EXECUTIVE SUMMARY

1.1 INTRODUCTION

JSW Thermal Energy Limited (JSWTEL) has proposed 1600 (2x800) MW Coal Based Ultra Super Critical Thermal Power Plant coming up at Villages Nitaipur & Salboni, Tehsil Salboni, District Paschim Medinipur, West Bengal.

West Bengal Power Distribution Company Ltd. (WBPDCL) invited bids for setting up a 1600 (2x800) MW Thermal Power Plant under DBFOO model in September 2024. M/s JSW Thermal Energy Ltd. was selected as the successful bidder by the Government of West Bengal vide letter dated 05.02.2025.

Earlier, M/s JSW Bengal Steel Ltd. had acquired approximately 1660 Ha. (4102 acres) of land from Government of West Bengal for the establishment of a 3.0 MTPA Integrated Steel Plant and a 300 MW Captive Power Plant (CPP) at Godapiasal, District Pashchim Medinipur, West Bengal.

Environmental Clearance (EC) for both the Steel Plant and the CPP was granted by the MoEF&CC vide letter dated 19.02.2008 in the name of JSW Steel Ltd. which was later transferred to JSW Energy (Bengal) Ltd. for CPP and to JSW Bengal Steel Ltd. for Integrated Steel Plant, vide letters dated 03.09.2012.

However, the proposed Steel Plant and CPP could not be established at the proposed site at that time.

The present proposal is for setting up of a 1600 MW (2x800 MW) power plant at the same location over an area of 724.38 Ha. The estimated capital cost for the proposed project is Rs. 14070 crores. As per MoEF&CC Notification vide G.S.R. 465(E) dated 11.07.2025, the project falls under Category C i.e. Sulphur dioxide emission standards shall not be applicable to the project.

The proposal for Terms of Reference (ToR) was considered & appraised in 27th meeting of Expert Appraisal Committee (Thermal Power Projects), MoEF&CC held on 08.07.2025, wherein the proposal was recommended for grant of Terms of Reference (ToR) & the ToR letter was issued vide TOR Identification No: **TO25A0601WB5681794N dated 26.07.2025** by the MoEF&CC, New Delhi.

1.2 DESCRIPTION OF THE PROJECT

The salient features of the project are given below: -

Table 1.1: Salient features of the project

S. No.	Particular	Details	
1.	Nature of the Project	JSW Thermal Energy Limited (JSWTEL) proposes to install 1600 (2x800) MW Ultra–Super critical coal based thermal power plant at Nitaipur, Salboni, Paschim Medinipur District, West Bengal. The total land requirement for the proposed project is about 724.38 Hectares.	
2.	Size of Project	Coal based 1600 (2x800) MW	
3.	Project Cost (In Crores)	:	Rs. 14070 crores.
4.	Project sector & category as per EIA Notification, 2006 & subsequent amendments	:	1(d), Thermal Power Plants & Category "A"
5.	Plant capacity (In Megawatt)	:	1600 (2x800) MW
6.	Land requirement (In Hectare)	:	Project Area: 724.38 Hectare (1790 Acres)
7.	Greenbelt & Plantation (In Hectare)	:	33% of project area i.e. ~ 239.05 hectare
8.	Technology	:	**Ultra Super-Critical**
9.	Coal requirement in (Million MTPA)	:	Requirement: 8.58 MTPA (at 85% PLF, GCV 2900-3100 Kcal /Kg)
10.	Source of fuel	:	Ib Valley & Talcher coal fields, MCL
11.	Coal transportation	:	Transportation: Through Rail Wagons to the plant
12.	Ash Generation (Million MTPA)	:	Ash generation (Bottom ash + Fly ash) is estimated to be 12100 TPD.
13.	Water requirement & Water allocation permission (MCM/ Annum)	:	• **36.50 MCM/ Annum** • Mukutmanipur Dam / Rupnarayan River, Kolaghat
14.	Water Source	:	Water requirement shall be met from Mukutmanipur Dam/ Rupnarayan River, Kolaghat, approximately 100 Km and 85 Km respectively away from the site.
15.	Manpower requirement (in nos.)	:	• Construction phase: 4124 nos. (Permanent: 124 & Contractual: 4000) • Operation phase: 2460 nos. (Permanent: 260 & Contractual: 2200)

Table 1.2: Details of Environmental Setting & Site Connectivity

<table>
<tr><th>S. No.</th><th>Particular</th><th>Particulars with Aerial distance & Direction</th></tr>
<tr><td>1.</td><td>Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value.</td><td>There are no protected areas under international conventions in study area for their landscape & cultural value. There are 14 no. of P.F. within 10 km radius of the project site.</td></tr>
<tr><td>2.</td><td>Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests.</td><td>
<table>
<tr><th colspan="3">PROTECTED FORESTS</th></tr>
<tr><th>Name</th><th>Aerial Distance (Km)</th><th>Direction</th></tr>
<tr><td>PF*</td><td>0.05*</td><td>W</td></tr>
<tr><td>P.F N/v Sluire</td><td>0.98</td><td>S</td></tr>
<tr><td>P.F N/v Gokulpura</td><td>1.80</td><td>NNE</td></tr>
<tr><td>P.F N/v Pathardaha</td><td>3.30</td><td>NNW</td></tr>
<tr><td>P.F N/v Dakshinsol</td><td>3.50</td><td>NE</td></tr>
<tr><td>Salboni P.F</td><td>3.90</td><td>WSW</td></tr>
<tr><td>P.F N/v Bankibandh</td><td>5.07</td><td>ENE</td></tr>
<tr><td>P.F N/v Betkundri</td><td>5.48</td><td>SSE</td></tr>
<tr><td>P.F N/v Mirga</td><td>5.58</td><td>N</td></tr>
<tr><td>P.F</td><td>6.66</td><td>SSW</td></tr>
<tr><td>Lalgarh P.F</td><td>7.0</td><td>WNW</td></tr>
<tr><td>Elephant Corridor#</td><td>7.0</td><td>West</td></tr>
<tr><td>P.F N/v Khamarbar</td><td>7.85</td><td>NNW</td></tr>
<tr><td>P.F N/v Bandhgora</td><td>10.00</td><td>NW</td></tr>
<tr><td>P.F N/v Nayagram</td><td>10.00</td><td>SSW</td></tr>
</table>
Source-SOI Toposheet and *Google Earth Imagery
</td></tr>
<tr><td>3.</td><td>Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration.</td><td>None in 10 km radius of project site</td></tr>
</table>

