)	100	45.92
	PM2.5 (ug/m^3)	60	15.32
	SO_2(ug/m^3)	80	11.78
	NOx(ug/m^3)	80	15.22
	CO(mg/m^3)	2	0.34
December 2021	PM10 (ug/m^3)	100	37.19
	PM2.5 (ug/m^3)	60	13.52
	SO_2(ug/m^3)	80	11.04
	NOx(ug/m^3)	80	15.15
	CO(mg/m^3)	2	0.79
January 2022	PM10 (ug/m^3)	100	35.48
	PM2.5 (ug/m^3)	60	13.23
	SO_2(ug/m^3)	80	10.49
	NOx(ug/m^3)	80	15.28
	CO(mg/m^3)	2	0.31
February 2022	PM10 (ug/m^3)	100	43.80
	PM2.5 (ug/m^3)	60	22.33
	SO_2(ug/m^3)	80	12.25
	NOx(ug/m^3)	80	25.29
	CO(mg/m^3)	2	0.50
March 2022	PM10 (ug/m^3)	100	62.19
	PM2.5 (ug/m^3)	60	11.39
	SO_2(ug/m^3)	80	10.81
	NOx(ug/m^3)	80	15.16

TRAFFIC STUDY

Traffic congestion Study at TSBSL Township

Project By:

TATA BSL

At: Meramandli, Dhenkanal ,Odisha.

JANUARY-2021

vetted by us as per the primary and secondary data provided by CEMC Pvt Ltd.

8/1/21

PPDey 08/Jan/2021

8/1/2021

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CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.
An ISO 9001-2015, OHSAS 18001:2007 & ISO 14001-2015 Certified Company, Empanelled with OCCL, ORSAC and SPCB of Govt. of Odisha
Accredited by NABET, QCI for EIA Studies as 'A' Category Consultant Organization. Empanelled with PCCF(Wildlife) &CWLW,Odisha
Enlisted in CIDC (established by the Planning Commission Govt. of India), NABLMoEF&CC, Govt. of India,
Recognised Environment Laboratory under Environment (Protection) Act, 1986.
Environmental Studies (EIA & EMP),Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RSA GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.
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INTRODUCTION

GENERAL

In the post liberalization era, the Indian steel industry has grown through greenfield capacity addition in the private sector, brown field expansion cum modernization of old plants both in the public & private sector, acquisition of steel capacities globally as well as backward integration into global raw material sources. With crude steel production of 78 Mt in 2012-13, India has emerged as the 4th largest steel producer in the world lagging behind only China, Japan and USA. As per some forecasts, India is likely to become the 2nd largest steel producer in the world by 2020 surpassing Japan and USA.

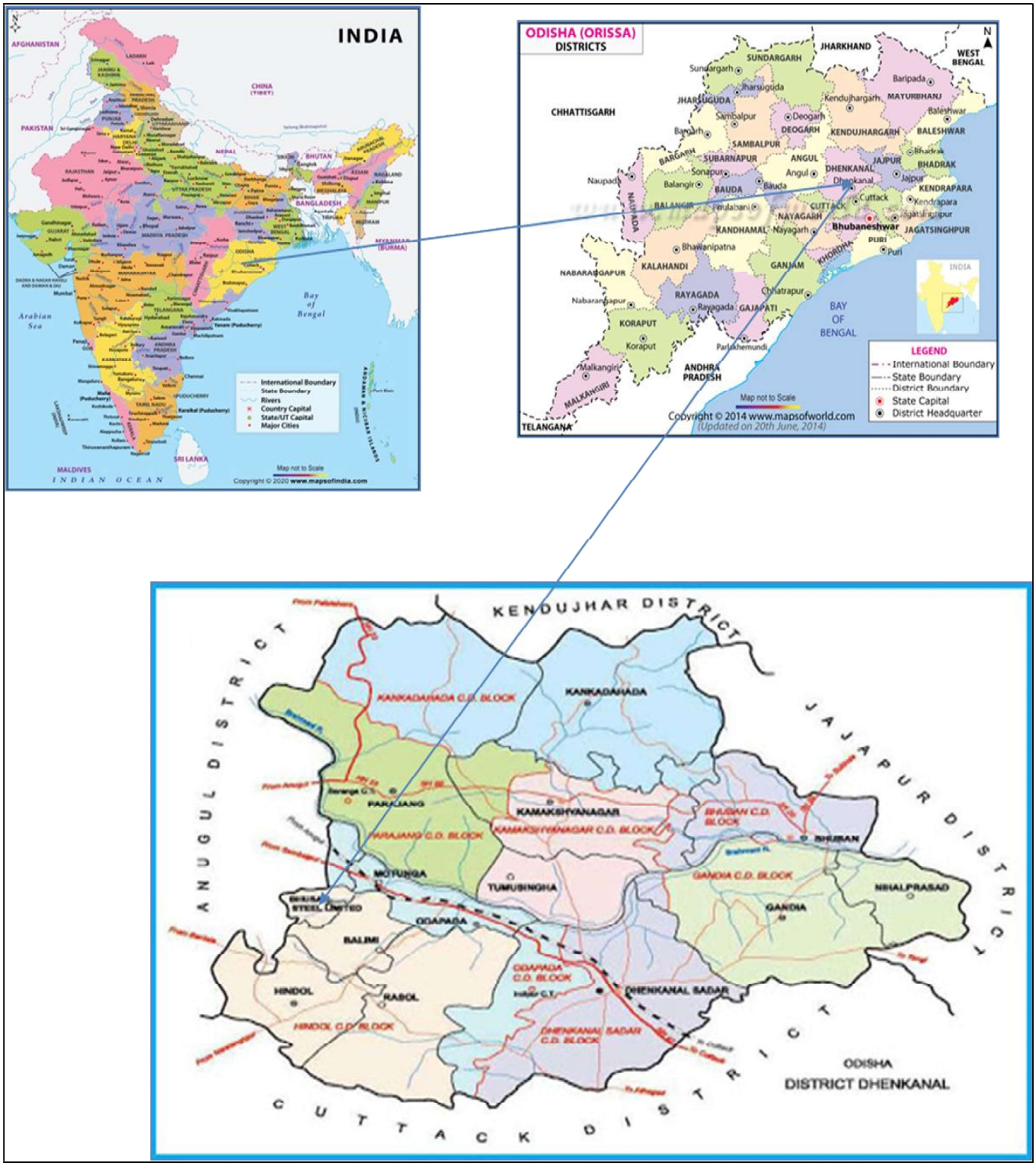
M/s TATA BSL Drafting a detail report on Traffic congestion study at TATA BSL Township Covering 50 acres of area approximately consisting of 30% greenery approx and accommodating around 3700 residents. The township comprises of 8 high-rise buildings, 21 mid-rise buildings, 6 low-rise buildings, 35 bungalows, 4 hostel blocks, 1 market complex, 1 utility block & 1hotel/club block & 1 km surrounding the whole township .

