JSWSL/ENVT/MoEF&CC/HYR2/2026-27/17
27th May 2026

To,
The Director
Regional office
Ministry of Environment Forest and Climate Change
1st Floor, Additional office block for GPOA,
Shastri Bhawan, Haddows Road,
Nungambakkam, Chennai -600006

Dear Sir,

Sub: JSW Steel Ltd., Salem Works - EC- Six Monthly Compliance Status Report submission for the period October 2025 to March 2026 - Reg.

Ref: Environmental Clearances F. No. J-11011/281/2006-IA. II(I) dated 07.07.2017, EC amendment dated 07.08.2019, EC Value addition dated 10.02.2020, EC Split dated 20.05.2025 and EC Amendment in certain general conditions dated 27.02.2026.

With reference to the above subject, please find enclosed the six-monthly compliance status report for the period October 2025 to March 2026 pertaining to the Environmental Clearances granted to JSW Steel Ltd., Salem Works.

We request you to kindly acknowledge the receipt of this submission for our records.

Thanking you,

Yours faithfully,

For JSW Steel Limited.,Salem Works

S M Kumar
Sr. VP - Plant Head

Encl: Environment Condition Compliance status report for the period October - March 2026

Cc:

Regional Directorate, Central Pollution Control Board,
77-A, Padi, Ambattur Industrial Estate Road, Mogappair, Chennai, Tamil Nadu -58

The Member Secretary, Tamil Nadu Pollution Control Board,
100, Anna Salai, Guindy, Chennai – 600 032.

The Joint Chief Environmental Engineer (M), TNPCB, Behind EPF Office, Thalvaipatty post, Salem West Taluk, Salem – 636 302

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JINDAL
O P Jindal Group

HALF YEARLY ENVIRONMENT CLEARANCE (EC) CONDITION COMPLIANCE REPORT

JSW STEEL LIMITED., SALEM WORKS

1.3 MTPA INTEGRATED STEEL PLANT

POTTANERI (P.O.), MECHERI, METTUR (TK.), SALEM (DT.)

TAMIL NADU, INDIA- 636453

Reporting Period: October 2025 to March 2026

Submitted to

REGIONAL OFFICE, MoEF&CC
Shastri Bhawan, Haddows road, Nungambakkam,
Chennai -600006

REGIONAL DIRECTORATE, CPCB,
Ambattur Industrial Estate Road, Mogappair,
Chennai, Tamil Nadu -58

JCEE (M), TNPCB, SALEM REGION,
Fairlands, Salem – 636016

Table of Contents

Your (Half Yearly Compliance Report) has been Submitted with following details	
Proposal No	IA/TN/IND1/458028/2024
Compliance ID	135347208
Compliance Number(For Tracking)	EC/M/COMPLIANCE/135347208/2026
Reporting Year	2026
Reporting Period	01 Jun(01 Oct - 31 Mar)
Submission Date	28-05-2026
RO/SRO Name	V Geroge Jenner
RO/SRO Email	tr025@ifs.nic.in
State	TAMIL NADU
RO/SRO Office Address	Integrated Regional Offices, Chennai
Note:- SMS and E-Mail has been sent to V Geroge Jenner, TAMIL NADU with Notification to Project Proponent.	

Your (Half Yearly Compliance Report) has been Submitted with following details	
Proposal No	IA/TN/IND/104947/2019
Compliance ID	131079288
Compliance Number(For Tracking)	EC/M/COMPLIANCE/131079288/2026
Reporting Year	2026
Reporting Period	01 Jun(01 Oct - 31 Mar)
Submission Date	28-05-2026
RO/SRO Name	V Geroge Jenner
RO/SRO Email	tr025@ifs.nic.in
State	TAMIL NADU
RO/SRO Office Address	Integrated Regional Offices, Chennai
Note:- SMS and E-Mail has been sent to V Geroge Jenner, TAMIL NADU with Notification to Project Proponent.	

Your (Half Yearly Compliance Report) has been Submitted with following details	
Proposal No	IA/TN/IND/26508/2015
Compliance ID	1229859186
Compliance Number(For Tracking)	EC/M/COMPLIANCE/1229859186/2026
Reporting Year	2026
Reporting Period	01 Jun(01 Oct - 31 Mar)
Submission Date	29-05-2026
RO/SRO Name	V Geroge Jenner
RO/SRO Email	tr025@ifs.nic.in
State	TAMIL NADU
RO/SRO Office Address	Integrated Regional Offices, Chennai
Note:- SMS and E-Mail has been sent to V Geroge Jenner, TAMIL NADU with Notification to Project Proponent.	

Your (Half Yearly Compliance Report) has been Submitted with following details	
Proposal No	IA/TN/IND/26508/2015
Compliance ID	1229774298
Compliance Number(For Tracking)	EC/M/COMPLIANCE/1229774298/2026
Reporting Year	2026
Reporting Period	01 Jun(01 Oct - 31 Mar)
Submission Date	29-05-2026
RO/SRO Name	V Geroge Jenner
RO/SRO Email	tr025@ifs.nic.in
State	TAMIL NADU
RO/SRO Office Address	Integrated Regional Offices, Chennai
Note:- SMS and E-Mail has been sent to V Geroge Jenner, TAMIL NADU with Notification to Project Proponent.	

COMPLIANCE STATUS REPORT TO THE EC DATED.20.05.2025

A. Specific Conditions		
Sl. No	**Condition**	**Compliance Status**
i.	M/s. JSWSL, being principal lessor shall be held responsible for compliance of all the conditions stipulated in EC dated 10.02.2020.	Agreed to Comply
ii.	The PP shall ensure that both the entities shall have relevant permissions related to land, EC/FC/CTE/CTO, as may be applicable to them, along with associated permissions required to operate such facilities. They shall maintain separate records of the finished products and raw materials for each facility at their respective gates.	Complied. Subsequent to the Environmental Clearance (EC) split for the GGBFS facility, separate statutory approvals have been obtained for the respective entities. Tamil Nadu Pollution Control Board has issued a separate Consent to Operate (CTO) vide Consent Order No. 2605172245658 dated 06.05.2026, valid up to 31.03.2031, for the JSWSL Salem Works operations excluding the GGBFS facility. Display boards containing the relevant details have been provided at both the gates.
iii.	The PP shall have clear-cut demarcation of process areas and provide separate entry/exit gates. In case, common infrastructure is used for transportation of raw materials or products/ accessibility by employees, then a MOU between the entities may be undertaken clearly indicating the entity holding responsibility for the common infrastructure.	Clear demarcation of all process and operational areas within the JSW Complex has been carried out. Further, for utilization of common infrastructure facilities such as transportation routes and employee accessibility, necessary MoUs have been entered into between JSWSL Salem Works and JSW Cement Ltd., clearly defining the responsibilities for operation and maintenance of the shared infrastructure facilities.
iv.	The PP shall ensure that there shall be sign boards at prominent locations covering name, capacity and area of the operating units within the JSW Complex along with EC/CFO details.	Sign boards displaying the name, installed capacity, area details, of the operating units within the JSW Complex have been provided at prominent
v.	The PP shall comply with the condition for development and maintenance of greenbelt in at least 33% area of the JSW complex as principal lessor.	Being Complied. JSW Salem Works has green cover to the extent of approximately 91 hectares, comprising around 34% of the total land area.
vi.	The PP shall widely publicize the executive summary of the EC split proposal and publish the split ECs in local newspapers within 15 days of grant.	Complied. The public notice regarding the Environmental Clearance was published in two widely circulated local newspapers Dinamani (Tamil is the vernacular language) and The Indian Express on 03.06.2025. Copy of advertisement is annexed as ***Annexure 1***
vii.	Both the entities i.e. JSWSL and JSWCL shall undertake Village Adoption programme in consultation with the District Administration.	Being Complied. As per Village Adoption Plan submitted to your good office, implementation started & status report attached along with CSR ESC report as ***Annexure 11***

viii.	The PP shall withdraw the existing EC amendment application and submit a fresh application post-splitting to incorporate all necessary aspects, including new EC post splitting. The amendment shall be obtained at the earliest.	Complied. As per EAC direction the EC amendment application has been withdrawn. Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC.
ix.	JSWSL and JSWCL shall strictly comply with the commitments made during EAC appraisal, including additional PH Action Plan.	Agreed to Comply
x.	Any future expansion or modernization of the 0.8 MTPA Slag Grinding Unit beyond the threshold limits specified in the EIA Notification, 2006, and its amendments shall require obtaining ToR and conducting a Public Hearing, as prescribed.	Agreed to Comply
xi.	All the other terms and conditions stipulated in environmental clearance vide letter dated 10.02.2020 shall remain unchanged.	Agreed to Comply
xii.	The PP shall install the requisite number of CAAQMS linked with CPCB server at designated places.	Complied. 04 Nos. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been already installed & the real time parameters of PM_{10}, $PM_{2.5}$, SO_2, NO_2 & CO are connected through IEMS to TNPCB. Further as instructed by EAC a CAAQMS station will be installed in the JSW Cement Plant premises by JSW Cement Ltd.

COMPLIANCE STATUS REPORT TO THE EC DATED.10.02.2020

A. Specific Conditions		
Sl. No	**Condition**	**Compliance Status**
i.	Particulate emission from the rod mill of slag grinding unit shall be less than 10 mg/Nm^3.	Being Complied. The GGBFS is a blast furnace slag grinding facility at JSW Salem Works, is operational since May 2022 which is equipped with a bag filter for emission control. TNPCB's latest survey confirms particulate emissions at 9 mg/Nm^3, meeting regulatory standard. Report is enclosed as **Annexure 2.** Now, the facility has been transferred (EC split dated 20.05.2025) to JSWCL and hence the condition hereafter will not be applicable to JSWSL Salem Works.
ii.	Green belt shall be developed in an area of 85 ha (210 acres) in and around the plant in a time frame of two years.	Complied. JSWSL Salem Works has enhanced its green cover to approximately 91 hectares, comprising around 34% of the total land area. With a tree survival rate ranging between 85–90%. Photographs of the greenbelt are enclosed as **Annexure 3**
B. General Conditions		
I. Statutory Compliance		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board / Committee.	Complied. We have obtained CTO under Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974. The CTO, granted by the Tamil Nadu Pollution Control Board (TNPCB) is valid until March 31, 2026 for Steel plant and upto 31.03.2027 for CPP. Post Environmental Clearance (EC) split for the GGBFS facility, separate statutory approvals have been obtained. Tamil Nadu Pollution Control Board has issued a separate Consent to Operate (CTO) vide Consent Order No. 2605172245658 (W) and No. 2605272245658 (A) dated 06.05.2026, valid up to 31.03.2031, for the JSWSL Salem Works operations excluding the GGBFS facility
ii.	The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.	Being Complied. We have obtained NOC from concerned department for drawl of ground water (80 KLD) which is only for domestic application. Copy of approval is attached as **Annexure 4** to this report.

iii.	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.	Complied. We have submitted Hazardous and Other Waste application vide OCMMS application no. 72246076 dated 16.12.2025 for Steel plant and 72246076 dated 16.12.2025 for CPP II to TNPCB under Hazardous and other Waste Management Rules, 2016.
II. Air quality monitoring and preservation		
i.	The project proponent should install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards II. Air Quality Monitoring and Preservation prescribed in Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	Being Complied. We have installed 32 nos. of dust analyzers (in both process and non-process stacks) & 11 nos. of gaseous emission monitoring systems (24 parameters) as per the applicability and the real time data of SPM, SO_2, NOx and CO are transmitted through IEMS to TNPCB and through ODAMS to CPCB servers. Air Quality Monitoring is being done by TNPCB biannually and Manual monitoring is conducted by a NABL and MoEF&CC accredited external laboratory (Air quality as applicable to the Integrated iron and Steel plant, Thermal Power Plant) on a monthly basis and report submitted to SPCB. Latest report of TNPCB survey and Monthly Environment monitoring reports are given in **Annexure 2 & 5**
ii.	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	Being Complied. In compliance with the Environment (Protection) Rules, 1986, as outlined in G.S.R. 277(E) dated March 31, 2012, for Integrated Iron & Steel plants and S.O. 3305(E) dated December 7, 2015, for Thermal Power Plants, We conduct monthly monitoring of fugitive emissions. This monitoring is performed by an external laboratory accredited by NABL & MoEF&CC while the Tamil Nadu Pollution Control Board (TNPCB) conducts biannual surveys. The fugitive emission levels are consistently within the prescribed standards. Summary of the report is enclosed as **Annexure 5**
iii.	The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM_{10} and $PM_{2.5}$ in reference to PM emission, and SO_2 and NO_x in reference	Complied. In consultation with the Tamil Nadu Pollution Control Board (TNPCB), 04 No. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been installed within the plant premises at locations where the maximum ground-level

	to SO_2 and NO_x emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.	concentrations of PM_{10}, $PM_{2.5}$, SO_2, and NO_2 occur. The real time parameters are connected to through IEMS to TNPCB.
iv.	The cameras shall be installed at suitable locations for 24x7 recording of battery emissions on the both sides of coke oven batteries and videos shall be preserved for at least one-month recordings.	Being Complied. There are 03 no. of Coke Oven Batteries installed adjacent to each other in the Coke Oven Plant. An IP camera has been installed on the top of the COP area to monitor battery emissions on the both sides with recording option and the minimum preservation time is one month.
v.	Sampling facility at process stacks and at quenching towers shall be provided as per CPCB guidelines for manual monitoring of emissions.	Complied. Sampling facilities at process stacks and quenching towers are provided for manual monitoring of emissions as per the guidelines issued by CPCB. JSW Salem Works equipped with wet quenching at Coke Oven Plant.
vi.	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality/fugitive emissions to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	Being Complied. Monthly summary report of continuous stack emission and ambient air quality monitoring and results of manual stack monitoring and manual monitoring of air quality/fugitive emissions are being submitted along with six monthly compliance reports to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB. Details are enclosed as **Annexure 2 & 5** The last six monthly compliance report submitted to MoEF&CC on 24.11.2025.
vii.	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.	Complied. Adequate Air Pollution Control measures are installed in the respective process and raw material handling areas. Water sprinklers, dry & wet fog systems, GI sheets (as dust barrier) tyre washing unit are provided in raw material handling areas to control fugitive emission. The details of APC installed are given in **Annexure 6**
viii.	The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags.	Being Complied. We have installed appropriate leakage detection systems like DP meters and for mechanized bag cleaning auto timer based cleaning system facilities are provided in respective bag filter systems. Periodic maintenance is also being carried out to ensure the healthiness of the system.
ix.	Secondary emission control system shall be provided at SMS converters.	Complied. JSW Salem Works not installed with SMS Converters. However, Dedicated secondary de-dusting systems at Energy Optimizing Furnace (EOF) & Ladle Refining

		Furnace (LRF) installed to control the secondary emissions.
x.	Pollution control system in the steel plant shall be provided as per the CREP guidelines of CPCB.	Complied. As per the CREP guidelines of CPCB, Pollution control systems are provided. Please refer **Annexure 7**
xi.	Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, and roofs regularly.	Complied. 3 No. of road sweeping machines dedicatedly for road cleaning applications and Mobile vacuum cleaners are also provided to clean shop floors, roofs regularly. The dust collected from the road sweeping machines is used in the Sinter Plant for sinter making.
xii.	Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/agglomeration.	Being Complied. Sinter Plant is functioning as Wealth from waste and Iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices are reused in the sinter plant for agglomeration processes which is direct replacement to the Iron Ore.
xiii.	The project proponent use leak proof trucks/dumpers carrying coal and other raw materials and cover them with tarpaulin.	Being Complied. SOP IMSW/PS/ENV/24 has been implemented to prevent spillage and leakage during transportation of coal, fly ash, and other raw materials. • Leak-proof trucks/dumpers are utilized. • Trucks/dumpers are loaded only up to body level to avoid overflow and spillages. • Vehicular speed within plant premises is restricted to 20 kmph to minimize fugitive dust generation. • Regular toolbox talks and awareness training are conducted for drivers and loading operators on safe material handling and transportation practices. • Internal roads are periodically cleaned and maintained through road sweeping machines and housekeeping activities. • Regular inspection and preventive maintenance of transport vehicles are carried out to ensure leak-proof condition. • Any observed spillages are immediately attended and cleaned to maintain proper housekeeping and environmental compliance.
xiv.	Facilities for spillage collection shall be provided for coal and coke on wharf of coke oven batteries (Chain conveyors, land based industrial vacuum cleaning facility).	Being Complied. We have installed a closed conveyor system for coking coal charging to stamping station. Dedicated coal charging and coke pushing systems are installed to avoid any spillage of coal and coke. There is

		a periodical cleaning schedule to ensure in case of any minor spillages.
xv.	Land-based APC system shall be installed to control coke pushing emissions.	The condition has been amended to "the project proponent shall adopt effective measures to control the coke pushing emissions for non-recovery type Coke Ovens" as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC. A dedicated localized dedusting system has been installed in both charging/pushing cars. (02 Nos.).
xvi.	Monitor CO, HC and O_2 in flue gases of the coke oven battery to detect combustion efficiency and cross leakages in the combustion chamber.	The condition has been amended to monitor of CO, HC, and O_2 in the flue gases of the Waste Heat Recovery Boilers (WHRBs) of non-recovery type Coke Ovens, in accordance with the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of the EC dated 10.02.2020, for value addition and technological upgradation of the existing 1.3 MTPA Integrated Steel Plant, vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC.
xvii.	Vapor absorption system shall be provided in place of vapor compression system for cooling of coke oven gas in case of recovery type coke ovens.	This condition stands exempted as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
xviii.	In case concentrated ammonia liquor is incinerated, adopt high temperature incineration to destroy Dioxins and Furans, Suitable NOx control facility shall be provided to meet the prescribed standards.	This condition stands exempted as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
xix.	The coke oven gas shall be subjected to desulphurization if the Sulphur content in the coal exceeds 1%.	Being Complied. The coal used in the coke oven contains Sulphur content of less than 1%. Necessary measures are undertaken at the procurement stage to ensure sourcing of low-Sulphur coal.

xx.	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.	Complied. GI sheets cover (as dust barrier), wind nets, water sprinkler systems and dry/wet fog systems are provided around the raw material stock piles to minimize the fugitive emissions.
xxi.	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil cellars.	Being Complied. Ventilation system for adequate air changes for all tunnels, motor houses, Oil cellars are being complied as per the CEIG rules.
xxii.	The project proponent shall install Dry Gas Cleaning Plant with bag filter for Blast Furnace and SMS converter.	This condition is partially modified to "The project proponent shall install Dry Gas Cleaning Plant with bag filter for Blast Furnace in case of expansion project" as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
xxiii.	Dry quenching (CDQ) system shall be installed along with power generation facility from waste heat recovery from hot coke.	This condition stands exempted as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
III. Water Quality Monitoring and Preservation		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories. The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at	Complied. We have installed electromagnetic flow meters (EMFM) at multiple water consumption, monitoring points to continuously track effluent flow. The real-time flow data is directly connected to TNPCB and CPCB servers. A dedicated EMFM is also installed at the effluent treatment plant (ETP) discharge point, along with an IP camera equipped with PTZ functionality, ensuring there is no overflow of trade effluent from the guard pond. All analyzers meet standards for the Iron & Steel and Thermal Power Plant sectors, and EMFM units and sensors are calibrated according to supplier specifications. Groundwater quality around the plant is monitored biannually by TNPCB and NABL-MoEF&CC accredited laboratory.

	sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 and NABL accredited laboratories.	Additionally, piezometric sampling bore wells within the plant premises are regularly monitored by an NABL- MoEF&CC accredited lab on monthly basis.
ii.	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	Being Complied. Monthly summary reports of continuous effluent monitoring, results of manual effluent testing and manual monitoring of ground water quality by TNPCB & NABL accredited laboratory are being submitted to the Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with the six-monthly monitoring report. Details are enclosed as **Annexure 8**
iii.	The project proponent shall provide the ETP for coke oven and by-product to meet the standards prescribed in G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time.	This condition is partially modified to "The project proponent shall ensure the wastewater treatment facility to meet the standards prescribed in G.S.R 277 (E) dated 31st March 2012 (Integrated iron & Steel) and meet the standards prescribed in S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC

iv.	Adhere to 'Zero Liquid Discharge'	Being Complied. We have established Zero Effluent Discharge system and wastewater generated from the various processes of steel and Thermal Power Plant is collected in a guard pond at steel plant premises and treated wastewater is 100% reused in steel plant for secondary applications as per the CTO under water act. To treat the effluent arising out of the pickling plant and etching lab a dedicated ETP with the facility of Pretreatment, Ultra filter, Multistage RO plant, MEE and ATFD installed. The treated wastewater is reused in pickling process and etching lab.
v.	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.	Being Complied. Sewage Treatment Plants are provided for treatment of domestic wastewater and treated water is meeting the prescribed standards. Treated water sample is being collected by TNPCB & NABL – MoEF&CC accredited laboratory on monthly basis and the results are well within the prescribed standards. Summary of the report is enclosed as **Annexure 8**
vi.	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.	Being Complied. Appropriate garland drains are provided at the Sinter Plant, Coke Oven Plant, and Captive Power Plant, followed by intermittent collection pits. Overflow from these pits is routed to rainwater harvesting ponds. Periodic cleaning and maintenance of the intermittent collection pits/tanks are carried out regularly, and periodic water quality analysis is also being undertaken.
vii.	Tyre washing facilities shall be provided at the entrance of the plant gates.	Complied. A Tyre washing unit is provided at the north entrance of the plant to control the fugitive emission from vehicular movement.
viii.	CO_2 injection shall be provided in GCP of SMS to reduce pH in circulating water to ensure optimal recycling of treated water for converter gas cleaning.	Being Complied. We are using treated wastewater as makeup (pH 8.0 -.8.5) for gas cleaning unit (GCP) where the alkalinity of existing circulating water is under control. Hence addition of CO_2 injection is not anticipated.
ix.	The project proponent shall practice rainwater harvesting to maximum possible extent.	Being Complied. We have implemented a comprehensive rainwater harvesting system, comprising four strategically located ponds designed to maximize water conservation. Two of these ponds are located near the township on the eastern side, with storage capacities of 17,500 KL and 1,08,000 KL, respectively. Within the plant premises, one pond near the RO plant area has a capacity of 15,000 KL, while

		another situated behind the guest house can store 5,000 KL. Collectively, these ponds offer a total rainwater storage capacity of approximately 1,46,000 KL. From October 2025 to March 2026, approximately 44,298 m^3 of harvested rainwater was utilized within the steel plant, primarily in the Coke Oven Plant and Captive Power Plant for quenching and cooling activities. The overall rainwater consumption during FY 2025-26 was approximately 93,999 m^3. This initiative aligns with our commitment towards United Nations SDG 6 (Clean Water and Sanitation) and SDG 12 (Responsible Consumption and Production). Further, by reducing dependence on energy-intensive freshwater extraction and treatment processes, the initiative also supports SDG 13 (Climate Action) through the reduction of greenhouse gas (GHG) emissions.
x.	Treated water from ETP of COBP shall not be used for coke quenching.	This condition stands exempted as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC.
xi.	Water meters shall be provided at the inlet to all unit processes in the steel plants.	Complied. Water meters are provided at the inlet to all unit processes in our steel plant and records are being maintained.
xii.	The project proponent shall make efforts to minimize water consumption in the steel plant complex by segregation of used water, practicing cascade use and by recycling treated water.	Being Complied. JSW Salem Works ensures compliance with water conservation measures by implementing maximum efforts to minimize water consumption. Key initiatives include the installation of a Reverse Osmosis (RO) plant, optimizing cooling water cycles of concentration (COC), and adopting Best Available Technologies (BAT), such as Air-Cooled Condensers instead of Water-Cooled Condensers. As a result, the entire quantity of treated water is reused in secondary processes. Additionally, utilization of rainwater has significantly reduced freshwater intake, thereby supporting sustainable water management within the facility. The plant

		has adopted and is adhering to a Zero Wastewater Discharge system.
IV. Noise Monitoring And Preservation		
Sl. No	**Condition**	**Compliance Status**
i.	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.	Being Complied. Noise level is being monitored on regular basis by a NABL - MoEF&CC accredited laboratory & TNPCB and the results are well within the standards. Reports are being submitted to the Regional Officer of the Ministry as a part of six-monthly compliance report. Details are enclosed as **Annexure 10**
ii.	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz.75 dB(A) during day time and 70 dB(A) during night time.	Complied. The ambient noise levels are being monitored on monthly basis and the results are well within the prescribed limit of 75 dB(A) during day time and 70 dB(A) during night time and reports are being submitted to the Regional Officer of the Ministry as a part of six-monthly compliance report. The report details (ROA) are given in **Annexure 10**
V. Energy Conservation Measures		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall provide TRTs to recover energy from top gases of Blast Furnaces.	This condition stands exempted as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
ii.	Coke Dry quenching (CDQ) shall be provided for coke quenching for both recovery and non-recovery type coke ovens.	This condition stands exempted as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
iii.	Waste heat shall be recovered from Sinter Plants coolers and Sinter Machines.	Being Complied. As part of our compliance efforts, waste heat from the Sinter plant cooler is diverted to the BF Slag grinding unit to recover sensible heat. Further projects such as Waste Gas Recirculation into Sinter Bed are being implemented.
iv.	Use torpedo ladle for hot metal transfer as far as possible. If ladles not used, provide covers for open top ladles.	This condition partially modified to “Provide suitable covers for open top ladles for transfer of hot metal, in case torpedo ladles are not used” as per the Environment

		Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC.
v.	Use hot charging of slabs and billets/blooms as far as possible.	Being Complied. Based on the product specification, hot charging is done for billets/blooms. Slabs are not produced in our facility.
vi.	Waste heat recovery systems shall be provided in all units where the flue gas or process gas exceeds 300°C.	Complied. Waste heat recovery boilers are in operation to recover maximum heat from flue gas and produce energy. Waste heat from Sinter plant cooler is diverted to the BF Slag grinding unit to recover sensible heat.
vii.	Explore feasibility to install WHRS at Waste Gases from BF stoves; Sinter Machine; Sinter Cooler, and all reheating furnaces and if feasible shall be installed.	Being Complied. We have installed various types of waste heat recovery boilers to recover maximum heat from flue gases. Waste heat from Sinter plant cooler is diverted to the BF Slag grinding unit to recover sensible heat. BF gas is utilized in Mills for Reheating furnaces, BF stoves and CPPs for steam generation. Power generation is maximized up to 70% through waste heat recovery system and rest is balanced through coal based boiler, Renewable Power and grid support.
viii.	Restrict Gas flaring to < 1%	Being Complied. Blast Furnace (BF) waste gas is being maximally utilized across various shop floors as a gaseous fuel, thereby optimizing the consumption of conventional fossil fuels. To ensure effective utilization, an online monitoring system (SCADA) has been installed for continuous monitoring and maximization of BF gas usage. Further, installation of a 40 TPH BF gas-fired boiler is currently in progress, which will further enhance the overall utilization of BF gas.
ix.	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly.	Being Complied. Solar panels with a total capacity of 75 kW have been installed, comprising 50 kW at the canteen, 10 kW each at the R&D building and Air Separation Plant and 5 kW at the MRSS. The average power generation is approximately 12 kWh, with further installations planned in a phased manner. Usage of RE power is 10.66 MW during FY 2025-26.

x.	Provide LED lights in their officers and residential areas.	Being Complied. We have taken action to install LED based lightings in the offices and township area and the replacement of sodium vapour lamp to LED is increased up to 1300 KW. Further, planned to install LED lights all over plant.
xi.	Ensure installation of regenerative type burners on all reheating furnaces.	Being Complied. BF gas is used as fuel and regenerative type burners are installed in reheating furnaces (Mills).
VI. Waste Management		
Sl. No	**Condition**	**Compliance Status**
i.	An attrition grinding unit to improve the bulk density of BF granulated slag from 1.0 to 1.5 kg/l shall be installed to use slag as river sand in construction industry.	Complied. BF slag grinding unit is under operation to produce ground granulated BF slag which is directly sold to cement industries as a value addition product.
ii.	In case of Non-Recovery coke ovens, the gas main carrying hot flue gases to the boiler shall be insulated to conserve heat and to maximize heat recovery.	Being Complied. The gas main carrying hot flue gases to the boilers is completely insulated to conserve heat and to maximize heat recovery.
iii.	Tar Sludge and waste oil shall be blended with coal charged in coke ovens (applicable only to recovery coke ovens).	This condition partially modified to "Waste oil generated from the NR – COP shall be disposed to the authorized recyclers" as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC
iv.	Carbon recovery plant to recover the elemental carbon present in GCP slurries for use in Sinter plant shall be installed.	Complied. The existing facilities of BF#1, EOF#1 and EOF#2 are provided with Wet Gas Cleaning Plants (GCP). The generated GCP slurry is routed through a thickener system followed by treatment in the sludge handling unit for dewatering and drying. The dried sludge, having higher iron content (~40-45%) along with carbon values (~5-7%), is reused in the sinter plant as a secondary raw material, thereby promoting waste minimization and resource recovery.
v.	Waste recycling plant shall be installed to recover scrap, metallic and flux for recycling to sinter plant and SMS.	Being Complied. A 50 TPH slag crushing facility has been commissioned to process SMS slag, facilitating the segregation of iron-bearing scrap for reuse in the SMS process and thereby reducing GHG emissions. The crushed slag is classified

		into various sizes for in-plant applications magnetic fractions used in the Sinter Plant and non-magnetic fractions utilized in paver block manufacturing as well as for sale in the open market. Recently, JSWSL Salem Works has collaborated with CSIR-Central Road Research Institute for the utilization of steel slag in road construction applications. In this regard, a Memorandum of Agreement (MoA) has been signed. Successful implementation of the project is expected to significantly enhance the overall utilization of steel slag.
vi.	Used refractories shall be recycled as far as possible.	Being Complied. Refractories are being selected to withstand high temperature whose shelf-life is longer whereby generation of used refractories are lesser. The used refractories are sent to recyclers.
vii.	SMS slag after metal recovery in waste recycling facility shall be conditioned and used for road making, railway track ballast and other applications. The project proponent shall install a waste recycling facility to recover metallic and flux for recycle to sinter plant. The project proponent shall establish linkage for 100% reuse of rejects from Waste Recycling Plant.	Being Complied. We have installed a slag crushing facility of 50 TPH to handle SMS slag to segregate iron bearing materials as scrap and reused in SMS process where by certain level of GHG emission is reduced. SMS slag is sent for metal recovery system and the crushed slag with various sizes is reused in internal applications like sinter plant, EOF as hearth layer and cooling media respectively and to cement industries. Portion of crushed slag is used in paver block facility as replacement to the natural aggregate and thereby ensuring effective reuse of rejects generated from the Waste Recycling Facility and promoting circular economy practices. Recently, JSWSL Salem Works has collaborated with CSIR-Central Road Research Institute for the utilization of steel slag in road construction applications. In this regard, a Memorandum of Agreement (MoA) has been signed. Successful implementation of the project is expected to significantly enhance the overall utilization of steel slag.
viii.	100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.	Being Complied. A coal-based boiler is installed in 2006 and imported coal with low ash is used as fuel and the boiler is being operated with flexible load to cater the captive power requirement. Fly ash generated from the coal based boiler is

		100% sent to local fly ash brick manufacturers. Sale order (MoU) has been issued to all the fly ash brick manufactures through Sales audit team.
ix.	Oil collection pits shall be provided in oil cellars to collect and reuse/recycle spilled oil. Oil collection trays shall be provided under coils on saddles in cold rolled coil storage area.	Being Complied. Oil collection pits are provided in oil cellars to collect and reuse the spilled oil. Cold rolled products are not manufactured in our plant.
x.	The waste oil, grease and other hazardous waste like acidic sludge from pickling, galvanizing, chrome plating mills etc. shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016. Coal tar sludge / decanter shall be recycled to coke ovens.	Being Complied. The Used oil, grease and other hazardous wastes like acidic sludge from pickling is disposed as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016 as amended. Our coke oven plant is Non Recovery Type. Hence, Coal tar sludge / decanter sludge is not generated during our plant operations.
xi.	Kitchen waste shall be composted or converted to biogas for further use.	Being Complied. A Biogas plant is installed at the canteen area and kitchen waste is converted into biogas and the same is used in the canteen as alternative fuel to LPG.
VII. Green Belt		
Sl. No	**Condition**	**Compliance Status**
i.	Green belt shall be developed in an area equal to 33% of the plant area with native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.	Being Complied. JSWSL Salem Works has undertaken significant plantation efforts within the Plant and Township premises. A total area of 91 hectares has been developed under green cover, constituting approximately 34% of the total land area. The plantations primarily consist of native tree species, aligned with CPCB guidelines, and demonstrate a survival rate of 85–90%. The greenbelt has been strategically developed to cover the plant's periphery, ensuring compliance with regulatory standard. The greenbelt layout is enclosed as **Annexure 3**
ii.	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.	Being Complied. A carbon sequestration assessment study has also been conducted to evaluate CO_2 absorption potential of the developed greenbelt within the plant and township premises. Further, the existing greenbelt and plantation developed within the plant and township premises have sequestered approximately 1584 tCO_2/year, as assessed through the carbon sequestration study carried out by Periyar

		University. The Carbon Sequestration study report is enclosed as **Annexure 12**
VIII. Public Hearing and Human health issues		
Sl. No	**Condition**	**Compliance Status**
i.	Emergency prepared plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Being Complied. Study on Risk and Disaster Management Plan was conducted and the detailed report was submitted on 01.02.2018 and the updated one submitted to local administration on 04.04.2025
ii.	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.	Being Complied. OHC team periodically conduct Heat stress analysis for the workmen working in high temperature work zone and suitable Personal Protection Equipment (PPE)s and other adequate requirements are provided as per the norms of Factory Act.
iii.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Agreed to Comply. Currently, there are no ongoing expansion activities.
iv.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Being Complied. Annual Health Check-ups conducted as per the Factories Act for all employees on yearly basis and records are being maintained in the OHC.
IX. Corporate Environmental Responsibility		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F. No. 22-65/2017-IA.III dated 1st May 2018, as applicable, regarding Corporate Environmental Responsibility.	Being Complied. All activities under the Corporate Environmental Responsibility (CER) are being diligently implemented. Progress updates are submitted regularly as part of the six-monthly compliance reports and the status report of October to March 2026 is enclosed as **Annexure 11**. Additionally, modifications to the ESC action plan, in response to the evolving needs of nearby villages, have been thoroughly assessed. The revised action plan status was formally communicated to the MoEF&CC via correspondence dated September 26, 2020.
ii.	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The	Being Complied. We have adopted sustainable development principles and goals, with environmental and other related

	environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental / forest / wildlife norms / conditions and / or shareholders' / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	policies duly approved by the Board of Directors. Systems are in place to monitor and report any deviations or violations of environmental norms and conditions. Any such deviations are documented and reported as part of the six-monthly compliance reports.
iii.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly report to the head of the organization.	Being Complied. A dedicated Environmental cell is in place with qualified personnel under the control of Section Head, who is reporting directly to the head of the organization.
iv.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional office along with the Six Monthly Compliance Report.	Being Complied. EMP implementation with action plan and environmental conditions along with responsibility matrix is implemented and year wise funds (CAPEX) earmarked for environmental protection measures are kept as separate account and not diverted for any other purposes. The details are submitted along with six monthly compliance report. The capex cost spent on EMP during H2 of FY 2026 is approx. ₹2.30 Crores and opex is approx. ₹16.51 Crores.
v.	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	Being Complied. Self-environmental audits are being conducted annually to assess compliance with applicable environmental requirements and management systems. In addition, environmental audits are carried out periodically by external agencies to verify conformance with the requirements of ISO 14001:2015 Environmental Management System standards. Further, during the current year, a third-party environmental audit has been completed through a NABET-accredited consultant to ensure compliance with all applicable Environmental Clearance conditions and statutory requirements. Report is attached as **Annexure 13**

vi.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Iron and Steel plants shall be implemented.	Being Complied. All the recommendations of the Charter on the Corporate Responsibility for the Environmental Protection (CREP) issued for the steel plants are implemented and the compliance status report **Annexure 7** is being submitted along with six monthly compliance report.
X. Miscellaneous		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising in at least in two local newspapers of the District or State of which one shall be in the vernacular language within seven days and in addition, this shall also be displayed in the project proponent's website permanently.	Complied. Environmental Clearance accorded from MoEF&CC dated 10.02.2020 and the same was advertised in two local newspapers on 14.02.2020 (Dinamani and The New Indian Express) which are widely circulated in the region of which Tamil is the vernacular language of the locality concerned. EC accorded is displayed in our website.
ii.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	Complied. We have submitted the copy of the Environmental Clearance dated.10.02.2020 to the Heads of local bodies on 30.05.2020 and Panchayats on 20.02.2020
iii.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	Being Complied. The compliance of the stipulated Environment Clearance conditions including results of monitored data is uploaded on our website at half-yearly basis and the latest one uploaded to website on 26.11.2025
iv.	The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO_2, NO_X (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	Complied. The criteria pollutant levels namely; PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO are displayed near the entrance of main gates of our company in the public domain & also uploaded in our website as in the six-monthly compliance report.
v.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest & Climate Change at environmental clearance portal.	Being Complied. Six-monthly reports on the status of the compliance of the stipulated EC are being uploaded to the website of the ministry of Environment, Forest & Climate Change, Parivesh portal.

vi.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	Being Complied. The Environmental Statement as prescribed under the Environment (Protection) Rules, 1986, for each financial year ending 31st March in Form-V is being submitted every year and displayed on the website of the company. For FY 2025 the report has been submitted on 29.09.2025.
vii.	The Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.	Being Complied. Date of financial closure and land development work has been informed to the JCEE of TNPCB, Salem dated 25.11.2020 and the same has been communicated through six monthly compliance report.
viii.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	Agreed to Comply. Abide by the order
ix.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	Agreed to Comply. Abide by the order
x.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Agreed to Comply. Abide by the order
xi.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Agreed to Comply. Abide by the order
xii.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Agreed to Comply. Abide by the order
xiii.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	Agreed to Comply. Abide by the order
xiv.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by	Agreed to Comply. Abide by the order

	furnishing the requisite data / information / monitoring reports	
xv.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.	Agreed to Comply. Abide by the order
xvi.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Agreed to Comply. Abide by the order

COMPLIANCE STATUS REPORT TO THE EC DATED.07.08.2019

Compliance status to the EC (Amendment) dated 07.08.2019

Subject: Expansion of integrated Steel Plant (1.0 MTPA to 1.3 MTPA) of M/s. JSW Steel Ltd., Located at Mecheri, Taluk Mettur, District Salem, Tamil Nadu – Amendment in Environmental Clearance issued dated 07.07.2017 – Reg.

Reference: F.No.J-11011/281/2006-IA.II (I) dated 07.08.2019

The compliance status for the EC conditions to the EC Amendment dated 07.08.2019 is given in this report.

Sl. No	Condition	Compliance Status
i	The specific condition no. vii given at paragraph no.26 of the EC accorded vide letter dated 7 /07/2017 shall read as below: "No effluent shall be discharged outside the plant premises and 'zero' discharge for the complete steel plant complex including Captive Power Plants (CPPs) shall be adopted.	Being Complied. Our plant adheres to Zero Wastewater Discharge concept, ensuring no effluent is discharged outside the premises, except for rainwater and surface runoff during the monsoon. CCTVs and an Electromagnetic Flow Meter (EMFM) have been installed at the overflow point of the guard pond, where process wastewater is collected for treatment. Zero wastewater discharge is consistently maintained across the entire steel plant, including the Captive Power Plant (CPP). As per the latest Consent to Operate (CTO) for CPP II (3 x 30 MW), all wastewater generated from CPP II is directed to the steel plant's guard pond for collection, treatment, and subsequent reuse in the steel plant. This treated water is effectively utilized for cooling, dust suppression, and gardening purposes as per the Consent Order.

COMPLIANCE STATUS REPORT TO THE EC DATED.07.07.2017

Compliance Status to the EC (Expansion) dated 07.07.2017

Subject: Expansion of integrated Steel Plant (1.0 MTPA to 1.3 MTPA) of M/s. JSW Steel Ltd., Located at Mecheri, Taluk Mettur, District Salem, Tamil Nadu – Environmental Clearance under EIA notification, 2006 – Reg.

Reference: F. No J-11011/281/2006-IA. II (I) dated 07.07.2017

The compliance status for the EC conditions to the EC Dated 07.07.2017 is given in this report.

A. SPECIFIC CONDITIONS:

Sl. No	Conditions	Compliance
i.	The occupational health survey of the active workmen involved shall be carried as per the ILO guidelines and all the employees shall cover in every 5 years @ 20% every year.	Being Complied. An Occupational Health Survey (OHS) is being conducted for all employees on yearly basis and records are being maintained in the OHC ensuring 100% coverage of all employees in accordance with the provisions of the Factories Act, 1948 and applicable statutory requirements. The health surveillance programme covers employees on a periodic basis and records are being maintained systematically in the OHC to ensure effective monitoring of occupational health conditions. The occupational health monitoring programme also broadly aligns with the principles of ILO occupational health surveillance guidelines with respect to periodic health assessment, exposure-based monitoring and maintenance of employee health records.
ii.	The amount allocated for ESC i.e. Rs 13 Crores shall be provided as CAPEX and the ESC shall be treated as project and monitored annually and the report of same shall be submitted to Regional office of MoEF&CC.	Being complied. An allocation of ₹13 Crores was earmarked towards Enterprise Social Commitment (ESC) activities for the proposed expansion project. Subsequently, following the segregation/split-out of the GGBFS unit, a proportionate ESC amount of ₹1.33 Crores is to be implemented by JSW Cement. Accordingly, the revised ESC obligation pertaining to the project is ₹11.67 Crores. The plant expansion is being undertaken in a phased manner: • Phase I: Capacity enhancement from 1.0 MTPA to 1.15 MTPA _ Completed

		• Phase II: Further enhancement from 1.15 MTPA to 1.3 MTPA - Yet to commence The total projected investment for the expansion is ₹1025 Crores. Phase I has been completed with an expenditure of approximately ₹650 Crores. Against the revised ESC allocation of ₹11.67 Crores, an amount of approximately ₹9.98 Crores has been utilized up to March 2026 towards implementation of ESC activities. Detailed expenditure and activity reports are enclosed as **Annexure 11**.
iii.	The project proponent shall provide for solar light system for all common areas, street lights, villages, parking around project area and maintain the same regularly.	Being Complied. Solar panels with a total capacity of 75 kW have been installed, comprising 50 kW at the canteen, 10 kW at the R&D building and 10 kW at Air Separation Plant and 5 kW at the MRSS. The average power generation is approximately 12 kWh, with further installations planned in a phased manner. Usage of RE power is 10.66 MW during FY 2025-26.
iv.	The project proponent shall provide for LED lights in their offices and residential areas.	Being Complied. Energy-efficient LED lighting systems are being implemented in place of conventional lamps across various areas, with plans to gradually extend the installation throughout the entire facility. All new lighting installations are LED-based.
v.	The project proponent should install 24X7 air monitoring devices to monitor air emission and submit report to Ministry and its Regional Office.	Being Complied. We have installed 32 nos. of dust analyzers (in both process and non-process stacks) & 11 nos. of gaseous emission monitoring systems (24 parameters) as per the applicability and the real time data of SPM, SO_2, NOx and CO are transmitted through IEMS to TNPCB and through ODAMS to CPCB servers. A copy of the report is attached as **Annexure 2.**
vi.	The ETP for Blast furnace effluent should be designed to meet Cyanide standards as notified by the MoEF&CC.	Being Complied. Our plant operates two blast furnaces. Blast Furnace #1 is equipped with a wet-type gas cleaning plant (GCP), while Blast Furnace #2 features a dry-type GCP. Cyanide levels have not been detected in the effluent from Blast Furnace #1. This is consistently verified through periodic

		analysis conducted by an external NABL & MoEF&CC accredited laboratory. Additionally, the State Pollution Control Board (SPCB) collects effluent samples from the guard pond on a monthly basis, with results confirming the absence of cyanides.
vii.	No effluent shall be discharged outside the plant premises and 'zero' discharge shall be adopted.	Being Complied. We have established Zero Effluent Discharge system and wastewater generated from the various processes of steel plant and thermal power plant is collected in a guard pond at steel plant premises and treated wastewater is 100% reused in steel plant processes as per the CTO under Water (P & CP) Act 1974 as amended. To treat the effluent arising out of the pickling plant and etching lab a dedicated ETP with the facility of Pretreatment, Ultra filter, Multistage RO plant, MEE and ATFD are installed. The treated wastewater is reused in pickling process and etching lab.
viii.	The ETP for coke oven by-product should be designed to meet EPA notified standards especially the cyanide and phenol.	Not Applicable. The Coke Oven plant installed is non-recovery type and hence the condition is not applicable to our operations.
ix.	Coke oven plant should meet visible emission standards notified by the MoEF&CC.	Not Applicable. As per MoEF&CC notification 2012 which is applicable to the Integrated Iron & Steel plant refer the visible emissions to by-product type coke oven (Recovery type). The condition has been amended to “the project proponent shall adopt effective measures to control the coke pushing emissions for non-recovery type Coke Ovens” as per the Environment Clearance issued for the amendment of certain General Conditions (12 Nos.) of EC dated 10.02.2020 for value addition and technological upgradation in the existing 1.3 MTPA Integrated Steel Plant vide Environment Clearance amendment dated 27.02.2026, issued by MoEF&CC. A dedicated localized dedusting system has been installed in both charging/pushing cars. (02 Nos.).

x.	The standards issued by the Ministry vide G.S.R. 277(E) dated 31st March 2012 shall be strictly adhered to and the standards prescribed for the Coke oven plant shall be monitored and the report should be submitted along with the six-monthly compliance report.	Being Complied. The standards issued by the Ministry vide G.S.R. 277(E) dated 31st March 2012 are related to emission standards of Iron and Steel plant. As per the standard the emissions related to coke oven plant is applicable to by product type and our Coke Oven plant is of non-recovery type. Emission standards with respect to stack (COP waste gas is used for steam generation and COP stacks are functioning as emergency stack) and fugitive emissions at the COP are being monitored and the results are submitted along with the six-monthly compliance report. Since, our plant is non-recovery type ETP is not anticipated for COP. All other emissions & effluent parameters related to sinter plant, blast furnace, steel making shop, mills are being monitored monthly and the values are well within the standard prescribed. The six months monitoring results by TNPCB and NABL accredited laboratory for stack emissions are given in **Annexure 2 & 5** and Effluent quality monitoring results are given in **Annexure 8**
xi.	The emission standards specified in the Environmental (Protection) Amendment Rules, 2015 issued by vide S.O. 3305 (E) dated 7th December 2015 for the Thermal Power Plant shall be strictly adhered to.	Being Complied. Air Quality Monitoring is being done by SPCB biannually and manual monitoring is conducted by a NABL and MoEF&CC accredited external laboratory (Air quality Monitoring as applicable to the thermal power plant with respect to the emission standards specified in the Environmental (Protection) Amendment Rules, 2015 issued by vide S.O. 3305 (E) dated 7th December 2015) on a monthly basis and we are submitting the monthly report to SPCB. Latest report of SPCB survey and Monthly Environment monitoring reports are given in **Annexure 2 & 5**
xii.	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November 2009 shall be followed.	Being Complied. We are adhering to the National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November 2009.

xiii.	On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks shall be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), and bag filters etc. shall be provided.	Being Complied. We have installed 4 Nos. of Continuous Ambient Air Quality monitoring stations to carry out the ambient air quality monitoring, considering the wind pattern. The installations one with the upstream of the plant and three are the downstream of the plant area at an angle of 120° each and the real time parameters are connected with IEMS, TNPCB. Online continuous stack monitoring systems are installed in all process and non-process stacks as applicable to monitor SPM, SO_2 & NOx as per the CTO condition. Further adequate Air Pollution Control measures in the respective process and raw material handling areas like water sprinklers, dry & wet fog systems, GI sheets are provided in raw material handling areas to control fugitive emission. As per the recent survey report of the TNPCB the stack and fugitive emission values are well within the standards. The details of stack wise APC installed are given in **Annexure 6**
xiv.	A statement on carbon budgeting including the quantum of equivalent CO_2 being emitted by the existing plant operations, the amount of carbon sequestered annually by the existing green belt and the proposed green belt and the quantum of equivalent CO_2 that will be emitted due to the proposed expansion shall be prepared by the project proponent and submitted to the Ministry and the Regional Office of the Ministry. This shall be prepared every year by the project proponent. The first such budget shall be prepared within a period of 6 months and subsequently it should be prepared every year.	Being Complied. A carbon sequestration assessment study has also been conducted to evaluate CO_2 absorption potential of the developed greenbelt within the plant and township premises. Further, the existing greenbelt and plantation developed within the plant and township premises have sequestered approximately 1584 tCO_2/year, as assessed through the carbon sequestration study carried out by Periyar University. The Carbon Sequestration study report is enclosed as **Annexure 12**
xv.	For the employees working in high temperature zones falling in the plant operation areas, the total shift duration will be 4 hrs or less per day where the temperature is more than 50°C. Moreover, the jobs of these employees will be alternated in such a way that no employee is subjected to working in high temperature area for more than 1 hr continuously. Such employees would be invariably provided	Being Complied. Employees working in high-temperature zones are rotated to alternate roles to ensure no individual is exposed to temperatures exceeding 50°C for more than one hour continuously. Adequate ventilation is maintained in these areas, and tasks requiring exposure to temperatures up to 45°C, such as handling hot metal or crude steel, are

	with proper protective equipment, garments and gears such as head gear, clothing, gloves, eye protection etc. There should also be an arrangement for sufficient drinking water at site to prevent dehydration etc.	limited to 10-15 minutes as per operational requirements. To prioritize worker safety, proper personal protective equipments (PPE) are provided, including aluminum-coated garments, headgear, gloves, eye protection, and other necessary gear. Additionally, arrangements are in place to supply sufficient hydration options such as drinking water, buttermilk, and lime juice to prevent dehydration and ensure employee well-being.
xvi.	In-plant control measures and dust suppression system shall be provided to control fugitive emissions from all the vulnerable sources. Dust extraction and suppression system shall be provided at all the transfer points, coal handling plant and coke sorting plant of coke oven plant. Bag filters shall be provided to hoods and dust collectors to coal and coke handling to control dust emissions. Water sprinkling system shall be provided to control secondary fugitive dust emissions generated during screening, loading, unloading, handling and storage of raw materials etc.	Being Complied. Dust suppression systems are provided to control fugitive emissions from all the vulnerable sources like raw material unloading and storage yards. Bag filters and Dry & Wet fog systems are provided in raw material transfer points, coal handling and coke sorting plant of coke oven. To control dust emission bag filters are provided in coal handling area of COP. Water sprinkler systems are provided in various locations to control secondary fugitive dust emissions generated during screening, loading, unloading, handling and storage of raw materials. A tyre washing unit is installed in the main gate entry to control dust emission due to vehicular movement.
xvii.	Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible limits issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008 and regularly monitored. Guidelines / Code of Practice issued by the CPCB shall be followed.	Not Applicable. JSW Salem Works not installed with sponge iron plant. The G.S.R. 414(E) dated 30th May, 2008 is related to sponge iron plant. Hence, it is not applicable.
xviii.	Hot gases from DRI Kiln should be passed through dust settling chamber (DSC) to remove coarse solids and After Burning Chamber (ABC) to burn CO completely and used in Waste Heat Recovery (WHRB). The gas then shall be cleaned in ESP before dispersion out into the atmosphere through ID fan and stack. ESP shall be installed to control the particulate emission from WHRB.	Not Applicable. The existing and expansion of the steel plant is following blast furnace route and there is no Direct Reduced Iron (DRI) process in our operations. Hence, it is not applicable.
xix.	Efforts shall further be made to use maximum water from the rain water harvesting sources. If needed, capacity of	Complied. We have implemented a comprehensive rainwater harvesting system, comprising four strategically

	the reservoir shall be enhanced to meet the maximum water requirement.	located ponds designed to maximize water conservation. Two of these ponds are located near the township on the eastern side, with storage capacities of 17,500 KL and 1,08,000 KL, respectively. Within the plant premises, one pond near the RO plant area has a capacity of 15,000 KL, while another situated behind the guest house can store 5,000 KL. Collectively, these ponds offer a total rainwater storage capacity of approximately 1,46,000 KL. From October 2025 to March 2026, approximately 44,298 m^3 of harvested rainwater was utilized within the steel plant, primarily in the Coke Oven Plant and Captive Power Plant for quenching and cooling activities. The overall rainwater consumption during FY 2025-26 was approximately 93,999 m^3. This initiative aligns with our commitment towards United Nations SDG 6 (Clean Water and Sanitation) and SDG 12 (Responsible Consumption and Production). Further, by reducing dependence on energy-intensive freshwater extraction and treatment processes, the initiative also supports SDG 13 (Climate Action) through the reduction of greenhouse gas (GHG) emissions.
xx.	Risk and Disaster Management Plan along with the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office, SPCB and CPCB within 3 months of issue of environment clearance letter.	Complied. Study on Risk and Disaster Management Plan was conducted and the detailed report was submitted on 01.02.2018 and the updated one submitted to local administration on 04.04.2025
xxi.	All the blast furnace (BF) slag shall be granulated and provided to cement manufacturers for further utilization. Flue dust from sinter plant and SMS and sludge from BF shall be re-used in sinter plant. Coke breeze form coke oven plant shall be used in sinter and pellet plant. SMS slag shall be given for metal recovery and properly utilized. All the other solid waste including broken refractory mass shall be properly disposed of in environment-friendly manner.	Complied. i. All the Blast Furnace Slag is converted to Granulated slag and sold to JSW Cement Ltd.as a value added product. ii. Flue dust from blast furnace, sludge from BF 1 & EOF, iii. Coke breeze from coke oven plant are re-used in sinter plant. iv. Pellet plant is not installed in our process. v. SMS slag is subjected to magnetic separation for metal recovery and after crushing further reused in internal applications including paver block

		making facility and sold to cement industries. vi. The refractories are being selected to withstand high temperature whose self-life is longer whereby generations of used refractories are lesser. The used refractories are sent to recyclers. Recently, JSWSL Salem Works has collaborated with CSIR-Central Road Research Institute for the utilization of steel slag in road construction applications. In this regard, a Memorandum of Agreement (MoA) has been signed. Successful implementation of the project is expected to significantly enhance the overall utilization of steel slag.
xxii.	Coal and coke fines shall be recycled and reused in the process. The breeze coke and dust from the air pollution control system shall be reused in sinter plant. The waste oil shall be properly disposed of as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.	Being Complied. 1.Coal and coke fines are recycled and reused in the Sinter plant and Blast Furnace. 2.Coke breeze and dust from the air pollution control systems are collected and reused in the Sinter Plant. 3.The waste oil generated from the process is being disposed to authorized vendor as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.
xxiii.	Green belt shall be developed in 33 % of plant area. Selection of plant species shall be as per the CPCB guidelines in consultation with the DFO.	Complied. JSW Salem Works has enhanced its green cover to approximately 91 hectares, comprising around 34% of the total land area. With a tree survival rate ranging between 85–90%, this reflects our commitment towards environmental stewardship.. Photographs of the greenbelt are enclosed as **Annexure 3**
xxiv.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel plants and Coke Oven Plants shall be implemented.	Complied. All recommendations outlined in the Charter on Corporate Responsibility for Environmental Protection (CREP) for steel plants have been fully implemented. The updated compliance status report is enclosed herewith as **Annexure 7**
xxv.	At least 2.5% of the total cost of the project shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues, locals need and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office. Implementation of such program shall be ensured by constituting a Committee comprising of the	Being complied. An allocation of ₹13 Crores was earmarked towards Enterprise Social Commitment (ESC) activities for the proposed expansion project. Subsequently, following the segregation/split-out of the GGBFS unit, a proportionate ESC amount of ₹1.33 Crores is to be implemented by JSW Cement. Accordingly, the revised

	proponent, representatives of village Panchayat and District Administration. Action taken report in this regard shall be submitted to the Ministry's Regional Office.	ESC obligation pertaining to the project is ₹11.67 Crores. The plant expansion is being undertaken in a phased manner: • Phase I: Capacity enhancement from 1.0 MTPA to 1.15 MTPA _ Completed • Phase II: Further enhancement from 1.15 MTPA to 1.3 MTPA - Yet to commence The total projected investment for the expansion is ₹1025 Crores. Phase I has been completed with an expenditure of approximately ₹650 Crores. Against the revised ESC allocation of ₹11.67 Crores, an amount of approximately ₹9.98 Crores has been utilized up to March 2026 towards implementation of ESC activities. Detailed expenditure and activity reports are enclosed as **Annexure 11**.
xxvi.	The proponent shall prepare a detailed CSR plan for every year for the next 5 years for the existing-cum-expansion project, which includes village-wise, sector-wise (Health, Education, Sanitation, Skill Development and infrastructure requirements such as strengthening of village roads, avenue plantation, etc.) activities in consultation with the local communities and administration. The CSR plan will include the amount of 2% retain annual profits as provided for in Clause 135 of the Companies Act, 2013 which provides for 2% of the average net profits of previous 3 years towards CSR activities for life of the project. A separate budget head shall be created and the annual capital and revenue expenditure on various activities of the plan shall be submitted as part of the compliance report to RO. The details of the CSR plan shall also be uploaded on the company website and shall also be provided in the Annual Report of the company. The plan so prepared shall be based on SMART (Specific, Measurable, Achievable, Relevant and Time bound) concept. The expenditure should be aimed at sustainable development and direct free distribution and temporary relief should not be included.	Being Complied. CSR plan for 5 years is prepared as per condition and activities are completed. The details of the CSR plan is uploaded on our company website and also provided in the Annual Integrated Report of the JSW steel limited The updated report of CSR for FY 2026 is attached as **Annexure 11**

xxvii	All the commitments made to the public during the Public Hearing /Public Consultation meeting shall be satisfactorily implemented and a separate budget for implementing the same shall be allocated and information submitted to the Ministry's Regional Office at Chennai	Complied. Commitments made to the public during Public Hearing is satisfactorily implemented and information submitted to the Ministry's Regional Office at Chennai
xxviii.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Agreed to Comply. Currently, there are no ongoing expansion activities. Provisions will be made for the expansion project activities and as per the condition temporary structure will be removed after the completion of expansion activities.

B. GENERAL CONDITIONS

Sl. No	CONDITIONS	COMPLIANCE
i.	The project authorities must strictly Adhere to the stipulations made by the concerned State Pollution Control Board and the State Government.	Agreed to Comply. We are adhering to the stipulations made by the SPCB.
ii.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Being Complied. There is no further expansion or modification in the plant is carried out without prior approval of Ministry of Environment, Forests and Climate Change (MoEF&CC)
iii.	At least four ambient air quality monitoring stations (AAQMS) should be established in the downward direction as well as where maximum ground level concentration of PM_{10}, $PM_{2.5}$, SO_2 and NO_X are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Chennai and the SPCB/CPCB once in six months.	Complied. In consultation with the Tamil Nadu Pollution Control Board (TNPCB), 04 No. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been installed within the plant premises at locations where the maximum ground-level concentrations of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO occur. Ambient Air Quality and stack emission data are regularly monitored and submitted to the Ministry of Environment, Forest, and Climate Change (MoEF&CC), the Regional Office in Chennai, and the State and Central Pollution Control Boards (SPCB/CPCB) on half yearly basis.
iv.	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.	Being Complied. Industrial wastewater is being collected, treated and reused 100% for secondary applications such as cooling, dust suppression and plantation purpose. Quality parameters are conformed to the prescribed standards under GSR 422

		(E) dated 19th May, 1993 and 31st December 1993. The treated wastewater analysis report given by TNPCB & NABL accredited laboratory is given in **Annexure 8**
v.	The overall noise levels in and around the plant shall be kept well within the standards 85 dB(A) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dB(A) during day time and 70 dB(A) during night time.	Being Complied. Ambient noise levels are measured in and around the plant areas on monthly basis and control measures like acoustic hoods, silencers, and enclosures are provided wherever required. The ambient noise levels are well within the standards prescribed under EPA Rules, 1989. Apart from this visual display boards are displayed to wear earplug, ear muff as PPE wherever required. The noise monitoring results by NABL accredited laboratory is enclosed in **Annexure 10**
vi.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Being Complied. Health surveillance (Annual Health Check-up) is being conducted for all employees on yearly basis and records are being maintained in the Occupational Health Centre.
vii.	The company shall develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	Complied. We have implemented a comprehensive rainwater harvesting system, comprising four strategically located ponds designed to maximize water conservation. Two of these ponds are located near the township on the eastern side, with storage capacities of 17,500 KL and 1,08,000 KL, respectively. Within the plant premises, one pond near the RO plant area has a capacity of 15,000 KL, while another situated behind the guest house can store 5,000 KL. Collectively, these ponds offer a total rainwater storage capacity of approximately 1,46,000 KL. From October 2025 to March 2026, approximately 44,298 m^3 of harvested rainwater was utilized within the steel plant, primarily in the Coke Oven Plant and Captive Power Plant for quenching and cooling activities. The overall rainwater consumption during FY 2025-26 was approximately 93,999 m^3. This initiative aligns with our commitment towards United Nations SDG 6 (Clean Water and Sanitation) and SDG 12 (Responsible Consumption and Production).

		Further, by reducing dependence on energy-intensive freshwater extraction and treatment processes, the initiative also supports SDG 13 (Climate Action) through the reduction of greenhouse gas (GHG) emissions.
viii.	The project proponent shall also comply with all the environmental protection measures and safeguards recommend in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.	Complied. To comply the environmental protection measures and safeguards as per the recommendation of EIA/EMP report for controlling air emissions including fugitive, water reduction, Zero Wastewater Discharge, Waste Minimization and maximum waste utilization. Apart from the above we are undertaking socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply, health care and formation of former producer organisation, etc. The details are given **Annexure 11** in the six monthly report of CSR.
ix.	Requisite funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change (MoEF&CC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Chennai. The funds so provided shall not be diverted for any other purpose.	Being Complied. EMP implementation with action plan and environmental conditions along with responsibility matrix is implemented and year wise funds (CAPEX) earmarked for environmental protection measures are kept as separate account and not diverted for any other purposes. The details are submitted along with six monthly compliance report. The capex cost spent on EMP during H2 of FY 2026 is approx. ₹2.30 Crores and opex is approx. ₹.16.51 Crores..
x.	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/ 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.	Complied. Copy of clearance letter is submitted to local administration on 14.07.2017 as well as uploaded to our website.
xi.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same	Being Complied. The compliance of the stipulated environment clearance conditions including results of monitored data is uploaded to

	periodically. It shall simultaneously be sent to the Regional Office of the MoEF&CC at Chennai. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM_{10}, SO_2, NO_X (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	company website once in six months and periodically updated as informed. Simultaneously the compliance reports are being submitted to the Regional Office of the MoEF&CC at Chennai and CPCB Regional Office Chennai & TNPCB Chennai. The criteria pollutant levels namely; PM_{10}, SO_2, NO_X and stack emission are displayed near the entrance of both gates of the company in the public domain.
xii.	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Chennai/CPCB/SPCB shall monitor the stipulated conditions.	Being Complied. Environmental conditions and compliance status report including results of monitored data are being submitted once in six months to the Regional Office of MoEF&CC, at Chennai and CPCB Regional Office Chennai & TNPCB Chennai.
xiii.	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Office of the MoEF&CC at Chennai by e-mail.	Being Complied. Environmental statement for each financial year ending 31st March in Form-V and status of compliance of environmental conditions is being submitted to the Regional Office of the MoEF&CC at Chennai. For the FY 2025, the report was submitted on 29.09.2025. The same was uploaded on our company website.
xiv	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be sent at website of the Ministry of Environment, Forests, and Climate Change (MoEF&CC) at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Chennai.	Complied. Environmental Clearance accorded from MoEF&CC dated on 07.07.2017 and the details have been advertised in Dinamani and The Indian Express on 14.07.2017. The same was advertised two local newspapers (Dinamani and The Indian Express) which are widely circulated in the region of which Tamil is the vernacular language of the locality concerned. A copy of the same is submitted to the MoEF&CC Regional office at Chennai on 15.07.2017
xv	Project authorities shall inform the Regional Office as well as the Ministry, the	Complied. Date of financial closure and land development work is

	date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	informed to Regional Office vide letter dated 12.10.2017.
xvi	Pollution control system in the steel plant shall be provided as per the CREP guidelines of CPCB.	Complied. As per the CREP guidelines of CPCB, Pollution control systems are provided. Please refer **Annexure 7**

ANNEXURE 1

EC ADVERTISEMENT

Newspaper advertisement of Environment Clearance

PUBLIC NOTICE REGARDING GRANT OF ENVIRONMENTAL CLEARANCE

We would like to inform that the Ministry of Environment, Forest and Climate Change, Government of India, has granted Environmental Clearance vide its EC Identification No. File No. J-11011/281/2006-IA. II(I) dated 20.05.2025, for splitting of existing EC of **M/s.JSW Steel Limited, Salem works, Pottaneri & M. Kalipatti Villages, Mecheri, Mettur Taluk, Salem District, Tamil Nadu** of 1.30 MTPA Integrated Steel Plant, 90 MW CPP along with 0.8 MTPA Slag Grinding Unit between **M/s. JSW Steel Limited and M/s. JSW Cement Limited.**

Now, JSW Steel Limited, Salem works remain with the final configuration of 1.30 MTPA Integrated Steel Plant and 90 MW of CPP unit. Transfer of 0.8 MTPA Slag Grinding unit to M/s.JSW Cement Limited and the unit is within the existing premises of M/s.JSW Steel Limited, Salem Works, Pottaneri & M. Kalipatti Villages, Mecheri, Mettur Taluk, Salem District, Tamil Nadu.

The copy of the EC is available at the Ministry of Environment, Forest and Climate Change website (www.parivesh.nic.in), Tamil Nadu Pollution Control Board, Chennai and Available in company's website (www.jsw.in)

This is issued as per the directives of MoEF&CC.

Sd/-

Place : Mecheri — **Authorised Signatory**

Date : 29.05.2025 — **M/s.JSW Steel Limited, Salem Works**

Published in The Indian Express (English Daily) dated 03.06.2025

சுற்றுச்சூழல் அனுமதி வழங்கல் குறித்த பொது அறிவிப்பு

இந்திய அரசின் சுற்றுச்சூழல், வனம் மற்றும் காலநிலை மாற்ற அமைச்சகம், சேலம் மாவட்டம், மேட்டூர் தாலுகா, பொட்டனேரி மற்றும் எம். காளிபட்டி கிராமங்களில் அமைந்துள்ள ஜே.எஸ்.டபிள்யூ ஸ்டீல் லிமிடெட் சேலம் ஒர்க்ஸ்–ன். 1.30 MTPA திறன் கொண்ட ஒருங்கிணைந்த எஃகு ஆலை, 90 MW மின்சக்தி உற்பத்தி நிலையம் (CPP) மற்றும் 0.8 MTPA ஸ்லாக் கிரைண்டிங் யூனிட் ஆகியவற்றுக்கான ஏற்கனவே உள்ள சுற்றுச்சூழல் அனுமதியை, ஜே.எஸ்.டபிள்யூ ஸ்டீல் லிமிடெட் மற்றும் ஜே.எஸ்.டபிள்யூ சிமெண்ட் லிமிடெட் ஆகியவற்றுக்கிடையே பிரிப்பதற்கான சுற்றுச்சூழல் அனுமதி ((EC Identification No. File No. J-11011/281/2006-1A. II(I) dated 20.05.2025) வழங்கியுள்ளது என்பதைத் தெரிவித்துக் கொள்கிறோம்.

தற்போது, ஜே.எஸ்.டபிள்யூ ஸ்டீல் லிமிடெட், சேலம் ஆலையின் 1.30 MTPA ஒருங்கிணைந்த எஃகு ஆலை மற்றும் 90 MW மின்சக்தி உற்பத்தி நிலையம் (CPP) யூனிட் இறுதி கட்டமைப்புடன் இருக்கும். 0.8 MTPA ஸ்லாக் கிரைண்டிங் யூனிட் ஆனது ஜே.எஸ்.டபிள்யூ சிமெண்ட் லிமிடெட் நிறுவனத்திற்கு மாற்றப்பட்டுள்ளது. இந்த யூனிட், சேலம் மாவட்டம், மேட்டூர் தாலுகா, பொட்டனேரி மற்றும் எம். காளிபட்டி கிராமங்களில் உள்ள ஜே.எஸ்.டபிள்யூ ஸ்டீல் லிமிடெட், சேலம் ஆலையின் தற்போதைய வளாகத்திற்குள்ளேயே தொடர்ந்து செயல்படும்.

இந்த சுற்றுச்சூழல் அனுமதியின் நகல் சுற்றுச்சூழல், வனம் மற்றும் காலநிலை மாற்ற அமைச்சகத்தின் இணையதளத்திலும் (www.parivesh.nic.in), தமிழ்நாடு மாசு கட்டுப்பாட்டு வாரியம், சென்னை அலுவலகத்திலும், மற்றும் நிறுவனத்தின் இணையதளத்திலும் (www.jsw.in) கிடைக்கும்.

இது சுற்றுச்சூழல், வனம் மற்றும் காலநிலை மாற்ற அமைச்சகத்தின் (MoEF&CC) வழிகாட்டுதல்களின்படி வெளியிடப்பட்டுள்ளது.

Sd/-

இடம் : மேச்சேரி — **அங்கீகரிக்கப்பட்ட கையொப்பமிட்டவர்**

தேதி : 29.05.2025 — **M/s. ஜே.எஸ். டபிள்யூ ஸ்டீல் லிமிடெட், சேலம் ஒர்க்ஸ்**

Published in Dinamani (Tamil daily) dated 03.06.2025

ANNEXURE 2

STACK EMISSION MONITORING REPORT OF TNPCB & NABL ACCREDITED LABORATORY

Annexure

Stack emission monitoring report of TNPCB & NABL accredited laboratory for the period Oct '25 to Mar '26.