<table>
<tr><th>S. No.</th><th>Particular</th><th>Particulars with Aerial distance & Direction</th></tr>
<tr><td>4.</td><td>Inland, coastal, marine or underground waters.</td><td>
<table>
<tr><th colspan="3">WATERBODIES</th></tr>
<tr><th>Name</th><th>Aerial Distance (Km)</th><th>Direction</th></tr>
<tr><td>Pond in Salgeria*</td><td>0.35</td><td>West</td></tr>
<tr><td>Sundra Nadi</td><td>0.95</td><td>NNE</td></tr>
<tr><td>Pond in Kusumdanga*</td><td>1.30</td><td>SSW</td></tr>
<tr><td>Pond in Shyamchandpur*</td><td>2.0</td><td>ESE</td></tr>
<tr><td>Parang Nadi</td><td>2.30</td><td>SW</td></tr>
<tr><td>Goaltor Canal</td><td>3.0</td><td>NW</td></tr>
<tr><td>Tamal Nadi</td><td>5.10</td><td>ENE</td></tr>
<tr><td colspan="3">*Source – Google Earth., #Source – Forest Dept., Medinipur Division</td></tr>
</table>
*Source-SOI Toposheet and *Google Earth Imagery*</td></tr>
<tr><td>5.</td><td>State, National boundaries</td><td>None within 10km Study area.</td></tr>
<tr><td>6.</td><td>Nearest highway / major road/routes or facilities used by the public for access to recreation or other tourist, pilgrim areas</td><td>
<table>
<tr><th>Particulars</th><th>Aerial Distance (in km)</th><th>Direction</th></tr>
<tr><td>N.H.60</td><td>1.10</td><td>East</td></tr>
</table>
**Source: Distance taken from Google earth imagery.*</td></tr>
<tr><td>7.</td><td>Defence installations</td><td>None within 10 km radius of project site boundary</td></tr>
<tr><td>8.</td><td>Densely populated or built-up area / Town</td><td>
<table>
<tr><th>Particulars</th><th>Aerial Distance (in km)</th><th>Direction</th></tr>
<tr><td>Salboni</td><td>~6.72</td><td>NNE</td></tr>
</table>
</td></tr>
<tr><td>9.</td><td>Nearest habitation</td><td>
<table>
<tr><th colspan="3">Nearest Habitation (In 0-500 M)</th></tr>
<tr><th>Village Name</th><th>Distance (Km) From Plant Boundary</th><th>Direction</th></tr>
<tr><td>Nitaipur</td><td>0.05</td><td>N</td></tr>
<tr><td>Salgeria</td><td>0.26</td><td>W</td></tr>
<tr><td>Radhagobindpur</td><td>0.35</td><td>W</td></tr>
<tr><td>Khorisol</td><td>0.11</td><td>SW</td></tr>
<tr><td>Arabari</td><td>0.10</td><td>S</td></tr>
<tr><td>Barju</td><td>0.40</td><td>S</td></tr>
<tr><td>Ramraydihi</td><td>0.25</td><td>E</td></tr>
<tr><td>Banshkopna</td><td>0.16</td><td>N</td></tr>
<tr><td>Chatibandh</td><td>0.20</td><td>N</td></tr>
<tr><td>Bhalukmari</td><td>0.23</td><td>E</td></tr>
<tr><td>Sitanathpur</td><td>0.27</td><td>E</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>S. No.</th><th>Particular</th><th>Particulars with Aerial distance & Direction</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Baragada</td><td>0.44</td><td>ENE</td></tr>
<tr><td>Palaibani</td><td>0.25</td><td>N</td></tr>
<tr><td>Masru</td><td>0.10</td><td>N</td></tr>
<tr><td>Karamsol</td><td>0.28</td><td>W</td></tr>
</table>
Source: - Distance taken from Google earth imagery.
</td></tr>
<tr><td>10.</td><td>Major industries / manufacturing units</td><td>None in 10 km radius of project site</td></tr>
<tr><td>11.</td><td>Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)</td><td>
<table>
<tr><th>S. No</th><th>Infrastructure Available</th><th>Name</th><th>Distance (in KM)</th><th>Directions</th></tr>
<tr><td rowspan="10">1.</td><td rowspan="10">Educational Facilities</td><td>Sitanathpur S.S High School</td><td>0.02</td><td>E</td></tr>
<tr><td>Palaibani Primary School, Palaibani</td><td>0.20</td><td>N</td></tr>
<tr><td>Jambediajr. High School</td><td>1.40</td><td>ENE</td></tr>
<tr><td>Dhanyasole ICDS school</td><td>1.74</td><td>NNE</td></tr>
<tr><td>Kotalkuli Upper Primary school</td><td>1.85</td><td>NNE</td></tr>
<tr><td>Deulkund pry school</td><td>2.32</td><td>SW</td></tr>
<tr><td>Bhursa Primary School</td><td>2.36</td><td>SW</td></tr>
<tr><td>Analysis & Research Training Institute. (ARTI)</td><td>2.84</td><td>NE</td></tr>
<tr><td>Kendriya Vidyalaya BRBNMPL Salboni</td><td>3.00</td><td>NE</td></tr>
<tr><td>Saiyedpur primary school</td><td>3.18</td><td>ENE</td></tr>
<tr><td rowspan="4">2.</td><td rowspan="4">Medical Facilities</td><td>Narasinghapur Primary School</td><td>4.64</td><td>SSE</td></tr>
<tr><td>Health Centre, Sitanathpur</td><td>0.220</td><td>East</td></tr>
<tr><td>Health Centre, Dubrajpur</td><td>1.50</td><td>NE</td></tr>
<tr><td>Health Centre, Kashijora</td><td>2.60</td><td>South</td></tr>
<tr><td rowspan="4">3.</td><td rowspan="4">Temples</td><td>Health Sub-Centre, Hatmari</td><td>2.70</td><td>East</td></tr>
<tr><td>Asnasuli Hunuman Mandir</td><td>0.23</td><td>E</td></tr>
<tr><td>Kali temple</td><td>0.29</td><td>E</td></tr>
<tr><td>Jambedia Kali Mandir</td><td>1.57</td><td>E</td></tr>
<tr><td>Jagannath temple</td><td>2.69</td><td>NE</td></tr>
</table>
Source: - Distance taken from Google earth imagery
</td></tr>
<tr><td>15.</td><td>Areas containing important, high quality or scarce resources.</td><td>The project site falls under Salboni Block which is categorized as “Safe” w.r.t ground water resources by CGWB.</td></tr>
<tr><td>16.</td><td>Areas already subjected to pollution or environmental damage.</td><td>None in 10 km of project site boundary.
The project site is located in Paschim Medinipur District of West Bengal. There is no CPA/SPA declared by CPCB within its 10 km radius area. The nearest CPA is in Durgapur ~100 km from project site.</td></tr>
<tr><td>17.</td><td>Areas susceptible to natural hazard which could cause the project to present environmental problems.</td><td>Project site falls in Zone III as per IS 1893 (moderate damage risk zone) as per Seismic Zone map.</td></tr>
</table>