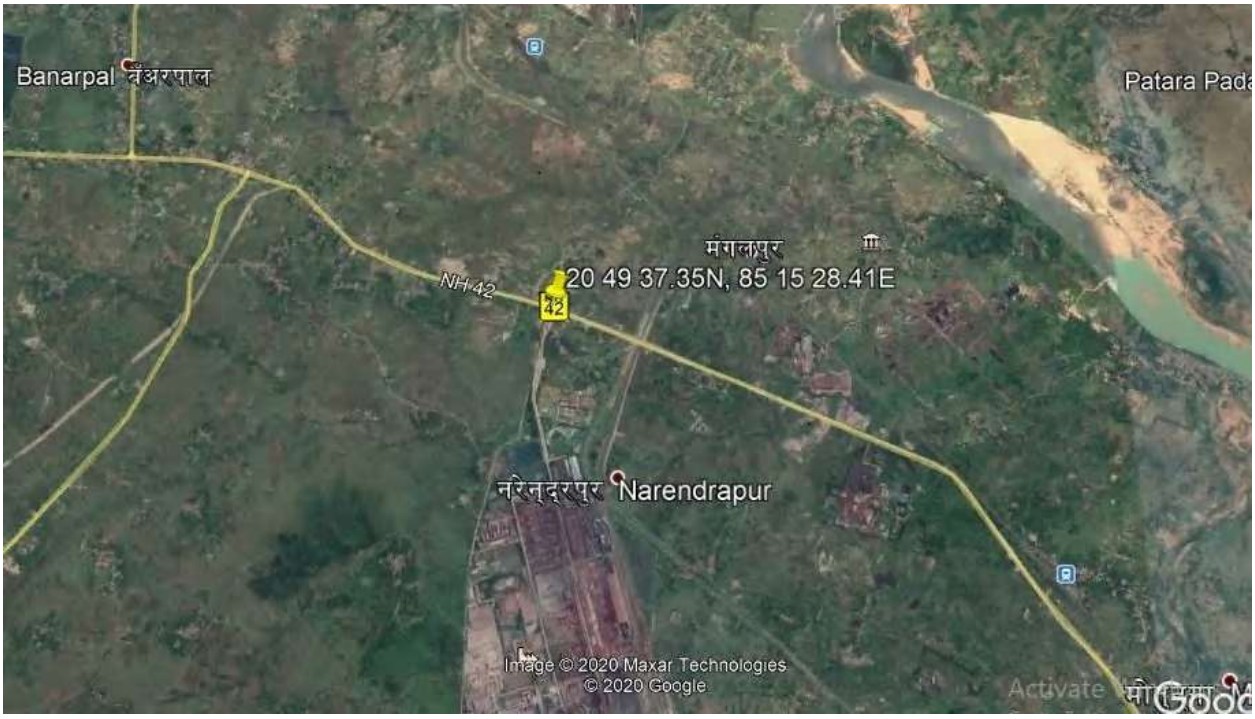
Recognizing the need for traffic engineering advice, M/s TATABSL, appointed M/s Center for Envotech and Management Consultancy to undertake the preparation of traffic study. This report presents the results and findings of the traffic study. The index map showing location of plant site in Meramandli, Dhenkanal district is attached.

BSL's existing integrated steel plant is located about 5 km from Meramandli Railway Stations(Angul – Cuttack broad gauge main railway line of East Coast Railway). National Highway 55 touches the northern side of plant site. The plant site is 113 km from Cuttack and 208 km from Sambalpur. The nearest port is Paradeep, which is more than 215 km away. There is no national park/wildlife sanctuary/reserve forest within 10 km radius of the plant.

The site is located between latitudes 20°46'41" to 20°49'20" N and longitudes 85°15'22" to 85°16'21" E at Meramandli block of Dhenkanal district of Orissa.The entry and exit of TATA BSL plant connected to NH-55 (1 km towards Sambalpur & 1 km towards Cuttack) which was falling under villages Joragadia, Itapa, and Asanabania in district of Dhenkanal ,Odisha .

Location of Plant site





This report is prepared into the following four sections:

Section 1: PCU values

Section 2: Traffic survey

Section 3: Estimation of traffic growth factor

Section 4: Assessment of traffic impact on NH (both the directions)

Section 1: PCU values:

Passenger Car Units for different category of vehicles have been referred from the Indo-HCM, 2017 as shown below. The median values for each category of vehicles have been considered.