I. Stack emission monitoring results of TNPCB					
Sl. No	Stack attached to	Discharge rate in (Nm^3/Hr)	Pollutants Concentration (mg/Nm^3)		
			PM	SO_2	NO_x
1	Sinter Plant - I - Sinter Machine	75103	49	-	-
2	Sinter Plant – I - Cooling System	72068	35	-	-
3	Sinter Plant – I Dedusting System	146259	36	-	-
4	Sinter Plant – I RMHS	21190	59	-	-
5	Sinter Plant - II - Sinter Machine	412987	50	-	-
6	Sinter Plant - II - Cooling & De-dusting System	373320	47	-	-
7	Sinter Plant - II - RMHS	80239	58	-	-
8	COP - Coke cutter	31569	56	-	-
9	Coke Oven - WHRB -II	44991	46	149	43
10	Coke Oven - WHRB -III	83909	40	117	23
11	Coke Oven - WHRB -IV	47965	43	139	36
12	BF Gas Fired Boiler	37480	45	59	21
13	Blast Furnace - I - Hot stove	43805	36	27	21
14	Blast Furnace - I - Stock House & RMHS	110612	57	-	-
15	Blast Furnace - I - Cast House	374617	48	-	-
16	Blast Furnace - II - Hot stove	138915	40	32	18
17	Blast Furnace - II - Stock House & RMHS	248502	43	-	-
18	Blast Furnace - II - Cast House	466297	48	-	-
19	Blast Furnace - II - PCI	44532	78	-	-
20	Process Boiler	29397	18	117	54
21	Energy Optimizing Furnace -I	64446	47	-	-
22	Energy Optimizing Furnace -II	66879	45	-	-
23	EOF Secondary dedusting system I & II	301555	43	-	-
24	Ladle Refining Furnace - 1 & 4 primary & LRF 1 to 4 Secondary dedusting	303605	45	-	-
25	Ladle Refining Furnace - 2 & 3	63682	39	-	-
26	VD boiler	13376	37	48	25
27	CCM-I ABGM - 1	17759	47	-	-
28	CCM-II ABGM - 2	34648	49	-	-
29	CCM-III Steam Exhaust 2	19249	6.8	-	-
30	CCM-III ABGM - 3	15533	48	-	-
31	BLM – Re Heating Furnace -I	30869	39	-	-
32	BLM – Re Heating Furnace -II	35125	37	-	-
33	BRM – Re Heating Furnace	76506	47	-	-
34	Pickling Plant - Acid Fumes Exhaust System Stack	17830	9	3	13
35	Pickling Plant - Acid - Hot Water Generator Stack	1268	9	5.3	12
36	Pickling Plant - MEE Thermic Fluid Stack	6439	26	8	20
37	GGBFS Grinding Mill Stack	136100	9	-	-
38	Batching Plant I Cement Silo vent stack	1100	34	-	-
39	DG Set (1250 KVA) EOF-2	1486	48	13	20
40	DG Set I (625 KVA) EOF 1	658	36	11	21
41	DG Set (650 KVA) BRM	606	34	8	19
42	AFBC - Boiler	153576	37	144	160
43	COAL CRUSHER CPP 2	4386	93	-	-
44	CPP II COAL SCREENING SECTION	7984	65	-	-
45	DG Set (500 KVA) CPP 2	1027	56	27	36

II. Stack emission monitoring report of NABL accredited Laboratory					
Stack No.	Source name	Stack emission Average (mg/Nm^3)			Discharge (Nm^3/hr)
		SPM	SO_2	NO_x	
1	Sinter Machine (Sinter Plant I)	114.5	58.1	54.6	84773
2	Cooling System (Sinter Plant I)	34.4	-	-	99239
3	Dedusting System (Sinter Plant I)	25.1	-	-	138712
4	Dust Extraction System For RMHS (Sinter Plant I)	32.2	-	-	24911
5	Sinter Machine (Sinter Plant II)	67.4	56.5	54.4	502513
6	Plant Dedusting and Cooling (Sinter Plant II)	50.2	-	-	447974
7	Crushing of Fuel & Raw Materials (Sinter Plant II)	33.7	-	-	112856
8	Coke wet quenching tower	0.0	0.0	0.0	0
9	Coke Oven Chimney 1A & 1B (Coke Oven) -Emergency stack	0.0	0.0	0.0	0
10	Coke Oven Chimney II (Coke Oven) -Emergency stack	0.0	0.0	0.0	0
11	Coke Oven Chimney III (Coke Oven) -Emergency stack	0.0	0.0	0.0	0
12	Coke cutter dedusting system stack (Coke Oven)	38.2	-	-	38718
13	Coke Dryer dedusting system stack (Coke Oven)	36.4	-	-	108449
14	Waste Heat Recovery Boiler I (Coke Oven)	27.0	347.7	267.4	56742
15	Waste Heat Recovery Boiler II (Coke Oven)	29.3	345.6	269.4	56057
16	Waste Heat Recovery Boiler III (Coke Oven)	28.1	348.8	261.8	53608
17	Waste Heat Recovery Boiler IV (Coke Oven)	25.2	342.0	263.3	49076
18	Waste Heat Recovery Boiler V (Coke Oven)	30.9	338.5	270.7	51715
19	BF Gas Fired Boiler	32	55.5	68.1	53430
20	Hot Stove (Blast Furnace I)	23.3	63.1	53.4	50372
21	GCP Flare (Blast Furnace I) -Emergency stack	0.0	-	-	0
22	Stock House Dedusting System (Blast Furnace I)	42.0	-	-	88592
23	Cast House Dedusting System (Blast Furnace I)	27.8	-	-	309976
24	Hot Stove (Blast Furnace II)	30.8	59.7	54.1	77206
25	GCP Flare (Blast Furnace II) -Emergency stack	0	-	-	0
26	Stock House Dedusting & RMHS (Blast Furnace II)	48	-	-	292960
27	Cast House Dedusting System (Blast Furnace II)	33	-	-	507339
28	Pulverized Coal Injection (Blast Furnace)	43.7	-	-	50909
29	Process Boiler (1*25 TPH) and (1*8 TPH) (Common Stack)	25.6	43.4	66.5	21890
30	Energy Optimizing Furnace (Steel Melting Shop I)	37.3	51.2	46.8	48168
31	Energy Optimizing Furnace (Steel Melting Shop II)	36.5	56.5	47.2	50754
32	Secondary Dedusting System EOF I&II (Combined SMS II)	40.6	-	-	306672
33	Ladle Furnaces (Steel Melting Shop I) (Duct area)	38.1	49.4	45.3	20928
34	Ladle Furnaces -1 & 4(65 T/Heat Each) Primary & 1 to 4 Secondary Dedusting (Steel Melting Shop)	33.5	43.7	39.1	49995
35	Ladle Furnaces(Common Stack) (Steel Melting Shop II)	39.3	-	-	429581
36	Vacuum Degasing Unit (Boiler) (Steel Melting Shop II)	34.1	56.5	64.0	21480
37	CCM#I Steam exhaust system	8.5	-	-	24241
38	Billet grinding machine stack - ABGM -1	47.8	-	-	21444
39	CCM#II Steam exhaust system -1	11.9	-	-	26995
40	CCM#II Steam exhaust system -2	11.0	-	-	27303
41	CCM#II Cut fumes Exhaust system	9.9	-	-	50225
42	Billet grinding machine stack -ABGM - 2	42.4	-	-	33498
43	CCM#III Steam exhaust system 1	11.9	-	-	32892
44	CCM#II Steam exhaust system stack #2	12.5	-	-	32595
45	Billet grinding machine stack -ABGM - 3	48.1	-	-	23294
46	Re-heating Furnace - Chimney- 1 (BLM	36.7	56.5	64.1	25503
47	Re-heating Furnace - Chimney- 2 (BLM)	36.6	53	47	27987
48	Reheating Furnace Chimney 1 & 2	49.8	53	61	57023
49	Pickling Plant- Acid Fumes exhaust system stack	12.4	8.5	7.1	1981
50	Pickling Plant- Acid - Hot water Generator Stack	0.0	0	0	0
51	Picklig plant - ARP - Hot water Generator	10.7	10.7	8.7	6878
52	Pickling plant - MEE – Thermic fluid Heater	11.0	-	-	24417
53	BF Slag Grinding mill stack	7.7	-	-	138209
54	BF Slag Grinding unit- Sinter waste Gas	0.0	-	-	0
55	BF Slag Grinding unit- Hot Air Generator	0.0	-	-	0
56	Batching plant#1 Cement silo vent stack	26.2	-	-	2311
57	Batching plant#2 Cement silo vent stack	0.0	-	-	0.0
58	AFBC Boiler	21.4	536	429	117307
59	Coal crusher	36.1	-	-	6629
60	Coal screening	39.1	-	-	15163
61	Raw Material Transfer and Discharge Point	35.3	-	-	1671

ANNEXURE 3

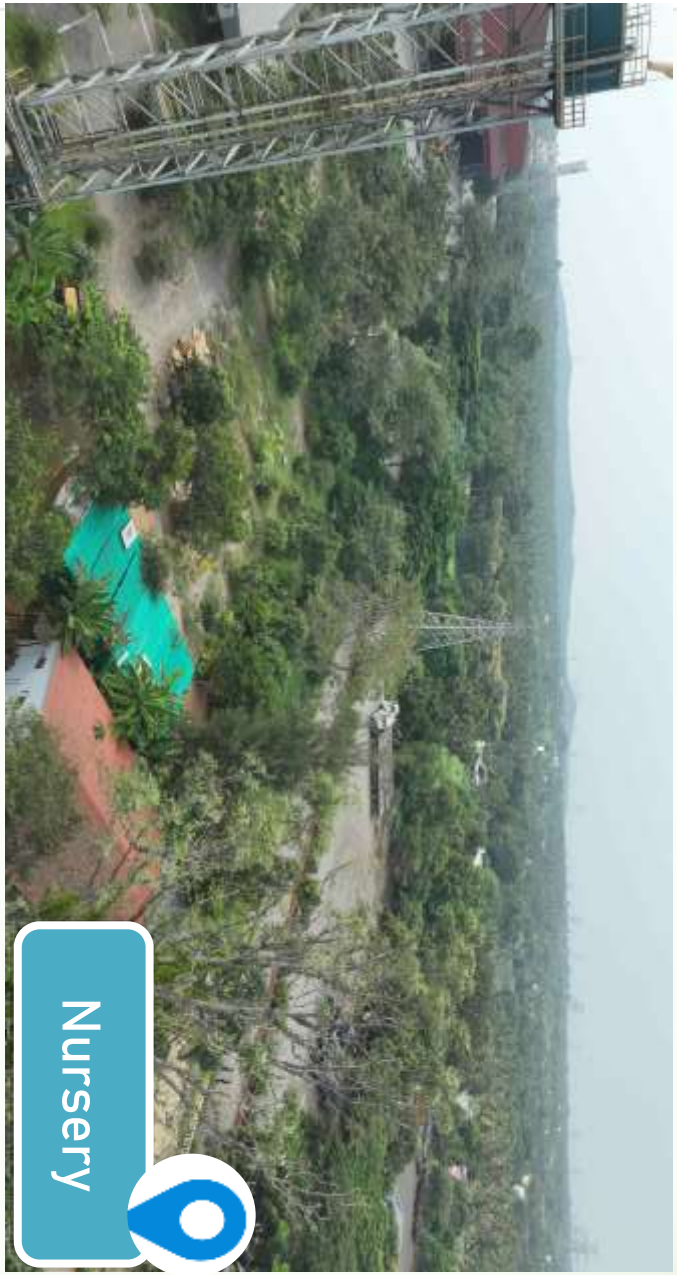
GREENBELT DEVELOPMENT

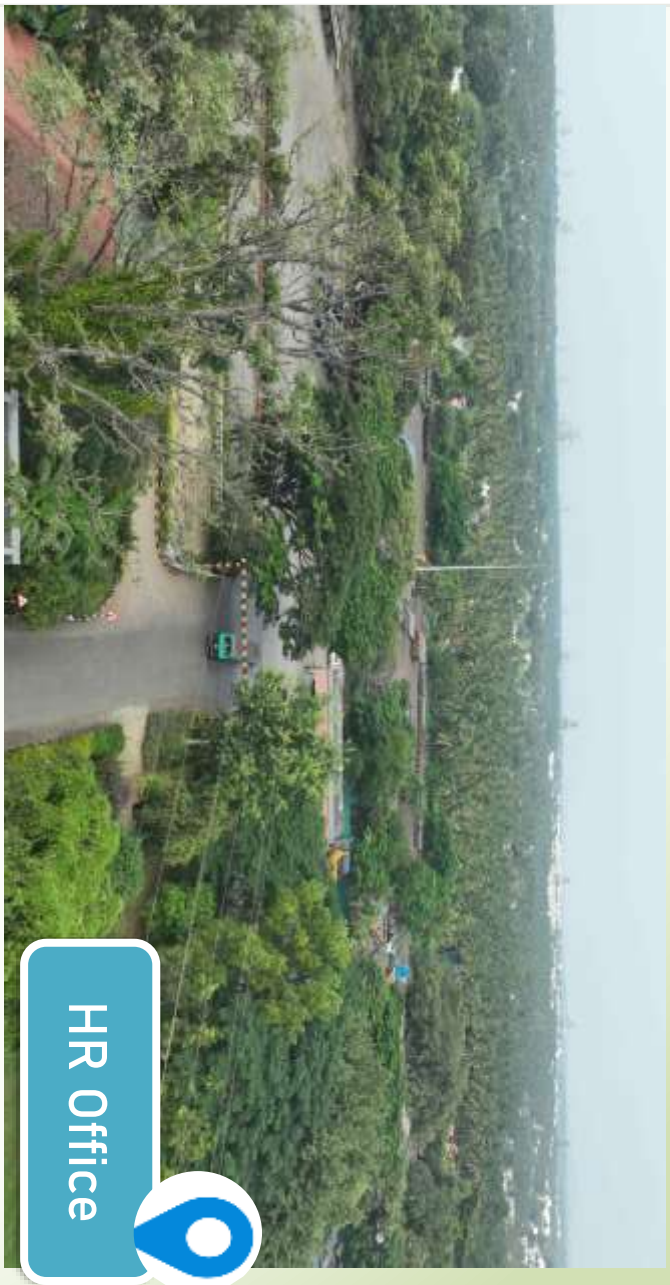
Greenbelt development at JSWSL Salem Works

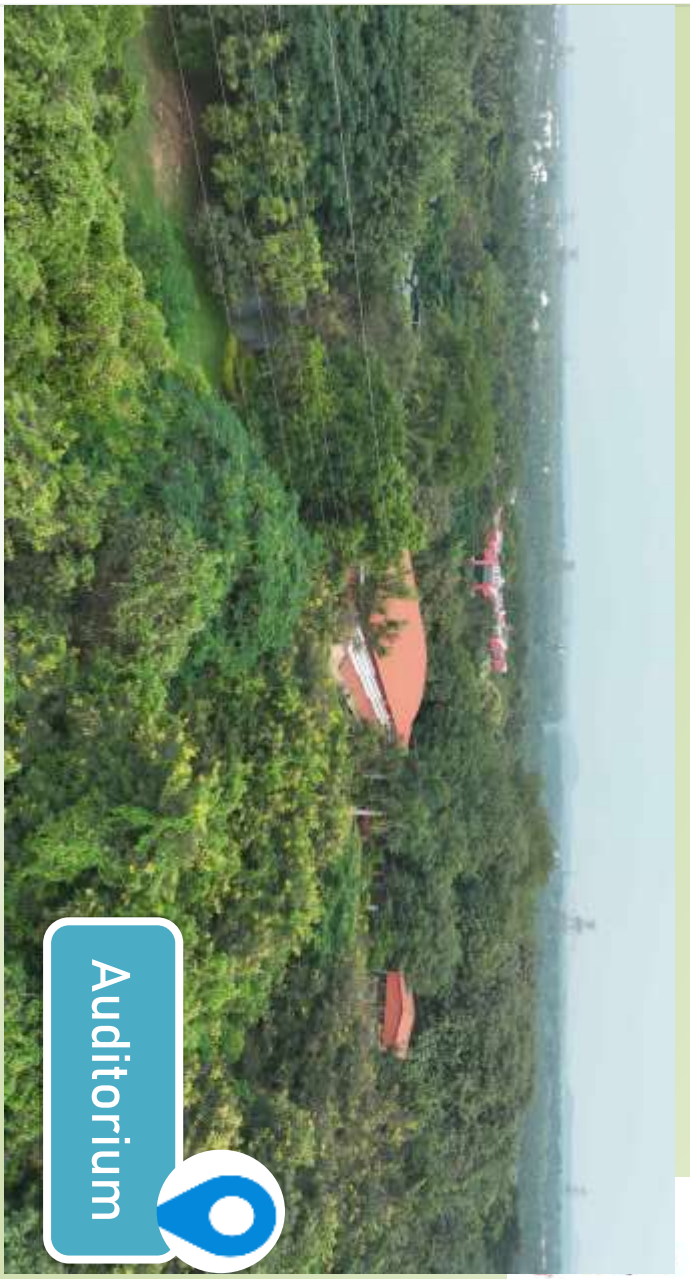
Greenbelt development at JSWSL Salem Works

Greenbelt development at JSWSL Salem Works

Greenbelt development at JSWSL Salem Works







Greenbelt development at JSWSL Salem Works

Greenbelt development at JSWSL Salem Works

Greenbelt development at JSWSL Salem Works

Greenbelt development at JSWSL Salem works

Coconut (*Cocos nucifera*)

Toddy palm(*Borassus flabellifer*)

Mango (*Mangifera indica*)

Margosa tree (*Azadirachta indica*)

Greenbelt development at JSWSL Salem works

Sacred fig tree (*Ficus religiosa*)

Scholars tree (*Alstonia scholaris*)

Pongam tree (*Pongamia pinnata*)

Indian mesquite (*Prosopis juliflora*)

Greenbelt development at JSWSL Salem works

Indian rosewood (*Dalbergia sissoo*)

Indian elm (*Holoptelea integrifolia*)

Mast tree (*Monoon longifolium*)

Blue gum tree (*Eucalyptus globulus*)

Greenbelt development at JSWSL Salem works

Flame tree (*Delonix regia*)

Teak (*Tectona grandis*)

Jamun (*Syzygium cumini*)

White silk cotton tree (*Ceiba pentandra*)

Greenbelt development at JSWSL Salem works

Tamarind (*Tamarindus indica*)

Purple orchid tree (*Bahunia purpurea*)

Bitterwood tree (*Simarouba amara*)

Queen crape myrtle (*Lagerstreomia speciosa*)

Greenbelt development at JSWSL Salem works

White frangipani (*Plumeria obtusa*)

Indian almond (*Terminalia catappa*)

Copperpod (*Peltophorum pterocarpum*)

Siris tree (*Albizia lebbeck*)

ANNEXURE 4

GROUNDWATER NOC

GOVERNMENT OF TAMIL NADU
WATER RESOURCE DEPARTMENT

Visuvaavasu : Margazhi
Thiruvalluvar Aandu 2056

From:
Er.T.Thamizhselvi,M.E.,
Chief Engineer, WRD,
State Ground & Surface Water
Resources Data Centre
Tharamani, Chennai 600 113.
Phone : 91-44-22542223 (Direct)
91-44-22541526/27(Board)
Email: cegwchennai@gmail.com
Web site: www.groundwatertnpwd.org

To:
M/s. JSW Steel Limited,,
Salem Works,
Pottaneri (Po), Mecheri,
Mettur Taluk,
Salem District-636453

Lr.No. OT 8/AG-2/1076/Renewal – NOC/SLM/2025 dated: 14.01.2026.

Sir,

Sub: **"Renewal of No Objection Certificate"** for drawal of groundwater to **"M/s. JSW Steel Limited",** Pottaneri & M.Kalipatty Village, Pottaneri Firka, Mechery Block, Mettur Taluk, Salem District – Drinking and Domestic purpose - 8th Renewal of NOC issued - Reg.

Ref: 1.This Office Lr.No. OT 8 / AG-2 /103/2025/ Renewal - NOC / SLM / 2025dated:20.02.2025.
2.The firm Renewal of NOC application date:28.05.2025.
3.This Office Lr.No:251DD(G)/AG-III/Renewal of NOC/2024 Dt:12.06.2025.
4.SE,GWC,ThanjavurLr.No:310CE/AG/T.F44C(SLM)/NOC/GWC/TNJ/2025 Dt:27.11.2025.

Please find the enclosed **"Renewal of No Objection Certificate",** for drawal of groundwater to **"M/s.JSW Steel Limited",** Pottaneri & M.Kalipatty Village, PottaneriFirka, Mechery Block, Mettur Taluk, Salem District. As per the G.O.(Ms).No 142 PW(R2)Department dt:23.07.2014, NOC for water based industries should be renewed every year. You are requested to strictly adhere to the quantity permitted and conditions mentioned in the certificate and apply for renewal of NOC before two months from the date of expiry, i.e**., 26.07.2026** without fail. If you fail to apply for renewal of NOC, it will be treated as "illegal" and informed to District Monitoring Committee to seal the bore well in your unit as per Honourable Madras High Court Orders in WP.No.28535 of 2014 & WP.No.16299/2018.

Enclosure:

1. **Renewal of No Objection Certificate**

14/1/26
Chief Engineer,WRD,SG&SWRDC,
Tharamani,Chennai-113.

Certificate No.1076/2025(R-8) **Dated:** 14.01.2026

GOVERNMENT OF TAMIL NADU

WATER RESOURCES DEPARTMENT

STATE GROUND & SURFACE WATER RESOURCES DATA

CENTRE CHENNAI – 113

Renewal of No Objection Certificate

This is to certify that **"M/s. JSW Steel Limited",** Pottaneri & M.Kalipatty Village, Pottaneri Firka, Mechery Block, Mettur Taluk, Salem District is hereby given the **"Renewal of No Objection Certificate"** for the drawal of total quantity of **80,000LPD** (Eighty Thousand litres per day) of groundwater for the purpose of **"Drinking & Domestic"** use from the Groundwater structure listed below with strict adherence of stipulated conditions.

Sl. No	Referred Well / Bore Well & SF. No	Village / Firka	Co-ordinates		Quantity Permittedfor Pumping in LPD
			Latitude	Longitude	
1.	Bore Well-1 / 309	Pottaneri / Pottaneri	11.81667^0 N	77.91638^0 E	**20,000**
2.	Bore Well-2 / 310	M.Kalipatty / Pottaneri	11.80944^0 N	77.92306^0 E	**20,000**
3.	Bore Well-3 / 311		11.81583^0 N	77.92027^0 E	**20,000**
4.	Bore Well-4 / 314		11.81416^0 N	77.91916^0 E	**20,000**
				Total	**80,000**

This renewal certificate is valid from 27.07.2025 to 26.07.2026 and Renewal of NOC is issued under the conditions laid down.

14/1/26

Chief Engineer,WRD,SG&SWRDC,
Tharamani,Chennai-113.

8th Renewal of NOC Conditions pertaining to M/s.JSW Steel Limited,Salem District

1 **This No Objection certificate issued for ground water extraction applies to the referred ground water abstraction structure only.**

2 All the **other ground water abstraction structures** (dug wells/bore wells/dug-cum bore wells) other than the permitted one inside the plant area **should not be considered** for this permission.

3 Such structures as said in Condition No.2 should be closed or used only for **Rain water harvesting** purposes.

4 This Certificate is applicable for drawal of permitted Quantity of ground water only and **not for transportation.**

5 The Company should install necessary "flow meters" to the referred well /bore well and monitor the quantity which should not exceed the permitted level. **Proper Records** should be maintained continuously from the date of drawal. Monthly statement of daily drawal of water should be sent to the Executive Engineer, Groundwater Division, Salem as per format enclosed.

6 As and when the officials of Ground Water Wing of WRD inspect the site/premises, perusal of drawal records and water quality observations should be allowed.

7 **Rain water harvesting structure** is to be established as per the direction of this department. Rain water harvesting structures already exist inside the plant premises, it should be maintained properly.

8 **Violation of the above stipulations in any form may lead to cancellation of the permission accorded by the Government.**

9 The Company should be ready to pay the **levy/charges for drawal of ground water** for commercial purposes, if Government / Ground Water Authority imposes any such orders in future.

10 It is also informed that during the renewal of the NOC, depending upon the hydrogelogical condition the category of the area and the site conditions, the quantity will be vary from permitted quantity.

11 The handed over Bore Well to this Department for Water Level monitoring purpose should be maintained properly. The firm has to take the water level in the first week of every month & maintain a monthly water level Register and the Assistant Geologist concerned should monitor the water level data and also check whenever required.

12 As per the G.O.(Ms).No 142 PW(R2)Department dt:23.07.2014, NOC for water based industries should be renewed every year

13 This No Objection Certificate is applicable **only for the purpose of "Drinking& Domestic"**, if any deviation in the usage of ground water is found, the NOC accorded is automatically deemed to be cancelled.

14 The **Assistant Director, Groundwater Sub-Division/Assistant Geologist** of the respective District **would inspect** either the rain water harvesting structures established in the premises of the firm or the records maintained or even the drawal of ground water as and when needed and it is the mandatory of the firm to maintain the Rain water harvesting structure/ structures properly and show the records needed.

15 **If any information / Documents submitted by this firm is found to false / in correct or any data provided by the firm is found to be incorrect, the NOC issued to the firm will be cancelled by this department without any prior notice.**

14/1/26

Chief Engineer,WRD,SG&SWRDC,
Tharamani,Chennai-113.

ANNEXURE 5

ONLINE STACK EMISSION MONITORING, AMBIENT AIR QUALITY MONITORING & FUGITIVE EMISSION REPORT

Annexure

Online stack emission monitoring & Ambient air quality monitoring report for the period Oct '25 to Mar '26

I. Online stack emission monitoring summary report (Oct '25 to Mar'26)

Stack No.	Source name	Parameter	UoM	Month					
		Month		Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	Sinter Machine (Sinter Plant I)	SPM	mg/Nm^3	69.51	84.99	85.69	79.89	72.76	76.11
		SO_2	mg/Nm^3	Excempted					
2	Cooling System (Sinter Plant I)	SPM	mg/Nm^3	41.59	56.46	40.15	29.00	35.00	35.89
3	Dedusting System (Sinter Plant I)	SPM	mg/Nm^3	20.37	13.89	20.04	25.55	34.41	27.21
4	Dust Extraction System For RMHS (Sinter Plant I)	SPM	mg/Nm^3	31.74	34.04	35.04	25.01	13.99	15.14
5	Hot Stove (Blast Furnace I)	SPM	mg/Nm^3	16.09	23.40	20.65	22.91	24.98	23.84
		SO_2	mg/Nm^3	63.34	64.13	53.53	25.47	84.99	81.25
		NOx	mg/Nm^3	8.47	10.28	6.39	10.68	50.02	44.84
		CO	ppm	1571.35	1764.97	1722.32	2490.26	5001.44	4559.19
6	GCP Flare (Blast Furnace I) -Emergency stack	NA	NA	Emergency Stack					
		NA	NA						
7	Stock House Dedusting System (Blast Furnace I)	SPM	mg/Nm^3	24.33	39.93	43.08	23.59	39.57	34.19
		SO_2	mg/Nm^3	Excempted					
8	Dust Extraction System for RMHS (Blast Furnace I)	SPM	mg/Nm^3	Stack removed and connected to BF1 SHDS					
		SO_2	mg/Nm^3						
9	Cast House Dedusting System (Blast Furnace I)	SPM	mg/Nm^3	37.41	11.53	18.15	18.72	47.08	38.64
		SO_2	mg/Nm^3	Excempted					
10	CPP I Boiler 2 Nos of 25 TPH each (Common Stack)	SPM	mg/Nm^3	27.88	19.13	18.07	23.12	30.09	29.92
		SO_2	mg/Nm^3	51.14	48.55	51.56	49.95	150.01	149.60
11	Energy Optimizing Furnace (Steel Melting Shop I)	SPM	mg/Nm^3	36.22	42.56	28.77	32.94	59.93	59.96
12	Ladle Furnaces (Steel Melting Shop I)(ABGM)	SPM	mg/Nm^3	29.99	32.45	18.00	21.41	39.99	39.11
13	Continuous Casting Machine (Steel Melting Shop I)	SPM	mg/Nm^3	Excempted					
14	Energy Optimizing Furnace (Steel Melting Shop II)	SPM	mg/Nm^3	36.25	39.51	38.90	34.78	64.81	64.63
15	Secondary Dedusting System EOF I&II (Combined SMS II)	SPM	mg/Nm^3	44.31	45.88	40.47	48.09	37.50	37.49
16	Sec. Dedusting System of LRF IV(Common) (SMS II)	SPM	mg/Nm^3	36.56	39.04	40.13	42.39	45.01	45.02
17	Ladle Furnaces(Common Stack) (Steel Melting Shop II)	SPM	mg/Nm^3	12.53	12.16	11.95	11.00	13.43	12.86
18	Vacuum Degasing Unit (Boiler) (Steel Melting Shop II)	SPM	mg/Nm^3	39.56	20.02	32.02	32.44	25.21	24.17
19	Steam Exhaust System 1 (Bloom Caster	SPM	mg/Nm^3	Excempted					
19	Steam Exhaust System 2 (Bloom Caster	SPM	mg/Nm^3						
20	Cut Fumes Exhaust System (Bloom Caster)	SPM	mg/Nm^3						
21	Reheating Furnace (Furnace 1 No2 Chimney) (BLM)(1)	SPM	mg/Nm^3	27.13	32.90	24.29	43.43	49.79	49.82
		SO_2	mg/Nm^3	Excempted					
22	Reheating Furnace (Furnace 1 No1 Chimney) (BLM)(2)	SPM	mg/Nm^3	15.97	18.52	33.26	43.96	70.02	69.90
		SO_2	mg/Nm^3	Excempted					
23	Coke Oven Chimney I (Coke Oven) -Emergency stack	NA	NA	Emergency Stack					
		NA	NA						
24	Coke Oven Chimney II (Coke Oven) -Emergency stack	NA	NA						
		NA	NA						
25	Coke Oven Chimney III (Coke Oven) -Emergency stack	NA	NA						
		NA	NA						

Stack No.	Source name	Parameter	UoM	Month					
		Month		Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
26	Waste Heat Recovery Boiler I (Coke Oven)	SPM	mg/Nm^3	29.71	14.90	24.72	27.71	19.96	20.05
		SO_2	mg/Nm^3	229.97	194.28	268.56	242.80	330.01	328.90
27	Waste Heat Recovery Boiler II (Coke Oven)	SPM	mg/Nm^3	31.00	22.41	25.80	33.83	27.52	27.52
		SO_2	mg/Nm^3	223.85	218.19	213.72	198.78	356.75	359.59
28	Waste Heat Recovery Boiler III (Coke Oven)	SPM	mg/Nm^3	33.31	18.61	21.75	28.27	22.55	22.54
		SO_2	mg/Nm^3	174.33	110.98	65.02	73.62	329.94	329.37
29	Waste Heat Recovery Boiler IV (Coke Oven)	SPM	mg/Nm^3	31.14	17.65	20.02	23.02	25.02	25.03
		SO_2	mg/Nm^3	190.26	145.54	150.14	141.37	340.20	339.35
30	Waste Heat Recovery Boiler V (Coke Oven)	SPM	mg/Nm^3	27.14	33.62	31.32	35.57	20.01	20.04
		SO_2	mg/Nm^3	317.76	315.85	270.23	301.02	344.85	344.58
31	BF Gas Fired Boiler	SPM	mg/Nm^3	34.97	36.27	32.89	36.87	28.10	28.01
32	Reheating Furnace (Bar & Rod Mill)	SPM	mg/Nm^3	53.36	67.11	50.25	41.30	52.38	55.22
		SO_2	mg/Nm^3	Excempted					
33	Sinter Machine (Sinter Plant II)	SPM	mg/Nm^3	79.38	76.92	69.53	66.02	72.44	63.77
		SO_2	mg/Nm^3	Excempted					
34	Plant Dedusting and Cooling (Sinter Plant II)	SPM	mg/Nm^3	33.10	34.74	39.93	38.34	40.01	43.85
35	Crushing of Fuel & Raw Materials (Sinter Plant II)	SPM	mg/Nm^3	17.66	11.18	14.24	18.30	22.52	21.81
36	Hot Stove (Blast Furnace II)	SPM	mg/Nm^3	30.27	21.17	30.72	30.96	29.99	30.08
		SO_2	mg/Nm^3	27.03	53.29	85.25	61.26	92.53	92.10
		NOx	mg/Nm^3	22.72	0.98	1.99	15.20	57.50	56.89
		CO	ppm	1912.44	1624.09	1551.92	1488.17	2229.94	2241.30
37	GCP Flare (Blast Furnace II) -Emergency stack	NA	NA	Emergency Stack					
		NA	NA						
38	Stock House Dedusting & RMHS (Blast Furnace II)	SPM	mg/Nm^3	21.36	14.91	16.66	20.70	34.97	29.44
		SO_2	mg/Nm^3	Excempted					
39	Cast House Dedusting System (Blast Furnace II)	SPM	mg/Nm^3	23.41	13.92	17.75	22.04	40.01	31.64
		SO_2	mg/Nm^3	Excempted					
40	Pulverized Coal Injection (Blast Furnace)	SPM	mg/Nm^3	40.63	21.41	26.53	34.20	44.97	41.24
		SO_2	mg/Nm^3	Excempted					
41	Steam Exhaust System - CCM-III	SPM	mg/Nm^3	Excempted					
		NA	NA						
42	CPPII-AFBC Boiler	SPM	mg/Nm^3	13.90	10.45	14.23	18.09	18.17	17.01
		SO_2	mg/Nm^3	362.04	341.50	308.41	226.98	211.78	390.05
		NOx	mg/Nm^3	225.62	169.58	188.01	238.63	184.71	294.91

II. Continuous Ambient Air Quality Monitoring Results (Oct '25 to Mar'26)

Month	CAAQMS#1					CAAQMS#2				
	PM_{10}	$PM_{2.5}$	SO_2	NO2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO2	CO
UoM	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3
Oct-25	50.27	27.26	16.85	5.30	0.29	58.44	29.01	5.62	7.71	0.54
Nov-25	57.73	33.55	4.87	2.94	2.57	66.57	35.18	9.30	5.49	0.59
Dec-25	52.53	31.58	7.45	5.87	0.40	64.23	33.45	5.41	5.43	0.44
Jan-26	52.08	37.34	7.45	5.87	0.61	60.48	33.45	5.41	4.92	0.83
Feb-26	33.58	18.16	5.26	6.41	0.55	55.83	33.86	2.66	4.58	0.88
Mar-26	32.67	18.76	7.45	5.87	0.73	58.45	33.45	5.41	4.55	0.98

Month	CAAQMS#3					CAAQMS#4				
	PM_{10}	$PM_{2.5}$	SO_2	NO2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO2	CO
UoM	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3
Oct-25	72.35	37.74	7.08	20.14	0.36	67.02	30.80	4.23	4.98	0.31
Nov-25	70.24	36.83	9.63	6.55	0.54	62.87	28.80	4.56	6.23	0.43
Dec-25	59.71	38.41	9.23	9.04	0.38	61.20	33.82	5.33	5.01	0.38
Jan-26	53.44	34.33	8.26	9.04	0.69	63.26	37.12	5.38	5.14	0.81
Feb-26	38.27	28.10	4.58	12.38	0.96	58.77	22.30	6.36	5.99	0.49
Mar-26	45.58	38.88	9.22	9.04	0.50	49.62	23.26	4.48	3.20	0.49

Tolerance limit: PM10: 100 $\mu g/m^3$, PM2.5: 60 $\mu g/m^3$, NOx: 80 $\mu g/m^3$, SO_2: 80 $\mu g/m^3$,
CO: 1 hr avg - 4 mg/m^3, 8 hr avg - 2 mg/m^3

The results are well within the prescribed standards.

III. Ambient Air Quality Monitoring results of NABL Accredited laboratory

Month	AQ-1 (Unit - µg/m3)				AQ-2 (Unit - µg/m3)			
	PM_{10}	$PM_{2.5}$	SO_2	NO2	PM_{10}	$PM_{2.5}$	SO_2	NO2
Oct-25	49.01	26.05	7.43	13.94	49.94	25.60	6.96	13.00
Nov-25	44.15	22.65	6.88	13.31	46.75	20.86	6.29	12.59
Dec-25	45.71	24.44	6.41	12.57	45.01	22.75	6.14	13.04
Jan-26	47.71	29.15	6.66	12.62	49.71	26.37	7.84	15.01
Feb-26	50.62	31.21	6.86	14.06	51.93	28.47	7.09	16.66
Mar-26	51.92	32.84	5.89	14.13	50.91	29.24	6.13	15.03

Month	AQ-3 (Unit - µg/m3)				AQ-4 (Unit - µg/m3)			
	PM_{10}	$PM_{2.5}$	SO_2	NO2	PM_{10}	$PM_{2.5}$	SO_2	NO2
Oct-25	48.33	28.78	8.33	14.02	49.84	27.93	7.61	15.13
Nov-25	45.53	24.64	6.51	14.21	44.00	25.17	6.58	14.18
Dec-25	47.17	25.34	6.97	12.87	45.96	25.08	6.27	14.37
Jan-26	47.52	27.37	7.18	13.30	48.47	27.21	5.72	13.45
Feb-26	49.72	35.61	5.16	16.00	50.35	29.01	5.00	14.96
Mar-26	50.45	27.69	5.98	14.27	46.82	25.56	4.51	14.96

Month	AQ-5 (Unit - µg/m3)				AQ-6 (Unit - µg/m3)			
	PM_{10}	$PM_{2.5}$	SO_2	NO2	PM_{10}	$PM_{2.5}$	SO_2	NO2
Oct-25	46.05	29.15	8.09	14.04	45.61	24.83	7.10	14.77
Nov-25	45.05	25.94	7.43	13.65	47.56	24.64	6.51	14.21
Dec-25	51.10	27.38	7.16	14.21	50.04	25.66	6.21	13.63
Jan-26	53.59	29.58	6.54	14.26	41.06	25.80	7.41	11.33
Feb-26	50.53	30.76	5.84	16.76	58.85	35.61	5.16	16.00
Mar-26	45.92	31.01	4.98	17.84	57.82	34.22	4.73	17.34

Month	AQ-7 (Unit - µg/m3)				AQ-8 (Unit - µg/m3)			
	PM_{10}	$PM_{2.5}$	SO_2	NO2	PM_{10}	$PM_{2.5}$	SO_2	NO2
Oct-25	47.80	24.34	7.67	14.70	44.64	24.39	7.18	13.20
Nov-25	45.33	23.90	6.95	13.86	49.37	27.32	6.64	12.31
Dec-25	51.00	25.67	6.47	12.35	51.16	28.35	6.92	12.53
Jan-26	50.53	27.72	5.90	12.28	54.96	32.06	6.32	14.67
Feb-26	49.13	31.32	5.97	14.74	51.85	30.20	5.52	14.40
Mar-26	46.85	27.50	5.36	16.59	58.74	35.44	5.07	16.09

Month	AQ-9 (Unit - µg/m3)				AQ-10 (Unit - µg/m3)			
	PM_{10}	$PM_{2.5}$	SO_2	NO2	PM_{10}	$PM_{2.5}$	SO_2	NO2
Oct-25	40.40	22.88	6.77	12.38	40.5	23.74	6.58	13.35
Nov-25	51.27	22.26	5.53	11.53	53.54	30.09	5.99	13.14
Dec-25	54.85	27.85	6.49	12.48	52.87	30.67	6.35	13.47
Jan-26	55.57	31.28	9.88	13.34	58.68	36.24	9.56	13.58
Feb-26	59.43	35.61	5.16	16.00	63.44	39.29	8.83	15.34
Mar-26	60.85	37.38	5.39	16.94	61.45	37.63	7.59	17.06

Month	AQ-11 (Unit - µg/m3)				AQ-12 (Unit - µg/m3)			
	PM_{10}	$PM_{2.5}$	SO_2	NO2	PM_{10}	$PM_{2.5}$	SO_2	NO2
Oct-25	38.56	20.3	5.46	12.8	41.29	22.16	5.95	11.45
Nov-25	48.24	28.01	4.83	12.86	43.48	22.26	5.53	11.53
Dec-25	51.98	29.02	5.96	14.21	46.17	23.61	6.12	14.51
Jan-26	53.94	31.34	7.47	14.19	45.63	25.50	5.59	12.90
Feb-26	57.17	34.82	7.13	15.66	58.85	35.61	5.16	16.00
Mar-26	63.22	38.02	6.17	17.12	52.97	31.66	5.01	16.13

Tolerance limit: PM10: 100 µg/m^3, PM2.5: 60 µg/m^3, NO2: 80 µg/m3, SO_2: 80 µg/m^3

IV. Analysis of Ambient Air Quality Monitoring results

PM_{10} in µg/m^3

Location	AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	AQ-7	AQ-8	AQ-9	AQ-10	AQ-11	AQ-12
Minimum	44.15	45.01	45.53	44.00	45.05	41.06	45.33	44.64	40.40	40.50	38.56	41.29
Maximum	51.92	51.93	50.45	50.35	53.59	58.85	51.00	58.74	60.85	63.44	63.22	58.85
Average	48.19	49.04	48.12	47.57	48.71	50.16	48.44	51.79	53.73	55.08	52.19	48.07
Standard	2.94	2.63	1.79	2.43	3.50	6.99	2.19	4.81	7.37	8.29	8.38	6.59
98th Percentile	51.79	51.83	50.38	50.30	53.34	58.75	50.95	58.36	60.71	63.24	62.62	58.26

$PM_{2.5}$ in µg/m^3

Location	AQ1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	AQ-7	AQ-8	AQ-9	AQ-10	AQ-11	AQ-12
Minimum	22.65	20.86	24.64	25.08	25.94	24.64	23.90	24.39	22.26	23.74	20.30	22.16
Maximum	32.84	29.24	35.61	29.01	31.01	35.61	31.32	35.44	37.38	39.29	38.02	35.61
Average	27.72	25.55	28.24	26.66	28.97	28.46	26.74	29.63	29.54	32.94	30.25	26.80
Standard	3.99	3.25	3.93	1.63	1.97	5.04	2.74	3.86	6.35	5.85	6.13	5.57
98th Percentile	32.68	29.16	34.93	28.90	30.99	35.47	30.96	35.10	37.20	39.12	37.70	35.22

SO_2 in µg/m^3

Location	AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	AQ-7	AQ-8	AQ-9	AQ-10	AQ-11	AQ-12
Minimum	5.89	6.13	5.16	4.51	4.98	4.73	5.36	5.07	5.16	5.99	4.83	5.01
Maximum	7.43	7.84	8.33	7.61	8.09	7.41	7.67	7.18	9.88	9.56	7.47	6.12
Average	6.69	6.74	6.69	5.95	6.67	6.19	6.39	6.28	6.54	7.48	6.17	5.56
Standard	0.52	0.68	1.08	1.12	1.13	1.06	0.83	0.82	1.76	1.45	1.00	0.43
98th Percentile	7.38	7.77	8.22	7.51	8.02	7.38	7.60	7.15	9.57	9.49	7.44	6.10

NO2 in µg/m^3

Location	AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	AQ-7	AQ-8	AQ-9	AQ-10	AQ-11	AQ-12
Minimum	12.57	12.59	12.87	13.45	13.65	11.33	12.28	12.31	11.53	13.14	12.80	11.45
Maximum	14.13	16.66	16.00	15.13	17.84	17.34	16.59	16.09	16.94	17.06	17.12	16.13
Average	13.44	14.22	14.11	14.51	15.13	14.55	14.09	13.87	13.78	14.32	14.47	13.75
Standard	0.72	1.60	1.08	0.64	1.73	2.06	1.64	1.45	2.18	1.56	1.67	2.11
98th Percentile	14.12	16.50	15.83	15.11	17.73	17.21	16.41	15.95	16.85	16.89	16.97	16.12

Tolerance limit: PM10: 100 µg/m^3, PM2.5: 60 µg/m^3, NO2: 80 µg/m3, SO_2: 80 µg/m^3

AAQ1: Mr.Murugesan - Pottaneri, AAQ2:Mr. Gopal - Malamannor, AAQ3:Mr.Surendran -Kavundanoor, AAQ4:Mr.Manivasagam - Soliyur, AAQ5:New Guest House - Township, AAQ6: Mr.Sellappan – Pudur panakadu, AAQ7:Mr.Gandhi – Kuttapatti Pudur, AAQ8:Mr.Santhanam - Ervadi, AAQ9:Mr. Arunasalam - Ervadi, AAQ10:Mr.Thangavel – Amarathan Kadu, AAQ11:Mr. Mahalingam – Kattuvalavu, Pottaneri, AAQ12:Mr. Venkatesan – Pottaneri.

Fugitive Emission Monitoring

S.NO	PLANT	LOCATION	PARAMETER	UoM	Standard	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	Narth Gate	North Gate Area (Near RMHS)	PM 10 ug/m^3	ug/m^3	4000	1982	1802	2185	1976	1862	1967
			SO2	ug/m^3	200	40	38	22	26	32	35
			Nox	ug/m^3	150	37	35	47	41	39	37
			CO	ug/m^3	5000	402	381	326	339	349	381
2	Narth Gate	North Gate Area (Near vehicle parking area)	PM_{10}	ug/m^3	4000	1759	1613	1428	1634	1785	1879
			SO_2	ug/m^3	200	35	37	40	39	41	43
			Nox	ug/m^3	150	40	36	65	60	65	60
			CO	ug/m^3	5000	380	394	412	438	484	477
3	SP storage yard	Old Weigh Bridge Area	PM_{10}	ug/m^3	4000	1120	1094	1231	1641	1741	1897
			SO_2	ug/m^3	200	32	38	27	25	29	32
			Nox	ug/m^3	150	31	34	39	35	38	35
			CO	ug/m^3	5000	391	388	324	397	426	464
4	Wagon Tippler	Wagon Tippler Area	PM 10 ug/m^3	ug/m^3	4000	1249	1121	2481	2247	2356	2239
			SO2	ug/m^3	200	34	36	23	29	32	36
			Nox	ug/m^3	150	36	39	32	36	40	43
			CO	ug/m^3	5000	370	390	345	379	462	491
5	Hazardous shet	Near Hazardous shet area	PM 10 ug/m^3	ug/m^3	4000	1126	1321	1215	1154	1523	1641
			SO2	ug/m^3	200	33	35	26	28	32	36
			Nox	ug/m^3	150	38	36	33	31	37	40
			CO	ug/m^3	5000	369	380	335	343	395	432
6	Sinter Plant - I	SP- I Near Cooling Fan Area & RMHS area	PM_{10}	ug/m^3	4000	2158	2347	2562	2126	2352	2436
			SO_2	ug/m^3	200	36	34	30	37	39	39
			Nox	ug/m^3	150	37	36	38	35	42	45
			CO	ug/m^3	5000	386	395	326	364	421	455
7	Sinter Plant - II	SP- II Near Waste Gas Fan Area	PM 10 ug/m^3	ug/m^3	4000	1983	1813	2058	1374	1485	1379
			SO2	ug/m^3	200	37	40	37	33	36	31
			Nox	ug/m^3	150	35	37	51	45	48	44
			CO	ug/m^3	5000	410	394	364	391	432	463
8	SP- II	SP- II Raw Material Yard area	PM_{10}	ug/m^3	4000	2025	1922	2160	1647	1756	1976
			SO_2	ug/m^3	200	39	41	25	29	34	36
			Nox	ug/m^3	150	38	34	32	30	39	41
			CO	ug/m^3	5000	373	412	304	335	374	430
9	BF- I	BF-I Cast House Area	PM_{10}	ug/m^3	4000	1134	1234	1836	1980	2056	1954
			SO_2	ug/m^3	200	36	38	41	45	48	45
			Nox	ug/m^3	150	42	40	49	43	45	41
			CO	ug/m^3	5000	477	410	423	471	486	467
10	BF- I	BF- I Near Stock House	PM 10 ug/m^3	ug/m^3	4000	1015	1314	1625	1234	1485	1367
			SO2	ug/m^3	200	40	37	30	33	37	39
			Nox	ug/m^3	150	39	41	37	35	43	40
			CO	ug/m^3	5000	402	422	349	364	421	460

11	BF- II	BF-II Cast House Area	PM_{10}	ug/m^3	4000	1033	1213	1538	1201	1395	1467
			SO_2	ug/m^3	200	33	39	35	38	37	39
			Nox	ug/m^3	150	42	40	46	41	45	41
			CO	ug/m^3	5000	406	437	412	426	448	403
12	BF- II	BF-II Near Stock House	PM 10 ug/m^3	ug/m^3	4000	2076	2264	2178	1964	2163	2236
			SO2	ug/m^3	200	41	40	33	36	42	43
			Nox	ug/m^3	150	39	37	40	42	49	42
			CO	ug/m^3	5000	410	394	376	380	485	429
13	BF- II	BF- II Raw Material Yard area	PM 10 ug/m^3	ug/m^3	4000	1950	1803	1548	1487	1598	1697
			SO2	ug/m^3	200	30	35	23	27	31	37
			Nox	ug/m^3	150	40	38	30	33	39	42
			CO	ug/m^3	5000	380	415	255	312	347	394
14	PCI	PCI Road Area (CONVEYOR JUNCTION –III)	PM 10 ug/m^3	ug/m^3	4000	2022	2264	2515	1330	1485	1534
			SO2	ug/m^3	200	35	40	44	41	43	41
			Nox	ug/m^3	150	41	39	34	36	41	39
			CO	ug/m^3	5000	394	435	368	375	405	422
15	BF- II	BF-II junction (Near canteen area)	PM_{10}	ug/m^3	4000	1102	1358	1524	1497	1654	1537
			SO_2	ug/m^3	200	36	39	40	39	43	40
			Nox	ug/m^3	150	40	42	52	45	51	48
			CO	ug/m^3	5000	411	390	423	454	479	491
16	GGBFS (RMHS)	GGBFS Near Mill area	PM_{10}	ug/m^3	4000	1566	1346	1758	1647	1795	1679
			SO_2	ug/m^3	200	36	38	25	28	32	35
			Nox	ug/m^3	150	39	35	38	36	41	40
			CO	ug/m^3	5000	406	384	334	384	437	466
17	GGBFS	GGBFS Screening area	PM 10 ug/m^3	ug/m^3	4000	1164	1023	1684	1734	1947	1834
			SO2	ug/m^3	200	37	36	28	31	36	34
			Nox	ug/m^3	150	36	38	31	27	30	38
			CO	ug/m^3	5000	391	401	309	333	349	388
18	EOF - I	EOF-I Near Furnace	PM_{10}	ug/m^3	4000	1966	1761	2051	1984	2098	1983
			SO_2	ug/m^3	200	44	40	46	42	47	45
			Nox	ug/m^3	150	40	43	58	53	59	56
			CO	ug/m^3	5000	488	479	584	554	589	537
19	EOF -II	EOF-II Near Furnace	PM 10 ug/m^3	ug/m^3	4000	2304	2156	2361	2154	2348	2279
			SO2	ug/m^3	200	35	39	42	40	46	43
			Nox	ug/m^3	150	33	36	55	51	59	57
			CO	ug/m^3	5000	405	434	523	489	516	541
20	Near LRF I & IV	LRF- I &IV Furnace Area	PM_{10}	ug/m^3	4000	1021	1231	1743	1637	1863	1764
			SO_2	ug/m^3	200	30	34	31	30	34	35
			Nox	ug/m^3	150	33	37	46	43	48	44
			CO	ug/m^3	5000	349	394	439	469	498	484
21	SMS	Scrap Yard Area	PM 10 ug/m^3	ug/m^3	4000	1846	1681	1936	1162	1263	1368
			SO2	ug/m^3	200	32	36	30	33	37	39
			Nox	ug/m^3	150	27	31	36	34	43	40
			CO	ug/m^3	5000	363	389	357	360	412	464
22	SMS	LRF II&III	PM 10 ug/m^3	ug/m^3	4000	1756	1613	2185	1976	2135	2066
			SO2	ug/m^3	200	34	39	30	33	37	35
			Nox	ug/m^3	150	41	43	47	42	46	44
			CO	ug/m^3	5000	442	460	432	404	459	467
23	SMS	CCM- III	PM_{10}	ug/m^3	4000	1769	1822	1426	1527	1689	1764
			SO_2	ug/m^3	200	32	36	33	31	35	34
			Nox	ug/m^3	150	31	34	45	42	49	45
			CO	ug/m^3	5000	412	430	401	422	449	466
24	SMS	SMS Lancing area	PM 10 ug/m^3	ug/m^3	4000	1632	1781	1893	2176	2381	2278
			SO2	ug/m^3	200	34	35	30	36	40	39
			Nox	ug/m^3	150	39	40	50	45	52	50
			CO	ug/m^3	5000	430	446	476	496	513	527
25	SMS	SMS Slag crusher unit	PM 10 ug/m^3	ug/m^3	4000	1756	1912	2316	2180	2267	2173
			SO2	ug/m^3	200	34	38	22	29	31	35
			Nox	ug/m^3	150	39	35	31	33	38	40
			CO	ug/m^3	5000	378	396	318	397	416	477
26	BRM	BRM (Near Furnace Area)	PM_{10}	ug/m^3	4000	986	831	1145	1264	1448	1346
			SO_2	ug/m^3	200	31	33	38	35	39	40
			Nox	ug/m^3	150	34	36	49	43	46	43
			CO	ug/m^3	5000	441	460	580	551	511	517

27	BLM	BLM (Near Furnace Area)	PM 10 ug/m^3	ug/m^3	4000	974	813	1028	1240	1465	1391
			SO2	ug/m^3	200	27	30	35	34	37	39
			Nox	ug/m^3	150	35	34	44	41	49	47
			CO	ug/m^3	5000	402	420	601	567	576	533
28	Grinding Mill	Ball Mill	PM 10 ug/m^3	ug/m^3	4000	1008	1123	1362	1614	1856	1734
			SO2	ug/m^3	200	31	36	28	34	37	40
			Nox	ug/m^3	150	30	32	36	39	46	42
			CO	ug/m^3	5000	449	434	339	354	455	467
29	COP	COP Coal Yard	PM_{10}	ug/m^3	4000	1312	1457	1925	1894	1956	1836
			SO_2	ug/m^3	200	31	33	35	36	42	40
			Nox	ug/m^3	150	28	30	27	29	37	35
			CO	ug/m^3	5000	423	410	290	312	389	431
30	COP	COP–Battery Area	PM 10 ug/m^3	ug/m^3	4000	1142	1267	1369	1467	1562	1241
			SO2	ug/m^3	200	32	34	39	40	43	46
			Nox	ug/m^3	150	37	35	48	485	52	50
			CO	ug/m^3	5000	532	490	522	503	559	522
31	COP	COP-Weigh Bridge Area	PM_{10}	ug/m^3	4000	1063	1180	1254	1367	1596	1449
			SO_2	ug/m^3	200	34	36	30	35	39	40
			Nox	ug/m^3	150	39	37	42	40	48	45
			CO	ug/m^3	5000	412	439	388	367	421	446
32	COP	COP (Near Coke cutter area)	PM_{10}	ug/m^3	4000	1061	1235	1754	1137	1324	1497
			SO_2	ug/m^3	200	28	30	33	35	39	35
			Nox	ug/m^3	150	33	35	52	50	56	51
			CO	ug/m^3	5000	423	460	364	387	416	391
33	COP	(Near Stamping Station Area)	PM 10 ug/m^3	ug/m^3	4000	986	1040	1135	1079	1286	1187
			SO2	ug/m^3	200	29	30	32	36	42	40
			Nox	ug/m^3	150	37	34	35	39	51	48
			CO	ug/m^3	5000	414	456	402	456	489	455
34	COP	(Near Coke Dryer area	PM_{10}	ug/m^3	4000	995	1015	1047	1176	1149	1281
			SO_2	ug/m^3	200	31	36	23	26	32	36
			Nox	ug/m^3	150	30	33	30	33	47	49
			CO	ug/m^3	5000	431	412	435	446	486	477

ANNEXURE 6

DETAILS OF APC MEASURES PROVIDED IN STEEL & CPPII

Details of Air Pollution Control measures provided in Steel & CPPII			
Stack No	**Stack attached to**	**Stack Type**	**Air Pollution Control Equipment (APC)**
1	SP#1 - Sinter machine waste gas fan stack	Process	ESP with stack
2	SP#1 - Cooling system stack	Non- Process	ESP with stack
3	SP#1 - Dedusting system stack	Non- Process	Bag Filters with stack
4	SP#1 - RMHS dust extraction system	Non- Process	Bag Filters with stack
5	SP#2 - Sinter machine waste gas fan stack	Process	ESP with stack
6	SP#2 - Dedusting and cooling system stack	Non- Process	ESP with stack
7	SP#2 - Crushing of fuel and raw materials dedusting stack	Non- Process	Bag Filters with stack
8	Coke Quenching Tower	Non- Process	Grit Arrester stack
9	COP - Coke oven battery #1 emergency stack# 1A & 1B	Process	Stack
10	COP - Coke oven battery#2 emergency stack	Process	Stack
11	COP - Coke oven battery#3 emergency stack	Process	Stack
12	Coke cutter dedusting system stack (Coke Oven)	Non- Process	Bag Filter with stack
13	Coke Dryer dedusting system stack (Coke Oven)	Non- Process	Bag Filter with stack
14	COP - Waste Heat Recovery Boiler # 1 stack	Process	Stack
15	COP - Waste Heat Recovery Boiler # 2 stack	Process	Stack
16	COP - Waste Heat Recovery Boiler # 3 stack	Process	Stack
17	COP - Waste Heat Recovery Boiler # 4 stack	Process	Stack
18	COP - Waste Heat Recovery Boiler # 5 stack	Process	Stack
19	BF Gas Fired Boiler	Process	Stack
20	BF#1 - Hot stove stack	Process	Stack
21	BF#1 - GCP flare stack (Emergency stack)	Non- Process	Venturi Scrubber with stack
22	BF#1 - Stock house dedusting	Non- Process	Bag Filters with stack
23	BF#1- Cast house dedusting system stack	Non- Process	Bag Filters with stack
24	BF#2- Hot stove stack	Process	Stack
25	BF#2 - GCP flare stack (Emergency stack)	Non- Process	Bag Filters with stack
26	BF#2 - Stock house dedusting & RMH system stack	Non- Process	Bag Filters with stack
27	BF#2 - Cast house dedusting system stack	Non- Process	Bag Filters with stack
28	BF - Pulverised Coal Injection unit	Non- Process	Bag Filters with stack
29	Process Boilers (1 x 25 TPH & 1 X 8 TPH)	Process	Common Stack
30	EOF#1- Primary dedusting system stack	Process	Venturi Scrubber with stack
31	EOF#2 - Primary dedusting system stack	Process	Venturi Scrubber with stack
32	EOF#1&2 - Secondary dedusting system stack	Non- Process	Bag Filter with stack
33	LRF#1 - Primary & LRF#1 to 4 secondary dedusting system stack	Non- Process	Bag Filter with stack
34	LRF#2,3,4 - Primary dedusting system stack	Process	Bag Filter with stack
35	Vacuum degassing boiler#1 & #2 stack	Process	Stack
36	CCM#1 Steam exhaust system stack	Non- Process	Stack

Details of Air Pollution Control measures provided in Steel & CPPII			
Stack No	**Stack attached to**	**Stack Type**	**Air Pollution Control Equipment (APC)**
37	CCM#1 -Billet grinding machine stack	Non- Process	Bag Filters with stack
38	CCM#2 Steam exhaust system stack #1 & #2	Non- Process	Stack
39	CCM#2 - Cut fumes exhaust system stack	Non- Process	Stack
40	CCM#2 -Billet grinding machine stack	Non- Process	Bag Filters with stack
41	CCM#3 - Steam exhaust system stack #1	Non- Process	Stack
42	CCM#3 - Steam exhaust system stack #2	Non- Process	Stack
43	CCM#3 -Billet grinding machine stack	Non- Process	Bag Filters with stack
44	BLM - Reheating furnace stack #1	Process	Stack
45	BLM - Reheating furnace stack #2	Process	Stack
46	BRM- Reheating furnace stack #1 & 2	Process	Stack
47	Pickling Plant- Acid Fumes exhaust system stack	Non- Process	Wet scrubber with stack
48	Pickling Plant- Acid bath - Hot water Generator Stack	Process	Stack
49	Pickling Plant- ARP - Hot water Generator Stack	Process	Stack
50	Pickling Plant- MEE – Thermic fluid Heater Stack	Process	Stack
51	BF Slag Grinding mill stack	Non- Process	Bag Filters with stack
52	BF Slag Grinding unit-Sinter waste Gas- Emergency stack	Non- Process	Damper with vent stack
53	BF Slag Grinding unit- Hot Air Generator - Emergency stack	Non- Process	Damper with vent stack from HAG
54	Batching plant#1 Cement silo vent stack	Non- Process	Bag Filters with stack
55	Batching plant#2 Cement silo vent stack	Non- Process	Bag Filters with stack
56	Limekiln(Not in Operation)	Non- Process	Not in operation
57	COP-DG Set -625 KVA Stack	Non- Process	Acoustic enclosures with Stack
58	Process Boilers area - DG set -1250 KVA stack	Non- Process	Acoustic enclosures with Stack
59	EOF#1 - DG Set -625 KVA stack	Non- Process	Acoustic enclosures with Stack
60	EOF#1 - DG Set -625 KVA stack	Non- Process	Acoustic enclosures with Stack
61	EOF#1 - DG Set -275 KVA Stack	Non- Process -Emergency stack	Acoustic enclosures with stack
62	EOF#2 - DG Set - 275 KVA Stack	Non- Process -Emergency stack	Acoustic enclosures with stack
63	EOF#2 - DG Set - 1250 KVA Stack	Non- Process -Emergency stack	Acoustic enclosures with stack
64	CCM#3 - DG Set - 1250 KVA stack	Non- Process -Emergency stack	Acoustic enclosures with stack
65	BRM - DG set - 650 KVA - stack	Non- Process -Emergency stack	Acoustic enclosures with stack
66	Pickling plant - DG Set - 400 KVA - stack	Non- Process -Emergency stack	Acoustic enclosures with stack
67	Coal fired boiler (127 T/HR)	Process	ESP with stack
68	Coal crusher house	Non- Process	Bag Filters with stack
69	Coal screening section	Non- Process	Bag Filters with stack
70	Raw material transfer and discharge point	Non- Process	Bag Filters with stack
71	Fly ash storage silo	Non- Process	Bag Filters with stack
72	Bottom ash storage silo	Non- Process	Bag Filters with stack
73	Diesel generator set – 500 KVA	Non- Process -Emergency stack	Acoustic enclosures with stack
74	Diesel generator set – 275 KVA	Non- Process -Emergency stack	Acoustic enclosures with stack

ANNEXURE 7

COMPLIANCE STATUS REPORT TO THE CREP CONDITIONS

Compliance status report for the conditions prescribed in the Corporate Responsibility for Environmental Protection (CREP) to our plant

Sl. No.	Condition	Compliance Status/Action Taken
1.	Coke Oven Plant: To meet the parameters PLD (% leaking doors), PLL (% leaking lids), PLO (% leaking off take) of the notified standards under EPA. To rebuild at least 40% of the coke oven batteries* in next 10 years by December 2012.	Our works installed with Non-recovery type coke oven (0.5 MTPA) with horizontal coal charging system and the requirements is not applicable.
2	Steel Melting Shop To reduce 30% by March 2004 and 100% by March 2008 (including installation of secondary de-dusting facilities).	SMS comprises of Energy Optimizing Furnaces wherein a "wet scrubbing system" comprising of a Down comer, quench chamber, venturi scrubber and cyclone separator and the cleaned gas sent through a chimney. The secondary steel making unit viz. Ladle Furnace is already equipped with a dedusting system comprising of bag filters as Air Pollution Control measure and after bag filters flue gas is vented through a stack. Dust collected from the bag filters is used in the Sinter Plant. Dedicated secondary dedusting systems are installed and in operations for EOF & LRF and fugitive emissions are significantly reduced. Dedicated dust monitoring systems are installed in the respective stacks and the real time parameters are connected with CAC,TNPCB
3	**Blast Furnace** - Direct inject of reducing agents in blast furnace	Pulverized Coal injection system installed and in operations and bag filters are installed as an air pollution control measures (bag filter with stack). The rate of pulverized coal injection is increased (upto approx. 137 kg/THM) and the implementation resulted in reduction of coke consumption in BF which leads to energy and GHG emission reduction.
4	**Solid Waste/Hazardous Waste Management** Utilization of Steel Melting Shop (SMS) / Blast Furnace (BF) slag as per the following. · By 2004 – 70% · By 2006 – 80% and · By 2007 – 100% **Hazardous Waste:**	The entire Blast Furnace Slag is converted to Granulated slag and used in slag grinding unit for GGBFS production. SMS slag is sent for metal recovery system and after crushing into various size. Based on the applications crushed slag is used internal applications including paver making facility & sent cement industries. At present the utilization level varying from 90 -95 %, to meet 100 % utilization we approached CSIR-CRRI for slag product modification and scheduled use for road making application with state government approval.

	- Charge of tar sludge/ETP sludge to coke oven by June 2003. - - Inventorization of Hazardous waste as per Hazardous waste (M & H) Rules, 1989 as amended in 2000 and implementation of the rules by December 2003. (Tar sludge, acid sludge, waste lubricating oil and type fuel fall in the category of HZ).	Our coke oven plant is non-recovery type and hence Tar sludge & ETP sludge generation is not applicable. The waste oil and other hazardous wastes generated is being disposed to authorized vendors as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016 as amended.
5	**Water Conservation / Water Pollution** - To reduce specific water consumption to 5 m3/ t for long products and 8 m^3/ t for flat products by December 2005.	We are presently manufacturing only long products and our specific water consumption is well within the prescribed limit. Specific water consumption is varying between 2.2 to 2.3 m3/tcs and PM Trophy methodology is adopted for calculating specific water consumption.
6	Installation of continuous stack monitoring	There are 28 nos. of Process stacks. Dust & Gaseous emission monitoring systems are installed as per the MoEF&CC 2012 notifications and the real time emission data of SPM, SO2 & NOx and CO (BF) are transmitted to the Care Air Centre of TNPCB and CPCB servers. There are 34 nos. of Non-process stacks. Dust emission monitoring systems are installed as per the MoEF&CC 2012 notifications and the real time emission data of SPM, SO2 & NOx and CO (BF) are transmitted to the Care Air Centre of TNPCB and CPCB servers Apart from the above, TNPCB is conducting bi-annual survey and Manual monitoring is being conducted by a NABL accredited external laboratory on monthly basis. The monitoring results are well within the permissible limits.
7	The unit shall operate the existing pollution control equipment efficiently and to keep proper record of run hours, failure time and efficiency with immediate effect. Compliance report in this regard be submitted to TNPCB every three months.	The pollution control equipment are being operated efficiently and effectively, proper records are being maintained for running hours, failure time and efficiency. Any failure leads to APC is resulted exceedance alarm from TNPCB server and appropriate correction and corrective action reports are being submitted to TNPCB on monthly basis.
8	To implement the recommendations of Life Cycle Assessment (LCA) Study sponsored by MoEF by December 2003.	Being Complied. LCA study and EPD process is being done to the final products with defined frequency.
9	The industry will initiate the steps to adopt the following clean technologies/measures to improve the	a. We are operating mini Blast Furnaces and BF gas top gas pressure (1.2 – 1.5

	performance of industry towards production, energy and environment. a Energy recovery of top blast furnace (BF) gas. a Use of tar-free runner linings. a De-dusting of cast house at tap holes, runners, skimmers ladle and charging points. a Suppression of fugitive emissions using nitrogen gas or other inert gas. a To study the possibility of slag and fly ash transportation back to the abandoned mines, to fill up the cavities through empty railway wagons while they return back to the mines and its implementation. a Processing of the waste containing flux & ferrous wastes through waste recycling plant. a To implement rainwater harvesting. a Reduction of green house gases by, • Reduction in power consumption. • Use of by-products gases for power generation. • Promotion of energy optimization technology including energy audit. • To set targets for resource conservation such as raw material, energy and water consumption to match International	bar) is not adequate to install TRT. b. Our coke oven plant is non-recovery type and hence not applicable. c. De-dusting systems are installed in operations at BF-I & II cast house covering tap holes, runners, at SMS skimmers ladles and charging points. d. Water sprinkling system, Dry & Wet fog systems and compressed air are used for suppression of fugitive emissions. e. As explained BF granulated slag is used 100 % and SMS slag utilization is 95 %. Fly ash generated is being 100 % disposed to fly ash brick manufactures. f. Waste containing flux & ferrous waste is 100 % utilized in the sinter plant, which functions as waste to wealth plant. g. We have established four rainwater-harvesting ponds with various capacity and 2 Nos are inside the plant and another 2 Nos are outside the plant. The total capacity of the rain water harvesting system is 146000 m^3 From FY25 onwards use of rainwater in secondary applications is being practiced. h. Various initiatives and measures are being taken to reduce the GHG emissions and present level of GHG emission is 2.70 tCO2/TCS (as per WSA methodology, Scope1 and Scope2). Major focus are being given to maximize the waste heat utilization, Renewable energy, use of biomass, bio char, bio gas and resource conservation. i. To reduce power consumption actions are being implemented procurement high efficiency drivers with lower power consumption and where ever applicable VFDs are installed. LED lights are installed in plant and township premises to replace sodium vapor lamps. To reduce power consumption various Environment

	Standards. • Up-gradation in the monitoring and analysis facilities for air and water pollutants. Also to impact elaborate training to the manpower so that realistic data is obtained in the environmental monitoring laboratories. • To improve over all house keeping.	Management and Energy Management programs and Kaizens are implemented to conserve power. j. Since our plant installed with Non recovery type coke oven 45 – 50 % captive power generated through WHRBs and by product BF gas is also used for power generation and steam generation. 65- 70 % captive power requirement met through WHRS only. k. All the projects are wetted to the best energy consumption through selection of equipment. Energy audit is being carried out and implementations are done in phased manner to minimize the energy consumption.The plant also have Energy Managers and Energy Auditor for internal audits. l. JSW Steel established Climate Action Group (CAG) and KPI with respect to Raw material, Energy and water consumption are being fixed as a key performance indicator and Chairman of the CAG on monthly basis is reviewing it and the respective plant heads will present the target compliance status including deviation analysis along with mitigation plan for continual improvement. Also bench marking practice is in place for JSW steel other plants level, National and International level. m. A separate Environment cell is available and with lab set up and trainings are being imparted to the monitoring personnel on defined frequency. Presently the environmental monitoring and analysis being done through M/s Nawal Analytical Labs India Pvt Ltd. n. TQM and 5S systems are special focused concept at our works and the system supports to maintain, improve and ensure housekeeping throughout the plant. Due to the implementation, saving in area, inventory control, retrieval time period and standardization practices are well improved.

ANNEXURE 8

ONLINE EFFLUENT MONITORING REPORT, EFFLUENT & GROUND WATER QUALITY MANUAL MONITORING REPORT OF TNPCB & NABL ACCREDITED LABORATORY

Annexure

Online effluent monitoring report and effluent & ground water quality manual monitoring report of NABL accredited laboratory

I.Online effluent monitoring report

S.No	Description	UoM	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	Effluent Inlet flow	m^3	79670.875	80107.875	86760.75	87610	79137	87503
2	Treated effluent water reuse in process	m^3	72041 .5	78044 .625	95261 .125	96974	86470	98430
3	ETP outlet discharge flow	m^3	0	0	0	0	0	0

Note; Consented Trade efflunet generation 2935 KLD

III. Treated trade effluent of CPPII-Cooling tower water by NABL accredited laboratory

S. No	PARAMETER	UNITS	TNPCB Tolerance Limit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
				TTRADE EFLUENT CPP-II 2 x 30 MW & 1x 30 MW	TTRADE EFLUENT CPP-II 2 x 30 MW & 1x 30 MW	TTRADE EFLUENT CPP-II 2 x 30 MW & 1x 30 MW	TTRADE EFLUENT CPP-II 2 x 30 MW & 1x 30 MW	TTRADE EFLUENT CPP-II 2 x 30 MW & 1x 30 MW	TTRADE EFLUENT CPP-II 2 x 30 MW & 1x 30 MW
1	Temperature	°C	40	25.7	25.9	25.8	25.8	25.7	25.4
2	pH @ 250C	-	5.5 to 9.0	7.16	7.26	7.25	6.59	6.65	6.74
3	Particles size	-	Shall Pass 850 µ IS Sieve	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass
4	Total Suspended Solids	mg/L	100	10	11	8	12	14	14
5	Total Dissolved Solids	mg/L	2100	1621	1702	1599	1595	1607	1654
6	Free Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	1000	164	169.24	151.14	172.14	164.07	182.34
8	Sulphide as S	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
9	Chloride as Cl	mg/L	1000	447	453.05	442.98	382.58	367.47	389.45
10	Fluoride as F	mg/L	2	0.43	0.59	0.39	0.34	0.31	0.43
11	Chemical Oxygen Demand	mg/L	250	42.35	39.94	48.16	42.17	39.81	42.65
12	BOD, 3 days @27°C	mg/L	30	8.19	8.06	9.07	9.07	8.06	8.06
13	Oil & Grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	50	0.63	0.71	0.88	0.85	0.81	0.91
15	Free Ammonia as NH3	mg/L	30	0.71	0.83	1.07	1.01	0.99	1.11
16	Total Kjeldahl Nitrogen	mg/L	100	8.23	8.61	8.44	6.85	6.03	8.41
17	Dissolved Phosphate as PO4	mg/L	5	0.19	0.21	0.22	0.18	0.15	0.26
18	Phenolic Compound as C6H5OH	mg/L	1	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]
19	Cyanide as CN	mg/L	0.2	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	-	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	1	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	0.2	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	2	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	0.05	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	0.01	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]

III. Treated trade effluent of Steel Guard bond water by NABL accredited laboratory

S.No	Parameter	Unit	TNPCB Tolerance Limit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	Temperature	°C	40	25.8	26.4	26.8	26.3	25.3	25.4
2	pH @ 250C	-	5.5 to 9.0	7.11	7.18	7.48	7.33	7.41	6.74
3	Particles size	-	Shall Pass 850 µ IS Sieve	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass
4	Total Suspended Solids	mg/L	100	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
5	Total Dissolved Solids	mg/L	2100	1216	1224	1265	1237	1257	1265
6	Free Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	1000	102.4	106.08	112.06	106.42	99.45	95.14
8	Sulphide as S	mg/L	2	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	1000	283.73	291.97	302.03	297	302.03	322.17
10	Fluoride as F	mg/L	2	0.25	0.28	0.22	0.19	0.15	0.19
11	Chemical Oxygen Demand	mg/L	250	32.57	39.94	35.86	37.7	38.53	35.29
12	BOD, 3 days @27°C	mg/L	30	8.98	8.06	7.05	8.06	8.06	9.07
13	Oil & Grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	50	0.64	0.61	0.69	0.59	0.61	0.78
15	Free Ammonia as NH3	mg/L	30	0.78	0.75	0.84	0.72	0.75	0.95
16	Total Kjeldahl Nitrogen	mg/L	100	9.98	8.32	5.45	6.03	7.18	9.14
17	Dissolved Phosphate as PO4	mg/L	5	0.14	0.17	0.14	0.11	0.12	0.18
18	Phenolic Compound as C6H5OH	mg/L	1	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
19	Cyanide as CN	mg/L	0.2	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	-	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	1	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	0.2	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	2	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	0.05	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	0.01	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
32	Colour	Hazen		BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
33	Odour	-		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
34	Bio assay	-		95% survival of fish after 96 hrs in 100% Treated trade effluent.	95% survival of fish after 96 hrs in 100% Treated trade effluent.	95% survival of fish after 96 hrs in 100% Treated trade effluent.	95% survival of fish after 96 hrs in 100% Treated trade effluent.	95% survival of fish after 96 hrs in 100% Treated trade effluent.	95% survival of fish after 96 hrs in 100% Treated trade effluent.
35	Manganese (Mn)	mg/L		BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
36	Iron (Fe)	mg/L		BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
37	Vanadium (V)	mg/L		BLQ[LOQ-0.005]	BLQ[LOQ-0.005]	BLQ[LOQ-0.005]	BLQ[LOQ-0.005]	BLQ[LOQ-0.005]	BLQ[LOQ-0.005]
38	Nitrate Nitrogen	mg/L		2.47	BLQ[LOQ-1.0]	1.25	1.53	1.53	1.64

IV. Result of analysis of steel treated trade effluent by TNPCB									
S.No	**Parameter**	**Unit**	**TNPCB Tolerance Limit**	**Oct-25**	**Nov-25**	**Dec-25**	**Jan-26**	**Feb-26**	**Mar-26**
1	pH at 25OC	Number	5.5 to 9.0	7.59	7.1	7.31	7.22	7.33	Report yet to be received
2	TSS at 103OC - at 105OC	mg/L	100	12	24	4.8582	24	16	
3	Total Dissolved Solids at 180OC	mg/L	2100	752	1424	1340	1628	1660	
4	Chloride as Cl	mg/L	1000	170	390	364	390	440	
5	Sulphate as SO4	mg/L	1000	54	520	179	202	475	
6	Oil & Grease	mg/L	10	<3	<3	<3	<3	<3	
7	BOD (at 27OC for 3 days)	mg/L	30	5	5.6	6	5.6	4.8	
8	COD	mg/L	250	40	64	64	64	72	
9	Dissolved Phosphate	mg/L	5	0.106	0.068	0.018	0.021	0.03	
10	Phenolic Compounds	mg/L	1	<0.01	-	<0.01	<0.01	<0.01	
11	Ammonical nitrogen as NH3- N	mg/L	50	0.56	2.24	2.04	2.8	3.36	
12	Total Kjeldhal Nitrogen	mg/L	100	2.24	4.48	5.6	5.6	7.84	
13	Sulphide	mg/L	2	<1	<1	<1	<1	<1	
14	Total Chromium	mg/L	2	<0.05	<0.05	<0.05	<0.05	<0.05	
15	Hexavalent Chromium	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	
16	Fluoride as F	mg/L	2	1.188	<0.02	<0.02	0.903	1.571	
17	Cyanide	mg/L	0.2	<0.001	<0.02	<0.02	<0.02	<0.02	
18	Free Ammonia	mg/L	30	0.683	-	-	-	-	
19	Boron	mg/L	2	<0.002	0.86	0.82	0.78	<0.2	
20	Total Residual Chlorine	mg/L	1	<1	<1	-	<1	-	
21	Lead	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	
22	Zinc	mg/L	1	<0.01	<0.01	<0.01	<0.01	<0.01	
23	Nickel	mg/L	3	<0.02	<0.02	<0.02	<0.02	<0.02	
24	Cadmium	mg/L	2	<0.01	<0.01	<0.01	<0.01	<0.01	
25	Mercury	mg/L	0.01	-	-	-	-	NP	
26	Arsenic	mg/L	0.2	-	-	-	-	NP	
27	Copper as Cu	mg/L	3	-	-	-	-	-	
28	Manganese	mg/L	-	-	-	-	-	-	

IV. Result of analysis of CPPII- treated trade effluent by TNPCB									
S.No	Parameter	Unit	TNPCB Tolerance Limit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	pH at 25OC	Number	5.5 to 9.0	7.38	7.17	7.30	6.89	7.12	Report yet to be received
2	TSS at 103OC - at 105OC	mg/L	100	4.0	12.0	24.0	16.0	8.0	
3	Total Dissolved Solids at 180OC	mg/L	2100	1636	1872	1896	2096	1740	
4	Chloride as Cl	mg/L	1000	300	360	300	345	330	
5	Sulphate as SO4	mg/L	1000	474	390	184	198	300	
6	Oil & Grease	mg/L	10	<3	3	<3	6.6	<3	
7	BOD (at 27OC for 3 days)	mg/L	30	2.0	4.0	7.0	8.0	3.0	
8	COD	mg/L	250	32.0	48.0	80.0	88.0	32.0	
9	Dissolved Phosphate	mg/L	5	0.99	0.022	0.02	0.04	0.06	
10	Phenolic Compounds	mg/L	1	<0.01	<0.01	<0.01	<0.01	<0.01	
11	Ammonical nitrogen as NH3- N	mg/L	50	4.48	5.6	6.72	7.28	6.72	
12	Total Kjeldhal Nitrogen	mg/L	100	6.78	8.96	10.08	11.20	10.08	
13	Sulphide	mg/L	2	<1	<1	<1	<1	<1	
14	Total Chromium	mg/L	2	<0.05	<0.05	<0.05	<0.05	<0.05	
15	Hexavalent Chromium	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	
16	Fluoride as F	mg/L	2	1.25	0.83	0.85	0.76	1.82	
17	Cyanide	mg/L	0.2	<0.001	<0.002	<0.02	<0.02	<0.02	
18	Free Ammonia	mg/L	30	2.465	-	-	-	-	
19	Boron	mg/L	2	<0.002	0.76	0.90	0.82	<0.02	
20	Total Residual Chlorine	mg/L	1	<1	-	-	-	-	
21	Lead as pb	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	
22	Zinc as Zn	mg/L	1	<0.01	<0.01	<0.01	<0.01	<0.01	
23	Nickel as Ni	mg/L	3	<0.02	<0.02	<0.02	<0.02	<0.02	
24	Cadmium as Cd	mg/L	2	<0.01	<0.01	<0.01	<0.01	<0.01	
25	Mercury	mg/L	0.01	-	-	-	-	***	
26	Arsenic	mg/L	0.2	-	-	-	-	***	
27	Copper as us	mg/L	3	-	<0.003	<0.05	-	-	
28	Manganese	mg/L	-	-	<0.02	-	-	-	

V.Result of analysis of ground water by NABL accredited laboratory

S.No	PARAMETERS	UNIT	Oct-25				Nov-25				Dec-25			
			Govt Borewell Water -Kavundanoor	Open Well Water - Mr. Rajamani, Kuttapatti Pudur	Ground Water - Govt Borewell Water Kuttapatti Pudur	Ground Water - Govt Borewell Water - Ervadi Village	Open Well Water - Mrs. Kaliyammal Teacher House	Ground Water - Open Well Water - Vellaiyen House Moorthipatti	Open Well Water - Venkatesan Pottaneri House	Govt Borewell Water - Parry Nagar	Ground Water - Govt Borewell Water - Moorthipatti	Ground Water - Openwell Water - Mr. Balan Pudur Panankadu	Ground Water - Govt Borewell Water - Kavundanoor	Ground Water - Mr. Selvam - Borewell Karapatti Pallam
1	Temperature	°C	26.3	25.4	25.4	26.3	25.6	25.7	26.5	26.1	25.8	26.9	25.3	25.9
2	pH @25°C	-	7.61	6.91	6.89	7.48	6.99	6.78	6.99	6.98	7.59	6.82	6.77	6.95
3	Particles size	-	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass
4	Total Suspended Solid	mg/L	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
5	Total Dissolved Solids	mg/L	1784	1842	1875	2454	1904	1881	1829	1824	1927	1852	1901	1855
6	Free Residual Chlorine	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.5]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.5]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.5]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	151.06	198	202	151.07	182.41	207.15	189.06	192.41	182.14	172.08	212.1	192.41
8	Sulphide as S	mg/L	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	554	614	621	492.03	629.24	624.2	599.03	604.07	553.73	563.8	553.73	604.07
10	Fluoride as F	mg/L	0.44	0.58	0.56	0.42	0.61	0.59	0.52	0.61	0.61	0.56	0.61	0.49
11	Chemical Oxygen Demand	mg/L	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
12	BOD, 3 days @27°C	mg/L	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
13	Oil & Grease	mg/L	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
15	Free Ammonia as NH3	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
16	Total Kjeldahl Nitrogen	mg/L	5.11	9.99	9.64	5.16	8.61	10.85	7.46	8.61	7.14	6.03	7.18	9.25
17	Dissolved Phosphate as PO4	mg/L	BLQ[LOQ-0.05]	0.19	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	0.22	BLQ[LOQ-0.05]	0.17	BLQ[LOQ-0.05]	0.37	0.19	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
18	Phenolic Compound as C6H5OH	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
19	Cyanide as CN	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]

V.Result of analysis of ground water by NABL accredited laboratory

S.No	PARAMETERS	UNIT	Jan-26				Feb-26				Mar-26			
			Open Well Water - Mr. Rajamani, Kuttapatti Pudur	Ground Water - Govt Borewell Water Kuttapatti Pudur	Ground Water - Govt Borewell Water - Ervadi Village	Open Well Water - Mrs. Kaliyammal Teacher House	Open Well Water - Vellaiyen House Moorthipatti	Open Well Water - Venkatesan House Pottaneri	Ground Water - Govt Borewell Water - Parry Nagar	Ground Water - Govt Borewell Water - Moorthipatti	Open Well Water - Mr. Balan Pudur Panankadu	Govt Borewell Water - Kavundanoor	Mr. Selvam - Borewell Karapatti Pallam	Ground Water - Govt Borewell Water - Moorthipatti
1	Temperature	°C	25.8	26.8	25.9	27.4	25.4	25.6	26.3	25.4	25.7	25.3	25.7	25.7
2	pH @25°C	-	7.59	7.68	6.89	6.59	7.64	7.19	7.56	6.78	7.63	7.62	7.76	7.71
3	Particles size	-	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass	Test pass	Test Pass
4	Total Suspended Solid	mg/L	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
5	Total Dissolved Solids	mg/L	2234	1916	1869	2138	2256	2118	2145	1882	2156	2133	2286	2014
6	Free Residual Chlorine	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.5]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.5]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.5]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	245.14	178.14	201.42	221.51	235.11	234.12	235.14	194.07	236.51	227.14	242.15	184.56
8	Sulphide as S	mg/L	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	719.85	533.59	624.2	714.81	729.92	634.27	704.75	619.17	725.61	684.61	629.24	548.74
10	Fluoride as F	mg/L	BLQ[LOQ-0.02]	0.55	0.35	0.56	0.62	0.35	0.41	0.37	0.41	0.39	0.64	0.65
11	Chemical Oxygen Demand	mg/L	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
12	BOD, 3 days @27°C	mg/L	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
13	Oil & Grease	mg/L	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	0.17	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
15	Free Ammonia as NH3	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	0.21	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
16	Total Kjeldahl Nitrogen	mg/L	7.43	6.89	9.47	9.14	6.31	13.99	BLQ[LOQ-1.0]	8.9	6.54	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	6.41
17	Dissolved Phosphate as PO4	mg/L	0.18	0.33	BLQ[LOQ-0.05]	0.16	0.44	0.26	BLQ[LOQ-0.05]	0.29	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
18	Phenolic Compound as C6H5OH	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
19	Cyanide as CN	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]