1.2.1 Process & Methodology

The proposed project of 1600 (2x800) MW capacity power plant is mooted to deploy the state-of-art technology and accordingly two units of 800 MW are being considered with ultra-supercritical steam parameters to attain high cycle efficiency.

Main Technical Features of the Proposal

Steam Generator (SG)	:	Two units of Ultra Super Critical, Pulverized coal fired boilers of approx. 2470 TPH Capacity each, Pressure 270 Kg/cm^2 each, at 603±5°C temp at Superheater outlet and 603±5°C at Reheater Outlet.
Cooling System	:	Closed recirculating condenser cooling system with induced draft cooling tower.
Coal Handling System	:	The coal handling system consists of wagon tipplers, conveyors, crushers, screens, Stacker Reclaimers and associated equipment inside plant. Two streams (1W+1S) of belt conveyors will feed coal into the bunkers of SG unit through travelling trippers. 30 days covered storage is envisaged for Stockpile for proposed 2x800MW and storage capacity is approx. 0.7 million Tons.
Ash Disposal System	:	Bottom ash is proposed to be evacuated from furnace bottom and Economiser ash hopper area in a wet slurry system with Jet pumps. Bottom ash is further pumped to the ash disposal area in lean slurry form with provisions for recovery of water from the ash pond. Alternatively bottom ash from slurry sump is proposed to be pumped to hydrobin and from there conditioned ash can be sent for further use by bulkers/trucks. Fly ash evacuation from APH, Duct hopper and ESP hopper to the buffer hopper tower is proposed to be by Vacuum type pneumatic system. From the buffer hoppers, fly ash will be conveyed through dense phase type pressure pneumatic system to three (3) Nos. Main fly ash silos and one (1) no. HCSD fly ash silo.
Power Evacuation	:	For power evacuation, 400kV switchyard would be provided. The generator transformers would step up generator voltage of 27kV to the

switchyard voltage of 400kV. The proposed one and half breaker scheme is reliable and provides continuity in power supply even during outage of a single bus or circuit.

Stack : One 275 Meter high RCC Chimney (Bi-flue) is proposed.

Environmental Aspects : Low NOX Burners with SOFA/OFA system shall be installed to complying with emission norms as per latest MoEF&CC. Independent flue cane for each unit and an adequately designed electrostatic precipitator with more than 99.99% efficiency are envisaged. Wastewater quality to be maintained as per MoEF&CC notification. Zero Liquid Discharge facility shall be established. Cooling water, blow down water, wastewater and ash water would be recycled back to the system after suitable treatment for reuse.

1.2.2 Ash Handling System

The ash generation from each boiler will be in the range of 251 TPH, out of which around 50 TPH will be bottom ash and 201 TPH will be the Fly ash. The system envisages the following (i) Intermittent wet or dry removal and disposal of bottom ash & economizer ash (ii) Intermittent evacuation of fly ash (iii) Dry collection of fly ash in Silo (iv)Disposal of ash slurry.