Table 3.4: Range and Median of PCU Values for various Vehicle Types

S. No.	Vehicle Type	Four Lane Divided Highway Segments		Six Lane Divided Highway Segments	
		Range	Median	Range	Median
1.	Standard Car *(SC)*	-	1.00	-	1.00
2.	Big Car *(BC)*	1.4 - 1.5	1.45	1.4 - 1.6	1.50
3.	Motorized Two-Wheeler *(TW)*	0.3 - 0.5	0.40	0.3 - 0.4	0.35
4.	Auto-rickshaw *(AUTO)*	1.1 - 1.3	1.20	1.2 - 1.4	1.40
5.	Light Commercial Vehicles *(LCV)*	2.7 - 3.3	3.10	3.0 - 3.6	3.40
6.	Two / Three Axle Trucks *(TAT)*	3.5 - 4.6	4.40	4.3 - 5.5	5.00
7.	Multi-Axle Trucks *(MAT)*	6.3 - 7.0	6.60	8.1 - 9.6	8.60
8.	Bus *(B)*	4.4 - 5.3	5.00	4.3 - 5.6	5.10
9.	Tractors including Trailers *(TT)*	3.9 -7.0	6.20	4.5 - 6.6	6.30

The PCU values considered for the present study is tabulated in Table 1.

Table No. 1: PCU values for different category of vehicles

Category of vehicles	PCU values
Two Wheeler	0.40
Three Wheeler (Auto rickshaw)	1.20
Light Motor Vehicle	1.225
Heavy Motor Vehicle	5.55
For **Light Motor Vehicle**: The average of SC and BC has been considered (Table 3.4 of Indo-HCM). For **Heavy Motor Vehicle**: The average of TAT, MAT, B, and TT has been considered (Table 3.4 of Indo-HCM).	

Section 2: Traffic survey:

Traffic study (classified traffic volume count) was carried out for main road & local road to estimate the traffic adequacy of the township as well as 1 km radius of the project site.

Existing traffic volume was measured in the main road and was carried out from 6:00 AM to 6.00 PM for 7 days from 07.12.2020 to 13.12.2020. The predominant category of vehicles plying on the roads i.e.2 Wheelers, 3 Wheelers, Light Motor Vehicle & Heavy Motor Vehicles were counted and recorded for each hour. The traffic volume is recorded for 12 hours and then it is converted to PCU values.

The hourly traffic flows for 7 days (dated 07.12.2020 to 13.12.2020) were counted on the NH for both the directions i. e. towards Cuttack and towards Sambalpur and reported in Tables 2 through 5. This hourly traffic volume has been considered as the existing traffic in the base year 2020. This hourly traffic has been converted as PCU/hr by using the PCU values as mentioned in Table 1.

Table No.2: Hourly traffic volume (NH-55 towards Cuttack):Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	231	221	209	217	213	187	196	186	185	178	171	168	197
		3W	87	91	82	89	82	86	92	79	75	73	71	79	82
		LMV	94	106	109	107	109	105	107	109	110	107	110	113	107
		HMV	135	141	152	145	143	148	157	165	173	180	214	233	166
08.12.20	NH-55	2W	208	233	214	223	214	195	207	189	187	185	178	170	200
		3W	83	88	85	90	83	80	89	77	79	76	77	75	82
		LMV	97	92	104	91	86	101	107	109	113	106	110	113	102
		HMV	137	139	157	152	145	161	172	178	186	225	215	233	175
09.12.20	NH-55	2W	211	208	206	221	224	192	205	196	189	181	178	169	198
		3W	85	94	80	77	83	88	91	78	77	82	76	74	82
		LMV	92	101	103	92	87	92	101	112	114	110	113	107	102
		HMV	139	147	143	154	143	149	154	172	192	209	221	238	172
10.12.20	NH-55	2W	225	215	224	220	235	196	214	217	186	155	167	169	202
		3W	92	83	86	88	83	91	86	73	82	74	76	73	82
		LMV	97	105	101	92	98	103	101	100	109	101	104	107	102
		HMV	148	152	142	172	167	153	166	142	186	215	224	236	175
11.12.20	NH-55	2W	233	214	224	214	205	202	193	186	185	179	171	169	198
		3W	89	88	81	86	82	85	82	72	77	79	74	71	81
		LMV	104	101	95	88	98	91	100	85	112	107	106	112	100
		HMV	143	154	142	178	181	155	164	168	194	227	209	233	179
12.12.20	NH-55	2W	233	233	225	229	220	224	217	187	178	164	168	170	204
		3W	91	82	83	84	83	81	79	74	76	81	74	72	80
		LMV	94	94	98	101	95	98	103	101	103	112	113	115	102
		HMV	145	157	161	149	176	149	158	178	187	209	233	241	179
13.12.20	NH-55	2W	239	227	217	209	231	217	217	206	192	178	170	168	206
		3W	86	83	76	82	76	79	74	76	72	76	73	72	77
		LMV	97	107	85	97	101	95	104	97	89	101	111	115	100
		HMV	152	164	142	152	149	158	165	173	226	221	208	237	179

Table No. 3: The average hourly traffic count (towards Cuttack)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	201	0.40	80
Three Wheeler	81	1.20	97
Light Motor Vehicle	102	1.225	125
Heavy Motor Vehicle	175	5.55	971
Total	**559**		**1273**

Table No. 4: Hourly traffic volume (NH-55 towards Sambalpur): Traffic survey done from 7th Dec to 13th Dec 2020.