VI. Result of analysis of ground water by TNPCB

S.No	Parameter	Unit	OPEN WELL - Tmt.Kaliammal teacher , Pottaneri	GOVT. Bore well , Kavundanoor	Selvam Bore Well Karapattipallam	BORE WELL Thiru Velliyan , Moorthipatti	GOVT BORE WELL - Moorthipatti	OPEN WELL - Thiru .Venkatesan, Pottaneri
			Jun-25					
1	Conductivity at 25o C	µmhos/cm	3420	2230	3650	1671	1725	4010
2	Turbidity	NTU	0.22	0.16	0.40	0.30	0.23	1.11
3	pH at 25o C	Number	7.36	7.03	7.17	6.96	7.27	7.8
4	TSS at 25o C	mg/L	4	4	4	4	4	4
5	Total Dissolved Solids at 180o C	mg/L	2532	1556	2680	1096	1192	2648
6	Chloride as Cl	mg/L	450	300	400	220	260	460
7	Sulphate as SO4	mg/L	560	400	520	171	173	420
8	O&G	mg/L	<3	<3	<3	<3	<3	<3
9	BOD (at 27o C for 3 days	mg/L	2.2	3	2	2.4	<2	2.8
10	COD	mg/L	32	40	40	64	32	80
11	Dissolved Oxygen	mg/L	5.8	5.2	6	5.7	6.2	5
12	Total Phosphate as PO4	mg/L	0.044	0.056	0.086	0.048	0.068	0.108
13	Dissolved Phosphate	mg/L	0.024	0.022	0.012	0.014	0.022	0.012
14	Phenolic Compounds	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
15	Ammonical Nitrogen as NH3 -N	mg/L	0.056	0.056	0.056	0.56	0.56	1.12
16	Total Kjeldhal Nitrogen	mg/L	1.12	1.12	1.12	1.12	1.12	1.68
17	Total Nitrogen	mg/L	4.336	5.14	6.072	4.635	4.511	7.648
18	Nitrate Nitrogen as NO3	mg/L	3.102	4.01	4.94	3.513	3.383	5.772
19	Nitrite Nitrogen as NO2	mg/L	0.114	0.005	0.012	0.002	0.008	0.196
20	Sulphide	mg/L	<1	<1	<1	<1	<1	<1
21	% Sodium	%	25	33	31	37	33	26
22	Total Hardness as CaCO3	mg/L	710	330	540	280	360	750
23	Calcium as Ca	mg/L	184	80	88	60	76	148
24	Magnesium as Mg	mg/L	61	32	78	32	41	92
25	Sodium as Na	mg/L	196	130	170	124	138	200
26	Potassium as K	mg/L	14	13	11	7	10	18
27	SAR	mg/L	4.55	4.43	4.52	4.58	4.49	4.51
28	Residule Sodium Carbonate	-	-ve	-ve	-ve	-ve	-ve	-ve
29	Total Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
30	Hexavalent Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
31	Fluoride as F	mg/L	0.772	1.239	1.15	1	1.083	1.333
32	Ph. Alkalinity	mg/L	<1	<1	<1	<1	<1	<1
33	Alkalinity CaCO3	mg/L	276	184	560	272	360	500
34	Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35	Iron Total as Fe	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
36	Free Ammonia	mg/L	0.683	0.683	0.683	0.683	0.683	1.366
37	Boron	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
38	Total Residule Chlorine	mg/L	<1	<1	<1	<1	<1	<1
39	Total Volatile solids at 550	mg/L	12	8	8	12	12	16
40	Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
41	Lead	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
42	Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
43	Nickel	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
44	Cadmium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
45	Magnesium as Mn	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
46	Feacal Coliform	MPN/100ml	96	74	101	86	75	98
47	Total Coliform	MPN/100ml	225	194	233	208	195	240

VI. Result of analysis of ground water by TNPCB

S.No	Parameter	Unit	OPEN WELL - Thiru .Rajamani, Kuttapatti Pudur	GOVT. BORE WELL Kuttapatti Pudur	OPEN WELL - Thiru .Balan, Pudur Panankadu	GOVT BORE WELL, ERVADI	GOVT BORE WELL, PARYNAGAR
			Jun-25				
1	Conductivity at 25o C	µmhos/cm	3350	3430	4690	2080	2300
2	Turbidity	NTU	0.31	0.18	0.54	0.25	0.86
3	pH at 25o C	Number	7.23	7.19	7.24	7.90	7.51
4	TSS at 25o C	mg/L	4	4	4	4	4
5	Total Dissolved Solids at 180o C	mg/L	2184	2384	3208	1416	1588
6	Chloride as Cl	mg/L	360	400	460	260	290
7	Sulphate as SO4	mg/L	473	480	600	280	260
8	O&G	mg/L	<3	<3	<3	<3	<3
9	BOD (at 27o C for 3 days	mg/L	3	2.7	2.2	<2	2
10	COD	mg/L	72	80	64	48	32
11	Dissolved Oxygen	mg/L	5	5.2	5.2	6.1	6.1
12	Total Phosphate as PO4	mg/L	0.1	0.082	0.084	0.062	0.07
13	Dissolved Phosphate	mg/L	0.014	0.034	0.022	0.028	0.026
14	Phenolic Compounds	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
15	Ammonical Nitrogen as NH3 -N	mg/L	0.56	0.56	0.56	0.56	0.56
16	Total Kjeldhal Nitrogen	mg/L	1.12	1.12	1.68	1.12	1.12
17	Total Nitrogen	mg/L	6.434	2.644	6.733	4.242	5.696
18	Nitrate Nitrogen as NO3	mg/L	5.308	1.513	4.875	3.102	4.464
19	Nitrite Nitrogen as NO2	mg/L	0.006	0.011	0.178	0.02	0.112
20	Sulphide	mg/L	<1	<1	<1	<1	<1
21	% Sodium	%	34	30	27	25	27
22	Total Hardness as CaCO3	mg/L	440	590	730	680	700
23	Calcium as Ca	mg/L	72	100	136	112	120
24	Magnesium as Mg	mg/L	63	83	95	97	97
25	Sodium as Na	mg/L	156	174	200	158	182
26	Potassium as K	mg/L	9	6	22	35	11
27	SAR	mg/L	4.59	4.42	4.57	3.74	4.25
28	Residule Sodium Carbonate	-	-ve	-ve	-ve	-ve	-ve
29	Total Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
30	Hexavalent Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
31	Fluoride as F	mg/L	1.017	1.15	1.094	1.008	0.733
32	Ph. Alkalinity	mg/L	<1	<1	<1	<1	<1
33	Alkalinity CaCO3	mg/L	5.8	524	320	212	332
34	Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
35	Iron Total as Fe	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
36	Free Ammonia	mg/L	0.683	0.683	0.683	0.683	0.683
37	Boron	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
38	Total Residule Chlorine	mg/L	<1	<1	<1	<1	<1
39	Total Volatile solids at 550	mg/L	8	16	20	20	8
40	Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03
41	Lead	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
42	Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
43	Nickel	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
44	Cadmium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
45	Magnesium as Mn	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
46	Feacal Coliform	MPN/100ml	98	98	101	-	-
47	Total Coliform	MPN/100ml	231	236	261	-	-

ANNEXURE 9

TREATED SEWAGE QUALITY MONITORING REPORT OF TNPCB & NABL ACCREDITED LABORATORY

Annexure

Treated sewage quality monitoring report of TNPCB & NABL accredited laboratory for the period of Oct'25 to Mar '26

Result of analysis of treated sewage by TNPCB (Plant STP)

S.No	Parameter	Unit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	$_{P}$H @ 25^{o}C	Number	7.9	7.28	7.59	7.63	7.66	Report yet to be received
2	TSS at 103°C - 105°C	mg/l	28	16	16	8	12	
3	BOD (at 27°C for 3 days)	mg/l	-	8	4	6	4	

Result of analysis of treated sewage by TNPCB (Township STP)

S.No	Parameter	Unit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	$_{P}$H @ 25^{o}C	Number	7.51	7.31	7.28	7.63	7.89	Report yet to be received
2	TSS at 103°C - 105°C	mg/l	24	4	12	8	8	
3	BOD (at 27°C for 3 days)	mg/l	-	5	3.6	6	4	

Result of analysis of treated sewage by NABL accredited laboratory (Plant STP)

S.No	Parameter	Unit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	PH 25 C	--	7.41	7.54	7.9	7.86	7.2	7.75
2	Total Suspended Solids	mg/l	9	12	11	9	14	16
3	BOD,3days@27°C	mg/l	8.03	9.07	8.96	7.93	14.88	8.12

Result of analysis of treated sewage by NABL accredited laboratory (Township STP)

S.No	Parameter	Unit	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
1	PH 25 C	--	6.93	7.51	6.84	6.92	7.42	7.29
2	Total Suspended Solids	mg/l	7	7	17	13	8	9
3	BOD,3days@27°C	mg/l	10.04	8.06	8.33	9.92	9.07	8.64

ANNEXURE 10

AMBIENT NOISE LEVEL MONITORING REPORT OF NABL ACCREDITED LABORATORY

FY 26 1st BI ANNUAL SURVEY REPORT - Ambient Noise				
S.No	Location	Mar-26		
		Leq	Lmax	Lmin
1	New Land area JSW Boundary	54.2	65.1	50.6
2	Open field – Near thangamapuri stores, Malamanoor.	53.3	63.7	51.1
3	Nearby Mr.Chinnamuthu House, Malamanoor.	50.8	56.4	48.6
4	Near Madhayen Temple at Coconut Farm.	47.1	51.6	45.7
5	Eastern Gate of JSW.	52.7	69	46.2
6	In front of Occupational in Health Centre.	53	70	41
7	Near Pickling Plant ETP	51.3	64.1	46
8	Reservoir Premises.	52.1	56.9	50.8
9	Near Bhavani Guest House	52	60.4	49.3
10	Near Executive Staff Quarters, JSW.	49.9	67.4	44.6
11	Nearby Railway Crossing kuttappatti village.	52.3	58.9	48.9
12	At Coconut Farm, Nearby Railway crossing.	49.8	66.7	47.6
13	Near Thiru. Sandhanam House, Ervadi Village.	49	56.5	46.5
14	At Parrynagar Residential Area.	51.9	55.6	49.8
15	Near by Over Head Tank	53.3	57.8	51
16	Opp. To Old Main Gate, Open Agricultural field.	51.3	59.6	48.3
17	Kaveri Guest House Premises.	50.6	59	48.9
18	Open Field, Pottaneri Village.	51.4	68.1	48.7
19	Raw Material Storage Yard (Iron Ore).	53.7	61.8	48.8

Annexure

Ambient Noise level monitoring report of NABL accredited laboratory for the period of Oct'25 to Mar '25

I. Ambient Noise Monitoring results (Oct'25 to Mar '26)

S.No	Location	Day Time Noise Level in dB(A)									
		Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Maximum	Minimum	Average	STD Deviation
1	New Land area JSW Boundary	58.4	56.1	58.5	57.2	59.6	56.3	59.6	56.1	57.7	1.4
2	Open field – Near thangamapuri stores, Malamanoor.	54.2	55.5	56.3	55.3	54.9	51.1	56.3	51.1	54.6	1.8
3	Nearby Mr.Chinnamuthu House, Malamanoor.	52.1	54.8	53.2	52.6	50.1	48.9	54.8	48.9	52.0	2.1
4	NearMadhayen Temple at Coconut Farm.	59.8	50.9	49.9	51.8	55.6	52.2	59.8	49.9	53.4	3.7
5	Eastern Gate of JSW.	62.3	60.4	61.4	60.5	62.7	57.7	62.7	57.7	60.8	1.8
6	In front of Occupational in Health Centre.	55.9	54.1	56.6	58.8	60.9	55.6	60.9	54.1	57.0	2.5
7	Near Pickling & Phosphating Plant 2 KLD ETP	61.4	59.8	58.5	59.6	61.2	58.8	61.4	58.5	59.9	1.2
8	Reservoir Premises.	62.7	60.7	62.3	60.2	61.7	49.7	62.7	49.7	59.6	4.9
9	Near Bhavani Guest House.	56.9	58.4	59.8	55.6	57	59.4	59.8	55.6	57.9	1.6
10	Executive Staff Quarters, JSW.	50.6	53.2	55.2	52.9	53.8	54.7	55.2	50.6	53.4	1.6
11	Nearby Railway Crossing kuttappatti village.	52.2	53.3	51.4	53.3	55.2	58.3	58.3	51.4	54.0	2.5
12	Near Thiru. Santhanam House, Earvadi Village.	48.6	49.9	48.7	50.1	51.6	57.1	57.1	48.6	51.0	3.2
13	At Coconut Farm, Nearby Railway crossing.	57.5	55.3	56.2	52.2	53.9	55.5	57.5	52.2	55.1	1.8
14	At Parrynagar JSW Boundary	53.8	55.1	54.4	57.3	58.3	56.3	58.3	53.8	55.9	1.7
15	Nearby Over Head Tank JSW Boundary	47.4	49.4	53.3	55.8	54.9	58.8	58.8	47.4	53.3	4.2
16	Open Agricultural field. West Compound Wall	57.7	56.8	57.2	59.9	62	54.9	62.0	54.9	58.1	2.5
17	Nearby Compound Wall opposite to Kaveri Guest House Premises	52.6	53.7	52.2	50.1	52.9	57.7	57.7	50.1	53.2	2.5
18	Open Field, Pottaneri Village.	50.8	52.2	52.8	53.6	49.7	52.2	53.6	49.7	51.9	1.4
19	Nearby Compound Wall opposite to Raw Material Storage Yard (Iron Ore).	56.6	52.7	54.1	51.4	50.5	51.4	56.6	50.5	52.8	2.3

Annexure

Ambient Noise level monitoring report of NABL accredited laboratory for the period of Oct'25 to Mar '25

I. Ambient Noise Monitoring results (Oct'25 to Mar '26)

S.No	Location	Night Time Noise Level in dB(A)									
		Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Maximum	Minimum	Average	STD Deviation
1	New Land area JSW Boundary	53.3	52.5	50.3	53.2	52.7	49.8	53.3	49.8	52.0	1.5
2	Open field – Near thangamapuri stores, Malamanoor.	45.1	47.1	44.6	48.4	46.2	47.7	48.4	44.6	46.5	1.5
3	Nearby Mr.Chinnamuthu House, Malamanoor.	44.8	45.1	45.9	47.7	46.7	44.1	47.7	44.1	45.7	1.3
4	NearMadhayen Temple at Coconut Farm.	47.3	45.6	46.7	44.6	43.5	40.8	47.3	40.8	44.8	2.4
5	Eastern Gate of JSW.	52.9	50.8	49.2	47.1	48.9	49.6	52.9	47.1	49.8	2.0
6	In front of Occupational in Health Centre.	46.4	45.6	46.5	48.3	49	45.8	49.0	45.6	46.9	1.4
7	Near Pickling & Phosphating Plant 2 KLD ETP	49.1	48.1	47.3	48.1	49.4	47.7	49.4	47.3	48.3	0.8
8	Reservoir Premises.	48.8	49	49.9	44.6	46.7	48.2	49.9	44.6	47.9	1.9
9	Near Bhavani Guest House.	40.6	43.4	45.2	48.9	50.4	51.4	51.4	40.6	46.7	4.3
10	Executive Staff Quarters, JSW.	41.5	42.5	47.6	49.2	51.9	50.8	51.9	41.5	47.3	4.3
11	Nearby Railway Crossing kuttappatti village.	43.5	42.7	45.4	47.2	46.5	48.8	48.8	42.7	45.7	2.3
12	Near Thiru. Santhanam House, Earvadi Village.	38.4	37.3	41.1	43.3	42.4	45.4	45.4	37.3	41.3	3.0
13	At Coconut Farm, Nearby Railway crossing.	50.1	48.9	44.2	47.2	46	47.2	50.1	44.2	47.3	2.1
14	At Parrynagar JSW Boundary	48.2	47.2	49.6	44.5	42.8	48.3	49.6	42.8	46.8	2.6
15	Nearby Over Head Tank JSW Boundary	44.7	40.4	43.3	47.8	40.1	43.3	47.8	40.1	43.3	2.9
16	Open Agricultural field. West Compound Wall	41.9	42.3	44.7	48.6	42.9	43.1	48.6	41.9	43.9	2.5
17	Nearby Compound Wall opposite to Kaveri Guest House Premises	47.6	45.5	48.6	50.2	53.5	51.4	53.5	45.5	49.5	2.8
18	Open Field, Pottaneri Village.	40.7	39.9	43.1	47.1	49.7	48.1	49.7	39.9	44.8	4.1
19	Nearby Compound Wall opposite to Raw Material Storage Yard (Iron Ore).	45.5	44.7	42.2	46.6	45.7	47.6	47.6	42.2	45.4	1.8

Standard limit for Ambient noise level at Daytime is 75 dB (A), Standard limit for Ambient noise level at Nighttime is 70 dB (A).
The ambient noise level monitoring results are within the CPCB norms.

ANNEXURE 11

REPORT ON CSR &CER ACTIVITIES

CSR REPORT FOR THE PERIOD OF OCTOBER 2025 TO MARCH 2026

JSW is deeply conscious of its vision and responsibilities to the communities around the plant. Empowering citizen with better health, education and employment opportunities is JSW's mission. JSW is committed to improve the quality of life of surrounding communities through Corporate Social Responsibility (CSR) programs. We have well-laid community development programs under CSR. Our focus is on,

- Health
- Education
- Environment
- Women Empowerment
- Agri Livelihood
- Rural Infrastructure Development

During the FY-2025-26, our CSR initiatives extended their reach across the following areas Pottaneri, M.Kalipatti, Kuttapatti, Viruthasampatti, Gonur Panchayats and Mecheri Town. Our total CSR expenditure for the amounted to Rs. 1.09 Crores, dedicated to projects aimed at improving community welfare, sustainable development and local infrastructure enhancement in this areas.

HONOURED BY TAMILNADU GOVERNMENT FOR COMMUNITY ENGAGEMENT:

The infrastructure of the library has been completely transformed, and the number of readers has increased significantly because of the improved facilities now available to them. Not only members of the local community and school students are utilizing the library, but children from schools in other areas have also expressed great interest in gaining exposure to its resources. In response to this, our ASPIRE team organized an educational trip to the Mecheri Library, providing students with an enriching learning experience from other villages. Furthermore, the Tamil Nadu Government has recognized our work by placing us under the special category for the remarkable contribution we have made within our communities. This recognition highlights the positive impact our initiatives have created in promoting education and access to knowledge. We have honored to receive an award from the Tamil Nadu School Education Minister, Mr. Anbil Mahesh Poyyamozhi, acknowledging our dedicated efforts and achievements.

JSW ASPIRE PROGRAM:

A School Management Committee Workshop (SMC) conducted with parents of government school students to strengthen their involvement in school development and learning. The workshop increased awareness of school processes and the importance of parental participation. Parents gained a clearer understanding of school management practices improving communication and collaboration with teachers and staff. This strengthened parent–school partnerships, leading to better student attendance, increased motivation, and improved academic support at home—all contributing to a more positive learning environment.

JSW ASPIRE PROGRAM: CHILDREN'S DAY CELEBRATION:

Children's Day celebrated with great enthusiasm at the Government Schools in Mallappanur and Viruthasamapatti, where 105 children participated actively in the event. Students showcased their talents through various cultural performances, games, and creative activities. Their efforts were recognized and appreciated to motivate them and build confidence. The celebration created a joyful and encouraging atmosphere, helping children feel valued while promoting participation, creativity, and a sense of togetherness within the school community.

AGRI – SUSTAINABLE LIVELIHOODS:

Under the Sustainable Livelihoods initiative, 450 fruit saplings were distributed to 25 farmers to enhance income generation and promote sustainable farming practices. The intervention encouraged crop diversification, improved long-term farm resilience, increased awareness of eco-friendly agriculture, and supported stable livelihoods through diversified agricultural income sources.

ENVIRONMENT EDUCATION – 7 SCHOOLS & 350 STUDENTS

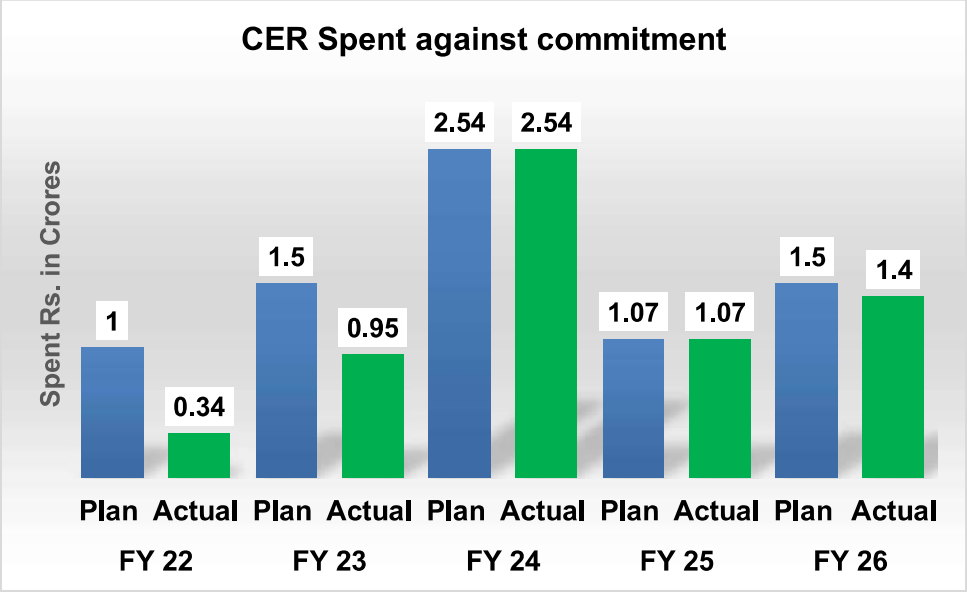
Environmental education regarding energy use is shifting from simple awareness to active and systemic behavioral change. Students have gained valuable participation skills and enhanced their presentation abilities by reporting and recording energy usage in their schools and homes. They have developed greater awareness of energy conservation and are adopting responsible usage habits in their daily lives. Improved communication and analytical skills help them confidently present data and contribute to sustainability initiatives.

S.No	Activitiy	Committed in Crs (INR) for FY 25-26	Spent in Crs (INR) From April 25 to Mar 26	Remarks
1	Climate resilient Agri - HIHI	0.40	0.40	Completed
2	Community Health Camps	0.10	0.10	Completed
3	JSW Aspire Project	0.47	0.47	Completed
4	Climate Resilient Program - KVK	0.12	0.12	Completed
Total		**1.09**	**1.09**	

ESC REPORT FOR THE PERIOD OF OCTOBER 2025 MARCH 2026

JSW Steel Ltd., Salem works is the only integrated steel plant in Tamil Nadu and presently operating with production capacity of 1.15 MTPA. JSW Steel Limited, Salem works is highly committed to protect the environment with distinctive focus on Triple bottom growth for sustainable development. The organization has always maintained Statutory and Regulatory compliances, believes in maintaining harmony with all the stakeholders, and contributes to societal support activities like:

- Agriculture
- Education
- Environment
- Health
- Sanitation
- School Infrastructure
- Sports
- Water
- Community Development
- Others



A TOKEN OF APPRECIATION:

The Honorable state tourism Minister , Thiru R. Rajendran, applauded our ESC contribution. International Day of Persons with Disabilities was celebrated in Salem on 3rd December, featuring special cultural events for children with special needs. The event was supported through the provision of lunch.

YOUTH SPORTS EMPOWERMENT PROGRAM:

Silambam and Mallarkambam training is being conducted in seven selected government schools, engaging 350 students in regular practice. The program has significantly improved students' physical strength, balance, and flexibility while also enhancing mental discipline, focus, and emotional control. It promotes healthier lifestyles and encourages long-term fitness habits. Additionally, the training empowers students with valuable self-defense skills, boosting their confidence and personal safety, and contributing to their overall holistic development.

SCHOOL GIRLS' TOILET HANDING OVER PROGRAM:

A newly constructed girls' toilet facility was handed over to the government school in Chinthamaniyur to provide safe, hygienic, and accessible sanitation for girl students. This initiative supports their health, dignity, and regular school attendance by reducing hygiene-related health risks and discomfort. With 385 girl students benefiting from the facility, the provision of clean sanitation also promotes better hygiene practices, which can positively influence their families and contribute to healthier communities over time.

WOMEN TOILET HANDING OVER PROGRAM –M.KALIPATTI:

A newly constructed women's toilet facility was formally handed over to the community to improve sanitation, safety, and hygiene for women and girls. The dedicated facility is expected to significantly reduce open defecation and provide a safe, dignified space for use, especially for elderly women and adolescent girls. Nearly 150 families will benefit from this initiative, which also promotes greater community awareness on hygiene practices and the importance of proper facility maintenance.

GENERAL MEDICAL CAMP:

Conducted five general medical camps for the surrounding community, screening 647 community members and enabling early identification of health issues. The initiative improved health awareness among residents, supported early detection of illnesses, ensured timely medical intervention, reduced health risks, and strengthened access to preventive and primary healthcare services across the panchayats.

SUPPORT TO FOREST RANGE OFFICE – METTUR:

37 warm jackets were provided to protect individuals from harsh cold weather conditions. Additionally, 37 high-quality torchlights were distributed to support safe patrolling of forest boundaries and farmlands during nighttime. This initiative has improved visibility, enhanced safety, and increased efficiency in night-time monitoring and protection activities.

KARUNYA ILLAM SOLAR PANEL INAUGURATION:

Karunya Illam Skill Development Centre has approached our Ladies Club with a request to support the installation of a solar panel system. This initiative aims to optimize energy costs, ensure sustainable power supply, and reduce long-term expenses.

Enterprise Social Commitment (ESC) submitted during Environment Impact Assessment (EIA) Study 2017 to MoEF&CC in the Table - 2

Table 2: Fund Allocation for (ESC) as per EC dated 07.07.2017 (Rs. In Crs)

Sl.No	Description of activities	No's of facility	Amount committed in five years (Rs. In Crs)					Total Rs in Crs
			Year I	Year II	Year III	Year IV	Year V	
1	Toilets	2000	0.5	0.75	0.75	0.5	0.5	**3**
2	Health center	1	0.25	0.25	0.25	0.25	0	**1**
3	Community hall	2	0	0.5	0.5	0	0	**1**
4	Hospital	1	0.5	0.5	0.5	0.25	0.25	**2**
5	Modern school New with GYM and Play ground	1	0	0	1	0.5	0.5	**2**
6	Watershed program	1	0	0.25	0.25	0.25	0.25	**1**
7	Water body strengthening/ Drinking water bore well drilling		0	0.25	0.25	0.25	0.25	**1**
8	Drainage		0.25	0.25	0.25	0.25	0	**1**
9	Government school improvement	1	0	0.25	0.25	0.25	0.25	**1**
Total			**1.5**	**3**	**4**	**2.5**	**2**	**13**

The actual amount spent on ESC until June 2020 is given in Table 3

Table 3: The actual amount spent on ESC until June 2020 (Rs. In Crs)

Sl. No	Description of activities	No's	Year I (Jul'17 to Dec'17)		Year II (Jan'18 to Dec'18)		Year III (Jan'19 to Dec'19)		Year IV (Jan'20 to Jun'20)		Total Rs (in Crs)	
			Committed	Spent	Committed	Spent	Committed	Spent	Committed	Spent	Committed	Spent
1	Toilets	2000	0.5	0.32	0.75	0.19	0.75	0.04	0.5	0	3	0.55
2	Health center	1	0.25	0	0.25	0	0.25	0.22	0.25	0.21	1	0.43
3	Community hall	2	0	0	0.5	0	0.5	0	0	0	1	0
4	Hospital	1	0.5	0	0.5	0	0.5	0	0.25	0.25	2	0.25
5	Modern school New with GYM and Play ground	1	0	0	0	0	1	0	0.5	0	2	0
6	Watershed program	1	0	0.24	0.25	0	0.25	0.21	0.25	0	1	0.45
7	Water body strengthening/ Drinking water bore well drilling		0	0	0.25	0.2	0.25	0.2	0.25	0.11	1	0.51
8	Drainage		0.25	0	0.25	0.39	0.25	0.1	0.25	0	1	0.49
9	Government school improvement	1	0	0.47	0.25	0.34	0.25	0.17	0.25	0.02	1	1
Total			**1.5**	**1.03**	**3.0**	**1.12**	**4.0**	**0.94**	**2.5**	**0.593**	**13.0**	**3.68**

Enterprise Social Commitment (ESC) revised commitment submitted to MoEF&CC dated 26.09.2020 is given in Table 4

Table 4 : Revised Fund Allocation for ESC as per letter submitted to MoEFCC (Rs. In Crs)

Sl.No	Sectors	Details	Total Rs in Cr Commitment
1	Health	Health & Eye Camps to public and school students , Hospital improvement	1.22
2	Education	School library support , career guidance , sports support , Anganwadi support , class toppers prize to school students, School Technology improvement	1.22
3	Infrastructure Development	School and Educational institution infrastructure improvement , village infrastructure improvement , toilet construction in schools and villages , village library support , Drainage improvement , road improvement , water body improvement , desilting of channels, pond and reservoir	4.7
4	Livelihood support	Need based training (Eg Tailoring , ARI , Zardoshi) to women , Spoken English training to unemployed youth to increase their employability level, organic training to farmers , agricultural inputs to Farmers , exposures trips to farmers , sponsorship to farmers for various training	1.18
5	Others	Waste Management support , sports related support in schools and Villages, awareness creation programs in schools and villages and other need based activities	1
Total in Rs. Crs (shall be spent)			**9.32**
Total spent Crs. Till June 2020			**3.68**
Total in Rs. Crs (as the commitment made)			**13.00**

Total Amount spent on Enterprise Social Commitment (ESC) from July 2020 to March 2022 is given in Table 5

Table 5 ESC spent from July 2020 to March 2022

Sl. No.	Description of activities	ESC fund Rs. in Crs	
		Committed	Spent
1	Health	0.13	0.14
2	Education	0.23	0.01
3	Infrastructure Development	0.63	0.19
4	Livelihood support	0.00	0.00
5	Others	0.00	0.00
	Total in Crs.	**0.99**	**0.34**

Total Amount spent on Enterprise Social Commitment (ESC) from April 2022 to March 25 is given in Table 6

Table 6: ESC spent details from April 22 to March 25

Sl. No.	Description of activities	April – September 22		October – March 23		April – March 24		April –March 25		Total spent in Crs from July 2017 onwards to till March 25
		Committed (Rs in Crs)	Spent (Rs in Crs)	Committed (Rs in Crs)	Spent (Rs in Crs)	Committed (Rs in Crs)	Spent (Rs in Crs)	Committed (Rs in Crs)	Spent (Rs in Crs)	(Rs. in Crs)
1	Health	0	0	0.25	0.08	0.43	0.43	0.134	0.134	0.644
2	Education	0.5	0.5	0.15	0.01	0.48	0.48	0.0843	0.0843	1.0743
3	Infrastructure Development	0	0	0.15	0.08	1.13	1.13	0.6722	0.6722	1.8822
4	Livelihood support	0	0	0.2	0	0.00	0.00	0.00	0.00	0
5	Others	0	0	0.25	0.28	0.5	0.5	0.78	0.078	0.9678
	Total in Crs	**0.5**	**0.5**	**1**	**0.45**	**2.54**	**2.54**	**1.07**	**1.07**	**4.56**
	ESC spent from 2017 onwards to till March 25	**Total ESC spent Rs. in Crs till Sept 24 (3.68+0.34+4.56)**								**8.58**

Table 7 ESC spent from April 2025 to September 2025

Sl. No.	Description of activities	ESC fund Rs. in Crs	
		Committed	Spent
1	Health	0.15	0.15
2	Education	0.05	0.00
3	Others	0.15	0.15
	Total in Crs.	**0.35**	**0.30**

Table 8 ESC spent from October 2025 to March 2026

Sl. No.	Description of activities	ESC fund Rs. in Crs	
		Committed	Spent
1	Agriculture	0.00	0.00
2	Education	0.00	0.00
3	Environment	0.33	0.32
4	Health	0.14	0.13
5	Sanitation	0.30	0.30
6	School infrastructure	0.00	0.00
7	Sports	0.09	0.09
8	Water	0.00	0.00
9	Community Development	0.19	0.18
10	Others	0.10	0.08
	Total in Crs.	**1.15**	**1.10**

ESC spent from 2017 onwards to till March 26	**9.98**

Village Adoption Program October 2025 to March 2026

JSW Steel Limited

JSW Steel

JSWSL/STTEL/ENVT/ECCC/LA/2025-26/53
08rd July 2025

To:

Block Development Officer,
Mecheri, Salem Dt.-636453.

Dear Sir,

Sub: JSW Steel Ltd., Salem Works – Village Adoption plan submitted to MoEF&CC and action plan - reg

Ref: EC issued to our Steel Plant vide file no. J-11011/281/2006-IA. II(I) dated 20.05.2025

JSW Salem cherishes people and believes in inclusive growth to facilitate creation of a value-based and empowered society through continuous and purposeful engagement of society around.
We support sustainable rural development through lake desilting, greenery, and eco-friendly farming. Our initiatives include building toilets, installing RO water systems, and promoting hygiene. We enhance education with life skills, environmental learning, and student aid. These efforts improve livelihoods, health, and learning in surrounding villages for lasting impact.

As part of the Village Adoption Project, we have proposed to adopt three villages: M. Kalipatti, Amarathanoor and Pottaneri. The planned areas of intervention include Health & Nutrition, Education, Agriculture, Water Management, and Environmental Management. Preliminary activities have already commenced.

At Kuttapati, a rainwater harvesting pond has been developed, enhancing irrigation capacity for approximately 193 hectares of agricultural land. Furthermore, 350 saplings have been planted to promote greenery, improve air quality, and raise environmental awareness through active community participation.

This is for your kind information and records. Kindly acknowledge the receipt of this letter.

Thanking you,

For JSW Steel Limited

A R Ariraj
Associate Vice President (HR &ADMIN)

Yours faithfully,
For JSW Steel Limited, Salem works

Encl.: Copy of the Environmental Clearance

Copy Received
Block Development Officer (I/C)
MECHERI.

Salem Works
P.O. Pottaneri, Mecheri,
Mettur-Tk, Salem-Dt. Pin :636 453
Tamilnadu, India.
CIN No L27102MH1994PLC152925
www.jsw.in

Registered Office
JSW Centre
Badra Kurla Complex
Bandra East, Mumbai 400 051
T + 91 22 4286 1000
T + 91 22 4286 3000

JINDAL
O.P. Jindal Group

Table 1: Three years plan for Village Adoption program (VAP)

JSW Steel Limited - Village Adoption program								
No. of villages to be adopted by each Company:								
1) JSW Steel: 4 nos of village Panchayat.								
Particulars	**Proposed Activity**	**Year Wise Expenditure**						**Tentative Budget (Rs. in lacs)**
		1st Year		**2nd Year**		**3rd Year**		
		Proposed Villages	**Budget in Lakhs**	**Proposed Villages**	**Budget in Lakhs**	**Proposed Villages**	**Budget in Lakhs**	
Health & Nutrition	Upgradation of Primary Health Centre	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	15
Education	Life skill Development for government school students	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	15
	UDAAN Scholarships Program for students persuing higher studies	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	15

Agriculture	Development of Agriculture in the area through Organic cultivation promotion, Package of Practices, Awareness on better farming practices.	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	15
	Developing FPOs of local farmers with microenterprise development	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	15
Water Management	Desilting lakh and ponds in and around villages to improve the ground water facilities	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	15
Environment Management	Increasing green cover in the Mecheri Diz Villages	4 Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	7	4Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	5	4Villages of DIZ - M. Kalipatti, Amarathanoor,Pottaneri and Parinagar.	8	20
		Total	**37**	**0**	**35**		**38**	**110**
		Grand Total						**1.10 Cr**

***NOTE**: Nature of the activities can be interchanged from village to village based on the outcome of need base analysis during the execution phase in coordination with local Gram Panchayat within the overall budget proposed here for Socio- Economic Development Plan.*
2)Zero date for the proposed activity will be considered from the date of approval of respective Gram Panchayat's.

Table 2: Spent from October 2025 to March 2026

S.No	Name of the Villages	Intervention	Committed in Crs (INR) for Oct 25 to Mar 26	Spent in Crs (INR) From Oct 25 to Mar 26	Remarks
1	M. Kalipatty	Health & Nutrition	0.10	0.10	Completed
2	Pottaneri				
3	Amarathanoor	Water	0.10	0.09	Completed
4	Mecheri DIZ villages	Environment Management	0.15	0.14	Completed
5	Mecheri DIZ villages	Rural Development	0.15	0.14	Completed
Total			0.50	0.47	

The allocated funds recorded under the Corporate Social Responsibility (CSR) budget are utilized to support and implemented various development initiatives carried out through designated adoption village projects.

VISION SCREENING CAMPS AT DIZ - SALEM

Eye camps were conducted across 38 locations, Mecheri block, and Salem district. Where 3,333 individuals were screened to identify various vision related issues. As part of the initiative, free spectacles were provided to 2,189 people to support improved eyesight and daily functioning. In addition, all participants received awareness and education on proper vision care, early detection of eye problems, and the importance of regular checkups, contributing to better eye health in the community.

WATER INTERVENTION:

Twelve water purifiers have been installed across selected Government Schools and Primary Health Centers. This initiative ensures access to clean and safe drinking water for approximately 1,700 students and 400 community members on a daily basis, improving their overall health, reducing water-borne illnesses, and supporting a healthier learning and living environment.

GREENERY DEVELOPMENT INITIATIVE:

A greenery development initiative was carried out through avenue plantation across multiple locations in the DIZ villages. The program focused on enhancing environmental sustainability by planting saplings along water bodies, community areas, and public spaces. 6,500 saplings were planted, contributing to increased green cover and strengthened local biodiversity. This effort supported habitat restoration, improved environmental quality, and enhanced community awareness on the importance of environmental conservation and long term ecological well-being.

YOGA EDUCATION AT ERWADI:

A Yoga Wellness Program is being conducted in Ervadi village, with 150– 200 community members, including youth and school children, participating daily to improve their physical and mental well-being. The initiative has helped reduce stress, anxiety, and behavioral issues among young participants while promoting overall fitness and mindfulness. It has also contributed to lowering healthcare concerns related to stress, inactivity, and lifestyle disorders, a healthier and more balanced community environment.

SOLAR STREET LIGHT SUPPORT SERVICES:

We distributed **83 solar-powered streetlights across more than ten villages,** significantly improving nighttime visibility and safety. Through our intervention, residents can now travel fearlessly after dark, enhancing security, mobility, and overall quality of life in their communities. Electrical expenses have been drastically reduced by adopting green energy initiatives. On behalf of the Panchayat, we thank JSW for its CSR contribution.

ANNEXURE 12

CARBON SEQUESTRATION REPORT

PERIYAR UNIVERSITY

Reaccredited with 'A++' Grade by the NAAC, State University- NIRF Rank 94
State Public University Rank 40

SALEM – 636 011, TAMIL NADU

DEPARTMENT OF ENVIRONMENTAL SCIENCE

CERTIFICATE

This is to certify that a comprehensive tree counting study was conducted at JSW Steel Pvt. Ltd. Salem Works, Pottaneri, Mecheri - 636 453, Salem District plant during May-June, 2025. The study recorded **120** tree species and a total number of **91,995** trees from the green cover of the Steel Plant. The estimated CO_2 offset of the total green cover is **1,584** tonne/year.

Dr. K. Murugesan
Project Investigator
Professor
Department of Environmental Science
Periyar University
Salem - 636 011

EXECUTIVE SUMMARY

- As part of comprehensive Carbon Sequestration by green belt Study Report, M/s. JSW Steel Ltd, Salem Works located at, Pottaneri P.O., Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India, have the commitment and attitude towards the Pollution Control and Prevention management system. The green cover of M/s. JSW Steel Ltd, Salem Works industrial area covers 36.4% of total industrial area, demonstrates a robust and strategically designed ecological system. A total number of **91,995** trees belonging to **120** species were recorded from green cover including industrial and township areas. The green area structure reveals a deliberate blend of fast-growing, pollution-tolerant species and a complementary mix of native, ecologically valuable trees, achieving both rapid environmental benefits and long-term biodiversity enhancement. Three species, Azadirachta indica, Bambusa vulgaris and Leucaena leucocephala, together account for nearly 48% of the total vegetation, forming the green belt's functional backbone through their rapid growth, hardiness, and soil-enhancing properties.
- Zone-wise analysis shows a purpose-driven greening strategy aligned with pollution load and land availability. Zone 1 hosts the largest population (30,016 trees) and performs as the plant's primary ecological buffer, recording the highest CO_2 sequestration of 420.26 tonnes/year. Zones 2 (23,475 trees) and 4 (20,264 trees) serve as secondary green belts, while Zone 3 reflects moderate greening due to industrial infrastructure density. Zone 5, the township area, contains 5,700 trees, offering community-level ecological benefits but contributing comparatively lower sequestration (88.05 t/year) due to younger vegetation.
- Species origin analysis shows 66 native and 54 exotic species, balancing ecosystem restoration with industrial resilience. The dominance of exotics is consistent with industrial greenbelt design, where pollution tolerance and rapid canopy establishment are critical. Age-class data shows that more than 70,000 trees are less than 10 years old. This means that the plantation is growing quickly and is currently in its most productive carbon-capture phase. The 14,028 mature trees, on the other hand, provide long-term stability. Age-class data reveals that over 70,000 trees are under 10 years old, confirming a rapidly expanding, actively growing plantation that is currently in its most productive carbon-capture phase, while 14,028 mature trees contribute long-term stability.
- Tree structure assessments across all zones show a young, vibrant, multi-layered plantation, with the majority of trees in smaller DBH and height classes typical of actively managed, human-established greenbelts. A limited but ecologically important cohort of large, legacy trees persists across zones, acting as keystone structures supporting biodiversity.
- Carbon-sequestration profiles highlight considerable variation across species. Azadirachta indica consistently shows the highest sequestration potential, especially in Zones 1 and 5, where it forms the foundation of carbon mitigation. Other high-efficiency species Tectona grandis, Albizia

lebbeck, Caesalpinia pulcherrima, Pongamia pinnata, and Cocos nucifera in some zones emerge as strategic assets for further climate-focused afforestation. On the other hand, common fruit and ornamental plants don't do much to capture CO_2; instead, they mostly serve biodiversity and aesthetic purposes.

- Overall, the intensive field study confirms that the JSW Salem greenery is well-engineered, scientifically structured, and ecologically effective. Its blend of density-based planting, species selection, and zone-specific design not only mitigates industrial emissions but also enhances biodiversity, soil stability, microclimate moderation and long-term ecological resilience. The findings support continued expansion using high-impact species while strengthening native diversity to ensure sustained environmental performance.
- Total Tree plantation as reported by JSW is around 2,72,357 trees since inception till March 2025 and the estimated CO_2 sequestration is 5707 MT during FY 2023-24. The complete counting of entire plant area with geotagging of each tree reveals a total number of trees survived is 91,995 as on March 2026.
- Total Carbon dioxide emission by the integrated steel plant operation in the year 2024-25 is about **2.735 tCO_2/tcs** (Steel Production **1073347 MT/year**).
- Total amount of CO_2 sequestered by currently existing green belt in the year 2024-2025 is **1,584** MT.

- Proposed green belt to the FY 2025-26 is 15,000 Tree saplings.
- **Criteria for number of trees:** Trees having height greater than 3 feet (~91795) were considered for sequestration calculation.

INTRODUCTION

I. Introduction

JSW steel ltd., Salem works is the only integrated steel plant in Tamil Nadu and producing special alloy steel. The plant is currently operating with a production capacity of 1.15 MTPA special alloy steel and the existing Consent Order (CTO) is valid till 31.03.2026. Details of Finished, Intermediate and By-products as per the CTO dated 23.01.2023 is given in the below Table.

S.No	Product/Intermediate product/By-product	UoM	Quantity
Product			
1	Steel production (Mild Steel, Carbon Steel, Alloy Steel and Special Steel) Products (Billets, Round bars, Round Corner Square, Flats, Coils, Bars & Rods, Annealed, Pickled and peeled & ground products, Steel Ball)	MT/Year	1150000
Intermediate Product			
1	Pig Iron production	MT/Year	300000
By-product			
1	Ferrous Sulfate	MT/Year	1200
2	Liquid oxygen for sale	MT/Year	15000
3	Liquid Nitrogen for sale	MT/Year	2000
4	Liquid Argon for sale	MT/Year	8000
5	Paver block by using Steel Making Shop slag	MT/Year	50000
6	Ready mix concrete	MT/Year	82500
7	Crushed slag (Steel Making Shop Slag)	MT/Year	226750
8	Ground Granulated Blast Furnace Slag(GGBFS)	MT/Year	800000

Process Description

Introduction

At present the production capacity of finished products (Special alloy steel) is 1.15 MTPA. The plant consists of Iron complex, Steel melting Shop, Mills, CPP and Auxiliary units. Iron complex (IC) consists1 No. of non-recovery Coke Oven Plant with the production capacity of 0.5 MTPA, 2 nos. of Sinter Plant with production capacity of 0.175 MTPA and 1.06 MTPA respectively and the total capacity at present is 1.235 MTPA. 2 nos. of Blast Furnace with the total production capacity of **1.12** MTPA (BF #1 – expanded from 0.367MTPA to 0.437 MTPA and BF #2 - 0.683 MTPA) and 1 no. of two strand Pig Casting Machines with capacity of 0.30 MTPA. Steel Making Shop (SMS) consists 2 nos. of Energy Optimizing Furnace (EOF) with total production capacity of 1.26 MTPA (EOF#1 -0.64 MTPA and EOF#2 -0.62 MTPA), 4 nos. of Ladle Refining Furnaces (LRF) with production capacity of 65 T/heat each, (Ladle Refining Furnace is attached with Vacuum Degassing unit to produce low carbon steel). There are 3 Nos. Continuous Casting Machines (CCM) contain 1 no. of three strand Continuous Billet (CCM#1) casters with production capacity of 0.35 MTPA, 1 no. of three strand Continuous Billet and Bloom casters (CCM#2) with production capacity of 0.50 MTPA and 1 no. of three strand Continuous Billet and Bloom casters (CCM#3) with production capacity of 0.45 MTPA. The total installed capacity is 1.30 MTPA and as per the CTO at present, the production approval is 1.15 MTPA only.

Steel Finishing Shop (Mills) consisting Blooming Mill (BLM) with the production capacity of 0.48 MTPA, Bar & Rod Mill (BRM) with the production capacity of 0.48 MTPA with wire rod block. For purification of steel and meet the customer requirement, additional process of annealing plant with the capacity of 0.06 MTPA and Peeled & ground unit with capacity of 0.01 MTPA (Design capacity 0.04 MTPA) are installed & under operation. Currently Pickling unit with capacity of 0.06 MTPA installed and operations. To the further value addition Grinding Media Mill (GMM) facility is installed in the downstream of Mills to produce Steel Ball.

In addition to the above units, 2 nos. of Air Separation Plants (150 TPD and 390 TPD) are in operational and to cater the expansion requirement additional ASP with the capacity of 250 TPD (Oxygen) will be installed in phase #2 expansion. 1 No. of Pulverized Coal Injection unit with grinding capacity of 150 kg/hr. and 1 No. of Lime Calcining Plant are existing (which is not in operations) and there are two numbers of process boilers with the capacity of 25 and 8 TPH to supply process steam to BFs.

Process flow diagram **(Figure #1)** and products of the steel plant **(Figure #2)** are

shown below.

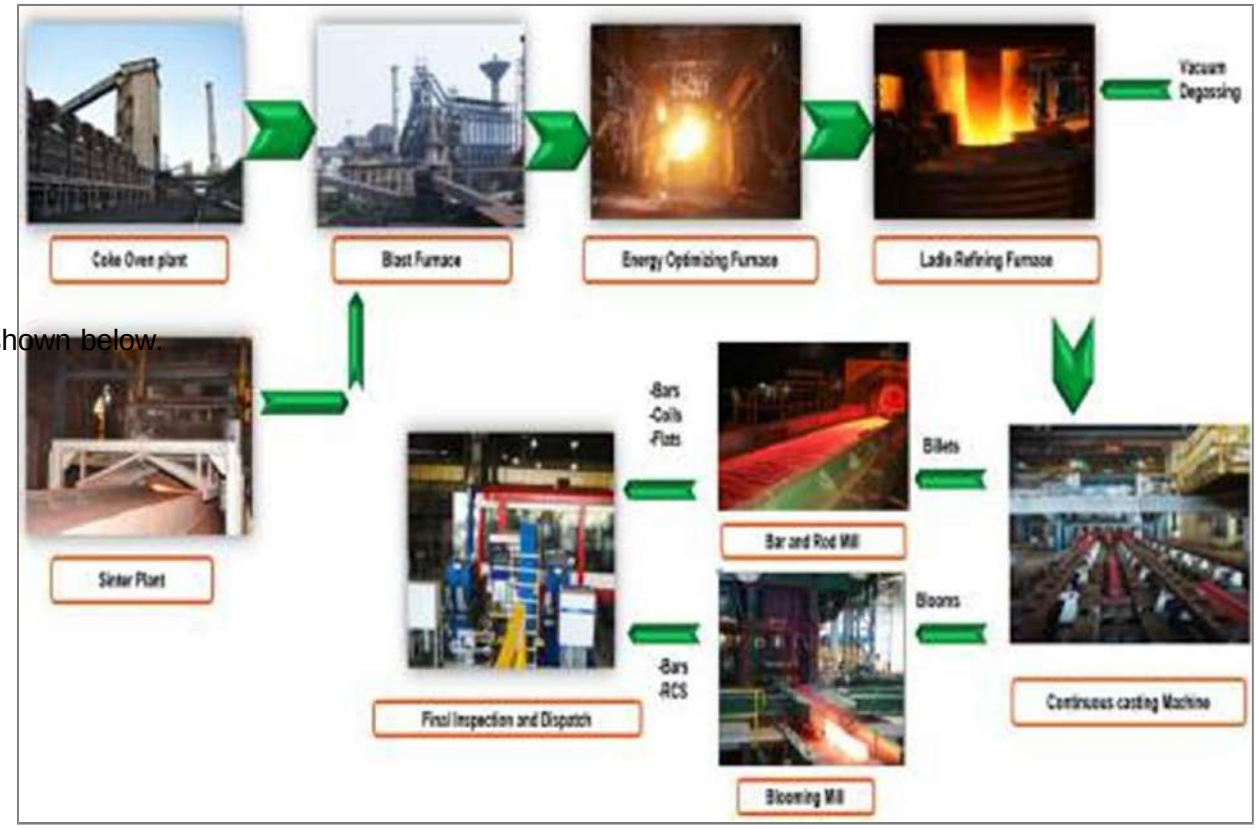


Figure #1: Process flow diagram

Figure #2: Products

IRON COMPLEX

Coke Oven Plant (Non-Recovery Type)

The Coke Oven Plant (COP) is a Non-recovery type and the capacity is 0.5 MTPA. Existing COP consists of 2 batteries with 48 ovens,1 battery with 24 ovens and each battery flue gas duct is connected with a RCC stack. The Plant will use stamp-charging technique to increase the bulk density of the coking coal, which will be charged to the ovens and it will help to increase the yield & also the strength of the coke. The Coke Oven operation is automatic and the process of coal carbonization is being controlled. There is no wastewater generation from the process. The fines i.e. coke breeze is used in Sinter Plant for sinter making. The waste heat of the flue gas is fully utilized in Waste Heat Recovery Boilers (WHRB) for steam generation. Online continuous emission monitoring systems are installed in the WHR Boilers and the real time data is connected with IEMS, Chennai.

Sinter Plant

At present the total capacity is 1.235 MTPA (Sinter Plant 1& 2 have production capacity of 0.175 MTPA and 1.06 MTPA respectively). Sintering is a process of agglomeration of fines by incipient fusion in to porous lumps called Sinter which is an ideal input for Blast Furnace. Iron ore fines, coke fines, lime stone fines, GCP sludge, EOF slag and other raw material fines dusts are processed in the plant at a temperature of about 1200^{o} C, by burning fuel (Furnace oil/BF gas). It is basically waste to wealth process unit. Most of the waste materials generated in steel plant are reused in sinter plant to convert it into sinter which is direct replacement of iron ore. To cater the heat exchange & evaporation losses provisions are made to raw water makeup for cooling application and there is no effluent discharged from sinter plant. APC measures are provided in process and non-process stacks (Raw material handling and de-dusting systems) with online continuous emission monitoring system and the real time data is connected with CAC, Chennai. Installation of Sinter Plant #3 is scheduled in phase#2 expansion activity as per the plan. In the raw material storage area water sprinklers/dry fog systems are provided to control the fugitive emissions. Sinter cooler hot gas usage in GGBS production is completed and CTO also obtained and SP#2 SPM emission reduction projects under implementation.

Blast Furnace (BF)

At present the total capacity is 1.12 MTPA (Blast furnace 1&2 have production capacity of 0.437 MTPA and 0.683 MTPA respectively). In blast furnace, sinter and calibrated iron ore are reduced by metallurgical coke at a temperature of 1400-1500^{o}C to produce hot metal. BF Slag is the by-product generated during the process and the same gets granulated while tapping and presently disposed to cement industries. BF gas from the furnaces is treated through APC measures (dust catchers, gas cleaning plant) and cleaned BF gas is used as fuel for heating application in various processes
like BF,SP, Mills, LRF-VD, CPP. BF#1 expansion (from 0.437 to 0.683 MTPA) is scheduled in phase#2. The byproduct is sold to cement industries and sold to open markets.

STEEL MELTING SHOP

Energy Optimizing Furnace

The capacity of Energy optimizing furnace is 1.26 MTPA (EOF #1 & #2 have production capacity of 0.64 and 0.62 MTPA respectively). Energy Optimizing Furnace (EOF) process is essentially an Oxygen steel making process in which Oxygen is injected into the furnace both above and below the surface of the molten bath. Hot metal from Blast Furnace is transported to EOF by ladle through loco operated hot metal transfer car. The hot metal is poured in to EOF with the help of hot metal charging crane. The metallic feed to EOF consist of 85% hot metal and up to 15% of scraps charges depending on the availability of scrap. Processed scrap is brought from scrap yard to EOF in scrap charging box and then will be charged to EOF. Other fluxes and additives is stored in over storage bunkers and added in EOF as per the process requirement. The process gas generated from EOF is cleaned with cyclonic separator/quencher and the cleaned gas is vented into atmosphere through a dedicated stack. Online continuous emission monitoring systems are installed in the stacks and the real time data is connected with CAC, Chennai. At present EOF slag is reused internally and disposed to cement industries and to improve the utilization a slag crushing plant and paver block making facility will be installed.

Ladle Refining Furnace (LRF)

From EOF, Liquid steel is tapped into steel teeming ladle placed on a self-propelled steel

transfer car and the liquid steel in the ladle is placed on steel vessel for processing in Ladle Refining Furnace(LRF). There are four numbers of LRF with the capacity of 65T/heat. In addition to the above two vacuum degassing units are provided to produce high purity steel along with LRF#1&3. Liquid steel obtained from EOF is taken to the LRF for adjustment of steel chemistry by addition of Ferro-alloys. LRF area is equipped with primary & secondary de-dusting systems to minimize the fugitive emissions. Dust is collected from the bag filters and reused in sinter plant. CEMS are installed in the respective stacks and the real time data is connected with IEMS, TNPCB, Chennai

Continuous Casting of Billets and Blooms (CCM)

The total production capacity is 1.30 MTPA (CCM #1, 2 & 3 have production capacity of 0.35, 0.50 and 0.45 MTPA respectively). The units comprising of each three stand billet and bloom casters. During continuous casting, the liquid steel from the pouring ladle, with the exclusion of air, via a thundish with an adjustable discharge device into the short, water-cooled copper mold. The shape of the mold defines shape of the steel. However, the at present the approved capacity to produce special steel is 1.15 MTPA.

MILLS

Blooming Mill (BLM)

The capacity of BLM is 0.48 MTPA and designed to produce heavy rounds in the range of 60 to 200 mm, Round Cornered Square (RCS) in the range of 55 to 240 mm as finished product having a capacity of 0.48 MTPA. The raw material input to the mill is from Bloom caster of sizes (i) 250 x 250 mm (ii) 280x 370 mm (iii) 310 mm Dia and (iv) 340 x 400 mm. Blooming Mill consists of BF Gas fired reheating furnace of 100T capacity with High pressure water jet de-scaler to remove the scale formed during heating. CEMS are installed in the respective stacks and the real time data is connected with IEMS, TNPCB, Chennai.

Bar and Rod Mill (BRM)

BRM capacity is 0.48 MTPA with 3 high mill (TRIO) with new sliding stand. The billets are transported to rolling mill billet transfer car/crane to billet storage and conditioning Bay of bar and rod mill. Mild steel billets is stored and the alloy steel billets is conditioned (i.e. ground and inspected). Finished product are bundled in the bundling station and stacked in the yard in respective location for dispatch. Minimum quantity of solid waste which is called Mill Scale is generated and the same is reused in sinter plant. In down stream of

BRM Annealing, Pickling (0.06 MTPA) and Peeled &ground (0.04 MTPA) plant are installed to produce value added products. Subject to customer's specification coils will be processed through Annealing, pickling, phosphating, lime coating, soaping process. Pickling plant effluents are treated in a dedicated ETP which is ensure ZLD. Hazardous waste generated from the pickling plant is disposed to TSDF. Further add to the value addition a Grinding Media Mill is installed with the capacity of 0.2 MTPA to produce Steel Ball which is the first unique facility in India. CEMS are installed in the applicable stacks and the real time data is connected with IEMS, TNPCB, Chennai.

Annealing & Pickling unit

The Annealing plant is installed in phase#1 expansion activity with the capacity of 0.06 MTPA & the unit is under operation. The unit has facility of bar & coil annealing. Based on the customer specification & requirement, bars and coils will be processed in the annealing plant. Pickling plant is installed with the capacity of 0.06 MTPA and the unit is ready for trial operation. The unit will be used to pickle wire rod coils. The plant consists main process of Acid pickling, phosphating, Lime and soaping with drier units. Based on the customer specification coils will be processed to Pickling only, pickling, phosphating and pickling & annealing. In the Annealing Plant, the useage of HSD is completely replaced with Compressed Bio Gas (CBG) at Hot water generator for acid picking and Thermic Fludic Heater at ZLD ETP. Also, would like to bring to your notice that the portion of the hot water generated for the acid pickling bath is used to heat the treated spent acid (after Acid Regeneration Plant) and hence the Hot Water generator installed for the ARP is redundant. It would be removed from the system and based on the same we will approach your good office to remove the respective stack details (stack number of the present proposal 55) from the CTO Effluent generated from the pickling process is treated in a dedicated ZLD ETP whare PTP, UF,RO, MEE and AFD are installed.

The Annealing complex is designed to produce heat treated Rounds, Square bars with round corners in the range of 55-160 mm as finished product and Heat treated wire rod coils in the range of 5.5 mm to 32 mm. Capacity of annealing complex is 0.06 MTPA. Rolled bars and coils from Rolling Mills are input to the Annealing plant. Annealing process is basically a dry process where electrical energy & nitrogen will be used for heating and cooling respectively. There is no consumption of water, discharge of emission from the process.

Coil Annealing Furnace

The coil annealing furnace is a 100 m^3 bell annealing furnace which operates from room temperature to 810^oC maximum and the cycle time of the furnace is up to 53 hours. Based on the customer needs annealed coils will be sent to pickling, phosphating.

Bar Annealing furnace

The bar annealing is a continuous roller type furnace and material moves from one end of the furnace to other end. The furnace operates to a temperature of 900^o C and cycle time is up to 33 hrs.

Peeled & ground

The capacity of peeled & ground unit is 0.04 MTPA. The Peeling Head unit is designed to have 5 tool holders with tool bits. At present 1 tool holder with tool bits is installed with the capacity of
0.01 MTPA and balance 0.03 MTPA will be installed in phase#2 expansion. Peeled and reeled bar are placed in the charging grid of the center less grinding machine. Individual bars will be lifted and placed on the Teflon roller table and feeding through center less grinding machine.

Process Boilers

There are 2 Nos of process boilers are available with the capacity of 25 and 8 TPH respectively. Blast Furnace gas (cleaned) is being used as fuel and steam is used in Blast Furnace operations to control the blast temperature. At present 8 TPH boiler is under operations and based on the requirement 25 TPH will be operated. A common stack is already available to disperse the emission raised from the process boilers.

Lime Calcining Plant

Steel melting grade limestone will be calcite in a vertical shaft kiln to produce like required fluxing agent for steel melting. Presently the plant is not in operation. Hence, Lime is getting procured from locally and imported.

Air Separation Plant (ASP)

Existing Air separation plant is having two units with the capacity of 150 TPD and 390 TPD respectively. From the Atmospheric Air, Oxygen, Nitrogen and Argon is separated by air separation process based on low pressure cryogenic cycle and double column

rectification system. High purity Oxygen is consumed in SMS process and low purity Oxygen will be consumed in blast furnace for Oxygen enrichment and also in the steel melting shop for EOF lancing, LD Converter, LRF and CCM for billet cutting. Argon is being used for rinsing in ladles and also to maintain inert atmosphere in the mold/thundish. Nitrogen is consumed for purging of gas pipelines, blast furnace top charging equipment, etc. After internal consumption the surplus by-products will be sold to outside vendors in the form of liquid. An additional ASP plant with capacity of 250 TPD is scheduled in phase#2 expansion.

QAD -Steel Samples – Macro Etching Lab

There is an etching lab facility for testing the steel products (sample) micro structure. Originally it was envisaged to use Hydrochloric acid for etching and the effluents (after neutralization) to be connected with pickling plant ETP and flue gas (after scrubber) to be dispersed through a dedicated stack. During operational phase (CTO) it was decided to perform the testing with Sulphuric acid instead hydrochloric acid where the effluents and fumes to be connected with pickling plant ETP (where Sulphuric acid effluents are treated) for treatment and reuse and consent also obtained.

When Sulphuric acid used it is noticed that micro structure results of steel samples not clear (visibility) compare HCl treatment. Hence, now it is moved to hydrochloric acid for etching lab and the effluent (after neutralization) is connected to the pickling plant ETP and fumes from the etching lab is connected with double stage wet scrubbers and the flue gas is dispersed through a dedicated stack (in the present proposal Stack no 61). This action taken is ensuring the work area environment improvement and also meet the customers' requirements. In this regard a letter submitted to your good office dated 28.06.2024 The APC measures implemented photo is attached in the Annexure- B of this report and the stack detail is uploaded in the OCMMS.

Paver Block making Unit

The utilization of the steel slag has been a major challenge in all integrated steel plants. Our R&D has successfully developed a technology for using steel slag in the manufacture of paver blocks. The study has established successful production paver blocks at 30% lower costs than with natural aggregates with lower use of cement and use of steel slag. For demonstration purposes a paver block making facility is installed to the production capacity of 25,000 Nos. of paver block/day which is equivalent of 50000 MT/annum of paver block. It is intended with its installation; entrepreneurs utilize this to supply good quality pavers for use in construction purposes. There is no fresh water requirement,

however, there will be waste water requirement of 25 KLD (treated waste water)and the same is met through the treated water from guard pond. To improve the waste utilization, it is also proposed to install further units in future. Raw materials like EOF slag, P - sand, Aggregates, Cement (green) is stored in a place covered with 5 feet wall by limited height to avoid fugitive emission. Tree plantation will be closely done with 3m width to minimize the noise level and waste water is being used for mixing of raw material, paver curing application.

SMS Slag Crushing Plant for Feeding to Paver Machine

Iron bearing material in the SMS slag and size of slag are the main concern to reuse. A 50 TPH capacity slag crushing unit is installed along with adequate air pollution control measures for crushing and separation of iron bearing material from SMS slag. After operations of the facility, the Iron bearing material will be reused in SMS process as scrap and crushed slag with various sizes will be reused in steel plant, paver block unit and sold to open merchant market. The byproduct quantity of 226750 MT/Annum and the same has been approved vide CTO dated 27.05.2022.

Batching Plant for Construction

The construction activity for the expansion units in the 1.3 MTPA steel plant expansion is under progress. For this purpose, it has been installed a batching plant with the capacity of 2 x 30 m^3/hr within the steel works and adequate air pollution control measures are provided to cater the emission control. The ready mix concrete will be used only to the construction purposes only and the anticipated quantity of ready mix concrete through the Batching Plant would be 82500MT/annum.

Raw Water & Waste water Treatment Systems

Raw Water Treatment System

An agreement already exists between PWD and JSW to utilize 5 MGD (22730 KLD) of raw water from downstream of river Cauvery. As per the CTE (CTE – EXP –II) fresh water requirement is about 2.45 MGD (12441.30 KLD) of raw water is met from the intake well located at downstream of Mettur dam which meets the 1.15 MTPA capacity of steel plant (excluding CPP of 90 MW) and at present proposal of water consumption is about 11736.3 KLD which will be met through kavery revier, ground water (domestic) and partially treated trade effluent from CPPII. Raw water is stored in a reservoir with capacity of 3 lakh $m^3$and water is pumped to pretreatment plant (clarifier followed by filter) to remove suspended solids. The existing water treatment and distribution system is remains unaltered. The details are shown in water balance diagram.

Wastewater generation and reuse

As per the CTE – EXP-II for the 1.30 MTPA steel production the expected trade effluent generation will be about 3245 KLD from steel plant and 78.8 from pickling plant. At present to the production of 1.15 MTPA steel the trade effluent generation is 2965 KLD from steel plant and 78.8 KLD from pickling plant and Etching lab. The effluent generation from the Pickling plant (78.50 KLD) & Etching lab (0.30 KLD) is about 78.80 KLD is treated in a dedicated ETP (ZLD) to treat and treated water is reused in pickling & etching lab process. The total effluent quantity is 2965 KLD (excluding pickling plant effluent) and including pickling plant effluent the quantity is 3043.8 KLD.

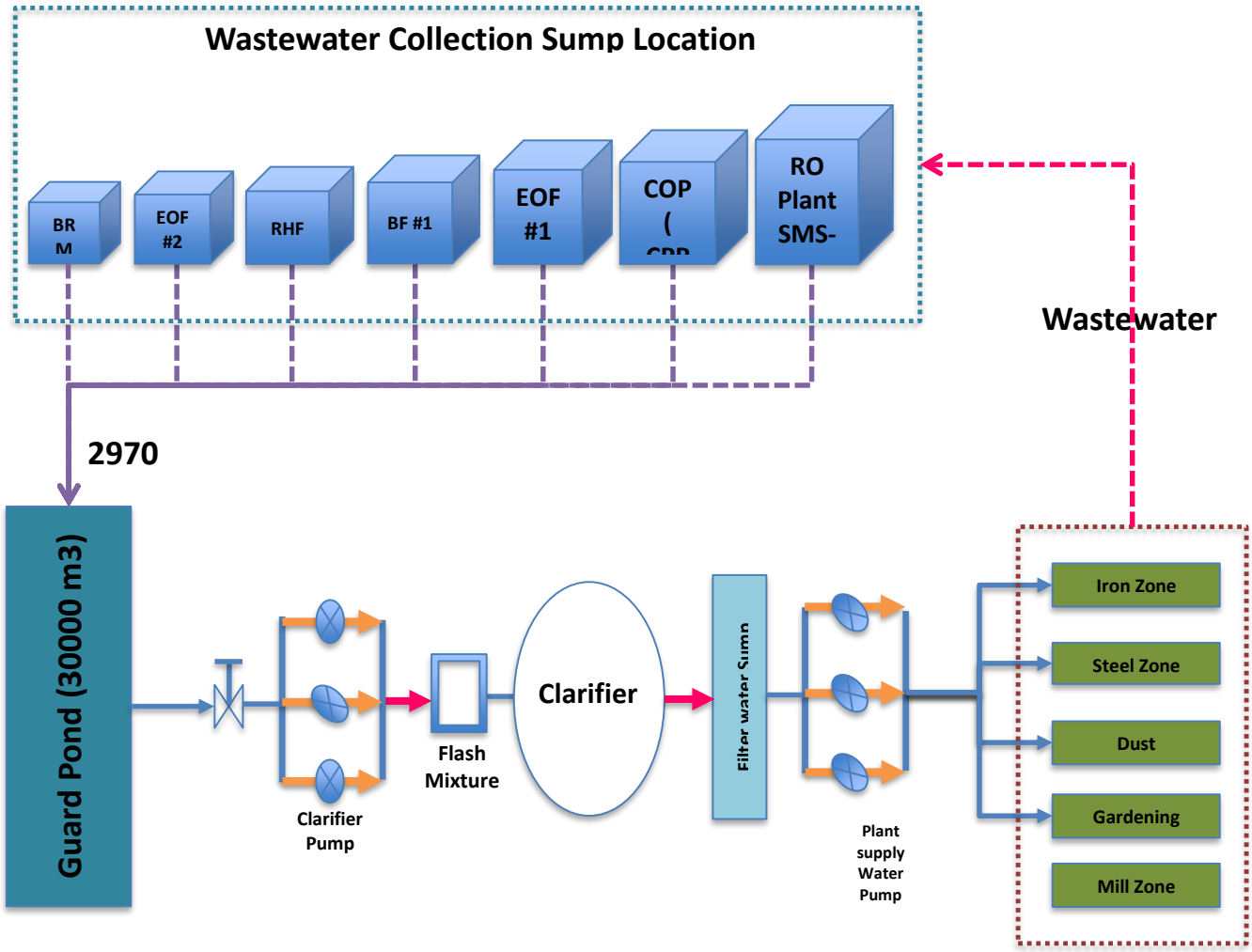
The trade effluent of 2965 KLD will be collected in the existing guard pond (capacity about 30,000 m^3) and subsequently taken for pretreatment and reuse. The trade effluent treatment plant capacity is 450 m^3/hr which consists of chemical dosing systems, clarifier and storage tanks. The treated water will be reused in steel plant for cooling applications, dust suppression system and Green belt development where Zero wastewater discharge to outside plant premises will be ensured. The treatment plant capacity details are given below.

S.No	Plant	Plant Capacity m3/hr	Dimension in m	Volume m^3	Retention time (Hrs.)	Actual volume can handle by the system m3
1	Guard pond		84 (D) X 5.5 (H)	30000	24	3050
2	Clarifier Tank	450	24 (D) × 3.5 (H)	1582	6	765

3	Treated water storage tank		10.0 × 7.5 x 3	225	1.30 - 2	127

WASTEWATER TREATMENT PLANT

The required chemicals (Alum and Poly) are prepared in 1000 L capacity FRP tank, agitator is provided for proper mixing and continuous dosing through dosing pumps for ensure proper reaction and settlement in the clarifier.



ZLD (Zero Wastewater Discharge) and EMFM details

To ensure ZLD the following systems are implemented. Flow meters (EMFM) are installed in appropriate locations and to measure Effluent inlet flow, Treated water flow in to the process & ETP outlet discharge flow dedicated EMFM installed and the real time values are connected with IEMS, TNPCB, Chennai. To ensure the continuous monitoring of the above a dedicated IP camera (with PTZ option) is installed in the ETP area and the real time video is connected with to TNPCB server.

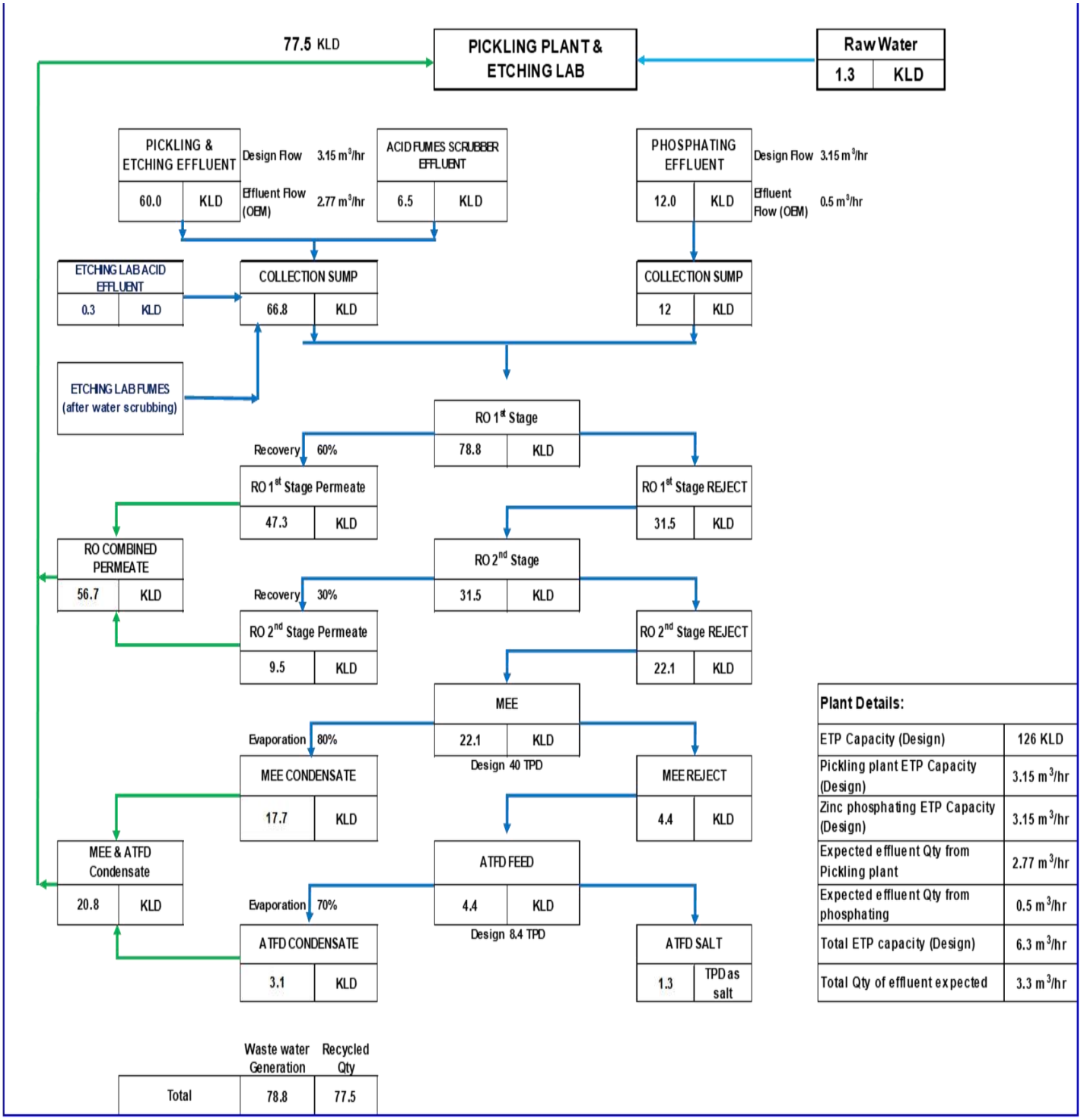
EMFM at Guard pond inlet

EMFM at Treated effluent water reuse point

EMFM at Guard pond overflow point

IP Camera (with PTZ option

WATER & WASTEWATER BALANCE DIAGRAM (Pickling plant – ZLD ETP – Capacity: 126 KLD)



Sewage Treatment Plant (STP)

Sewage treatment plants are installed in Township and Plant premises with the capacity of 200 KLD & 100 KLD respectively. The treated sewage is used for **process cooling application (recently)** and greenery development nearby the STP premises. The STP component details are given in a table below. In the plant, present sewage generation is in the range of 55 – 65 KLD and the existing plant capacity is 100 KLD, the approved quantity for Steel alone is 95 KD and for GGBFS is 1 KLD which is withdrawn now. It is scheduled to revamp the both STP units with MBR technology for quality. Hence, the both STP capacity is adequate to handle the requirements.

Carbon Sequestration

CO_2 Sequestration is the long-term capture and storage of atmospheric carbon dioxide. The primary goal is to reduce the amount of CO_2 in the atmosphere to mitigate global warming and avoid dangerous climate change. There are two broad categories like as Biological Sequestration (Using natural processes like plants and soils) and Geological Sequestration (Using technological means to capture CO_2 from industrial sources). The necessity of CO_2 sequestration stems from a simple imbalance in the carbon cycle. Human activities, primarily burning fossil fuels and deforestation, have released vast amounts of CO_2 that were locked away for millions of years. This has increased the atmospheric CO_2 concentration from a pre-industrial level of about 280 ppm to over 420 ppm recent days. This elevated concentration traps heat in the atmosphere, leading to global warming, climate change, ocean acidification, and other severe environmental impacts.

Scope of the study

The CO_2 sequestration study is critically significant for the steel industry because it offers a pathway to decarbonize one of the world's most carbon-intensive sectors, whose conventional blast furnace process is inherently reliant on coal, releasing large amounts of CO_2. For a plant like JSW Steel in Salem, which specializes in high-value products for the automotive and construction sectors industries increasingly demanding carbon capture technologies is key to maintaining market competitiveness and ensuring long-term viability. By integrating Carbon Capture, Utilization and Storage, steel plants can directly mitigate their massive carbon footprint, transforming waste CO_2 into a storable commodity, which is essential for the company to meet its corporate sustainability targets and for nations to fulfil their net-zero emissions pledges under international climate agreements. Ultimately, these studies are not just an environmental imperative but a strategic business necessity, bridging the gap between essential industrial production and the urgent global need for climate action.

METHODOLOGY

Study area

The study area for assessing greenery count and carbon sequestration at the JSW Steel Plant in Salem would encompass both the industrial premises and its immediate surrounding buffer zone. This includes the built-up industrial area with its internal green belts, which are strategically developed to mitigate dust and pollution. Crucially, the study must

extend to the vegetated hills characteristic of the Salem region, where JSW has undertaken major afforestation and ecological restoration projects. The focus here is on quantifying the total green cover comprising native, hardy and fast growing trees to establish a baseline greenery count. Table shows the different areas included its represent zones.

Table 1. JSW Steel plant notable greenery areas in different zones

S. No	Zone Name				
	Zone 1	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**
1	New land area	Old admin block	ASP area	Temple gate area	Old Staff quarters
2	Pottaneri side dense area	Guest house	Blast furnace area	New Admin block area	Play ground
3	Water service station backside	Waggon tipper area	SMS quality lab area	COP yard 1 and 2	New staff quarter and lake area
4	Main canteen Backside	GGBS area	Quess office area	LNG gas station	Guest house area
5	Iron ore storage area	Sinder plant area	Slag crushing area	RS gate near area	Water treatment plant area
6	Lorry parking area	Blast furnace office area	Guard pond area	Power plant area	Water storage area

The carbon sequestration potential of this study area is directly derived from the health, density, and species composition of its greenery. Fast-growing species planted in the afforested hills act as rapid carbon sinks, absorbing atmospheric CO_2 and storing it in their biomass (trunks, branches, roots) and in the soil organic matter. A comprehensive assessment would involve calculating the above-ground and below-ground biomass using field measurements such as Diameter at Breast Height (DBH) and tree height. This allows for the estimation of the total carbon stock locked within the study area, providing a metric to offset the plant's operational carbon emissions. The ultimate goal is to measure the net environmental benefit, where the created man-made forests within the study area serve as a functional, compensating carbon sink for the adjacent industrial activity.

Health and Safety protocol

The integrated health and safety protocol assessment demonstrated a mandatory approach to safeguarding the well-being of all personnel involved in the greenery count and carbon sequestration work. By conducting a safety class and subsequent online test for all 26 students and 6 faculty members, the program ensured a standardized level of safety awareness, which is important for mitigating risks associated with outdoor fieldwork, such as encounters with wildlife, handling tools and navigating difficult terrain. Complementing this,

the comprehensive health screening recording basic parameters like temperature, SPO_2, BP, height, weight and blood group for the same 32 individuals establishes a baseline health data. This not only confirms the participant's fitness for the physically demanding tasks but also prepares the team to respond effectively to any medical emergencies that may arise during field work.

Survey method

The survey method was structured to ensure both comprehensive data collection and team safety over the 30-day period. By organizing the personnel, students divided into 4-5 groups with 3 members associated with 1 faculty for ensuring the data collection and species identification. The core methodology of a manual, individual tree census was critical for generating high-accuracy data, as it eliminated estimation errors and allowed for the direct recording of essential biometrics for each plant: species identity, DBH using a measuring tape and height using a Nikon rangefinder.

To measure tree parameters for carbon sequestration, start by measuring Diameter at Breast Height with a diameter tape. Place the tape at 1.37 meters from the ground. On sloped terrain, take the measurement from the uphill side. For trees that fork below breast height, measure the thinnest, thickest, and one average stem, then calculate the average of these three measurements. Next, determine the tree height by standing a set distance away, like 5-10 meters and using a laser rangefinder to sight the top and bottom angles, which provides the exact height. Once you have the DBH and height data, choose a species-specific and region-specific algometric model. Generic models can lead to significant mistakes. Input your measurements to calculate total dry weight biomass, considering both the above-ground and below-ground parts. Finally, convert this biomass to carbon mass by multiplying by 0.5, since around half of dry biomass is carbon. Then, multiply the carbon mass by 3.67 to find the equivalent amount of carbon dioxide sequestered. Remember, the choice of allometric model is the biggest factor affecting accuracy, and consistent measurement points and tools are crucial for reliable long-term monitoring comparisons.