Table 1.3: Quantum of Ash Generation

Parameter	Value
Hourly coal firing rate at 100% TMCR condition /unit	572 TPH
Total ash content in Worst Coal	44%
Bottom ash (BA + Eco. Ash) generation @ 20% (T/day) from both units	2420
Fly ash (ESP + APH Ash) generation @ 80% (T/day) from both units	9680
Total Ash generation (T/day) from both units	12100
Annual ash generation @ 85% PLF (MMTPA) from both units	3.775

1.3 DESCRIPTION OF THE ENVIRONMENT

The baseline environmental quality of air, water, soil, noise, socio-economic status, and ecology has been assessed during the period of March 2025 to May 2025 in the study area of project site.

1.3.1 Baseline data

Ambient air quality:

Eleven ambient air quality monitoring stations were selected in and around the project site. The results of the monitored data indicate that the ambient air quality were well within the prescribed limits by CPCB.

Parameter	Min. Value	Max. Value	Observation
PM_{10}	38.75 µg/m³ at Ramnagar	72.36 µg/m³ at Project site	Well within the permissible limits.
$PM_{2.5}$	20.13 µg/m³ at Ramnagar	47.36 µg/m³ at near JSW cement plant	Well within the permissible limits.
NO_2	11.09 µg/m³ at Shalbani	27.02 µg/m³ at near JSW cement plant	Well within the permissible limits.
SO_2	9.72 µg/m³ at Nayagram	26.39 µg/m³ at Project Site	Well within the permissible limits.
CO	0.21 mg/m³ at Ramnagar	0.58 mg/m³ at Project site & near JSW cement plant	Well within the permissible limits.

Water quality:

The baseline water quality status in the region is established by analyzing samples at twenty-three locations consisting of sixteen ground water samples and seven surface water samples. It was found that both ground water and surface water quality is well within prescribed limits.

RESULTS

Ground Water

Parameter	Min Value	Max Value	Remarks
pH	6.58 (Maupal)	7.84 (Nayagram)	Within standard
TDS	312 mg/L (Project Site)	460 mg/L (Dhansol)	Within desirable limit.
Total Hardness	121.4 mg/L (Ramnagar)	172 mg/L (Shyamchandpur)	Within desirable limit.

Parameter	Min Value	Max Value	Remarks
Calcium	31.02mg/L (Shyamchandpur)	46.2 mg/L (Jambedia)	Within desirable limit.
Magnesium	8.4 mg/L (Shyamchandpur)	13.53mg/L (Bhaudi)	Within desirable limit.
Chloride	20.49mg/L (Bhaudi)	36.8 mg/L (Dhansol)	Within desirable limit.
Fluoride	0.1 mg/L(Dhansol)	0.18 mg/L(Godapiyasashal)	Within desirable limit.
Alkalinity	80.6 mg/L (Chandabila)	1200 mg/L (Salgeria)	Exceeding desirable limt at Salgeria; affects taste & scaling
Nitrate	3.15 mg/L (Bhaudi)	6.45 mg/L (Dhansol)	Well within limits; no health concern.
Sulphate	26.8mg/L (Project site)	38.6 mg/L (Dhansol)	Very low; no issue.
Heavy Metals (Pb, As, Hg, etc.)	BDL (Below Detection Limit)	BDL	No heavy metal contamination detected.
Biological Parameters (*E. coli*, Coliforms)	Absent at all sites	Absent at all sites	Excellent bacteriological quality.

Surface Water

Parameter	Min Value	Location (Min)	Max Value	Location (Max)	Interpretation
pH	6.68	Parang Nadi (Upstream)	7.76	Parang Nadi (Down stream)	All values within acceptable range; water is neutral to mildly alkaline.
TSS (mg/L)	4	Pond Near Kusumdanga	4.3	Pond Near Shyamchandpur	Low solids indicate low sediment or runoff load; minimal erosion.
Total Hardness (mg/L)	120	Pond Near Shyamchandpur	150	Salgeria	Moderately hard water; likely influenced by geology.
Total Alkalinity (mg/L)	120	Pond Near Kusumdanga	140	Salgeria	Indicates natural buffering; no concern.
Chlorides (mg/L)	30.49	Salgeria	39.48	Parang Nadi(Downstream)	All values well below limit;
Sulphate (mg/L)	9.9	Pond Near Kusumdanga	19	Salgeria	Safe levels; minor variation, possibly natural source.
Nitrate (mg/L)	8.6	Sundra Nadi(Downstream)	12.1	Salgeria	All values low; minimal agricultural runoff.
BOD (mg/L)	3	At Four loactions	4	Pond Near Shyamchandpur & Parang Nadi(Downstream)	indicates negligible biodegradable organic pollution.

Parameter	Min Value	Location (Min)	Max Value	Location (Max)	Interpretation
COD (mg/L)	36.6	Salgeria	44.2	Parang Nadi(Downstream)	All values low; confirms low organic load.
Dissolved Oxygen (mg/L)	6.5	Salgeria	6.9	Sundra Nadi(Downstream)	Very healthy; supports aquatic life.
Total Coliform (cfu/100ml)	Not detected	--	---	Not detected	---.
Faecal Coliform	29	Pond Near Shyamchandpur	52	Parang Nadi(Upstream)	Faecal contamination; likely local discharge; indicates pollution.

Noise levels:

Parameter	Min Value	Location (Min)	Max Value	Location (Max)	Interpretation
Daytime Leq (dB[A])	49.7	Chandabila	68.4	Project Site (Industrial Area)	All locations comply with CPCB daytime limits.
Night time Leq (dB[A])	34.6	Chandabila	53.3	Project Site (Industrial Area)	All locations comply with CPCB nighttime limits.