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	224	215	203	220	205	179	189	192	178	169	164	163	192
		3W	80	85	76	93	74	78	85	85	67	64	65	74	77
		LMV	87	100	103	111	100	97	101	115	103	99	103	107	102
		HMV	128	135	147	148	135	140	151	171	166	172	207	228	161
08.12.20	NH-55	2W	201	227	208	227	205	187	200	195	179	177	171	164	195
		3W	77	82	79	94	75	72	83	83	71	67	70	70	77
		LMV	91	86	99	95	77	94	100	115	106	97	103	108	98
		HMV	131	133	151	155	136	154	165	184	178	217	209	227	170
09.12.20	NH-55	2W	205	202	201	225	216	184	199	202	181	173	171	163	194
		3W	78	88	75	81	74	80	84	84	69	74	69	68	77
		LMV	85	95	98	95	79	84	94	118	106	102	107	101	97
		HMV	132	141	138	157	135	141	147	178	184	200	215	232	167
10.12.20	NH-55	2W	218	209	219	223	226	188	208	223	178	146	161	163	197
		3W	85	77	81	91	74	83	79	79	74	65	70	68	77
		LMV	90	99	96	95	89	95	95	106	101	93	97	102	97
		HMV	141	146	136	175	159	145	159	148	178	207	218	231	170
11.12.20	NH-55	2W	227	208	219	217	196	194	186	192	177	170	164	163	193
		3W	83	82	76	89	73	77	75	78	70	70	67	66	76
		LMV	98	95	89	92	89	83	93	91	104	99	99	107	95
		HMV	137	148	137	181	172	148	158	174	186	218	203	228	174
12.12.20	NH-55	2W	226	227	220	232	211	217	211	193	170	156	161	164	199
		3W	85	76	78	88	74	73	73	80	68	73	68	67	75
		LMV	87	88	92	105	86	90	97	107	95	103	107	109	97
		HMV	138	151	155	153	167	142	151	184	179	201	227	235	174
13.12.20	NH-55	2W	232	221	212	213	223	209	211	212	184	169	164	163	201
		3W	79	77	71	85	68	71	68	82	64	68	67	67	72
		LMV	91	101	80	101	92	88	98	103	81	93	104	110	95
		HMV	145	158	136	155	140	150	158	179	218	213	202	232	174

Table No.5: The average hourly traffic count (towards Sambalpur)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	196	0.40	78
Three Wheeler	76	1.20	91
Light Motor Vehicle	97	1.225	119
Heavy Motor Vehicle	170	5.55	944
Total	**539**		**1232**

Table No.6: Hourly traffic volume estimation (Vehicles entering to the plant premises through TATA BSL main gate): Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	COLLECTOR ROAD	2W	74	84	77	98	95	87	96	101	97	101	87	89	91
		3W	25	21	26	24	23	31	35	34	31	32	26	23	28
		LMV	85	78	96	101	89	98	101	103	112	98	96	103	97
		HMV	115	121	117	123	114	119	113	108	118	120	124	128	118
08.12.20	COLLECTOR ROAD	2W	71	81	74	95	92	84	93	98	94	98	84	86	88
		3W	26	22	27	25	24	32	36	35	32	33	27	24	29
		LMV	88	81	99	104	92	101	104	106	115	101	99	106	100
		HMV	118	124	120	126	117	122	116	111	121	123	127	131	121
09.12.20	COLLECTOR ROAD	2W	73	83	76	97	94	86	95	100	96	100	86	88	90
		3W	29	25	30	28	27	35	39	38	35	36	30	27	32
		LMV	92	85	103	108	96	105	108	110	119	105	103	110	104
		HMV	113	119	115	121	112	117	111	106	116	118	122	126	116
10.12.20	COLLECTOR ROAD	2W	77	87	80	101	98	90	99	104	100	104	90	92	94
		3W	22	23	31	25	24	26	27	22	23	25	23	20	24
		LMV	97	90	108	113	101	110	113	115	124	110	108	115	109
		HMV	121	127	123	129	120	125	119	114	124	126	130	134	124
11.12.20	COLLECTOR ROAD	2W	80	90	83	104	101	93	102	107	103	107	93	95	97
		3W	27	28	36	30	29	31	32	27	28	30	28	25	29
		LMV	91	84	102	107	95	104	107	109	118	104	102	109	103
		HMV	125	131	127	133	124	129	123	118	128	130	134	138	128
12.12.20	COLLECTOR ROAD	2W	73	83	76	97	94	86	95	100	96	100	86	88	90
		3W	30	31	39	33	32	34	35	30	31	33	31	28	32
		LMV	85	78	96	101	89	98	101	103	112	98	96	103	97
		HMV	132	138	134	140	131	136	130	125	135	137	141	145	135
13.12.20	COLLECTOR ROAD	2W	76	86	79	100	97	89	98	103	99	103	89	91	93
		3W	29	30	38	32	31	33	34	29	30	32	30	27	31
		LMV	76	69	87	92	80	89	92	94	103	89	87	94	88
		HMV	141	147	143	149	140	145	139	134	144	146	150	154	144

Table No.7: The average hourly traffic count (Vehicles entering to the plant premises through TATA BSL main gate)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	92	0.4	37
Three Wheeler	29	1.2	35
Light Motor Vehicle	100	1.225	123
Heavy Motor Vehicle	127	5.55	705
Total	**348**		**900**

Table No.8: Hourly traffic volume estimation (Vehicles outgoing from TATA BSL township to plant premises): Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	LOCAL ROAD	2W	46	43	36	37	35	41	46	40	41	43	38	40	41
		3W	15	16	23	20	21	24	31	22	21	15	13	12	19
		LMV	60	65	67	55	64	75	66	63	58	52	49	42	60
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
08.12.20	LOCAL ROAD	2W	48	45	38	39	37	43	48	42	43	45	40	42	43
		3W	16	17	24	21	22	25	32	23	22	16	14	13	20
		LMV	63	68	70	58	67	78	69	66	61	55	52	45	63
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
09.12.20	LOCAL ROAD	2W	51	48	41	42	40	46	51	45	46	48	43	45	46
		3W	22	15	24	26	20	23	25	23	19	21	22	20	22
		LMV	69	74	76	64	73	84	75	72	67	61	58	51	69
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
10.12.20	LOCAL ROAD	2W	56	53	46	47	45	51	56	50	51	53	48	50	51
		3W	19	12	21	23	17	20	22	20	16	18	19	17	19
		LMV	66	71	73	61	70	81	72	69	64	58	55	48	66
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
11.12.20	LOCAL ROAD	2W	50	47	40	41	39	45	50	44	45	47	42	44	45
		3W	12	5	14	16	10	13	15	13	9	11	12	10	12
		LMV	69	74	76	64	73	84	75	72	67	61	58	51	69
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
12.12.20	LOCAL ROAD	2W	56	53	46	47	45	51	56	50	51	53	48	50	51
		3W	15	8	17	19	13	16	18	16	12	14	15	13	15
		LMV	67	72	74	62	71	82	73	70	65	59	56	49	67
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
13.12.20	LOCAL ROAD	2W	48	45	38	39	37	43	48	42	43	45	40	42	43
		3W	24	17	26	28	22	25	27	25	21	23	24	22	24
		LMV	71	76	78	66	75	86	77	74	69	63	60	53	71
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0