Table 2. Instruments used for Greenery count in JSW

S. No	Name of tool/Instrument	Purpose
1	4.5 feet PVC pipe	For identifying the tree height for DBH measurement
2	Measuring Tape	For measuring tree DBH
3	Nikon Range finder	For measuring tree height
4	GPS mobile phones	For recording geocoordinate of the trees and photos

5	Field Data sheets	For recording the field data

Crucially, the spatial location of each tree was recorded by geotagging using GPS-enabled mobile phones, creating a precise digital inventory and map of the forest resources. This approach directly support the precise greenery count was achieved through the total tree tally, while the species-specific DBH and height measurements provided the foundational data required for robust allometric calculations of biomass and carbon sequestration potential for the entire study area.

Tree identification

The process of tree identification served as the foundational and most critical step in the entire field survey, as the species of each tree directly determines its ecological function and carbon storage capacity. Using field guides and the expert knowledge of faculty members, the teams identified trees based on key morphological characteristics such as leaf shape, bark texture and the presence of flowers and fruits. This accurate is essential for applying the correct species-specific allometric equations that convert the raw physical measurements of DBH and height into accurate estimates of biomass and carbon sequestration, thereby underscoring that correct species naming is what transforms simple measurements into meaningful ecological intelligence.

Tree mapping using Arc GIS software

The comprehensive field data collected was systematically integrated and visualized using ArcGIS software, where every counted tree was precisely mapped according to its recorded latitude and longitude. This geospatial process transformed the individual tree records including species, DBH, and height into a dynamic digital map, creating a powerful management and analysis tool. The resulting map provides an intuitive visual representation of the forest structure, showing species distribution patterns, density variations and individual tree locations across the study area. This final step is sophisticated spatial analysis, shows the total carbon stocks by providing the exact geospatial context for the entire inventoried tree population.

Table 3. Total number of Tree species recorded in JSW industrial and township area						
S. No	**Specie Name**	**Common Name**	**No. of individuals recorded in each species**	**Cumulative Total of**	**CO_2 Sequestration MT/Year**	**Cumulative CO_2 Sequestration MT/Year**
1	Acacia auriculiformis	Earleaf Acacia	167	167	1.77	1.77
2	Acacia catechu	Black Catechu	02	169	0.02	1.79
3	Acacia dealbata	Silver Wattle	385	554	8.94	10.73
4	Adonidia merrillii	Manila Palm	18	572	0.15	10.87
5	Aegle marmelos	Bael Tree	09	581	0.16	11.03
6	Ailanthus excelsa	Tree of Heaven (Indian)	130	711	4.95	15.98
7	Alangium salviifolium	Sage-leaved Alangium	93	804	1.09	17.07
8	Albizia amara	Bitter Albizia	152	956	1.97	19.04
9	Albizia lebbeck	Vaagai	8573	9529	242.20	261.23
10	Albizia saman	Rain Tree	279	9808	7.35	268.58
11	Alstonia scholaris	Devil Tree	460	10268	5.98	274.57
12	Annona montana	Mountain Soursop	15	10283	0.27	274.84
13	Annona squamosa	Custard Apple	413	10696	1.94	276.78
14	Araucaria columnaris	Cook Pine	05	10701	0.07	276.85
15	Areca catechu	Betel Nut Palm	78	10779	0.46	277.31
16	Artocarpus heterophyllus	Jackfruit Tree	183	10962	2.75	280.05
17	Azadirachta indica	Neem Tree	15222	26184	275.26	555.31
18	Bambusa vulgaris	Common Bamboo	17709	43893	86.38	641.70
19	Bauhinia purpurea	Purple Orchid Tree	354	44247	5.25	646.95
20	Bombax ceiba	Red Silk Cotton Tree	04	44251	0.14	647.08
21	Borassus flabellifer	Palmyra Palm	687	44938	36.00	683.08
22	Bougainvillea glabra	Paper Flower	19	44957	0.08	683.16
23	Butea monosperma	Flame of the Forest	37	44994	0.56	683.72
24	Caesalpinia pulcherrima	Peacock Flower	3953	48947	126.04	809.76
25	Calophyllum inophyllum	Indian Laurel	08	48955	0.10	809.86
26	Carica papaya	Papaya	108	49063	0.91	810.77
27	Caryota mitis	Fishtail Palm	142	49205	3.79	814.55
28	Cassia fistula	Golden Shower Tree	1125	50330	29.32	843.87
29	Cassia sophera	Senna	27	50357	0.84	844.71
30	Casuarina equisetifolia	Whistling pine	2200	52557	27.52	872.23

31	Ceiba pentandra	Kapok Tree	22	52579	1.11	873.34
32	Citrus × limon	Lemon	62	52641	0.27	873.60
33	Citrus hystrix	Kaffir Lime	08	52649	0.07	873.67
34	Cocos nucifera	Coconut	506	53155	31.38	905.05
35	Commiphora caudata	Hill Myrrh	10	53165	0.03	905.08
36	Conocarpus lancifolicus	Damas Tree	104	53269	0.24	905.32
37	Cordia africana	Sudan Teak	02	53271	0.02	905.34
38	Cordia dichotoma	Indian Cherry	74	53345	1.14	906.47
39	Couroupita guianensis	Cannonball Tree	04	53349	0.01	906.48
40	Crateva religiosa	Sacred Garlic Pear	01	53350	0.03	906.51
41	Cupressus sempervirens	Italian Cypress	78	53428	0.15	906.65
42	Dalbergia lanceolaria	Indian Rosewood	02	53430	0.05	906.70
43	Dalbergia latifolia	East Indian Rosewood	97	53527	1.11	907.81
44	Dalbergia sissoo	North Indian Rosewood	14	53541	0.16	907.97
45	Delonix regia	Flame Tree	126	53667	7.96	915.93
46	Dendrocalamus giganteus	Giant Bamboo	17	53684	0.02	915.95
47	Dodonaea viscosa	Hopbush	34	53718	0.41	916.36
48	Dypsis lutescens	Areca Palm	03	53721	0.06	916.42
49	Eucalyptus globulus	Blue Gum	595	54316	32.96	949.38
50	Ficus benghalensis	Banyan Tree	80	54396	14.97	964.35
51	Ficus carica	Common Fig	27	54423	0.49	964.85
52	Ficus elastica	Rubber Plant	26	54449	0.12	964.96
53	Ficus macrophylla	Moreton Bay Fig	30	54479	0.39	965.36
54	Ficus microcarpa	Chinese Banyan	273	54752	4.20	969.55
55	Ficus racemosa	Cluster Fig	92	54844	1.66	971.22
56	Ficus religiosa	Sacred Fig	534	55378	25.84	997.06
57	Ficus rubiginosa	Rusty Fig	10	55388	0.07	997.13
58	Gmelina arborea	Gamhar	91	55479	1.01	998.14
59	Holoptelea integrifolia	Indian Elm	352	55831	6.55	1004.68
60	Howea forsteriana	Kentia Palm	22	55853	0.24	1004.92
61	Hyophorbe lagenicaulis	Bottle Palm	141	55994	4.03	1008.95
62	Lawsonia inermis	Henna	12	56006	0.03	1008.97
63	Leucaena leucocephala	Subabul	11508	67514	83.37	1092.34
64	Limonia acidissima	Wood Apple	61	67575	0.33	1092.67

65	Livistona chinensis	Chinese Fan Palm	15	67590	0.18	1092.85
66	Madhuca longifolia	Mahua Tree	97	67687	1.99	1094.84
67	Mangifera indica	Mango	1124	68811	21.46	1116.31
68	Manikara zapota	Sapota	206	69017	1.25	1117.55
69	Manilkara hexandra	Khirni	08	69025	0.15	1117.71
70	Melia dubia	Malabar Neem	354	69379	9.82	1127.52
71	Mimusops elengi	Spanish Cherry	48	69427	0.09	1127.61
72	Morinda tinctoria	Indian Mulberry	40	69467	0.29	1127.91
73	Moringa oleifera	Drumstick Tree	97	69564	1.16	1129.06
74	Muntingia calabura	Jamaican Cherry	833	70397	6.69	1135.75
75	Murraya koenigii	Curry Leaf Tree	99	70496	0.32	1136.07
76	Musa × paradisiaca	Banana	16	70512	0.18	1136.25
77	Nerium oleander	Oleander	108	70620	0.56	1136.80
78	Nyctanthes arbor-tristis	Night-flowering Jasmine	07	70627	0.03	1136.83
79	Paulownia tomentosa	Foxglove Tree	02	70629	0.20	1137.03
80	Peltophorum pterocarpum	Yellow Flame Tree	10	70639	0.67	1137.70
81	Phoenix sylvestris	Wild Date Palm	64	70703	0.98	1138.68
82	Phyllanthus acidus	Star Gooseberry	11	70714	0.06	1138.74
83	Phyllanthus emblica	Amla	444	71158	2.29	1141.03
84	Phyllostachys aurea	Golden Bamboo	237	71395	1.23	1142.26
85	Picea abies	Norway Spruce	06	71401	0.01	1142.27
86	Pithecellobium dulce	Manila Tamarind	1087	72488	44.46	1186.72
87	Polyalthia longifolia	False Ashoka	203	72691	2.83	1189.55
88	Pongamia pinnata	Indian Beech	4667	77358	63.51	1253.06
89	Prosopis juliflora	Mesquite	535	77893	5.75	1258.82
90	Psidium guajava	Guava	376	78269	2.28	1261.10
91	Pterocarpus marsupium	Indian Kino Tree	187	78456	3.04	1264.14
92	Punica granatum	Pomegranate	93	78549	0.17	1264.31
93	Ravenala madagascariensis	Traveler’s Palm	02	78551	1.11	1265.42
94	Roystonea regia	Royal Palm	226	78777	3.65	1269.07
95	Sambucus nigra	Elderberry	04	78781	0.01	1269.07
96	Santalum album	Sandalwood	365	79146	2.32	1271.39
97	Saraca asoca	Ashoka Tree	287	79433	4.59	1275.98
98	Senna siamea	Siamese Cassia	32	79465	0.62	1276.60

99	Sesbania grandiflora	Agati	01	79466	0.05	1276.65
100	Simarouba glauca	Paradise Tree	296	79762	6.19	1282.84
101	Spathodea campanulata	African Tulip Tree	14	79776	0.26	1283.09
102	Spondias pinnata	Wild Mango	07	79783	0.02	1283.11
103	Strychnos nux-vomica	Poison Nut Tree	64	79847	1.10	1284.21
104	Swietenia mahagoni	Mahogany	29	79876	0.50	1284.71
105	Syzygium aqueum	Water Apple	16	79892	0.02	1284.73
106	Syzygium cumini	Jamun	1820	81712	37.46	1322.19
107	Tabebuia aurea	Silver Trumpet Tree	41	81753	1.81	1324.00
108	Tamarindus indica	Tamarind	288	82041	12.34	1336.34
109	Tecoma stans	Yellow Bells	454	82495	2.63	1338.97
110	Tectona grandis	Teak	7325	89820	213.65	1552.61
111	Terminalia arjuna	Arjun Tree	55	89875	1.55	1554.17
112	Terminalia bellirica	Baheda	09	89884	0.05	1554.22
113	Terminalia catappa	Indian Almond	1089	90973	16.40	1570.61
114	Thespesia populnea	Portia Tree	236	91209	2.76	1573.38
115	Vachellia leucophloea	White Bark Acacia	76	91285	0.99	1574.36
116	Vachellia nilotica	Gum Arabic Tree	08	91293	0.12	1574.48
117	Vitex negundo	Five-leaved Chaste Tree	24	91317	0.19	1574.67
118	Wodyetia bifurcata	Foxtail Palm	225	91542	2.58	1577.26
119	Wrightia tinctoria	Pala Indigo Plant	299	91841	5.41	1582.67
120	Ziziphus mauritiana	Indian Jujube	154	91995	1.54	1584.21

JSW steel plant, Salem greenery count and CO_2 sequestration study should be carried in 237.28 hectare of industrial area and 30.8 hectare of township area. Initially total steel plant was divided by 5 zones (4 zones in Industrial area and township area) based on the total area it occupies. The overall observation reveals that the JSW steel plant is a significant a large-scale green belt, successfully integrating a massive number of trees (91,995) within an industrial and township complex comprise in 120 species (Table 3). Table shows the overall species wise distribution of recorded species.

The plantation is overwhelmingly dominated by a handful of species chosen for their rapid growth and utility. Azadirachta indica (15,222), Bambusa vulgaris (17,709) and Leucaena leucocephala (11,508) together constitute nearly 45% of all trees. This indicates a primary strategy of quickly establishing dense green cover. Neem is a hardy, pollution-tolerant native and Bamboo is excellent for soil binding and has commercial value. Soobabul is exotic, but it is a legendary fast-grower. This trio form the backbone of the plant's green infrastructure. Beyond the dominant species, the presence of many less numerous but ecologically significant trees indicates an effort to enhance biodiversity. Species like Aegle marmelos, Saraca asoca, Terminalia arjuna and several Ficus species are important for birds and wildlife.

The zone wise observation shows significant variation in species count. Among these, Zone 1, with 30,016 trees, is clearly the primary green buffer, likely positioned to act as a major pollution sink between the most intensive industrial operations and other areas. Zones 2 (23,475) and 4 (20,264) serve as significant secondary green belts or internal parks, while the Zones 3 green cover (12,540) suggests these areas contain dense infrastructure where space for greenery is limited. This pattern demonstrates that the greening strategy is not uniform but is a risk-based, functional design prioritizing environmental protection where it is most needed. Figure 1 shows the geotag map of plant species in zone wise observation.

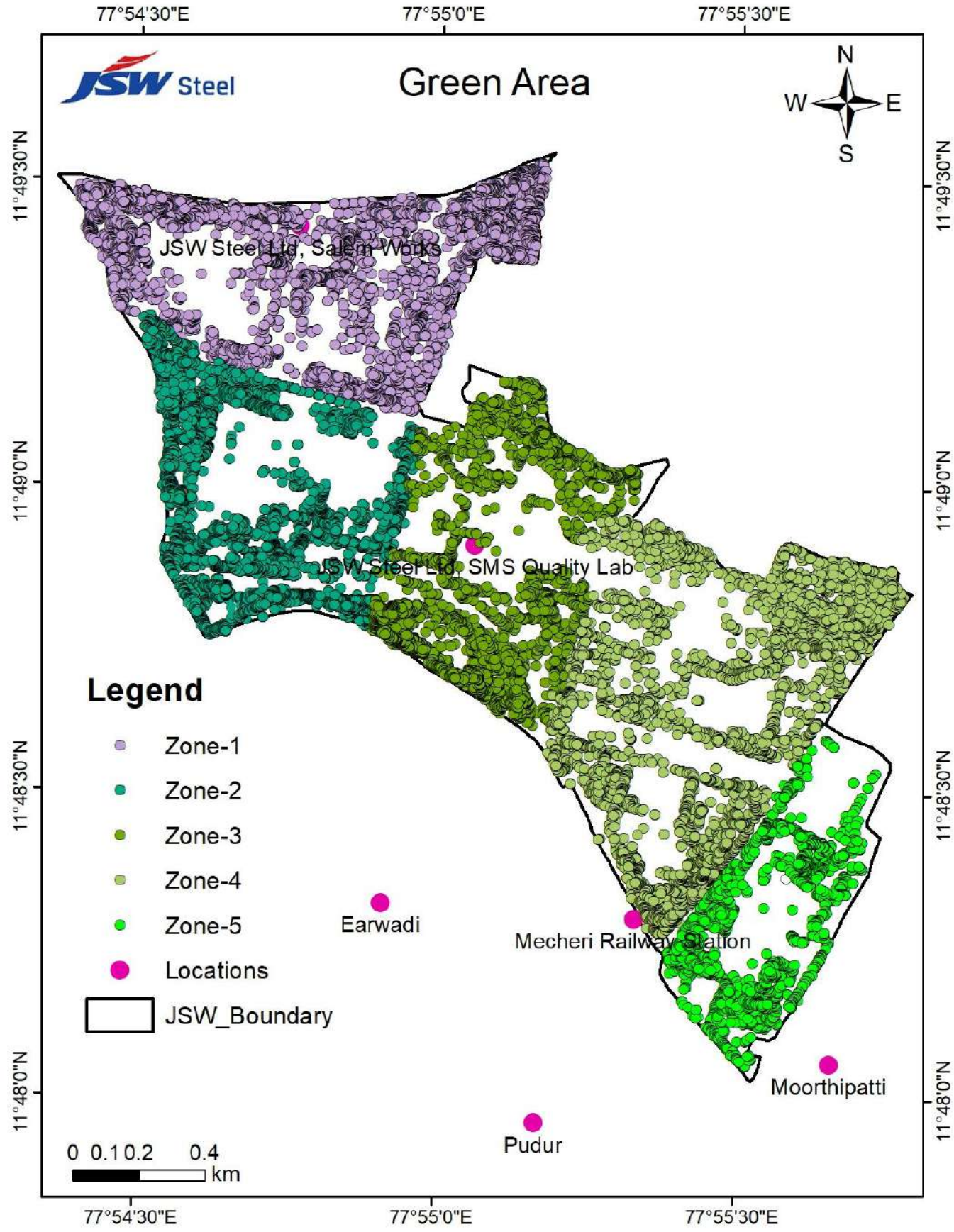


Figure 1. Geotag map of tree species distribution in JSW industrial and township areas

The origin of the observed 120 different tree species were assessed. The fact that 66 of these species are native shows a strong commitment to ecological restoration, as native trees are best adapted to the local climate and provide the most suitable habitat and food for local wildlife. The substantial number of exotic species (54) is choice for an industrial setting; these trees are likely selected for their functional traits, such as rapid growth, high tolerance to air pollution, and soil-binding capabilities, which are essential for quick and effective environmental engineering within the challenging conditions of a steel plant.

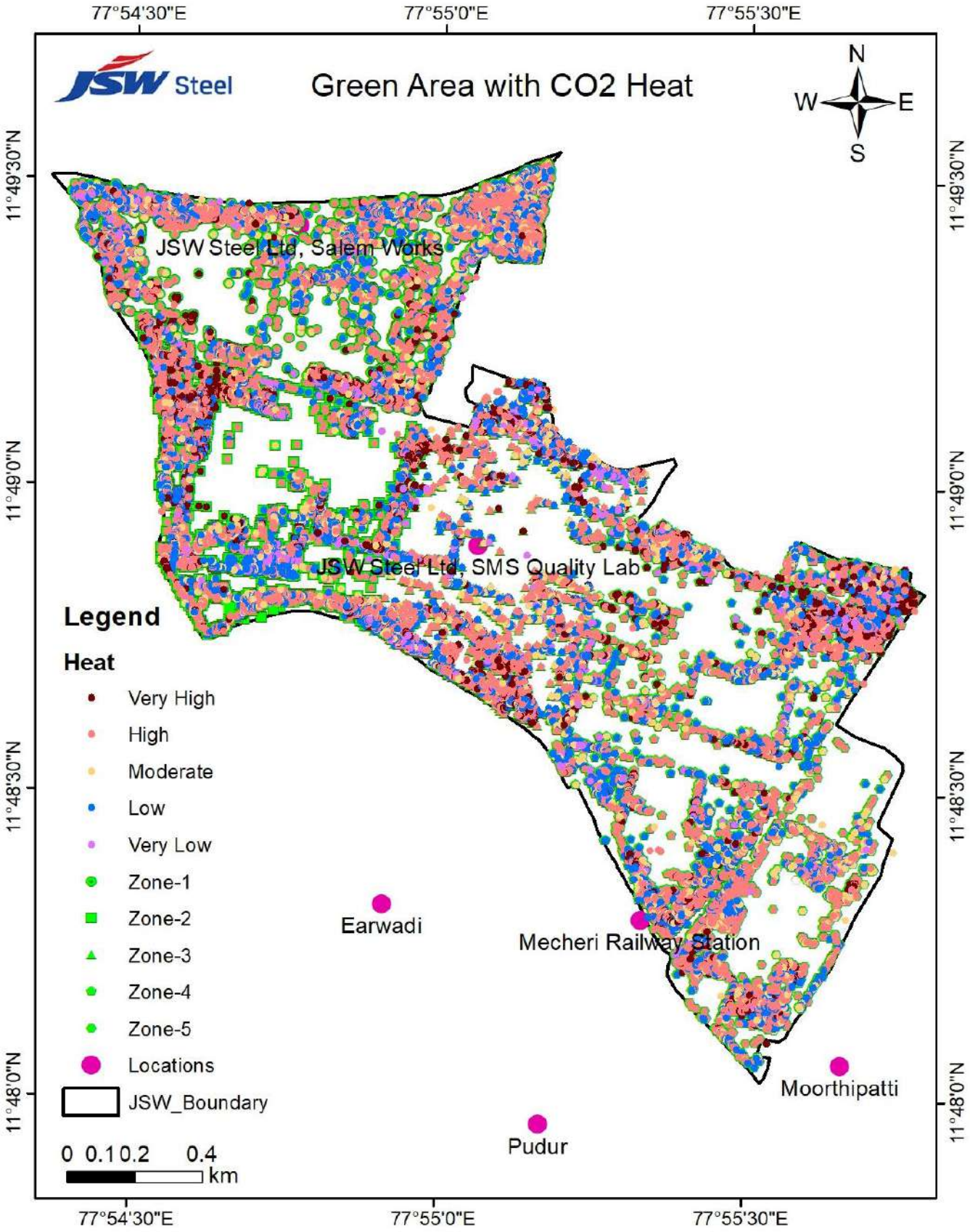
The CO_2 sequestration per zone reveals a direct and compelling correlation between the previously detailed tree distribution and the environmental performance of the JSW steel plant's green belt (Table 4). Zone 1, which hosts the highest number of trees (30,016), demonstrates the greatest carbon sequestration capacity at 420.26 tonnes of CO_2 per year, effectively acting as the primary carbon sink for the facility. This is followed by Zones 2, 4, and 3, whose sequestration rates of 415.83, 286.35, and 373.21 tonnes/year respectively align closely with their respective tree counts, confirming that the strategic, density-based planting strategy is directly translating into quantifiable climate benefits.

Table 4. Carbon sequestration potential of all zones in JSW steel Ltd

S. No	Zone	CO_2/Year (In tonnes)
1	1	420.26
2	2	415.83
3	3	286.35
4	4	373.21
5	5	88.05
	Total	**1583.70**

The significantly lower sequestration in Zone 5 (88.05 tons/year) further underscores this relationship, highlighting how the conscious decision to concentrate greenery in specific zones has successfully created a powerful, functional system for offsetting the plant's industrial carbon emissions, with the total annual sequestration of around 1,584 tons of CO_2 representing a substantial environmental dividend. Figure 2 illustrates the heat map of CO_2 sequestration in all zones.

Figure 2. Geotag heat map of CO_2 sequestration in JSW industrial and township areas



The chronological study reveals that, out 91,995 species, 77,967 species are under 10-year-old, it shows the majority of the plant species are under fast growing stage and act as a carbon sink (Figure 3). While, 14,028 specie are above 10 years old, which shows the mature plants are recorded and act as a long-term carbon sink. Table shows the age wise distribution of recorded plant species in total industrial and township area.

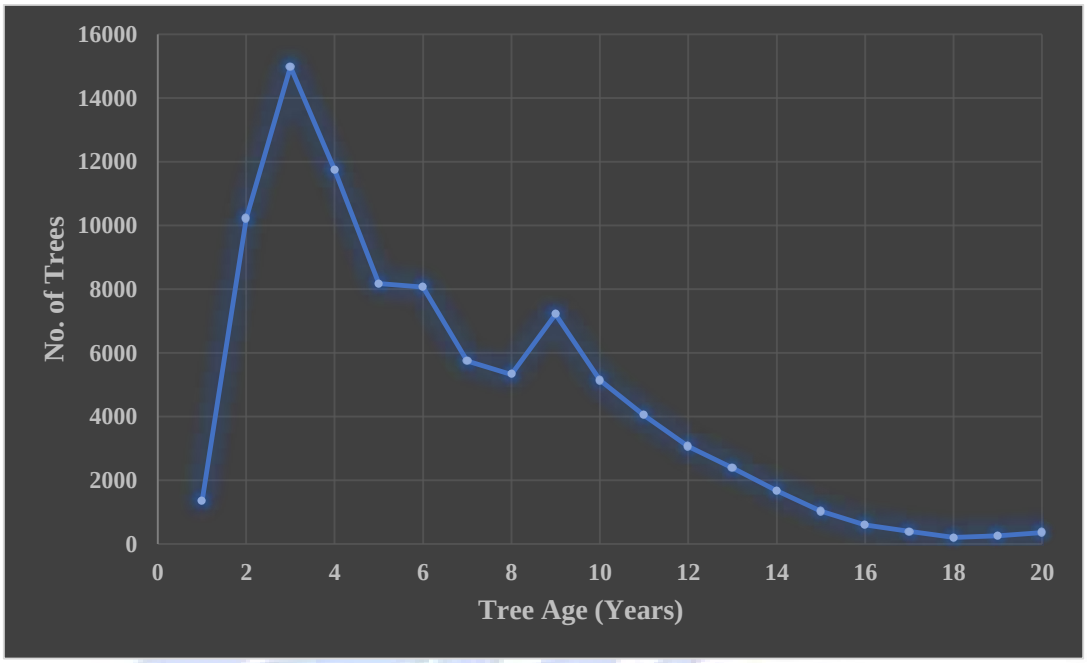


Figure 3. Age wise distribution of recorded species in JSW steel Ltd

Table 5. Percentage of Green cover in industrial area of JSW steel plant

S. No	Zone	Green cover area	
		Hectares	%
1	Zone 1	28.74	12.0
2	Zone 2	19.53	8.2
3	Zone 3	14.69	6.1
4	Zone 4	24.14	10.1
	Total	**87.1**	**36.4**

Overall green cover within the industrial zone (Zones 1-4, totalling 239.15 hectares) is 36.4%, derived from 87.1 hectares of vegetation (Table 5). When examined individually, Zone 1 contributes the largest absolute area (28.74 ha), while the proportion of green space varies across the zones. In contrast, the separate township area (Zone 5, at 30.8 hectares total) shows a slightly lower green cover percentage of approximately 33%, with 10.17 hectares of

green space. This indicates that, proportionally, the industrial area maintains a marginally higher level of green cover than the residential township, though both fall within a similar range, suggesting a comparable prioritization of green infrastructure across land-use types in this development.

Zone wise observations:

Zone 1:

The zone 1 encompasses key operational areas including, pottaneri side dense area, new land area, water service station backside area and main canteen back side area. Consequently, this zone also demonstrates the plant's highest capacity for carbon sequestration, directly linking its strategic greening to measurable atmospheric benefits. Figure show the notable areas included in Zone 1.

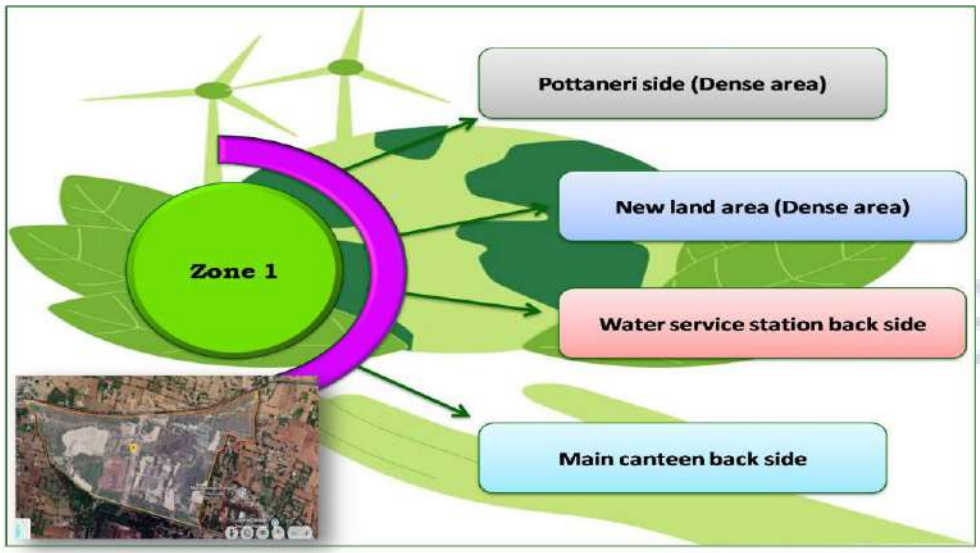


Figure 4. Zone 1 covered areas in JSW steel Ltd

In zone 1, 30,016 plant species were recorded belongs to 76 distinct species. With this, Azadirachta indica (7,994) and Bambusa vulgaris (6,771) forming the very backbone of this area, indicating a primary focus on dense, fast-growing cover for pollution control and soil stabilization. The significant presence of Albizia lebbeck (1,334) and Pongamia pinnata (2,776) further reinforces this strategy, as these species are renowned for their exceptional ability to act as robust green buffers, absorbing dust and industrial emissions. Furthermore, the inclusion of high-value timber like Tectona grandis (1,804) and Santalum album (248), alongside fruit-bearing trees, suggests a dual-purpose design that integrates long-term economic value and resource sustainability into the primary goal of environmental engineering, making Zone 1 a critical and multi-functional asset for the steel plant.

Table 6. DBH wise species distribution in Zone 1

S. No	DBH (cm)	No. of Trees species
1	1 - 50	25536
2	50.1 - 100	4000
3	100.1 - 150	403
4	150.1 - 200	60
5	200.1 - 250	12
6	Above 250	05
	Total	**30,016**

The DBH data for Zone 1 provides the forest structure and its history, revealing a young, actively growing plantation with a few ancient sentinels (Figure). The overwhelming majority of trees (25,536) are small to medium-sized (1-50 cm DBH), indicating that most of the plantation is young and recently established, contributing significantly to rapid growth and air purification. A much smaller number of trees (4000) fall into the medium-large category (50-100 cm), suggesting these are the older, foundational plantings from the initial phases of the green belt development. The minimum quantity of very large trees (only 473 trees over 100 cm) confirm this is a managed, human-made forest rather than a natural, old-growth woodland. However, the presence of a few true giants (17 trees over 200 cm, with one exceeding 500 cm) is critically important; these are likely pre-existing, remnant native trees preserved during construction, and they serve as vital keystone structures for biodiversity, providing habitat and ecological stability.

The height profile reveals a healthy, multi-layered forest structure within Zone 1. The vast majority of trees (under 9688 are under 5 m tall, forming a dense understory and mid-canopy that is excellent for dust filtration and noise reduction. The significant number of trees in the 5.1-15 m range (18,845) indicates a thriving, maturing woodland, while the rapidly declining count of trees taller than 15 m (only 1,483) is typical of a managed forest where only the most vigorous individuals grow into the upper canopy. This structured layering is ecologically efficient, as it maximizes light capture and spatial use, creating a complex habitat that supports diverse wildlife and enhances the overall carbon sequestration capacity of the zone (Table 7).

Table 7. Height wise species distribution in Zone 1

S. No	Height (m)	No. Trees species
1	0.1 - 5	9688
2	5.1 - 10	11187
3	10.1 - 15	7658
4	15.1 - 20	1133
5	21.1 - 25	299
6	25.1 - 30	51
	Total	**30,016**

Carbon sequestration potential of zone 1 reveal that, this zone act as a major carbon sink when compare to other zones of industrial township area. This zone sequestrates the 343.03 tonnes per year CO_2.

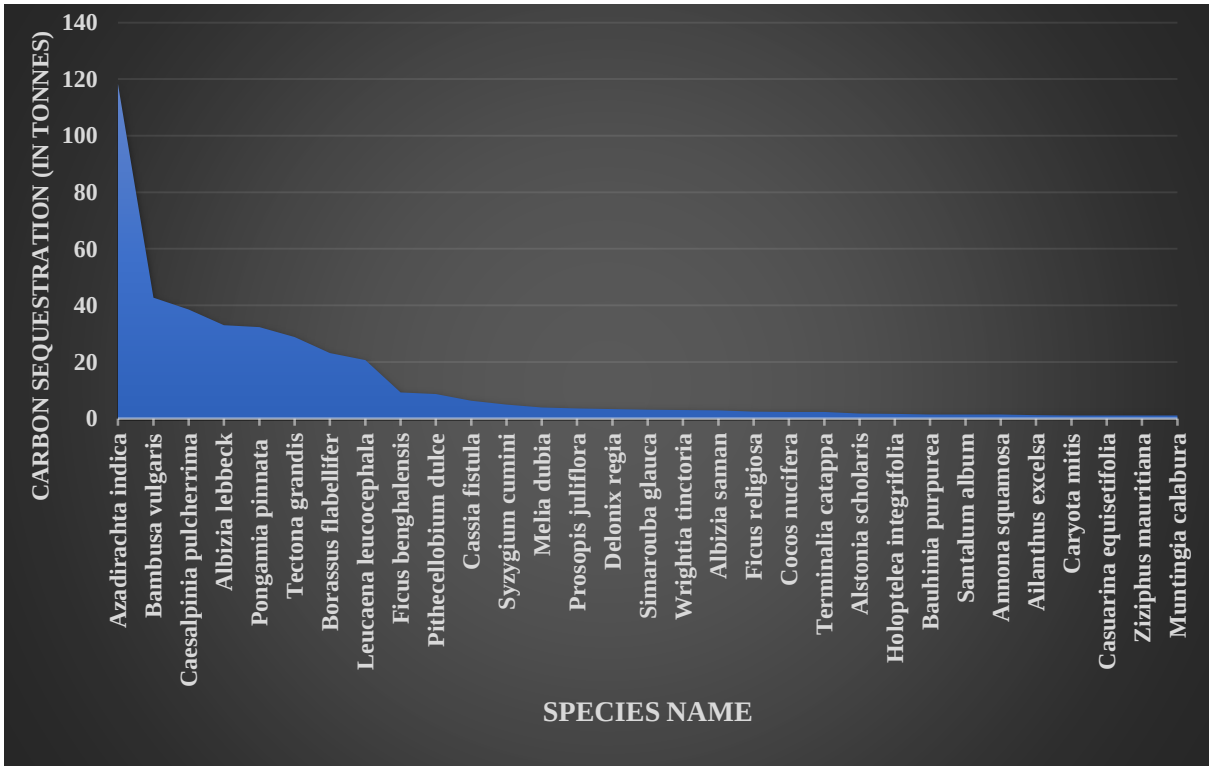


Figure 5. Carbon sequestration potential of species recorded in Zone 1, JSW steel Ltd

In this, Azadirachta indica demonstrates a significantly high capacity for CO_2 sequestration, with a 118.32 tonnes that dwarfs all other listed species (Figure 5). This positions it as an exceptionally potential tool for carbon capture. The following species, such as Albizia lebbeck, Bambusa vulgaris and Caesalpinia pulcherrima also show strong potential with values in the 20-30 range, forming a second tier of highly effective trees. In stark contrast, many common trees like Mangifera indica, Psidium guajava and Citrus × limon exhibit very

low sequestration values (below 0.2 tonnes), indicating they are relatively poor at capturing atmospheric CO_2 compared to the other plant species.

Zone 2:

Zone 2 of the steel plant encompasses several key operational areas, including the wagon tipper section, coke storage yard, old administrative block, and guest house premises. Zone 2 is a second high dense areas in term of plant species recorded. Figure shows the notable areas in Zone 2.

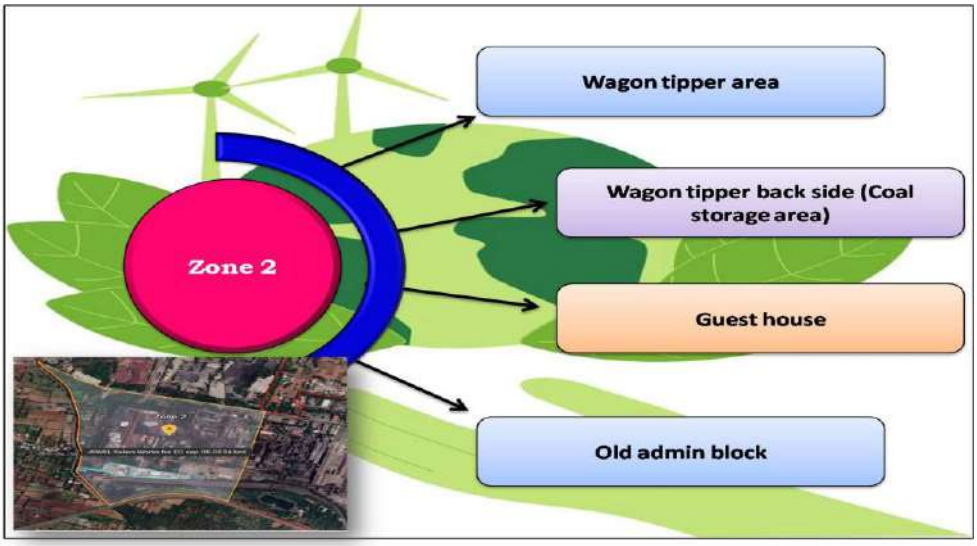


Figure 6. Zone 2 covered areas in JSW steel Ltd

This zone recorded with total of 23,475 tree species included with 89 individual species. The most immediate insight is the dominance of a few key species, with Bambusa vulgaris being overwhelmingly the most numerous, recorded at 5,862 individuals. It is followed at a significant distance by other high-population species such as Albizia lebbeck (2,519), Tectona grandis (2,294), Leucaena leucocephala (2,146), Azadirachta indica (2,014). This indicates that the landscape is heavily characterized by these particular trees, which may be due to deliberate afforestation program, their ecological hardiness (e.g., Teak for timber, Bamboo for versatile uses). The presence of these species in such large numbers suggests they form the structural and ecological backbone of this particular environment. A large number of trees, including many native, fruit and ornamental species like Mangifera indica, Saraca asoca and Polyalthia longifolia exist in much smaller numbers, typically ranging from a few dozen to a few hundred individuals. Furthermore, many species are represented by very few specimens, with several appearing only once or twice (e.g., Aegle marmelos, Butea monosperma). This long tail of low-frequency species is crucial, as it contributes to the overall genetic and species diversity of the area, potentially supporting a wider range of wildlife and increasing the ecosystem's resilience.

Table 8. DBH wise species distribution in Zone 2

S. No	DBH (cm)	No. of Trees species
1	1 - 50	18447
2	50.1 - 100	4317
3	100.1 - 150	603
4	150.1 - 200	72
5	200.1 - 250	25
6	Above 250	11
	Total	**23,475**

The forest structure in Zone 2 is indicating a healthy and regenerating population. The vast majority of trees (18,447) are in the smallest diameter class (1-50 cm), showcasing a robust and abundant understory of saplings and young trees. This is a positive sign for the forest's long-term sustainability, as it suggests successful recruitment and a strong potential for these young trees to grow into the larger size classes. The number of trees drops precipitously with each successive size category, with only 4,317 trees in the 50-100 cm class, 603 in the 100-150 cm class, and so forth. This pattern is typical of a natural forest where many young trees compete for resources, and only a small fraction survive to reach maturity and large sizes. The scarcity of very large trees further defines the zone's ecological character. Only 72 trees are in the 150-200 cm range, and a mere 8 and 2 trees are in the 250-300 cm and 300-350 cm classes, respectively. The presence of a single, truly monumental tree in the 500-1000 cm category is ecologically significant. This individual likely acts as a keystone structure, providing critical habitat, storing a disproportionate amount of carbon, and serving as a seed source for the surrounding forest. Overall, this diameter distribution points to a dynamic, multi-aged forest that is actively growing, with its future canopy dominated by the numerous trees currently in the small and medium size classes.

The height assessment data reveals that, zone 2 heavily dominated by shorter vegetation, characteristic of a young and regenerating (Table 9). The nearly equal distribution between the 0.1-5m (9301 trees) and 5.1-10m (9866 trees) cohorts suggests a continuous cycle of growth and recruitment in the understory and sub-canopy layers. This could indicate a healthy regenerative capacity, but it also points to the absence of a tall, continuous canopy that would otherwise shade out and suppress the growth of such a large number of small trees.

Table 9. Height wise species distribution in Zone 2

S. No	Height (m)	No. Trees species
1	0.1 - 5	9301
2	5.1 - 10	9866
3	10.1 - 15	3084
4	15.1 - 20	892
5	21.1 - 25	283
6	25.1 - 30	45
7	30.1 - 35	04
	Total	**23,475**

The dramatic decline in tree numbers with increasing height underscores the presence of a low canopy. Only about 15% of all trees exceed 10 m, and a mere 1.4% exceed 20 m. The presence of just 4 trees in the 30.1-35 m class confirm that emergent giants are exceptionally rare in this landscape. This overall height profile is consistent with a secondary growth forest, a wooded savanna, a recently logged area, or a plantation with a high density of young trees. The structure suggests the ecosystem is still developing its vertical complexity, with the future canopy likely to be formed from the dense pool of trees currently in the 5-15 m range.

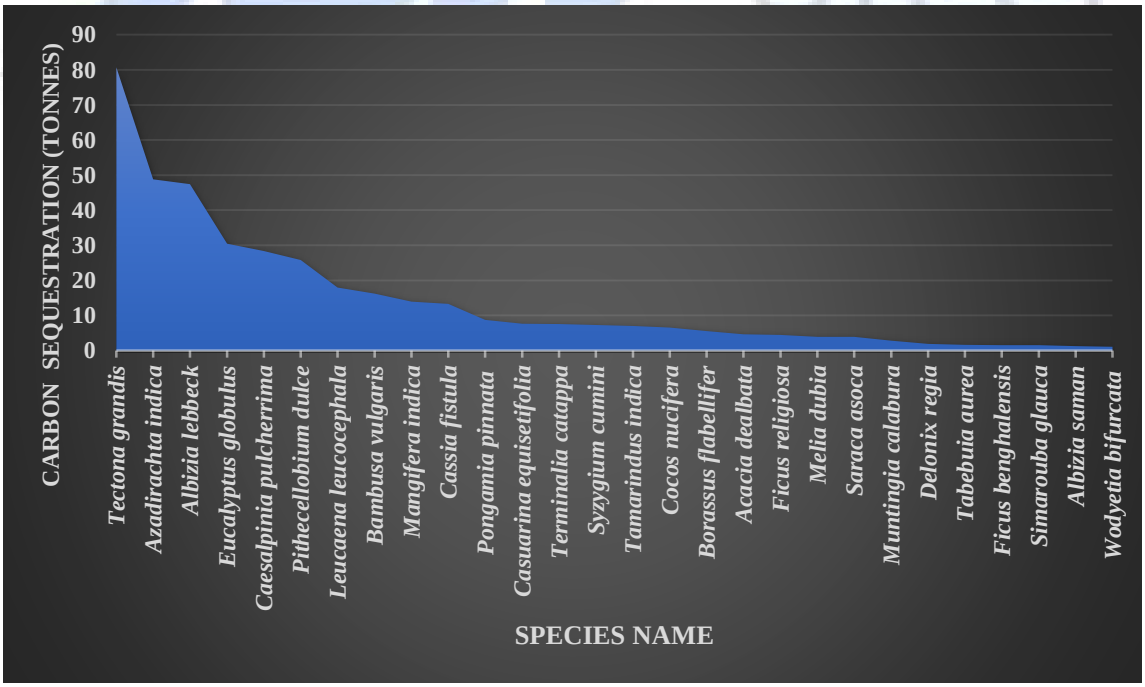


Figure 7. Carbon sequestration potential of Tree species recorded in Zone 2

In term carbon sequestration zone 2 is second highest in compare to other zones with 415.83 tonnes CO_2/year. Among 89 plant species, Tectona grandis, Azadirachta indica and Albizia lebbeck lead the group with values above 50 tonnes, demonstrating a significantly superior capacity for carbon capture. They are followed by a second tier of highly effective species, including Caesalpinia pulcherrima and Pithecellobium dulce, all with sequestration values above 25 tonnes. This clear hierarchy indicates that for the primary goal of maximizing carbon capture in afforestation or reforestation projects, strategic selection is paramount. Planting a Tectona grandis or an Albizia lebbeck would yield a vastly greater carbon sequestration return per tree than most other species. The extremely low scores of common trees like Citrus × limon and Moringa oleifera highlight that commonality does not equate to sequestration efficiency. Therefore, this data strongly advocates for a purpose-driven planting strategy: high-impact species from the top of the list should form the backbone of carbon sequestration initiatives, while the lower-performing species can be incorporated for biodiversity, agricultural or landscaping purposes without the expectation of significant carbon capture. (Figure 7)

Zone 3:

This zone comprises north side ASP area to south side guard pond area (Transport area, small canteen, Blast furnace and Safety & Environment dept.). This main industrial areas, office buildings are occupies the major area of this zone and less area of vegetation were recorded.

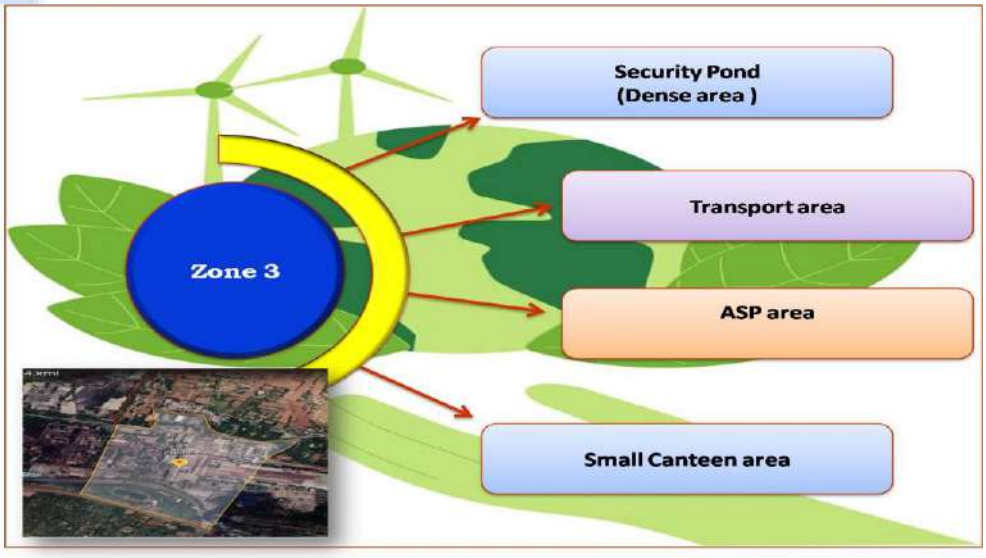


Figure 8. Areas covered in Zone 3 in JSW steel Ltd.

In zone 3, tree population is heavily dominated by a few key species, suggesting a landscape shaped by specific economic or ecological priorities. Three species stand out as the clear pillars of this environment: Tectona grandis with 2,105 trees, Albizia lebbeck with

2,104 trees, Azadirachta indica with 1,484 trees, Bambusa vulgaris with 1,325 trees and Leucaena leucocephala with 1,060 trees. Their overwhelming prevalence strongly indicates they are the result of deliberate, large-scale planting initiatives, likely for commercial timber, fuelwood or soil improvement. Followed by, some abundant species, which are renowned for their fast growth and multiple uses, from medicinal properties to construction material. The population structure is therefore defined by these workhorse species, which form the ecological and economic backbone of the zone. Beyond these dominant species, the data reveals a rich understory of biodiversity and varied land use. A significant number of fruit trees are present in moderate numbers, such as Mangifera indica (81), Psidium guajava (96) and Cocos nucifera (226), pointing towards agroforestry and subsistence gardening practices integrated into the area. The presence of species like Santalum album (13) and Dalbergia latifolia (3) indicates the value placed on high-value timber, even if they are not yet abundant. However, the very low counts for many native or ornamental species (e.g., Butea monosperma and Couroupita guianensis each with 2) suggest that while biodiversity exists, it is limited and may be secondary to the primary goals of wood production and utilitarian planting that define the character of this particular tree population.

Table 10. DBH wise Tree species distribution in Zone 3

S. No	DBH (cm)	No. of Trees species
1	1 – 50	8935
2	50.1 – 100	3007
3	100.1 - 150	510
4	150.1 - 200	56
5	200.1 - 250	23
6	Above 250	09
	Total	**12,540**

The forest structure heavily skewed towards youth and early maturity, indicating a landscape that is both rapidly growing and recently established. The overwhelming majority of trees over 96% fall within the 1-100 cm at DBH range, with a particularly dense population in the smallest class (1-50 cm). This massive base of young trees form the foundation of the forest and suggests either excellent natural regeneration, successful active planting efforts. The dramatic decline in tree numbers with increasing DBH provides critical insight into the forest's ecological history and future potential. The scarcity of large trees is striking; only 598 individuals (4% of the total) have a DBH exceeding 100 cm. This pattern could be the result of several factors: it could be a young plantation that has not yet had time for trees to mature,

a forest that has undergone past logging which removed the largest specimens, where environmental pressures naturally limit tree size and longevity. The presence of a very small cohort of "giants" above 250 cm is ecologically significant, as these individuals likely represent legacy trees that have survived past disturbances and now serve as critical reservoirs for biodiversity and carbon storage.

The height distribution reveals a forest canopy that is predominantly low to medium in stature, with a significant concentration of trees in the 5.1 to 10 m range (Table 11). The fact that this is the largest cohort (3,964) suggests the ecosystem is dominated by a dense, developing sub-canopy layer. The higher count in the 5.1-10 m class compared to the 0.1-5 m class (5,099) indicates a successful transition of a large number of saplings into established young trees. This structure points towards a maturing, even-aged stand, possibly the result of a past regeneration event or plantation establishment, where a large cohort of trees is growing in unison and has passed the most vulnerable early establishment phase.

Table 11. Height wise species distribution in Zone 3

S. No	Height (m)	No. Trees species
1	0.1 - 5	3964
2	5.1 - 10	5099
3	10.1 - 15	2595
4	15.1 - 20	760
5	21.1 - 25	115
6	25.1 - 30	07
	Total	**12540**

The rapid attrition of trees beyond 15 m highlights a significant constraint on vertical growth. The number of trees plummets from 760 in the 15.1-20 m class to just 7 in the 25.1-30 m class, indicating that very few individuals can to become emergent giants. This pattern could be due to environmental limitations like soil depth or water availability, high-density competition which stifles upward growth. The virtual absence of a true tall canopy (only 0.04% of trees are above 25 m) defines this as a "closed" but relatively low-stature forest, which creates a very different habitat structure for light-dependent plants and wildlife compared to a forest with a more layered canopy.

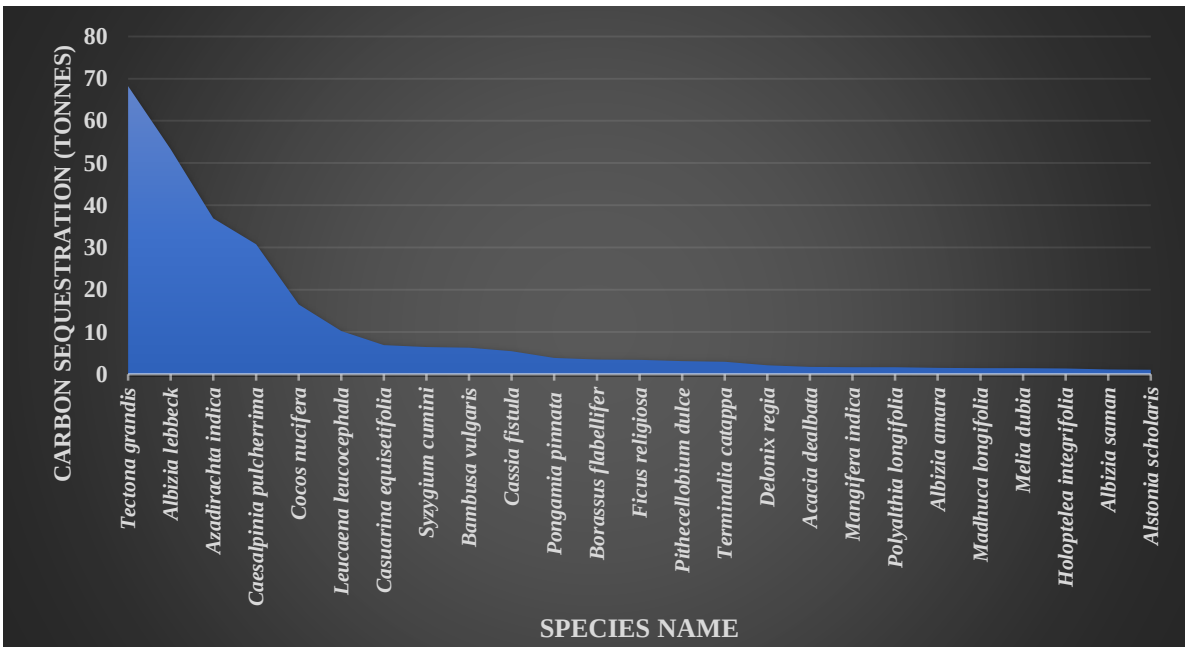


Figure 9. Carbon sequestration potential of species recorded in Zone 3, JSW steel Ltd

In this zone, Tectona grandis and Albizia lebbeck stand far above the rest, with sequestration of 68 and 53 tonnes/year respectively, establishing themselves as the most powerful tools for carbon drawdown in this environment (Figure 9). They are followed by a second tier of highly effective species, including Azadirachta indica and Caesalpinia pulcherrima, which also show strong performance. This dramatic concentration of sequestration potential means that strategic species selection is paramount; planting a Teak tree yields a carbon capture return that is orders of magnitude greater than most other species. The presence of Cocos nucifera high on the list is also notable, suggesting that in this specific context, certain cultivated palm can be significant contributors alongside traditional timber trees. Conversely, the long tail of the dataset, comprising the vast majority of species with very low sequestration values offers a crucial cautionary insight. Many common fruit trees like Mangifera indica and Psidium guajava demonstrate minimal impact on carbon stocks despite their other ecological or utilitarian benefits. The extremely low scores for species like Citrus × limon and Moringa oleifera highlight that commonality and utility for food do not equate to high sequestration efficiency. Therefore, this data strongly advocates for a clear prioritization: high-impact species from the top of the list should form the foundation of any carbon-centric afforestation project, while lower-performing species are best incorporated for biodiversity, agricultural and landscaping purposes without the expectation of significant carbon mitigation.

Zone 4:

The zone 4 represents the most densely vegetated area within the steel plant, spanning multiple functional spaces including the temple gate, auditorium, Occupational Health Centre (OHC), vehicle parking zones, new administrative block, horticulture

department, COP yard, COP 2, power plant area, RS gate vicinity, and LNG station. This diverse zone serves as the green heart of the industrial facility.

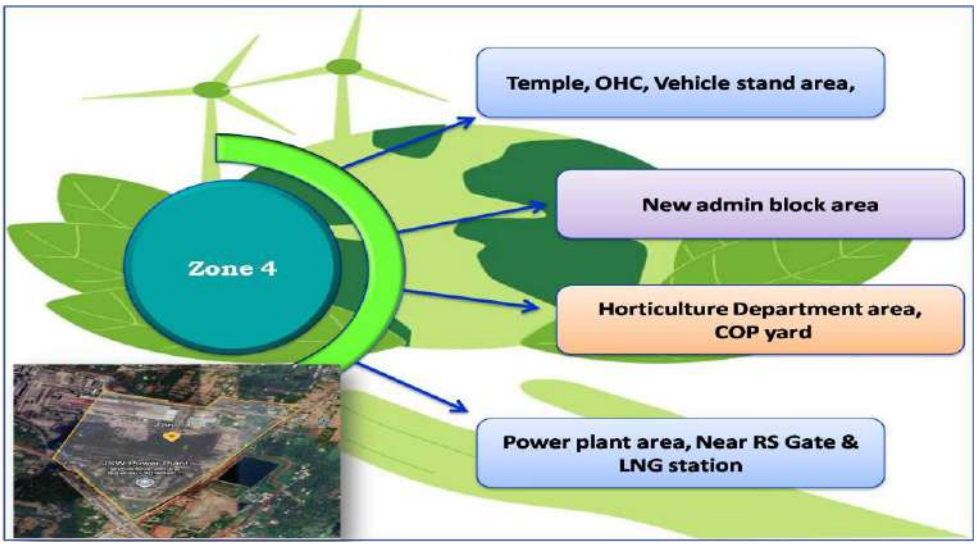


Figure 10. Zone 4 covered areas in JSW steel Ltd

This zone recorded totally 20,264 tree species with 90 distinct individuals. Among these, Leucaena leucocephala is dominated with a count of 5,456 that dwarfs all others. Followed by the high counts of other trees like Bambusa vulgaris (2,997), Albizia lebbeck (2,296), Azadirachta indica (2,296) and Tectona grandis (1,007), shows picture of a managed ecosystem where economic and functional uses (e.g., fodder, fuelwood, construction material, and high-value timber) are the primary drivers of the tree composition. The high population of species like Syzygium cumini (650), Pongamia pinnata (567) and Casuarina equisetifolia (634) further reinforces this theme, as they are commonly planted for soil improvement, biofuel, edible fruit and pulp. Beyond this core group of dominant species, the data reveals the presence of moderate populations of fruit trees like Mangifera indica (351), Psidium guajava (94), Tamarindus indica (87) indicates integrated agroforestry ecosystem. Ornamental and culturally significant species like Ficus religiosa (244) and Tecoma stans (226) are also well-represented, suggesting planting for shade and aesthetic spaces. However, the very low counts for many native, medicinal and high-value timber species like Santalum album and Dalbergia latifolia highlight a limitation. While a diverse array of species exists, their scarcity implies that natural forest complexity is not the priority; instead, the ecological character is defined by a few highly prolific, purpose-driven species that form the vast majority of the tree cover.

Table 12. DBH wise species distribution in Zone 4

S. No	DBH (cm)	No. of Trees species
1	1 - 50	15724
2	50.1 - 100	3638
3	100.1 - 150	740
4	150.1 - 200	104
5	200.1 - 250	38
6	Above 250	20
	Total	**20,264**

The majority of the trees 15,724 individuals, constituting over 76% of the total population are concentrated in the smallest size class (1-50 cm). This massive reservoir of saplings and pole-sized trees indicates either prolific natural recruitment, successful active reforestation efforts, that reset the forest's growth cycle, followed by strong regrowth. The substantial number of trees in the next class (50.1-100 cm, with 3638 individuals) shows that a significant portion of the young trees are successfully maturing and forming a dense mid-story canopy. This structure points to a dynamic and productive forest with a strong potential for future growth. The dramatic decline in tree numbers with increasing diameter class reveals the significant ecological filters that limit trees from reaching large sizes. Only 162 trees (less than 1% of the total) have achieved a DBH exceeding 200 cm, qualifying them as true forest giants. The presence of these 20 exceptional individuals in the "Above 250" cm class is ecologically vital; they likely function as keystone structures, providing critical habitat, storing a disproportionate amount of carbon, and serving as a genetic reservoir. The steep attrition rate from one class to the next suggests that factors such as intense competition for light and resources, density-dependent mortality of the most valuable large trees prevent the vast majority of individuals in the smaller classes from progressing to maturity.

This zone dominated by low to medium-height trees, forming a dense and relatively uniform canopy layer (Table 13). The majority of trees over 84% of the total population are under 10 m tall, with the single largest cohort (9,545) found in the 5.1-10 m range. The fact that this 5.1-10 m class is larger than the 0.1-5m class (8,034) is particularly significant; it indicates a highly successful establishment phase where a massive number of saplings have survived and grown into a thicket of young trees.

Table 13. Height wise species distribution in Zone 4

S. No	Height (m)	No. Trees species
1	0.1 - 5	8034
2	5.1 - 10	9545
3	10.1 - 15	1903
4	15.1 - 20	606
5	21.1 - 25	154
6	25.1 - 30	22
	Total	**20,264**

The rapid decline in tree abundance beyond 10 m highlights a significant constraint on vertical development. While a substantial number of trees (2,685 individuals) exceed 10 m, their numbers drop sharply with each successive height class. The presence of 154 trees between 21.1-25 m and a small cohort of 22 emergent trees above 25 m confirm that some individuals are successfully penetrating the main canopy layer, but they remain rare. This pattern suggests that intense competition for light within the dense 5-10 m layer is stifling the upward growth of most trees. The structure points towards a forest still in a vigorous building phase, with its future canopy structure yet to be fully determined.

The total carbon sequestration of the zone 4 is 373.21 tonnes /year, which includes 90 individual species. Among these, Albizia lebbeck stands out as the undisputed leader, with a sequestration of 99 tonnes that is nearly double that of the next most effective species, Azadirachta indica at 52 tonnes. Along with Tectona grandis and Leucaena leucocephala, these top four species form a distinct tier of elite performers, responsible for the vast majority of carbon capture represented in this environment. Beyond the top performers, the data illustrates a steep decline in sequestration potential, with the majority of species contributing only minimally. Notably, many common fruit and ornamental trees, such as Mangifera indica, Psidium guajava and Citrus × limon, have very low values confirming that their primary value lies in horticulture or nutrition rather than climate mitigation. The extremely low scores for many species at the bottom of the list (e.g., Bougainvillea at 0.005) highlight that they are negligible contributors in term of carbon storage

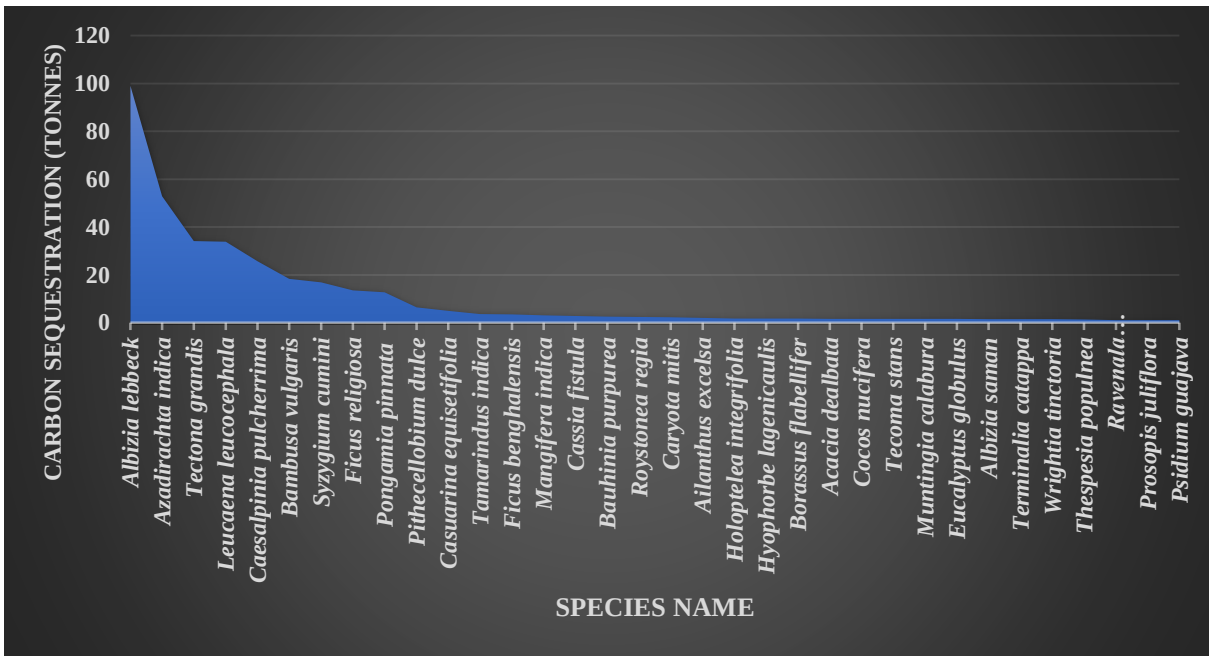


Figure 11. Carbon sequestration potential of species recorded in Zone 4, JSW steel Ltd

Zone 5:

Zone 5 is designated as the township area, located outside the industrial zone. This sector encompasses community facilities such as staff quarters, water treatment plant, lake, and play ground. Spanning 30.8 hectares, the township is rich in biodiversity, supporting 5700 individual plants. This vegetation is comprised of a diverse mix of 76 distinct species, creating a significant green space within the township environment. The species diversity observation indicates, Azadirachta indica, which with 1,434 individuals, is more than three times as abundant as the next most common tree. This indicates a landscape where neem has been extensively planted, likely for its medicinal properties, drought resistance and utility. Followed by Bambusa vulgaris (754), Casuarina equisetifolia (430) and Albizia lebbeck (320) all known for fast growth and uses in construction, soil improvement and fuelwood. The high count of Ficus microcarpa (250) further suggests its popularity as a robust ornamental tree in this specific area.

Beyond this core group, the population shows a significant presence of species associated with agroforestry and fruit production, dominant timber and utility trees. Mangifera indica (151), Prosopis juliflora (157) and Pongamia pinnata (316) are well-represented, indicating that food, fodder, and biofuel resources are integrated into the landscape. However, the very low counts for many species, including several Ficus species, Santalum album and other natives (many with fewer than 10 individuals), highlight a constrained biodiversity. This pattern points to a managed environment where a few highly adaptable, multi-purpose and

naturalized species form the bulk of the tree cover, while a wider variety of native and specialist species exist only in small, potentially vulnerable populations.

Table 14. DBH wise species distribution in Zone 5

S. No	DBH (cm)	No. of Trees species
1	1 - 50	4181
2	50.1 - 100	1343
3	100.1 - 150	158
4	150.1 - 200	14
5	200.1 - 250	04
	Total	**5,700**

The zone 5 observed with overwhelmingly young and immature, characterized by a heavily skewed distribution toward the smallest tree sizes. A remarkable 73% of all trees (4,181 out of 5,700) fall within the 1-50 cm range, forming a massive base of saplings and pole-stage trees. This indicates a landscape that has undergone very recent large-scale regeneration, either through natural means following a major disturbance through intensive planting efforts. The presence of a substantial number of trees in the 50.1-100 cm class (1,343 individuals) shows that a good portion of these young trees are successfully developing into an established mid-story, but the sheer dominance of the smallest class defines the area's character as a rapidly developing, early-successional forest.

The dramatic and rapid decline in tree numbers with increasing DBH is the most telling feature of this forest's history and its future trajectory. The scarcity of large trees is extreme; only 158 trees (2.8% of the total) exceed 100 cm DBH and a mere 18 trees (0.3%) are larger than 150 cm. This pattern strongly suggests that the forest is occupied with young trees than older tress. The near absence of large, mature trees means the forest currently lacks the complex structural habitat and significant carbon storage typically provided by old-growth specimens. Its ecological value and future canopy will be entirely dependent on the successful maturation of the vast number of trees currently in the smaller size classes.

The height distribution reveals a forest structure that is heavily skewed towards low-stature vegetation, dominated by a dense understory and sub-canopy layer. The vast majority of the population over 93% of all trees are under 10 m tall, with a particularly significant concentration in the 5.1 to 10 m range (2,933 trees). The fact that this cohort is larger than the 0.1-5 m group (2,380 trees) indicates a successful "bulge" of growth, where a large wave of saplings has matured into a thick, uniform layer of young trees. This structure is characteristic

of even-aged stands, such as those found in young plantations, recently logged areas undergoing natural regeneration, where a single major establishment event has created a crowded population of trees of similar age and size competing vigorously for resources.

Table 15. Height wise species distribution in Zone 5

S. No	Height (m)	No. Trees species
1	0.1 - 5	2380
2	5.1 - 10	2933
3	10.1 - 15	338
4	15.1 - 20	49
	Total	**5,700**

The data further highlights a severe limitation on vertical growth, with a dramatic collapse in tree numbers beyond the 10 m mark. Only 387 trees (less than 7% of the total) exceed 10 m in height and the number plummets to just 49 individuals in the 15.1-20 m class. The complete absence of any trees recorded above 20 m confirm the lack of an emergent layer or a true forest canopy. This suggests that environmental pressures such as poor soil quality, limited water availability, high-density competition that removes taller trees are preventing almost all individuals from growing to maturity. The result is a closed but stunted woodland, whose ecological function is defined by its dense, low canopy rather than the complex, multi-layered structure of a mature forest.

The carbon sequestration hierarchy for this specific zone, with Azadirachta indica emerging as the unequivocal leader. Its sequestration of 18.14 tonnes/year is nearly double that of the next species, Albizia lebbeck (9.495 tonnes), establishing it as the cornerstone of this area's carbon capture efforts. A second tier of significant contributors includes species like Casuarina equisetifolia, Pongamia pinnata, and Cocos nucifera, all with values above 4.0 tonnes. The notably lower ranking of typically high-performing species like Tectona grandis at 1.73 tonnes, which often dominates other zones, suggests that the local environmental conditions and the age and structure of the teak population here limit its relative effectiveness, highlighting that a species' sequestration potential can be highly context-dependent.

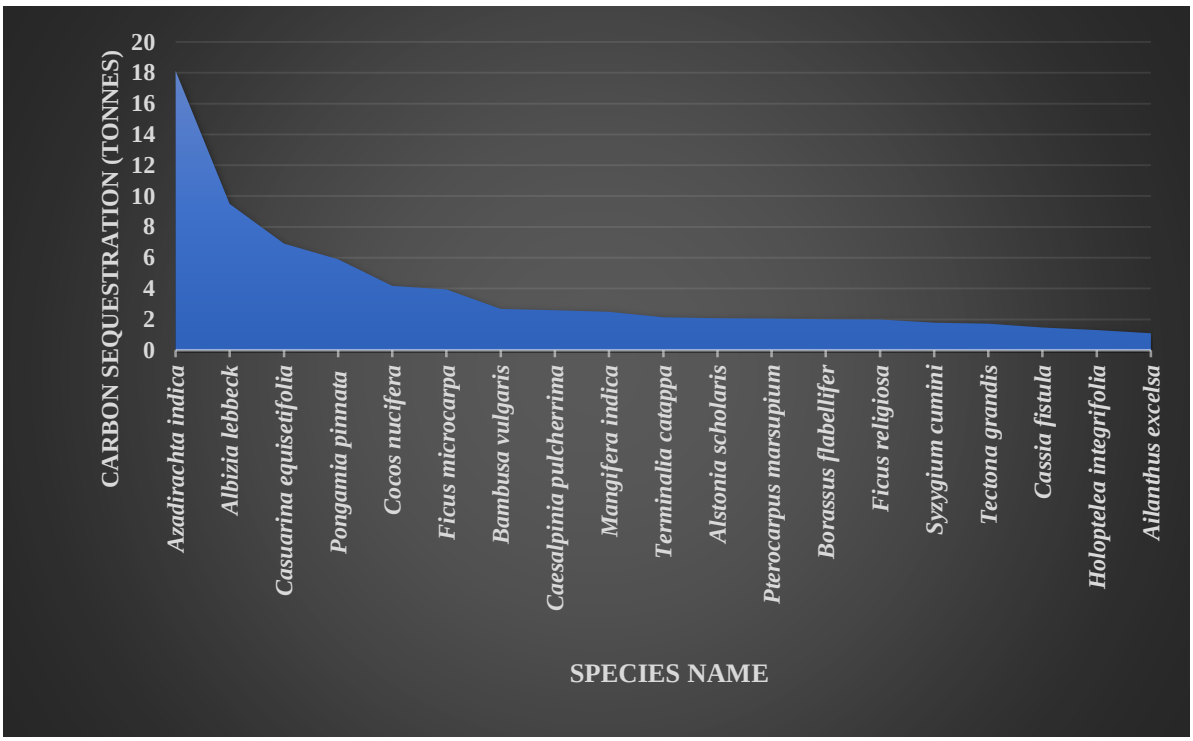


Figure 12. Carbon sequestration potential of species recorded in Zone 5, JSW steel Ltd.

Beyond the top performers, the data underscores that the majority of species in this ecosystem contribute only minimally to the total carbon stock. The steep drop-off after the first few species results in a long tail of trees with low sequestration values, many of which are common fruit trees like Mangifera indica (2.495 tonnes) and Psidium guajava (0.254 tonnes). The extremely low scores for many species at the bottom of the list confirm they are functionally negligible for carbon storage in this context. This stark disparity provides a clear strategic imperative to maximize carbon drawdown in this zone, conservation and planting initiatives must be aggressively focused on the elite performers like Neem, as utilizing the vast number of low-efficiency species would require an immense amount of land and resources to achieve a comparable impact.

About Study Team

The study team was structured with academic expertise and manpower, comprising 6 faculty members and 26 postgraduate students (Table 16). The faculty leadership included a Principal Investigator from the Department of Environmental Science and Co-Principal Investigator from the Department of Botany, who provided overall scientific direction and oversight for the project. The participating postgraduate students gained invaluable hands-on field experience in ecological surveying and data collection techniques. This collaborative structure ensured the project was executed with scientific rigor while simultaneously

functioning as a large-scale training exercise for the students involved. Table shows the list students and faculty member, who involving field work.

Table 16. List of faculty members and students involving in greenery count work

S.No.	Name	Designation
1	Dr. K. MURUGESAN	Professor & Project Investigator
2	Dr. D. ARULBALACHANDRAN	Assistant Professor & Co-Project Investigator
3	Dr. R. VISHNUPRADEEP	Guest Faculty
4	Dr. A. VENKATESAN	Guest Faculty
5	Dr. V. BALAMURUGAN	Post-Doctoral Fellow
6	Mr. D. DINESH KUMAR	Guest Faculty
7	Ms. ELANTHENDRAL G	I M.Sc. (EVS) (Environmental Science)
8	Ms. GAYATHRI G	
9	Ms. GOWRI D	
10	Ms. KEERTHANA P	
11	Ms. MADHUMITHA N	
12	Ms. POORNIMA D	
13	Mr. SIVARAMAN M	
14	Mr. KARTHIKEYAN K L	I Int. M.Sc. (EVS) (Environmental Science)
15	Mr. TAMILSELVAN T	
16	Mr. PARTHIBAN T	II Int. M.Sc. (EVS) (Environmental Science)
17	Ms. SOWNTHARYA V	
18	Mr. AJAY KRISHNAN M	III Int. M.Sc. (Environmental Science)
19	Mr. KIRUTHIVARMA A P	
20	Mr. SABARINATHAN J	
21	Mr. SHANKARBALAJI M	
22	Ms. SHRI SATHYA PRIYA M G	
23	Mr. VASANTH M	
24	Ms. VASUNDRA J	
25	Mr. BOOBALAN A	IV Int. M.Sc. (Environmental Science)
26	Mr. GANESH G	
27	Mr. GNANAVEL S	
28	Mr. RISHIVARTHAN G R	
29	Mr. SANJAY K	
30	Ms. SHAREEBA S	
31	Mr. SRI RAM S	I M.Sc. (BOTANY)
32	Mr. GOKUL RAM M G	

RECOMMENDATIONS

S. No	Strategic Initiative	Proposed Actions	Enhanced Findings	Key Benefits	Implementation
1	**Afforestation with native Trees & Eradication of Exotic Trees and Weed Trees**	**Plant:** Neem, Tamarind, Pungam. **Remove:** Invasive exotics like Subabul (Leucaena leucocephala) and Seemai Karuvel (Prosopis). **Replant** cleared areas immediately with native trees.	**Ecological Restoration:** Native species have a 90% higher survival rate in local conditions compared to exotics, requiring significantly less irrigation. **Water Conservation:** Removing water-intensive exotic trees (like Prosopis) can reduce groundwater consumption in the greenbelt by an estimated 30-40%. **Biodiversity Index:** Replacing monocultures with native groves can increase local bird and insect diversity by over 50%.	Reduced water dependency, Enhanced habitat for local wildlife and prevention of soil degradation caused by invasive species. Preventing the spread of tree weeds.	**Critical (Immediate)**
2	**Targeted Zonal Planting for Pollution Control**	**Perimeter Barrier:** Plant tall, fast-growing species (Albizia sp., Mahogany, Polyalthia sp.) along boundaries. **Hotspot Remediation:** Plant high-pollutant tolerance, uptaking, absorbing	**Dust Suppression:** A dense multi-row vegetative barrier can reduce dust particle (SPM) transmission by up to 60-70% before it leaves the site boundary. **Gas Abatement:** Species like Ficus religiosa have a high Leaf Area Index (LAI) and can absorb SO_2 and NOx effectively, acting as a biological scrubber. **Noise Reduction:** Dense vegetation along	Improved compliance with environmental standards, Healthier air quality for surrounding communities and Visual screening of industrial operations.	**High (Short-term)**

		species (Peepal, Banyan, Ashoka) near stacks and roads.	boundaries can dampen industrial noise by 5-10 decibels.		
3	**Utilization of Empty Pockets (Strategic Landscaping)**	**Open Tracts:** Create dense, drought-resistant "Miyawaki-style" native forest patches. **Buffer Zones (e.g., Water Station):** Install structured green walls/wind breaks. **Amenity Areas (e.g., Canteen):** Develop shaded groves with flowering plants for aesthetics. Plant new trees to increase the number to 1500 ~ 2000 per hectare.	**Micro-Climate Regulation:** Dense forest patches can lower ambient temperature in the immediate vicinity by 2°C to 5°C, reducing heat island effect. **Social Value:** Transforming barren pockets near canteens and guest areas into green spaces improves employee morale and corporate image. **Soil Stabilization:** Covering empty pockets prevents wind erosion and topsoil loss. **Fill Empty Pockets with native species:** Pottaneri side (2000 Trees), new land area (3500 Trees), north gate bus stand backside (1000 Trees), iron ore storage area (1500 Trees), water wash station backside (1000 Trees), canteen behind area (1000 Trees), LNG station side (1000 Trees), behind slag crushing area (1000 Trees) and horticulture department opposite (500 trees)	Creation of recreational spaces, Maximized land utilization and Enhanced aesthetic value and employee well-being.	**Medium (Ongoing)**
4	**Hygiene & Maintenance Enhancement**	Conduct a site-wide clean-up drive to remove non-biodegradable waste (plastics, construction	**Sapling Survival:** Removal of garbage (especially plastic) prevents soil toxicity and allows for better root penetration, increasing sapling survival rates by over 25%.	Healthier soil and plant growth, Improved workplace safety and hygiene and	**Critical (Immediate)**

		debris, and waste rubber materials) from greenbelt areas. Dedicate a site for dumping non-biodegradable waste. Implement a regular maintenance schedule for weeding and watering.	**Pest Prevention:** Clearing organic debris eliminates breeding grounds for pests and pathogens that could harm the new plantations. **Workplace Safety:** A clean environment reduces the risk of accidents (e.g., fires from debris, injuries from sharp waste).	Professional and cared-for appearance of the facility.	