Soil Quality:

Parameter	Min Value	Max Value	Interpretation w.r.t Soil Health
Texture	Sandy clay loam (all locations)	Sandy clay loam (all locations)	Good for moderate drainage; needs organic enrichment for better fertility.
Sand (%)	51.4%	59.8%	High sand content; Well-drained but may have low water retention and nutrient holding capacity.
Silt (%)	12.8%	19.7%	Balanced silt content supports moderate fertility and soil workability.
Clay (%)	25.3%	30.4%	Low clay; Less nutrient holding; needs improvement in structure and water retention.
pH	6.45	7.42	Slightly alkaline; favorable for most crops but may affect micronutrient availability (like Fe, Zn).
Electrical Conductivity (µS/cm)	1603	1787	Low EC; No salinity issues; good for plant growth.
Cation Exchange Capacity (meq/100gm)	1.26	1.4	Moderate CEC; soils can retain moderate nutrients but can improve with organic matter addition.
Potassium (mg/kg)	114	152	Adequate to good potassium levels; Supports plant root development and resistance.
Sodium (mg/kg)	30.6	36.2	Sodium levels are within acceptable range; no significant sodicity risk.

Parameter	Min Value	Max Value	Interpretation w.r.t Soil Health
Calcium (mg/kg)	511.7	633.7	Healthy calcium levels; Good for soil structure and plant strength.
Phosphorus (mg/kg)	16.3	19.7	Low to moderate, needs supplementation for high-yield crops.
Magnesium (mg/kg)	1.4	1.52	Adequate magnesium; Supports chlorophyll and enzymatic activities.
Sodium Absorption Ratio (SAR)	0.34	0.35	Low SAR; No major sodicity hazard for crops.
Water Holding Capacity (%)	31.2%	39.4%	Moderate; sandier soils have lower WHC, requiring frequent irrigation or organic amendments.
Porosity (%)	42%	55%	Reasonable porosity; suitable for air and water movement, but high sand content may cause rapid drying.
Zinc (mg/kg)	0.69	0.89	Adequate; essential for plant growth but should be monitored at sites closer to the minimum.
Lead (Pb), Mercury (Hg), Arsenic (As)	BDL (Below Detection Limit)	BDL (Below Detection Limit)	No heavy metal contamination detected.
Organic Matter (%)	1.02%	1.44%	Low organic matter; Indicates poor natural fertility; organic amendments (compost, green manure) are recommended.
Total Kjeldahl Nitrogen (mg/kg)	0.159	0.191	Low nitrogen; Needs nitrogen supplementation (fertilizers, organic inputs) for crop production.

Biological environment:

Flora:

S. No.	Type Vegetation	Core Zone	Buffer Zone
1.	Trees	8	37
2.	Shrubs	6	16
3.	Herbs and Grasses	4	14
4.	Climbers	--	8

Fauna:

9 Mammalian species, 81 birds, 80 herpetofauna, 42 butterflies, 12 moths and 56 fish species were observed in the 10 km buffer study area of the project.

List of Schedule-I species as per the IWPAA- 2022

S.No.	Scientific Name	Common Name	Schedule-I
1.	*Herpestes edwardsii*	Common Indian Mongoose	I
2.	*Elephas maximus indicus*	Indian elephant	I
3.	*Ptyas mucosa*	Indian Rat Snake	I
4.	*Fowlea piscator*	Checkered Keelback	I
5.	*Naja naja*	Spectacled Cobra	I
6.	*Daboia russelii*	Russell's Viper	I

7.	*Lissemys punctata*	Indian Flapshell Turtle	I

Socio-Economic Environment:

Total population

In the study area, there are 20531 households of which 7.05% household's falls in 0 to 2 km, 24.35% households in 2 to 5 km and 68.59% households in 5 to 10 km. The average household size in the study area is approx. 5 members per family.

The total population of the study area is 98994 of which 6.99% resides within 0 to 2 km, 24.11 % are in 2 to 5 km and 68.89% in 5 to 10 km. Out of the total population, 50.77% are male and 47.23% are female, comprising the sex ratio of 970 females per 1000 males.

The child population of 0-6 age group is of 12.58% of the total population of the study area. The sex ratio of 0-6 population is 975 girl children per 1000 boys.

Literacy

In the study area, 65.20% of the total population is literate persons. Out of the total literates, 56.50 % are male literates and 43.50% are female literates.

In terms of literacy rate, the overall literacy rate of the study area has been estimated as 65.20%, whereas the male literacy rate is 56.50% and female literacy rate is 43.50%, creating the gender gap in literacy rate of 13.00%. This indicates that the study area has wide scope of development towards girls/women education.

On the other hand, 14.72% of total population are illiterate, out of the total illiterate 40.03% are males and 59.97 % are females.

Working population

The overall work participation rate in the study area is just 43.85% of the total population. Out of this, the male work participation is 67.75% and female work participation is 32.25%.

Out of the total workers, 52.68% are the main workers 47.32% are marginal workers. In the group of main work force also, the male work participation is much higher than the female work participation, creating a significant gender gap of 66.85%.

Among all the work forces, males are mostly working in the nearby small industries, agriculture & allied activities, laborers, etc. However, women on the other hand work as marginal workers due to their occupancy in household and domestic chores. Apart

from the household works, most of the women work as marginal cultivators in their agricultural lands.

Social Structure

Schedule Caste Community: In the study area, 19.73% of total population belongs to Schedule Caste community. Out of which, 51.02% are males 48.98% are females, creating the sex ratio of 960 females per 1000 males in this community.

Scheduled Tribe Community: In the study area, population belongs to Scheduled Tribe community is 15.83 % of the total population. Out of the total ST population, 50.00% are males and remaining 50.00 % are females, creating the sex ratio of 1000 females over 1000 males among the ST community.