Table No.9: The average hourly traffic count (vehicles outgoing from TATA BSL township to plant premises)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	46	0.4	18
Three Wheeler	19	1.2	23
Light Motor Vehicle	66	1.225	81
Heavy Motor Vehicle	0	5.55	0
Total	**131**		**122**

Table No.10: Hourly traffic volume estimation (Incoming vehicles from TATA BSL main gate & township meeting at junction within the plant premises): Traffic survey done from Traffic survey done from 7th Dec to 13th Dec 2020.

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	LOCAL ROAD	2W	120	127	113	135	130	128	142	141	138	144	125	129	131
		3W	40	37	49	44	44	55	66	56	52	47	39	35	47
		LMV	145	143	163	156	153	173	167	166	170	150	145	145	156
		HMV	115	121	117	123	114	119	113	108	118	120	124	128	118
08.12.20	LOCAL ROAD	2W	119	126	112	134	129	127	141	140	137	143	124	128	130
		3W	42	39	51	46	46	57	68	58	54	49	41	37	49
		LMV	151	149	169	162	159	179	173	172	176	156	151	151	162
		HMV	118	124	120	126	117	122	116	111	121	123	127	131	121
09.12.20	LOCAL ROAD	2W	124	131	117	139	134	132	146	145	142	148	129	133	135
		3W	51	40	54	54	47	58	64	61	54	57	52	47	53
		LMV	161	159	179	172	169	189	183	182	186	166	161	161	172
		HMV	113	119	115	121	112	117	111	106	116	118	122	126	116
10.12.20	LOCAL ROAD	2W	133	140	126	148	143	141	155	154	151	157	138	142	144
		3W	41	35	52	48	41	46	49	42	39	43	42	37	43
		LMV	163	161	181	174	171	191	185	184	188	168	163	163	174
		HMV	121	127	123	129	120	125	119	114	124	126	130	134	124
11.12.20	LOCAL ROAD	2W	130	137	123	145	140	138	152	151	148	154	135	139	141
		3W	39	33	50	46	39	44	47	40	37	41	40	35	41
		LMV	160	158	178	171	168	188	182	181	185	165	160	160	171
		HMV	125	131	127	133	124	129	123	118	128	130	134	138	128
12.12.20	LOCAL ROAD	2W	129	136	122	144	139	137	151	150	147	153	134	138	140
		3W	45	39	56	52	45	50	53	46	43	47	46	41	47
		LMV	152	150	170	163	160	180	174	173	177	157	152	152	163
		HMV	132	138	134	140	131	136	130	125	135	137	141	145	135
13.12.20	LOCAL ROAD	2W	124	131	117	139	134	132	146	145	142	148	129	133	135
		3W	53	47	64	60	53	58	61	54	51	55	54	49	55
		LMV	147	145	165	158	155	175	169	168	172	152	147	147	158
		HMV	141	147	143	149	140	145	139	134	144	146	150	154	144

Table No.11: The average hourly traffic count (Incoming vehicles from TATA BSL main gate & township meeting at junction within the plant premises)

Types of vehicles	No. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	137	0.40	55
Three Wheeler	48	1.20	58
Light Motor Vehicle	165	1.225	202
Heavy Motor Vehicle	127	5.55	705
Total	**476**		**1020**

Table No.12: Hourly traffic volume estimation (outgoing of vehicles from TATA BSL main gate meeting at NH): Traffic survey done from 7th Dec to 13thDec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	75	89	101	123	105	114	108	111	106	110	105	107	105
		3W	26	22	27	25	24	32	36	35	32	33	27	24	29
		LMV	86	87	89	79	101	98	87	88	91	97	84	83	89
		HMV	112	105	134	108	125	132	133	126	114	128	126	131	123
08.12.20	NH-55	2W	68	82	94	116	98	107	101	104	99	103	98	100	98
		3W	28	24	29	27	26	34	38	37	34	35	29	26	31
		LMV	94	95	97	87	109	106	95	96	99	105	92	91	97
		HMV	118	111	140	114	131	138	139	132	120	134	132	137	129
09.12.20	NH-55	2W	58	72	84	106	88	97	91	94	89	93	88	90	88
		3W	27	23	28	26	25	33	37	36	33	34	28	25	30
		LMV	98	99	101	91	113	110	99	100	103	109	96	95	101
		HMV	115	108	137	111	128	135	136	129	117	131	129	134	126
10.12.20	NH-55	2W	54	68	80	102	84	93	87	90	85	89	84	86	84
		3W	24	25	33	27	26	28	29	24	25	27	25	22	26
		LMV	83	84	86	76	98	95	84	85	88	94	81	80	86
		HMV	122	115	144	118	135	142	143	136	124	138	136	141	133
11.12.20	NH-55	2W	48	62	74	96	78	87	81	84	79	83	78	80	78
		3W	30	31	39	33	32	34	35	30	31	33	31	28	32
		LMV	94	95	97	87	109	106	95	96	99	105	92	91	97
		HMV	129	122	151	125	142	149	150	143	131	145	143	148	140
12.12.20	NH- 55	2W	53	67	79	101	83	92	86	89	84	88	83	85	83
		3W	26	27	35	29	28	30	31	26	27	29	27	24	28
		LMV	103	104	106	96	118	115	104	105	108	114	101	100	106
		HMV	124	117	146	120	137	144	145	138	126	140	138	143	135
13.12.20	NH-55	2W	50	64	76	98	80	89	83	86	81	85	80	82	80
		3W	31	32	40	34	33	35	36	31	32	34	32	29	33
		LMV	96	97	99	89	111	108	97	98	101	107	94	93	99
		HMV	127	120	149	123	140	147	148	141	129	143	141	146	138