Plant species recommended for CO_2 and SO_2 Assimilation

S. No	Scientific name	Common Name
1	Acacia leucophloea	Velvel
2	Albizia lebbeck	Vaagai
3	Casuarina equisetifolia	Savukku tree
4	Dalbergia latifolia	Indian Rosewood
5	Ficus religiosa	Peepal
6	Ficus benghalensis	Banyan
7	Madhuca longifolia	Indian Butter Tree
8	Melia dubia	Malabar neem
9	Pongamia pinnata	Poongam
10	Polyalthia longifolia	Ashoka
11	Swietenia mahagoni	Mahakani
12	Syzygium cumini	Naval tree
13	Tectona grandis	Teak
14	Bamboo sp.	Bamboo

Conclusion

The Carbon Sequestration Green Belt assessment of JSW Steel Ltd., Salem Works demonstrates a well-planned and ecologically effective greening strategy that significantly contributes to environmental sustainability. With 36.4% green cover and nearly 92,000 trees across 120 species, the industrial landscape reflects a strong commitment to pollution control and ecological balance. The dominance of fast-growing, pollution-tolerant species such as Azadirachta indica and Bambusa vulgaris ensures efficient carbon capture while supporting soil health and resilience. Zone-wise distribution indicates a strategic approach, with Zone 1 functioning as the primary carbon sink and ecological buffer. The predominance of young trees highlights rapid plantation growth and high current carbon sequestration potential, while mature trees ensure long-term stability and biodiversity support.

However, the presence of a considerable number of exotic species and uneven green distribution across zones suggest scope for improvement. It is recommended to gradually increase the proportion of native species with tree density recommended by the CPCB to strengthen ecological integrity and reduce dependency on exotics. Enhancing tree density in empty pockets areas will improve overall carbon capture. Continued monitoring, diversification with high-sequestration native species, and balanced age-class management will further optimize the green belt's environmental performance and long-term sustainability. Furthermore, periodical assessment of tree diversity and survivability is necessary to estimate the CO_2 sequestration at precise level.

ANNEXURES

1. List Geotag maps for tree species distribution in JSW Steel Plant, Salem

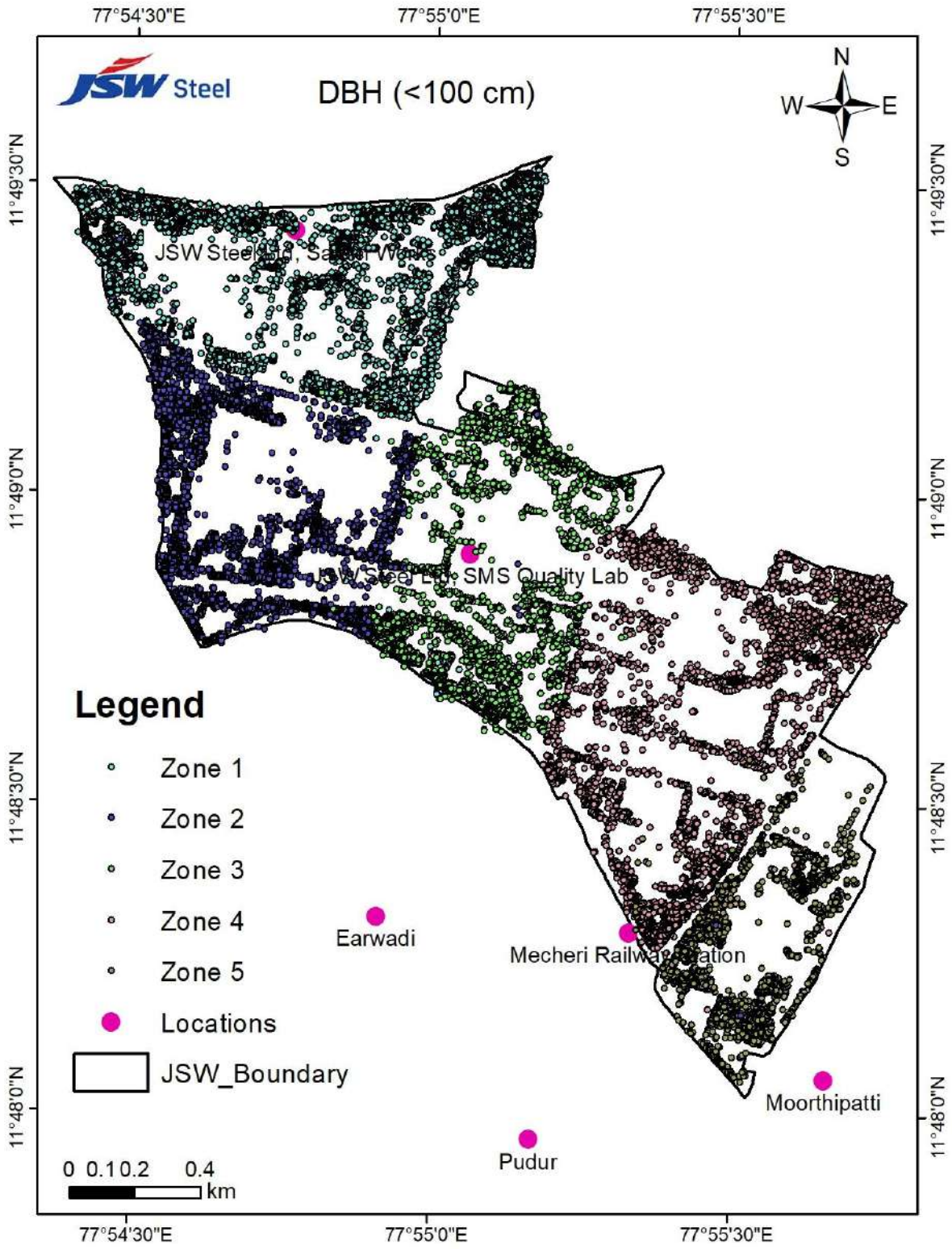


Figure 13. Geotag map of tree species distribution (DBH < 100 cm) in JSW steel plant, Salem

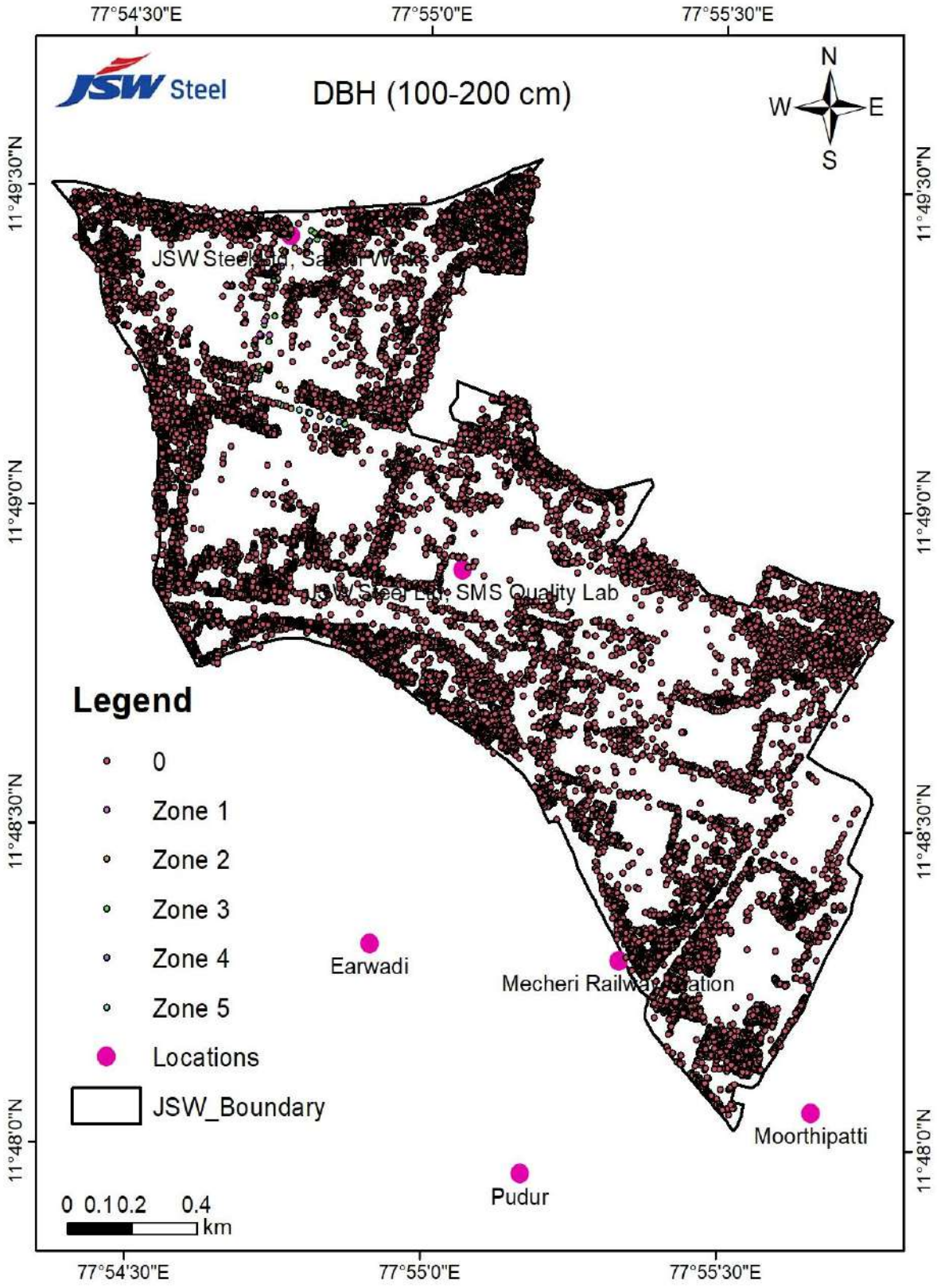


Figure 14. Geotag map of tree species distribution (DBH 100-200) in JSW steel plant, Salem

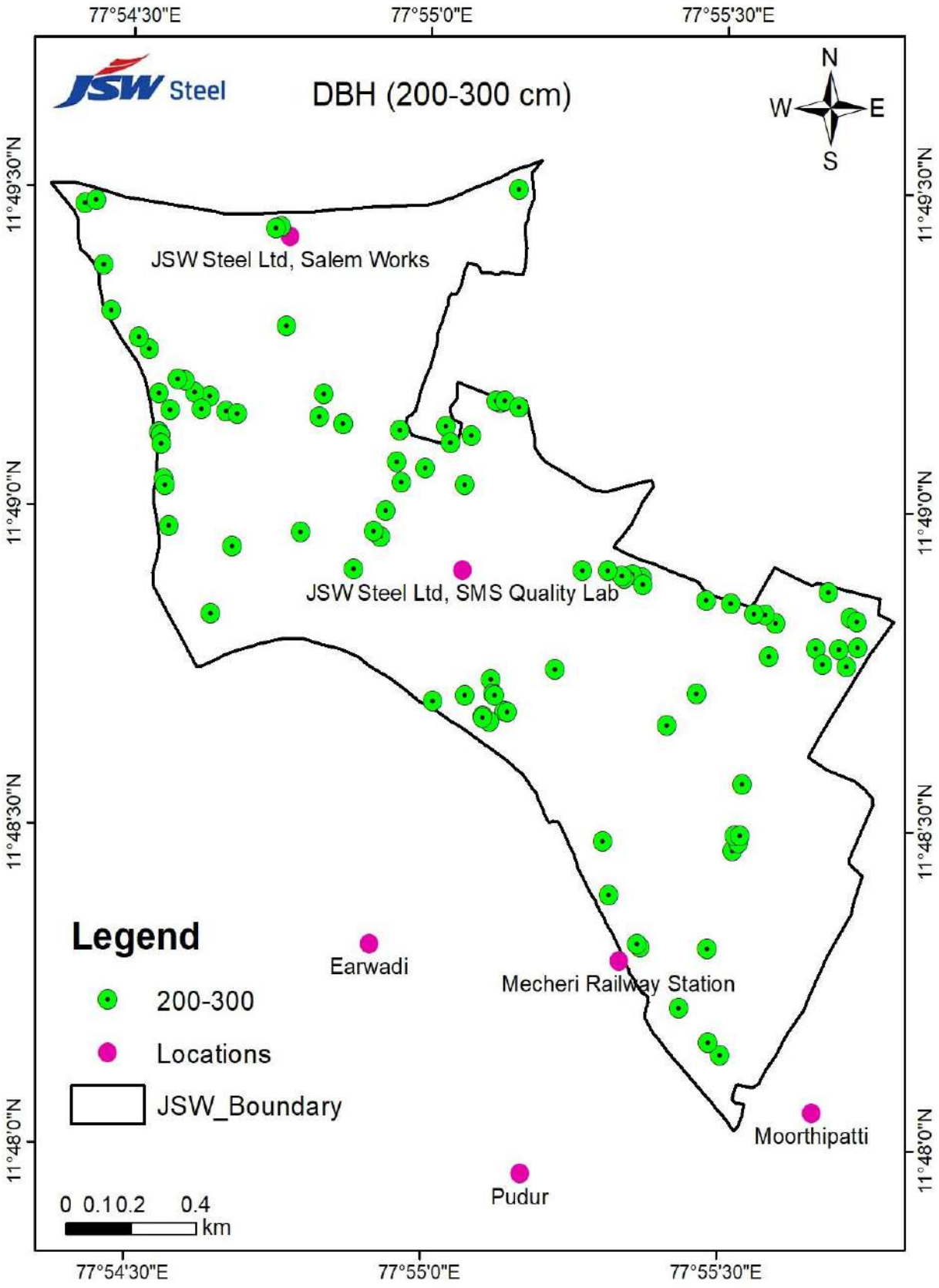


Figure 15. Geotag map of tree species distribution (DBH 200-300) in JSW steel plant, Salem

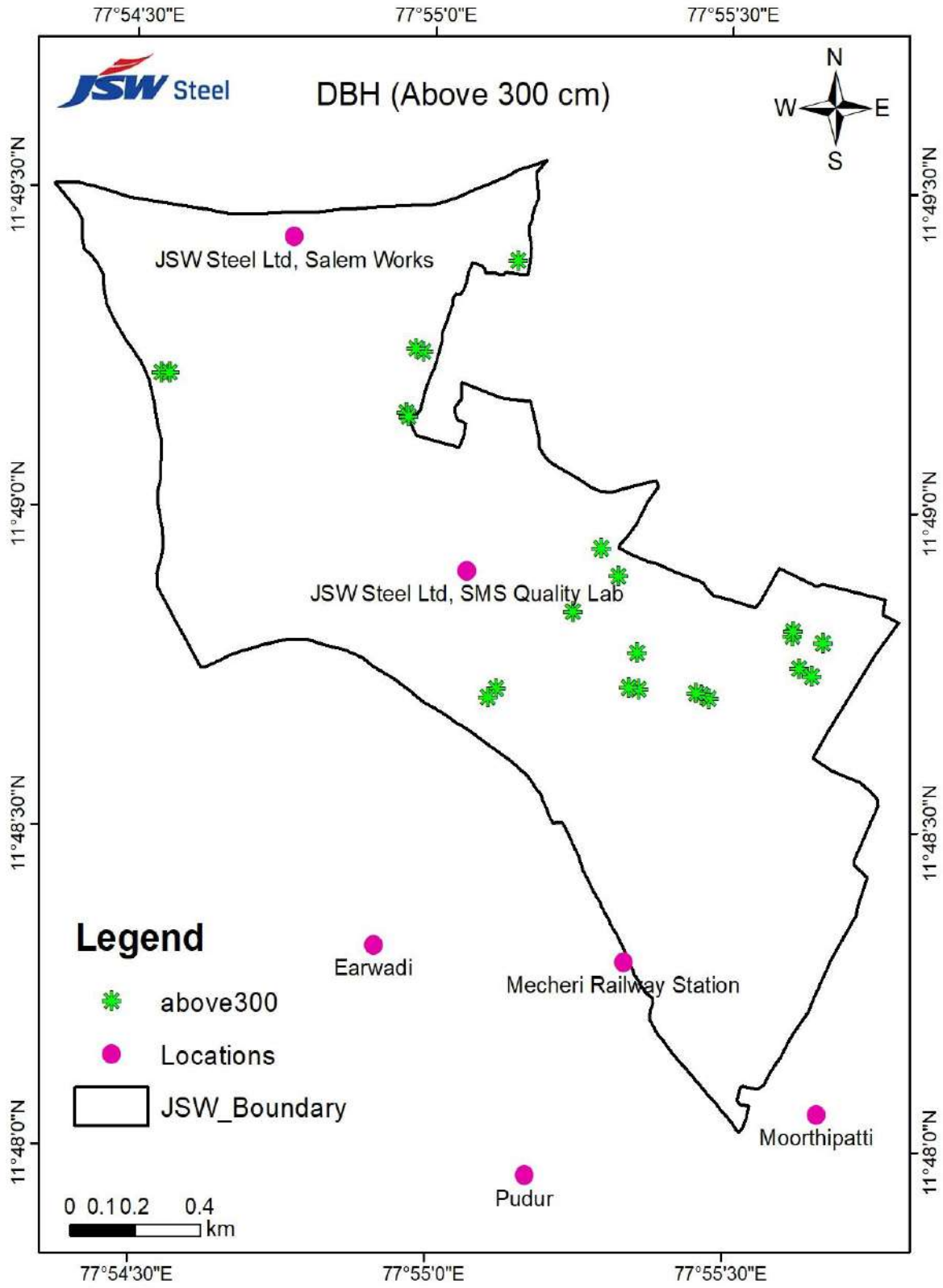


Figure 16. Geotag map of tree species distribution (DBH above 300) in JSW steel plant, Salem

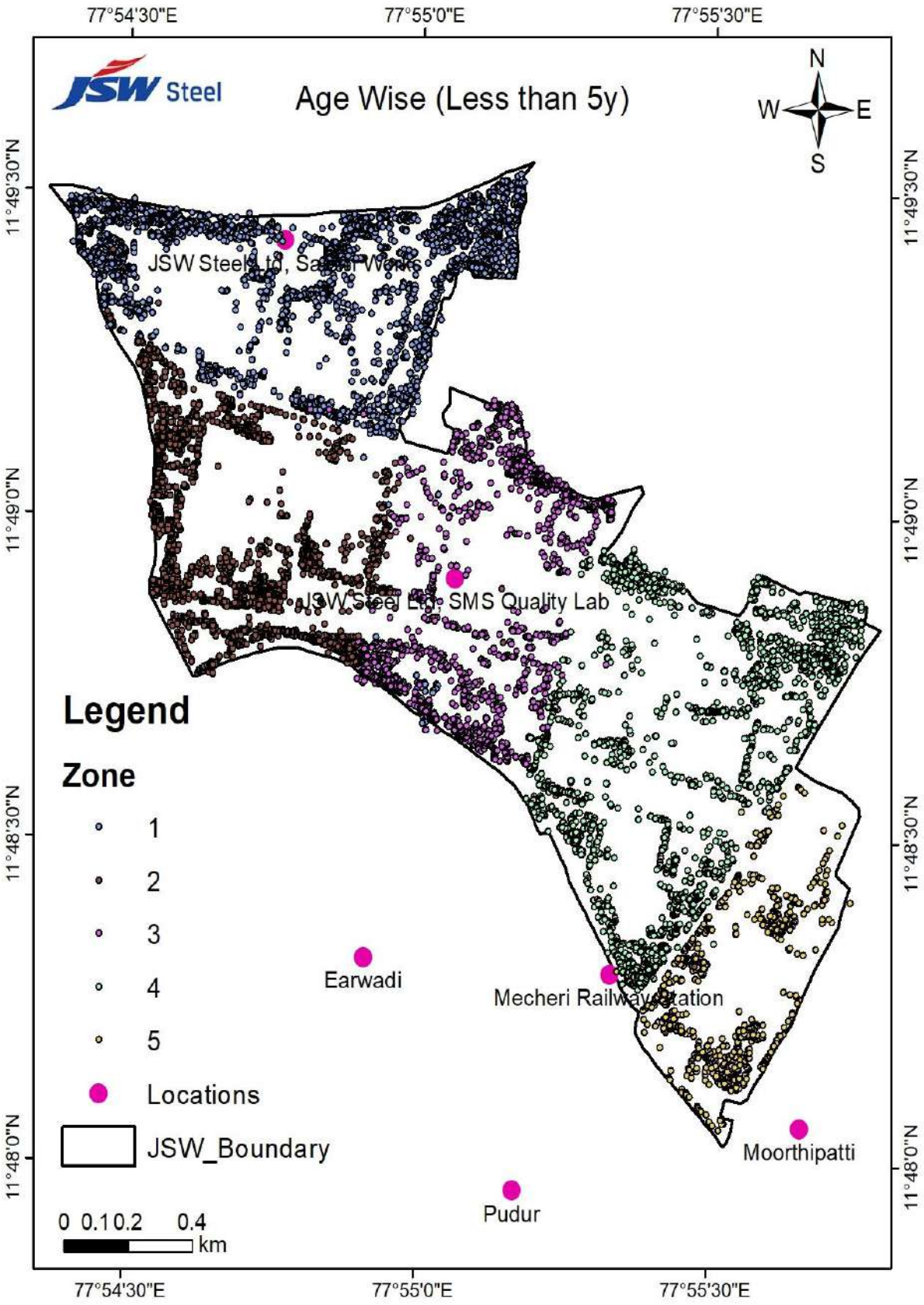


Figure 17. Geotag map of age wise tree species distribution (<5 years) in JSW steel plant, Salem

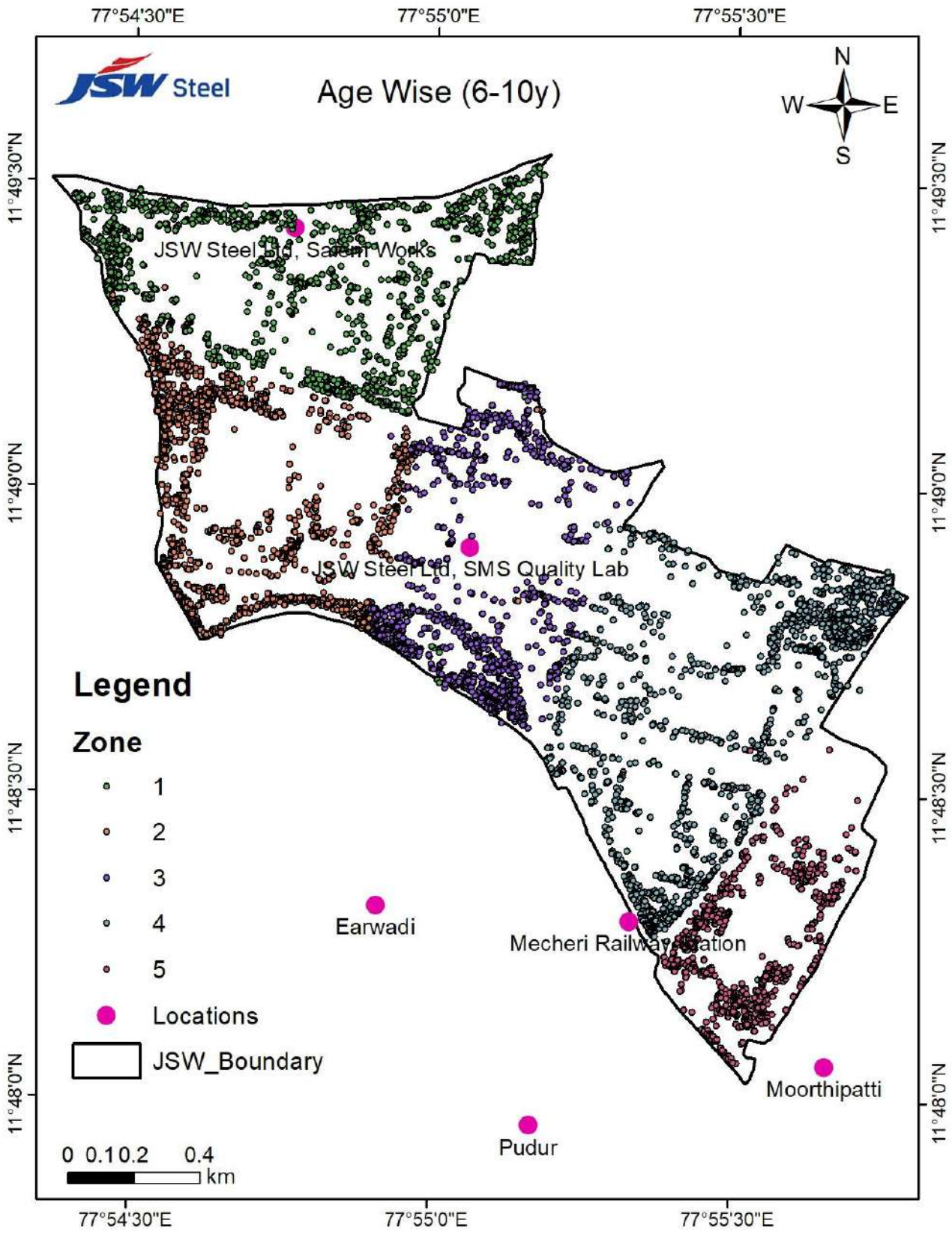


Figure 18. Geotag map of age wise tree species distribution (6-10 years) in JSW steel plant, Salem

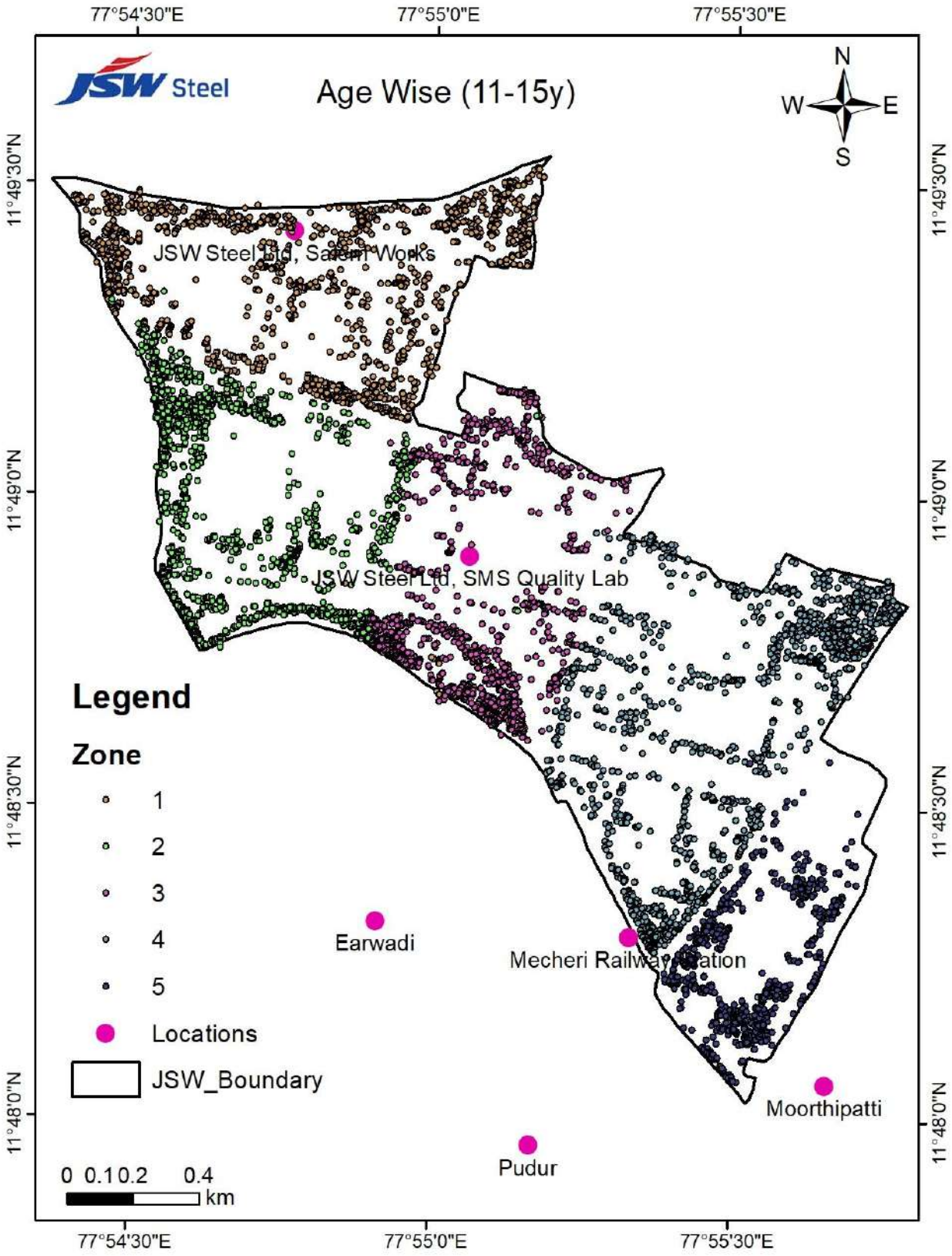


Figure 19. Geotag map of age wise tree species distribution (11-15 years) in JSW steel plant, Salem

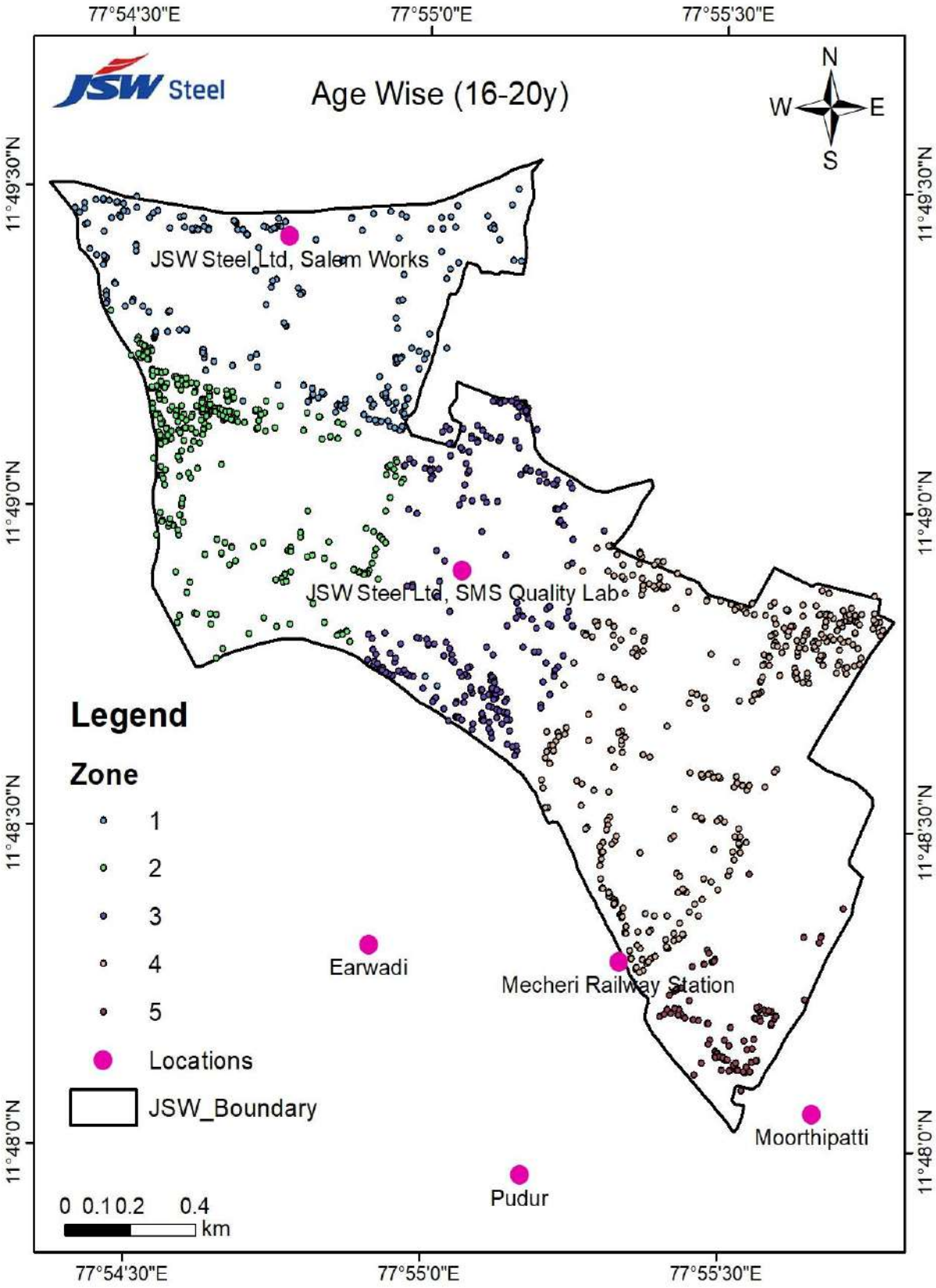


Figure 20. Geotag map of age wise tree species distribution (16-20 years) in JSW steel plant, Salem

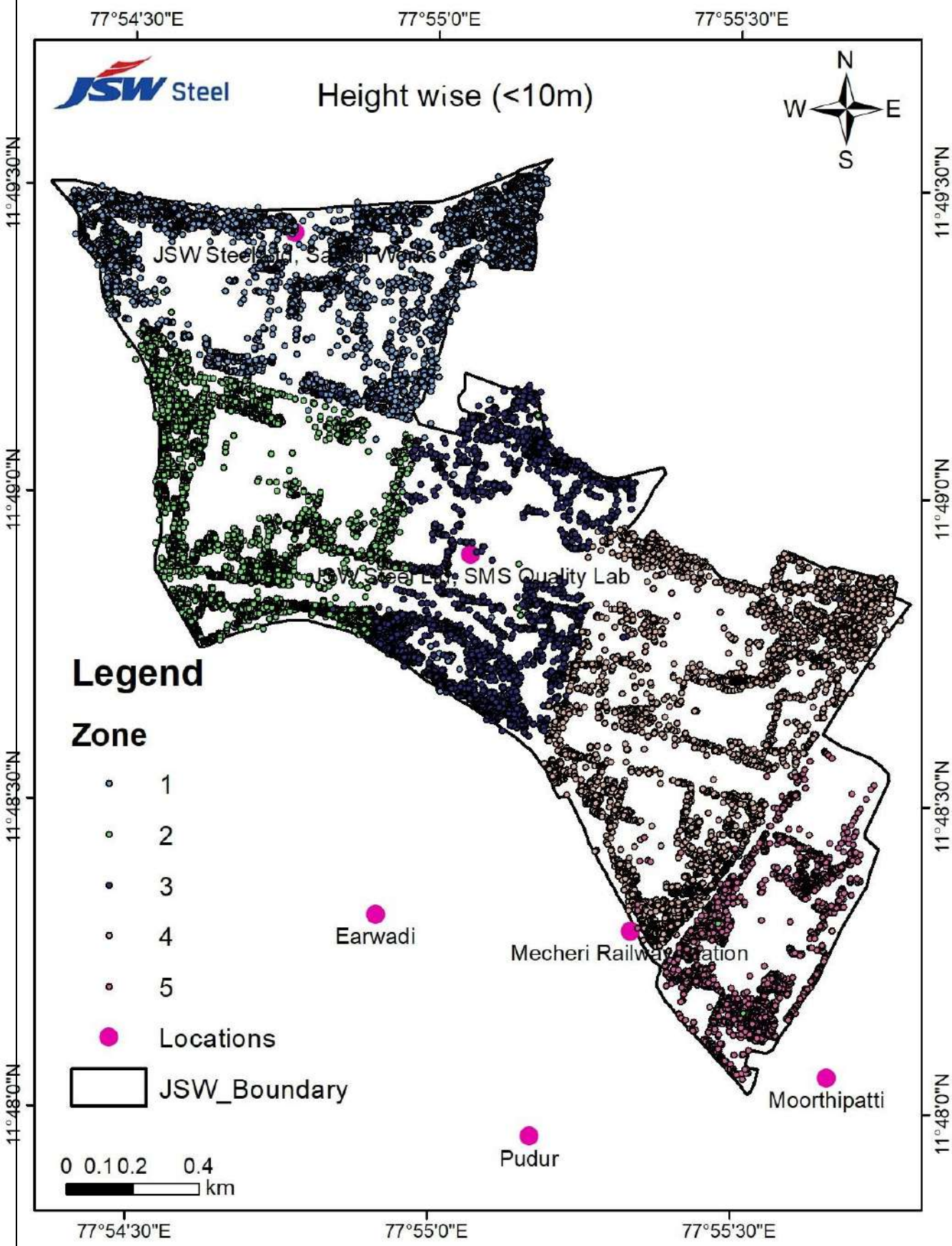
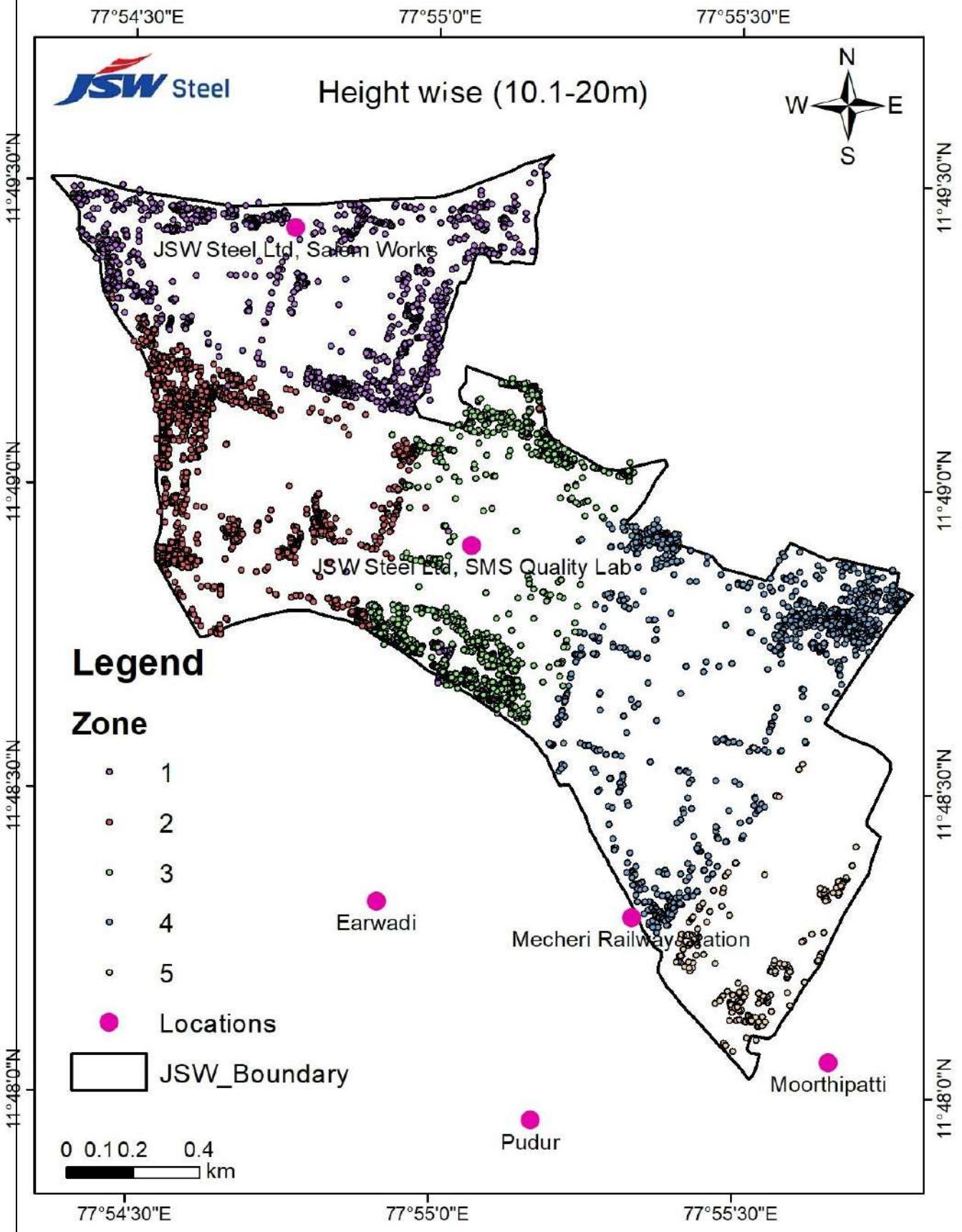


Figure 21. Geotag map of height wise tree species distribution (< 10 meters) in JSW steel plant,

Figure 22. Geotag map of height wise tree species distribution (10 - 20 meters) in JSW steel plant, Salem



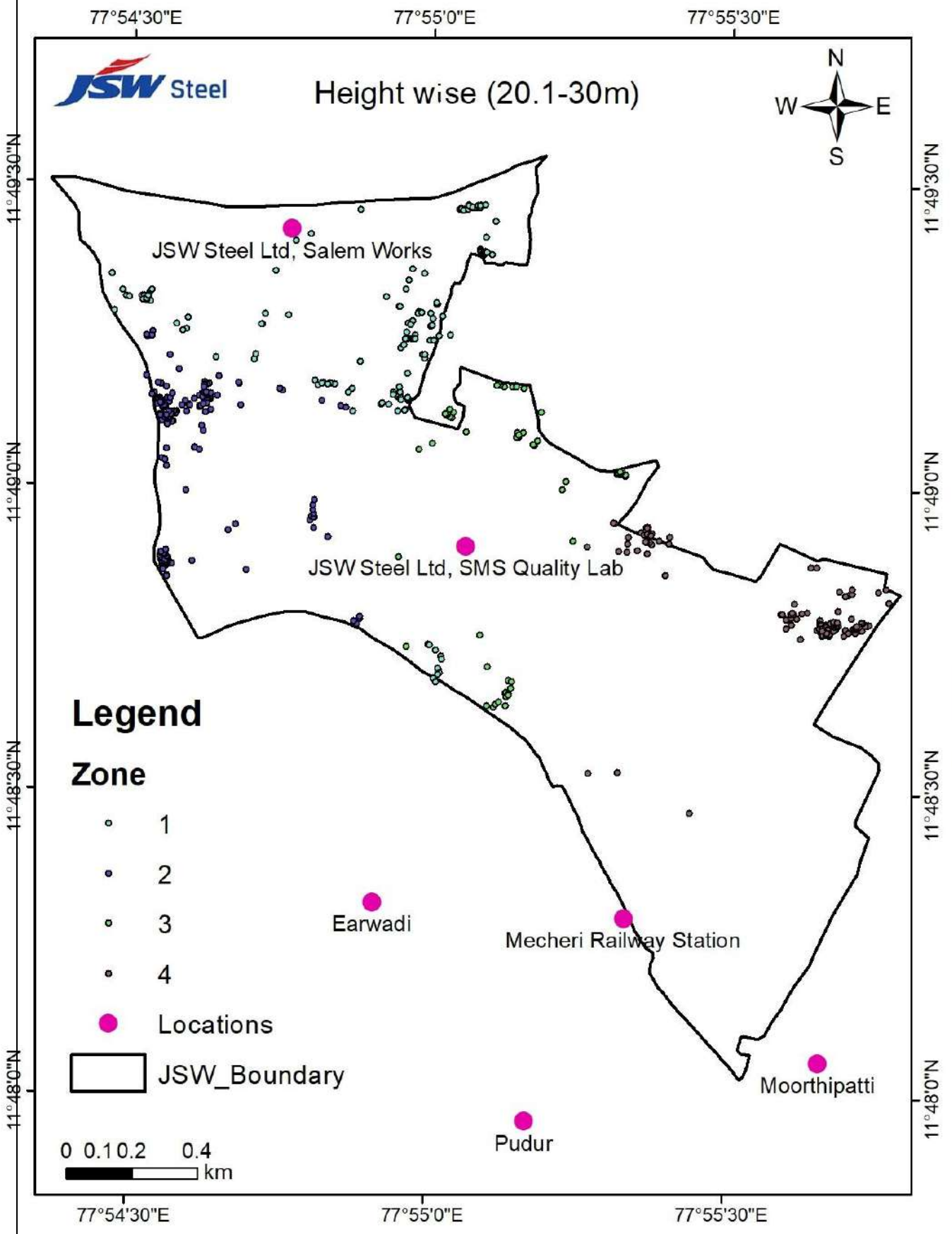


Figure 23. Geotag map of height wise tree species distribution (< 10 meters) in JSW steel plant, Salem

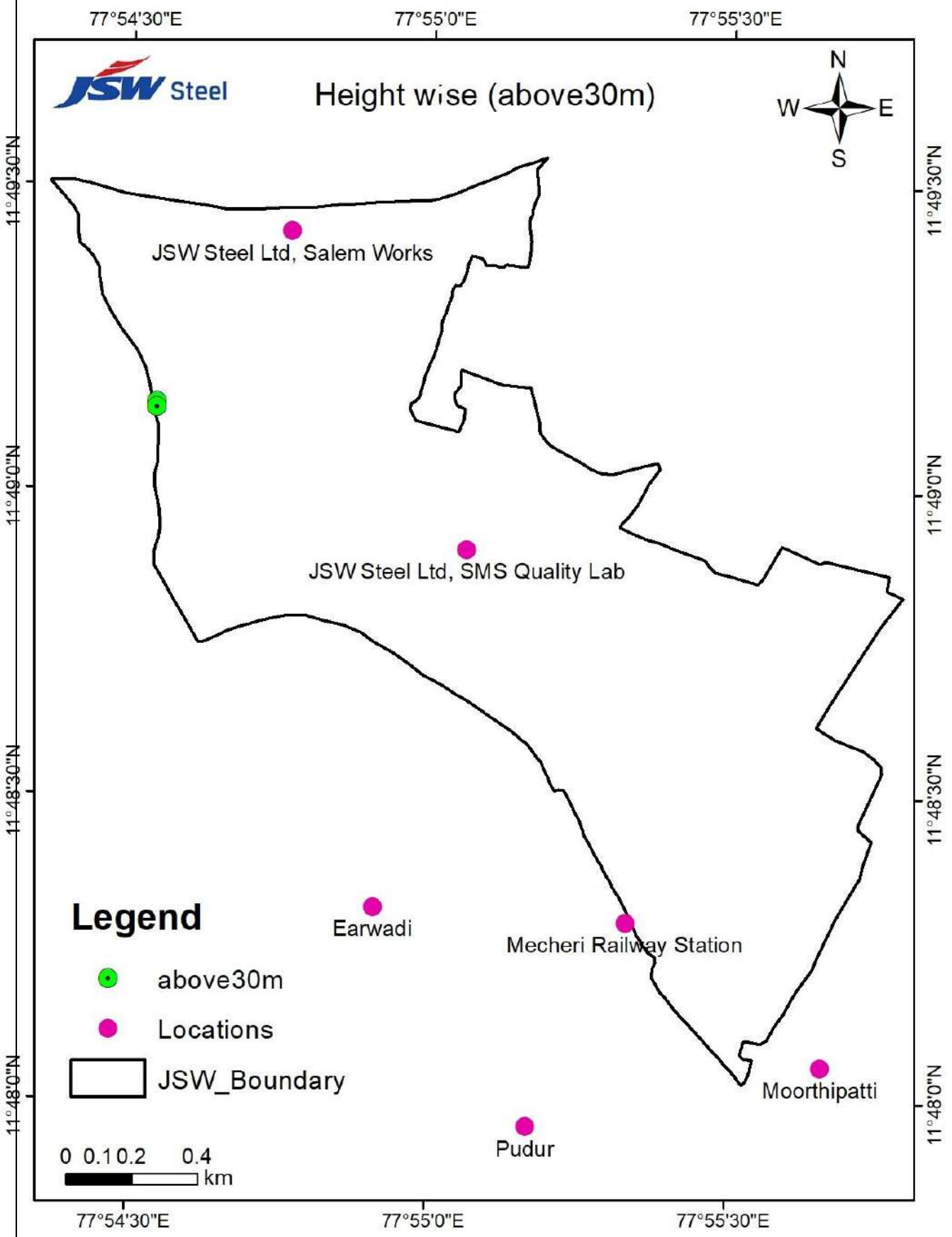


Figure 24. Geotag map of height wise tree species distribution (< 10 meters) in JSW steel plant, Salem

1. List of sampling images in different zones of JSW industrial area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Google


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Note: JSW SALEM
Powered by NoteCam


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Note: JSW SALEM
Powered by NoteCam


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Powered by NoteCam


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Powered by NoteCam


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Powered by MotoCam


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Elevation: 360.42±19.8 m
Accuracy: 19.88 m
Time: 26-06-2025 10:11
Address: 636453 Tamil Nadu, India
Note: JSW SALEM


GPS Map Camera
Salem, Tamil Nadu, India
, Koolaiyur, Tamil Nadu 636453, India, Salem, Tamil Nadu 636453, India
Lat 11.812592° Long 77.910617°
26/06/2025 10:46 AM GMT +05:30
Google


GPS Map Camera
Salem, Tamil Nadu, India
Rw86+6vv, Salem, Tamil Nadu 636453, India
Lat 11.813794° Long 77.910311°
26/06/2025 10:29 AM GMT +05:30
Google


GPS Map Camera
Salem, Tamil Nadu, India
Rw86+8wv, Salem, Tamil Nadu 636453, India
Lat 11.813885° Long 77.910247°
26/06/2025 10:27 AM GMT +05:30
Google


GPS Map Camera
Salem, Tamil Nadu, India
Rw4f+q7h, Tamil Nadu 636453, India, Salem, Tamil Nadu 636453, India
Lat 11.808794° Long 77.924353°
30/06/2025 11:34 AM GMT +05:30
Google


GPS Map Camera
Salem, Tamil Nadu, India
Rwg9+7f4, Salem, Tamil Nadu 636453, India
Lat 11.824548° Long 77.918956°
01/07/2025 10:37 AM GMT +05:30
Google

3. List of some geotagged tree images in different zones of JSW industrial area


Salem, Tamil Nadu, India
Google


Salem, Tamil Nadu, India
Google


Mettur, Tamil Nadu, India
Google


Mettur, Tamil Nadu, India
Google

Carbon Sequestration by the Green Belt

Calculation Formula: 0.25 x (Tree Dia)^2 x (Height in Feet) x (1.2 Wet weight) x (0.725 dry weight) x (50% Carbon Content) x (3.67 CO_2 in Carbon) x 0.454 (Pounds to Kg) /1000 (Kg to Tonne)

Scientific name	Common Name	Zone	DBH (Inch)	Height (Feet)	CO2 in KG	CO2 in MT	Age	CO2 Seq/per Tree / Year
Albizia lebbeck	Vaagai	1	17.554	65.620	3663.673	3.664	19	0.1928
Roystonea regia	Royal palm	1	4.012	8.859	25.840	0.026	7	0.0037
Roystonea regia	Royal palm	1	3.511	8.859	19.784	0.020	6	0.0033
Roystonea regia	Royal palm	1	3.761	9.187	23.552	0.024	6	0.0039
Albizia lebbeck	Vaagai	1	22.945	65.620	6259.835	6.260	20	0.3130
Albizia lebbeck	Vaagai	1	9.153	65.620	996.108	0.996	12	0.0830
Albizia lebbeck	Vaagai	1	11.661	65.620	1616.689	1.617	14	0.1155
Albizia lebbeck	Vaagai	1	5.517	55.777	307.599	0.308	9	0.0342
Azadirachta indica	Neem	1	3.135	19.686	35.048	0.035	5	0.0070
Albizia lebbeck	Vaagai	1	6.645	49.215	393.798	0.394	10	0.0394
Syzygium cumini	Naval maram	1	1.379	9.187	3.166	0.003	3	0.0011
Azadirachta indica	Neem	1	7.523	26.248	269.168	0.269	10	0.0269
Albizia lebbeck	Vaagai	1	1.379	42.653	14.701	0.015	3	0.0049
Syzygium cumini	Naval maram	1	1.505	9.515	3.903	0.004	3	0.0013
Albizia lebbeck	Vaagai	1	5.015	55.777	254.214	0.254	8	0.0318
Albizia lebbeck	Vaagai	1	2.006	26.248	19.141	0.019	4	0.0048
Pongamia pinnata	Pungan	1	0.878	9.515	1.328	0.001	2	0.0007
Albizia lebbeck	Vaagai	1	3.135	55.777	99.302	0.099	5	0.0199
Albizia lebbeck	Vaagai	1	0.878	10.171	1.420	0.001	2	0.0007
Tectona grandis	Teak	1	1.254	7.940	2.262	0.002	2	0.0011
Albizia lebbeck	Vaagai	1	6.896	65.620	565.439	0.565	10	0.0565
Albizia lebbeck	Vaagai	1	2.508	39.372	44.861	0.045	4	0.0112
Tectona grandis	Teak	1	1.003	5.578	1.017	0.001	2	0.0005
Albizia lebbeck	Vaagai	1	4.388	42.653	148.837	0.149	7	0.0213
Albizia lebbeck	Vaagai	1	2.006	39.372	28.711	0.029	4	0.0072
Albizia lebbeck	Vaagai	1	1.881	39.372	25.234	0.025	3	0.0084
Albizia lebbeck	Vaagai	1	1.379	9.843	3.393	0.003	3	0.0011
Pongamia pinnata	Pungan	1	0.752	5.906	0.606	0.001	2	0.0003
Pongamia pinnata	Pungan	1	0.878	5.906	0.824	0.001	2	0.0004

Albizia lebbeck	Vaagai	1	0.376	7.218	0.185	0.000	1	0.0002
Bauhinia purpurea	Butter fly tree	1	0.502	4.922	0.224	0.000	1	0.0002
Thespesia populnea	Poovarasamaram	1	0.627	5.906	0.421	0.000	1	0.0004
Albizia lebbeck	Vaagai	1	6.269	5.578	39.721	0.040	9	0.0044
Albizia lebbeck	Vaagai	1	4.012	5.578	16.270	0.016	7	0.0023
Albizia lebbeck	Vaagai	1	5.015	5.578	25.421	0.025	8	0.0032
Phyllanthus emblica	Indian goose berry	1	0.627	7.218	0.514	0.001	1	0.0005
Albizia lebbeck	Vaagai	1	6.520	59.058	454.894	0.455	10	0.0455
Psidium guajava	Guava	1	0.376	7.218	0.185	0.000	1	0.0002
Albizia lebbeck	Vaagai	1	5.768	49.215	296.645	0.297	9	0.0330
Terminalia catappa	Badani maram	1	0.627	6.562	0.467	0.000	1	0.0005
Albizia lebbeck	Vaagai	1	9.153	59.058	896.497	0.896	12	0.0747
Albizia lebbeck	Vaagai	1	5.266	59.058	296.758	0.297	9	0.0330
Albizia lebbeck	Vaagai	1	6.144	59.058	403.920	0.404	9	0.0449
Albizia lebbeck	Vaagai	1	2.633	59.058	74.189	0.074	5	0.0148
Albizia lebbeck	Vaagai	1	6.269	59.058	420.575	0.421	9	0.0467
Albizia lebbeck	Vaagai	1	7.272	59.058	565.925	0.566	10	0.0566
Albizia lebbeck	Vaagai	1	2.884	49.215	74.161	0.074	5	0.0148
Albizia lebbeck	Vaagai	1	2.006	49.215	35.889	0.036	4	0.0090
Albizia lebbeck	Vaagai	1	2.257	49.215	45.422	0.045	4	0.0114
Psidium guajava	Guava	1	0.502	4.922	0.224	0.000	1	0.0002
Mangifera indica	Mango tree	1	0.752	5.250	0.538	0.001	2	0.0003
Carica papaya	Papaya	1	2.006	9.187	6.699	0.007	4	0.0017
Psidium guajava	Guava	1	1.003	22.967	4.187	0.004	2	0.0021
Psidium guajava	Guava	1	1.003	22.967	4.187	0.004	2	0.0021
Carica papaya	Papaya	1	6.269	19.686	140.192	0.140	9	0.0156
Psidium guajava	Guava	1	0.752	9.843	1.009	0.001	2	0.0005
Phyllanthus emblica	Indian goose berry	1	1.003	8.203	1.495	0.001	2	0.0007
Phyllanthus emblica	Indian goose berry	1	2.508	9.843	11.215	0.011	4	0.0028
Phyllanthus emblica	Indian goose berry	1	3.009	9.843	16.150	0.016	5	0.0032
Azadirachta indica	Neem	1	9.028	72.182	1065.905	1.066	12	0.0888

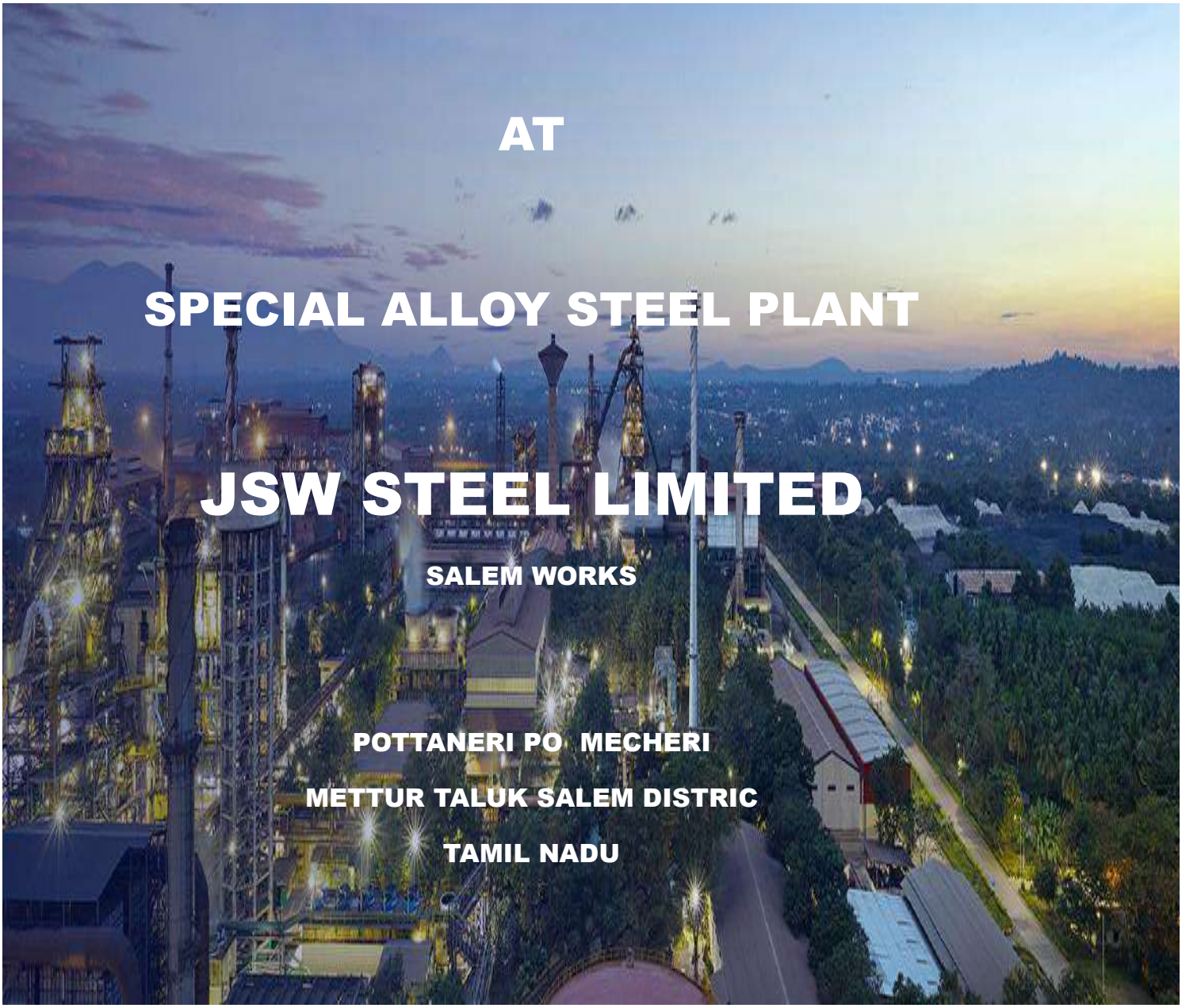
Carica papaya	Papaya	1	1.505	5.578	2.288	0.002	3	0.0008
Azadirachta indica	Neem	1	10.281	82.025	1571.080	1.571	13	0.1209
Azadirachta indica	Neem	1	9.278	72.182	1125.944	1.126	12	0.0938
Cocos nucifera	Coconut	1	5.015	11.484	52.338	0.052	8	0.0065
Carica papaya	Papaya	1	1.881	13.124	8.411	0.008	3	0.0028
Musa × paradisiaca	Banana	1	5.015	13.124	59.815	0.060	8	0.0075
Musa × paradisiaca	Banana	1	4.388	11.484	40.071	0.040	7	0.0057
Azadirachta indica	Neem	1	7.021	49.215	439.641	0.440	10	0.0440
Azadirachta indica	Neem	1	4.388	55.777	194.633	0.195	7	0.0278
Azadirachta indica	Neem	1	4.765	55.777	229.428	0.229	8	0.0287
Azadirachta indica	Neem	1	9.404	59.058	946.293	0.946	12	0.0789
Azadirachta indica	Neem	1	7.899	55.777	630.610	0.631	11	0.0573
Azadirachta indica	Neem	1	7.147	62.339	576.944	0.577	10	0.0577
Azadirachta indica	Neem	1	8.150	62.339	750.259	0.750	11	0.0682
Azadirachta indica	Neem	1	2.633	62.339	78.311	0.078	5	0.0157
Azadirachta indica	Neem	1	7.774	72.182	790.381	0.790	11	0.0719
Azadirachta indica	Neem	1	11.284	72.182	1665.476	1.665	13	0.1281
Albizia lebbeck	Vaagai	1	8.150	65.620	789.746	0.790	11	0.0718
Albizia lebbeck	Vaagai	1	8.526	65.620	864.328	0.864	11	0.0786
Albizia lebbeck	Vaagai	1	7.774	65.620	718.529	0.719	11	0.0653
Albizia lebbeck	Vaagai	1	6.269	68.901	490.671	0.491	9	0.0545
Albizia lebbeck	Vaagai	1	10.031	68.901	1256.117	1.256	12	0.1047
Albizia lebbeck	Vaagai	1	8.150	68.901	829.233	0.829	11	0.0754
Albizia lebbeck	Vaagai	1	3.636	55.777	133.621	0.134	6	0.0223
Albizia lebbeck	Vaagai	1	2.257	52.496	48.450	0.048	4	0.0121
Albizia lebbeck	Vaagai	1	3.511	59.058	131.892	0.132	6	0.0220
Albizia lebbeck	Vaagai	1	4.765	55.777	229.428	0.229	8	0.0287
Albizia lebbeck	Vaagai	1	5.015	49.215	224.307	0.224	8	0.0280
Albizia lebbeck	Vaagai	1	13.541	68.901	2289.272	2.289	15	0.1526
Azadirachta indica	Neem	1	7.774	65.620	718.529	0.719	11	0.0653
Albizia lebbeck	Vaagai	1	5.266	52.496	263.784	0.264	9	0.0293

JSW Steel

ANNEXURE 13

THIRD PARTY ENVIRONMENT AUDIT REPORT

ENVIRONMENT AUDIT REPORT 2025



AT

SPECIAL ALLOY STEEL PLANT

JSW STEEL LIMITED

SALEM WORKS

POTTANERI PO MECHERI

METTUR TALUK SALEM DISTRIC

TAMIL NADU

CHENNAI TESTING LABORATORY PRIVATE LIMITED

Testing redefined

A SUPER 19 TVK INUSTRIAL ESTATE GUINDY CHENNAI 600032

I pledge to make all changes in my lifestyle to protect environment
I also completely commit to motivate my family, friends and others about importance of environment friendly habits

CONTENTS

1 ABOUT JSW SALEM

1.1 HISTORY

The existing plant of JSW Steel Limited (**JSWSL**) at M.Kallipatti Village, Pottaneri, Mettur Taluk, Salem District was originally operating as SISCOL (Southern Iron Steel Company Limited) with a installed capacity of 0.23 MTPA producing Pig Iron & had facility such as Sinter Plant, Blast Furnace, & Pig Iron Casting Machine. The plant at its existing location had been in operation since 1991. The plant also had a steel making shop consisting of an Energy Optimizing Furnace, Continuous Casting machine, and a Ladle Furnace. The energy optimizing furnace had a capacity of 30 T and was developed by Korf Technological Services (Brazil). The casting machine was then producing 100x100, 130x130, and 160x160 mm casts. The Ladle Furnace had a capacity of 30 T to regulate the liquid steel temperature & a steel finishing shop comprising of bar and rod mill having a capacity of up to 2,30,000 tons per annum then.

In January 2005, JISCOL (Now JSW Steel) acquired this plant & has ever since been expanding its facility producing special steel to an extent of 1.15 MTPA, one of the largest in the country. The plant is one of the leading virgin steel producers in the country with capability to produce 850 different grades of special steel with a wide a range of sizes as per requirement. The plant is one with absolute state of the art technology such as 8 stand H/V mill for size reduction, Kocks block technology for providing ¼ DIN standard, phased array technology that detects internal defects, & one of very few plant using Energy Optimizing Furnace (EOF) for special steel production.

The plant operates as "ZERO WASTE WATER DISCHARGE" unit, wherein the entire waste water generated is treated & recycled for re-use back. Further, JSWSL has been consistent in discharging their duties as responsible citizen ensuring that the impact of their businesses is both positive & sustainable.

The unit is operating with all regulatory clearances in place, including Environmental clearance, and valid consent to operate from TNPCB vide Consent Order No 2307249391459 (Air Act) & 2307149391459 (Water Act) Dated 23/01/2023 & valid up to March 31, 2026.

1.2 LOCATION

The plant of **JSWSL** is located at Pottaneri & M. Kalipatti village, Mettur taluk, Salem district, Tamil Nadu at an altitude of 339 m to 368 m above MSL (Mean Sea Level), occupying a total land area of 265.93 Ha.

1.3 ENVIRONMENT CLEARANCE

Post-merger of "Southern Iron and Steel Company Limited (SISCOL)" with "JSW Steel Limited" w.e.f. 01.04.2007, JSW Steel Limited (JSWSL), Salem works started its operation in 2007 and is presently having Environmental Clearance for expansion up to 1.3 MTPA, the details of environmental clearance obtained at various stages are as below,

DATE	EC REFERENCE	NAME OF PROJECT
02/01/2007	J-11011/281/2006-IA.II (I)	Expansion of Steel Plant from 0.23 MTPA to 1.0 MTPA
07/07/2017	J-11011/281/2006-IA.II (I)	Expansion of Steel Plant from 1.0 MTPA to 1.3 MTPA
07/08/2019	J-11011/281/2006-IA.II (I)	Amendment in EC issued in 2017
10/02/2020	J-11011/281/2006-IA.II (I)	0.8 MTPA Slag Grinding Unit within existing Steel Plant, and also value addition facilities
28/11/2022	No-Increase in Pollution Load Certificate	Steel Plant – 1.15 MTPA Slag Grinding (GGBFS) – 0.8 MTPA Steel Ball – 0.2 MTPA
20/05/2025	IA/TN/IND1/458028/2024 dated 12.08.2024. J-11011/281/2006-IA.II (I) EC24A1001TN5425828S	Hiving of Slag Grinding Unit (GGBFS) plant exclusively as a separate Entity under JSW Cement Limited , while all the other parts of plant remaining under JSW Steel Limited, Salem Works.
27.02.2026	J-11011/281/2006-IA.II (I) EC25A1005TN5852672A	Amendment in Certain of the General Conditions of EC Dated 10.02.2020

1.4 TNPCB CONSENT

JSWSL is at present operating with a valid consent issued by TNPCB vide Consent Order # 2307249391459(Air Act) & Consent Order # 2307149391459(Water Act) dated 23/01/2023 for Steel production (Mild Steel, Carbon Steel, Alloy Steel and Special Steel) Products (Billets, Blooms, Round bars, Round Corner Square, Flats, Coils, Bars & Rods, Hexagon, Annealed, Pickled, Peeled & Ground products and Steel Ball) of **1.15 MTPA** as main product, & other by products/intermediate products & also 0.8 MTPA Slag Grinding Unit, however, this consent order was further amended vide Consent Order # 2605272245658(Air Act) & Consent Order # 2605172245658 (Water Act) dated 06/05/2026, wherein slag grinding unit has been hived off as a separate unit & steel plant as such having validity of consent up to alone now **March 31, 2031**.

1.5 IMPLEMENTATION vs ENVIRONMENTAL CLEARANCE & TNPCB CONSENT

EQUIPMENT	CONFIGURATION	STATUS	REMARKS
Non-Recovery Coke Oven	0.5 MTPA	In operation	
Sinter Plant - I	20 m^2	In operation	To be De-commissioned
Sinter Plant - II	90 m^2	In operation	
Sinter Plant - III	90 m^2	Yet to install	
Blast Furnace - I	402 to 650m^3	Yet to install	
Blast Furnace - II	650 m^3	In operation	
Pig Casting Machine	PCM	In operation	
Energy Optimizing Furnace-I	65T	In operation	
Energy Optimizing Furnace-II	65T	In operation	
Ladle Furnace - I	65 T	In operation	
Ladle Furnace - II	65 T	In operation	
Ladle Furnace – III with VD	65 T	In operation	
Ladle Furnace - IV	65 T	In operation	
Ladle Furnace – V with VD	65 T	In Operation	
Continuous Casting Machine	1	In operation	
Continuous Casting Machine-	2	In operation	
Continuous Casting Machine	3	In operation	
Bar & Rod Mill	BRM	In operation	
Blooming Mill	BLM	In operation	
Pickling & Annealing	-	In operation	
Peeled & Ground	-	In operation	
Air Separation Plant - I	O_2 – 150 TPD N_2 – 108 TPD	In operation	
Air Separation Plant - II	O_2 – 390TPD N_2 – 135 TPD Ar – 15 TPD	In operation	
Air Separation Plant - III	O_2 – 250 TPD N_2 – 135 TPD Ar – 10 TPD	Yet to Install	
CPP Unit I	7 MW	-	**DELETED**
CPP UNIT I & II	2 X 30 MW	In operation	
CPP UNIT III	30 MW	In operation	
Paver Block	50000 TPA	In operation	**Hived -Off as Separate Unit**
Slag Crushing	256320 TPA (50 TPH)	In operation	
Batching Plant	83500 TPA (30M^3/hr)	In operation	

2 PLANT & PROCESS DETAILS

2.1 PRODUCT & PRODUCTION CAPACITY

The plant produces Mild steel, Carbon Steel, Alloy Steel and Special Steel. The finished products include, Billets, Blooms, Round bars, Round Corner Square, Flats, Coils, Bars & Rods, Hexagon, Annealed, Pickled, Peeled & Ground products and Steel Balls.

JSWSL Salem Works have the following facilities at their plant -

- Coke Oven Plant (Non-recovery type)
- Sinter Plants
- Blast Furnaces
- Pig Casting Machine
- Steel Melting Shops Consisting of EOF, LRF, CCM
- Bar & Rod Mill
- Blooming Mill
- Pickling, Annealing of steel and Steel ball (value addition)
- Air Separation Plants
- Captive Power Plant
- Value addition facilities for Wealth from waste
- SMS Slag Crushing unit
- Paver block making facility

The consented production capacity as per the extant consent to operate from TNPCB vide Consent Order No 2307249391459 (Air Act) & 2307149391459 (Water Act) Dated 23/01/2023 & valid up to March 31, 2026, is as follows,

S.No	PRODUCT DETAIL	QUANTITY (TPA)
PRODUCT DETAILS		
1	Steel production (Mild Steel, Carbon Steel, Alloy Steel and Special Steel) Products (Billets, Blooms, Round bars, Round Corner Square, Flats, Coils, Bars & Rods, Hexagon, Annealed, Pickled, Peeled & Ground products and Steel Ball)	1150000
BY-PRODUCT DETAILS		
1	Ferrous Sulphate	1200
2	Liquid oxygen for sale	15000
3	Liquid Nitrogen for sale	2000
4	Liquid Argon for sale	8000
5	Paver block by using Steel Making Shop slag	50000
6	Crushed slag (steel Making Shop Slag)	226750
7	Ready-Mix concrete	82500
8	Ground Granulated Blast Furnace Slag	800000
INTERMEDIATE PRODUCT DETAILS		
1	Pig Iron Production	300000

2.2 LAND AREA & BREAK UP

The total land available under the possession is 265.93 ha (657.12 acres). The plant site is in 235.13 ha (581.01 acres) and township area is 30.80 ha (76.11 acres). The plant is maintaining green belt area of 90.56 ha (223.78acres) to fulfil CPCB norms of 33% of total plant area, largely consisting of native species. There are No forest land involved, and no rivers/streams pass through the site. Further, no modification or diversion of natural drainage pattern is seen. The land use breakup of the total site is

S. NO.	PLANT FACILITIES	AREA	
		HA	%
1	Built up area	76.65	28.82
2	Greenbelt Area	90.56	34.05
3	Open land	63.62	23.92
4	Stockyard	4.3	1.62
	PLANT AREA	**235.13**	**88.42**
	Township Area	30.8	11.58
	Total	**265.93**	**100**

2.3 RAW MATERIAL REQUIREMENT

RAW MATERIAL	QUANTITY TPA	SOURCE	DISTANCE / TRANSPORT
Iron ore fines	0.939	Jharkhand	Appx.1900 km, Rail cum road
Iron ore pellets	0.409	Karnataka	Appx. 354 km, Rail cum road
Lump ore	0.690	Karnataka	Appx.400 km, Rail cum road
Coking coal	0.585	Australia Russia	Appx.9000 km, Shipping cum road
Non coking coal for COP	0.147	Australia Russia	Appx.9000 km, Shipping cum road
Non coking coal for PCI	0.194	Australia Russia	Appx. 9000 km, Shipping cum road
Power plant coal	0.172	Australia Russia	Appx.9000 km, Shipping cum road
Coke breeze for SP	0.023	In house	-
Limestone for CPP-II	0.175	Oman	Appx. 2,250 km, Shipping cum road
Dolomite	0.120	Tamil Nadu	50 km, Road
Quartzite	0.033	Tamil Nadu Andhra Pradesh	<300 km, Road
Dunite	0.033	South Africa	Appx. 6600 km, Shipping cum Rail cum road
Lime powder	0.065	Malaysia	2656 km, Shipping cum road
Mill scale	0.109	Tamil Nadu	<300 km, Road
Purchase coke	0.128	Tamil Nadu	<300 km, Road
Anthracite	0.067	Australia, Russia	Appx.9200 km, Shipping cum road
Ferro Alloy	0.037	Open Market	
Scrap	0.100		

2.4 MANUFACTURING PROCESS

JSWSL had perfected the art of special alloy steel making over the years, and has therefore niche processes to produce the requirement of various industries requiring high grade special alloy steel, the process adopted is briefly described below

2.4.1 COKE OVEN PLANT (COP – Non- Recovery Type)

The Coke Oven Plant (COP) is basically Non recovery type and the capacity is 0.5 MTPA. COP consists of 2 batteries with 48 ovens, 1 battery with 24 ovens and each battery flue gas duct relates to a dedicated stack. The Plant will use stamp-charging technique to increase the bulk density of the coking coal, which will be charged to the ovens. It will help to increase the yield and also the strength of the coke. The Coke Oven operation is automatic and the process of coal carbonization is being controlled.

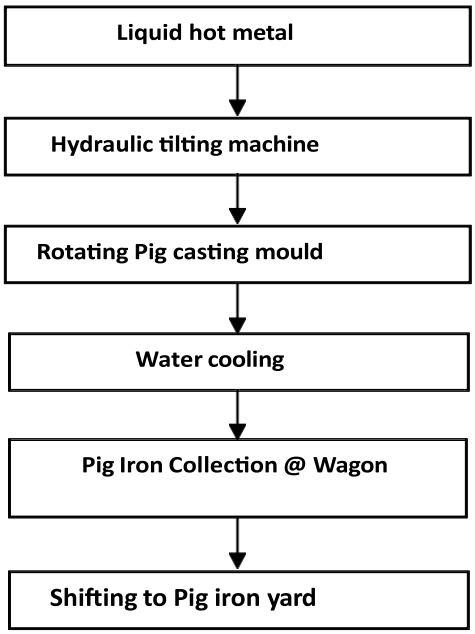
Carbonization of coal is completed in 65 hrs at the temperature range of 1100-1300oC. On completion of the process, the coke will be discharged from the oven into the quenching car which is quenched in the wet type quenching tower. To cater the evaporation losses provisions are made for raw and waste water makeup to wet quenching system. There is no waste water generation from the process. After quenching, coke will be cut in to specified size, screened, transferred to coke drier to reduce the coke moisture about 3% and finally coke is transferred to Blast Furnaces as reducing agent. The fines i.e. coke breeze is used in Sinter Plant for sinter making.

The waste heat of the flue gas is fully utilized in Waste Heat Recovery Boilers (WHRB) for steam generation. Since, 100 % of flue gas is utilized for steam generation, no flow of gas is expected through COP stacks & the existing stacks are being maintained as emergency stacks.

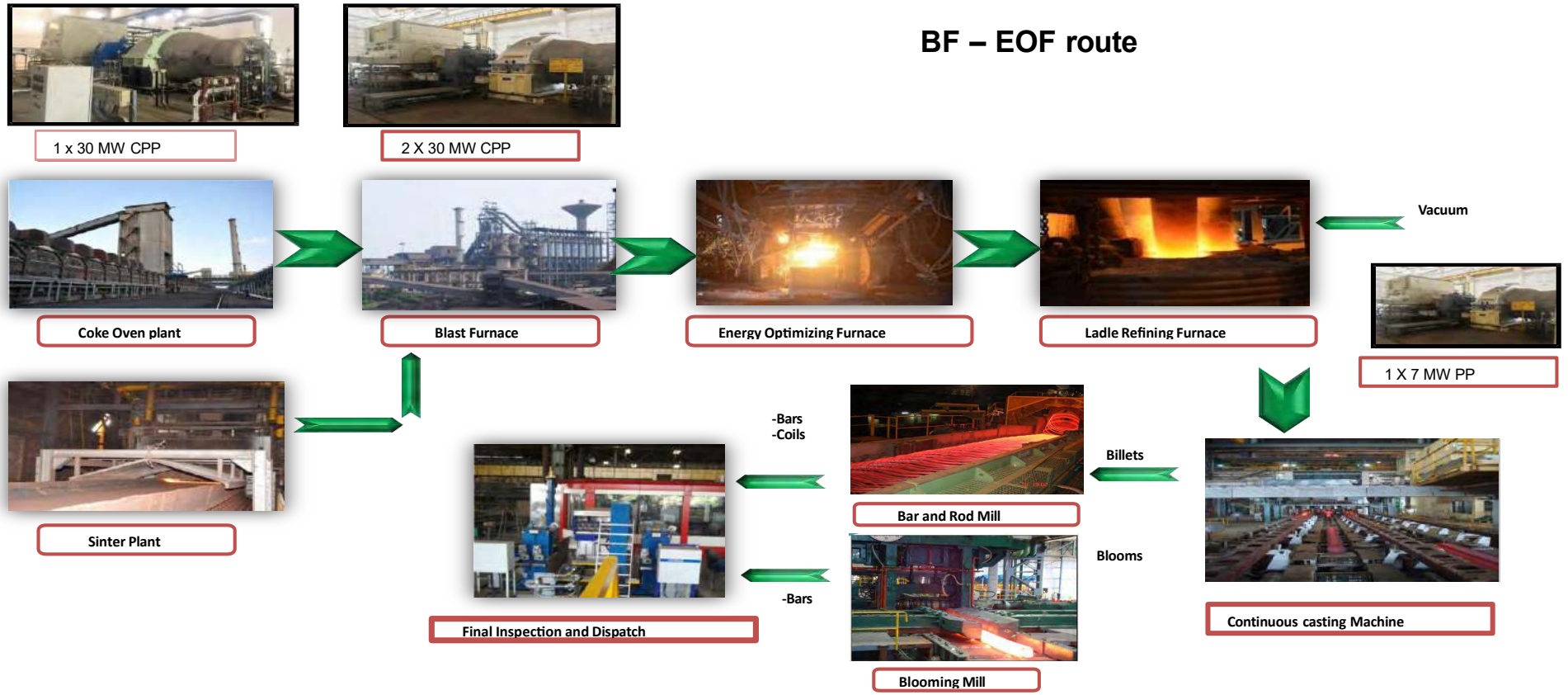
There are 5 Nos. of WHRBs installed to recover the waste heat for steam generation and dedicated stacks are provided to each boiler. Online continuous emission monitoring systems are installed in the boiler stacks and the real time data is connected with TNPCB, CPCB servers.