1.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

During Construction Phase:

SOIL:

No significant impact is envisaged on the soil quality of the project area. Construction activities would be confined to the plant boundary. Therefore, no impact on the soil quality of the study area located beyond the plant boundary has been envisaged.

WATER:

Activity / Aspect	Impact	Mitigation / management plan
• Discharge of untreated sewage generated from labour camp on land, surface water bodies. • Land clearance (the silt and soil can erode and increase sediment load in waterways), open storage of construction material, excavated earth	• Risk of contamination of ground or surface water due to discharge of waste water resulting in odour nuisance and water borne diseases in animals and humans and phytotoxicity in plants / crops • Increased sediment load can affect aquatic biodiversity by making the waterway turbid and	• Domestic consumption demand & water requirement for civil works during construction phase will be met from existing water source. • Excavation during dry season only and proper management of excavated soil through stabilized and covered stockpiling of excavated earth to be used for plantation. • 100% excavated earth will be backfilled within project premises for site levelling and grading.

Activity / Aspect	Impact	Mitigation / management plan
construction waste can increase sediment load in water ways due to run-off from construction site, excavated soil pile etc. from project premises • Storage of hazardous waste like used oil, discarded containers etc. in open on unpaved area resulting in spillage and leaching to sub-soil, water table / aquifer. • Improper collection & storage of MSW, plastic waste etc. generated from labour camp	restricting the amount of sunlight entering the waterway in surface water bodies and water ways. • Risk of contamination of soil, ground water, surface water bodies, toxic substance accumulation by crops / plants, rendering ground water unfit for human / animal consumption and adversely impacting on human and animal health. • Contaminated ground water is extremely difficult to treat. • Odour nuisance from open storage of MSW, increase in disease vectors affecting human and animal health.	• The stockpiles of construction material will be protected with toe wall of adequate height along with garland drain & sedimentation traps to prevent uncontrolled discharge of runoffs during monsoon and reuse the collected waste water for construction purpose after primary settling. • Provision of storm water drains with oil & grease traps and sedimentation traps as per contour & drainage pattern. • Storm water diversion channels to divert storm run-off from flowing over the construction areas. • Removal & proper disposal of all the debris from site, as soon as construction is over. • Domestic sewage generated will be disposed off to well-designed soak pits. • Storage of hazardous chemical & hazardous waste in covered room with impervious flooring. • Wash offs containing these chemicals will be drained into impervious trays / barrels for disposal as hazardous wastes. • Water requirement during construction phase will be met through nearby available sources till it is available from Mukutmanipur Dam/ Rupnarayan River, Kolaghat.

AIR:

Dust is the predominant pollutant affecting the air quality during the construction phase. Project activities during construction phase would cause a marginal increase in dust levels and gaseous emissions in the ambient air for short duration.

However, this increase in concentration levels of pollutants is distributed throughout the project site and shall fall under the category of area source and would be temporary in nature and localized.

NOISE:

The noise generation during the construction will have significant impact on the existing ambient noise level however it will be temporary, of short duration & mostly restricted to project premises. Increase in noise level will be near the source only and is not expected to create any noise pollution at far off distances and outside the plant premises which itself spans 724.38 hectares.

ECOLOGY & BIODIVERSITY:

Due to removal of vegetation: The impact of construction activities would be primarily confined to the project site, covering a total area of 724.38 hectares. The proposed area is industrial land, covered with very few nos. of tree species like Khajoor, Tal, weeds, common grasses etc. The site development works will lead to land clearing & levelling activities involves removal of vegetation & weeds, and grasses within the project area. Removal of these vegetation would not have any significant ecological impact as these species are common and widely available in this area. However, removal of tree will lead to loss of habitat for fauna in the core zone. A three-tier greenbelt on plant periphery with avenue plantation along roads within plant premises using native plant species in an area covering 239.05 hectare of total plant area will be developed.

Due to deposition of dust on pubescent leaves: Construction activities leads to removal of top soil, often leads to soil erosion that generate fugitive dust due to vehicular movement. The generation of fugitive dust due to vehicular movement would have negative impact on the surrounding vegetation due to deposition of dust on pubescent leaves which may lead to temporary reduction of photosynthesis. However, this would be confined to the initial periods of the construction phase and would be minimized through water sprinkling, paving roads and phase wise judicious construction management plan.

Due to increase noise level: Additional vehicular movement for import of construction materials and operation of construction machinery may lead to increase of noise level in

the surrounding environment causing adverse impact on human health and disturbance to faunal species. Noise prone construction activities such as piling, drilling, excavation, cutting, etc. would be done during daytime only. The noise pollution certified construction machinery would be allowed for operation at site, thus, increased noise level at project boundary would be contained below the permissible limit.

Due to construction waste water: Runoff construction waste water from project site may drain into nearby rivers/ water bodies near plant premises that may cause water pollution, however, it is proposed that no waste water will be discharged and it will be reused for plantation through settling basin. Hence, no impact on aquatic ecology envisaged.

SOCIO-ECONOMIC ENVIRONMENT

Construction phase will affect the influx of Population in the area. During construction, phase significant increase in income of local people is expected as local unskilled, semiskilled and skilled persons will gain direct or indirect employment during construction phase. Since the immigration of work force during construction phase is likely to be very small, the social impacts on demography, literacy, health care, transport facilities and cultural aspect are expected to be insignificant.

DURING OPERATIONAL PHASE:

1.4.1 AIR ENVIRONMENT

PM from boilers will be controlled by the installation of ESP Dust suppression and bag filters for the coal handling systems will control PM emissions. Low-NOx burners with SOFA/Over Air Fire (OAF) system shall be provided to effectively control SO_2 and NOx emission levels. Ash silos will be provided for collection of fly ash in dry form for further transportation to utilities.