Table No.13: The average hourly traffic count (outgoing of vehicles from TATA BSL main gate meeting at NH)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	88	0.4	35
Three Wheeler	30	1.2	36
Light Motor Vehicle	96	1.225	118
Heavy Motor Vehicle	132	5.55	733
Total	**346**		**922**

Table no. 14: Hourly traffic volume estimation (outgoing of vehicles from TATA BSL township meeting at NH): Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	21	36	31	26	29	34	35	41	37	34	33	25	32
		3W	10	12	10	11	13	14	9	10	13	14	15	11	12
		LMV	32	35	41	46	41	47	42	40	39	35	37	33	39
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
08.12.20	NH-55	2W	23	38	33	28	31	36	37	43	39	36	35	27	34
		3W	11	13	11	12	14	15	10	11	14	15	16	12	13
		LMV	35	38	44	49	44	50	45	43	42	38	40	36	42
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
09.12.20	NH-55	2W	26	41	36	31	34	39	40	46	42	39	38	30	37
		3W	22	15	24	26	20	23	25	23	19	21	22	20	22
		LMV	39	42	48	53	48	54	49	47	46	42	44	40	46
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
10.12.20	NH-55	2W	31	46	41	36	39	44	45	51	47	44	43	35	42
		3W	19	12	21	23	17	20	22	20	16	18	19	17	19
		LMV	36	39	45	50	45	51	46	44	43	39	41	37	43
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
11.12.20	NH-55	2W	25	40	35	30	33	38	39	45	41	38	37	29	36
		3W	12	5	14	16	10	13	15	13	9	11	12	10	12
		LMV	41	44	50	55	50	56	51	49	48	44	46	42	48
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
12.12.20	NH- 55	2W	31	46	41	36	39	44	45	51	47	44	43	35	42
		3W	15	8	17	19	13	16	18	16	12	14	15	13	15
		LMV	34	37	43	48	43	49	44	42	41	37	39	35	41
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
13.12.20	NH-55	2W	23	38	33	28	31	36	37	43	39	36	35	27	34
		3W	24	17	26	28	22	25	27	25	21	23	24	22	24
		LMV	27	30	36	41	36	42	37	35	34	30	32	28	34
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0

Table No.15: The average hourly traffic count (outgoing of vehicles from TATA BSL township meeting at NH)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	37	0.4	15
Three Wheeler	17	1.2	20
Light Motor Vehicle	42	1.225	51
Heavy Motor Vehicle	0	5.55	0
Total	**96**		**86**

Table 16: Total traffic coming out of the TATA BSL plant & township and merging with NH traffic

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	125	0.4	50
Three Wheeler	47	1.2	56
Light Motor Vehicle	138	1.225	169
HeavyMotor Vehicle	132	5.55	733
Total	**442**		**1008**

Out of these 1008 PCU/hr, 60% traffic is moving towards Cuttack and rest 40% is moving towards Sambalpur. Therefore, 605 PCU/h traffic from the plant & township is meeting with NH traffic and moving towards Cuttack. Similarly, 403 PCU/h traffic which is coming out from the plant & township is meeting with NH traffic and moving towards Sambalpur.

Section 3: Estimation of traffic growth factor:

For establishing reliable growth rate, the data should be for a number of years. The analysis has been carried out for the entire period as explained below. The best way to arrive at the rate of growth is through regression analysis. The formula for expressing for the compound rate of growth of traffic is

$$P_n = P_0(1 + r)^n$$

Where,

P_n = Traffic in the n^{th} year

P_0 = Traffic flow in the base year, n = number of years

r = annual rate of growth of traffic, expressed in decimal. Taking logs on both sides,

$$Log_e(P_n) = Log_e(P_0) + n \times Log_e(1 + r)$$

$$Y = A_0 + A_1 \times n$$

Where,

Y $= Log_e(P_n)$

A_0 $= Log_e(P_0)$

A_1 $= Log_e(1+ r)$

The above equation can be established from the data set of n values. This procedure has been used to estimate the annual rate of growth of traffic. The data for 2-Wheeler, 3-wheeler, LMV, and HMV are tabulated.

Table No. 17: Traffic volume from 2012-13 to 2014-15 per year

Year	2 Wheeler Including Total Motorcycles, Scooters and Mopeds on Road	3 Wheeler Including Total Three Wheelers and Auto rickshaw on Road	Light Motor Vehicle (LMV) Including Total Jeeps, station wagons, Private cars and Taxies on Road	Heavy Motor Vehicle (HMV) Including Total Buses, Trucks, Lorries, Tractors and Trailors on Road
2012-13	98413	1894	3841	12085
2013-14	105156	2163	5496	12690
2014-15	114072	2382	5772	13247
Total Average	**105880**	**2146**	**5036**	**12674**

(Reference-District Statistical Handbook, Dhenkanal) Attached in Annexure-1

Estimation of Traffic Growth

Table No. 18: Annual rate of growth of 2-wheeler

Year	n	2 Wheeler, Including TotalMotorcycles, Scooters and Mopeds on Road (P)	Y =Log_e(P)
2012-13	**0**	98413	11.49693
2013-14	**1**	105156	11.5632
2014-15	**2**	114072	11.64459

Table No. 19: Annual rate of growth of 3-wheeler

Year	n	3 Wheeler, Including Total Motorcycles, Scooters and Mopedson Road (P)	Y =Loge(P)
2012-13	**0**	1894	7.546446
2013-14	**1**	2163	7.679251
2014-15	**2**	2382	7.775696