2.4.2 PIG CASTING MACHINE (PCM)

Main purpose of pig casting machine is to handle excess hot metal accumulated in case of any downstream process (SMS) delay / failure or to pour hot metal with the deviated quality (Above 1.5% Silicon). In Pig casting machine, Hot metal in the refractory ladle is held in a hydraulic tilting machine with the help of EOT crane. That hydraulic tilting machine is used for tilting and pouring the hot metal slowly in to the pig cast moulds. Moulds are made up of cast iron and it is connected like endless chain and it will be rotated by an electrical drive. Liquid hot metal will be poured in the moving mould and it will be cooled by spraying water over metal while travelling and will be discharged to wagon after cooling. Wagon will be moved to magnetic crane yard by electric winch and pigs will be shifted to pig iron yard with the help of magnetic crane. Then it will be sent to SMS as an addition for steel making Process



2.4.3 PROCESS FLOW CHART



2.4.4 SINTER PLANT

Presently, plant is operating with two sinter plants of machine size of 20 and 90 sq.m respectively, with a capacity to produce 1.235 MTPA.

Sintering is an agglomeration process which converts the iron ore fines into porous mass to make them as feed material to blast furnace for iron making, with necessary accessories like flux and fuel crushing plant, circular cooler, mixing drums, product screening facility, waste gas system, etc.

The sinter plant consist of the following main technological units:

- Fuel and flux crushing;
- Flux screening;
- Storage and proportioning;
- Primary mixing room;
- Secondary mixing room;
- Sintering and cooling;
- Waste gas de-dusting;
- Main exhaust fan; and
- Cold Sinter Screening & Plant de-dusting

The coke breeze generated in coke oven plant will be recycled in sinter plant as a raw material for sintering. The recycled material from gas cleaning plant of blast furnace is also utilized in sinter plant. Flux materials like limestone and dolomite will be crushed to <3 mm size in crushing plant and stored in the proportioning bins. The coke will be crushed to fines in the range of 0 – 3 mm size using roll crushers and stored in proportioning bins. All the raw materials will be mixed into a homogeneous mixer and nodulized in mixing drums before charging into sinter machine. BF gas will be used as fuel in ignition furnace in the sinter machine. Sintering will take place in the machine and the hot sinter will be discharged to the circular cooling machine. The cooled sinter will be screened to separate the fines <5 mm from the product sinter. The screened product will be sent to blast furnace. All fines of raw/waste material collected at various places of steel plant like Blast furnace de-dusting, SMS slag, Gas cleaning plant dust from BF & Energy optimization furnace, Mill scale from BRM, BLM and CCM and Raw material transfer systems are also collected and conveyed to sinter plant for making sinters which is direct replacement of iron ore. Online continuous emission monitoring systems are installed in the above system and the real time data is connected to CAC, TNPCB, Chennai. Provisions are made for raw

water makeup in the cooling tower and effluent water is connected to guard pond from where it is taken to ETP & treated waste water is then re-used back in the utilities.

2.4.5 BLAST FURNACE

The plant is presently operating with two blast furnaces with capacities of 402 m^3 and 650 m^3 respectively. The blast furnace is a vertical counter- current heat exchanger as well as a chemical reactor in which burden material charged from the top descend downward and the gases generated at the tuyere level ascend upward. The inside profile of the furnace from top to bottom is termed furnace throat, shaft, belly, bosh and hearth. The throat is the top portion of the furnace and includes the machinery necessary for charging coke and burden materials and drawing off the top gasses. The top gas is routed from the furnace top to the gas cleaning plant and then to the consumption zones. The profile of the furnace widens from the shaft. The widening of the furnace chamber from top to bottom is necessary to avoid hanging and scaffolding of the burden in the blast furnace when the raw material expands during high temperature. The height of the shaft is about 3/5 of the total height of the furnace. The shaft is followed by the belly and bosh.

The profile again narrows in the bosh, where the stock column starts to melt the hearth where the fluid slag and the hot metal accumulate. The upper part of the hearth is water-cooled tuyeres made up of copper. The hot air for combustion is injected through tuyeres into the blast furnace. Hot metal is tapped through the tap hole, which is opened by power driven drills into a train of ladles kept below the runner of the cast house. Slag comes along with the metal and is skimmed off with the help of skimmer plate towards slag runner and is granulated and collected in the slag granulation plant. The tap hole is tightly sealed with a mud gun after tapping process is complete.

Raw material (ore, sinter, coke) is screened before being charged into the blast furnace through conveyors. Air for combustion in the blast furnace is blown from turbo/motorized which are preheated in hot blast stoves at about 1200°C which is then blown through tuyeres into the blast furnace.

Each blast furnace is equipped with minimum three stoves which operate alternatively. Preheating of air helps in reducing fuel consumption in the furnace. The useful volume of the proposed BF’s shall be 650 m3 X 2 No’s with total hot metal production of 1.36 MTPA.

The feed charge to BF shall consist of 75% sinter, 25% pellet or lump ore. There are 11 numbers of stacks are existing to handle the process gases generated from both the furnaces and de- dusting system envisaged for the blast furnace area. The BF gases are used in stoves, sinter plant, downstream of steelmaking process, reheating furnaces of mills and power generation. However, two individual flare stacks are provided to flare the excess gas if any. Online continuous emission monitoring systems are installed in the above system and the real time data is connected to CAC, TNPCB, Chennai. Provisions are made to raw water & RO water makeup for cooling application and effluent water is connected to guard pond for treatment and reuse.

2.4.6 STEEL MAKING SHOP (SMS)

The steel melting shop is having two numbers of Energy Optimizing Furnaces (EOF), each of capacity 65 T, and existing secondary steel refining is having 5- Ladle Refining Furnaces and two vacuum degaussing units. 5- LRF's (LRF #1,2,3,4,5) are having capacity of 65 T each. The metallic feed to EOF consists of 85% hot metal and up to 15% of scraps, depending on the availability of scrap. The plant is also equipped with GCP (Gas Cleaning Plant) & APC (Air Pollution Control) of adequate capacity. Online continuous emission monitoring systems are installed in these systems and the real time data is connected to OCEMS, TNPCB, Chennai. Provisions are made for raw water & RO water makeup in cooling towers and effluent water is connected to guard pond, from where it is taken to ETP & treated waste water is then re-used back in the utilities.

The liquid steel produced from EOF shall be subjected to secondary metallurgy operation in ladle furnace with vacuum degassing. The Energy Optimizing Furnace (EOF) operates as a batch melting process producing batches of molten steel termed as "heats". The EOF furnace operating cycle is called as tap-to-tap cycle and the sequence operations followed are as follows:

- Furnace charging;
- Melting;
- Refining;
- De-slagging;
- Tapping; and
- Furnace turn-around.

Modern operations aim for a tap-to-tap time of less than 40 minutes. EOF shall be equipped with atmospheric injectors, tuyers & supersonic lancers. Hot metal from the blast furnace is poured through launders. The hot metal is lanced with oxygen for refining.

2.4.7 LADLE REFINING FURNACE

The plant is presently operating with 5- LRF's with common VD capacities of 65 T each. Secondary steel treatment in the LRF provides the production of steel with high precision of chemical composition and temperature, allows de-sulphurization of metal, to be brought up to the specified parameters. The amount of non-metallic inclusion serves as the accumulating and damping facility between a melting unit and steel casting units. Since this is an alloy steel unit, the secondary additions are carried out in this LRF unit to have the required chemical composition. Thus refined steel from LRF is subjected to Vacuum Degassing (VD) in the common VD unit for 2 LRF. It provides high degree of degassing, de-oxidation, de-sulphurization, de-carburization and non-metallic inclusion or removal. LRF + VD units are equipped with argon lancing or if necessary, with oxygen blowing. Required vacuum is created with the aid of VD boilers (2 Nos.). In the proposed EC amendment, the LRF#1 primary dedusting system flue gas volume of about 38000 Nm3/hr will be taken to secondary dedusting system of LRF which is having the designed capacity of 550000 Nm^3/hr & currently operating with flow of about 400000 Nm^3/hr. After this connectivity the flow will be 438000 Nm^3/hr in secondary dedusting and the primary de-dusting of LRF-1 will be spared to CCM-3 grinding machine as APC. LRF- 5 with VD system & 2 Nos of BF gas boilers are proposed in the EC amendment to cater the process time requirement for producing special steel. The liquid steel after secondary metallurgy operation is sent to continuous casting machine. All ladle furnaces 1 - 4 are connected to common secondary dedusting stack with bag filter installed to clean the gas before letting out into atmosphere.

Online continuous emission monitoring systems are installed in the above system and the real time data is connected to CAC, TNPCB, Chennai. Provisions are made to raw water & RO water makeup for cooling application and effluent water is connected to guard pond for treatment and reuse. The collected dust recycled back to sinter plant.

2.4.8 CONTINUOUS CASTING MACHINE

Existing two numbers of casters comprising of each three stand billet and bloom casters with the capacity of 0.35 & 0.5 MTPA respectively. In the phase-1 expansion activity CCM-3 is installed with the capacity of 0.45 MTPA and commissioned. At present the total production capacity of CCM is 1.3 MTPA. During continuous casting, the liquid steel from the pouring ladle, with the exclusion of air, via a tundish with an adjustable discharge device into the short, water-cooled copper mould. The shape of the mould defines the shape of the steel. Before casting, the bottom of the mould is sealed with a dummy bar. As soon as the bath reaches its intended steel level, the mould starts to oscillate vertically in order to prevent the strand adhering to its walls. The red hot strand, solidified at the surface zones, is drawn from the mould, first with the aid of a dummy bar, and later by driving rolls. Because of its liquid core, the strand is carefully sprayed and cooled down with water. A roll on all sides is also support it until it has completely solidified. This prevents the still thin rim zone from disintegrating.

Once it gets completely solidified, the strand is divided by mobile cutting torches or shears. Intensive cooling leads to a homogeneous solidification microstructure with required technological properties. High casting speeds are achieved depending on dimensions and the number of strands that cast simultaneously speeds of about 0.35 to 0.7 m/min for bloom caster and 1.2 m/min for billet caster. The existing CCM shop consists of a billet caster & bloom caster which produces billets & blooms. Online continuous emission monitoring systems are installed in the above system and the real time data is connected to CAC, TNPCB, Chennai. Provisions are made to raw water & RO water makeup for direct and indirect cooling application and effluent water is connected to guard pond for treatment and reuse. A stack of steam exhaust system is installed with the height of 33m and one more additional stack is proposed to install as same as CCM#2 in the EC amendment. A DG set of capacity 1250 KVA also installed as emergency application. Fresh & waste water is used for direct cooling purpose and scale removal will be led into a scale pit. The clear water recycled back to system. The scales are being sent to sinter plant.

2.4.9 BAR AND ROD MILL

BRM existing capacity is 0.40 MTPA, during the phase-1 expansion the capacity is

augmented by addition of 0.08 MTPA by replacing 3 high mill with new sliding stand and the present capacity of the unit is 0.48 MTPA. The billets are transported to rolling mill billet transfer car/crane to billet storage and conditioning Bay of bar and rod mill. Mild steel billets will be stored and the alloy steel billets will be conditioned.

To increase capacity of the mill up to 0.48 MTPA two sliding stand/six continuous stand in place of trio is incorporated. The mill is designed to roll wide range of mild steel and alloy steel products. Steel billets of size 160 mm x 160 mm x 8m and 220 x 220 x 8m with variety of grades are fed into the 1 No of 100 t/hr. rapid re-heating furnace to heat it to a maximum of 1250oC. After attaining the required temperature, these hot billets are discharged from the furnace and fed into a three high mill for further reduction to 104 mm x 112 mm. Billet reduced at TRIO will be sent to continuous mill (Train 1, 2 & 3) for further reduction to get the required finishing size at the Kocks Block. Bars/flats, leaving the Kocks Block/Continuous mill are divided by a dividing shear located after the continuous mill, fed into the cooling bed and further cut into 500T cold shear. Finished product are bundled in the bundling station and stacked in the yard in respective location. In case of coil production for sizes less than 16 mm, bars leaving the Kocks Block are finished at NTM and they are wound in coil shape by the Laying Head which is guided by a pinch roll.

The bottom end of the pipe revolves rapidly and forms the rod into rings that overlap in Spenserian form on to the stelmor conveyor where it can control the cooling rate of the coil with the help of blowers. The coils are carried through the conveyor and the coils are loaded to the 'C' hook conveyor by means of coil transfer car and they are cooled to ambient temperature after passing through a conveyor consisting of 100 nos. of 'C' hooks. These coils are inspected, end trimmed, compacted, bound/strapped and unloaded from the conveyor. Coils are then stacked at the stacking yard at the designated places. In case of coil production for sizes more than 16 mm, the finished bar from Kocks travel through water boxes 1 & 2, then it is fed through pinch roll to the Garret Coiler.

These hot coils are handled with the help of a plate conveyor. The coils are carried through the conveyor and the coils are loaded to the 'C' hook conveyor by means of coil transfer car and they are cooled to ambient temperature after passing through a conveyor consisting of 100 nos. of 'C' hooks. These coils are inspected; end trimmed, compacted, bound/strapped and unloaded from the conveyor.
Coils are then stacked at the stacking yard at the designated places. BF cleaned gas is used as fuel in the BRM furnace and after heat exchange the flue gas is vented out through

dedicated stack system. Due to the augmentation the expected consumption of BF gas will be marginal and the existing stack provisions are sufficient to handle. The existing reheating furnace system will be maintaining the temperature of the bars to product conversion and thereby intermediate furnace system is not in operation and the respective process and stack will be removed after the EC amendment.

Online continuous emission monitoring systems are installed in the above system and the real time data is connected to CAC, TNPCB, Chennai. Provisions are made to raw water & RO water makeup for direct and indirect cooling application and effluent water is connected to guard pond for treatment and reuse. Minimum quantity of solid waste which is called Mill Scale is generated and the same is reused in sinter plant. Based on the customer specifications/requirements bars and coils will be sent to annealing process

2.4.10 BLOOMING MILL

Existing capacity of BLM is 0.36 MTPA and during the Phase-1 expansion the capacity is augmented by addition of 0.12 MTPA. At present the capacity of blooming mill is 0.48 MTPA. The following modifications were executed to the capacity enhancement. Cooling bed downstream modification with new Abrasive saw and new Bundling machine, up gradation of slow cooling facility, Additional 35/10 MT EOT crane in Mill bay, New stand assemblies for continuous mill and Modification of Reheating furnace/ additional pre-heating furnace. Blooming mill is designed to produce heavy rounds in the range of 60 to 200 mm, Round Cornered Square (RCS) in the range of 55 to 240 mm as finished product having a capacity of 0.48 MTPA. The raw material input to the mill is from Bloom caster of sizes (i) 250 x 250 mm (ii) 280 x 370 mm (iii) 310 mm dia and (iv) 340 x 400 mm. Blooming Mill consists of BF Gas fired reheating furnace of 100 T capacity with High pressure water jet de-scaler to remove the scale formed during heating. Rolling takes place in two stages - Reversible mill and Continuous mill.

The Intermediate size from two high Reversible mill is fed into 8 stands Continuous Mill (Horizontal and Vertical mill) for further reduction to required sizes. The products are transferred to hot saw, where it is cut into customer required lengths and transferred to cooling bed. The end product after cooling is bundled and given for inspection. 100% Inspection of rolled bars takes place in automatic inspection line. After inspections the bars are bundled and stored in stacking area for dispatch. BF cleaned gas is used as fuel in the

BLM furnace and after heat exchange the flue gas is vented out through dedicated stack system. Due to the augmentation the expected consumption of BF gas will be marginal and the existing stack provisions are sufficient to handle. Online continuous emission monitoring systems are installed in the above system and the real time data is connected to CAC, TNPCB, Chennai. Provisions are made to raw water and RO water makeup for direct and indirect cooling applications and effluent water (cooling tower and MGF back wash) is connected to guard pond for treatment and reuse. Solid waste termed as Mill Scale is generated from BLM will be reused in sinter plant as existing practice.

2.4.11 PICKLING PLANT

The pickling plant installation is under progress with the capacity of 0.06 MTPA and the process is closed tunnel type design and Sulphuric acid will be used as pickling material. There will be 4 Nos. of pickling bath tanks with working capacity of 15 m3 each and 3 nos. of water bath for washings. Out of 3 water baths, 1 No. will be used for high pressure water rinse with the capacity of 7 m3 and 2 Nos. will be used for dip rinse with the capacity of 15 m3 each.

Wire rod coils (approx. weight of 3 MT) will be taken through 'C' hook and dipped in 1st or 2nd pickling bath (both are inter connected) for about 15 meter where the concentration of acid will be expected about 14-16%. Subsequently the coils will be dipped in to pickling bath 3 & 4 and the expected acid concentration will be 18-20%. Overall duration of the pickling process will be 30 mins/cycle. To maintain acid bath concentration about 18- 20 % (effective pickling), fresh acid (98 %) will be fed in to pickling bath No 4. Pickled acid (spent pickling liquor) with the expected concentration of 12 - 14 % will be periodically (automated) drained from pickling bath no.1

The spent pickling liquor will be transferred to spent pickling liquor collection tank (30 m3 capacity). In view of minimize the resource depletion (Fresh acid consumption) and Hazardous waste generation an Acid Regeneration Plant (ARP) will be installed with the capacity of 1.5 m3/hr. The spent pickling liquor will be sent to ARP unit to separate out the regenerated acid and Ferrous Sulphate. A dedicated LPG based hot water generator will be installed to maintain the acid temperature of 50oC before stored in to regenerated

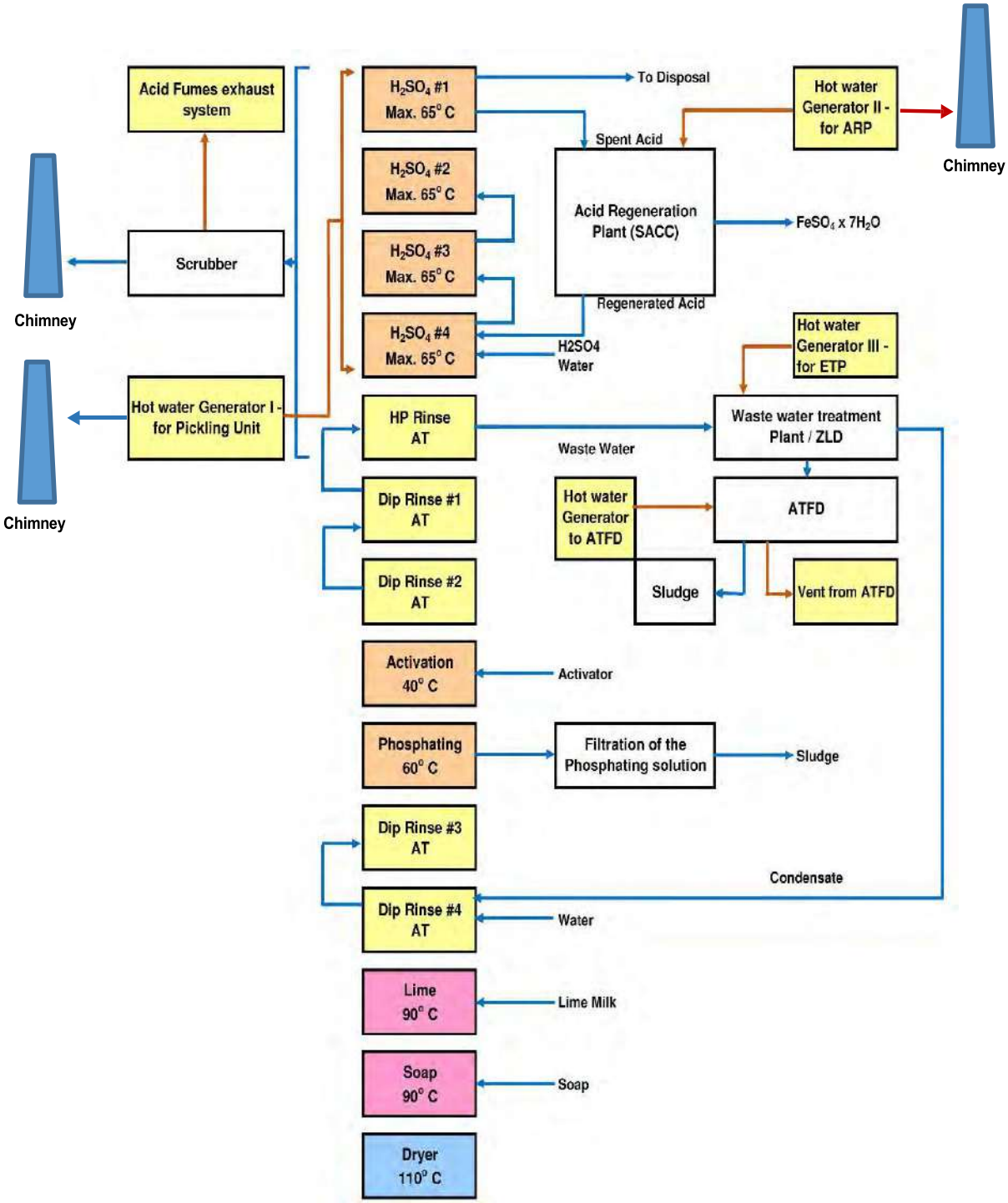
acid tank. Flue gas from the hot water generator will be discharged through a dedicated stack with the height of 10m. The operation of hot water generators of pickling bath and

ARP will be automated and based on the needs only the operation will happen. The regenerated acid (conc.18-20%) will be transferred to a dedicated acid tank (30 m3 capacity) and subsequently fed in to acid bath No #4 to maintain the concentration of acid at 18-20%. Due to this facility, expected fresh acid (98%) consumption will be about 2 MT/day and for this 35 MT capacity dedicated storage tank is provided. Fresh acid tank, spent pickling liquor tank and Regenerated acid tank are installed in a same platform with secondary containment (below the ground level with chemical coated bricks) for safe handling. Considering the ARP system operational conditions about 200 MT of Spent pickling liquor will be disposed to TNPCB authorised vendor for proper disposal. Ferrous sulphate will be used/sold as fertilizer.

The pickling process is highly effective at the temperature of 65oC. To meet this requirement, a hot water generator will be installed to supply hot water (temperature 130oC at 6 bar) to all the pickling baths through indirect heating by tube type heat exchangers. Based on the temperature profile, the hot water generator will be operated automatically and HSD will be used as fuel and the flue gas will be discharged through a dedicated stack with the height of 30m. The water (after indirect heating pickling baths) will be recycled back to hot water generator. After acid pickling, coils will be shifted to rinsing process to remove residual acid. In this process, coils will be rinsed with high pressure water jet for about 2 min. in a bath with capacity of 15 m3. Then the coils will be moved to dip rinse baths 1 & 2 for about 2 min. From the rinsing baths about 2.5 m3 of waste water will be expected to generate and collected in acid waste water collection pit/sump.

During operation phase acid fumes generation will be expected from the pickling process. In view of improve the work area environment, a dedicated acid fumes exhaust system will be installed with scrubber and a blower with flow rate of 150000 Nm3/hr. In the scrubbing unit water will be continuously recirculated to dilute the acid fumes and acid free mist will be discharged through a dedicated stack with the height of 30m. Scrubbed water pH will be monitored through online and based on the pH level of 2.5 – 3.5 effluent water will be automatically drained and the same will be sent to the existing acid waste water collection pit/sump. The expected total effluent from pickling plant will be about 3.15 m3/hr will be treated in a dedicated ZLD ETP for treatment and reuse.

2.4.11.1 PICKLING PROCESS FLOW DIAGRAM



2.4.12 LIME AND PHOSPHATING

Based on the customer specification, after pickling coils will be moved to lime solution bath for about 3 min. which will be provided with the tank capacity of 20 m3 and subsequently moved to electrical drier unit for drying application. After pickling, coils will be moved to phosphating process (surface coating) to prevent oxidation. To remove the excess phosphate from the phosphate, bath the solution will be filtered through dedicated filtering system and expected phosphate sludge generation will be about 100 MT/annum. Phosphate sludge will be disposed through TNPCB authorized vendor for proper disposal. After phosphating, the coils will be moved to phosphate dip rinse and about 0.5 m3/hr of effluent water will be generated from the baths. The effluent will be collected in phosphate waste water collection sump and subsequently send to the ZLD ETP for treatment and reuse. Based on the customer's specifications the coils will be sent to soap coating bath with working capacity of 10 m3 for surface smoothness by using Soap solution and further sent to drier which will be operated electrically. The finished pickled product will be stored and despatched to customers.

2.4.13 ANNEALING PLANT

The Annealing plant is installed in phase-1 expansion activity with the capacity of 0.06 MTPA. The unit consists of bar & coil annealing. Based on the customer specification & requirement, the bars and coils will be processed in the annealing plant. The Annealing complex is designed to produce heat treated Rounds, Square bars with round corners in the range of 55-160 mm as finished product and Heat treated wire rod coils in the range of 5.5 mm to 32 mm.

Rolled bars and coils from Rolling Mills are input to the Annealing plant. Annealing process is basically a dry process where electrical energy & nitrogen will be used for heating and cooling respectively. There is no consumption of water, discharge of emission from the process.

Coil Annealing Furnace (CAF)

The wire rod coil annealing furnace is a 100 m^3 bell annealing furnace (BAF) which

operates from room temperature to 810^{O}C maximum by electrical power and the cycle time of the furnace is up to 53 hours. Here the wire rod coils are placed one above the other in coil carrier (Stem) and loaded inside the furnace chamber. 28 stems are loaded and covered with inner cover. Nitrogen purging will be done inside the inner chamber of BAF to make inert atmosphere. As a result of inert atmosphere, no oxidation takes place in the wire rod material and the result of it is, no Iron scale formation is expected. Heating hood is placed above the inner cover and it consists of heating elements with refractory lining. Electrical energy is converted to heat energy by the heating elements and the wire rod coils are heated indirectly by convection. Heating of the material takes place gradually; soaking takes place at the required temperature and then slow cooling to Room Temperature. Cooling is done through blowers located in bottom of the heating hood. It sucks and throws the atmosphere at various locations and it is circulated over the inner cover to remove the heat and vented through two flaps located at the top of the heating hood.

In this process also no atmosphere will directly contact the wire rod coil and there is no chance of Iron scale generation. Once the temperature reaches to less than 500^{o}C, heating hood is removed and cooling hood is placed over the inner cover for natural cooling. The expected Nitrogen & electrical power consumption will be 35 Nm3 & 300 KWH per ton of coil annealing respectively.

Bar Annealing Furnace (BAF)

The bar annealing is a continuous roller type furnace and material moves from one end of the furnace to other end. The furnace operates to a temperature of 900oC and cycle time is up to 33 hrs. The furnace consists of Loading Table, Vacuum Chamber, Intermediate table, Heating Zone, Cooling Zone & Unloading Table. The heating zone length is 43 meters and cooling zone length is 33 meter. Total length of the furnace is purged with nitrogen to maintain the inert gas atmosphere. Nitrogen will be used to maintain inert atmosphere throughout the furnace to avoid any oxidation. Due to the above, Iron Scale formation not expected from the process. The raw material input is round bar and square bar, which moves on a slow moving rollers into various zones as per the given program. The heating is done by electrical power with heating element and radiant tubes. Heat is transferred by convection method and it takes gradually. Based on the customer requirement, soaking & cooling temperature will be maintained. The expected Nitrogen & electrical power consumption will be 50 Nm3 & 300 KWH per ton of coil annealing respectively.

2.4.14 PEELED AND GROUND

The production capacity of peeled & ground unit is 0.04 MTPA. The Peeling Head unit is designed to have 5 tool holders with tool bits. At present 1 tool holder with tool bits is installed with the capacity of 0.01 MTPA and commissioned. Peeling machine driven by Electric motor with gear box units through belt drives. Coolant oil will be continuously circulated to reduce the heat which was produced during peeling operation. Before the Peeling head, Pinch roll will be operated to push the bar into the peeling head.

Pinch roll is a Motor and gear box driven. Both top and Bottom roll locked mechanically, depending up the bar size which is to be maintained in the level of the bar in peeling head. Pinch roll speed is controlled by VFD drive control make of Danboss. Each bar will be manually feed into peeling head through pinch roll after the required size setting. Before pinch roll and after the Peeling machine either side 1 no bar holding trolley will be available. Bar will be hold by the vice with is attached in the trolley itself. Bar will be moved towards peeling head with the help of pinch roll. Other end of the peeling head having the guide rollers which will make considerable smoothness to the peeled bars. The Other end of the trolley holds the bar which will arrest the vibration of the bar while come out from peeling machine, and pull out the bar simultaneously. Machine production - 40 mm to 75 mm diameter. While peeling scrap chips (Bar skin) are collected in the collecting tray which is below the peeling head, which will send to scrap yard for recycle process. After peeling, bars will be transferred through transfer table to the Reeling machine. Depending up the Bar size reeling machine rolls gap will be set for reeling operation. Both side rollers having supporting screws with stopper plate which is connected with heavy tie rod, to withstand the load during reeling Operations. During reeling operation coolant oil will feed to the bar to remove the heat. Straightened bar tolerance will be roughly 1.5 mm per motor & 3 mm of maximum 6 meter. After reeling operation, manually bar will be collected in the collecting table.

2.4.15 CENTER LESS AND GRINDING MACHINE

Peeled and reeled bar are placed in the charging grid of the center less grinding machine. Individual bars will be lifted and placed on the Teflon roller table and feeding through center less grinding machine. In grinding machine - grinding size of the bars from 20 mm

diameter up to 100 mm diameter. Grinding wheel size: 610mm OD diameter x 355.8mm ID X 305mm thickness. Regulating wheel will guide the bar in a straight line and grinding will happen uniformly throughout the bar by grinding wheel. Max grinding can be carried out in the range of 40 to 50 micron. Ground bars will be collected in the discharging grid which will bundled 1 MT or 1.5 MT as per requirement. Coolant oil will be continuously circulated to reduce the heat which was produced during peeling operation. Iron powders during the grinding Operation will be collected and reused in sinter plant. In the process air and water pollutions are not anticipated and noise level will be maintained within the limit.

2.4.16 AIR SEPARATION PLANT

Existing plant is having two units with the capacity of 150 TPD and 390 TPD respectively. In the phase #2 expansion activity additional 250 TPD capacity of ASP is envisaged to cater Oxygen enrichment in blast furnace and steel making shop. However, considering the technological up gradation the proposed 250 TPD capacity may be enhanced to 390 TPD and proposed to dismantle the existing 150 TPD ASP. After the implementation the capacity of ASP will be 780 TPD (2 x 390 TPD). High purity oxygen will be consumed in SMS process and low purity oxygen will be consumed in blast furnace for oxygen enrichment and also in the steelmaking shop for EOF lancing, LD Converter, LRF and in while cutting in CCM. Argon will be required for rinsing in ladles and also to maintain inert atmosphere in the mould/tundish. Nitrogen will be required for purging of gas pipelines, blast furnace top charging equipment, etc. Oxygen, nitrogen and argon will be produced by air separation process based on low pressure cryogenic cycle and double column rectification system. Oxygen shall be supplied with internal compression with process liquid pumps and nitrogen either internal or external compression. Provisions are made to sell surplus by-products of Liquid Oxygen, Liquid Nitrogen & Liquid Argon

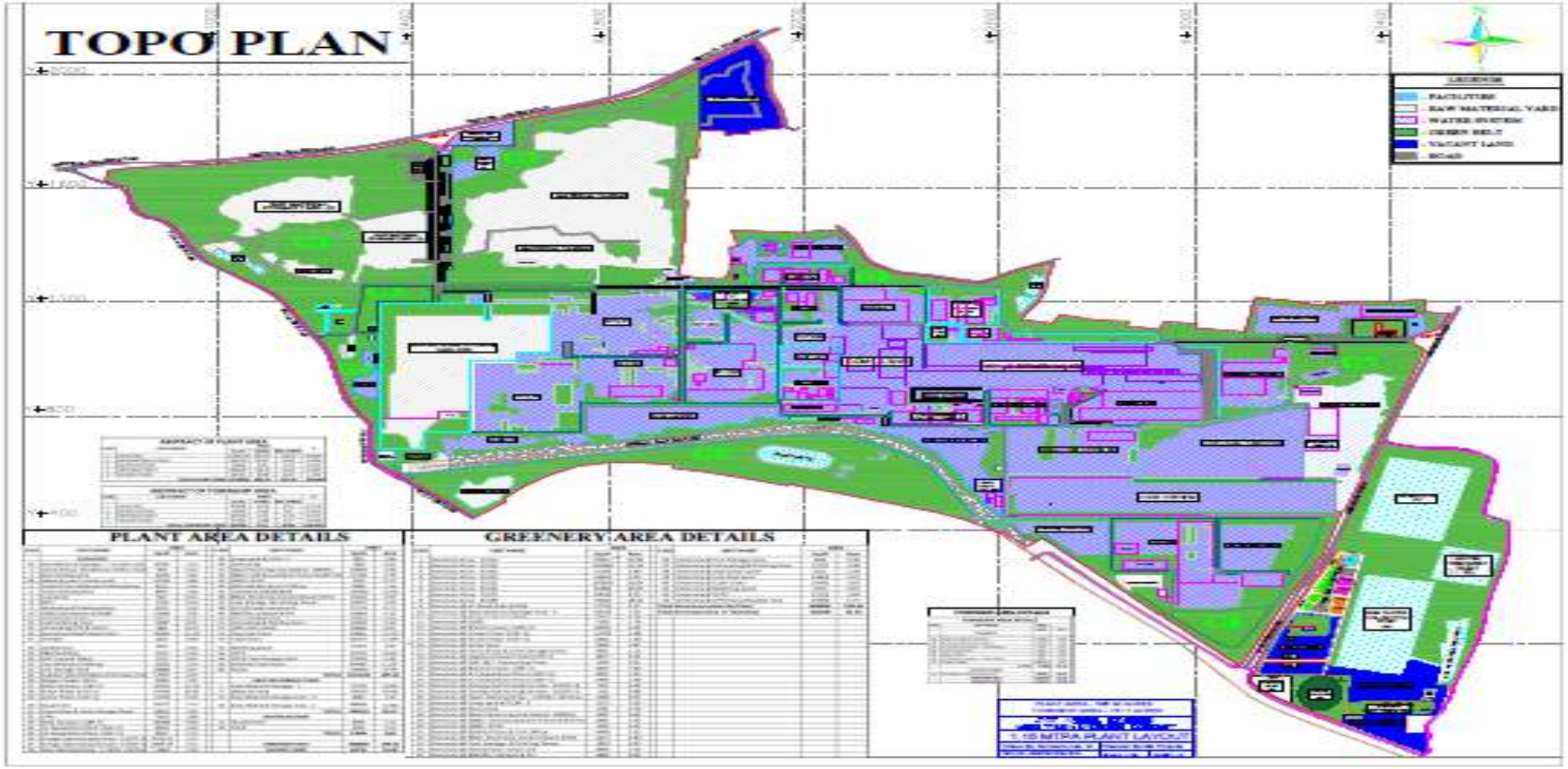
2.4.17 CAPTIVE POWER PLANT

Existing captive power plant comprises of;

- 3 x 30 MW using 5 Nos. WHR Boilers of COP sensible heat, 1 No. of BF gas and 1 No. of coal based (AFBC boiler.).

Air cooled condenser is installed in place , there is also a small cooling tower with the capacity of 500 m3 RCR is installed, and boiler is operated at present at 60 – 70 TPH, however, at peak capacity boiler will operate at the designed capacity of 127 TPH for power generation. The average power demand of the plant is 90 MW. Power to the tune of 90 MW is generated. The entire requirement of electric power is met from captive generation taking the support of state electricity grid for stability. Coal based boiler is connected to ESP with a dedicated stack with the height of 80m and all other Waste heat recovery boilers & BFG boiler are connected with a dedicated stack of 30 - 35m height, including WHRB #3 boiler with stack height of 30 metres.

2.5 PLANT LAYOUT



2.6 WATER CONSUMPTION

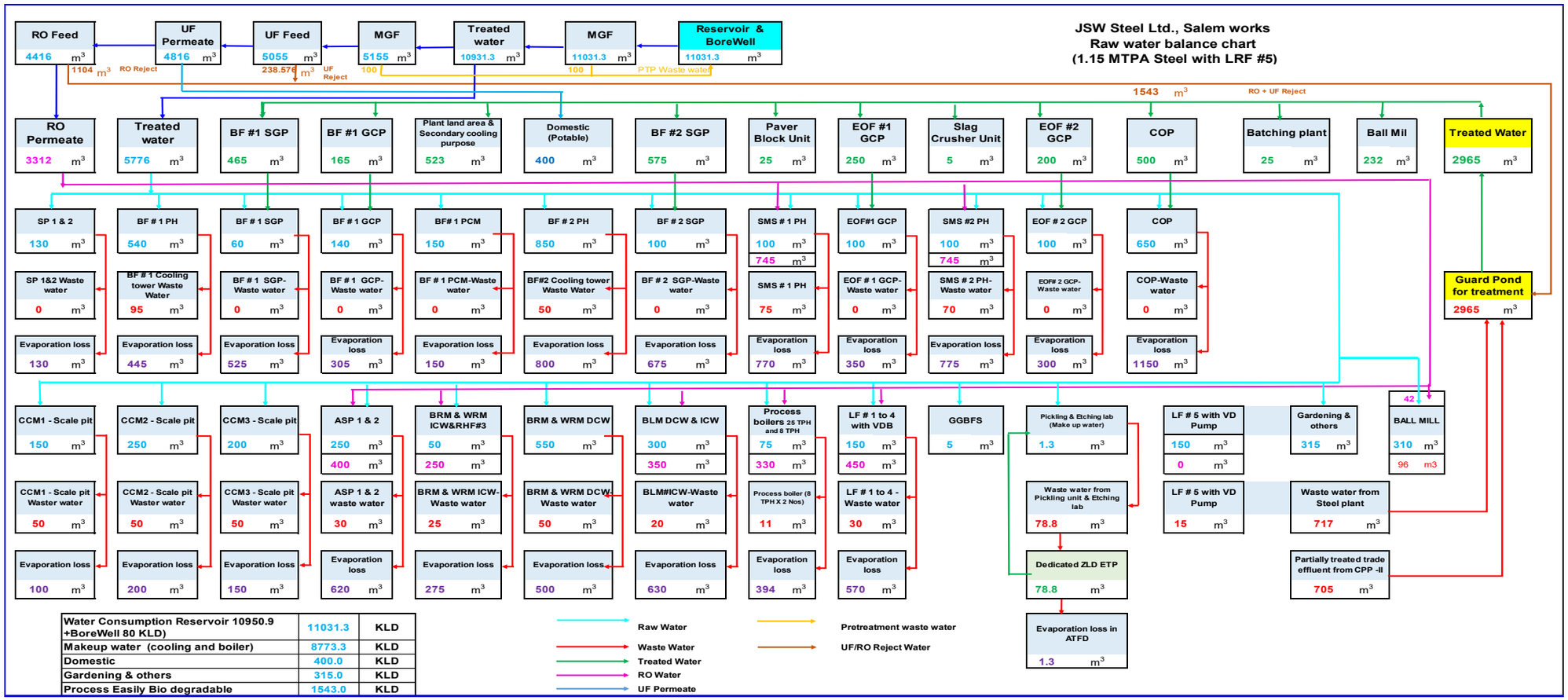
An agreement already exists between PWD and JSWSL to utilize 5 MGD (22730 KLD) of raw water from downstream of Mettur dam. For the existing plant the fresh water requirement is 3.9 MGD (17727 KLD against the sanctioned capacity of 5 MGD (22730 KLD). A raw water storage reservoir is located within the JSW premises to meet up to 12 days of its requirement.

A RO plant with the capacity of 4 MLD is installed in the upstream and the RO permeate is blended with fresh water and used as makeup for cooling towers where by COC is increased which is resulting in reduction of blow down water generation from steel plant. RO reject water TDS about 1200 mg/l is sent to waste water treatment plant for treatment and reused. Treated waste water is re-used in steel plant for non-critical applications like SGP, GCP, Quenching and green belt maintenance. **ZERO WASTEWATER DISCHARGE** is fully implemented.

The water consumption is largely for cooling water make-up & requirement as follows

WATER USAGE POINT	QUANTITY KLD
Cooling Water Make-Up & Boiler Make-Up	8773.3
Other Process Water	1543.0
Green Belt	315.0
Domestic Requirement	400.0
TOTAL	**11031.3**

2.6.1 WATER BALANCE



2.7 POWER & FUEL CONSUMPTION

The power requirement of the plant to the extent of 101.5 MW is met largely from its captive power plant (CPP-II: 3 x 30 MW) & balance from TANGEDCO. Facilities are provided for import & export of power from TANGEDCO, & a power purchase agreement to extent of 38.4 MVA is already in place with TANGEDCO.

2.8 MANPOWER

The total work force in the present operating plant including both steel plant & captive power plant is around 5391-Nos, consisting of managerial staff, executives, engineers, supervisors, skilled/non skilled labours etc.

3 POLLUTION WASTE & ITS MANAGEMENT

The various types of pollution from the plant are categorized under the following:

- Air Pollution;
- Water Pollution;
- Solid waste; and
- Noise Pollution

3.1 AIR POLLUTION & MITIGATION MEASURES

Dust & Gaseous Emissions are the predominant source of pollution from the operations such as Sinter Plant, Blast Furnace, Mills and power plant where combustion and reduction process taking place. The flue gas generated from these processes are taken to appropriate air pollution control measures like ESP, Bag filters, venturi scrubbers, cyclone separator, etc., and the cleaned gas is vented to the atmosphere through dedicated stacks. All the process emissions are complying the standard prescribed. Online stack monitoring systems are installed in various processes to monitor the emission level continuously and to take immediate corrective action if the emission level move away from the prescribed standard. The details of stack emission including its characteristics are as detailed below

3.1.1 STACK EMISSION DETAILS

Stack No.	Stack Name	Air Pollution Control Measures	Height from Ground Level in m	Gaseous Discharge (Nm^3/hr)	Diameter (m)	Velocity (m/s)
1	Sinter Plant -1 (0.175MTPA) Sinter Machine	ESP with stack	45.0	126000	1.60	17 - 19
2	Sinter Plant -1 Sinter Machine Cooling System	ESP with stack	35.0	102024	2.00	10 - 12
3	Sinter Plant -1 Dedusting system	Bag House with stack	30.0	150000	2.20	10 - 12
4	Sinter Plant -1 – Raw Material Handling System	Bag House with stack	34.0	30000	1.00	9 - 11
5	Sinter Plant -1 Product Bin Dedusting System	Bag House with stack	14.0	16000	0.65 x 0.46	14-16
6	Sinter Plant -2(1.06 MTPA) Sinter Machine	ESP with stack	85.0	660000	4.00	18-20
7	Sinter Plant -2 Plant De-Dusting & Cooling System	ESP with stack	50.0	485000	3.80	10 - 12
8	Sinter Plant -2 Fuel Crushing & Raw Material De-Dusting System	Bag House with stack	32.0	140000	1.75	14-16
9	Sinter Plant -2 Sinter Conveyor Dedusting System	Bag House with stack	14.0	16000	0.60 x 0.40	18-20
10	Coke Oven Plant(NRT) (0.50 MTPA) Coke Wet Quenching Tower	Grit Arrestor Stack	32.0	100000	15.40 x 3.50	14-16
11	Coke Oven Plant(NRT)-Coke Oven Battery-1(Emergency Stack -1A&1B)	Stack	75.0	120000	3.0	9-11
12	Coke Oven Plant(NRT)-Coke Oven Battery-2(Emergency Stack)	Stack	80.0	30000	3.78	9.11
13	Coke Oven Plant(NRT) Coke Oven Battery-3(Emergency Stack)	Stack	65.0	70000	2.50	14-15
14	Coke Oven Plant(NRT) Coke Cutter De-Dusting	Bag House with Stack	30.0	40000	1.15	11-13
15	Coke Oven Plant(NRT) Coke Drier Dedusting	Bag House with Stack	30.0	150000	1.70	14-16
16	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 1	Stack	35.0	75000	1.38	13-15
17	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 2	Stack	35.0	75000	1.38	13-15
18	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 3	Stack	35.0	120000	1.80	11-13
19	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 4	Stack	35.0	75000	1.38	15-17
20	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 5	Stack	35.0	75000	1.55	15-17
21	Blast Furnace Gas Fired Boiler	Stack	35.0	60000	1.38	14-16
22	Blast Furnace -1 (0.437 MTPA) Hotstove	Stack	60.0	58000	2.15	9-10
23	Blast Furnace -1 Gas Cleaning Plant Flare (Emergency Stack)	Venturi Scrubber with Stack	40.0	35000	0.72	14-15
24	Blast Furnace -1 Stock House & RMHS De-Dusting	Bag House with Common Stack	36.0	350000	2.70	17-19
25	Blast Furnace -1 Cast House De-Dusting	Bag House with Stack	41.0	460000	3.00	12-13
26	Blast Furnace -1 Skull Cutting De-Dusting	Bag House with Stack	20.0	20000	0.60	17-19
27	Blast Furnace -1 Iron-Ore Supply Conveyor #1 De-Dusting	Bag House with Stack	1.80	7500	0.40	15-17

Stack No.	Stack Name	Air pollution Control Measures	Height from Ground Level in m	Gaseous Discharge (Nm3/hr)	Diameter (m)	Velocity (m/s)
28	Blast Furnace -1Iron Ore Supply Conveyor #2 De-Dusting	Bag House with Stack	2.30	7500	0.40	15.17
29	Blast Furnace -2 (0.683 MTPA) Hot stove	Stack	50.0	200000	2.50	14-16
30	Blast Furnace -2 Gas Cleaning Plant (Emergency Stack)	Bag House with Stack	50.0	60000	1.20	12-14
31	Blast Furnace -2 Stock House & RMHS De-Dusting	Bag House with Stack	35.0	350000	2.70	17-19
32	Blast Furnace -2 Cast House De-Dusting System	Bag House with Stack	43.5	691000	3.60	14-16
33	Blast Furnace – Pulverized Coal Injection	Bag House with Stack	49.0	72000	1.10	14-16
34	Blast Furnace -2 Raw Material Conveyor De-Dusting	Bag House with Stack	23.6	27500	0.63	11-13
35	Process Steam Supply Boiler (1 x 25TPH & 1 X 8TPH) BF Gas Based	Common Stack	61.0	62500	1.85	13-15
36	Energy Optimizing Furnace -1(0.64 MTPA) Primary De-Dusting	Venturi Scrubber with Stack	43.0	80000	1.70	14-16
37	Energy Optimizing Furnace -2(0.62 MTPA) Primary De-Dusting	Venturi Scrubber with Stack	43.0	82000	1.70	14-16
38	Energy Optimizing Furnace -1 & 2 Secondary De-Dusting	Bag House with Common Stack	43.0	550000	3.50	14-16
39	Ladle Refining Furnace 1,4 & 5(65 T/Heat each) Primary & 1 to 4 Secondary De-Dusting	Bag House with Common Stack	43.0	550000	3.50	14-16
40	Ladle Refining Furnace 2 & 3 (65 T/Heat each) Primary De-Dusting	Bag Filter with Common stack	40.0	75000	1.60	13-15
41	Process Steam Supply Boilers 1&2 for Vacuum De-Gassing (BF Gas Fired)	Common Stack	42.0	90000	1.50	10-12
42	Continuous Casting Machine -1(0.35 MTPA) Steam Exhaust	Stack	24.0	45000	1.05	12-14
43	Continuous Casting Machine -1(0.35 MTPA) Billet Grinding Machine	Stack	30.0	29000	1.0	11-13
44	Continuous Casting Machine -2(0.5 MTPA) Steam Exhaust Stack 1 & 2	Stack	26.2	45000	1.0	16-18
45	Continuous Casting Machine -2 Cut Fumes Exhaust	Stack	21.0	80000	1.50	16-18
46	Continuous Casting Machine -2 Billet Grinding Machine	Stack	30.0	40000	1.20	11-13
47	Continuous Casting Machine -3(0.45 MTPA) Steam Exhaust Stack 1	Stack	26.2	45000	1.00	16-18
48	Continuous Casting Machine -3 Steam Exhaust Stack 2	Stack	33.0	45000	1.00	16-18
49	Continuous Casting Machine -3 Billet Grinding Machine	Bag House with Stack	40	38000	1.20	12-14
50	Blooming Mill (0.48 MTPA) Re-Heating Furnace Stack - 1	Stack	30.0	40000	1.20	12-14
51	Blooming Mill (0.48 MTPA) Re-Heating Furnace Stack - 2	Stack	30.0	40000	1.30	12-14
52	Bar & Rod Mill (0.48 MTPA) Reheating Furnace Stack 1 & 2	Stack	30.0	120000	1.20	11 - 13
53	Pickling Plant (0.06 MTPA) – Acid Fume Exhaust	Wet Scrubber with Stack	30.0	45000	1.00	14-16
54	Pickling Plant – Acid Bath – Hot Water Generator	Stack	30.0	9000	0.30	14-16
55	Pickling Plant – Acid Regeneration Plant – Hot Water Generator	Stack	10.0	2000	0.30	4-6
56	Pickling Plant – Multiple Effect Evaporator (Thermic Fluid Heater)	Stack	30.0	9000	0.50	14-16
57	Sinter Plant Waste Gas to BF Slag Grinding Unit (Emergency Stack)	Damper with Vent Stack	30.0	660000	2.5	19-21

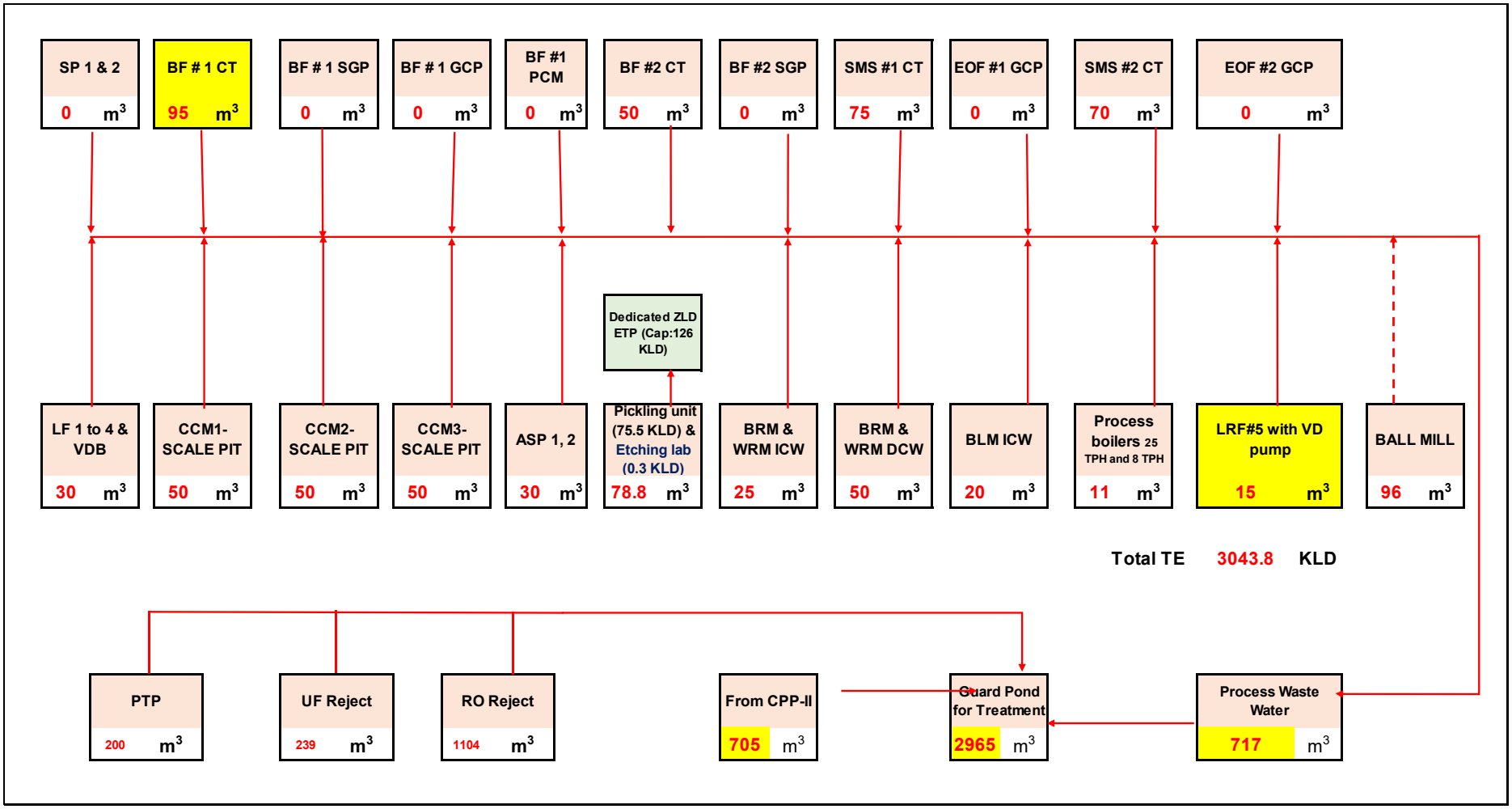
Stack No.	Stack Name	Air pollution Control Measures	Height from Ground Level in m	Gaseous Discharge (Nm3/hr)	Diameter (m)	Velocity (m/s)
58	Batching Plant 1 Cement Silo Vent	Bag House with Stack	15.0	1000	0.10	2-3
59	Batching Plant 2 Cement Silo Vent	Bag House with Stack	15.0	1000	0.10	3-4
60	Lime Kiln Unit	Stack	48.0	70000	1.0	12-14
61	QAD Sample Testing Lab Stack	Double Stage Wet Scrubber	11.0	4000	0.25	17-19
62	D G Set – 625 KVA Coke-Oven Plant	Acoustic Enclosure/Stack	28.5	15000	0.35	25.0
63	D G Set - 1250 KVA Process Steam Supply Boiler	Acoustic Enclosure/Stack	12.0	10000	0.30	25.0
64	D G Set – 625 KVA EOF 1	Acoustic Enclosure/Stack	12.0	10000	0.20	25.0
65	D G Set – 625 KVA EOF 1	Acoustic Enclosure/Stack	12.0	10000	0.20	25.0
66	D G Set – 275 KVA EOF 1	Acoustic Enclosure/Stack	12.0	3025	0.10	15
67	D G Set – 275 KVA EOF 2	Acoustic Enclosure/Stack	12.0	3025	0.10	15
68	D G Set - 1250 KVA EOF 2	Acoustic Enclosure/Stack	12.0	13680	0.30	25
69	D G Set - 1250 KVA CCM 3	Acoustic Enclosure/Stack	12.0	13680	0.40	25.0
70	D G Set – 650 KVA BRM	Acoustic Enclosure/Stack	12.0	7150	0.20	20.0
71	D G Set – 400 KVA Pickling Plant	Acoustic Enclosure/Stack	12.0	4400	0.20	20.0

3.2 WASTE WATER GENERATION & TREATMENT

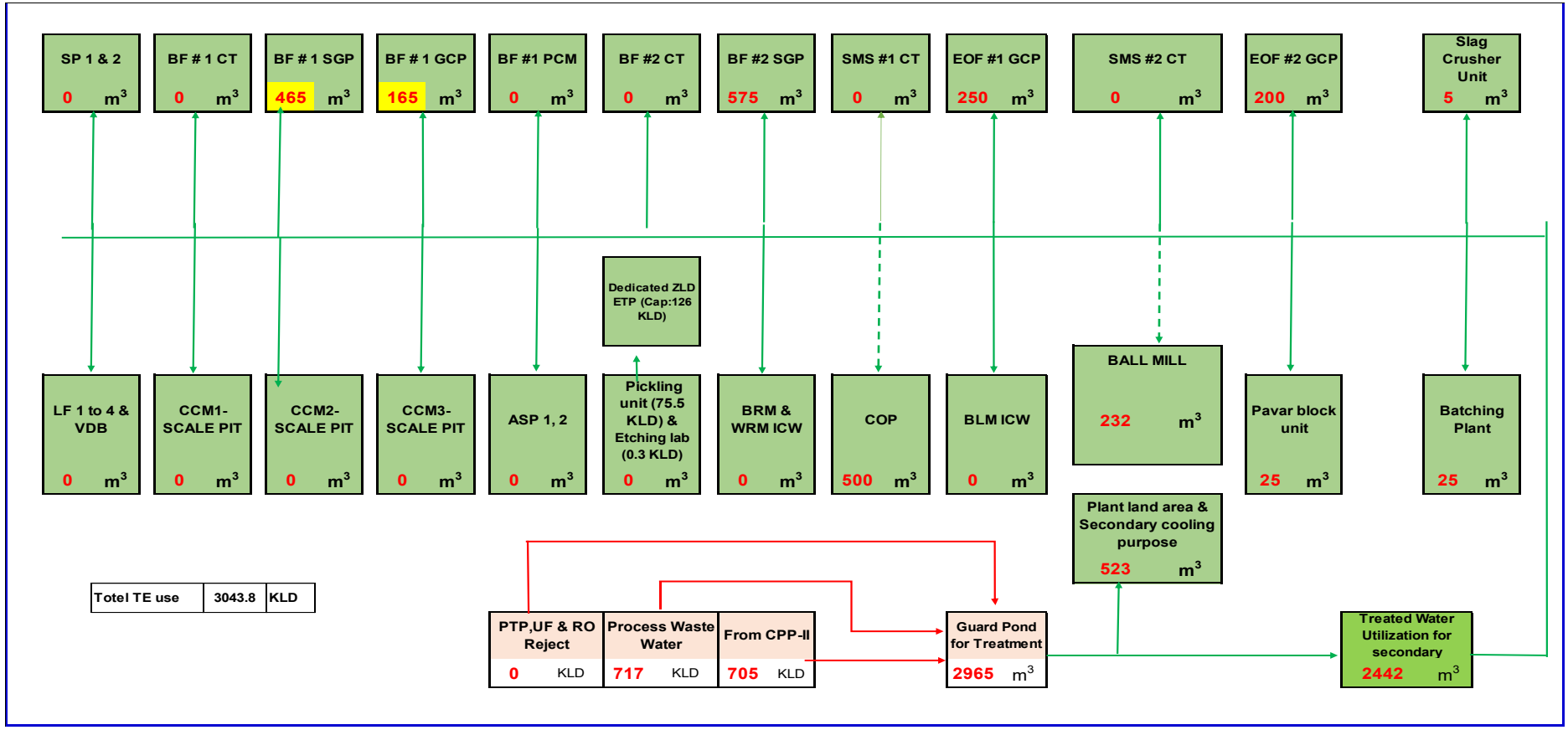
To a large extent the waste water generated is in the form of cooling water blow down, apart from waste water generated as rejects in water treatment plant & captive power plant.

WASTE WATER SOURCE	QUANTITY KLD	RE-USE
Cooling Water Blow Down	2965	Treated & used back for cooling water make-up
Captive Power Plant		
Water Treatment Plant	1542.6	Again mixed with raw water for treatment
Domestic Sewage	299.7	Treated in 2-Separate STP each in plant & township & used for green belt
TOTAL	**11031.3**	

3.2.1 TRADE EFFLUENT GENERATION



3.2.2 WASTE WATER UTILISATION



Two numbers of sewage treatment plants are installed inside plant & township with the capacity of 100 KLD & 200 KLD respectively, to treat the entire domestic sewage generated, which at present is 99.7 KLD in Plant & <200 KLD in the township. Flow meters are installed in STPs for monitoring the treated water flow.

3.2.3 CHARACTERISTICS OF WASTE WATER

3.2.3.1 SEWAGE – TREATED

S. No.	Parameters	Units	Treated
1	pH at 25^0C	Number	7.56
2	TSS at 103^0C at - 105^0C	mg/l	16
3	BOD (at 27^0C for 3 days)	mg/l	<2
4	COD	mg/l	21
5	Ammonical Nitrogen as NH_3.N	mg/l	2.5
6	Total Nitrogen	mg/l	1.0
7	Faecal Coliform	MPN/100 ml	20

3.2.3.2 TRADE EFFLUENT – INLET & OUTLET

S. No	Parameters	UoM	Inlet	Outlet
1	pH		8.2 -8 .4	7.8 -8.2
2	Turbidity	NTU	20 – 30	5
3	Suspended Solids	mg/l	35 -45	15
4	TDS (Max)	mg/l	1700	1650 – 1750
5	Phenolic compounds	mg/l	<0.05	<0.05
6	Cyanide	mg/l	BDL	BDL

3.2.4 COMPONENT OF TREATMENT PLANT

3.2.4.1 SEWAGE TREATMENT PLANT

Name of the Treatment Unit	No. of Units	Dimension (LxBxH in m)
Plant: 100 KLD Capacity		
Collection tank I	1	4.50 x 2.30 x 2.50
Anaerobic tank I	1	4.00 x 4.00 x 3.00
Anaerobic tank II	1	4.50 x 7.00 x 3.50
Screening chamber	1	3.50 x 0.50 x 0.60
Collection tank II	1	3.50 x 1.80 x 3.20
Aeration tank	1	6.70 x 3.50 x 3.50
Clarifier	1	1.90 x 1.90 x 2.90

Chlorine contact tank	1	1.50 x 1.90 x 2.70
Multi Grade Filter	1	10 m^3/hr
Activated Carbon filter	1	10 m^3/hr
Treated water Tank	1	2.50 x 3.50 x 3.50
Sludge drying beds	4	3.50 x 2.00 x 1.80
Township: 200 KLD Capacity		
Anaerobic tank	1	6.50 x 4.70 x 3.00
Screening chamber	1	2.00 x 1.00 x 1.20
Collection Tank	1	2.00 x 2.40 x 2.70
Aeration tank	1	10.00 x 6.00 x 3.00
Clarifier	1	3.20 x 3.20 x 2.80
Hypo dosing tank	1	100 L
Multi Grade Filter - Proposal	1	10 m^3/hr
Activated Carbon filter – Proposal	1	10 m^3/hr
Treated water tank I	1	2.50 x 2.50 x 1.60
Treated water tank II	1	4.00 x 4.00 x 3.00
Sludge drying beds	4	4.00 x 1.00 x 1.50
Source: JSW Steel Limited, Salem		

3.2.4.2 EFFLUENT TREATMENT PLANT

3.2.4.2.1 BLOWDOWN TREATMENT

S. No	Plant	Capacity in m^3/hr	Dimension	Volume in m^3
1	Guard Pond	450	84 dia x 5.5 m height	30,000
2	Clarifier Tank		24 m dia x 3.5 m height	1582
3	Treated water & Storage Tank		10 m x 7.5 m x 3.0 m	225

3.2.4.2.2 FLUE GAS SCRUBBER WASTE TREATMENT

S.No	Plant	Capacity m^3/hr	Dimension	Volume m^3
1	BF -1 GCP	320	19 m dia x 3.5 - 4.3 m height	1050
2	EOF -1 GCP – A	250	15 m dia x 3.0 - 4.2 m height	600
3	EOF -1 GCP – B	200	13.5 m dia x 3.0 – 3.5 m height	450
4	EOF -2 GCP	350	17 m dia x 3.0 – 4.2 m height	770

3.2.4.2.3 SLUDGE THICKENER

S.No	Plant	Capacity m^3/hr	Dimension	Volume m^3
1	Sludge Concentrator (3 No's)	7.30 (Each)	5 m dia x 2.50 - 2.9 m height	52
2	Sludge storage tank (2 No's)	6.25 (Each)	5 m dia x 2.50 – 2.9 m height	52
3	Filter Press (4 No's)	4.5 m^3 (per press)	1.2 m x 1.2 m (72 plates)	215

3.2.4.2.4 PICKLING PLANT ETP

A dedicated Effluent Treatment Plant with the capacity 126 KLD is installed with facilities of MGF, ACF, UF/RO (two stages) and Multiple Effect Evaporators (MEE, 2 stage) followed by an Agitated Thin Film Drier (ATFD). Treated water from the ETP will be reused in pickling process and final concentrate chemical sludge/salt is sent to TNPCB authorized vendor for safe disposal. The raw effluent and treated water characteristics were as follows

S.No.	Description of the parameter	UoM	Raw effluent	Treated water
1	pH	--	0.5-2.0	6.5-7.5
2	TSS	mg/L	< 1500	< 1
3	TDS	mg/L	< 7000	160

The entire treated effluent from the pickling plant is re-used back in the pickling plant, and thus requiring only 1.3 KLD as make-up fresh water.

The waste water from pickling & scrubber is collected in a separate waste acid water tank, whereas the waste water from phosphating & lime coating units are collected in phosphate waste water collection tanks. After addition of lime, lye, polyelectrolyte, alum in each of these collection tanks are pumped to 2-separate reaction tanks. This pre-treated water is then passed through UF Membrane for removal of particulates & biological remnants. The permeate from UF is then passed through 2-stage RO. The RO-Permeate is collected in clear water tank, and the rejects are passed through mechanical evaporator, wherein the condensed water is collected & taken to clear water tank. The entire clear water is then re-used back in the pickling plant.

PICKLING PLANT ETP CAPACITY

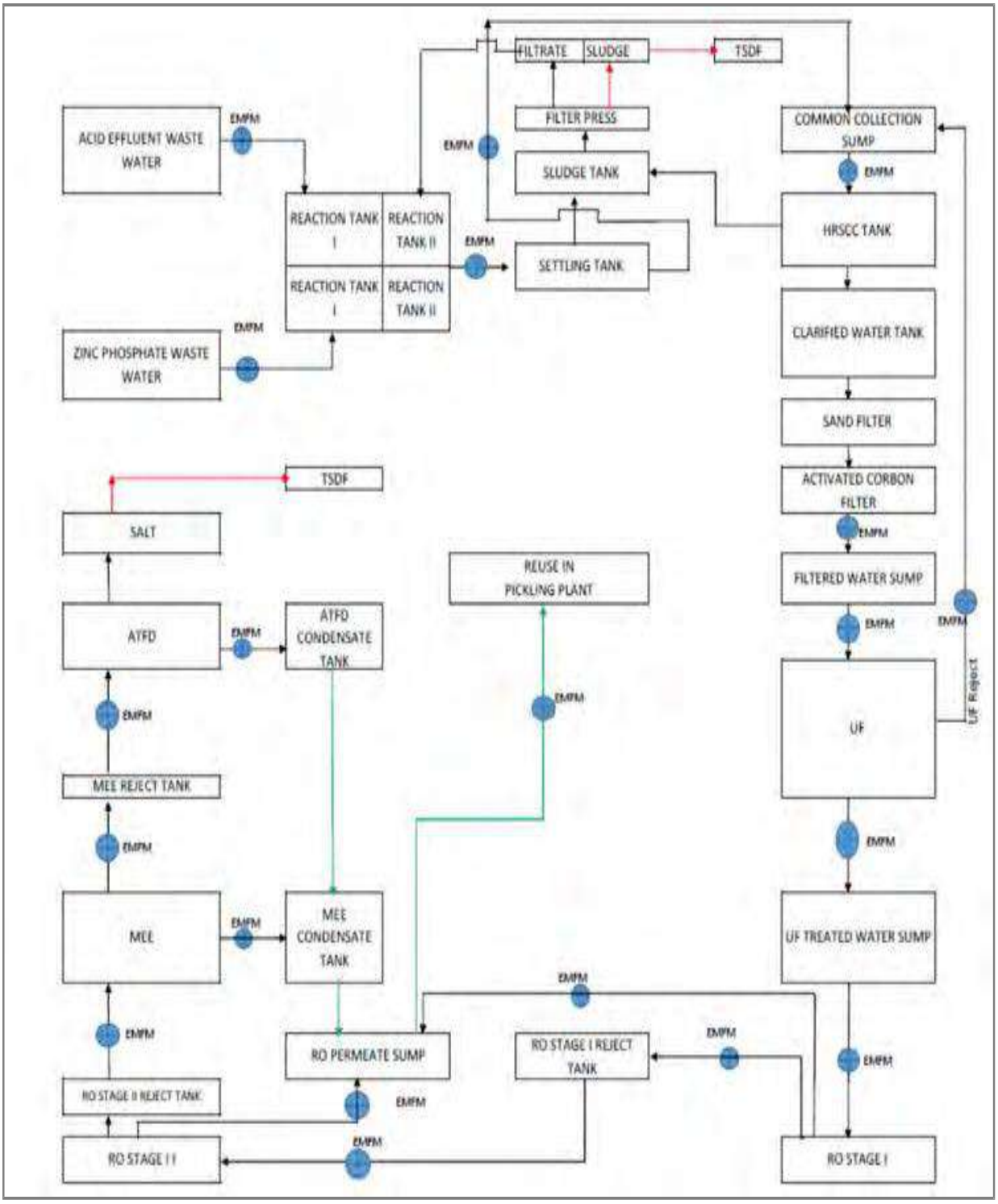
S.No	Description	UoM	Design value	Requirement
1	Design capacity	m^3/hr	6.3	3.3
2	Operating Hrs	Hrs	20	24
3	Capacity	KLD	126	78.5
4	Ultra Filter	m^3/hr	6.3	3.18
5	RO plant	m^3/hr	6.3	2.70

MEE SPECIFICATION

S.No	Description	UoM	Design value	Requirement
1	Feed rate	kg/hr	2000	850
2	Operating Hrs	Hrs	20	20
3	Water evaporation capacity	kg/hr	1600	680
3	Concentrate outlet capacity	kg/hr	400	170
4	Inlet Sp.Gravity		1.0	1.0
5	Feed Temperature	°C	Ambient	Ambient
6	Initial TDS	%	4.0	4.0
7	MEE concentrate TDS	%	20	15
8	Thermic fluid inlet temp	°C	180	180
9	Thermic fluid outlet temp	°C	160	160
10	Cooling water temperature	°C	32	32
12	Condensate TDS	mg/l	250	250
13	Energy requirement	Kcal/hr	5000000	Based on trial run

ATFD SPECIFICATION

S.No	Description	UoM	Design value	Requirement
1	Feed rate	Kg/hr	420	170
2	Operating Hrs	Hrs	20	20
3	Water evaporation capacity	Kg/hr	350	145
5	Concentrate outlet capacity (< 10 % moisture)	Kg/hr	70	25
6	Type		Scraped surface – Tubular type	
7	MOC		SS316	
8	Heating surface area	m^2	13.7	
9	Inlet TDS	%	Min 15	20
10	Condensate TDS	mg/l	< 500	< 500
11	Salt moisture	%	< 10	< 10
12	Sp.Gravity		< 2	< 2
13	Energy requirement	Kcal/hr	300000	

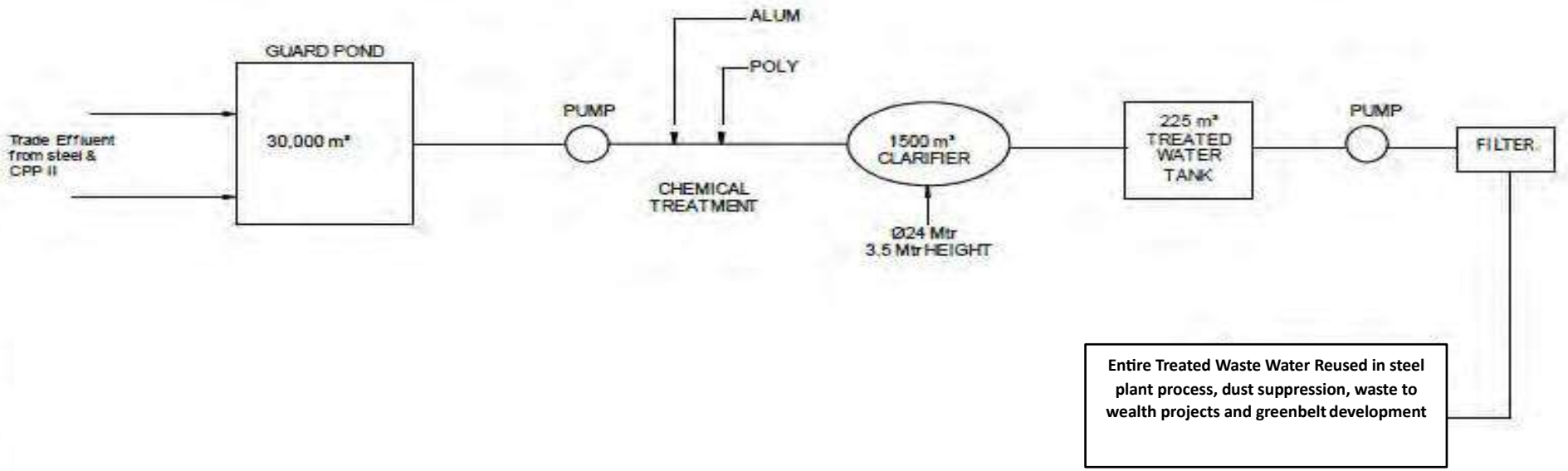


PICKLING PLANT ETP

COMPONENTS – PICKLING PLANT ETP

S.No.	Description	Size	Quantity
1	Acid pickling effluent - waste water collection sump	2.3 x 3.6 x 3.5 m	1 No.
2	Lime coating & Phosphating effluent - waste water collection sump	2.3 x 3.6 x 3.5 m	1 No.
3	Chemical preparation tank – Acid pickling Effluent	1.7 x 2.0 x 3.5 m	1 No.
4	Reaction Tank I - Acid pickling Effluent	1.3 x 1.3 x 2.5 m	1 No.
5	Reaction Tank II - Acid pickling Effluent	1.3 x 1.3 x 1.5 m	1 No.
6	Chemical preparation tank –Lime coating & Phosphate Effluent	1.7 x 2.0 x 3.5 m	1 No.
7	Reaction Tank I - Lime coating & Phosphating effluent	1.3 x 1.3 x 2.5 m	1 No.
8	Reaction Tank II - Lime coating & Phosphating effluent	1.3 x 1.3 x 1.5 m	1 No.
9	Settling Tank - Acid pickling Effluent	2.0 x 2.0 x 3.5 m	1 No.
10	Settling Tank - Lime coating & Phosphating effluent	2.0 x 2.0 x 3.5 m	1 No.
11	Common water collection sump	2.5 x 3.6 x 3.5 m	1 No.
12	High Rate Solid Contact Clarifier	3.0 (D) x 3.5 (H) m	1 No.
13	Sludge Holding Tank	1.7 x 2.0 x 3.5 m	1 No.
14	Filter press	250 kg/hr	1 No.
15	Clarified Water Tank	2.5 x 3.6 x 3.5 m	1 No.
16	Pressure sand filter	0.8 (D) x 2.0 (H) m	1 No.
17	Activated carbon filter	0.7 (D) x 2.0 (H) m	1 No.
18	Pretreated Water Tank	2.5 x 3.6 x 3.5 m	1 No.
19	UF Membrane (MPS)	0.2 (D) x 1.53 (H) m	3 No's
20	UF Treated Water Tank	2.5 x 3.6 x 3.5 m	1 No.
21	RO - Micron cartridge filter	4.0" (D) x 20.0" (H) m	1 No.
22	RO 1st Stage membrane	8.0" (D) x 40.0" (L) m	6 No's (BWM)
23	RO 2nd Stage membrane	8.0" (D) x 40.0" (L) m	3 No's (SWM)
24	RO combined product water tank	2.5 x 3.6 x 3.5 m	1 No.
25	RO 1st Stage reject water tank	2.5 x 3.6 x 3.5 m	1 No.
26	RO 2nd Stage reject water tank	2.6 (D) x 3.7 (H) m	1 No.
27	MEE Feed day tank	1.0 (D) x 1.25 (H) m	1 No.
28	MEE (Double Effect forced Circulation)	2000 kg/hr	1 No.
29	MEE condensate tank	2.0 (D) x 2.4 (H) m	1 No.
30	MEE Reject tank	1.9 (D) x 3.9 (H) m	1 No.
31	ATFD (Jacketed vessel with internal scrapper)	420 kg/hr	1 No.
32	ATFD condensate tank	2.0 (D) x 1.3 (H) m	1 No.
33	ATFD Salt storage shed	5.0 x 5.0 x 5.0 m	1 No.

3.2.5 SCHEME EFFLUENT TREATMENT PLANT – BLOW DOWN



3.3 SOLID WASTE MANAGEMENT

Solid waste generation from BF and SMS units are BF granulated slag and SMS Steel slag respectively. Other solid wastes generated from de-dusting system, gas cleaning plant dust, etc., and are reused in sinter plant for sinter making.

BF granulated slag is 100% used for GGBS production as value added facility. SMS slag is subjected to slag crushing and after removal of iron bearing material is used in paver production. The crushed slag is used in sinter plant and SMS as hearth layer and cooling media respectively and balance crushed SMS slag is sold to cement industries.