Mitigation measures

To control PM from TPP Stacks, Electrostatic Precipitator (ESP) is proposed. To control NOx emission, Low NOx Burners with SOFA/Over Fire Air (OFA) system is proposed.

With these controls, Hg emission is expected to be brought below the emission limits as measured in various other TPPs in India.

Necessary dust suppression arrangement and bag filters will be used in railway siding and coal handling plant. The top surface of coal wagons will be adequately sprinkled to reduce fugitive emissions during transportation. Belt conveyors will be covered to minimize the fugitive dust emissions. Auxiliary fuel transportation will be occasional; hence its impact will be for a limited time period. The fly ash silos will be provided with bag filters to control emission. Regular housekeeping will be done at plant roads, platforms, and storage area.

1.4.2 WATER ENVIRONMENT

The Water requirement for the proposed project is optimized as 36.50 MCM/Year to be met from Mukutmanipur Dam/ Rupnarayan River, Kolaghat, approximately 85 Km and 100 Km, respectively away from the site. Provision will be made for installation of pumps for future 2x800MW. Detailed study for raw water pumping from intake to plant reservoir to be carried out by specialized agency. It is proposed to utilize the power plant wastewater for plant reuse to achieve the Zero Liquid Discharge (ZLD) concept. It is envisaged to utilize cooling water blow down for ash handling purposes and treated wastewater will be used for plantation and gardening activities.

1. Recirculating type of cooling water (CW) system with mechanical draft cooling towers (CT) is being adopted. The cooling water system is designed considering Cycles of Concentration (COC) of 5.0 (five). During plant operation, all the measures will be taken to operate the plant above 5 COC which will help further reduce in water consumption. Moreover, drift loss in cooling tower will be maintained less than 0.02% by using multi-layer drift eliminators.
2. Recycling and reutilization of cooling tower blow down water is considered by adopting CW Blow down recycle scheme. Blow down water will be recycled back as cooling tower make up water. The balance CW blowdown water will be recycled to Ash handling system for makeup. No fresh water will be utilized for Makeup of Ash handling system.
3. In the water pre-treatment (PT) plant, thickener will be installed to recover underflow water of the PT plant clarifiers. Appx. 75% water is recovered from the thickener.

4. Effluent collected from various sources will be utilized in the Coal Handling Plant dust suppression system after necessary treatment.
5. In Sewage treatment plant (STP), the sewage generated is treated and utilized in Horticulture.
6. Wet Slurry Disposal System will be adopted for ash disposal which will reduce the water requirement substantially.
7. Total 4492605 m3/ year of Rain Water will be collected from Plant Site Area.
8. Total 198150 m³/year of rooftop rainwater from the Plants Shed and BTG area will be recharged in two recharge ponds within the plant premises.

1.4.3 NOISE ENVIRONMENT

- Noise reduction measures include insulation, damping pads, and acoustic enclosures.
- Regular equipment maintenance and safety gear for workers will be provided.
- Noise levels will comply with regulations, not exceeding 75 dB (A) at 1 m distance.
- Extensive oiling, lubrication, and preventive maintenance will minimize noise generation.
- Earplugs will be provided in areas where noise levels may exceed permissible limits.
- Supervisors will ensure machinery conditions and silencers are maintained.
- Adequate greenbelt will be developed within the project premises and around the plant boundary.

1.4.4 SOCIO-ECONOMIC ENVIRONMENT

The company will take various steps for social & environmental development for the villagers in more then one ways. The details of the various activities to be undertaken by the company's CSR activities are described in detail in Chapter 8 of "Project Benefits" of the report. The company will continue to work for development of the society in future also. The additional economic opportunities for local population will create a long term positive impact in the society. Project also does not involve discharge of any pollutant and follows zero discharge, thus the environment will not be negatively impacted. All due care will also be taken to manage the odour as per present practices and the same will be improved to match the best industry practices.

1.4.5 SOLID & HAZARDOUS WASTE

- Fly ash and bottom ash will be main solid waste to be generated from the plant. 100% utilization of fly ash as per MoEF&CC guidelines is proposed.
- Ash Dyke is proposed in 93.08 Ha, which is less than **0.1 Ha. /MW** (i.e. 160 Ha. for 1600 MW) allowed as per Fly Ash Notification dated 31.12.2021.
- Stored in Silos and sent to Cement manufacturing, bricks manufacturing industries. Unused fly ash, if any, will be sent to ash dyke using wet slurry.
- Wet slurry disposal to ash pond and further gainful utilization in land reclamation, mines, Highways etc.
- Bottom ash generated shall be supplied to the brick producers / filling of low lying area / filling of mine voids as per the statutory guidelines thereby eliminating the need for separate area shall be explored.

IMPACT

- Improper storage, handling and disposal of solid & hazardous waste leads to contamination of soil, ground water and surface water.
- Contamination may also be caused by spillage of hazardous waste, run-off from hazardous waste storage area etc.
- Plants may take up contaminants from soil and accumulate toxic substances ultimately adversely affecting human / animal health due to ingestion.

Hazardous Waste

- Hazardous waste will be handled, stored & disposed off in line with Hazardous & Other waster (management & transboundary movement) Rules 2016, amended till date.
- Separate covered storage area with impervious flooring and catch drains connecting to WTP will be provided with Hazardous waste storage area.
- Used batteries will be will be given back to the supplier under buy back agreement with supplier.
- Bio-medical waste generated from medical unit will be handed over to CBWTF (Jhansi).