Table No. 20: Annual rate of growth of LMV

Year	n	Light Motor Vehicle (LMV)Including Total Jeeps, station wagons, Private cars and Taxies on Road	Y =Log_e(P)
2012-13	**0**	3841	8.253488
2013-14	**1**	5496	8.611776
2014-15	**2**	5772	8.660774

Table No. 21: Annual rate of growth of HMV

Year	n	Heavy Motor Vehicle (HMV)Including Total Buses, Trucks, Lorries, Tractors and Trailors on Road.	Y =Log_e(P)
2012-13	**0**	12085	9.39972
2013-14	**1**	12690	9.44857
2014-15	**2**	13247	9.491526

Table No. 22: Five year Annual rate of growth for each category of vehicles

Year	2 Wheeler Including Total Motorcycles, Scooters and Mopeds on Road	3 Wheeler Including Total Three Wheelers and Auto rickshaw on Road	Light Motor Vehicle (LMV) Including Total Jeeps, station wagons, Private cars and Taxies on Road	Heavy Motor Vehicle (HMV) Including Total Buses, Trucks, Lorries, Tractors and Trailors on Road
Annual rate of growth	0.075731	0.120752	0.225072	0.046028

Section 4: Assessment of traffic impact on NH (both the directions):

The base capacity of the NH depends on the operating speed. For the present study, analyses have been carries out for operating speed 70, 80, and 90 km/h. The variation in V/C ratio and level of services (LOS) have also been studied for all the three possible cases and the capacity for the NH is considered as follows (Indo-HCM, 2017).

Table 3.6: Base Capacity Values for varying Operating Speed

Operating Speed (Km/h)	Capacity (PCU/h/direction) for Four Lane Divided Highway Segments	Capacity (PCU/h/direction) for Six Lane Divided Highway Segments
70	3640	5500
80	3940	5930
90	4240	6360
100	4540	6790

Table 23: Capacity of NH road section

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways
70	3640
80	3940
90	4240

Now, the impact of project i. e. traffic generated from the TATA BSL on the existing traffic flow of the adjacent NH is assessed. In order to assess this effect, the total traffic (PCU/hr) from the TATA BSL plant and township are calculated and added with the existing traffic flow of the NH. The detailed analysis is shown in Tables 24 through 33. Tables 24 to 28 represent the analysis of the traffic in NH moving towards Cuttack whereas Tables 29 to 33 represents for the direction towards Sambalpur. The impact has been studied for the base year (2020) as well as for the year 2025-2026. The volume to capacity ratio for base year and 2025-2026 have also been calculated and presented in the following tables.

Table No. 24: The projected traffic in NH in 2025-2026 (towards Cuttack) without any traffic from the TATA BSL plant and township

Types of vehicles	Nos. of vehicles/Hr	Annual growth rate	Projected traffic in 2025-2026 (vehicles/hr)	Projected traffic in 2025-2026 (PCU/hr)
Two Wheeler	201	0.07573	290	116
Three Wheeler	81	0.12075	143	172
Light Motor Vehicle	102	0.22507	281	344
Heavy Motor Vehicle	175	0.04603	219	1215
Total	**559**		**933**	**1847**

Table No. 25: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Cuttack) without any traffic from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.349	0.507
80	3940	0.322	0.469
90	4240	0.300	0.436

Table No. 26: The total traffic in NH in the base year (2020) (towards Cuttack) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2020)	Merging traffic (PCU/Hr) *60% of the merging traffic from TATA BSL plant and main gate* (2020)	Total traffic in NH (Towards Cuttack) (2020)
Two Wheeler	80	30	110
Three Wheeler	97	34	131
Light Motor Vehicle	125	101	226
Heavy Motor Vehicle	971	440	1411
Total	**1273**	**605**	**1878**

Table No. 27: The projected traffic in NH in 2025-2026 (towards Cuttack) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2025-2026)	Merging traffic (PCU/Hr) *60% of the merging traffic from TATA BSL plant and main gate* (2025-2026)	Total traffic in NH (Towards Cuttack) (2025-2026)
Two Wheeler	116	33	149
Three Wheeler	172	37	209
Light Motor Vehicle	344	111	455
Heavy Motor Vehicle	1215	484	1699
Total	**1847**	**665 (10% increase has been considered)**	**2512**

Table No. 28: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Cuttack) with the traffic merging from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.516	0.690
80	3940	0.477	0.638
90	4240	0.443	0.592

Table No. 29: The projected traffic in NH in 2025-2026 (towards Sambalpur) without any traffic from the TATA BSL plant and township

Types of vehicles	Nos. of vehicles/Hr	Annual growth rate	Projected traffic in 2025-2026 (vehicles/hr)	Projected traffic in 2025-2026 (PCU/hr)
Two Wheeler	196	0.07573	282	113
Three Wheeler	76	0.12075	134	161
Light Motor Vehicle	97	0.22507	268	328
Heavy Motor Vehicle	170	0.04603	213	1182
Total	**539**		**897**	**1784**

Table No. 30: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Sambalpur) without any traffic from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.338	0.490
80	3940	0.313	0.453
90	4240	0.291	0.421

Table No. 31: The total traffic in NH in the base year (2020) (towards Sambalpur) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2020)	Merging traffic (PCU/Hr) *40% of the merging traffic from TATA BSL plant and main gate* (2020)	Total traffic in NH (Towards Sambalpur) (2020)
Two Wheeler	78	20	98
Three Wheeler	91	23	114
Light Motor Vehicle	119	67	186
Heavy Motor Vehicle	944	293	1237
Total	**1232**	**403**	**1635**

Table No. 32: The projected traffic in NH in 2025-2026 (towards Sambalpur) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2025-2026)	Merging traffic (PCU/Hr) *40% of the merging traffic from TATA BSL plant and main gate* (2025-2026)	Total traffic in NH (Towards Sambalpur) (2025-2026)
Two Wheeler	113	22	135
Three Wheeler	161	25	186
Light Motor Vehicle	328	74	402
Heavy Motor Vehicle	1182	322	1504
Total	**1784**	**443 (10% increase has been considered)**	**2227**

Table No. 33: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Sambalpur) with the traffic merging from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.449	0.612
80	3940	0.415	0.565
90	4240	0.386	0.525

Assessment of Level of Service (LOS)

LOS is the qualitative measure of any roadway which depends mainly on the operating traffic volume. There are 6 Levels of Service (A to F) based on volume to capacity (V/C) ratio. LOS-A represents best operating condition for driving whereas LOS-F represents the worst condition.