3.3.1 QUANTITY OF NON-HAZARDOUS WASTE GENERATION & DISPOSAL

S. No	Solid Waste	Nature of Solid Waste	QUANTITY	Disposal
Blast Furnace (TPD)				
1	Sinter fines	Fines	1100	100% Reuse in Sinter Plant
2	Slag	Granulated slag	1350	100% given to GGBFS
Steel Melting Shop (TPD)				
1	Slag	Slag	720	After slag crushing, iron bearing material separation & screening reused for paver making, internal use and sold in the open market.
Flue dust from Process & Dedusting system (TPD)				
1	Flue dust from bag filter	Dust	125	Re-Use in Sinter Plant & sold in open market
2	Gas cleaning plant	Sludge	200	100% Reuse in Sinter plant
Continuous Casting Machine(TPD)				
1	Scale	Scales	40	100% Reuse in Sinter plant
2	Scrap	-	200	Reuse in Steel Melting Shop
Rolling Mills(TPD)				
1	Scrap	Scrap	65	Reuse in Steel Melting Shop
2	Mill Scale	Scale	32	100% Reuse in Sinter plant
3	Broken refractory	Refractory material	300 (TPA)	Sold to refractory manufacturers
Coke Oven Plant(TPD)				
1	Coke breeze	Dust	70	100% Reuse in Sinter plant
Captive Power Plant(TPD)				
1	Fly ash	Dust	50	Fly ash brick manufacturing units

3.3.2 QUANTITY OF HAZARDOUS WASTE GANERATION & DISPOSAL

S.NO	DESCRIPTION	MODE OF DISPOSAL	QUANTITY (TPA)	
			STEEL PLANT	CPP II
3.3	Sludge and filters	Disposal to TSDF	1.5	0.5
5.1	Used or spent oil	Disposal to Authorised Recyclers	70	3.5
5.2	Wastes or residues containing oil	Disposal to Authorised Recyclers	25	3.5
5.2	Wastes or residues containing oil	Disposal to pre-processed recycler	40	2.5
33.1	Empty barrels/ containers/liners contaminated with hazardous chemicals /wastes contaminated with oil	Disposal to Authorised Recyclers	30	3.0
12.5	Phosphate Sludge	Disposal to pre-processed recycler	100	-
35.3	Chemical Sludge/salt from waste water treatment (ZLD)	Disposal to pre-processed recycler	700	-
35.3	Chemical Sludge/salt from waste water treatment (ZLD) **ATFD SALTS**	Stored at Site	**600**	-

COKE OVEN PLANT

SINTER PLANT

BLAST FURNACE

ENERGY OPTIMIZING FURNACE

LADLE REFINING FURNACE

CONTINUOUS CASTING MACHINE

BAR & ROD MILL

BLOOMING MILL

FINAL INSPECTION & DESPATCH

3.4 NOISE POLLUTION & MITIGATION

The major noise generating sources from different plant facilities are Cooling Tower, steel melting section, rolling mill section, Transformer, machine shop, DG sets etc. The noise levels at source are as follows

S. No	Sources	Noise Level in dB(A)	OSHA Occupational Exposure Standard for Noise Level
	Sinter Plant – I		
1	Mixing and Nodulizing drum area	86.5	90
2	Waste gas fan area	85.4	90
3	Cooling air fan area	87.1	90
4	RMHS	83.5	90
	Sinter Plant – II		
5	Near de-dusting fan area	86.8	90
6	Near circular fan area	87.3	90
7	Near crusher house area	85.0	90
8	Near waste gas fan area	85.7	90
9	Product screen house area	86.2	90
	Blast Furnace - I		
10	Stack house area	85.5	90
11	Furnace area	87.3	90
12	Snort valve area	86.8	90
13	GCP area	85.0	90
	Blast Furnace – II		
14	Blower house area	86.9	90
15	Gas cleaning plant area	84.6	90
16	Near furnace area	84.1	90
17	Stock house area	86.3	90
18	Snort valve area	86.8	90
19	PCI inner area	87.2	90
	Captive Power Plant – I		
20	Near boiler area	85.8	90
21	Near turbine area	84.6	90
22	Near condenser area	86.0	90
23	Near ID Fan area	86.7	90
	Energy Optimizing Furnace – I		
24	Near furnace area	86.3	90
25	Near ID fan area	85.2	90
	Energy Optimizing Furnace – II		
26	Near furnace area	84.9	90
27	Near ID fan area	82.5	90
	Continuous casting Machine		
28	Near tundish area	84.8	90
	Ladle Refining Furnace		
29	Furnace area	87.2	90

S. No	Sources	Noise Level in dB(A)	OSHA Occupational Exposure Standard for Noise Level
	Bar and Rod Mill		
30	Near furnace area	86.0	90
31	Three high rod mill area	86.7	90
32	Near blower area	87.3	90
	Air Separation Plant –II		
33	LOX pump area	84.9	90
34	Main compressor pump area	84.2	90
35	Air compressor area	87.1	90
	Coke Oven Plant		
36	Coke cutter area – during operation	83.4	90
37	Double duct screen house area		
	Warf area	84.5	90
38	Hammer mill area	86.4	90
39	Stamping station area – I	85.2	90
40	Stamping station area – II	86.7	90
41	Single duct screen	86.3	90
	Blooming Mill		
42	UV bag inspection area	87.9	90
43	Near CP-6 hacksaw	85.8	90
44	Near CP-5 mill area	87.6	90
	Captive Power Plant – II		
1	Near admin building area	76.8	90
2	Near STG building Inner area	86.8	90
3	Near turbine area – I	87.4	90
4	Near cooling tower area - `	86.2	90
5	Near ID fan area	84.7	90
6	Near turbine area - II	82.0	90
7	Near ESP area	83.5	90

3.5 GREEN BELT DEVELOPED

Of the total land area of 265.93 ha, green belt has been developed in the area of 90.56 ha, thus achieving CPCB norms of 33% of total plot area, along the periphery of the boundary consisting extensively of native species.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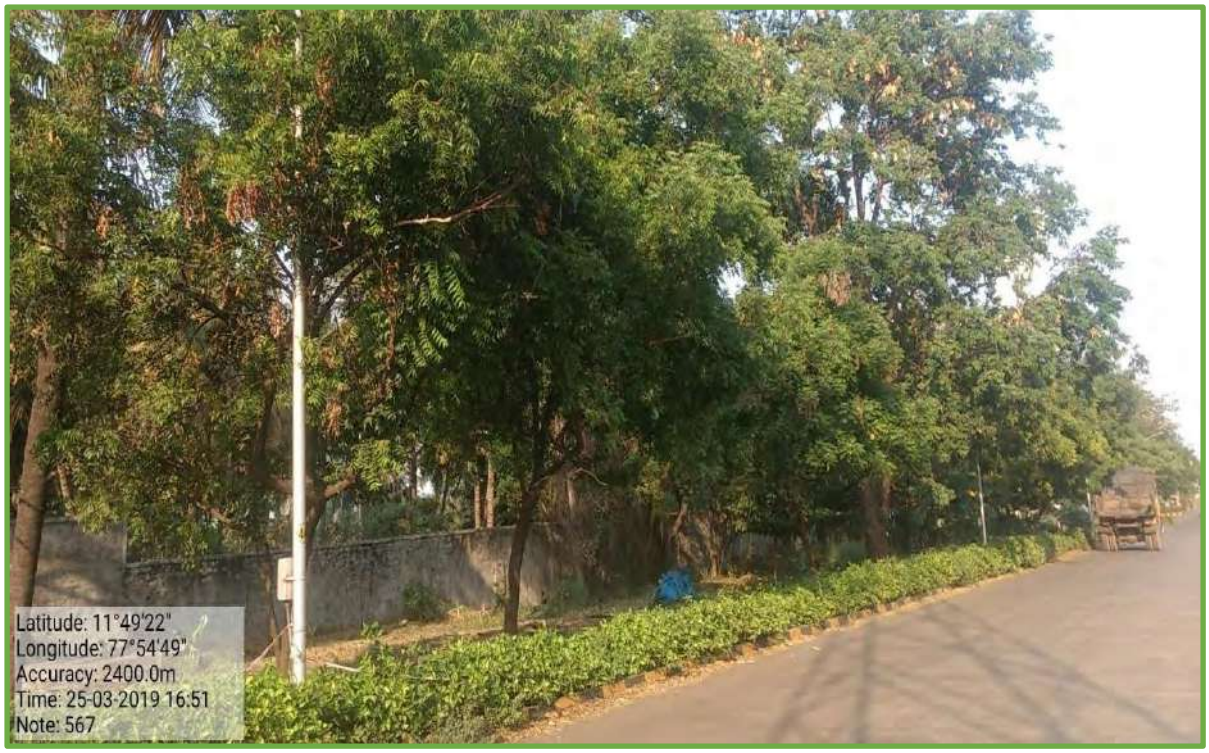
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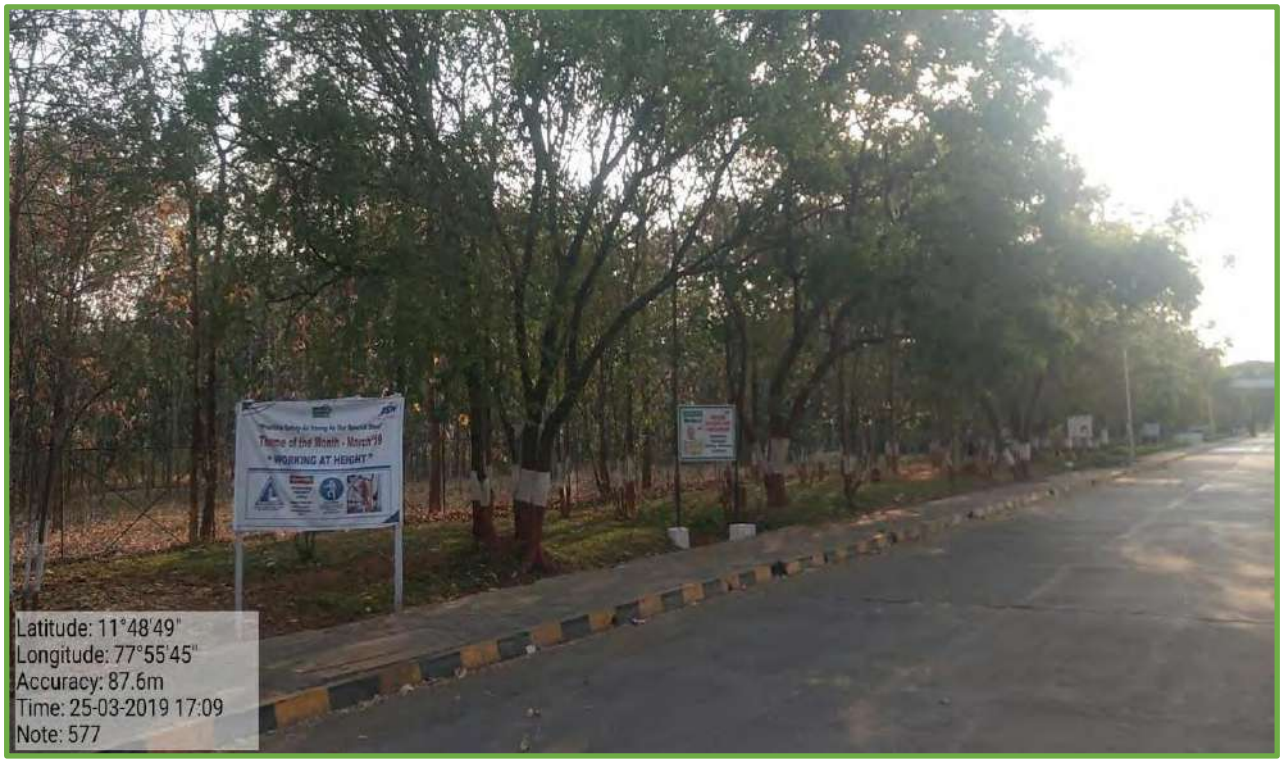
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4 COMPLIANCE – ENVIRONMENTAL CLEARANCE

4.1 ENVIRONMENT CLEARANCE DATED 07.07.2017

JSWSL had obtained 3-Nos of environmental clearance within past 10-Years ie each in 2017, 2020, 2025 including latest amendment obtained with respect to certain general conditions in the EC obtained in 2020. In 2017 , the said environmental clearance was for augmentation of steel plant capacity from 1.0 MTPA to 1.3 MTPA, whereas, in 2020 was an amendment in environmental clearance for additional installation of 0.8 MTPA Slag grinding unit with production of value added products using slag, & 2025 JSWSL had obtained clearance to hive-off slag grinding unit & its related facilities as a separate unit, and that creating 2-distinct plants, one being exclusively for steel plant & the other being exclusively for Slag based products under the umbrella of JSW Cements Ltd.

Thus, the environmental clearance valid with respect to extant steel plant of JSWSL is the environmental clearance obtained in 2017, and is the latest environment clearance applicable to this unit of JSWSL located at Mettur, Salem District.

4.2 COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE

Proposal No. IA/TN/IND/26508/2015 / File No. J-11011/281/2006-IA.II (I)		
S.No	**CONDITION**	**COMPLIANCE**
A.	**SPECIFIC CONDITION**	
I.	The occupational health survey of the active workmen involved shall be carried as per the ILO guidelines and all the employees shall cover in every 5 years @ 20% every year	JSWSL has been regularly carrying out health survey of its employees & maintaining records as per ILO norms & have ensured converage of all employees until now.
II.	The amount allocated for ESC i.e. Rs 13 Crores shall be provided as CAPEX and the ESC shall be treated as project and monitored annually and the report of same shall be submitted to Regional office of MoEF&CC	Report with respect to capital expenditure on ESC are regularly being submitted to IRO, Chennai of MoEFCC, and have expended Rs 8.88 Crores on ESC.
III.	The project proponent shall provide for solar light system for all common areas, street lights, villages, parking around project area and maintain the same regularly	Solar Lighting has largely been provided in the off-site by JSWSL to an extent of 75 KW at present.

IV.	The project proponent shall provide for LED lights in their offices and residential areas.	JSWSL has provided LED lighting largely, and all their new lighting requirements are LED based.
V.	The project proponent should install 24X7 air monitoring devices to monitor air emission and submit report to Ministry and its Regional Office.	JSWSL has provided online continuous monitoring system ie installed 32 Nos. of dust analyzers & 24 Nos. gaseous emission monitoring systems and the real time data of SPM, SO_2, NOx and CO are being transmitted to the Care Air Centre of TNPCB and CPCB servers.& have also been regularly submitting reports of this to IRO, Chennai, MoEFCC.
VI.	The ETP for Blast furnace effluent should be designed to meet Cyanide standards as notified by the MoEFCC.	Waste water emanating from the GCP of BF-I is found to be free of cyanide, based on the analysis carried in the past at various times and also the present samples analysed.
VII.	No effluent shall be discharged outside the plant premises and 'zero' discharge shall be adopted.	The plant is operating as a Zero Waste Water Discharge unit, and the entire trade effluent generated is treated and re-used back in the plant process.
VIII.	The ETP for coke oven by-product should be designed to meet EPA notified standards especially the cyanide and phenol.	Not Applicable, Plant is based on NRCO.
IX.	Coke oven plant should meet visible emission standards notified by the MoEF&CC.	This is Not Applicable, however, the coke-oven batteries operate under negative pressure, thus visible emissions are largely eliminated.
X.	The standards issued by the Ministry vide G.S.R. 277(E) dated 31st March 2012 shall be strictly adhered to and the standards prescribed for the Coke oven plant shall be monitored and the report should be submitted along with the six-monthly compliance report	JSWSL has been meeting the emission levels at point sources with respect to Sinter Plant, Blast Furnace, Furnace etc at all times as revealed by the records & datas maintained.
XI.	The emission standards specified in the Environmental (Protection) Amendment Rules, 2015 issued by vide S.O. 3305 (E) dated 7th December 2015 for the Thermal Power Plant shall be strictly adhered to.	JSWSL meets up to 65% of fuel requirement in Boilers from Waste gases of MBF/Coke-oven & only the balance is based on coal, thus ensuring that the emission norms at the outlet are always well within the norms.
XII.	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November 2009 shall be followed.	The Ambient Air Quality in and around the plant site of JSWSL have been found to be well within the norms stipulated as per vide G.S.R. No. 826(E) dated 16th November 2009
XIII.	On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks shall be provided and sufficient air pollution control devices viz. Electrostatic	JSWSL has provided 4-Nos of continuous Ambient Air Quality Monitoring System connected to CAC of TNPCB/CPCB & extensive control measures at all the sources of air emissions, and all the significant point sources of emission have

	precipitator (ESP), and bag filters etc. shall be provided.	been provided with online continuous monitoring system connected to care air center of TNPCB/CPCB.
XIV.	A statement on carbon budgeting including the quantum of equivalent CO2 being emitted by the existing plant operations, the amount of carbon sequestered annually by the existing green belt and the proposed green belt and the quantum of equivalent CO2 that will be emitted due to the proposed expansion shall be prepared by the project proponent and submitted to the Ministry and the Regional Office of the Ministry. This shall be prepared every year by the project proponent. The first such budget shall be prepared within a period of 6 months and subsequently it should be prepared every year	JSWSL has been regularly updating & submitting the details of Carbon Budgeting, sequestration, emission, control measures, targets etc including measures on Green Energy to IRO, Chennai MoEFCC. Further, a detailed study has also been undertaken by JSWSL to establish baseline status for future planning of carbon offset.
XV.	For the employees working in high temperature zones falling in the plant operation areas, the total shift duration will be 4 hrs or less per day where the temperature is more than 50oC. Moreover, the jobs of these employees will be alternated in such a way that no employee is subjected to working in high temperature area for more than 1 hr continuously. Such employees would be invariably provided with proper protective equipment, garments and gears such as head gear, clothing, gloves, eye protection etc. There should also be an arrangement for sufficient drinking water at site to prevent dehydration etc.	JSWSL has ensured that all employees working in hot areas are provided with appropriate PPE's & that duration of exposure is also restricted with appropriate rotation of workers in that area to prevent any long term exposure & impact.
XVI.	In-plant control measures and dust suppression system shall be provided to control fugitive emissions from all the vulnerable sources. Dust extraction and suppression system shall be provided at all the transfer points, coal handling plant and coke sorting plant of coke oven plant. Bag filters shall be provided to hoods and dust collectors to coal and coke handling to control dust emissions. Water sprinkling system shall be provided to control secondary fugitive dust emissions generated during screening,	JSWSL has provided wind shields at all areas storing coal, iron ore, coking coal etc, and also dry fogging, water sprinklers etc at various locations across the plant.

	loading, unloading, handling and storage of raw materials etc.	
XVII.	Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible limits issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008 and regularly monitored. Guidelines / Code of Practice issued by the CPCB shall be followed.	Not Applicable, as JSWSL at salem does not have a sponge iron plant.
XVIII.	Hot gases from DRI Kiln should be passed through dust settling chamber (DSC) to remove coarse solids and After Burning Chamber (ABC) to burn CO completely and used in Waste Heat Recovery (WHRB). The gas then shall be cleaned in ESP before dispersion out into the atmosphere through ID fan and stack. ESP shall be installed to control the particulate emission from WHRB.	Not Applicable
XIX.	Efforts shall further be made to use maximum water from the rain water harvesting sources. If needed, capacity of the reservoir shall be enhanced to meet the maximum water requirement.	JSWSL has provided 4-Nos of surge ponds, which act as rain water harvesting ponds, and rain water collected in this is utilized to the maximum in the process operations.
XX.	Risk and Disaster Management Plan along with the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office, SPCB and CPCB within 3 months of issue of environment clearance letter.	JSWSL has already submitted a report on Risk & Disaster Management Plan including mitigation measures to IRO, Chennai, MoEFCC.
XXI.	All the blast furnace (BF) slag shall be granulated and provided to cement manufacturers for further utilization. Flue dust from sinter plant and SMS and sludge from BF shall be re-used in sinter plant. Coke breeze form coke oven plant shall be used in sinter and pellet plant. SMS slag shall be given for metal recovery and properly utilized. All the other solid waste including broken refractory mass shall be properly disposed off in environment-friendly manner	JSWSL is granulating the blast furnace slag & supplying to its own group cement company, whereas flue dust, SMS & BF Sludge, coke breeze are used in its won sinter plant, SMS Slag is also given to its own group cement company for production of slag cement. All hazardous waste are disposed for downstream use/recycling/disposal as per Hazardous waste Authorization.
XXII.	Coal and coke fines shall be recycled and reused in the process. The breeze coke and dust from the air pollution control system shall be reused in sinter plant. The waste oil shall be properly disposed of as per the	

	Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.	
XXIII.	Green belt shall be developed in 33 % of plant area. Selection of plant species shall be as per the CPCB guidelines in consultation with the DFO.	Of the total 265.93 ha land area, about 90.86 ha is covered with green belt, thereby achieving green belt coverage of up to 34% of the total land area.
XXIV.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel plants and Coke Oven Plants shall be implemented.	JSWSL has implemented all the recommendations of CREP with respect to emissions, solid waste utilization, water conservation, energy conservation etc.
XXV.	At least 2.5% of the total cost of the project shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues, locals need and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office. Implementation of such program shall be ensured by constituting a Committee comprising of the proponent, representatives of village Panchayat and District Administration. Action taken report in this regard shall be submitted to the Ministry's Regional Office	JSWSL has a robust CSR cell, and have undertaken numerous initiatives to the extent of Rs 8.88 Crores addressing the locals needs for their exclusive socio-economic benefits. JSWSL has uploaded its CSR plan on the web site, and also have an elaborate annual report on CSR activities.
XXVI.	The proponent shall prepare a detailed CSR plan for every year for the next 5 years for the existing-cum-expansion project, which includes village-wise, sector-wise (Health, Education, Sanitation, Health, Skill Development and infrastructure requirements such as strengthening of village roads, avenue plantation, etc) activities in consultation with the local communities and administration. The CSR plan will include the amount of 2% retain annual profits as provided for in Clause 135 of the Companies Act, 2013 which provides for 2% of the average net profits of previous 3 years towards CSR activities for life of the project. A separate budget head shall be created and the annual capital and revenue expenditure on various activities of the plan shall be submitted as part of the	

	compliance report to RO. The details of the CSR plan shall also be uploaded on the company website and shall also be provided in the Annual Report of the company. The plan so prepared shall be based on SMART (Specific, Measurable, Achievable, Relevant and Time bound) concept. The expenditure should be aimed at sustainable development and direct free distribution and temporary relief should not be included.	
XVII.	All the commitments made to the public during the Public Hearing /Public Consultation meeting shall be satisfactorily implemented and a separate budget for implementing the same shall be allocated and information submitted to the Ministry's Regional Office at Bhubaneswar.	Commitments made to the public during Public Hearing is satisfactorily implemented and information submitted toIRO, MoEF & CC, Chennai.
XVIII.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	-
B.	**GENERAL CONDITION**	
I.	The project authorities must strictly Adhere to the stipulations made by the concerned State Pollution Control Board and the State Government.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance, including the conditions of No-Increase in Pollution Load Certificate. JSWSL in its existing plant at mettur had not changed any of its process, equipment, raw material or the products produced including the emissions with respect to the existing consent of TNPCB or the environmental clearance obtained.
II.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	
III.	At least four ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of PM10, PM2.5, SO2 and NOX are anticipated in consultation with the SPCB. Data on ambient air quality and stack	JSWSL has been undertaking regular AAQ monitoring at 4- locations identified by TNPCB outside the plant site on weekly basis, and also at 12-locations on monthly basis & have also been submitting the report regularly to TNPCB from an accredited environmental laboratory.

	emission shall be regularly submitted to this Ministry including its Regional Office at Chennai and the SPCB/CPCB once in six months.	
IV.	Industrial waste water shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time. The treated waste water shall be utilized for plantation purpose.	The JSWSL plant operates on zero waste water discharge, wherein the entire treated trade effluent is re-used back within the plant process for cooling water make-up, dust suppression, paver block production, slag crushing etc , however, the records & datas reviewed had indicated the treated trade effluent is within the stipulated norms & have been operating the ETP's continuously as recorded in the Log Book. Records & Data's reviewed including the log books maintained by JSWSL revealed that STP has been operating continuously, the treated sewage has also been meeting discharge standards for disposal on land for green belt development, and the treated sewage is entirely utilized for green belt development
V.	The overall noise levels in and around the plant shall be kept well within the standards (85 dB(A)) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dB(A) during day time and 70 dB(A) during night time	Both Night & Day time noise levels at the boundary of the plant at all locations monitored were well within the CPCB permissible levels, & the past datas reviewed were also found to be within permissible levels
VI.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act	JSWSL has been regularly carrying out health survey of its employees & maintaining records as per ILO norms & have ensured converage of all employees until now, including records maintained as per factories act.
VII.	The company shall develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	JSWSL has provided 4-Nos of surge ponds, which act as rain water harvesting ponds, and rain water collected in this is utilized to the maximum in the process operations.
VIII.	The project proponent shall also comply with all the environmental protection measures and safeguards recommend in the EIA/EMP report. Further, the company must undertake socio-economic development activities	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance, including the conditions of No-Increase in Pollution Load Certificate.

	in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.	
IX.	Requisite funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change (MoEF&CC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Chennai. The funds so provided shall not be diverted for any other purpose.	Adequate funds have been provided to meet recurring expenses for maintaining all the measures envisaged in the EMP, and capital cost have been fully provided and expended for full implementation of the EMP.
X.	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/ 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.	Copy of environmental clearance & its compliance have been updated in its JSWSL portal, copies of environmental clearance with intimation of having been accorded environmental clearance has also been given to all the local bodies by JSWSL, and all critical parameters monitored are also digitally displayed at the plant boundary on real time basis with continuous recording & data logger.
XI.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF&CC at Chennai. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM10, SO2, NOX (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain	
XII.	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental	JSWSL is regularly submitting 6-monthly compliance report at the online portal of MoEFCC ie PARIVESH.

	conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Chennai/CPCB/SPCB shall monitor the stipulated conditions.	
XIII.	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Office of the MoEF&CC at Chennai by e-mail.	JSWSL has been regularly submitting the returns with respect to Form – 4, Form V Environment Audit report & Copy of environmental clearance & its compliance have been updated in its JSWSL portal
XIV.	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be sent at website of the Ministry of Environment, Forests, and Climate Change (MoEF&CC) at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Bhubaneshwar.	JSWSL had informed the public vide publication in local newspapers including in vernacular language that it had been accorded environmental clearance. Advertisements have been given Dinamani(Tamil Newspaper) and The Indian Express on 14.07.2017
XV.	Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	JSWSL has been regularly updating the MoEFCC, TNPCB vide its submission of 6-monthly report at the parivesh portal its compliance & status of the plant.

4.3 ENVIRONMENTAL CLEARANCE AMENDMENT DATED 07.08.2019

F.No.J-11011/281/2006-IA.II (I) dated 07.08.2019		
S. No	**Condition**	**Compliance Status**
i	The specific condition no. vii given at paragraph no.26 of the EC accorded vide letter dated 7 /07/2017 shall read as below: "No effluent shall be discharged outside the plant premises and 'zero' discharge for the complete steel plant complex including Captive Power Plants (CPPs) shall be adopted.	JSWSL has ensured operation of the plant on the basis of Zero Waste Water Discharge, with entire treated waste water being re-used back within the plant, with no discharge outside the plant boundary.

4.4 ENVIRONMENT CLEARANCE DATED 10.02.2020

A. Specific Conditions		
Sl. No	**Condition**	**Compliance Status**
i.	Particulate emission from the rod mill of slag grinding unit shall be less than 10 mg/Nm^3.	The GGBFS is hived off as a separate unit, and is at present not part of JSWSL, hence NOT APPLICABLE.
ii.	Green belt shall be developed in an area of 85 ha (210 acres) in and around the plant in a time frame of two years.	Of the total 265.93 ha land area, about 90.86 ha is covered with green belt, thereby achieving green belt coverage of up to 34% of the total land area.
B. General Conditions		
I. Statutory Compliance		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board / Committee.	JSWSL is operating with valid Consent to Operate.
ii.	The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.	The plant operates predominantly on water drawn from Mettur Dam, however have also obtained clearance for drawl of ground for domestic use.
iii.	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.	JSWSL has valid Hazardous Waste Authorisation at present.
II. Air quality monitoring and preservation		
i.	The project proponent should install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards II. Air Quality Monitoring and Preservation prescribed in Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power	JSWSL has installed 32 nos. of dust analyzers (both in process and non-process stacks) & 24 nos. of gaseous emission monitoring & has been meeting the emission levels at point sources with respect to Sinter Plant, Blast Furnace, Furnace etc at all times as revealed by the records & datas maintained. JSWSL meets up to 65% of fuel requirement in Boilers from Waste gases of MBF/Coke-oven & only the balance is based on coal, thus ensuring that the

	Plant) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	emission norms at the outlet are always well within the norms.
ii.	The project proponent shall monitor fugitive emissions in the plant premised at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	JSWSL has regularly undertaken fugitive emission monitoring once every 3-months
iii.	The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM_{10} and $PM_{2.5}$ in reference to PM emission, and SO_2 and NO_x in reference to SO_2 and NO_x emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.	JSWSL has been undertaking regular AAQ monitoring at 4- locations identified by TNPCB outside the plant site on weekly basis, and also at 12-locations on monthly basis & have also been submitting the report regularly to TNPCB from an accredited environmental laboratory & provided 4-Nos of continuous Ambient Air Quality Monitoring System connected to CAC of TNPCB/CPCB
iv.	The cameras shall be installed at suitable locations for 24x7 recording of battery emissions on the both sides of coke oven batteries and videos shall be preserved for at least one-month recordings.	Cameras have been provided at the coke oven plant for battery emission monitoring.
v.	Sampling facility at process stacks and at quenching towers shall be provided as per CPCB guidelines for manual monitoring of emissions.	Appropriate port holes with all facilities to enable manual sample collection in stacks have been provided in all stacks..
vi.	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality/fugitive emissions to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	JSWSL is regularly submitting 6-monthly compliance report at the online portal of MoEFCC ie PARIVESH.
vii.	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.	JSWSL has provided adequate air pollution control equipments at the points sources, as well as fugitive sources to limit pollutants to within permissible levels & have been meeting the standards.

viii.	The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags.	All bag filter provided are solenoid valve based pulse jet mechanisms for cleaning of bags, & dust monitors.
ix.	Secondary emission control system shall be provided at SMS converters.	Secondary De-Dusting systems have been provided at all the furnaces in the SMS.
x.	Pollution control system in the steel plant shall be provided as per the CREP guidelines of CPCB.	JSWSL has entirely been meeting with CREP guidelines.
xi.	Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, and roofs regularly.	JSWSL has provided 3-nos of mechanical road sweepers, and mobile vacuum cleaners are provided at eh shop floors. The dust collected is used in the sinter plant.
xii.	Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/agglomeration.	
xiii.	The project proponent use leak proof trucks/dumpers carrying coal and other raw materials and cover them with tarpaulin.	All transportation in JSWSL is carried out in tarpaulin covered trucks.
xiv.	Facilities for spillage collection shall be provided for coal and coke on wharf of coke oven batteries (Chain conveyors, land based industrial vacuum cleaning facility).	Convered coneveyors are provided for coking coal, to obviate any spillage.
xv.	Land-based APC system shall be installed to control coke pushing emissions. The project proponent shall adopt effective measures to control the coke pushing emissions for non-recovery type Coke Ovens.	JSWSL has provided stamp charging of coking coal into the batteries.
xvi.	Monitor CO, HC and O_2 in flue gases of the coke oven battery to detect combustion efficiency and cross leakages in the combustion chamber. Monitor CO, HC and O_2 in flue gases of Waste Heat Recovery Boilers for non recovery type Coke Ovens.	The coke oven plant is based on Non-recovery Coke-Oven & hence ensures complete combustion within the oven, eliminating all volatile emission.
xvii.	Vapor absorption system shall be provided in place of vapor compression system for cooling of coke oven gas in case of recovery type coke ovens.	At JSWSL coke oven is based on Non-Recovery type & hence is NOT APPLICABLE. .
xviii.	In case concentrated ammonia liquor is incinerated, adopt high temperature incineration to destroy Dioxins and Furans, Suitable NOx control facility shall be provided to meet the prescribed standards.	

xix.	The coke oven gas shall be subjected to desulphurization if the Sulphur content in the coal exceeds 1%.	JSWSL has ensured using low sulphur coking coal
xx.	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.	JSWSL has provided wind shields at all areas storing coal, iron ore, coking coal etc, and also dry fogging, water sprinklers etc at various locations across the plant
xxi.	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil cellars.	JSWSL has provided adequate Air Ventilation system..
xxii.	The project proponent shall install Dry Gas Cleaning Plant with bag filter for Blast Furnace and SMS converter.	JSWSL has largely provided air control systems in the form of Bag Houses/ESP in major process stacks..
xxiii.	Dry quenching (CDQ) system shall be installed along with power generation facility from waste heat recovery from hot coke.	The hot flue gases from coke-oven plant are provided with waste heat recovery boilers.
III. Water Quality Monitoring and Preservation		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories. The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 and NABL accredited laboratories.	The online continuous monitoring system for pH at the outlet of ETP is connected to the Water Quality Watch Center of TNPCB & CPCB, and the data logger revealed uninterrupted connection with appropriate calibration graphs in place to corroborate authenticity.JSWSL has also provided EMFM at the inlet & outlet of the ETP, and are also connected to water quality watch center of TNPCB & have also provided EMFM at each of the outlet of 7-intermediate storage tanks of trade effluent including log books of record of discharge, including provision of EMFM at ZLD ETP of pickling/etching lab JSWSL has been regularly conducting analysis of ground water through NABL Accredited Laboratory.
ii.	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water	JSWSL is regularly submitting 6-monthly compliance report at the online portal of MoEFCC ie PARIVESH

	quality to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	
iii.	The project proponent shall provide the ETP for coke oven and by-product to meet the standards prescribed in G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time.	Coke-Oven plant is based on Non-Recovery Type, hence, NOT APPLICABLE.
iv.	Adhere to 'Zero Liquid Discharge'	JSWSL has ensured operation of the plant on the basis of Zero Waste Water Discharge, with entire treated waste water being re-used back within the plant, with no discharge outside the plant boundary.
v.	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.	JSWSL has provided 2-Exclusive sewage treatment plant each for township & plant.
vi.	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.	All storage & stock areas have been provided with garland drains by JSWSL.
vii.	Tyre washing facilities shall be provided at the entrance of the plant gates.	JSWSL has provided a tyre washing unit.
viii.	CO_2 injection shall be provided in GCP of SMS to reduce pH in circulating water to ensure optimal recycling of treated water for converter gas cleaning.	JSWSL is using treated waster for make-up thus eliminating the requirement of reduction in alkalinity.
ix.	The project proponent shall practice rainwater harvesting to maximum possible extent.	JSWSL has provided 4-Nos of surge ponds, which act as rain water harvesting ponds, and rain water collected in this is utilized to the maximum in the process operations

x.	Treated water from ETP of COBP shall not be used for coke quenching.	Coke-Oven plant at JSWSL is based on Non-Recovery Type, and the water used for coke quenching, is again used back for coke quenching.
xi.	Water meters shall be provided at the inlet to all unit processes in the steel plants.	Water meters are provided by JSWSL.
xii.	The project proponent shall make efforts to minimize water consumption in the steel plant complex by segregation of used water, practicing cascade use and by recycling treated water.	At present JSWSL has implemented Air Cooled System, where-ever, feasible, and are using entire treated waste water back in the process, thereby, minimising fresh water requirement.
IV. Noise Monitoring And Preservation		
Sl. No	**Condition**	**Compliance Status**
i.	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.	Regular monitoring of ambient noise had been undertaken, & JSWSL is regularly submitting 6-monthly compliance report at the online portal of MoEFCC ie PARIVESH, and noise levels have been found to be within norms.
ii.	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz.75 dB(A) during day time and 70 dB(A) during night time.	
V. Energy Conservation Measures		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall provide TRTs to recover energy from top gases of Blast Furnaces.	JSWSL has been using Blast Furnace gas largely for steam generation
ii.	Coke Dry quenching (CDQ) shall be provided for coke quenching for both recovery and non-recovery type coke ovens.	JSWSL at present is using wet quenching of coke.
iii.	Waste heat shall be recovered from Sinter Plants coolers and Sinter Machines.	To large extent waste heat is being recovered by JSWSL.
iv.	Use torpedo ladle for hot metal transfer as far as possible. If ladles not used, provide covers for open top ladles.	JSWSL is using ladles for hot metal transfer.
v.	Use hot charging of slabs and billets/blooms as far as possible.	JSWSL is hot charging billets/blooms for rolling.
vi.	Waste heat recovery systems shall be provided in all units where the flue gas or process gas exceeds 300°C.	JSWSL has provided waste heat recovery boilers for steam generation.

vii.	Explore feasibility to install WHRS at Waste Gases from BF stoves; Sinter Machine; Sinter Cooler, and all reheating furnaces and if feasible shall be installed.	At JSWSL 65% of power requirement is met through waste heat recovery boilers & waste heat from flue gas of process is also used in various processes within
viii.	Restrict Gas flaring to < 1%	
ix.	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly.	Solar Lighting has largely been provided in the off-site by JSWSL to an extent of 75 KW at present. JSWSL has provided LED lighting largely, and all their new lighting requirements are LED based.
x.	Provide LED lights in their officers and residential areas.	
xi.	Ensure installation of regenerative type burners on all reheating furnaces.	JSWSL has installed regenerative type burners in the re heating furnace.
VI. Waste Management		
Sl. No	**Condition**	**Compliance Status**
i.	An attrition grinding unit to improve the bulk density of BF granulated slag from 1.0 to 1.5 kg/l shall be installed to use slag as river sand in construction industry.	-
ii.	In case of Non-Recovery coke ovens, the gas main carrying hot flue gases to the boiler shall be insulated to conserve heat and to maximize heat recovery.	Ducts carrying waste flue gas have been insulated by JSWSL
iii.	Tar Sludge and waste oil shall be blended with coal charged in coke ovens (applicable only to recovery coke ovens).	Coke oven plant based on Non Recovery Type, hence NOT APPLICABLE.
iv.	Carbon recovery plant to recover the elemental carbon present in GCP slurries for use in Sinter plant shall be installed.	JSWSL is recovering elemental carbon, and using it in the sinter plant.
v.	Waste recycling plant shall be installed to recover scrap, metallic and flux for recycling to sinter plant and SMS.	-
vi.	Used refractories shall be recycled as far as possible.	JSWSL has ensured use of high quality refractory to minimise generation, however, the waste refractory generated are disposed to recyclers.
vii.	SMS slag after metal recovery in waste recycling facility shall be conditioned and used for road making, railway track ballast and other applications. The project proponent shall install a waste	JSWSL has installed iron recovery system for re-use, and also use of waste generated in other processes within.

	recycling facility to recover metallic and flux for recycle to sinter plant. The project proponent shall establish linkage for 100% reuse of rejects from Waste Recycling Plant.	
viii.	100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.	JSWSL is disposing the entire fly ash generated to local fly ash brick manufacturers.
ix.	Oil collection pits shall be provided in oil cellars to collect and reuse/recycle spilled oil. Oil collection trays shall be provided under coils on saddles in cold rolled coil storage area.	JSWSL has provided oil collection system in the cellars, whereas cold coil facility is not part of the plant.
x.	The waste oil, grease and other hazardous waste like acidic sludge from pickling, galvanizing, chrome plating mills etc. shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016. Coal tar sludge / decanter shall be recycled to coke ovens.	The Used oil, grease and other hazardous wastes like acidic sludge from pickling is being disposed as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016 as amended by JSWSL, whereas coke oven being Non-Recovery Type, there is no generation of Coal tar sludge / decanter sludge is not generated during our plant operations.
xi.	Kitchen waste shall be composted or converted to biogas for further use.	JSWSL has installed bio gas plant in the kitchen
VII. Green Belt		
Sl. No	**Condition**	**Compliance Status**
i.	Green belt shall be developed in an area equal to 33% of the plant area with native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.	Of the total 265.93 ha land area, about 90.86 ha is covered with green belt, thereby achieving green belt coverage of up to 34% of the total land area. JSWSL has been regularly updating & submitting the details of Carbon Budgeting, sequestration, emission, control measures, targets etc including measures on Green Energy to IRO, Chennai MoEFCC. Further, a detailed study has also been undertaken by JSWSL to establish baseline status for future planning of carbon offset.
ii.	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.	
VIII. Public Hearing and Human health issues		
Sl. No	**Condition**	**Compliance Status**
i.	Emergency prepared plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	JSWSL has fully implemented On Site & Off-Site emergency preparedness plan based on HAZOP & Risk Assessment.

ii.	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.	JSWSL has provided personnel protective equipments to all employees, and have also been conducting regular heat stress analysis at hot zones in the plant.
iii.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	-
iv.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	JSWSL has been regularly carrying out health survey of its employees & maintaining records as per ILO & factories act norms & have ensured converage of all employees until now.
IX. Corporate Environmental Responsibility		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F. No. 22-65/2017-IA.III dated 1st May 2018, as applicable, regarding Corporate Environmental Responsibility.	JSWSL has been carrying out all l activities under the Corporate Environmental Responsibility (CER) diligently and reports are being submitted regularly as part of the six-monthly compliance reports.
ii.	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental / forest / wildlife norms / conditions and / or shareholders' / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	JSWSL has adopted sustainable development principles and goals, with environmental and other related policies duly approved by the Board of Directors. Systems are in place to monitor and report any deviations or violations of environmental norms and conditions. Any such deviations are being documented and reported as part of the six-monthly compliance reports.
iii.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will	JSWSL has dedicated Environmental cell is in place with qualified personnel under the control of Section Head, who is reporting directly to the head of the organization.

	directly to the head of the organization.	
iv.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional office along with the Six Monthly Compliance Report.	JSWSL has been implementing EMP with action plan based on environmental conditions, and year wise CAPEX bing allocated in a separate account, the details of which it has also regularly submitted in the six-monthly compliance report.
v.	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	JSWSL has regularly undertaken annual self assessment audit, and also have conducted third party audit every 3-years & submitted in its 6- monthly complince report.
vi.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Iron and Steel plants shall be implemented.	JSWSL has fully complied with CREP guidelines.
X. Miscellaneous		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising in at least in two local newspapers of the District or State of which one shall be in the vernacular language within seven days and in addition, this shall also be displayed in the project proponent's website permanently.	Copy of environmental clearance & its compliance have been updated in its JSWSL portal, copies of environmental clearance with intimation of having been accorded environmental clearance has also been given to all the local bodies by JSWSL, and all critical parameters monitored are also digitally displayed at the plant boundary on real time basis with continuous recording & data logger JSWSL had also informed the public vide publication in local newspapers including in vernacular language that it had been accorded environmental clearance
ii.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	
iii.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	

iv.	The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO_2, NO_X (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	JSWSL, and all critical parameters monitored are also digitally displayed at the plant boundary on real time basis with continuous recording & data logger
v.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest & Climate Change at environmental clearance portal.	JSWSL is regularly submitting 6-monthly compliance report at the online portal of MoEFCC ie PARIVESH.
vi.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	JSWSL has been regularly submitting Form V to TNPCB.
vii.	The Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.	-
viii.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	JSWSL has been strictly operating in compliance to conditions of the consent to operate issued by TNPCB, and environmental clearance issued by TNPCB , and various commitments made as part of public hearing, environment impact assessment etc, and have concurred to not undertake any additional activity contrary to regulatory clearance at any point in time.
ix.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	
x.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	
xi.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	-

xii.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	-
xiii.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	-
xiv.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports	-
xv.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.	-
xvi.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010	-

5 COMPLIANCE – TNPCB CONSENT

5.1 LATEST CONSENT TO OPERATE

The unit has 2-separate Consent to Operate (CTO) ie each for its steel plant & captive power plant,

The existing valid Consent to Operate (CTO) ie valid up to March 31, 2026 for steel plant are CTO issued vide 2307249391459 (Air Act) & 2307149391459 (Water Act), with following capacity of production consented with the present CTO

No.	Description	Quantity (TPA)
Product Details		
1	Steel production (Mild Steel, Carbon Steel, Alloy Steel and Special Steel) Products (Billets, Blooms, Round bars, Round Corner Square, Flats, Coils, Bars & Rods, Hexagon, Annealed, Pickled, Peeled & Ground products and Steel Ball)	1150000
By-Product Details		
1	Ferrous Sulphate	1200
2	Liquid oxygen for sale	15000
3	Liquid Nitrogen for sale	2000
4	Liquid Argon for sale	8000
5	Paver block by using Steel Making Shop slag	50000
6	Crushed slag (steel Making Shop Slag)	226750
7	Ready-Mix concrete	82500
8	Ground Granulated Blast Furnace Slag	800000
Intermediate Product Details		
1	Pig Iron Production	300000

The existing consent to operate with respect to point source of emission permits point sources of emission from the following stacks attached to each of processes

Stack No.	Stack Name	Air Pollution Control Measures	Height from Ground Level in m	Gaseous Discharge (Nm^3/hr)	Diameter (m)	Velocity (m/s)
1	Sinter Plant -1 (0.175MTPA) Sinter Machine	ESP with stack	45.0	126000	1.60	17 - 19
2	Sinter Plant -1 Sinter Machine Cooling System	ESP with stack	35.0	102024	2.00	10 - 12
3	Sinter Plant -1 Dedusting system	Bag House with stack	30.0	150000	2.20	10 - 12
4	Sinter Plant -1 – Raw Material Handling System	Bag House with stack	34.0	30000	1.00	9 - 11
5	Sinter Plant -1 Product Bin Dedusting System	Bag House with stack	14.0	16000	0.65 x 0.46	14-16
6	Sinter Plant -2(1.06 MTPA) Sinter Machine	ESP with stack	85.0	660000	4.00	18-20
7	Sinter Plant -2 Plant De-Dusting & Cooling System	ESP with stack	50.0	485000	3.80	10 - 12
8	Sinter Plant -2 Fuel Crushing & Raw Material De-Dusting System	Bag House with stack	32.0	140000	1.75	14-16
9	Sinter Plant -2 Sinter Conveyor Dedusting System	Bag House with stack	14.0	16000	0.60 x 0.40	18-20
10	Coke Oven Plant(NRT) (0.50 MTPA) Coke Wet Quenching Tower	Grit Arrestor Stack	32.0	100000	15.40 x 3.50	14-16
11	Coke Oven Plant(NRT)-Coke Oven Battery-1(Emergency Stack -1A&1B)	Stack	75.0	120000	3.0	9-11
12	Coke Oven Plant(NRT)-Coke Oven Battery-2(Emergency Stack)	Stack	80.0	30000	3.78	9.11
13	Coke Oven Plant(NRT) Coke Oven Battery-3(Emergency Stack)	Stack	65.0	70000	2.50	14-15
14	Coke Oven Plant(NRT) Coke Cutter De-Dusting	Bag House with Stack	30.0	40000	1.15	11-13
15	Coke Oven Plant(NRT) Coke Drier Dedusting	Bag House with Stack	30.0	150000	1.70	14-16
16	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 1	Stack	35.0	75000	1.38	13-15
17	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 2	Stack	35.0	75000	1.38	13-15
18	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 3	Stack	35.0	120000	1.80	11-13
19	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 4	Stack	35.0	75000	1.38	15-17
20	Coke Oven Plant(NRT) Waste Heat Recovery Boiler 5	Stack	35.0	75000	1.55	15-17
21	Blast Furnace Gas Fired Boiler	Stack	35.0	60000	1.38	14-16
22	Blast Furnace -1 (0.437 MTPA) Hotstove	Stack	60.0	58000	2.15	9-10
23	Blast Furnace -1 Gas Cleaning Plant Flare (Emergency Stack)	Venturi Scrubber with Stack	40.0	35000	0.72	14-15
24	Blast Furnace -1 Stock House & RMHS De-Dusting	Bag House with Common Stack	36.0	350000	2.70	17-19
25	Blast Furnace -1 Cast House De-Dusting	Bag House with Stack	41.0	460000	3.00	12-13
26	Blast Furnace -1 Skull Cutting De-Dusting	Bag House with Stack	20.0	20000	0.60	17-19
27	Blast Furnace -1 Iron-Ore Supply Conveyor #1 De-Dusting	Bag House with Stack	1.80	7500	0.40	15-17

Stack No.	Stack Name	Air pollution Control Measures	Height from Ground Level in m	Gaseous Discharge (Nm3/hr)	Diameter (m)	Velocity (m/s)
28	Blast Furnace -1Iron Ore Supply Conveyor #2 De-Dusting	Bag House with Stack	2.30	7500	0.40	15.17
29	Blast Furnace -2 (0.683 MTPA) Hot stove	Stack	50.0	200000	2.50	14-16
30	Blast Furnace -2 Gas Cleaning Plant (Emergency Stack)	Bag House with Stack	50.0	60000	1.20	12-14
31	Blast Furnace -2 Stock House & RMHS De-Dusting	Bag House with Stack	35.0	350000	2.70	17-19
32	Blast Furnace -2 Cast House De-Dusting System	Bag House with Stack	43.5	691000	3.60	14-16
33	Blast Furnace – Pulverized Coal Injection	Bag House with Stack	49.0	72000	1.10	14-16
34	Blast Furnace -2 Raw Material Conveyor De-Dusting	Bag House with Stack	23.6	27500	0.63	11-13
35	Process Steam Supply Boiler (1 x 25TPH & 1 X 8TPH) BF Gas Based	Common Stack	61.0	62500	1.85	13-15
36	Energy Optimizing Furnace -1(0.64 MTPA) Primary De-Dusting	Venturi Scrubber with Stack	43.0	80000	1.70	14-16
37	Energy Optimizing Furnace -2(0.62 MTPA) Primary De-Dusting	Venturi Scrubber with Stack	43.0	82000	1.70	14-16
38	Energy Optimizing Furnace -1 & 2 Secondary De-Dusting	Bag House with Common Stack	43.0	550000	3.50	14-16
39	Ladle Refining Furnace 1,4 & 5(65 T/Heat each) Primary & 1 to 4 Secondary De-Dusting	Bag House with Common Stack	43.0	550000	3.50	14-16
40	Ladle Refining Furnace 2 & 3 (65 T/Heat each) Primary De-Dusting	Bag Filter with Common stack	40.0	75000	1.60	13-15
41	Process Steam Supply Boilers 1&2 for Vacuum De-Gassing (BF Gas Fired)	Common Stack	42.0	90000	1.50	10-12
42	Continuous Casting Machine -1(0.35 MTPA) Steam Exhaust	Stack	24.0	45000	1.05	12-14
43	Continuous Casting Machine -1(0.35 MTPA) Billet Grinding Machine	Stack	30.0	29000	1.0	11-13
44	Continuous Casting Machine -2(0.5 MTPA) Steam Exhaust Stack 1 & 2	Stack	26.2	45000	1.0	16-18
45	Continuous Casting Machine -2 Cut Fumes Exhaust	Stack	21.0	80000	1.50	16-18
46	Continuous Casting Machine -2 Billet Grinding Machine	Stack	30.0	40000	1.20	11-13
47	Continuous Casting Machine -3(0.45 MTPA) Steam Exhaust Stack 1	Stack	26.2	45000	1.00	16-18
48	Continuous Casting Machine -3 Steam Exhaust Stack 2	Stack	33.0	45000	1.00	16-18
49	Continuous Casting Machine -3 Billet Grinding Machine	Bag House with Stack	40	38000	1.20	12-14
50	Blooming Mill (0.48 MTPA) Re-Heating Furnace Stack - 1	Stack	30.0	40000	1.20	12-14
51	Blooming Mill (0.48 MTPA) Re-Heating Furnace Stack - 2	Stack	30.0	40000	1.30	12-14
52	Bar & Rod Mill (0.48 MTPA) Reheating Furnace Stack 1 & 2	Stack	30.0	120000	1.20	11 - 13
53	Pickling Plant (0.06 MTPA) – Acid Fume Exhaust	Wet Scrubber with Stack	30.0	45000	1.00	14-16
54	Pickling Plant – Acid Bath – Hot Water Generator	Stack	30.0	9000	0.30	14-16
55	Pickling Plant – Acid Regeneration Plant – Hot Water Generator	Stack	10.0	2000	0.30	4-6
56	Pickling Plant – Multiple Effect Evaporator (Thermic Fluid Heater)	Stack	30.0	9000	0.50	14-16
57	Sinter Plant Waste Gas to BF Slag Grinding Unit (Emergency Stack)	Damper with Vent Stack	30.0	660000	2.5	19-21

Stack No.	Stack Name	Air pollution Control Measures	Height from Ground Level in m	Gaseous Discharge (Nm3/hr)	Diameter (m)	Velocity (m/s)
58	Batching Plant 1 Cement Silo Vent	Bag House with Stack	15.0	1000	0.10	2-3
59	Batching Plant 2 Cement Silo Vent	Bag House with Stack	15.0	1000	0.10	3-4
60	Lime Kiln Unit	Stack	48.0	70000	1.0	12-14
61	QAD Sample Testing Lab Stack	Double Stage Wet Scrubber	11.0	4000	0.25	17-19
62	D G Set – 625 KVA Coke-Oven Plant	Acoustic Enclosure/Stack	28.5	15000	0.35	25.0
63	D G Set - 1250 KVA Process Steam Supply Boiler	Acoustic Enclosure/Stack	12.0	10000	0.30	25.0
64	D G Set – 625 KVA EOF 1	Acoustic Enclosure/Stack	12.0	10000	0.20	25.0
65	D G Set – 625 KVA EOF 1	Acoustic Enclosure/Stack	12.0	10000	0.20	25.0
66	D G Set – 275 KVA EOF 1	Acoustic Enclosure/Stack	12.0	3025	0.10	15
67	D G Set – 275 KVA EOF 2	Acoustic Enclosure/Stack	12.0	3025	0.10	15
68	D G Set - 1250 KVA EOF 2	Acoustic Enclosure/Stack	12.0	13680	0.30	25
69	D G Set - 1250 KVA CCM 3	Acoustic Enclosure/Stack	12.0	13680	0.40	25.0
70	D G Set – 650 KVA BRM	Acoustic Enclosure/Stack	12.0	7150	0.20	20.0
71	D G Set – 400 KVA Pickling Plant	Acoustic Enclosure/Stack	12.0	4400	0.20	20.0

The existing consent to operate with respect to trade effluents permits points of discharge trade effluent & their respective threshold limits of quantity permissible for discharge to respective treatment plants as follows, and thereafter achieve zero liquid discharge

Outlet No.	Outlet Description	Max. daily discharge KLD	Point of disposal
Effluent Type: Sewage			
1	Sewage (Plant)	96.0	On land for gardening
2	Sewage (Township)	200.0	On land for gardening
Effluent Type: Trade Effluent			
1	Treated trade effluent from ETP	2357.0	For steel plant process cooling and dust suppression
2	Treated trade effluent from ETP	25.0	For ready mix concrete
3	Treated trade effluent from ETP	25.0	For paver block facility
4	Treated trade effluent from ETP	5.0	For SMS slag crushing unit
5	Treated trade effluent from ETP	523.0	For Green Belt development
6	Combined RO permeate from pickling plant ETP	56.7	Recycle to Pickling process & Etching lab
7	MEE Condensate from pickling plant ETP	17.7	Recycle to pickling process
8	ATFD condensate from Pickling plant ETP	3.1	Recycle to pickling process
9	ATFD Evap. loss from pickling plant ETP	1.3	Evaporation loss

5.2 COMPLIANCE TO CONDITIONS OF CONSENT TO OPERATE – STEEL PLANT

Consent Order No 2307249391459 (Air Act) – CTO Valid Up To – 31/03/2026		
S.No	**CONDITION**	**COMPLIANCE**
3(a)	The emission shall not contain constituents in excess of the tolerance limits as laid down hereunder	All parameters with respect to SO_2, NO_X, PM, CO were all found to be within the permissible standards in major significant sources of stack emissions monitored during the present study carried out as part of the environmental audit, and the past datas reviewed were also found to be within permissible levels.
3(b)	The Ambient Air in the industrial plant area shall not contain constituents in excess of the tolerance limits prescribed below.	All parameters with respect to SO_2, NO_X, PM 2.5, PM 10,O_3, NH_3 were within the NAAQ Standards in all the AAQ stations monitored as part of the present study , whereas Benzene, Benzo-Pyrene, CO, Lead, Arsenic, Nickel were all below detectable limit & the past datas reviewed were also found to be within permissible levels
3(c)	The Ambient Noise Level in the industrial plant area shall not exceed the limits prescribed below:	Both Night & Day time noise levels at the boundary of the plant at all locations monitored were well within the CPCB permissible levels, & the past datas reviewed were also found to be within permissible levels
4.	All units of the Air pollution control measures shall be operated efficiently and continuously so as to achieve the standards prescribed in Sl. No.3 above.	The continuous online monitoring systems installed in major stacks had shown the emission levels were within norms and thus indicting the performance of pollution control have always been efficient & meeting the norms.

5.	The occupier shall not change or alter quality or quantity or the rate of emission or replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in change in quality and/or quantity of emissions without the previous written permission of the Board.	JSWSL in its existing plant at mettur had not changed any of its process, equipment, raw material or the products produced including the emissions with respect to the existing consent of TNPCB or the environmental clearance obtained.
6.	The occupier shall maintain log book regarding the stack monitoring system or operation of the plant or any other particulars for each of the unit operations of air pollution control systems to reflect the working condition which shall be furnished for verification of the Board officials during inspection.	A separate log book has been maintained with respect to each of the pollution control equipment, and have also been updated with details such as continuous running, break down, troubleshooting etc.
7.	The occupier shall at his own cost get the samples of emission/air/noise levels collected and analyzed by the TNPC Board Laboratory once in every 6 months/once in a year/periodically for the parameters as prescribed.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained.
8.	Any upset condition in any of the plants of the factory which is likely to result in increased emissions and result in violation of the standards mentioned in Sl.No.3 shall be reported to the Member Secretary / Joint Chief Environmental Engineer-Monitoring and the concerned District/Assistant Environmental Engineer of the Board by e-mail immediately and subsequently by Post with full details of such upset condition.	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit.
9.	The occupier shall always comply and carryout the order/directions issued by the Board in this Consent Order and from time to time without any negligence. The occupier shall be liable for action as per provisions of the Act in case of noncompliance of any order/directions issued.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
SPECIAL ADDITIONAL CONDITIONS		
S.No	**CONDITION**	**COMPLIANCE**
1.	The unit shall install the approved retrofit emission control device/equipment with at least 70% Particulate matter reduction efficiency on all DG sets with capacity of 125 KVA and above or otherwise the unit shall be shift to gas based generators within the time frame prescribed in the notification No:TNPCB/Labs/DD(L)02151/2019 dated10.06.2020 issued by TNPCB.	The plant predominantly is based on its own captive power plant including the power generated using WHRB, and hence reliance on D.G.Set is very very rare, and thus the plant had not required to operate its D.G.Sets, thus retrofitting was felt redundant at present.

2.	The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.	The plant is based on minerals such as Iron-Ore, Coal etc. without any semblance of any material of biological origin, thus resulting in non applicability of this condition.
ADDITIONAL CONDITIONS		
1.	The unit shall comply with the conditions stipulated in the Environmental Clearance obtained vide letter No. No J-11011/281/2006-1A. 11(I) dt 10.2.2020 from Ministry of Environment & Forests, Government of India, New Delhi	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
2.	The unit shall comply with all the conditions stipulated in the NIPL certificate issued to the unit vide Board letter dated 28.11.2022 for the proposed expansion activity.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance, including the conditions of No-Increase in Pollution Load Certificate.
3.	The unit shall operate and maintain the Air Pollution Control measures efficiently and continuously so as to achieve the Ambient Air Quality/Emission standards prescribed by the Board.	All parameters with respect to SO_2, NO_X, PM 2.5, PM 10, O_3, NH_3 were within the NAAQ Standards in all the AAQ stations monitored as part of the present study, whereas Benzene, Benzo-Pyrene, CO, Lead, Arsenic, Nickel were all below detectable limit & the past data's reviewed were also found to be within permissible levels
4.	The unit shall adhere to the Ambient Noise level standards prescribed by the Board	Both Night & Day time noise levels at the boundary of the plant at all locations monitored were well within the CPCB permissible levels, & the past datas reviewed were also found to be within permissible levels
5.	The unit shall adhere to the Stack emission/Fugitive emission standards prescribed by the MoEF&CC from time to time	All parameters with respect to SO_2, NO_X, PM, CO were all found to be within the permissible standards in major significant sources of stack emissions & sources of fugitive emission monitored during the present study carried out as part of the

		environmental audit, and the past data's reviewed were also found to be within permissible levels
6.	The unit shall conduct Ambient Air Quality/ Noise Level/ Stack Emission through TNPCB lab periodically and submit the report regularly.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained.
7.	The unit shall ensure that the OCEMS for the parameters such as PM, SO2, NOx & CO installed at various stacks are connected to CAC,TNPCB and CPCB servers at all times and calibrated periodically as per the CEMS guidelines issued by CPCB.	All the major stacks such as those of sinter plant, blast furnace, the boiler of CPPII are provided with online continuous monitoring system for PM, SO_2, NO_X connected to care air center of TNPCB & CPCB.
8.	The unit shall ensure that coal and coke fines shall be completely recycled and reused in the process. The breeze coke and dust from the air pollution control system shall be reused in sinter plants	Coal fines, coke fines, breeze coke, and dust collected in air pollution control equipment are all entirely re-used back in the process ie sinter plant.
9.	The unit shall furnish data of ambient air quality from 4 locations identified by TNPC Board outside the unit premises on weekly basis to comply with the NAAQ standards by engaging a NABL accredited laboratory to the Board	JSWSL has been undertaking regular AAQ monitoring at 4- locations identified by TNPCB outside the plant site on weekly basis, and also at 12-locations on monthly basis & have also been submitting the report regularly to TNPCB from an accredited environmental laboratory.
10.	The unit shall furnish monthly data of air quality in12 locations, wherein AEL, TNPCB, Salem is conducting bi annually by engaging a NABL accredited laboratory to the Board	
11.	The unit shall install NO2 and CO analyzers in other three CAAQMS installed within the unit premises and the real time data shall be transmitted to CAC,TNPCB, Chennai	NO_2 & CO analysers are installed in all the CAAQMS , and all these 4-CAAQMS are connected to care air center TNPCB & CPCB, and are also digitally displayed at the plant boundary on real time basis with continuous recording & data logger.
12.	The unit shall ensure that the real time parameters of four number of CAAQMS are being displayed in the digital display board installed in the main entrances of the unit.	
13.	The unit shall ensure the connectivity of real time parameters of four number of CAAQMS to CAC, TNPCB, Chennai at all times.	
14.	The unit shall ensure that the dust suppression system such as water sprinklers, road sweeping machines, Dry fog, Wet fog, etc., are operated continuously and efficiently so as to achieve the fugitive emission standards issued by MoEF&CC notification dated 31.03.2012	All parameters with respect to SO_2, NO_X, PM, CO were all found to be within the permissible standards in major significant sources of stack emissions & sources of fugitive emission monitored during

		the present study carried out as part of the environmental audit, and the past data's reviewed were also found to be within permissible levels
15.	The unit shall continue to develop adequate green belt by planting tree saplings of native species in and around the unit premises so as to comply with the Board norms.	Of the total 237.28 ha land area, about 85 ha along boundary is covered with green belt, with a total of 272357-trees thereby achieving green belt coverage of up to 34% of the total land area.
16.	In case of revision of consent fee by the Government, the unit shall remit the difference in amount within one month from the date of notification. Failing to remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.	Payment of consent fees has been duly taken care by JSWSL , and have been meticuluously ensuring compliance with respect to this.
17.	The unit shall provide interlocking systems where ever possible in such a way that whenever the pollution control system fails, the feed of raw materials is cut off automatically and the emissions are controlled.	JSWSL ensures that the raw material supplies are cut-off the moment any exceedance in emission levels are notices, and the main process brought under controlled operation until the appropriate rectifications are taken to ensure operation of the pollution control equipment's efficiently to meet the standards & the operations are re-started.
GENERAL CONDITIONS		
S.No	**CONDITION**	**COMPLIANCE**
1.	The occupier shall make an application along with the prescribed consent fee for grant of renewal of consent at least 60 days before the date of expiry of this Consent Order along with all the required particulars ensuring that there is no change in production quantity and emission.	JSWSL has ensured application for consent renewal on time in the past, and have also ensured payment of consent fees on time.
2.	This Consent is given by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished, in the application will also be ground for review/variation/revocation of the Consent Order under Section 21 of the Act.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
3.	The conditions imposed shall continue in force until revoked under Section 21 of the Act	

4.	After the issue of this order, all the 'Consent to Operate' orders issued previously under Air (Prevention and Control of Pollution) Act, 1981 as amended stands defunct.	-
5.	The occupier shall maintain an Inspection Register in the factory so that the inspecting officer shall record the details of the observations and instructions issued to the unit at the time of inspection for adherence.	JSWSL has maintained an inspection register at its plant site to enable an inspecting officer to record the observations during the inspection
6.	The occupier shall provide and maintain an alternate power supply along with separate energy meter for the Air Pollution Control measures sufficient to ensure continuous operation of all pollution control equipment's to ensure compliance.	The plant operates on captive power as its predominant source of power with 3-separate units of 30 MW each, and has also back up power in the form of D G Sets , and that separate energy meters had been installed for each of the air pollution control equipments.
7.	The occupier shall provide all facilities to the Board officials for collection of samples in and around the factory at any time.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained, and have been enabling the board officials to collect samples.
8.	The applicant shall display the flow diagram of the sources of emission and pollution control systems provided at the site.	Flow diagrams have been exhibited at each & every point of significant sources of pollution & control equipments.
9.	The liquid effluent arising out of the operation of the air pollution control equipment shall also be treated in a manner and to the satisfaction of standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 as amended.	Most of the control equipment's used are Bag Filters ,& ESP except the effluent generating from gas cleaning plant of blast furnace, & quenching of coke oven plant, wherein treatments are being ensured
10.	The air pollution control equipment's, location of inspection chambers and sampling port holes shall be made easily accessible at all time	All the points of environment control measures in the plant have been provided with accessibility for inspection, maintenance, operation etc, and sampling points have also been provided in the stack attached to each of the air pollution control equipments.

11.	In case of any episodal discharge of emission, the industry shall take immediate action to bring down the emission within the limits prescribed by the Board.	JSWSL ensures that the raw material supplies are cut-off the moment any exceedance in emission levels are notices, and the main process brought under controlled operation until the appropriate rectifications are taken to ensure operation of the pollution control equipment's efficiently to meet the standards & the operations are re-started
12.	If applicable, the occupier has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances.	Public Liability Insurance Act is applicable, and hence are in possession of valid public liability insurance to provide relief just incase required.
13.	The issuance of this consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any natural watercourse or in Government Poramboke lands	-
14.	The issuance of this Consent does not convey any property right in either real personal property or any exclusive privileges, nor does it authorize any injury to private property or Government property or any invasion of personal rights nor any infringement of Central, State laws or regulation	-
15.	The occupier shall forth with keep the Board informed of any accident of unforeseen act or event of any poisonous, noxious or polluting matter or emissions are being discharged into stream or well or air as a result of such discharge, water or air is being polluted	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit, however, in case of such occurrence JSWSL concur immediate information to the Board.
16.	If due to any technological improvements or otherwise the Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any treatment system, either in whole or in part) the Board shall, after giving the applicant an opportunity of being heard, vary all or any of such conditions and thereupon the applicant shall be bound to comply with the conditions as so varied.	-

17.	In case there is any change in the constitution of the management, the occupier of the new management shall file fresh application under Air (Prevention and Control of Pollution) Act, 1981, as amended in Form-I along with relevant documents of change of management immediately and get the necessary amendment with renewal of consent order	JSWSL concurs to inform the board immediately in case of change in name or constitution of the company.
18.	In case there is any change in the name of the company alone, the occupier shall inform the same with relevant documents immediately and get the necessary amendments for the change of name from the Board.	
19.	The occupier shall display this consent order granted to him in a prominent place for perusal of the inspecting Officers of this Board.	Copies of consent orders including all regulatory clearance have been prominently kept to enable the board officials peruse with ease
Consent Order No 2307149391459 (Water Act) – CTO Valid Up To – 31/03/2026		
S.No	**CONDITION**	**COMPLIANCE**
3.	The effluent discharge shall not contain constituents in excess of the tolerance limits as laid down	The JSWSL plant operates on zero waste water discharge , wherein the entire treated trade effluent is re-used back within the plant process for cooling water make-up, dust suppression, paver block production, slag crushing etc , however, the records & datas reviewed had indicated the treated trade effluent is within the stipulated norms & have been operating the ETP's continuously as recorded in the Log Book. Records & Data's reviewed including the log books maintained by JSWSL revealed that STP has been operating continuously, the treated sewage has also been meeting discharge standards for disposal on land for green belt development, and the treated sewage is entirely utilized for green belt development
4.	All units of the sewage and Trade effluent treatment plants shall be operated efficiently and continuously so as to achieve the standards prescribed in Sl No.3 above or to achieve the zero liquid discharge of effluent as applicable.	

5.	The occupier shall maintain the Electro Magnetic Flow Meters/water Meters installed at the inlet of the water supply connection for each of the purposes mentioned below for assessing the quantity of water used and ensuring that such meters are easily accessible for inspection and maintenance and for other purposes of the Act. Industrial Cooling, Spraying in mine pits or boiler feed. Domestic purpose. Process.	JSWSL has provided EMFM at the points of domestic water consumption, inlet & outlet of the STP, and are also connected to water quality watch center of TNPCB. JSWSL has provided EMFM at the inlet of process water consumption, inlet & outlet of the ETP, and are also connected to water quality watch center of TNPCB. JSWSL has also provided EMFM at each of the outlet of 7-intermediate storage tanks of trade effluent, also at ZLD ETP of pickling/etching lab, including log books of record of readings at each of these EMFM's. All these points of location of EMFM have been provided with accessibility for inspection
6.	The occupier shall maintain the Electro Magnetic Flow Meters with computer recording arrangement for measuring the quantity of effluent generated and treated for the monitoring purposes of the Act.	
7.	Log book for each of the unit operations of ETP have to be maintained to reflect the working condition of ETP along with the readings of the Electro Magnetic Flow Meters installed to assess effluent quantity and the same shall be furnished for verification of the Board officials during inspection	
8.	The occupier shall at his own cost get the samples of effluent/surface water/ground water collected in and around the unit by Board officials and analyzed by the TNPC Board Laboratory periodically.	JSWSL has been regularly conducting analysis of ground water/surface water/effluent samples through TNPCB & submitting consolidated reports regularly
9.	Any upset condition in any of the plants of the factory which is, likely to result in increased effluent discharge and result in violation of the standards mentioned in Sl. No.3 above shall be reported to the Member Secretary / Joint Chief Environmental Engineer-Monitoring and the concerned District/Assistant Environmental Engineer of the Board by e-mail immediately and subsequently by Post with full details of such upset condition	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit, however, in case of such occurrence JSWSL concur immediate information to the Board
10.	The occupier shall always comply and carryout the order/directions issued by the Board in this Consent Order and from time to time without any negligence. The occupier shall be liable for action as per provisions of the Act in case of non-compliance of any order/directions issued.	-
11.	The occupier shall develop adequate width of green belt at the rate of 400 numbers of trees per Hectare	Of the total 265.93 ha land area, about 90.26 ha along boundary is covered with green belt, thereby achieving green belt

		coverage of up to 34% of the total land area.
12.	The occupier shall provide and maintain rain water harvesting facilities.	JSWSL has provided 4-Nos of surge ponds, which act as rain water harvesting ponds & this being clean water are used for process.
13.	The occupier shall ensure that there shall not be any discharge of effluent either treated or untreated into storm water drain at any point of time.	JSWSL has ensured that storm drainage are kept exclusive to be free of run-off from any critical areas, which are separately collected & treated & stored, hence obviating any contamination in storm water drains.
14.	In the case of zero liquid discharge of effluent units, the occupier shall adhere the following conditions as laid under. i). The occupier shall ensure zero liquid discharge of effluent, thereby no discharge of untreated/treated effluent on land or into any water bodies either inside or outside the premises at any point of time. ii) The occupier shall operate and maintain the Zero liquid discharge treatment components comprising of Primary, Secondary and tertiary treatment systems at all times and ensure that the RO permeate/Evaporator condensate shall be recycled in the process and the final RO reject shall be disposed of with the reject management system ensuring zero liquid discharge of effluents in the premises. iii) The occupier shall operate and maintain the reject management system effectively and recover the salt from the system which shall be reused in the process if reusable or shall be disposed of as ETP sludge. iv) In case of failure to achieve zero discharge of effluents for any reason, the occupier shall stop its production and operations forthwith and shall be reported to the Member Secretary/Joint Chief Environmental Engineer-Monitoring and the concerned District/Assistant Environmental Engineer of the Board by e-mail immediately and subsequently by Post with full details of such upset condition. v) The occupier shall restart the production only after ascertaining that the Zero discharge treatment system can perform effectively for achieving zero discharge of effluents.	Records & Data's reviewed including the log books maintained by JSWSL revealed that STP/ETP has been operating continuously without any interruption , the treated sewage/trade effluent has also been meeting the discharges standards. The Log Books maintained by JSWSL revealed that the entire treated trade effluent is re-used within the plant for cooling water make-up, dust suppression, slag crushing, paver block production & ready-mix concrete plant, without any discharge to outside the plant site or on land JSWSL ensures that the raw material supplies are cut-off the moment any malfunction in ZLD IS noticed, and the main process brought under controlled operation until the appropriate rectifications are taken to ensure operation of the pollution control equipment's efficiently to meet the standards & the operations are re-started

SPECIAL ADDITIONAL CONDITIONS		
S.No	**CONDITION**	**COMPLIANCE**
1.	The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.	The plant is based on minerals such as Iron-Ore, Coal etc. without any semblance of any material of biological origin, thus resulting in not applicability of this condition.
ADDITIONAL CONDITIONS		
S.No	**CONDITION**	**COMPLIANCE**
1.	The unit shall comply with the conditions stipulated in the Environmental Clearance obtained vide letter No. F. No. J-11011/281/2006–IA. II (I) dt 10.2.2020 from Ministry of Environment & Forests, Government of India, New Delhi	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
2.	The unit shall comply with all the conditions stipulated in the NIPL certificate issued to the unit vide Board letter dated 28.11.2022 for the proposed expansion activity.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance, including the conditions of No-Increase in Pollution Load Certificate.
3.	The unit shall operate and maintain the sewage treatment plants provided for the treatment of sewage generated from township & industrial plant efficiently and continuously so as to bring the quality of treated sewage to satisfy the discharge standards prescribed by the Board at all times.	Records & Data's reviewed including the log books maintained by JSWSL revealed that STP has been operating continuously , the treated sewage has also been meeting discharge standards for disposal on land for green belt development, and the treated sewage is entirely utilized for green belt development
4.	The unit shall utilize the entire quantity of treated sewage for gardening/tree plantation purposes within the premises.	
5.	The unit shall ensure that the EMFMs are provided at the inlet & outlet of STPs and the same shall be connected to WQW, TNPCB, Chennai.	JSWSL has provided EMFM at the inlet & outlet of the STP, and are also connected to water quality watch center of TNPCB.
6.	The unit shall operate and maintain the combined Effluent Treatment Plant provided for the treatment of effluent arising from blast furnace, steel melting shop, mills(Bar and rod mills, blooming mill) utilities such as Air Separation Plant, Captive power plant(cooling Tower bleed off, boiler blow	Records & Data's reviewed including the log books maintained by JSWSL revealed that ETP has been operating continuously ,

	down), freshwater treatment facilities such as ultra-filtration and R.O. rejects continuously and efficiently so as to bring the quality of treated trade effluent to achieve the discharge standards prescribed by the Board at all times.	the treated effluent has also been meeting discharge standards. Log books have also been maintained for each of the EMFM installed.
7.	The unit shall ensure that the trade effluent expected to be generated from the Steel Ball making facility shall be treated in the existing combined ETP and the same shall be utilised for various application as per the consent order and log book shall be maintained for the EMFMs installed in the outlet of the cooling tower bleed off.	
8.	The unit shall ensure that the entire quantity of treated trade effluent is reused in the steel plant for cooling purposes, dust suppression, paver block facility, RMC process, SMS slag crushing and Green belt development as consented.	The Log Books maintained by JSWSL revealed that the entire treated trade effluent is re-used within the plant for cooling water make-up, dust suppression, slag crushing, paver block production & ready mix concrete plant.
9.	The unit shall maintain online continuous effluent monitoring system for the parameter pH provided at the outlet of combined ETP provided for the Steel plant & CPP properly for ensuring connectivity with WATER QUALITY WATCH, TNPCB and CPCB without any interruption at all times for monitoring of effluent parameter and calibrate the system regularly to display accurate effluent data always.	The online continuous monitoring system for pH at the outlet of ETP is connected to the Water Quality Watch Center of TNPCB & CPCB, and the data logger revealed uninterrupted connection with appropriate calibration graphs in place to corroborate authenticity.
10.	The unit shall ensure that the EMFMs are provided at the inlet & outlet of combined ETP and the same is connected to WQW, TNPCB, Chennai and CPCB servers.	JSWSL has provided EMFM at the inlet & outlet of the ETP, and are also connected to water quality watch center of TNPCB.
11.	The unit shall maintain log books for the EMFMs installed in the outlet of the 7 intermediate collection tanks provided for the trade effluent arising from various process of steel plant.	JSWSL has provided EMFM at each of the outlet of 7-intermediate storage tanks of trade effluent including log books of record of discharge.
12.	The unit shall operate and maintain the ETP followed by RO (2 stages), MEE (2 stages) and ATFD provided for the treatment of effluent arising from pickling plant and etching lab efficiently and continuously so as to achieve ZLD at all times and ensure that combined RO permeate and condensate of MEE & ATFD is completely recycled to pickling process and etching lab.	Records & Data's reviewed including the log books maintained by JSWSL revealed that ETP/RO/MEE for treatment of effluent arising from pickling plant and etching lab has been operating continuously , & condensate/permeate are re-used back in the pickling/etching process.

13.	The unit shall maintain log books for the EMFMs installed in the ZLD ETP provided for pickling plant and etching lab.	JSWSL has provided EMFM at ZLD ETP of pickling/etching lab including log books of record of discharge.
14.	The unit shall ensure that there shall not be any stagnation or ponding of treated/untreated sewage/effluent inside the premises and shall ensure that no effluent/sewage shall reach directly or indirectly any water source or adjacent private/public lands under any circumstances.	JSWSL as per the data reviewed, and environment audit carried out indicate, that the entire treated effluent from the plant is entirely re-used back in the process without any discharge, whatsoever
15.	The unit shall comply with the provisions of Hazardous and Other Wastes (Management & Trans Boundary Movement) Rules, 2016 as amended from time to time while handling of the wastes.	Records & datas reviewed including log books, returns etc reveal JSWSL is totally complying with the provisions of Hazardous and Other Wastes (Management & Trans Boundary Movement) Rules, 2016 as amended
16.	The unit shall collect & dispose the non-hazardous solid waste generated for further beneficial use without any accumulation inside the premises and shall maintain log books for the generation and disposal.	BF Slag & Furnace Slag in entirely used for production of paver blocks, sinter waste entirely re-used back in the sinter plant, and other solid waste are also entirely used for downstream beneficial purpose.
17.	The unit shall analyze the ground water quality regularly through TNPCB Lab every month and furnish the consolidated report to the Board periodically.	JSWSL has been regularly conducting analysis of ground water through TNPCB & submitting consolidated reports regularly
18.	The unit shall ensure that the storm water arising from the plant area during rainy season shall not contain any contaminants and shall satisfy the Inland surface water standards before disposal.	JSWSL has ensured that storm drainage are kept exclusive to be free of run-off from any critical areas, which are separately collected & treated & stored, hence obviating any contamination in surge ponds, which act as rain water harvesting ponds & this being clean water are used for process. The outlet from these surge ponds are provided with online continuous monitoring equipment for pH and TDS, which are connected to WQW of TNPCB.
19.	The unit shall ensure that the OCEMS for the parameters pH and TDS are installed at the surplus outlet of the rain water harvesting pond and the same shall be connected to WQW, TNPCB, Chennai.	