Municipal Solid waste generation & management

About ~1 TPD of municipal solid waste is anticipated during construction phase. MSW if not handled properly may lead to air-borne or water borne diseases; etc. Municipal solid

waste from labour camp and office area are required to be disposed off on a daily basis and to be handed over to authorized agency.

In order to avoid any solid waste disposal problems, an effective MSW management system by means of collection of wastes in different types of dust bins, temporary storage at designated area within project premises and transporting the same & disposed off through MSW disposal system of municipality, through recognized agency.

1.5 ANALYSIS OF ALTERNATE SITE & TECHNOLOGY

The project is proposed in an area of 724.38 Ha (1790 acres), which is already in the possession of JSWTEL. Three alternate site were examined for site selection of the proposed project i.e. Site 1 – Shushni Paschim Medinipur District, Site 2 – Jagannathpur Bankura district Site 3 – Salboni Paschim Medinipur District. Site 3, Salboni is the most suitable location for the proposed project due to its favorable topography, availability of land, minimum environmental and social impacts and superior connectivity, in contrast to the limitations identified at Sites 1 and 2. Details of Alternative Route Analysis are given in **Chapter V** of this report.Ultra Super Critical thermal power plants combine high efficiency, reduced emissions, and operational flexibility, making them a compelling choice for large-scale power generation projects aiming for both economic and environmental sustainability.

1.6 ENVIRONMENTAL MONITORING PROGRAMME

Environmental Management Cell

Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. The monitoring program will be implemented under the post-project monitoring as per WBPCB/CPCB guidelines. The major environmental considerations involved in the construction and operation of the thermal power station will be taken up by a full-fledged multi-disciplinary Environmental Management Cell (EMC) with key functions of environmental, safety and occupational health for management of the entire plant and surrounding environment.

It is predicted that socio-economic impact due to the proposed project will positively increase the employment opportunities for local inhabitants. The project infrastructure will be of use to the people of the area. The contribution to the revenue of the State Govt. will be put in public welfare and augmented growth. The entire project area is devoid of any

endangered flora and fauna. Thus, the proposed project is not likely to affect the environment or adjacent staff etc. This EMC will take up additional responsibility of environmental functions related to proposed mega power plant.

Operation Head would represent the Project's Company's interest in the operation & maintenance of the power station and would oversee the functioning of O&M Cell Company.

Green Belt: -

The greenbelt will be developed as per the CPCB guidelines in force. Re-densification of existing greenbelt shall be done.

EMP costing: -

The heads for EMP are: Electrostatic Precipitator, Chimney, Cooling Tower including civil works, Ash Handling including ash water recirculation, Ash disposal civil work, Dust extraction & suppression system, DM Plant Waste Treatment System, Sewerage collection, treatment & disposal, Green Belt & landscaping, , Low NOx Burner with SOFA/Over Fire Air (OFA) system, Rainwater harvesting, Solar power harnessing, Enhancing Environmental Laboratory & Environmental Monitoring, CEMS, CAAQMS, EQMS monitoring system & Main gate display board and Wind Breaking Wall, Dry Fog System & RCC Flooring in Coal Storage Area.

A cost provision of Rs. 2512.50 Cr. as capital cost and Rs. 251.25 Cr. as recurring cost has been earmarked towards environmental measures.

1.7 ADDITIONAL STUDIES

The existing storage facilities of LDO and HFO will be used and proposed project does not involve any augmentation in capacities of existing LDO and HFO tanks, therefore risk assessment, hazard analysis has not been carried out for LDO and HFO storage.

Within the plant: Personnel working in the plant during the operational phase.

Outside the plant: There are no major habitation within 1.0 km of storage tanks of LDO and HFO.

However, by implementing all the possible risk mitigation measures the same could be minimized.

Disaster Management Plan: On Site & Offsite Emergency Plan with level I, II and III emergency has been prepared and detailed in chapter 7 of this EIA/ EMP report.

1.8 PROJECT BENEFITS

JSWTEL will continue to carry out its CSR activities, inline to the applicability of Company's Act 2013, in the field of Education, Women Empowerment, Water resource development, Health, Sustainable Livelihood, Community Infrastructure, Training & Skill development thereby increasing the quality life in study area. Therefore, positive impacts are anticipated on socio-economic aspects during operation phase after implementation of the proposed project. A separate budget Rs 81.85 crore @ 0.50% towards CER activities (as per Ministry's OM dated 01.05.2018) is allocated for Social EMP (CER) activities, and efforts will be made to address concerns raised after the public consultation during the final EIA ensuring responsible corporate practices.

1.9 ENVIRONMENT COST & BENEFIT ANALYSIS

The benefits of environmental regulations can include, for example, reduced human and wildlife mortality, improved water quality, species preservation, and better recreation opportunities. The costs are usually reflected in higher prices for consumer goods and/or higher taxes. The latter are market effects readily measured in monitory values, while the former are non-market effects for which monitory values are not available. In addition to complicating the practice of cost-benefit analysis, this raises ethical issues. Monitory values cannot be assigned with respect to undisturbed natural places, to save human and animal lives. If such things are too 'priceless' to assign monitory values, we lose the ability to use cost-benefit analysis to inform the decision.

1.10 CONCLUSIONS

It is predicted that socio-economic impact due to the proposed project will positively increase the employment opportunities for local inhabitants. The proposed project will be within the existing plant premises. The project infrastructure will be of use to the people of the area. The contribution to the revenue of the State Govt. will be put in public welfare and augmented growth. The entire project area is devoid of any endangered flora and fauna. Thus, the proposed project is not likely to affect the environment or adjacent ecosystem adversely.