Capacity is the maximum number of vehicles that can pass a given point on a lane or roadway during one hour, under the most nearly ideal roadway and traffic conditions, which can possibly be attained. For the estimation of base capacity, the table suggested by Indo-HCM has been referred in this report and is provided below for reference.

The LOS have been calculated for base year (2020) and for the year 2025-2026. This exercise has been carried out for both the directions (i. e. towards Cuttack and towards Sambalpur) separately. The volume to capacity ratio (towards Cuttack) without any traffic from the TATA BSL plant and township are presented in Table 25. Similarly, the volume to capacity ratio (towards Cuttack) with the traffic merging from the TATA BSL plant and township are presented in Table 28. It can be clearly seen that, the increase in V/C ratio in the NH (towards Cuttack), due to addition of traffic from the TATA BSL plant and township is shown in the Table 34. The same exercise has been carried out for the other direction of NH (i. e. towards Sambalpur) and shown in Table 35.

[Reference:IndoHCM,2017]

Table 3.8: LOS Thresholds for Four Lane Divided interurban Highway Segments

LOS	Density (PCU/km/ direction)	Volume-to-Capacity ratio (v/c)	Service Volumes (PCU/day)	Recommended DSV Value for Upgradation (PCU/day)
A	≤ 18	0.00 - 0.20	≤18000	22500@ **LOS-B:** Suggested threshold flow for conversion from **four lane to six lane divided road** to ensure **enhanced safety** in traffic operations.
B	19 - 27	0.21 - 0.30	18001 - 27000	
C	28 - 45	0.31 - 0.50	27001 - 45000	
D	46 - 64	0.51 - 0.70	45001 - 63000	
E	65 - 90	0.71 - 1.00	63001 - 90000	
F	> 90	> 1.00	> 90000	

Table No. 34: Change in V/C ratio and LOS in NH (towards Cuttack), Year 2025-2026

Operating speed (km/hr)	Without any traffic from the TATA BSL plant and township (2025-2026)		With the traffic from the TATA BSL plant and township (2025-2026)	
	V/C	LOS	V/C	LOS
70	0.507	D	0.690	D
80	0.469	C	0.638	D
90	0.436	C	0.592	D

Table No. 35: Change in V/C ratio and LOS in NH (towards Sambalpur), Year 2025-2026

Operating speed (km/hr)	Without any traffic from the TATA BSL plant and township (2025-2026)		With the traffic from the TATA BSL plant and township (2025-2026)	
	V/C	LOS	V/C	LOS
70	0.490	C	0.612	D
80	0.453	C	0.565	D
90	0.421	C	0.525	D

Conclusion

A detailed traffic study was carried out at TATA BSL main gate & township. The traffic data were collected for continuous 7 days for a period of 12 hours every day The average annual growth rate for individual category of vehicles have been determined from the information collected from transport department, Dhenkanal. Finally, the expected future traffic in the NH (both the directions) have been estimated for the Year 2025-2026. The change in V/C ratio and LOS are also estimated and reported for both the directions. It is obvious that there is an increase in V/C values due to the addition of traffic from TATA BSL township & plant and this increases are approximately 35% and 25% for the traffic moving towards Cuttack and Sambalpur respectively. From this study, it can be concluded that, in the year 2025-2026, the approximate V/C values are expected to be 0.6 and 0.55 for the traffic stream moving towards Cuttack and Sambalpur respectively and most likely the NH will operate in LOS -D.

XI. TRANSPORT AND COMMUNICATION

11.04. Motor Vehicles Registered & M.V on Road in Dhenkanal district

(In Number)

Sl. No.	Vehicles	Number Registered during			Motor Vehicles on road		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	2	3	4	5	6	7	8
1	Motor Cycles, Scooters and Mopeds	6743	7959	8916	98413	105156	114072
2	Three Wheelers & Auto Rickshaws	33	264	267	1894	2163	2382
3	Jeeps and Station Wagons	187	91	43	726	2133	2176
4	Private Cars	246	176	225	1727	1909	2134
5	Taxies	2	22	8	1388	1454	1462
6	Buses (Contract Carriages & Stage carriages)	21	20	15	659	680	695
7	Trucks and Lorries	541	276	198	7197	7502	7748
8	Tractors and Trailors	279	389	304	4229	4508	4312
9	Miscellaneous Vehicles	0	8	20	1371	131	151
	Total	**8032**	**9197**	**9988**	**117604**	**125636**	**135624**

Source : State Transport Authority, Odisha, Cuttack

ACCREDITATION AND EMPANELMENT

Centre for Envotech and Management Consultancy Pvt. Ltd.

An ISO 9001-2015, OHSAS 18001:2007 & ISO 14001-2015 Certified Company,

Empanelled with:

- State Pollution Control Board (SPCB), Odisha as Environment Consultant under category –'A'.
- Orissa Construction Corporation Limited (OCCL) as Associated Consultant for carrying out EIA, FDP, Preparation of Wildlife Management Plan, GIS map, Socioeconomic survey, DGPS & ETS survey.
- Orissa Space Application Centre (ORSAC) for carrying out DGPS & ETS survey.
- Office of the Principal Chief Conservator of Forest (Wildlife) & Chief Wildlife Warden [PCCF (Wildlife) & CWLW], Odisha for preparation of Site Specific Wildlife Management Plans.

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