20.	In case of revision of consent fee by the Government, the unit shall remit the difference in amountwithin one month from the date of notification. Failing to remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.	Payment of consent fees has been duly taken care by JSWSL , and have been meticuluously ensuring compliance with respect to this.
21.	The unit shall not use 'single use and throwaway plastic items' such as plastic sheets used for food wrapping, spreading on dining table etc., plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead unit shall encourage use of eco-friendly alternative such as banana leaf, areca nut palm plate, stainless steel, glass, porcelain plates/cups, cloth bag, jute bag etc.	JSWSL has completely banned use of single use throw away plastics within the plant site.
22.	The unit shall comply with the E-Waste Management Rules 2016. E-Waste as listed in Schedule – I, generated by them shall be channelized through collection center or dealer of authorized producer or dismantler or recycler or through the designated take back service provider of the producer to authorized dismantler or recycler. The unit shall maintain records of e-waste generated by them in Form-2 and make such records available for scrutiny by the TNPCB. The unit shall file annual returns in Form-3, to the TNPCB on or before the 30th day of June following the financial year.	
23.	The unit shall submit the Environmental Statement for the financial year ending on 31st March on or before 30th of September every year.	JSWSL has been regularly submitting Form V Environment Audit report before the due date.

GENERAL CONDITIONS

S.No	CONDITION	COMPLIANCE
1.	The occupier shall make an application along with the prescribed consent fee for grant of renewal of consent at least 60 days before the date of expiry of this Consent Order along with all the required particulars ensuring that there is no change in Production quantity and change in sewage/Trade effluent	JSWSL has ensured application for consent renewal on time in the past, and have also ensured payment of consent fees on time.
2.	This Consent is issued by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished in the application will also be ground for review/variation/revocation of the Consent Order under Section 27 of the Act and to make such variation as deemed fit for the purpose of the Act.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
3.	The consent conditions imposed in this order shall continue in force until revoked under Section 27(2) of the Act.	

4.	After the issue of this order, all the 'Consent to Operate' orders issued previously under Water (Prevention and Control of Pollution) Act, 1974 as amended stands defunct.	-
5.	The occupier shall maintain an Inspection Register in the factory so that the inspecting officer shall record the details of the observations and instructions issued to the unit at the time of inspection for adherence.	JSWSL has maintained an inspection register at its plant site to enable an inspecting officer to record the observations during the inspection
6.	The occupier shall provide and maintain an alternate power supply along with separate energy meter for the Effluent Treatment Plant sufficient to ensure continuous operation of all pollution control equipment's to maintain compliance.	The plant operates on captive power as its predominant source of power with 3-separate units of 30 MW each, and has also back up power in the form of D G Sets , and that separate energy meters had been installed for each of the treatment plants
7.	The occupier shall provide all facilities to the Board officials for inspection and collection of samples in and around the factory at any time	All the points of environment control measures in the plant have been provided with accessibility for inspection, maintenance, operation etc, and sampling.
8.	The occupier shall display the flow diagram of the sources of effluent generation and pollution control systems provided at the ETP site.	Flow diagrams have been exhibited at each of the sites of treatment plants consisting of sewage, trade effluent etc.
9.	The solid waste such as sweepings, wastage, package, empty containers, residues, sludge including that from air pollution control equipment's collected within the premises of the industrial plant shall be collected in an earmarked area and shall be disposed of properly.	JSWSL have been exclusively collecting hazardous waste & solid waste separately without any mix-up, whatsoever & have also been disposing as per norms.
10.	The occupier shall collect, treat the solid wastes like food waste, green waste generated from the canteen and convert into organic compost.	JSWSL have ensured that all their bio-degradable waste ie organic waste are subject to composting & used as manure.
11.	The occupier shall segregate the Hazardous waste from other solid wastes and comply in accordance with Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008	JSWSL have been exclusively collecting hazardous waste & solid waste separately without any mix-up, whatsoever.
12.	All pipes, valves, sewers and drains shall be leak proof. Floor washings shall be admitted into the trade effluent collection system only and shall	All pipes, valves, drains etc carrying material or waste have been ensured by JSWSL to be entirely leak-proof, and have also

	not be allowed to find their way in storm drains or open areas.	ensured collection of waste water exclusively into the treatment units.
13.	The occupier shall ensure that there shall not be any diversion or by-pass of trade effluent on land or into any water sources.	JSWSL as per the data reviewed, and environment audit carried out indicate, that the entire treated effluent from the plant is entirely re-used back in the process without any discharge, whatsoever.
14.	The occupier shall ensure that solar Evaporation pans shall be constructed in such a way that the bottom of the solar pan is at least 1 m above the Ground level (if applicable).	JSWSL does not have solar evaporation pan in its facility.
15.	The occupier shall furnish the following returns in the prescribed formats to the concerned District office regularly. a) Monthly water consumption returns of each of the purposes with water meter readings in Form-I on or before 5th of every month. b) Yearly return on Hazardous wastes generated and accumulated for the period from 1st April to 31stMarch in Form–4 before the end of the subsequent 30th June of every year (if applicable). c)Yearly Environmental Statement for the period from 1st April to 31st March in Form –V before the end of the subsequent 30th September of every year (if applicable).	JSWSL has been regularly submitting the returns with respect to water consumption in Form I, hazardous waste generation & disposal in Form – 4, Form V Environment Audit report.
16.	If applicable, the occupier has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances.	Public Liability Insurance Act is applicable, and hence are in possession of valid public liability insurance to provide relief just incase required.
17.	The issuance of this consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any natural watercourse or in Government Pocomoke lands.	-
18.	The issuance of this Consent does not convey any property right in either real personal property or any exclusive privileges, nor does it authorize any injury to private property or Government property or any invasion of personal rights nor any infringement of Central, State laws or regulation.	-
19.	The occupier shall forth with keep the Board informed of any accident of unforeseen act or event of any poisonous, noxious or polluting matter or emissions are being discharged into stream or well or air because of such discharge, water or air is being polluted.	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment

		audit, however, in case of such occurrence JSWSL concur immediate information to the Board.
20.	If due to any technological improvements or otherwise the Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any treatment system, either in whole or in part) the Board shall, after giving the applicant an opportunity of being heard, vary all or any of such conditions and thereupon the applicant shall be bound to comply with the conditions as so varied.	-
21.	In case there is any change in the constitution of the management, the occupier of the new management shall file fresh application under Water (Prevention and Control of Pollution) Act, 1974, as amended in Form-II along with relevant documents of change of management immediately and get the necessary amendment with renewal of consent order.	JSWSL concurs to inform the board immediately in case of change in name or constitution of the company.
22.	In case there is any change in the name of the company alone, the occupier shall inform the same with relevant documents immediately and get the necessary amendments for the change of name from the Board.	
23.	The occupier shall display this consent order granted to him in a prominent place for perusal of the inspecting Officers of this Board.	Copies of consent orders including all regulatory clearance have been prominently kept to enable the board officials peruse with ease

5.3 COMPLIANCE TO CONDITIONS OF CONSENT TO OPERATE – POWER PLANT

<table>
<tr><th colspan="3">CONSENT ORDER NO. 2205242882719 (AIR ACT) DATED: 08/04/2022.</th></tr>
<tr><th colspan="3">Special Conditions</th></tr>
<tr><th>S. No</th><th>CONDITIONS</th><th>COMPLIANCE</th></tr>
<tr><td>1</td><td>This consent to operate for is valid for operating the facility for the manufacture of products (Col. 2) at the rate (Col. 3) mentioned below. Any change in the products and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.
Product Details
1. Power Generation (Captive) – 90 MW</td><td rowspan="3">JSWSL at present is operating 3 x 30 MW CPP & Point/Fugitive sources of emission are in compliance to the consent obtained.</td></tr>
<tr><td>2</td><td>This consent to operate for Expansion is valid for operating the facility with the below mentioned emission/noise sources along with the control measures and/or stack. Any change in the emission source/control measures/change in stack height has to be brought to the notice of the Board and fresh consent/ Amendment has to be obtained.</td></tr>
<tr><td>3(a)</td><td>The emission shall not contain constituents in excess of the tolerance limits as laid down hereunder:</td></tr>
<tr><td>3(b)</td><td>The Ambient Air in the industrial plant area shall not contain constituents in excess of the tolerance limits prescribed below.</td><td>All parameters with respect to SO_2, NO_X, PM 2.5, PM 10, O_3, NH_3 were within the NAAQ Standards in all the AAQ stations monitored as part of the present study, whereas Benzene, Benzo-Pyrene, CO, Lead, Arsenic, Nickel were all below detectable limit & the past data’s reviewed were also found to be within permissible levels
.</td></tr>
<tr><td>3(c)</td><td>The Ambient Noise Level in the industrial plant area shall not exceed the limits prescribed below:
<table>
<tr><th>Limits in L.eq.- dB(A)</th><th>Day Time</th><th>Night Time</th></tr>
<tr><td>Industrial Area</td><td>75</td><td>70</td></tr>
</table></td><td>Both Night & Day time noise levels at the boundary of the plant at all locations monitored were well within the CPCB permissible levels, & the past datas reviewed were also found to be within permissible levels</td></tr>
<tr><td>4</td><td>All units of the Air pollution control measures shall be operated efficiently and continuously so as to achieve the standards prescribed in Sl. No.3 above.</td><td>All parameters with respect to SO_2, NO_X, PM, CO were all found to be within the permissible standards in major significant sources of stack</td></tr>
</table>

		emissions & sources of fugitive emission monitored during the present study carried out as part of the environmental audit, and the past data's reviewed were also found to be within permissible levels
5	The occupier shall not change or alter quality or quantity or the rate of emission or replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in change in quality and/or quantity of emissions without the previous written permission of the Board.	JSWSL at present is operating in total compliance to existing consent to operate & environmental clearance with no change in process, or quanity of emission, raw material etc.
6	The occupier shall maintain log book regarding the stack monitoring system or operation of the plant or any other particulars for each of the unit operations of air pollution control systems to reflect the working condition which shall be furnished for verification of the Board officials during inspection.	A separate log book has been maintained with respect to each of the pollution control equipment, and have also been updated with details such as continuous running, break down, troubleshooting etc.
7	The occupier shall at his own cost get the samples of emission/air/noise levels collected and analyzed by the TNPC Board Laboratory once in every 6 months/once in a year/ periodically for the parameters as prescribed.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained..
8	Any upset condition in any of the plants of the factory which is likely to result in increased emissions and result in violation of the standards mentioned in Sl.No.3 shall be reported to the Member Secretary / Joint Chief Environmental Engineer-Monitoring and the concerned District/Assistant Environmental Engineer of the Board by e-mail immediately and subsequently by Post with full details of such upset condition.	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit.
9	The occupier shall always comply and carryout the order/directions issued by the Board in this Consent Order and from time to time without any negligence. The occupier shall be liable for action as per provisions of the Act in case of non-compliance of any order/directions issued..00	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance

SPECIAL ADDITIONAL CONDITIONS

S. No	CONDITIONS	STATUS
1	The unit shall install the approved retrofit emission control device/equipment with atleast 70% reduction in particulate matter reduction efficiency ona all DG sets with capacity of 125 KVA and above	Use of D.G.Set is very very rare, and thus the plant had not required to operate its D.G.Sets, thus retrofitting was felt redundant at present.

	or otherwise the unit shall be shift to gas based generators within the time frame prescribed in the notification No.TNPCB/Labs/DD(L)02151/2019 dated 10.06.2020 issued by TNPCB.	
2	The unit shall obtain No Objection certificate (NOC) from Tamil Nadu Bio Diversity Board/National Bio Diversity Authority if the unit is using any biological resources or knowledge associated thereto as per provisions of Biological Diversity Act 2022	The plant is based on minerals such as Coal etc. without any semblance of any material of biological origin, thus resulting in non applicability of this condition.

ADDITIONAL CONDITIONS

S. No	CONDITIONS	STATUS
1	The unit shall comply with the conditions stipulated in the Environmental Clearance issued by MOEF&CC vide letter no. F. No. J-11011/281/2006–IA.II (I) dated 7th July, 2007 for the expansion of Special Alloy Steel from 1.0 MTPA to 1.3 MTPA.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance
2	The unit shall operate and maintain the Air Pollution Control (APC) measures provided for the emission sources efficiently and continuously so as bring the quality of emission to satisfy the Ambient Air Quality /Emission standards prescribed by the Board.	All parameters with respect to SO_2, NO_X, PM 2.5, PM 10, O_3, NH_3 were within the NAAQ Standards in all the AAQ stations monitored as part of the present study, whereas Benzene, Benzo-Pyrene, CO, Lead, Arsenic, Nickel were all below detectable limit & the past data's reviewed were also found to be within permissible levels
3	The unit shall adhere to the Ambient Noise level standards prescribed by the Board.	Both Night & Day time noise levels at the boundary of the plant at all locations monitored were well within the CPCB permissible levels, & the past datas reviewed were also found to be within permissible levels
4	The unit shall conduct periodical survey for Ambient Air Quality/ Noise Level/ Stack Emission thro' TNPCB Lab and submit the report to the Board.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained.
5	The unit shall maintain the online emission monitoring system provided to the stack attached to Boilers properly for ensuring connectivity with CARE AIR CENTRE, TNPCB without any interruption at all times for transmission of emission data and calibrate the system regularly for display of accurate & reliable emission data.	All the major stacks such as those of CPPII are provided with online continuous monitoring system for PM, SO_2, NO_X connected to care air center of TNPCB & CPCB..

6	The unit shall maintain CAAQMS provided for monitoring emission parameters PM, SO2, NOx properly and abnormalities of emission if any shall be brought down immediately to achieve the emission standards prescribed by the Board at all times.	4-CAAQMS are connected to care air center TNPCB & CPCB, and are also digitally displayed at the plant boundary on real time basis with continuous recording & data logger.
7	The unit shall provide interlocking system in such a way that whenever the pollution control system fails, the feed of raw material is cut off automatically and the emissions are controlled.	JSWSL has provided interlocking system in the coal feed system, in case of emission exceedance.
8	The unit shall continue to develop green belt with native species in an extent area of 33% of the total area of the premises. Extensive plantation/green belt shall be developed along the internal roads and boundary line of the premises. A minimum of 15 m width green belt shall be maintained.	JSWSL has developed green in an area of 7.2 Ha of the total 20.28 Ha, which is about 35 % of the total land area, fully replete with native species.
9	In case of revision of consent fee by the Government, the unit shall remit the difference in amount within one month from the date of notification. Failing to remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.	Payment of consent fees has been duly taken care by JSWS, and have been ensuring compliance with respect to this meticuluously.
GENERAL CONDITIONS		
S. No	**CONDITIONS**	**STATUS**
1	The occupier shall make an application along with the prescribed consent fee for grant of renewal of consent at least 60 days before the date of expiry of this Consent Order along with all the required particulars ensuring that there is no change in production quantity and emission.	JSWSL has ensured application for consent renewal on time in the past, and have also ensured payment of consent fees on time.
2	This Consent is given by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished, in the application will also be ground for review/variation/revocation of the Consent Order under Section 21 of the Act.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
3	The conditions imposed shall continue in force until revoked under Section 21 of the Act.	-

4	After the issue of this order, all the 'Consent to Operate' orders issued previously under Air (Prevention and Control of Pollution) Act, 1981 as amended stands defunct.	-
5	The occupier shall maintain an Inspection Register in the factory so that the inspecting officer shall record the details of the observations and instructions issued to the unit at the time of inspection for adherence.	JSWSL has maintained an inspection register at its plant site to enable an inspecting officer to record the observations during the inspection
6	The occupier shall provide and maintain an alternate power supply along with separate energy meter for the Air Pollution Control measures sufficient to ensure continuous operation of all pollution control equipment's to ensure compliance.	The plant operates on captive power as its predominant source of power with 3-separate units of 30 MW each, and has also back up power in the form of D G Sets , and that separate energy meters had been installed for each of the air pollution control equipments.
7	The occupier shall provide all facilities to the Board officials for collection of samples in and around the factory at any time.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained, and have been enabling the board officials to collect samples
8	The applicant shall display the flow diagram of the sources of emission and pollution control systems provided at the site.	Flow diagrams have been exhibited at each & every point of significant sources of pollution & control equipments.
9	The liquid effluent arising out of the operation of the air pollution control equipment shall also be treated in a manner and to the satisfaction of standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 as amended.	JSWSL Captive power plant does not have any source of liquid effluent from air pollution control equipment.
10	The air pollution control equipment's, location of inspection chambers and sampling port holes shall be made easily accessible at all time.	All the points of environment control measures in the plant have been provided with accessibility for inspection, maintenance, operation etc, and sampling points have also been provided in the stack attached to each of the air pollution control equipments.
11	In case of any episodal discharge of emission, the industry shall take immediate action to bring down the emission within the limits prescribed by the Board.	JSWSL ensures that the raw material supplies are cut-off the moment any exceedance in emission levels are notices, and the main process brought under controlled operation until the appropriate rectifications are taken to ensure operation of the pollution control equipment's efficiently to meet the standards & the operations are re-started

12	If applicable, the occupier has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances.	Public Liability Insurance Act is applicable, and hence are in possession of valid public liability insurance to provide relief just incase required.
13	The issuance of this consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any natural watercourse or in Government Poromboke lands.	-
14	The issuance of this Consent does not convey any property right in either real personal property or any exclusive privileges, nor does it authorize any injury to private property or Government property or any invasion of personal rights nor any infringement of Central, State laws or regulation.	-
15	The occupier shall forth with keep the Board informed of any accident of unforeseen act or event of any poisonous, noxious or polluting matter or emissions are being discharged into stream or well or air as a result of such discharge, water or air is being polluted.	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit, however, in case of such occurrence JSWSL concur immediate information to the Board.
16	If due to any technological improvements or otherwise the Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any treatment system, either in whole or in part) the Board shall, after giving the applicant an opportunity of being heard, vary all or any of such conditions and thereupon the applicant shall be bound to comply with the conditions as so varied.	-
17	In case there is any change in the constitution of the management, the occupier of the new management shall file fresh application under Air (Prevention and Control of Pollution) Act, 1981, as amended in Form-I along with relevant documents of change of management immediately and get the necessary amendment with renewal of consent order.	JSWSL concurs to inform the board immediately in case of change in name or constitution of the company.
18	In case there is any change in the name of the company alone, the occupier shall inform the same with relevant documents immediately and get the necessary	

	amendments for the change of name from the Board.	
19	The occupier shall display this consent order granted to him in a prominent place for perusal of the inspecting Officers of this Board.	Copies of consent orders including all regulatory clearance have been prominently kept to enable the board officials peruse with ease

CONSENT ORDER NO. 2205142882719 (WATER ACT) DATED: 08/04/2022.

S. No	CONDITIONS	COMPLIANCE
1	This consent to operate is valid for operating the facility for the manufacture of products (Col. 2) at the rate (Col. 3) mentioned below. Any change in the products and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained. **Product Details** Power Generation (Captive) – 90 MW	. JSWSL at present is operating 3 x 30 MW CPP & waste water generation, its characteristics are in compliance to the consent obtained.
2	This consent to operate for Expansion is valid for operating the facility with the below mentioned permitted outlets for the discharge of sewage/trade effluent. Any change in the outlets and the quantity has to be brought to the notice of the Board and fresh consent has to be obtained.	
3	The effluent discharge shall not contain constituents in excess of the tolerance limits as laid down hereunder.	
4	All units of the sewage and Trade effluent treatment plants shall be operated efficiently and continuously so as to achieve the standards prescribed in Sl No.3 above or to achieve the zero liquid discharge of effluent as applicable.	JSWSL has provided collection tanks for waste water & then further treatment in its plant.
5	The occupier shall maintain the Electro Magnetic Flow Meters/water Meters installed at the inlet of the water supply connection for each of the purposes mentioned below for assessing the quantity of water used and ensuring that	JSWSL has provided EMFM at the points of Industrial Cooling, boiler feed, domestic use and Process to monitor water consumption on daily basis and are easily accessible for inspection.

Outlet No.	Description of Outlet	Max. daily discharge in KLD	Point of d
Effluent Type : Sewage			
1.	Sewage	3.7	On indu land
Effluent Type : Trade Effluent			
1.	Trade effluent I	700.0	Reuse in
2.	Trade effluent II	5.0	Reuse in

	such meters are easily accessible for inspection and maintenance and for other purposes of the Act. a. Industrial Cooling, Spraying in mine pits or boiler feed. b. Domestic purpose. c. Process.	
6	The occupier shall maintain the Electro Magnetic Flow Meter with computer recording arrangement for measuring the quantity of effluent generated and treated for the monitoring purposes of the Act.	JSWSL has provided EMFM at its captive power plant to ascertain effluent quantity, which is further treated at the steel plant..
7	Log book for each of the unit operations of ETP have to be maintained to reflect the working condition of ETP along with the readings of the Electro Magnetic Flow Meters installed to assess effluent quantity and the same shall be furnished for verification of the Board officials during inspection.	JSWSL is maintaining log books of effluent generated at the captive power plant, the collected waste water is further treated at the ETP of steel plant.
8	The occupier shall at his own cost get the samples of effluent/surface water/ground water collected in and around the unit by Board officials and analyzed by the TNPC Board Laboratory periodically.	JSWSL has been regularly conducting analysis of ground water/surface water/effluent samples through TNPCB & submitting consolidated reports regularly
9	Any upset condition in any of the plants of the factory which is, likely to result in increased effluent discharge and result in violation of the standards mentioned in Sl. No.3 above shall be reported to the Member Secretary / Joint Chief Environmental Engineer-Monitoring and the concerned District/Assistant Environmental Engineer of the Board by e-mail immediately and subsequently by Post with full details of such upset condition.	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit, however, in case of such occurrence JSWSL concur immediate information to the Board
10	The occupier shall always comply and carryout the order/directions issued by the Board in this Consent Order and from time to time without any negligence. The occupier shall be liable for action as per provisions of the Act in case of non-compliance of any order/directions issued.	-
11	The occupier shall develop adequate width of green belt at the rate of 400 numbers of trees per Hectare.	JSWSL has developed green in an area of 7.2 Ha of the total 20.28 Ha, which is about 35 % of the total land area, fully replete with native species
12	The occupier shall provide and maintain rain water harvesting facilities.	JSWSL has provided 4-Nos of surge ponds, which act as rain water harvesting ponds & this being clean water are used for process.

13	The occupier shall ensure that there shall not be any discharge of effluent either treated or untreated into storm water drain at any point of time.	JSWSL has ensured that storm drainage are kept exclusive to be free of run-off from any critical areas, which are separately collected & treated & stored, hence obviating any contamination in storm water drains.
14	In the case of zero liquid discharge of effluent units, the occupier shall adhere the following conditions as laid under. i) The occupier shall ensure zero liquid discharge of effluent, thereby no discharge of untreated /treated effluent on land or into any water bodies either inside or outside the premises at any point of time. ii) The occupier shall operate and maintain the Zero liquid discharge treatment components comprising of Primary, Secondary and tertiary treatment systems at all times and ensure that the RO permeate/Evaporator condensate shall be recycled in the process and the final RO reject shall be disposed-off with the reject management system ensuring zero liquid discharge of effluents in the premises. iii) The occupier shall operate and maintain the reject management system effectively and recover the salt from the system which shall be reused in the process if reusable or shall be disposed-off as ETP sludge. iv) In case of failure to achieve zero discharge of effluents for any reason, the occupier shall stop its production and operations forthwith and shall be reported to the Member Secretary/Joint Chief Environmental Engineer-Monitoring and the concerned District/Assistant Environmental Engineer of the Board by e-mail immediately and subsequently by Post with full details of such upset condition. v) The occupier shall restart the production only after ascertaining that the Zero discharge treatment system can perform effectively for achieving zero discharge of effluents.	Not Applicable, as waste water generated in captive power plant is sent to combined ETP (Guard pond) located at steel plant for common treatment and reuse in the steel plant as consented.

SPECIAL ADDITIONAL CONDITIONS		
S. No	**CONDITIONS**	**STATUS**
1	The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board/National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.	The plant is based on minerals such as Iron-Ore, Coal etc. without any semblance of any material of biologi cal origin, thus resulting in not applicability of this condition.
ADDITIONAL CONDITIONS		
S. No	**CONDITIONS**	**STATUS**
1	The unit shall comply with the conditions stipulated in the Environmental Clearance issued by MOEF&CC vide letter no. F. No. J-11011/281/2006–IA.II (I) dated 7th July, 2007 for the expansion of Special Alloy Steel from 1.0 MTPA to 1.3 MTPA.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
2	The unit shall intimate to MOEF&CC, GoI, New Delhi regarding the reduction in the quantity of trade effluent generation from 720 KLD to 705 KLD due to the implementation of operational excellence & improvement project as an Environment Management Programme to reduce fresh water consumption by utilizing the RO permeate and fresh Water at the ratio of 1:1 as makeup water to the auxiliary cooling tower of STG -3 (1x30 MW) so as to reduce the cooling water blow down.	JSWSL has already initimated MoEF&CC, GOI.
3	The unit shall collect, pre-treat the trade effluent arising from CPP-II before sending to the combined ETP of steel plant for further treatment and reuse in steel plant.	JSWSL is neutralizing the waste water generated from Captive Power Plant, before sending it to cpmbined ETP of steel plant.
4	The unit shall maintain logbook for EMFMs in the pipe line provided for the purpose of pumping of pre treated trade effluent from CPP II to Steel plant ETP.	JSWSL has installed EMFM at the inlet of pipeline transporting waste water to combined ETP.
5	The unit shall operate and maintain the combined ETP system effectively & efficiently for the treatment of trade effluent generated from the steel plant & CPP – II so as to bring the quality of treated effluent to satisfy the discharge standards prescribed by the Board at all times and shall utilize the treated effluent for the purpose of industrial cooling and dust suppression.	Records & Data's reviewed including the log books maintained by JSWSL revealed that ETP has been operating continuously , the treated effluent has also been meeting discharge standards
6	The unit shall operate and maintain online continuous effluent monitoring system provided at the outlet of combined ETP provided for the Steel plant & CPP properly for ensuring connectivity with Water	JSWSL has provided online continuous monitoring system at the outlet of combined ETP for pH, TSS, Temperature & e connectivity

	Quality Watch (WQW), TNPCB without any interruption at all times and calibrate the system regularly for display of accurate & reliable effluent data always.	with Water Quality Watch (WQW), TNPCB & have also been calibrated
7	The unit shall monitor the ground water quality regularly and furnish a consolidated report to the Board.	JSWSL has been regularly conducting analysis of ground water through TNPCB & submitting consolidated reports regularly
8	The unit shall ensure that there is no direct/indirect discharge of effluent outside the premises/into the water bodies.	JSWSL has ensured, there is no discharge of water in any form outside the premises..
9	The unit shall comply with the conditions as mentioned in the Notification dated 07.12.2015 of MOEF&CC issued for the thermal power plant regarding water consumption [max up to 2.5 m3/MWh] and emission parameters such as PM [30 mg/Nm3], SO2 [100 mg/Nm3], NOx [100 mg/Nm3] and mercury [0.03 mg/Nm3].	JSWSL is complying with the water consumption norms & emission norms applicable with respect to boilers in the Captive Power Plant.
10	The unit shall collect and store the fly ash in the silo and send to fly ash brick manufacturers for beneficial utilization and shall maintain log books for the same	JSWSL has been disposing the entire fly ash generated to local brick manufacturers
11	The unit shall comply with the provision of Fly Ash Notification 1999 and the rules notified in the amended issued by the Ministry of Environment and Forests, Government of India dated 03.11.2009.	
12	The unit shall comply with the provisions of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended from time to time while handling of hazardous waste.	JSWSL has ensured operation in compliance to Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended & also have valid authorization
13	It shall be ensured that the operation of the unit shall not cause any public complaint.	JSWSL has taken utmost care to prevent any impact to the surrounding environment
14	The unit shall not use 'single use and throwaway plastic items' such as plastic sheets used for food wrapping, spreading on dining table etc., plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead unit shall encourage use of ecofriendly alternative such as banana leaf, areca nut palm plate, stainless steel, glass, porcelain plates/cups, cloth bag, jute bag etc.,	JSWSL has implemented complete ban on single use plastics within the plant boundary.
15	In case of revision of consent fee by the Government, the unit shall remit the difference in amount within one month from the date of notification. Failing to	-

	remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.	
General Conditions		
S. No	**CONDITIONS**	**STATUS**
1	The occupier shall make an application along with the prescribed consent fee for grant of renewal of consent at least 60 days before the date of expiry of this Consent Order along with all the required particulars ensuring that there is no change in production quantity and change in sewage/Trade effluent.	JSWSL has ensured application for consent renewal on time in the past, and have also ensured payment of consent fees on time.
2	This Consent is issued by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished in the application will also be ground for review/ variation/ revocation of the Consent Order under Section 27 of the Act and to make such variation as deemed fit for the purpose of the act.	Records & data's reviewed had indicated that the plant has been operating in total compliance to all conditions of the consent & environmental clearance.
3	The consent conditions imposed in this order shall continue in force until revoked under Section 27(2) of the Act.	-
4	After the issue of this order, all the 'Consent to Operate' orders issued previously under Water (Prevention and Control of Pollution) Act, 1974 as amended stands defunct.	-
5	The occupier shall maintain an Inspection Register in the factory so that the inspecting officer shall record the details of the observations and instructions issued to the unit at the time of inspection for adherence.	JSWSL has maintained an inspection register at its plant site to enable an inspecting officer to record the observations during the inspection
6	The occupier shall provide and maintain an alternate power supply along with separate energy meter for the Effluent Treatment Plant sufficient to ensure continuous operation of all pollution control equipment to maintain compliance.	The plant operates on captive power as its predominant source of power with 3-separate units of 30 MW each, and has also back up power in the form of D G Sets , and that separate energy meters had been installed for each of equipments in ETP.
7	The occupier shall provide all facilities to the Board officials for inspection and collection of samples in and around the factory at any time.	JSWSL had undertaken regular monitoring through TNPCB, once every 6-months and records are maintained, and have been enabling the board officials to collect samples

8	The occupier shall display the flow diagram of the sources of effluent generation and pollution control systems provided at the ETP site.	Flow diagrams have been exhibited at each & every point of significant sources of pollution & control equipments.
9	The solid waste such as sweepings, wastage, package, empty containers, residues, sludge including that from air pollution control equipment's collected within the premises of the industrial plant shall be collected in an earmarked area and shall be disposed-off properly.	JSWSL is collecting sweepings, wastage, package, empty containers, residues, sludge and storing in areas earmarked.
10	The occupier shall collect, treat the solid wastes like food waste, green waste generated from the canteen and convert into organic compost.	JSWSL has provided Bio-Gas Plant
11	The occupier shall segregate the Hazardous waste from other solid wastes and comply in accordance with Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2016	JSWSL has obtained valid authorization ,however, Haz. Waste category 35.3 SEP salt is not applicable, as the trade effluent from the additional 1 x 30 MW is being sent to combined ETP at steel plant (Guard Pond) for treatment and reuse as consented.
12	All pipes, valves, sewers and drains shall be leak proof. Floor washings shall be admitted into the trade effluent collection system only and shall not be allowed to find their way in storm drains or open areas.	JSWSL has ensured this..
Jsws l	The occupier shall ensure that there shall not be any diversion or by-pass of trade effluent on land or into any water sources.	
14	The occupier shall ensure that solar Evaporation pans shall be constructed in such a way that the bottom of the solar pan is at least 1m above the Ground level (if applicable).	-
15	The occupier shall furnish the following returns in the prescribed formats to the concerned District office regularly. a) Monthly water consumption returns of each of the purposes with water meter readings in Form-I on or before 5th of every month. b) Yearly return on Hazardous wastes generated and accumulated for the period from 1st April to 31st March in Form–4 before the end of the subsequent 30th June of every year (if applicable).	JSWSL has regularly been submitting Form I , Form IV & Form V regularly

	c) Yearly Environmental Statement for the period from 1st April to 31st March in Form –V before the end of the subsequent 30th September of every year(if applicable).	
16	If applicable, the occupier has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances.	Public Liability Insurance Act is applicable, and hence are in possession of valid public liability insurance to provide relief just incase required.
17	The issuance of this consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any natural watercourse or in Government Poromboke lands.	-
18	The issuance of this Consent does not convey any property right in either real personal property or any exclusive privileges, nor does it authorize any injury to private property or Government property or any invasion of personal rights nor any infringement of Central, State laws or regulation.	-
19	The occupier shall forth with keep the Board informed of any accident of unforeseen act or event of any poisonous, noxious or polluting matter or emissions are being discharged into stream or well or air as a result of such discharge, water or air is being polluted.	The data's reviewed, and interaction with plant personnel of each of the departments had revealed that there had not been instance of upset condition that had occurred in the period of this environment audit, however, in case of such occurrence JSWSL concur immediate information to the Board.
20	If due to any technological improvements or otherwise the Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any treatment system, either in whole or in part) the Board shall, after giving the applicant an opportunity of being heard, vary all or any of such conditions and thereupon the applicant shall be bound to comply with the conditions as so varied.	-
21	In case there is any change in the constitution of the management, the occupier of the new management shall file fresh application under Water (Prevention and Control of Pollution) Act, 1974, as amended in Form-II along with relevant documents of change of management immediately and get the necessary amendment with renewal of consent order.	JSWSL concurs to inform the board immediately in case of change in name or constitution of the company

22	In case there is any change in the name of the company alone, the occupier shall inform the same with relevant documents immediately and get the necessary amendments for the change of name from the Board.	
23	The occupier shall display this consent order granted to him in a prominent place for perusal of the inspecting Officers of this Board.	Copies of consent orders including all regulatory clearance have been prominently kept to enable the board officials peruse with ease

6 CREP COMPLIANCE

COKE OVEN PLANT	
To meet the parameters PLD (%leaking doors), PLL(%leaking lids), PLO (%leaking off take) of the notified standards under EPA	Not Applicable, The coke-oven plant is based on Non-Recovery Coke-Oven
STEEL MELTING SHOP	
100% Reduction of Fugitive Emissions by installation of secondary de-dusting facilities	SMS comprises of Energy Optimizing Furnaces wherein a "wet scrubbing system" comprising of a Down comer, quench chamber, venturi scrubber and cyclone separator and the cleaned gas emitted through a chimney. Ladle Furnace is already equipped with a dedusting system comprising of bag filters as Air Pollution Control measure clean flue gas emitted through a stack. Dust collected from the bag filters is used in the Sinter Plant. Dedicated secondary dedusting systems are installed and in operations for EOF & LRF and fugitive emissions are significantly reduced. Dedicated dust monitoring systems are installed in the respective stacks and the real time parameters are connected with CAC,TNPCB
BLAST FURNACE	
Direct inject of reducing agents	Pulverized Coal injection system installed and in operations and bag filters are installed as an air pollution control measure (bag filter with stack). The rate of pulverized coal injection is increased (up to approx. 137 kg/THM) and the implementation resulted in reduction of coke consumption in BF which leads to energy and GHG emission reduction
SOLID/HAZARDOUS WASTE	
100% Utilization of SMS/BF Slag	90-95% of BF/SMS Slag is being used in-house & sent for beneficial purpose such as cement production, metal recovery & road making etc.
Inventorization of Hazardous Waste	The waste oil and other hazardous wastes generated is being disposed to authorized vendors as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016 as amended
WATER CONSERVATION/POLLUTION	
To reduce specific water consumption to less than 5 m^3/t for long products	Specific water consumption at present is varying between 2.2 to 2.3 m3/t
To reduce specific water consumption to less than 8 m^3/t for flat products	No flat products are produced at present
ONLINE CONTINUOUS MONITORING	
Installation of continuous stack monitoring system with calibration in major stacks	All major stacks are provided with online continuous monitoring system.
Installation of continuous ambient air quality monitoring stations	4-Nos of Continuous Ambient Air Quality Monitoring system is provided
OPERATING RECORD OF POLLUTION CONTROL EQUIPMENT	
All pollution control equipments to be efficiently maintained including maintaining records of run hours, failure time, and efficiency with report submitted to CPCB/SPSCB every 3-months	The pollution control equipment are being operated efficiently and effectively, proper records are being maintained for running

	hours, failure time and efficiency. Any failure leads to APC is resulted exceedance alarm from TNPCB server and appropriate correction and corrective action reports are being submitted to TNPCB on monthly basis.
LIFE CYCLE ASSESSMENT	
Implementation of recommendations of LCA	LCA study and EPD process is being done to the final products with defined frequency.
CLEAN TECHNOLOGIES	
Energy recovery of top blast furnace gas	Mini blast furnace and BF Gas top pressure is not adequate to install TRT
Dedusting of cast house at tap holes, runners, skimmers ladle, charging points	De-dusting systems are installed in operations at BF-I & II cast house covering tap holes, runners, and at SMS skimmers ladles and charging points.
Suppression of fugitive emission using nitrogen gas or other inert gas	Water sprinkling system, Dry & Wet fog systems and compressed air are used for suppression of fugitive emissions.
Slag & Fly Ash for filling Abandoned Mines	BF granulated slag is used 100 % and SMS slag utilization is 95 %. Fly ash generated is being 100% disposed to fly ash brick manufactures
Process of waste flux & ferrous waste through recycling plants	Waste containing flux & ferrous waste is 100 % utilized in the sinter plant, which functions as waste to wealth plant.
To implement rain water harvesting	Rain water harvesting fully implemented
GREEN HOUSE GASES	
Reduction of Power consumption	65% of power for plant is generated using waste heat of flue gas, solar/LED powered lights, motors based on VFD
Use of by products gas for power generation	
Energy optimization & energy audit	
RESOURCE CONSERVATION	
Raw Material, Energy, Water consumption to international standards	An established Climate Action Group (CAG) and KPI with respect to Raw material, Energy and water consumption as key performance indicator and Chairman of the CAG on monthly basis is reviewing it and the respective plant heads present the target compliance status including deviation analysis along with mitigation plan to bench marking practice is in place for JSW steel other plants level, National and International level.
UPGRADATION	
Monitoring equipments of Air & Water Pollution	All pollution control equipments are being regularly monitored
Manpower Training	A separate Environment cell is available and with lab set up and trainings are being imparted to the monitoring personnel on defined frequency

7 ENVIRONMENT AUDIT

An environmental audit is a systematic process that evaluates an organization environmental performance & compliance. It can help organization improve their environment management and safety control systems by identifying gaps, assessing risks, and thereby recommending appropriate management measures to promote good environment management & thus enhance public credibility. As part of this comprehensive environmental audit of JSWSL was carried out, with broad scope

- Review of data with respect to ambient air quality, process stack emission, fugitive emission, material balance, water consumption, waste water generation, hazardous & solid waste generation, results of online continuous monitoring systems of emission & effluent, flow meter readings etc
- Random collection of samples of process stack emission, waste water untreated & treated, soil quality in & around plant, water quality in and around the plant, fugitive emissions within plant & its adherence to standards
- Gaps & compliances with respect to conditions of environmental clearance, & consent to operate of both steel plant & captive power plant.

The sources of environment risk from the operation of the existing plant of JSWSL are the emissions from the process operation (i.e) impact on Air Environment, more particularly the particulates, SO_2, NO_X, emission due to fuel burning in Boilers, waste water discharges, make up water consumption, hazardous & solid waste generation, apart from other minor impacts due to Noise etc.

The activities of significance identified for environment audit are

- Manufacturing Process & it's Emission
- Fuel Burning in Boilers
- Fugitive Emissions
- Waste Water Generation
- Solid & Hazardous Waste Generation

And it impact on Ambient Air Quality, Water Quality, Soil Quality, Noise etc.

7.1 REVIEW OF DATA

7.1.1 PRODUCTS ACTUALLY PRODUCED

PRODUCTS	QUANTITY (T/Y)	
	2023-24	**2024-25**
Steel Products	1111813	1073347
Allowed as per EC/CTO	**1150000**	**1150000**
Ferrous Sulphate	635	534
Allowed as per EC/CTO	**1200**	**1200**
Liquid oxygen for sale	2810	2046
Allowed as per EC/CTO	**15000**	**15000**
Liquid Nitrogen for sale	45	543
Allowed as per EC/CTO	**2000**	**2000**
Liquid Argon for sale	1449	1481
Allowed as per EC/CTO	**8000**	**8000**
Paver block by using Steel Making Shop slag	4102	5014
Allowed as per EC/CTO	**50000**	**50000**
Crushed slag (steel Making Shop Slag)	186169	130425
Allowed as per EC/CTO	**226750**	**226750**
Ready-Mix concrete	25605	3640
Allowed as per EC/CTO	**82500**	**82500**
Ground Granulated Blast Furnace Slag	578790	518580
Allowed as per EC/CTO	**800000**	**800000**
Pig Iron	3088	2275
Allowed as per EC/CTO	**300000**	**300000**
POWER GENERATION	67.32	66.75 MW
	90 MW	**90 MW**

7.2 RAW MATERIAL USAGE

S. No	RAW MATERIAL	CONSUMED QUANTITY TPA		CONSENTED QUANTITY TPA
		2023-2024	2024-2025	
1	Iron-Ore Fines	909775	909775	1470000
2	Iron-Ore Pellets	-	-	500000
3	Lump Ore	577251	682162	705000
4	Coking Coal	681250	673291	585000
6	Non-Coking Coal for PCI	139504	142983	215000
7	Power Plant Coal	129087	117239	172000
8	Coke-Breeze for SP	87695	87695	23000
9	Lime Stone for CPP II	407.25	595	175000
10	Dolomite	43355	51509	147000
11	Quartzite	9060	3499	39000
12	Dunite	17574	3632	39000
13	Lime powder	67205	67205	94500

7.3 AIR ENVIRONMENT

7.3.1 AMBIENT AIR QUALITY

7.3.1.1 AVERAGE LEVELS

CONCENTRATION (µg/Cu.M)			
POLLUTANT	2023-24	2024-25	2025-26
PM 10	42.02	47.53	52.33
PM 2.5	24.54	27.17	29.63
SO2	20.86	17.16	8.74
NOx	12.28	14.81	7.86

The Ambient Air Quality has always been within the NAAQS stipulation for Ambient Environment.

7.3.2 PROCESS EMISSION

7.3.2.1 SINTER MAIN STACK - I

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	128.8	119.1	118.3

The emission levels are well within the standards prescribed

7.3.2.2 SINTER MAIN STACK - II

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	85.2	67.7	67.1

The emission levels are well within the standards prescribed

7.3.2.3 BLAST FURNACE – I – GCP STACK

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	28.4	25.6	23.6
SO_2	51.8	53.6	62.4
NO_X	47.7	49.0	54.2

The emission levels are well within the standards prescribed

7.3.2.4 BLAST FURNACE – II – GCP STACK

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	28.1	24.6	27.3
SO_2	53.4	56.8	59.5
NO_X	48.7	49.6	53.6

The emission levels are well within the standards prescribed

7.3.2.5 EOF PRIMARY DEDUSTING - I

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	55.9	52.9	39.1

The emission levels are well within the standards prescribed

7.3.2.6 EOF PRIMARY DEDUSTING - II

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	56.0	53.1	37.0

The emission levels are well within the standards prescribed

7.3.2.7 COKE OVEN BATTERY I

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	31.5	27.8	25.3
SO_2	349.1	341.3	347.5
NO_X	273.5	276.1	269.1

The emission levels are well within the standards prescribed

7.3.2.8 COKE OVEN BATTERY II

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	30.1	29.3	29.0
SO_2	347.0	342.6	347.2
NO_X	274.1	276.3	268.8

The emission levels are well within the standards prescribed

7.3.2.9 COKE OVEN BATTERY III

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	32.3	33.0	28.7
SO_2	344.3	343.3	349.2
NO_X	268.8	276.8	262.8

The emission levels are well within the standards prescribed

7.3.2.10 COKE OVEN BATTERY IV

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	28.8	30.8	28.0
SO_2	339.7	341.8	341.2
NO_X	260.0	268.5	262.6

The emission levels are well within the standards prescribed

7.3.2.11 REHEATING FURNACE I

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	32.5	31.6	39.0
SO_2	48.1	47.7	57.3
NO_X	43.8	40.8	57.3

The emission levels are well within the standards prescribed

7.3.2.12 REHEATING FURNACE II

AVG CONCENTRATION (mg/N.Cu.M)			
POLLUTANT	**2023-24**	**2024-25**	**2025-26**
SPM	46.7	61.2	42.0
SO_2	45.0	52.0	54.6
NO_X	40.8	44.6	46.3

The emission levels are well within the standards prescribed

7.4 WATER ENVIRONMENT

7.4.1 WATER CONSUMPTION

CONSUMPTION (KLD) Average			
DESCRIPTION	**2023-24**	**2024-25**	**2025-26**
Raw Water	13073	12596	12732
Waste Water Re-Used	2704	2707	2855
TOTAL	**15777**	**15303**	**15587**

The water consumption has always been well within the consented capacity.

7.4.2 WASTE WATER

WASTE WATER GENERATION (KLD)			
DESCRIPTION	**2023-24**	**2024-25**	**2025-26**
Trade Effluent	2700	2583	2762
As per Consent	**2935**		
Domestic Sewage	267	87	270
As per Consent	**296**		

The waste water generation have also been well within the consented capacity.

7.5 ONSITE ACTUAL SAMPLING & ANALYSIS

7.5.1 PRECURSOR

As part of this environmental audit, random sampling was undertaken from various sources & attributes of the environment to ascertain the quality & characteristics of each of these samples & thereby determine the extent of control the mitigation measures do have to safeguard the ambient environment. And in this regards samples were collected from stack emissions, ground water, treated waste water, fugitive emissions within plant at the most vulnerable points that were identified. Hence, location of these sampling areas were identified & samples collected for further analysis.

7.5.2 FUGITIVE EMISSION

The areas identified to be most vulnerable with respect to fugitive emissions in the plant were predominantly the Raw Material handling areas, and more-specifically the most vulnerability was found the areas handling raw material with respect to the Blast Furnace & Sinter Plant. Sampling was done using Respirable Dust Samplers for a period of 8-hours at the time when the plant was in operation at full capacity, and results are as follows

SUSPENDED PARTICULATE MATTER (µg/m3)		
LOCATION	**METHOD**	**VALUE**
Sinter Plant – 2 RMHS Area	IS 5182 (PART 4)	1842
Blast Furnace – 2 RMHS Area		2093

7.5.3 STACK EMISSION

The significant point sources of emission identified were predominantly from Blast Furnace, Sinter Plant, Reheating Furnace, where there is significant consumption of ore, coal etc., and hence predominant source for SPM, SO_2, NO_X , which in fact are the major sources compared to other point sources of emission. Each of these does have control measures in the form of ESP, Scrubbers etc to limit the emission of any pollutant of significance. Apart from this, the other major source is the energy optimizing furnace, wherein the

pollutant of significance is the particulate matter, which however is also provided with scrubber to limit the extent of particulate emission.

Accordingly, the samples were collected from following stacks connected to these major equipments,

- Sinter Plant Exhaust -2
- Sinter machine waste gas fan exhaust
- Black Furnace Stove – 2
- Energy Optimising Furnace(EOF) – 2 – Primary Dedusting
- Reheating Furnace – 2 (Bloom Plant)

STACK LOCATION	CONCENTRATION (mg/Nm^3)		
	SPM	SO_2	NO_X
Sinter Plant Exhaust -2	82.2	31	102
Sinter machine waste gas fan exhaust	77.8	49	63
Blast Furnace Stove - 2	123	BLQ(LOQ:3.0)	BLQ(LOQ:5.0)
EOF – 2 – Primary Dedusting	83.6	39	54
Re-Heating Furnace – 2 (Bloom Plant)	51.4	31	102

7.5.4 WATER ENVIRONMENT

In order to ascertain the water environment as a whole existing , and mitigation measures to limit the pollution, samples were collected from various sources such as treated/untreated sewage both within the plant & township, the trade effluent treated/untreated in the EOF ETP, BT ETP, Captive Power Plant, Guard Pond, Pickling Plant ETP & also ground water at various locations around the plant site in nearby settlements/villages & quality of water in the region.

The samples were collected at following points, for analysis

- Untreated/Treated Sewage within STP at plant
- Untreated/Treated Sewage at STP in the Township
- Treated Effluent at inlet in the Guard Pond
- Treated Effluent at outlet in the Guard Pond

- Treated Effluent Water EOF – I Thickner
- Treated Effluent Water EOF – II Thickner
- Treated Effluent Water BF – I Thickner
- Treated Effluent at Captive Power Plant
- Pickling Effluent – HRSSC
- Pickling Effluent RO Feed
- Pickling Effluent RO Reject
- Pickling Effluent MEE Condensate
- Pickling Effluent Combined RO Permeate

- Up Stream Piezometric Borewell of Pickling Plant
- Down Stream Piezometric Borewell of Pickling Plant
- Up Stream Piezometric Borewell of Guard Pond
- Down Stream Piezometric Borewell of Guard Pond
- Piezometric Borewell near Cooling Tower at Captive Power Plant
- Rain water Harvesting Pit at Township
- North East Rain Water Harvesting Pit

Water samples were also collected at off-site locations for analysis is as follows,

- Cauvery Water Offtake Point
- Raw water treated Reservoir
- Open well in Pottaneri at TMT Kaliammal Teacher House
- Government Borewell at Kudavanoor
- Bore Well at Karapathipatti
- Open well at Moorthipatti
- Government Borewell at Moorthipatti
- Open well at Pottaneri (Thiru Venkatesan)
- Open well at Kuttapatti Pudur (Thiru Rajamani)
- Government Borewell at Kuttapatti Pudur
- Open Well at Pudur Panankadu (Thiru Balan)
- Government Borewell at Ervadi
- Government Borewell at Parynagar

7.5.4.1 RESULTS OF ANALYSIS

7.5.4.1.1 Untreated/Treated STP Sewage at Plant

PARAMETER	UNIT	CONCENTRATION	
		UNTREATED	TREATED
pH @ 25°C	-	6.7	7.7
Total Suspended Solids	mg/l	240	15
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	140	16
Total Coliform	MPN/100ml	> 1600	350
E.Coli	MPN/100ml	540	46

The treated sewage quality ia within norms.

7.5.4.1.2 Untreated/Treated STP Sewage at Township

PARAMETER	UNIT	CONCENTRATION	
		UNTREATED	TREATED
pH @ 25°C	-	7.0	7.5
Total Suspended Solids	mg/l	64	12
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	48	14
Total Coliform	MPN/100ml	920	240
E.Coli	MPN/100ml	240	34

The treated sewage quality ia within norms.

7.5.4.1.3 Treated Effluent Inlet/Outlet of Guard Pond

PARAMETER	UNIT	CONCENTRATION	
		INLET	OUTLET
Total Suspended Solids	mg/l	36	15
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve	
Total Dissolved Solids	mg/l	1630	1480
pH @ 25°C	-	7.6	7.7
Temperature	°C	30.1	30.0
Oil & Grease	mg/l		BLQ
Total Residual Chlorine	mg/l		BLQ
Ammonical Nitrogen as N	mg/l		BLQ
Total Kjeldahl Nitrogen as N	mg/l		BLQ
Free Ammonia as NH_3	mg/l		BLQ
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	9	3
Chemical Oxygen Demand (COD)	mg/l	42	16
Hexavalent Chromium as Cr^{6+}	mg/l		BLQ
Percent Sodium	%	54.80	52.69
Residual Sodium Carbonate	meq/l	Nil	Nil
Cyanide as CN	mg/l		BLQ
Chloride as Cl	mg/l	402	407
Fluoride as F	mg/l	0.34	0.22
Dissolved Phosphate as P	mg/l		BLQ
Sulphate as SO_4	mg/l	143	146
Sulphide as S	mg/l		BLQ
Phenolic Compounds as C_6H_5OH	mg/l		BLQ
Boron as B	mg/l		BLQ
Arsenic as As	mg/l		BLQ
Cadmium as Cd	mg/l		BLQ
Total Chromium as Cr	mg/l		BLQ
Copper as Cu	mg/l		BLQ
Lead as Pb	mg/l	0.04	0.03
Mercury as Hg	mg/l		BLQ
Nickel as Ni	mg/l	0.03	BLQ
Selenium as Se	mg/l		BLQ
Zinc as Zn	mg/l	0.18	0.11
Total Coliform	MPN/100ml	170	40
E.Coli	MPN/100ml	49	17

7.5.4.1.4 Treated Effluent EOF 1, II BF I Thickner

PARAMETER	UNIT	CONCENTRATION		
		THICKENER		
		EOF I	EOF II	BF I
Total Suspended Solids	mg/l	56	5	56
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve		
Total Dissolved Solids	mg/l	2230	1550	2230
pH @ 25°C	-	6.9	7.4	6.9
Temperature	°C	30.1	29.7	30.1
Oil & Grease	mg/l	BLQ		
Total Residual Chlorine	mg/l	BLQ		
Ammonical Nitrogen as N	mg/l	12.6	BLQ	12.6
Total Kjeldahl Nitrogen as N	mg/l	25.3	BLQ	25.3
Free Ammonia as NH_3	mg/l	0.25	BLQ	0.25
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	48	5	48
Chemical Oxygen Demand (COD)	mg/l	212	24	212
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ		
Percent Sodium	%	57.13	35.61	57.13
Residual Sodium Carbonate	meq/l	Nil	Nil	Nil
Cyanide as CN	mg/l	BLQ		
Chloride as Cl	mg/l	794	337	794
Fluoride as F	mg/l	0.46	0.28	0.46
Dissolved Phosphate as P	mg/l	3.6	BLQ	3.6
Sulphate as SO_4	mg/l	286	124	286
Sulphide as S	mg/l	BLQ		
Phenolic Compounds as C_6H_5OH	mg/l	BLQ		
Boron as B	mg/l	BLQ		
Arsenic as As	mg/l	BLQ		
Cadmium as Cd	mg/l	BLQ		
Total Chromium as Cr	mg/l	BLQ		
Copper as Cu	mg/l	BLQ		
Lead as Pb	mg/l	0.11	BLQ	0.11
Mercury as Hg	mg/l	BLQ		
Nickel as Ni	mg/l	0.03	BLQ	0.03
Selenium as Se	mg/l	BLQ		
Zinc as Zn	mg/l	0.3	0.51	0.3
Total Coliform	MPN/100ml	94	49	94
E.Coli	MPN/100ml	40	11	40

7.5.4.1.5 Treated Trade Effluent – Captive Power Plant

PARAMETER	UNIT	CONCENTRATION
Total Suspended Solids	mg/l	5
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve
Total Dissolved Solids	mg/l	1550
pH @ 25°C	-	7.4
Temperature	°C	29.7
Oil & Grease	mg/l	BLQ
Total Residual Chlorine	mg/l	BLQ
Ammonical Nitrogen as N	mg/l	BLQ
Total Kjeldahl Nitrogen as N	mg/l	BLQ
Free Ammonia as NH_3	mg/l	BLQ
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	5
Chemical Oxygen Demand (COD)	mg/l	24
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ

Percent Sodium	%	35.61
Residual Sodium Carbonate	mg/l	Nil
Cyanide as CN	mg/l	BLQ
Chloride as Cl	mg/l	337
Fluoride as F	mg/l	0.28
Dissolved Phosphate as P	mg/l	BLQ
Sulphate as SO_4	mg/l	124
Sulphide as S	mg/l	BLQ
Phenolic Compounds as C_6H_5OH	mg/l	BLQ
Boron as B	mg/l	BLQ
Arsenic as As	mg/l	BLQ
Cadmium as Cd	mg/l	BLQ
Total Chromium as Cr	mg/l	BLQ
Copper as Cu	mg/l	BLQ
Lead as Pb	mg/l	BLQ
Mercury as Hg	mg/l	BLQ
Nickel as Ni	mg/l	BLQ
Selenium as Se	mg/l	BLQ
Zinc as Zn	mg/l	0.51
Total Coliform	MPN/100ml	49
E.Coli	MPN/100ml	11

The entire treated waste water is re-used back in the process within plant

7.5.4.1.6 Pickling Plant Effluent

PARAMETER	UNIT	CONCENTRATION				
		HRSCC	RO FEED	RO REJECT	MEE CONDENSATE	COMBINED TREATED
Total Suspended Solids	mg/l	48	7	26	7	BLQ
Particle Size of Suspended Solids	-					Passed through IS 850 Micron Sieve
Total Dissolved Solids	mg/l	7150	8250	32450	246	120
pH @ 25°C	-	11.8	6.9	7.4	7.8	7.7
Temperature	°C	30.1	30	30.1	29.9	29.8
Oil & Grease	mg/l					BLQ
Total Residual Chlorine	mg/l					BLQ
Ammonical Nitrogen as N	mg/l	1.8	1.3	5.6	1.6	BLQ
Total Kjeldahl Nitrogen as N	mg/l	2.6	2.8	11.3	3.2	BLQ
Free Ammonia as NH_3	mg/l	BLQ		0.11	BLQ	BLQ
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	6	5	40	8	BLQ
Chemical Oxygen Demand (COD)	mg/l	34	18	166	36	BLQ
Hexavalent Chromium as Cr^{6+}	mg/l					BLQ
Percent Sodium	%	96.51	95.44	96.41	95.78	95.03
Residual Sodium Carbonate	meq/l	29.70	5.81	21.43	1.68	0.16
Cyanide as CN	mg/l					BLQ
Chloride as Cl	mg/l	720	2035	8338	32	30
Fluoride as F	mg/l	0.56	0.38	0.54	0.18	BLQ
Dissolved Phosphate as P	mg/l	0.48	0.7	0.86	0.48	BLQ
Sulphate as SO_4	mg/l	284	710	2664	9	9.6
Sulphide as S	mg/l					BLQ
Phenolic Compounds as C_6H_5OH	mg/l					BLQ
Boron as B	mg/l					BLQ
Arsenic as As	mg/l					BLQ
Cadmium as Cd	mg/l					BLQ
Total Chromium as Cr	mg/l					BLQ
Copper as Cu	mg/l					BLQ
Lead as Pb	mg/l	0.04				BLQ
Mercury as Hg	mg/l					BLQ
Nickel as Ni	mg/l	0.03	0.07	0.16		BLQ
Selenium as Se	mg/l					BLQ
Zinc as Zn	mg/l	0.04	0.06	0.09		BLQ

There is no discharge of waste water from pickling plant & entire treated waste water from pickling plant is re-used back in the pickling plant.

7.5.4.1.7 Piezometric Borewells

PARAMETER	UNIT	CONCENTRATION				
		PICKLING PLANT		GUARD POND		
		UPSTREAM	DOWNSTREAM	UPSTREAM	DOWNSTREAM	CPP II
Total Suspended Solids	mg/l	BLQ	3	4	9	13
Particle Size of Suspended Solids	-					Passed through IS 850 Micron Sieve
Total Dissolved Solids	mg/l	920	930	1220	1320	1080
pH @ 25°C	-	7.3	7.2	7.3	7.2	7.1
Temperature	°C	29.8	29.9	30.1	30.1	30.0
Oil & Grease	mg/l					BLQ
Total Residual Chlorine	mg/l					BLQ
Ammonical Nitrogen as N	mg/l					BLQ
Total Kjeldahl Nitrogen as N	mg/l					BLQ
Free Ammonia as NH_3	mg/l					BLQ
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l					BLQ
Chemical Oxygen Demand (COD)	mg/l					4
Hexavalent Chromium as Cr^{6+}	mg/l					BLQ
Percent Sodium	%	27.68	27.34	36.98	39.02	37.05
Residual Sodium Carbonate	meq/l	Nil	Nil	Nil	Nil	Nil
Cyanide as CN	mg/l					BLQ
Chloride as Cl	mg/l	147	143	253	546	260
Fluoride as F	mg/l	0.13	0.14	0.37	0.33	0.27
Dissolved Phosphate as P	mg/l					BLQ
Sulphate as SO_4	mg/l	52	51	89	192	93
Sulphide as S	mg/l					BLQ
Phenolic Compounds as C_6H_5OH	mg/l					BLQ
Boron as B	mg/l					BLQ
Arsenic as As	mg/l					BLQ
Cadmium as Cd	mg/l					BLQ
Total Chromium as Cr	mg/l					BLQ
Copper as Cu	mg/l					BLQ
Lead as Pb	mg/l					BLQ
Mercury as Hg	mg/l					BLQ
Nickel as Ni	mg/l					BLQ
Selenium as Se	mg/l					BLQ
Zinc as Zn	mg/l					BLQ

Parameters analysed in the samples collected at piezometric bore-wells were within norms with respect to IS 10500

7.5.4.1.8 Harvested Rain Water

PARAMETER	UNIT	CONCENTRATION	
		TOWNSHIP	NORTH EAST
Total Suspended Solids	mg/l	16	18
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve	
Total Dissolved Solids	mg/l	820	360
pH @ 25°C	-	7.0	6.9
Temperature	°C	30.1	29.9
Oil & Grease	mg/l	BLQ	
Total Residual Chlorine	mg/l	BLQ	
Ammonical Nitrogen as N	mg/l	BLQ	
Total Kjeldahl Nitrogen as N	mg/l	BLQ	
Free Ammonia as NH_3	mg/l	BLQ	
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	BLQ	
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ	
Percent Sodium	%	47.89	47.89
Residual Sodium Carbonate	mg/l	Nil	
Cyanide as CN	mg/l	BLQ	
Chloride as Cl	mg/l	197	99
Fluoride as F	mg/l	0.33	0.13
Dissolved Phosphate as P	mg/l	BLQ	
Sulphate as SO_4	mg/l	69	36
Sulphide as S	mg/l	BLQ	
Phenolic Compounds as C_6H_5OH	mg/l	BLQ	
Boron as B	mg/l	BLQ	
Arsenic as As	mg/l	BLQ	
Cadmium as Cd	mg/l	BLQ	
Total Chromium as Cr	mg/l	BLQ	
Copper as Cu	mg/l	0.04	0.03
Lead as Pb	mg/l	BLQ	
Mercury as Hg	mg/l	BLQ	
Nickel as Ni	mg/l	BLQ	
Selenium as Se	mg/l	BLQ	
Zinc as Zn	mg/l	0.25	0.18

Parameters analysed in the samples collected at rain water reservoir were within norms with respect to IS 10500

7.5.4.1.9 Offsite Water Quality

PARAMETER	UNIT	CONCENTRATION			
		CAUVERY INTAKE POINT	TREATED RAW WATER RESERVOIR	OPENWELL POTTANERI KALIAMMAL	GOVERNMENT BOREWELL KAVUNDANOOR
Total Suspended Solids	mg/l	9	8	3	4
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve			
Total Dissolved Solids	mg/l	240	236	260	230
pH @ 25°C	-	8.3	8.1	7.4	8.0
Temperature	°C	30.1	29.9	29.8	29.9
Oil & Grease	mg/l	BLQ			
Total Residual Chlorine	mg/l	BLQ			
Ammonical Nitrogen as N	mg/l	BLQ			
Total Kjeldahl Nitrogen as N	mg/l	BLQ			
Free Ammonia as NH_3	mg/l	BLQ			
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	BLQ			
Chemical Oxygen Demand (COD)	mg/l	4	4	BLQ	
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ			
Percent Sodium	%	28.49	18.58	32.50	28.35
Residual Sodium Carbonate	mg/l	Nil			0.22
Cyanide as CN	mg/l	BLQ			
Chloride as Cl	mg/l	36	18	31	30
Fluoride as F	mg/l	0.11	0.11	0.36	0.10
Dissolved Phosphate as P	mg/l	BLQ			
Sulphate as SO_4	mg/l	12	7	185	8.7
Sulphide as S	mg/l	BLQ			
Phenolic Compounds as C_6H_5OH	mg/l	BLQ			
Boron as B	mg/l	BLQ			
Arsenic as As	mg/l	BLQ			
Cadmium as Cd	mg/l	BLQ			
Total Chromium as Cr	mg/l	BLQ			
Copper as Cu	mg/l	BLQ			
Lead as Pb	mg/l	BLQ	0.04	BLQ	
Mercury as Hg	mg/l	BLQ			
Nickel as Ni	mg/l	BLQ	0.03	BLQ	
Selenium as Se	mg/l	BLQ			
Zinc as Zn	mg/l	BLQ	0.03	BLQ	

PARAMETER	UNIT	CONCENTRATION			
		BOREWELL KARAPATHIPATTI SELVAM	OPENWELL MOORTHIPATTI VELLAIYAN	GOVERNMENT BOREWELL MOORTHIPATTI	OPENWELL POTTANERI VENKATESAN
Total Suspended Solids	mg/l	BLQ			
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve			
Total Dissolved Solids	mg/l	340	230	310	420
pH @ 25°C	-	7.3	7.6	7.6	7.9
Temperature	°C	29.9	30.2	30.1	30.1
Oil & Grease	mg/l	BLQ			
Total Residual Chlorine	mg/l	BLQ			
Ammonical Nitrogen as N	mg/l	BLQ			
Total Kjeldahl Nitrogen as N	mg/l	BLQ			
Free Ammonia as NH_3	mg/l	BLQ			
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	BLQ			
Chemical Oxygen Demand (COD)	mg/l	BLQ			
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ			
Percent Sodium	%	41.97	35.66	36.86	30.37
Residual Sodium Carbonate	mg/l	Nil			
Cyanide as CN	mg/l	BLQ			
Chloride as Cl	mg/l	328	258	248	323
Fluoride as F	mg/l	0.34	0.33	0.22	0.34
Dissolved Phosphate as P	mg/l	BLQ			
Sulphate as SO_4	mg/l	116	93	86	114
Sulphide as S	mg/l	BLQ			
Phenolic Compounds as C_6H_5OH	mg/l	BLQ			
Boron as B	mg/l	BLQ			
Arsenic as As	mg/l	BLQ			
Cadmium as Cd	mg/l	BLQ			
Total Chromium as Cr	mg/l	BLQ			
Copper as Cu	mg/l	BLQ			
Lead as Pb	mg/l	BLQ			
Mercury as Hg	mg/l	BLQ			
Nickel as Ni	mg/l	BLQ			
Selenium as Se	mg/l	BLQ			
Zinc as Zn	mg/l	BLQ			

PARAMETER	UNIT	CONCENTRATION			
		OPENWELL KUTTAPATTIPUDUR RAJAMANI	GOVERNMENT BOREWELL KUTTAPATTIPUDUR	OPENWELL PUDURPANANKADU BALAN	GOVERNMENT BOREWELL ERVADI
Total Suspended Solids	mg/l	BLQ		5	BLQ
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve			
Total Dissolved Solids	mg/l	256	212	236	196
pH @ 25°C	-	7.2	7.9	7.5	7.4
Temperature	°C	29.9	30.1	29.9	30.1
Oil & Grease	mg/l	BLQ			
Total Residual Chlorine	mg/l	BLQ			
Ammonical Nitrogen as N	mg/l	BLQ			
Total Kjeldahl Nitrogen as N	mg/l	BLQ			
Free Ammonia as NH_3	mg/l	BLQ			
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	BLQ			
Chemical Oxygen Demand (COD)	mg/l	BLQ			
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ			
Percent Sodium	%	44.6	49.55	49.88	42.59
Residual Sodium Carbonate	mg/l	Nil	1.74	Nil	
Cyanide as CN	mg/l	BLQ			
Chloride as Cl	mg/l	170	171	120	161
Fluoride as F	mg/l	0.34	0.34	0.42	0.44
Dissolved Phosphate as P	mg/l	BLQ			
Sulphate as SO_4	mg/l	44	66	31	30
Sulphide as S	mg/l	BLQ			
Phenolic Compounds as C_6H_5OH	mg/l	BLQ			
Boron as B	mg/l	BLQ			
Arsenic as As	mg/l	BLQ			
Cadmium as Cd	mg/l	BLQ			
Total Chromium as Cr	mg/l	BLQ			
Copper as Cu	mg/l	BLQ			
Lead as Pb	mg/l	BLQ			
Mercury as Hg	mg/l	BLQ			
Nickel as Ni	mg/l	BLQ			
Selenium as Se	mg/l	BLQ			
Zinc as Zn	mg/l	BLQ			

PARAMETER	UNIT	CONCENTRATION
		GOVERNMENT BOREWELL PARYNAGAR
Total Suspended Solids	mg/l	BLQ
Particle Size of Suspended Solids	-	Passed through IS 850 Micron Sieve
Total Dissolved Solids	mg/l	2420
pH @ 25°C	-	7.0
Temperature	°C	29.8
Oil & Grease	mg/l	BLQ
Total Residual Chlorine	mg/l	BLQ
Ammonical Nitrogen as N	mg/l	BLQ
Total Kjeldahl Nitrogen as N	mg/l	BLQ
Free Ammonia as NH_3	mg/l	BLQ
Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	BLQ
Chemical Oxygen Demand (COD)	mg/l	BLQ
Hexavalent Chromium as Cr^{6+}	mg/l	BLQ
Percent Sodium	%	35.58
Residual Sodium Carbonate	mg/l	Nil
Cyanide as CN	mg/l	BLQ
Chloride as Cl	mg/l	655
Fluoride as F	mg/l	0.47
Dissolved Phosphate as P	mg/l	BLQ
Sulphate as SO_4	mg/l	232
Sulphide as S	mg/l	BLQ
Phenolic Compounds as C_6H_5OH	mg/l	BLQ
Boron as B	mg/l	BLQ
Arsenic as As	mg/l	BLQ
Cadmium as Cd	mg/l	BLQ
Total Chromium as Cr	mg/l	BLQ
Copper as Cu	mg/l	BLQ
Lead as Pb	mg/l	BLQ
Mercury as Hg	mg/l	BLQ
Nickel as Ni	mg/l	BLQ
Selenium as Se	mg/l	BLQ
Zinc as Zn	mg/l	BLQ

Water samples collected in the off-site facility from around in the villages indicate the parameters analysed were all within norms with respect to IS 10500

7.5.5 SOIL QUALITY

Eight locations within the plant and village settlements were selected for soil sampling. At each location, soil samples were collected from surface 0 to 30 cm depth and are homogenized and collected after quartering. This is in line with IS: 2720 and Methods of Soil Analysis, Part-1, 2nd edition, 1986 of (American Society for Agronomy and Soil Science Society of America). The homogenized samples were analyzed for physical and chemical characteristics. The samples have been analyzed as per the established scientific methods for physico-chemical parameters. The heavy metals have been analyzed by using Inductive Coupled Plasma Analyzer.

ANALYTICAL TECHNIQUES USED FOR SOIL ANALYSIS

Sr. No	Parameter	Method (ASTM Number)
1	Grain size distribution	Sieve analysis (D 422 – 63)
2	Textural classification	Chart developed by Public Roads Administration
3	Bulk density	Sand replacement, core cutter
4	Sodium absorption ratio	Flame photometric (D 1428-82)
5	pH	pH meter (D 1293-84)
6	Electrical conductivity	Conductivity meter (D 1125-82)
7	Nitrogen	Kjeldahl distillation (D 3590-84)
8	Phosphorus	Molybdenum blue, Colorimetric (D 515-82)
9	Potassium	Flame photometric (D 1428-82)
10	Iron	AAS (D 1068-84)
11	Zinc	AAS (D 1691-84)
12	Boron	Surcumin, Colorimetric (D 3082-79)
13	Chlorides	Argentometric (D 512-81 Rev 85)

Soil samples were collected from

- Near STP in Township
- At Plant Hazardous Waste Storage Area
- Sinter Plant – 2 (RMHS Area)
- Karapathipatti (11°48'37.84"N & 77°54'42.257"E)
- Kuttapatti Pudur (11°47'49.764"N & 77°55'21.594"E)
- Ervadi (11°48'50.064"N & 77°54'33.456"E)
- Pottaneri (11°49'24.906"N & 77°54'24.492"E)
- Karapathipatti (11°49'4.098"N & 77°55'13.62"E)

7.5.5.1 SOIL CHARACTERISTICS

PARAMETER	UNIT	CONCENTRATION				
		KARAPATHIPATTI	KUTTAPATTHIPUDUR	ERVADI	POTTANERI	KARAPATHIPATTI
Ph	-	8.0	7.6	8.0	8.2	7.2
Electrical Conductivity @ 25°C	µs/cm	65	92	45	91	188
Cation Exchange Capacity	meq/100g	11.54	13.68	10.28	13.65	12.86
Available Nitrogen as N	mg/kg	124	152	104	113	128
Available Phosphorus as P	mg/kg	14	16	10	14	9
Available Potassium as K	mg/kg	14	16	24	12	20
Total Organic Carbon	%	0.53	0.67	0.47	0.54	0.57
Total Organic Matter	%	0.91	1.15	0.81	0.93	0.98
Bulk Density	g/cm^3	1.53	1.54	1.48	1.49	1.51
Iron as Fe	%	2.51	2.65	3.67	3.13	3.08
Cadmium as Cd	mg/kg	BLQ	BLQ	BLQ	BLQ	BLQ
Lead as Pb	mg/kg	BLQ	BLQ	BLQ	BLQ	9.13
Zinc as Zn	mg/kg	46.92	39.52	24.61	47.54	193.06
Mercury as Hg	mg/kg	BLQ	BLQ	BLQ	BLQ	BLQ
Aluminium as Al	%	1.46	1.15	0.971	1.17	1.69
Arsenic as As	mg/kg	BLQ	BLQ	BLQ	BLQ	BLQ
Manganese as Mn	mg/kg	365.52	330.67	236.56	308.66	413.25
Nickel as Ni	mg/kg	41.99	25.64	29.06	21.35	34.79
Total Chromium as Cr	mg/kg	79.68	39.49	51.94	41.34	47.18
Water Holding Capacity	%	32	36	34	32	36
Calcium as Ca	mg/kg	124	135	113	120	132
Magnesium as Mg	mg/kg	30	31	25	28	30
Exchangeable Potassium as K	mg/kg	46	54	64	42	68
Availeble Sodium as Na	mg/kg	94	106	85	92	103
Permeability	cm/hr	1.14	1.18	1.08	1.12	1.07
Porosity	%	44	46	45	42	45
Sodium Absorption Ratio	-	7.36	9.65	6.57	5.94	7.69
Water Soluble Chloride as Cl	mg/kg	118	135	113	122	115
Water Soluble Sulphate as SO4	mg/kg	75	83	48	57	72
Boron as B	mg/kg	1.24	1.38	1.05	1.35	1.25
TEXTURE	-	Silty Clay Loam	Silty Loam	Loam	Silty Clay Loam	Loam
Sand	%	16.72	15.51	17.02	15.24	22.82
Silt	%	61.47	73.25	58.63	63.54	58.69
Clay	%	21.81	11.24	24.35	21.22	18.49

PARAMETER	UNIT	CONCENTRATION		
		NEAR TOWNSHIP STP	PLANT HAZARDOUS WASTE STORAGE AREA	SINTER RMHS
Ph	-	8.2	8.4	8.6
Electrical Conductivity @ 25°C	µs/cm	94	66	90
Cation Exchange Capacity	meq/100g	21.63	13.52	11.95
Available Nitrogen as N	mg/kg	172	85	114
Available Phosphorus as P	mg/kg	26	6	8
Available Potassium as K	mg/kg	23	12	18
Total Organic Carbon	%	0.66	0.38	0.49
Total Organic Matter	%	1.13	0.65	0.84
Bulk Density	g/cm^3	1.46	1.52	1.52
Iron as Fe	%	2.99	6.405	7.484
Cadmium as Cd	mg/kg	BLQ	BLQ	BLQ
Lead as Pb	mg/kg	BLQ	23.50	12.60
Zinc as Zn	mg/kg	59.36	76.48	108.56
Mercury as Hg	mg/kg	BLQ	BLQ	BLQ
Aluminium as Al	%	1.65	1.986	1.872
Arsenic as As	mg/kg	BLQ	BLQ	BLQ
Manganese as Mn	mg/kg	524.68	58.30	15.90
Nickel as Ni	mg/kg	38.07	40.54	47.92
Total Chromium as Cr	mg/kg	70.62	371.41	69.04
Water Holding Capacity	%	56	38	40
Calcium as Ca	mg/kg	154	106	123
Magnesium as Mg	mg/kg	32	27	29
Exchangeable Potassium as K	mg/kg	82	44	56
Availeble Sodium as Na	mg/kg	78	114	117
Permeability	cm/hr	0.43	1.06	1.04
Porosity	%	45	40	43
Sodium Absorption Ratio	-	3.65	8.96	7.36
Water Soluble Chloride as Cl	mg/kg	124	125	138
Water Soluble Sulphate as SO4	mg/kg	62	53	57
Boron as B	mg/kg	1.33	1.13	1.19
TEXTURE	-	Clay	Silty Clay Loam	Silty Clay Loam
Sand	%	18.36	16.27	20.65
Silt	%	13.52	54.37	56.93
Clay	%	68.12	29.36	22.42

7.5.5.2 INFERENCE

The soil is slightly alkaline to neutral , which is ideal for plant growth. The electrical conductivity indicates low salinity, which can aid germination & cropping. The organic carbon in general is also sufficient. The available Nitrogen is sufficient, which Available Phosphorus & Potassium are in general average, meaning agricultural with fertilizer aid can significantly support agricultural activities. Cation Exchange capacity is moderate to high indicating good fertility. Exchangeable Ca^{++} is high with high base saturation, Exchangeable Mg is moderate with moderate base saturation, Exchangeable K^{++} is less and Exchangeable Na is also less not indicating any alkalinity. Sodium adsorption ratio indicates the soils are normal Heavy metals such as **Arsenic, Mercury, Cadmium** etc are entirely absent indicating no impact on the soil environment due to the operation of the plant over the years.

8 CONCLUSION

- The plant is operating within the production capacity within the limit for which environmental clearance & consent to operate has been obtained.
- The plant has valid consent to operate for all the existing operations at the plant in plant.
- The plant also has valid Hazardous Waste Authorization for storage, handling & disposal of the hazardous waste being generated
- The plant is operating in total compliance to all conditions of the environmental clearance.
- The plant is operating in compliance to all conditions of the consent to operate of TNPCB
- The plant is operating in compliance to all conditions of the No-Increase in Pollution load certificate obtained
- The plant is operating in compliance to the Hazardous Waste Authorization Obtained
- The plant is also operating in compliance to all the requirements of CREP
- The Ambient Air Quality in and around the plant are far within permissible levels with respect to GSR.No.826 (E) dated 16 November 2009.
- The plant has fully adopted & implemented "ZERO WASTE WATER DISCHARGE", by using the entire treated trade effluent back in the process, and treated effluents comply to GSR 422 (E) 19 May & 31 December 1993.
- All point sources of emission in the steel plant as well as in the captive power plant are provided with adequate control measures, and ensuring that the emissions are within standards including GSR 277 (E) dated 31 March 2012.
- All sources of fugitive emissions such as rw material handling, storge, conveyance, transfer points, crushers etc are provided with adequate measures to limit fugitive emission to within standards
- The ambient noise levels are maintained with the permissible within the plant & also in nearby settlements.
- The plant is entirely re-using coal fines, coke fines, dust etc back in the sinter plant.
- All Blast Furnace & Coke-Oven have been provided with WHRB
- Online continuous ambient & stack monitoring equipment's have been provided with appropriate calibrations in place, connected to care air center of TNPCB/CPCB.
- Online continuous monitoring systems have also been provided at all the ETP's/STP's connected to water watch.
- Occupational health monitoring is being regularly undertaken, & covered all employees with no adverse reports.
- Adequate measures are in place for employees working in high heat areas.
- The plant has very well developed green as per requirement.
- The plant also has a robust rain water harvesting systems in place
- JSWSL has maintaining log books of records of operation of air pollution control equipments, energy meters, flow meters etc
- JSWSL has provided adequate back up power for operation of pollution control equipments in case of emergency
- JSWSL has been regularly undertaking environmental monitoring & analysis through TNPCB Boards Laboratory
- JSWSL has also been undertaking regular monitoring & analysis through NABL/CPCB accredited laboratories
- The plant has adequate public liability insurance in place